Anatoli Unitsky

THE WORLD ENGINEER

AUTOBIOGRAPHY

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Introduction

This book was written in two phases. The first one up to the eighth part was in 2019–2020. The rest was written in 2022. When the first edition went to press, no one, including myself, could have imagined that the most pessimistic predictions set out on its pages would come true in such a swift and all-destroying manner. The two-year events that separated the first and second editions of The Engineer are truly ultra-important. They have changed everything forever. They brought the point of no return of our Earth's civilization even closer to that fairly distant line, that is two generations away from us, about what I have often spoken earlier – almost to the present moment.

For me, the events of these years were marked by a complete rethinking of everything I had known and believed until now. At the same time, I have received confirmation of my own rightness, and not only remain faithful to my ideals and goals, but as if I feel an additional impetus to work for their prompt achievement and implementation. Time is greatly compressed, I feel the tension of this tightened to the limit spring of time – and I am afraid of being late. That's what the "point of no return" is all about. You can be late, forever.

In the first seven parts of the book, describing the creation of my branch-forming business and understanding that I must be very careful in my statements (enemies and dishonest competitors, of which there are many, do not slumber), I tried to avoid sharp corners. Just in case, remembering well, and at the level of animal instinct, how everything was taken away from me. To zero – seven times in 25 years. And I rose again, each time higher than the previous one. I thought that both I and humanity still had plenty of time. There are no illusions about it now. There is catastrophically little time left. Therefore, in the new parts of the book – from the eighth to the tenth – I speak as directly and openly as possible. What is at stake is not so much business, as the future. Our future. The future of all of the Earth's technocratic humanity.

After all, technocracy is engineering. Here the engineer is in charge, not the banker, the poet, or the philosopher. It is more logical to talk about what is going on today and about our future for practical engineers, not sofa experts, office plankton, or numerous uneducated bloggers, detached from real life.

Silence is no longer an option. Everyone must choose a side. I did. I hope that my example, experience, reasoning, arguments, and calculations will help everyone make their own choice. I wish it turns out to be right. With what I give myself to the judgment of the reader and time.

PART 1

Sources and Circumstances of Making a Man and an Inventor

The Courage to Use Your Mind

I did it!

I could take a bow and accept congratulations, so to say. Really, are there many people who have managed to do anything like this: create a unique transportation and infrastructure complex from an idea to realization? And there they are, the machines of the future conceived by me about 50 years ago, running along almost invisible ways in the sky, as if flying. But there is no happiness in this. I'm no longer young – I have crossed 70-year milestone. I want to accomplish so much more, but there is less and less time. What has been done is dead, for me as an inventor. I am moving forward, trying not to waste myself in doubts. I want to believe in winning, but I don't know much about winning and it doesn't mean particularly much to me. On the other hand, I know what struggle means.

All my father's family – more than 20 people, including his father and mother – were executed in the 1930s. He was not killed, apparently, because the executors felt sorry for a child (he was seven years old then). His family was executed on the basis of a denunciation of the "good" and "righteous" neighbors. The case was fabricated on the basis that one of the Unitskys who lived in Poland had come to visit his brother in the Polesian village of Krushniki, which had become cut off from Poland and become a part of Belarus. The charge was that they were Polish spies and kulaks to boot. The guilt of the other Unitskys consisted of not reporting this information to the authorities. People were shot to death as well for such things as failure to inform on others.

Now I think that throughout their entire lives, these ancestors of mine were mistaken only about one thing: they did not kill those who came to arrest them; they did not stab them with pitchforks. They were confident that the authorities would sort things out and re-establish the truth. They didn't fight but obediently went to their deaths at the hands of scum, at the denunciation of envious people and slanderers. They were "guilty" only of working harder than others and achieving more. Ever since I learned this story, I could no longer trust and blindly believe in the government and everything that came from it and was supported by it. That is why all my life I have tried to think and act independently, without looking over my shoulder at the authorities, not giving up, and continuing despite everything, to head toward my goal – to what I myself considered worthy of struggle.

To attain everything through my own mind – that is my principle. Of course, experience nourishes the mind. The path I have taken and which I continue to traverse is unique, like the path of any person.

Polesie – a historical, cultural, and physicogeographical area located on the territory of the Polesian Lowland. Polesie is mainly located in the South of Belarus and the North of Ukraine, also partially covering the territories of Poland and Russia. Belarusian Polesie is located in a zone of mixed forests. Several rivers flow there, the largest of which is the Pripyat; there are also large swamps and extensive wetlands there.

Precisely because for the course of my whole life I did not follow the lead of others, did not adapt to others' standards and rules, did not wish to blindly follow human laws but relied on the laws of nature and my beloved physics, at my age, has enabled me to hope that this small autobiographical book will be not only interesting but useful as well to the reader. Just as the experience of almost any struggle that expands the limits of freedom. Although I did not choose this path myself – what kind of fighter am I? I'm the one who has been struggled against all the time, for 50 years now, and continues to be struggled against by everyone who is not lazy. It's enough to go on the internet and read what it says about me. My kind of struggle is to defend myself from an unjust attack on me and my cause, and not to attack someone to restore justice. Besides, what is justice? We are not gods and cannot know it. Justice is not objective. It is subjective and always has a personal connotation.

Anatoli Unitsky with his father, Eduard,
near the monument to the repressed Unitsky family in the village of Krushniki

Dedicated to all repressed from the village of Krushniki

Black raven... Black raven
With a sharp beak and claws...
KGB-ism, Stalinism,
What made of us your laws?
The age of cruelty,
The rivers of the blood,
Antichrist has morality –
Man-eaters' brotherhood...
Where is God? He sees
Satan's orgy ball...
But how to live through this –
How such is possible?!

Eduard Unitsky

Repression in the USSR – mass arrests, imprisonment, and executions of Soviet citizens on charges of anti-state and anti-social activities. The repression reached the highest extent in 1937–1938 (the "Great Terror"). In most cases, the charges were unjustified. In total, the victims of terror during the Soviet period, according to various estimates, were from 10 million to 39 million people including about 1.1 million of those sentenced to death.

Kulaks (wealthy peasants) – this notion was used in the USSR to define well-to-do peasants, rural bourgeoisie, and resellers. In 1928–1932, one of the directions of the USSR state policy was "liquidation of kulaks as a class" – "dekulakization," which involved the forcible and arbitrary deprivation of all means of production, land, and civil rights of all those using hired labor, as well as eviction to remote areas of the country, sometimes – execution by a firing squad. In total, about four million peasants became victims of dekulakization.

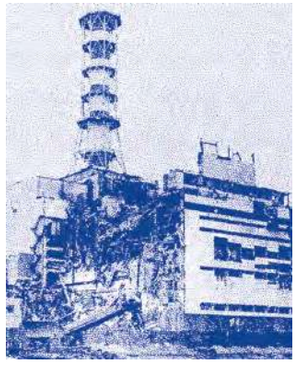
Childhood: Nature, Logical Thinking, and the Motherland Lost Forever

I was born on April 16, 1949 in Belarus, which was a part of the USSR at that time, in the village of Kryuki, Braginsky District, in the boondocks among the Polesian swamps. Today this is part of the radiation exclusion zone, and in fact the most contaminated part of it. It is just seven kilometers to the Chernobyl Nuclear Power Plant. At the time of the accident in 1986, a radioactive cloud of gas and dust formed after the thermal explosion of the reactor fell on everything that was my little Motherland, covering an area of about one square kilometer with a deadly blanket, forever separating this small piece of land from the rest of the world. The wind was blowing just in the direction of Kryuki then. It was there that most of the radioactive dust – uranium and graphite – settled... The last time I was in my birthplace was several years ago.

No one lives in Kryuki, the homes are destroyed and looted, many of them have burned down, leaving only the stoves, like after the war. The gardens have grown wild, a forest grew on the asphalt. The radioactive background is thousands of times the norm and 10 times higher than in the rest 30-kilometer part of exclusion zone. Two years after the disaster, I saw the ripe ears of wheat, huge, unharvested fields of stalks through which the new green growth was struggling to emerge. The wheat swayed and rustled in the wind, like dry, dead reeds. Twice it had not been harvested, but no one was planning to harvest that crop for thousands of years. It was one of the most profound and tragic impressions of my life.

My first recollection is etched into my memory. For a short time, we lived in the Donbass. Mother worked at that time in a coal mine and was raising her two children alone. The shifts started very early, about six in the morning, so she had to take me to school before the start of classes, sometimes two hours before the doors opened. It was still dark, it was winter, it was very cold, sometimes over 30 degrees Celsius below zero. I was entirely alone on the school porch, seeing the stars, waiting for someone to open the doors for me... Later, I remember mainly work. There was a lot of it in my childhood.

When we returned to Kryuki, the three of us lived together – mother, my younger sister Tamara, and me. I have very few childhood memories of my father. He left us when I had not even started school yet. (In fact, we became acquainted much later, many years later after moving to Belarus, I lived at his house for a time with his family then.) I recall how once he put me, a little boy, on my knees on peas for picking up an apple from the ground in the neighbor's garden. It seemed that I had stolen it, although it was lying on the ground all wormy, but my father didn't bother to investigate. I was handed a lesson for my whole life: don't take what isn't yours, even if you're sure no one wants it. My sister cried and begged me to apologize, but I stood silently on the peas, even though it was excruciatingly painful – not so much physically as from resentment for such injustice.



Chernobyl disaster – the destruction of the reactor at the fourth power unit of the Chernobyl Nuclear Power Plant located near the city of Pripyat (Ukrainian SSR, now Ukraine), which occurred as a result of an explosion on April 26, 1986. A large number of radioactive substances were released into the environment as a result of the accident. This disaster is the largest in the history of nuclear power engineering, both in terms of the estimated number of people killed and affected by its impact and in terms of economic damage.

1950. I was nine months old. My father – Eduard, my mother – Julia

Exclusion zone – a territory that is prohibited for free access and has been subjected to intense contamination with radionuclides as a result of the accident at the Chernobyl Nuclear Power Plant. In 1986–1987, it was called a 30-kilometer zone, since mandatory eviction of people was carried out within a radius of 30 kilometers from the epicenter of the disaster. In total, more than 115,000 people were evacuated. Currently, the exclusion zone remains mostly uninhabitable due to the increased radioactive background.

Kolkhoz (a collective farm) – an enterprise created for collective farming. Entry into collective farms was often compulsory, and the entrant had to pass over all the land and other property that belonged to him to the created farm. Only a house with a small homestead plot of land and a minimum number of livestock could remain in personal property. Collective farms in the USSR spread everywhere in the course of collectivization, followed by resistance from the peasantry and repressions from the state.

Mother was busy at the collective farm until late at night, and we helped her as much as we could. During the summer, we looked after the house and the large garden – more than an acre, with a considerable farm – a cow, pigs and chickens. In addition, we gathered mushrooms and berries.

I earned my first money at the age of eight. Filling an order for a timber enterprise, I gave life to a small pine forest with my own hands. Over several years, I planted several hundreds of thousands of trees (pines) – I cannot give a more precise number. And although I was paid only a few kopecks, I received about 10 rubles in cash and spent them on presents – nylon stockings (a great rarity in our remote village!) for mother and my teacher, whose daughter was my first love.

On the whole, there wasn't enough money, or to be more accurate, there wasn't any at all. Instead of cash, the collective farm gave my mother workdays, everywhere there was an exchange in kind. Although mother worked from dawn to dusk, without days off, it turned out, however, that she was in debt to the collective farm: either they provided a horse, or they ploughed the garden – all of this was taken out of the workdays. The local hard currency, which could buy at least something, was moonshine. It could be used to pay, for example, for hay for the cows for the winter or firewood brought from the forest. Without moonshine,

Common pine – a coniferous tree that is widely spread around the world, including the territory of Belarus. It reaches a height of up to 30 meters. "I planted hundreds of thousands of pine trees when a child. My forest, rustling in the exclusion zone, still supplies hundreds of tons of oxygen to the biosphere of the planet every year and captures hundreds of tons of radioactive dust," recalls Anatoli Unitsky.

1950. Village of Kryuki. I was one year and three months old

1951. Village of Kryuki. I was a little over two years old. I was sitting on the knees of my grandfather's brother, my mother's brothers were standing near me

1953. With my sister next to the New Year tree

we could not have survived. The torturous process of producing it, which was my area of responsibility, has been preserved in my memory.

I would lay a fire on the clay floor of the porch of our wooden home with a thatched roof. A 30-liter empty milk pail was placed on it. A shaft with a stirrer at the very bottom of the pail passed through the lid, where bread dough served as a seal. This mixture had to be constantly turned. The mash, made from potatoes and beets (we didn't have sugar, and saw it only on holidays), was very thick and burned easily. You had only to slow down for a few seconds, and the product was ruined. The moonshine took on a burnt aftertaste and became brown in color. Therefore, with one hand I stirred the mixture, and with the other fed in firewood and changed the bottles, into which the 40-proof drink, our family's liquid currency, was poured through a coil.

Sometimes the process would drag on until late. I was unbearably sleepy, and the fumes clouded my brain. I will never forget that smell.

Nylon stockings – a piece of women's clothing for legs; this product is made of synthetic fiber. They appeared in the USSR in the mid-1950s and gradually became widespread, but they remained a scarce commodity for a long time. Women treated stockings with special attention and even took special care of them. After stockings became unsuitable for wear, they were used in Soviet times in housekeeping, for example, for filtering liquids or storing onions.

Workdays – a measure of evaluation and a method of accounting for the quantity and quality of labor in collective farms in 1930–1966. According to the results of each reporting period, an employee was entitled to a share of collective farm income according to the workdays he worked up. Workdays were exchanged for field/livestock products or money received by the collective farm from the sale of agricultural products.

Samogon (moonshine) – a strong alcoholic drink. It is made at home by distilling alcohol-containing mass (home brew) through homemade or factory-made devices. Home brew is obtained as a result of fermentation of products that contain sugar and saccharified starch substances (potatoes, beetroots, fruits, and others). In the USSR, samogon was often used as a universal unit of exchange, especially in rural areas, where the turnover of cash was very limited. The Soviet State struggled with bootlegging, anti-samogon campaigns were conducted. In one of them, more than 50,000 people were convicted for manufacturing and selling samogon in 1958. The penalty was from two years in prison (for production for personal use) to seven years (for selling).

1954. With my mother and my sister

Local police officer – an official in the state body of law enforcement, called "militia" in the USSR. The local police officer was responsible for enforcing the law and protecting the rights of citizens living in the relevant administrative-territorial area. In rural areas, such areas included several villages controlled by the Local Village Council. Local police officers reported to them.

To this day, I don't like champagne. The way it smells and fizzes, giving off gases, reminds me of that mash. You had to keep tasting it, so as not to miss the moment when it was ready, and I was only about 10–12 years old at the time. When I was in the elementary grades at the rural school, I distilled more than a ton of moonshine. It was hard and dangerous but necessary. Thanks to this, we survived.

My mother could have been put in jail for making moonshine. To this day I remember the wild horror I experienced when once, a local police officer came to our cottage. The latest portion of spirits, just distilled, was on a shelf on the porch, next to another bucket, the one with water.

The policeman thought that there was water in both buckets, he scooped up the liquid with an aluminum half-liter mug and began to drink it. Naturally, he immediately understood everything. And my younger sister and I looked at the policeman with every-growing terror, since we could imagine how this all might end. But this officer of the law turned out to be a good person. He drank it to the bottom, wiped his mouth with his sleeve, and went away, saying before leaving, "Good water." It was a simple, humane act, for which I am grateful to him. As I am grateful to other people who were around us and taught me to be a person; the work that brought me up; to all those first, the most important impressions and the most important lessons for my whole life. Here are some of them.

In the winter, aside from work around the house and care of the livestock, we gathered pinecones, which the timber works would take for a kopeck per kilogram (saplings were then grown from the seeds). In 30-below frost, we headed to the works in the forest. I was ten years old and my sister was seven. One day I climbed up a large pine tree which was covered with ripe pinecones. I was high up, about 10 meters. I began to chop at a branch, so that it would fall, and we could gather the "harvest." I looked up and saw some more pinecones up higher.

Kopeck – a small coin. It is 1/100 of a ruble. It was originally made of copper in the USSR. Then, in 1926, it was made of a golden bronze alloy. From that moment on, a coin with a face value of one kopeck weighed exactly one gram, two kopecks – two grams, three kopecks – three grams, five kopecks – five grams. Knowing this, Unitsky used kopecks as weights for handmade scales, on which he weighed components while preparing fuel for missiles. You could buy a box of matches, one postal envelope without a stamp, or a glass of sparkling water without syrup for one kopeck in the late Soviet era.

1959. Village of Kryuki. Third grade. I was next to my teacher Polina

A Party District Committee – a representative body of a public organization at the district level. The regional Committee and the Central Committee were above it in the hierarchy. City committees and primary cells were below it. This structure was typical for the Communist Party of the USSR, which played a leading role in the life of society, and for the Komsomol of the USSR (Communist Youth League). These structures were guided by the Communist Marxist-Leninist ideology, imposing it as the only correct system of views.

UAZik – an off-roader produced in the USSR (UAZ-469 and UAZ-3151). The main command vehicle in the Soviet Army. It was widely used for civil purposes. It was especially valued in rural areas because of its features. The off-roader had such good terrain crossing capacity that in 1974 factory testers managed to drive up an almost standard UAZ on the mount Elbrus. The car bounced noticeably on mud-locked roads, for which it was called "goat" (this animal is known for its ability to make amazing jumps).

I climbed on to the branch that I had just chopped, and, sitting more comfortably, I went to work on the next branch. And here the branch I had chopped broke off, and I went down head over heels with the axe, landing in a deep snowbank, which saved my life. The axe fell next to my sister. Thus, fate taught me a visible lesson: don't chop the branch on which you are sitting. For the majority, this simple truth is incomprehensible. What people are doing today with the planet is confirmation of that.

Recently, the American cable channel HBO filmed a series about the tragedy at the Chernobyl Nuclear Power Plant. The movie became the most popular of its type in history. Many, many people talked about it, finding all kinds of things in it – the West's anti-Russian propaganda, and proof of the emergence of a new environmental awareness. The Chernobyl disaster was portrayed as the greatest evil that humankind had caused nature. Hypocrites. Cars, planes, factories, the extraction of hydrocarbons, agricultural chemicalization – all these continue to cause damage many orders of magnitude greater than that explosion of 1986. And with every year, the situation in our home – on planet Earth – becomes only worse.

When in 1988, two years after the accident, we traveled to Kryuki – to my Motherland seven kilometers away from Chernobyl, the atmosphere of the apocalypse really was sensed. The entire perimeter of the zone was covered with a fence more than three meters in height, with barbed wire on top. And I noticed clumps of skin with fur on them on it. These were elk who had run away from the zone, overcoming this incredible obstacle. At the library (already in the village itself), which I had always associated with something sacred, everything was overturned and trampled. Seared in my memory is a volume of Lenin's works on the floor, and on it, right on the cover with a depiction of the great leader, the footprint of a dirty boot – defiled relics...

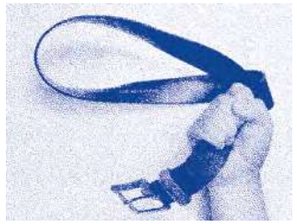
The First Secretary of the Bragin District Party Committee who was accompanying us (without him we would not have been allowed in the zone) took out a three-liter can of birch juice from the trunk of the car and put it on the hood of the UAZik. And I still thought, "Why do we need this juice, if there are tears in our eyes and a lump in our throats." It turned out this was moonshine. There was a dry law in the country, we had to maintain secrecy. We turned out to be unprepared for such a turn of events. Even so, we found some sort of glasses, and I plucked a snack from our former garden – leek and garlic growing among the weeds. We knew that all of this was very radioactive, but after seeing the surrounding destruction and the horrible desolation, you were somehow indifferent to what would happen to you.

As if you had already died. Yet everyone remained alive, even after such a Chernobyl snack. We lived to old age.

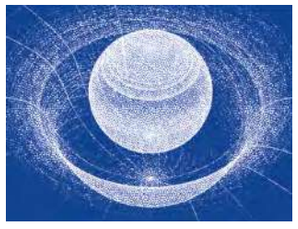
I mention this because compared to more urgent problems, Chernobyl is not as terrible as people try to portray it. How many people suffered as a result of this man-made disaster? It is not known exactly. Meanwhile, it is known that each year, a million and a half people die in automobile accidents (including those victims who do not end up in the generally accepted statistics since they die in hospitals from their injuries a few days later). And a magnitude more die untimely from pollution of the water, soil, and air by transport and industry. Everything is happening exactly as in my story of the cut-off branch. Living on planet Earth, without another suitable place to live throughout the entire known Universe, humankind stubbornly continues to destroy the only support it has under it. If nothing changes, a fall is inevitable. Our entire planet then will await the fate of my Motherland, which became part of the exclusion zone. For me, this understanding was always especially clear. Likely, it was because of that lesson.

1960. Village of Kryuki. I was 11 years old. The best children's outfit of those years: white shirt, trousers, with bare feet. I didn't wear shoes from early spring till late autumn

Prohibition and the anti-alcohol campaign of 1985–1990 (dry law) – measures taken by the leadership of the USSR to reduce alcohol consumption. During the campaign, alcohol production was significantly reduced and a large number of stores were closed. Alcohol was sold only from 2 p.m. to 7 p.m., one bottle per hand. Huge queues appeared. In the absence of normal drinks, some people consumed eau de cologne and cleaning liquids. The wine industry was severely affected, and huge areas of vine yards were destroyed, including unique collectible varieties. Selection work was persecuted. Despite the insignificant positive results, the population has reacted to the anti-alcohol campaign extremely negatively.



"Education with a belt" (flogging) – a physical punishment consisting in striking the body. It has been used as a form of child rearing since ancient times. "And do not feel pity while beating the baby: if you punish him with a rod, he will not die, but he will be healthier, because you, by executing his body, save his soul from death," says a book on home economics in Russia well-known since the 16th century. In the USSR, a leather belt was most often used as a tool for flogging; blows were inflicted on the buttocks. The practice was widespread, although not officially approved. Corporal punishment was strictly forbidden in Soviet schools.



Gravity (from lat. *gravitas* – load) – a fundamental property of matter, expressed in the mutual attraction of bodies. Gravity is crucial in the formation and evolution of the Universe determining the key conditions for the equilibrium and stability of astronomical systems. There would be no planets, stars, galaxies, or black holes without gravity. It is the main mechanism that triggers the process of thermonuclear fusion inside stars, during which all the main chemical elements are formed. Thus, life would not have been possible without gravity.

I owe my village origin for my sense of closeness to nature, which defines my way of thinking and acting. I took off my shoes in early spring, in April, and ran barefoot until late autumn, sometimes even until November. Of course, above all, we spared our footwear in this way, but it enabled us in the direct sense to feel the earth. Even now I love to stroll barefoot, even in the winter through the snow, and try to do this at every convenient opportunity. I advise others to organize such walks as well, and not only as something good for your health. If a person walks on the ground with his bare feet, he treats it with more responsibility – he will not start trashing it and will make it more convenient to plan for footpaths and will become wiser.

With footwear, a person begins his alienation from the earth, and multi-story buildings in that sense are the apotheosis of alienation. He who lives on the second floor already no longer perceives what is under his window as his. Often, he himself can throw out some garbage, and not pay attention if someone else does this. What can be said of those living on the 10th or 20th floors? Further this is transferred to nature as a whole and forms the attitude at the basis of all environmental problems. I am convinced that if people would walk barefoot more, the world would be better. Cleaner, at any rate.

Evidently, an important circumstance in the formation of my personality was that fact that from childhood, I had a very bad memory. As a small child I often hit my head falling from the oven or from a horse. Once riding horseback, I struck my head on the crossbar and broke my nose. Once a cart ran over me, and I couldn't even walk for a time. Perhaps something in my brain was damaged. It became clear that I had problems with this when I went to school.

For the first while my studies were not a success at all. I simply could not master anything from the subjects but memorized with difficulty even elementary formal requirements. I would write on the diagonal in my notebook or start from the other end. Mother explained to me how to study with the help of a belt, and I had to find a solution myself. Since I could not hold anything in my memory, I began to train not my memory but logic. This is how a blind person begins to develop his hearing.

As I was incapable of memorizing rules and formulas, I solved them on my own, calculating them anew. Why memorize them, if I could always obtain a formula myself? For me, this turned out to be easier. In turn, this factor made the exact sciences more attractive – not drilling but understanding and inventing it anew each time. Mathematics was one of my favorite subjects in school. Physics became my god. At a fairly early age, I realized that actually it was the laws of this science which ruled our world, and not gods who were like people.

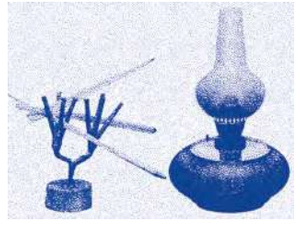
Take just one law of physics, the law of gravity. If gravity didn't exist, would cosmic hydrogen have collected in the Sun, and would the monstrous temperatures and pressures have emerged that gave rise to thermonuclear reactions and the emergence of the "miracle": "Let there be light"? It is physics that ignited the Sun and gave us light, and not gods. Without gravitation, would the rocks and cosmic dust have collected into a planet? And without the planet and the Sun, would people have appeared, and would they have been able to think up gods for themselves, if these very people didn't exist? And there are hundreds if not thousands of such laws in physics; we don't know a lot of them and perhaps we will never know them, but they are in fact what rule our real, not digital or metaphysical world.

Thanks to my bad memory, I developed logic and established myself as an inventor. Usually the mind is associated with memory, with knowledge, and not with logic and philosophy; then according to this premise, the Great Soviet Encyclopedia must be the smartest – I could find the answer to practically any question there and often used it until the onset of the internet era. I agree that a good memory can make an encyclopedia out of a person. But it is fairly rare, as far as I can surmise, that a good memory is combined with the ability to create, since the brain is packed with "garbage" – unnecessary information – and therefore looks for a ready-made solution, rather than trying to work it out on its own.

Memory is the predetermination of the current moment. I was there, I did something, then headed elsewhere and therefore I am here. For creativity, you often must end up here and now, from nowhere. That concerns inventiveness as well. Instead of searching the memory for some sort of others' paths to solve problems, the inventor thinks up his way. The inclination to find my own way in everything was inherent in me from my earliest years.

And another thing I remember from very early childhood, in the remote village among the Polesian swamps, where I studied in the lower grades with a splinter and then with a kerosene lamp, some kind of certainty lived in me that I would become an outstanding person – a professor, an academic, who would save the world. Who exactly I didn't know, but I always sensed this mission. I think that is very important in the context of formulation of a certain fundamental problem, the solving of which life is then devoted. I always had numerous ideas; I was always inventing something but weighing what came to mind on the interior scales of significance, I threw away practically everything. I only selected and continued to develop what could have significant meaning in the future for everyone. It is necessary, however, to distinguish all of that from vanity, which I do not suffer from at all.

The Great Soviet Encyclopedia – the most famous and complete Soviet universal encyclopedia. It was produced in the USSR since 1926 with a circulation of up to 600,000 copies. The third and last edition of the encyclopedia (1969–1978) consisted of 31 books and included about 100,000 articles. The authors and editors of the encyclopedia managed to concentrate in it the wealth of knowledge accumulated by mankind over the millennia. The publication was often the only source of adequate information for the Soviet people about a variety of subjects, events, and people.



Splinter and kerosene lamp – lighting devices used in the USSR before the mass introduction of electricity. A splinter is a thin long stick of dry wood that was set on fire to get light. Kerosene lamp is a more complex device that works on the basis of kerosene burning. Kerosene lamps disappeared from the life of Soviet people only after World War II, having lived up in settlements far from communication lines until the early 1960s. Anatoli Unitsky recalls that electricity was introduced in the village of Kryuki, where he spent his childhood, when he studied in the fifth grade.

Partisan war in Belarus – an armed opposition of local population units to the fascist troops that occupied the territory of Belarus in the period from 1941 to 1944 during the World War II. The partisan movement was massive, with more than 370,000 people in its ranks by the end of the war. The partisans' priority tasks were to prevent German reinforcements from reaching the front and sabotage in the enemy's rear. The destruction of an ammunition depot described by Anatoli Unitsky is one of the successful operations carried out by the partisans of Polesie.

1962. Village of Kryuki. Tolya Unitsky was a sixth grader

Rather, it's a question of a sense of mission instilled even in my last name, which I understood significantly later, in my mature years. The mission is inseparable from self-sacrifice and a certain impending doom. Thanks to this vague but, at the same time, very tangible feeling, I always placed my personal interests second, preferring the far to the near.

I was little concerned with money and domestic comforts. I worked and continue to work not for them. Possibly, this is related to my father who abandoned us, to whom I wanted to prove something, demonstrate how he was wrong. In that situation I had to prove it to myself as well – I am worth something, I am a person, and he, in rejecting me, had made a mistake. And since I almost never saw my father, the wish to prove something to him essentially transformed into the desire to establish myself to the world. To become an outstanding person.

Model Rocket Hobby

About five kilometers from the village there were the ruins of a German ammunitions depot that had been blown up by partisans. You could find gunpowder and explosives laying around, and several village children were killed hunting for them, blown up on the mines. Sinister wooden crosses were erected there, warning of the danger. However, that did not stop us, the postwar boys. While observing extreme caution, I looked for smokeless gunpowder that was like long pieces of pasta and used them for fuel in my first imperfect rockets.

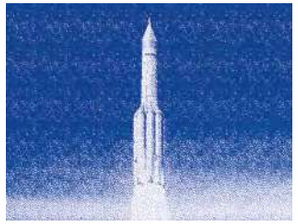
One of my first pastimes was to make a very simple rocket with my own hands and then launch it. This was also one of the first lessons in physics and chemistry. In a few years I understood that the powder for shells was poorly suited for rockets – they often exploded. I began to look for a way to make my own powder, whose combustion I could control. Once I noticed that a paper sack with remnants of fertilizer, thrown on to a fire, began to burn brightly when it fell on the coals. Thus, I found two components of rocket fuel: charcoal and saltpeter. Soon I discovered a third as well. Many years later I learned that I had created one of the variations of black powder.

Through my passion for pyrotechnics, I discovered the essence of scientific knowledge and transformation of the world. Unlike nature, which moves slowly, changing the face of a cliff over centuries, man wishes to act on the environment instantly – to burn or blow up something. Such activity does not always have a defined goal. It's not only a question of satisfying the needs for comfort and safety but of the joy of discoveries, enjoyment that provides the opportunity to control the forces of the elements. I learned this joy rather early. I built my first real rocket at the age of about eight, in second grade. Then I made dozens of them, if not hundreds. In the course of my childhood design work, I learned from my own experience as well that human toying with the elements can have consequences. Sometimes terrible ones.

Once I nearly burned down our home with the thatched roof. A rocket landed on a curtain, and it caught on fire. I put out the flame, but the fabric continued to smolder when mother returned from work. Frightened, I hid the smoldering curtain under my bed. Fortunately, mother smelled smoke and found it. Later, when we moved to Kazakhstan, and my mother obtained an apartment, I nearly caused a fire several more times.

In eighth grade, I felt myself to be the chief designer of my three-stage rockets which flew on a solid fuel that I myself had invented.

Gun powder and smoke powder – explosives capable of relatively slow burning, the energy of which can be used for launching projectiles. Smoky gunpowder has been known since antiquity. It consists of 75% saltpeter, 15% coal, and 10% sulfur. Anatoli Unitsky recalled the episode with a bag of fertilizers that got on charred fragments of wood and began to burn brightly. It was the result of interaction of two of the three main components of gunpowder – charred wood and saltpeter, used as fertilizer. Later on, Unitsky was able to independently find a third component, making his own substance, which he used as fuel for missiles. Gun powder, which the author of the book found around the destroyed German ammunition depot, differs from smoke one in composition and appearance. It is not a powder but long rods that resemble long pieces of pasta, as described by Unitsky. This feature is due to the need to speed up gunpowder burning when fired from the gun.



Rocket – an aircraft moving in space due to the action of jet propulsion, which occurs only as a result of the rejection of part of its own mass (working body) of the device and without the use of substances from the environment. Since a rocket flight does not require the presence of air or gas environment, it is possible not only in the atmosphere but also in vacuum. The rocket's operating principle is used in a variety of flying devices – from a holiday firecracker to a launch vehicle.

Yuri Gagarin – the first person in world history to fly into the outer space (April 12, 1961). Holder of the highest insignia of a number of states. He became widely known internationally and became the cult-figure of many Soviet people. In the USSR, you could buy his photos everywhere, which were hung on the walls in many homes, a number of localities were renamed in Gagarin's honor (including his hometown – Gzhatsk); streets and avenues received his name; many monuments were erected to the first cosmonaut.

At home I had a small workshop with some hand-made scales, whose weights were Soviet coins – one kopeck was one gram, two kopecks were two grams, three were three grams, five were five grams. Once I prepared a portion of gunpowder, about 300 grams, then poured it into a heap on a newspaper on the floor and decided to test its quality. I didn't find anything smarter than separating out a small quantity of the power by hand, moving it about 30 centimeters to the side, and igniting it. I saw how the flame raced toward the heap along the trail of remaining powder, but it was already impossible to do anything. The powder ignited... The floor had a hole in it, there were black clouds of smoke in the apartment, and I had a smoked, singed face.

To this day I remember how for a long time, I ran around the huge ficus plant in the middle of the room, with mother chasing me and whacking me with a belt. After that incident, I heartily detested that plant, which had become a witness to my shame and a synonym of punishment, and I decided to exterminate it. Only after the third attempt did I manage it, when I buried a pack of the salt in the flowerpot, under the roots. Mother never did understand why her favorite ficus wilted, which she had cherished for several years. And only later did I understand that the ficus wasn't to blame for my problems, and I was very ashamed of that deed.

There is something in a person that opposes him to nature and can spill out in aggression. Consciously or unconsciously, we often vent on other forms of life our own hurt for the suffering we undergo – pain, hunger, sickness, death. Nature enrages us with its indifference, its remoteness from our problems, and this is one of the reasons for environmental disasters. But there is also in people, however, a sense of inseparable unity with everything around us and with the Universe. This is a hundred times more important, and in this is likely the entire hope of humankind.

My enthusiasm for rockets was connected to a love of the stars, which were numberless over the village in the backwoods and then in the steppes of Kazakhstan. I dreamed of making an enormous rocket, to soar. Stars always enchanted me. Sometimes I would sit for hours and look at them, having awakened long before dawn. Sometimes, in order to be first in the forest, when it was still dark, I would awaken my little sister, and we would go mushroom picking to our "harvest" spots, covering about five kilometers. When we came there, we would lie beneath a tree, and I would tell my Tamara about the stars, until the sun rose. Now I rarely manage to see a night sky sprinkled with little lights unless I stay over on the weekend in Maryina Gorka. Not long ago I put up a telescope there – the dream of my childhood. Unfortunately, urban residents are deprived of this pleasure of a nightly rendezvous with eternity –

1963. Town of Nikolsky (nowadays – the city of Satpayev). I was 14 years old. I had already been the "Chief Designer" of multi-stage rockets

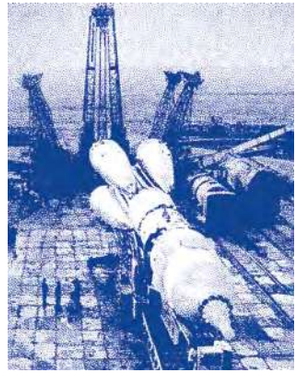
1963. Town of Nikolsky (nowadays – the city of Satpayev). With a group of my school friends

that is yet another one of the reasons for our isolation from nature, evidence of the wrongness of the world that we have created.

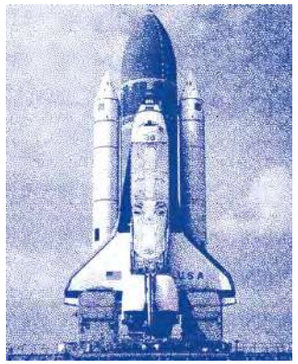
The year was 1961. I turned 12 years of age then. We moved to Kazakhstan. Mother's younger sister took us in. She had settled with her family in the miners' settlement of Nikolsky, near Jezkazgan. Mother found a job as a worker at the mine. Such a drastic change of residence had been preceded by a visit of my mother's sister to Kryuki, where she saw the impoverished, miserable condition in which our family lived. They decided then that together it would be easier to make ends meet.

My enthusiasm for rockets gained further encouragement. Just at that time, Yury Gagarin had flown in space, which without a doubt was the main event not only on the scale of the country but of the whole world. And here, the Baikonur Cosmodrome was just few hundreds of kilometers away. Sometimes at night, you could see a rocket launch. If it went normally, they would report it on the radio the next day.

Living next to coal mines and pits also became a great help. Tons of explosives were used to blast the bedrock, and the empty bags were simply thrown away along with their remains, which I then collected and used in my kid amusements. (In fact, I never liked to do anything without a purpose, simply for amusement.) I set about experimenting with various components and proportions, searching for the most suitable to use in my multi-stage rockets. In time, I learned on my own to prepare an optimal composition of gunpowder and explosives from improvised materials sold in stores and pharmacies. I got to the point



Baikonur Cosmodrome – the first and largest spaceport in the world. It is located on the territory of Kazakhstan that was part of the USSR during the period described in the book. Baikonur remained the world leader in the number of launches until 2016. About 5,000 launch vehicles were sent to orbit from it over the entire time of its operation. The distance between the complex and the city of Satpayev, where Anatoli Unitsky lived as a child, is just few hundreds kilometers. Sometimes the inventor could see launches, which he recalls when talking about his childhood.



Space shuttle – a reusable US spaceship produced and operated under the state program "Space Transportation System." In total, five shuttles were built (two of them went all to pieces in accidents) and one prototype. Space flights were carried out from 1981 till 2011. The average number of flights was four per year. At the same time, according to NASA, the total actual cost of the program for 2011 was $113.7 billion excluding inflation.

where I could make a bomb using components for it from an ordinary kitchen. Moreover, I had no special literature on this topic, except for a chemistry textbook. On the other hand, I had interest, the power of observation and the logic developed due to my poor memory.

One of my school friends asked me to teach him to make explosives. His cat had grown old and was very sick, and his master thus wanted to rid the poor thing of his suffering. Harsh, of course, but at that time no one had heard of the now popular animal protection movement. People treated things like this differently than today – much simpler. I taught him. He made a small explosive packet, but he calculated the capacity poorly. Unfortunately, at the moment of the explosion, his sister happened to be nearby. It exploded in such a way that the girl remained unharmed only by a miracle. Once again, I saw how dangerous knowledge can be and how it can be applied in different ways, to create or to destroy. I never taught anyone to make explosive again. Meanwhile, my home-made rockets became better and more complex.

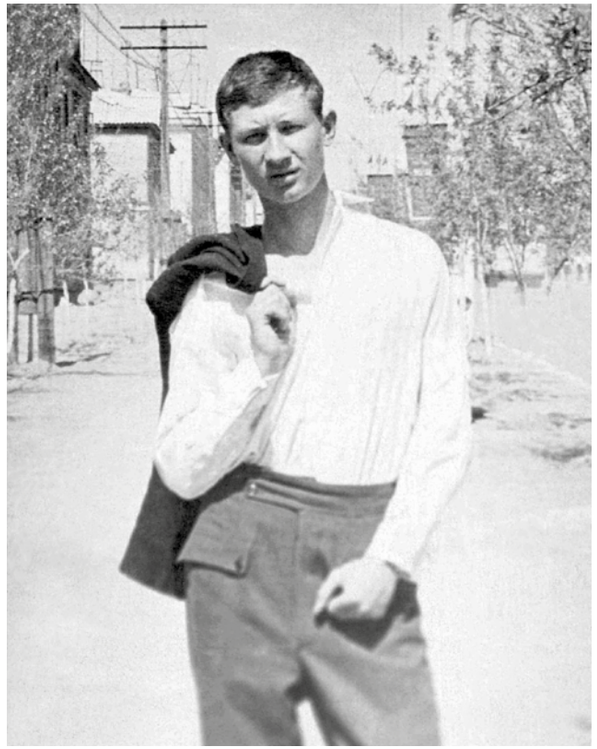
There were various children's clubs in the village and the school, but there wasn't a single one for model rockets. Therefore, I had to figure out everything myself. The knowledge I got from math club and the Skilled Hands Club came in handy. There I mastered how to work with metal and wood, including on lathes. Although the USSR's achievements in space were among the chief subjects of its pride, I don't recall that any of my peers shared this passion with me. And it was all-consuming. Once my sister accidently broke the template of my latest model rocket which had been left on the table. I yelled until I was hoarse and became upset to the point of tears. Although I made a great deal of these works throughout my children, there was something special in each one – the design, the detail, the shape of the element.

I gained satisfaction from the process of gradual improvement. I wanted to calculate the speed of the fuel's combustion precisely, so I packed in the gunpowder and prepared a special air channel in a jet engine of my own construction. Then, many years later, I learned that using approximately this same technology, the explosive was packed into the solid-fuel engines of American space shuttles. The engines were enormous – about three meters in diameter and the height of a five-store house. The workers, dressed in spacesuits (so as not to die from the fumes), tamped the fuel in with wooden mallets (so God forbid, a spark wouldn't arise) and constantly checked the solid fuel to see if dangerous air pockets were forming.

I wanted to control the height of the rocket's flight, the time and distance at which the stages separated, the place the stage landed, the possibilities, the boundaries. I reached the point of a rocket that launched

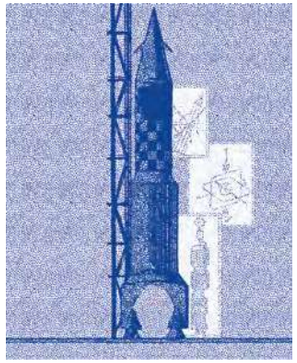
to a height of more than two kilometers. I decided to launch a living creature to such a height. A field mouse had the honor of becoming the first passenger. I thought up and made a squib that ejected a passenger capsule which descended from the height in a parachute made by me of cigarette paper. Everything in the rocket, even a solid fuel engine with a special channel which ensured the correct combustion, was made of paper soaked in adhesives I had selected – there simply wasn't any other materials in a schoolboy's possession in those years. Such were my first compositional materials.

I want to emphasize that I was completely confident of the "cosmonaut's" safety because I knew how everything worked – in maximum detail and consistently to the level of fundamental laws of physics. The mice always returned to the earth alive and unharmed. They descended in the parachute precisely within the radius I had traced beforehand and ran off when I opened up the little cabin.



1966. Town of Nikolsky (nowadays – the city of Satpayev). Anatoli Unitsky was about to leave school No. 3

Komsomol (Young Communist League) – a youth organization of the Communist Party of the Soviet Union. Komsomol had an extensive network of representative offices throughout the country, in all educational and scientific institutions, state agencies, factories, and plants. It played an important role in socio-political and economic life and had its own printing houses. In 1977, Komsomol consisted of over 36 million Soviet citizens aged 14–28 years (the so-called Komsomol age).



An acting physical model – a physical representation of a system, object, or process that is produced for research or demonstration purposes and has similar behavior dynamics in one aspect or another. By measuring the parameters of the current physical model, researchers can obtain the values of the parameters of the research object. If the scale of the physical system is changed, for example, by 1,000 times (reduction of an elephant to the size of a mosquito), the strength of the load-bearing elements (in this case, bones) will decrease by a million times, in proportion to the area of their cross-section, and the load (that is, weight) will increase by a billion times. Therefore, an elephant cannot be modeled on the example of a mosquito, since the physical modeling must take into account the nonlinearity of changes in physical parameters when changing the scale: speed, temperature, mass, strength, and others.

A acting physical model of a cosmodrome brought me my first award from the Komsomol officials of Jezkazgan. To this day, I consider it one of the chief awards in my life, although subsequently there were a lot of them. I kept the award and it hangs in the waiting room near my work office.

Anatoli Unitsky was awarded a Certificate of Appreciation for the first place at the exhibition of children's technical and fine arts for the acting model of a cosmodrome. The rocket with several stages flew to a height of more than two kilometers, where the passenger module was separated from it and fell to the ground on a parachute made of cigarette paper. The "astronaut" was a field mouse. The animal wasn't hurt

First Disappointment

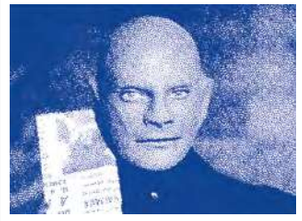
Space beckoned to me. Like many others then, I loved science fiction, but even so, I already considered myself an inventor and tried to test the fantasy with knowledge. How can humankind explore space? How to travel between planets? With the help of rockets? Soon it became clear to me that the models I had created were not much inferior to the rockets developed by the country's main design bureaus. And I began to understand more and more clearly that a rocket was an ineffective and expensive vehicle, harmful and dangerous to the environment.

Once my sister and I watched a film at the summer movie theater whose screen was set in the direction of Baikonur. During the show, I saw how a tiny star rose to the sky above the canvas of the screen. It was a rocket. When the film was over (I think it was French, about Fantômas), a heavy rain began to fall, although rains in those areas were rare. My sister and I waded along the street up to our knees in water and we were afraid of drowning, so fast was the current. And I connected these two factors – the launch of a heavy rocket at Baikonur and the downpour about an hour and a half later just a few hundreds of kilometers away from the cosmodrome. It turned out that the launch drastically changed the weather. Subsequently, I would notice this constantly.

Even later I learned that at each blast-off, a rocket "burns out" a hole in the ozone layer, or to be more precise, a tunnel the size of France, destroying tens of millions of tons of ozone at once. Yet it is precisely in the ozone layer that planetary weather is formed, since just one billionth part of the atmosphere – ozone – absorbs up to 4% of the sun's radiation, serving as a kind of blanket for the planet. In an area of 600,000 square kilometers (the size of France), this power of absorption consists of more than 20 billion kilowatts, which is 10 times the capacity of all power stations on the planet. This enormous energy is not retained in the upper layers of the atmosphere, as usual, but rushes through the "hole" toward the Earth's surface.

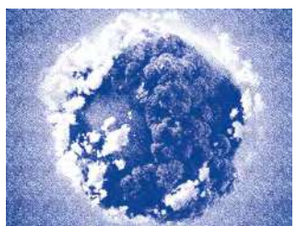
It is not hard to imagine the damage if numerous rockets are sent into orbit like shuttle buses. The planet will be destroyed. To be more precise, the biosphere of the planet, while the planet itself will become dead. Moreover (taking into account all the pre-flight and post-flight losses and expenditures of energy), the average efficiency factor of the rocket as a means of geocosmic transportation is less than 1%, which in efficiency is an order of magnitude less than the symbol of inefficiency, the locomotive. I calculated this efficiency factor myself, when I was still

Science fiction – a genre in literature, cinema, and other art forms, one of the varieties of fantasy fiction. Science fiction is based on fantastic assumptions in the field of science, including exact, natural, and human sciences. Science fiction describes imaginary technologies and scientific discoveries, contacts with non-human intelligence, a possible future or alternative course of history, and the impact of these assumptions on human society and personality. The action of science fiction often takes place in the future.



Fantômas – a fictional character, a genius criminal hiding his face, one of the most famous anti-heroes of French literature and cinema. Fantômas became widely known in the USSR from the comedy film trilogy by André Hunebelle with Louis de Funés and Jean Marais in the lead roles. The films were released on screens starting since 1967. Soviet audiences were not familiar with the original source of literature, so they often did not notice the parodic nature of the French film, perceiving it as an action film. Here is how the writer Viktor Dragunsky conveyed the impressions of a Soviet boy of eight years old that appeared when watching the movie: "First, the mystery! Secondly, the mask! Thirdly, adventures and fights! And fourthly, just interesting, that's all!" After watching this film, many boys began to play Fantômas.

Ozone layer – a part of the Earth's atmosphere at altitudes of 12–50 kilometers with the highest concentration of ozone at an altitude of 20–25 kilometers, created as a result of the solar ultraviolet radiation impact on molecular oxygen. The ozone layer protects Earth from dangerous ultraviolet and solar radiation. It is with its emergence that scientists associate the appearance of the possibility for living creatures to leave the ocean and begin the expansion of life on land. On the other hand, the ozone layer traps heat that is dissipated from the Earth's surface. As the amount of ozone in the atmosphere decreases, the air temperature goes down, the direction of the prevailing winds changes, and the weather changes, too. Some scientists see the destructive human impact on the ozone layer as the cause of the global climate change.



Biosphere – the Earth's shell in the soil, air, and water inhabited by living organisms, staying under their impact and occupied with the products of their life's activities, as well as the whole complex of its properties as a planet where conditions are created for the development of biological systems; the global ecosystem of Earth.

1966. Town of Nikolsky (now the city of Satpayev).
Spring... There were only a few days left until school graduation

a schoolboy, because it was impossible to find such information in the literature at the time. Then I realized that this was not the direction in which something should be improved. I knew from the models that there was no point in perfecting something bad. It can be made endlessly better but will remain flawed in principle, and that means another principle is necessary.

I started seeking my own solutions. At first, only in a flight of imagination and thought. I contemplated the possibilities of anti-gravitation. An anti-gravity ship could climb to a height where the atmosphere ends without hindrance. It is even capable of flying vertically upwards into infinity to break away from the Earth's pull and escape from the Earth's gravitational pit – strictly along (but by no means across) the gravitational force lines, accelerating to the second cosmic speed. That means that a jet engine was required even in this only hypothetically-possible

system in order to get into a circular Earth orbit – across, not along the gravitational lines of force, where, in fact, all the satellites fly. A kind of hybrid of a Baba Yaga mortar and a space rocket, capable of accelerating around the planet to the first cosmic velocity.

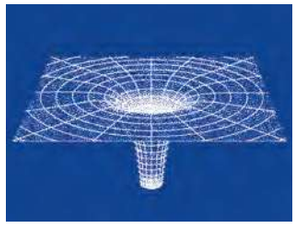
I read about the space elevator, the electromagnetic cannon and Tsiolkovsky's train that spanned the planet, which attained weightlessness as it raced around the planet, but could not take off. All of this turned out to be too complicated, expensive, and inefficient or impossible at that time, given the level of development of industry and power. Only the example of the fabled Baron Munchausen inspired me. He was able to hurl himself anywhere pulling his pigtail, even to outer space. The baron used only his own internal forces when he rescued himself and his horse that had gotten into a swamp – an ideal means of moving about in space, especially in the cosmos, where there was nothing to rely on. Subsequently, this really would become the principle of work of my chief invention. At that time, wide-scale human exploration of space, the creation of the space industry for the needs of humankind was put off for an uncertain period of time.

1966. Town of Nikolsky (now the city of Satpayev). School friends

$$\eta = \frac{A}{Q} 100\%$$

The efficiency factor (performance coefficient) – a parameter of the efficiency of a system (device, machine) in relation to conversion or transfer of energy. It is determined by the ratio of the useful energy to the total amount of energy received by the system. Efficiency factor is most often measured in percentage. The greater energy share from the total amount received was used for useful work, the higher the efficiency factor.

Gravitational lines – imaginary lines drawn in the gravity field so that the direction of the tangent to these lines at each point in space coincides with the direction of the field intensity.



Gravitational pit – a figurative designation of the position of objects located on the surface of the planet, taking into account the action of gravitational forces on them, which should be overcome to enter orbit and go farther into the outer space. Depending on the mass and size of an astronomical object, the "depth" of the gravitational pit will differ. Accordingly, the amount of energy and speed required to "get out" of the pit will be different. So, on the Mars satellite Phobos, even a tennis ball thrown with sufficient effort can go out on a space trip. It is possible to take off from the surface of Earth in a rocket, developing a speed of 7.91 kilometers per second. Getting out of gravity pits in the same way will be difficult or impossible on larger and more massive planets. This will require a speed of 42.58 kilometers per second on Jupiter, overcoming almost two and a half times the value of gravity (acceleration of free fall).

Space elevator – the concept of a hypothetical engineering structure for non-rocket launch of cargo into space. The design of the elevator is based on the use of a cable stretched from the surface of the planet to an orbital station located in geostationary orbit (altitude 35,786 kilometers). An elevator carrying a payload moves along the cable. Presumably, this method can be much cheaper than using launch vehicles. However, the cable length of about 100,000 kilometers (to provide a counterweight, the cable must go far into space) requires exceptionally high breaking strength combined with low density. The availability of material that meets these extremely high requirements has not been confirmed at this time.

Konstantin Tsiolkovsky – a Russian and Soviet philosopher, inventor, and school teacher. The founder of theoretical cosmonautics. He substantiated the use of rockets for space flights, came to the conclusion on the necessity to use "rocket trains" – prototypes of multi-stage rockets.

Baron Munchausen – a German Baron, storyteller, who became a literary character. Munchausen's name has become a household name, as a designation for a person who tells about incredible adventures. In one of the stories that allegedly happened to Munchausen, he managed to pull up himself and his horse out of a swamp in which he got stuck by pulling his own pigtail. Anatoli Unitsky mentions this episode as an example of moving a system in space by using its own internal forces. If this type of travel were possible, it would be the safest from the view point of ecology, since in this case, the interaction of a vehicle with the environment is not required.

At the Crossroads

I still had little contact with my father. Letters were rare. But one summer he invited me to his house (I was an eighth grader by then). The trip from Kazakhstan to Belarus was interesting. During the journey the landscape outside the window changed to become unrecognizable. From the steppes, I found myself in the land of my native Belarusian forests and rivers. The rest left a heavy residue on my mind. My father had a family of his own, and the arrival of a stranger's boy made no one happy. He, too, was rather cold to me. The only positive memory I have is that we used to go fishing with him, which by that time I was seriously interested in.

On the way back, in Moscow at the VDNKh (Exhibition of Achievements of the National Economy), I bought a record with songs by The Beatles, who were very popular at the time. A respectable-looking citizen approached me, opened up his jacket and there, in the lining, were dozens of records. It was like a kid in a candy shop. I didn't know where to look first. The Beatles among them were the absolute best. The record, by the way, did not look normal at all – it was one of those made by craftsmen out of X-rays – someone's lungs were imprinted on mine. I spent all the cash that I had – three rubles – and traveled the next three days on an empty stomach. I remember how in Karaganda, where the layover was several hours, I went into a sports store. I got up the courage to ask a woman: "Could you give me 50 kopecks? I don't have enough for a spinning rod." She gave it to me. I bought a liter of kumys with this cash and didn't die of hunger.

Imagine my great disappointment when I returned home and put the record on a record player and heard... a funeral march. I had been deceived in Moscow, the capital of our Motherland! By the way, after that people were dishonest with me over and over again. Nevertheless, I remained true to myself, to the way that I am; I believe in and trust people since I think – it's better they lie to me than I mislead someone. Furthermore, I think that it is better to believe in people and sometimes be deceived than not to believe and obtain confirmation of the correctness of your own skepticism. ...I have lost interest in music ever since.

In the year between school and institute, I worked as an apprentice to an electrician in Siberia, in the city of Uray, and after I returned to Nikolsky, I worked as a plumber at the district boiler room, and went on a three-month surveying expedition to the steppes.

I had a friend, Sasha Skavysh. His mother was the manager of the cafeteria in Nikolsky. Living on an empty stomach and without cash, I would

VDNKh (All-Union Exhibition of Achievements of National Economy of the USSR) – a large-scale compound of buildings in Moscow, the second largest exhibition complex in the city. One of the showplaces and hallmarks of the Soviet and Russian capital. It is one of the 50 largest exhibition centers in the world.

"Beatly" – such was the name they sometimes used to call the popular English vocal and instrumental quartet "The Beatles" in the USSR. The music by the Beatles, which appeared in the USSR since 1962–1963, became a significant catalyst for the development of the creative underground and Russian rock in particular. The band's army of fans in the country numbered millions of young people. Beatlemania in the USSR had similar manifestations to what was happening in the West and around the world – hair styles, dress patterns, and so on were copied.

Gramophone records on X-ray pictures – an analog carrier of sound data that was widespread in the USSR in 1940–1970. They were made using home-made devices that imprinted a sound track in the form of a spiral on to X-ray pictures, the material of which was suitable for this purpose. The sound quality was low. Recordings of musicians banned in the USSR for ideological reasons were mostly sold on such media. The trade was illegal. The usual equipment of that time was used for play back: gramophones, phonographs, later – electric record players and electrophones.

Kumys – fermented mare's milk obtained as a result of lactic-acid and alcohol fermentation. The drink is foamy, whitish in color, with a sour-sweet taste. It is common in everyday life among residents of Kyrgyzstan, Kazakhstan, Mongolia, as well as the Turkic and Mongolian regions of Russia. The product is mainly home-made and sold from hand to hand.

1966. Town of Nikolsky (now the city of Satpayev).
Photo taken in front of the school a few days before graduation

often be amazed when I came to visit them that their family always had Armenian cognac, Moscow sausage, and other products in short supply. Then his parents left to earn some cash in the Siberian city of Uray, and Sasha remained in Nikolsky by himself. During the entire tenth grade, he lived in our family. We got to be very good friends, and when he decided to move closer to his parents after school, I came with him.

In Uray, his mother once again was working as the manager of a cafeteria, so there were no problems with products in short supply. I went to work as an electrician's apprentice on a power train – that is when a power plant is put on wheels, in train cars, and supplied power to Uray. I remember it was warm aboard the train, and a lot of rats were under the cars. I decided to get rid of them, and like a fisherman, began to catch them with a rod, hooking them with a piece of lard. This was an unpleasant sort of "fishing" – the rats caught on the hook squealed horribly.

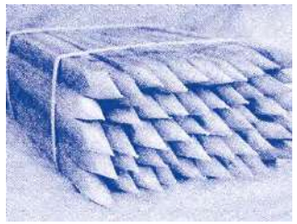
I lived in Uray for three months. Then I left. The reason was an incident when the step-father of my friend, who worked as a truck driver, for a trivial reason said in front of everyone: "If you let a pig come to the table, it puts its feet on the table." They let me understand that they didn't need a freeloader, although I was earning a fair amount then and brought all my money to my friend's family. I will recall that he lived in our family himself for nearly a year and his parents didn't help at that moment at all.

When I came back to Kazakhstan in 1966, I got my first registration in the Record of Employment – a third category plumber. I worked at the boiler room, my mother got me that job. I was entrusted with the most responsible job – hauling broken toilets filled up to the brim with human shit. It shook and gave off a stench, and hardly suggested the idea that any such biomass, whether natural or man-made, could be turned into a source of life – into fertile soil, into humus. And then gardens could be planted on such a base and food grown that would be not a killer but medicine.

I came to this knowledge and further to innovative agro- and biotechnologies much later. But even then, transporting the stinking slurry, I wondered about its purpose. Nature needs it for something, doesn't it? An animal feeds and excretes waste products. They get into the soil and fertilize it. So why does human waste go down the drain? Then it goes into rivers and from there into the ocean, poisoning both. The idea of creating a new type of plumbing system, however, which I have implemented today, apparently came from that first position of mine. In fact, I was at that job only a brief time, but I remembered it for good; and today I often tell my engineers: "I'm a plumber. That's my first specialty. But I didn't stop there. I began to develop further and grew. Now I'm a General Designer. Not only of machines and structures but also of relict fertile soil (the one that was on the planet hundreds of millions of years ago), the starting point for the creation of which were those toilets filled to the top." (By the way, the word "shit" now has a completely different meaning for me: it is a valuable biosphere raw material for obtaining biohumus – the basis of any soil fertility.) With this I want to say every time: "Do not stop at what you have achieved. Set new goals. Reach new heights. Grow. In everything. In knowledge, personal status, results of work."

I was in the surveying expedition for three months in the steppes near the Baikonur Cosmodrome. This is an enormous, closed territory the size of a European country. The shards and ejected stages of the rockets fell here, and we constantly stumbled over them during work. Sometimes they were 10 meters in length. The local aboriginal Kazakhs, who hadn't been evicted, adapted the remnants of the space technology to their needs. You could see a tea pot at a yurt which was on a stand made from a small jet engine; a campfire, in which insulated wires and some plastic parts were burning instead of firewood. I remember once I tested the strength of the body of a rocket's lower stage – my axe bounced off and didn't even leave any scratches. I realized what unique materials were used in rocket building and envied the engineers, who had invented all that.

Humus (from lat. humus – earth, soil) – the main organic substance of soil, which contains nutrients necessary for higher plants. Humus makes up 85–90% of the organic matter of soil being the main criterion for assessing its fertility. In the weight volume of the up per soil layer, the humus content varies from fractions of a percent (brown desert-steppe soils) to 10–15% (chernozem). The composition of humus includes individual organic compounds, products of their interaction, as well as organic compounds that are in the form of organomineral formations.



Range poles – small straight stakes or sticks with pointed lower ends, with which they are stuck in a vertical position into the soil to mark the terrain line while geodetic surveying as well as while implementing various types of projects on the ground (designation of the direction of a road, channel way, forest lane, power transmission line, and so on). Range poles are set at a certain interval and make up a line.

Domino (Dominoes) – a table game in which a chain of tiles ("bones," "stones") is built by adjoining halves with the same number of points. The most popular version of the game of domino in the USSR was the game of "goat." Tables for the game were located in many courtyards of all cities around the country. "Slaughtering the goat" (as a round of the game was called) was played exclusively by men, by two or four of them (splitting into pairs). The loser received the status of "goat" and, by agreement, either crawled on hands and knees under the table (sometimes bleating), or repeatedly bleated sitting at the table under the laughter of the winner.

Day after day, I kept moving forward, over the hills, pulling a hundred-meter metal tape measure, and carrying pegs and a range pole. My movement was guided by the surveyor who stood behind above the previous range pole. They were placed every 500 meters. Stops were organized for this. A truck pulled up carrying the surveyor. In the back were 30-liter milk pails with spring water, which we collected every day nearby. A half-liter mug was instantly emptied, and once again I hoisted my burden on my shoulders and pulled the coiled tape measure further. In a day we did three quotas – 27 kilometers with a heavy pack on our shoulders in 40-degree heat. My thirst was so bad that I drank about three buckets of water a day; that was likely when I damaged my kidneys.

The monotonous labor, day in and day out, and the same repetitive, silent steppe... That time, that state were like a conversation, a very important conversation with myself, uninterrupted in time and space. In space, it was defined by the nature. In the absence of vegetation above the knee, everything spoke of space and the sky. I wanted to become a pilot, but I was not suitable due to my health, since they had discovered a heart defect – mitral valve insufficiency. I wasn't even supposed to be drafted into the army because of this, and I was placed in a hospital in the cardiology department for observation. But the diagnosis was not officially made, and that is why I managed to serve – in the missile forces at the edge of the world, in the Far East, 10,000 kilometers from home. I didn't get the papers about my state of health, which would have enabled me to avoid this, due to a minor incident.

In the hallway of the high blood pressure department of the hospital in the city of Nikolsky, a group of domino lovers would gather, knocking so loudly on the metal table that the rest of the patients, who weren't domino fans, were greatly irritated. After deciding to teach them a lesson, with the help of my ward mates I prepared out of components that was available in the hospital a very unstable explosive mixture. In the process of preparation, in the form of a wet substance, it is stable, but if the dried mass is acted upon even very slightly – it's enough for a fly to land on it – and there will be a loud bang (but completely harmless even so, since there is no shrapnel). So that evening, before bedtime, I put a mixture of not more than half a gram in a newspaper. I put the newspaper on the table on which they played. I figured that by morning, the mixture would dry out, and when they knocked the dominos against the table even slightly harder, there would be a bang, and the frightened domino fans would scatter and no longer bother the normal patients.

So, the players arrived. They sat for a while, they chatted about something for a time but didn't start the game for some reason.

Meanwhile, one of the heart patients noticed the newspaper and took it to read. He walked along the hallway, while waving it, with a nurse following him, delivering the medicines. There was an explosion. The man fell unconscious. With cries of "they killed him!", the nurse dropped the tray with medicines and fled. The culprit, of course, was found and expelled from the hospital without a diagnosis and papers. I successfully graduated from the institute, and then as a healthy soldier was sent to serve in the missile forces in troop unit number 22219. In fact, it was difficult to call my health strong. Besides the heart defect, during my years of study at the institute I had been diagnosed with incurable kidney disease, with which you don't live long – chronic nephritis. I'm already 70, however, and I feel better than I did, for example, 40 years ago.

Most of all I recall being hungry in the army, which didn't pass for the first half year of my service. There was little food, and everything that was filling – meat, vegetables – was eaten up by the senior conscripts, who left only thin broth for the dogfaces. My mother sent me a little money which I used to buy a loaf of bread and an onion, washing them down with water from the pitcher. Hunger is a feeling, it must be said, that is humiliating for a person. When I became a senior conscript myself in half a year, everyone at my table ate equal portions, for which I personally had to fight. It violated tradition. I was heeded most likely because I stood out – I was older, I had a higher education, I was involved with science, and I helped to conduct some exercises with the soldiers.

Thanks to the army and the straightforward story with the unfair food distribution, I became convinced that changes are possible even in such a conservative environment. If what was previously customary is incorrect, then it must be changed. You shouldn't adapt yourself to the existing rules but search for new solutions to problems. Even there, I manifested these chief features of the inventor. Especially given the constant awareness of injustice of everything that was happening there.

In the army, I learned some new things about missiles as well, which I also had to refuel in a special spacesuit, so toxic is the fuel used in them. One drop of heptyl in a 15-cubic-meter square space will kill everything living within 10–12 minutes. This fuel was used not only in the military but the civilian space program, including in the very Russian Proton system*. Along with the ejected first stage, fuel residues fall to the earth somewhere in Russian Altai and poison everything around it. After this, the residents of these areas may go mushroom-picking or swim in the lake, and then die suddenly.

* The Proton is an expendable launch system used for both commercial and Russian government space launches. The first Proton rocket was launched in 1965 from Baikonur.

Senior conscripts and dogfaces (hazing) – an unofficial hierarchical system of relations between soldiers that has developed in the army based on their ranking according to the amount of actual service period and related discrimination. It is semi-criminal in nature and usually manifests itself in the form of exploitation, psychological or physical violence. The total service period was two years in the land Armed Forces of the USSR. Those who served less than six months were called "dogface"; more than a year and a half – "senior conscripts."

Служебная характеристика на ЮНИЦКОГО Анатолия Эдуардовича,белоруссa,1949г. рождения, члена ВЛКСМ с 1964года, в Советской Армии с ноября 1974г. образование высшее.

За время службы в подразделении зарекомендовал себя исключительно добросовестным и дисциплинированным воином. На протяжении всего срока службы являлся отличником Советской Армии. К изучению своей военной специальности относился добросовестно, образцово исполнял свои служебные обязанности, воинские уставы и наставления. Является спортсменом-разрядником и значкистом военно-спортивного комплекса. Оказывал всестороннюю помощь командирам в воспитании и обучении личного состава, принимал активное участие в жизни подразделения. Выступал с интересными докладами перед личным составом о развитии науки и техники, достижениях научно-технической революции, её социальных проблемах, активно разъяснял личному составу документы КПСС и Советского Правительства. Пользовался заслуженным авторитетом среди командиров и товарищей. Обладает отличной графикой, много сил вложил в реконструкцию ленинской комнаты, является редактором стенной газеты, которая по праву занимает призовые места.

Способный инженер, много сил приложил в оборудовании военного городка, внёс ряд ценных предложений. Систематически занимался углублением своих знаний по специальности, личное время посвящал научной деятельности. Имеет научные публикации. Делу КПСС и Советскому Правительству предан, военную и государственную тайну хранить умеет.

Достоин зачисления для учебы в аспирантуре.

КОМАНДИР БАТАРЕИ КАПИТАН – (КУЗНЕЦОВ)

15.08.75г.

С характеристикой согласен:

КОМАНДИР ВОЙСКОВОЙ ЧАСТИ 22219

МАЙОР – (НИКИФОРОВ)

МАЛАЙЧЫНА, ЮНІЦКІ!

У групе радавога саставу ідуць палітычныя заняткі. На пытанне кіраўніка адказвае радавы Анатоль Юніцкі, былы інжынер вытворча-тэхнічнага аддзела дарожна-будаўнічага трэста № 2. Яго выступленне аргументаванае, глыбокае па зместу, насычана прыкладамі з жыцця падраздзялення. Кіраўнік групы задаволен.

Напярэдадні радавы Юніцкі старанна рыхтаваўся да заняткаў, вывучаў і канспектаваў праграмны матэрыял, уважліва сачыў за бягучымі падзеямі ў краіне і за рубяжом.

Высокую актыўнасць Юніцкі праяўляе не толькі на занятках па палітычнай падрыхтоўцы. У баявой вучобе ён таксама ідзе ўперадзе. За дзесяць месяцаў службы ў часці, якая ў гады Вялікай Айчыннай вайны вызваляла Гомельшчыну і ўдастоілася ганаровага найменавання аднаго з яе гарадоў, ён стаў выдатнікам баявой і палітычнай падрыхтоўкі, класным спецыялістам.

Пра яго адносіны да вучобы і службы гавораць многія заахвочванні, сярод якіх кароткатэрміновы водпуск.

«Закончыць службу ў арміі з выдатнымі паказчыкамі па ўсіх прадметах навучання», — так вырашыў воін і паўсядзённа дабіваецца пастаўленай мэты.

A Performance Report I received in the Soviet Army and a note in the Belarusian language saying "Well done, Unitsky!" published in "Gomelskaya prauda" [The Truth of Gomel] in 1975

If you look at the army as a whole from the perspective of an engineer, it seems to be a redundant mechanism compensating in makeshift fashion for the fundamental shortcomings of the system. Unable to eliminate these shortcomings, the army takes away enormous resources for its work and as a result in critical situations can destabilize the system. This was what happened, for example, in the revolutionary years. As for the famous saying, "If you want peace, prepare for war" (the last argument of all apologists for warmongering), who said that war is a necessary, inevitable, and right component of the life of society? On the contrary, war is a proof of imperfection and one of the most horrible manifestations of it. It would be correct to think and act in the direction of eliminating the reasons for the occurrence of wars, and not prepare for them in order for them not to occur. In itself, such a position is paradoxical.

Studying at the Institute

Since I was not destined to be a pilot, I had to study to become an engineer. I had already tested myself as a worker and believed that experience was enough for me. I did not give much thought in particular in which institute I could learn the basics of science, because I did not have any information about the high education institutions.

I entered the Tyumen Industrial Institute. It turned out that I was not prepared at all for the exams, therefore in selecting my specialization I operated on the principle of least resistance – I'll go where there is less competition. I submitted my documents to the Department of Automobile Highways, where only 0.6 people applied per place. As it turned out in the future, I chose correctly.

1967. Standing on the platform with my mother. I was going to Tyumen to study at the Institute

1968. In the corridor of the Tyumen Industrial Institute with friends and my future wife – Galina

I believe that I received a very good education, although Tyumen at that time seemed to be a province. People said, "Tyumen is good, the capital of woods." Even the streets in the city weren't paved, but boardwalks were placed, which squelched under your feet. For most of the year we wore boots, which we took off upon entering the Institute, cleaning the mud off with special trowels and washing them in tubs before changing to shoes.

The difficult living conditions were amply compensated by the interesting studies. The teachers at the Institute were talented and young and had come, like me, to the end of the world for romance and "the scent of the taiga." I became friendly with many of them, thank to which I studied well. Once I found a mistake in the textbook about strength of materials, which even they had not noticed. Sometimes I could correct them, indicating inaccuracies and mistakes in the explanations. Some of them were insulted and lowered my grades on exams, giving me "Cs," although the answers were all solid "As." Others, on the contrary, appreciated this. Some of them even wept when I decided, for family circumstances, to quit the Institute. Looking back, I realize that they were essentially kids like me, only 5–7 years older.

My favorite subjects were strength of materials, descriptive geometry, physics, chemistry, higher mathematics. I tried to be among the best. That helped me even in courting the girl Galya, who later became my first wife. At colloquiums during an academic hour I solved tasks for myself and her, and often managed to help even other comrades. I did this with pleasure, which gives a person a sense of intellectual superiority over the difficulties he faces. In order to prevent my giving hints to students, teachers would ask me to leave the auditorium about 20 minutes after the start of the lesson (even within that time I managed to solve the tasks for Galya). I have to say, however, that such "punishment" was pleasant; in this way,

1968. City of Tyumen. Studentship

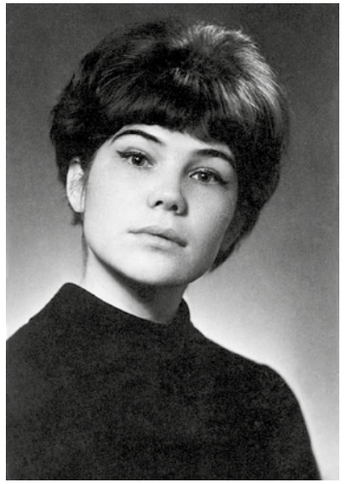
I was acknowledged as an intellectual leader. In the remaining 30 minutes of time I went out in the empty hallway, smoked a cigarette and it was just then, never more so far, that I felt a great freedom; I was young, and everything came easy.

At the Institute, the wish to do science, which had existed since childhood, grew stronger. Therefore, I was not particularly upset, when I realized that due to my health I could not have the romantic profession of a pilot. Being a pioneer at the drawing board or in the laboratory seemed to me no less exciting than conquering the skies. The fate of a researcher seemed full of unusual adventures. In rocket modelling as well as in my coursework later I found the opportunity not just to calculate and reproduce something but to contribute improvements, to bring something to perfection to the extent possible.

I noticed that in designing the road surfaces of highways, the cost of the roadbed is not considered. But this is obvious, after all: the thicker the covering, the less the ground needs gravel, and the thinner, the more ground it needs. I conducted an analysis and offered a solution which enabled the cost of construction to be reduced by 3–5%, and that is about 100,000 Soviet rubles for each kilometer of road, without complication of the calculations. I simply proposed to subtract from the cost of each layer of road surface (in its design and optimization) the cost of the ground of the same volume. This study was my first research paper, then published in a central industry journal. Later, already in my graduate thesis, I described the means of reducing the cost of the construction of roads by using local soil, processed with refuse from petroleum products, and drew up a nomogram for calculating the deformations of constructions of flexible highway surfaces. I wrote an article – my second scientific publication, and in fact it was immediately published in the Soviet Union industry journal “Avtomobilnye dorogi” [Highways].

1969. City of Tyumen. My sister Tamara arrived with a folk dance ensemble from the Tobolsk Cultural and Educational School

1969. Galina and me



1969. Galina

1969. Galina with her friends

Banya (steam bath) – a room equipped for warm washing of a person with the simultaneous action of water and hot air or steam. Banyas remained the main place to carry out hygiene procedures for a long time in Russia and the USSR. Village banyas are small buildings, built most often near the house. If someone did not have an own banya, then the villagers went to their neighbors for washing. In cities and areas with multi-apartment buildings, public banyas were created, designed for simultaneous visits by a large number of people.

I got married in my fourth year. Galya was the most beautiful girl in the Institute. She did not pay attention to me for a long time. I had to fight for my happiness. I even sang songs and played the guitar for her, although I had no ear or voice, so to say. At one point she was planning on getting married but not to me, to a fellow classmate, who lived in the city of Asbest, where she had been born. I was invited to the wedding as a guest. It was winter. It was about 40 degrees below zero, and I didn't have any gloves. I stuffed my hands into the pockets of the coat, which I had worn from fall to spring, and pushed my suitcase ahead of me with my foot. But inside, everything was burning. So much, that after I got to the wedding, I managed to convince the bride to back down from her mistaken intention and give consent to marry me. The wedding was frustrated, although all the guests had come to the impending celebration. The failed groom for some reason beat up the father of the bride, and not me.

I invited the father, whom I had hardly seen before that time, to Galya's and my wedding, which took place in Tyumen in 1971. We chatted and he asked me mainly about everyday matters – how and where I lived, what did I intend to do. He offered us to come to him in Belarus. He held the position of a manager of a building trust in Mozyr – a big boss. I didn't promise anything but said I would think about it.

After we got married, I had to switch to the correspondence department. I worked at the same place, at the Institute, in the Department of Highways. Soon our son, Denis, was born. We were poor, living first

in a banya, which was rented by us as a room, and then in a trailer in the forest. The conditions were terrible – filth, roaches, disgusting woodlice several centimeters in length, and a draft through all the cracks in the walls. And here we had a little baby on our hands... This continued several months. Then I decided to accept the father's offer and move to his place in Mozyr, and then to Gomel.

April 20, 1971. City of Tyumen. Wedding with Galina, my first wife

I acted like an adventurer, not considering the consequences of my actions. In the middle of the school year, I withdrew my wife's and my documents from the Tyumen Institute. We took a suitcase with our clothes (we had no other property), our son (Denis was four months old then) and went. At first, we headed to the Kiev Highway Institute with our documents. There were told, "We won't take Belarusians, there is a Department of Highways at the Polytechnical Institute in Minsk, go there." But in Minsk, however, they refused to take our documents, since it turned out that in the final year, transfer from one institute to another can be made only with permission from the USSR Ministry of Education. The prospect loomed of heading back to the army. My wife couldn't go to institute with a child. We both risked being left without higher education. And only thanks to my father's connections, we were nevertheless enrolled in the final year of the correspondence department. Parallel to this I worked as a technician at the Gomel Road Construction Trust.

1973. With my first wife Galina and our son Denis

ДЫПЛОМ

Ю № 317166

Гэта дыплом выдадзены Юніцкаму Анатолю Эдуардавічу

у тым, што ён у 1967 годзе паступіў у Гомельскі індустрыяльны інстытут

і ў 1973 годзе скончыў па поўна курс Беларускага ордэна Працоўнага Чырвонага Сцяга політэхнічнага інстытута

па спецыяльнасці "Аўтамабільныя дарогі"

Рашэннем Дзяржаўнай экзаменацыйнай камісіі ад 21-25 чэрвеня 1973 г. Юніцкаму А. Э. прысвоена кваліфікацыя інжынера шляхоў зносін

Старшыня камісіі Крафтэр

Горад Гомель 30.06.1973 г.

Рэгістрацыйны № 14-2206

ДИПЛОМ

Ю № 317166

Настоящий диплом выдан Юницкому Анатолию Эдуардовичу

в том, что он в 1967 году поступил в Гомельский индустриальный институт

и в 1973 году окончил полный курс Белорусского ордена Трудового Красного Знамени политехнического института

по специальности "Автомобильные дороги"

Решением Государственной экзаменационной комиссии от 21-25 июня 1973 г. Юницкому А. Э. присвоена квалификация инженера путей сообщения

Председатель Государственной экзаменационной комиссии Крафтэр

Ректор Крафтэр

Минск 30.06.1973 г.

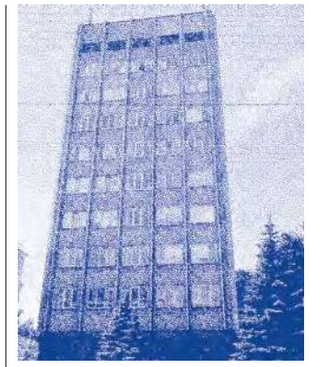
Регистрационный № 14-2206

Московская типография Госнака. 1971.

1973. A Diploma certifying that Anatoli Unitsky, a graduate of the Belarusian Polytechnic Institute, was conferred the qualification of Engineer of Transport Routes

My dissertation project, "Opsa – Drisvyaty Highway" was recognized as the best in the class. I became convinced how wonderfully I had been trained in Tyumen. The only internal student in the department who was going for the Diploma with Honors was given a "B" in the subject "Bridges" and an explanation was given: "After passing the exam by the correspondence student Unitsky and his answers on the design of wooden, steel, concrete, and steel-reinforced concrete bridges, we cannot give you an 'A.' We are sorry." The exam was given by an academician of the Belarusian Academy of Sciences, the only bridge academician in Belarus. Naturally, the graduate did not get the Diploma with Honors and had a grudge against me for his whole life, as if I was to blame for being more talented than he was.

My next "Belarusian period" lasted more than 20 years – until 1997. After completing my service in the army in 1975, I returned to work at the Gomel Highway Construction Trust now as a senior engineer. After a while I transferred to the Institute for Mechanics of Metal-Polymer Systems at the Belarusian Academy of Sciences – the only scientific research Institute in Gomel Region. I wanted to be closer to science, which had always drawn me. I quickly grew from a senior engineer in one of the laboratories to the director of the patent and licensing service of the Institute. My best ideas came precisely during this period. Even so, the main discovery had taken place even earlier, during my student years, and then was only formulated in more details and justified in all its components.



Institute for Mechanics of Metal-Polymer Systems of the Belarusian Academy of Sciences – a research institution. Initially, it specialized in studying the possibilities and prospects of using polymers in various types of technical devices. For example, the first monograph released by the Institute was called "Gear Wheels Made of Plastics." A wider range of problems is covered later on: the physical and chemical basis for the development of composite materials based on organic and inorganic polymers, physics, chemistry, and surface mechanics, analysis of contact interactions, friction, wear, and lubrication in technical and biological systems. The Institute is still functioning. It is the winner of many awards and prizes.


МИНИСТЕРСТВО СТРОИТЕЛЬСТВА И ЭКСПЛУАТАЦИИ АВТОМОБИЛЬНЫХ ДОРОГ БССР
Белорусский дорожный научно-исследовательский институт
Минский городской комитет комсомола
Минское областное правление НТО автомобильного транспорта и дорожного хозяйства
Проектно-технологический трест "Оргдорстрой"

ВОПРОСЫ ПОВЫШЕНИЯ ТЕХНИЧЕСКОГО УРОВНЯ ДОРОЖНОГО СТРОИТЕЛЬСТВА БССР

Минск 1974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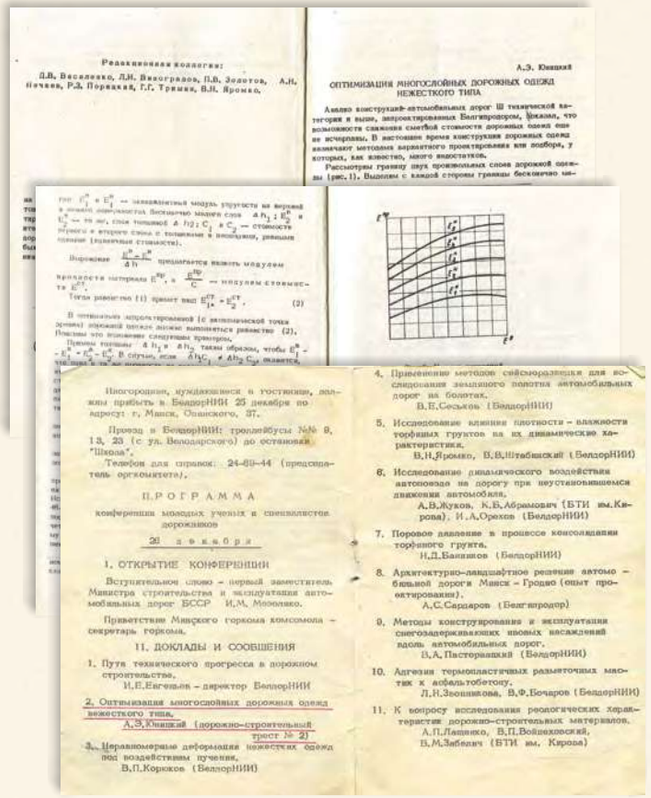
НЕФТЕПРОМЫСЛОВОЕ СТРОИТЕЛЬСТВО

МОСКВА-1974


Редколлегия в составе:
Д.В. Веселовский, Л.М. Виноградов, П.В. Золотов, А.Н. Ничаев, Р.Д. Порываев, Г.Г. Тришин, В.Н. Яромко.

А.Э. Юницкий

ОПТИМИЗАЦИЯ МНОГОСЛОЙНЫХ ДОРОЖНЫХ ОДЕЖД НЕЖЕСТКОГО ТИПА

Иногородние, нуждающиеся в гостинице, должны прибыть в БелдорНИИ 25 декабря по адресу: г. Минск, Осипенко, 37.

Проезд в БелдорНИИ: троллейбусы №№ 9, 13, 20 (с ул. Володарского) до остановки "Школа".

Телефон для справок: 24-60-44 (председатель оргкомитета).

ПРОГРАММА

конференции молодых ученых и специалистов дорожников

26 декабря

1. ОТКРЫТИЕ КОНФЕРЕНЦИИ

Вступительное слово – первый заместитель Министра строительства и эксплуатации автомобильных дорог БССР И.М. Мисюлько.

Приветствие Минского горкома комсомола – секретарь горкома.

II. ДОКЛАДЫ И СООБЩЕНИЯ

1. Пути технического прогресса в дорожном строительстве.
И.Е.Евгеньев – директор БелдорНИИ

2. Оптимизация многослойных дорожных одежд нежесткого типа.
А.Э.Юницкий (дорожно-строительный трест № 2)

3. Неравномерные деформации нежестких одежд под воздействием пучения.
В.П.Корюков (БелдорНИИ)

4. Применение методов сейсморазведки для исследования земляного полотна автомобильных дорог на болотах.
В.Е.Сеськов (БелдорНИИ)

5. Исследование влияния плотности – влажности торфяных грунтов на их динамические характеристики.
В.Н.Яромко, Б.В.Нитабашский (БелдорНИИ)

6. Исследование динамического воздействия автопоезда на дорогу при неустановившемся движении автомобиля.
А.В.Жуков, К.Б.Абрамович (БТИ им. Кирова), И.А.Орехов (БелдорНИИ)

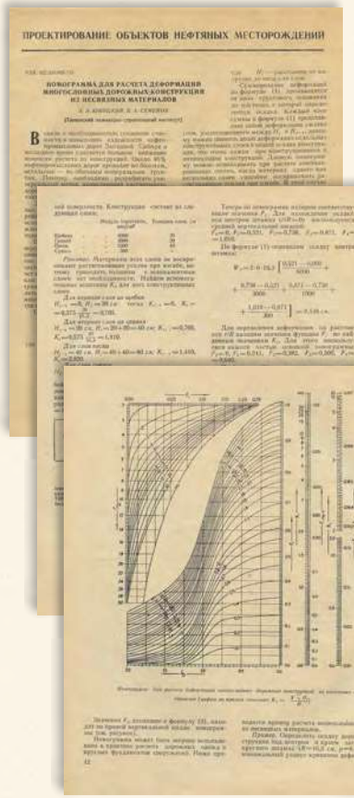
7. Поровое давление в процессе консолидации торфяного грунта.
Н.Д.Банников (БелдорНИИ)

8. Архитектурно-ландшафтное решение автомобильной дороги Минск – Гродно (опыт проектирования).
А.С.Сердаков (Белгипродор)

9. Методы конструирования и эксплуатации снегозадерживающих полос насаждений вдоль автомобильных дорог.
В.А.Пастернацкий (БелдорНИИ)

10. Адгезия термопластичных разметочных мастик к асфальтобетону.
Л.Н.Звонникова, В.Ф.Бочаров (БелдорНИИ)

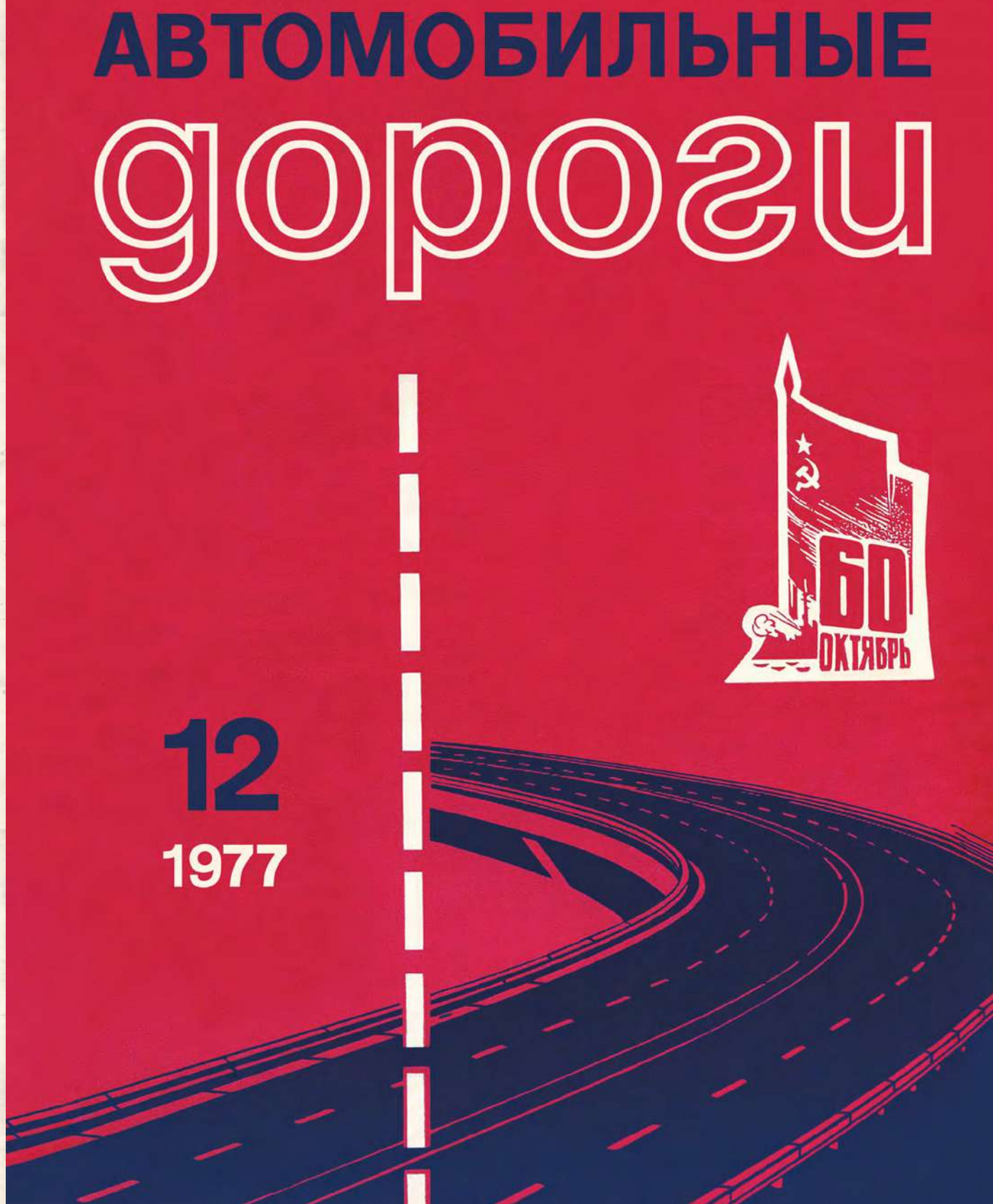
11. К вопросу исследования реологических характеристик дорожно-строительных материалов.
А.П.Лашенко, В.П.Войтеховский, В.М.Забелич (БТИ им. Кирова)


ПРОЕКТИРОВАНИЕ ОБЪЕКТОВ НЕФТЯНЫХ МЕСТОРОЖДЕНИЙ

НОМОГРАММА ДЛЯ РАСЧЕТА ДЕФОРМАЦИЙ МНОГОСЛОЙНЫХ ДОРОЖНЫХ КОНСТРУКЦИЙ ИЗ НЕСВЯЗНЫХ МАТЕРИАЛОВ

1974. Scientific and Technical Conference of Young Scientists and Specialists in Road Construction "Issues of Increasing the Technical Level of Road Construction in the BSSR"

1974. Reference scientific and technical collected book "Oilfield Construction"



ПРОЕКТИРОВАНИЕ

Учёт стоимости грунта земляного полотна

Инж. А.Э. ЮНИЦКИЙ

В настоящее время проектирование и выбор рациональной дорожной конструкции (дорожная одежда + земляное полотно) сводят, как правило, к проектированию и выбору оптимальной дорожной одежды и определению поправки к объёму земляного полотна на её устройство. При этом упускается из виду, что при изменении толщины слоёв одежды в процессе оптимизации изменяется её общая толщина и, соответственно, величина поправки к объёму земляного полотна и его стоимость. Поэтому принятый вариант дорожной конструкции не гарантирует оптимальность решения, так как изменение одного из слагаемых её стоимости (стоимости земляного полотна) фактически не принималось в расчёт в процессе оптимизации.

Этот недостаток легко устраним, если при определении стоимости слоя дорожной одежды использовать следующие зависимости (возможны два расчётных случая).

1. На участках автомобильных дорог, относящихся к I типу местности по характеру и степени увлажнения, продольный профиль проектируют независимо от конструкции дорожной одежды и её толщины. Поэтому каждый слой одежды в насыпи уменьшает, а в выемке увеличивает объём земляных работ только на величину, равную объёму этого слоя, и его расчётная стоимость $C_{сл}$ (руб/100 м^2), равная изменению, которое внёс в стоимость дорожной конструкции этот слой, может быть выражена формулами:

а) в насыпи

$$C_{сл} = h_{сл}\,(C^1_{сл} - C_{гр}), \qquad (1)$$

где $h_{сл}$ – толщина слоя дорожной одежды, см; $C^1_{сл}$ – сметная стоимость слоя толщиной 1 см и площадью 100 м^2, руб.; $C_{гр}$ – стоимость слоя грунта в насыпи толщиной 1 см и площадью 100 м^2 (стоимость 1 м^3 грунта в насыпи), руб/м^3;

$$C_{гр} = K_у K_н C^1_{гр}, \qquad (2)$$

где $K_у$ – коэффициент относительного уплотнения грунта; $K_н$ – коэффициент непредвиденного увеличения объёма земляных работ; $C^1_{гр}$ – сметная стоимость 1 м^3 грунта в насыпи с учётом его разработки, транспортирования и уплотнения, руб/м^3;

б) в выемке

$$C_{сл} = h_{сл}[C^1_{сл} + (C^1_{гр.в} - C^1_{гр.р})]\,, \qquad (3)$$

где $h_{сл}$, $C^1_{сл}$ – то же, что и в формуле (1); $C^1_{гр.в}$ – сметная стоимость разработки, транспортирования и уплотнения 1 м^3 грунта из выемки в насыпь или отвал, руб/м^3; $C^1_{гр.р}$ – то же, из резерва грунта в насыпь взамен грунта из выемки, руб/м^3 (при разработке выемки в отвал $C^1_{гр.р} = 0$).

Разность $C^1_{гр.в} - C^1_{гр.р}$ определяет экономическую конкурентоспособность грунтов выемки и резерва для устройства насыпи.

2. На участках автомобильных дорог, где возвышение низа дорожной одежды над уровнем грунтовых вод или поверхностью земли $h_{УГВ}$ является определяющим для назначения рабочей отметки, каждый слой, кроме поправки к объёму земляного полотна на его устройство, также изменяет рабочую отметку насыпи, что приводит к увеличению её объёма (рисунок 1, заштрихованная часть). В этом случае расчётная стоимость слоя дорожной одежды (в руб/100 м^2):

$$C_{сл} = h_{сл}\,(C^1_{сл} - C_{гр} + \Delta V C_{гр}) = h_{сл}\,[C^1_{сл} + C_{гр}(\Delta V - 1)], \qquad (4)$$

где $h_{сл}$, $C^1_{сл}$ – то же, что и в формуле (1); ΔV – изменение объёма насыпи за счёт увеличения её рабочей отметки при изменении толщины слоя дорожной одежды на 1 см, отнесённое к площади слоя в 100 м^2, м^3/100 м^2;

$$\Delta V = \frac{2(B_o + mH)}{B_{сл}}, \qquad (5)$$

где B_o – ширина обочины, м; m – заложение откосов; H – рабочая отметка, м; $B_{сл}$ – ширина слоя, м.

Такой подход к определению расчётной стоимости позволяет свести оптимизацию дорожной конструкции к оптимизации одежды, так как в стоимости её конструктивных слоёв учтены изменения в стоимости земляного полотна на их устройство.

Пример. Требуется определить расчётные стоимости слоёв дорожной одежды автомобильной дороги II категории для перечисленных выше расчётных случаев.

Для возможности сравнения результатов исходные данные для всех расчётных случаев приняты одинаковыми и представлены в таблице 1.

Таблица 1

Слой	Материал слоя	Толщина слоя, см	Сметная стоимость слоя толщиной 1 см, руб/100 м^2
1	Мелкозернистый асфальтобетон	5	30
2	Крупнозернистый асфальтобетон	8	24
3	Щебень	25	8
4	Песок мелкий	40	2
5	Грунт земляного полотна	–	1

Сметная стоимость грунта дана с учётом его относительного уплотнения и непредвиденного увеличения объёма земляных работ (для расчётных случаев 1а и 2). Грунт из выемки разрабатывается в отвал (для расчётного случая 1б). Средняя высота насыпи равна 1,5 м (для расчётного случая 2). Поперечный разрез дорожной конструкции показан на рисунке 2.

Расчёт. Для расчётного случая 1а согласно формуле (1)

$$C_{сл} = h_{сл}\,(C^1_{сл} - 1). \qquad (6)$$

Поскольку грунт из выемки разрабатывается в отвал, то в расчётном случае 1б $C^1_{гр.р} = 0$ и формула (3) примет вид:

$$C_{сл} = h_{сл}\,(C^1_{ср} + 1). \qquad (7)$$

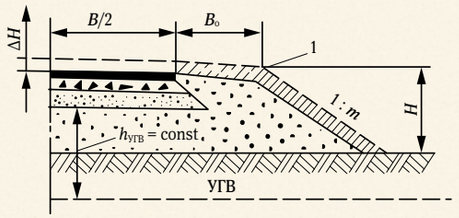


Рисунок 1 – Изменение объёма земляных работ (заштрихованная часть) в зависимости от изменения толщины дорожной одежды (Δh)

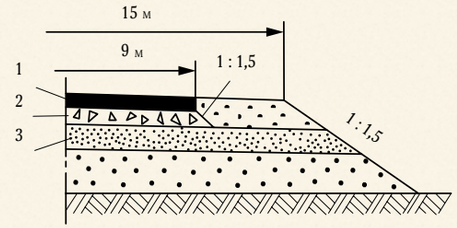


Рисунок 2 – Дорожная конструкция: 1 – покрытие; 2 – щебёночное основание; 3 – песчаный подстилающий слой

В расчётном случае 2 ширина слоёв дорожной одежды различна (она устраивается с присыпными обочинами), поэтому поправка ΔV в формуле (5) будет индивидуальна для каждого слоя.

$$\Delta V = \frac{2(B_o + mH)}{B_{сл}} = \frac{2(3 + 1{,}5 \times 1{,}5)}{B_{сл}} = \frac{10{,}5}{B_{сл}}$$

и

$$C_{сл} = h_{сл}\left[C^1_{сл} + 1\left(\frac{10{,}5}{B_{сл}} - 1\right)\right] = h_{сл}\left(C^1_{сл} + \frac{10{,}5}{B_{сл}} - 1\right). \qquad (8)$$

Расчётные стоимости слоёв, вычисленные по формулам (6), (7) и (8), представлены в таблице 2. Для сравнения показана их фактическая стоимость.

Таблица 2

Слой	Расчётные стоимости слоёв, руб/100 м^2			
	Без учёта стоимости грунта (фактическая стоимость)	С учётом стоимости грунта для расчётных случаев		
		1а	1б	2
1	150	145 (96,7)	155 (103,3)	150,8 (100,5)
2	192	184 (95,8)	200 (104,2)	193,3 (100,7)
3	200	175 (87,5)	225 (112,5)	202,4 (101,2)
4	80	40 (50,0)	120 (150,0)	63,0 (78,8)

Примечания.

1. В скобках указана стоимость слоёв относительно их фактических стоимостей (в %).

2. Ширина слоёв для расчётного случая 2 определялась по средней линии.

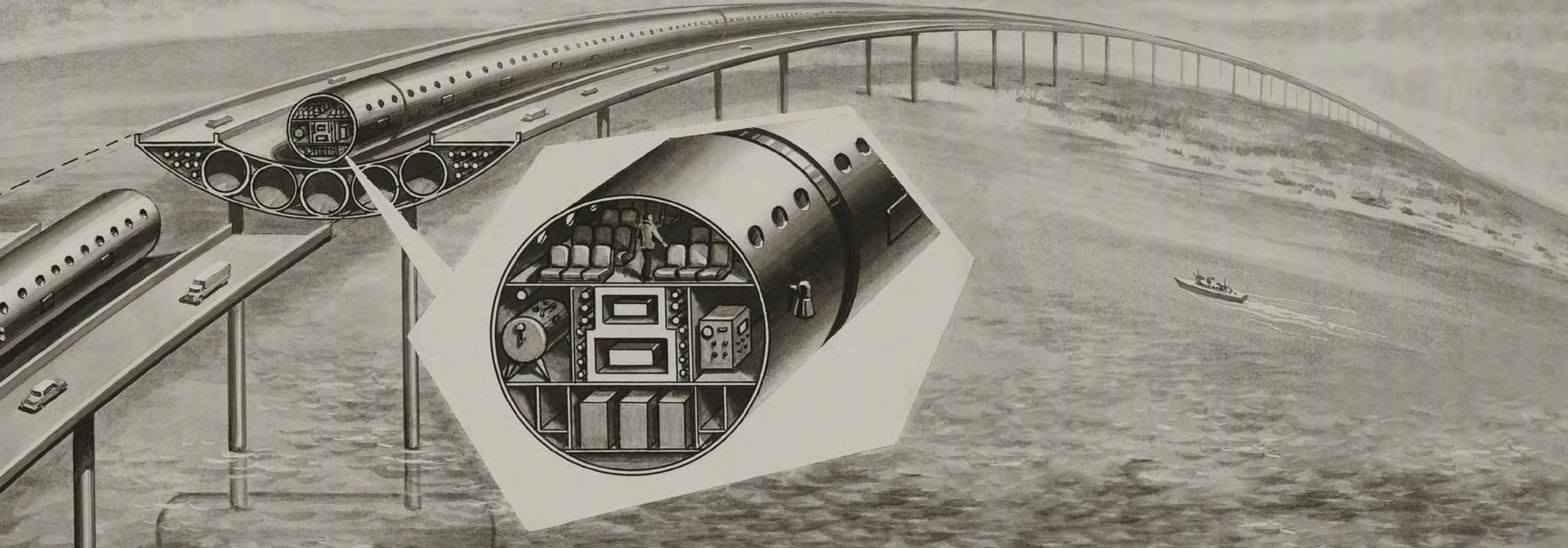
Из анализа данных таблицы 2 следует, что соотношение стоимостей слоёв различно для каждого расчётного случая и в значительной степени отличается от соотношения их фактических стоимостей, что приводит к другим оптимальным толщинам; наибольшее отличие расчётных стоимостей от фактических имеют нижние слои дорожной одежды (их стоимость меньше отличается от стоимости грунта), поэтому экономическая целесообразность их применения будет значительно зависеть от расчётного случая.

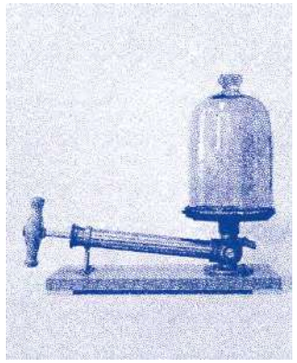
Как показали результаты анализа, проведённого автором, учёт вышеуказанных факторов позволяет в некоторых случаях снизить стоимость дорожной конструкции автомобильных дорог I–III категорий на 3–5 % практически без усложнения расчётов.

УДК 625.731.1:69.003

PART 2

The Invention Which Changes Everything





Vacuum – a space free of matter. In engineering and applied physics, a vacuum is a medium consisting of gas at a pressure significantly lower than the atmospheric one. Technical vacuum is understood as a highly rarefied gas. Physical vacuum is the lowest (basic) energy state of a quantized field. Even the cosmic vacuum, which has a very low density and pressure, is not really perfect. There are several hydrogen atoms per cubic centimeter in the interstellar space. Vacuum can be created artificially on Earth, but this is a very expensive procedure. However, its use in industry today allows to create materials and products with significantly improved or unique qualities.

Over
$30 million
is required to start a launch vehicle with an average payload of about three tons.

Inception of the Idea of the General Planetary Vehicle

I think that I owe the development of logic and the ability to optimize not only to my poor memory but also to the poor situation of my family and the need to work constantly. These circumstances made me a pragmatic. Ever since, I have followed a rule: before taking up something, I must clearly know what the goal is. Before taking action, I think it through in advance and conceive of the least expensive means of achieving it. For that very reason, the result and not the process has always been in first place for me, although sometimes it took years and even decades... From these positions I also came to review transportation as a whole, having begun with my childhood hobby – space transport.

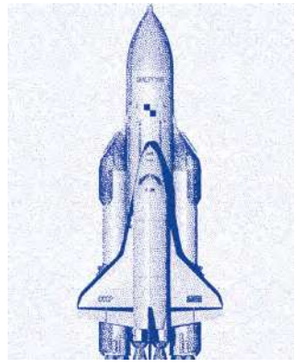
Why does humankind need space for anyway, from the pragmatic point of view? Today it is used to ensure communications, monitoring of various processes, and for scientific purposes. But it is obvious, however, that the possibilities of space have been explored by humankind only to a tiny and even microscopic degree. This theme is well developed in the science fiction that flourished on the wave of space enthusiasm in the 1960s through 1980s.

Unlimited space, raw materials, and energy resources, zero gravity, vacuum – this is an ideal environment and endless possibilities for technologies and industrial development. All of these is right nearby, overhead, at a distance of some 300 kilometers. Yet this all remains inaccessible, because it costs too much. Starting a launch vehicle costs no less than $30 million with an average payload of about three tons ($10,000 per kilogram or $10 million per ton). But for a million tons (that is for only 140 grams for each inhabitant of the planet), it is already $10 trillion! And that is if we calculate the cost of delivering the cargo to a height of 200 kilometers. In reality, with longer flights and at higher orbits everything will be even more expensive. Really, space is inaccessible for this reason, and along with it all its possibilities and all its riches.

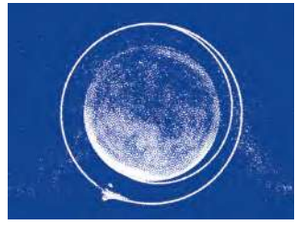
Analyzing more deeply the question of the possibility of space exploration with the help of rockets, I concluded: space will remain inaccessible even with the cost of rocket launching is substantially reduced. Firstly, the negative effect that launches have on the nature – it will kill our planet, more precisely, its living component, the biosphere. A planet can become dead, like Mars and Venus, without losing its original status of a planet. The second issue concerns interplanetary travel; if the planet

is bigger than Earth (for example, Jupiter or Saturn), a rocket there will basically not manage to enter orbit due to the other sizes and masses of these planets, and therefore the first cosmic velocity will differ (on Jupiter, 42.1 kilometers per second versus 7.91 kilometers per second on Earth). So, earthlings are lucky; we live on a relatively small planet; otherwise we would not have either Sergey Korolyov, or Wernher von Braun, or Yuri Gagarin. Obviously, if we really want to explore space, it is necessary to search for some other solutions more effective than a rocket. The search for such a solution is an interesting problem, which was posed earlier by Konstantin Tsiolkovsky, a pioneer of cosmonautics.

Back in childhood I had read the book "Dreams of Earth and Sky" in which the author, the Russian scientist Tsiolkovsky, describes a train circling the planet along the equator. On the train, there is another such train, then a third, a fourth, and so on – each moves faster and faster relative to the surface of the planet until the last one achieves zero



Launch vehicle – a rocket designed to transfer a payload into the outer space. Sometimes the term is used in an expanded sense: a rocket designed to deliver a payload to a particular point (in space or in a remote area of the Earth) – for example, artificial Earth satellites, spacecraft, nuclear and non-nuclear warheads.



First cosmic velocity – the minimum (for a given height above the surface of the planet) horizontal speed, which must be given to an object to make it move along a circular orbit around the planet. The first cosmic velocity for an orbit located near the Earth's surface is 7.91 kilometers per second. It was first achieved on October 4, 1957 by a Soviet spacecraft (the first artificial Earth satellite "Sputnik-1"). It is impossible to exit into space from Earth without reaching this speed.

Sergey Korolyov and Wernher von Braun – Soviet and American Chief Designers of rocket and cosmic technology, the founders of modern rocket engineering. Sergey Korolyov is a key figure in human space exploration, the founder of practical cosmonautics, one of the creators of Soviet rocket and space technology that provided strategic parity and made the USSR an advanced rocket and space power. The first artificial Earth satellite and the first cosmonaut of the planet, Yuri Gagarin, were launched under the leadership by Korolyov. Werner von Braun – the Creator of the first ballistic missiles, the director of the US lunar program.

gravity due to its centrifugal force. Nevertheless, it could not launch, since it has to speed up even more, and a weightless train has no coupling between the wheels and the rail. It is technically difficult to imagine the implementation of this system, but theoretically it is possible. In his other work, Tsiolkovsky considered the construction of a tower with one end attached to some firmament in space – the idea of a space elevator. For Tsiolkovsky it was clear: a rocket is not the only way. I began to analyze the alternatives and search for my own solutions.

At that time, there was no suitable material for the construction of an elevator. I doubt this problem is resolved even today in the era of composites, although the opposite is claimed. Thus, quite recently, the Japanese announced a project to construct such an elevator. They intend to use carbon nanotubes. However, even if this works, wide-scale industrial exploration of space will not be possible. The payload claimed for this self-supporting elevator of 100 tons, with its length minimum of 40,000 kilometers (the length of the equator!) will be insufficient for this – that is no more than 10,000 tons of cargo per year (a gram and a half for each inhabitant of the planet per year, or several milligrams per day). For comparison: today, China alone and by rail only hauls more than three billion tons of cargo every year. As much would be required to serve the industry of just one country but not all humankind.

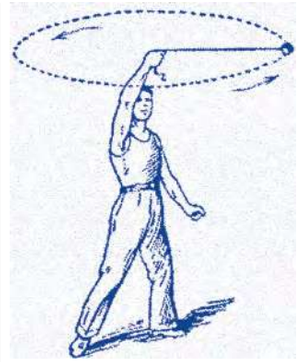
Space elevator (one of the structural design versions)

The same measures should also be applied in the case of space. A space tramway, a space bridge, an electro-magnetic cannon and other options up to anti-gravity either yield less than the elevator or exceed it slightly in performance. They are also as pointless to achieve the goal of wide-scale exploration and industrialization of space. The only possible option is Tsiolkovsky's train, as strange as it seems. To be sure, his idea must be radically improved.

The multi-stage construction of trains proposed by Tsiolkovsky does not hold up to criticism. What remains in effect is only the fact that the vehicle must circle the planet. Best of all would be along the equator. In order to get out of the gravitational pit and climb to orbit, the construction must revolve, accelerating up to eight kilometers per second – the first cosmic velocity of our planet. It remains only to decide how to ensure this rotation and what should be the vehicle configuration, which, at first approach, does not seem such a complicated engineering task.

I grabbed on to this idea and realized it could be developed. Because it was the only solution not contradicting the laws of physics for a self-supporting aircraft, but not for a fixed, stable, stationary construction attached to the planet. Because I believe in laws of physics and not in otherworldly forces. I don't believe in any UFOs, which fly in and solve all our problems. At the same time, I believe in extraterrestrial civilizations, which know more than we do. But we ourselves know a thing or two.

I began to look for ways to implement this. I mentally inflated a torus with a pressure of a billion atmospheres. It would be problematic and unwise to unwind a certain yet abstract ring that encircles the planet with external drives. In order to reach the required rotation speed of such a massive construction, you would need, first, a large amount of energy, and second, super-hard materials. Then, likely, you would have to place an engine inside the system, in a special channel. You could reduce the friction resistance during acceleration by using an electric motor with magnetic levitation of the rotor. Air resistance will be removed by pumping out of the channel in which the engine will work. The rotor fulfills the role of a flywheel, unwinding until it takes on zero gravity under the effect of centrifugal force and begins to head upwards, dragging along the entire structure in the form of a giant torus and the cargo attached to it. Then the second flywheel is turned on, beginning to rotate in the direction opposite to the first one and revolving due to it the vehicle's hull to the speed of eight kilometers per second required to enter near-Earth space orbit. Thus, for the first time I found a solution to create the General Planetary Vehicle (GPV)



Centrifugal force – the inertial force in a non-inertial reference frame that is independent of the speed of movement of a material point in the reference frame and does not depend on accelerations (linear or angular) of the reference frame itself relatively to the inertial reference frame.

Performance of the self-supporting space elevator is not more than

10,000 tons of cargo per year

(one and a half grams for each inhabitant of the planet).

More than

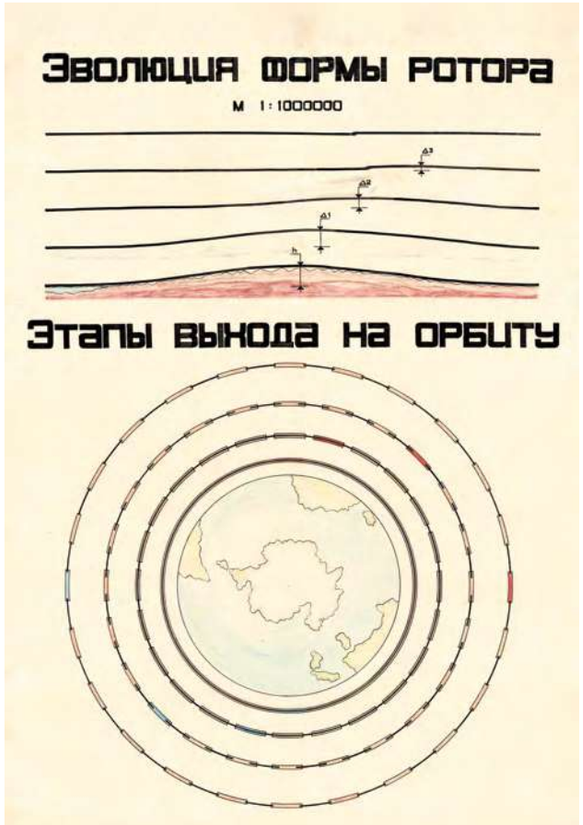
3 billion tons of cargo per year

is transported in China by rail.

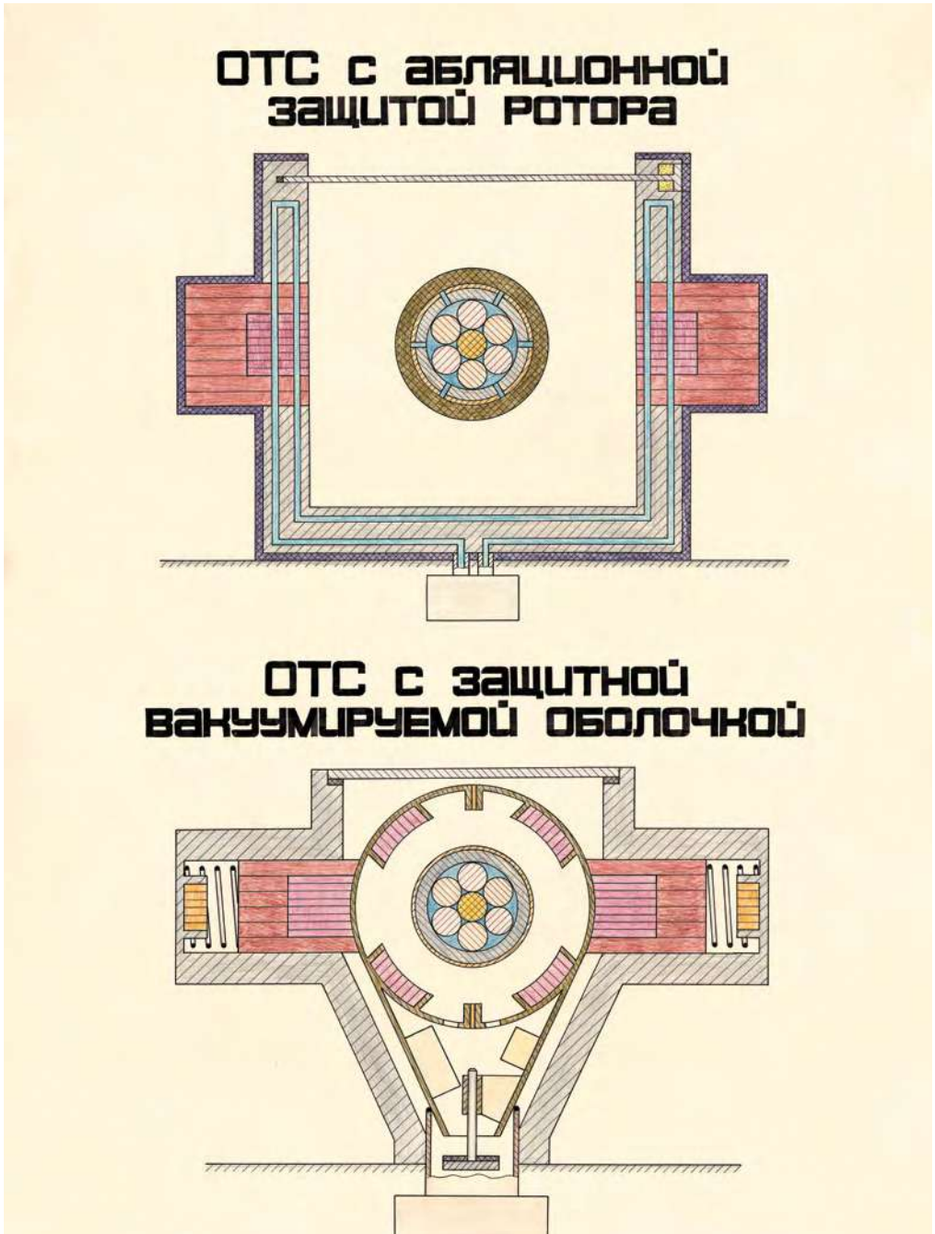
capable of going into orbit up to 100 times per year with each flight delivering in a couple of hours up to 10 million tons of cargo and up to 10 million passengers, providing them with the comfort of a modern railroad. No other geocosmic transportation system is capable of such a thing, both among implemented and among hypothetically possible ones.

In the General Planetary Vehicle invented by me, what only Baron Munchausen was able to do will be realized. Just as he dragged himself and his horse out from the swamp by his own hair, so my geocosmic transport uses only the internal forces of the system to travel in space. Consequently, it has the ability not to interact with the environment or destroy it. It does not contradict the laws of physics although the Baron himself acted in violation of them. In particular, from the laws of conservation it follows that the center of the mass of the system cannot be moved in space at the expense of the internal forces of the system. Consequently, the “Munchausen – horse” system could not be moved by using Munchausen’s arms’ force.

Poster of 1974.
Structural design of the rotor and cargo-passenger GPV (version)



Poster of 1974.
Stages of the GPV rotor’s exit into outer space



Poster of 1974.
The GPV with ablative protection of rotor and the GPV with protective vacuumized shell

$$\vec{p} = m\vec{v}$$

Conservation laws – fundamental physical laws according to which, under certain conditions, some measurable physical quantities that characterize a closed physical system do not change over time. These are the most general and significant laws in any physical theory. Some of the conservation laws are always fulfilled under all conditions (for example, the laws of conservation of energy, momentum, moment of momentum, electric charge). Other laws are only approximate and are fulfilled under certain conditions.

2019. General Planetary Vehicle (visualization)

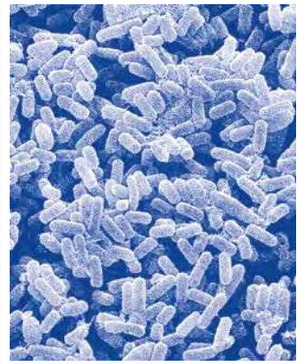
Pulling his pigtail upwards, he could tear out his hair, break his arm but not pull himself out of the swamp. But in the General Planetary Vehicle concept proposed by me, however, the center of his mass always coincides with the center of the mass of Earth. On the whole, it remains immobile, it is only an element of the system that moves by the internal centrifugal force – a ring encircling the planet, the body deformed (lengthening by increasing the diameter) as it rises in space. From the perspective of the physics, there is nothing impossible in this. From the perspective of ecological and electrical efficiency, there are no and cannot be decent alternatives.

Saving the Planet

For several weeks I couldn't think of anything else. Every spare minute I took a pencil and sketched and calculated... Or I went to the library in order to find out some additional information. There was the feeling of a really big discovery, although at that time I didn't fully understand all of its significance. This awareness came gradually. First there was the birth of my son and the simple parental fear for his future and consequently, for the future of the world in which he will live. Then service in the army which visibly demonstrated what a monstrous machine had been created for the destruction and annihilation of life. Then there was the work on construction sites, the opposite side of which was always destruction. All this was permeated with official proclamations of the struggle for peace, for the conservation of nature and a bright future that were not tied to reality. Over and over again I returned to the idea of the General Planetary Vehicle, each time seeing almost in reality what could be transformed. Gradually it became clear why such changes were necessary. I simply did not manage to find another path of development. There still isn't one even today, although this is felt more acutely than before, and is obvious now not only to me.

According to modern conceptions, life appeared on Earth about four billion years ago. Developing and adapting to the conditions existing on the planet, living organisms began to transform the surroundings. These transformations were no less than those that had occurred with living organisms to the extent of their development and improvement. On a deserted planet that was dead at first, an atmosphere containing oxygen appeared, soil, coral reefs, the ozone layer, and the contemporary landscape with its swamps, tundra, taiga, and jungles. Thus, the Earth's biosphere was formed, created from wastes from the life cycle of living organisms (e.g., atmospheric oxygen is also a waste product of the life cycle of vegetation, the humus of fertile soil is what has decayed, rotted, and passed through the stomachs and intestines of animals, the earth worm, and microorganisms). In the Earth's biosphere, millions of forms of living organisms and the planet transformed by them were ideally "matched" to each other. There is nothing excessive here.

But now the human being appears on the stage who, thanks to his intelligence, has begun to flex his muscles, sense organs, and intellect, and has become to create technology and master technological processes. This happened long ago, several hundred thousand years ago, when primitive people began to make primitive tools of labor, and then



Soil microorganisms – microscopic forms of life that contribute to the decomposition of dead organic substances up to mineral ones, as well as produce valuable forms of humus in the deep layers of earth, that is, they participate in processes without which the normal existence of biogeocenoses would be impossible. Vital processes in the soil play a key role for its structure, fertility, growth and development of plants. The number of various microorganisms in garden soil with a depth of arable layer up to 0.2 meter can be 7%, which means 42 kilograms of organic mass for every 100 square meters.

Technosphere – part of the biosphere (according to some ideas, the entire biosphere over time), radically transformed by man through the indirect impact of technical means as well as technical and man-made objects (buildings, roads, mechanisms, etc.), specific technical knowledge, skills, rules, theories, and in general the system of relations between man and nature, where technology acts as a sort of intermediary.

began to cook food on a fire, and to process animal skins. It was then humankind chose the technological path of development, and we are not fated today to change it. The modern industrial might of the Earth's civilization is only the logical development of the technocratic direction.

Factories, plants, power stations, lathes, automobiles, and such are analogues of living organisms in the biosphere. And like living organisms, they exchange energy, information, and substance with their surroundings and therefore just like organisms inevitably must transform nature that surrounds them. Only from the perspective of biology, the pollution of the environment is occurring. From the technological perspective, the factories, plants, and power stations do not pollute anything. On entry they have raw materials, and on exit they have ready-made manufactured items and original raw materials transformed (net of the finished production) which naturally goes back to where it was taken from – the environment. It is fundamentally impossible to avoid this. To create closed technological cycles and thus resolve environmental problems is also fundamentally impossible. It would be approximately the same as prohibiting a cow from producing dung, urine, methane, and CO_2 along with milk.

Even the biosphere as a whole is not a closed system. After all, it transformed a previously inert Earth. Only the "Earth – biosphere" system is closed. Just like the technosphere, and not an individual factory or plant, under the conditions of a given planet, the system cannot be closed. The technosphere will inevitably transform Earth. But in which direction?

The technosphere does not need an oxygenated atmosphere. Already today the industry of the USA and China consumes more oxygen than the green plants produce on the territories of these countries. They live in debt – they leach oxygen from the atmosphere (essentially stealing it) produced by the Russian taiga and the jungles of the Amazon. What if all countries reach such a level of industrial development?

The technosphere does not need soil. That is why there is less and less fertile earth on the planet, and more and more slag, ash, and waste heaps. Acid rains, smog, an elevated radiation level, destruction of the ozone layer, and so on – all of this is inevitable. The process of transforming the Earth's nature, the biosphere, can only be slowed down but it cannot be stopped. The technosphere occupies the same ecological niche as the biosphere as a whole: machines, mechanisms, and technical devices are placed in the depths of the earth, water, and air and actively exchange matter and energy with them.

Global environmental problems – a set of socio-natural problems that affect the social progress of mankind and the preservation of civilization. These problems are characterized by dynamism, arise as an objective factor in the development of society, and require combined efforts of all mankind to solve them. Global environmental problems are interrelated and affect all countries. The most urgent of them are: air and land pollution, destruction of the ozone layer, depletion of freshwater reserves, pollution of the World Ocean, destruction of soil covering, and depletion of biological diversity.

Weightlessness – a state in which there is no force of interaction of a body with a support or suspension (the weight of the body); it occurs in connection with gravitational attraction or the action of other mass forces (in particular, the force of inertia created during accelerated movement of the body). The use of weightlessness in industry has not been developed on Earth, since creating such necessary short-term (no more than a minute) conditions on the planet, unlike space, is a complex and expensive procedure. For this reason, it is tempting to establish some production facilities in space, which would significantly reduce energy costs and significantly improve the quality of certain materials as well as create unique raw materials and products.

Environmental problems became severe in the 21st century only because the technosphere, in its energy efficiency, that is, in its ability to transform the environment, approximated the biosphere as a whole. For example, now the biosphere is producing more than 200 billion tons per year of dry organic material, which, converted to fuel, is only an order of magnitude greater than the annual consumption of energy by all technology at the disposal of the Earth's civilization. But the volume of soil, ore, and other raw materials transported and processed by machinery is already close to the volume of organic matter produced by the biosphere.

There is only one radical way out of this situation: it is necessary to provide an environmental niche for the technosphere outside the biosphere. This would ensure the preservation and development of the biosphere according to the laws and directions that have been formulated during billions of years of evolution of life on the planet, and also the harmonic interaction of the community of people (as biological entities) with the biosphere.

There is no such environmental niche for the technosphere on Earth. There is one in near space, however, where there are ideal conditions for the majority of technological processes – weightlessness, deep vacuum, ultra-high and cryogenic temperatures, unlimited raw material, energy, space, and other resources.

There is not so much time left for humankind's wide-scale space exploration. In aviation, the concept of the point of no return exists – the moment after which a plane no longer has enough fuel in order to return. In my estimation, there are only two generations, that is 40–50 years until the point of no return in the development of our technocratic civilization. After that, nothing can restore the balance disrupted between Live Nature and dead industry, i.e., between the technosphere and the biosphere. Due to the technocratic oppression of the biosphere, its irreversible degradation will begin, and along with it, the degradation of the human race that has created this very technosphere.

The planet can be saved, preserving, at the same time, the possibility for further development of the Earth's civilization, only by transferring industry into space, after organizing it on a more effective technological level. From the position of physics, the General Planetary Vehicle I have conceived is the only implementable engineering tool for solving such an ultra-wide-scale problem. Once I understood this, I was finally certain of my mission. Now I am obliged to convey the idea to the maximum number of people and do everything in my power to implement this idea. Such a decision was not fully conscious, but it determined the path that I have followed now for about 50 years.

How My Inventions Began to Worry the KGB

Like a doctor who makes a diagnosis of a person on a hunch by looking at him, and like an artist observes the play of light and shadow in everyday life, so, too, an inventor tries to think up new solutions and tools no matter what he encounters. Since childhood, I had numerous ideas at the level of an invention in the most diverse fields. Thousands of ideas. In time, their number grew, and the moment came when I realized that it was time to formulate them as inventions. I then worked in the highway construction trust, laying pavement, so to say, and worked on my inventions after work and on weekends as a hobby. Realizing that I did not know how to fill out the forms to get copyright certificates (patents), I decided to protect at first my simplest solution. I chose soap.

This was at the end of 1976. At that time in the USSR, hard soap was an absolutely universal hygienic means. It was used for both laundry and washing, as a fragrance and even as a means of fighting moths (it was put in closets with clothing). Most likely you have often found yourself in this situation: you are taking a bath, you have soaped up, and suddenly the soap falls in the water and sinks. It's not easy to find it, especially because the suds are getting in your eyes and stinging as soon as you open them. You think, "Wouldn't it be great if soap didn't sink at all..." Given that we lived in poverty, we didn't throw out lumps of soap until they were completely worn out; it was expensive, after all. But it was difficult and inconvenient to use the pieces left over – they were thin, and broke and crumbled easily. I decided to improve this cosmetic and detergent substance. I thought of inserting a piece of foam in the center of the bar in the shape of a leftover piece of soap – then the soap would not sink, and it could be used totally. The convenience of using it wouldn't suffer, and only the cheapest piece of foam would be discarded.

I filled out a form and submitted it to the patent bureau. A few months later, they returned it as improperly filled out – it had not passed a formal experts' analysis. I redid it, and it was accepted. I was very happy with this. Nevertheless, I was refused a patent. As I understand it now, ineligibly. Usually an invention for which an application has been submitted is compared to another, analogous invention submitted earlier. But my soap was compared to a completely different soap – it had a magnet placed inside it, and it could adhere without falling to a steel surface;

KGB of the USSR – the central body of USSR state administration in the field of security, which operated in 1954–1991. In addition to carrying out traditional intelligence functions (in particular, state border guarding, foreign intelligence and counterintelligence activities, combating terrorism), KGB performed the ideological function and sought to suppress any activity that was contrary to the ideology officially proclaimed by the Communist Party. Various means were used at different times for this purpose, ranging from imprisonment and execution to the use of psychological pressure, including foot surveillance, pressure through public opinion, undermining professional careers, preventive conversations, deportation from the USSR, forced imprisonment in psychiatric clinics, political trials, discrediting, various provocations, and intimidation.

Copyright certificate (patent) – a document certifying the copyright for an invention. It was issued in the USSR. Unlike a patent, a copyright certificate does not preserve the author's exclusive right to use the invention. This right went to the state. The concept was introduced in the "Regulations on Inventions" of July 30, 1919. Copyright certificates were issued before the introduction of the law of the USSR "On Inventions in the USSR" dated July 1, 1991, under which only one form of protection of inventions was preserved in the country – a patent.

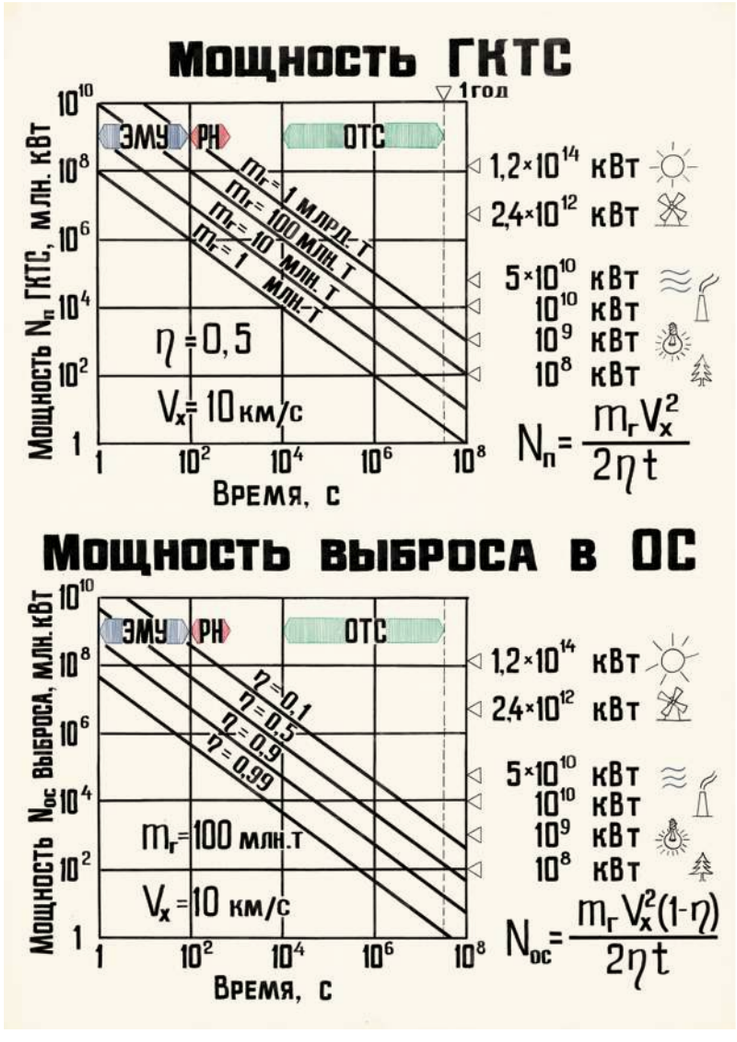
to be sure, it sunk in the water like a brick. By the way, this wasn't important to this short-sighted expert.

My next applications were for underwater rockets. This topic still greatly concerned me. Although I no longer looked at rockets as a means for widescale space exploration, from the perspective of inventions, they remained interesting. The possibilities of using jet-powered aircraft, with power resulting from the ejection of part of its own mass, both for peaceful and military purposes, were still inexhaustible. The rockets I invented could be maintained under water (and not in underground silos) at a depth of several kilometers and could be launched from there at a speed of 500 kilometers per hour or more – after all, the pressure there is of hundreds of standard atmospheres, you only have to place the rocket on a special piston. The rockets could also move under water horizontally in a special gas cloud that reduced the resistance of the water.

Based on one of the underwater installations, I invented a high-power pneumo-hydraulic energy storage, placed in the sea or on dry land in ground waters, at a depth of about a kilometer. During peace time, the device could work as an accumulating power station, where air is pumped under pressure. In the event of war, an intercontinental missile could be launched from it being pushed out of the shaft by a special piston located at a depth. The jet engine would ignite only when the weapon ends up high in the atmosphere, as a result of which the launch wouldn't be detected by the enemy. Infrared detection systems would not work. There is nothing in the world like that to this day. Meanwhile, in the 40 years that have passed since these applications were filed, such a cheap and powerful energy accumulator could have saved trillions of kilowatt-hours of electric power. The energy would be accumulated at night, when everyone is asleep and the power plants are idling (as it is known, it is dangerous to turn them off), and would be disbursed during the day when the peak power consumption occurs.

I submitted more than 20 applications for inventions – all of them were rejected. They were rejected for contrived reasons. For example, they compared a power station with a rocket launcher to... a film greenhouse and an oil tanker. The rejections came from the department of specialized technology (all of my applications ended up right there). Only recently did I learn that in Russia unique rockets have been created capable of moving under water in a gas cloud at a speed of 300 kilometers per hour. When they encounter islands that jut out of the water in their trajectory of movement, they fly over them in the air and then once again dive into the water. I don't know who got these ideas first – me or classified military institutes.

Then I began to submit applications for the General Planetary Vehicle – a geocosmic non-rocket vehicle capable of taking terrestrial industry to space, in orbit. I kept a correspondence going for five long years regarding these applications – the experts put forward about 500 arguments and objections against it. The Sun and the Moon would prevent this, they said, and Earth is not an ideal sphere – it's a geoid. And solar wind would blow everything away, and there isn't enough money, along with concrete and steel. I kept insisting, citing calculations and arguments – the correspondence filled several hundred pages.

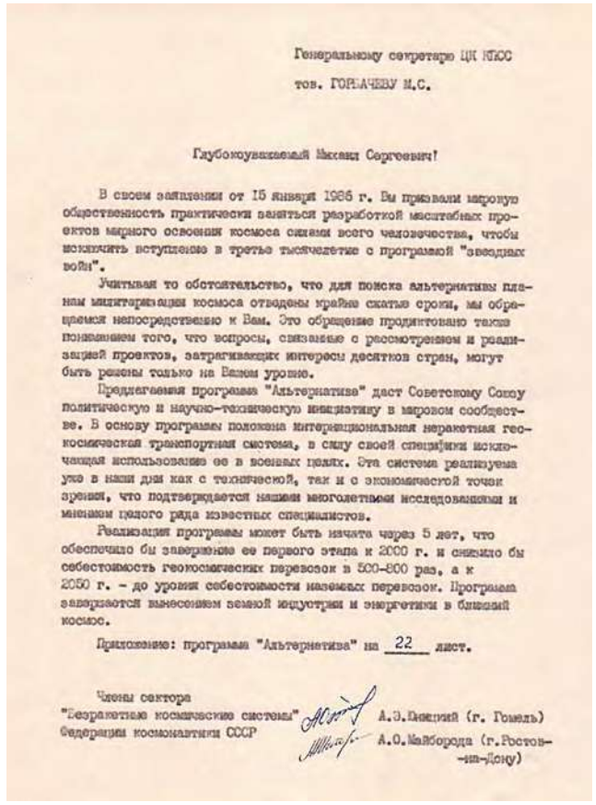


Poster of 1976.
Power capacity of geocosmic transport system depending on cargo flow

Mikhail Gorbachev – Soviet and Russian state, political, party, and public figure. The last General Secretary of the Central Committee of the Communist Party of the Soviet Union (1985–1991). The last Chairman of the Presidium of the Supreme Soviet of the USSR (1988–1989), the first and only President of the USSR (1990–1991). A large-scale attempt to reform the Soviet system ("perestroika") was made during Gorbachev's tenure as head of state and party leader. A policy of transparency, freedom of speech and the press, democratic elections, and reforming of the socialist economy in the direction of a market economy model was introduced, which led to a deep economic crisis and the further collapse of the Soviet Union.

Perestroika – large-scale changes in the state ideology, economy, internal and foreign policy of the USSR, which began in the second half of the 1980s. The goal of the reforms was to overcome various social, cultural, political, and economic crisis phenomena that were manifested in the USSR by the mid-1980s, by comprehensively democratizing the socio-political and economic system that had developed in the country and introducing elements of a market economy.

In despair, I decided to publish my space program. And then quite frankly, I wrote a letter to Mikhail Gorbachev, General Secretary of the Central Committee of the Communist Party of the Soviet Union (CC CPSU). I proposed a hyper-accumulator of energy, which the USSR could oppose to the Strategic Defense Initiative (SDI), also known as "Star Wars" (announced by US President Ronald Reagan on March 23, 1983, a long-term program of scientific research and experimental design work aimed at creating the scientific and technical basis for developing a wide-scale system of anti-missile defense with elements based in space, eliminating or restricting possible defeat of land or sea targets from space). Essentially, this program had the purpose of destroying the Soviet Union, although it was based on fairly dubious engineering ideas not implemented even today, by the way – kinetic weapons that would shoot pebbles at Soviet missiles at a speed of 200 kilometers



Генеральному секретарю ЦК КПСС
тов. ГОРБАЧЕВУ М.С.

Глубокоуважаемый Михаил Сергеевич!

В своем заявлении от 15 января 1986 г. Вы призвали мировую общественность практически заняться разработкой масштабных проектов мирного освоения космоса силами всего человечества, чтобы исключить вступление в третье тысячелетие с программой "звездных войн".

Учитывая то обстоятельство, что для поиска альтернативы планам милитаризации космоса отведены крайне сжатые сроки, мы обращаемся непосредственно к Вам. Это обращение продиктовано также пониманием того, что вопросы, связанные с рассмотрением и реализацией проектов, затрагивающих интересы десятков стран, могут быть решены только на Вашем уровне.

Предлагаемая программа "Альтернатива" даст Советскому Союзу политическую и научно-техническую инициативу в мировом сообществе. В основу программы положена интернациональная неракетная космическая транспортная система, в силу своей специфики исключающая использование ее в военных целях. Эта система реализуема уже в наши дни как с технической, так и с экономической точки зрения, что подтверждается нашими многолетними исследованиями и мнением целого ряда известных специалистов.

Реализация программы может быть начата через 5 лет, что обеспечило бы завершение ее первого этапа к 2000 г. и снизило бы себестоимость геокосмических перевозок в 500-800 раз, а к 2050 г. – до уровня себестоимости наземных перевозок. Программа завершается вынесением земной индустрии и энергетики в ближний космос.

Приложение: программа "Альтернатива" на 22 лист.

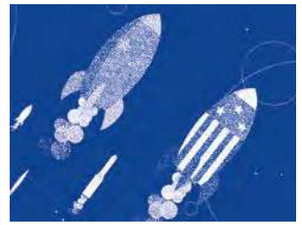
Члены сектора
"Безракетные космические системы" Федерации космонавтики СССР А.Э.Пилипий (г. Гомель)
А.О.Майборода (г.Ростов-на-Дону)

1986. Address to Mikhail Gorbachev, the General Secretary of the CPSU Central Committee

per second (720,000 kilometers per hour!), X-ray laser cannons and other similar pseudo-scientific nonsense. Likely this was a bluff on the part of the USA, necessary in order to force the USSR to expend resources on designing the means to defend from weapons that no one intended to create. The Russians really did invest hundreds of billions of dollars in anti-SDI, finally undermining the country's economy, which ultimately led to its collapse.

Essentially what I proposed to Gorbachev was an operating model of the GPV, reduced 200 times, with a dual purpose: a peaceful one, as a giant kinetic accumulator of electrical power, and also a military one. In an underground tunnel around Moscow with a diameter of about three meters across (which is far less than the metro tunnel) a rotor could be placed in a vacuum channel, held by a magnetic suspension to prevent contact with the walls. Then, as with the GPV, the rotor could be driven along the channel and respectively, around Moscow, by a linear motor, accelerating to a speed of eight kilometers per second, that is, to the first cosmic velocity. The length of the rotor is made up of separate hollow projectiles, linked together and filled to capacity with special heat-resistant needles. Upon a threat from space, the rotor would divide into separate projectiles which would be diverted to special canals, placed at certain intervals. In the canal, each projectile is rotated by an electromagnetic field to a certain angle and revolves around its own axis. Upon entry into the atmosphere, it makes the appropriate aerodynamic maneuver, the hull burns and then a cloud of needles flies at the speed of eight kilometers per second in the direction chosen. This cloud knocks down everything in its path (enemy missiles, airplanes), and then falls like a meteoric shower on the enemy's territory.

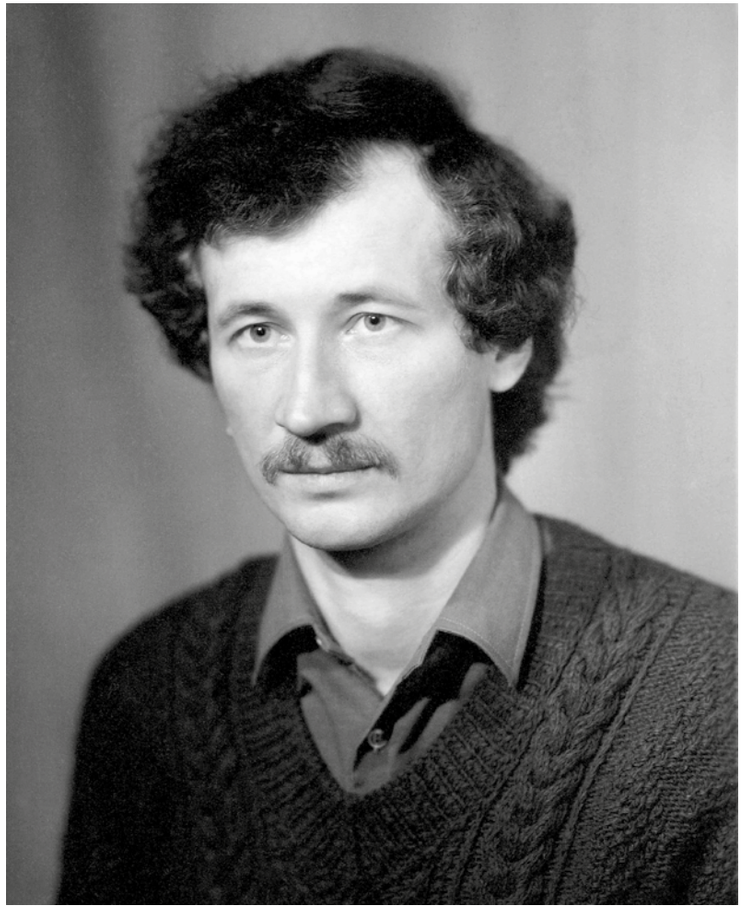
The needle, flying at space velocity, will easily pierce a tank. If the needles will then fly in a grid with a ten-centimeter mesh, all objects larger than a baseball will be destroyed. Even so, such weapons can be called relatively humane (although I think this term in general is hardly applicable to an instrument of killing, even in defense from an attack). Killing the enemy with bullets (and the needles are the same as bullets) is considered normal; it is not prohibited by any international conventions, after all. Chemical and bacteriological weapons are prohibited, as are both nuclear and thermonuclear weapons. The possibility of using such a weapon against the country in which I lived together with my family did not seem illusory at all at the time. Naturally, such a prospect worried me, as it did others. That is why I named the Center for Scientific and Technical Creativity of the Youth "Star World" that I founded in Gomel in 1988 – as a counterweight to Star Wars, the ideology that the Americans devised.



Space Race – an intense competition in the field of space exploration between the USSR and the United States in 1957–1975. The race events included launches of satellites, space flights of animals and humans, as well as landing on the Moon. The race was a side effect of the Cold War. Nevertheless, it has provided a number of significant achievements and breakthroughs in the development of science and technology.

Cold War – a term used in reference to the global geopolitical, military, economic, and ideological confrontation between two blocs of states from 1946 to the late 1980s. One of their centers was the USSR and the other – the United States. This confrontation was not a war in the international legal sense. One of the main components of antagonism was the ideological struggle – as a consequence of the contradiction between the capitalist and socialist models of the state system.

Center for Scientific and Technical Creativity of the Youth – a type of commercial enterprise that was a kind of experiment of the Soviet authorities during the years of perestroika. Such centers were one of the first types of entrepreneurship legalized in the USSR. Later, after the collapse of the USSR and Russia's transition to a market economy, many managers and functionaries of the centers have managed to develop major business structures in the country.



1977. 28-year-old Anatoli Unitsky was a Senior Engineer at the Gomel Road Construction Trust

I was first invited to the Gomel KGB regarding the letter to Gorbachev. They were concerned. "Anatoli, do you really not understand that Mikhail Gorbachev is a very busy person? And there are so many PhDs in science and academicians in our country. Please, don't get in the way of their work." I did not listen to their objections, however. Perhaps because my horoscope sign is Aries, and I am as stubborn as a ram. Furthermore, according to the Chinese calendar, I was born in the year of the bull. It turns out I am twice horned and twice hoofed. It seemed to me back then that I could lift up anybody with my horns or at least trample them with my hooves.

First Publications and Reactions to Them

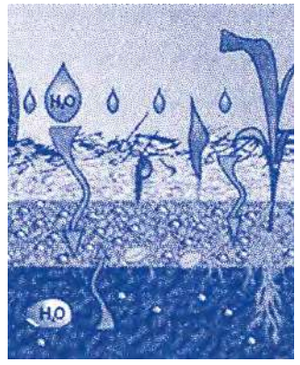
I submitted the first application to obtain copyright certificate (a patent) on the General Planetary Vehicle in 1977. By that time, approximately 5–6 years after the emergence of the engineering-formulated idea, it hadgrown into a specific technical solution. The basic preparatory work was done approximately within half a year. It took that long because everything was done in my spare time, mainly in the evening and at night. Even so, work was a delight, I kept having the feeling that what was being done had enormous significance, that it was the start of a great journey. At that time, I didn't know what this journey would be like.

My application to the State Committee for Inventions, like all the other applications submitted before that time, was returned to me. They rejected it, saying it was incorrectly filled out and hinting that such major ideas are not defensible at all. At the end of the day, in order to learn how to fill out applications correctly, I took courses in patent law, and then went to work at a scientific research institute – the Institute for Mechanics of Metal-Polymer Systems at the Belarusian Academy of Sciences.

Science and inventions were areas in which I felt comfortable, which could not be said about road construction, especially when it was a question of paving the countryside. You come out in nature, you see the natural landscape, and here the realization comes to you: your task is to change it, to destroy it. You send vehicles here, you build an embankment, and you dig a hole, which violate hydrology; then you cover the earth with asphalt so that it is level, and nothing can grow on it. Then cars drive over it, bringing with them noise, exhaust gases, the products of tire wear and other garbage. It will lay there, on the side of the road, where there was once forest. You took a direct part in this transformation, and supposedly in people's interests, you damaged nature. But a human is a part of nature. Can such interests be correct? I experienced this conflict personally, and by virtue of the sense of closeness to the earth retained even from childhood, I felt it keenly. For this reason, as well, I was relieved to transfer to the Institute, although I lost a significant amount of pay, which affected relations with my family.

At the Institute, first I worked in the position of lead engineer, then became head of the patent licensing office, where I gained a lot of practice. I personally, and along with co-authors, patented more than 100 inventions. Three times I was recognized as the best inventor of the year,

USSR State Committee for Inventions – a state administrative agency conducting the state policy in the field of inventions and discoveries as well as in charge of issuing patents and author's certificates on them.

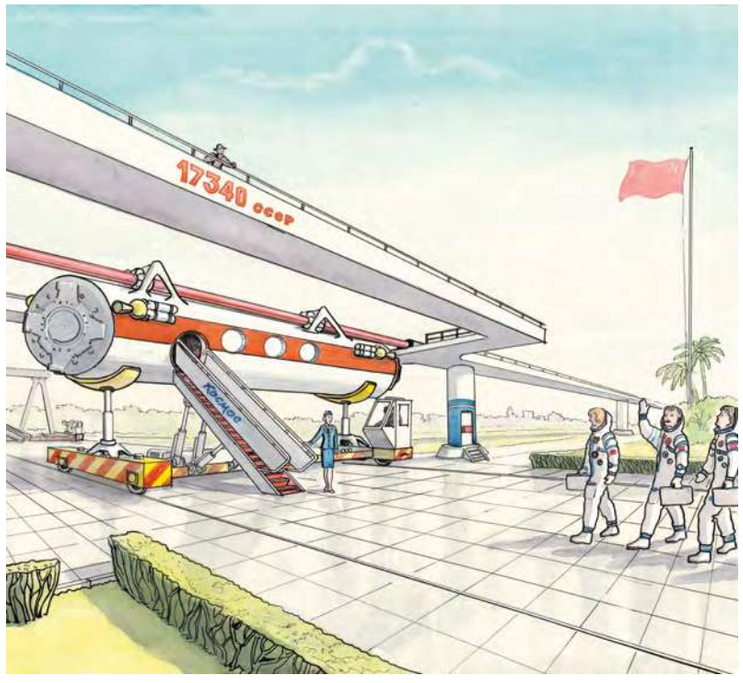


Soil hydrology – a branch of hydrology that explores the systems and processes of receipt, translocation, and consumption of moisture in the soil as well as these systems and processes themselves. Violation of soil hydrology significantly changes the processes of transferring substances in them, leads to the redistribution of humus in the soil structure and the transformation of its qualitative composition. The result is a secondary salinization of the soil, waterlogging of the land and soil degradation. One of the main reasons for this deterioration of soil status is the laying of transport communication lines.

Exhaust gases – products of oxidation and incomplete combustion of hydrocarbon fuel in an internal combustion engine. With exhaust gases, the atmosphere is supplied with saturated and unsaturated hydrocarbons, aldehydes, carbon and nitrogen oxides, soot, and other carcinogenic substances, in total more than 100 items. Exhaust gases cause a general weakening of the body – immunodeficiency; they damage the tissues of the nervous system and increase the risk of developing dementia – an acquired mental deficiency. In addition, they themselves can cause various diseases: respiratory failure, maxillary sinusitis, laryngotracheitis, bronchitis, bronchopneumonia, lung cancer, atherosclerosis of the brain vessels, pulmonary pathology, disorders of the cardiovascular system. Exhaust gases are the main source of excess of permissible concentrations of toxic substances and carcinogens in the atmosphere of large cities and the formation of smog.

and the Institute took first place in inventions in the USSR. People came to us from all the Union republics to acquire experience. Parallel to this, I did not cease to submit applications for the General Planetary Vehicle. But I kept getting rejections over and over.

I was given to understand, by hook or by crook, that thousands of reasons could be found to reject my idea. When I understood that an amateur inventor who has submitted an application by himself personally, not from a state enterprise, will never obtain a patent for something serious, I decided to publish my own program for industrial space exploration. If only for no other reason than to defend my precedent and copyright, since my applications and my correspondence about them would never be published. I got in touch in Moscow with the editorial offices of the most widely-read All-Union popular science magazines, and in 1982, in two of them, "Izobretatel' i ratsionalizator" [Inventor and Innovator] and "Tekhnika – molodyozhi" [Technology for Youth] my first articles on this topic were published. That's when the unrighteous struggle was unleashed against me, but first I will cite the text in full of my first popular scientific article of 1982.



Poster of 1980. GPV. Second level circle passenger station


СОЮЗ СОВЕТСКИХ СОЦИАЛИСТИЧЕСКИХ РЕСПУБЛИК

ГОСУДАРСТВЕННЫЙ КОМИТЕТ СССР ПО ДЕЛАМ ИЗОБРЕТЕНИЙ И ОТКРЫТИЙ

АВТОРСКОЕ СВИДЕТЕЛЬСТВО

№ 769438

На основании полномочий, предоставленных Правительством СССР, Государственный комитет СССР по делам изобретений и открытий выдал настоящее авторское свидетельство на изобретение:

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Anatoli Unitsky has more than 100 copyright certificates


ПРОЛЕТАРИИ ВСЕХ СТРАН, СОЕДИНЯЙТЕСЬ!

ПОЧЕТНАЯ ГРАМОТА

ИНСТИТУТ МЕХАНИКИ МЕТАЛЛОПОЛИМЕРНЫХ СИСТЕМ АКАДЕМИИ НАУК БССР

НАГРАЖДАЕТ

ведущего инженера КИЗИРИЯ АНАТОЛИЯ ЭДУАРДОВИЧА

За достигнутые успехи в социалистическом соревновании и активное участие в общественной жизни Института.

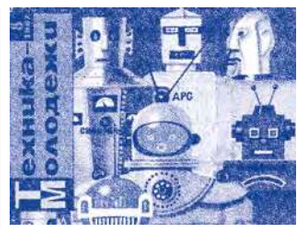
И.о.директора,д.т.н. А.Н.СЕМЕНЕНОК

Секретарь партбюро,к.т.н. В.М.КУПЧИНОВ

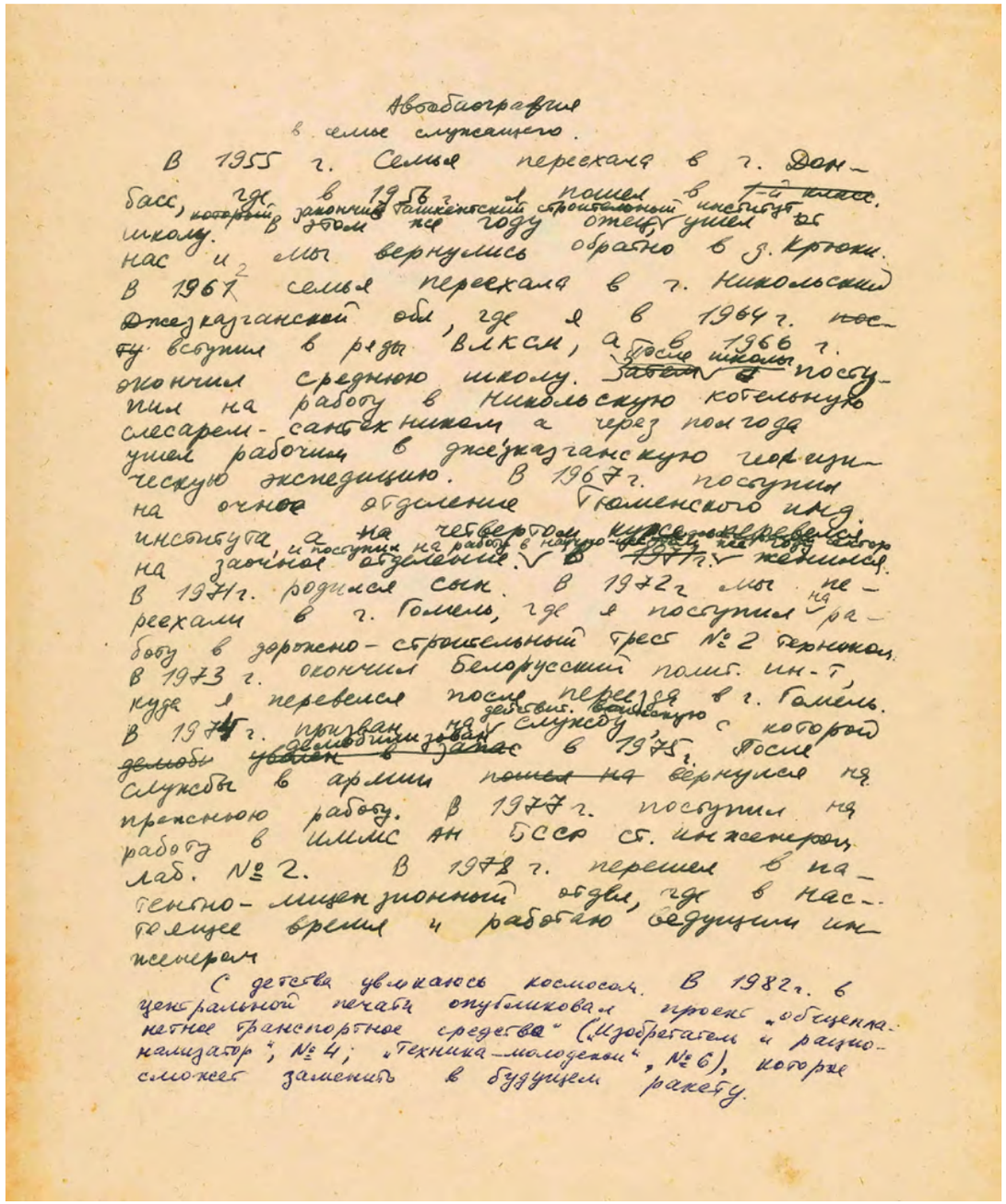
Председатель месткома,к.т.н. Л.С.КОРНИЛОВА

"30"декабря 1980г.

1980s. Certificates of appreciation awarded to Anatoli Unitsky for achievements



Journals "Izobretatel' i ratsionalizator" [Inventor and Innovator] and "Tekhnika – molodyozhi" [Technology for Youth] – popular science editions, published monthly in the USSR. They had a large circulation and audience, were distributed in retail chains and by subscription and were supplied to all libraries in the country. "Izobretatel' i ratsionalizator" was the press organ of the All-Union Society of Inventors and Rationalizers. "Tekhnika – molodyozhi" published the best works of Soviet and foreign fiction in addition to popular science articles.



Автобиография

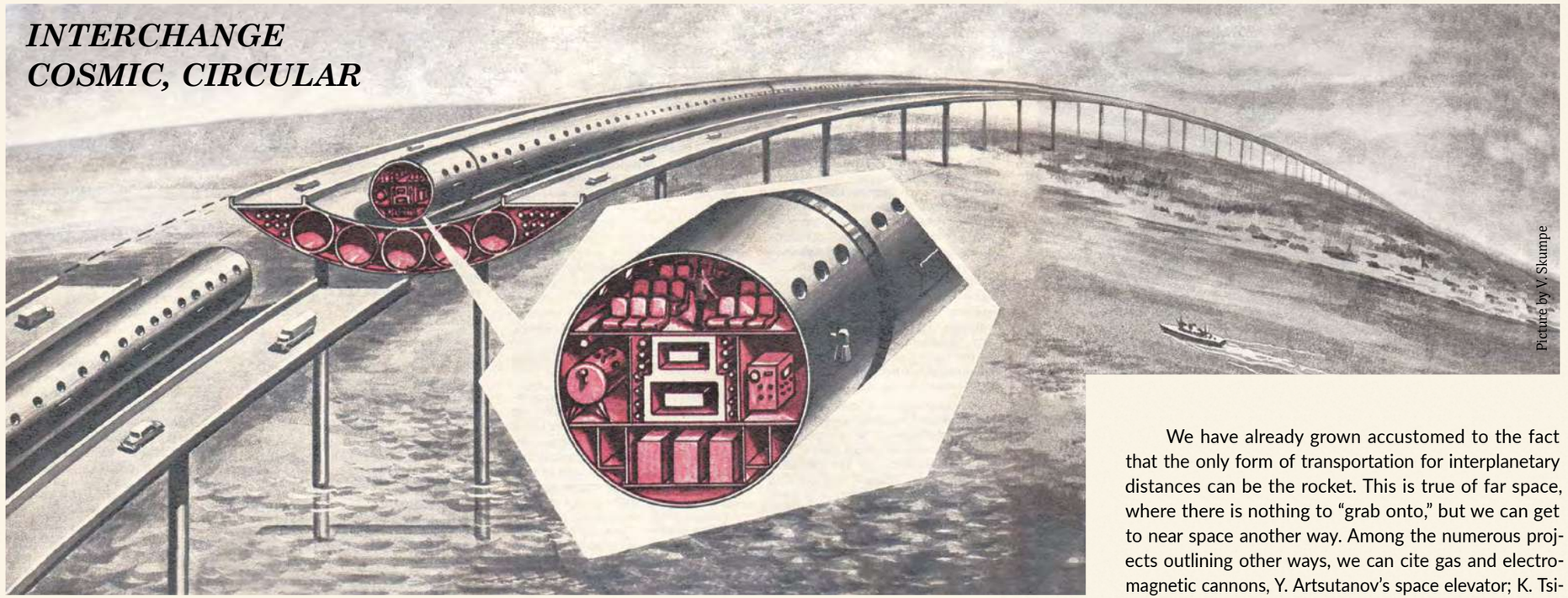
Я семьи служащего.

В 1955 г. Семья переехала в г. Донбасс, где в 1956 г. я пошел в 1-й класс. В 1965 г. окончил Ташкентский строительный институт. В этом же году отец ушел на пенсию и мы вернулись обратно в г. Кривой Рог. В 1967 г. семья переехала в г. Никольский Джезказганской обл., где я в 1964 г. поступил в ряды ВЛКСМ, а после 1966 г. окончил среднюю школу. После школы поступил на работу в Никольскую котельную слесарем-сантехником а через полгода ушел рабочим в джезказганскую геологическую экспедицию. В 1967 г. поступил на очное отделение Гомельского инж. института а на четвертом курсе перевелся на заочное отделение. В 1971 г. женился. В 1971 г. родился сын. В 1972 г. мы переехали в г. Гомель, где я поступил на работу в дорожно-строительный трест № 2 техником. В 1973 г. окончил Белорусский полит. ин-т, куда я перевелся после переезда в г. Гомель. В 1974 г. призван на службу в ряды СА, с которой демобилизован в запас в 1975 г. После службы в армии пошел на вернулся на прежнюю работу. В 1977 г. поступил на работу в ИПМС АН БССР сл. инженером лаб. № 2. В 1978 г. перешел в научно-технологическую отдел, где в настоящее время и работаю ведущим инженером.

С детства увлекаюсь космосом. В 1982 г. в центральной печати опубликован проект „общественного транспортного средства" („Изобретатель и рационализатор", № 4; „Техника — молодежи", № 6), которое сможет заменить в будущем ракету.

1982. Autobiography written by Anatoli Unitsky

INTERCHANGE COSMIC, CIRCULAR



Picture by V. Skumpe

More than 20 years ago, Yuri Gagarin paved the way into space. Ever since, projects to explore near-solar space, which had seemed a remote dream, took on an unexpected reality. Today, in strictly scientific works, the phrase "cosmic imperative" has become fashionable. A significant part of humankind has realized that our civilization will inevitably exchange its two-dimensional nature to a three-dimensional one, will leave the spherical surface of Earth and head to the stars. In fact, if the entire population of the planet reaches the standard of living of the advanced countries, the extraction of raw materials and the expenditures of energy will have to be increased approximately by about 30 times. The corresponding level of pollution will turn out to be deadly for nature.

It has been suggested that in the next 200,000 years, people will settle the entire galaxy. Krafft Ehricke, a major specialist in astronautics, has stated: "Developing industrialization will inevitably change the environment and thus resurrect the ancient dragon of the nomad life – as a necessary condition for human existence. The main line is still the same, only the scene is somewhat changed by the turn of the millennia."

It is said that the first step is the most difficult. That is true for interplanetary flights as well. The earth holds us. The Gomel engineer Anatoli Unitsky proposes an original solution to the problem of terrestrial gravity. At first glance, it seems fantastic. But psychologists say that the recognition of any idea to a significant extent is determined by the fact of how quickly we grow used to it. From a scientific perspective, there are no miscalculations in Unitsky's project. That means the question of the means of entering near space will be decided in the future depending on which way turns out to be the most economically profitable. The author of the article believes that in this regard, his idea is beyond competition, and offers it to be refuted.

We have already grown accustomed to the fact that the only form of transportation for interplanetary distances can be the rocket. This is true of far space, where there is nothing to "grab onto," but we can get to near space another way. Among the numerous projects outlining other ways, we can cite gas and electromagnetic cannons, Y. Artsutanov's space elevator; K. Tsiolkovsky's multi-level circumferential trains; B. Beletsky's and M. Giverts' pulsating ship; and M. Okunev's orbital ring. The abundance of proposals is caused by the fact that there is not a single one that is really attractive. The Achilles' heel of almost all of them is a significant expenditure of energy.

Let us try to imagine future energy expenditures. Prof. Gerald O'Neill of Princeton University, author of a widely known project for space colonization, believes that by 2060, 16 billion people will live and work outside the planet. Without getting into the reliability of this prediction, we will note only that a one-time delivery from Earth of people alone will require an overall launch weight of rockets operating on a shuttle system of 100 billion tons. The delivery of construction materials, food, and water will increase this figure tens of times over. If we take into account that the lion's share of the weight of the rocket comes from the fuel, and the missile itself by its basic indicators is worse than a steam train, then it becomes clear that humankind will have to remain "home," unless a fundamentally different form of transportation appears.

But we cannot get by without space. Our industry is adapted to terrestrial conditions, since there was no choice. Space offers it. Amazing opportunities open up to place factories and plants under the conditions of weightlessness, deep vacuum, ultra-low and ultra-high temperatures, increased radiation... And these conditions are quite near – a matter of several hundred kilometers. The majority of technological processes can take place in space far more effectively and more cost efficiently, and mass production will rise to a new qualitative level. Just as now, factory workshops are place outside of a residential zone, so in the future, the basic part of production will go outside our common home – Earth, which will be turned into an eternally green area for life, studies, and rest of earthlings.

In order for all this to come about, geocosmic transport must have not only an output capacity of billions of tons a year but a low cost of transportation. Let us approach the solution of this task through pure logic. We will fantasize absolutely freely, without fearing the comments of the "internal editor." The ideal means of transportation will be one that only utilizes its own internal forces for travel. Why? All known "crews" interact with the environment, which not only requires energy but also poisons the environment itself. A superpowerful space vehicle is capable of turning the said usual flaw into an unbearable one. For example, the American multi-use space shuttle, operating on solid fuel, emits into the atmosphere about 100 tons of toxic chlorine elements in one launch. Imagine, billions of such launches are needed to colonize space!

Interaction with the environment can be eliminated only when internal forces are used. Just as Baron Munchausen dragged himself out of the swamp by his hair, the hypothetical vehicle must move without relying on anything. Unsupported static equilibrium can only be found in the center of the planet's mass. It would be absurd, imitating the engineer Garin[1], to try to break through to the center of Earth, but there's no need for that: it is enough to combine the center of the vehicle's mass with the center of the planet's mass. The solution suggests itself. The geoid has to be surrounded by a ring.

But how to make a global ring serve as transport? According to the laws of mechanics, the position of the center of a system cannot be changed due to the action of internal forces. But certain parts

[1] The main character in a Russian science fiction novel written in 1926–1927 by Alexei Tolstoy.

IZOBRETATEL' I RATSIONALIZATOR No. 4–82

of the device may move relative to each other. It turns out that there is only one path for space voyages: a symmetrical deformation of the ring. If the ring circles the globe, then to increase the diameter by 100 kilometers (and that is already near space), the length of the ring must increase by 0.785%. So, this is quite an acceptable magnitude. Thus, the most important step has been done, but let us see what sort of difficulties are ahead.

Let us define the internal moving forces and the connection to the vehicle. In order to increase and reduce the diameter of the ring, let us make it a composite of separate blocks, with the distance between them modified using hydraulic cylinders, for example. The calculation indicates that pressures arise in the load-bearing construction that exceed the pressure at the center of the planet. Not a single material can withstand it. You could make a ring in the form of a toroid and inflate it, but then pressure of millions of atmospheres is required. That's obviously impossible to make. Is there a way out?

Let us try to solve this problem proceeding from the conditions of space flight. It is clear that the ring must provide a speed of not less that the first cosmic velocity for its passengers and cargo. That is at the end of the path. But at first it must be immoveable; obviously you can't jump on it while it is "in motion." The only way out (if only its internal forces are used) is to make a general planetary "steering wheel" from several rings capable of revolving independently from one another. Then, launching from one of these, the others may gain the necessary circular speeds without interacting with the environment. Analysis indicates that there must be no less than three rings. Obviously, there has to be an outer ring – the body of the vehicle. In its central part in the toroid casings, working ring flywheels are placed, made in the form of infinite electrical tape. These are the internal rings. In order for the flywheels to have a high speed of movement, they are equipped with a magnetic suspension, and air is pumped out of the casing. To drive the flywheels, it is most expedient to use a linear motor.

Imagine such a scene. A special 20-meter high overpass goes along the Earth's entire equator. On the ocean expanses – and they predominate – the overpass is placed on floating supporting towers anchored at the bottom. And above the overpass, like a gigantic pipeline of three meters in diameter, stretches our vehicle. We will call it the GPV – the General Planetary Vehicle. Having reached this point, a reader not inclined to fantasies will exclaim: "Some kind of Manilovism![2] But how much will it weigh?" We will say right off that each running meter of the GPV has a mass of about one ton, and the full length, as you understand, is 40,000 kilometers. Thus, according to Malinin and Burenin[3], it turns out that such an "artifact" will pull about 40 million tons. It is a terrifying figure, of course. But the vehicle is calculated for a one-time haul of 10 million people and 10 million tons of cargo. So, let us not be frightened of numbers which astronomers usually handle, but let us better look at how our vehicle will work.

After supplying electrical power to the coil of the line motor, a running magnetic field emerges. In the ring of the heavy flywheel, which is the rotor of the motor, a current is induced. The current will interact with the magnetic field that created it, and the flywheel, not encountering any resistance, will be brought into motion, or to be more precise, to revolution around Earth. With the achievement of the first cosmic velocity, the flywheel will become weightless. Then its centrifugal force will begin to put the ever-increasing vertical pressure on the GPV's hull through magnetic suspension, until every one of its running meters is balanced.

The freight and passengers are placed in the vehicle, with a preliminary winding of the heavy flywheel to its calculated velocity. Large loads are suspended on cables directly to the GPV. In order that it does not lift off prematurely, the weightless toroid is kept in place with special weights. After release, the diameter of the ring begins to increase. To lift off, it is sufficient for the centrifugal force to exceed the weight by one kilogram per running meter.

After leaving the dense layers of the atmosphere, the reverse drive of the heavy flywheel is switched to generator mode. The flywheel begins to break, and the motor produces an electrical current. This energy is switched to the motor of the light flywheel, which is turned on to direct mode, and it begins to rotate in the opposite direction relative to the heavy flywheel. This ensures that the kinetic energy of the GPV elements rotating around the planet remains unchanged during the output process. Otherwise, the ring may fall back to Earth.

The body of the vehicle, obeying the law of conservation of angular momentum in the system, will spin in the same direction when it comes into rotation, and rotate in the same direction as the heavy flywheel. Thus, at the same time, the diameter of the GPV and the speed of rotation of its body around Earth will increase more and more simultaneously. When the heavy flywheel completely comes to a halt relative to the body, the drive mode is changed; the light flywheel motor is switched to generator mode, and the heavy flywheel is switched to direct mode.

Approximately two hours later, the GPV will reach an elevation of 300–400 kilometers and will have a circumferential velocity equal to the first cosmic velocity. The radial speed will fall to zero. Moored along the entire length to the first industrial necklace of Earth, located at the same elevation, the GPV will release part of the freight and passengers which will immediately find themselves at their destination. The vehicle will make stops at the next cosmic ring industrial manufacturing complexes situated on lower circular orbits. Then, undocking from the last of them, the GPV will attain the second cosmic velocity and send the remaining freight on its way throughout the solar system. Landing on Earth will take place in reverse order.

During the process of the transportation cycle, supply of energy from outside will not be required. The GPV will get by on the initial reserve of kinetic energy which will be redistributed from the heavy flywheel to the vehicle body, and then upon landing will be returned to the flywheel. The energy of the space freight delivered to Earth will also join it.

On the way to space and back, or in the time free from transportation concerns, the GPV will gain an unlimited quantity of cheap energy (by current conceptions). It will gain it chiefly from two sources – the planet's ionosphere and the energy of rotation of Earth around its own axis. From the first source, renewed by the sun, the energy will be taken from currents of the ionosphere; after all, the difference of potentials between it and Earth is equal to 400,000 volts. It will not be particularly difficult with one-way freight traffic to force the energy of the planet's rotation to work for humankind as well over the course of hundreds of years. In fact, it is environmentally harmless. For example, if you take an average power of 100 billion kilowatts over the course of a century, the circumferential speed of the Earth's equatorial points will decrease by... 0.3 millimeters per second.

The energy obtained by the GPV will accumulate in the flywheels or will be transferred to Earth. The flywheels are capable of accumulating up to 10^{12} kilowatt-hours of energy, which will enter the planetary energy system at a peak power of up to 100 billion kilowatts. At the same time, the GPV's power-up capacity will be thousands of time less thanks to the great length of the process.

The vehicle system proposed may seem too large-scale, consumptive of material, and expensive. But is that the case? To solve terrestrial transportation problems much simpler than those in space, humankind has spent enormous efforts to this day. Millions of cars, planes, locomotives, and ships have been manufactured, millions of kilometers of highways, thousands of ports, bridges, and train stations. All of this costs far more than the GPV. In fact, a chain of just the consumer vehicles in the world today could circle Earth around the equator 30 times! No less significant are the expenditures on power as well, in all its manifestations.

We should not think that space transportation, power, and other problems of the future will be decided by waving a magic wand. Humankind must make expenditures just as it has before now. The expenditures will be considerable. And the GPV, thanks to its multifunction nature, will ensure they will quickly and effectively pay for themselves. Calculations indicate that although the implementation of the project, according to preliminary figures, will require tens of trillions of rubles, the low cost of space travel will be ensured – several kopecks per kilogram of freight. The price of the energy obtained will also be low.

The implementation of the project will require efforts that while considerable, will be less than current power industry, on the development of which advanced countries spend up to half of their budget, or the arms race, which threatens the existence of humankind. And do we have a choice?

By A. Unitsky

[2] Manilovism, or futile day-dreaming, originated from Manilov, a character in 19th century Russian writer Nikolai Gogol's Dead Souls.

[3] Alexander Malinin (1835–1888) and Konstantin Burenin, authors of "Arithmetic," the only math textbook in tsarist Russia, published in 1887. The expression "according to Malinin and Burenin" became a bound phrase signifying the laws of mathematics.

IZOBRETATEL' I RATSIONALIZATOR No. 4–82

Space colonization – a hypothetical creation of autonomous human settlements outside Earth, both on other planets and in the interplanetary space under artificially created biosphere conditions. Despite the attractiveness of this idea, its implementation remains difficult today due to the high cost of space flights and the launch of payloads necessary for the creation of a base that will later be used for colonization. The General Planetary Vehicle proposed by Anatoli Unitsky is designed to solve this problem, providing a transition of the Earth's human civilization to a qualitatively new stage in the exploration of extraterrestrial space. According to Unitsky, the colonization of space by means of Eco-CosmoHouses will be a less expensive and more promising technology than the colonization of dead planets of the Solar system and their satellites (Moon, Mars, and others) ill-fitted to terrestrial life forms. In addition, people can travel in such space houses for thousands of years on a journey to other star systems, just as another known space house travels in the outer space – the planet Earth inhabited by millions of species of living organisms including the human civilization.

It's possible that my articles turned out to be the last straw for the KGB's patience. It must be understood that at that time, the public influence and the significance of the All-Union popular science magazines were enormous. The print run of "Tekhnika – molodyozhi" was 1.7 million copies. But likely I managed to annoy the experts quite a bit even before these publications. Perhaps my letter to Mikhail Gorbachev attracted attention, or I touched upon classified works, or perhaps I gave hints of new solutions to missile designers. Whatever the case, after this article and a number of similar publications, I achieved an effect that I had not expected at all.

First, the press took up arms against me, as if there were no other topics for discussion. In his incriminating articles, a prominent scientist made such statements about me: "The paranoid engineer inventor from the city of Gomel, not entirely in his right mind, has encroached on the achievements of Soviet science and technology in the area of development of the space industry, and he must be held accountable for this" and "How dare he? Who is he? A college drop-out and a schemer..." I continued to be summoned to the KGB. During the conversations, which sometimes lasted several hours, I was forced to listen to some choice nonsense. They already suspected that I was a spy for foreign intelligence service, that I possessed the gift of telepathy and was negatively influencing the minds of Soviet people... They even "caught" me with the fact that I am a distant relative of Tsiolkovsky; therefore, such nonsensical ideas, like the ones of this scientist from Kaluga, were born in my head...

I continued my correspondence with the State Committee for Inventions, in the hope that nevertheless they would issue me patents for my break-through inventions. Although I realized that this was unlikely – like encountering a dinosaur on the street. The blondes in jokes, from which I differed little in my views, would be certain: "The likelihood of this is quite high – 50-50, I will meet it or not."

Once, when I came back home from work, I received a summons to court. A certain man by the last name of Taran claimed that the author of the article about the General Planetary Vehicle wasn't me, but it was written under his pseudonym, "Anatoli Eduardovich Unitsky," and the fee should be paid to him, and not me – who was some crook from the obscure city of Gomel, who by coincidence had the same full name as he has. I received 45 rubles for one article, and 30 for a second. I remember I bought my wife some bronze Indian candlesticks for her birthday with this money.

The trials took place in Gomel and in Moscow from 1983 to 1985. The editors of the journals with whom I had been acquainted for several years by that time were summoned as witnesses. The respondents were I,

Cover page and pages of the All-Soviet Union journal "Tekhnika – molodyozhi" that published an article by Anatoli Unitsky about the General Planetary Vehicle in 1982

V. Zakharchenko, Editor-in-chief of the journal "Tekhnika – molodyozhi," and N. Karasyova, Editor-in-chief of the journal "Izobretatel' i ratsionalizator." Some kind of madman with a certificate (Vladimir Taran) was against the heads of the most authoritative publications in the USSR with print runs of millions of copies. Of course, there was a back story here.

In 1982, Vasili Zakharchenko, who before that time had a large credit of trust with the Soviet government and was welcome in the highest offices, began to publish on the pages of "Tekhnika – molodyozhi" the science fiction novel by Arthur Clarke titled "2010: Odyssey Two." After the first two chapters appeared, a scandal broke out. Clark dedicated the book to the most famous Soviet dissident at the time, Academician Andrei Sakharov, but this dedication, of course, was not put in the journal. The text itself underwent a thorough examination and was shortened. But neither the translators nor the editorial board or the Main Administration for Literary and Publishing Affairs of the USSR noticed that the last names of the main characters of the novel coincided with the names of Soviet dissidents famous in the West, many of whom were at that moment in prisons. In the end Zakharchenko was removed from all his positions and expelled from the editorial boards of "Detskaya literatura" [Children's Literature] and "Molodaya gvardiya" [Young Guard], which had published my article "To Space on a Ring?" in the 1983–1984 yearbook. For this mistake, the writer lost his exit visa, he was no longer invited to appear on radio and television, and he was made an "anathema." Possibly the trials with my involvement were part of this persecution, and it was not only about me.

Dissidents – people who advocate views that differ from those generally accepted in a particular society, as a result of which they are often subjected to persecutions, ostracism, and repressions by official authorities. In the USSR, this part of people included those whose political views differed from the prevailing Communist ideology and practice in the state. In official Soviet documents and propaganda, the term "dissident" was usually used in quotation marks: "so-called dissidents." They were called "anti-Soviet elements," "anti-Soviets," "renegades" much more often.

ШТРЫХІ ДА ПАРТРЭТА

ПРАЕКТ ЮНІЦКАГА

ВЯЛІКАЯ ТРАНСПАРТНАЯ КОЛА

МОСКОВСКИЕ НОВОСТИ * LES NOUVELLES DE MOSCOU * NOVEDADES DE MOSCU *

MOSCOW NEWS

No. 4 (3044), SUNDAY, JANUARY 23, 1983 Price 8 kop

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SPACE FLIGHTS—ON A RING?

Sooner or later, according to many scientists and engineers, to avert overheating of the atmosphere, most energy-intensive industries will have to be put into orbit. But is this really a cure-all? "Suspending" just one per cent of the world's industry over the planet would require 10,000 million tons of cargo turnover. This would expend yet more energy, adding to the heated atmosphere...

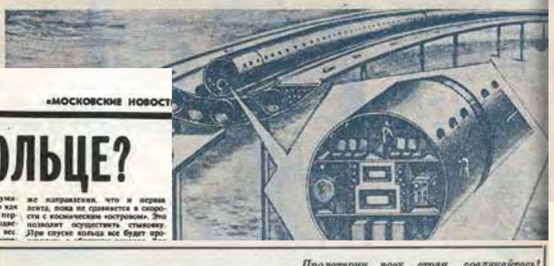
Anatoly YUNITSKY, an engineer from Gomel, thinks that the problem can be solved. What we need is to give up rockets as traditional space transportation. As an alternative, Yunitsky sug-

initial length. But what force will pull the huge thing outward, provided there are telescopic joints which allow it?

The ring will be expanded by internal forces. A huge amount of power will be needed for the first "inhalation"—about 10 trillion kilowatt-hours, says Yunitsky. But this will have to be done only once. The expanded ring will spend all the stored power during the first "inhalation", but on its way back ("exhalation"), the APTF will actually be "dropping" down on

ling at satellite velocities. Certain laws of mechanics help us. Having sped up the first tape initially, we have not only stored motional energy but also created tremendous momentum. When the first tape brakes and the second one accelerates in the opposite direction, the momentum naturally decreases. But since the law of conservation of momentum exists in nature side by side with the law of conservation of energy, the body of the APTF will start rotating. It will rotate in the direction of the first tape until it reaches the speed of

feasible? It will cross a nu of countries and oceans and require unusually high spen Actually there is nothing possible in overcoming such ficulties. The equatorial could agree to set up an i national zone for the APTF lot of metal will be nee true. But if the present automobile fleet were strun one line, it would circle equator forty times. This m that from the technolo point of view, human societ presently quite capable of sembling the equatorial



В КОСМОС — НА КОЛЬЦЕ?

Рано или поздно, чтобы предотвратить перегрев атмосферы, надо будет вынести на орбиту наиболее энергоемкие производства, так считают многие ученые и специалисты. Но панацея ли это? Ведь даже 1 процент мировой промышленности, «подвешенный» над планетой, потребует 10 миллиардов тонн грузооборота. Вновь расход энергии, нагрев атмосферы...

Клуб интересных встреч

„ДИАЛОГ"

ВСТРЕЧА ДЕВЯТАЯ

«Основной мотив моей жизни — сделать что-нибудь полезное для людей. Вот почему я интересовался тем, что не давало им хлеба, ни силы. Но я надеюсь, что мои работы, может быть, скоро, а, может быть, в отдаленном будущем дадут обществу горы хлеба и бездну могущества».

К. ЦИОЛКОВСКИЙ.

На счету величайшего изобретателя Томаса Эдисона — 1093 патента. Он прожил 84 года. Результат американского изобретателя вряд ли будет превзойден — уж очень усложнились сейчас поиски новых путей в науке и технике. По сравнению с достижениями Эдисона количество зарегистрированных изобретений (23) гомельчанина Анатолия Эдуардовича Юницкого кажется, конечно, незначительным. Однако у Анатолия все, как говорится, впереди. Ведь ему только 34 года.

Что же представляет собой общепланетное транспортное средство, для каких целей оно предназначено?

Об этом — наш сегодняшний рассказ.

„ЧЕЛОВЕК ОБЯЗАН ПРИНЯТЬ ВЫЗОВ ВСЕЛЕННОЙ", —

ТАК СЧИТАЕТ ГОМЕЛЬСКИЙ ИНЖЕНЕР АНАТОЛИЙ ЮНИЦКИЙ, ПРЕДЛОЖИВШИЙ ПРОЕКТ ОБЩЕПЛАНЕТНОГО ТРАНСПОРТНОГО СРЕДСТВА БУДУЩЕГО

ДЕТСТВО ИЗОБРЕТАТЕЛЯ, ДЕТСТВО ИДЕИ

ИДЕЮ «ПОДСКАЗЫВАЕТ» ...БАРОН МЮНХГАУЗЕН

ŻOŁNIERZ WOLNOŚCI

HORYZONT

GAZETA CODZIENNA WOJSKA POLSKIEGO

Trzydzieści lat temu, 4 października 1957 roku, pierwszy sztuczny satelita rozpoczął wędrówkę wokół naszej planety. Od tego historycznego dnia rozpoczął się i trwa do dziś triumfalny pochód techniki rakietowej.

Czy rzeczywiście triumfalny? Trzy dziesięciolecia to okres dostatecznie długi, aby można było trzeźwo ocenić rzeczywiste możliwości tych imponujących (zwłaszcza zewnętrznie) urządzeń... W minionym okresie w przestrzeń kosmiczną, rozciągającą się na wysokości 200 — 300 km, wprowadzono około 10 tysięcy ton ładunków użytkowych. Dużo to czy mało? Posłużę się pewnym porównaniem, być może niezupełnie idealnie pasującym: na tę samą odległość 200 — 300 km ten sam ładunek w tym samym czasie na Ziemi może przewieźć furmanka zaprzężona w parę koni. Przy czym operacja ta będzie kosztowała o wiele taniej niż ten kosmiczny transport, liczony na setki miliardów rubli i dolarów.

Fantazja czy nauka?

Projekt XXI wieku — w kosmos bez rakiet

(Specjalnie dla „Żołnierza Wolności")

Летним вечером 1976 года на одном из центральных перекрестков Гомеля остановился человек. Истерично визжали тормоза, надрывно голосили клаксоны, а он — ни с места. Когда же самые нетерпеливые из моторизованных сограждан стали «ненормально» объезжать, тот вдруг рванулся вперед, рискуя попасть под колеса. Правда, все обошлось. И обладателям колес было в тот момент невдомек, что им наперерез с невиданной скоростью мчалось совсем иное «колесо»...

С работы он возвращается пешком. Идет не спеша. Во время этих прогулок и осеняют его безумные идеи. Быть, скажем, такая: от каждого бруска мыла в хозяйстве остается обмылок. Значит, около десяти процентов мыла попадает в отходы. Дело вроде копеечное. Но в масштабах страны убытков — на миллион. А что, если внутрь бруска вставить кусочек пенопласта? И мыло можно использовать целиком, и в ванне оно не утонет... Мелочь? Мелочь. Особенно в сравнении с идеей, которая прямо-таки «оглушила» его, скромного инженера дорожного стройтреста Анатолия Юницкого, в тот памятный день.

Рядом притормозил автобус, и Анатолий подумал: не успеешь разогнаться, а уже остановка — сколько энергии впустую тратится! Прикинул — не меньше половины. Значит, хорошее дело предлагает московский профессор Нур-

Юницкий попытался встать и... очнулся. Он сидел за столом, уронив голову на кипу листов с чертежами. Светало...

А. Силин, доктор технических наук, заведующий лабораторией контактного взаимодействия твердых тел ВНИИ оптико-физических измерений.

Это глобальный проект, который требует рассмотрения не только с технической и экономической точки зрения, но и с позиций всего человечества, поскольку он требует объединения усилий многих людей. С точки зрения физики — это проект корректный и не вызывает никаких сомнений. За внешней простотой главной идеи и совершенно необычным ее конструкторским воплощением — глубокое понимание сути поставленной задачи и смелое, свободное от гнета традиций инженерное воображение, помноженное на отличную осведомленность в самых последних новинках различных отраслей техники.

На работе, улучив свободную минуту, Анатолий поделился замыслом с токарем, начальником отдела стройуправления.

— Идея хорошая,— сказал Олег Кривко.— Хотя как такая махина полетит — представить трудно. Знаю-знаю, ты вспомнишь, как говорили, что паровоз забуксует на гладких рельсах, а самолет не поднимется, потому что тяжелее воздуха... Но я — практик. Зачем строить невесть что? Тут на земле еще вон

СПАСАТЕЛЬНЫЙ КРУГ,

ИЛИ ШАНС ДЛЯ ПОТОМКОВ

Виктор ЖУК

бей Гулиа — аккумулятор нового типа с маховиком. Если соединить его с тормозным механизмом, энергия перебежит на маховик, а потом, при разгоне — обратно на колеса. Вот только мощность такого аккумулятора ограничена

ская скорость! Весь маховик станет невесомым, и в нем появится подъемная сила.

— Ай да Юницкий! — воскликнул Анатолий и как инженер, знакомый с патентным делом, добавил: — Ай да

ства трубы занимает вакуумный канал, в котором сердце системы — маховик. Точнее, два маховика. Все остальное место — для полезной нагрузки.

«Контакт? Есть контакт!» На ОТС подается ток, и маховик начинает разбег

сколько дел. А для полетов в космос есть ракеты. «Колесо» лучше? Докажи.

И Юницкий перевернул исчерканные ватманские листы чистой стороной.

Аргументы он находил на той же самой улице, по которой ходит каждый

Пролетарии всех стран, соединяйтесь!

СОВЕТСКАЯ БЕЛОРУССИЯ

Орган Центрального Комитета Коммунистической партии Белоруссии, Верховного Совета и Совета Министров БССР

ОСНОВАНА В АВГУСТЕ 1927 г. № 287 (16870) Воскресенье, 14 декабря 1986 года Цена 3 коп.

В космос... на колесе

— Анатолий Эдуардович, насколько мне известно, это первый в республике общественный комитет с такой проблематикой. Чем обусловлено создание его в городе?

— Во-первых, в Гомеле достаточно высок научно-технический потенциал. Кроме того, сам я уже несколько лет являюсь членом секции Федерации космонавтики СССР.

— Как можно определить задачи нового комитета?

— Мы будем заниматься анализом различных идей и проектов, разрабатывать узловые вопросы, популяризировать поиски в этом направлении среди молодежи. Со временем, возможно, будет создана группа или конструкторское бюро по проектированию систем.

— Любопытно, а чем вам не угодили человеку нынешние космические корабли?

— Многие ученые и специалисты считают: чтобы предотвратить перегрев атмосферы, рано или поздно надо будет вынести на орбиту наиболее

пульты разрабатываемой в США. Космический транспорт должен иметь не только пропускную способность в миллионы тонн, но и низкую себестоимость перевозок. С этой задачей должно справиться предлагаемое мной общепланетное транспортное средство. Сокращенно — ОТС. Представляет оно собой колесо, или, точнее, обод, надетый на Землю по ее экватору. Расширяясь на 300—400 километров, обод уйдет в космическое пространство, унося туда сырье. На «выдохе» на Землю будет до-

ной длины, кольцо беззвучно скроется за облаками.

— Что же даст начало движению такой громадины! Что позволит ОТС оторваться от Земли!

— Внутри кольца в узком безвоздушном канале находится бесконечная металлическая лента. Поддерживаемая магнитной подвеской, лента эта играет роль ротора огромного электродвигателя. Но вот ротор набирает обороты. Как только скорость сравнялась с первой космической, магнитные подвески перестают «ощу-

вик, расположенная над первой. Если разогнать ее, как и первую, но в обратном порядке, то их скорости сравняются и кольцо перестанет расширяться.

С учетом законов механики, сохранения энергии и момента количества движения решена проблема «пересадки» грузов на космические «заводы-острова». И, разумеется, возвращения на Землю.

— Анатолий Эдуардович, вы изложили свой проект в общих чертах. Это понятно. Но реально ли такое грандиозное сооружение! Ведь оно потребует небывалых затрат.

— Да, это так. Например, для первого подъема кольца потребуется значительный расход энергии. Но, сжимаясь, кольцо будет накапливать силы для нового цикла. Потребуется много металла. Однако, если нынешний мировой автопарк вытянуть в цепочку, он 50 раз обовьется вокруг планеты по экватору. Значит, а

Голас Радзімы

№ 15 (2001) 9 красавіка 1987 г.

ГАЗЕТА БЕЛАРУСКАГА ТАВАРЫСТВА ПА КУЛЬТУРНЫХ СУВЯЗЯХ З СУАЙЧЫННІКАМІ ЗА РУБЯЖОМ (БЕЛАРУСКАЕ ТАВАРЫСТВА «РАДЗІМА»)

Выдаецца з 1955 г. Цана 4 кап.

КАСМІЧНЫ ТРАНСПАРТ ЗАЎТРАШНЯГА ДНЯ

ЛІФТ, КАНВЕЕР, КОЛА?..

Па прапанове Федэрацыі касманаўтыкі СССР у Гомелі пры абласным савеце навукова-тэхнічных таварыстваў створаны камітэт па праблемах беззракетных касмічных сістэм. Узначаліў яго інжынер, кіраўнік патэнтна-ліцэнзійнай службы Інстытута механікі металапалімерных сістэм Акадэміі навук Беларускай ССР Анатоль ЮНІЦКІ. Журналіст Анатоль ГАТОЎЧЫЦ узяў у яго інтэрв'ю.

— Анатоль Эдуардавіч, якія за-

пульсуючы карабель Бялецкага і Гіверца, арбітальнае кольца Акунёва, касмічны ліфт Арцутанава, касмічны канвеер Палякова... Аднак ва ўсіх у іх слабае месца — каласальны расход электраэнергіі. Гэта адносіцца і да электрамагнітных катапульты, якая распрацоўваецца ў ЗША. Касмічны транспарт павінен мець і прапускную здольнасць мільёны тон, і нізкі сабекошт перавозак. Гэтым умовам нібыта адпавядае агульнапланетны транспартны сродак (АТС). Уяўляе ён кола. Дакладней, вобад, надзеты на Зямлю па экватару. Расшырыўшыся на 300—400 кіламетраў, вобад дойдзе да касмічных заводаў, несучы туды сыравіну. На Зямлю будзе даст аўляцца гатовая прадукцыя.

— Як жа выглядае гэта глабальнае дзіва-кола?

— Праект абмяркоўваўся на пасяджэнні секцыі ракетна-кас-

вертыкальную пад'ёмную сілу, пакуль не ўраўнаважыць коўны пагонны метр. Скідваюцца захваты, і АТС, расшыраючыся, «усплывае» ў космас. Працуючая, як гіганцкі ваўчок, стужка стварае ўнутры сістэмы незвычайную цвёрдасць. Ніякія ўраганы не здольны змяніць геаметрычную фігуру кольца.

У космасе рухавікі кольца пераключаюць на генератарны рэжым. Стужка тармозіцца. Куды прымяняць выпрацаваную такім чынам электраэнергію? У АТС для гэтай мэты прадугледжана другая стужка — махавік, размешчаная над першай. Калі разагнаць яе, як і першую, але ў адваротным напрамку, іх хуткасці зраўняюцца і кольца перастане расшырацца.

З улікам законаў механікі, захавання энергіі і моманту колькасці руху вырашана праблема «перасадкі» грузаў на касміч-

Проекты будущего

ОЖЕРЕЛЬЕ ПЛАНЕТЫ ЗЕМЛЯ

ГОРИЗОНТЫ НАУКИ И ТЕХНИКИ

КУДА УЕДЕМ НА РАКЕТНОЙ ТЕЛЕГЕ?

С того исторического дня 4 октября 1957 года, когда по небосклону планеты стремительно пронесся первый искусственный спутник, ракетно-космическая техника начала триумфальное шествие.

Триумфальное? Три десятилетия — достаточный срок для трезвой оценки истинных возможностей этого внешне впечатляющего творения. За прошедшие годы в ближний космос, начинающийся на высотах 200—300 км, совместными усилиями выведено около 10 тысяч тонн полезной нагрузки. Много это или мало? Одно сравнение, быть может, не идеально конкретное, поражает: на те же 200—300 км аналогичный груз за тот же срок на земле перевезет в телеге пара лошадей. И обойдется эта транспортная операция дешевле затраченных на космический эквивалент сотен миллиардов рублей и долларов.

Чрезвычайно высокая стоимость вывода в космос полезной нагрузки и ряд других аспектов позволяют делать критическую переоценку освоения космического пространства на основе ракетной концепции. Объективно ракеты - носители являются сегодня одними из самых сложных продуктов научной и инженерной мысли. Часто их узлы и конструкции работают на пределе при огромных механических нагрузках, температурах и давлениях. Неудивительно, что для

Где выход? Он перекликается с мыслью, высказанной задолго до современного технологического рынка провидцем Циолковским: Земля — колыбель человечества, но нельзя вечно жить в колыбели. Земляне могут рассчитывать на безграничное будущее, если, как это ни парадоксально, останутся таковыми лишь по происхождению. Если совершат массовый исход в космическое пространство с его неограниченными просторами и потенциально неисчерпаемыми ресурсами.

Но что значит построить, по Циолковскому, «эфирные города», освоить иные небесные тела, развить космическую индустрию? Совершенно очевидно: следует, по крайней мере на первых этапах эпохи расселения, выводить на орбиты сотни миллионов тонн грузов, миллионы пассажиров — участников «великого исхода». Как

охватить планету по экватору и стать, по замыслу его разработчиков, «спасительным ожерельем» цивилизации.

ЗНАКОМЬТЕСЬ: ПРОЕКТ XXI ВЕКА...

Сразу оговоримся, это не концепция, а в деталях и чертежах продуманная система. Она обросла мясом инженерных расчетов, достаточно корректных экономических выкладок. Технически ОТС сложно, в силу чего наглядно описать его устройство и принцип функционирования не просто. В общих чертах общепланетарная транспортная система, предназначенная для одновременного вывода в околоземный космос миллионов тонн полезного груза, выглядит так.

Представьте себе эстакаду, замкнутую по экватору Земли, — ее длина 40 тыс. км. На материках она

В КОСМОС БЕЗ РАКЕТ

ПРОЕКТ XXI ВЕКА...

же тогда быть с объективно существующим ракетно-экологическим ограничением — 10 тысяч тонн? Оно отпадет, если удастся создать транспортно-космические средства

крепится с помощью обычных опор, в океане — на понтонах, размещенных ниже поверхности и заякоренных на дне. По ней на высоте 10—30 метров

Пралетарыі ўсіх краін, яднайцеся!

Чырвоная Змена

Газета выдаецца з красавіка 1921 года

ОРГАН ЦЭНТРАЛЬНАГА КАМІТЭТА ЛКСМ БЕЛАРУСІ

№ 23 (12753) Аўторак, 2 лютага 1988 года Цана 3 кап.

НАВУКА: ПОШУКІ, ПРАГНОЗЫ, ГІПОТЭЗЫ

«ВЫРАТАВАЛЬНЫ КРУГ» ПЛАНЕТЫ

1982. My colleagues
from the Institute for Mechanics of Metal-Polymer Systems

The sessions were like the theater of the absurd. The judge asked Taran why he chose such a pseudonym. The plaintiff, without batting an eye, said "I wanted even to take the pseudonym Konstantin Eduardovich Tsiolkovsky, but I considered it immodest. Then I decided to take only his patronymic – Eduardovich. After that..." In a word, he spouted nonsense. He talked about the invisible inks he signed with, and how editors of the journal did not bother to see his real last name and signature, because they had not pressed the manuscript with a hot iron. He spoke of how he, a Muscovite, traveled to Gomel, and from there sent his articles – with his "pseudonymous" address: apt. 40, 90 Kirova Str., Gomel. The explanation for why he took precisely this address for the residence attached to his pseudonym was the following: Kirov was the last name of a famous revolutionary; 90 is the degrees of alcohol and 40 is the degrees of vodka. And it was not his fault that in fact some guy named Unitsky lived at that address. But I didn't find this funny at all.

The trips to Moscow to the trials, which in those years and under those circumstances would have been simply impossible not to appear at, cost money, took time, and did not end without unpleasantness. Thus, on one of the trips, I booked a double room to share at the hotel "Rossiya." The second person turned out to be a man who introduced himself as a colonel in the police from outside of Moscow. He even put his ID on the table, so that I would be convinced of his honesty.

An old friend called my room when he learned I was in Moscow and asked me to come downstairs. We exchanged a few phrases and agreed to meet in the morning. When I returned to the room, my roommate was gone, along with my wallet and passport which had been carelessly left in the pocket of my jacket.

Then I was told that this comrade used to "professionally" move into hotels disguised as a colonel in order to empty out pockets or purses. Although I don't rule out that he could have been especially assigned to me. Likely that was even a real policeman, performing an assignment. Leaving a person in Moscow alone and without cash or ID was effective, like everything else the KGB undertook to battle any opinions which were different from the only correct one – the official opinion.

My colleagues at work, neighbors in my building began to look at me with suspicion. The summonses to the courthouse were dropped in our mailbox (at that time they were not closed). The papers had a seal and a notation that "in the event you fail to appear, you will be compulsorily brought to court by police workers." The majority didn't know the reason for why I was summoned to court so often, but as they say, there is no smoke without fire – that meant that I was under suspicion. And there were more and more summonses.

After the plagiarism lawsuit, Taran appealed to the court in Gomel, accusing me of possessing the gift of telepathy. His proof? Taran's father died several years ago, and he informed his son from the other world that I was to blame for his death. Apparently, this was one of the methods of the KGB's work – to sic on an undesirable one of their plainclothesmen, who would persecute him for years and take this black sheep to court until he went mad or until everyone he knew turned away from him, including even his family. In order not to file counterclaims, the plaintiff must have a certificate that he is a schizophrenic. Then he can sue whomever he likes for whatever he likes; he is a schizophrenic after all. But it was impossible to file a counterclaim on such a plaintiff by law; he was sick, and the "most humane" court in the world – the Soviet one – must defend this sick person from attacks by sane people. To put it another way, a rabid dog could bite you, but you couldn't bite back; it wasn't humane.

Then I was accused of being a spy for foreign intelligence services, having stolen the idea for a penknife with a double hinge and passing this secret to some German at the 1980 Olympics in Moscow. There were "witnesses" to my unreliability, although all these lawsuits did not get very far by virtue of their absurdity. But I continued to get summonses to court regularly for several years. Due to all this even my wife began to look at me with some suspicion. I couldn't travel as a tourist to Bulgaria, because at a meeting of the Institute's Party Committee (without a recommendation from this body no one can travel abroad, although I was not a member of the Party), I was told that I might deliberately miss the bus and flee to the West. People in such a position were called "banned from travel abroad." I was among them.

Party Committee – a Committee elected by the party organization of the Communist Party of the Soviet Union to conduct current work. Party Committees existed at all levels of the Party hierarchy: at workshops of factories, at the faculties of universities, in district, city, and regional committees. They were included in all the main processes and participated in making all the significant decisions that determined the development of enterprises and organizations.

Even today, you must pay for such dissent. After string transport began to become well-known as an alternative to existing transportation systems, new waves of slander poured down on me. The internet was buzzing with exposes and accusations directed at me. You could find all sorts of things. According to a version in the Lithuanian press, I was a Russian spy and nothing but a legend. Supposedly everything I was doing was a plot by Russian intelligence services created to strike a blow at NATO. For example, with the help of the uBuses, I planned to shoot down planes flying from NATO's airport to Šiauliai. That was why I had rented 40 hectares of land there of all places in 2014 in the free economic zone, in order to construct test tracks for string transport.

According to the opinion of a number of "analysts," I am a member of the secret gang run by a certain Morozov – a type of post-Soviet godfather, the founder of an international Cosa Nostra in the former republics of the USSR. The engineer Unitsky is one of his capos. It is also I who has conducted experiments in my homeland in the village of Kryuki and built a small nuclear reactor for a missile, which then resonated with the Chernobyl station located seven kilometers away. In short, Chernobyl was supposedly blown up by me, as the "Empire of Evil" of the USSR was also destroyed by me. If some publications were to be believed, I had begun to select people without passports from the unrecognized Donetsk People's Republic in Ukraine as test subjects for string transport. And once a uBus, moving at a speed of 500 kilometers per hour, went off the rails in EcoTechnoPark outside of Minsk and crashed into a supporting tower. Blood and guts were mixed with soil. I, Unitsky, gathered all this up into a jeep, took it outside of town, and burnt it. For "proof," a photograph of a burnt jeep was posted on the internet. Next to it is the photo of a wall with a bullet trail near where either gangsters shot at me, or I shot at them. Moreover, as an obvious conclusion the claim is made that I am an international fraudster and crook without an honest bone in my body.

Who needs this? And who profits from it? Perhaps the threads trace to the USSR KGB, lost in the past? It even sounds stupid, somehow. Or maybe it comes from above, for my tempering? For you cannot obtain hard steel unless you heat it red-hot and then plunge it into cold spring water. Perhaps this is only training, study – in order that I become hardened and bring to completion what fate has inscribed for me? If that is the case, then I am grateful to the Teacher. If what has happened to me had not occurred, then looking back, I would have had to invent all of this. Even so, in certain circumstances, and at a certain time, such reassuring thoughts do not always work.

Recalling the first clash with the system for suppressing scientific dissent, I must admit: it was not easy for me, it was nasty and disgusting. I did not feel I was to blame at all. I felt an enormous pressure on my psyche. They wanted to break me, to force me to give up these "delirious ideas," as they said. They tried to make me insane, although I worked at that time as the head of the patent office of the Institute and was a well-known inventor; everyone knew I was sane, but... Given this state of affairs and knowing that a piece of paper with a certified seal plays a big role in our lives, I was forced to turn to the psychiatric hospital in Gomel. I showed the doctors my publications, the patents for my inventions, talked about my son and my wife, and answered the questions they gave me. The doctors were surprised that I had withstood such pressure over several years. They gave me a certificate that I was not insane and not suffering from schizophrenia and was the most normal person.

All of this lasted about three years and ended with nothing. I withstood it, I worked successfully at the Institute, I kept inventing, I obtained copyright certificates, I continued to work on my system and published in Union publications, I spoke at conferences and conducted an extensive correspondence. I even wrote a letter to the science fiction writer Arthur Clarke already mentioned. In his book

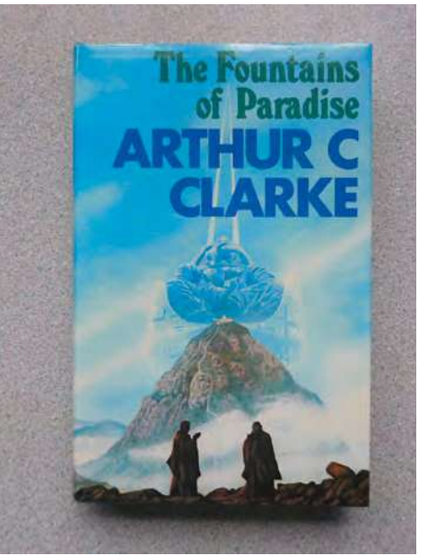
String transport and string-rail overpass – a type of transport systems developed by Anatoli Unitsky, in which transportation of passengers and cargo is carried out on special overpasses consisting of string rails, supporting towers, and anchoring structures. The rails have prestressed wires or steel ropes (strings) inside. The string-rail overpass has unique features, provides significant material savings in the construction of communications and allows to increase speed, comfort, and safety of traffic. A variety of electric vehicles on steel wheels is used as rolling stock. The systems control is fully automated.

"The Fountains of Paradise," he developed the idea of a space elevator. I told him about my project. He responded. He thanked me and wished me success. I have kept the letter to this day. "Go for it! Victories are achieved by persistent and goal-oriented people. I believe you are one of them," wrote Clarke. I think he was not mistaken about me.

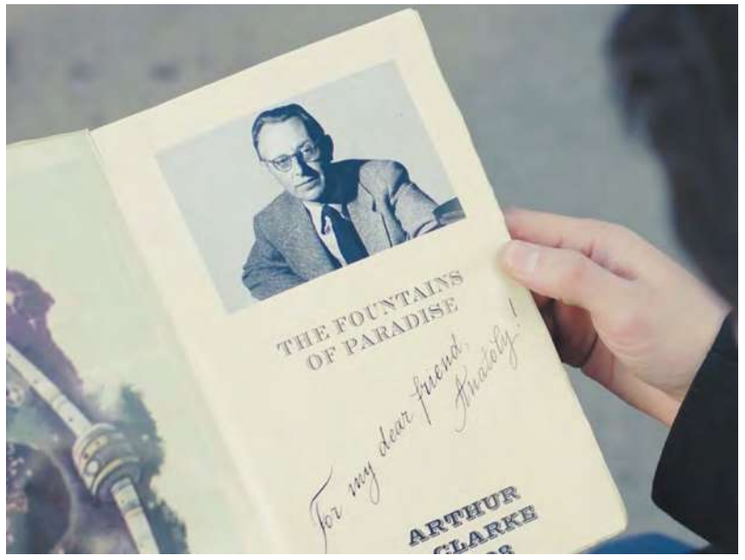
The letter was not the only acknowledgement of the need for my ideas. There was a great deal of correspondence in response to the articles. More importantly, however, the world around me became richer. Many unusual and interesting people appeared, and events on a different scale than before began to happen.

One day I was in the editorial office of the "Komsomol'skaya pravda" [Komsomol Truth] newspaper. We were discussing another article about the General Planetary Vehicle. On the same day the Soviet hockey team was going to the 1983 World Championship, which was traditionally celebrated in the Red Hall of the "Komsomol'skaya pravda." Only 20 people were invited: officials, famous scientists, artists. Coincidentally, I was among them. Evgeni Petrosyan, who was gaining popularity in those years, appeared on the stage, entertaining the audience. For the first time I was among the celebrities. My idea, my project led me there. Of course, it is hard to call what was happening a confession, but the direction seemed right – everything around me testified to this. Here I was, a boy from Kryuki, a plumber who had been carrying toilets not long ago, in the capital of the USSR, among those who were making the history of the great country. Very soon millions of people will be watching the hockey players with bated breath. It is as if the athletes are going to war, and here they are given their last instructions and advice...

Another confirmation: my idea is really the power capable to open doors, to lead to the right people. I move the idea, it moves me. If my idea is important, then I myself become significant. Life has meaning. That's what I thought. By the way, our hockey players became world champions that year.



Arthur Clarke's science fiction novel published in 1979



2019. The book signed by Arthur Clarke

Patenting and Cosmonautics – More Fun Than It Seems

I often had to travel to Moscow, approximately once a month, including on business to defend our applications for patents at the Institute for State Patent Examination, which is on Berezhkovskaya Embankment. It is about two kilometers on foot from the Kievskaya metro station. I was always in a hurry, I walked quickly, almost running; there was little time, and more than enough to do in Moscow. I will describe one incident that happened to me. One winter I slipped and fell hard on the ice. I stood up and realized that my pants had ripped – the seam holding together the halves of the trousers had come apart. Essentially, I had on two halves of pants, held together by a belt. What was to be done? My defense was in 20 minutes. I ran into the institute and immediately went to the cloak room attendant. "Please, find me a needle and a long black thread." I went into the men's room, took off my pants, and began to sew them. Imagine the scene: an inventor is sitting in the toilet in his coat and underwear, patching his pants. I managed to finish the job, defended the application, and several months later, our Institute of Polymers was given the latest USSR copyright certification.

I cooperated with the USSR Federation of Cosmonautics where I held the position of head of the section on non-rocket transportation systems. I began to organize the first conference on non-rocket space exploration, which at that stage in 1988 had become a small but significant victory for me. But nothing of this could protect me. In some ways it was just the opposite.

The attempts the KGB undertook to portray me as insane could have quite possibly succeeded. The authorities battled non-conformity and dissidence, including in science, with different methods at the time. For example, Academician Andrei Sakharov was exiled to the closed city of Gorky (now Nizhny Novgorod). He was a prominent scientist, the creator of the hydrogen bomb, thrice given the Hero of Socialist Labor award, and he had to be suppressed gently, so there wouldn't be an enormous outcry in the West. They treated unknown conformists – like me – much simpler – they could kill me (I hope that this would be excessive in this case) or make me crazy and lock me up for years in a madhouse.

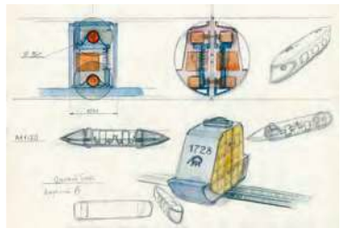
Psychiatry in those years was one of the tools of oppression. It was an active, tested means of subjecting a person to social ostracism, which worked especially well with scientists, inventors and artists.

USSR Federation of Cosmonautics – an organization in the field of outer space activities. Its members included employees of enterprises and organizations in the rocket and space industry, scientific and research institutions, museums, planetariums, and space enthusiasts. The goals of the Federation were to promote the interests of the USSR in world space activities, to preserve and develop the scientific and technical potential of Soviet cosmonautics, and to develop and implement high-tech space technologies in other sectors of the national economy.

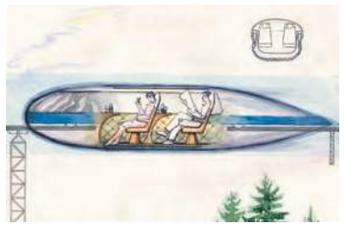
Punitive psychiatry – the practice of the Soviet authorities' struggle with dissidents, which consisted in the misuse of psychiatric diagnosis, treatment, and isolation. Making a psychiatric diagnosis allowed the authorities to avoid a public trial of dissenters by sending them to psychiatric hospitals without trial and for an indefinite period. In addition, declaring dissidents mentally ill allowed the authorities to avoid the problem of political prisoners.

These spheres of activity directly require of a person a particular freedom of thought, and often beyond the bounds of what is generally considered reasonable. Maybe that's why sometimes the people in these professions really do have mental deviations.

In my position as head of the patent office, I became acquainted with many inventors not only of the Institute but in Gomel Region. I helped more than 2,000 candidates to obtain copyright certificates. It should be noted, however, that the majority of those who came through, as it turned out, really were not right in the head. For example, one of them set himself the goal of "not a day without an invention." Thus, he visited me nearly five times a week. He brought applications for a bucket with two handles, so it was easier to pick up. Then he thought up a suitcase with two handles, and so on – an iron, a screwdriver, a television set, all with two handles. Another completely illiterate inventor, by contrast, wanted to use one wire to conduct electricity, not two. "Because the electrons flow and flow and thus may completely run out. That's dangerous! So, let's make devices with one wire – television sets with one wire, vacuum cleaners with one wire..." Nikola Tesla in his day managed to make something like this, but on an entirely different scientific principle than the way modern electrical networks function. Such experiments were conducted later as well, including in the Soviet Union. I myself was witness to a transfer of electrical power with a capacity of 10 kilowatts through a single wire the thickness of a hair (even so, another problem arises – the transformation of energy on entry and exit, where great losses occur). Tesla's wire was not a conductor but a guide (this role can be fulfilled, for example, by a laser ray as well), along which the energy was then transmitted by an electrical field. Here it was not a question about the real technology but simply an idea cut off from reality. And much else was proposed in this vein. I had to deal constantly with authors of projects of a perpetual motion machine – I know several dozen such "inventors."



Poster of 1979.
Vehicle cabin



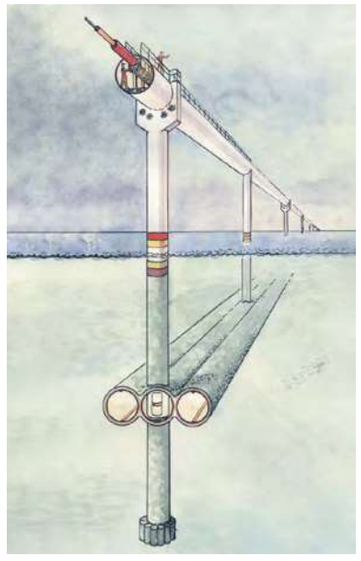
Poster of 1980.
String-rail transport system

Poster of 1981.
String transport station located on the upper floors of the building

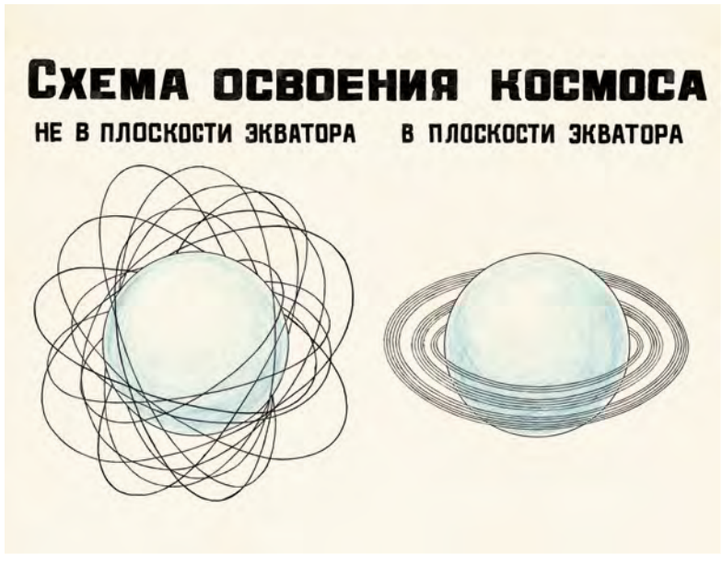
There were also enough crazy people at the USSR Federation of Cosmonautics. At conferences and seminars, they would talk long and seriously about extraterrestrials. There were some who had personally been in contact with them and had flown with them to the Moon. One affirmed that he had spent several months on another planet, describing in detail the everyday life and social system of our brothers in mind. I always noted that there were a lot of skyscrapers in their narrations, linked by thin strings along which cars with passengers scurried. Of course, I didn't begin to confess to these raconteurs that by that time I had already independently invented string transport, including solutions that outwardly seemed very similar to the extraterrestrial technologies described. I admit, however, that it was nice to hear that more advanced civilizations had taken this same path. Although understandably, such tales are not very believable, it nevertheless inspired me.

Inventions and space are spheres where a person encounters the unknown, what is always beyond the bounds of the ordinary. An inventor is simply obliged to be a little crazy. It is necessary to go beyond the limits of the customary and rational in order to think up something new. Therefore, it is not surprising that some madmen begin to imagine themselves as inventors. There is a thin line here, however, as in everything. The madness of the inventor goes beyond the bounds of the customary in order to make the customary better. Craziness in the usual sense most often is simply flight from reality and the creation of one's own parallel world. Space is yet another boundless space for such world creation. Even so, of course there were real inventions and real enthusiasts of space travel. The experience of working with them turned out to be extremely important in my later life.

The most general and main principles that distinguish an invention from everything else are what get a patent. In many years of work with patents, I began to distinguish clearly the main from the secondary.



Poster of 1981.
The light version of the GPV

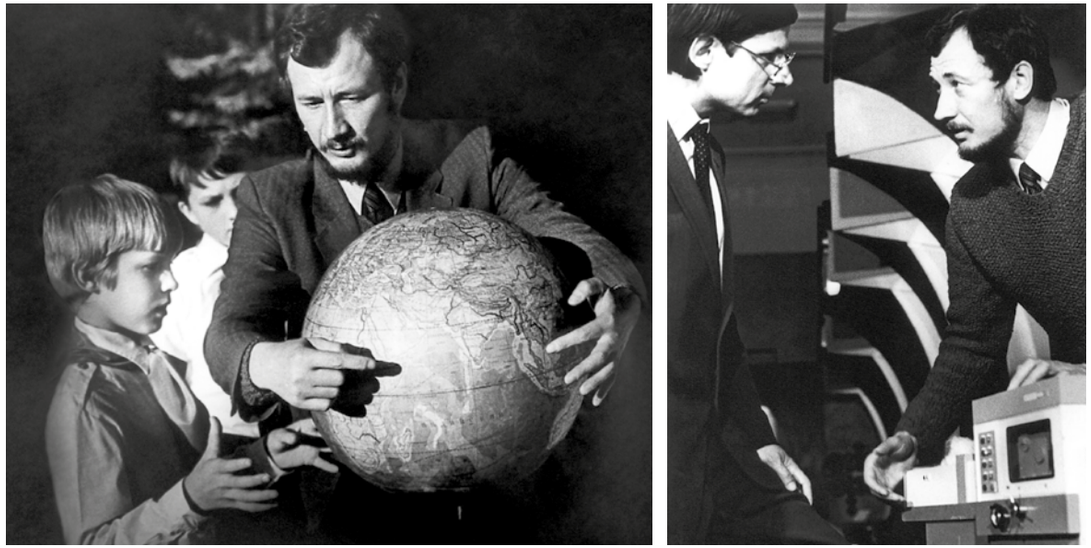


Poster of 1984.
Scheme of near-Earth space exploration (options)

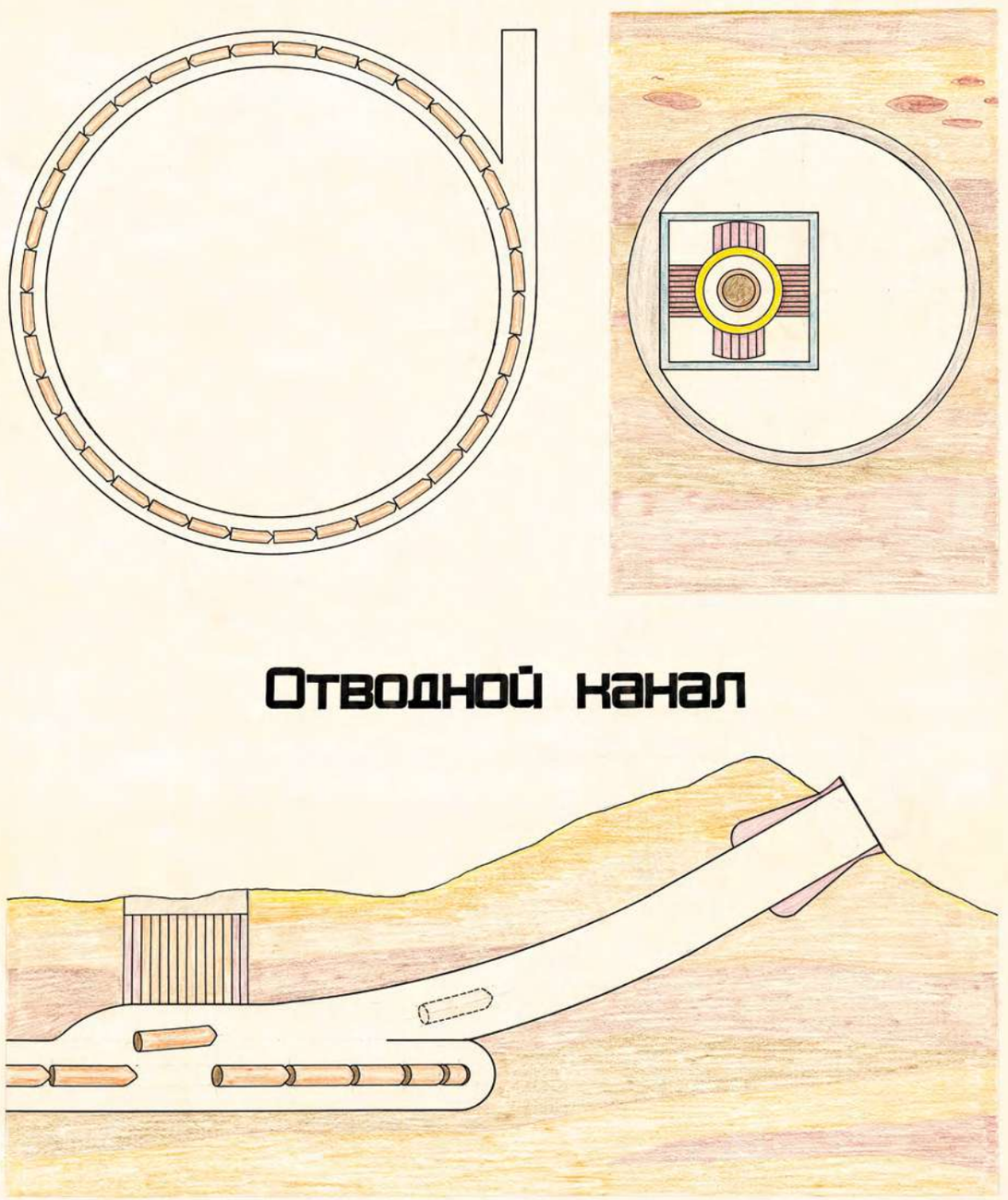
Albert Einstein noted something similar when he spoke about his work at the Swiss Patent Office, that he learned there to “separate the wheat from the chaff,” that is, from the garbage. Not only in inventions but other things as well. This ability enabled him to detect obviously impractical ideas and very much helped him later not to get too distracted with something like that, and to concentrate on the essential. Many people do not know how to do that. The majority shift their attention from one insignificant thing to another. For example, they travel far away to catch a glimpse of some landmarks, take a selfie in front of them and continue their essentially pointless journey due to a lack of understanding about the main thing – and thus often spend their whole lives this way, exchanging it for insignificant trifles.

Despite numerous eccentric circumstances in the activity of the Federation of Cosmonautics, the main line, of course, was constructive. Involvement in this work enabled me to get acquainted with many people who later had an influence on work on the project of the General Planetary Vehicle, including on organizing my first Scientific and Technical Conference “Non-Rocket Space Industrialization: Problems, Ideas, Projects,” which took place in April 1988 in my homeland – in the city of Gomel.

As for extraterrestrials, I think they exist. We can’t be the only intelligent beings in the Universe. However, if they are more developed than we are, then we hardly need to meet with them. Usually the meetings of civilizations that are at different levels of development end with the destruction of one of them – the less developed one. We can observe such a course of events in historical retrospective even on our native Earth, with the exploration of new territories, whether America or Siberia. On the other hand, extraterrestrial beings that have reached a really high degree of perfection will simply not bother to contact such wild creatures as us. On modern Earth, scattered by wars and carelessly exploited, they simply have no one to talk to. And can we earthlings who are not capable of getting along with one another even when we speak the same language, understand them, representatives of other planets, alien to us?



Second half of 1980s. Anatoli Unitsky at the meeting with pioneers and at work



How My Inventing and Social Activity Influenced My Personal Life

My work on the project of the General Planetary Vehicle annoyed not only the government but those most close to me. The start of the difficulties could be considered my transfer from the highway construction trust to the Institute for Mechanics of Metal-Polymer Systems. The salary was lower there, but I had to work more. When you are doing calculations, you sit up for a long time, returning home sometimes after midnight. Moreover, I began to travel to other cities to take part in scientific events. Then followed the insane court cases organized against me. There wasn't enough time or strength for domestic affairs. Such a situation could not help but reflect on my relations with my wife and son. I realized this all very clearly, but I couldn't live any differently. It was necessary to choose – either I was an inventor and a revolutionary or a family man with a stable salary. I chose the first. But they wanted the second from me.

My wife, Galya, began to take offense a great deal, then became jealous, and then fell into depressions. In response, I grew even more distanced. She didn't have enough attention and care, which a woman has the full right to demand from her husband, and which I could not give her. We began arguing. Galya tried to influence me through our son.

1980. Young Unitsky family

Family photos of 1989 and 1991. With my first wife Galina and our son Denis

She would tell him how bad I was, how I hurt her. Denis took her side. But that once again distanced me. She did not share my convictions, enthusiasms, and ideas, and thought they were nonsense. Every defeat, starting with the lawsuits, was portrayed as confirmation, of my worthlessness, some sort of foolishness, and a cause for regrets. Soon tension spilled over into physical conflicts. She would get furious and attack me with her fists, beating me and throwing various things around, so that she nearly killed me a few times.

Once, on request of the director of the institute, after a reception organized for the end of a scientific conference, I had to take home a professor who had too much to drink. He was barely standing, and was impulsive, and kept trying to run away or get up somewhere so I managed to keep hold of him with difficulty. At one point the professor was able to open the door of a trolleybus on the fly and jump out of it. I went after him. I can't count how many times we fell, until we got to his house. When I was finally walked him home, I returned to my place, and there was grass, leaves, and some mud on my clothes. Galya grabbed the first thing that came to hand – a heavy dog collar – and hit me in the face as hard as she could. She almost knocked my eye out. Then for two weeks, I went to work at the Institute wearing sunglasses.

Several years later, when we were already divorcing, I gathered together in a briefcase all the objects that she had thrown at me and brought them to court. There were a lot of them. A hammer, screwdriver, and knife were especially dangerous. The classics were the frying pan and the plunger. Of the historic items,

1991. With my wife Galina

1995. Still together. Happy? Or Not?

there was a little bronze bust of Marx. I couldn't take some things as they were broken – teacups, plates, and so on. In the end, I didn't show any of the material evidence to the judge. I did not have the opportunity. After the trial, we lived in the same apartment together more than 10 years but were already strangers to one another. Our disaffection had begun long before that, and the events to be described I largely endured in solitude. And although there was support and like-minded colleagues, almost no one was prepared to make sacrifices for the sake of an idea and sacrificed the idea at a critical moment.

I have written about Galya in this book because I want to explain the motives and reasons for several important actions in my life and events. I loved her, we were happy and unhappy together, and we parted ways. That's the way it was. I claimed Galya didn't understand me. Likely, I didn't understand her. Of course, not always and not in everything. For a time, we had been very close.

She was the most beautiful girl at the institute. And she chose me and suffered a lot together with me. In that little room in Tyumen. Then with our infant in her arms, she followed me to Belarus. Cooped up into my father's apartment, she waited for me to return from the army. We raised our son together. We went through the fall of the USSR, the years of ruin and universal poverty following it. I am grateful to her. She, like I, however, made her own choice herself. I do not condemn her for anything at all, but I recall certain episodes in this book only to describe the circumstances in which I then lived and worked.

It happens that people who were close to each other suddenly lose something along the way. If they go their separate ways, that's normal. I think it's more terrible when they go on together, without looking at each other, not seeing any common goal, and keep moving as if from inertia. Such fellow travelers steal time from each other. And I am grateful to Galya for the fact that she never pretended, never hid her feelings and emotions. Even for throwing at me whatever was at hand when she got mad. With that, she likely freed me. She pushed me away, so that I could move forward without losing my time and not taking it away from her. Then I realized that partings are an important part of our fates as meetings. Both open up new opportunities.

Conference on Issues of Non-Rocket Space Exploration

The persecution of me in courts and the numerous articles, both positive as well as negative assessing my idea, evidenced that it had become famous and reached the masses. Considering the print runs of the journals where I was publishing, my name was known throughout the entire Soviet Union. I received numerous letters from readers. Sometimes they were interesting and even constructive. Sometimes they were critical and sometimes just funny. One of them from Leningrad (St. Petersburg today) wrote that after reading my articles he had begun to prepare for life in orbit. He was urinating into his household ficus plant, and planning to begin experimenting with his feces. Three months later, I received three large packages from that same address.

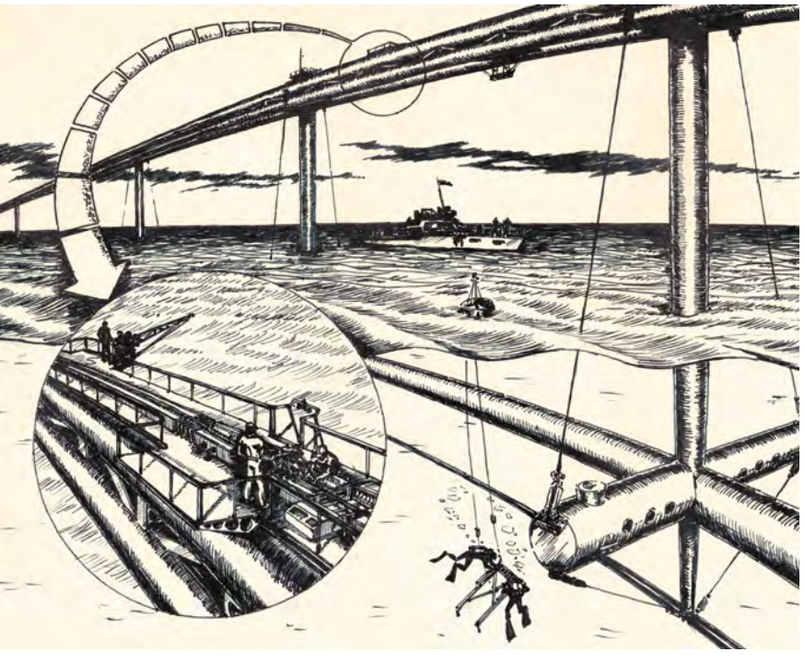
1980s. Media about string transport and the GPV projects developed by engineer Anatoli Unitsky

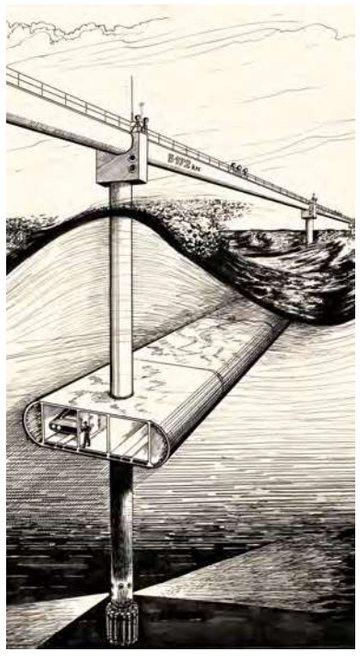
What could I imagine about their contents? It turned out that there were enormous and thick atlases in the boxes with military nautical charts on which were indicated depths, temperatures, currents, and other data from all the oceans. With the “Secret” stamp. In principle, the sender was guided by the correct message: most of the launch overpass of the General Planetary Vehicle had to run along the ocean.

All of this was movement forward. Even such curious messages had their positive consequences. They forced me to reflect on the opportunities for development of agriculture in space and many years later led to my own technology for creating relict humus (which is what existed more than 100 million years ago) from brown coal. After all, coal was once wood, and wood drew everything necessary for life from soil, above all its fertile part, that is, from the humus. And I learned how to turn coal into fertile humus. In fact, I did use the nautical charts in several calculations, and I have kept them ever since.

But more was required. It was necessary to attract specialists to the discussion. After obtaining an expert appraisal from the USSR Federation of Cosmonautics, where the project was twice discussed in an expanded session of the non-rocket section, I began to prepare to conduct the first international conference precisely on non-rocket space exploration.

First, I managed to convince Academician Anatoli Sviridyonok, director of my own Institute where I worked, to facilitate the planned event. Then I involved the USSR Federation of Cosmonautics and the leadership of the Gomel Regional Party Committee of the Komsomol, although by that time I was no longer of Komsomol age. The Gomel Regional Party Committee provided significant financial and organizational





Posters of 1976–1977. Offshore section of the GPV with linear floats, namely, forevacuum tunnels for hyper-speed transport (speed is over 1,000 kilometers per hour)

help although I was not a Party member, but the Party in those years guided everything that went on in the Soviet Union. Serious support was provided by the cosmonaut Igor Volk, with whom I had become acquainted at a seminar, and subsequently became friendly for many years. Igor was so strongly imbued with the idea, with its humanist and environmental components that he came in person in order to go with me to a meeting with the first secretary of the Regional Party Committee, and then to the Central Committee of the Communist Party of Belarus. The authority of a Hero of the Soviet Union worked perfectly. Furthermore, numerous other organizations and enthusiasts helped me.

The conference took place in Gomel in April 1988 and lasted three days. About 500 people from 20 countries attended. Along with Igor Volk, there were several other cosmonauts. The cosmonaut Alexander Alexandrov presided. More than 100 papers and speeches were heard during the roundtables. I was a lecturer and co-lecturer on four topics. Without a doubt, this was great work, of which I’m proud and which has yielded its tangible results.

A short 30-minute popular science film “To the Sky by Wheel” was made about the conference. I had become acquainted with Yuri Khashchevatsky, director of the film, even before that – during the filming of a television broadcast about my project. Somehow, we immediately bonded and felt free in our interchanges. We didn’t simply work; we experienced every frame. The film was constructed around a debate between a skeptic and an optimist – and the debate really did go on until we were hoarse. Yuri was after all a physicist by his first education, so it was not hard to find a common language.

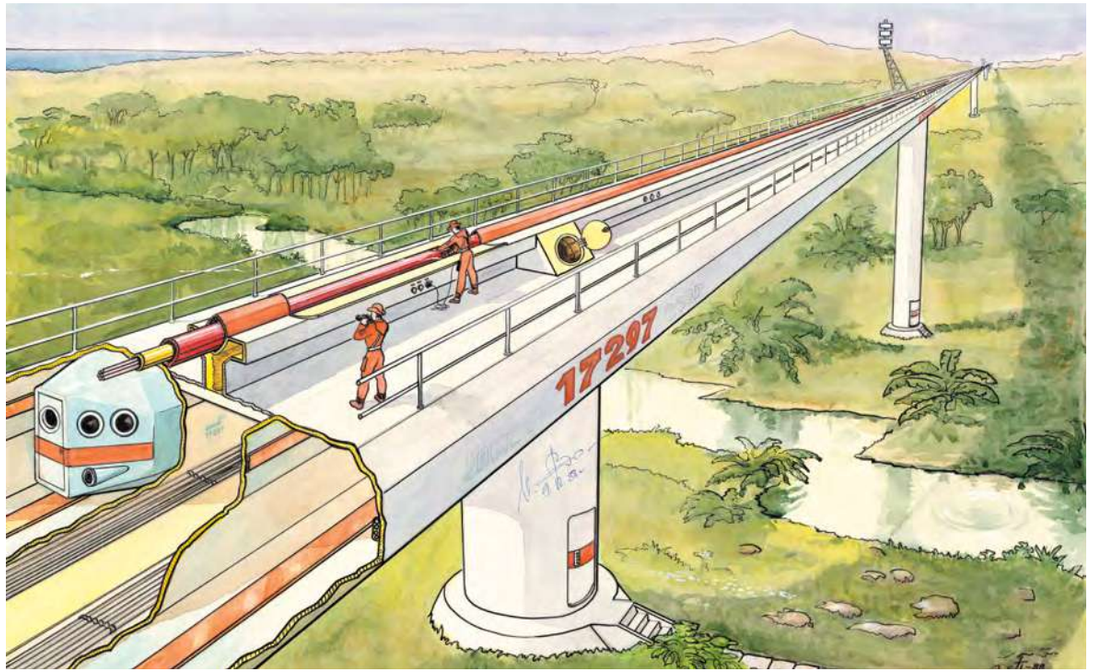
Then he began to make political films. I do not support Khashchevatsky in his political views, and disagree with many things, but I respect him as a fighter, boldly speaking out against what he disagrees with, having the courage to use his mind. I respect him for staying in Belarus despite the fact that all his relatives emigrated to Israel.

The film “To the Sky by Wheel” is on the internet. It conveys the atmosphere of the event well – the alarming call to humankind to come to its senses and direct the maximum efforts not to destruction of the planet but to ensuring the conditions to preserve life and the development of civilization. Above all this is what united the conference participants. This is what inspired Igor Volk, Hero of the Soviet Union, and others to come to Gomel.

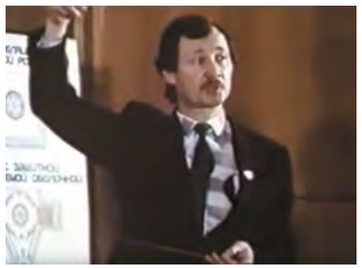
Igor shared a story of how once he was in space, he keenly realized what damage people were doing to the Blue Planet. He was seized with a wish to destroy the cause of all the troubles, including even himself...

Komsomol Regional Committee – regional Committee of the youth organization of the Communist Party of the Soviet Union (Communist Youth League, or Komsomol). It represented the interests of Komsomol and participated in socio-political and economic life at the regional level. In the vertical of power, it was located between the District Committee from below and the Central Committee from above.

Hero of the Soviet Union – the highest degree of distinction of the USSR that was awarded for performing a feat or outstanding services during hostilities as well as in peacetime. The Gold Star medal was awarded as a badge of distinction. Many cosmonauts received such awards, starting with Yuri Gagarin, the first man to fly into space. Heroes occupied a special position in Soviet society, enjoyed various privileges and were well-known and respected people.



1988. Poster of the GPV signed by Igor Volk, the USSR pilot-cosmonaut, Hero of the Soviet Union



1989. Stills from the movie "To the Sky by Wheel" by Belarusfilm production

1988. Cover and two-page spread of the program of the first Scientific and Technical Conference "Non-Rocket Space Industrialization: Problems, Ideas, Projects"

He has said repeatedly that every earthling ought to go into space, in order so that there, among the icy blue of the stars, watching the evening and morning views of Earth through the porthole, dreaming of green grass, a person could become aware fully of his responsibility to his Home. Igor Volk died not long ago. To his last days, he continued to fight for the environment of the planet. I have not admired Earth from space, but I remember my village of Kryuki, my Motherland, throughout my whole life, which due to human activity, the accident at the Chernobyl Nuclear Power Plant, turned out to be lost to me forever. And although I understand the feelings that Igor put into his words, I never had the desire to destroy people. I think that we, despite our opinion of ourselves, are still only children. Can you wish to destroy a child for the fact that he broke or ruined something? We still have a chance to grow up and survive.

1988. City of Gomel. Group photo of participants of the first Scientific and Technical Conference "Non-Rocket Space Industrialization: Problems, Ideas, Projects" – pilot-cosmonaut Igor Volk, Hero of the Soviet Union, in the center in the lower row

1988. Anatoli Unitsky and pilot-cosmonaut Igor Volk had a lot of common topics for discussion

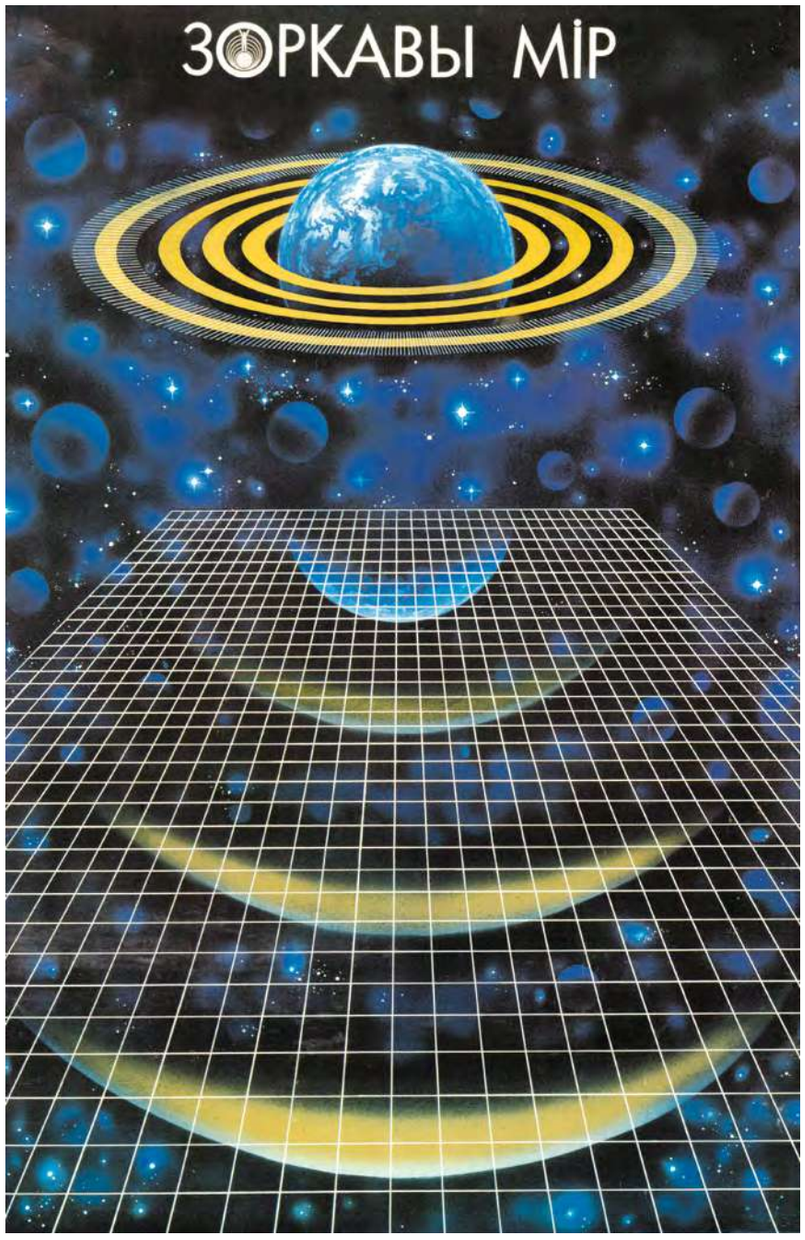
1988. Publication in the regional newspaper "Gomel'skaya prauda" [Gomel Truth] about the international conference on non-rocket space exploration

"Star World"

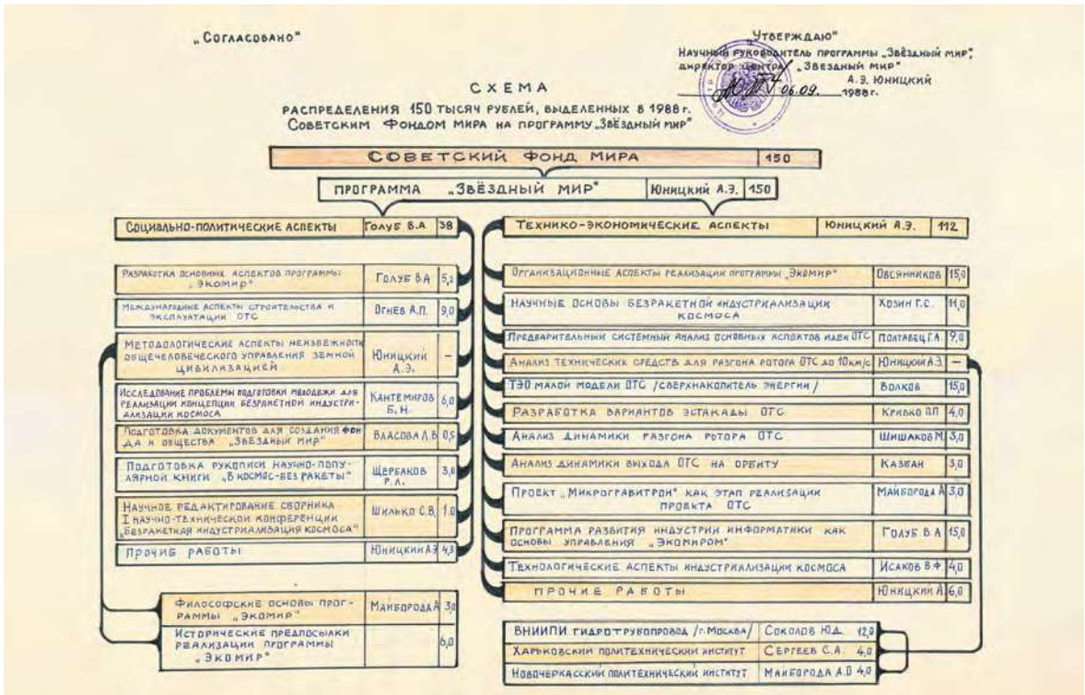
The conference was a great achievement for an ordinary Soviet engineer. Along with that, it also marked a kind of dead end. The Institute where I worked held first place in the USSR in inventions. As head of the patent office, I had a good salary for those times and a secure future. Inner satisfaction was lacking, however, because everything I possessed did not enable the further advancement of the idea of non-rocket space exploration. A historically defining moment came to leave academic science. At that time, it was allowed to create Centers for Scientific and Technical Creativity of the Youth, out of which many prominent Russian entrepreneurs were promoted, including Mikhail Khodorkovsky, who later became a famous billionaire and a fierce warrior against the "Putin regime." One of these centers called Star World had been created by me in the city of Gomel with the support of the Soviet Fund for Peace and the USSR Federation of Cosmonautics. It was the second such center in Belarus (the headquarters of the first was in the capital city of Minsk). To open Star World, I had to get permission from the Council of Ministers and the Central Committee of the Communist Party of the republic. The Soviet Fund for Peace awarded me a grant of more than $200,000 (150,000 Soviet rubles) for research in the field of non-rocket space exploration. That was big money then, if converted to present day – more than a million dollars.

The Soviet Fund for Peace – a mass public organization, in which other Soviet public organizations, workers' associations, and individual citizens participated on a voluntary basis. It was established in 1961. It promoted the development of relations and contacts of the Soviet public with foreign organizations and movements fighting for peace, national independence and freedom, development of friendship and cooperation between nations, prohibition of nuclear and other weapons of mass destruction, and the achievement of a general and complete disarmament. It funded a number of public organizations as well as scientific research on peace and disarmament issues.

Second half of 1980s. City of Gomel. Working at the Star World center



1988. Poster of the Star World Center for Scientific and Technical Creativity of the Youth. The objective of the Center is to contribute to implementation of the Star World program on development of the GPV and transfer shift of harmful industries away into near space orbit as a means for global environmental disaster prevention


„Согласовано"

„Утверждаю"
Научный руководитель программы „Звёздный мир",
директор центра „Звездный мир"
А.Э. Юницкий
06.09. 1988 г.

СХЕМА
РАСПРЕДЕЛЕНИЯ 150 ТЫСЯЧ РУБЛЕЙ, ВЫДЕЛЕННЫХ В 1988 г. Советским Фондом мира на программу „Звёздный мир"

СОВЕТСКИЙ ФОНД МИРА — 150

ПРОГРАММА „ЗВЁЗДНЫЙ МИР" — Юницкий А.Э. — 150

Социально-политические аспекты	Голуб В.А	38
Разработка основных аспектов программы „Экомир"	Голуб В.А	5,2
Международные аспекты строительства и эксплуатации ОТС	Огнев А.П.	9,0
Методологические аспекты неизбежности общечеловеческого управления земной цивилизацией	Юницкий А.Э.	–
Исследование проблемы подготовки молодежи для реализации концепции безракетной индустриализации космоса	Кантемиров Б.Н.	6,0
Подготовка документов для создания Фонда А.Д. и общества „Звёздный мир"	Власова Л.В.	0,5
Подготовка рукописи научно-популярной книги „В космос – без ракеты"	Щербаков Р.Л.	3,0
Научное редактирование сборника I научно-технической конференции „Безракетная индустриализация космоса"	Шилько С.В.	1,0
Прочие работы	Юницкий А.Э.	4,3
Философские основы программы „Экомир"	Майборода А.	3,0
Исторические предпосылки реализации программы „Экомир"		6,0

Технико-экономические аспекты	Юницкий А.Э.	112
Организационные аспекты реализации программы „Экомир"	Овсянников	15,0
Научные основы безракетной индустриализации космоса	Хозин Г.С.	14,0
Предварительный системный анализ основных аспектов идеи ОТС	Полтавец Г.А	9,0
Анализ технических средств для разгона ротора ОТС до 10 км/с	Юницкий А.Э.	–
ТЭО малой модели ОТС /сверхнакопитель энергии/	Волков	15,0
Разработка вариантов эстакады ОТС	Крыско О.П.	4,0
Анализ динамики разгона ротора ОТС	Шишаков М.	3,0
Анализ динамики выхода ОТС на орбиту	Кавган	3,0
Проект „Микрограватрон" как этап реализации проекта ОТС	Майборода А.	3,0
Программа развития индустрии информатики как основы управления „Экомиром"	Голуб В.А	15,0
Технологические аспекты индустриализации космоса	Исаков В.Ф.	4,0
Прочие работы	Юницкий А.	6,0

ВНИИПИ гидротрубопровод /г. Москва/	Соколов Ю.Д.	12,0
Харьковский политехнический институт	Сергеев С.А.	4,0
Новочеркасский политехнический институт	Майборода А.О	4,0

1988. Scheme of distribution of 150,000 rubles (about $200,000) allocated by the Soviet Fund for Peace for implementation of the Star World program

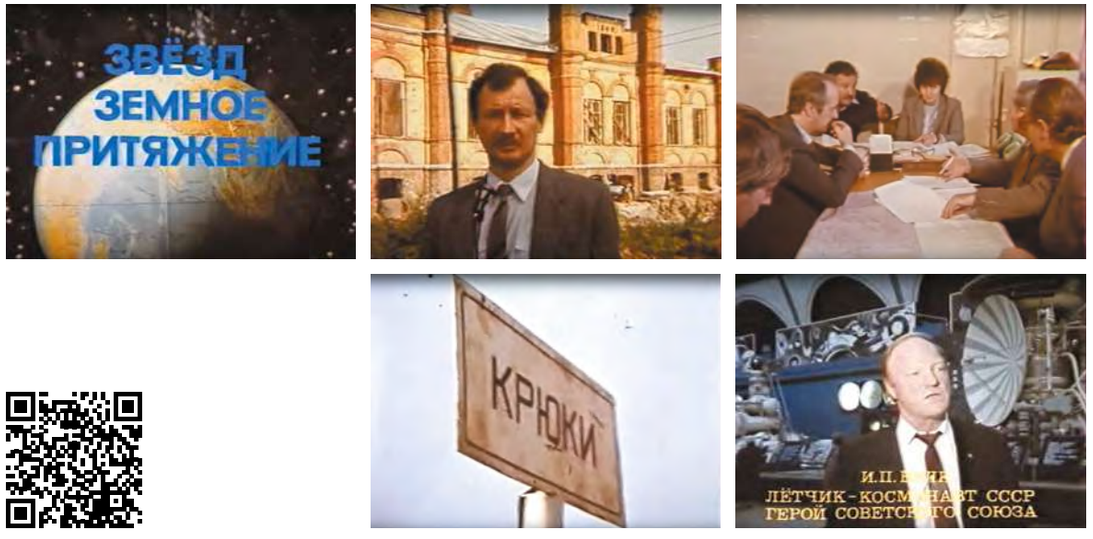
Within the framework of the Center's work, I organized and realized in practice a large number of innovations. I think we worked at the level of Skolkovo, the most famous Russian innovation center today, not less. In a year and a half, my Star World successfully completed about 100 unique projects, including the creation within seven months – from drafting to manufacturing and testing – of a fundamentally new combine harvester twice as productive as an ordinary one with a cost 20 times less than the usual one manufactured by Gomselmash [Gomel Agricultural Machinery Plant] at that time. Among the designs were string greenhouses, superconductive systems to transmit energy and much else.

A sum equivalent to about $5 million was collected on the Center's account. I could return the funds received from the grant to the Fund for Peace, although they had been given without a requirement of return. I was counting on long-term cooperation, however, and did this as an act of good will. We planned to invest the rest of the funds in the construction of a test site such as that built now at Maryina Gorka. For that purpose, I even looked at about 100 hectares of land at a collective farm located near Moscow, because I realized that I needed to get out of the provinces, which Gomel represented. I was able to reach an agreement that this land would be allocated to us, but we would purchase it. Belarusfilm studio made the second film about Star World, "Earth's Gravity of Stars." My next plans included getting to the USSR Academy of Sciences, in order to petition to include the work on non-rocket industrialization of space in its plans, and to create an All-Union organizational council which would supervise this activity.

On the wave of success, I didn't notice the dissatisfaction coming for quite understandable reasons from government representatives who at that time had control of the whole economy. The Center operating with the effectiveness and energy of a private business annoyed Soviet bureaucrats who had grown accustomed to a measured routine. To them we were upstarts claiming the right to compete. That harvester we had made for 20,000 rubles was designed parallel to an analogous project by the city-forming enterprise "Gomselmash." The state spent a lot of money on the factory's machinery – about 300 million rubles along with reconstruction of the factory, at that time the equivalent of $400 million. Even so, the factory combine harvester didn't yield nearly the indicators that we had. Can you imagine how they looked, compared to us?

After the tests and demonstrations of our "Star" combine harvester, I was invited to the Party Regional Committee, although I was not a Party member. They asked (almost verbatim): "Who are you? You want to put 30,000 people out of work? Do you understand, you goddamn innovator, that we can put you in prison right now?" The harvesting machine was not the only reason for a conversation in such a tone. Our other projects also created competition no one needed and cast the state bureaucracies in an awkward light. I believed in my strengths, however, and was no longer afraid of the bureaucrats and military intelligence officers who had tried to intimidate me in the past. I kept going ahead, but I somewhat underestimated the enemy. And soon I was stopped.

In 1989, I ran for election as a people's deputy in the USSR Supreme Soviet (the parliament at the time). My purpose was to get closer to the government, to have the possibility to lobby the interests of the non-rocket industrialization of space. My program was to end work on a number of ineffective state projects; reduce the armed forces (in half at a minimum) and redistribute the funds to health, education, and the environment; breaking down the calcified economic mechanisms and the administrative legal system,



1989. Stills from the movie "Earth's Gravity of Stars" by Belarusfilm production about the Star World Center for Sientific and Technical Creativity of the Youth


ЯК ВЫРАТАВАЦЬ ЗЯМЛЮ

ЗВЯЗДА

1989. Republican newspaper "Zvyazda" [Star] published an interview with Anatoli Unitsky, Director of the Star World center

1989. The author of string and geocosmic transport systems against the background of the iconic poster "Zorkavy mir" [Star World]

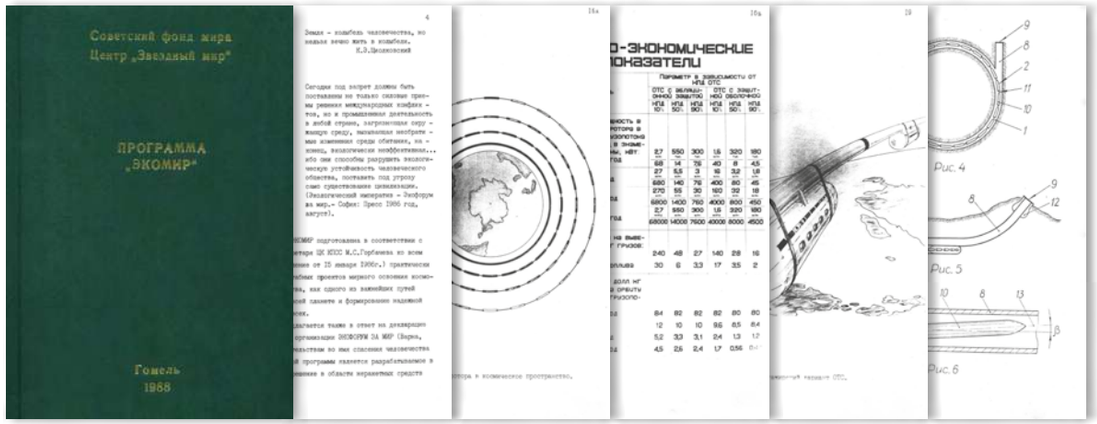
transfer to a market economy; to close plants, collective and soviet running at a loss, end the system of privileges, and ensure freedom of speech. Essentially, my campaign was built on exposing the ineffectiveness of the existing system whose representative – the first secretary of the Gomel Communist Party Regional Committee was my rival in the elections.

Once again, I was invited to the Party Regional Committee and the KGB, I was shadowed, printing presses refused to publish my election leaflets although there were no lawful reasons for this. I began pasting up typewritten programs around the city, but intelligence agents tore them down immediately afterward. They tried to prevent my meetings with voters, closing halls on various pretexts. I talked to people on the street. According to preliminary polls, victory should have been mine. But then I was betrayed, for the first time so starkly, not counting my father's departure from the family.

What I was willing to endure my comrades were not willing to take on themselves. The authorities pressured the collective, and they removed me from the post of director of Star World, which I had founded (under the charter, the position was elected). I was offered to remain as a regular employee, but naturally I refused. Not out of pride, no.

USSR Supreme Soviet – the highest body of state power in the USSR in 1938–1989. It had not only legislative but also partially executive and controlling power and was formally considered the collective head of state. The building of the USSR Supreme Soviet was located in the Kremlin – a fortress in the center of Moscow, which is still the main socio-political, historical, and artistic complex of the capital of Russia.

I simply realized that these people had left me, in a struggle that had been our common one. Before, they had sworn their friendship and loyalty to me, saying that my ideas had become the meaning of their lives. Now I turned out to be alone. To oppose this, just like opposing the system further, was useless. They could put me in prison, in the end. I packed up my briefcase and left, leaving behind everything. Without me, the Star World center worked another year and a half, but in that time my former “comrades-at-arms” could no longer create anything and consequently didn’t earn anything. Likely they were concerned only how to divide up the $5 million in profits among the 20 people in the collective.



1988. Cover and pages of the scientific research of the EcoSpace program, which analyzes the arrangement of the future civilization and gives its arrangement consisting of three global systems (worlds): BioSpace, HomoSpace, TechnoSpace

1989. Covers, front pages and other abstracts of scientific papers prepared in the Star World center, including a study of the monetary and financial system of the future, which anticipated the emergence of electronic payment systems and blockchain technologies


Кандидат в народные депутаты СССР
по Гомельскому городскому национально-территориальному
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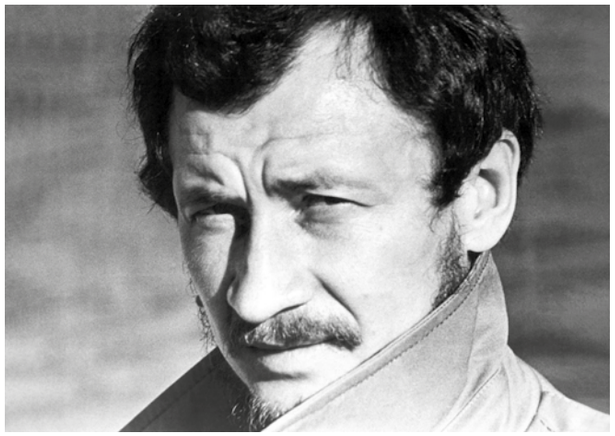
Группа поддержки кандидата.
Тел. 55-20-09.

1989. City of Gomel. The election program of Anatoli Unitsky, a candidate to the People’s Deputies of the USSR



End of 1980s. Anatoli Unitsky: looking into the future

PART 3

Optimal Ground Transport as Development of the Idea

The General Planetary Vehicle Overpass as the Basis of String Transport on Earth

It was the beginning of the wild 1990s. For two or three years it was very difficult. Everyone was in a state of suspension, which I suffered along with the country. The USSR was living out its last days, and then collapsed. It was a civilizational disaster like the fall of the Roman Empire. Just as in all the previous years and in later years to come, work saved me. Based on the reports of the Star World center, a major analysis had to be done. I saw clear priorities ahead – to continue development of the idea of the General Planetary Vehicle in separate fundamental solutions and ensure the funding of the program. I realized that there were two paths to this – search for an investor or creation of a business. I chose both.

Even earlier, after objections received from various people and institutions regarding the great material intensity of constructions of the GPV, insurmountable for the economy, I began to optimize it, focusing on the parts of the construction that consumed the most material – the overpass surrounding the planet. Soon I discovered that if it was made prestressed, it would yield enormous savings.

Of the four types of stress-strain state of materials – stretching, compression, bending, twisting – the most favorable (in the sense of the most complete use of the physical and mechanical properties of the materials) is stretching. For example, with an equal payload, a stretched cable with a diameter of 10 centimeters and a length of 500 meters is thousands of times less material-intensive than the Ostankino TV tower working on compression or a road bridge with bending in a span of the same 500 meters. Moreover, the use of the stretching property in the structure of the overpass was obvious, since this property is the main principle of operation of the GPV.

Imagine a system with the length of 40,000 kilometers (the length of the equator) and only two or three meters across. Divide 40 million meters by two. The ratio of the cross dimension to the length is equal to one to 20 million. The analogy would be a web one kilometer in length. Such a web could not work on the principle of compression, since in that case it would inevitably lose its stability. Only a stretched structure could function. Therefore, I drafted everything in such a way that the toroid – the GPV – was stretched during the whole cycle of operation. Elevating to space, being in space, landing on Earth, it must always be stretched like a string. The ground overpass must also be stretched (to save material).

Collapse of the USSR – a process of systemic disintegration in the social structure, national economy, social and political spheres of the Soviet Union, which ended with the termination of its existence on December 25, 1991. The starting point of the collapse is considered to be the second half of the 1980s and the beginning of perestroika. Its completion was the signing of Belavezha Accords and Alma-Ata Protocol establishing a confederal Union of former Soviet republics (Commonwealth of Independent States) in December 1991 followed by the resignation of the USSR President Mikhail Gorbachev and the adoption of the Declaration on the termination of the existence of the USSR by the Council of Republics of the USSR Supreme Soviet.

I calculated a construction made up of anchoring structures that take on the horizontal load from stretching, installed with spans of up to five kilometers (along the length of the strings), supporting towers located at a distance of 50 to 2,000 meters from each other, and thin, prestressed beams with stretched high-strength reinforcing cables (strings) at the core. Unexpectedly, I saw that the resulted overpass could have other applications. In particular, for the movement of the ground vehicle along it. Beams can easily be turned into rails. Such a railway becomes maximally light, durable and even, which ensures high speed and makes the travel on it comfortable. At the same time, if you make the overpass continuous along the length, without temperature joints, then its load-bearing capacity will increase twice. Thus, you can minimize the quantity of materials in construction of the GPV on the ground and undewater. Thus, a cheap, sturdy, and long-lasting road can be created, that is, string transport. Moreover, this invention of mine is a significant investment proposition and business worth billions. I will spend the funds received on (nothing more or less than!) saving the planet. In addition, even what string transport would give to the world would become an enormous step forward for all humankind.

2018. GPV integrated with string transport system (visualization)

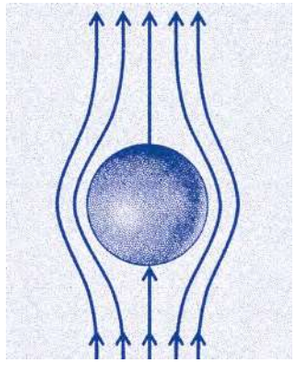
What Will Happen from the Physics Perspective if I Travel from Point A to Point B

A prestressed string-rail structure, by definition, is less material-intensive than any other. A vehicle on it can move along the earth's surface. This is environmentally sound, safe, solves a lot of problems, and yields amazing efficiency. The more I thought about the advantages of second level transportation systems, the more potential I saw in them.

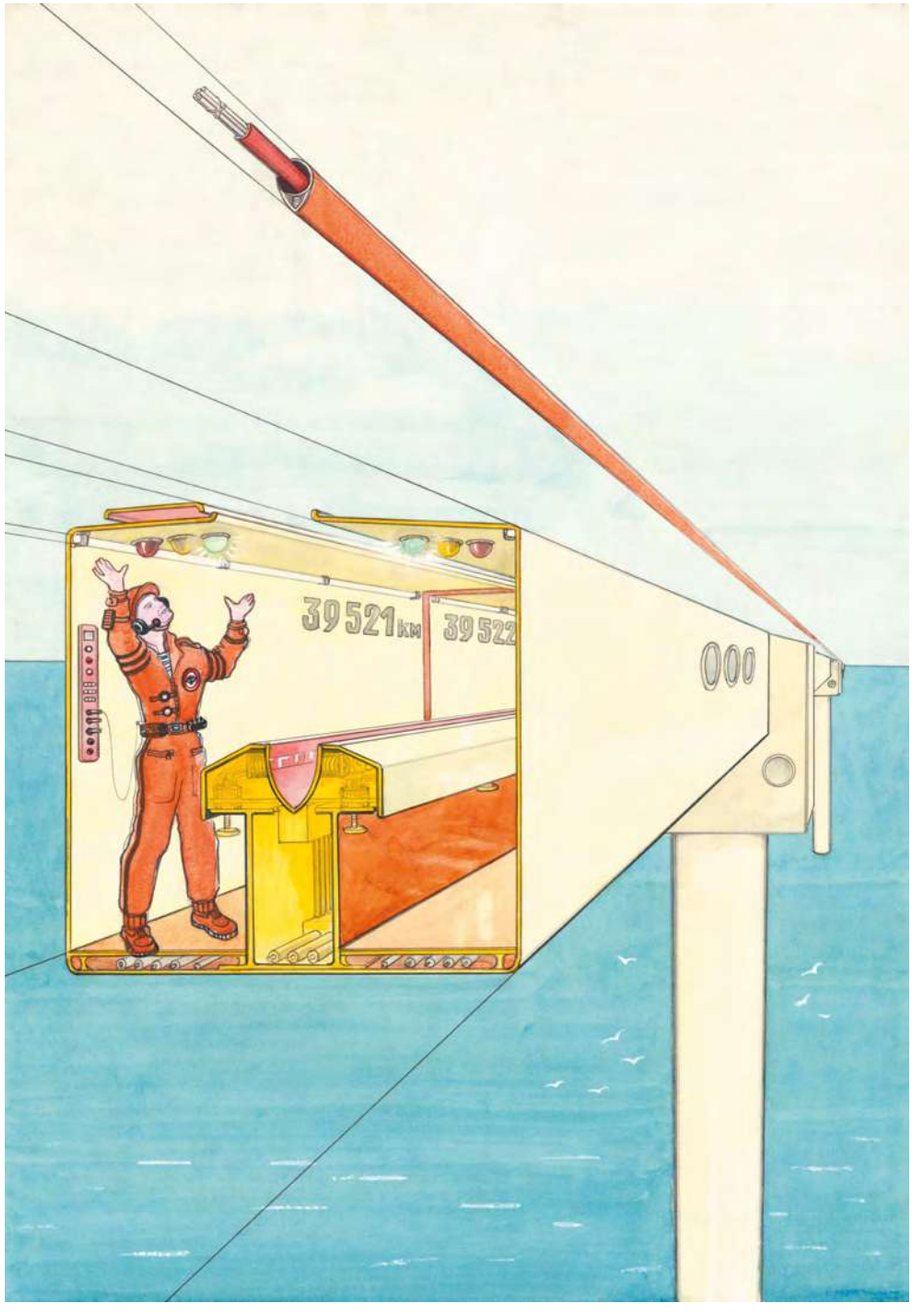
I began to test my hypothesis. I began from afar. As in everything, I wanted to get to the essence, to obtain 100-percent certainty. I threw aside absolutely everything I knew about transportation and left only the laws of physics. So, what happens from the perspective of physics, if I arrive from point A to point B? For me, then a student, point A was Tyumen, where I was studying, and point B was Moscow, the capital of our Motherland. The form of transportation was of no importance in my reasoning.

While traveling by any mode of transport at the beginning and the end of the way, I am approximately at the same elevation above sea level, about 100 meters – that means my potential energy as a cargo has not changed as a result of travelling. At both points I remained immobile relatively to the ground surface – that means my kinetic energy also did not change. Consequently, if the energy state of the cargo (myself) did not change, then the useful work by the vehicle is equal to zero, and the ratio of the vehicle useful action will also be equal to zero. Here there is nothing to change and improve – how can you improve zero?

In this case, what is all the energy spent for? It turns out that 100% of the energy in any form of ground transport is spent not on useful transport work but to a fight with the environment and to destroy it. I made the conclusion that in order to perfect a vehicle, precisely these expenditures of energy had to be minimized, and not some sort of nodes in any known transportation system had to be improved. In addition, I came to the understanding that for a high-speed vehicle with a speed of above 400 kilometers per hour, more than 90% of the energy expenditures in movement are just for aerodynamic resistance, and not for anything else. The most important thing in a high-speed ground vehicle is its aerodynamics, and not, for example, the use of a magnetic cushion. After all, a magnetic cushion will not improve aerodynamics but rather worsen it, because the aerodynamic contours of the vehicle will become less perfect.



Aerodynamics – the science that studies the movement of air masses and their impact on bodies that are located and moving in the flow. While evaluating the efficiency of body movement, they use the value equal to the ratio of drag force of this body to the product of velocity pressure by the area of its greatest cross-section – drag coefficient, usually denoted as C_x. The smaller is the number that this coefficient is equal to, the less air resistance the object experiences when moving and, consequently, the less energy it will lose.



Poster of 1975. The simplest cargo version of the GPV

Over 90% of energy consumption for high-speed transport moving at speeds of above 400 kilometers per hour is accounted for by aerodynamic resistance.

Thus, it is aerodynamics that needs to be improved in high-speed vehicles in the first place.

Even as a student, I understood the significance of aerodynamics for speedy movement, when I analyzed the formula for the power of aerodynamic resistance. This formula contains several parameters: the density of the air; the midsection (square of the crosscut), and the ratio of aerodynamic resistance. And only one parameter – speed – enters the formula to the third degree, that is, cubed. What does this fact mean and what can it lead to? If, for example, an ordinary passenger car travels at a speed of 100 kilometers per hour, then its motor spends on aerodynamics, let us suppose, 20 kilowatts of power, or five liters of fuel per hour. That is acceptable. But what if the car races up to a speed of 500 kilometers per hour? The speed has increased five times, but the power of the aerodynamic resistance to movement (I remind) is five cubed, that is, 125 times. As a result of these calculations we obtain 2,500 kilowatts on aerodynamics and more than 600 liters of fuel per hour on it as well – that is already beyond the bounds of the reasonable. And if the speed of the car's movement is increased to 1,000 kilometers per hour? Then there will be totally astronomical figures – the engine power should be increased up to 20,000 kilowatts, and it will burn five tons of fuel in an hour.

Soon I realized that with speeds higher than 500 kilometers, the vehicle must move in a forevacuum tube, and the higher the speed, the less dense the atmosphere should be. I began to develop the concept of a transportation system with the use of forevacuum pipes, but I didn't proceed beyond the theory, design sketches, and calculations at that time, in the early 1970s. The implementation of this idea is associated with a considerable number of technical difficulties and requires enormous funds. The Americans who are trying today to create "a train in vacuum," the Hyperloop, have run into this in practice. They attracted hundreds of millions of dollars in investments; however, the demonstrated results are quite modest so far. At the present time, my progress in this direction is no less, but most likely even more (I cannot claim this precisely) than they have, betting more on PR-advertising than on engineering by all indications.

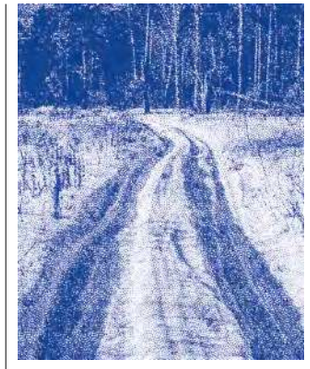
Without ceasing work on systems with the use of forevacuum pipes, but doing this in my spare time, I concentrated primarily on simpler solutions. Where it was a question of speed equal to or below 500 kilometers, the aerodynamic characteristics can be improved by using simpler and more affordable means than pumping out air on sections of the road stretching hundreds of kilometers and maintaining the necessary low pressure (about 10 millimeters of mercury column is not yet a vacuum), ensuring tightness and creating locks, removing heat from the vehicle moving in the pipe – its engine and brakes, and much more.

2017. High-speed uPod (visualization)

I scrutinized not an individual car, no matter how it moved (on a paved road, rails, air, or water) but a transport complex as a whole, as a system, in which there are three basic elements – a path, a moving object, and an external environment in which this movement takes place. In such a dimension, with the presence of air, it turns out to be extremely important at what distance from the surface, that is from the screen, the movement occurs.

The entire vehicle, moving directly above the earth, experiences the screen effect. For that reason alone, its aerodynamic features automatically worsen by a factor of 2.5. The heart of the matter and the reason for this is the asymmetrical flowing of air during movement close to the road's surface which acts as a screen.

It turns out that the overpass I conceived is the solution. Due to the fact that it is prestressed, the need for a heavy, solid roadbed disappears. Two narrow rails can be used as a track that do not create a screen and practically hang in the air above the surface of the earth, which in this case will also not act as a screen, since the vehicle is raised to a height greater than its size. For that reason alone, the aerodynamics improves by 2.5 times in comparison with other types of overhead and ground transport. Looking ahead, I will say that according to the results of an aerodynamic wind tunnel test, I managed to bring the ratio of the aerodynamic resistance C_x of uBus to a value close to 0.04. This is close to the theoretical limit and not attainable in any other transportation system capable of getting mass application. Thus, the string overpass even in the first approximation guaranteed an entire range of benefits, starting from economizing in construction and ending with an enormous reduction of energy expenditures on transportation. Here I realized that aside from the most effective geocosmic transportation system (or rather parallel to it), I invented an optimal vehicle for transportation in an aerial environment above the ground.



Track – initially a deepening in a dirt road from the wheels. Regarding transport, it is the transverse distance between the extreme edges of the vehicle's wheels. In rail transport, which includes string transport, it is a path formed by a pair of parallel rails.

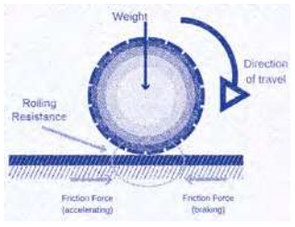
Why Am I Certain That String Transport Is the Best System of All

My conviction that string transport is the best has three reasons: the laws of physics, accumulated practical engineering experience and optimization. What I will say now will relate not only to ground but space transportation systems as well.

First, my inventions are based on the laws of physics but not on the requirements of the economy, politics or anything else (although they are even taken into account to some extent). I considered the design of a vehicle first of all from the viewpoint of speed, energy, and material, that is, from fundamental things. History is silent on whether there was anyone who said to himself while creating a vehicle, starting to design it from scratch: "I don't know anything except the law of physics which now operate and which scientific progress will not abolish in the future." Possibly, it was the inventor of the wheel, but George Stephenson, the maker of the first locomotive, proceeded from different prerequisites.

Stephenson was engaged in maintaining and improving steam engines in an English coalmine. A track road was built there. It was used to transport coal in horse-drawn wagons. The inventor didn't create the fundamentally best vehicle; he conceived of an economically profitable replacement of the horse. Another great discovery which changed transportation was the airplane of the brothers Wilbur and Orville Wright, inspired by people's ancient dream of flight. Here, too, the task was not set to create an ideal system from the perspective of physics. Possibly, the approach I have implemented is unique. I do not find reasons to think otherwise. Moreover, only such an approach, based on an effort to improve a vehicle to the maximum extent from the perspective of fundamental laws, can yield fundamental superiority.

The second reason for confidence in the superiority of string transport is the continuity of the idea. In any system, it is not only individual elements that are important so much but the structural interconnections between them. A random pile of parts is not the same as the engine assembled from those parts. The innovation of my invention is also connected first to the nature of the structural interactions of the elements, the majority of which were known and tested before me. However, in my invention, I tried to combine everything of the best that has been created in transport in the thousands of years of its development.



Rolling resistance – a set of forces that affect a rolling body and prevent its free movement forward. Additional energy is needed to overcome the rolling resistance, therefore, a car consumes 5–30% of fuel and more, depending on the speed, just to roll forward on an asphalt road.

Moreover, for all the basic criteria, the maximum possible characteristics allowed by the law of physics were obtained. That is, it is not possible to improve it further, I extracted the maximum of possibilities.

The knowledge obtained in aviation, automobile manufacturing, and also in the design of hovercraft enabled the conception of a unique aerodynamics in which more than 90% of energy losses during rapid movement are removed. Again: I have achieved the maximum possible characteristics – wind tunnel tests showed the values of the aerodynamic resistance coefficient of the ideal shape of a high-speed uBus, equal to the theoretically possible minimum: $C_x = 0.04$. Nothing can be improved here. By the way, in aviation and in submarines, a much lower value of C_x (e.g., equal to 0.02) may also appear. But not because aerodynamics or hydrodynamics are better there, but because there the resistance refers to the area of the wings of the aircraft or to the volume of the submarine. If it is referred to the midsection (the transverse area of the hull, where the cargo is), the C_x value increases dozens of times, up to 1.0 and higher. For a high-speed train, this value is even higher and can reach 2.0–3.0.

The "steel wheel – steel rail" system, which determines the efficiency of movement along a string-rail track structure and has an efficiency factor of 99.9% (a force of one kilogram can move a cart weighing one ton), is partially borrowed from the railroad. Only 0.1% separates this system from the maximum possible efficiency factor equal to 100%.

The creation of intelligent control systems became possible thanks to the merits of cybernetics and technologies of transfer, storage, and protection of data.

Experience and knowledge accumulated for centuries by bridge-builders have made an invaluable contribution to the conception of the main element of string transport – prestressed continuous transport overpasses (without temperature joints).

Of course, the list could be continued. Many inventors have taken the same path, for example, the author of the most famous machine gun, Mikhail Kalashnikov, who successfully linked several technical solutions known before him: the use of an intermediate cartridge (medium in capacity between that of a pistol and a rifle), the upper location of the gas outlet node and the presence of a receiver.

Next, I optimized the borrowed solutions in order to ensure even more impressive characteristics. For example, I improved the steel wheel (doubled the reduction of rolling resistance) and reduced several-fold both the contact pressures in the "wheel – rail" pair and the wear by comparison to the railroad wheel pair.

The optimization, as the founding principle of work in creating string transport, is the third reason for my confidence in its superiority.

The value of aerodynamic resistance coefficient C_x of high-speed uBus configuration is equal to a theoretically possible minimum of

0.04.

The use of steel wheels in string transport gives an efficiency factor of

99.9%.

Why Should We Evaluate String Transport on a Planetary Scale

The worldwide length of highways is above

60 million kilometers

with more than

30 million kilometers

paved.

Vehicles are commodities of mass consumption. Everyone uses them. There are about a billion cars available. Paved automobile roads alone of more than 30 million kilometers in length occupy today a territory equal to the area of five countries the size of Great Britain. There are planes and airports, ships, ocean and river infrastructure, trains and about one and a half million kilometers of railroads as well as bicycles and motor bikes, cable ways, monorails, and much more. Transportation is in every place where people live. And everywhere it is not only a solution of problems but also their source. Enormous resources are spent on manufacturing and use, the air and soil are polluted, and enormous discomfort is created for urban dwellers. It is one of the most wide-scale phenomena of modern civilization, and therefore its effectiveness must be evaluated at a planetary scale. After all, one automobile is good. But billions are likely bad. One plane is very good, but tens of thousands of steel birds smoking up the sky are bad – so bad, that the governments of some countries have even been forced to impose environmental taxes. In the same way, one kilometer of string transport is hardly able to change the world. But if there are 25 million kilometers?

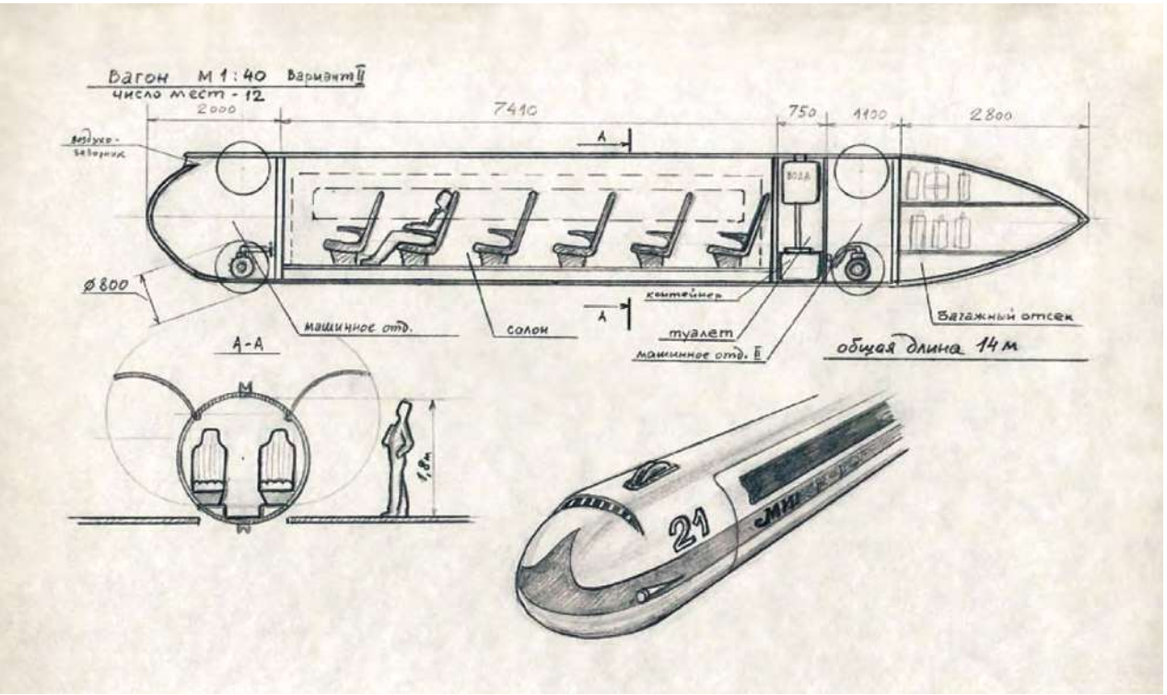
A single vehicle cannot cause Earth much harm. Given the small numbers of transport, serious demands for efficiency and environmental friendliness could hardly be demanded at all. The manufacturers would not get profits from optimization and would not be interested in anything like this. If you make one vehicle a year, it's not so important how much metal is in it – a ton more or less. If there are millions of vehicles, then each kilogram economized, each screw is a contribution to profit and the possibility of increasing the attractiveness of the product from the perspective of its fundamental criteria of effectiveness: the ratio of price to quality.

Recently colleagues brought to me a sketch of a new sub-type of string overpass, the concept of which I proposed and designed with high-strength bolts: nodes are held by the friction forces that occur during compression. I see that in the places where the string-rail elements are joined, there is some sort of incredible number of bolts. I ask why. They explain: everything is aimed at increasing the longevity – the welding will not withstand 100 million cycles of loading with the calculated load, and the overpass will not operate for 100 years but will begin to collapse in 20 years. They show calculations and refer to standards. They prove it. I calculate that there are about 100,000 holes for every kilometer of double-track road and, accordingly, tens of thousands of bolts. This needs a lot of work not only to drill holes in high-strength steel but also to tighten the bolts to a strictly fixed strength. And that costs money. The longer the road, the more money. I know that it can be done differently, reducing the number of holes by two or three times, and perhaps abandoning them altogether.

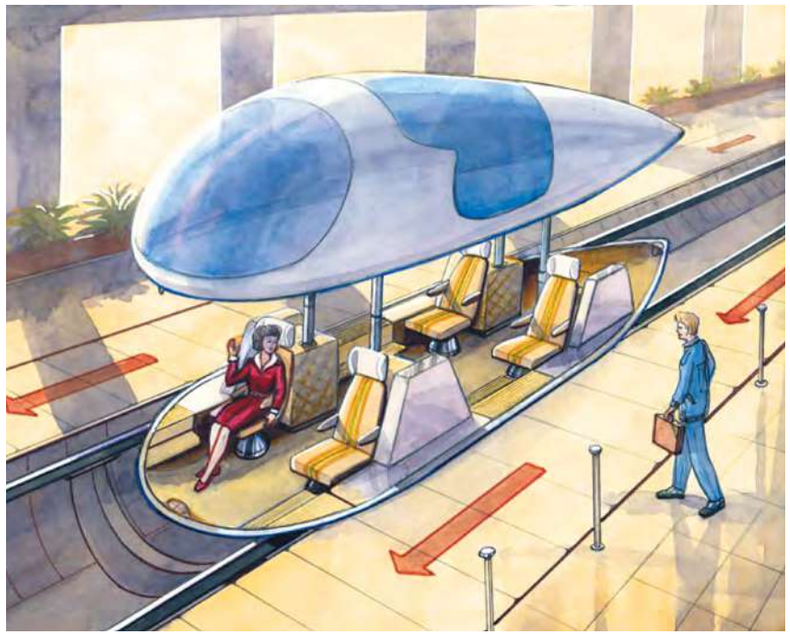
I recall Henry Ford, who required that his engineers join all the elements of the engine in one block (back then, the cylinders were still separately installed, as in a locomotive, where there are no significant size restrictions). He was also told that it was impossible. He had only to threaten the workers with firing, and the job was done. Today, all automobile engines are like the way Ford required that they be made. I promised my engineers a bonus for every hole justifiably removed from the structure. After all, on a planetary scale, it turns into hundreds of billions of holes and turns into additional costs with the large number of zeros resembling these holes. But I haven't given anyone a bonus, because I myself managed to find solutions that reduce the number of strength bolts three times, which reduced the cost of the overpass by half and increased its durability by the same factor.

My chief principles for design and construction are based on the unity of three components: esthetic design minimalism. Any engineering solution – a part, node or object – must be esthetic from the engineering perspective, that is, the maximum functional. The chief function (for example, for a plane it is aerodynamics; for a wheel – rolling resistance) must be implemented in a structural (materialized) solution in which there is nothing in excess – like a sculptor, an engineer must remove everything non-functional. A plane that flies well is beautiful, and not the one that is incapable of flight but drawn by an artist, albeit a talented one. By the way, the famous airplane designer Andrei Tupolev claimed that ugly planes cannot fly well.

Unfortunately, in the age of computers and gadgets, the attention of engineers has shifted to the virtual information world, where mathematics and digits rule. In this world, you can draw everything you like, but this does not mean that this will work in the real world, in which physics rules and in which we live. Another sphere of abstraction influencing the work of engineers are references, all kinds of standards, instructions and rules of which an incredible number have been created. Written by people and not by nature, nevertheless they are often perceived by mediocre engineers as dogma and applied by them everywhere without thinking about whether this should be used in this specific case.



Posters and drawings of 1980s.
Utran options



Likely, this will be too great a presumption, but I see a certain connection between the huge number of breakthrough design solutions proposed in the world in the mid-20th century, and the minimum standards that the designers of those years had to follow. Regulations were introduced later, and now they often only limit engineering creativity.

Several years ago, the classic engineering dogmatist Alexander Kotrekhov worked with us as a Chief Project Engineer. We had only begun to design test overpasses for EcoTechnoPark in the Belarusian town of Maryina Gorka. And this Chief Engineer, heading the project works at that time, began to tell everyone in our engineering group that Unitsky was demanding that construction standards and rules be violated, and he did not agree with this, and therefore was collecting papers for the prosecutor.

Once I came to the construction site and I saw that the excavator was digging enormous pits for supporting towers. I came up and the excavator operator told me, “Anatoli, what an idiot put down this substitute for weak soil – my steel bucket bends when I dig this ‘weak’ soil?” It turned out there was clay here. Yes, but weak soil is watered clay, and here it was as dry and dense as a rock. And after the excavation, the clay is loosened and watered, especially when rains started at that time and it could not even be filled back in. We had to fill the pits with concrete and sand-gravel mixture, which cost us both time and about $100,000.

And all because this engineer had a dogma – a supporting tower must not shift vertically even by a millimeter. Before working in our company, he designed frame buildings in which the frames – made up of columns – are linked together by a load bearing reinforced concrete slab. And if at least one column sinks, the slab begins to crack and may break. But we had a line construction in which the sinking of a supporting tower would not affect the stability of the overpass, since the span structure is flexible. Settlement of a supporting tower influences another characteristic of a road – the evenness of the route and the smoothness of the drive, that is, the comfort of travel. With a span length of 50 meters and a speed of travel up to 100 kilometers per hour, unevenness of 20 centimeters on a section of 100 meters (two spans, in which the average supporting tower settled) is not even felt by the passenger. And this does not affect the durability and longevity of the overpass, as we in fact observe at EcoTechnoPark. Kotrekhov was fired, and the supporting towers of the five constructed string overpasses of various types were designed in the future with an understanding of how the structure operates.

As a rule, standards are created in specific conditions and for specific goals. For example, modern sanitary standards were introduced in times when waste was still poured out right on the streets – on the heads of passersby. City dwellers were forced to wear hats with very wide brims to protect themselves from feces falling not only on the head but also on the shoulders. The French fashion for these accessories came from this. And if hats are still relevant, the standards themselves have obviously become outdated. Today at my farm, I demonstrate the possibilities of a sanitation and plumbing system organized differently. For example, there is no external plumbing in my house. All waste from the kitchen and toilet go to the root system of plants in the greenhouse inside the building, where microorganisms planted there work to turn the incoming biomass into the most necessary product for life – fertile humus. Just as in nature in the woods – after all, there is no plumbing there.

Everything that we have grown accustomed to throwing away in pails or flushing down the toilet can be used to ensure homes with tasty and healthy food. For example, one person can feed two others with his waste, including that from the kitchen (from a banana peel and potato skins to chicken bones and grease from washing the dishes), if his biowaste is redirected to a garden or a vegetable patch built into the biosystem and architecture of the home. From these wastes, humus will be processed – the basis for life and fertility, where the entire periodic table is present needed for building and maintaining the cells and DNA of our organism.

2018. Anchoring structures of string tracks in EcoTechnoPark: one is building-like, the other is steel framed

Transport accessibility – a standard indicator of the time spent on transport links between different points within the systems of group settlement (planet, country, region, city). The creation of new modes of transport contributes to increasing transport accessibility, leading to changes in the forms of people's settlement. So, in the United States, with the advent of cars, urban residents were able to move to the suburbs, and the cities themselves received a significant incentive for growth.

Vegetables and fruits are grown in the home from biowastes, which are not only absolutely environmentally pure but healthy – you cannot buy such produce either in the supermarket or pharmacy. They will become a valuable addition to the diet of the houses' inhabitants. The same is true about transportation and in general about everything. The existing standards are not Holy Writ. The norms are situational. Change the situation, and they change, too. In order to see and understand this, however, it is necessary to be able to think and analyze everything on a planetary scale.

Further, I will provide a description of the advantages of string transport proceeding from the presumed construction of 25 million kilometers of string roads, that is, the creation of an alternative transport and infrastructure network throughout the whole world. I present the characteristics of string transportation from the perspective of its efficiency, resource consumption, safety, comfort, accessibility, sociality, and environmental friendliness. I will cite a detailed justification, relying on calculations and results of experiments conducted by me for many, many years of work.

Efficiency of String Transport

If a 40-seat car on steel wheels with improved aerodynamics and a mass of 15 tons travels along string rails, then at a speed of 500 kilometers per hour it consumes about 400 kilowatts from the engine's power, or 10 kilowatts per passenger. Of these, more than 90% go to aerodynamics and about 8% – to steel wheels. Converted to fuel, such a vehicle expends 20 liters of diesel fuel per 100 kilometers of track, or 0.5 liters per 100 passenger-kilometers. I obtained these results later on the basis of experimental data.

The wind tunnel experiments which I began in 1994 at Krylov Central Scientific Research Institute (in St. Petersburg) demonstrated that the ratio of aerodynamic resistance of the string electric vehicles (C_x) which I created reached the level of 0.06. This is close to the theoretical minimum equal about to 0.04. And I know how to reduce in the future this characteristic of the high-speed uBus to the theoretical limit. Then such a vehicle will begin to consume 1.5 times less energy, i.e., fuel.

According to the results of testing, the ratio of friction from rolling of a steel wheel on a steel head of a string rail indicated a volume within one or two thousandths. Thus, if a rail-based electric car on steel wheels, called the "uPod," is fueled by calculation on the basis of one liter per passenger, it will travel 200 kilometers at the speed of 500 kilometers per hour. In the event the speed of travel is reduced to 100 kilometers per hour, this same vehicle will travel more than 5,000 kilometers.

For comparison: even the best high-speed car, for example, the Bugatti, at a speed of 500 kilometers per hour would require an increase of the power supply up to 3,000 kilowatts. In fact, that is five tank engines. Of these, about 2,000 kilowatts go to aerodynamics (Bugatti has a ratio of aerodynamic resistance (C_x) of 0.36, taking into account the spoiler – only 0.42, which is 6–7 times worse than in string transport vehicles). Approximately another thousand kilowatts of power will go to the pneumatic wheels, since the rolling resistance of such wheels progresses nonlinearly with an increase in speed, and with the high rotation of the wheel worsens tenfold.

Having excess power, such a wheeled vehicle with its constant operation would expend per day 18 tons of fuel, and 6,500 tons per year, which makes up 130,000 tons in a 20-year period of service. And this is only a two-seat sports vehicle! A 40-seat high-speed uBus, more comfortable and safer, under the same conditions over 20 years would save more than

Unitsky String Transport video presentation (2022)

Electric vehicle – a car powered by one or more electric motors. It appeared earlier than the internal combustion engine. The first prototype of such a vehicle was created in 1841, however, the popularity of the invention came only in the late 20th and early 21st century. By that time, cars with internal combustion engines had become one of the main sources of environmental pollution. Despite the fact that the transition to electric vehicles is often presented as a means of solving environmental problems, such devices themselves, running on ordinary asphalt roads, are not able to reduce the level of harmful emissions into the atmosphere. They consume no less energy than conventional cars. The only difference is that environmental pollution occurs not on roads, but in places where electricity is generated. Electric vehicles implemented in string transport are tenfold more efficient than conventional ones. Energy consumption is significantly reduced due to improved aerodynamics and travel on rails.

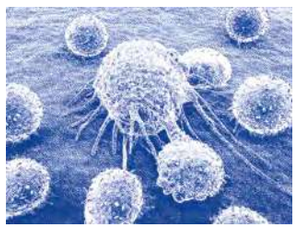
110,000 tons of fuel, or 50 full-weight railroad trains with fuel. And in that time it would also transport at an average distance of 500 kilometers five million passengers more than Bugatti.

Even more surprising will be the advantages of string vehicles compared to the most economical airplane in the world – the Airbus A380. Although the cruising speed of the A380 is 890 kilometers per hour, the string vehicle moves almost twice as slow; they can be rightly compared with each other, since string transport will be even faster up to a distance of 2,500 kilometers in the logistics chain of "door-to-door." You won't have to pass through long check-in procedures, get to the airport, and then back from it (for example, in a taxi, for an additional payment); or sit for a long time and ride on the landing strip, which in this case also involves an additional expenditure not only of time but of energy, that is fuel, and so on.

The capacity of the fuel tanks in an A380 is 320,000 liters (250 tons of aviation kerosene). The Airbus completely uses up a tank in 17.5 hours of flight, or is capable of burning (with non-stop operation) 343 tons of kerosene per day, 125,000 tons in a year, 2.5 million tons in 20 years of use.

You can imagine what environmental damage is caused by only one plane burning millions of tons of fuel in the most vulnerable part of the atmosphere, the lower levels of the stratosphere, where, essentially, the ozone layer, which protects the biosphere, begins. Today it is proven that some products of combustion of airplane engine are washed away at such altitudes only within a year, during which the ozone, which protects everything living on the planet from deadly ultraviolet rays of the sun, is destroyed. Furthermore, it is necessary to remember that in the process of burning 2.5 million tons of kerosene about 8.5 million tons of atmospheric oxygen (which we all breathe) is depleted irreparably and more than 100 environmentally-hazardous carcinogenic and chemically active products of combustion of an overall mass of more than 10 million tons is jettisoned into the ozone lawyer. Moreover, the exhaust from the combustion of this fuel will not only be mixed up to the ozone layer but will end up there in the form of ionized gas ejected from the turbines at high speed and high temperature. Just imagine: the example above is just one plane, and the most efficient one.

An articulated train of uBuses with the same capacity as the A380 (525 passengers) moving along the overpass invented by me, will expend more environmentally clean electrical energy (converted to fuel); about 20 tons per day, 7,300 tons per year, 150,000 tons over a 20-year period of constant use. The A380's fuel (over its entire life cycle) compared to a string train is more than two million tons, which is about

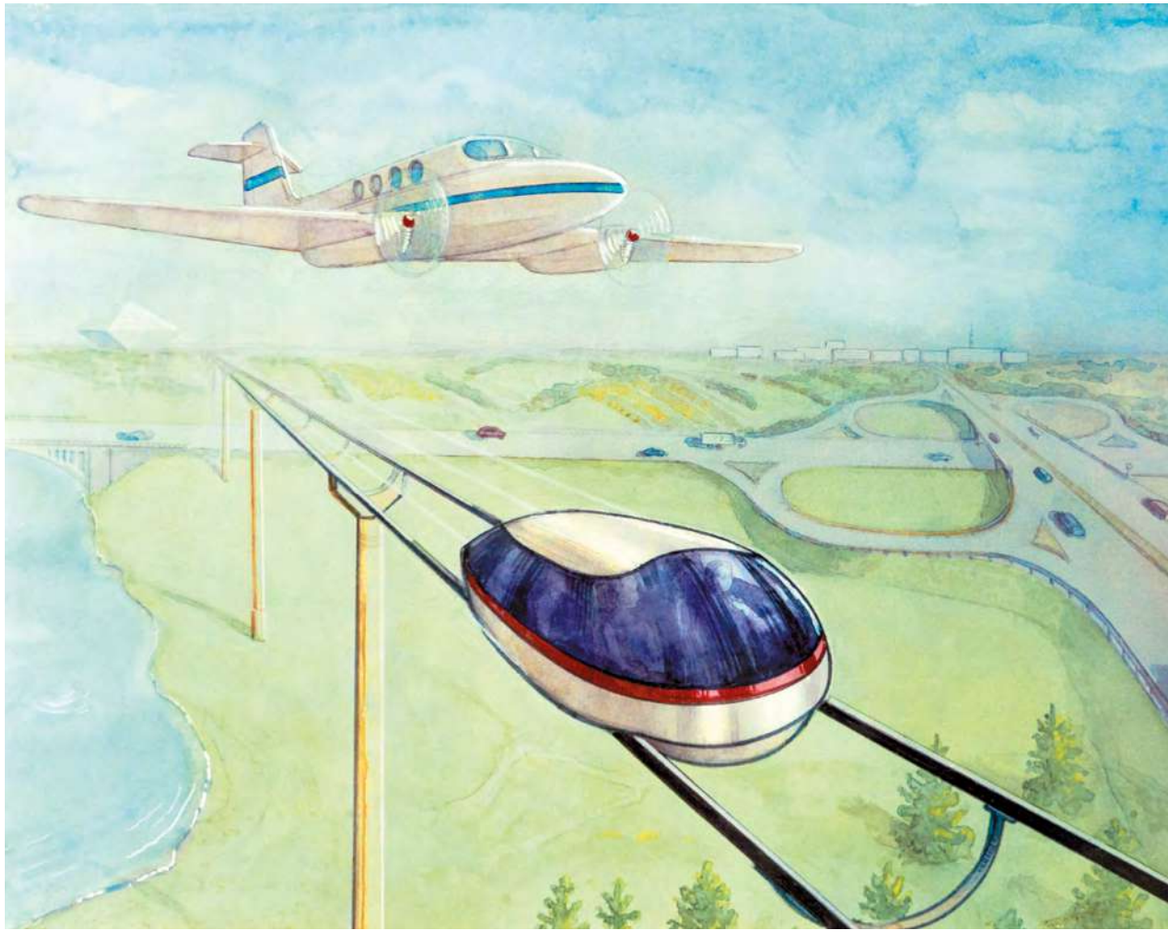


Carcinogens – environmental factors, the impact of which on the human or animal body increases the likelihood of malignant tumors. Carcinogens can have a chemical (various chemicals), physical (ionizing radiation, ultraviolet rays, and in some cases electromagnetic fields), or biological (oncogenic viruses, some bacteria) nature. Oncologists estimate that 80–90% of all human cancers are the result of these factors.

a thousand railroad trains of 40 tank cars with a capacity of 50 tons of fuel each, costing in total more than $2 billion! Let me repeat: these problems are created by only one plane, and the most efficient one.

The advantages are analogous for the uPod's economizing of energy (fuel) compared to the high-speed railroads and trains on magnetic cushion which, in order to attain a speed of 500 kilometers per hour have a drive with a specific power of 70–80 kilowatts per passenger, while for string transport this indicator is equal approximately to 10 kilowatts.

An excerpt from the conclusion of Solomenko Institute for Transportation Problems of the Russian Academy of Sciences of 2008: "Unitsky String Transport is the most economical transport system of all those known. In comparison with the plane, eight times as much; with the train on magnetic cushion, nine times as much; with the high-speed railroad, three times as much."



Poster of 1980s. High-speed utran

2021. uFlash (visualization)

Particularly impressive are the advantages of string transport, if they are analyzed in the dimension of a planetary scale. Let us examine conditional fuel savings for 25 million kilometers of high-speed string roads. It is not so much – in the 20th century, more than 30 million kilometers of all possible paved roads were laid; however, they turned out to be insufficient, therefore more and more new ones are being built everywhere. Only in Russia alone, in order to surpass the USA in the length of the network of highways, it would be necessary to lay at least five million kilometers of new roads.

To serve such a network of roads of the length of 25 million kilometers, it would be needed no less than 250,000 conditional trains with a capacity of up to 500 passengers each (that is, at the level of the passenger capacity of the Airbus A380). That is not a very big quantity of rolling stock; one "train" per 200 kilometers of roads (in a single-track dimension) with an average frequency of about 20 minutes. In comparison with aviation, which also performs transportation work, the conditional savings of fuel on such a network of roads would make up more than 30 billion tons per year at a total cost of about $40 trillion. For comparison: presently, approximately six billion tons of oil is extracted annually; the known world reserves of oil are 150 billion tons.

The efficiency of the network of string transportation significantly increases its multi-functional nature. The string overpass may be combined with multi-channel lines of communication (wire, optical, cell, and radio-relay), lines of electrical transmission (cable and air), and also solar and wind electrical stations for its own needs as well as to provide relevant services. String transport will become a communication network on which passengers, cargo, energy, and information will travel safely and is eco-friendly. Consequently, the network of string transport will be so efficient that even without taking into account the transportation possibilities, it will pay back for its creation just through its own multi-functionality.

Resource Capacity of String Transport

The 21st century will be the century of saving resources – energy, raw material, mineral, spatial, financial, time, labor, food, and others. And this has a direct relationship to transport communications. Over 100 years, the population on the planet has grown four times, and the GDP – 20 times, which has increased the demand for certain natural resources by 2,000%. Moreover, the world has entered the era of expensive resources – the era of low prices is in the past. The growth of the middle class by three billion people over the next 20 years will sharply increase the demand for new resources, and the search for new sources of raw materials, energy, water, and foodstuffs is difficult and expensive. The surge in demand will occur right at the moment when the search for new sources of resources will be particularly difficult or expensive, and we can expect a "resource revolution." A shortage or increase in prices for one type of resource may spread to others. The attempt to satisfy the growing demand with a proportional increase in production will require additional investments of up to $10 trillion per year and will cause serious risks to civilization.

String transport will be able to give humankind a double saving. First, cargo string tracks will provide cheap access to currently unavailable mineral resources, located high in mountains, in the tundra, and on the shelf of the Arctic Ocean, in the depths of vast deserts or continents, for example, in Australia. Accessible and less-costly mineral resources will enable the global economy to continue to develop dynamically. Secondly, cargo-and-passenger string roads will allow creating an extensive global network of transport and infrastructure communications – uNet, combined with information and energy networks, at an order of magnitude cheaper and with much less expenditure of raw materials, energy, and other resources. In addition, within a century, almost all transport will move to the second level, leaving the first level to nature and people. In particular, lands, equal to the area of five Great Britains, which are currently occupied by roads, will be returned to land users on the planet. All of the above mentioned will contribute to the improving the communication capacity of the Earth's civilization and its sustainable development while improving the planetary ecology. According to UN data, the people's need for travel should increase by 2–3 times in the next 30 years with a significant increase in the speed and distance of these movements.

Exhaustible and inexhaustible natural resources – types of substances and energies used by people. Exhaustible resources are divided into renewable resources, which are constantly restored if the required conditions are maintained, and the rate of recovery exceeds the rate of their consumption (soil, vegetation, wildlife, mineral salts, etc.), and non-renewable resources – those that are not regenerated or are renewed hundreds of times slower than they are consumed (oil, coal, metal ores, and most of other minerals). Inexhaustible resources include water, climate, and space. The total water reserves on the planet are inexhaustible, but this applies only to the salty waters of the World Ocean that are still little used. Fresh water needed for humans is an exhaustible natural resource.

About
10,000
tons of steel
and over
150,000
tons of reinforced concrete
for each kilometer of double-track route will be saved during construction of string transport roads as compared to known types of high-speed railways in overpass structural design and trains with magnetic levitation.

Ash and slag collection points – places for storing ash and slag from thermal power plants, factories, places of raw material extraction operating on solid fuel. As a rule, ash and slag are transported in the form of pulp (using water) through ash pipelines. At the same time, there is a natural deposition of ash and slag, water flows into nearby reservoirs. Ash and slag collection points are the factors of polluting air, underground and surface water sources.

Lightweight and thin track structure of an overpass type, placed above the ground at the second level, has a low material consumption and accordingly a low consumption of mineral resources for its construction: steel and steel structures, non-ferrous metals, reinforced concrete, concrete, cement, rebar, crushed stone, sand, and soil. However, due to the uncut string rail structure (there is no expansion or other transverse welds throughout its length, as it is assembled into one continuous string), the load-bearing capacity of backup supporting towers is increased considerably. And since such supporting towers are the majority in the construction of the second level roads (about 100 supporting towers are required per one anchoring structure), naturally, the material consumption and the cost of the support part of the string roads is significantly reduced.

In comparison with known types of high-speed railways of an overpass type and magnetic levitation trains, the potential savings of the main building and construction materials in the construction of string transport roads will amount to about 10,000 tons of steel and more than 150,000 tons of reinforced concrete for each kilometer of the double-track overpass. In the 25-million-kilometer string road network the potential savings of mineral resources will be at least 250 billion tons of steel and about four trillion tons of reinforced concrete. This is exactly the data I received when I compared the material consumption of the first string test track, built at Ozyory in 2001, with a high-speed railway of an overpass type, built using Japanese technology in 2007 on the island of Taiwan for traffic at a speed of up to 350 kilometers per hour.

Currently, about 1.5 billion tons of steel are produced per year in the world. And in order to get additional 250 billion tons of steel and rolled steel, the following waste will be released into the environment: more than 32 of dust, more than 17 of sulfur dioxide, more than 38 of carbon monoxide, more than four of nitrogen oxide and more than 50 trillion cubic meters of waste water. At the same time, land disturbed by mining operations, occupied by dumps, ash and slag collection systems with an area of about 60,000 hectares would be additionally withdrawn. More than 1.2 trillion tons of various exhaustible raw materials (including coking coal) would have been extracted in quarries and mines, after processing of which about 120 billion tons of various environmentally dangerous and carcinogenic substances would have ended up in solid and environmentally hazardous waste alone. Even more resources would be required (including energy, land, human, financial, and other resources) and no less global environmental problems would arise in the production and installation of additional trillions of cubic meters of reinforced concrete.

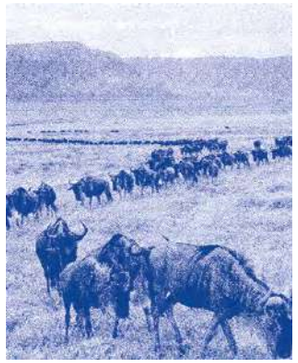
2019. Construction of string track in Sharjah (UAE)

Along with this, it is necessary to emphasize the advantages of the overpass (as a supporting structure for a high-speed track structure) compared to the traditional earth embankment (by excavation) as well as a crushed stone and sand cushion and assembled rails and sleepers of a high-speed railway.

In construction of the string-rail overpass, the precise volume of the earthworks will be reduced more than 100 times, compared to laying the same road in a linear embankment. Therefore, the landscape and biogeocenosis in the construction zone will not be damaged in any way and land recultivation will not be required. This is especially important in track laying on permafrost and soft soils that are not able to withstand the additional load from the embankment, not only weight but also heat in the summer.

Not only the earth embankment itself but also the underlying soils on traditional high-speed highways must be firm (additionally compacted approximately by 10%), which turns such a road into an extended low-pressure dam, that cuts off the sources of rivers and the movement of ground and surface water, including floodwaters. This extremely material-intensive embankment, sometimes reaching a height of 10 meters or more (or about 500,000 cubic meters of soil for each kilometer of the highway), disrupts the migration of animals, both domestic and wild, oppresses

Biogeocenosis – a stable self-regulating system that includes a community of living organisms and a set of abiotic environmental factors within a single territory, linked by the circulation of substances and the flow of energy. Organic components of biogeocenosis (animals, plants) are inextricably linked with inorganic ones (water, soil). For example: biogeocenosis of a pine forest, biogeocenosis of a mountain valley.



The paths of migration of animals – the routes through which regular movement of animal populations takes place, during which individuals from one area of habitat move to another but then return back. Migration paths are established as a result of complex evolutionary processes that allow animals to change their living conditions or pass certain development cycles. The construction of transport communication lines is often the cause for a disruption of the routes, leading to negative consequences, up to the disappearance of some populations.

natural biodiversity and prevents the movement of agricultural and other equipment. Furthermore, due to the danger of large animals (elk, cows, wild boars), coming out on the road, which would lead to the collapse and derailment of high-speed rolling stock, railway workers are forced to fence such an embankment. The cost of such traditional fencing as well as the accompanying embankment of traditional transport infrastructure (culverts, bridges, overpasses, multi-level interchanges, etc.) will be significantly more expensive than the entire string-rail overpass of the same length.

The earth embankments of railways (including high-speed ones) and highways cover (take away from the land user), taking into account the infrastructure, at least four hectares of soil for every kilometer. To construct 25 million kilometers of such roads, about a million square kilometers of soils must be destroyed – that is the area of four Great Britains. Given the average cost of land withdrawn for construction of a million dollars per hectare, the cost of land is $100 trillion; at the cost of $10 million per hectare it will be a quadrillion of dollars (land is constantly becoming more expensive and by the end of the century may on average cost more). If string tracks are built instead of ordinary ones, this land will be preserved. The most valuable mineral resource on the planet, of course, is living soil, which gives us all life. It will also be preserved in a territory equal to four Great Britains.

Another advantage of string transport is the savings on resources during the mass production of rolling stock. For example, a modern airplane can carry up to a ton of its construction and fuel per passenger (rising to an elevation of 10–12 kilometers in doing so, spending on this an additional amount of energy). In addition, one passenger seat in a modern Airbus costs up to $500,000–600,000, but the entire aircraft park would cost the customer an additional $75 trillion in order to perform the same transportation work as the string road network of 25 million kilometers. Behind this excessive cost are irrationally used and limited (and therefore not used for other more reasonable purposes) raw materials, labor, including social and financial resources of our Earth's civilization.

In order to better understand the difference between aviation and string transport, we will conduct a mental experiment. Imagine that we need to get to a neighboring city, which is three kilometers away. And there are two possible routes. The first is to walk along a horizontal road, pushing a cart weighing 250 kilograms on steel rails, and reach the goal in an hour. The second is to put on a backpack weighing a ton and reach the goal in the same hour, along the way overcoming a mountain 10 kilometers high. So, the first route is string transport and the second is modern aviation.

Railway cars do not haul fuel, but they contain up to 1,800 kilograms of "iron" per passenger of a compartment car, and considering the weight of the locomotive – 2.5 tons, which is extremely inefficient from a resource perspective. Just imagine, 2.5 tons of iron per passenger weighing 100 kilograms (including luggage)! Consequently, rail transport (although, according to couch experts, it is the very efficiency and environmental friendliness) is not only far from being optimal but is also insufficiently reasonably designed from an engineering point of view. Each passenger seat on the railway is also expensive and in fact the higher the estimated speed, the more expensive it is. For example, in "Sapsan" high-speed trains, purchased by Russia in Germany, with a speed of just 250 kilometers per hour, every seat has costed the taxpayer almost $200,000. At the same time, even the high-speed (500 kilometers per hour) uPod has approximately the same weight and size characteristics as a modern passenger automobile (or a microbus) – up to 400 kilograms per passenger. And its cost (in mass production) will not exceed $25,000 per passenger.

2016–2018. Manufacturing of string transport rolling stock

Safety of String Transport

It is commonly known that the highest transport crash rate is on the automobile highways. In total, more than 10 million people suffer from deaths, injury or disability every year, which is nearly three times the population of a country like Georgia. Let me emphasize: every year! And in 100 years – more than a billion people, of which more than 100 million will die! You and I, our relatives and children may also be among the unlucky ones. Statistics will be irrelevant to our grief.

No measures to increase safety on traditional highways, located on the first level, i.e., on the ground surface, are effective. These roads are dangerous initially, especially automobile roads, due to their technical and technological nature. Even the electric car so fashionable lately cannot solve the problems of safety. This is evidenced by statistics. Not so long ago, some 20–25 years ago, less than a million people per year died on roads. In the same 20–25 years, their number will exceed two million victims per year.

On average, about 500,000 people per year die in wars from industrial and natural disasters, production injuries, and terrorism on the planet, which is three times less than on the roads. It turns out that the most perfect murder weapon invented by humans is not the tank or the Kalashnikov rifle, not the cruise missile and the atom bomb but the automobile.

In the last 10 years, the annual death rate in aviation accidents on the planet was about 300–500 people, which is several thousand times less than on the roads, and taking into account injuries and disabilities of people – 20,000 times less. For comparison: today, on automobile roads, every day (and not every year!) an order of magnitude more people are killed – about 4,000 people (considering post-crash deaths in hospitals, which are not included in road deaths statistics). We can consider that on the roads of the world, every day, the equivalent of about 10 of A380 Airbus planes "fall and crash" or the equivalent of 20 of the smaller A310 Airbus vehicles. As for people's disability – respectively 100 pieces of A380 and 200 of A310 aircrafts. Every day!

We're not at all afraid of cars, although we fear sharks, despite the fact that only 10 people around the world per year are killed by them. We fear crocodiles less than sharks, although there are far more their victims – 1,000 every year. We are even less afraid of lightning, and they annuall kill an order of magnitude more people than in aviation accidents – according to one source – 6,000 people, according to others – 24,000, and more than 200,000 are injured. However, how can this be compared to the number of victims on the highways of the world that we use every day? We don't fear the automobile merely because we have grown accustomed to it and consider it our friend.

More than
10 million people
fall victim to road traffic accidents every year.

2020. uWind (visualization)

The basic reason for transport accidents is that modern roads are located on the ground – on the first level. That is also where the main part of the planet's biosphere is located – fertile soil, flora, and fauna, and where life percolates and lives, and where the "king of nature," that is, the human being, labors. The second most important reason for accidents on highways is the lack of an automobile anti-derailment system, since the automobile is held on the roadway only by the friction forces between the tire and the roadbed. The third reason is the absence of a clearly defined traffic path (track), so it is possible to move into the oncoming lane and the car goes off the roadbed.

Raising the track structure above the ground (on a lightweight and thin as well as extremely strong and reliable overpass) prevents the crash of such a transport system's rolling stock with passengers, animals, automobiles, and trains as well as agricultural, construction, and other vehicles. Equipping rail automobiles with an anti-derailment system and the presence of a rail track, that is a specified trajectory with an accuracy of up to millimeters, will eliminate other causes of accidents on the roads.

The second level of placement, the anti-derailment system, and the presence of a track in the aggregate will increase safety on string-rail tracks of an overpass type to a higher level than in modern aviation. Thanks to the increased transportation safety, more than 100 million people will be saved from death on the world's roads in 100 years. More than a billion *Homo sapiens* will not be disabled or crippled. What can be more noble than saving these people among whom may be the readers of this book? Or are we unable to justify the definition we have given ourselves, the "Man of Reason"?

Comfortability of String Transport

Today, we come to work already tired and return home from work even more exhausted. Practically every day, a resident of a large city, which is about 50% of the population of any industrialized country, spends nearly half of his free time on the road, sometimes more than three hours daily. Stalled in traffic jams and inhaling polluted air drawn into the passenger compartment of an automobile from the surface of the asphalt, or in a crowd of poor folks like himself (often wearing antimicrobial face masks), stepping on his feet and sneezing in his face in metro and commuter train cars, in buses, trams, and trolleybuses.

Research has shown that, for example, you can only stay for three seconds in the world's best Moscow metro without harm to your health. This is due to the very extreme noise, powerful electromagnetic fields, claustrophobia, and extreme crowding of people in the restricted underground space not intended for these purposes. After all, the human was never meant for being underground and for thousands of years has used underground space for burying the dead.

Even the best private car does not add to transport comfort, as it also stands in traffic jams, makes the driver (and passengers) nervous, and leads to chronic stress and hypodynamia. This is also due to the need to tensely analyze the situation on the road and adjacent area every second in order to drive the car safely.

Transportation fatigue is also created by the physiological characteristics of a person – his vestibular apparatus does not tolerate frequent of braking and acceleration, vibrations, shaking, and noise. Moreover, passenger fatigue depends not only on the oscillation modes of the vehicle body (acceleration and frequency) but also on the duration of exposure to such accelerations. For example, the impact of acceleration of two meters per second squared, which is common in automobile and railroad transportation, is permissible without harm to health only for 15 minutes of one trip.

In order to determine transport comfort, even complex criteria have been developed – the smoothness of movement W, which takes into account both the acceleration of the passenger's vibrations and the frequency of these vibrations. At $W = 2$, the passengers will feel as if they are not rushing at a speed of 500 kilometers per hour but are sitting at home on the couch. Namely the travel comfort in a high-speed rail electric car, moving on a string overpass, will correspond to this indicator in the future.

Transportation fatigue – a load on the body and nervous system that occurs both with public transport passengers and motorists. The two main factors that affect transport fatigue are the comfort of being in a vehicle and the time spent for traveling.

Comfort will also add the feeling of free flight at a low altitude above the ground, which each of us has experienced at least once in our vivid dreams.

The factors that ensure high comfort of passenger transportation using string transport are the following: high evenness and rigidity of the track (at a span of 50 meters, construction and dynamic unevenness is no more than 10 millimeters), soft suspension (statistic stroke of at least 300 millimeters), and low noise level (not more than 70 decibels) during movement; low rates of acceleration and braking of rolling stock (about 0.5 meters per second squared) thanks to the absence of traffic hindrance; the absence of traffic jams, intersections, traffic lights, pedestrian crossings, and dangerous areas with a reduced speed of movement, and also dangerous and unreliable transport interchanges; automated control system; short wait and travel time; the possibility of "door-to-door" trips with the use of private and family rail cars.

2018. High-speed uBus interior design first shown at InnoTrans exhibition (Berlin)

Construction and dynamic unevenness on 50-meter span will not exceed

10 millimeters.

Static suspension travel will be at least

300 millimeters.

Traffic noise level will not exceed

70 decibels.

Progression and braking acceleration of the rolling stock will be about

0.5 meters per second squared.

Accessibility of String Transport

On the most rapid modern transport – airplanes – a passenger can get from the center of Moscow to the center of St. Petersburg (660 kilometers) in the best case within three hours, that is, at an average speed of 220 kilometers per hour. Having suffered fears in flight and suffering at the initial and final stages of this trip (city – airport and airport – city), which will also lead to a significant increase in the cost of such a trip.

The enormous 1,000-ton railway train, which loads the tracks to the limit and literally sucks animals and people under the wheels, cannot safely rush at high speed through a built-up and densely populated territory. Consequently, the train has to slow down and, therefore, even in their boldest forecasts, railway workers plan to get from Moscow to St. Petersburg in three hours (the average speed is 220 kilometers per hour) with the cost of the ticket above $100.

On string transport, such a trip would take an hour and a half (the average speed would be 430 kilometers per hour) with a cost per passenger delivery of less than $15.

A travel from Moscow to St. Petersburg by string transport will take

90 minutes

(at an average speed of 430 kilometers per hour).

2021. String passenger station concept (visualization)

The short travel time is caused not only by the high design speed of travel but other transportation logistics. The rail cars with a few seats with the capacity of a microbus (about 10 people) will leave frequently without a schedule, like a fixed-route taxi. And they will not make stops on the way. A few-seat taxi doesn't stop at every lamppost if no one gets in or out, right? But multi-seat streetcars and buses must make frequent stops along the entire route, according to the approved schedule.

The main reasons for the low net cost of travel on the string transport are:

– high fuel (energy) efficiency. With the consumption of 0.5 liters per 100 high-speed passenger-kilometers and the price of diesel fuel of one dollar per liter, the energy cost will be about $0.5 per passenger for every 100 kilometers of travel. With the electrification of the road (a more expensive version of the construction), the cost of energy consumption will be reduced further 2–3 times;

– low depreciation charges for repair and restoration of the string-rail overpass and transport infrastructure due to the low cost of construction and long period between repairs;

– low depreciation charges for repair and reconstruction of the rail cars due to their low cost and long service life, comparable to a conventional automobile with similar characteristics;

– small number of station and line service personnel. When using an automated control system, salary costs can be reduced by another two times.

All conventional high-speed highways – railways and magnetic levitation roads – are unprofitable both because of the high cost of their construction and because of the high operating costs. Authorities try to increase the operating profitability by increasing the price of tickets, which makes such a transport service unaffordable for many categories of users. Only string roads will be highly profitable. For example, on the route Moscow – St. Petersburg, the operating company's revenue (if the ticket price is $50) will be up to $40 per passenger. Thus, with a volume of transportation of 50,000 passengers per day, the annual revenue will be $700 million. That means that such a project will be highly profitable.

For comparison. The construction of a similar 820-kilometer Moscow – Kazan high-speed railway planned by the Russian government will cost $28 billion. The railroad companies want to get another $10 billion as a government subsidy during the operational stage because such a project is generally extensively unprofitable. For the same money, a string track St. Petersburg – Moscow – Kazan – Vladivostok with a length of 9,200 kilometers can be built.

Annual income of the operating company on Moscow – St. Petersburg route will be

$700 million

(with a transportation volume of 50,000 passengers per day and ticket fare of $50).

Sociality of String Transport

The creation of a global highly efficient transportation and communication network on the basis of string transport at a length of millions of kilometers will totally transform the world. Fertile soil on all continents of the planet with an area that would exceed the territory of Japan, Germany, Great Britain, and the Netherlands taken together will be returned to land users. Currently, this soil is “rolled” into asphalt and “buried” under sleepers. If there is no alternative to automobiles, then over the next century, new highways will take up the same amount of territory.

A fundamentally new communications network, in which urban, high-speed intercity, and truck highways will be combined with information and power networks, will provide a stimulus to the development of the economy of any country. This includes environmentally friendly involvement in residential and economic turnover of poorly developed and hard to reach territories, such as the sea shelf, mountains, jungles, taiga, and deserts. This will increase the level of employment of the population by creating new high-paying jobs both at the construction stage

2019. Ecohouse (visualization)

and at the stage of operation of the communication system and infrastructure projects. This will help to increase tax revenues to budgets as well as expand social opportunities for states due to the fact that there will be a demand for labor resources not only in the transport industry but also in related industries and the economy.

This will accelerate the growth of the economy and the GDP (of individual countries and the world on the whole) by at least 10% per year, as financial, material, and labor resources will be redirected from unprofitable, high-cost, and environmentally dangerous conventional transport projects to highly efficient, low-cost, and cost-effective transport and infrastructure projects. This will reduce the burden on budgets and taxpayers and bring profit to more than one generation of people. The social activity of the society will increase due to the increase in people’s communication skills. It will be possible to travel five times faster and 10 times further (compared to conventional road and rail transport), with higher comfort and safety for the same money. By improving the standard of living as well as local and planetary ecology, safety, and reducing injuries in transport it will be possible to extend the average life expectancy of a person on the planet by at least five years.

The scarcity of the Earth’s resources due to the rapid development of population growth on the planet gave rise to the idea of the “golden billion.” This is one of the theories of the fascist persuasion that calls for either limiting the world’s population to one billion people by annihilation of the “unworthy,” or further increasing the parasitism of industrialized countries (where exactly a billion residents live) on third-world countries, leaving them the role of raw-material appendages, places to bury toxic waste and location of environmentally-hazardous industries.

In fact, 25 times more people – 25 billion people – can live on Earth in comfortable conditions and even with a higher level of consumption than the famous “golden billion.” Or an average of about 200 people per square kilometer of land. And this is without taking into account the area of Antarctica, although it is much easier and cheaper to develop than, for example, the alien, distant, and much colder Mars. That means one person per 5,000 square meters (50 acres, or half a hectare). It is simply necessary to organize this life in our own home of the planet Earth in a different way.

“Forward to nature” – we must live where the conditions for life “on the green ground” can be created far more comfortable and safer than life “on the black asphalt” in modern large cities. Thanks to string transport, people will be able to settle in pedestrian clusters (of course, this will happen voluntarily, just as in the 20th century, people voluntarily gathered in anthill metropolises poorly adapted for normal life).

+10%

Creation of a global transport and communications network based on string transport will accelerate economic and GDP growth (of separate countries and the world as a whole) by at least 10% per year.

The golden billion – a metaphor used in journalism to refer to the population of the richest and most developed countries and reflects the imbalance in living standards and consumption between them and developing countries. The term “golden billion” goes back to the report of the Club of Rome “Limits of Growth” (1972), containing the results of modeling the growth of the human population and the depletion of natural resources. The report was the first to thoroughly analyze the problem of overpopulation of Earth with limited natural resources.

2019. Linear city (visualization)

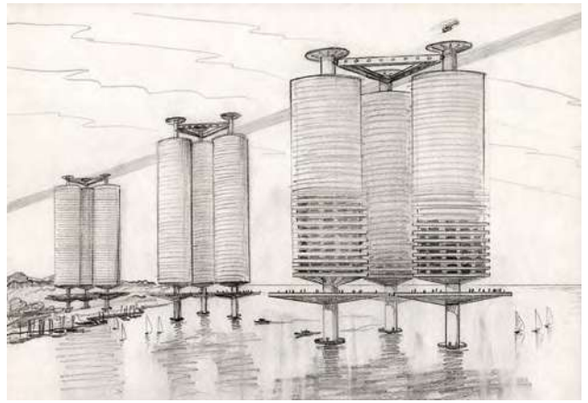
These settlements are something like modern villages, with an area of about a square kilometer each, inscribed in the natural environment (taiga, jungle, mountains, sea shelf, and desert) with minimal violations of their ecology.

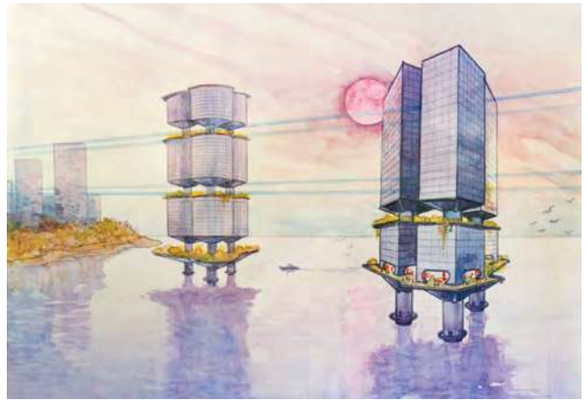
All infrastructure clusters – residential, trade, entertainment, sports, industrial – will be connected to each other by a network of safe, effective, and environmentally friendly high-speed (500 kilometers per hour) second level transport. It will be approximately like the circulatory and lympathic systems which unite systems and individual cells in a living organism. Without disturbing the existing natural landscape, it is necessary to build such a network of roads without destroying the fertile soil layer and with minimal earthworks.

Residential buildings should be low-rise and environmentally safe for the surrounding world and people living in them, in particular, by using vacuum string glass for external walls. Such dwellings should not take away the land from nature. The soil under buildings must be transferred to the second level, to the flat roof of a building, enriched with fertile humus to its content in natural chernozem soil and used for year-round automated production of environmentally friendly household food products.

Each family will have its own winter garden. Smart homes will be bright, warm in winter (vacuum glass with a thickness of 20 millimeters will replace a brick wall with a thickness of one and a half meters), and cool in summer, since the role of natural air conditioning will be performed without any energy costs by the soil layer on the roof with a garden growing on it. The raw materials will be enough to build not even billions but trillions of such structures, since silicon dioxide – the basis of glass – is one of the most common minerals of the Earth's crust.

Five hundred square meters (or five acres) of dry land or sea per person is sufficient for a comfortable residence in a private house with self-supply of food staples. Therefore, nine-tenths (90%) of the land will be used for biosphere reserves – specially preserved natural territories intended designed to demonstrate a balanced interaction of nature and a human being as well as the concept of sustainable development of the environment.





1985–2020. Linear city (posters and visualizations)

Environmental Friendliness of String Transport

The most valuable mineral resource on the planet is the fertile layer of living soil on which the "green lungs" of the planet vegetate and where the bulk of our food is grown. Humus has been created in the soil by Live Nature for millions of years not in order to have asphalt or railway sleepers laid over it. Nevertheless, the main transport communications of the 20th century – railways (more than a million kilometers) and highways (more than 60 million kilometers, including unpaved roads) – have now destroyed soil in an area twice the total area of countries such as Japan, Germany, Great Britain, and the Netherlands.

Nothing grows on that soil – it's dead. The land adjacent to the roads, which area is an order of magnitude higher, is poisoned by pollution from automobile exhaust (they contain more than 100 harmful substances

2019. String transport overpass (visualization)

and carcinogens), de-icing salts, tire and pavement abrasion detritus. On even larger territories, in fact again an order of magnitude greater, the movement of soil and surface waters is disrupted. This leads to waterlogging of some huge areas and desertification of other equally vast regions, leading to irreversible destruction of the existing natural ecosystems and biogeocenoses there.

The Chinese government has now set a course for the construction of high-speed railways. In particular, the longest high-speed railway in the world – Beijing – Shanghai railway – was recently laid there. Meanwhile, there are expert opinions of 20 years ago, in which the following forecasts were made. If China builds an extensive network of high-speed tracks, the roadbeds of these thoroughfares will cut off the sources of all rivers, the movement of surface and ground waters, and the paths of migration of animals. This step will virtually destroy the country's ecology and agriculture and could lead to mass starvation comparable in scale to the famine in the days of the "cultural revolution," when every Chinese village began to put steel furnaces and when more than 10 million people died of starvation.

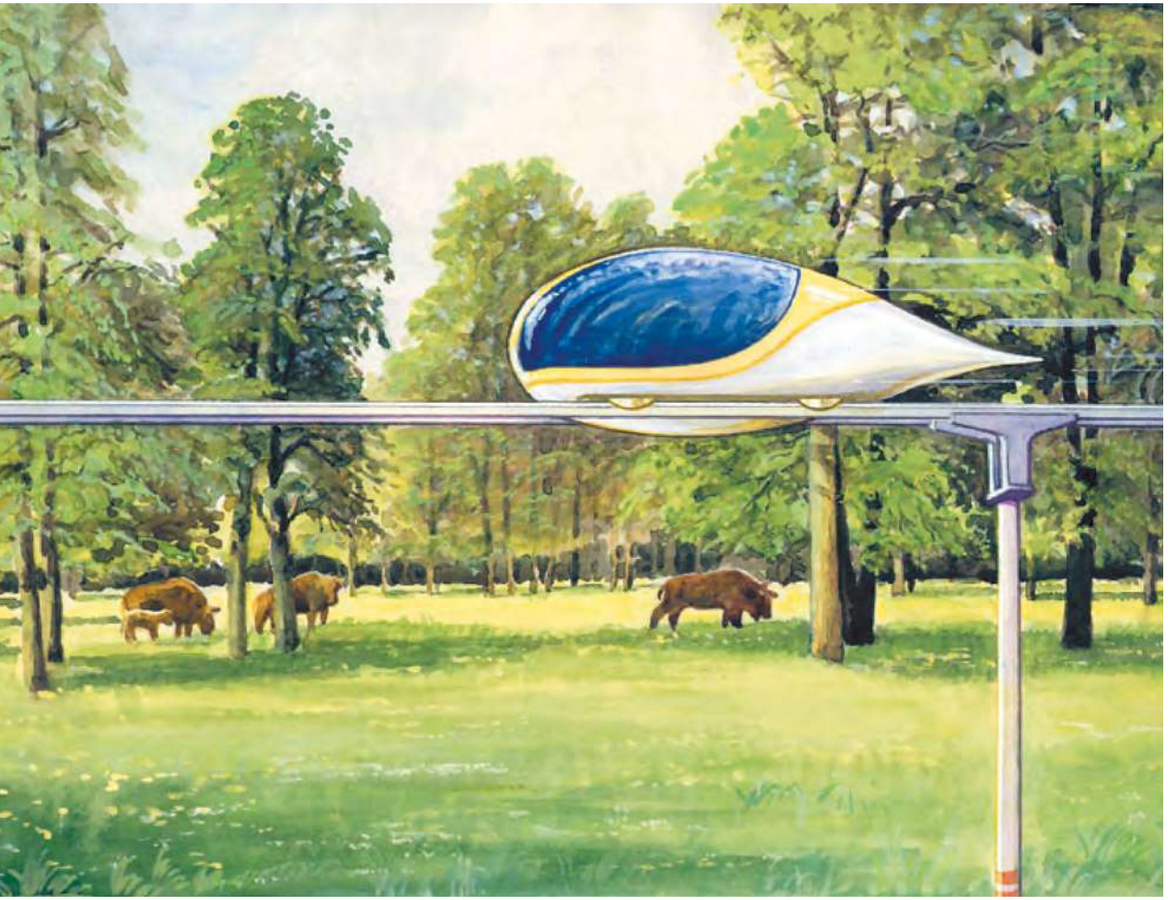
Analogous negative consequences can be created by a network of traditional high-speed railways on any territory if the tracks pass through an earth embankment. For example, it is thanks to environmentalists in the 1990s that the decree of the President of the Russian Federation prohibited the construction of a high-speed railway line Moscow – St. Petersburg, since, according to the estimates, the environmental damage to the country, if this project were implemented, would be commensurate with the consequences of the Chernobyl accident at the Chernobyl Nuclear Power Plant.

One hectare of pine forest yields about 30 tons of oxygen per year – as much as it is required per year for 150 people to breathe. A hectare of deciduous forest releases about 16 tons of oxygen per year, and a hectare of agricultural land – 3–10 tons. Simple mathematics indicates that approximately 100 million hectares that have been "flattened into asphalt" will not produce at least 1.5 billion tons of oxygen every year.

Almost 3.5 kilograms of oxygen or about 15 kilograms of air are required to fully burn one kilogram of gasoline. The substances contained in fuel combustion products, including car in exhaust gases, can cause progressive damage to the central nervous system, liver, kidneys, brain as well as cause lethargy, Parkinson's syndrome, pneumonia, endemic ataxia, gout, bronchial cancer, dermatitis, poisoning, allergies, respiratory and other diseases. The probability of their occurrence increases as the time of exposure and concentration of harmful substances increases, as, for example, it occurs in modern megacities.

15 kilograms of air

is needed to burn one kilogram of gasoline.



Poster of 1982. High-speed utran

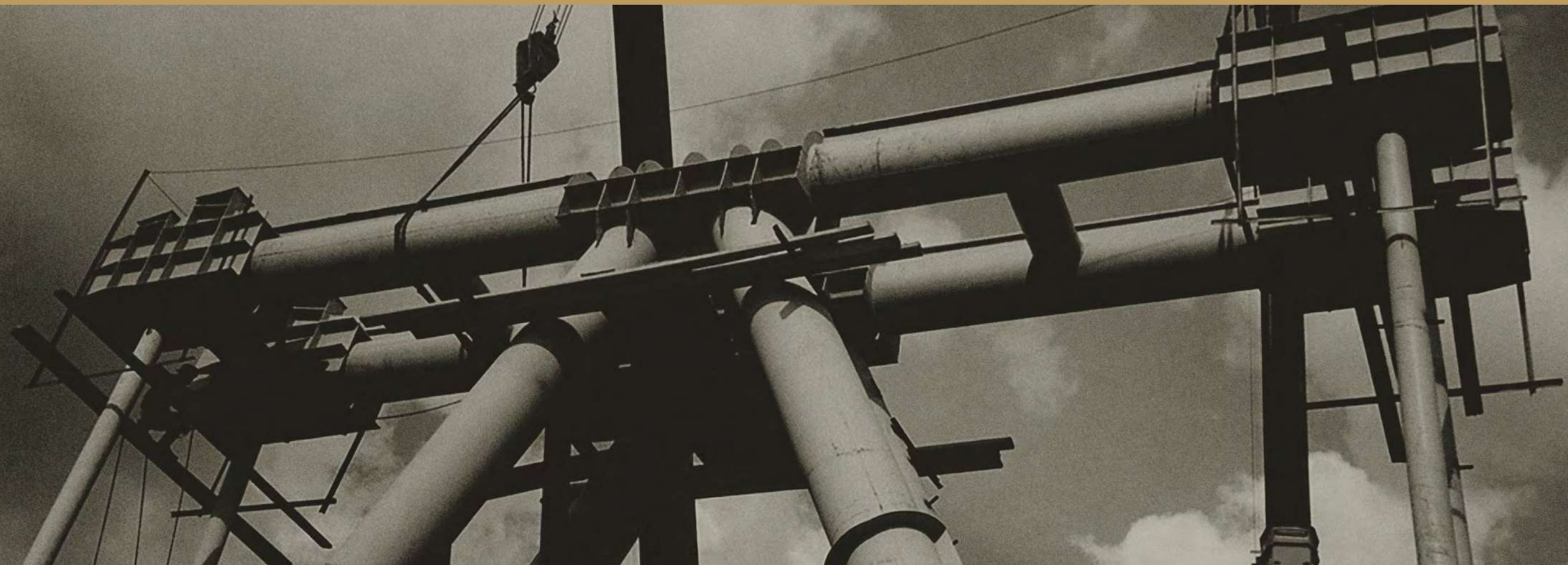
100
billion tons of oxygen

will be saved annually
in case of transition
to string transport
due to saving 30 billion tons
of fuel on 25 million kilometers
of high-speed routes.

The switch to string transport may save 30 billion tons of fuel annually on 25 million kilometers of high-speed roads. An additional removal from the atmosphere of 100 billion tons of oxygen will not be required in order to burn such amount of fuel. Hundreds of billions of tons of toxic and carcinogenic substances will not be released into the environment. In addition, it will not be necessary to produce additional hundreds of billions of tons of metal and cubic meters of concrete. Nor will billions of kilowatts of excess capacity be required to drive rolling stock, which will not pollute the environment not only with the products of fuel combustion but with the loudest noise during their operation. The environmental benefits from this are enormous and difficult to calculate.

PART 4

Difficulties of Implementation in Theory and Practice



My First Business, My First Partner

According to all indicators, string transport should exceed the known means of transportation, just as the General Planetary Vehicle had turned out to be orders of magnitude more efficient than rockets. However, work on the creation of string transport required funds, which I did not have. After what I had suffered from the authorities, I could not allow myself to return to government service; in that situation I could not rely on someone's funding. Just as the Star World center collapsed, so did the USSR. Citizens grew preoccupied with divvying up the money earned by the country on an idea – the idea of communism, which was controversial, but in some way creative as well. By that time, I had 76 patents on inventions, more than 20 of which were used in national agriculture, and received even a decent revenue from a number of them. I could have even become involved in business or have become a farmer. Both these options seemed quite acceptable. I rented a plot of land outside Mozyr and planted it. I opened up one of the first foreign-currency stores in the city of Gomel. The business began to bring in a profit, although here, too, at every step, obstacles were put in my way.

The local residents apparently considered the parcel of 30 hectares I had rented their own property. They plundered a large portion of the first harvest. They stole the farm vehicles I had purchased on a bank loan, and then poured diesel fuel on my land, poisoning the soil. Thankfully, they did not dump garbage there, but it could have reached that point. In response to a fence installed, they set the home and warehouse on fire. Then they began to write complaints to the authorities about me. In short, they tried as hard as they could to force me out. Finally, when I returned from my latest business trip, I was informed that the farm no longer belonged to me because I had been absent for too long. But the parcel had been given to me for lifetime use with the right of inheritance. I had been away all of a few weeks, and work on the farm had not ceased – I had a staff of workers, including my own relatives. Then I recalled Robinson Crusoe – no one had heard a word from him for nearly 20 years, but even after that time his estate in England continued to belong to him. What can you do – private property is not respected in our country. That explains the ruin everywhere, because "it's not mine."

Gangsters immediately had their eye on my store. At first, they came in a few times, and took a look around. Then they met me at the door

Foreign-currency stores – retail stores in the USSR that sold food and consumer goods for foreign currency. They offered a wide variety of imported goods that were not available in regular stores. Until 1990, ordinary Soviet citizens were not able to legally avail of currency stores, since the currency turnover in the country was under strict state control. After the liberalization of foreign exchange transactions, private foreign exchange shops appeared.

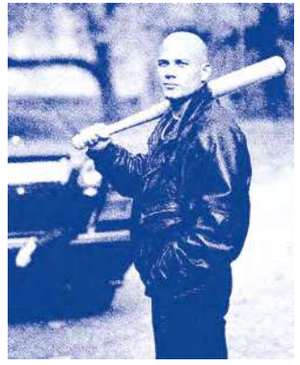
1992. City of Gomel. My first business – currency shop opened in the post-Soviet period of capitalism

and demanded protection money. It was a difficult time, when an entrepreneur had to either make a deal in some fashion with racketeers, or take up a machine gun in his hands himself. These two options were unacceptable for me – if I had taken up either one of them, most likely I would have long ago been buried. I'm not that kind of person; I can't be so unprincipled, brazen, and cynical; I would have lost. A friend of my father then came in the nick of time to support me (but turned out to be a gangster himself). He was my first private partner in string transportation.

As I mentioned earlier, my father had reached the position of a manager in a construction trust, which in the Soviet era was the equivalent of turning a person into a semi-god, at least at the level of a city or a region. He had cash and connections.

As a young man, Sasha Kapitonov had decided to become a businessman. He began in Mozyr with the manufacture of extended clay blocks (claydite) – a new and promising technology for construction at that time. He came to my father with an offer to invest in the business. He took a loan of about 30,000 Soviet rubles (which at that time was the cost of six Zhiguli passenger cars). He created a business and then, apparently, he sold it. Several years later, he faithfully returned the money. To be sure, due to wild inflation, you could only buy about a kilogram of sausage with that amount by then. Sasha was like that.

The business led Kapitonov to create his own opportunities. The times enabled him to remove competitors with methods of force. To succeed in this, he applied remarkable organizational skills – he cobbled together a gang, so to speak, took over the oil from the Mozyr Oil Processing Plant and by the age of 28 was already considered a dollar millionaire.



Racketeering – extortion, usually taking the form of organized crime. It spread in the USSR since late 1980s as a result of the beginning in the development of entrepreneurial activity. For a reward, criminals offered businessmen the services of the so-called "protection racket" – providing protection from other extortions. In case of a refusal to cooperate, racketeers used threats, ruthless violence, hostage-taking, murders, and other methods of pressure.

It was said that subsequently up to 400 fighters took part in Kapitonov's operations to take away enterprises and businesses. Everything was put into motion – bribes, forgery of documents, blackmail, threats, kidnapping, and murder. The corpses of businessmen, tied up with athletic weights, were thrown into the water somewhere out of sight. He had authority. Oligarchs resorted to his services in organizing corporate raiding. Like my father, I knew nothing about this at that time. Everything was exposed later, after nearly 10 years, when Kapitonov was put in prison.

Sasha said immediately that I didn't have to worry about my problems with racketeers. He would help me. He knew my father well and respected him. He also liked me, I was so kind and trustworthy. We would talk. I would describe my projects, and he would take an interest. At that time, I saw in this the chance to get financing from him as a strategic investor. He was interested even more and offered me a partnership. He saw that he could become a second Henry Ford. He would invest the cash, and I would invest the science. Soon, by the end of 1993, we signed a licensed agreement for a million dollars, created joint companies in Germany and Belarus, and rented an office in Minsk.

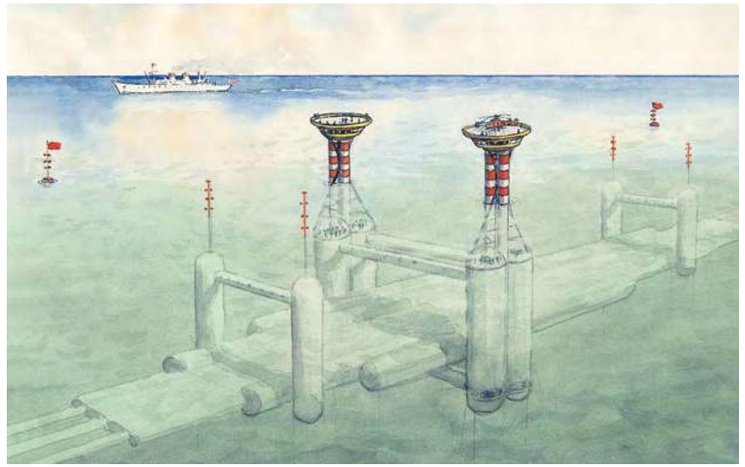
I was given a salary – $1,000 per month – and I could get down to intensive work. The basic task at first consisted of gathering together in one expanded study all the work on the General Planetary Vehicle and string transport and theoretically proving the necessity, opportunity, and efficiency of my program. I began to write a monograph "String Transport Systems: On Earth and in Space"; involved the Academy of Sciences of Belarus in this process and specialists from the Belarusian State University; and totally immersed myself in calculations and proofs.

My partner regarded scientists and engineers with contempt: "Why do we need the Academy of Sciences? Their academicians are standing at the metro entrance and begging tips from me." When I shared with him my thoughts about the creation of a string transport design bureau, he made available a small room, 20 square meters in size in his own office, which was 100 meters from the Presidential Palace in the Center of Minsk (during the Soviet era, the Central Committee of Komsomol of the Republic was located there). I shared my plans with him, and he said: "Let's put in a couch here, so that the designers working round the clock can have a nap. Here's a table, so they can drink tea; it will be free. We'll also buy them some tickets for the trolleybus – we shouldn't have to economize on that. The salary will be $20 per month. And let them work, the bastards. And if they work badly or start to whine, we'll punch them in the kidneys, the kidneys."

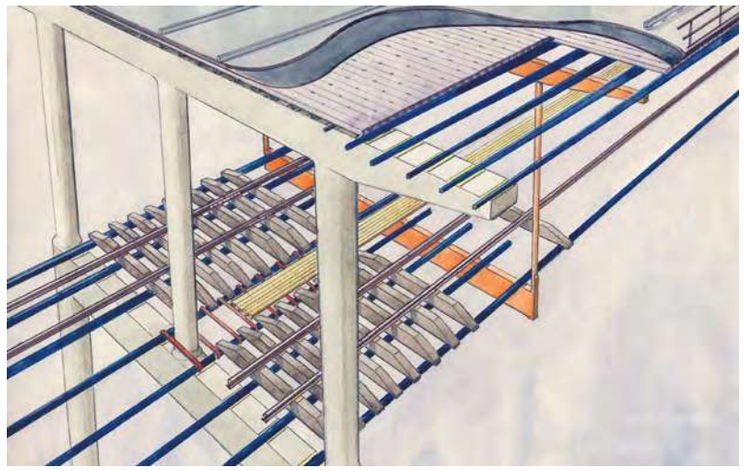
Of course, with that kind of approach, no design bureau was created, and I continued to work alone, without a salary: Sasha did not pay it even once in the entire three years of partnership – 36 months. He deceived me from the very first day. For example, when we agreed on a 50-50 partnership, he traveled to Germany alone, created a company there called NTL Neue Transportlinien GmbH, in Herten (there was a Belarusian trade office there). And had me face the facts: "31% is actually enough for you." Then, sometimes resorting to the assistance of gangsters, he forced me to rewrite the license agreement, reducing my portion first to 25%, then to 15%. Before our split, he said that he would not give anyone more than 10% in a joint business, and in general I had only randomly fallen into the string transport business, therefore I shouldn't have any percentage at all.

Although I had to do myself the bulk of the work, starting from that time, I began to clearly sense the support of my son, Denis, who had grown up by that time. There were times when only he and I worked together on string transport. My son did everything – filled out forms, prepared letters, and then ran the sites, systematized the research, helped in the publication of the printed matter (it is largely due to his effort that my main book, the monograph "String Transport Systems: On Earth and in Space" came out in print).

Despite the fact that the divorce with his mother, Galya, had a deep influence on our relationship (because Denis couldn't accept it), I could always rely on him. My son went the greater part of the path with me, by my side in the most difficult minutes. Of course, in many things, our views differed, which often happens between fathers and children, but we agreed on the main things. I am infinitely grateful to him and certain that he will continue the cause of my life, which is proper for a son.

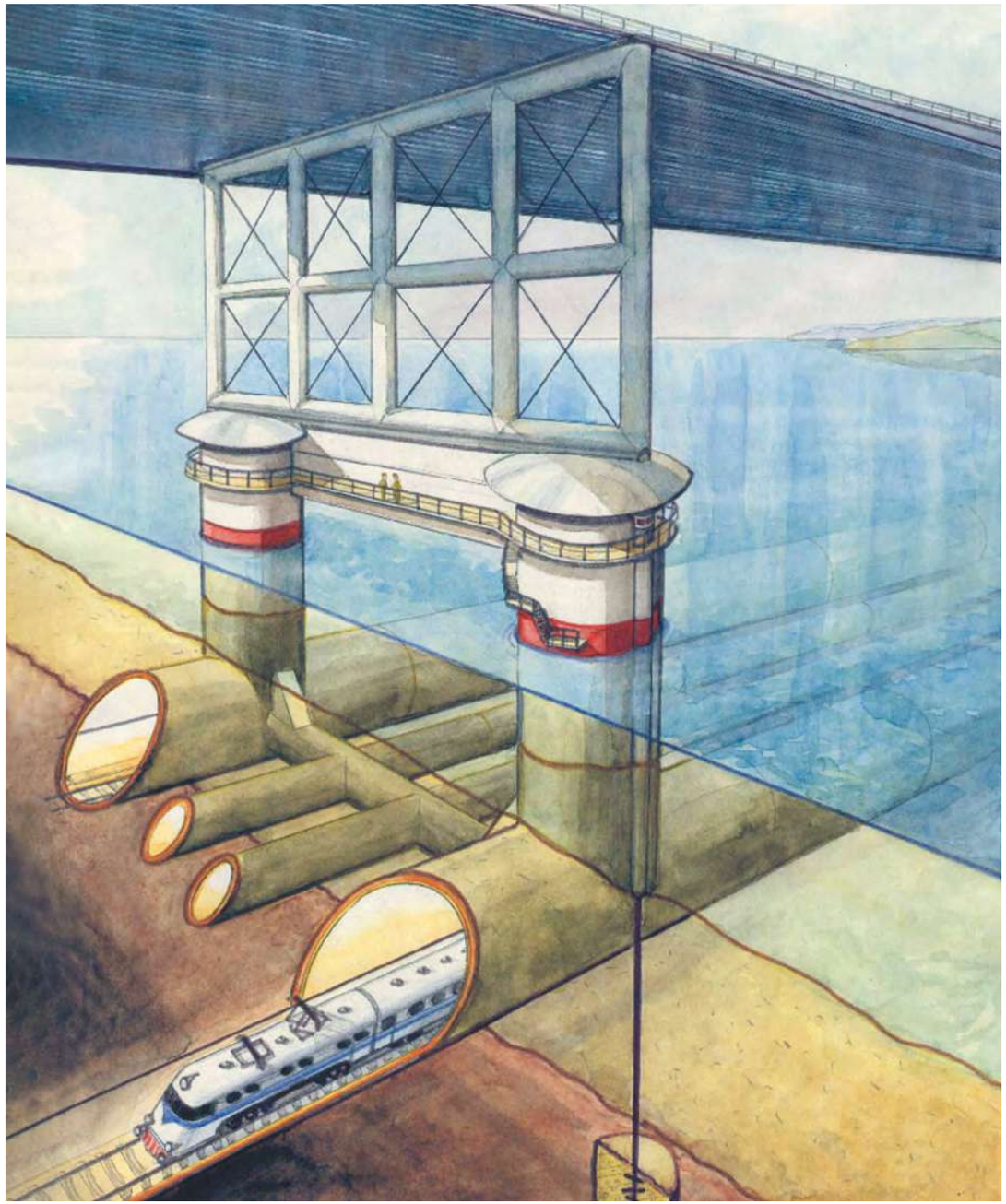


Poster of 1993. Floating underwater station of the offshore section of string track



Poster of 1993. Railway tracks laid on a string overpass

Corporate raiding – unfriendly or forceful takeover of an enterprise against its owners' will. The term came to the territory of the former USSR from the United States, where they call raiders the attacking party in the processes of mergers and acquisitions of businesses, and the concept usually does not have a criminal connotation. In Russia, corporate raiding was often carried out with gross violations of the law, including theft and forgery of documents, use of violence, and the like.



Poster of 1992. Multi-functional string bridge

Burnt and Not Burning Manuscripts

Along with the work on the monograph, I published my first specialized articles on commercial projects with the use of string transport and then began to develop cooperation with the government and scientists of Belarus. The Academy of Sciences, together with the Belarusian State University, conducted an examination of the proposed technology. Based on its results, a letter was sent to the President of Belarus in 1995 signed by two academicians (Mikhail Vysotsky, Vice President of the Academy of Sciences and General Designer of the Minsk Automobile Plant (MAZ), and Fyodor Kaputsky, Dean of the Belarusian State University). The letter said: "...It is very important to discover and support in a timely manner such comprehensive scientific and technological programs that would enable the Republic of Belarus to advance and take a worthy place in the world economy..." After that, we were invited to the Presidential Administration, with which I attempted to set up work. Parallel to this, the first appraisal of string transport was conducted,

Poster of 1994. Test site design concept of string transport system

which resulted in specialists determining the cost of the technology to be several billion dollars. Unfortunately, there were other experts performing with non-constructive criticism. Far from all of them supported me.

Most of the bureaucrats kept asking me the same question: “Tell us, who needs this?” I spent a long time going from door to door, in principle, unsuccessfully. The outburst of one high official who at that time headed the Committee for Science in Belarus, who had been assigned to support string technology by order of the President of Belarus, was characteristic: “How sick we all are of you with your stupid strings!

Covers and pages of magazines, where articles related to string transport were published in 1993 (in Belarusian and German)

1995. String transport tracks in the mountains (visualizations)

We don’t have enough disposable syringes and medicines in our country, and here you barge in with your crazy ideas. And anyway, when your uBus will ride above the forest, all the leaves will fall from the trees. Support will happen only over my dead body.” I realized that breaking through this wall would be very difficult but nevertheless, I continued to knock on it.

My partner Sasha Kapitonov disappeared into thin air as unexpectedly as he had appeared. All works had to be financed independently, with what remained after liquidation of my business and the money obtained for inventions already operating (I had about 30 of them then). Aside from this, in order to attract investment back in 1996, that is, before the appearance of crowdfunding, much less crowd-investing, I broke the building program down into a stage-by-stage development of string transport into shares. I began to sell the shares as bonds: you give me money, and I give you a pledge that when the stock capital is created, you will be able to get a portfolio of shares, proportional to your investment. I borrowed money under a secured loan. Thus, I parted with a diamond ring, one of the few family valuables. I figured it was forever, but later I managed to get it back.

Crowdfunding and crowd-investing – a collective collaboration of people who voluntarily pool their funds or other resources, usually via the internet, to support the efforts of other people or companies. Fundraising can serve a variety of purposes – helping victims of natural disasters, supporting political campaigns, financing startup companies and small businesses, generating profits from joint investments, and much more. A project that comes out for collective financing is usually called a startup.

1995. A raspberry-red jacket is one of the fashionable symbols of that time – a gift from Sasha Kapitonov

Mid-1990s. City of Minsk. While working on string transport

In 1995, my scientific monograph “String Transport Systems: On Earth and in Space” was published in a small print run: just 100 copies. There weren’t enough funds for more. I had to pay for everything out of my own pocket. But it was not a question of quantity. This was a very significant work, to date remaining one of the most important steps on the path to the implementation of string transport. It was entirely understandable that there was only my name on the cover of the book – as the author of the technology, the general designer, and, aside from everything else, the investor and the author of the scientific monograph.

But it was just this that severely angered Kapitonov appeared once again. His first question, when we met again, was “And where am I? Why am I not among the authors of the scientific monograph?” Three young athletic guys came into the room and began collecting the books and taking them out into the yard. Then they poured kerosene over them and set them on fire. I watched this bonfire from the window. After this demonstration of force, Kapitonov, my strategic partner at that time, said, “Listen, we’re going to put a stone around your neck now and drown you in the nearest pond. There aren’t even going to be any ripples. Sign over everything to me.” He gave me one day to prepare the documents to transfer to him the rights to my patents, my share in the company, and the intellectual property. The threat was not ambiguous.

The next day, I simply did not go to work. Aside from the real reasons I had for this action, there were technical ones – literally several days earlier, I had awkwardly fallen down and broken my left arm, which was in a cast. I went to Moscow without warning anyone, even my wife.

Size of circulation of the first edition of the monograph “String Transport Systems: On Earth and in Space” issued in 1995 was only

100 copies.

The last edition of the monograph was printed in 2019. The total size of circulation (in Russian and English) was

6,000 copies.

Intellectual property – a temporary exclusive right secured by law as well as personal non-property rights of authors to the result of intellectual activity. Intellectual property assessment is the determination of the value due to the potential efficiency of the intangible asset being evaluated.

Cover and first page of my first scientific monograph
"String Transport Systems: On Earth and in Space"

Preliminarily, I wrote a statement to the KGB that in the case of my death, Kapitonov should be blamed, and I transferred all rights to my designs to the Belarusian state.

The KGB had long been interested in Sasha, and my statement became a good impulse for his arrest. Due to a happy confluence of circumstances, however, he had already escaped to live in Ukraine, in Kiev. When the Belarusian operative agents came to arrest Kapitonov, they could only just drink tea with him, as a citizen of another country, have a chat, and leave. I calmed down and was able to get back to work. Fortunately, several copies of my monograph had been kept at home. That enabled me to move on.

Support of the President of Belarus

I did not restrict myself to Belarus in search of support of the project, and precisely this, strangely enough, enabled me to find approval in my homeland. In 1996, at an exhibition in Hanover (Germany), where I was presenting an operating 1:10 model, I met the President of the Republic of Belarus Alexander Lukashenko. He was pleasantly surprised, seeing a fellow countryman among the exhibitors. I conducted the presentation and explained in brief what social and economic boost the development of string transport could bring to the country. He promised support and right on the spot gave instructions to his aides.

1996. City of Hanover. Stand of string transport at the industrial exhibition fair.
My partner Alexander Kapitonov is in the center of the photo from the top

1996. City of St. Petersburg. Air blowdown of 1 : 5 scale model of high-speed module in airflow test tube

By that time, string transport system had been reviewed and had passed examination by a session of the commission of the Scientific Council of St. Petersburg State Transport University. I sent the conclusion to the Presidential Administration, which assigned its own experts to study the issue on the basis of this and the text of my scientific monograph. In a memorandum addressed to the President, his aide, Pyotr Kaputula, PhD in Economics, wrote: "...The priority of creating a high-speed transport system for the 21st century in the Republic of Belarus will become a confirmation to the world public of the presence in the republic of the high scientific and technical potential and significantly increase its international rating." In reply, the long-awaited order of the President of my country came, addressed to the Prime Minister Sergey Ling: "Provide support to the designers in the completion of experimental design works to create a string transport system." It was the year 1997.

I managed to convince everyone that string transport was precisely the project that could help boost the Belarusian economy. That we would build test sites, advance science, patent the technology, and sell it around the whole world, paving innovative roads designed in Belarus. I was full of hopes and for the second time began to search for a location to build the test site. Meanwhile, the Prime Minister transferred the responsibility for performing Alexander Lukashenko's assignment to four Belarusian ministers. After a year of my appeals, all kinds of defenses, round tables, simply going up and down the floors of various institutions, in one of the most important offices, I was told, "Unitsky, we are so sick of you, so sick, you can't even imagine! Do you understand, there is a person, there is a problem; if there isn't a person, there isn't a problem."* Once again I was made to understand that it was better to go away, that it was no longer worth looking for support in Belarus – for me, this was fraught with very serious consequences.

* Notorious saying of Soviet leader Joseph Stalin, which contained the threat of arrest and execution.

To Moscow

I always loved the road, from my first trips. The move from Belarus to Kazakhstan; the road from Kazakhstan to my father in Belarus. The road to Tyumen, to studies. Army travel all over the country – from Belarus to the Far East of Russia and back again. The conditions were always so-so – Soviet economy class railway cars where the latrines had a hole in the floor, through which excrement fell right on the tracks.

Once on route from my place of service from Gomel to Ussuriysk, which is not far from Vladivostok in Russia, when the temperature was below −30, I and 72 other draftees became witness to a strange scene. The guard, with a red-hot poker and cries "Look out!" ran through the whole economy class car, where I had settled on the top level of the three-level bunk, in order to break a hole in the frozen floor of the WC with the poker. The furnace was in one part of the car, and the latrine was at the opposite, about 20 meters away. That's how it was all the 10 days of my journey in the Soviet Army. That was considered normal on the railroads. I am convinced that in the future, everyday inconveniences should not prevent the enjoyment of travel. This is more important than it may seem at first glance.

The way people feel as they travel from place to place determines a great deal. Our ancestors, walking on foot and riding on horseback, had an inclination to reflection. People of the second half of the 19th and 20th centuries are forced to navigate schedules and passenger flows of mass transit and are fussy and enterprising. The traveler of the future will combine these two extremes. He will not be preoccupied with any discomfort; he will once again acquire the desire to reflect. Having grown accustomed to high speeds and spending a minimum amount of time on the road, he will turn out to be even more enterprising but will not waste his efforts on fussing. Travel will become to the full extent what it should be – space and time for self-knowledge, which occurs especially intensively when we are able to remove ourselves from our customary surroundings. Traveling from one place to another, it is simpler to us to see ourselves without attachment to any specific space. It is very important to sense oneself as an inhabitant of the planet, and not just its small part.

A little while after the train takes off, you fall into a kind of hypnosis. You are not asleep or awake. You are not free from occupations or occupied with them. It is a borderline state. It enables you to look at things more attentively, as if abstracted. Through the clack of the wheels or the rumble

Soviet economy class railway cars – the most common type of passenger railway cars in the USSR. It consisted of nine compartments without doors, with six seats in each – two upper, two lower, and two side seats, separated by a narrow corridor that passed through the entire car. There are 54 seats in total. A fully occupied third-class sleeper could be stuffy and cramped. In the seats at the end of the car, passengers often had to put up with unpleasant odors coming from the restroom behind the wall.

Cossacks – a military social stratum formed on the territory of modern Russia, Ukraine, and Kazakhstan. Representatives of the Cossacks played a prominent role in the life of Russia before the revolution of 1917, often acting as one of the mainstays of the tsarist power. The Cossacks were persecuted in the USSR. After the collapse of the Soviet Union, an attempt is made to revive the Cossacks in new formats, but it turned out difficult due to restrictions on weapons-bearing as well as a fundamentally different setup of the army compared to the tsarist Russia.

of the engine you can see your own thoughts, turn them as if in a three-dimensional model, see the connections, and discover something new. Likely, it's all about the fact that you are not hurrying anywhere and you are only in the certainty of the road.

My second wife, Nadezhda, and others, who have had occasion to travel with me in a railway car, often joke about my habit of falling asleep instantly. In fact, it isn't sleep. You continue to hear everything around you, but because of the surrounding monotony your gaze turns within. The change of landscape and circumstances stimulates thinking and gives it diversity. I love thinking and working on the road.

In 1998, on the way to Moscow, when the government said outright that I should leave Belarus, I dreamed what string transport could give the world. Aside from the obvious advantages, such as speed, safety, and comfort, it contained the prerequisites of a new way of thinking and a freeing up of time. Including in the literal sense. I imagined how while traveling people could occupy themselves with what was interesting to them and important to them at the given moment. They wouldn't have to monitor the traffic, worry about their transfer, or how to get to their destination from the station or the airport. All the time could be spent on thinking, study, relaxation. How much more time there will be! How this would extend human life! That was worth continuing the struggle.

A great city with great opportunities awaited me. I had with me a copy of my first scientific monograph, which had miraculously survived, several advertising brochures on string transport and a change of underwear. I had no money. I knew almost no one at the place where the train had taken me. In my Motherland, I had left behind disappointment and debts for an enormous sum for those times – I borrowed money to implement the project supported by the President. What happened was very reminiscent to a repeat of the story with Star World – innovation stuck in the craw of the authorities, and from my supposed comrades, I got treachery and the prospect of murder instead of support.

For several months I spent the night at the Belorussky Railway Station in Moscow, shuttling between Gomel and Moscow, once again making the rounds of ministries and offices, where I made presentations of string transport. I had no money at all. Only debts of a crazy amount for those days: $40,000. There were days when I had to eat dandelions. I picked them, chopped them up finely to make salad. I knew from my half-starved childhood in Kryuki that these plants containing potassium, magnesium, copper, iron, vitamins A, C, and B were good for food. There I used to eat everything from nature: mushrooms, berries, nettles, wild sorrel. It came in handy now. I dodged the fare riding in streetcars. Several times I was rounded up by controllers. I explained myself. I showed newspapers

and magazines with articles about me. Saying I was an inventor with no money, came to the capital to save mankind. They let me go without a fine. I appealed to governmental and scientific organizations and received verbal support from the Russian Minister of Transport. And soon I found help, as always, in a place and in a way that I had not sought and that I couldn't have imagined I would find.

My paths took me to a certain All-Russia Fund headed by a former colonel in the GRU [Russian military intelligence], a general of the Cossack forces. Having learned of my program, he said, "Listen, we'll raise all the Cossacks now! And if each of them gives $100, then we'll cover the world with string roads. Let's form a joint company and start working." I replied, "There's no money, however." He said, "Well, you only need $700 to create a regional fund to promote the development of string transport. Through it, we will attract the necessary investments." Later I learned that all that cost only $200.

The proposal interested me. I borrowed the necessary sum from my Moscow acquaintance, Vladimir Plavunov. I wrote a note, in which I pledged to return it a month later; in the event the return of the loan was delayed, each following month one percent per day would be added. I gave the cash to the Cossacks, and they pledged to fill out the necessary applications with their lawyers. We approved the fund's charter, assigned positions, and I was sort of put as its head. Everything was created for string transport. This was my first fund, which was called "Regional Public Fund to Promote the Development of String Transport System." After setting everything up, I went to Gomel to celebrate my 51th birthday. But when I returned, once again a surprise awaited me.

"Did you create the company?" I asked the general. He stared at me and replied, "Yes, it was created." I asked to take a look at the documents. He took out a folder, put it on the table and pushed it toward me. I read and I could not believe my eyes: my name was not mentioned in even one of the papers. I said, "Listen, the charter was actually different. We had in fact agreed that I would head up the fund. This is my program, after all; I was the one to provide the cash to create the company." The general of the Cossack forces once again looked at me and replied, "Let me get my Cossack saber and I'll chop you up into tiny bits, like a hamburger."

I didn't grasp the situation right away; I could not imagine that the general would take such a drastic measure for some $700. Then I realized: having registered the organization to me and yet in doing so, having removed me from managing it, they had got themselves a front man. Now anything they liked could be done through the fund and have no responsibility for anything.

The more I thought about it, the more I began to go crazy. One time, two, three, four – first in Belarus, and now here. How much of all this can you bear, realizing that you are being dragged through the mud for nothing, with impunity? In the hope of finding justice, I signed up for a meeting with Vladimir Rushaylo, who had just been appointed Deputy Minister of the Interior of the Russian Federation.

Vladimir Rushaylo received me, and I have to say, treated me with great understanding and sympathy. Likely the fact that he had read my project for the General Planetary Vehicle had an effect. I told him in detail about string transport, about how I had sought support from the Cossacks, and how they had treated me. Rushaylo promised to investigate the situation and said he would take my case under his personal oversight – that was worth a lot. I could be confident that if in this newly created organization, the Cossacks ran a single ruble, they would be put in prison. But they didn't manage to do that. The Ministry of the Interior confiscated everything from them and transferred to me the corporate seal and the bank account. That story ended well. I became the full-fledged president of the fund created, which later came in very handy.

UN-Habitat – the United Nations program on the promotion of sustainable development of human settlements. The main goal is to support international cooperation in the field of improving urban systems and their elements, civil housing, and construction materials. The program was founded in 1978.

United Nations

Back in 1998 in Belarus, at the 9th Pan-European Transport Conference focused on the Crete transport corridor Paris – London – Minsk – Moscow, I gave a lecture in which I described the possibility of building such a high-speed route using string transport. I cited all the necessary calculations: the cost of construction and the payback period. I received superior performance indicators. The question was discussed with the participation of the Belarusian and Russian Ministers of Transport and eleven of their colleagues from Europe. "Our" bureaucrats spoke against it: "Untested," "Premature," "Fantasy." Others gave either reserved or positive comments. Representatives from the Presidential Administration of Belarus expressed their strong support. In conclusion they wrote: "Review the possibilities of using a string transport system as a high-speed component of the Crete Transport Corridor."

In the foyer, I organized a small exhibit. After my speech, Vladimir Storchevus, Director of the UN-Habitat Center in Russia, approached me. He remarked that this was all very interesting and that the problem deserved full support. He gave me his telephone number. At that time, there were no mobile phones yet, and usually we exchanged contact information and entered it into paper notebooks. During one of my hopeless nights at the Belarusian Station in Moscow, I recalled that meeting at the conference in Minsk. I found my notebook and called him from the station pay phone. I recall the conversation only in general outlines; therefore, I will cite here its artistic description, made by my friend Anatoli Borovsky:

"A calm voice is heard at the other end of the line.

'Vladimir?'

'Yes, it's me.'

'This is Anatoli Unitsky calling, if you remember me. We met in Minsk at an international conference. I was proposing string technologies.'

'Yes, I remember it very well, but where the hell have you been? There's been no news from you. Where are you now? Where are you staying?'

'At the Belorussky Railway Station.'

'I'm asking, where are you staying?'

'At the station, I've been living here for several months.'

'I don't get this at all. Here, Anatoli, this is urgent, come see me right away. Don't delay.'

[...]

Then Anatoli Unitsky described his situation in detail.

Sighing, Vladimir shook his head in reproach.

'And in all these months you didn't call me?'

'It just happened that way... It's hard to explain.'

'Well, it's all understandable. Here's what, Anatoli, let's prepare the documents to obtain a grant from the United Nations for your invention.'

'A grant?' he said in disbelief, looking at the Head of the Russian UN-Habitat Center.

'Yes, for the allocation of a grant. You won't get it tomorrow but after several months, perhaps a year. The paperwork unfortunately takes up a lot of time.'"

In reality, it was not quite like that, but that doesn't change the crux of the matter. Storchevus and I talked for a while. He replied abruptly: "Come." The office of the UN-Habitat Center is located in the Gosstroy [State Construction Committee] building, actually, the Ministry of Construction of Russia. During the subsequent conversation, Vladimir once again confirmed that he saw great potential in the string transport project and offered his help in obtaining the grant. The project was titled "Sustainable Development of Population Centers with the Use of String Transport Systems." This turned out to be not so easy. I received the grant for $150,000 through my public fund, which I had got back from the Cossacks before that.

2019. Linear city (visualization)

Work on the Grant

When I began to get installments from the UN, I started to work on the project and simultaneously quash some of my debts, which naturally had grown by that time. I returned the money in full to everyone who wanted to get back the money they had loaned me. Many refused, preferring to acquire a share in my technology. They saw the market prospects for the initial effort which the UN had supported.

The point of my research amounted to the justification for the need to create an innovative network of high-speed transport. The demand for new approaches to the development of infrastructure was obvious then and remains obvious today. The world had stopped. I demonstrated this in my articles, speeches, and presentations and was horrified myself. Transportation no longer fulfills its functions in development. Furthermore, it is becoming fatal for human beings and nature – pollution of the water, air, and earth; a million and a half deaths per year; 100 million disabled. And negligible efficiency. That was and is my pain.

1999. City of Moscow. Stand of string transport at the exhibition "Special Transport – 99."
Together with Vladimir Storchevus, Director of the UN-Habitat Center in Russia. He was the one, who supported me in the work on two UN grants and then within the framework of cooperation with the administrations of Khabarovsk, Khanty-Mansiysk, Stavropol, and other cities in Russia

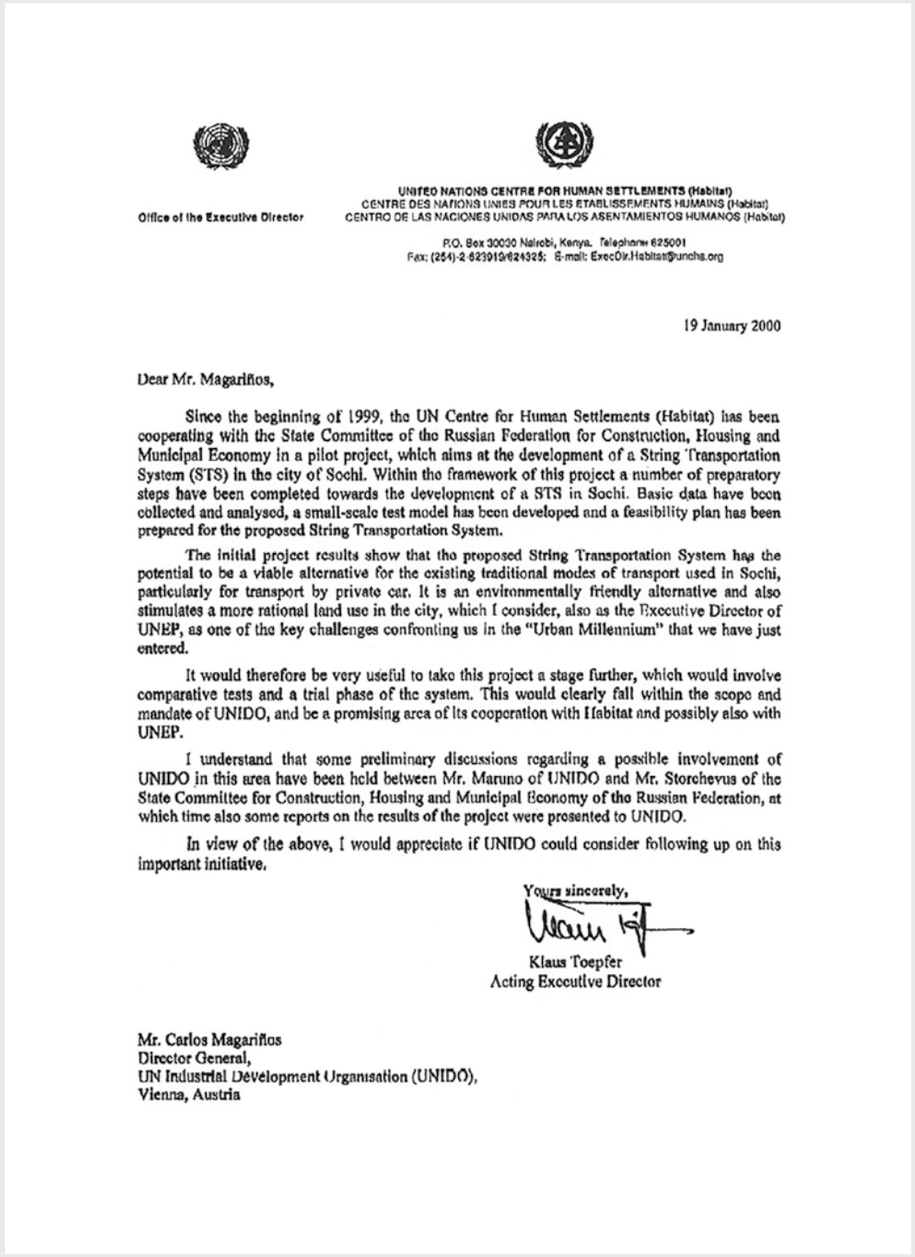
The desire to change the situation is one of the spiritual supports helping me maintain stamina, no matter what befalls my destiny. Now, with a possibility for expression, I had to be convincing in order to show everyone the way. Otherwise, as I understood, everything would die. But I had to begin from something small, a specific proposal, in which all the advantages could be demonstrated.

From 1997, I cooperated with the administration of the city of Sochi. The city authorities, that were prepared to allocate land for a test center, even included string transport in one of their Federal Programs.

I began from Sochi. It is a resort, where during the tourist season, the population grows by many times. The geographical location of Sochi provided all the conditions for turning the city into a major transit and tourist center. However, it is a mountainous locality, which made the laying of ordinary roads more difficult. The construction of string transport under these conditions would resolve city transportation problems (the length of Sochi along the Black Sea is almost 150 kilometers) and would enable the advantages of high-speed second level transport to be utilized.

1999. City of Sochi. UN-Habitat Seminar, which included a presentation of high-speed string transport route Sochi – Adler – Krasnaya Polyana – Engelmanovy Polyany (venue of the seminar – Joseph Stalin's Green Dacha in Sochi)

1999. City of Sochi. Near string transport model at the international seminar attended by UN experts



Office of the Executive Director

UNITED NATIONS CENTRE FOR HUMAN SETTLEMENTS (Habitat)
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19 January 2000

Dear Mr. Magariños,

Since the beginning of 1999, the UN Centre for Human Settlements (Habitat) has been cooperating with the State Committee of the Russian Federation for Construction, Housing and Municipal Economy in a pilot project, which aims at the development of a String Transportation System (STS) in the city of Sochi. Within the framework of this project a number of preparatory steps have been completed towards the development of a STS in Sochi. Basic data have been collected and analysed, a small-scale test model has been developed and a feasibility plan has been prepared for the proposed String Transportation System.

The initial project results show that the proposed String Transportation System has the potential to be a viable alternative for the existing traditional modes of transport used in Sochi, particularly for transport by private car. It is an environmentally friendly alternative and also stimulates a more rational land use in the city, which I consider, also as the Executive Director of UNEP, as one of the key challenges confronting us in the "Urban Millennium" that we have just entered.

It would therefore be very useful to take this project a stage further, which would involve comparative tests and a trial phase of the system. This would clearly fall within the scope and mandate of UNIDO, and be a promising area of its cooperation with Habitat and possibly also with UNEP.

I understand that some preliminary discussions regarding a possible involvement of UNIDO in this area have been held between Mr. Maruno of UNIDO and Mr. Storchevus of the State Committee for Construction, Housing and Municipal Economy of the Russian Federation, at which time also some reports on the results of the project were presented to UNIDO.

In view of the above, I would appreciate if UNIDO could consider following up on this important initiative.

Yours sincerely,

Klaus Toepfer
Acting Executive Director

Mr. Carlos Magariños
Director General,
UN Industrial Development Organisation (UNIDO),
Vienna, Austria

2000. Letter from Klaus Toepfer, Executive Director of UN-Habitat Center (UN Deputy Secretary General), to Carlos Magariflos, Director General of the United Nations Industrial Development Organization (UNIDO), stating the need to support the development of string transport

Just imagine – light rails, stretched between supporting towers over land, which would be installed without significant restrictions on the terrain. Completely automated control of speed modules that would be moving along those roads in the air. Open streets in the city and the possibility of enjoying the seascapes from nearly bird's eye view. High efficiency. The city would get a very powerful stimulus in development, and all the expenditures could be paid back in a short period. Moreover, the creation of the string transport network would not disrupt the region's ecosystems and would enable its beauty to be preserved. My transport could make Sochi very comfortable for living and recreation, and after it, all of the South of Russia; it is capable of making the entire world so. In the report, I demonstrated and proved this in detail, with all the necessary calculations. The client, UN-Habitat, was satisfied with the study. And already by 2000, one of the offices of the UN organizations expressed a readiness to award a grant (a non-returnable investment) of $30 million for research in the area of string transport.

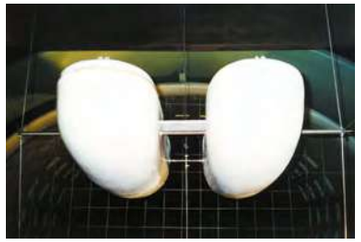
A major part of the preparatory work necessary to receive the funds was already done. It remained only to officially request and obtain support from the Government of Russia. The Chairman of Gosstroy (currently the Ministry of Construction) wrote a letter to the Foreign Ministry about the possibility of using UN funds to build a string test site in Russia, from which new roads will be exported around the world. It was necessary, however, to appeal officially through the Foreign Ministry of Russia to the UN. Instead of this, requests from diplomats went to the Ministry of Economics and the Ministry of Science. Economics supported it, but Science responded as follows: "All the transportation problems in Russia are already solved, the existing roads are not overloaded. We consider that it is not expedient to involve UN funds in the development of some sort of alternative string technologies." Trying to figure out what was going on, I wrote a letter to the President of the Russian Federation, Vladimir Putin. Then I, passionate about physics since childhood, heard that I do not know it even at the sixth-grade level. The head of the development department of the Ministry of Transport of the Russian Federation told me this. I turned to him when I found out that that's where my letter was being considered.

– Calm down already, inventor. Apparently, you did not learn physics at school. Sixth grade. Well, pull a rope in the bathroom, hang a baby car on it – and you will see that your miracle vehicle does not work, – they advised me within the walls of the department.

That's when I was nicknamed "Strum-strum-string" in the corridors of power. Most of the additional "arguments" I received were foul language. The grant, of course, was not allocated. As for sixth-grade physics, by the way, I really don't know it, because in my day it was only taught from seventh grade. But the fact that string transport works, everyone can see, and not just by the example of the rope in the bathroom, but by visiting the full-fledged transport complexes built in several countries of the world. Be that as it may, another dose of venom from the transport authorities, who see me as a direct competitor, failed to paralyze me. Apparently, I had acquired the immunity that is usually developed in an innovator, who is treated like a leper. Thank God they didn't stake me or burn me at the stake, and thanks for that. And I continued my work.

Aside from cooperation with the UN, I obtained new patents and maintained the old ones; took part in exhibitions and conferences; published in journals; appeared on television. It was a very productive, intense period. In 2001, three years after my final moving to Moscow, I began the construction of a full-scale test site in Ozyory outside of Moscow, where I was supposed to confirm all my calculations in practice. I had hoped that the logical consequence would be a serious funding of my innovative transportation program. That, in parallel with developing string transport, I could return to work on my General Planetary

Vehicle – that was the point and goal of it. This was all for the sake of the GPV, and everything that had happened to me turned out for the better. If I had not been thrown out of Star World, I would not have written the monograph. If they had not made it clear they wanted me to leave Belarus, there wouldn't have been the UN grant. If only...



2000. City of St. Petersburg. Air blowdown of 1 : 5 scale model of bicorporal uBus in airflow test tube

2000. City of Moscow, Tushino airfield. Testing a prototype of 1 : 5 scale string transport model of bicorporal uBus

Nadezhda

Several times during the period related to work with the grant, I had occasions to travel to Crimea, where the authorities, understanding the importance of applying string transport to develop resort zones, also expressed interest in the technology. On one of my trips, I took with me my former wife, Galya. By that time, we had been divorced for more than 10 years, but we continued relations and even lived in the same apartment which I had received as a young specialist from the road construction trust. I had promised to take Galina to the seaside, to the resort town of Saki. After a successful presentation, we planned to remain for a week, in order to take a vacation. There I got acquainted with Nadya – my real friend, loving and beloved wife, and most faithful comrade in all the years of struggle.

That evening, friends invited us to a discotheque. Galya didn't feel like going, but I headed over. There were a lot of people around, but I immediately noticed her – a girl with eyes that sparkled like a southern night.

The manager of the event was told that I was an academician, a prominent inventor. He began to speak toasts in my honor, he even treated all those present with Muscat champagne – a bottle per table. I was in the center of attention, and Nadya simply came up to me and asked me for a dance. Boldly.

Meanwhile, my former wife, Galya, who was in the hotel room, kept hearing my name from the speakers at the disco. It sounded as if I had organized a lavish party, treating everybody right and left. She went to see what was going on. And she saw that Nadya and I were dancing. Then Galya went outside, found a heavy stick, came back, and hit me over the head from behind with all her might. I lost consciousness. When I woke up and realized what had happened, I came up to her and said right in her face, "From this minute, I want nothing to do with you." Nadya gave me first aid – she disinfected the wound and found some ice somewhere to put on the place of the injury. She behaved very energetically and was as businesslike in everything. Her image stuck in my mind; I couldn't get rid of it. And I didn't want to. Then I had to leave, but a month later I returned in order to look for her in the 30,000-strong town of Saki, knowing only her name – Nadezhda.

I didn't know anything about her – where she lived or where she worked. I simply wandered around the resort town, asking people I met about a beautiful girl with starry eyes. Someone said he had seen someone like that in a nearby store. In a week I found Nadya behind

Housing problem in the USSR – a feature of everyday life in the USSR associated with obtaining housing. Apartments were mostly provided free of charge on a first-come basis. The application submitted to a special Commission had to be furnished with information about the family members, available housing, and a reference from the place of employment. The established standards were 7–9 square meters per person (excluding kitchen, bathroom, hallway, balcony). It was difficult to simply buy or sell housing in the USSR.

the counter (like everyone else in Crimea, she moonlighted during the summer).

"Hello. Do you remember me?"

"I do."

"Would you like to have dinner with me?"

She smiled. She raised her eyes (as people do when they want to think up some fun). She said she would, but only if I round up some martinis and pineapples. And I, like a young man in love, at the age of 50 headed out to look for these goods, which were rather rare then, in the little seaside town. In a few hours I found all I needed (paid triple the price) and met my 20-year old beloved as she was closing the store. We headed to the sea. We sat on the shore for a long time. I talked about myself, about string transport and the General Planetary Vehicle. It turned out that back in childhood, Nadya had read my article in the magazine "Tekhnika – molodyozhi" and remembered it well.

We gazed at the stars and I spoke about the world I want to enable with my inventions. Describing the cities, where you could gaze at the stars since there wouldn't be any smog. Green linear cities with gardens not only along the road and under them but on the roofs of all the buildings – totally pedestrian, with clean air and a translucent sky, like in my village of Kryuki in the 1950s. People won't be overcrowding because a distance

Linear cities and transport-oriented development – cities in the form of narrow strips of buildings that develop along transport lines and have a symmetrical structure. The idea of a linear city was first proposed by engineer Arturo Soria y Mata (1882), and he even began to build it on the outskirts of Madrid: a narrow strip along the highway. This configuration allows to create a clear zoning system, separating industrial and residential areas. When optimizing transport systems that act as the central element forming linear cities, it opens up the possibility of more rational use of territories. Anatoli Unitsky proposed and developed his own model of linear cities built along the routes of string transport.

of even 200 kilometers can be crossed in half an hour, thanks to new transport raised above the earth. People will settle in the most remote and beautiful places, not disrupting their beauty, created by nature. The houses will be of one and two floors; each will have its own garden and backyard, the harvests from which will be enough to always supply a family with fresh, pure vegetables and fruits.

The factories and plants, as long as the need for them will remain on Earth, can be removed hundreds of kilometers from the residential complexes. After all, the people working there can cover such distances in a matter of minutes. All of this is possible if transport becomes improved. The lifestyle of society has changed before with the improvement of transport.

First, moving on foot, a person could not go far from his home, and the towns were small. Animal-drawn transport made possible for them to cover longer distances; automobiles enabled them to grow still stronger; it became possible to get to work from the suburbs. And this natural process should not be stopped. Transportation, like the circulatory system, determines the organization of human settlements. If today, this organization is flawed, the reason is contained in the means of traveling. I told Nadya about my solutions.

I spoke about what the creation of the General Planetary Vehicle could provide for civilization. How space would open up for people; would become accessible to interplanetary and even intergalactic trips – everything that the science fiction writers had dreams, on whose books Nadezhda, like me, had grown up. I tried to show that this is all realistic, that there isn't anything impossible in this, above all, from the perspective of physics. It turned out that she was ready to understand and accept everything she heard. It's exactly the kind of attention and understanding that I've been searching for a long time and had no longer hoped for (I believed that at my 50 years of age, I was too old to start a new life) that I got from Nadezhda. Some time later, she came to me in Moscow. Soon we got married. Only it was rather unusual.

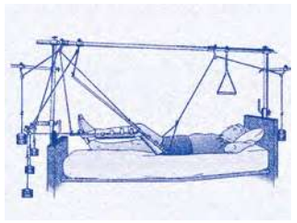
My Nadezhda – a spouse, friend, investor, companion, life partner

It was the winter of 2001, at the time of the Epiphany frosts. Returning home one evening from the design office I created in Moscow, I slipped and fell. The janitors had not sufficiently sprinkled sand on the sidewalk. One foot went on the slippery ice and the other on the sand. Falling backwards, on my back, I heard a crack. I laid on the street for an hour, waiting for the ambulance to come. Finally, the medics arrived, put me on a stretcher, and looked at my leg. "Why is your leg lying so awkwardly? It is crooked somehow, to the side. Turn over." It was broken in two places... And then I was in the hospital, in traction – there were weights on my leg and I could not get up or turn over. Nadya took care of me.

It turned out she was the only person who needed me. After three weeks, I proposed, "Let's get married." She was in her 21st year, I was 51. We got married right in the hospital. After taking my passport, another person signed for me at the Wedding Bureau, my driver; I could not go to register the marriage chained to a bed with a weight on my leg. You know, at that time, I couldn't even imagine that I would have more children, I thought I was too old. Now Nadya and I have two beautiful girls. One daughter celebrated her 13th birthday in 2022 and the other – her 20th.

2017. My reliable rear: wife Nadezhda and our daughters Anastasia and Maryana. And I'm trying to provide them with reliable protection

Epiphany frosts – a decrease in temperature that occurs in the second half of January. They coincide with a Church holiday dedicated to the biblical story of Jesus Christ's baptism in the Jordan river by John the Baptist. Frosts reach minus 40 degrees Celsius at this time in some years in some regions of Russia. Despite this, many believers perform the traditional ritual of dipping into a hole made in the ice that covers rivers and lakes in winter.



Skeletal traction in case of a fracture – a method of treating injuries to the limbs, which consists in gradual repositioning of fragments with the help of weights and holding them in the correct position until the formation of a primary bone callus. To do this, the injured limb is suspended with a weight attached to a spoke inserted into a hole drilled up in the bone. Then the damaged limb is fixed. The patient's time in a partially stationary state is from four to eight weeks.

General Lebed

As they say, there is no cloud without a silver lining. Marrying Nadezhda was not the only lucky circumstance that accompanied the double fracture of my left leg.

Not long before that, we had prepared an operating physical model of string transport at a scale of 1 : 5 on a 100-meter track at the Kolomenskoye Museum Reserve in Moscow. Since I was put in the hospital, the model was not disassembled (there was no one to organize it), and Sergey Sibiryakov was able to show it to General Alexander Lebed*.

Sibiryakov at that time held the post of department head at the Ministry of Nationalities Affairs of the Russian Federation. By that time, we had been acquainted nearly a year. Sergey had the reputation of a person interested in new technologies. I did a presentation for him. He became interested in the project and even put a model of the string transport in his office and on occasion would tell the bureaucrats and businessmen who came into his office about me and my technology. Sibiryakov introduced me to my future partner Dmitri Teryokhin; he was the one who interested in my project the Governor of the Krasnoyarsk Region, Alexander Lebed, who had sat next to him on the same plane.

Sibiryakov caught sight of Governor Lebed at the Krasnoyarsk Airport in the check-in line. The combat general was enormously popular. Many saw in him the future president of Russia. He was independent, bold, and decisive, like a natural-born politician. For example, the Krasnoyarsk Region, the governor of which was Lebed, was the only one of Russia's numerous regions which paid all its debts of back pay for civil servants in those years. In order to achieve this, the general had to get into a conflict with a number of major businessmen and even not pay the salaries of the territory's administration until the authorities did settle accounts with the people. The idea of creating a fundamentally new type of vehicle capable of giving a powerful stimulus to the technological and economic development of the region he governed and Russia as a whole should have definitely interested him. This was his scale, and Sibiryakov knew that for certain. Sergey offered the flight attendant several hundred-dollar bills in order to seat him in business class directly behind the general.

* General Alexander Lebed (April 20, 1950 – April 28, 2002), Russian military officer and politician, held senior positions in the Airborne Troops and was involved in the Soviet war in Afghanistan as well as in the Transdniestrian and Chechen conflicts. He ran in the 1996 Russian presidential election and later was elected as governor of Krasnoyarsk Region in 1998. He was killed in a helicopter crash.

He introduced himself to Lebed and asked him to listen,"There's an interesting project with a future." However, the general, tired and not having slept several nights, said he would take a little nap and then there would be some time to talk. That was how it happened.

Sergey Sibiryakov is a wonderful speaker who knows how to persuade people. Lebed wanted to see the string transport with his own eyes. Right from the airport, they headed to Kolomenskoye but not to the Russian Presidential Administration, which was among the general's plans – in order to see the model which remained there, due to a confluence of circumstances. (The park management had given me an ultimatum to take it apart, but the weights hanging on my broken leg prevented it.)

The governor was very interested. Suddenly, in his long leather raincoat, he knelt down in the snow. Everyone was simply shocked. It turned out that he wanted to look at the model from below – does the vehicle move on a magnetic cushion or does it have wheels? Two weeks later, the first investments were transferred to the fund that had been created with the Cossacks' help and then seized from them by the police. We began the construction of the test site in the suburban town of Ozyory.

2001. Kolomenskoye Museum Reserve. Prototype of string transport model at 1 : 5 scale

String Transport Test Site in Ozyory

Pesochnoye, Dolgoye, Nizhnyeye, Shchuchye – there are about 40 bodies of water from which Ozyory [Lakes] got its name. In the spring, the existing roads are flooded, and it is problematic building new ones. There is only one bridge for the whole region. String transport, which would not be affected by floods, could carry passengers and freights to the capital above the ground and above the water at 500 kilometers per hour speed, is a great opportunity for development. Moreover, at the initial stage of construction, money will flow into a 101st kilometer town where alcoholism and drug addiction flourished, to which the unreliable were exiled in the past, and jobs will be created. In short, it was not hard to convince the local government to allocate land for construction of the test site for string transport.

The funds for the construction was provided by General Alexander Lebed and Dmitri Teryokhin, a businessman whom, after several months of intensive discussions, I managed to convince to become a strategic investor and partner. We began to prepare a license contract for $5 million, but never did sign the partnership for a year and a half due to fundamentally unavoidable contradictions.

Teryokhin had invested in various endeavors, including projects by alchemist Victor Petrik, famous at the time – from fullerene, from which he undertook to make ultra-compact batteries for string transport, to the production of artificial diamonds the size of a fist. Dmitri had both funds and connections. His father-in-law occupied executive positions in Gazprom, and Teryokhin earned several dozens of millions of dollars every month on these connections. Teryokhin himself also had projects with ministries and companies extracting raw materials. He was not an oligarch, but he was counted among the major businessmen. Furthermore, Dmitri agreed to split the business 50-50, as in the case of Alexander Kapitonov, which for me was a fundamental point.

Before and after Teryokhin, many people wished to invest funds in string transport, but basically everyone wanted to get control over the business for their money. From the experience with Star World, I knew that most likely in doing so they would kick me out the door and grab everything for themselves. Several times I ended negotiations immediately after it was proposed that the future business would be in favor of the investors. “You will still have 30% left.” No thanks. Those are unacceptable terms. The technology belongs to me; all the work done and to come

101st kilometer – an unofficial term denoting a method of restriction on rights that was applied in the USSR to certain categories of citizens. They were forbidden to settle within a 100-kilometer zone around Moscow, Leningrad, the capitals of the Union republics (Kiev, Minsk, etc.), and other major as well as “closed” cities (Sevastopol, Dnepropetrovsk). During the years of political repression, family members of the repressed were sent to the 101st kilometer and beyond. Later, non-working citizens (parasites), dissidents, hardcore criminals and those convicted of particularly serious crimes were subjected to similar expulsions.

2000. City of Ozyory. Presentation of string transport to Boris Gromov, Governor of the Moscow Region. Demonstration of a prototype and a string rail fragment

is on my shoulders. The goal is not simply to create a good product in the transportation sector but to demonstrate the path to radical change of the means of interaction between the human being and nature. Can I be confident that those owning the business I have invented will move toward that goal and not get involved in divvying up funds, like my “friends” and “colleagues” at Star World?

The drafting and construction proceeded at a good pace. We erected a small test site, essentially a track of about 150 meters in length. In parallel to this, research in aerodynamics was conducted. In March 2001, the mark for kilometer zero was laid in Ozyory – the symbol of the start of our string roads which would encircle the entire world. We organized a small champagne reception and invited representatives of the local administration and a priest to consecrate the construction site – we could not do without him.

2001. Ergonomic mockup model of high-speed uniflight. Sergey Sibiryakov is next to me

2001. City of Ozyory. Construction of the string transport test site. My wife Nadezhda Kosareva, an employee of my engineering company "Unitsky Scientific Manufacturing Company" is next to me

2001. City of Ozyory. Official ceremony of laying the foundation stone for kilometer zero of string roads

2001. City of Ozyory. General Alexander Lebed, Governor of the Krasnoyarsk Region, one of the main investors of the project, was visiting the string transport test site

When the first stage was approaching completion, the press became interested in the project. The premiere was approaching. We hurried to finish by the deadline, for the arrival to Ozyory of my partner, General Alexander Lebed, from Krasnoyarsk – the domain of another general, Boris Gromov, Governor of Moscow Region, with whom Lebed was not friendly. Not friendly at all – he was a real general; the other was a "parquet general*."

* With a disdain connotation is a military man who made his career in comfortable conditions, who did not endure hardship and deprivation and was unsuitable for harsh conditions.

2001. Construction of a string-rail track structure at the string transport test site in Ozyory

2001. City of Ozyory. Boris Gromov, Governor of the Moscow Region, was visiting the string transport test site

Much was done at the last minute. The night before the premiere, in 12-below freezing weather, we poured concrete into the casing of the empty string rails. The purpose of that important procedure was to reinforce the construction and battle corrosion as well as reduce noise. Of course, the concrete did not manage to dry up in time. Some of the sections remained unfilled entirely, but I know that the construction in such a state would hold the load. Some people were nervous, especially the driver, who had to drive the ZIL-131 truck. We placed the multi-ton vehicle on steel wheels, and it imitated rolling stock. When the ZIL took off along the overpass in the air, I stood under it in order to demonstrate its sturdiness.

All the calculations were confirmed. String transport was indeed the most efficient and economical means of transportation. Based on what we managed to build, it turned out that the consumption of construction materials for one kilometer of the length of the double-track prestressed (stretched) string overpass is reduced by an order of magnitude in comparison with analogous systems.

For comparison: a high-speed railroad on an overpass built in 2000–2007 using Japanese technology in Taiwan for a travel up to 350 kilometers per hour, required an order of magnitude more of steel and 100 times more of concrete than the string road. On each span of 35 meters, there is a reinforced concrete superstructure weighing several thousand tons, and under each powerful pylon, four bored piles, each with a diameter of two meters and a length of up to 60 meters, weighing hundreds of tons. The overpass for the Transrapid trains running on a magnetic cushion designed by the Siemens company consumes approximately as much material.

By beating competitors in the amount of required construction material, string transport, of course, turns out to be significantly more affordable in cost. The savings of investment costs for building one kilometer of the string-rail overpass (in comparison with the high-speed railroad and for the trains on a magnetic cushion) will be tens of millions of dollars per kilometer. (This information is given with consideration of the inevitable increase in cost of traditional vehicle overpasses under difficult natural and climactic conditions of traffic on the majority of tracks.) Other characteristics are also impressive from the engineering, design, and economic perspective. Not everyone is capable of seeing this, however. Unforeseen difficulties which emerged in relationships with partners took their toll.

2001. Testing the string transport at the Ozyory test site

Length of the test string overpass section in Ozyory was about

150 meters.

Weight of the rolling stock simulator based on the ZIL-131 truck was over

10 tons.

2001. Testing the string transport at the Ozyory test site. I demonstrated the reliability and safety of the system, while standing under the track structure along which the rolling stock simulator based on the ZIL-131 truck with a weight of over 10 tons was moving

The first demonstration took place on the eve of the day which had been planned as the premiere, with the participation of the chief investor, Alexander Lebed. This was done at the request of the central Russian television. We were promised that the footage filmed would be broadcast only the next day, after the interview with the general.

The phone rang that evening. Lebed was on the line. “Turn on the TV, inventor... Who needs yesterday’s snow?” I turned on the TV right away and to my great surprise, I saw that the TV news was showing the interview filmed with me today. The television people from Russia’s Channel One deceived me. I tried to explain something. We talked for some time. I recall another statement he made that day: “The more I get to know people, the more I like dogs.” Months were then spent in order to somehow at least reinstate a relationship of trust. But no more funding came from him. Then Lebed was killed tragically in the air crash. Some say that the helicopter’s blade got caught on a power transmission line. Others say that this was a political assassination. Some even made a connection between the accident and string transport, as with the death of another politician, Vladislav Sashchikhin, Mayor of Ozyory.

СОБЫТИЯ. НОВОСТИ ИР №12/2001

ЗИЛ-КАНАТОХОДЕЦ

Успешно прошли первые испытания струнного транспорта А.Э.Юницкого в подмосковных Озерах.

Мы рассказывали нашим читателям об интересной, полуфантастической идее надземного транспорта Анатолия Эдуардовича Юницкого (ИР, 7, 2000; 11, 2001). Отношение к ней специалистов было разным: от восторженного до откровенно скептического. Но всех убеждали тщательные расчеты и впечатляющие рисунки будущих трасс: мол, на компьютере и не такое можно нафантазировать.

Символический камень нулевого километра будущей трассы был заложен 10 марта 2001 г., а уже в октябре прошли первые испытания. И одному Юницкому известно, каких невероятных усилий это стоило. Зато теперь на берегу Оки красуется ажурная стальная конструкция.

Путепровод покоится на двух фундаментальных опорах: одна на уровне земли, другая на 15 м выше. Расстояние между ними 150 м. Два стальных троса, заключенных в трубы диаметром 100 мм из нержавеющей стали, натянуты гидравлическими домкратами с усилием около 600 т и закреплены на опорах оригинальными анкерами. 4 промежуточные опоры поддерживают путевую структуру от провисания, а система растяжек создает дополнительное напряжение в тросах.

Фото 1

1. Очень конкретный разгодор изобретателя А.Юницкого и золотопромышленника Х.Совмена.

2. Пассажирский вариант отрабатывается пока на моделях, но выглядит тоже убедительно.

3. ЗИЛ набирает скорость.

Фото 2

Фото 3

В качестве имитатора транспортного модуля воспользовались услугами обычного серийного грузовика ЗИЛ-131. Только колеса заменили на стальные с двумя ребордами, да руль нейтрализовали за ненадобностью. Контактный профиль колеса повторяет геометрию трубы путепровода, обеспечивая оптимальное сцепление при минимальном износе пары.

А испытания выглядели так: ЗИЛ, как обычно, запустил двигатель и без лишнего шума пошел на подъем. В считанные секунды, не напрягаясь, одолел пролет и спокойно вернулся. Второй выход на «подкуми» оказался более зрелищным: было движение с ускорением, торможением и остановкой. Третий этап испытаний продемонстрировал полное равновесие модуля к атмосферным осадкам. Хотя под колеса лилась вода, ЗИЛ так же уверенно шел на подъем.

Разработчики удовлетворены результатами испытаний. Юницкий сказал, что все цели данного этапа достигнуты. Довольны и инвесторы: от Минтранса РФ, от администраций Московской области и Красноярского края.

Губернатор Громов дал указание Минтрансу области проработать возможность продления трассы. Возможно, нынешний, испытательный стенд станет въездом на будущую московскую магистраль.

А. Лебедь назвал проект Юницкого транспортом будущего. «Онитранс» готовит ряд разработок для красноярцев. Самым грандиозным может стать проект транспортной магистрали Красноярск–Норильск. Пока более реальна прокладка пассажирской трассы через Енисей к местам отдыха горожан.

Потенциальный заказчик Х.Совмен прилетел на испытания тоже из Красноярского края. Он — президент ЗАО «Золотодобывающее предприятие «Полюс». В 2001 г. предприятие добыло 30 т драгоценного металла. Заметим, что всего в РФ добывают 132 т золота за год. Основную проблему предприятия — перевозку больших масс породы — сейчас решают 32 Катерпиллера (мощные самосвалы стоимостью около миллиона долларов за штуку). Добавьте сюда их обслуживание в экстремальных условиях Севера, прокладку и содержание дорог... Это и побудило предпринимателя Х.Совмена заказать «Онитрансу» сравнительный экономический анализ, и если условия молодой фирмы окажутся предпочтительнее, трассы ее протянутся не только до Москвы, а и до самых до окраин.

Тел. (095) 118-02-38, 118-54-65. ОАО «Онитранс».

Е.РОГОВ, наш фотокорреспондент, Московская обл., г. Озеры

ИТЕ: ВОТ ОН ПО КАНАТАМ ИДЕТ...

ТИ СТРУНЫ ВЕДУТ ПРЯМИКОМ В БУДУЩЕЕ

Земля ушла из-под колес ЗИЛа.

Зачем все это нужно? Ответ дают экономика и экология. Сегодня строительство одного километра железнодорожного пути обходится в 3–5 млн. долларов, автострады – 5–10 млн., монорельсовой трассы – 4–10 млн. Пожалуй, лишь канатная дорога требует «всего» 1,5–2 млн. долларов на километр, но быстро по ней не поедешь. Расчеты показывают, что струнная трасса будет стоить те же 1,5–2 миллиона и обеспечит пропускную способность порядка 100 тысяч пассажиров и более 100 тысяч тонн грузов в сутки. К тому же потребуется минимальный земледотвод, сохранится почти в первозданном виде природа. В труднодоступной местности северное БАМа струны Юницкого могут оказаться единственно приемлемым вариантом развития транспортной сети.

Все эти доводы хороши, но был у новой идеи серьезный недостаток: ни одного реального километра никто не видел. А чтобы построить его, нужны как раз те самые 1,5–2 миллиона «зеленых», которые просто так, под идею, никто не даст. На помощь пришел Центр ООН по развитию населенных пунктов, выделивший грант на строительство первой экспериментальной линии, кое-что добавила администрация Красноярского края, и дело завертелось. В августе 2001 года в Озерах начали монтаж первой анкерной опоры, а в конце октября мы уже побывали на пуске первого 150-метрового отрезка будущей 10-километровой трассы. Грузовик здесь использован лишь в качестве примера тяжелого самоходного транспортного средства; в перспективе – создание обтекаемых грузовых и пассажирских модулей разных размеров и грузоподъемности, работающих на электротяге. Если электрически изолировать рельсы друг от друга, можно сделать токосъемниками стальные колеса, подобно поездам игрушечных железных дорог.

Такие вагончики, возможно, будут катать нас в будущем через всю страну.

2001–2002. Press articles on the string transport test site in Ozyory and prospects for technology development in the world

2002. City of Ozyory. Joint field meeting of the Scientific and Technical Councils of the Ministry of Transport and the Ministry of Railways of Russia. From the Minutes of Meeting: “Having familiarized ourselves with the current test bench of string transport, the Scientific and Technical Council of the Ministry of Transport of the Russian Federation and the Scientific and Technical Council of the Ministry of Railways of the Russian Federation note that the string transport system developed by Unitsky Scientific Manufacturing Company may be attributed to one of the new perspective non-traditional types of above-ground transport, which has previously shown its feasibility”

In 2002, the Mayor of Ozyory, a town in the Moscow suburbs, was returning from a vacation abroad with his wife. On the way home from the Moscow Airport, his government car exploded – a bomb had been planted in the back seat. Sashchikhin’s wife was killed along with him. The driver and the bodyguard survived. Since Ozyory was well known mainly because the string transport was being built there, the yellow press ran lurid headlines like “Ozyory Mayor Explodes on String.” Naturally, the prosecutor’s office covered that base, too, and summoned me to interrogations. It turned out that the Mayor spent abroad more time than any other district leader of the Moscow Region – more than 200 days a year. The main purpose of his business trips was: “Search for investments in string transport.” Of course, he didn’t actually search for any investments. And he was blown up, possibly, because he did not share his vodka business with gangsters – Ozyory had springs with the purest water which was ideally suited for vodka production (there were a lot of underground vodka stills there).

Very soon after the first demonstrations, the second main investor Dmitri Teryokhin also quit funding the work. His father-in-law died, and no millions of dollars could have prevented that transportation incident (a blood clot broke loose when he was flying in an airplane). Without the support of his influential relative, Teryokhin’s business was disrupted. Dmitri was forced to economize where he could, and string transport was in the first line items of expenses which he decided to cancel.

Unfortunately, my radiant expectations were not justified. All the central Russian media outlets had reported about the string transport test ground, but without funding and support from the government everything began to die away. We received numerous delegations, conducted negotiations, kept doing science, but this didn’t bring in money. The more we went on, the less there was of it. More than 100 people worked at that time in my Moscow company, “Unitsky Scientific Manufacturing Company.” It reached the point that we did not get any salaries for three months, and that included me, the General Director and General Designer. It became obvious, that the company would have to be closed...

PART 5

Years of Trials and Errors

Expectations and Reality

Many times in my life I experienced the feeling of a gap between what my imagination depicted and what was created in reality. The path from idea to implementation, from invention until realization lies through long lines of ghosts in waiting. In Ozyory one of such ghosts was built – a thing with outlines of something living, but not actually so. In the same manner, the airplane of Wright brothers could be called a ghost of modern aviation.

The test site was operating. A good, attractive story of the future transportation to which it should have referred was created around the site. But it only remotely resembled the future. In the end, few were capable of attaining those sophisticated engineering decisions, which have already been realized by us today. The majority saw a metal hulk resembling either a bridge or a roller coaster, and a ZIL truck on steel wheels, rather awkwardly moving along the overpass. Possibly tourists look at ancient ruins in the same way, namely they see them as a pile of stones and not the beautiful cathedral of antiquity which these stones once were, even if a century later, the peculiar features of aesthetics and the beauty of the design thought can be detected in them. For many, the stones will remain only stones, and they are capable of saying something important only to a small group of specialists.

A field session of the Scientific and Technical Councils of the two Russian ministries took place in Ozyory: transportation and railways (of the railroad engineers, who were in a separate ministry). Such an event was occurring for the first time in Russian history – beyond the 101st kilometer, and what is more, in a small town. It was I, the General Designer of string transport, who managed to put them together. The specialists appraised my string transport technology and pronounced it innovative. Moreover, they even recommended it for introduction subject to a number of improvements. The conclusion and recommendations were given according to which I was able to implement the technology only 15 years later, at the Belarusian testing and demonstration center – to be sure, independently and with funds from investors around the world through the system of crowd-investing.

Recommendations are the province and the purpose of specialists. Solutions are not their job and not their capability. For a solution, an appraisal is needed; for an appraisal, an idea must be implemented in full, as it was done in the case of string transport at the present time. We have already presented several types of transport and infrastructure complexes – string-rail overpasses, passenger stations, infrastructure facilities, control and safety systems along with a dozen models fundamentally different of rolling stock – rail electric vehicles on steel wheels, now known as uPods, each of which is as complex as an airplane. At last, the string transport in the Belarusian town of Maryina Gorka and the city of Sharjah in the Emirates is presented the way as it was depicted in my imagination and therefore can amaze an unprepared specialist. At that time, there was nothing like this, but for me as the inventor the town of Ozyory near Moscow is connected with many important things in my life.

I recalled one incident. It was winter, 30 degrees below zero. For several days, the rails had been intentionally watered, and thus they froze about five centimeters in depth with ice. Then snow fell, and an additional snow cap of about 10 centimeters formed on the rails. The ZIL was parked below, the incline of the track was 10%, which meant the elevation difference on 100 meters was 10 meters. According to the claim of the experts gathered (including UN representatives), the vehicle would not climb upward to the height of a five-story home due to its skid. I even bet a case of cognac that it would go up, although this was the first experiment. I remember the experts ran away from the test track; they were afraid pieces of ice flying from all sides from under the steel wheels of the truck would fall on their heads. I was sure I was right, since I knew that the icy condition was a problem only for pneumatic tires – the rubber cannot crush the ice (because of small pressure). Moreover, it packs the snow, creating the icy condition. For a tram – a vehicle on steel wheels – the icy condition is not a problem, but deep snow is a problem – the tram sinks on to its underside, and the wheels don't reach the rails.

2002. Winter testing of string transport at the Ozyory test site

2003. City of Ozyory. Nickolay Koshman, Chairman of the Federal Agency for Construction, Households and Utilities (Gosstroy of Russia), was visiting the string transport test site

The successful testing of string technology at the test site in Ozyory was a small victory for me, on which I placed great hopes. The workability of my idea was proven! I was proud of myself, when work on the test site was completed. I felt such a sense of elation... I felt everything was possible. To some extent, this was the pride of a child who has made his first steps and is willing to compete with a world racing champion. Obviously, the child can grow up and beat all the records, in reality. When someone looks at this pair at the starting line from outside, however, everyone unambiguously sees the champion of the present; but how many will see the champion of the future?

My trouble is that I thought exactly like an engineer and inventor and thought that those who make decisions are also capable of this. I did not set myself the goal of creating "pictures," but I wanted, above all, to confirm and re-confirm the suitability of the principles incorporated into the system. I was able to convince my investors to whom I in fact sold this "picture" of the correctness of this step. When, for the various reasons already cited above, they began to back down from continued financing, it was of little use. No one was hurrying to provide money for further development, much less order a project with the use of string transport. Essentially, what I got out of it was only the physical model in the proportion 1:1, as opposed to those small models which earlier I had used to conduct presentations. I had the heavy feeling that what I had done was not appreciated. I learned my lesson.

In Belarus, we worked differently – from the first day, we were inclined to implement the idea in full both from the functional as well as the visual perspectives. That was why, in 2016, we had already demonstrated in particular the full-fledged prototypes, and did not began experiments with mock-ups of the rolling stock. That stage had been passed in Ozyory in 2001, and it was also necessary to go on further. To be sure, not at all in the way that it was imagined, when we were working on the test site, and later, when we showed it to numerous bureaucrats and oligarchs. As the saying goes, if you want to make God laugh, tell Him about your plans.

An Offer I Couldn't Refuse

I remember that moment distinctly. Nadya and I had three rubles left, which is something like 10 American cents. It was not even enough to buy some bread. There were no prospects on the horizon. I had to somehow support my family and feed our little daughter. And exactly at that moment of total hopelessness, suddenly Kapitonov phoned me, after six years of abandonment – in the spring of 2002. He returned from non-existence and made me an offer I could not refuse given the situation I was in. Although, I am certain that in any other circumstances, I wouldn't have had anything to do with him once again, since he had threatened to drown me and not even leave circles on the water.

"Hello, old man. How are you doing?" he said.

"Alright," I said. "We're working."

"Listen, when can we meet? I heard you built something there?"

"Yes," I said. "We built a test site in Ozyory."

"Well, let's do it, I'm in Moscow now, let's get together..."

So, I went to the Hotel Metropol, located next to the Bolshoi Theater, near the Red Square. In a hotel room that costs $5,000, there was Kapitonov sitting in embroidered jeans for $10,000... A sharp businessman.

So, we met. We drank Hennessey cognac and snacked on black caviar. Things were going very well for him. He had somehow managed to "pinch" an eight-story building in the center of Kiev with office spaces for 10,000 square meters. The authorities wanted to grab this building back from him, and Kapitonov spent a whole year on the defensive. A year. With shooting and storming, everything as it should be. In the end, he wrested it back and thus obtained an asset worth $20 million. Kapitonov was flush with cash and was in a very good mood. He said, "Let's forget past grievances. I'm sorry for what happened. It won't happen again. Let's rebuild the company and put you in the management."

This was a firm that we jointly registered in Germany at the onset of our partnership. At the time of my second meeting with Kapitonov, it had moved from Herten to Berlin. I knew that when we had parted ways in 1996, he had even paid some lawyer 50,000 Deutschmarks to throw me out of the company, since originally, I had a share of about 31%. They sent me letters in which they summoned me to meetings in Germany, and I was supposed to attend them, although I was in Belarus. In fact, the letters were deliberately sent late, so that I would get them during holidays and couldn't get a visa. Now, however, aside from reinstating

me in the German company, Kapitonov proposed creating a new company in Kiev, whose shares we would divide up 50-50. He promised to build me and my son villas in Germany and provide for my family.

I will recall, that at that moment, I had not money at all. The joint firm with Teryokhin had collapsed. Its office was located in a closed regime plant in Moscow, and all the firm's property, including a safe with my documents and personal cash, had been seized to pay the rent arrears. Aside from everything else, there were payroll debts to the employees. I knew that Kapitonov would likely deceive me, but there was no other way out. I agreed to work with him. Only I did way out of desperation, "Let's be honest this time, even so." He swore he would keep his word.

We went to Kiev and registered a new company. Then we headed off to Germany in order to reinstate me in the old company, and it turned out that I had remained a member of it. According to German law, it is impossible to expel a person from an organization without their presence. And even the cash paid to lawyers did not help. Kapitonov also turned out to have been deceived – he had been told that it was done. I have to admit this was pleasant. One of the few instances in my life of the triumph of law and the interests of the individual over the right of the American dollar.

That trip mainly made a good impression on me about Germany – there had been a very great contrast in 2002 between us and them. When in 2018, I found myself in Berlin again, having come to take part in the InnoTrans exhibition, everything was no longer the same. I couldn't even find anywhere in the city places where you could eat their famous sausages with sour cabbage and beer. All around were only Turkish and Chinese fast-food restaurants. The sense of order in the streets had faded, as had its personality. In the end, all modern cities tend to become indistinguishably similar to each other – to be equally ugly.

When I got back from Berlin, Nadya, our three-month old daughter Nastya, and I moved to Kiev. For the second time, I began to work with Kapitonov. Once again, we put together a design bureau and looked for land for construction of a test and demo center. And we found it not far from Kiev, in Gostomel.

2002. Press articles about string transport

How I Lost the Company Engaged in Building the Test Site in Ozyory

Embarking on collaboration with a new partner, I had to finish off the previous project. Regarding the Unitsky Scientific Manufacturing Company, which was involved in building the test site in Ozyory, I had long ago prepared documents about the transfer of a share in the company in the amount of 50% to Dmitri Teryokhin and had sent two copies of the agreement to him for signature. When I left for Kiev, out of these papers, his lawyers made two agreements in which I supposedly twice gave him the same 50%. That is, this was the very same agreement, which I had signed in two copies, and on which later they placed different dates. Thus, the company was totally transferred to them. Thanks to the fact that I had figured that office in Moscow would close soon, I had managed to take out several computers and some of the documentation.

On the other hand, in some sense, Teryokhin behaved decently. While our collaboration had lasted, a large part of the cash he had invested was set up as a loan agreement. In other words, according to the documents, I had taken cash from him as a loan. If he had gone to court with these papers (I have kept them), I could have been put in prison. Formally, I owed him $1.5 million. Of course, they had not gone to me. It was the form in which the project was financed – the sums were sent to Ozyory, to the construction, to the maintenance of the design bureau.

Why did Teryokhin need the company? Evidently, he decided that he could make string transport without me. My colleagues from Star World thought exactly the same. And in the exact same way, in both cases, nothing came of it. Teryokhin placed Igor Dubatovka in the lead design position. I had invited Dubatovka from Minsk in 2000, when I had only begun to work in Ozyory and had searched for designers and architects for the construction part of it. At first, he was department head, and then was my assistant. After my business was taken away from me, Dubatovka, together with Teryokhin tried to move the project further along for several years. They tried to present it as if the test site in Ozyory had been built by them, and there was no Unitsky there at all. But either they didn't have the persistence, or the faith, or the knowledge, at a certain point, everything was closed. Dubatovka was able to grab one of my companies in Ozyory, and with his comrade Shametko continued working for several years and did some projects, no longer

related to string transport. Subsequently, largely thanks to this, he was able to set up his design business in Minsk. I know that in the capital of Belarus, his firm called “Monorakurs” designed the building of a shopping center next to the new building of the railroad station and other rather important facilities. Igor Dubatovka will appear again in my story.

2002. City of Ozyory. Materials for the test report No. OT STAU S-1.2-2002

Kapitonov’s Way

Thus, I was thrown out of one company. The work in the other, knowing Kapitonov, did not instill big hopes. All ended predictably. Just nine months of joint activity passed, and once at lunch at a Japanese restaurant in Kiev on Kreshchatik, my partner made up his mind to have a candid conversation. (During the conversation, quite a few words from the non-normative lexicon figured in, which I have rephrased here for ethical and moral reasons. In fact, the insightful reader will guess where, what, when, and how.)

“Listen, what do I need you for? I know everything even without you. The designers are already working with us, we have prepared the project and obtained land in Gostomel for the string testing center. Why do I need you?”

This conversation was not a surprise. Everything was heading in this direction with a certain clarity, so not long before the incident described I had taken my personal things out of the office, to which I was simply not admitted later.

Kapitonov turned around and said to his gangsters: “Take his car.”

He had given it to me at the start of our second cooperation.

“Sasha, but that’s actually a present that you had made in order to pay off your debt. Did you really forget about your debt of the payroll in Minsk – $36,000, a $1,000 per month? Although on paper, you were in fact a strategic partner, for three years I worked for free and was forced to look for investments independently, even with a strategic partner. After all, you positioned yourself in that way.”

“Take it…”

“Actually, I don’t have a car.”

I had figured it would all end this way; therefore, I had registered the car under my mother-in-law’s name.

And here he told me of his resentment, which he had never mentioned before:

“Alright, I understand your report to the Belarusian KGB in 1996 regarding my threats against you, but there’s one thing I can’t understand. Why did you write that I tortured you and stuck a soldering iron up your ass?”

“What soldering iron? What ass?”

“Well, three guys from the Belarusian KGB came to Kiev to arrest me. They said I had tortured you and in the course of the torture I had used a soldering iron.”

The Belarusian KGB guys had lied and embellished the story to their taste – there was nothing like that in my complaint.

That day, after the conversation described, I got totally drunk. Despite all my efforts, once again, everything was taken from me. Nadya told me that when I got home, I took off my shoes, and without taking off my suit and tie, got into a bathtub filled to the brim and started washing my socks. The next day, we left Kiev, where there was nothing left to do.

Kapitonov really did build a road without me, not a string road at all, but simply a type of monorail. He called it "Kapway" – "Kapitonov's Way." They implemented in this system a lot of incomprehensible solutions, ridiculous from the engineering perspective, for example, wrapping the steel wheels in rubber. I was told that when the car went into motion, it flew into pieces in different directions. The design of the track structure turned out to be massive, and not at all as light-weight as we had done in Belarus. But, actually, there is nothing surprising in the fact that Kapitonov did not work out with his road.

The designers I recruited from various enterprises, including aircraft engineers from the Antonov Design Bureau in Kiev, did not understand and did not grasp the specifics of string transport operation. To illustrate this statement, I recall my first experience of designing a high-speed module. It was in Moscow, during the construction of the Ozyory test site. Being busy with construction, I could not devote much time to design. At the same time, I did not want work on the most promising area to stand still. And there was no reason not to trust the designers, who had education and competence. Most of the work was done by those who came from the design bureaus of ZIL and other automotive plants of the USSR and Russia. But the result was unexpected.

At some point I was presented with documentation for the car. The length of the model was supposed to be about 10 meters. At the same time, the wretched designers took up almost all of its volume with aggregates. The vehicle accommodated only two passengers. To save the aerodynamics of the body, instead of doors they designed lockable hatches like those used in submarines. That is, during boarding, the passengers would have to crawl in. And the driver would have to drive the vehicle while lying down on the engine, because otherwise there wasn't enough room. To open the hatch, one had to press the pedal and then "steer" it – turn the steering wheel on the hatch a few turns. The device for mechanical coupling, intended to be used in case of failure of one of the cars on the line, was borrowed from the streetcar – a huge and awkward drawbar, deteriorating aerodynamics and making the appearance ugly.

The monster I saw had no resemblance to a high-speed string passenger vehicle, a concept which had not only been in my head for about 10 years but was described in detail in the technical specifications I gave to the designers. Naturally, I was horrified and indignant. The designers, who had previously worked at ZIL, one of whom was even the chief designer, were genuinely surprised at my indignation. They took my remarks to heart: what an ungrateful person Unitsky was – they were trying so hard, working in the evenings and even at weekends.

I did not change their minds but simply fired everyone who was involved in the design. Approximately the same engineering nonsense was done by Kapitonov's specialists without me. The trouble was that my partner himself had neither the knowledge nor the desire to understand the drawings, so he got what he got: an under-tram, under-bus, and under-monorail.

Nobody needed Kapitonov's way, although he invested in it almost everything he had. In the end, he went bankrupt. According to some reports, for that reason, his wife left him, and soon after, Sasha died of a heart attack. The rumors turned out not to be entirely true, but more on that later.

Early 2010s. Village of Gostomel. What's left of Kapway transport system – Kapitonov Way

2021. The only car of Kapitonov's ambitious but never materialized project in the State Aviation Museum of Ukraine

Failed Trip to EXPO-2005, Project in Khabarovsk, Biased Expertise, Khanty-Mansiysk, and Partnership with Oligarch Polonsky

The cash from the sale of the BMW, which Kapitonov had given me as a present and then tried to take away, helped to hold out the first time and to continue the development of the technology. Then we had to sell some real estate, which my wife, Nadezhda, owned in Crimea. By today's prices, her three small hotels were worth about a million dollars. All the proceeds went to work on string transport.

The office was located right in our home in a three-room Moscow apartment. Teryokhin had given me $100,000 a year earlier to buy it for a 3% share in our joint company. Our family with our older daughter lived in one room, in the second the design bureau was located, and in the third Vladimir Zharkevich, our Chief Designer, was quartered. Nadya agreed to all of this without grumbling. Both then, and now, she repeatedly helped me out. In all times, she was my main helper. Five times in 10 years she sold her own cars, so that we could work somehow and pay the salaries of our designers.

I undertook an attempt to show string transport at the World Exhibition EXPO-2005, which took place in Japan in the city of Nagoya. The Russian Academy of Natural Sciences, Gosstroy, and the Ministry of Economics, which had allocated $30,000 to me to create an operating model of the two-track string complex, helped me. The scale selected was 1:10. All the elements were as they were in the real system. Prestressed string rails, anchoring structures and supporting towers, stations and uPods moving in automatic mode. Everything was done at a high level given the daily work for six months, while the event lasted. During the sessions of the EXPO organizing committee, at which lists of participants were coordinated, the operating model of string complex could be seen by everyone, including decision-makers: it stood in the lobby of the building where the organizing committee met.

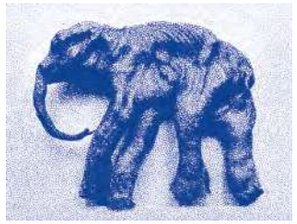
At the end of 2004, there was the final session of the exhibition organizing committee. The final list of projects in the Russian exhibition was read. If necessary, the authors of the stands would provide comments. All of the projects were approved unanimously, including a mock-up of the Tokamak thermo-nuclear power station. The speaker was academician Evgeni Velikhov, the Science Director of the organizing committee of this exhibition and at that time Vice President of the Academy of Sciences. After he read out the title, "Unitsky String Transport," he suddenly made a face, began to fidget, and even jumped out of his seat. He nearly started stamping his feet. "What? This doesn't exist anywhere in the world, and we're going to Japan and we will disgrace ourselves?" And he abruptly crossed out the exhibition exposition from the lists of participants in the world-wide show. He practically accused me of the string transport being a pseudoscience. In public – about 100 people were present, including Andrei Fursenko, the Minister of Education and Science. He crossed it out of the list, not having discussed it with any of the members of the organizing committee, and without asking a single question of me, the author of the string technologies.

After the meeting was over, I (the only one, who had been "spurned") went up to Velikhov. I asked him, "How dare you, Evgeni, stating that I am a pseudoscientist? You can see the physical model of string transport – it is here in the hall. In fact, it is a physical model, and not a mock-up like what you are apparently taking to the show." I spoke of the stand, on which the Tokamak mock-up was planned to be presented – the design of an international thermo-nuclear reactor in which Velikhov was taking the most active part. In the future, he even became the chairman of the council for that costly, prolonged design, which to this day has not yielded the expected results.

The concept of the central element of the thermonuclear station – a toroid chamber with magnetic coils (the tokamak) – had emerged back in the 1950s. The build itself was designed in the mid-1980s. In 2010, construction began, whose deadline has been extended three times: from 2016 to 2018; then to 2019; and today the planned date of release is 2025. The budget for the construction has increased from €5 billion to €19 billion. At the time when the conversation described took place, they had nothing to show except a mock-up made out of styrofoam, aluminum, and similar uncomplicated materials. And they brought to the show not an operating physical model but a mock-up: they put a battery inside and different colored blinking lights which created the illusion of the thermo-nuclear processes going on there. Essentially, they were the pseudoscientists, not me.

"Do you understand the difference between a mock-up and a physical model?" I asked. "I do. String transport, unlike your project, is absolutely real technology. I demonstrated the workability of the system in Ozyory at a scale of 1:1. You had to have heard about this. Where is the pseudoscience here? I have successfully demonstrated the project in many countries..." His reply was something like this: "You can go on demonstrating it anywhere you want, but you're not going to Japan to EXPO-2005."

The World Exhibition, or EXPO – an international exhibition that is a symbol of industrialization and an open platform for demonstrating technical and technological achievements. It lasts for six months. At various times, World Exhibitions were the first to present such well-established inventions as electric car lights, a photo booth, an escalator, a diesel engine, a computer, an incubator, a monorail, and much more.



The baby mammoth Dima – a unique museum exhibit and a subject of paleontological research found in 1977 in the North of Russia. It was the only fully preserved mammoth in the world until 2007. It is believed that the name Dima comes from the name of a small stream, near which the fossil animal was extracted. In 2005, at the EXPO in Japan, a dummy baby mammoth was presented as part of an exposition built around another discovery – the Yukagir mammoth found in September 2002.

Fukushima Daiichi disaster in Japan – a major radiation accident of the maximum level seven on the International Nuclear Event Scale (INES), which began on Friday March 11, 2011 as a result of the strongest ever earthquake in Japan's history and ensuing tsunami. Failure of backup power supply sources and all normal and emergency cooling systems led to meltdown of the reactor core and hydrogen explosions on power units. Their buildings were partially destroyed, and there was a significant release of radioactive materials into the environment.

In the end, one of the chief exhibits presented by Russia at the World Exhibition was a half-decomposed baby mammoth named Dima, discovered in Yakutia, and with him, an entire family of prehistoric animals. I thought back then, "Now this must be a symbol of Russian science, in fact." What relationship did these fossil remains have to progress, technical and technological innovations? What achievements of scientists did they demonstrate? It's a rhetorical question, of course. Subsequently, the press described the participation of Russians in the event as follows: "The Russian pavilion hardly made a sensation; the cultural program, which was organized by the Confederation of Theater Unions, saved the day. The entire hall sang 'Katyusha' in the Japanese language, along with the Pyatnitsky Choir." In short, they brought along not science but an accordion.

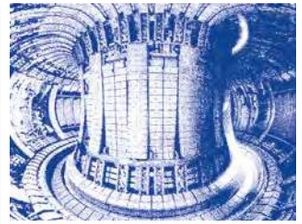
For me it was noteworthy that Velikhov, who was the sole person to prevent my trip to EXPO and who called me a pseudoscientist in public, is one of the perpetrators of the Chernobyl disaster. I will recall that this tragedy cost me my homeland, which happened to be a part of the exclusion zone. He was and is one of the lobbyists for nuclear energy, who claimed in due time that the reactors are so safe, they can be built on Red Square in Moscow. And if there are other specialists, such as academicians Anatoli Aleksandrov and Valeri Legasov, who recognized and acknowledged their guilt in what happened, Evgeni Velikhov did not. To be sure, after the 1986 accident, he began to say that the Chernobyl-type reactors were very bad; the "water-to-water" or pressurized water nuclear reactors were another matter. But precisely a reactor of that group was involved in the Fukushima Daiichi disaster in Japan, which by some estimates exceeded Chernobyl in scale.

The issue of the safety of experiments with controlled thermonuclear process remains controversial in general. On the other hand, my project of the General Planetary Vehicle capable of providing humanity for millions of years with unlimited supplies of cheap and environmentally friendly energy available in space would hardly be approved by Velikhov. After all, this and other such "real" scientists do not know that a real (and not mythical!) thermonuclear reactor – the Sun – has already worked without accidents for five billion years and will work without accidents for the same period. Why should we spend an enormous amount of time and money on the creation of a pathetic imitation of what nature has already created? Fortunately, or unfortunately, academician Velikhov, like the majority of scientists, who have worked in one particular field for a long time, was incapable of seeing and appropriately evaluating anything else designed outside the framework of his, and only his academy of sciences. Later, I often encountered such stupidity and one-sidedness in the views

of "people of science." This is probably logical, since my understanding of science is somewhat different from that accepted in the circles of scientific bureaucrats.

In my view, science is not about referring to the materials of someone else's work but about new data and new thoughts, not always backed up by research, as confirmed by great thinkers, starting with Socrates. This is why my research is full of philosophy and, naturally, of restrained emotion, presented in a popular scientific style rather than in the dry scientific language of academic science. Perhaps because of my dissimilarity to other scientists, instead of the encouragement I could have relied on taking into account the humanistic potential and science intensity of the string transport projects and the General Planetary Vehicle, I often encountered reinforced concrete walls in the person of so-called "scientists," whom I had either to walk around or hit my forehead against.

In 2004–2005, I came across a project in Khabarovsk and obtained funding from it. Once again, it was through UN-Habitat. Thanks to the facilitation of the center, and also successful negotiations and presentations, we were able to interest the regional government. We signed a contract with Mayor Alexander Sokolov, and I obtained approximately a million dollars to conduct the pre-project and then the project works.



Thermonuclear fusion – a type of nuclear reaction in which light atomic nuclei are combined into heavier ones due to the kinetic energy of their thermal movement. Scientists have been studying the possibility of using a thermonuclear reaction as an almost inexhaustible source of energy since 1950s. First of all, this is due to the prospect of mastering the technology of controlled thermonuclear synthesis. However, the scientific and technological base does not allow to implement this idea on an industrial scale until now.

2006. Demonstration of string transport to Viktor Novitsky, Deputy Mayor of Khabarovsk, and Vladimir Storchevus, Director of the Executive Office of the UN-Habitat Center in Russia

The UN representatives were prepared to facilitate the work further. They were very close to offering some serious money for my designs – about $5 million. And together we had gone 90% of the way necessary for the allocation of these funds. We had even obtained for the Khabarovsk project the support of the decision of the Russian Federation for Mineral Resources and the necessary documents from the State Duma.

As part of the work on the project, my next partner became Alexander Lebedev, oligarch, and deputy of the Russian State Duma, Yuri Luzhkov's rival for Mayor of Moscow. He had approached me himself. We signed a strategic partnership agreement, and Lebedev invited me to visit the Russian-Azerbaijani forum in Baku. "Putin and Aliyev will be there. Let's go, let's show a working model of the string transport. And in general, Vladimir Putin and I are from the same 'nest,' and there won't be a problem to obtain his support." Supposedly he was getting a foot in the door of the President's office.

The model, which we had planned to demonstrate and which several months before had not been allowed by Velikhov into EXPO-2005, weighed about 200 kilograms and was packed into several boxes two meters in length. "No problem, we'll fly on my personal plane," said the oligarch, solving the problem. We flew out of Vnukovo Airport. There were just five passengers in the Tu-154 – me and Vladimir Zharkevich, my Chief Designer, Lebedev with his assistant, and the President of the Reserve National Bank. There were leather sofas, redwood, nice, charming stewardesses, cognac, black caviar – all the accoutrements of a successful businessman. While we flew, we talked a lot. Lebedev was fired up about the idea of string transport. He then decided, similar to the UN, to invest $5 million in my first Khabarovsk project.

My new partner had become enthusiastic about the fashionable trend at that time – affordable housing, which he had intended to demonstrate to the President of Russia, along with string transport. A two-story wooden home, brought to Baku on several trucks, was assembled in three days and completely furnished. One of the builders hammered an enormous nail into the wall near the entrance, for reasons that remain obscure, and did not pull it out after the assembly was finished. As we were coming out of the house to meet the government motorcade, the Bank President, who was with us, snagged his extremely expensive jacket on the protruding nail and tore off a large (the size of the palm) piece of fabric from the jacket's shoulder. There was already no time to find a new outer garment for him. We had to go out to meet the leaders of Russia and Azerbaijan.

We stood by the road along which the leaders Vladimir Putin and Ilham Aliyev were to arrive – Lebedev, the Bank President, and me. Behind us was the wooden house, ahead was the exhibit complex, where the forum took place, to the left of me was the six-meter operating model of 1:5 scale, where the vehicle was moving along, back and forth. The Bank President was clutching the rag torn from his jacket, which was hanging from his left shoulder. From the side, it looked exactly as if he had put his hand on his heart, as Americans do when they sing their national anthem. Aliyev went by, and Putin behind him. Vladimir Putin recognized my partner, and therefore opened the window of the car slightly and ran his gaze over him. That was the entire meeting. We had counted on him coming later as part of his review of the exhibition, but it didn't happen. Even so, at that time it seemed that the trip had a success.

I remember the nail as a curiosity and as an example of how important a role can be played of things that seemed to be trivial at first glance. I will describe my attitude to them somewhat later. For now, I will only make an admission: had everything happened somewhat differently, Putin could have torn his jacket on that very nail. Could Lebedev then have been able to rely on the commercial success of his idea of affordable housing? In fact, he was never able to sell it to anyone.


Экономическая и философская газета

49 (529) ◆ декабрь ◆ 2004 год

ДОРОГУ новому виду транспо «второго» уровня!

ДОРОГУ...

Знание Державной России быть! ВЛАСТЬ!

Концептуально-аналитическая газета

№4 (171) - январь - 2004 г.

За-против-за

Транспортная система «второго уровня» – струнный транспорт Юницкого

Новый рынок емкостью триллион евро ждет стратегического партнера

Upon return, we talked again in Moscow a lot, and the oligarch finally was solidified in his belief that string transport would definitely change world logistics for the best. But the people to whom Lebedev assigned the work on my project believed otherwise. People, who were involved in these events, later told me how the discussion went approximately and what actions were taken.

"Why do we need these strings? Some Unitsky fellow, Khabarovsk... Does Lebedev really not know what to invest his $5 million in?" That was the question of one of the oligarch's close associates. Another agreed with this claim and suggested, "Let's go to MIIT (Moscow Institute of Transport Engineers), pay them, and they will write what we need." They took $20,000 in cash (instead of $5 million – an obvious savings); they went to MIIT and they said, "Write a negative conclusion, that this string transport is total crap." Without hesitation, the engineers fulfilled the order. They drew it up as scientific research and threw it together in two weeks, 20 pages in all. They wrote such craziness that I became nauseous after reading it. It was total nonsense from the engineering perspective. Suffice to say, all the so-called research was constructed from my advertising brochures, certain scattered figures ripped from them and data, which related to various options of implementation of the string technologies. They created the report by combining these figures with a non-workable model, not even bothering to request any more documents from me. It was the same thing as if, for example, when examining a plane that is not going to fly, you do not just increase its weight by an order of magnitude (like the Airbus A380) and to reduce, on the contrary, the area of the wings – by the same 10 times like a Soviet "crop duster," the An-2 plane. Herewith, I calculated that one page of this pseudoscience research cost about $1,000.

After reading this quasi-report (which said "Look, Unitsky is an illiterate swindler"), the oligarch ordered to cancel the agreement on strategic partnership. A courier came bringing papers for termination, I signed them, and they gave me that fabricated report. If they had not given it to me, I would not even have known the reason for the break-up of the business relationship.

I made my own conclusion on the "expertise" I had received. They had 20 pages; I had 50. I found more than 150 mistakes – starting from the calculations and ending with the grammar. I demonstrated that they were idiots and, in fact, total idiots. Illiterate, dishonest, indecent people, who both do not know mathematics and physics, strength of materials and the basics of subjects of general education. I wrote a letter in the style of Saltykov-Shchedrin* and sent it to the Minister of Transport, so that he would take note what kind of institutions of higher education we have in our country, and how they support innovation. The letter contained the sentence, "I have the impression that this is not a serious engineering institute but a home for mentally retarded children." This phrase later became popular on the internet and went over the top on the MIIT query: "MIIT – boarding school for mentally retarded children." In short, it got all sorted out: one of the professors became ill and an ambulance was called to him, someone was fired, but Lebedev terminated the contract, and I did not receive the funds. MIIT performed its function – it blocked the work of a railway transport competitor. In general, it behaved in bad faith. However, is there ever a good-faith competition anywhere?

Problems also arose with the UN-Habitat program. Something strange started happening there, and soon the center's representative office in Russia was completely closed. Thereafter the project in Khabarovsk was fated not to take place.

Continuing the search for a strategic partner, after a while I came across Sergey Polonsky, the sixth strategic partner in succession (if Kapitonov is counted twice for each of his appearances). Polonsky was a young

* Russian satirical author of the 19th century.

2006. City of Moscow. Presentation of the possibilities of string technology for transport communication between high-rise buildings of the Moscow-City complex to Sergey Polonsky, President of Mirax Group Corporation

dollar millionaire, the founder of the Russian investment and development company "Mirax Group," which built the highest building in Europe. However, it was far from perfect. Later this building had to be cut down by several dozen floors, while the lower two floors were filled with concrete due to the settlement of incorrectly designed high-rise building. His approaches to construction were clear.

"Wow, what a cool project!" Polonsky exclaimed about string transport.

I agreed to work with him subject to a number of conditions, including paying off my debts, which by that time had accumulated over $100,000. After all, it was necessary to purchase the equipment, pay salaries to several dozen employees, maintain the test site in Ozyory as well as cover the costs of organizing meetings and presentations. There was no revenue side. Polonsky called his secretary and said, "Give Unitsky $120,000 through Viktor Uzlov, who will administer the project." Uzlov gave me the money as a non-refundable investment and took a receipt. Then he said more than once at every opportunity that he had invested large sums in Unitsky. That was not true. He did not invest anything, on the contrary, he took it away. This funding belonged to Polonsky, while Uzlov was only the messenger.

The global economic crisis of 2008 – the imbalance between supply and demand for goods and services that was observed around the world. It resulted in a significant decline in production, demand, and prices for raw materials as well as an increase in unemployment. The negative consequences of the crisis were felt by the absolute majority of participants in economic relations; many banks, corporations, and companies had to cease to exist.

We began to work together in 2007. Unfortunately, like all the previous strategic partners, Polonsky immediately forgot all of his promises about the technology funding in the amount of $50 million, having barely obtained 70% in my business for 7,000 Russian rubles (less than $300, as the authorized capital of the company Unitsky String Transport paid up at that time was equal to 10,000 rubles).

Previously, I was fortunate to make good contacts in Khanty-Mansiysk, one of the richest regions of Russia, where oil and natural gas are extracted. I worked there for almost two years, twice made string transport presentations personally to the Governor, Alexander Filipenko, and three times spoke at international investment forums held in Khanty-Mansiysk. We prepared a proposal in respect of which I succeeded to make an agreement about the allocation of funds from the budget in the amount of 800 million rubles (about $30 million): this project was even included in the 2009 regional budget. Polonsky promised to invest the same amount of money in the project. But the global crisis of 2008 broke out.

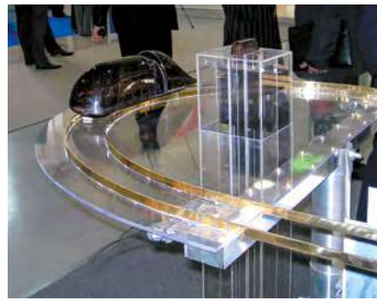
Another meeting was held with the presence of Polonsky himself. He, like many others, had serious problems in connection with the crisis. So serious that Polonsky was especially upset about something that day and drank quite a bit. It was noticeable – he was slurring his words. He listened to our report. The clock hands showed 11:00 p.m. on the dial at that time. We waited for a meeting for six hours in the Polonsky's waiting room, as Mao Zedong used to wait in Stalin's waiting room. Then the oligarch leafed through the estimates and stared at everyone as if he saw them for the first time, "Are you out of your goddamn minds? What kind of amounts are you slipping me? uBus – $500,000, anchoring structure – a million dollars. But I've driven in two-meter piles in Moscow-City cheaper! What is wrong with that? Drive in a pile – that's your anchoring structure. Pull the rope, hang the trough, nothing falls and nothing breaks – that's it! The project was done! Why do you need some kind of uBus?"

I tried to object. He drew his attention to one of the engineers, namely, our chief designer and my deputy, "Who are you? What's that shit you're wearing? What are those cheap, stainless-steel specs? What's that shabby leatherette briefcase? Get out of here, asshole!" When the latter, discouraged, was in the way toward the exit, Polonsky shouted, "Don't break the smart door, moron! It costs a million dollars." When I said that no one had the right to insult the members of my team, Polonsky looked at the others with a bleary eye, held a pause and then summed up the meeting, "The project is closed. You can all butt out..." He said something similar (not directly concerning string transport), only milder, in one of his interviews shown on central television, "Anybody who doesn't have a billion dollars can kiss my ass."

Support of the President of Russia

While working with Polonsky, I got to know more closely Viktor Uzlov, who was considered the right-hand of the oligarch, the Vice President of Mirax Group. He was interested in string transport and showed the desire to get closer, probably because he had some kind of conflict with Polonsky, and subsequently they even sued each other.

I enlisted Uzlov, so that he could finally beat a path for the first project implementation in the administration of Khanty-Mansiysk Region, where the Governor of the region and the Mayor of the city were my supporters. The project had already been included in the regional budget, but the global financial crisis froze all further process. I spent more than two years on this work in order to establish the necessary contacts. I flew to Khanty-Mansiysk more than 10 times. In addition, I created a company there for the implementation of the string transport project. I transferred the intellectual property rights valued at 800 million rubles to this company.



2007. City of Khanty-Mansiysk. Stand with a prototype of string transport at the exhibition of investment projects "Yugra Invest"

2007. Demonstration of string transport to the Governor and the Government of Khanty-Mansiysk Autonomous Okrug

Uzlov also assured me that he had a million dollars, and he was prepared to invest it in the string technologies (we signed an agreement for this purpose). He tried to receive interests from me – at first 10%, then 25%. We came to an agreement that at first he must contribute a million dollars and gain the budget in the amount of $30 million, then he will receive 10% in string technologies for the first action and 15% for the second action. Looking ahead, I would like to say that neither of these conditions was met. However, he does not forget to tell everyone even now, after all these years, that he allegedly has 25% in string technologies.

Viktor Uzlov considered himself to be an effective manager. A native of Ulyanovsk, he claimed to have ties there, including among the region leadership. Even today, he insists that the Governor Sergey Morozov, who is known as a pro-innovation politician, became interested in the string transport project thanks to his involvement. This is not the case in reality. Uzlov helped me with some questions, however, the main work I did myself. A year later, after several presentations and negotiations about prospects for the region's development using my projects, Governor Morozov held a presentation for Dmitri Medvedev – at that time the President of the Russian Federation – at the State Council Presidium Meeting on Transport Innovation, which was held in Ulyanovsk in 2009. It was a kind of culmination of my interaction with the Russian political elite.

Morozov was having a hard time – army depots caught fire, everything was in smoke, the ammunition was exploding – and now there was the State Council Meeting. We must pay tribute to the Governor, because he was not afraid to present string transport of Unitsky to his colleagues in spite of this situation.

End of 2000s. High-speed string transport (visualization)

At that time, it was a very ambiguous, even toxic technology for the majority of members of the Russian government starting with the Minister of Transport Igor Levitin. Many meeting participants did not like the presentation. It was clearly visible from the film footage. Their faces were contorted as if they had been forced to eat a lemon.

The President verbally supported Sergey Morozov and his idea, "Here you are laughing, but in fact, this is a very serious innovation. When in the 19th century people spoke about steam locomotives, the representatives of government agencies, involved in horse transport, sat there giggling in the same way. Now it is an entire industry, that you, by the way, lead." Medvedev at all times wanted to look wise and sometimes it looked stupid. As a result, the President verbally assigned the Ministry of Transport to find a billion rubles for Unitsky's technology. Subsequent actions indicated the opposite. A week later after these wise words of the President at the State Council on Transport Innovation the test site in Ozyory was destroyed.

The string transport test site, built in 2001, was standing by 2009 without any visible use. The structure was rusted in many places and the area around it was overgrown with tall grass. Every year I went there several times to put it in order and place the ZIL-131 on the string rails to show officials and experts, including from the UN, that string transport is a reality. Despite the external abandonment, the site continued to perform its main demonstrative function, and it was an important trump card in my negotiations.

For those people, who were not interested in the implementation of a major infrastructure project without their participation, the functioning site in Ozyory, of course, was a hindrance. When the question was raised about the support at a government level, they decided to get rid of the test site.

2009. City string track (visualization)

The overpass was demolished in an organized manner without any notification just in one day a week after the State Council meeting. Eyewitnesses said that there was a lot of military vehicles, powerful cranes, bulldozers, dump trucks, special machines for cutting steel and reinforced concrete structures, and dozens of people with a sign “EMERCOM” on their suits. This is not cheap. Most likely they had to design an entire military operation with the technology of recycling prestressed overpass up to 600 tons as well as anchoring structures with the height of a five-story house and load-bearing steel pipes, filled with concrete, with a diameter of one meter.

Meanwhile, it was impossible to find any objective reasons other than a fear of competition. The land under the test site was not needed by anyone, either before or after. Today, there is the same wasteland as there was before 2001. It is still unknown where hundreds of tons of steel reinforced concrete constructions, built at the expense of General Lebed and investor Teryokin, disappeared. Sometimes I joke, “Perhaps they were buried on Mars, not without the help of another of our competitors – Elon Musk.”

The demolition of the test site, in principle, showed me the seriousness of the government intention and the money of Russia – not to allow it under any pretext and to nip it in the bud. It seemed that everything possible was done to “reach out” with all my usual ingenuity. If the result has not been achieved in spite of everything, then the approach must be drastically changed. I needed the authority and funds for support, but they didn’t need me. Consequently, it was necessary to find another way. So I decided to start working through the securities market, the issue of which can be provided with my engineering developments. I found the best conditions for this plan implementation in Australia. It was the year 2009.

End of 2000s. String transport passenger stations (visualizations)

String Transport in Australia: New Attempt and Failure Again

Having borrowed $200,000 from several Russian investors, I opened five companies in Sydney, including STU (String Transport of Unitsky – an innovative engineering company) and STS (String Transport Systems – a public commercial company). Remembering all the previous stories of business divestment, I became the General Director of all these companies. The purpose of some of them was to do the engineering part and the others, the investment part.

Solving bureaucratic matters in Australia turned out to be unusually easy – a minimum of approvals, lines, and tie-ups. Surprisingly, all five companies (one of them with an authorized capital of more than a billion dollars, paid by my intellectual property) were registered within 40 minutes.

I remember the registration process for a similar company, Unitsky String Transport in Moscow, with an authorized capital of about $100 million. I joined the queue in the street at 7:00 a.m., and I was about 500th in it. It was 20 degrees below zero and the tax office opened at 9:00 a.m. I got into the building about noon and spent about three hours in hallways. There were no rest rooms, no place to warm up or get something to eat. After submitting documents, I heard the following words, "Come back in a week for the result." A week later, the documents were returned to me as improperly filled out – they could pick on a quotation mark or a comma. It was clear to me, however, the reason was my intellectual property, estimated by experts at 3.8 billion rubles. I was able to register the company only on the fourth time, when I threatened to turn to the President of Russia and the General Prosecutor for support.

The sun and ocean were beautiful in Australia. Besides, the people were completely different than in Russia, they were friendly. A cleaning lady in this country received a salary of $5,000 and was happy. It seems that everyone has only good things ahead of them. I felt the same. And those, who learned about string transport for the first time, were immediately taken with the idea and were ready to invest in its implementation. A trickle of money flowed to us, which allowed to move forward with optimism. The design engineering department grew. Designers were recruited in Minsk, including some who worked with me in Moscow and Ozyory. Thus, Igor Dubatovka appeared in my life again.

I shuttled between Sydney, Moscow, and Minsk, spending days on the road. The flight between Minsk and Sydney is 20 hours long.

2011. String transport in Australia (visualization)

I flew nearly a million kilometers for a year and a half. I even got the diamond card from the airline and twice I was given a free upgrade to first class on A380, which I could not afford (the cost of the ticket was about $10,000). Once I heard that my name was being called while I was in line for boarding at the Dubai Airport. I went up to the desk and the airline person said to me, "Change…" and something in English I didn't understand. I replied, "What do you mean, change? I don't need to exchange my money." I remembered that the word "change" meant the currency exchange. Then someone in line explained it to me, "You are being offered a free upgrade from economy class to the first class."

Once on the Dubai – Sydney flight I saw the film "Avatar" for the first time. Now it is my favorite movie. I have watched it more than 10 times. It's about human greed and the stupidity resulting from this flaw in the context of technologies developed to an amazing level. Intelligence creates wonderful things that can serve monstrous purposes. That's what the film is about, after all. Once again, I was dreaming on the road, half asleep. I wondered if that was the point of my struggle – to change the customary order of things that were incorrect at root? And furthermore, to reconcile the human being and nature. These thoughts were mixed in with the work on optimizing the project constituent parts – the finance and engineering calculations as well as the companies' management. Somewhere in this multitude of tasks, inspired by the images of providence, I missed something. I should have noticed it, but I didn't. Perhaps, I myself provoked the occurrence of some circumstances.

Thoughts about the harmony of mind and nature were alien to my partner Uzlov. He was an effective manager. His job and his mission were to earn money. Such a goal is known to accept all means. The further we went, the more our views diverged. "We shouldn't work on everything at once. One working model is enough; the main thing is that something should go along the overpass, and it does not fall apart.

You don't have to make detailed drawings – some pictures are enough. We don't need so many designers – as many as 35 people. Two designers would be enough for a lure." I thought different.

Then as now, I believe that the global business creation – the largest in the entire history of humankind – requires a global approach. If I concentrated on one thing and began to build a small test site or even an operating cargo track at some raw material production enterprise, instead of EcoTechnoPark in Belarus, where a wide range of transport solutions, using complex technologies created by me, has been demonstrated, then nothing would come of it at all.

In order to stimulate interest from buyers and investors, it is necessary to show the entire spectrum of possibilities and prospects. This is the only way to demonstrate the scale of what is being created. For that, it is necessary to work in parallel in all directions. Concentration on one thing and desire to act in a strict sequence of steps within a narrowly defined framework are fatal both for the engineer and the inventor as well as for the businessman. Such an approach narrows the horizon, does not allow to see all the possibilities and dulls the mind with monotony. The example of the Brothers Wright is illustrative in this regard – they were the first to complete a controlled and stable flight of a person on a self-moving apparatus heavier than air, but the aviation was made by William Boeing, who came to it seven years later from the outside (in fact he was engaged in a wood-working business, and the first planes were made of wood).

Consistency, of course, is important and I believe it is one of the most important of my professional and personal traits. However, it is important not in the sense of not starting to do something until certain conditions are met but in the sense of undertaking everything possible (within the framework of existing laws and morals, regardless of the circumstances) to achieve the goal. Consistency is a strategy; the basis for a successful tactic is the parallel execution of actions.

In business, the chances of success are increased proportionally to the number of products types, which you can offer, and the number of income sources. By working simultaneously on numerous tasks, I consistently went to my goal not only in invention but also in business. Uzlov probably believed that I was doing everything wrong, "Effective managers must run the company. Even by inheritance, the company should not be passed on to one's children but to managers; then it will be honest and fair." Soon these conversations resulted in concrete actions according to classic spy stories in seizing my business and the intellectual property for string technologies.

Uzlov was my seventh strategic partner. To be sure, without money but thanks to his strategic "vision" and "planning." He was like a gypsy (in fact, gypsy blood flows in the veins of his wife Oksana, and Victor had become her henpecked husband). He knew how to force people to cross his palm with silver, for which he would give them happiness. And I was no exception too.

Having hired an Australian lawyer, Uzlov convinced me that it was impossible to combine three positions: General Director of the public company STS in Sydney, through which the financing was coming; General Director of the engineering company STU in Sydney; Head of the STU representative office in Minsk. Supposedly, this is contrary to the Australian law – there is a conflict of interests and I risk becoming a "grey cardinal." I was forced to resign from a position in a public company, where investment money flowed, and to take Dubatovka, with whom Uzlov had become friends by that time, for the post of Head of the representative office. I was assured that nevertheless the right of the decisive vote would remain with me. After all, I am the main shareholder, I have more than 51% of the votes. I trusted him and agreed to it. And very soon afterward I lose everything once again. I got convinced again, that the business is not really run by shareholders, but by managers they have hired.

2011. String transport in Australia (visualizations)

2011. String transport over flooded area (visualization)

The accounts of the Australian company investing in the work of designers were in Uzlov's hands. But the investment had been attracted, however, for the technology. In order to completely seize the business, it was necessary to grab the remainder – the design engineering department. Uzlov wrote me a letter in which he offered to give up the business voluntarily, but otherwise, threatened reprisals. If I did not agree, he would find me in any country of the world where I would try to work on string technologies, and he would "rub me out," approximately the way Putin had promised to "rub out" the terrorists (to be sure, Putin had been more precise about it – "in the latrine"). And he gave me a deadline: 9:00 a.m., the next Monday.

I ignored the threats. Then, my seventh partner bribed the engineers with the help of Igor Dubatovka, and none of them came to work on Monday. The equipment, documents, furniture and even my personal things changed owners – now it was Viktor Uzlov. Then the Australian company and the Minsk representative office were closed through the Belarusian Foreign Ministry, using forged documents with a forged seal (I still have the real seal). New companies were incorporated under different names with different owners, of course, without me but with the STS abbreviation, under which they could continue to attract investment. Moreover, a month later, the newly minted company obtained the prestigious international award called the "Golden Chariot" in Dubai for string technologies, and nobody even remembered the engineer Unitsky. In fact, soon all these companies were closed, having failed to do anything, although Uzlov himself was to appear more than once.

Unable to develop the string transport project without me, my junior partner Uzlov could not forgive me. Despite the fact that he took away the entire business and bankrupted my Australian companies, I rose again.

2011. City mounted string transport (visualization)

Unable to defeat me completely, Uzlov began to hate me even more. I remember one scene, which I witnessed when I was still a schoolboy and which illustrates this attitude in the most eloquent way. A hunter (near my fishing spot) wounded a wild duck and it began to run away from him across the field. He tried to beat the bird with the butt of his rifle, but he kept missing. He kept beating with more and more frenzy until the wooden butt of the expensive rifle flew into pieces. When he finally managed to catch the unfortunate duck, he simply kicked it into the mud. What was its fault? Why such hatred? Because the hunter was unable to kill his victim immediately, and it dared to resist, because it didn't want to die.

One of Uzlov's lawsuits against me was illustrative. At the time of its submission, two years had passed after his raider's grab of my company. And suddenly it turns out that I supposedly borrowed more than $200,000 from him and did not return it. He sued me in a Moscow court, according to my place of residence at that time. There was my signature and the seal of the Moscow company Unitsky String Transport. This was strange in itself – a typewritten (and not handwritten) loan to a private person with the company's seal. Where did Uzlov get this document? I remembered the circumstances.

It was just when this "successful businessman," who worked for Polonsky then in the Mirax Group, agreed to finally break through our contract for the first string track in Khanty-Mansiysk (as I have recounted earlier). By that time, I managed to pass all the examinations and approvals, complete the research "Strategy for Application of String Transport in Khanty-Mansiysk Region," which took up six thick volumes, and even include the project in the district budget (for amount of 800 million rubles which is about $30 million). However, the 2008 crisis struck, and everything stopped. Uzlov undertook to revive the process.

Viktor told me, “I’m an experienced businessman. I swear I will sign the contract and knock some cash out of the regional budget. But don’t you get in the way.” He used the familiar form of “you” in Russian with everyone. “I’ll go and do everything myself, especially since you promised me 15% in business for this. The number of pages of the future contract is not yet known, so sign the blank last pages and put a stamp, and then we’ll put the text in later. We also don’t know the place where the text will end, so put six signatures – duplicate for us and the customer – in the upper part, in the middle and at the bottom of each page.” Uzlov typed then the text of a fictitious loan on these pages instead of the contract with the Khanty-Mansiysk regional government. He filed the lawsuit when I had another difficult period of lack of money. Apparently, he decided to finish me off with this.

His meanness was also in the fact that he allegedly lent me money during the very period of time when he left the oligarch Sergey Polonsky and sued him – then he also felt a lack of finance, and I paid him a salary from my pocket at that time. Nadya was pregnant with our second child, Maryana. I told my wife, “Honey, we have problems – there’s nothing to pay the salaries of the designers in Minsk and our new manager Uzlov in Moscow. We have to sell the jeep.” She agreed. With tears in her eyes, she drove to places where it was possible to do this quickly, with her belly pressed up against the wheel (she was already nine months pregnant, after all). She looked for the best price. Having sold for half the cost the car that I gave her as a present for her 30th birthday just a few months ago, she hid the bundle of banknotes on her large belly under a fur coat, and stood on the side of the road, trying to catch a taxi in order to get back to town. And that bastard, Uzlov, at the same time allegedly lent me $200,000...

Thinking about these events from different sides, I suddenly realized that at the root of the surname Uzlov there is a word “zlo,” meaning “evil” in Russian. And I noticed my last name, the English spelling of which is Uni-T-Sky. It can be decoded as “Uniting” and “Sky” with a “T” – transport. Then I also noted that my full name, Unitsky Anatoli Eduardovich, is abbreviated in English as “UAE,” that is, the “United Arab Emirates.”

Beginning of 2010s. String transport (visualization)

Общество с ограниченной ответственностью
«Независимая экспертиза XXI век»

ЗАКЛЮЧЕНИЕ № 073-И-10
об оценке рыночной стоимости
исключительного права на ноу-хау
«Струнные технологии Юницкого на стадии start-up»

Зарегистрировано в реестре заключений о стоимости
за № 073-И-10 от 20 мая 2010 г.

1. Общие сведения:

1.1. Основание для проведения оценки: договор № 073-И-10 от 11.05.2010

1.2. Объект оценки: Исключительное право на ноу-хау «Струнные технологии Юницкого на стадии start-up»

1.3. Заказчик: Гражданин России Узлов Виктор Александрович

2. Цель оценки: Определение рыночной стоимости для взноса в уставный капитал австралийской компании String Technology Unitsky Pty Ltd

31 080 000 000
(тридцать один миллиард восемьдесят миллионов) рублей

или

1 034 000 000
(миллиард тридцать четыре миллиона) долларов США

или

1 156 000 000
(миллиард сто пятьдесят шесть миллионов) австралийских долларов

В.А.Башких
Н.Н.Маркова
Э.С.Филатова
Е.А.Десятов

2010. One of the first reports of independent experts on assessment of market value of intellectual property for developments related to string transport.
The exclusive right to the know-how of “Unitsky String Technologies at the Stage of Startup” was estimated at $1.034 billion. In the future the intellectual property will be estimated at $400 billion

Beginning of 2010s. String transport (visualization)

Another Partner – Not for Long but Brightly

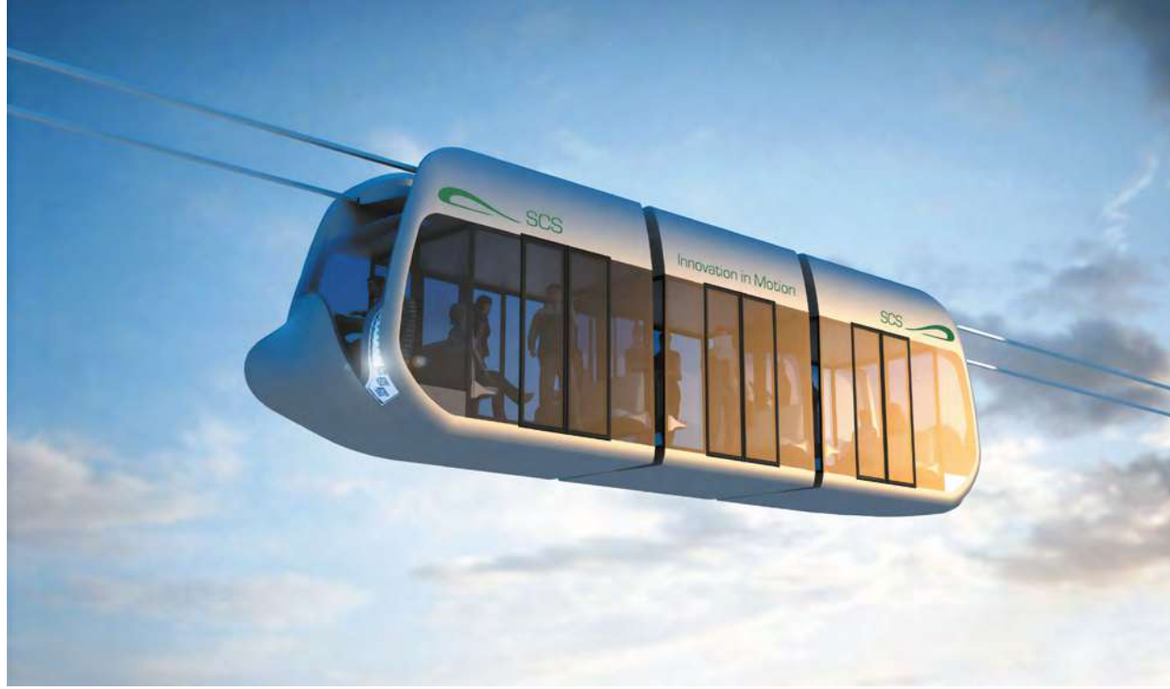
Upon my return, after parting with Uzlov and Dubatovka, I briefly collaborated with Salim Miftakhutdinov, who called himself the king of homeopathy. However, he was from Siberia and had not the slightest idea about homeopathy. But he thought he knew a lot about business. However, even in this case, everything boiled down to the fact that business should be built on the model of a snail's shell and stand on three legs. One leg for accounting, the second for the legal service, the third for the managers. Then, he thought, there would be harmony and stability; it seemed to him wise and, indeed, beautiful. Reciting his incantations over and over again, he looked not at his interlocutors, but at his own reflection in the mirror that occupied the entire wall opposite his desk in his office.

Our new hospitable partner invited us to stay with him in his secure office almost in the center of Moscow, paying our salaries, which he arranged as loans, against a receipt. Miftakhutdinov often went on business trips in search of investments for the development of string transport. I was involved in the design. But something was wrong. I found out what it was by coincidence, when I saw a flash drive on the coffee table, which, as it turned out, had been left by him inadvertently.

The flash drive contained documents that clearly showed that the firm EDAS, owned by Salim, had been created by him together with a senior partner, Eduard, hence the name. Salim had made the same loans to Eduard that he had made to me. Then he went to court and took everything from his partner, even the apartment. Afterwards Eduard died suddenly. And the whole business passed to Salim and his son.

My doubts and fears increased after this discovery. In addition, it turned out that Miftakhutdinov's frequent business trips, the costs of which he wrote off as investments in string transport, were just tourism and a way of entertainment.

I tried to part with my partner amicably, but he made it clear that he was not ready to do that. He said that he had already invested a lot of money, so I had to give him a stake in technology and intellectual property. On the other hand, it was already difficult for me to leave, since all my stuff – my entire archive – was under guard in his office. I began to procrastinate, waiting for the right moment to come. And it came, when Miftakhutdinov went on another trip, ordering repairs to his office. It was a suitable excuse for me to take out my personal belongings



Beginning of 2010s. String transport (visualization)

as well as documents for my intellectual property and know-how. Nevertheless, Nadezhda whom I had asked to help, and I feared until the last moment that we would not be allowed to do so. When we took the folders to the car parked in front of the door with the engine running we felt like we were either thieves or spies. After taking my stuff, I wrote a letter to Miftakhutdinov, in which I said all that I thought about him. He went to court with the receipts, just as I had expected.

The processes lasted from 2013 to 2019. Miftakhutdinov found an approach to the judge and the bailiffs. The bailiffs even tried to get money from me three times for the same court decision. Once I paid it. Then I went to court myself but to a different court. The bailiff was fired and the judge was transferred to another job.

The loan receipts that Salim submitted to the court also had second pages that he had taken out. They accurately described everything: how much money was spent, when, and on what, not by me but by Miftakhutdinov, because I hadn't even seen this money (dinners, Salim's foreign trips, office rent, etc. There were dozens of expenses which don't even fall under the term of the "loan"). In addition, the loan amounts were not round, because EDAS' accounting department accrued some kind of interest. For example, a loan of 3,521,003 rubles 12 kopecks. I suggested to the judge to ask Miftakhutdinov how he was counting 12 kopecks when he allegedly gave me the loan, to which there was no response.

It seemed that this mess was never going to end. From time to time Nadezhda received messages on her phone from my ex-partner, saying that I was "the living devil." In fact, it was probably he who had devilish plans. Later on, I found a lot of evidence to that effect. For example, I found out that at one of his meetings he presented the Prime Minister of Vietnam my monograph "100 Questions – 100 Answers," on the cover of which his name, and not mine was written as the name of the author of string technologies. Obviously, he was getting ready to take the business away, just like the other partners I told about before. However, as fate would have it, what could have been a tragedy for me turned out to be a comedy, albeit a nerve-wracking one.

PART 6

Saving Earth Is the Job of Earthlings

Reloading the Project and Betting on Crowd-Investing

They say that life is a road. My life is like that exactly. They say that life is like fishing. And again, it's like that for me. Just as on the road you may immerse yourself in a particular meditative state, when you begin to see thoughts and see new connections, so it is while fishing. For hours, you stare at the float bouncing on the water. Slowly, you explore the water, as if it were outer space. You try to see the fish through the water, in order to understand its preferences. Just as the line from the fishing rod stretches between the fisherman's hands and the depths, so under the hypnosis of this quiet occupation your thoughts have their own threads uniting the disparate. In fact, it's not only about that.

For me, fishing is also getting to know nature and of course inventiveness. I knew practically all the spots on the Pripyat River, where I used to go when I lived in Belarus. I studied the fish, their habits, I measured the depth of the water, I explored the peculiarities of the current in order to find the paths along which the fish went and fed as well. I changed the original factory form and grinding of the Soviet hooks (Kiev hooks were the best in the USSR at that time, although they differed from Japanese hooks in about the same way as Zaporozhets differed from Toyota), the color of the fishing lines and even the sinkers. As a result, I could catch a hundred bream at one go, each of which weighed more than a kilogram.

Once, when I worked at the Gomel Institute for Mechanics of Metal-Polymer Systems, I invited my colleagues fishing. When they began to ask me the details, I told them about the places I know, about the catches. Likely, this seemed like bragging to them. They began to laugh and make fun of me, as if to say, "We know you fishermen. If your hands are tied up at the wrists, you won't be able to show the size of your fish, but you can tell by spreading your palms that its eyes were as big as this." I wanted to prove that I was telling the truth. We bet a case of cognac that I would catch a hundred first. I caught much more, although the others barely caught even one bream.

We were sitting in the same boat using identical fishing rods and the same bait. We also cast lines from the shore. I took out fish after fish. The others had practically nothing biting. Naturally, they suspected a trick. They asked to sit where I was sitting, to change fishing rods; they looked over my gear, but they couldn't understand anything. The secrets were at the same time simple and complicated. I took into account numerous

2006. Anatoli Unitsky's fisherman's luck is a natural result of thoughtful actions. And also a good rest, nature enjoyment, and philosophy of self-awareness

circumstances – where to cast, how and when to hook the fish when biting, what depth of water to catch the fish depending on the time of day, and so on. There was also a certain trick in my gear and bait. But it was impossible either to guess all of this or learn it in an hour.

As a result, my fishing buddies simply got mad at me – in three days, the five of them caught five breams, but my catch was more than 400. I dried out the fish and then gave each one of my offended companions a 50-liter bag of dried bream. By the way, I never did get from them the case of cognac which they lost to me.

I will also note that the experts who claimed that the ZIL could not climb up the icy string overpass on steel wheels in Ozyory did not give me the case of cognac, either. There were a lot of similar arguments with analogous bets in my life, but I have never received the prize. The majority of people think that they don't have to keep their word. But I think that if you gave your word, keep it, no matter how hard it is. However, those losing were offended at me very often, at best. The fishing incident was very illustrative in that regard.

Almost everyone, almost always unconsciously becomes offended at those who outwardly do the same thing but achieve different results than they do. When a person sees apparent superiority, the first thing he thinks is that it is a trick. Although most often, of course, it's not a trick but preparation and professionalism, which is obvious only in sports, where the height, weight, muscle volume, and so on can be measured. For precisely this reason, people can easily admit that someone is superior to them in physical characteristics, but it is hardly for them to admit that they do not have sufficient knowledge or intellect. In the case of this fishing trip described, of course it was a question of knowledge, careful preparation, and research.

I never revealed my main secret of successful fishing, because my colleagues did not believe in my skill, moreover, they also made fun of me. My week-long fishing trip was preceded by almost a year of preparation. Casting my rod, I already knew everything that I needed. I learned (which I spent a lot of time on) how at the bottom of the river, sometimes at a depth of 10 meters, to find a fish path along which the fish travels and feeds on, sometimes swimming to the surface with the current two to three kilometers away

from their winter hibernation hole. This path is quite narrow, about a meter wide. I fished only there. I was also feeding this path: I prepared a bucket of special food every day. I cooked peas, wheat, corn and made feed bricks by mixing the ingredients with powdered red clay I took with me. In the evening, I carefully lowered the formed bricks onto the path, then put the boat in this place (plus or minus 10 centimeters, sometimes 100 meters from the shore), and fished. And my overconfident colleagues lined up to the left and right of the path, hoping for a chance. It is easy to check the effectiveness of this method in everyday life. Throw one coin on the sidewalk and the second one – a meter away from it, in the grass. The one lying on the sidewalk will be picked up by the first passerby, the other hidden among the grass will remain unnoticed for years.

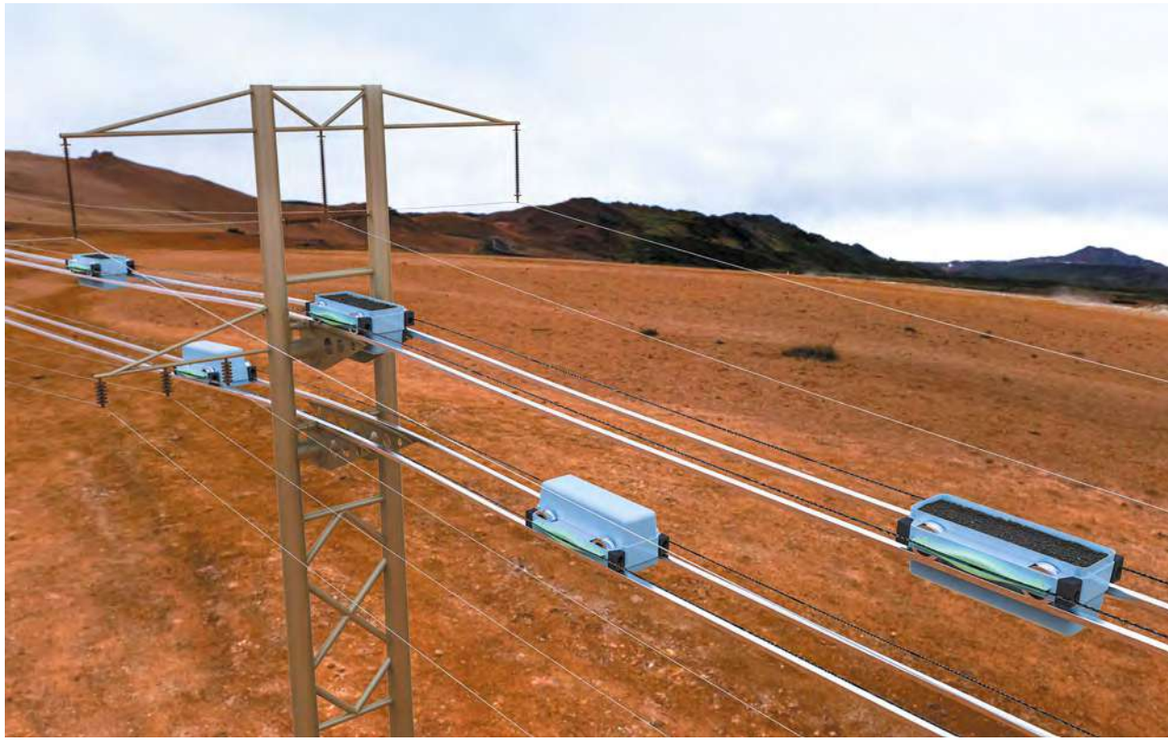
By the way, until now, although about 40 years have passed, there are legends about this fishing at the Gomel Institute of Polymers.

I don't think that you can obtain anything substantive in life accidentally. Even those discoveries and inventions which were made unexpectedly were still the outcome of conscious work, although even with a side effect. Those who count on a chance are forced to limit themselves to accidental blessings which fall to their lot from time to time. There are numerous examples when people waste the large amount of cash won in a lottery on all sorts of nonsense and then remain as poor as they were. For me, fishing is a process of learning, deliberate, intensive action, and the catch is the goal and the logical result of this action. Any goal requires sensible steps for its achievement. For my entire life, I tried to approach everything precisely from this perspective. Fishing taught me a lot. Moreover, so to say, by totally immersing yourself in it, it enables you to escape from everyday circumstances and gives you time to think.

It finally became clear to me that I could not obtain any justice from Uzlov in the near future. Having once again lost almost everything in Australia and Belarus (money, property, companies, intellectual property, engineering personnel trained by me for many years, connections, hopes for success and development prospects), I realized that I had lost not only the past and present but also the future. I could have lost heart as well. Someone may put a bullet in their temple or put a noose around their neck in such a situation. But I told myself: "It's not your fault that you were deceived by your partner, your friend and brother, with whom you went through thick and thin. This is a lesson, and being the highest one it is so expensive. I need to take advantage of the moment and reboot."

I dropped everything and went to Nadya's relatives in Crimea (Ukrainian at the time) to go fishing. I spent three months on the shore of a lake, on Donuzlav Bay, in its freshwater part, which is more than 10 kilometers long. I spent days fishing, day and night. By the way, naturally I didn't shave every day and I have continued that tradition to this day. I believe that's fortunate. I brought home my catches, I wrote down some things that came to mind as I was fishing, and once again went away to cast my rods. I placed five rods at a distance from each other along the shore and in a night ran about 20 kilometers – first a bell would ring on one end and then a bell on the other. I had to run fast, otherwise I wouldn't manage to get settled in time. I would sit in a rocking chare with a flashlight on my forehead. My hands bitten by mosquitoes (they looked like moving and buzzing gloves) were always occupied, especially at night when I had to untangle the lines that had become tangled or take the fish off the hooks, sometimes several fish at once. All that time, just as intensively as I performed these actions, I was thinking. How should I go on living?

I looked at my mistakes and I realized: all of them had happened according to the same scenario. If I managed to convince someone strong of the viability and possibility for realization of my designs, someone capable of helping them to advance, if that person agreed to facilitate them, understanding what profits



2010. Cable driven cargo track in Australia (visualization)

the realization of my ideas could bring, and if he stood alongside with me, then in a little while he would begin to see everything as his own property. In all cases, the desire to take it away inevitably occurred. And of course, if there were no guarantees that this would not repeat again, then was it worth for me to take the same path I had been passing before this?

Searching for a new partner would most likely mean once again looking for someone who wished to grab everything for himself. And the likely reason here is the same that made my Gomel colleagues indignant – the inability of a person to give credit for the abilities and the results of intellectual labor of another person. The psychology of any major investor is simple, "I gave you money. Everything you did was realized on my cash, so that means it belongs to me." This is evidently the same psychology of an effective manager. In his opinion, he brought in the cash, he created the conditions, and that was why everything should belong to him. Of course, this did not suit me; therefore, I had to go on without major investors and "efficient" managers in the future.

Back when I was working with Uzlov, people came to me looking for opportunities to earn money on string transport. They proposed various ideas, they advertised new financial instruments and their unique services. All of this seemed to me to be uncooked and seemed doomed to failure. Not a single one of these schemers' projects had any thoroughness. But certain things stuck with me. For example, this was

how I learned about the existence of crowdfunding in the form in which it has spread thanks to the internet. Now, when the traditional routes for searching for an investor had come to a dead end, I began to think in that direction.

At the present time, numerous micro-investors (more than 500,000 according to the figures for 2022) from more than 220 countries and territories of the world (there are less member states in the UN) are investing in the implementation of string transport. On the one hand, this dispersion of sources of capital guarantees that I will not wind up dependent on a single one of them, not a single one of them can grab for himself what I have done. On the other hand, appealing to people with a request to help me so that they can help themselves is a self-evident step, the implementation of which with the advent of the internet, for the first time, real technical means have appeared to enable.

String transport is necessary precisely for simple people, not oligarchs and politicians. These investors could make a contribution to the building of a better future. Millions of people all over the world would become shareholders of string transport. A revolution? No. Evolution. Its new branch appears when the logic by which everything was developed until now has led to the brink beyond which is death. It is a struggle for survival at a civilizational level. All of this, however, is good in an idea, in the film "Avatar." In reality, people have to be offered something more tangible than evolution and harmony. They won't pay for those wonderful things.

2011. Urban mounted string vehicle of high capacity (visualization)

Everything that I had, that I had managed to accumulate in the years of work on string transport is intellectual property. As a licensed patent expert, and in the past, as the head of a patent licensing office at an academic institute, I knew perfectly well that intellectual property has its price. Previously, in Australia, I had already made use of this asset and conducted an appraisal. Or to be more precise, not I, but a specialized company which has an international license for the right to appraise intellectual property and know-how. Now I could repeat the same thing, incorporate the value of the intellectual property in the authorized capital of the company, which was especially created for the implementation of the technology named Unitsky String Transport. A part of this capital, which means the company as well, to which my ideas belong, can be traded for investments.

Crowdfunding or crowd-investing has turned out to be the most attractive model for work with investors. This is largely because the traditional scheme for making a company public (which we had planned to do in Australia) was too difficult, expensive and for me, practically unrealizable in Russia and other countries at that time. It was also not realistic to go to Australia for a second time – too many questions would be provoked by the circumstances related to Uzlov. The money had been stolen and disappeared, his promises were not kept, all the companies created jointly with him had ceased to exist. Thousands of investors were deceived by him, but he blamed me for everything.

2011. High-speed string vehicles (visualization)

2013. City of Moscow. While filming "Brainstorm. New Transport"

Three months later, Nadya and I returned from Crimea to Moscow. During the time spent fishing, the plan had matured and had been formulated in all its basic nuances. We invited several people who, in my view, could help bring it to life, and we began to act. We brought together people; we described the string transport to everyone we could. Soon we conducted the first webinar with an introduction to the project, taped by video appeal, created a site with tools for investing in exchange for a share in the technology, and conducted the first conference.

String Transport in Lithuania: Why I Wanted to Build a Test Site in Europe and Why These Plans Were Fated Not to Be Realized

From the very beginning, it was clear to us that such a wide-scale concept as the creation of a new branch of the economy in the field of transportation with funds attracted from micro-investors may be realized only in an international format. The maximum number of people from all countries on all continents had to be attracted to the project, and string transport has to be turned into a kind of religion. In order to formulate the basic tenets, I described the most substantive, in my view, ills of modernity associated with the ineffectiveness of existing transport and infrastructure solutions and their danger.

The catastrophic fatality statistics on the roads; the woeful consequences for the environment; the restriction on mobility and inequality; the cities that are impossible for a comfortable life, which continue to grow and turn the life of the modern person into a nightmare from which no way out is seen. We showed the path to salvation and called people to follow us to a clean, safe, and comfortable future for everyone. String transport is that way out.

It seemed to me that people would listen and comprehend such progressive ideas if they come from the world center of enlightenment – Europe. Russians are generally inclined to idealize the West beyond measure. We imagine that freedom, humanism, entrepreneurialism all exist only there. We see only flaws in ourselves and virtues in them. We are prepared to reject ourselves, everything that is our own, which is mired in centuries of slavery and lies. But we rarely think of whether our self-renunciation is needed by anyone there. We ourselves are prepared to meet half-way with open arms, confident that people will treat us the same way. Even the history of colonization of most of the known world by the Europeans does not teach us anything.

Meanwhile, the sense of a prejudicial attitude toward the outsider is common to them as before, despite all the conversations about openness and democracy. An outsider finds it almost impossible to enter the old world of city dwellers and farmers who lived for centuries in close proximity, imbued with a living common history.

On the narrow European streets, surrounded by beautiful architecture that magnifies the personality and ambitions of the European, a person

from the East will always be a foreigner. We can learn to understand the language of Europeans, but we are hardly able to comprehend their way of thinking, which is formed from the space that has nurtured the person, in the geographical sense, putting it literally. A person raised in Ryazan fields, Polesian forests or the Kazakh steppe cannot think in the same way as a person raised in some surroundings of stone and marble, idyllic landscapes on the coast of Northern Italy or the Swiss Alps.

As a consequence and as a concomitant circumstance, there are insurmountable cultural differences. In conjunction with geography they make us who we are and determine our destiny. I am certain that my idea of the General Planetary Vehicle (just as what Konstantin Tsiolkovsky, revered by me, created and what he thought about) are impossible in any other space. Everything – nature, civilization, the everyday life generated by it – orients us to global thinking, beyond the horizon, which is visually always rather limited and overpowering for the resident of the flatlands. The boundaries of the world for the resident of the mountains or the coast look different. The majestic and insuperable elements are inclined to be confined to arranging what lies nearby, and not to conquer and make sense of what is far away.

On the other hand, we Slavs are not inclined to consider ourselves capable of independently choosing our direction of development. We wait until someone shows us the way, until the revelation descends. In this way people waited for the founder of statehood, Rurik; in this way they accepted Christianity; in this way they were building communism, conceived by the Germans, which was entirely unsuitable for this economic base. It is worth nothing that in all the cases cited, we went further than others, as if we were trying to befriend the world and be useful to it. Desperately serving the world to the point of self-abandonment, upon which the prim Europeans always looked with amazement. I made a similar mistake as well, believing, like the majority of us, in a civilized Europe but encountering a barbarism there no less than in the Motherland.

The closest European country was Lithuania – at some time it was one country with Belarus and practically everyone spoke Russian there. It was decided that we would build a center for demonstration and certification of string technology that would show what type they could become with the incorporation of string transport. It was planned to open a design bureau in Minsk. After all, I don't know foreign languages and I couldn't work fully with foreign engineers without being able to understand one another at a basic level. And where are the engineers in Lithuania, if almost half the able-bodied population of that country has left to earn their living in Western Europe?

The information shared with me by our investors from law enforcement agencies and the former KGB, that is, the FSB, also pushed me to this step. It became known that in Russia they decided to open a criminal case against me, as they saw another financial pyramid in a crowd-investing scheme to attract investments. In March 2014, I left for Lithuania. We have set up three companies there within a month; we signed an agreement with the Mayor of the city of Šiauliai to rent land to build a test center and paid money for the land. We rented a whole floor for an office at the University in Vilnius so as to be closer to education and science, and began to hire employees. Nadya and the girls also moved to Vilnius. The eldest, Nastya, started fifth grade at school; the youngest, Maryana, went to day care. Nadya actively helped me, taking care of all the administrative work and was the co-founder of my Lithuanian companies.

I realized something had gone wrong when Nadya was summoned to the school and the day care center in order to find out what our children did when we were away on business trips. This fact could have been written off as European attentiveness, but most likely it had to be regarded as a testing of the waters to find the instruments to put further pressure on me. Likely, they wanted to take away the children. Along with this, the harassment in the local media began.

At first, the press and television had been very welcoming to our technology. There were broadcasts of programs and laudatory articles in the newspapers. They spoke of the innovations coming to Lithuania; about how the country could get a new, serious scientific and research center in a few years. The technology was capable of giving a powerful industry-leading impetus to the development of the economy and increase the country's attractiveness for investment. Then the accent shifted instantly. At first the press was interested in the sources of the project's funding, although as I have already said, we did not issue shares in the traditional sense and worked through the mechanism of crowd-investing – essentially, we took out a loan backed by its intellectual property. All of this was put differently by the media. They wrote that we had supposedly offered the purchase of shares – securities – and that could not help but attract the attention of law-enforcers.

Anyone can understand that trading in unregistered shares is illegal. The National Bank of Lithuania published a warning and sent a demand to the Prosecutor General's Office to conduct an investigation. I began to be suspected of fraud, illegal funding activity, and then (once again!) espionage. In fact, this time, it was in favor of Russia, which had supposedly decided to build a testing ground next to a NATO airfield two kilometers from Šiauliai for this purpose in order to spy on them, and possibly even shoot down planes with the help of the intelligent control systems of our uPods.

Rumors flew that string transport was in fact a KGB project, and that engineer Unitsky is only the cover name for their intelligence operation to penetrate the West. There was a lot of this sort of nonsense on the internet and in the newspapers – it was a real national scandal. A criminal case was opened; to be sure, at first, I was involved as a witness and only later as a suspect. I realized that at any moment, for example, in giving testimony, I could be requalified as a suspect and immediately arrested. And while sitting in a cell, I would automatically become a criminal and then I would never be able to prove anything to anyone.

2014. National flags of Belarus and Lithuania on the desk as a tribute to these countries

The intelligence agencies trailed us, listening in on our cell phones. Our computers were confiscated, including our personal ones – from the home we were renting in Vilnius. Three people broke into our home, then sat in the bushes, and waited for Nadya to come in the front door with keys in her hands. I was bewildered.

People in the know told me that I should leave Lithuania as quickly as possible. Everyone could see that it was an issue of a deliberate, well-organized persecution. I didn't know of anything I could be guilty of, and no one could prove any of the charges ascribed to me. It was hinted that they have other means of pressure – if necessary, they will simply plant ammunition or drugs on you. I got into the car, took Nadya and the children, and that very same day drove to Belarus. This was the end of December 2014. Later I learned that one pro-government newspaper had directly called for my arrest as an international con man and fraudster and had even learned by some means where I could be found – at the Vilnius Airport. The fact is, not long before these events, our family had intended to fly to Egypt for the New Year's holiday, and we had bought tours and tickets. So that was how the newspaper even showed the flight number and the time of the plane's departure. Naturally, in this situation, Nadya and I didn't feel like going on vacation anymore.

Today, justice has been restored in part. The investigation, which lasted more than three years, proved the entire falsity of the suspicions directed at me. Essentially, it was a very cleverly played farce, which forced me to leave the country and abandon the project for a minimum of two years. Possibly, even longer. In some countries, to this day I am accused of crimes in Lithuania that I never committed.

Even the failed plot to brand me as an international fraudster even today for many is an argument not to trust engineer Unitsky. Ever since, attempts have not ceased to accuse me of lying and the wish to misappropriate someone's money under the pretext of creating some deliberately dysfunctional transport technology. If we evaluate this from the perspective of our unscrupulous competitors, they have achieved a very substantial result.

The competitors are primarily companies that have long ago staked out for themselves a place in the market of transportation services and do not wish to see new players appear. There are many such companies and they are all stronger than me in their financial lobbying capabilities. When we came to Lithuania, representatives of Siemens were actively working there proposing to build a rapid railroad across the entire Baltics for €20 billion. Meanwhile, I said in an interview that we were capable of implementing such a project for €2 billion. There is a great likelihood that this entire commotion emanated from them, since I, with my more efficient and inexpensive string transport, literally stood in their way. The following is indication that a very strong player was behind this entire scandal: the Minister of Transport, the Prime Minister, the National Bank, the Prosecutor General, the intelligence agencies, and even the President of Lithuania became involved in the campaign against me. On the other hand, it's nice that not they but I won – a simple engineer from Belarus.

From the investigation materials I learned that the betrayal had come from those closest to me. Those who should have protected me and helped me. Two Lithuanians whom I had hired as my deputies and who later even made a family – they got married. I gave them a salary of $5,000 per month (which is a lot for Lithuania), an expensive car to use, helped them buy housing, and passed over to them several assets of the companies. In return they began to write denunciations of me to the prosecutor's office. Possibly, they had been infiltrated from the very outset by the intelligence services, since we had poorly understood what was in fact going on in the country, and how much Russians and everything to do with Russia was hated, although I am Belarusian, which is a completely different nation.

2014. Linear city (visualizations)

To Belarus, the Motherland

Someone who is clever with words said that real success is movement forward from failure to failure with ever-growing optimism. This is ascribed to Winston Churchill. I believe that consistency has been a determining trait of character and thinking in my life. As an engineer, as an inventor, I am convinced that for a person who clearly knows what he wants to achieve, there are no unsolvable problems, if his goal just doesn't contradict the laws of physics. If I know what I want, I am obliged to use all possible means to achieve the desired result, pass through all possible paths until I find the only true one, making attempt after attempt until I achieve success.

Out of millions of inventions, only a few will have real value; out of a million solutions, only a few will turn out to be workable. Yet they are what change the world, opening up new opportunities for people, enabling them to do what once seemed impossible; to cross thousands of kilometers in a few hours; to transmit information from one continent to another in factions of a second; to explore space and other planets. Only by consistently moving toward the intended goal can make something be achieved. This movement forward, no matter how hard it may be, will bring a painful pleasure, because you know that every step, no matter how difficult it may be, every fall, no matter how painful it may seem, every failure, no matter how hard it may seem, and every defeat, no matter how terrible it may be, brings you closer to your goal.

I returned to Belarus as a fugitive. For the three years that the investigation continued, I could not travel to Europe, fearing arrest – according to some information, I was declared wanted through Interpol. Thus, I was not able to attend the premiere of the first full-fledged examples of string transport rolling stock which took place in 2016 at the InnoTrans exhibition in Berlin. In fact, there was still a long way to go before that. In 2015, I somehow managed to obtain some abandoned land, a former tank range soaked with gunpowder and diesel fuel, to build an experimental demonstration center not far from Minsk, in Maryina Gorka. The funding of it, like everything in general, was very difficult.

No sooner did I register the "Unibus" company in the Mogilev Free Economic Zone, hundreds of angry letters were showered on the administration demanding to jail me or expel me from the country as a swindler and Russian spy who had a criminal case on him in Lithuania.

As a result, I was forced to close "Unibus," although the issue of the allocation of the 40 hectares of land had already been decided.

2015. City of Maryina Gorka. EcoTechnoPark: that was the beginning

The Lithuanian scandal had followed me back home to my Motherland. The Belarusian press acted no worse than their Western colleagues and met me with headlines like “In Mogilev a Resident Has Been Registered Who Was Kicked Out of Lithuania.”

The investors did not understand what was going on, although I tried to explain the situation from my position. I published an open letter to the president of Lithuania and posted explanations on websites that we had created to promote the project. All that I could do was demonstrate the injustice of what had happened, explain my real motives and purposes. Yet again I tried to explain that I offered Lithuania hundreds and even thousands of jobs in the future, millions or even billions of tax and investment revenue for the economy, and the status of a world center for innovations in the field of transport technologies. Today, Belarus, which met me halfway, despite all the slander from Western neighbors, has already received much of this.

On issues related to attracting investment, Andrei Khovratov helped me. At that time, he was the Director of a specific organization which had as its goal the increase of ordinary people’s financial literary. He wanted ordinary people to take part in the distribution of global cash flows. As a business trainer, he wanted to teach them how to do this. He tried to make the world more just and likely more right. I wished the same thing as an engineer who proposed technical solutions for this. Our interests coincided. Even back when I had been in Moscow, before Lithuania, he had called me to introduce himself. We spoke for about an hour. He immediately made the decision to get involved. It is worth noting that Andrei got the idea of establishing contact with me only because three people had insistently recommended that he have nothing to do with the scammer Unitsky.

This person, who had made it his goal to become a second Warren Buffet, from our very first conversation demonstrated an inclination to think and act independently, without looking over his shoulder at the opinion of others around him. We had that in common as well, although later it was for this reason that we parted. After a while, our views on how to build a business also parted.

The further, the more his methods of attracting investments did not suit me, and in the end I publicly announced the termination of cooperation with Andrei. He became busy with some projects of his own.

2014. City of Minsk. International Scientific and Technical Conference “SkyWay Technology as the Core of Eurasian Development”

2015. Offshore section of the route with sagging track structure (visualization)

2015. String transport (visualization)

He even created his own cryptocurrency using my name in its name, although I had nothing to do with it. Then he was arrested for something… After that, I didn’t follow his fate. Apparently, we parted in a timely manner. Life has given me a lesson. However, Khovratov has an unconditional merit. He has created an enormous network of investors working on the principle of multi-level marketing. All these people helped us a lot, for which they got the rights to part of the technology. Another similar network was organized by an investment fund led by Evgeni Kudryashov. I am firmly convinced that his motives are just as noble. In total, hundreds of thousands of people who followed me have invested in string transport. I am convinced that all the efforts they have made were all correct. Today, this has become clear. Back then, they all simply believed in me, for which I am enormously grateful to them.

Construction of EcoTechnoPark – Center for Development, International Expertise, and Certification of String Transport

I stood alone in the field among overgrown, impassable weeds of the former tank range and thought that this attempt may turn out to be the last in my life. With tears in my eyes I wailed to the skies, "God, what should I do? Help me or at least let me come to my senses!" I had suffered yet another failure then, it would have turned out to be fatal for me – I would have looked like a schemer and a scammer. For now, I already had serious obligations to my investors, I couldn't let them down. I had embarked on a path which could have two outcomes – victory or shame. I was 65 years old, and time had ruthlessly gained the upper hand. In fact, age had not reduced my ability to work; just as before I rose at dawn and went to bed late, working practically nonstop. If time is not stopped and not turned back, then at least you can dispose of what you have in order to manage to do as much as possible. From childhood, my life had been true to that principle.

I knew that I had to work a lot and work constantly. I had to hire designers once again. I had to build and demonstrate string transport systems and operations, propose and work over possible projects, and visualize what had been conceived. Investors had to be shown what their money was going to.

We began construction even before we obtained all the necessary permits. Not a single day could be lost. In doing so, we publicized through the internet the process of mounting string systems, realizing that this could not help being noticed by the authorities and if they wished, they could put an end to everything. We were counting on the fact that among them there would appear someone who understood the whole enormity of what had been conceived, or, on the contrary, would not ascribe any significance to our activity. We hoped for the slowness of the machinery of state. We hoped for success.

All of the cash that came to us from the funds were immediately put to use. There was not enough money. We had to increase the staff of designers, but there was nothing to pay even to those already staying with us. The employees had not received their pay for several months. Many had left. Those who remained, in my view, understood something

2015. EcoTechnoPark. It's a start!

that the others had not realized – although, possibly, I had somewhat overestimated them. Even now, when we had substantial achievements and no one doubted the workability of the string systems, many did not understand why something had to be changed; they used to say, "I don't know anything about it," and didn't want to change anything themselves and become better, to work more professionally and productively.

After we had confirmed the viability of the concept and demonstrated several types of transportation and infrastructure systems, the majority of people became flustered. It turned out that their vision of the task amounted to building some string track and forcing some vehicle to move along it. "Well, it went, didn't it?" It remains a mystery what, in their opinion, should occur next. Everyone should rush to buy systems that were only prototypes essentially? Due to the lack of understanding of some elementary things, I had to fire a great many people myself. Each time this was difficult for me. Each time I expected changes and suffered, if I could put it that way, until the end. At the very beginning, I trusted the employee fully and without reservation, and gradually reached the point of total lack of faith, simply observing how he showed himself.

When I meet a person, he is always like a clean sheet of paper for me. And it isn't important what is said or written about him because that may be his enemies and ill-wishers (everyone has them). I don't make guesses about who is in front of me, I try not to give any biased assessments, but I judge by his words, actions, deeds, and behavior, and even thoughts that sooner or later manifest themselves in conversation. Each person draws his own portrait himself, with individual brush strokes, now in bright colors, now in dark, and sometimes black. If on this formerly clean sheet of paper there is more black than bright (green, yellow, blue) then I part ways with such a person. It depends on him whether this happens. Despite everything, I have kept my faith in people.

2015–2016. Different phases of construction of EcoTechnoPark

As an inventor testing all possible options, I am prepared to give anyone a chance to prove themselves, whoever demonstrates to me clarity of vision and the means of achieving it. And I always help as much as I can. Of course, this concerns only cases where the goal indicated coincides with my own. It is such people who take the initiative and move toward their goal whom I was seeking then. I met with each one and talked with him personally. Now, when there are more than 1,000 people working in design bureaus, I can't afford to do that anymore. Likely that is partly the reason for a growing formalism regarding the work – in fact, it is inevitable with the growth of a company. Another important reason is the rigidity peculiar to designers to a greater extent than ordinary people.

When I began working in Belarus, I literally had to break everything down and explain things simply, even truths that were obvious to me. I had to create not just a design bureau and other scientific research and project divisions (there are now more than 50 of them at Unitsky String Technologies Inc.) to solve typical problems but also my own design, project, and scientific engineering schools to solve innovation problems in the field of string technologies. Much of what the professionals who came to us had learned in universities turned out to be inapplicable to string systems either because it contradicted the principles of their work or required a broader and comprehensive view.

2015. Zero Kilometer of string roads opens on the territory of the future EcoTechnoPark

The main thing I encountered was the narrowness of the views of mechanics and builders, each in their specialization. Actually, not a single designer was prepared to work on the creation of transport complexes that included innovation systems: rolling stock – electric rail vehicles on steel wheels; transport overpass – prestressed, uncut, and statically indeterminate; second level infrastructure – passenger stations, cargo terminals, switches, depots, intelligent control systems as well as power supply and communication systems. All the engineers were concentrated on one thing. As a consequence, I often had to perform the role of supervisor in most cases.

All the fundamental engineering solutions in string technologies are mine, often made and implemented despite the fierce defensiveness of designers. As the General Designer, I had to break through the rigidity and incomprehension (sometimes very brutal and uncompromising) of those whom I paid a salary. On that basis, all applications for the inventions submitted on string technologies in the last five years – and there are more than 100 of them – are my own, without co-authors.

During the construction of the first anchoring structure combined with a passenger station, when I saw the volume of earthworks, the volume of reinforced concrete and tonnage of armature, I literally became sick. It was on September 1, 2015. Our office had recently moved to a new building; we already had 100 engineers working for us; the first bureaus had been created, including the project designing bureaus. One of the first jobs was the drafting of the anchoring structure. And here I saw a total absence of understanding of how this construction worked, primarily for tipping and shifting in the ground from the effect of temperature and pre-tension of strings with a force of about 1,000 tons – the weight of 20 heavy tanks. Taking into account such a great stress, the designers stupidly planned a large-size structure, in order to pour more concrete and weigh down the station. Naturally, it grew much more expensive.

We never had extra funds, we have always worked and still work on the fly, without any financial reserves. That means any increase in the cost of any works can lead to an unplanned halt in construction for an indefinite period. But the special nature of crowd-investing means that for successful attraction of investments, you have to constantly show results. Halting at the intermediate stage where we were then, and even now, would mean a lowering of the amounts of funding which even then were insufficient. That is why I always have to economize in everything and constantly look for new solutions so as to do as much as possible and as quickly as possible for less funds.

I at once called EcoTechnoPark and stopped all the works. Then I went downstairs to my office on the floor below, took a clean sheet of paper and a pencil. In 10 minutes, a new concept for the anchoring structure was ready. Once again, I went up to the design bureau and gave them the sketch of the anchoring structure, saying, "You have two days to redo the drawings. The construction has been halted, and we are suffering losses. Each day of work stoppage costs €20,000. If you don't do this, you will all be fired, the entire design bureau. And you will pay for the losses out of your own pocket."

Two days later, on a weekend, the drawings were ready. We saved about 1,000 tons of concrete and 98 tons of armature, which is about $500,000. That was just on one anchoring structure. Yet the drafting continued poorly; therefore, the entire design bureau and the Director were fired. The personnel problem to this day remains one of the most substantive. At the beginning of the way, it had been even more severe.

Unitsky String Technologies Inc. is an innovative company with an ambiguous image about which the press and all kinds of trolls on the internet write constantly. People do not want to come to work for us as the funding is not stable and no one, including myself, can give a guarantee that there will be money tomorrow. No recommendations are in effect. The deadlines are tight and there is no time for a lead-up.

2016. City of Minsk. Manufacture and assembly of the first rolling stock prototypes of the fourth generation of string vehicles transport

For that reason, engineers are taken “from the street” – there were no others – and their level and qualification could only be tested on the job. Only now, three years after the events described, I can say that we have one of the strongest engineering teams in Belarus, even stronger than those of the Belarusian machine-building giants such as MAZ [Minsk Automobile Plant] and BelAZ [Belarusian Automobile Plant]. Four intensive years of daily efforts were needed for this, and I had to fire more than 400 engineers (some with an argument and through lawsuits in court). Some of them, having caused damage to the company in the hundreds of thousands of dollars, even filed lawsuits against it, seeking “justice.” Labor legislation, as a rule, stands on the side of the employee, not the employer.

I couldn’t keep an eye on everything, of course. As a result, once again, mistakes were made. Some of them could be called curiosities if they didn’t demonstrate the stupidity and narrow-mindedness of professional views and had not reached the critical point.

When the string rails were stretched on the first semi-rigid line in one of the anchoring structures, an embedded part was ripped out – the element to which the rail is attached and from which the tension force is distributed throughout the structure of the anchoring structure, in order to be transmitted to the foundation and to the ground. Pavel Vladyko performed this job (not an ordinary engineer but the Director of a railroad construction bureau) and had factored in only the horizontal load, failing to plan a sufficient margin of strength for the bending moment, although the rail was attached in cantilevered fashion relatively to the load-bearing plate. He had designed the embedded detail made of the weakest brand of steel – St3 – although the tension in the layer exceeds its stability by a factor of nearly four.

I happened to be at the construction site, went up to the anchoring structure, and heard the cracking under the cable tension. I called over the project designer: he was there as well and was monitoring the tension of cables.

“Pavel, can you hear how the embedded part is cracking? That means the concrete is separating from the metal, which should not be happening. And in general, the junction, which has to take on a load of 200 tons looks visually weak. It won’t hold. Did you calculate everything correctly?”

“Anatoli, of course, I calculated everything. I’d bet my head on it. But the cracking isn’t necessarily in the embedded part.”

About 10 minutes later, a sharp clap was heard. I ran up to the anchoring structure – about three meters of the embedded detail along with the anchor junction had torn out of the load-bearing plate. With a load three times less than the calculated one. The damage, direct and indirect, amounted to at least a million dollars for us. Pavel was fired, but a year later he went to some members of the yellow press and told them “the whole truth” about the “con man Unitsky” and “his financial pyramid.” For many years, we have tried to take Pavel to court, which is hard to do in Belarus, where it is customary to punish other things. For example, you can land in jail for stealing a chicken that cost a few dollars. But for causing damage worth millions of dollars, which is no better than robbery, it is virtually impossible to punish someone.

We lost half a year, if not more. All of the tricks which we had been forced to do to solve this problem – reinforcing the embedded detail and the load-bearing plate; anchoring of cables cut inside the rail hull; disruption of the electrical insulation of the rails throughout the whole length and much else caused additional expenditures of at least $500,000. Due to the mistake that had been made, we could not demonstrate what had been announced: a perfectly smooth rail with anti-bend. In November 2016, we demonstrated a track which was essentially in danger of collapse. Our vehicle moved at a speed of more than 20 kilometers per hour, the rails underneath it bent, because the strings in it were not stretched, and there was no concrete.

Everything looked underdone. I was put in a rather awkward position and was forced to supply additional explanations. That incident, unfortunately, was not the only one.

The designers of the rolling stock often acted without coordinating with the drafters of the overpass. For example, that very same anchoring structure (the station) in which the embedded part had torn out, turned out to be so poorly conceived that its width allowed only a few vehicles we worked on to enter it – the narrowest – a two-seat uBike and a 14-passenger uBus. The track was impossible for wider uCars. In most cases, the designers concentrated on one thing, forgetting about the other components of the designed complexes. None of the employees hired were able to work as a whole – to hold the entire picture of string transport in their heads – more than a dozen systems and more than a hundred sub-systems – and even today cannot do this.

The fact that the General Designer solves all our engineering problems is overall correct – that's my area of responsibility. I'm the one who conceived the string technologies, through many decades of suffering. I was the one who created the investment system, founded the Group of companies, brought in the investors, gathered together more than 1,000 engineers and taught them a lot. And naturally, I must be responsible for all of this. However, the difficulties that I had to encounter, were not created by me. It often all generally depended on external circumstances, such as the work of subcontractors. For example, we invited specialists in prestressed structures; it was necessary to stretch the armature cable inside the rail hull. The contractors we hired quit after a while, saying it was an impossible task. I had to develop the technology for stretching independently.

2016. EcoTechnoPark. Stretching the string rail and start of running tests of light transport system and two-seat string vehicle

2017. EcoTechnoPark. Start of running tests of 14-passenger string vehicle.
Under the track structure to my left is Dmitri Teryokhin, one of the main investors of the project within the framework of which the first test site for string transport was built in Ozyory in 2001

2017. EcoTechnoPark. Construction of a cargo route

2017–2019. EcoTechnoPark

We purchased collet anchors from a company with a worldwide reputation that guaranteed quality, since it is involved even in the construction of nuclear power stations, where there are very high requirements for design and quality of construction. But these collet anchors broke at the very first attempt to hold the calculated load – there were stress concentrators in them since they were designed incorrectly.

Then we designed and manufactured our own anchors which have stood for more than five years and will stand for another 100 years. There were numerous such things and circumstances that seemed trivial at first glance. And each detail like that had significance.

Attitude Towards Details

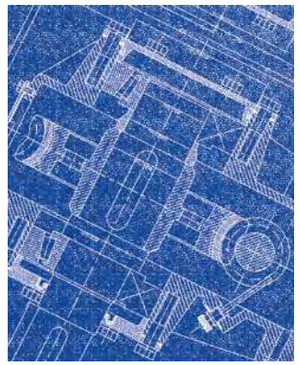
There are no details in technology. Especially when it is related to people's health and safety. Transportation in this regard is particularly illustrative: terrible catastrophes have occurred and will continue to occur due to a designer's tiny miscalculations and mistakes.

When the first full-metal planes began to be built, the company Boeing made rectangular portholes in the hull, simply sawing them out of aluminum sheets. Once during a flight, an aircraft broke up in the air. Everyone was killed. The flights of other planes were halted. They were all in hazardous condition – from vibrations due to overloads, cracks appeared in the corners of the portholes in the hull, which grew in time and became longer. Then the hull broke apart like an avalanche. In the sharp corner of any stressed structural element, there are always stress concentrators, in which the stresses are increased at times. These can be removed – for example, by making a curvature of the necessary radius. I must constantly remind our designers of this obligatory requirement.

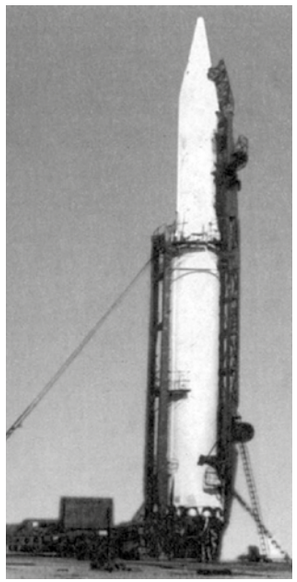
There should be no concentrators of stress anywhere, not in the rails and the string; not in the wheels and the uBus frame; not in the support junction and the foundation of the anchoring structure or supporting tower. This is particularly true of welding – not only metal is weakened in welding due to changes in its structure and crystal lattice, but the high temperature during welding leads to a local change in the dimensions of the part and the appearance of temperature stresses, sometimes quite significant.

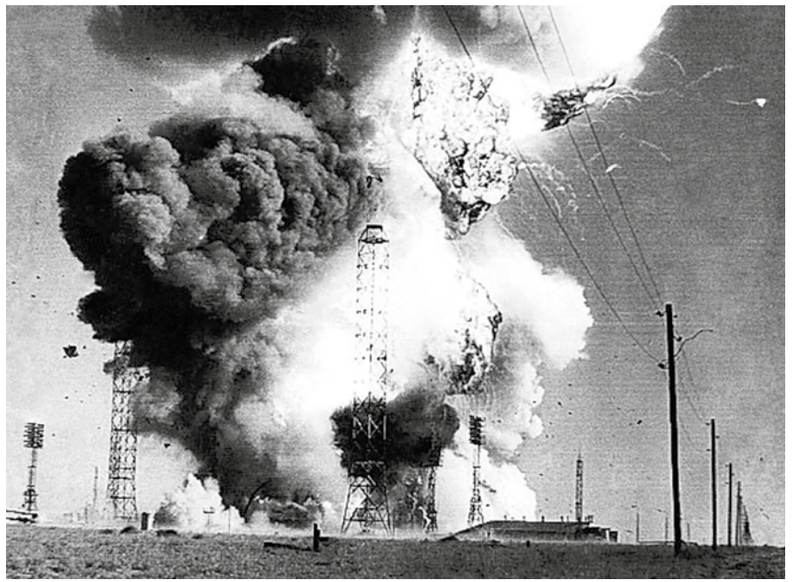
Even an extra point on a sketch or the absence of it can lead to a tragedy. I recall the story of what happened at the Baikonur Cosmodrome. In the Soviet era, where there were no computers or Xerox machines yet, sketches were made by hand using pencil, whatman paper, and a drafting board. In a single copy. So as to get a copy, a tracer (there was also such a profession) manually transferred the sketching ink on to transparent tracing paper. Then these sketches were transferred from the tracing paper on special machines to get the necessary number of copies on color-sensitive paper. Incidentally, the drawings were red in color and smelled strongly of ammonia (it was used in copying technology at that time).

So, when a navigation system for the latest launch vehicle was designed, its electrical diagram was made incorrectly. In the places where the wires had to be welded to each other, there were dots. The tracer failed to transfer one of the dots from the sketch to the tracing paper.



Blueprint – a copy or reproduction of a technical drawing obtained using contact printing on light-sensitive paper. The technology was widespread until the late 1970s. Two methods were used in the production of copies: cyanotype and later diazotype. The cyanotype produced an image with white lines on a blue background. This is related to the name "blueprint," which later remained, although the color of the lines and background changed. The diazotype mentioned by Anatoli Unitsky produced dark lines on a background varying from pink-lilac to pure white by color.





1960. Tragedy at Baikonur

So, two wires out of thousands were not welded together. The next rocket was launched from Baikonur with several military satellites on board. When the first stage is launched, it would fire back with cartridges in its normal regimen. But on this launch, however, the cartridges didn't work – they didn't receive the signal to fire. The first stage did not separate. The second stage was activated, and the launch vehicle exploded. There was about a billion dollars in losses. That was the cost of a single dot.

I have a special attitude toward dots. Again, in the Soviet era, in designing a typewriter, one of the designers decided to "improve" it – why there should be an extra key and an unnecessary lever? There were already more than 50 of them along with punctuation marks and numerals. Let's combine the letters "e" and "ë" in Russian. Thus, the stressed "e" or "ë" disappeared from typewriters and printing presses, although the "ë" continued to exist in the Russian language. This attitude leads to the degradation of the Russian language; therefore, I require that all our employees respect the Russian language and all documents in our company are written correctly, just like this book "The World Engineer."

I will cite yet another example of how important details are. Alexander Yakovlev drafted a new airplane Yak-42 in a design bureau. This was a good plane – India alone planned to buy about a hundred of them. In the design of the Yak-42, the stabilizers were controlled by a screw jack, that is, a "screw – nut" pair, which was bearing the entire load. In terms of strength, everything was normal, but the screw and nut should withstand millions of cycles of loads, and the metal should not get "tired," change its structure and wear out after a dozen flights. But they decided to economize on the stand trials – instead of millions of cycles of load they got by with thousands. The jack passed them well – that meant everything was normal.

This was the end of June 1982. I was fishing then in the Pripyat River along with my father and his friends, including the Deputy Chairman of the Gomel Executive Committee, now called the Deputy Governor.

We went on vacation for a few weeks not to the south but to fish in the cleanest river with the most abundance of fish in Europe. We lived in tents and an RV. At that time, the Yak-42 was making one of its first flights from Leningrad to Kiev. The route lay over the place where we had pitched our tent. The plane began to lower its altitude – it moved to another level. Due to the resulting overloads, although they were standard, the stabilizer drive failed – the thread was severed due to wear. The plane went into a nosedive and in a few seconds began to fall apart almost over our heads. Passengers were blown out of the cabin, their clothes were blown off, and they fell to the ground naked. Mothers, in an attempt to save their children, fell with them in their arms. No one was saved – 132 people were killed. My father's friend later told us of the reasons for the accident (he was recalled from vacation and joined a government commission to investigate the crash which had taken place above the Belarusian territory).

The thoroughness of the technology of string transport is such that the string-rail overpass should stand 100 years. During this time, it will experience hundreds of millions of loading cycles – running of wheels and vehicles. There should not be any concentrators of tension throughout the entire structure (not in a single one of the elements of the overpass!); even so, every joint, every bolt and screw, every welded seam must hold and not lose strength and stability. And all designers who take part in designing of transportation and infrastructure complexes know that. I never stop repeating to them again and again the point of the Hippocratic oath, applicable to engineers as well: "Do no harm to others with your ill-conceived solutions!"

Obviously, not everything can be predicted. Especially in those fields where you are a pioneer. Even in space travel there have been cases that were seemingly easy to foresee. For example, due to the absence of atmospheric pressure, the pressure suit of Alexey Leonov – the first person to go out into outer space – was inflated so that the cosmonaut had difficulty returning to the ship. The suit had to be deflated, which was dangerous because of the excessive pressure reduction in the equipment. The best minds of the Soviet Union could not calculate this, experimenting and training under water, where there is pressure. In string transport, we are also pioneers. No one has done anything like this before us. Fortunately, the conditions under which we conduct experiments are as close as possible to the real conditions in which the technology will be utilized in the future. But despite this, during the tests various force majeure arose several times.

Details that often play a decisive role in the work of technology and the fates of people who depend on it can have a fatal outcome even for business. In our case, the investors did not want to know anything about the difficulties that arose. They expected results in the shortest possible time according to the plans indicated by me which were made, for understandable reasons, according to the most optimistic of possible scenarios. Any minor oversight (a detail) was magnified by criticism and became an argument in the hands of those who oppose the engineer Unitsky, starting from Lithuania. And they tracked every of my steps.

First, they said I did not intend to build anything but just wanted to collect money from naive people who trusted me. I began the construction rather briskly, taking into account the constant shortage of funds and the paces. Then they began to claim that the things that were built could not function, but it did work. They said it didn't work the way it had been promised, it doesn't get to the promised speeds, the rails are not smooth. But we did that as well. Then they proclaimed that no one would buy the product that we have created. Today Dubai and many other countries have stated their intention to acquire our product. They – these anonymous enemies – will have nothing left but to go in a circle and repeat the previously stated arguments in new ways and in new variations. We will go on, despite everything. And yet their voices remain heard, and too much effort was wasted on fighting them, not to mention this at least in brief here.

On Difficulties. Not Technical but Economic and Social

In 2016, a man named Konstantin Sidorovich came to my office and introduced himself as the Editor of the "Technology" section of Onliner, one of the largest news portals in Belarus. We talked for more than two hours. He did not listen with any particular attention. He was somewhat tired and mainly looked at his mobile phone. He asked the usual questions, which I had answered for various people hundreds of times during various periods. He was little interested in the technology but focused more on the sources of the money. At that time, I had not been involved in that side of the company's activity for a long time and was concentrating on the engineering work. Even so, I said something about this as well. I explained the system on which crowd-investing is built. I had nothing to hide. I was sincere. The next day, I took him to the production facility and the construction site at EcoTechnoPark in Maryina Gorka.

Several months later, on the eve of a premiere in Berlin of our first vehicles, a hit piece came out. Once again, I read about myself as an international con man and a vehement fantasist, builder of financial pyramids and the Potemkin village in Maryina Gorka, where everything is made of plywood by illiterate and crooked-armed pensioners. To be sure, this time I got by without being accused of espionage, but in thousands of comments, I was called many things, including a blue-faced alcoholic

2016. A lot of issues were resolved in this General Designer's office

2016. City of Berlin. Premier of rolling stock prototypes at InnoTrans, one of the world's largest specialized transport exhibitions

who for some reason had not been put in prison yet or expelled from Belarus as he was from Lithuania. "Why don't the KGB or the President react on this?" the paid trolls wailed. And this wave of dark, dirty, and distorted negative material went all over the country – to all the bureaucrats and engineers whom we needed so greatly, to our investors, who followed my every step, and of course other media whose opinion could be decisive. It seemed the Lithuanian story was repeating itself.

The first problems followed immediately afterwards. The models of the rolling stock which we had sent to Germany for the exhibit were held up at the border. I was told that some sort of people in plainclothes had come and carefully studied the freight. The planned presentation could have been cancelled. Everything could have turned to ashes, and there was nowhere to turn for support. There was only one thing left to do: express my position and make a statement of protest.

We wrote an open letter to the Ministry of Information of Belarus. We obtained the signatures of about 200 employees of our company (almost all those who worked for us at that time). I began to prepare documents to file a lawsuit to defend my honor and dignity. Meanwhile, the vehicle got through customs anyway. That was a good sign. At least, it became clear that the authorities would not shoot from the hip at the first sign of a press attack, as they did in Europe. Nevertheless, as we discovered later, they still heeded the slander and mud-slinging at me to some extent.

The trial was a total farce. The main buffoon at it was an expert philologist who represented the interests of the journalist. The headline of the article, put in quotes, and thus representing a quote from me, was as following: "Elon Musk is bullshit. Bring me the cash." I never said such a thing. The quotation marks were obvious libel. Two other experts, both with doctorates in philology, confirmed this. Nevertheless, a woman of about 50 years, who appeared to be heavily hung-over (the respondent's expert), found her argument. "Let us say two crates of vodka were stolen. What difference does it make how many bottles are in it, 10 or 20? It is the same here. It does not matter if Unitsky said this or not. He meant it, in fact." The judge accepted this argumentation, and my lawsuit was rejected. At the courthouse, I was forced to stand, while the respondent and his lawyer sat. Only one chair was found for the plaintiff – for his lawyer. When I asked for another one, I was told that the court does not have any extra chairs, although there were many. I went out in the hallway, took a chair, and sat down next to my lawyer, not far from the judge.

The verdict was that the article's author simply expressed his opinion and the text did not contain any insults of me. Then, my appeal was turned down. To this day, I have not been able to bring this journalist to justice. I intend to go to international courts. In fact, this news portal has already published five materials of this type, continuing with impunity to accuse me of fraud and the building of Potemkin villages, despite all the obvious successes.

Under the influence of this sell-out yellow press, many people in Belarus formed the expected opinion of me and what I am doing. Not surprisingly but importantly, among them is the former Belarusian Minister of Transport. When I first met him at a trade exhibit and invited him to come and see our stand, he backed away from me as if I had the plague, saying, "As an engineer, I don't believe in it. No wonder Onliner writes ill of you. You are con men." Later, as part of an unofficial government delegation, he visited the EcoTechnoPark demonstration center, saw the vehicle in operation with his own eyes, but in the presence of the Vice Premiere of the government and the leadership of the National Academy of Sciences, he said: "No one needs this, there are no innovations here, and Unitsky is a criminal." And all because there are no ties, and the rails are strange somehow, not like a railroad. I was told that later it reached the point that a bureaucrat who saw an article about me in a magazine on the board of a state airline demanded that the entire print must be confiscated, and if that is not possible, to tear out the pages with the article from the publication. Although this magazine was in Air Force One.

Another government official who I had known since my time working at the Institute for Mechanics of Metal-Polymer Systems, an academician, was at first delighted when he saw what we had created at that same Minsk exhibition. He left an enthusiastic comment in the guest book. Several days later, apparently after seeking the advice of colleagues and reading articles by Belarusian journalists and having learned the opinion of the designer Unitsky from the Minister of Transport, he called me personally and asked me to tear the page with his signature and comment out of the book. I did not do that. The note remains to this day, but we never received any tangible support from the Academy of Sciences or from the government. Moreover, when we requested an allocation of a parcel of land to extend the test high-speed track for 20 kilometers, to reach a speed of 500 kilometers per hour, we were refused. All 16 sectoral approvals – with signatures and stamps from energy and communications ministers to Emercom and the Fire Department had been obtained. However, bureaucrats, especially the members of the Academy of Sciences, were very worried that because of the construction of string track, numerous birds would be killed, and valuable species of trees would be chopped down in laying the track across a swamp. Perhaps this was a question of some kind of flying swamp muskrats or special types of swamp palms? I never did understand such reasoning. Especially when we had planted more than 20,000 trees and bushes, including walnuts, peaches, blueberries, and ginseng on an empty lot – a former tank range. And nearby, on the territory of the Unitsky's Farm Enterprise, which is also a former tank range, there is a built stable, a fenced plot for dozens of deer and fallow deer, and an organized zoo with more than 60 species of animals and birds, with the exotic ones among them. They say this is the best zoo in Belarus.

This was the cautious Belarusian nomenklatura, who say neither yes nor no, who think according to the principle "if only nothing bad happens." However, officials are the same everywhere, in every country of the world where I worked – and this is more than 10 states. In fact, I will say it again: I am grateful to the government that did not cause me any particular hindrances and enabled me to do what was done. Although there was an order that was fulfilled by the press, that is obvious. I was told it came from Lithuania, and I have no reason to disbelieve this. The identity of the person interested in having nothing come

2016. City of Minsk. Stand of string transport
at the exhibition "Transport and Logistics – 2016." With my family

of my work was also known to me. Most likely, it was someone who wanted a contract with Dubai to be theirs, like other contracts that we intended to get. It might even be Siemens again. Competition is very high, like the demands placed by the modern market on transportation systems. It is quite easy to throw your competitor over the bridge or be thrown here, and this does not necessarily have to be done in the literal, physical sense, as, for example, the competitors did with an inventor by the last name of Diesel.

Henry Ford, whose goals were similar to mine ones found it far simpler – he made only automobiles and did not get involved in asphalt, bridges, interchanges, gas stations, and automated navigation systems. Who was his competitor? The cart, the stagecoach, the carriage, vehicles drawn along a dirt road by a horse – such a competitor is easily overtaken in the literal and figurative sense.

We are creating a new branch of industry, and not as a science but as a market product, which must be purchased from us. It is a very complex, even super-complex product exceeding the world's analogies in many times. Our transport systems incorporate fundamentally new rail electric vehicle, the prestressed string-rail overpass and second level infrastructure – stops, stations, freight terminals, switches, repair shops, power supply, communications, an intelligent control system, and much more besides. And if there is something

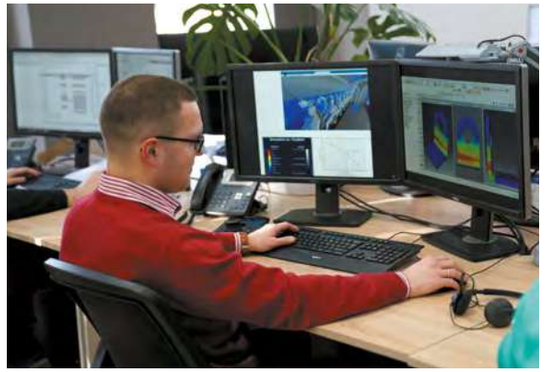
from this list that we don't create, or we do create and demonstrate only in part, or it doesn't meet high modern world-class standards, or what is more, doesn't exceed them, no one will acquire our product.

And our competitors are not just some kind of model of an automobile (for example, the Tesla electric car) but the world automobile industry as a whole with all its transportation infrastructure with its century-long history; and not just some sort of tram but the entire world railroad industry, again, with all the transport and accompanying infrastructure. The competitors themselves also understand this perfectly well, but even so, there are examples in history where a new transport branch practically forced out the old. None of today's market leaders wish to allow a repeat of an analogous scenario.

Aside from the corporative interests, there exist social trends as well which run counter to what we have done. I encounter them in one way or another at various time, but I suppose I never felt their resistance so directly as I have in recent years, when I had to work with public opinion a great deal.

What I have created in Belarus with the support of hundreds of thousands of investors is humanism in the best sense of the word. More than 1,000 highly-qualified jobs, hundreds of millions of dollars of foreign investment in the country, tens of millions of dollars in additional taxes, the foundation of our own science, engineering, and design school without analogies in the world of industry-making innovations. The purpose of all this is the saving of human lives. The prevention of millions of premature deaths that annually occur on roads; the prospect of building transportation that does not harm nature. Unfortunately, most people turn out to be simply incapable of understanding such motives.

2019. EcoTechnoPark. Nature, transport, and man are in harmony with each other



2017–2018. Company at work

The consumer society lives on a principle reminiscent of mold in a Petri dish – destroying limited resources in the limited space which constitutes the biosphere, it confidently moves towards its demise from its own wastes. There are almost no serious attempts to change the situation either at the level of states or at the UN. Consumer demands are growing, and corporations are prepared to offer an even greater quantity of things, placing science at the service of their interests. Everything is oriented exclusively toward getting a profit. "Seize the moment, 'après nous, le déluge' (after us, the flood)." For such an attitude toward life to be accepted, corresponding values and priorities are imposed. The main thing is the individual person and not humankind; it is necessary to "take everything from life" as much as possible without giving anything in exchange. The consumer attitude towards things, typical of the perverted, is extended to mass

consciousness – a social pederasty. The worst thing about it is the rejection of the natural human striving to continue the race.

Following a superficial attitude toward life, which turns a person into a carefree one-day butterfly, a superficial attitude is also formed toward the ideas that determine the direction of civilization's development. The opposite is also true. For the modern intellectual, it is not important to penetrate the essence of a subject studied as deeply as possible but to establish as many connections as possible between the subject and other elements of reality. The connections are largely external, superficial, and for show. The modern intellectual is not ready to listen to anyone fully and calls on others to do the same.

After Friedrich Nietzsche, Karl Marx, and other bold thinkers who were capable of making decisions in the spiritual realm and whose decisions are linked by many to the events of World War II and other hellscapes of the 20th century, to speak about something seriously, to make a responsible intellectual choice became mauvais ton (bad tone). No. You have only to delicately indicate correlations and gently hint at possible options. God forbid you should fall into extremism! You should not speak in a categorical form! Such fear is the weakness of intellectuals, weakening modern society as a whole. I call this "intellectual imbecility" – the inability and unwillingness to see further than your nose and relying on your ostensible education. You encounter similar things in any university and any academy of sciences throughout the whole world. But I think, speak, and act in a different way, urging people to take responsibility, to make up their minds to change if not everything, then a lot. I am not afraid of saying that the world has been incorrectly organized, and I know what is necessary to do to correct the situation. Naturally, this provokes rejection in the absolute majority. On the other hand, innovations have never met with understanding from contemporaries and were forced to make their way with great difficulty. This is particularly characteristic of the transportation industry – it is the most conservative and the most corrupt.

A thousand years passed from the invention of the saddle and the bridle to their large-scale application. More than 100 years passed from the invention of the steam engine to the time the railroad began to develop actively. The same occurred with aviation – a large chunk of time lay between the first flight and the first commercial application of aircraft.

When one of the first steam engines was tested, a two-meter tall boxer walked ahead along the rails and threw off the embankment people with pitchforks who intended to stop this iron monster. Ordinary people thought the "fire-breathing monster" would be the reason for why the cows would cease to milk and the chickens to lay eggs, and the huts along the railroad would catch fire from the sparks flying out of the steam pipe.

When at the end of the 19th century, the prospects of air flight were discussed at the British Academy of Sciences, one of the most prominent scientific leaders of the time – Lord Kelvin – stated that an object heavier than air could not fly. The same Englishmen, in forecasting London's infrastructure development, predicted that its streets would be covered with a meter-thick layer of horse dung in 100 years due to the increase in the number of horses. What can be said then of rocket-building? Tsiolkovsky was considered the village idiot. Children threw stones at him when he rode by his bicycle. Even when the idea for the personal computer first arose, most experts tried to prove that such a thing would not be in demand; the designers had to apply quite a bit of effort to get it through. Today, technical innovations appear every day, but most of them are in the ordinary area of digital electronics. As before, few are capable of an innovational infrastructure breakthrough. And not only in the issue of implementing something fundamentally new but in the sense of its application.

2018. City of Berlin. International exhibition for transport technology and logistics "InnoTrans": the first demonstration of high-speed uPod to a general public

Court Trials

I did not cease my attempts to restore justice in the courts. Our lawyers conducted a dozen cases against the yellow press, against my former partners such as Uzlov, and even against the government of Lithuania, which had utterly without grounds suspected me of fraud and seized all my property and hope for the future. So far, there were only a few positive results, but from my experience I know that persistence can make miracles. Moreover, it is the only lawful method of fighting libel and injustice, which were destroying the cause of my whole life.

Many people had told me regarding the courts that it was not worth getting embroiled in litigation. “Dogs bark, the caravan moves on,” they said. I do not agree with this claim. The caravan goes along a worn path, and dogs let themselves be known from behind the fences. Let the dogs bark – there is no danger. We, however, by creating string transport, are pioneers, and the dogs do not just inundate us with barking but hurl themselves right at our feet and bite us. And if they are rabid? You can get infected and die. What then? To turn a blind eye to this means to put everything in jeopardy.

I have already spoken of the consequences of publications – what damage they cause us, how they undermine trust in us by our investors and partners. I wonder if Henry Ford would have been able to sell a lot of automobiles and in general create a new industry if the most read newspapers of the USA – the New York Times and the Washington Post for years wrote that he was a fraud and a swindler, that he was the creator of pyramid schemes that would collapse any minute, that he is a Russian spy and the son of Polish spies, that there are no innovations in his automobile, and that every buyer of a Ford car would get hundreds of threatening and insulting letters demanding they refrain from buying them? And in addition, if good specialists did not come to work at Ford under the pretext imposed by an unscrupulous press: “Your company is going to be closed soon anyway, and you’ll be put in jail.”

Courts throughout the whole world are called to uphold the existing order. And if that order is imperfect, then the justice they prescribe will be imperfect as well. It is not hard for any government to put anyone whom it finds undesirable in jail. Reasons will always be found. There are many examples of this. I would like our country to be an exception in protecting innovators, their honor and dignity. Unfortunately, such claims, which include my lawsuits, are rarely satisfied. For example, I went through this in Lithuania, where the court decision on the claim for the protection

2016. Justice and truth triumphed over the lies of former partners Uzlov and Dubatovka

of the honor and dignity of the scientist and entrepreneur Anatoli Unitsky said that Dr. Unitsky should be more tolerant and he needs to respond more adequately to criticism voiced in the free press.

The government usually is not interested in defending the dignity of its citizens, although there are exceptions. Judging from everything that has been done in recent years in the social sphere, it wants to see people ignorant, unsure of themselves, cowardly, and deprived of initiative. Obviously, it will be much easier to manage such people. In fact, I go to court not only to defend my dignity but to cut off attempts to rewrite history and others to appropriate what has been created by me.

My former partner Viktor Uzlov together with my former employee Igor Dubatovka started their own “string” transport. They called it “Uprail.” Essentially, from an engineering perspective, it was the same kind of nonsense as the monster that Kapitonov had spawned in Gostomel. To advance the project, they decided to use the test site in Ozyory which supposedly they themselves had built and which was the first model of their system. Recently, they photoshopped photographs of the track on their website, including the one from which they cut out my picture, and removed the logo from the simulator of the rolling stock (the “drop” and the “U” that my last name begins with), the rights to which belong to me. This original photograph was made in 2001 by my son Denis. He kept the negatives, as there were no digital cameras back then. We sued them in the Supreme Court of Belarus and won, publicly shaming the falsifiers, although they brought to court as many as five false witnesses who had to prove that it was Dubatovka and Uzlov who built the first test site of string transport in the Ozyory near Moscow, and not me. I think they did not forgive me for this, just as they did not forgive me in general for my success, which in their opinion should have gone to them. I am certain that an enormous part of the negativity spewed at me on the internet is ordered by Uzlov. Possibly the “exposes” in the Belarusian press are his doing as well.

Find six differences. Left – a photo from Anatoli Unitsky's personal archive taken in 2001. Right – a photo falsified by Victor Uzlov and Igor Dubatovka

The opposition to the development of string transport becomes stronger the more successes we achieve. Even though the true commissioners of such negative press remain in the shadows, what does surface indicates that these forces are quite influential. After we concluded an agreement with Dubai's Ministry of Transport and the Sheikh announced the approval of the project with use of our technology, on the same day in the comments on his Twitter account, a message appeared: "Assign your intelligence agencies to take a closer look at this project. It is widely known as fraudulent." The author of the commentary turned out to be Vitali Shuravko, the founder and co-owner of Onliner, one of the largest media sites in Belarus. Such "opinion leaders" as Shuravko, in my view, are no better than those who wrote the denunciation of my ancestors, who were then shot as enemies of the people. Must I, too, be punished by those denunciations for the fact that I worked more than others and did more than others, above all for Belarus?

To draw attention to the problem and simultaneously publicly express my position and my attitude toward what is happening, I wrote an open letter to Belarusian President Alexander Lukashenko. I asked him to investigate, if only for himself. Almost all the employees of our engineering company Unitsky String Technologies signed the letter (at that time there were more than 800 people). Many personally expressed support to me. After all, the nastiness coming from the press affected them, too. They were forced to catch sarcastic looks when they mentioned their workplace, they were forced to explain and prove something, sometimes even among friends.

I know some people are embarrassed by their work in Unitsky String Technologies company and try not to mention it. Others deliberately resist the stereotypes created by the sell-out scribblers. A lot of people realize what is going on in reality. The petition "Against Lies and Slander in the Media," which we organized on an international internet site, collected more than 30,000 signatures. But the most important justification of our correctness, indisputably, was everything created by the company despite numerous slanders.

Six Years of EcoTechnoPark in Belarus: What Has Been Done

Six years have passed from the start of the drafting and pounding in the first post. In that time, five demonstration test complexes of string transport of various types have been built on a former tank range of about 36 hectares (the first in the world! From zero!) at a length of more than four kilometers. The sixth and seventh complexes are being constructed. There are plans for the eighth one in the near future. We constantly improve the technology – this is what EcoTechnoPark was created for, essentially, with the logic of "for 100 years." We are five steps ahead of our closest competitors.

On one of the track structures, we were able to increase the freight load three times with minimal expenses. This fact is confirmed by the flexibility of the technology. On another overpass, again with a maximum of simple means, we increased the smoothness of the track by an order of magnitude. Here various types of innovative contactless rail heads are being tested – there were not even any transverse welds which also create a small, additional knock when the wheels rock due to a local change in the hardness of steel. All the necessary second level infrastructure has been built – stations; track changers; multi-kilometer engineering networks for water and sewage; systems of power supply with networks

2018. EcoTechnoPark. 18-passenger uCar and 48-passenger uBus on the truss string overpass

2019. EcoTechnoPark. uWind – one of the simplest models in the range of string transport rolling stock. Cargo uTruck designed for transportation of bulk cargo

of a total power of about 1,000 kilowatts; systems of communication and intellectual management, including a system of sensors and technical vision.

The main purpose of the sixth test complex being built, that is almost a kilometer long, is to check the compliance of the actual parameters with the required ones as well as to carry out survey, commissioning, and experimental work, including test running of the rolling stock manufactured in Minsk (before shipping it to the consumer anywhere in the world).

A line of models of innovative electric vehicles has been developed and presented live; 12 entirely different types of electric vehicles on steel wheels – the uBike, several types of uBuses, several types of uCars, uLite, uWind, uCont, uTruck, uTrans, and others, five of which were already certified, including the tropical version. All of these vehicles were manufactured at our own production facility, created out of nothing, and outfitted with the most modern machine tools. Each of these vehicles was a very complex

means of transportation, no less complex than an airplane and considerably superior in all of its innovation to Tesla's electric car, which is broadcast to the whole world today.

Unquestionably, the most significant of what we demonstrated at the Belarusian test center were not the specific types of string roads or rolling stock but the fundamental solutions on which they were founded. These discoveries have a global, transformative potential. We are a minimum of 10 years ahead of the whole world, and people are already coming to us from many other countries to learn, and from Japan "to get inspired," as the host of Tokyo TV told us. Today we enter the market with commercial projects. Everything that is necessary for a decisive step is already prepared.

Any client (and it is not important from which country) wants to see three components: technology that really works and is certified; the marketability of the proposed solutions; and human capital and assets needed for the realization of targeted projects. We have all of the above, which we have managed to achieve during this time with the help of crowd-investing– hundreds of thousands of ordinary people throughout the whole world. As for myself, I have been trying to do this for more than 40 years.

2019. EcoTechnoPark. Different types of string transport rolling stock – six uPods (including high-speed transport module) – on various types of string overpasses

2019. EcoTechnoPark. High-speed uPod on the truss-type string overpass. Two six-passenger uCars are moving one after the other on the string overpass with a flexible type of rails in electronic coupling, demonstrating the efficient operation of the automatic control system

At the moment this book was being written, Unitsky String Technologies company, that is, all of its investors, possessed the following: about 1,000 employees, primarily engineers; more than $15 million in basic funds; 36 buildings and constructions; more than 3,000 machines and equipment (including computers, notebooks, and monitors); 32 automobiles and tens of thousands of tools, inventory, and other property; non-tangible assets valued at $5.2 million – this is the professional software and the right to use the land (a total of almost 40 hectares – not only in Maryina Gorka but also in Minsk), as well as investments in long-term assets in the amount of approximately $18 million. The authorized capital of Unitsky String Technologies company, which was formed with cash, is about $71 million. This is approximately as much as possessed by a Belarusian giant such as the Minsk Wheel Tractor Plant (the factory produces enormous missile carriers – unique vehicles with a dozen wheels, all of which are drive and rotary). What kind of financial pyramid is this and where is the fraud?

The company's team (at the time of writing the book in 2019 – more than 1,000 technical specialists) working on the project implementation of string transport

EcoTechnoPark test and demonstration center built on the territory of a former tank range. Beginning of construction (2015–2016)

2019–2020. EcoTechnoPark test and demonstration center
built on the territory of a former tank range

What Goes to Market Is Dead to an Inventor

A French writer was once asked: "What is your best book?" "The one which I have not yet written," he replied. Engineering becomes a creative act when it goes beyond the bounds of the routine of standard problems. There is no limit to perfection in inventing as in art. No matter how good a vehicle is, it can always be made better. That is why for me, what has already been done today is dead.

I must constantly move forward to overtake my competitors, to ensure in advance at each new stage of development of string transport a more qualitative product, a better service than before. I have been involved in this more than for 40 years. What has been done today is the result of an extensive search, of trials and errors. After I was able to obtain more data on the work of the system in practice more than theory could provide, only more work was added. For nearly 200 years now, railroad engineers have been improving the wheelset and the wheel flange, which have dozens of variations. You could ask, what possibly is left in this hunk of metal to perfect? Of course, that is not the case; improvement of any technological product must continue throughout the whole lifecycle of technology, and in transportation, this will be hundreds of years.

2018. EcoTechnoPark. Restored prototype of the first simulator of transport module of string transport – ZIL-131 truck, which made test runs at the test site in Ozyory in 2001

Each highway that we built in Belarus was changed during the drafting process no less than 10 times. Each highway to come will be different from the previous one. Precisely in this way the advantage has been ensured. Even if the competitors would like to borrow something, they will wind up several steps behind. By that time, we will always know and be able to do more than what is contained in what have already created. Many believe, however, that such an approach is incorrect. As Uzlov once did, now several people tell me that I must concentrate on one thing. I have already shared my thoughts in this regard. I will just add a commonly known saying: what does not develop, dies. After all, I could not try to go to market with the first model (a simulation) of string transport rolling stock, ZIL-131, in which we replaced the wheels with steel ones to conduct experiments on the test track in the Ozyory in 2001. Today, that vehicle is only a monument, a part of history, like the first uBike which we released in Belarus in November 2016, like the first automobiles that came off the conveyor belt at Ford, which can no longer be seen on the streets of cities. For that reason, I am confident that like the famous French writer, my best invention is ahead.

As always, I work with a pencil and paper. A computer is used only to check mail and search on the internet for information needed. Someone might laugh at this and accuse me of being old-fashioned. And I will not deny this. Meanwhile, I see a lot of advantages to such work the old way.

Look at the old buildings whose blueprints were drawn by hand. Compare them with the new ones created with the aid of computers. You cannot help but notice an enormous difference. Old buildings have individual character. They are more alive and soulful. I think there are objective reasons for this. Calculating them in your mind, sketching the lines of future constructions with your own hand, you seem to let them go through you – each detail. At the same time, a fuller understanding of the whole is obtained.

A computer can speed up work substantially. But it does this, however, at the expense of performing some operations for a person. It is merely a very powerful calculator and does not add to the user's mind, but perhaps even dulls it. You inevitably lose something, and you take something in the very result of your engineering labor as a given, without thinking. I constantly run into these difficulties in work

2018. EcoTechnoPark. Models of vehicles: uFlash, 48-passenger uBus, uWind

2019. At work...

Drawings with individuality

with our engineers who are using modern software. The fact that they lose the whole beyond the parts is one of the essential problems. This concerns the need for constant development as well, as I said. It is clearly realized when we know better what we have created at the current stage, with all the shortcomings, with a clear understanding of the fact that we, as the creators of something fundamentally new, often make many mistakes. By relying on a computer which supposedly does not allow mistakes, we kill creativity in ourselves. Without creativity, there is no inventiveness.

Road to the United Arab Emirates

The question of where to build the first commercial string transport highway is one of the most important. Much depends on its answer. Few will pay attention to innovative systems if they are built somewhere on the periphery. The first project must be a model. For that reason, one of the best places on the planet is the United Arab Emirates, which in a short period of time managed to become one of the most technologically advanced countries. From all over the world, people come here to look at the latest achievements of progress. If you succeed in implementing string transport here, people everywhere will be interested in it. I grasped this fact quite a long time ago. My first attempts to contact the government of this Middle-Eastern country were made back in the late 1990. Only 20 years later I was able to reach my goal.

Numerous trips, presentations, exhibits, and receiving of delegations at the Belarusian center. A lot of time spent without any result. Interim agreements. Memoranda of understanding. All of this led us to the place

2019. City of Dubai. String transport was demonstrated at the World Government Summit

2019. City of Dubai. Sheikh Mohammed bin Rashid Al Maktoum, Ruler of Dubai, was able to examine string transport technology

we had originally wanted to go. The approach to the Emirates was found through India, as more than 80% of workers in the UAE come from this country. This provided an opportunity to present string transport in a targeted way to those ready to hear us out and listen to us. As a result, a high-ranking Emirates official recently told me, "We are happy that you came to our country with breakthrough technologies. Our house is your house." When he said this, he held my hand in his own two hands and looked into my eyes; he spoke sincerely, and such people cannot be let down, much less deceived.

I have had the honor of meeting with the rulers of practically all the emirates of the UAE and have made presentations for them. As a result, I have got the full impression that we have found each other – I with my technology and they with their demand for innovation. And I understood their main message, which I heard constantly, "I saw and I believed." Sheikh of Sharjah, at our second meeting, said that he had a dream

about how string transport, like a bullet, would pass through mountain ranges, linking territories under his rule scattered throughout various parts of the country. He wanted to be remembered by his descendants for this. And all of them, who have money today and understand that their source – oil and gas – sooner or later will run out, are looking for ways of further development, thinking about the future of the country far more than the powers-that-be anywhere else in the world.

In Sharjah, at the American University's TechnoPark, where we obtained 28 hectares of land, a new innovation transport infrastructure cluster is being built. Here, we plan to build urban passenger and freight test and demonstration complexes with string transport highways 2.5 kilometers in length, which will enable the vehicles to reach speeds of 150 kilometers per hour. In Belarus, with test tracks of a maximum length of 900 meters, we could not obtain such speeds. We need the test site in the Arab Emirates not only to obtain high speed and certify string transport under tropical conditions but to demonstrate the high productivity of string roads – freight systems can carry here 40-foot marine containers and freight loads up to 35 tons, and city and suburban articulated trains can hold up to 300 passengers in comfort. We also were not able to demonstrate such large and heavy vehicles in Belarus, since the overpasses there were not intended to carry such a load.

2019. Start of construction of uSky Test & Certification Centre in Sharjah

2019. uSky Test & Certification Centre in Sharjah (visualizations)

2019. Construction of uSky Test & Certification Centre

Of course, none of the achievements listed here in the Arab Emirates would have been possible without the testing and demonstration center in Belarus. And while I had counted on the demonstration of the systems in action ensuring more (the coming of large investors prepared to contribute hundreds of millions immediately, purchase orders, prepayment for construction, and so on), what we have now is worth a great deal and on the whole confirms the correctness of our actions. When we showed a video at presentations that recorded the work of the transportation systems, people said to us, “That is how the future must look.” When we brought representatives of the Arab Sheikhs to Belarus, the majority of questions fell away on their own. Only one, rhetorical question remained, “If here, with almost nothing, you attracted cash in small amounts through crowd-investing and could achieve so much in such a short time, what could you do with our support?”

2019. Sharjah. uSky Test & Certification Centre in the UAE. A historical photo: tropical uCar is ready to go

2019. Presentation of the construction of uSky Test & Certification Centre in Sharjah to Sheikh Sultan bin Muhammad Al Qasimi, Ruler of the Emirate

Burden of Fame

Collective investing – crowd-investing – is impossible without publicity. When there are more than 300,000 investors in a project, and a million more people just know about it and take an interest in it from time to time, the burden of fame crushes you. You must deal with things that none of us was trained to handle. Numerous temptations arise, what are called “golden trumpets.” So, I too, in meeting a lot of people, have been compelled to hear much flattery directed at me; however, I believe that this problem emerged for me late enough that I could not help but cope with it. For most of my life I have experienced ridicule, mockery, and persecution. If somebody began flattering me, it would end as a rule with him needing something from me. In principle, it is like that now. Therefore, I am not hastening to make any conclusions right away; I am trying to maintain an appropriate calm in order to evaluate people exclusively by their deeds, behavior, actions, and thoughts. Words in all this time have not meant very much. In words, as a rule, everything is beautiful.

2019. EcoTechnoPark. EcoFest – annual event, which is a kind of report to investors

For several years in a row, we have held a kind of reporting event for our investors, called EcoFest. Thousands of people from dozens of countries travel to attend. Along with the demonstration of technical achievements, the guests await my report as head of the project. For me, this is a serious test, since I have never liked public speeches, although I have been forced to make them all my life. In the last four years, with the start of crowd-investing, they have been particularly frequent.

I have poor diction; I have a hollow voice due to a nose broken long ago. I recall how Yuri Khashchevatsky made the film, "To the Sky by Wheel" about the conference in 1988 on the non-rocket industrialization of outer space, and I happened to be in the cutting room and hear him bawl me out terribly – my words were hard to distinguish. Knowing this, I am forced to prepare each speech thoroughly, including spending hours practicing to pronounce the speech loudly. Nadezhda has been my only and my main listener and critic during this time.




2019. EcoTechnoPark. Over 5,000 people from almost 50 countries participated in EcoFest

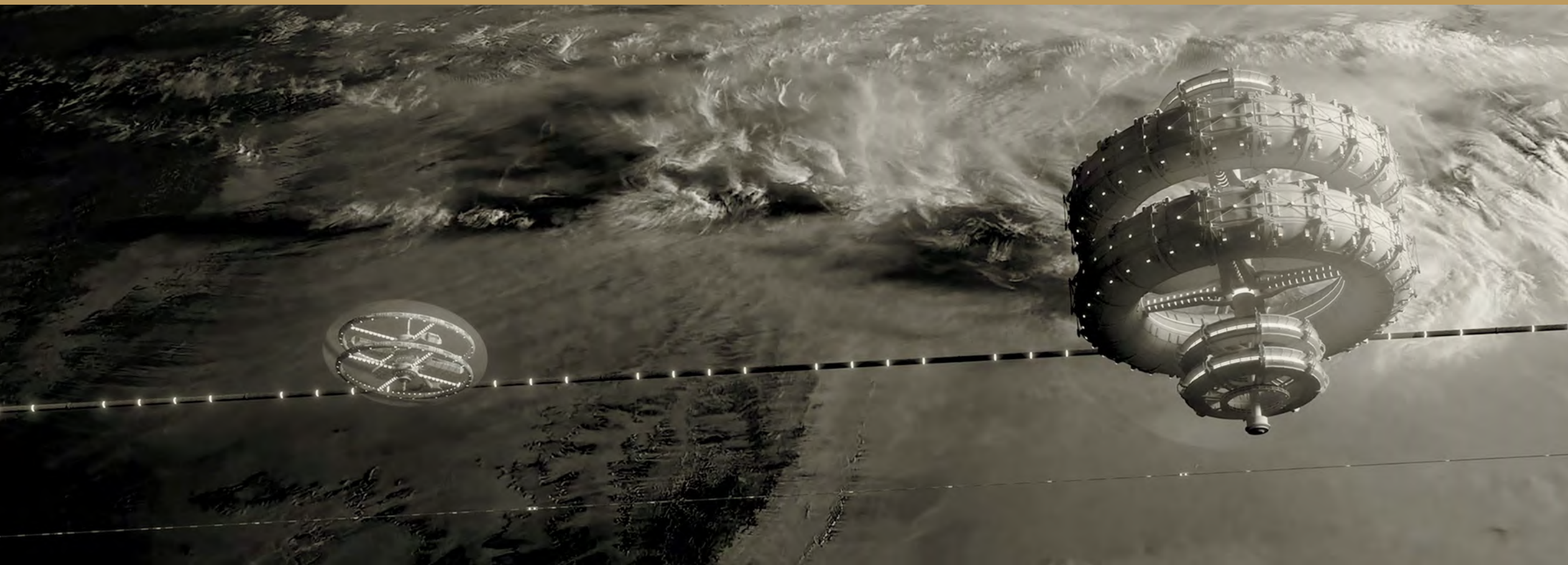
2019. EcoTechnoPark. Interview with the management of the design bureau:
Anatoli Unitsky, General Designer, and Nadezhda Kosareva, General Director, communicate with journalists

She gives me a lot of advice, although she tries to do this as unobtrusively as possible. We simply talk over all sides of the issues and various outcomes of events after which I decide myself.

Often strangers recognize me. At a shopping center, at the airport, on the walk I take every morning. Not only in Belarus and Russia but, for example, in Australia, India, Vietnam, and the Emirates. Many of these people really love me and trust me deeply. I know this from letters and personal communication. I am grateful to them. Nevertheless, when I say "burden," it is a fact. I am not exaggerating. This fame does not elicit in me any delight. There is only the constant reminder of a sense of enormous responsibility – to keep the promise, to bring string transport to commercial realization, to enable those who trusted me to be fully rewarded by becoming co-owners in one of the largest international transportation companies. To create the maximum necessary conditions so that the General Planetary Vehicle and what it is capable of giving all of us becomes a reality.

PART 7

Present Difficulties and Tasks for the Future



The East Is a Delicate Matter

The prospects I have described, which opened up before us in the UAE, are really amazing. I have said much less than it is in reality. However, I have been burnt too many times to experience optimistic feelings without caveats. In this case, there are quite a few caveats.

In the event the first projects in the Arab Emirates is successfully realized, all the doors will be open. String transport may objectively be incorporated everywhere. Everything that I dreamed of my whole life is beginning to turn into reality. But the price of a mistake in this country is very high. I know lots of stories that enable me to make a judgement about this. I personally have already managed to encounter many subtleties of the East. For example, a well-known company promises to build the largest Ferris wheel in the world – one-and-a-half times larger than in London. They are met with open arms. When the process is already launched, something goes awry, the construction begins to lurch.

2021. uSky Test & Certification Centre in Sharjah (UAE)

2021. The team constructing the facilities at uSky Test & Certification Centre in Sharjah

All of those who took part in the project are prosecuted. Such cases are ubiquitous. Not only a wrong move but even a careless word can put an end to any beginnings.

On the first day of the Government Summit in Dubai, where we brought our vehicles for demonstration, I gave an interview. Among other things, I expressed doubt about the efficiency of the American Hyperloop project, which proposes to implement transport with the aid of special capsules that move in a tube with rarified air (vacuum). The government of one of the Emirates had invested certain funds in the development of this project. However, I pointed out that taking into account the time spent on hermetical sealing and unsealing, high-speed string transport moving in the atmosphere can deliver passengers and freight to their destination faster. This was perceived by some individuals as an insult to the authorities who had invested in Hyperloop, although I had never imagined such a thing.

Our participation in the summit was then jeopardized as well as a number of agreements that had been prepared for signature. I did not start arguing, conceded my mistake, and bore my punishment. Even so, I realized that our participation in the summit and its coverage in local media gave a greater effect than my expenses. Thus, our advertising campaign was indirectly reimbursed. Anyway, the fact itself says a lot. In this and in other instances, I was given a lot to understand. In particular, not fulfilling obligations, even verbal ones, can involve harsh punishment not only for me and the members of my family but our whole team as well – all those who directly or indirectly were responsible for success or failure – planners, constructors, designers, and other employees.

In addition to the responsibility to our Arab partners, there are my promises given to investors. Both are interconnected. In the event of failure, neither the one nor the other will want justifications. As the saying goes, everything is at stake. Well, apparently, I have been heading toward this my whole life. The next moment of truth is coming. Who am I, in the face of it? What distinguishes me today from the person I was in 1977, when the idea of the geocosmic General Planetary Vehicle was formulated and I filed my first application for the invention?

2021. The Sharjah ecohouse not only demonstrates an innovative eco-friendly concept for living space, but also serves as the headquarters of uSky Test & Certification Centre

2021. A tropical uCar on the test track at uSky Test & Certification Centre in Sharjah

Do People Change?

You should never count on everything turning out as planned. However, you should not give up realizing your intentions, bowing to the greatness of external circumstances. A person rarely has the strength to change them. You can conquer them. For that, you must see your goal rather clearly and continue to head toward it, despite everything, while there is still strength to get up after you fall.

I agree that the formula of real success is simple: "Move forward from failure to failure with increasing enthusiasm." A person without a goal is like a ship without a course. He will simply drift, exhausted from a physical and spiritual hunger, surrounded by meaningless space and time, indiscernible in its directions.

My story is a story of struggle and failures. It exists precisely for this reason, and I dare say it may be interesting to someone. There is no history without struggle. Without a goal, any struggle will be obviously lost. Could I have withstood the onslaught of Soviet trials, constant negativity from my first wife, the KGB's persecution, and betrayals of my friends, if I did not know why I must preserve and cultivate toughness in myself? Of course not. Could I have maintained a normal attitude towards people after the amount of meanness happened to see, if I did not understand that only with their help I was able to move forward? I think not. Thanks to the fact that I knew where I was going, everything happening acquired meaning. Every defeat made me stronger.

I would hardly have found within myself the strength to hold the first conference in Gomel in 1988 if not for the enormous number of objections, which the idea of the General Planetary Vehicle encountered. I hardly could have written the first scientific monograph if the Soviet Union would not have collapsed followed by the tough "roaring period," since I would not have had either time or strength for that colossal work. I would never have received a grant from the UN and found support among Belarusian officials in the 1990s. I could go on citing examples. Each new obstacle forced me to find new ways of overcoming it, both in business and in engineering. Today I am convinced that there is not any problem that would not have a solution. Of course, within the bounds of the laws of physics.

From my earliest childhood I was a workaholic. I inherited it from my mother and was raised by circumstances. I'm still the same. I wake up at five in the morning and for an hour, while lying in bed, I think about my business, I construct and plan, or rather, I continue to optimize

2019. One of numerous work meetings

the entire set of engineering tasks and problems from the string technologies to the space programs, from the living humus for the cosmohouse for 10,000 people to the new type of aircraft, from anchoring strings to environmentally safe power plants of a new type, the waste of which will be... grapes. Yes, yes, grapes in fact, or apples, or some other agricultural product.

Not concentrating on anything specific but running through the problems like a pianist runs before a concert over the keys on the piano; sometimes within a morning I find the solutions for several dozen small but especially important problems that arise every day. This is a workout of my brain – my main muscle, which must be trained hard a lot every day. I take up my main jobs right after breakfast, exercise, and walk, sketching out the solutions found with a pencil in a thick notebook with graphic paper. This is my engineering diary, which in 50 plus years has grown to a small library with a hundred volumes – notebooks with tens of thousands of sketches and visualized ideas. Most ideas just remain on paper – you cannot bite off more than you can chew, and for many solutions you must sometimes make hundreds of sketches to find the optimal version. And it is seven days a week in this way. I often end at midnight. I try to use my time in the maximal efficient way. Of course, I do not forget about the main thing – my family. Although even this is easy to combine with work – on trips, while fishing, while going for mushrooms, my mind continues

to work intensively. For the last 50 years, in some sense I have been completely immersed in my inventions. I perceive almost everything around me through them. Everything I do is directed to this.

I travel a lot in connection with the particulars of my work. In the last year, I have practically been living in a plane. I am completely uninterested in cities, historical landmarks, and such. Of course, if I am with my family in Paris, I will visit the Eiffel Tower, but only to see with my own eyes how certain engineering solutions were made in the standard. Although I was already familiar with the structure of the tower as well as with the fact that it is constantly painted and this paint has become three times as expensive as the construction itself over 100 years. What made an impression was not so much the tower itself but the nets around it, so that those attempting a suicide could not jump from this great height, as well as the enormous lines and signs at every step to keep your wallets hidden.

At the hotel, we were also warned never to show that we had cash – we could be stalked and robbed. We followed the recommendations, but the whole family (Nadya and me as well as our children) was still robbed. We had dinner in a restaurant, the table was outside, and we placed a backpack with all our valuables: passports, phones, wallets, bank cards, and a laptop, between our legs. Only three people came up to us while we were at dinner – the waiter and flower sellers, all clearly not European-looking, migrants. When Nadya reached for her phone, the backpack was not under the table. We spent the whole night at the police station

Innovative string rail is the basis of string transport technology

along with the Parisian homeless, while the police went from ATM to ATM, where thieves tried to withdraw money from our bank cards... Then we had to execute documents for departure to the homeland through the Embassy.

This is also why I prefer to stay at the desk in a hotel room, take a pencil and a piece of graph paper, and work. I often get up in the middle of night when an idea comes to my mind. I'm afraid to forget it if I don't write it down. My family is used to it. Nadya may bring me a glass of milk or cover my shoulders with a blanket. Thanks to her, I do not have to think about everyday things. Of course, she has never reproached me for this, as she knew that she should be two steps behind me. Yes, two in fact, so as to preserve both her and my own personal space.

People often treated me unfairly. However, I never became a misanthrope. That would be ridiculous. After all, everything I do is for people. In principle, the number of times I have been deceived and betrayed speaks for itself – I trust people and believe in them, in their ability to make themselves better. Modern civilization, the way of thinking and acting that it forms, resembles a kindergarten. On the scale of planetary history, we are children. Every one of us. As a result, we may take offense at trifles, we are unable to treat ourselves with prejudice, we want to take from the other what we like, we don't understand that the place, where we live, needs care, as well as we don't think about the future and act out of emotions, rather than reason.

The betrayals I have endured do not trouble me much today. I do not even refer it to my own account. I leave it on the account of others. I transferred a large number of shares in those companies, which are building the string transport today, to Teryokhin, whose lawyers, in fact, took away my company, which was building a test site in Ozyory. This was an expression of gratitude for help. And I even payed him $100,000 back, which he gave me in 2000 to buy an apartment in Moscow. Although I didn't have to, because for that money he bought a 3% stake in Unitsky Research and Production Complex then, and afterwards completely took this company away from me.

2017. City of Dharmsala. With Tibet spiritual leader Dalai Lama XIV during a business trip to India

2018. City of Berlin. International exhibition for transport technology and logistics InnoTrans: with the top vehicle of string transport model line – high-speed uPod

2019. Works on string transport are being carried out under supervision of the General Designer of Unitsky String Technologies Inc. uCar in tropical modification is adapted to hot climate and high humidity

2020. Looking through pages of the monograph "String Transport Systems: On Earth and in Space": practice confirms the adherence to fundamental principles laid down in the base of string technology

I got a call from Kapitonov once, whom I thought for a long time was dead. He said he was "in durance vile," i.e., in a Russian prison. He asked me to help his wife and three children; supposedly he might still be useful to me. I remembered how in Kiev, about 15 years ago, he took everything from me and threw me out on the street with my wife and little daughter. As a farewell, he said that he would give me a few thousand dollars if I crawled to him for alms in the future. Well, look how it all turned out, the opposite. I sent $10,000 to his wife (the alms promised by Sasha would be the same today) and asked Sasha Kapitonov and his wife to forget about my existence once and for all. He also helped me in some ways to become who I am now.

Life has changed me little. I believe that a person's character is mostly formed in the first years of life. Somewhere by the age of 25, it is finally determined. All further changes are external in nature. I believe that I have not become more callous. Perhaps he became more unperturbed. I have become enriched with knowledge and experience. I have learnt lessons from mistakes that I will never make again: to trust others with things, which may become a temptation; to deal again with those, who have already betrayed you; to be engaged in politics; to get involved with bandits and so on. Although, perhaps, I would have done the same now if I were in the same circumstances again. Did I have any other choice? Could I choose at all? Yes. The choice was to fight or accept, to do it, no matter how hard it was, or to wait for someone to do it for you. To go forward, even with bad people, because there are no other companions, or to stay where you are, with good people, and to halt own development, which for me is equal to death. I always chose the first path. Later good people joined me, who did not have to be persuaded, and they were ready to go by themselves. The bad ones, on the country, moved away, and more often, fell off like dirt stuck to the shoes.

Particular Moments of a Global Issue

Since 1980s, I have been saying that humanity is moving inexorably towards the point of no return. And I am trying to understand this not only at the global level. I am interested in all the constituent parts of the movement. There are social transformations (I have already mentioned them) in addition to environmental aspects. There are even the factors of ordinary life which lead us to the final – physical inactivity, the quality of air, water, and food.

Our body needs almost all the chemical elements of the periodic table (at least 80) for normal functioning, but we get them in a reduced amount and in a different quality. In fact, we need them in a form of complex organic compounds, rather than by themselves. The foodstuff we consume today is grown mainly on only three elements that are part of the simplest inorganic compounds: nitrogen, potassium, and phosphorus. So far, we almost do not feel the consequences, but soon we may face irreversible changes, including at the genetic level: the molecules of our DNA that transmit genetic information cannot be complete with such a diet.

2019. Laboratory of agricultural and technical research of Unitsky String Technologies company

Many of the diseases, which humankind is massively facing at the present time, are related precisely to the lack of the correct “building materials” for the cells restoration that we are made of. Actually, trillions of our cells, containing DNA in their structure, live on average about half a year, then die and are excreted from the body. New cells must take their place, otherwise the organism will die. How long will the plane fly if, for example (due to a lack of components), its rivets are made of plasticine, and wheels are made of cast iron in the manufacture or repair process?

The realization of such non-obvious things, in addition to string transport and space programs, prompted me to study agro- and biotechnologies. For this purpose, in particular, I created Unitsky’s Farm Enterprise for my own money next to the demonstration and certification center for string transport in Maryina Gorka. Here we collect the Bank of fertile soils from all over the world (more than 100 regions from five continents), in order to preserve samples of the microorganisms contained in them and carry out a whole range of studies in the area of agro- and biotechnologies.

Healthy (living) fertile soil is the basis for comfortable and safe conditions for human habitation. It is the source of the human immune system – microflora and microfauna of our intestines, which are mainly considered to be soil-based. Trillions of microorganisms in thousands of species live there. They work day and night – feed us, give us water, and even heal us. Many experts call the intestine contents our second brain. Therefore, we work on the humus production technology – the chief nutrient substance of soil – from brown coal. We breed fish, poultry, and livestock, which we feed exclusively with the organic products we receive. The products, grown on the farm, go to the company’s cafeteria, where the employees of our design engineering departments have meals. As you can see, we take care about the health of our staff in this way too.

2019. Test samples and research products of special purpose plants

Green products grown at the Unitsky’s Farm Enterprise have a short way from the vegetable bed to the counter

We would like to show how, with the help of publicly available scientific achievements, it is possible to rationalize farming without losing productivity and without increasing the basic procedures cost. In fact, I try to do the same thing in this area that I did in the area of transport – to correct what is commonly accepted but fundamentally wrong. Unfortunately, almost everything is wrong in life of a modern person. If nothing is changed, the Earth’s civilization may perish. Saying more precisely, it will inevitably die. Almost with 100 percent certainty.

Right and Wrong Ways of Life

The meaning of “wrong” can only be determined if the opposite is understood. I believe that what’s natural is right, as well as what follows from the natural sciences laws: physics, chemistry, and biology. From a scientific point of view, a human being is species of animal. The mind, abstract thinking, and just one organ located in the depths of the brain – the center of abstract thinking – distinguish us from the ape and other animals. In fact, this difference allowed us to achieve the position of the dominant species on Earth, but it has also led to the fact that our way of life has diverged from that led by the other animals. Moreover, this distinction is radical in nature and has recently begun to affect certain fundamental things, upon which the continuation of the genus and survival (that is, the main purpose of existence of any species from the biological perspective) depend. Mainly these deviations that define a significant part of our everyday life in the mass consumption era I think wrong.

Most people today live in cities, the streets of which are intended for cars, not pedestrians. This is wrong. It is known that many animals reproduce poorly in captivity and do not give healthy offspring. And how does life in the city, if you look at it broadly, differ from captivity? Little space, little air, little movement, a diet with scant number of nutritious elements, and so on. We eat the wrong food, we breathe the wrong air, and we move the wrong way. There is a case where a well-known engineer cured himself of a fatal disease with simple exercises – rising up on his toes and abruptly falling back on his heels. How did he come up with this idea? He simply reproduced the way of life of a primitive man, whose body was in good shape, including due to hydraulic shocks that occurred when running during a hunt. There are reverse venous valves in our legs, and the hydraulic shock of a heel kick lifts the blood up and helps the cardiac blood flow.

Anyone will tell you that walking and running barefoot are useful. Hundreds of zones are located on our feet, the stimulation of which is vitally necessary, but the “children of asphalt” are deprived of such an opportunity. At the same time, it is better to walk and run barefoot, as our ancestors did, on clean and not polluted land, or rather, on grass, the dew on which is healing. This will be real in our pedestrian linear cities – actually, large villages. In fact, our body and nervous system is electrical, formed in the electrical potential of Earth, and shoes are an electrical insulator, so a potential difference of tens or even hundreds of thousands of volts is created. We often suffer shocks, especially in dry rooms,

2018. Linear city scheme (visualization)

and there are sparks that only occur at very high voltage, about 100,000 volts. I wonder if anyone would want to put their iPhone in a strong electromagnetic field, for example, in a microwave oven? No, in the consumer society, it is a pity to lose $1,000. It is a paradox, but it is not a pity to lose health, which is numerous times more valuable.

The wrong attitude permeates almost all spheres of live and activity, often being fixed as principles. I’ve already talked a lot about cities. I will tell you about the architects who create them. I do not like architects. There is an explanation for this, just as for everything I do. Architecture for me is like a skin for my body. By the way, I thought hard about the skin function, and I have never received the correct answer to my question, which I have asked dozens of times to various people, “What is the largest and heaviest organ in our body?” No one can answer correctly. They name brain, liver, stomach, and intestines. But the skin of an adult person is about two square meters in size, and it weighs more than 12 kilograms. The main skin function for any living creature is the body protection from the changing environment (temperature, moisture, mechanical actions, and other things) and optimal conditions creation for the functioning of all internal organs. This is so-called homeostasis – self-regulation and dynamic balance of an open system such as our body. So, the main skin function is not an external beauty but internal and functional. Unintelligent people begin to “embellish” their body by means of tattoos, piercings, scars, various toning creams, and make-up, which little distinguishes them from savages, who even put sticks and rings in their noses and ears, sawed off their teeth, stretched the necks of girls, and committed other outrages on the body for the sake of their limited conception of the world where they live.

How do architects differ from these savages? They also embellish buildings, urban quarters, and cities as a whole. Especially without thinking about the fact that in this house, where there is no “homeostasis” necessary for a person, that person will have to live for tens or even hundreds of years from generation to generation. At the same time, the external beauty is mainly admired by tourists and architects themselves, who do not live in these houses. That is why “beautiful” skyscraper centers are being built with “beautiful” and the most sophisticated high-rise buildings, which are uncomfortable to live in and which cannot be reached without standing in traffic jams and not inhaling exhaust gases and asphalt fumes.

The skin of an adult is over

12 kilograms.

Practically no one thinks about the “homeostasis” of cities, even the so-called “smart” cities; if I open the window in my home remotely to adjust the temperature in it, the city does not become better for my habitation. Adults and children will continue to die under vehicles wheels on the streets. The day will soon come when those who survive will be first forced to wear respirators and then gas masks just to move (but not walk; nature conceived legs for us for a good reason but without their constant functioning our organism will face serious problems and its homeostasis will also be disrupted). And this is all because cities are designed by architects, that is artists, not engineers, and they also approve the general plans for cities, preserving their mistakes for decades if not for centuries. In fact, the crazier the artist in this crazy world, where such engineers as I serve, the more “valuable” his work. Therefore, you can draw a square ball or cut off your ear. I wonder if an engineer put square wheels on a car or cut off the right wing of an airplane to improve the aerodynamics, would such “works” be more valuable?

When making an analogy with a living organism, an apartment in a building can be considered as a separate living cell; a house – as a separate organ; a district (neighborhood) with roads, utilities, and amenities – as a system of organs; a developed city – as a living organism. We know that if individual cells and even organs in a body are healthy, but the systems (for example, cardio-vascular, nervous, gastrointestinal, etc.) are sick (for example, affected by cancer), the body will not last long – it will die. How can each cell in our body, and there are about 30 trillion (!) of them,

be healthy without the systems dedicated to it – lymphatic, circulatory, nervous, immune, and others? Without them it will not live long either – it will get affected and die, or may turn into cancer, metastasize and kill the whole body. After all, it cannot understand the organism it forms a part of. The cities created by architects are originally “sick,” starting from apartments, houses and neighborhoods, and in this form they have no future.

Modern cities are designed and built by people not for people but for machines that serve them, moving us further and further away from Live Nature. In fact, it is nature (read: the laws of physics), not machines, that created human with natural, not artificial, homeostasis, which we cannot change. We are not gods.

Another incident came to my mind in connection with this. In Soviet times, I worked for about a year at a closed military enterprise, the so-called “post office box.” (By the way, I created and implemented six of my inventions there within such a short period of time. However, we are now talking about something else.) Kinescopes for TV sets and microchips for military use were manufactured there, on which a lot of gold was spent – hundreds of kilograms every year. Before applying the gold coating, the products were washed and degreased in vats with ethyl alcohol. Later Gorbachev imposed a dry law in the country, but workers really wanted to drink alcohol. What did they come up with? They crawled up to the container with alcohol, where they soaked the parts, so that the foreperson would not notice them, and without rising, they lowered their hands into the liquid over the edge of the container. After 20 minutes, a drunk worker crawled away, followed by the next crawling worker who wanted to get his “100 grams of alcohol.”

The fact is that our skin breathes and absorbs the substances with which it comes into contact. Therefore, it is necessary not only to drink clean water but also take a bath and shower with clean water. This means that a swimming pool with chlorine will never replace the natural sea, because all the salts, contained in the water, are absorbed through the skin. Since life originated in the ocean, the mineral composition of our blood according to our genetic homeostasis corresponds to the mineral composition of the ancient ocean. The ancient ocean roars in our blood! That is why it is necessary to maintain not the chlorine level in the blood but practically the whole periodic table contained in sea water in the same natural proportions.

Surrounded by concrete, asphalt, and plastic, we forget about the natural beauty. A city resident may be afraid of chicken, although every day he buys meat for baking or frying. For him, this bird is food. There are almost no associations between a living creature of nature and a steak for dinner. The distance between the natural and the artificial is only increasing. The artificial environment, created by human mind, takes more and more of life for itself. In the end, the mind, intended to serve the person, begins to destroy him as a part of nature, against which war has been declared.

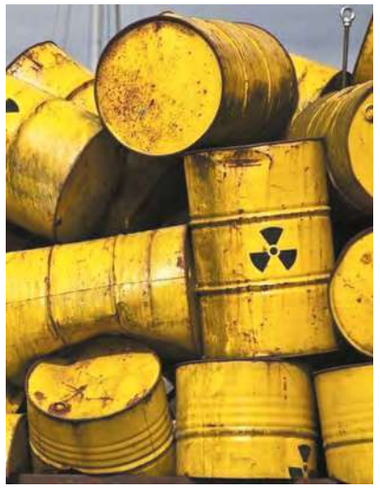
Science today knows about 10 million species of living organisms (although some evidence suggests there are about a trillion of these species, with 99.99% of them being microorganisms). Each year about 20,000 species die out. Some of them disappear from the Earth’s biosphere for natural reasons (this is evolution), but most of them disappear for anthropogenic factors. The genetic information about these organisms is also lost forever – DNA, which will be impossible to restore by engineering methods even in the future, since this molecule is hundreds of thousands of times more complex than, for example, Boeing. A plane consists of several million parts, but this gigantic organic molecule contains hundreds of billions of “parts” – atoms of dozens of chemical elements, structured in an unusually complicated and durable construction, tested by millions of years of evolution and, furthermore, capable of self-reproduction. In terms of engineering complexity, this macromolecule surpasses everything taken together that created the humanity in the entire history of its technocratic path of development.

The number of allergies, cancer, lung, and cardiovascular diseases as well as genetic disorders and inherited human diseases, caused by contamination of water, air, and soil, is growing rapidly on the planet. There are irreversible changes in the landscape and soil, forests are disappearing, rivers, seas, and oceans are polluted, and the planet's ozone layer is being intensively destroyed. All of the above are consequences of the insoluble antagonism between the biosphere and the technosphere. They exist on similar principles and are generally very similar formally.

The entire biosphere of Earth is created from the organisms' waste products. Oxygen and, consequently, ozone are waste products of photosynthetic bacteria and green plants; fertile soil and humus – all of this has died, rotted, and passed through someone's stomach and intestines, including soil microorganisms and earthworms. The technosphere also "works" in the same way. Plants, factories, power stations, machine tools, automobiles, and other engineering equipment, created by the technocratic human, are the analogues of living organisms in the biosphere. And they also exchange energy, information, and matter with the environment, so just like living organisms, they must inevitably transform the nature around them.

However, from the biology perspective, the technogenic pollution of the environment is occurring now. From the technical perspective, however, machine tools, plant, factory, power station, and automobile do not pollute anything. Going in they have raw commodities and materials and going out, manufactured products or services; for example, power, information or transportation and the transformed original raw material (after subtracting the manufactured product or service) which, naturally, goes back from where it was taken – into the environment.

The technosphere does not need human, like everything living in general, but the human needs the technosphere. Turn off electricity in the world, and hundreds of millions of people will die in a matter of days. I have already said that the technocratic path of development was chosen by our ancestors a long time ago, hundreds of thousands of years ago, when they began to make primitive tools. We cannot change this choice today. We must find a way to preserve our industrial power and at the same time stop destroying ourselves.



2019. General Planetary Vehicle (visualization)

There is only one radical way out of this situation: it is necessary to take terrestrial industry into near-terrestrial space, beyond the bounds of our common home – the planet's biosphere. Near space is the best niche for the technosphere.

My General Planetary Vehicle is the only solution for the industrialization of near space that is possible from the viewpoint of the laws of physics. For the decades have passed since I first have announced this project, my confidence not only has not disappeared but, on the contrary, has increased. Unfortunately, the negative impact of the technosphere on the environment has also increased proportionally. As for the people consciousness – it is still not ready for radical changes, preferring to accept the terrible end, drawn by almost every tenth film, released in Hollywood and collecting hundreds of millions of dollars at the film release.

Modern society seems to be deliberately going towards its end. Like a mortally-ill patient, who has resigned himself to his fate. "However, the disease can still be cured once and for all," I say. People do not believe me, like a seller of a universal remedy, choosing the proven means of official medicine. Although they cannot cure them, they ameliorate the symptoms, enabling them to go on. These are the pills that governments offer as part of various programs to reduce CO_2 emissions, switch to renewable energy, and so on. Meanwhile, it is no secret that drug manufacturers are interested in making us sick, because you cannot make money off a healthy person.

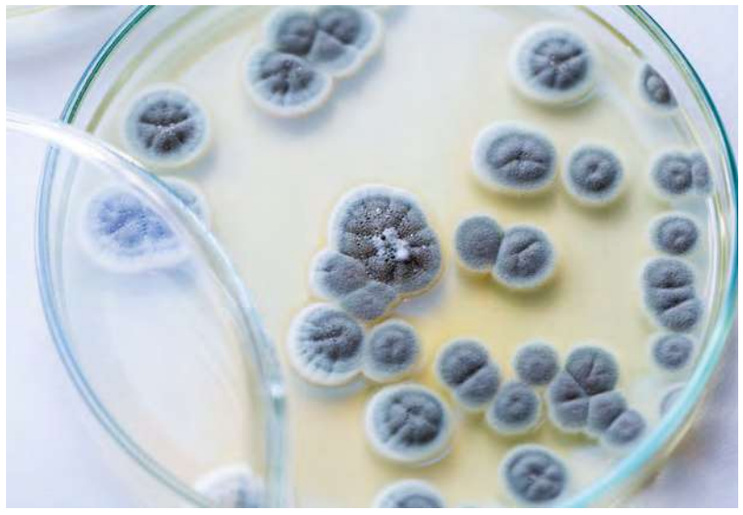
Now more and more people are realizing that things like global warming are fakes, created as tools to "wheedle" money and distract attention from something else. Thanks to the myth of warming, the US earns huge amounts on CO_2 emission quotas. So, if Russia signed the Kyoto Protocol today, it would become bankrupt, because of the amounts of money that it would have to pay (although, for example, volcanoes and oceans emit no less greenhouse gases into the atmosphere than all countries combined). Well, the more difficult the obstacles to be overcome, the more decisive must be the actions.

The Universe-25 Experiment: How Heaven Became Hell

At one time I was amazed at three independent experiments on living creatures set up at various times in various countries. Proceeding from the results of studies, the future destiny can be predicted for: 1) the human being as a species of animal; 2) human societies; 3) human civilizations as a whole as communities of individual human societies on planet Earth common to all; 4) the technocratic vector of development of our terrestrial civilization chosen not by us but our common ancestor, the primitive human.

The first experiment was the simplest: a population of mold was placed in a Petri dish with an abundance of nutrient medium; the dish was sealed with a lid. The mold grew quickly. After consuming all the nutrient and polluting the limited space with the waste products of its own life activity, it died just as quickly.

The second experiment was made on frogs. One pot was filled with very hot water, and a second one with very cold. Each container was placed on a low flame, and a frog was put into each one. The first frog that landed into the hot water, jumped from the pot as if scalded and survived. The second frog stayed in the comfortable environment



Experiment with mold population in a Petri dish

John Calhoun, American environmental scientist

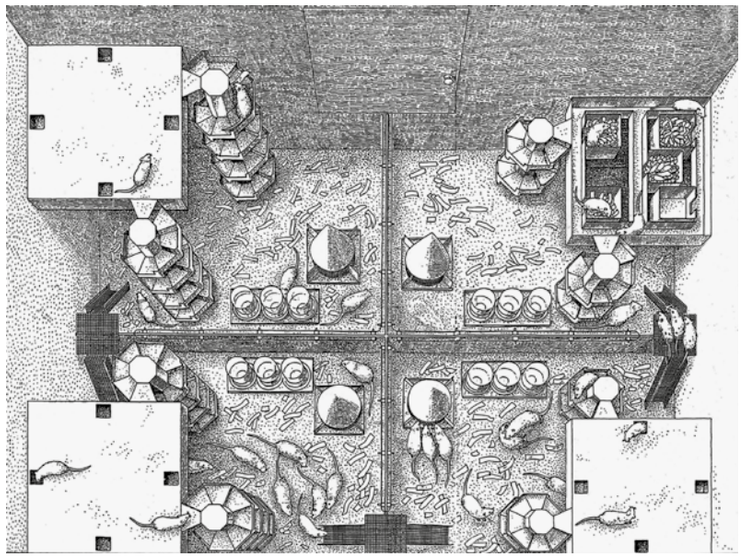
and remained in it without any signs of discomfort. In fact, it did not know that its “home” was on a flame. After a while, sensing that the bottom of the pot was heating up locally, it swam up to a cooler spot, and from there to a new place, and again and again. The frog tried to adapt to the changing environment, not even trying to save itself, until it perished in extremely hot water that boiled it alive.

The third experiment was the most difficult and the most prolonged since the development of a population of animals with formation of a society was studied. The American scientist and ethologist John Calhoun, together with the National Institute of Mental Health (NIMH) in 1972 constructed a veritable paradise for rats, calling his research Universe-25. A comfortable temperature of 20 °C was maintained, there was an abundance of food and water, and numerous nests for mates were created. The scientist selected rodents for his experiment although the end goal of his research was to predict the future for human society.

The rats’ home was constantly kept clean; all necessary measures of security were taken; the appearance of predators or the emergence of mass infections were excluded. The test subjects were monitored by veterinarians, and the state of their health was constantly tracked.

The experiment started with the settlement of four pairs of healthy rats who needed only a little time to get acclimated, realize what a rodent fairy tale they had entered, and to begin to rapidly multiply. Calhoun called the period of acclimatization Phase A. From the moment the first babies were born, Phase B followed. This was the stage of exponential growth of the population in ideal conditions, and the number of rats doubled every 55 days. Starting from Day 315 of the experiment, that is, in the sixth rat generation, the pace of the growth in the population slowed significantly; now the number doubled every 145 days, which marked the starting of the third Phase C. At the time, about 600 rats were living there, and a definite hierarchy and a certain social life were formed. There was physically less space than there was before.

A category of “outcasts” appeared who were pushed to the center of the space; they often wound up victims of aggression. The group of “outcasts” could be recognized by their bitten tales, torn fur, and traces of blood on their bodies. The “outcasts” were mainly young individuals who had not found a social role



Universe-25 experiment: rat layout

for themselves in the “paradise” of rat hierarchy. The problem of a lack of appropriate social rules for individuals was caused by the fact that in the ideal conditions created, the mice lived for a long time, and consequently the aging rats did not free up space for young rodents. Often the aggression was directed at the new generations of individuals being born. After their expulsion, the male rats broke down psychologically; they displayed less aggression; and they did not wish to protect their pregnant mates or perform any social roles. Although they did periodically attack either other individuals from the society of “exiled” or any other rats.

The female rats, preparing for labor, became more and more nervous, since due to the growing passivity of the males they were not protected from accidental attacks. As a result, the females, protecting their offspring, would themselves get into fights. However, paradoxically, the aggression was aimed not only at those around them; no less aggressiveness was manifested toward their own offspring. Often the females killed their young and moved to isolated upper nests, turning into aggressive hermits and refusing to reproduce. As a result, the birth rate dropped significantly, and the mortality rate of the young reached significant levels.

Soon, the last stage of existence of rat paradise began, Phase D, or the Death Phase, as John Calhoun called it. The symbol of this stage was the appearance of a new category of rats who were called the “beautiful ones.” These included males who demonstrated uncharacteristic behavior for this species, refusing to fight and struggle for mates and territory, and not exhibiting any wish to mate, inclined to a passive style of life. The “beautiful ones” only ate, drank, slept, and groomed their fur, avoiding conflicts or performing any social functions. They were dubbed with this name because unlike the other inhabitants, there were no marks of fierce battles, no scars or torn fur; they were known for their narcissism and self-love. The researchers were amazed at the absence of the wish in the “beautiful ones” to mate and reproduce. Among the last wave of births, the “beautiful ones” and the hermit females refused to reproduce and fleeing to the upper nests, became the majority.

The average age of a rat in the last stage of existence in “rat paradise” was 776 days, which exceeded by 200 days the upper limit of reproductive age. The mortality rate of the young reached 100%, the number of pregnancies was insignificant and soon reached zero. The dying rats practiced homosexuality, deviant and inexplicably aggressive behavior in the conditions of an abundance of vitally necessary resources. Cannibalism flourished even at the same time as an abundance of food; the females refused to raise their young and killed them. The rodents rapidly died off. On the 1780th day of the experiment, the last inhabitant of the “rat paradise” died. This occurred approximately after 20 rat generations.

Forecasting a similar disaster, Calhoun conducted a number of experiments for the third stage of the Death Phase. Several small groups of rats were taken out of the rat house and moved to conditions that were just as ideal but with minimal population and unlimited free space. There was no crowding or intraspecies aggression. Essentially, for the “beautiful ones” and the hermit females’ conditions were created under which the first four pairs of rats could exponentially replicate and create a social structure. But to the surprise of the scientists, however, the “beautiful ones” and the single females did not change their behavior and continued to refuse to mate, replicate, and fulfill their social functions related to reproduction. Due to the lack of new pregnancies, the population of rodents reduced to nothing. A similar situation was noted in other resettled groups. As a result, all the experimental rats died from old age, while under ideal conditions.

John Calhoun created the “theory of two deaths” from the results of the experiment. The “first death” is the death of the soul. When the newly-born individuals had no place in the social hierarchy of the “rat paradise,” then a shortage of social roles was noted in the ideal conditions with unlimited resources, and there was open confrontation between adults and young rodents, and the level of unmotivated aggression increased. The growing numbers of the population, the increased crowdedness, the raising of the level of physical contact – all of this, in Calhoun’s opinion, led to the emergence of individuals capable only of the simplest behavior. In the conditions of an ideal world, in safety, with an abundance of food and water, and an absence of predators, the majority of the test rats only ate, drank, slept, and groomed themselves.

The rat is a simple animal; for rats, the most complex behavioral models are the process of grooming a mate, reproduction, care of the offspring, protection of the territory and the babies, and participation in the hierarchical social groups. The psychologically-broken rats rejected all of the above. Calhoun called such a rejection of complex behavioral patterns the “first death,” or the death of the soul. After the onset of the “first death,” physical death (the “second death” in Calhoun’s terminology) was inevitable and was a question of a short time. In the event that the “first death” affected a significant part of the population, the entire colony was doomed to die even in “paradise” conditions.

Once the scientist was asked about the reasons for the emergence of the group of the “beautiful ones” among the rats. Calhoun cited a direct analogy with the human being, explaining that the key feature of the human, his natural destiny is to live under conditions of pressure, tension, and stress. Rats who refused to fight, who chose the unbearable lightness of being, turned into autistic “beauties,” fit to perform only the most primitive functions – eating and sleeping. The “beautiful ones” refused everything that was difficult, required effort, and in principle became incapable of such heavy and difficult behavior. The researcher cited a parallel with many modern men, who were prepared only for the most routine, daily actions to support physiological life but with an already dead soul. This is expressed in a loss of creativity, the ability to overcome things, and most importantly, a conciliatory will to be under pressure. The rejection of accepting many challenges; flight from stress, from life, from total struggle and overcoming – this is the “first death”

Experiment Universe-25: monitoring the "rat paradise"

in the terminology of John Calhoun, or the death of the soul, after which the "second death" inevitably follows. This time, it is the death of the body.

The question remains: why was Calhoun's experiment called Universe-25? This was the 25th attempt of the scientist to create a paradise for rats, although all the previous experiments also ended in the death of all the test rodents.

In all three experiments, we can see the modern vector of development of the person, society, and human civilization as a whole. How are we smarter than frogs who try to find a cooler and more comfortable spot in conditions of global warming of the habitat, of his home? After all, it was not aware, and it is not capable of becoming aware due to the absence of reason, of complex connections of cause and effect which led to this phenomenon!

Our common home is the biosphere. It is not even a home but one large room, because it does not even have barriers in it. Should you mine ore or extract oil in the center of the room? Then let us extract them in some corner, in a country of the third world. Let us put the garbage there, too, and perhaps hide it under the floor, and bury nuclear waste there for thousands of years. And not only those wastes. And we can also wave a test tube with white powder from the UN podium and, under the guise of saving humanity from bacteriological weapons, destroy an entire society, an entire country, simultaneously killing not only the leader but also about a million of innocent people. After spent trillions of dollars on it. How many starving people, for example, could have been fed with this money? Or sick people treated, or millions of homes for homeless built? For these funds, we could have laid thousands of kilometers of highly-profitable high-speed string roads

and solved many problems of transportation mobility on all the continents of the planet. And is it not unnatural from the point of view of a reasonable economy to consider war and death profitable? This is acceptable only from the point of view of economy of the "beautiful ones."

And the Equatorial Linear City 40,000 kilometers in length could have been built, with workplaces and housing for millions of people, which could become a base platform for a kind of non-rocket cosmodrome – to take harmful terrestrial industry into orbit, to near space.

The "beautiful ones" (the same for people as for rats), however, have a perverse logic of keeping their well-groomed skin beautiful. Their unmotivated aggression has the same roots as in the "rat paradise" – a broken spirit.

How is modern Western society, consisting of nothing but such "beautiful ones" better than the dying society in the "rat paradise"? Here, too, pederasty flourishes and same-sex marriages are officially permitted; in such families there is no "father" or "mother," but "parent No. 1" and "parent No. 2" and more than a dozen types of "its." Here you are not allowed to give women flowers and open the door for them because you can wind up in jail for sexual harassment. Civilization already passed through all this, although locally, to be sure – in the Roman Empire. It disappeared, it was replaced by more viable civilizations, which were called "barbaric" for some reason. If terrestrial civilization disappears as a whole, however, another civilization will not appear on our planet, unless some more viable "barbarians" from other worlds fly to Earth. But that will be, so to say, a completely different story, which we will never learn.

Even unconsciously understanding the approach of its end, Western civilization (the "older") manifests increasingly aggressively to the "younger" societies and countries – not only "foreigners" (such as Iraq, Libya, Syria, Russia) but "their own," that are weaker (for example, toward Yugoslavia).

I am certain that the "barbarians" in the historical sense will turn out to be more resilient, and no sanctions will kill them, but on the contrary, will make them stronger, as the Universe-25 experiment indicated. To be sure, the outcome of this global experiment will occur in the 21st century; therefore, the experiment which is going on before our eyes and which places *Homo sapiens*, or more precisely *Homo technocraticus* above our civilization, I would call "Civilization-21."

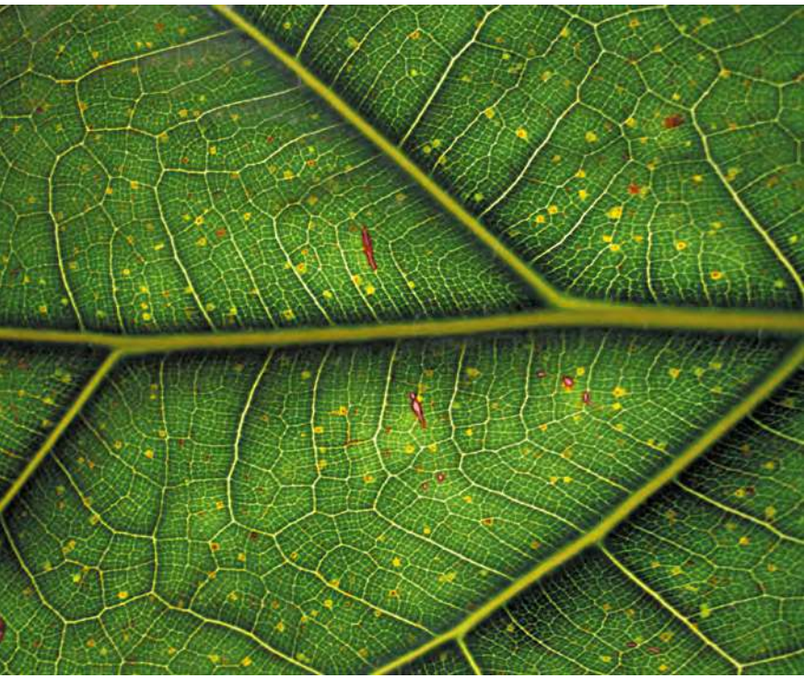
What are the main differences between the global experiment Civilization-21 going on with our participation from the local and primitive experiments described, including Universe-25?

First, there is the difference of scale: the Petri dish is increased to the dimensions of the planet, and the pot to the volume of the biosphere. And the very test subjects are somewhat different: instead of one form of living creatures – mold, frogs, rats – in this global experiment, millions of species are involved, more than 20,000 of which die out every year. They disappear forever, irreversibly, from our common home, the biosphere of the planet. And in this home that is common for earthly life, it is humankind which has prescribed another alien "sphere" – the technosphere, which in fact is the key protagonist in the Civilization-21 experiment. And humankind is developing it, the technosphere, not by the laws of symbiosis with the biological technological niche, which has already formed in billions of years of evolution, but in antagonism to it – according to the industrial criteria prescribed by the "beautiful ones." The basic criteria are the gaining of profit and maximizing of consumption – it is unimportant what – the main point is that with every year, it is necessary to consume more and more. Not only of material valuables but of information – this is why in recent years, information technologies have been developing at furious paces, and the virtual world has begun to displace the real, material world. Thus, it is faster and simpler to create and sell a "product" with a high profit.

Secondly, in the experiments described, the behavior was by the lowest living creatures, that is, the “barbarians,” those “whom you do not pity” – mold, frogs, rats. Now, the human is experimenting on himself, in fact at the very top level of society – on human civilization as a whole.

Thirdly (and this is the main distinction), humankind is making a global experiment not just on civilization, on the technocratic type of civilization, which in this context can only be opposed to the biological type of civilization. Of course, I imply the most general meaning in the concept of civilization, meaning by it the social form of the movement and organization of matter. In that sense, we can speak of the presence of a civilization in all social animals, and not only the human. There exist civilizations of ants, bees, rats, and other living creatures. All of them, unlike humankind, fit harmonically into the biosphere and do not disrupt its balance. Dolphins, for example, do not organize such research, since they are a purely biological civilization – after all, they lack industrial technologies – cars, factories, power stations, mining and refining plants, information technology, and sciences. They simply could not put even the simplest experiments described above – they have no Petri dish, pot, or fire; they could not build a “rat paradise” and support it for years, since they do not have science.

The biosphere, unlike a Petri dish, is constructed very cleverly; the waste products of the organic activity of some organisms become the food for others, until they return to the start of the food chain. In the end, they all turn into soil humus – the foundation of the fertility of any earth. Everything is born from the earth and returns to it. Thus, the cycle of organic matter, energy, and information begins. The main technological machine tool (or its equivalent: the vehicle, the factory, the power plant) in these technologies



2019. Linear city (visualization)

of transformation and utilization of biological waste are microorganisms, mainly in the soil. They are miniscule in size and invisible to the naked eye but from the engineering perspective, they are perfection. In a kilogram of living fertile soil, there are about a trillion of them. Only imagine: a trillion in every kilogram! Engineers in thousands of years could not create anything like this – after all, any microorganism is more complex and more perfect than all of industry, all machines, plants, computers, automobiles, planes, and missiles created by the genius of humankind.

And what of bacteria! Every molecule of its DNA is hundreds of thousands of times more complex than the Boeing; it has hundreds of billions of parts (atoms), and in one of the best aircrafts created by man there is only several millions. In order to convey information, a human uses a little more than 30 letters and 10 numerals, but the biological language is far smarter; there are about 80 perfect “letters” – the atoms of 80 chemical elements of periodic table. The dictionary “Life” contains trillions of “words,” from which the most perfect poem in the Universe called “The Biosphere of the Planet Earth” is composed. We people will never manage to create something like this in the technosphere; we are too primitive for this and too foolish, even though we think the world revolves around us.

The Equatorial Linear City with a length of

40,000 kilometers

would be a base for transferring harmful industry away into near space orbit.

More than

20,000

species of living organisms

die every year.

Humankind manufactures a hundred million automobiles a year with difficulty and a billion mobile telephones, but any animal, including the human, within a week “churns out” hundreds of millions of spermatozoids in his testes, each of which is more complex than the automobile billions of times over. And any bacteria (when created in optimal conditions) can replicate every 20 minutes and within 24 hours is capable of producing trillions like itself. What engineering technology could reproduce and replicate this?

The technosphere will never be like the biosphere, so that on the waste products of some industrial technologies, others are created, engineering technologies. Industry is characterized by gigantomania and capacity building; whether an atomic power station, an oil-refining plant, an international airport stretching several square kilometers and costing tens of billions of dollars. Meanwhile, as in the biosphere, an entirely reverse process is observed: the miniaturization of technological processes, so that in any place where any waste appears, there is already a miniature factory invisible to the eye, necessary for its utilization.

You should not try to argue with Live Nature and its home. Dead engineering technologies should be taken beyond the terrestrial biosphere, after creating there in space improved technologies applicable precisely to space conditions – weightlessness, vacuum, and unlimited resources (energy, raw materials, space, etc.).

The General Planetary Vehicle Is Even More Relevant Today

The most difficult obstacle on the path to the implementation of the program to create the General Planetary Vehicle – GPV – is already behind us. It consisted of disbelief in me as an engineer. The demonstration of string transport in action, when everything began to work exactly as I had said it would, should put an end to these doubts. I made string transport; I can implement a space project as well. The attitude towards me has changed, and I can no longer be called a fantasist and a dreamer. I have once again become actively involved in geocosmic transport, or to be more precise, this work had never ceased but was conducted in silence. Now I have begun to speak of this openly.

In June 2019, the second International Scientific and Technical Conference “Non-Rocket Space Industrialization: Problems, Ideas, Projects” was held (the first was in 1988). It should be noted that I paid for everything personally – the organization, the publication of the materials, and even the work on these materials – I personally paid out of the money (in the format of grants) which I had received throughout the entire time of work at Unitsky String Technologies company as General Designer and Chairman of the Board of Directors. In principle, these funds are the only ones that I freely control. Not a kopeck more than the amounts coming into the design bureau from investment funds, that is from hundreds of thousands of investors, ends up with me. Absolutely everything is invested as intended – in the work on string transport. Often, I contribute my own money as well without receiving anything back up to a certain point. I never had the goal of enriching myself. Today, what I have is sufficient for my own needs.

Unitsky’s Farm Enterprise in Maryina Gorka, which is 60 kilometers from the capital of Belarus, is better than a villa in Côte d’Azur. This event was held on the territory of my farm of about 200 hectares, significant not only for me but for all humankind. Most of the speakers were engineers from our Belarusian company Unitsky String Technologies. Everything was very low key – without any noise in the press and invitations to “prominent scientists.” I had enough experience dealing with such figures for decades in a dozen countries that I knew in advance that all that can be expected from them is superficial criticism and attempts to push their own interests. For example, the National Academy of Sciences of Belarus, when we appealed to them for granting the status of scientific to our engineering organization in 2018, they came back with a number

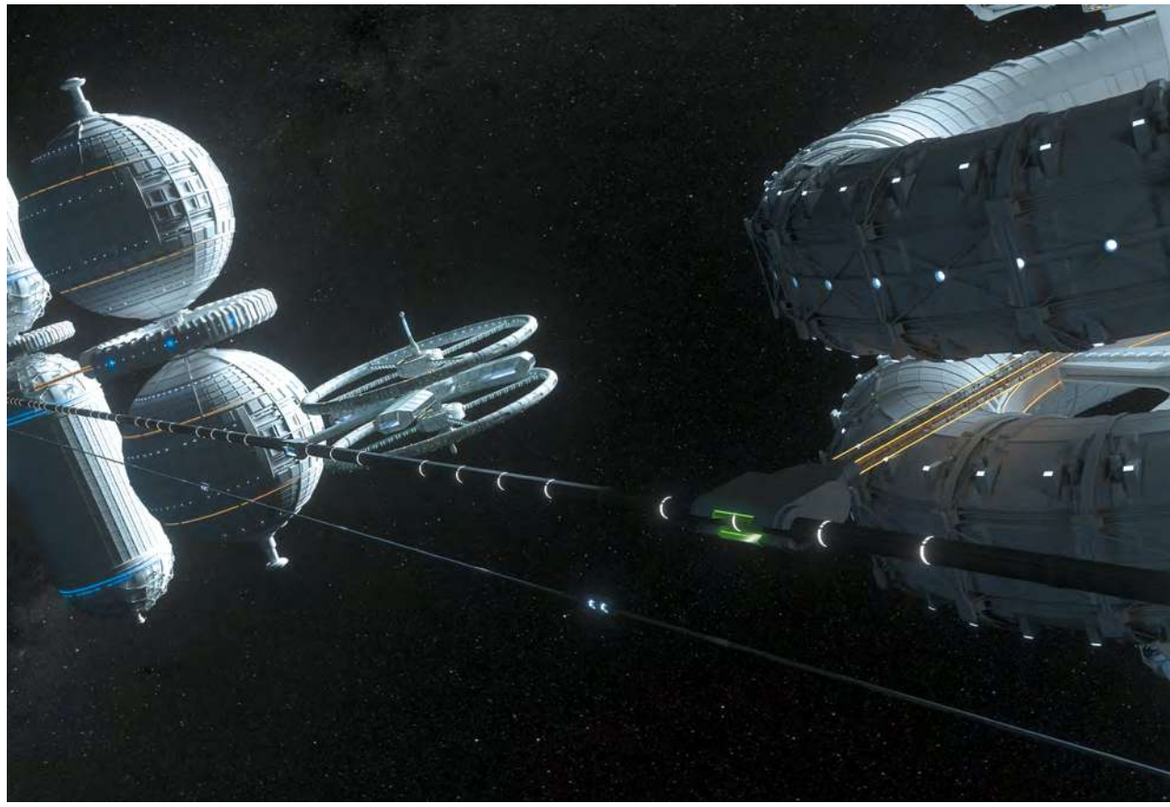
of counter and, surely, informal proposals – to build a pedestrian string road at our own expense in their botanical garden; to provide our employees and equipment for work on a "national project" to create their own electric vehicle and so on. Naturally, we refused. As a result, we were then refused, although there is not less science in our company than in some Institutes of the Academy. As for the evaluation which the community of scientists gave to string transport, developed in our republic, it was "nothing," in the vein of "the idea is good, but it is necessary to research the issue comprehensively." As if it were not comprehensible! After all, this is exactly what we had been doing, proving the viability of the concept. To be fair, it should be noted that in 2022 we were finally (at the third attempt in five years) granted the status of a scientific organization.

Scientists and specialists from various branches of science-intensive industries are rarely capable of really understand what goes outside of the area of their competence and regular involvement. Recalling Kozma Prutkov, I consider any specialist is like a flux – he is one-sided. A person worked on rockets is not capable of thinking about the possibility of non-rocket exploration of space. Why should I turn to him? This has already been done. Nothing usable came out of it.

2019. Moments of work at the International Scientific and Technical Conference "Non-Rocket Space Industrialization: Problems, Ideas, Projects"

I see the discussion of the prospects for implementing my proposed geocosmic program at the initial stages as hardly in the format of family get-togethers, a club or a fund which little by little begins to do the work on a project intended to save the planet. There are numerous such examples: from the 12 disciples of Christ to the first Congress of the Russian Social Democratic Labor Party. I had already begun to gather together such a club of like-minded people – the international conference, which representatives of 12 countries took part, is one of the results. Despite the privacy of the setting of the last event, the published collection of conference materials was maintained at a very good scientific level. I consider this an important achievement.

Moreover, in the Republic of Belarus, a commercial organization has been established, Astroengineering Technologies, which has been engaged in my project. For now, I am its only founder and investor. Not so long ago, an international assessment of my intellectual property on the GPV was carried out. The amount was staggering – $9.7 trillion. This is by no means surprising, given the economic and social effect of a planetary scale, which the implementation of my invention can ensure. If you consider the direct



2019. Network of industrial and residential facilities located in the equator plane at low circular orbits (visualization)

The GPV for one flight will allow delivering into orbit at the first cosmic velocity

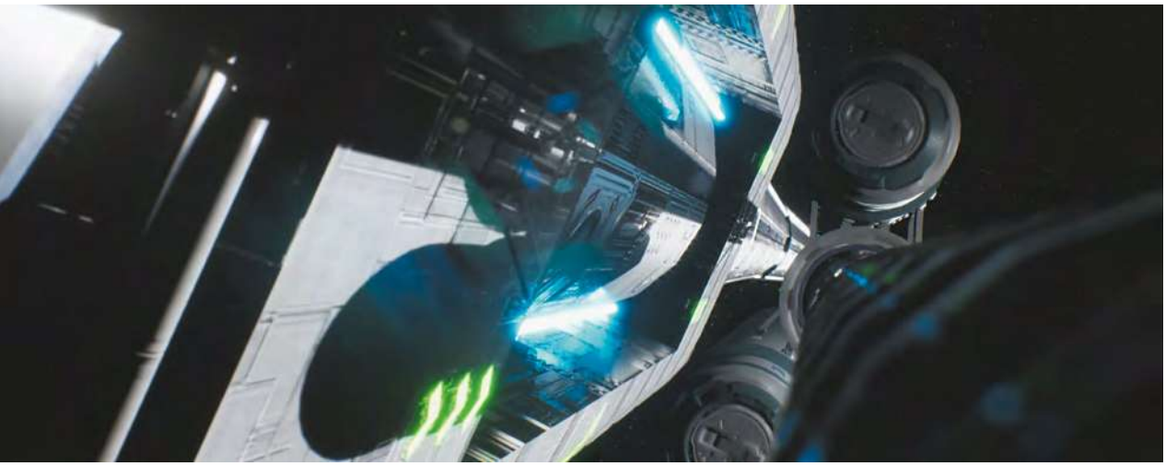
10 million passengers
(250 persons per kilometer of body length),

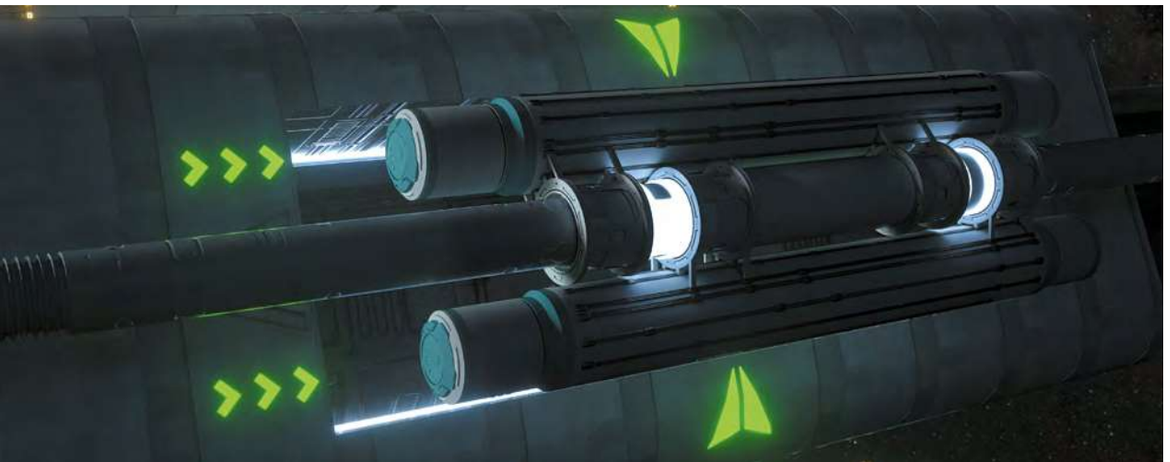
10 million tons of cargo
(250 kilograms per meter of body length).

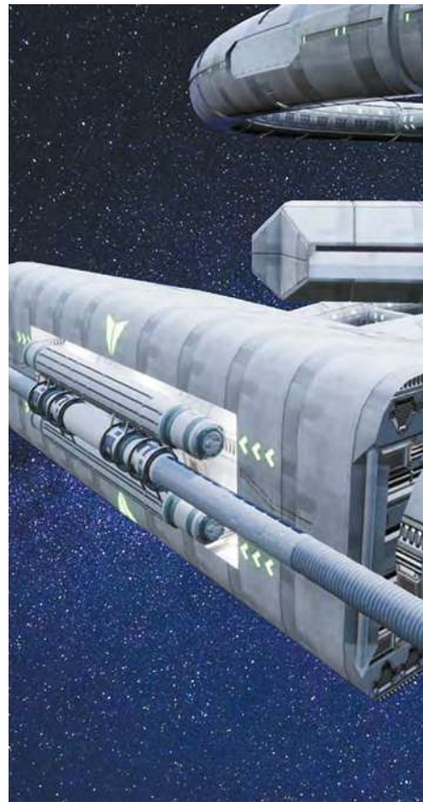
effect of the non-rocket industrial exploration of space, then a giant flying machine, delivering 10 million tons of cargo to the orbit, would provide a minimum of $20 trillion to the economy by comparison with rockets. That is, even a single flight to space would pay for all the expenses and provide a profit of more than $10 trillion.

The freight and passenger GPV will allow, in one flight, in addition to 10 million tons of cargo (250 kilograms per meter of the body length), deliver up to 10 million passengers (up to 250 people per kilometer of the body length) to orbit at the first cosmic velocity. The freights are what is necessary to create a space industry, and in the future – raw materials that will be processed, and products that will be manufactured by the space industry and sent to Earth to billions of consumers. The passengers will be primarily those specialists assigned to the creation and functioning of the near-Earth space industry.

2019. General Planetary Vehicle. Docking (visualizations)







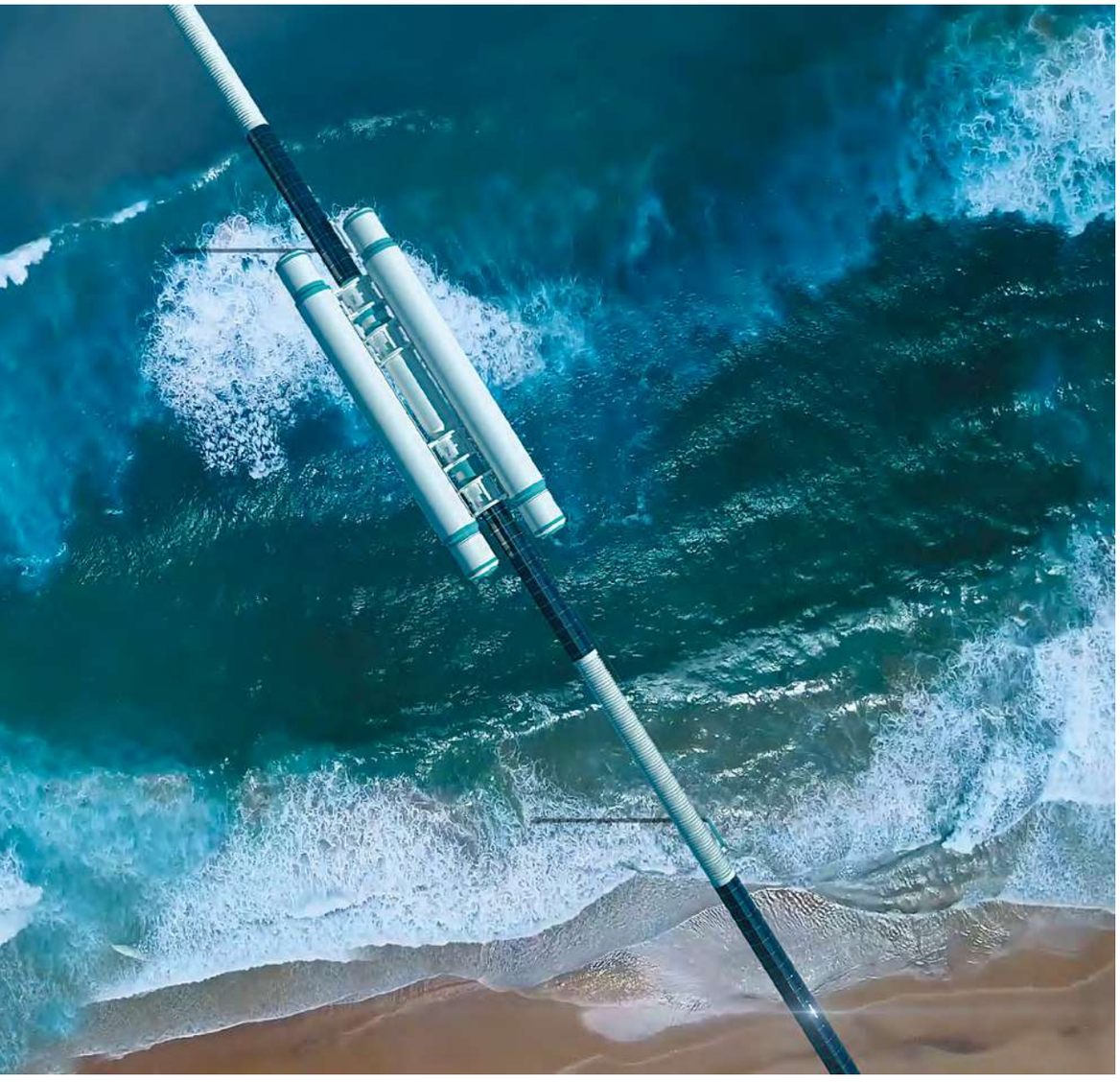
2019. General Planetary Vehicle (visualizations)

Within one year, the GPV may travel to space up to 100 times. Thus, within that time it can do what a modern world rocket-and-space branch (taking account of the carrying capacity of the rockets and the maximum possible number of launches) will require about a million years. At the same time, the cost of delivering each ton of freight into orbit – less than $1,000 – will be reduced by comparison with rockets a thousand-fold.

The environmentally friendly GPV, operating exclusively on electrical energy, will enable the industrialization of near space in reality. For this it will be necessary to close on the planet all industrial plants harmful for the terrestrial biosphere, after creating them anew on the near-Earth orbit based on environmentally-pure principles for space. This step will open up the opportunity for fundamentally new industrial technologies by using the unique capabilities of space unavailable on Earth. Above all, this means the unlimited energy, raw material, and territorial

Up to
100 times a year
the GPV will be able to go into space.

resources of space. Amazing opportunities will open up also in the area of nanotechnologies, information, and energy communications. Taking industry outside the bounds of the planet radically improves our common environmental habitat, our common home, the biosphere of the planet Earth, without any restrictions on the growth of industry. I will describe this in more detail how I see this process today.



2019. General Planetary Vehicle (visualization)

Space Industrialization in a Single Example: Space Settlements

With industrialization of the near-Earth space, first of the Industrial Space Necklace "Orbit" must be created – a transportation-infrastructure and industrial-residential complex covering the planet at the equator and having the corresponding length, for example, for a height of 400 kilometers, about 42,500 kilometers. The construction of the necklace starts with the very first launch of the General Planetary Vehicle. From that moment, due to new space solar energy, the program starts to pay off itself and for the foreseeable future will be capable of leading to almost the complete disappearance of energy resources based on hydrocarbons from the Earth's market. Accordingly, the first flights should optimally be planned in such a way as to put raw materials, equipment, and people in orbit to build a space complex and then to deliver energy and space products back.

Industrial Space Necklace "Orbit" (ISN "Orbit") – a concept proposed by Anatoli Unitsky for creating a large-scale complex of industrial objects located in near space in an equatorial orbit and connected to each other by communications along the orbital line resembling a necklace. Transportation of resources needed for the construction and operation of the necklace as well as delivery of products to Earth is carried out using the General Planetary Vehicle. According to Unitsky's idea, this complex will include all the industrial production facilities necessary to meet the needs of civilization. The space industry will not only solve the Earth's global environmental problems but also ensure sustainable development in the long term by using the inexhaustible resources of outer space.

Video presentation of the non-rocket space industrialization program uSpace

There are numerous options here. For example, the separation of water (which could be used on lift-off as ballast) into hydrogen and oxygen. Under terrestrial conditions, it is a very expensive procedure due to high energy costs. There, above, in weightlessness and with a cloudless sky, solar energy will cost almost nothing. Expensive hydrogen will go back to Earth for sale, and oxygen to provide living conditions for the first space industry workers and, again, back to the Earth's atmosphere, including to repair the holes in the ozone layer created by man in the pre-astroengineering age – the age of terrestrial industry.

There are about a billion employees engaged in terrestrial industry today, including transport, energy, communications, and information technologies. Taking into account the number of people on the planet, approximately the same number of employees may be required in orbit as well. In the future, due to automation and robotics, this demand will be reduced by a thousand times, to a million employees. There will be no less tourists and vacationers, since in space, recreational complexes can be modeled with conditions better than on Earth. Therefore, in orbit, it will be necessary to create residential settlements of a new type, in which millions of people will live, work, rest, undergo courses of therapy and treatment.

In such a house for several thousand residents – in a small society like a village, built on innovative principles – the best part of the terrestrial biosphere will be recreated with all the necessary natural conditions: atmosphere, diverse landscape, living organisms, soils, biogeocenoses, and aquatic ecosystems. The most comfortable physical conditions will be

EcoCosmoHouse (ECH) – the concept of a settlement proposed by Anatoli Unitsky, in which a group of people can live outside the Earth's atmosphere for a long time. The conditions in EcoCosmoHouse can be even more comfortable than on Earth. Gravity is supposed to be created inside a spherical, toroidal, or cylindrical structure due to its rotation around its axis. It is planned to simulate the change of time of day, the presence of water, plants, and animals selected in such a way as to ensure a proper nutrition of the inhabitants as well as self-reproduction and preservation of time-unlimited stability of this artificially created environment.

2019. EcoCosmoHouse (visualization)

recreated as well – gravitation, lighting in a natural spectrum, optimal temperature, pressure, and moisture of the air. The crosswise dimension of these facilities will be up to 500 meters in order not to excessively increase their windage, which would slow down the entire industrial complex due to the presence of gas environment at this height, although a very sparse one. The problem is that at the height of 400 kilometers, we can only speak relatively about atmosphere since its density is very low – almost a trillion times less that with atmospheric pressure.

Comfortable living of people in space requires conditions that are equivalent to and even superior to those on Earth. Gravity in orbit can be simulated by centrifugal forces. The most comfortable will be a lowered gravity, similar to that on the Moon or Mars, with a free fall acceleration five times lower than on Earth. Then an adult weighing approximately 15 kilograms could fly like a bird, if he were equipped with wings.

Cross dimension of EcoCosmoHouse is up to

500 meters.

EcoCosmoHouse will make

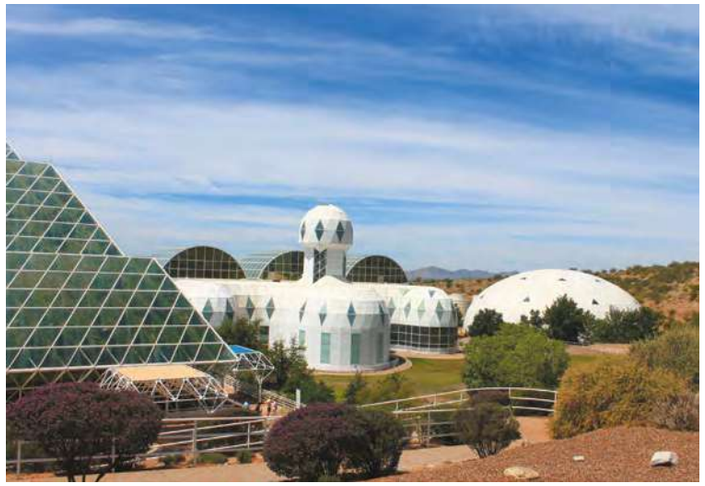
16 revolutions around the planet

per earthday.

Day and year lose their meaning in the cosmic house, since it will make one revolution around the planet for about an hour and a half, that is 16 times during a day. Therefore, in the orbital house, there should be artificial lighting, and day and year can have an optimal duration, differing, accordingly, from 24 hours and 365 days. For example, for the majority of modern urban residents, the 24-hour cycle is imposed and forced, as evidenced by the regular use of an alarm clock.

Comfortable lighting is necessary in the house for people as well as plants and animals. Moreover, light must be qualitative on a spectrum and continuous (most plants gather strength and bloom only when daylight is no less than 14 hours), and also intensive (weak lighting is deadly for plants). The ideal option for light-loving species is sunlight. In any case, the Sun must serve as the source of illumination in the space house – either with the help of special mirrors and lenses or through the conversion of sunlight into electrical energy.

The biosphere of the planet should be fully simulated in the space house. The whole diversity of flora and fauna of subtropics must be represented, the climactic zones of Earth that are most favorable for life, first of all microflora and microfauna, i.e., soil biogeocenosis with thousands of species of microorganisms. The biosphere of the orbital house should constantly process oxygen necessary for the breathing of people and animals living there, produce healthy food, and utilize all the waste products of the life activity of living organisms, including humans, into humus. We have already begun testing today all the technologies needed for this at my farming enterprise in Maryina Gorka. Probably the first model of a space settlement will appear here as well, terrestrial for now. Although there are many factors in space, which do not exist on Earth, we intend to test the possibility of creating a biosphere: to do what the Americans were unable to do in their time as part of the projects “Biosphere” and “Biosphere-2.” It is worth mentioning one of their mistakes: they paid little attention to living fertile soils (although for some reason they even modeled a dead desert) and the thousands, if not millions, of species of soil microorganisms that live in it, which by their nature serve as the immune system of the biosphere of the planet. In our concept, this is one of the central elements.



Biosphere-2 experiment

2019. Residential and landscaping areas of the toroidal EcoCosmoHouse (visualizations)

There are meteor and radiation hazards in space as well as in near-Earth orbit, against which existing orbital stations do not provide full protection. For example, a drop of water at a speed of 20 kilometers per second is capable of piercing the tank armor, and cosmic radiation can kill a person within a few days, since its level is significantly higher than the Chernobyl Nuclear Power Plant after the accident. The most effective protection from these two main cosmic hazards are not heavy-duty, thin-walled screens but thick, multi-layer barriers, which may include a multi-meter layer of soil located inside the EcoCosmoHouse as well as ground water and reservoirs.

About
500,000
tons
is an approximate mass of materials required to build the EcoCosmoHouse for 5,000 people in orbit.

The structural part of the space housing cluster will be a hollow sphere, or cylinder, or torus, or a combination of all of them, rotating around its own axis. For the initial launch, massive space settlements will be sufficient (a mass of about a million tons), which can be done in pairs, situated on one axis, or next to each other, or placed one inside the other like a nesting doll. Then, you can obtain any circumferential speed and, consequently, gravity, by using an electric motor, not a jet engine. Moreover, one hull will turn one way, and another in the reverse.

The most material-intensive part of the orbital house will be the anti-meteor and anti-radiation shield, and also the layer of soil – their total thickness must be about 10 meters. An ecosystem of reservoirs will be made in the house with fresh and salt water; a light wind will blow, clouds will run high overhead, and periodically, warm rain will fall. The inclined part of the soil, closer to the axis of rotation, should be filled with mountain landscapes, streams, waterfalls, and the relevant ecosystems.

2019. Interiors of the residential module equipped in the GPV (visualizations)

2019. Sections of the passenger transport module. Toroidal EcoCosmoHouse (in cross section) (visualizations)

The air in the space house will be filled with the scents of flowers and useful phytoncides*, the beneficial effect of which on the human body is not comparable to any medications. There will be no noise, only singing of birds and rustling leaves of trees.

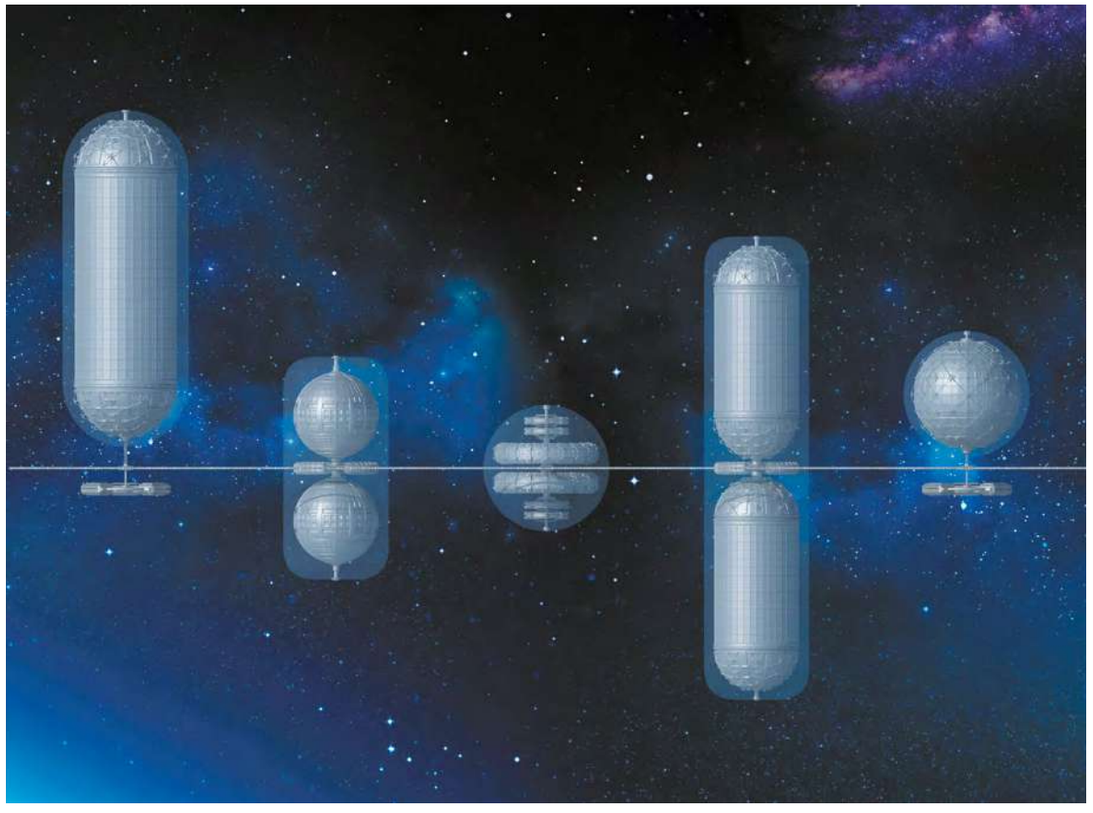
The approximate amount of materials needed for construction of a space house in orbit for 5,000 people is about 500,000 tons. It will cost approximately $500 million to deliver all the materials to orbit for one such settlement with the help of the GPV. Materials for it, including water and soil, also will cost approximately $500 million; construction and assembly works will be about a billion. Thus, the space settlement in orbit, in which several thousand ordinary people can live and work, will cost about $2 billion. This is 75 times cheaper than the International Space Station, whose cost has already exceeded $150 billion, although no more than 10 specially-trained astronauts live in it at the same time.

It is worth noting that if the construction of just one such space house is done with the help of rockets, then 500 years and $5 trillion are needed just on delivery of the materials from Earth to orbit. The GPV can in just one flight deliver the materials and equipment for a one-time construction of dozens of analogous houses. The same is true for the construction of industrial facilities in orbit.

A space settlement in orbit is
75
times less-costly
than the International Space Station, which has already cost more than $150 billion.

* Phytoncides are antimicrobial allelochemic volatile organic compounds derived from plants. The word, which means “exterminated by the plant,” was coined in 1928 by Dr. Boris Tokin, a Russian biochemist from Leningrad [St. Petersburg] University.

Almost all the engineering solutions needed to create the GPV and the ISN “Orbit” are widely known, tested in practice, and implemented at the present time in industry. According to my calculations, the budget of the project will be about $2.5 trillion. That is not so much, if you consider that the annual US military budget today is nearly $700 billion. The technological basis for the construction of the overpass will be string transport systems – the ground transportation infrastructure network uNet, which will allow to profit from the project already at the initial stages of its implementation through transportation of passengers and cargo on the surface of the planet. String transport in the future is an overpass for takeoff and landing of the GPV, and also a system of distributing cargo and passenger flows on Earth. After once spinning off the idea of the GPV, today, string transport is really preparing the grounds for its implementation. Thus, humankind has every opportunity to implement the most ambitious project in the entire history of civilization.



2019. Linear city (visualization)

About 100 million tons of metal will be needed to build the GPV, including the overpass along the equator (this steel is forged on the planet no less than in three weeks) and almost 10 million cubic meters of reinforced concrete (approximately the same amount of concrete was laid in a single dam of the Sayano-Shushenskaya Hydroelectric Power Plant). The wattage of connection of the GPV in the world power grid is about 100 million kilowatts (2.5 kilowatts per linear meter of length is the wattage of an iron), or 10 kilowatts per ton of cargo, which is less than 2% of the established net capacity of power plants in the world and is equal to the power of a single launch of a heavy launch vehicle capable of lifting not 10 million tons but less than 100 tons into space in a single flight. Mining Bitcoin today consumes more electrical power than is needed for the functioning of the GPV.

The linear city with millions of workplaces, built on the planet along the overpass of the GPV, will allow the commercialization of the space industrialization program even before the start of shifting the industry beyond the planet. String roads are already capable today of earning money; people can build housing and develop business around them – the new green transport makes life in a zone of transportation accessibility even more attractive. I am confident that string transport

Construction of the GPV, including the overpass along the equator, will require about

100 million tons of metal

(the same amount of steel is smelted on the planet in less than three weeks) and almost

10 million cubic meters of reinforced concrete

(the same amount of concrete is laid in the dam of the Sayano-Shushenskaya HPP).

Project implementation deadline would be approximately

20 years

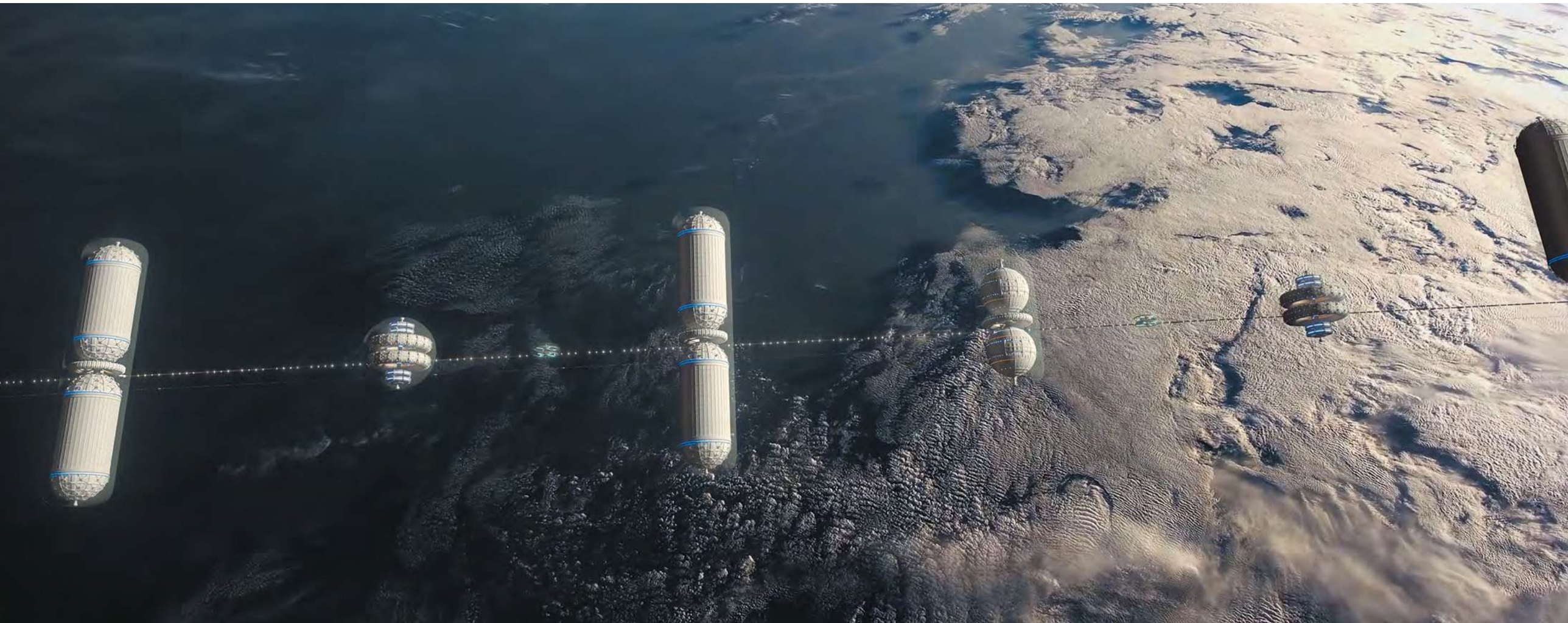
(assuming the funds are available today).

infrastructure complexes will provide a stimulus to develop previously unsettled lands.

Thanks to string transport overpasses, lines of modern information communications, electricity, water, and fertile soil will come to the most remote corners of the planet. Life will appear around them, and deserts will gradually disappear from the surface of the planet. Housing in the mountains and on the sea shelf will be more prestigious than, for example, New York or Paris. Man and nature will finally come to live in harmony with each other. Parallel to this will be scientific research and experimental design works on the GPV, which will require about 5% of the amount of the investments in the project.

I'm hopeful that the global geocosmic program I have proposed will by common goals and tasks unite all the countries of the world around it and attract the financing of this super-ambitious project designed to save humanity. By virtue of its technical features, the project directly affects the territory of dozens of countries (mainly those situated along the equator) and for political and economic reasons, the entire world. The GPV and the industrial necklace around Earth will be an irreplaceable platform for the future exploration of deep space by reusable space vehicles as well as a protective circuit of the planet to protect it from space threats, including meteorites. However, it is far more significant that the implementation of such an ambitious project will greatly reduce the technogenic burden on the biosphere, help to solve most environmental problems, and prevent epidemics, pandemics, wars, and other disasters that would otherwise prove inevitable. Events and the consequent arguments outlined in the following parts of this book demonstrate that a time of global problems requires global solutions.

2019. Network of industrial and residential facilities located in the equator plane at low orbits (visualization)



PART 8

Predictions That Came True, Masks Put On and Dropped

Pandemic

In late 2019, I learned about the existence of the Chinese city of Wuhan. Then the word “coronavirus” showed up. No one thought that it would dominate for a long time, displacing even such words as “terrorist attack,” “gender,” “economy,” and “crisis” in the news summaries. But, since February 2020, the entire world has introduced new life rules:

– medical face masks became mandatory for all people;

– we saw the closing of borders, public events, and social places, such as cafes, stores, and cinemas;

– schoolchildren and students switched to distance learning. They studied at home on computers, communicating with each other and their mentors via messengers and video conferencing, and everyone learned the word “zoom”;

– many companies repositioned their employees into remote work on the same principle;

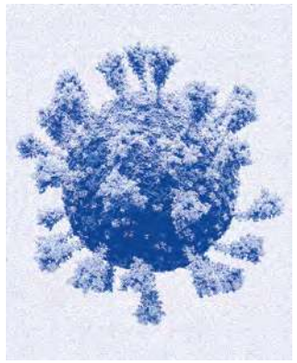
– many countries banned people from the streets.

We had a pandemic on our hands.

In Belarus, where I was then, the authorities decided to pursue their way, which was very different from the European and the American one. Although we wore masks, concerts and movie screenings were on pause, though factories and schools functioned as usual. Most people continued to go to work, albeit with as much, or more, fear than in Western countries. Rumors circulated about overcrowded hospitals and morgues. No one understood anything. Television reported that the pandemic was just the ordinary flu, that a sauna and a glass of vodka were the best cure, and that there was no reason to panic. At the same time, the gruesome news media pictures illustrating rows of coffins and abandoned streets in large cities worldwide proved the opposite.

The internet grew with all kinds of contradictory information. Immediately there came versions that the coronavirus was a bacteriological weapon. The pandemic was created on purpose. Some “global elites” are behind it. The other point of view is that the disease is not as dangerous as they are trying to portray it. The third opinion, shared by the majority, is that the threat is real, especially for the elderly and chronically ill.

Almost everyone preferred to reinsure themselves and not go outside for unnecessary reasons. The borders were almost closed. I had to cancel scheduled trips. Like everyone else, I did not understand what was going on. Why, and for what reason, were such unprecedented measures imposed? What would happen next? Was the threat real?



Coronavirus (COVID-19) – a disease that can occur both in the form of an acute respiratory viral infection of a mild course and in a severe form. The most common symptoms of coronavirus include fever, fatigue, and dry cough. The virus is able to infect various organs through direct infection or the body’s immune response. The most common complication of the disease is viral pneumonia. COVID-19 is transmitted primarily by airborne droplets with inhalation of sprayed droplets that carry the virus when coughing, sneezing, or talking.

To sort it out and to reinsure me until it was clear what was what, I went to Maryina Gorka and stayed at a guesthouse in our testing center, where I moved my office. I did approximately the same thing I had done 10 years before when, for the seventh time, circumstances took every penny from me, including in Australia and Belarus. However, I did not despair and went to the Crimean lake of Donuzlav – to fish, think, and refresh myself. There, in particular, I developed an investment system, which even today is successfully functioning and continues to steadily (for the ninth year already!) fund the development of string technologies from 220 countries and territories around the globe.

The relocation to Maryina Gorka meant not being in complete lockdown. I met with our engineers several times a week to discuss ongoing projects. I was in regular touch with the workers at the center and my farm, which was next door, over the fence. But I had more time at my disposal than usual. I saved time by not traveling and wasn’t distracted by trivial things, as, unfortunately, often happens in the office. Instead, I began grasping the essence of what was happening in the world. I watched analytical reviews and interviews with experts, read articles and books on topics related to the pandemic, and more. Step by step, I created a better understanding of things. The results of this work and the inevitable conclusions were overwhelming, and even I found them hard to believe.

The 5D World Rebuilding Program

I will begin describing my discovery with the most general things, the basics I had before delving into the material. Then, I will unfold the whole picture to the reader piece by piece.

I have been saying for a long time that with the rash pace of the development of the Earth's industry achieved by the end of the 20th century, humankind has a couple of generations left before the point of no return. However, it may be too late if nothing happens in 30, 40, or 50 years. Then, the gun called "Industry," hanging on the wall of our house called "Biosphere," will fire a shot at the head of the self-murderer called "Human Civilization."

I say this because crucial decisions for earthlings are made chaotically and haphazardly by the so-called "global elite," which no one has nominated, elected, or seen. In general, they are impostors and self-appointees. This pseudo-elite was spontaneously and randomly composed of politicians, bankers, and wealthy merchants. There are no engineers or, at the very least, philosophers capable of comprehensive and systematic thinking on a planetary scale. So, they, according to their professions and the views inherent in their competencies, will lead our civilization only to where one can make fabulously high profits. However, the gains are only for some, the pseudo-elite first and foremost.

We all need leadership to take us in the opposite direction, in the vector of the industrial, that is, the technocratic way of human development. Not because I like technocracy, although I am generally a technocrat. But for millions of years, since the invention of fire, man has taken an engineering and industrial path of development, including its social component. And we cannot change all that – why should we? We are no gods, after all.

Probably we should become a merely biological civilization, like an ant colony, a swarm of bees, or a pack of dolphins? However, engineering can be added here, not all of it but only the digital one, and let artificial intelligence as "advanced" as the mentioned above "global elite" decide everything for all these unreasonable animals. We will only satisfy our animal needs if artificial intelligence allows it, which will regulate the birth rate of the digitized posthumans right up to eliminating fringe elements.

I was thinking from an engineer point of view, without delving deeply into our planet's ongoing political and social problems, however, it is obvious that human civilization is primarily social and only afterwards – technocratic.

Artificial intelligence – the ability of computer systems to perform creative and intellectual functions that are traditionally considered as human-like. In addition, this definition denotes the science and technology of creating intelligent machines. The term "artificial intelligence" was introduced in 1956 by the American computer scientist John McCarthy.

Being aware of the nature of the emerging situation and who is responsible for it, I wonder why they ("global elites") do not see the obvious. How can they think that worldwide cataclysm will not affect them and their children, hoping there will be some kind of a "secret door" for them? It is clear: neither a private island in the ocean, a deep bunker in the mountains nor a Boeing with anti-missile defense can perform such a function. All, without exception, will be forced to follow the same biospheric path and go the same way as all humanity has turned towards, including its inevitable degradation, extinction, and death, and by historical standards, not in a distant perspective but instantly.

As I see it, the pandemic is the aftermath of the devastating human impact on nature, the immense and nonsensical consumption. Examples abound. Officially claimed, the virus overspread to humans from animals. The blame is on the pangolins, according to one version. Chinese gourmands, who are well-fed and jaded people, have a high demand for these animals. Because of this, pangolins came to the brink of extinction and were not strictly in service of human hunger. Pangolin meat is a luxury item, an element of upmarket consumption.

Likewise, because of humans, thousands, if not millions, of other species of animals, plants, and microorganisms are on the brink of complete extinction. About three species of living creatures disappear from Earth every hour. The planet may be defending itself from offensive people. Pandemics of the future will be way more dreadful than that announced in 2020.

Moreover, it is our way of life, which, along with the yoke imposed on nature, makes humanity the main culprit in the emergence of pandemics. To start, we settled large populations in cities where many people were in close contact with each other. But, at the same time, cities tend to have

Pangolins – mammals covered with large scales, common in Africa and Asia. Their population is not very large, moreover, it is endangered, as these animals are of interest to poachers. Pangolin scales are highly valued on the black market, as traditional Chinese medicine suggests that they can be used to treat many diseases. Pangolin meat is considered as a delicacy; especially appreciated by Chinese and Vietnamese gourmets. China has laws restricting the capture of these mammals.

obsolete, nearly ancient, transportation systems, in which urban, intercity and international transportation involve large gatherings of people in public places, means of transport, train stations, and airports. Further, our inadequate nutrition and unhealthy lifestyles weaken and destroy our immunity, while experts know that immunity is our primary defense, irreplaceable by any medicines invented by humans, including vaccines.

It is easy to notice that previously named leading causes of the pandemic, i.e., insane consumption and crowding, are the source of all the most massive shocks of recent centuries. All the wars and economic problems of the 20th century occurred because of overcrowding and a persistent desire to consume as much as possible, resulting in the escalation of the struggle for resources and spheres of influence. This struggle is one of the essential elements of a capitalist system based on profit and around profit.

In general, the capitalist system implies the need for and imminence of crises, each leading to more disastrous consequences. Most economic experts agree with this opinion. Currently, the knowledge about this has become widespread, right down to the layman's level. Accordingly, there is a demand for the reform of capitalism since the "global elites" do not accept alternative models, like socialism. After all, these are the capitalist "elites," and they cannot disown themselves.

Since experts mainly associate crises with overproduction of goods, these crises can be avoided only if we change the nature of production and consumption. Before exploring how the "elites" intend to arrange the new world, it is necessary to understand how all this is happening now and in the most general terms.

Enterprises manufacture goods, pay workers for their labor, and keep the added value to spend on product development, plus their own needs, including their need to pay taxes. That said, the goal of production is to increase profits, which is achieved by optimizing technological processes, reducing the cost of labor, and increasing the number of manufactured goods.

Therefore, the production volume should always increase, and the relative wages for labor should decrease. At the same time, workers are buying most of the products. If they earn less, they buy less. Yet, producers continue to create more and more goods and services. There are so many of them at some point, so nobody needs them, and the manufacturers cannot sell enough products to pay off the investments. Then they opt for staff redundancy, assembly line shutoff, and production minimization.

The economy sinks into crisis. Then someone goes bankrupt, someone optimizes something, prices drop for the accumulated surplus of goods, warehouses once chock-full of products gradually empty, and then there is a demand again that exceeds supply. Everything is repeated at a new round. Of course, a war or a pandemic can significantly mitigate the situation. In a short time, crises can create new market outlets, job opportunities, requests for specific product ranges, orders, and more. That is precisely the reason why wars begin at the moment the economy reaches its peak; it is not an effect of power excess but a way to avoid the upcoming steep and painful fall from the top. Is it possible to prevent crises in some other way? I believe saying yes.

The assumption is that it is possible to improve the capitalist system to make its development stable instead of cyclical (from crisis to crisis); it is enough to organize production and consumption into a state of balance and order. Of course, not in the logic of the planned economy but by providing the ability for the capitalist elites to preserve their power and wealth.

Digitalization should come to the rescue, being a digital transformation of society and the economy. Most notably, it's about internet technologies, big data processing technologies, virtual and augmented reality, artificial intelligence, 3D printing, printed electronics, blockchain, quantum computing, and more.

Digitalization will help to get total control and accountancy: what and how much is in production, what and how much is purchased. It will also form the basis of a new – inclusive, in other words "universal" capitalism, where ordinary people will no longer own anything as private individuals; they will only have access to services. Because life will turn out to be unthinkable over time without these digital services, the demand for them will become constant, increasing in proportion to consumption without any fundamental restrictions (as everything starts to happen in a virtual digital environment, not in a limited world of material objects, there will be no restrictions).

Digitalization is one of the five pillars on which a new world order is in the making.

One can also speak of the four "Ds": depopulation, desocialization, deindustrialization, and decarbonization. With their large-scale post-capitalist deployment, these vectors of development proposed by modern capitalism are likely to ensure the stable development of the system. However, this "brave new world" will turn out to be horrific from the point of view of seven billion people for whom there is no place. The substance of such plans is as follows.

Digitalization is the basis and is a dreadful tool within the logic it is developing today. It includes the following:

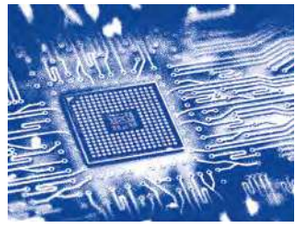
1) the introduction of widespread accounting and control systems for production, services, banking, and so on, which will lead, in the end, to the introduction of total control over the "wrong people" and the transfer of civilizational functions to supposedly "smart" but in fact to primitive artificial intelligence, which, from an engineering point of view, is by several orders of magnitude below the complexity of the simplest microorganism structure, such as coronavirus;

2) the accelerated introduction of bioengineering technologies, the mass production of robots, the promotion of genetic mutation projects and species crossbreeding as well as the interbreeding of people, artificial intelligence, and machines, which will lead to a gradual transformation of the human personality into a soulless human-like creature, into a cyborg, a bio-digital convergent.

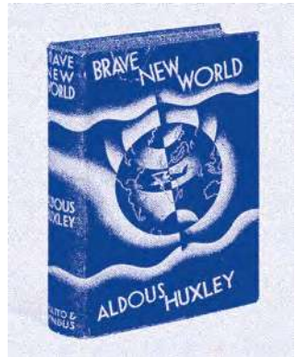
Desocialization is:

1) the establishment of a new policy glorifying minorities (social, ethnic, racial, biological, and gender) where they dominate over the majority;

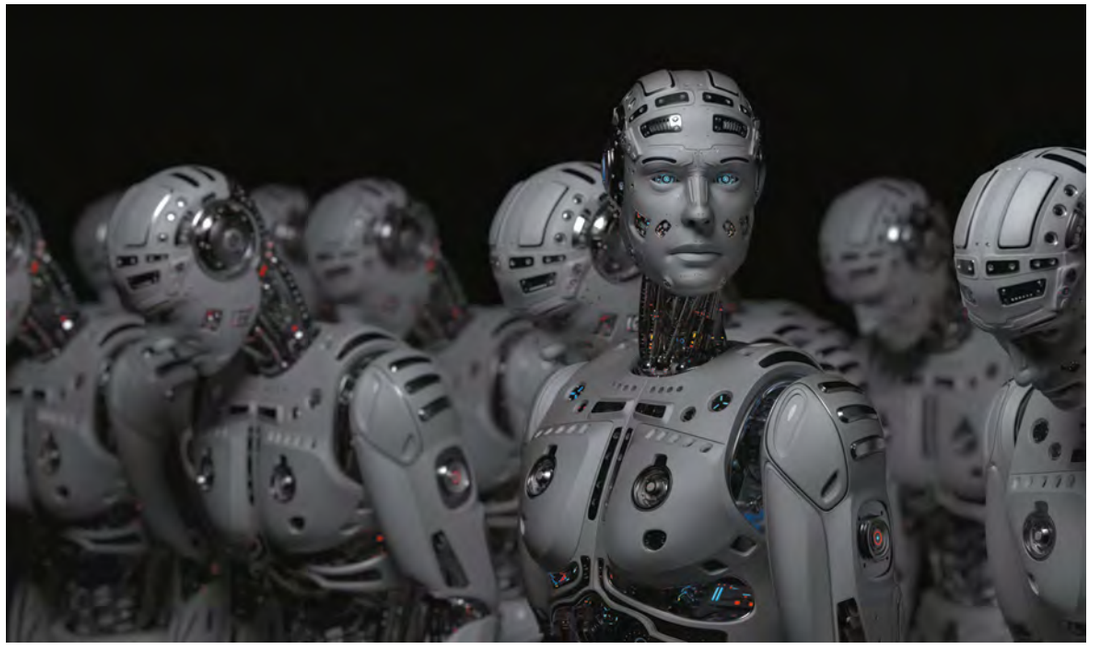
2) the subordination of humanity to liberal values, opposition to critical and analytical thinking of people, deprivation of privacy and civil rights, total censorship, complete control and manipulation of the media, social networks as well as consciousness, ideology, education, science, culture, art, and religion. After all, frail and dying capitalism needs primitive convergent



Digitalization – a general term for the digital transformation of society and the economy. Describes the transition from the industrial age and analog technologies to the age of knowledge and creativity, characterized by digital technologies and innovations in the digital economy.



Brave New World – a dystopian satirical novel by English writer Aldous Huxley published in 1932. The events of the distant future are described, where religion and cultural heritage were sacrificed to the prosperity of civilization through the absolute renunciation of negative emotions. Wars, diseases, even the slightest conflicts were suppressed by the programming each person grown in a test tube. The upper strata of society – alphas – enjoy absolute prosperity, and the lower castes – epsilons – are content with the smallest, because from the childhood they are programmed to enjoy such a life.



consumers, not creative individuals. Moreover, there will be a gradual decrease in the role of nation-states in society and the transfer of most of their functions to global corporations;

3) the fight against natural childbearing, the elevation of bodily and spiritual ugliness and perversion, depravity, and lust, along with mentally and physically disabled people to an ideal of harmony and beauty;

4) the destruction of family and nation-states' institutions which must be replaced by global (supranational) corporations that have entered the totalitarian phase of their development;

5) the expanding influence of transnational pharmaceutical corporations, commonly called "Big Pharma," the likes of which are not interested in human health since only ill people can bring profit;

6) the incremental and consistent introduction of a guilt complex into social consciousness during many decades that is a complex of personal and collective inferiority. We, ordinary people, who are the overwhelming majority, are forced on all continents to repent, to feel guilt, inferiority, and faultiness at the slightest pretext: for the fact that we are not homosexuals; for the light (or dark) color of our skin; for our nationality and heritage; for eating meat and opposing genetically modified and artificial foods; for doubting the benefits of vaccinations and the existence of pandemic at all; for having mothers and fathers, for using "man" and "woman," "he" and "she" words; for being healthy and not disabled; for the fact we don't blindly believe in global warming and the carbon greenhouse effect... The list of our "guilt" goes into infinity. In its social essence, it is a psychological terror unleashed on every person and humanity.

Society is gradually and fairly consistently transforming into a kind of turbulent, albeit aptly managed, set of minorities dissatisfied with life and upset with the "alien" majority. The majority of society, it seems, is under pressure to constantly take care of these people wronged by life, including the furious desire

to dominate over the majority, and these needs ask not to be questioned and criticized. When questioned, it immediately becomes racism, homophobia, or xenophobia.

The fact that democracy, in its modern Western interpretation, is the power of the minority over the majority was a revelation to me. Although it turned out that for the ideologists of the global liberal and capitalist system, this is an accepted and evident axiom. Such a perverted view, essentially turning everything upside down, reminds me of the story of any cancer cell that, with its "unconventional values," misleads and deceives the weakened immune system of a healthy organism with trillions of normal cells and ultimately kills its master, and dies itself by metastasizing into all organs.

The displacement of small companies and industrial enterprises from the market will lead to the emergence of global monopolies, free to dictate any favorable conditions to the consumer.

The erosion of the functions of the state and their transfer to global corporations will lead to a revision of social policy and social hierarchy. For example, why pay pensions? And, in general, do corporations need disabled older adults and children, hospitals and roads, or the entire social infrastructure? Consumption, childbirth, and other manifestations of human life will have to be rationed by the new standards to support the "sustainable development" of the proposed "brave new world."

Reducing the importance and role of the nation-state and its abolition is necessary for the beneficiaries of capitalism to pay fewer taxes. At the same time, it serves to increase the demand for goods and services provided to the population in many countries at the expense of these same taxes. I'm talking about removing the intermediary that reduces the efficiency of the capitalist system and adds unnecessary variables. In essence, the reanimation of Trotskyism should take place. Its idea is laid in a phrase: "The technology of establishing global power by eliminating the nation states and other organizations competing with the global power."

Desocialization and detaching from society makes each person unprotected in the face of global corporations, depriving him of the hope of receiving help and support from loved ones who could pass on to him specific necessary knowledge, experience, goods, or services. So, naturally, he will have to singlehandedly purchase everything he needs. As the consumer, he becomes much more reliable and efficient from the standpoint of making a profit from him.

That is why, under various glib excuses, there is an accelerated elimination of competitors of global corporations – small and medium businesses, personal and private property – with the transition to a supposedly more "advanced" sharing economy.

Deindustrialization is:

1) the redeployment of almost all sectors of the world economy into a vague and opaque sphere of environmentally safe production, plus the monetization of the environment to benefit elite globalists. As a result, there is a widespread change from traditional nature conservation activities to environmental extremism;

2) the accelerated reduction of industries and workplaces, creating a civilizational "digital concentration camp" with a global lockdown and payment of guaranteed basic remuneration. The minimum "rations" go to those who refuse to work;

3) the curtailment of the traditional (natural) production of agricultural products and a transition to genetically modified and synthetically produced foods, in particular a defective composition and the quality of artificial meat, which could be dangerous to human's health. One of the main arguments is that a cow is allegedly more environmentally hazardous than a car and an airplane since it emits many greenhouse gases, including carbon dioxide and methane, that is why the humanity will be supposedly compelled to renege on beef in the near future.

Decarbonization is the rejection of hydrocarbon fuels – oil, coal, natural gas – and CO_2 emissions into the atmosphere, replacing them with technologies purported to be green but ineffective and environmentally even more dangerous.

Decarbonization and deindustrialization are interrelated elements of the same program. In a broader view, they refer to the monetization of ecology and its transformation into capital. For example, people and businesses must pay for what we need most, such as water and air, the value of which becomes part of the surplus value. As a result, the demand for this product will stabilize, reducing the risk of overproduction. On the other hand, the slowdown in industrial development is a high road to a decrease in the population's real income. Consequently, a population reduction satisfies one of the goals of the "elites," also known as **depopulation.**

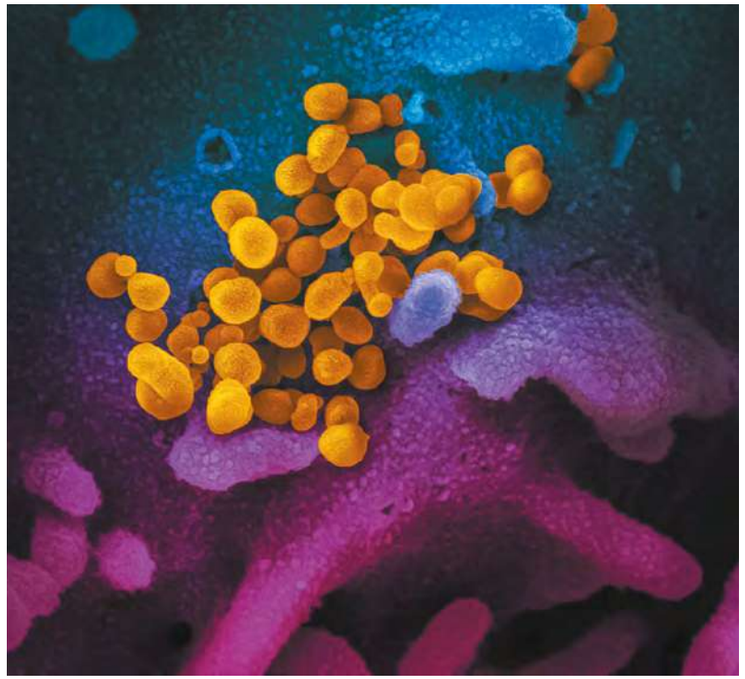
The "sustainable development" thesis of the Club of Rome assumes an accelerated reduction in the world population to the "golden billion," even down to 500 million. Hence the special operation we know as the COVID-19 pandemic has ebbed away at families, immunity, and the small- and medium-sized business ecosystem that is the lifeblood of many countries and cities.

Matrix RNA vaccination, yet to be adequately studied for long-term consequences, is supposedly the most "humane" self-imposed method, which logically fits into depopulation. Over time, this can lead to irreversible genetic changes in the vaccinated organism, negatively affecting the male and female reproductive organs. In its social essence, such "treatment" can be like a "velvet genocide" or prolonged murder.

In the theories we've been fed, vaccination leads to collective immunity, although, in the documents of the World Health Organization, this is called "herd immunity." To them, humanity is just a herd, in which it is necessary to replace the natural immunity created over billions of years of evolution with externally controlled artificial immunity. So, we get hooked on mandatory vaccination – a strong addiction – for a lifelong intake of questionable vaccines, constantly mutating. It will become another step towards turning people into cyborgs.

Depopulation is necessary because capitalism is a social system that only needs a small number of people to function due to the automation of production and similar innovations. Moreover, an excess of human biomass is dangerous for the system since those individuals who are not involved in production will nevertheless need goods and demand them. Therefore, it is better to optimize the size of the population, even at his own expense, in such a way that it would provide sufficient volumes of demand and involve producing what it consumes.

The Club of Rome – an international non-governmental organization created in April 1968 on the initiative of Aurelio Peccei, a prominent businessman, later a well-known public figure. The goal of the Club of Rome is to study the global problems of our time and draw the attention of the world community to them. It unites representatives of the world political, financial, cultural, and scientific elite.



The people should be able to feed themselves and simultaneously guarantee an increase in profits and luxury to the "global elites" but nothing more.

Looking further and describing a transition that has already happened, theorists say that humans are no longer the primary consumer of products. The actual situation today is simplified: one company produces metal and sells it to a company that manufactures robots. Then the same metal producers and other companies buy those robots as, for example, machine tools. In the end, robots make robots for robots. Humans may not be involved in these processes at all.

The world order described above is a global "digital concentration camp" and a part of overall "digital fascism." Such a system, offered to us as an image of an inclusive future, will be strictly ordered and self-sufficient. The main difference between such a "brave new world" and the existing world order is stability, as opposed to cyclicity. That is why globalists repeat the mantra "sustainable development" like a spell from black magic. At the same time, they use every effort to pretend that their actions are motivated only by global environmental problems and concern for people. Of course, the motivations are different, but ecology is a good product and perhaps the best planetary business resource available.

I have found evidence everywhere that what is happening, including the coronavirus pandemic, is part of a deliberate and steadily implemented program. For example, Prince Philip, the husband of Queen Elizabeth II, one of the ideologists of the decrease in the planet's population, talking about his rebirth back in 1988, said: "In the event that I am reincarnated, I would like to return as a deadly virus, to contribute something to solving overpopulation." How much do you have to hate humanity to say such a thing?

October 18, 2019. New York. "Event 201" is a pandemic exercise conducted by Johns Hopkins University with the participation of the Bill & Melinda Gates Foundation and the World Economic Forum

On October 18, 2019, months before the announcement of the actual pandemic, the Johns Hopkins Center for Health Security, the World Economic Forum, and the Bill & Melinda Gates Foundation held a pandemic exercise called "Event 201." Business, government, and medical representatives discussed the specifics of a coronavirus pandemic, which will spread from bats to humans. It was supposed that 65 million people would die from the infection over 18 months. The pandemic would continue until an effective vaccine was born or the number of recovered individuals reached 80–90%. At the same time, the world economy will collapse by 11%.

Information about this is publicly available, a script, videos from the scene, final recommendations, and more can be easily found. Although the exercise occurred months before the epidemic, the description of the situation came to fruition. An "esteemed" validity check expert, the British organization FullFact refutes the assertion that the exercise was a rehearsal for the COVID-19 pandemic. It is noteworthy that among the founders of FullFact are such companies as Facebook, Google, and the Open Society Foundations of George Soros. Interestingly, the same platform gets credit for refuting a series of scandalous news stories directly or indirectly related to the pandemic, depopulation, and the role of the "global elites" in them.

These facts include a widely circulated online quote dated 2009 and attributed to former US Secretary of State Henry Kissinger: "Once the herd accepts mandatory forcible vaccination, it's game over! They will accept anything – forcible blood or organ donation – 'for the greater good.' We can genetically modify children and sterilize them – 'for the greater good.' Control sheep minds and you control the herd. Vaccine makers stand to make billions, and many of you in this room today are investors... It's a big win-win. We thin out the herd and the herd pays us for providing extermination services. Now, what's for lunch, huh?" Kissinger, in 1974, prepared a secret report called "Memorandum 200," which said that population growth in the least developed countries concerns US national security. Therefore, the proposal came forth to give paramount importance to ensuring birth control and downsizing the human population. This document has formed the basis of the official policy of the United States since 1975, later declassified in the 1990s.

Regarding the rebuttals given by supposedly reputable organizations like FullFact, I believe this is part of an extensive information game in which IT corporations can play with the facts in any possible way. They banner whatever is convenient and do their bidding. If something is not profitable, they declare it fake, conspiracy, or elements of conspiracy theories. Who can stop them when the media, social networks, and search algorithms are all in their hands? They can even shut down the US President's account, as happened to Donald Trump. Shut up anyone they want. They can say anything, including calls for the physical destruction of entire states, their leaders, and their representatives. That is what the Facebook management did when they announced that they would not block messages suggesting the assassination of Vladimir Putin, Russian ministers, and the military. Whoever controls the information controls the world. They do today, which is precisely what biochemistry corporations do. Therefore, they may soon have as much total control over our bodies as they already have over our minds and senses today.

For 20 years, the "medical mafia" Big Pharma have been pursuing their goal to create a sustainable demand for their products within the framework of the new world medical order, in which a person is just a subject for experiments, something like a guinea pig. A vaccine is most suitable for this because its demand does not depend on market conditions. To do this, you must scare all of humanity, all 7.9 billion people, with messages like, "Get vaccinated! Or you will die." The demand has been secured for many years, necessitating the pandemic and a constantly mutating virus, combating which will require more and more vaccines. The coronavirus fits perfectly into this scenario. Vaccine production plants have already been built all over the globe. It is obvious that no one intends to give them up, and this was a long-term plan. Again, a prominent figure among the lobbyists is Bill Gates. The principal investor in the pandemic announcer the World Health Organization, the primary owner of the corporation that supposedly invented the cure for the virus.

The prices of the vaccines that have become indispensable can be raised over time, providing long-term profits for the owners of the WHO. This organization has become an effective tool for extracting profit from each of us within the framework of another anti-human program, "Bio-Digital Convergence," which is being developed and successfully implemented by the "global elites" in the framework of the 5D program of gradual transformation of people into convergent cyborgs.

The Problem of Global Overpopulation Is the Fig Leaf of Capitalism

The problems of exceeding the limits of growth and overpopulation of the planet, presented by globalists since the 1970s, are a smokescreen behind which they hide real issues: the growth limits of capitalist production and the limits of its human capacity.

Capitalism is a system in which the few thrive at the expense of the many; the center grows rich by using the resources of the periphery. The basis of the future post-capitalist system is that it will not be for everyone either. On the one hand, this "brave future" is intended only for the "brilliant million," next to which the "golden billion" of digitized indentured servants – bio-digital convergents – will subsist while serving.

On the other hand, production automation leads to the fact that the labor needs for capitalism come down to relatively low figures, and those involved in production are useful and get paid for their work; they are also consumers. But the remaining several billion are like annoying parasites who pose a real threat to the system because they can rebel anytime.

The more population there is that has to be fed by the capitalist system, the more unstable it becomes. Marxists call this the central contradiction of capitalism: the contradiction between the social nature of the production process and the private capitalist form of appropriation of the deliverables. Everyone exists within the system, but only a few can live well, and the more some cannot, the more likely it is that this poor majority will overthrow and destroy the wealthy minority.

That is why when the "global elites" talk about overpopulation, they are not at all concerned about the depletion of the planet's resources. They know that there are technologies today that may solve this multicomponent problem; it's how they take care of preserving their wealth and dominant position. For them, this is the real meaning of "sustainable development." They play with concepts to achieve their real goals. Regarding the limits of growth for capitalism, they talk about the limits of development in general, find ways to achieve their goals, and make money on this: their black magic. The plan of the global pseudo-elites becomes evident.

Therefore, a "new reality" is systematically being formed with a "modern-day serf," a human-like creature without properties which is easy to control and manipulate, at the level of animal reflexes, namely: asexual and soulless, without historical memory and identity, without conscience and morality, without a family and children, without goal-setting and the meaning of life. It only has a sense of consumption and is not so much real as virtual and emotional.

In these plans, one should not see any plot or conspiracy theories. There is no conspiracy. "Global elites" by masking our faces, the faces of billions of people worldwide, unmasked theirs. They do not hide their intentions; they talk about them openly. Anyone can see for themselves. One has only to set a goal and spend a little time. For example, you can read the book "COVID-19: The Great Reset" written by Klaus Schwab, one of the ideologists of globalism and the permanent head of the World Economic Forum in Davos. Below are just a few of his quotes from the mentioned book and from some other of his works.

"The world will no longer be the same, capitalism will take on a different form, we will have completely new types of property in addition to private and public. The largest multinational companies will take on more social responsibility, and they will take an active part in public life."

"Governments must also adapt to the fact that power is also shifting from state to non-state actors as well as... to loose networks... Increasingly, governments will be seen as public-service centers."

"The greater population growth is... the higher the risk of new epidemics."

"If both democracy and globalization expand, there is no place for the nation state."

"The containment of the coronavirus pandemic will necessitate a global surveillance network."

And so forth... And, for example, the UK Prime Minister, Prince of Wales, the President of the United States Joe Biden, and others do not hesitate to declare their consent to Schwab's talking points. Moreover, the heads of multinational corporations will also not object to such a program that expresses their interests.

In support of the above, we can refer to a detailed analysis of the utter futility of the socio-economic vector along which our civilization is developing, led by "deep power," as conducted in numerous works and speeches in the field of economics, nature management, ecology, sociology, and politics of such independent researchers as M. Khazin, V. Katasonov, O. Chetverikova, A. Fursov, V. Boglaev, I. Shnurenko, A. Dugin, S. Pereslegin, and others. I learned in detail about their views as well as their analysis of the global situation, our past, present, and foreseeable future during the pandemic, while in partial self-isolation in our EcoTechnoPark.

The developers of the Great Reset program plan to zero out the technocratic vector of human development, formed over many previous millennia, and to zero out the human technogenic civilization, the one to which we belong. Beneficiaries of capitalism, whose crisis as a system by its socio-economic nature has taken place over the past several decades, are trying to camouflage it as the crisis of humanity, the planet-wide technogenic society created in the era of capitalism.

As I delved deeper into the matter, it became crystal clear that the globalists paved the road to planetary civilizational hell with good intentions.

Earlier, back in the 1970s, when I read the Club of Rome documents, I could not have imagined that claims about limits to growth could lead "elites" to pursue artificial and aggressive population reduction and the destruction of the economic basis of the global community. I thought they were expressing concern and not like they were suicidal. How can we turn the history of civilization back? To give up everything humanity has worked so hard to achieve? And for what? The answer turns out to be shockingly simple. It is to preserve their power and privileges. For this purpose, they are ready to destroy everything. They can even commit liquidation of civilization because they, actual Satanists, have developed manic phobia (derived from ancient Greek φόβος, meaning fear or dread), a symptom, the essence of which is an irrational uncontrolled fear or stable excessive anxiety in certain situations or the presence of a particular known object. They apply this phobia to a person and a personality, people and society, society and the state, or industry and the biosphere.

The "global elites," led by the US and Great Britain, are ruining and obliterating countries and peoples with the hands of the world hegemon. Hence, Iraq, Libya, Syria, and Afghanistan – those states that did not want to follow the same path as the US and Great Britain – appeared unwanted. Nobody even remembers now the two atomic bombs needlessly dropped on Japan, the Korean and Vietnam wars.

An armed conflict between Russia and Ukraine is also primarily an act of the collective West, encouraging and provoking neighboring states into an open and bloody battle and fomenting it through an information agenda and the supply of a large number of weapons. On the one hand, Russia, which does not fit into the desired post-capitalist picture of the world, must be weakened, ruined, and then annihilated, which is what the Anglo-Saxons have been dreaming about for centuries. On the other hand, the destruction of the infrastructure of a large European country is to free up space for further expansion of funds on its territory (a massive new area that is 1/9 of the Earth's land) for the growth of neo-capitalism, also called inclusive capitalism. It will be necessary to restore the cities and roads, infrastructure and enterprises, which will mean financial and commodity turnover, the emergence of new markets, and so on. The fact that the young guys, the primary gene pool, are dying in the battles is quite in line with the depopulation strategy and helps solve the problem of overpopulation both in real time and in the future. After all, those who die will not father children.

Henry Kissinger dreamed of this, and I've mentioned it before: "We thin out the herd and the herd pays us for providing extermination services." In other words, let the Russians kill each other right "to the last Ukrainian," and we will help them in any way we can for the common good.

The "global elites" are destroying civilization not only directly but also by indirect means. First and foremost, this happens through the environmental movement with quotas and bans imposed around it. Such measures inhibit countries' industrial development outside the collective West's borders. Because of all kinds of ecological sanctions, it is too expensive for them to build and run factories. As a result, economic growth is slowing down, and living standards and quality of life are declining. Previously, at the time of Thomas Malthus, this factor was not decisive for the growth or decline of the human population, but now it turns out to be very important. All thanks to mobile digital devices and global information monopolies.

Many studies have already shown that the proliferation of smartphones and access to information directly affects people's perceptions of themselves, their lives, and how many children they should expect to have. As people scroll through their Instagram and Facebook feeds, they see pictures of the "beautiful life" and set their sights accordingly. They strive for comfort, want to build a career, and be successful, and having many children hinders rather than helps these plans, especially when the economy is stagnant and needs to meet new demands. The whole chain looks devilishly elegant. Due to environmental restrictions, there is no booming industry and no growing economy, but there is thriving informatization, which together leads to a decline in the birth rate. That is precisely what the pseudo-elites want. Thus, they throw off the human "ballast" from the biospheric ship we know as "Life on Planet Earth." Based on their vision of tomorrow, they deprive billions of people of the future – those, who have already been born but will not give birth and those, who won't be born in favor of Satan's false values and idols. Why false? Because they are contrary to life and nature, which are the essential criteria of truth, goodness, and beauty.

The idea that the future of civilization is seen only in a return to a state similar to primitiveness is unnatural and monstrous. Is it possible that the best thing for humanity would be artificial population shrinkage, replacement of humans with robots and artificial intelligence, and total control of conscious and physical life using digital and biochemical technologies?

The above implies the utmost removal, a departure from all organic and natural to all artificial and manufactured. And if nature is the criterion of all that is good – and I will tell you why – then the proposed course of action will lead to an absolute evil and Satanism in its purest form.

Life and nature are the criteria of truth, goodness, and beauty, because they rise above everything and have no more significant definitions and certainties than those inherent in them. Of all the living things that are conceivable to us, it's mankind that brings something else into the world apart from nature. In Christianity, this is called free will. And this ability not only to follow the laws of nature but also to use them for one's own needs and even to oppose them is the cause of man's evil, falsehood, and ugliness. So, for example, killing a living creature is not itself evil if done by nature's laws to obtain food. But murder committed by man for profit, power, or perverse pleasure is malicious, false, and ugly. In science, on the other hand, something corresponding to the natural structure of the object under study will be the only true statement. In art, it is beautiful only if it reveals the nature of the thing portrayed. Finally, in engineering, the most efficient device is the one that makes the best use of natural energy and produces minor damage to nature.

If life and nature are absolute reference points for man, they must be the same for all humanity and civilization. From this perspective, we, like all life, must strive to grow, multiply numerically, develop physically and spiritually, occupy new territories, and humanely, without disturbing or destroying them. It is necessary to increase production, expand the industry, extract and process more, and move faster. The main thing here, in the industrial vector of development of our multibillion civilization, is not to get into clinch with Live Nature, home to life for the last four billion years. Under the accepted thesis of nature as the criterion of truth, only this path is valid. But is it possible? Or have we exceeded the capacity of our planet? Or is it true that the only way for humans to follow nature is to turn against it? Perhaps to commit suicide or to destroy everything in creation? To limit and to emasculate ourselves? Does it turn out that humans generally represent some misunderstanding, a ridiculous mistake of nature, a dead-end branch of evolution?

The reader has guessed that my answer to these questions will ultimately relate to the need to industrialize and colonize space, by which we will have all the conditions for conservation and growth. Nevertheless, I was primarily interested in something else. Is it true that humans have no resources for further development here on Earth? Is it true that we have exceeded all possible limits of growth? Or is it just that the image of the future, as usual, is drawn based on the idea of the past? Is it not the case that those leading us into this "brave new future" are willing to sacrifice our lives rather than try to change the existing logistical, infrastructural, and economic systems historically shaped by very different conditions than our time? I have tried to look into these matters, and the results of my research have been staggering for me.

PART 9

Civilization Capacity of the Space Home Named Planet Earth

Criteria for the Limits of the Economic Capacity of the Earth's Biosphere

We can regard the limits of the economic capacity of the Earth's biosphere from the following three perspectives.

1. The biosphere is a living matter consisting of about a trillion species of unique, inimitable, and very complexly engineered living organisms, created by the Earth's nature as the Universe evolved over the past 3.5 billion years.

2. Terrestrial technogenic human civilization is a mega-society of 7.9 billion identities, created by a living organism (*Homo sapiens*) in the Earth's biosphere over the past two million years of the engineering (industrial) technologies development.

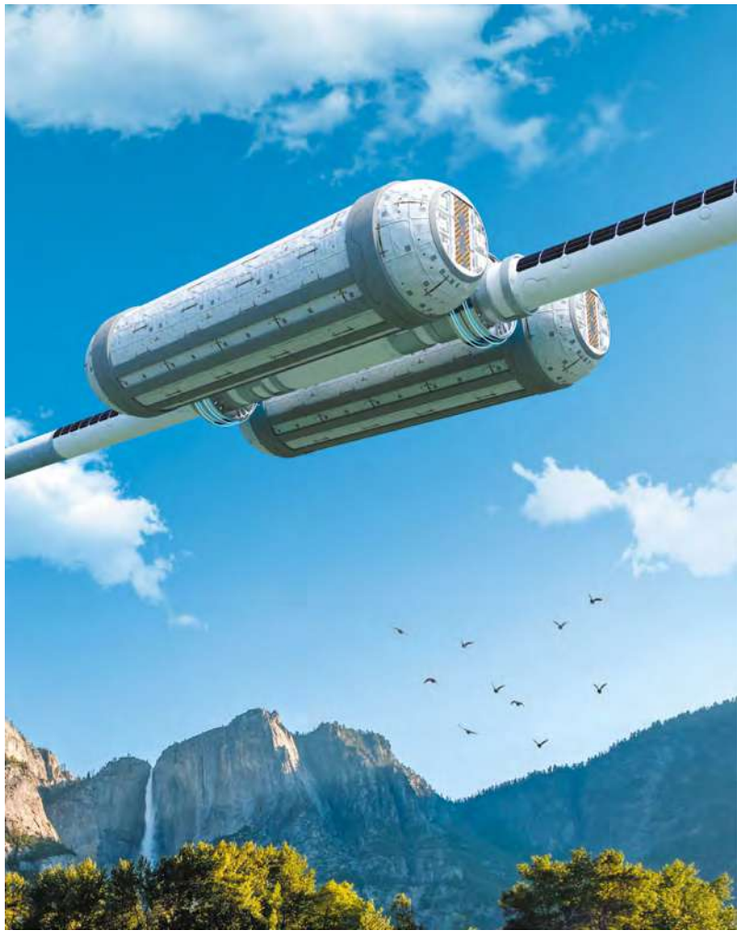
3. The technosphere (global industry) is a dead matter created mainly over the past two centuries (for the period when the Earth's population exceeded the mark of one billion people) by our technogenic civilization in the form of millions of primitive engineering technologies, each of which, from airplanes to smartphones, is millions of times inferior and less complex than even the simplest living being, a microorganism.

It should be noted that modern humankind and the artificial intelligence it creates are intermediate (but not final) biosphere products (between animal past and cosmic future) of the technogenic vector of the development of the Earth's human population. Therefore, neither can exist, sustain, and develop without the engineering technologies that gave rise to them.

Even in the distant future, sustainable development of our civilization is only possible due to new socio-industrial technologies friendly to the biosphere, and not through deindustrialization and total closing-up, or zeroing out, of existing industrial technologies.

We are not a civilization of dolphins, which, having very high intelligence and a shared language, possibly even more complex than that of humans, are nevertheless a population of animals that are entirely dependent on the environment since they have no science, art, civilized society, spirituality, or engineering and industrial technologies.

All existing industrial technologies hostile to the biosphere must either be reconstructed into biospheric technologies or, if impossible, removed from the planet and dispatched into a dead environment, such as near space.



2022. General Planetary Vehicle (visualization)

The concept of the biosphere's economic capacity is an unacceptable criterion for an objective analysis since modern human economic activity is based on existing industrial technologies, for which the main impetus for development and progress over the past few centuries has been for-profit, to grow GDP per capita in intangible, like digital, monetary terms.

Therefore, a system analysis must be performed based on physical, not virtual monetary characteristics, not by transferring modern parasitic and large-scale industrial technologies opposed to Live Nature into the future but by relying on the natural biosphere technologies we know but do not widely use. The main thing is that these technologies should befriend real Live Nature and the biosphere as a whole, instead of the virtual digital economy of artificial intelligence that went mad, where neither we nor Live Nature are a part.

The analysis must be performed based on the main physical criteria: matter, energy, and information, which are the primary resources as for the biosphere, where the humanity is a biological component, and for the technosphere, where the humanity is also an intellectual (informational) component but now as a planetary community – technogenic civilization.

The primary matter here is:

1) for humanity:

a) living fertile soil based on natural humus;

b) natural organic foodstuffs (that are grown in living fertile humus and that use almost the entire periodic table) as a source of energy and raw materials for the construction of any cell in our body;

c) clean, slightly mineralized natural drinking water that contains almost the entire periodic table. For instance, spring water contains about 1,000 dissolved minerals, as opposed to distilled water, which does not contain any minerals at all and is hazardous to human health;

d) clean atmospheric air containing life-giving oxygen (on average 20.9% by volume, 23.1% by mass), which is produced and quantitatively regulated by living terrestrial organisms;

e) every square meter of the Earth's surface and every cubic meter of soil and water is a living space that a long time ago, billions of years to be more precise, was occupied all over the place by the true planet's hosts: living organisms (mainly microorganisms). Our multicellular ancestors, including the primogenitor, learned, or rather evolutionarily adapted, to coexist with them peacefully many millions of years ago;

2) for the industry:

a) mineral raw materials, almost the entire periodic table;

b) energy and fuel resources;

c) clean atmospheric air, needed mainly just for oxygen, for processes such as fuel combustion;

d) process water, including distilled water or containing special process additives, usually life-threatening;

e) square meters of the planet's surface and cubic meters of soil and water, which is taken away from the life on Earth and polluted afterwards with dead and alien man-made waste that is dangerous for the living biosphere.

Since humanity has nothing to do with the creation of the terrestrial biosphere (it is only seen in attempts to destroy it), the biosphere itself is not viewed in this study as a subject of system analysis.

Living Earth's Resources and Their Criteria

The modern living biosphere of Earth created by billions of species on an otherwise dead planet, the third in a row from a "yellow dwarf" star on the outskirts of an unremarkable medium-sized spiral galaxy. Probably, life here arose by chance from a random set of chemical elements and due to a random combination of favorable physicochemical and natural climatic conditions. The probability of this emergence of life, super complex in terms of the structure and functioning of a living cell, is equal to zero (a more accurate mathematical probability: 10^{100} times less than the ratio $1 : 10^{100}$), but it did begin.

The evolution of the terrestrial biosphere took about 3.5 billion years while was regulated and governed by life and optimized by all the general planetary life and not by any single species of living organisms. First living organisms inhabited a new planet were blue-green algae (protozoal cyanobacteria).

The dead technosphere was created according to entirely different physical patterns; it is instead built around engineering technologies by only one of the types of living organisms endowed with intelligence, human, which also regulates, governs, and optimizes its evolution. The first complex engineering technologies that laid the foundation of the technological development of human civilization are the chipped stone tools created about 3.5 million years ago. But the most critical technological advancements happened about two million years ago; that is, the creation of fire and using it for cooking by burning one biospheric product, like wood from trees, in another biospheric product, oxygen from the air.

The biosphere and technosphere exist by different principles, though they occupy the same niche in space and time on our planet. Therefore, they struggle for resources, living (biosphere) and technological (technosphere). Therefore, it is necessary to distinguish between the following:

1) living matter and dead matter;

2) resources necessary for life and others for engineering technology;

3) energy for life and for industry;

4) space for life and, separately, for technological processes;

5) safety for living organisms and for industrial technologies;

6) information for the continuation and the development of life (material DNA molecules and genes, where both the carriers themselves – atoms of chemical elements of almost the entire periodic table, and their spatial combinations, that is the information directly are important)

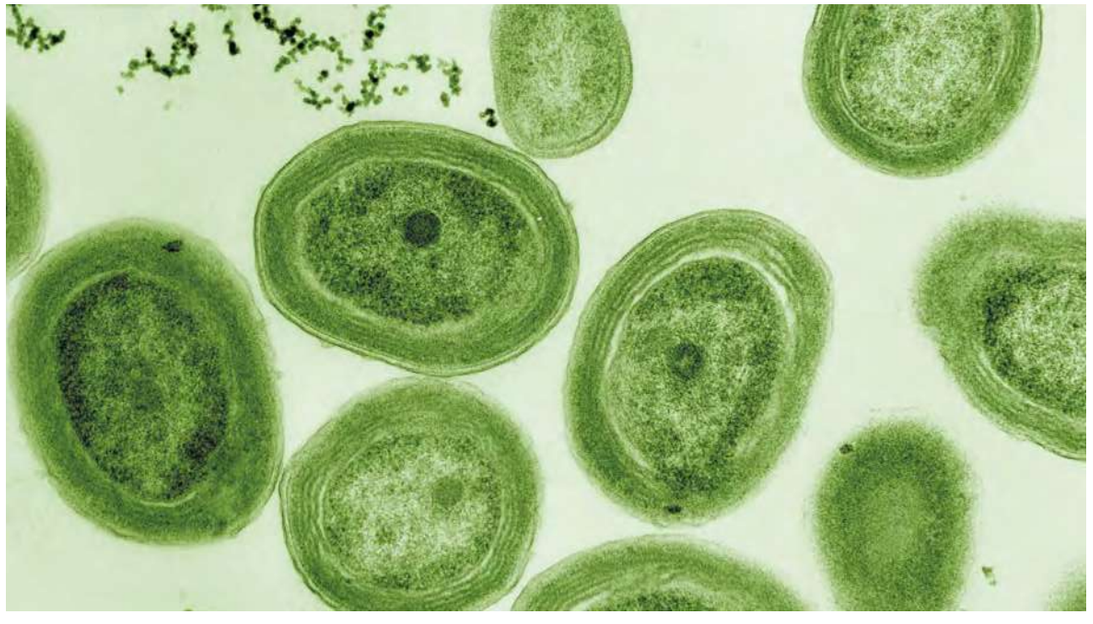
A yellow dwarf – a type of small stars with a mass from 0.8 to 1.2 of the solar masses and a surface temperature of 5,000–6,000 K. According to their name, correspondingly to the results of photometry, they have a yellow color, although subjectively their color is perceived by a person as pure white (hotter stars appear blue). The most famous yellow dwarf is the Sun. Other famous stars of this class: Alpha Centauri A, Alpha Northern Corona B, Tau Ceti.

and information for engineering technologies (virtual numbers recorded on physical media, where the media do not matter, but only the numbers themselves are important).

Both living beings (microorganisms, plants, and animals, including humans) and industrial entities (engineering technologies, equipment, buildings, structures, etc.) are open systems. They exchange matter, energy, and information with the environment on the same basic principles. At the point of entry to the system, they have resources; at the point of exit from the system, metabolic processes result in a product (or service) and waste. For example, a blast furnace that melts steel for forming, a car that provides transportation, or a cow that creates milk and meat.

At the same time, products we humans use and the resulting industrial and organic waste end up in the same environment, that is in the biosphere of the planet, from which the source raw materials were taken. For example, ore, coal, and aerial oxygen are raw materials for a blast furnace, while grass, water, and aerial oxygen are inputs for a cow. Therefore, no matter how "green" and "zero waste" we purport it to be, any industrial technology will inevitably pollute the living biosphere with dead products. The desire to create waste-free engineering technologies is equivalent to improving a cow to produce only milk and meat without generating any manure, urine, methane, CO_2, or other waste.

Life has changed and harmoniously adapted the inherently dead planet for itself, making it alive; the industry will inevitably change the living planet for itself, making it dead. It's just a matter of time. The only way out is to move the terrestrial industry, the technosphere, outside the terrestrial life, the biosphere. And there is only one place close to our Earth's civilization for processing dead raw materials into dead products without negative impact and pollution of the living Earth's biosphere. The area is called "near space," referring to the dead space surrounding the planet.



Biosphere Resources

The biosphere is the house in which humankind lives, which is only part of the entirety of Earth. We do not inhabit the entire biosphere but only the uppermost part of the Earth's crust and the lowermost part of the Earth's atmosphere, from the roots of trees to their tops, which has a relative thickness of about 1/100,000 of the planet's diameter. It is the thinnest living film, the delicate "skin of the planet," where practically all the Earth's life is located and where humans have placed the bulk of the Earth's industry, except for planes, rockets, and submarines that are in motion performing transport work. Both terrestrial life and the terrestrial industry use the main types of resources from this part of the biosphere.

Humanity is like one large family of almost eight billion individuals inhabiting one huge communal room of this terrestrial house, the biosphere, which has no windows, doors, or partition walls, where Live Nature originally birthed billions of other rightful families, the species of living organisms.

The composition of the cells of any living organism includes 86 chemical elements of the periodic table – macro-, micro-, and ultramicroelements (25 of which are required for the normal functioning of the organism, and 18 of which are indispensable) that are usually found in complex organic compounds, typically acquired through food.

Water is the most important biospheric mineral resource for the birth and existence of any of the Earth's living organisms. H_2O makes up, on average, about 75% of the mass of any living cell; therefore, the main chemical element of the cell by weight is aqueous oxygen, and after evaporation of water, it is about 60% carbon by weight. Land plants, which account for 98% of all Earth's biomass, take this fundamental chemical element required for building cells from the carbon dioxide contained in the atmospheric air. Therefore, atmospheric CO_2 is also an essential biospheric mineral resource.

Each living organism, as noted above, is an open system and, accordingly, a participant in biospheric metabolism. It consumes food, water, and air from the biosphere and discharges its biowaste into the soil, water, and air. Organic waste, in turn, becomes food along the chain from some types of microorganisms, through flora and fauna, to other microorganisms. Therefore, the simplest forms of life are the beginning of food chains and their end; therefore, communities of microorganisms, primarily soil ones, are the basis of all biospheric processes. They are the leading creators of the Earth's biosphere.

86
chemical elements
are part of any living organism's cells.

Oxygen (and as a derivative – the ozone layer) has also become an intermediate waste of biospheric metabolic processes; it has become an indispensable atmospheric mineral resource for most contemporary species of organisms, primary for fauna, including humans.

Generations of sponges, myriads of bacteria and algae are the actual creators of the modern Earth's crust, including the accumulated reserves of sediment, chalk, iron, and even gold and diamonds. Almost all organisms need phosphorus, calcium, and, of course, carbon. The creation of a limestone skeleton (like corals or ancient archaeocyaths) occurs with the release of carbon dioxide, so the greenhouse effect was a by-product of the construction of reefs in ancient times.

For example, coccolithophorids absorb calcium from water and sulfur dissolved in it. It is required to synthesize organic compounds that increase the buoyancy of algae and allow them to stay close to an illuminated surface. When these cells die off, the organic matter disintegrates, and the volatile sulfur compounds evaporate along with the water, serving as a premise for forming clouds in the planet's atmosphere. One liter of seawater can contain up to 200 million coccolithophorids. Each year, these unicellular organisms diligently supply up to 15.5 million tons of sulfur to the atmosphere, more than all volcanoes and all terrestrial transport.

Even lighter continental plates were formed largely thanks to living organisms, which changed the planet's tectonics by transforming volcanic rocks into other minerals. As they moved, heavier oceanic plates began to dive under lighter continental plates. There, in the hot bowels of the planet, they melt in this natural chemical reactor at a depth of 120–180 kilometers, forming diamonds from dead organic matter, like ocean-bottom sediments, which are then carried out by volcanic eruptions through kimberlite pipes to the surface of the Earth's crust.

It should also be noted that the energy flow produced by living organisms on Earth is 30 times higher than the geological flow of energy.

Ultimately, living organisms, using solar energy, process all kinds of dead matter from the planet into living matter, the organic waste product of which is silt, also known as sapropel, which is the bottom sediments of freshwater reservoirs, as well as soil humus, which is the basis of Earth's fertile living soil.

All biological resources are renewable and infinite due to the circulation of matter, energy, and information in the Earth's biosphere. Only the Sun's energy is external to the biosphere. Therefore, life on the planet will exist in various forms for at least another five billion years until our star dies.

Thanks to the Sun and atmospheric oxygen, another irreplaceable waste by-product has been formed in the Earth's biosphere: the ozone layer. Without it, life on the planet (primarily on land) would be impossible due to the harsh ultraviolet radiation of our star. The ozone layer is in dynamic equilibrium, and its enemy is stratospheric aircraft and space rockets. One blast-off of a heavy launch vehicle burns out a tunnel the size of France in the ozone layer and destroys about 10 million tons of ozone. One hundred frequent launches can destroy it, which I wrote about in my articles 40 years ago. While such ozone holes can gradually heal under the influence of solar radiation and the production of new ozone, the harm from them is apparent and enormous.

About
10
million tons of ozone
is destroyed by one start of a heavy launch vehicle.

Living Matter and Humus as a Resource

Humus in the soil is the main biospheric waste and, at the same time, is the leading food resource of organic origin for the flora – about 98% of all terrestrial biomass – containing all the chemical elements necessary for life in the form of the most complex sets of organic substances. However, the main thing is: each kilogram of fertile humus provides working space for about a trillion toilers, the most complex symbiosis of tens of thousands of species of soil bacteria and microorganisms, without which the mere existence of biogeocenoses would be impossible.

The food chain of all terrestrial life originates in the soil. Some microorganisms accumulate insoluble humic compounds; otherwise, the nearest rain would wash out all the food from the soil. Others convert them into a soluble form while feeding and watering the plants since they live not only in the soil but also in the roots and the aerial part of plants. At the same time, they have a relatively narrow area of expertise since they produce thousands of various organic substances, which include more than 80 chemical elements of the periodic table, without which the existence of any multicellular organisms, including humans, is impossible.

In essence, the living fertile humus of the Earth's soils is not only the primary biosphere resource but also the main component of the global immune system, feeding, watering, and healing the biosphere and, consequently, humans through healthy, wholesome, and salubrious food, grown on this soil. The health of flora and fauna, including humans, depends on the health of living fertile soils, which are almost everywhere destroyed by tillage, chemical fertilizers, pesticides, and industrial pollution. In particular, the weakened immune system of the biosphere and humans are the causes of the emergence and spread of epidemics and pandemics.

Humus is an irreplaceable biosphere resource, and the leading biosphere food since some types of microorganisms process a variety of dead organic matter into insoluble humus, accumulating it in the soil. In contrast, others convert it into a soluble form and feed the plants.

In the Earth's biosphere, about 200 billion tons of dry organic matter, or about one trillion tons on a live-weight basis, are produced annually in photosynthesis, and about the same amount dies and disintegrates. If only 1% of this annually dying organic matter (equal to about 10 billion tons in live weight) is converted into food by transforming it into living fertile humus (including through cow stomachs) in which agricultural products are grown, then these organic products (without the use of GMOs and chemistry) can feed the entire future Earth's population of 10 billion people, which is justified below.

In 500 million years of active photosynthesis alone, the biosphere produced 200 billion tons per year × × 500 million years = 10^{20} tons (equal to 100 million trillion tons) of dry organic matter. If this organic matter had not been involved in the biospheric circulation of living matter, then at a density of one ton per cubic meter, like coal, the layer of this organic matter on the planet and its bodies of water would have had a thickness of about 200 kilometers, six times the average thickness of the Earth's crust. Therefore, the powerfully transformative force of life is evident in the geological formation of the modern Earth's crust and continents.

Should we evaluate this resource in monetary terms, the minimum cost of delivered biosphere products, including dry organic matter and the derived humus, at a minimum price of $100 per ton, will be (for the past 500 million years): 10^{20} tons × $100 per ton = 10^{22} ($10 billion trillion). This is the minimum cost of the organic component of the Earth's biosphere, including reserves of humus, sapropel, shale, coal, oil, natural gas. In essence, we live on the waste of billions of generations of billions of species of living beings for billions of years.

Atmospheric Oxygen as a Resource

The living organic matter of the biosphere contains 16 trillion tons of oxygen, and the upper layer of the ocean contains eight trillion tons. The atmosphere contains 1.4×10^{15} tons, or 1,400 trillion tons (or 87 times more than in living organisms), including about three billion tons (0.00021%) that make up the ozone layer. The atmospheric cycle of oxygen takes 4,500 years.

The annual photosynthesis of oxygen by the biosphere is more than 310 billion tons. Of these tons, there is annual expenditure as a resource:

1) for biospheric needs: aerobic respiration requires 230 billion tons, and microbial oxidation (decay) needs 51 billion tons;

2) for industrial needs (anthropogenic respiration): burning fossil fuels and nitrogen fixation in the production of mineral fertilizers requires 12 billion tons (or 4% of the oxygen produced on the planet);

3) for other losses: photochemical oxidation, chemical erosion, nitrogen fixation of lightning, oxidation of volcanic gases, and more, amount to about 20 billion tons, which significantly exceeds its expenditure for the entire Earth's industry.

Over the past 2.5 billion years of the biosphere's evolution, oxygen photosynthesis has produced more than 5×10^{20} tons of oxygen, equal to 500 million trillion tons. The oxygen released during photosynthesis radically changes our planet, the atmosphere and the lithosphere. It was almost immediately spent on the oxidation of rocks, mineral compounds dissolved in the oceans, and gases of the primary atmosphere. For example, most modern iron ore deposits result from oxidation over billions of years of iron compounds dissolved in water and their sedimentation.

Based on the efficiency of the biosphere, an increase in the productivity of photosynthesis by only 5% will increase the production of atmospheric oxygen by 15 billion tons per year, which more than outweighs its expenditure for anthropogenic respiration. In turn, plant productivity can be grown by increasing the content of anthropogenic carbon dioxide in the atmosphere, including that resulting from the operation of relict solar biopower plants in linear cities, which I will discuss in detail below.

Water as a Resource

The total amount of water on the planet is 1.39×10^{18} tons (1.39 million trillion tons), which is 275 times the mass of the atmosphere but is only 1/4,000 of the mass of Earth. Salty ocean waters make up 96.4% of the volume of the hydrosphere, and fresh waters make up the rest, including glaciers (1.86%), underground water (1.68%), and surface water on land (0.02%).

The mass of water vapor in the atmosphere is 14 trillion tons (about 0.001% of the mass of the hydrosphere, or 0.27% of the mass of the atmosphere); however, the importance of water vapor for life on the planet

is difficult to overestimate, because the atmosphere is the main desalinator of salty seawater. Analysis shows that 450 trillion tons of water evaporate from the surface of the oceans per year, which equals a layer 1.25 meters thick. Another 71 trillion tons of water enters the atmosphere, evaporating from the land's surface. Simultaneously, the same volume precipitates on the planet's surface, an average of about 1,020 millimeters per year. That is why the ocean's water level is stable and practically does not change due to its evaporation.

The colossal amount of thermal work that our nearest star on the planet has until now carried out staggers the imagination. Over 3.5 billion years since the appearance of life, the Sun has evaporated such an amount of water on Earth which would fill an ocean the size of the planet's surface area, with a depth of more than three million kilometers, or eight times greater than the distance from Earth to the Moon.

The transformative power of living organisms is no less grandiose in scale for the evolution of our planet, including for its water balance, which can be understood from the following example. If all the oxygen produced by living organisms weren't part of the biospheric circulation but were removed from the atmosphere and expended only for the oxidation of hydrogen and the production of water, then a layer of liquid 0.5 millimeters thick would appear on Earth in a year, and 2.5 billion years of active photosynthesis would form an ocean covering the entire Earth with a depth of more than 1,000 kilometers.

Therefore, it is possible that the bulk of water on our planet was not brought by comets from space, as it is generally accepted, but was formed by the oxidation of hydrogen constantly entering the atmosphere from the depths of Earth due to degassing of the Earth's core. The same processes are happening today. Therefore, ice melting and global warming are not the only processes involved in the rising ocean level today but a product as well of water generated by the Earth's biosphere.

Humanity annually consumes about 11 trillion tons of water: from river flows for irrigation – about six trillion tons, for industrial purposes – 4.1 trillion tons, for household needs – 0.9 trillion tons, which is only 2.1% of the world's precipitation. So, all humankind's demand for freshwater can be met from precipitation (rain and snow) plus additional condensation of water vapor from the air at the place of its consumption (for reduction of the water transportation cost). This can be implemented in the linear cities described in detail below. There are no large consumers (neither agricultural, nor industrial, nor household), as it was previously in rural areas when all water needs were met from small sources – wells, springs, streams, shallow boreholes.

Technological Resources

The primary resources for the industry are mineral raw materials (ore, stone, sand, and more), energy raw materials (coal, oil, gas, and more), and various substances taken from the environment for the implementation of technological processes:

– aerial oxygen, as the most accessible oxidizer in fuel combustion in internal combustion engines of cars, airplanes, and ships as well as in thermal power plants, boiler houses, blast furnaces, etc. Depending on the fuel type and combustion technology, one requires 2–8 times more oxygen by weight than the fuel itself (for example, two times for coal, eight times for hydrogen) and 10–40 times more air, respectively;

– water, as the most accessible universal solvent and the primary liquid medium for most chemical and technological processes.

The extraction of non-renewable minerals and building materials on the planet has already exceeded 60 billion tons per year (about eight tons per inhabitant) and continues to grow. Of these, there are more than 10 billion tons of ore, including iron – 2.4 billion tons and copper – about four billion tons. Cement production reached five billion tons per year, and concrete exceeded 30 billion tons.

More than 15 billion tons of raw energy resources are mined annually, including about eight billion tons of coal, 4.5 billion tons of oil, more than three billion tons of natural gas, including shale gas. The fuel is then burned using air, which contains its oxidizing agent, oxygen. At the same time, the total rated capacity of energy equipment on the planet using fossil fuels, including thermal power plants, boiler houses, and all types of vehicles (road, rail, aviation, sea transport, rockets, and other), exceeds 100 billion kilowatts. This equipment is extremely resource-needy, excessive in power, and is used in average only for 10–15% (for example, cars are not loaded both in terms of capacity and time).

The extraction of construction sand on the planet has exceeded 11 billion tons; of gravel (stone), including for concrete manufacture – 20 billion tons. The scope of earthworks (with the movement of soil for tens and even hundreds of kilometers) during the construction of roads, factories, power plants, buildings, structures, and other infrastructure facilities (mainly in cities) exceeded 30 billion tons per year.

According to my estimates, the scope of strip mining and remediation work in the extraction of mineral raw materials reached 300 billion tons per year, with an average overburden ratio equal to five tons for each ton of mined mineral raw materials.

The total rated capacity of energy equipment on the planet using fossil fuels exceeds

100 billion kilowatts.

Therefore, about 400 billion tons of minerals are mined, processed, and transported annually over an average distance of several tens of kilometers. About 300 billion tons are ordinary soil, including rocky soil, which goes to the dump, meaning that's how the best part of the fuel consumed by the equipment is spent. At the same time, certain raw materials and resources are transported using inefficient, outdated, and environmentally hazardous transport over distances exceeding 10,000 kilometers.

On all the continents, resource mining and construction industries leave a vast number of "scars" on the "Earth's living skin," primarily on the fertile living soil, which comprises an average thickness of about 40 centimeters thick and equal to only 1/30,000,000 of the size of the planet. More and more sores appear on the thinnest "planetary skin," which is why it cannot be healthy. I'm referring to huge concrete-asphalt megacities, many kilometers of quarries, mines, and boreholes, high and extensive dumps, elongated embankments, and road cuts (more than 60 million kilometers, 15,000 lengths of the equator), which are changing the terrain, destroying soil fertility, and deteriorating their biogeocenosis and hydrology, the movement of surface and ground waters. For example, the land, a size five times that of Great Britain, has already been "paved over" and "buried" under railway sleepers only to build the roads on the planet.

The mass of annually mined and transported mineral resources in the planet's biosphere is currently two times higher than the generation of living matter (about 200 billion tons of dry organic matter per year); therefore, it is here that the technosphere's most significant impact and influence on the Earth's biosphere.

Humanity must cardinally revise its attitude, not just to all industrial technologies but also to technologies for the extraction of minerals (not just to the volumes of their extraction). Likewise, we must change how we pursue the construction of roads in a linear embankment so that the volume of extracted and moved minerals on our planet is reduced by at least an order of magnitude.

The leading consumer of industrial resources today, both mineral and energy, are cities that are intensively built up and expanded. In the cities, there is also the primary end user of the energy generated on the planet, including the lighting, heating, and air conditioning of buildings, fuel combustion produced by cars, and even the consumption of electric power by electric vehicles.

All technological resources are finite and non-renewable due to the lack of circulation of substances, energy, and information in the man-made technosphere. The main reason is that it does not have myriad microscopic

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equivalent robots working at the atomic and molecular levels, such as microorganisms in the Earth's biosphere. If they were present, they could close local trophic industrial chains. The waste from engineering technologies, without any additional transportation and additional costs of energy and other resources, would become raw materials for other engineering technologies, and industrial (as well as biospheric) resources would become renewable.

The terrestrial industries will continue to exist until they convert all the resources they need into industrial waste thrown into the biosphere. And it doesn't matter whether the resources run out or the pollution destroys the biosphere because, in all of these scenarios, any technogenic civilization will forego its future on its home planet. It will inevitably fade away and then die. According to some forecasts, this can happen on our planet as soon as this century if the vector of civilization's technological development is not changed and the environmentally dangerous part of the terrestrial industry is not taken into space. Only such a vector of development will give our technogenic civilization access to the infinite resources of the Universe, including mineral, energy, spatial, and technological (weightlessness, deep vacuum, technological purity, and more).

Certain raw materials and resources are transported using inefficient, outdated, and environmentally hazardous transport over distances exceeding
10,000
kilometers.

The greenhouse effect – a rise in temperature on the surface of the planet as a result of thermal energy that appears in the atmosphere due to the heating of gases. The main gases that lead to the greenhouse effect on Earth are water vapor and carbon dioxide.

Greenhouse Gases in the Earth's Atmosphere and the Global Greenhouse Effect

The greenhouse effect on the planet is due to the presence of polyatomic gases in the surface layer of the atmosphere. These gases are opaque to thermal radiation and include water vapor, carbon dioxide, methane, ozone, nitrogen oxide, freon, and others.

Water vapor, of which there are 12.7 trillion tons in the Earth's atmosphere, is the most active greenhouse gas in terms of its contribution to the planet's rising temperature. Its contribution to the total greenhouse effect on Earth, reaching 32 °C, is 20.2 °C, compared to the 7.2 °C that carbon dioxide contributes.

The greenhouse effect on Earth now is, on average, up to 78% due to water vapor and only up to 22%, or 3.5 times less, due to carbon dioxide. Contributions from other gases, including methane, is negligible. That being said, in terms of one ton of gas in the Earth's atmosphere, the greenhouse efficiency of one ton of carbon dioxide is only 1.5 times higher than the greenhouse effect from one ton of water vapor.

Without greenhouse gases, the average temperature on Earth would be about –18 °C, compared to today's average of about 15 °C, meaning that rivers and seas would permanently be frozen, and there would be no plants on land.

Emissions of industrial water vapor, like that from cooling towers of nuclear power plants, are not so harmless because each ton of steam entering the surface layer of the atmosphere is equivalent in terms of the greenhouse effect to 0.67 tons of carbon dioxide. Therefore, the environmental friendliness of a nuclear power plant is an illusion not only because of problems with radiation but also due to climatic factors, since for every kilowatt-hour of electricity generated at a nuclear power plant, 3.6 kilograms of water vapor is released into the surface layer of the atmosphere. For example, in 2015, Russian nuclear power plants emitted 730 million tons of water vapor into the atmosphere. In terms of CO_2, that equals about 490 million tons of carbon dioxide, which significantly exceeds greenhouse gas emissions by all Russian transport, including cars.

Additional sources of water vapor entering the planet's atmosphere count in billions of tons per year, including evaporation from waters used for domestic needs (180), evaporation from industrial waters (800), from river flows for irrigation (5,400). The total CO_2 equivalent expressed as a global greenhouse effect equals more than 4,000 billion tons of carbon dioxide.

Considering that the greenhouse effect from one ton of water vapor in the atmosphere is only 1.5 times less than CO_2, the impact of anthropogenic activities on the water vapor circulation and its contribution to the greenhouse effect is 140 times greater than the carbon coming from all industries on Earth, including transport.

Today, it is more important for humankind to optimize water consumption in everyday life, industry, and agriculture to organize a successful fight against global warming. It is more significant than, for example, at the behest of globalists, to redirect our efforts to "carbonic windmills" because the decarbonization program promoted by globalists pursues completely different goals, nourishing their obsession with global warming.

The entire multimillion-year-old history of the development of life on our planet evidences that carbon dioxide is not the main climate-forming factor. For example, 250–320 million years ago, in the Carboniferous period, the concentration of carbon dioxide was two times lower than it is now, but the average temperature was 10 °C higher. While 150–200 million years ago, the content of CO_2 was almost an order of magnitude higher than now – 0.3%, and 400–600 million years ago – even 0.6%, while there was no global warming, on the contrary, almost the entire planet was covered with ice.

Without greenhouse gases, the average temperature on Earth would be about

–18 °C.

Safe Carbon Capacity of the Earth's Atmosphere

The total carbon dioxide in the Earth's atmosphere today is 3.03 trillion tons, or about 0.038% of the total mass of the planet's atmosphere. Of that, 550 billion tons annually dissolve in seawater and transform into living matter due to photosynthesis. On average, all atmospheric CO_2 participates in the carbon planetary cycle every five to six years.

The creation of organic matter annually consumes about 300 billion tons of carbon dioxide (about 10% of the CO_2 in the atmosphere). Most carbon dioxide returns to the atmosphere and hydrosphere due to the oxidation of once-living organisms and their waste products.

The most significant amount of free carbon dioxide (140 trillion tons) in the biosphere is in the ocean's upper layer, which is 46 times more than in the atmosphere.

Due to the creation of organic matter in the Earth's biosphere, it should be noted that the carbon cycle is completely closed. Only an insignificant part of the total organic carbon absorbed by plants annually passes into the lithosphere and leaves this cycle.

Studies have shown that the current level of carbon dioxide in the Earth's atmosphere for effective photosynthesis is 2–3 times lower than the optimal one. The data on the optimal levels of CO_2 in commercial greenhouses is cited at levels of 0.1–0.12% or more. Based on this, we can conclude that there is a shortage of carbon dioxide in the Earth's biosphere by hundreds of billions, if not trillions of tons.

An increase in CO_2 concentration in the atmosphere is caused not so much by industry and transport as by its return from sediments in the ocean and on land due to an increase in the average temperature on the planet. It increases crop yields and promotes the growth of forests, meadow plants, fish, crustaceans, mollusks, algae, and corals in the ocean.

Therefore, the current global level of industrial CO_2 emissions (about 30 billion tons per year, or about 1% of its content in the atmosphere) will affect the greenhouse effect at a maximum of 1% of the previously mentioned 22% carbon dioxide impact on the climate, for a total of a mere 0.22%. This is significantly lower than the margin of error in measuring the average temperature on the planet and the average CO_2 content in the atmosphere. An additional greenhouse effect will manifest only if this industrial carbon dioxide remains liberated instead of being bonded by green plants or technologies in industrial regions or dissolved in the ocean.

Therefore, the recently vilified anthropogenic CO_2 is entirely safe for the biosphere and not only is not excessive but does not even make up for the carbon deficiency in the Earth's atmosphere.

It is important to remember that the dry matter of any organism, not including the oxygen and hydrogen contained in all living cells, is about 60% carbon. Carbon is the main chemical element of life on Earth, including humans. The food chain for carbon begins precisely in the atmosphere, where it should be present in sufficient quantity from the viewpoint of the evolution of the living biosphere, not the dead technosphere created by human civilization or artificial intelligence, which does not need a biosphere at all.

The global volume of industrial CO_2 emissions is

30 billion tons per year,

or

1%

of its content in the atmosphere.

Energetically Safe Capacity of the Earth's Biosphere

World Energy Consumption

The term "world energy consumption" refers to the total energy consumed by our civilization. It includes all the energy obtained from all energy resources and used in all industrial and consumer sectors of the world economy. This measure of consumption is an essential indicator of a technogenic civilization's level of development in the productive-economic and socio-political fields.

The average solar energy density at the outer edge of the Earth's atmosphere is 1.366 kilowatts per square meter. It has already been calculated that without this energy – imagine, for example, the Sun suddenly dying – the Earth's atmosphere would drop to –20 °C over a week and then to –73 °C over a year. After a few years, the temperature on Earth will drop to –240 °C and remain at this level.

The prevailing opinion is that over the past 2,000 years, when the Earth's industry appeared everywhere and started to develop intensively, solar radiation was stable, with variations within a 0.2% range. Such variations in the intensity of solar radiation will amount to only 2.732 watts per square meter, which, with a cross-sectional area of Earth of 130 million square kilometers that includes the atmosphere, provides fluctuations in the power of external energy falling on the planet of 350 billion kilowatts. This value exceeds 167 times the total rated capacity of all power plants worldwide, equal to 2.1 billion kilowatts. With a population of eight billion people in 2022, this amounts to only 0.26 kilowatts of electric power per inhabitant of the planet.

The same fluctuations in the power of the planet's extrasolar energy supply from the technogenic civilization will be acceptable in the future and will not lead to global environmental problems. Moreover, the power of solar energy reaching Earth is unstable over time due to changes in the distance to our star (from 147 million kilometers in January to 152 million kilometers in July). Such fluctuations in a year account for a 6.9% change, which is 34.5 times greater than the 0.2% mentioned earlier. Besides, the luminosity of our star increases by 1% every 110 million years due to the accelerated combustion of hydrogen (the power of solar energy reaching Earth grows at the same time by 1.78 trillion kilowatts). Therefore, in 4–5 billion years, the Sun will go as far as turning into a red giant, expanding, and simply swallowing Earth.

The capacity of current energy consumption, considering the combustion of the nuclear power industry and hydrocarbons, is more than 20 billion kilowatts, or 2.6 kilowatts for each inhabitant of the planet. Combined with an increase in the future power of energy consumption per capita to five kilowatts (with the annual energy consumption of 43,800 kilowatt-hours per person), the safe capacity of the terrestrial power industry is 350 billion kilowatts / 5 kilowatts per person = = 70 billion people.

The power of modern energy consumption is more than **20 billion kilowatts.**

At the same time, at least 1/2 of this energy is currently consumed by the industry through transport, metallurgy, chemical production, fuel for the production of agricultural products, and other types of production. That's why we optimize the industrial technologies remaining on Earth by moving the environmentally hazardous part of the industry outside the biosphere and into near space. Primarily those concerning transport and infrastructure, power, and agriculture. The result would be that the energetically-safe civilization capacity of the planet's biosphere will increase at least two times, accommodating up to 140 billion people.

With a future Earth's population of 10 billion people, the power capacity that is safe for the biosphere will therefore be 350 billion kilowatts per 10 billion people, equaling 35 kilowatts per person. This amount is 13.5 times higher than the current per capita power consumption of the entire terrestrial technogenic civilization.

Optimization of Biosphere Energy Resources

Shale's total global biosphere reserves are estimated at 650 trillion tons, and brown coal is estimated at 4.9 trillion tons. The organic matter of oil shales is formed from the biomass of predominantly non-vascular algae (sapropel components), and to a lesser extent, from land plants (humic components) and partially animal organisms. The content of organic matter, including proto petroleum, in shales is, on average, 45% varying from 10% to 80% in different fields.

The mass of organic matter in brown coals and oil shales can be estimated at 295 trillion tons with an average specific heat of combustion of 33 megajoules per kilogram (Qbdaf = 29–37 megajoules per kilogram), or an average of 9.17 kilowatt-hours per kilogram. These reserves of oil shale and brown coals are sufficient to generate approximately 2.7×10^{18} kilowatt-hours of energy, of which 1.2×10^{18} kilowatt-hours is electricity, equal by 45% to the efficiency factor of a coal-fired thermal power plant. Then, with an average annual power consumption of energy of five kilowatts per person, where 2.25 kilowatts per person

With an average annual power consumption of energy of 2.5 kilowatts per person (after the Earth's technosphere is brought into near space), oil shale reserves will provide 100% of energy for the Earth's population of 10 billion people for

10,800 years.

is electric energy and 2.75 kilowatts per person is heat, oil shale reserves will provide 100% of energy for the Earth's population of 10 billion people for about 5,400 years, and at 2.5 kilowatts per person for 10,800 years.

Relict Solar Bioenergy (RSBE)

It should be noted that the energy stored in brown coals and oil shales is relict (ancient) solar energy created by living organisms that lived on the planet 100–450 million years ago. Therefore, oil shale and brown coal can be used not so much for generating electrical and thermal energy but for producing relict living humus. This being the basis of the fertility of any soil, biohumus will have the same chemical composition as an ancient tree that took everything necessary for life from the relict soil.

It is proposed that we should not burn fossil fuels completely; instead, perhaps 50–75% at most. The combustion waste from fossil fuel burn, including ash, slag, sludge, dust, and flue gases, must be mixed with the unburnt 25–50% of shale or brown coal, plus any raw organic materials, like grass, peat, sawdust, manure, or household compostables. The resulting multicomponent mixture, in which organic and mineral raw materials are present, is finally processed into living fertile humus in bioreactors using specially selected communities of aerobic and anaerobic microorganisms.

The resulting relict biohumus can be added to the soil at a level of 2–3%, which, with this proportion, would make even the most barren desert sand fertile. Ideally, highly fertile soil could be created around

the power plants, on which, for example, gardens can be planted. In this vision, produce like grapes, apples, and other agricultural products become the net positive "waste" of the operation of relict solar biopower plants.

This is easy to achieve, as more than 80 chemical elements that make up all terrestrial living organisms, including ancient plants, turned into coals and shales in prehistoric times, and all of them again, through the restored relict soil, will give new life to new organisms in 100–450 million years only.

Traditional thermal power plants emit, for instance, sulfur into the atmosphere, causing acid rains that kill all life in the vast areas it touches. But sulfur belongs to macroelements and is vital for all living organisms. For example, the daily amount of sulfur an adult requires is four to five grams (our body contains about 100 grams of it), and it should enter the body of a plant, animal, or human, not in the form of acid rain but in the form of organic compounds with food.

Excess heat from power plants (about 55%) will be sent to the greenhouses. It will be converted into the cold in hot countries and sent to cool orangeries. Furthermore, carbon dioxide will not be emitted into the atmosphere. It will instead be delivered to greenhouses and orangeries where this carbon will be utilized by plants in food carbohydrates, proteins, fats, vitamins, and other living matter in the form of thousands of various organic compounds. It should be noted that greenhouses plants will absorb atmospheric CO_2, produce food, and release additional oxygen for people nearby to breathe.

Furthermore, deep processing of some coals and shales will be carried out at relict solar biopower plants to obtain from them not only fertile humus (including liquid) but also synthetic fuels as well as a wide range of chemical products (aromatic hydrocarbons, oxygen and nitrogen compounds, alicyclic alcohols that have hydrogen-donating properties), and chemical elements that span almost the entire periodic table, including gold (its content in shale is up to 40 grams per ton), elements of the platinum group, tungsten, molybdenum, rare, rare-earth, and other metals.

Some Russian coals contain (in grams per ton of coal): yttrium (254), scandium (96), dysprosium (384), gadolinium (335), samarium (211), lanthanum (46), cerium (89), and neodymium (806), which is more than two kilograms of rare-earth elements per ton of fossil fuels. Therefore, Russia's entire demand for rare-earth metals (about 10,000 tons per year) can be covered by processing only five million tons of such coals. The entire world demand (about 200,000 tons per year) can be covered by processing 100 million tons, less than 1% of coals and shales planned for use in such power plants.

Coals (shales) and the products of their combustion – flue gases, dust, ash, sludge, slag – will be used as raw materials for obtaining chemical products at biopower plants located in industrial clusters of linear cities. Such technologies have been in place in Russia for a long time. At the same time, the lower the energy value of the used coals and shales (the higher their ash content), the more efficient and productive they will become from the standpoint of the production of fertile humus and a wide variety of chemical elements, products, and substances at biopower plants. Therefore, relict solar biopower plants operating on brown coals and oil shales will meet the future demand for these products of humankind on Earth for millennia to come.

Increased Soil Fertility as a By-Product of Relict Solar Bioenergy

The RSBE technology will be completely biospheric, meaning environmentally friendly and waste-free. A power industry such as this will not kill living creatures; on the contrary, it will create and foster new lives with natural, not nature-like technologies.

Adding up to 10% of humus to the top fertile soil layer will be enough to turn

15 billion square kilometers of land

into chernozem farmland.

More than

1.5 tons of humus

can be produced from a ton of brown coal.

About 450 trillion tons of living humus with a moisture content of 50–60% can be obtained from 295 trillion tons of organic matter of shales. When up to 10% of humus, which is the average humus content in chernozems, is introduced into the upper fertile soil layer with a thickness of 30–40 centimeters, or approximately 30,000 tons per square kilometer, it will be sufficient enough to transform 15 billion square kilometers of land into chernozem agricultural lands. That amount exceeds the area of the planet's land by approximately 100 times and the area of the entire surface of Earth by 29 times.

The terrestrial relict biospheric power industry could transform the planet's entire land into a blooming garden, planted on the most fertile and ideal soil for life, the rich chernozem. Even if the layer of chernozem, with a humus proportion of 10% or more, reaches a meter or higher, this will not be hard to achieve. Such bioenergy will become accessible for humankind since the waste it produces fertile humus, which will cost more than oil on the market and will pay for the production of electric and thermal energy.

The RSBE technology, which is being successfully tested at the Unitsky's Farm Enterprise, located in Maryina Gorka, in the Republic of Belarus, can produce more than 1.5 tons of humus from a ton of brown coal. One ton of humus would enable the growth of about one ton of organic food.

About a trillion "workers" put effort in each kilogram of fertile humus, entering into the most complex symbiosis of several tens of thousands of soil bacteria and microorganism species

Therefore, the annual production of 15–20 billion tons of brown coal and shale, which is only two to three times higher than the current level of their production, will not only provide energy to 10 billion people at the rate of five kilowatts per person but nourish them with healthy and wholesome, even curative, food. Moreover, this will stop the desertification of the planet and will annually ramp up the production of nutrient-depleted and desert soils to the chernozem level on an area of more than 30 million hectares, which, for reference, exceeds the area of the Republic of Belarus.

The principal oil shale reserves are concentrated in the United States, accounting for about 450 trillion tons, from which more than 300 trillion tons of humus can be produced. Not to mention the generation of electricity and heat. These reserves alone are enough to provide humanity with energy for thousands of years to come and turn the entire planet into a blooming garden several dozen times over with a layer of chernozem thicker than that currently existing in Ukraine. The cost of American shales as an energy resource and raw materials for the production of humus can be estimated at $3,000 trillion at least, with a minimum cost of $100 per ton or $30,000 trillion at $1,000 per ton.

Food Solar Bioenergy (FSBE)

Biofuels are various combustible products derived from raw plant materials, the main advantage of which is their renewability and that they require solar energy readily supplied to Earth by the Sun. Therefore, using biofuels in transport, industry, and power will not change the existing natural energy balance of the planet. For example, with a sugar beet yield of 100 tons per hectare, grown on highly fertile soil enriched with humus, and sugar content of 18%, the root crops planted on one hectare of land can bring 10 tons of pure alcohol. Alcohol is an environmentally friendly fuel that is practically equal in its characteristics to natural gas and hydrogen. The additional upsides of alcohol-based energy are that it is less explosive, easy to store and use, and more readily available.

The remaining 90 tons of raw beets from each hectare will be used for animal feed and humus, returning to the soil as organic fertilizer. Additional humus will not be required to restore the nutrients taken by beets from the soil that were used to obtain alcohol. The plants instead take carbon, oxygen, and hydrogen, forming part of alcohol, not from the soil humus but from the air (carbon dioxide) and soil water. One hundred tons of root crops contain about 70 tons of water.

To obtain one billion tons of alcohol annually, or approximately the same amount of motor gasoline produced in the world today, it would

10 tons of alcohol

can be obtained from 100 tons of sugar beets with a 18% sugar content.

require one million square kilometers of sown land. This area is 21 times less than the planet's deserts, occupying 21 million square kilometers, not including the polar deserts of Antarctica and the Arctic. Therefore, by restoring the fertility of deserts alone, humankind will be able to fill its need for environmentally friendly hydrocarbon fuel for millennia and provide food through the additional production of humus to billions of people and animals.

The two billion tons of dry residual organic waste created annually in alcohol production could become animal feed and humus in biopower plants. That's why living matter will return to the soil where, in my example, sugar beets were grown, not only restoring but enriching the fecundity of this farmland, thanks to shales. This process is the real green solar bioenergy, not environmentally unsafe windmills and solar panels that produce only energy but nothing more and require a lot of non-renewable resources for their production and ensuing disposal.

If $1 trillion is invested annually in relict and food solar bioenergy, it would be about the same as in oil production and refining today. This investment would provide energy to all of humanity. In addition, this would enable additional annual vegetation of an area of 330,000 square kilometers, equal to the size of a country like Vietnam. Note that such a biospheric-driven power industry could increase the total biomass of plants on the planet because they would grow where today's deserts are. Such a plan would increase the utilization of anthropogenic CO_2 by plants and the additional production of food for humans and animals. Additionally, it would increase the production of oxygen by the biosphere, which is necessary for 10 billion air-breathing people and compensation for its withdrawal from the atmosphere by terrestrial industry, including relict bioenergy.

The Infrastructure of Habitation and Settlement

The layout of modern cities and the logistics in them as well as buildings and structures, need to meet the requirements for a safe, sustainable, and comfortable living for residents. Cities on the planet were built and developed spontaneously. First, hundreds and thousands of years ago, footpaths were made between individual dwellings and then paved with cobblestones, along which horse-drawn city transport began to move. Then asphalt was laid on the cobblestones for the cars to drive. Skyscrapers were then built around the asphalt. This is how modern megacities emerged, at which point life became impossible. What kind of comfort can we talk about if, in some cities, one has to spend three to four hours to get to work by several types of transport?

The modern infrastructure of habitation, especially megacities, was built not for people but for cars, primarily for road transport, which today numbers more than a billion passenger cars alone. This includes traffic jams, smog, noise pollution, dirty air, soil saturated with hundreds of carcinogens, exhaust gases, anti-icing agents, and tire and asphalt wear products. We have streets, backyards, surface, overland, underground garages, and car parks packed with millions of cars.

Cities on the planet have occupied vast territories and use the best lands too. These lands have been withdrawn from biospheric life cycles because buildings, structures, city roads, and infrastructure occupy them. For example, China's world's largest city, Chongqing (82,400 square kilometers), is practically equal in area to a country like Austria (83,800 square kilometers).

A significant part of the best plots of land on the planet is today paved over and buried under railway sleepers, five times the size of Great Britain. The fertile soil adjacent to the roads is degraded on a more extensive territory by order of magnitude. Due to imperfect transport, about 1.5 million people die on the roads every year, including post-accident deaths in hospitals, and hundreds of millions, if not billions, of large and small animals; more than 10 million people get into accidents, are injured, become disabled, and are crippled.

By the end of the 21st century, more than 100 million people may die on roads, while about a billion will become disabled and crippled. Electric cars – a fashionable trend in transportation – will not necessarily save lives. On the contrary, they will likely kill and maim people on the roads. But these lives can be saved, and the lands returned to land

users if we change the structure of the settlement and habitation of the urban population, make cities pedestrian-friendly, and move transport to the second level – to a height of about 10 meters.

Linear City

Linear cities harmoniously blend with the environment of any natural and climatic zone on the planet and will become an alternative to modern megacities. Not only do they not take away fertile land for building construction, but they create more. The cities will have everything they need: clean energy, organic food, and artesian spring water. The cities will help deserts disappear from the planet, transforming it into blooming garden where all future humanity will live and work safely and comfortably.

Placing linear cities at least 10 meters above the current ocean level is more reasonable. If ocean levels rise in the future, in hundreds of years, through a natural cyclical global warming or warming caused by human activity, the ocean will not flood these settlements.

The linear city will be made of pedestrian clusters connected by an urban electric second level communicator moving at a speed of up to 150 kilometers per hour, the Unitsky String Transport as the safest, most energy-efficient, and environmentally friendly type of passenger and freight transportation.

Through the linear city, or parallel to it, the uNet transport and communication corridor about 100 meters wide will pass, including the high-speed routes of string transport (speed up to 500–600 kilometers per hour), hypervelocity uMach routes located in forevacuum tunnels (speed up to 1,200–1,500 kilometers per hour), and cargo systems. To ensure comfortable movement, in which centrifugal accelerations should be below one meter per square second, the radii of curves on vertical and horizontal routes should be at least 20–25 kilometers, and for 1,200–1,500 kilometers per hour – at least 120–150 kilometers. Hence, the linear city can be winding, but high-speed routes must be as straight as possible.

With an average population density along a linear city of 2,000 people per one kilometer, to accommodate 10 billion people, the total length of cities built along the uNet communication network and combined with relict solar biopower plants, power transmission, and communication lines, would be five million kilometers. Then the network of linear cities will occupy an area of about five million square kilometers, or 1/27 of the Earth's land, excluding the continent of Antarctica. The remaining 26/27 of land can be allocated for national parks, reserves, wildlife sanctuaries, and reservations with sparing land tenure systems.

The area of deserts on the planet, excluding the polar deserts of Antarctica and the Arctic, is four times greater. Therefore, if the deserts were made green and fertile, and linear cities were built only there, 40 billion people would be able to live in them, and they would be supplied with everything they need: housing, food, drinking water, energy, transport, work, rest, and recreation. It would be easier and cheaper to do this than, after having finally exhausted, polluted, and ruined our native planet, to fly to a distant, cold, and alien Mars to lead a wretched existence in spacesuits without organic food and fresh air and water.

In the future, linear cities will occupy land nominally since gardens will grow on the roofs of all buildings in greenhouses and orangeries. Natural biogeocenoses and biosphere ecosystems will be created there, even where there are deserts and permafrost today.

The total length of the uNet network, counting the transverse lines and second level roads entering protected natural areas and natural resource deposits, will then amount to approximately 10 million kilometers. For comparison, the total length of the world network of all types of roads is currently 68.9 million kilometers.

2021. String transport (visualization)

Near the residential clusters, along or across the linear city, there will be infrastructural clusters with other functions: scientific, educational, industrial, sports, shopping, entertainment, recreational, and more. To improve the logistics and maintenance of production facilities, including the relict solar biopower plants with a large volume of freight traffic of raw materials and humus, infrastructure clusters may be located outside the residential area, in the area of the uNet transport and communication corridor. The required volume of transportation through the cargo component of the global network is about 10 billion tons of shale and brown coal per year and about the same amount of fertile humus.

In the linear city, the average speed of public urban transport, uPods, will be 60–80 kilometers per hour and more. With no traffic obstacles, such as intersections and pedestrian crossings, cars, trams, buses, snow or sand drifts, or puddles on the roadway, it will be the safest and, by order of magnitude, faster urban public transport in the world. For example, the fastest transport today is in Berlin whose average speed is 6.5 kilometers per hour. For comparison, in Washington, it is only 2.8 kilometers per hour.

The Unitsky String Transport with a string-rail track structure of a sagging type is the most energy-efficient type of urban road out of all theoretically possible ones since it automatically recovers energy when moving from station to station. When leaving the station, the uPod, moving downhill, accelerates to the rated speed only due to gravity and without using the engine. In the second half of the way, the uPod, moving upward, is decelerated by gravity without using the brakes.

In such a system of operation, similar to the pendulum swings, the potential energy of an uPod is automatically converted into kinetic energy and vice versa under the laws of physics, and not with the help of mechanical recuperators, which, as a rule, have a low-efficiency factor. Energy is needed here only to overcome a steel wheel's aerodynamic drag and rolling resistance, which is about five to seven times less than is required when traditional urban modes of transport, like buses, trams, and trains, move along a horizontal track. Therefore, to perform similar transportation work, the network of string urban routes located at the second level will require five to seven times less energy than an ordinary urban transport network at the first level of the same length and capacity.

The string transport track structure is designed in such a way that electrical and information networks will be embedded into it, providing electricity and communication for both the clusters and the linear city as a whole with the entire infrastructure: social and cultural, shopping and entertainment, scientific and industrial, and others.

Each cluster will have one or several relict solar biopower plants with a total capacity of 10,000–20,000 kilowatts (depending on the number of cluster residents) located outside the residential area, producing up to 50,000 tons of fertile humus over a year. This would enable, for example, annually transforming up to one square kilometer of the desert into fertile land such as chernozem. Therefore, in 50 years of operation, the worldwide linear city will be able to increase soil fertility to the level of rich chernozem on the entire Earth's land, including mountains and deserts.

Linear City Cluster

The cluster, with an area of one to two square kilometers, with dimensions of about one to one and a half kilometers, is planned to be constructed as a pedestrian urban-type settlement. It will comfortably accommodate from 2,000 to 3,000 people, based on 500 square meters of land per person or 25 acres for an average family of five. That equals 7,000–10,000 people at 200 square meters per person or 10 acres per family.

2021–2022. Linear city (visualizations)

The cluster is ideal for land, but with minor changes, it can exist on the sea shelf or open sea if the buildings and structures are buoyant.

Dimensions of the clusters depend on the need to connect their centers with urban string routes of the sagging type without supporting towers. Furthermore, frequent stops for urban transport less than one kilometer apart significantly reduce the average speed of rolling stock, leading to an increase in travel time. And in a linear city on spans longer than one and a half kilometers, the string-rail track structure will sag excessively under its weight and the weight of the rolling stock, requiring passenger stations to be located at heights of 50 meters or more. Therefore, the dimensions of the cluster in plain view

and the length of spans of one to one and a half kilometers are ideal from the viewpoint of pedestrian and urban transport logistics as well as technical and economic indicators.

The residential area will appear as blocks, separated by a green strip 100–200 meters wide, with common spaces for the cluster residents and guests: leisure and sports areas, public buildings, sports stadiums, a health center, a medical station, shops, cafes, workshops, a kindergarten, a school, and other amenities.

In the center of the cluster, there will be a high-dominant building with a string transport station on one of the floors, or the roof, within walking distance. Reaching it from any point of the cluster takes about 10 minutes. In the center of the green strip at the height of more than 10 meters, there will be a string-rail track structure that is visually light and delicate, even casting no shadow, which, with the same capacity, will be at least 10 times cheaper than a traditional underground metro.

Silently moving along air rails will be the rolling stock of the high-speed sky metro, that is, rail electric vehicles on steel wheels called uPods, which are at least three times more power-efficient, i.e., greener than a traditional electric car. The height of the safe movement of rolling stock at the lowest point of the track, in the middle of the sagging span, namely in the interval between adjacent clusters, will be no less than six meters to the bottom of the moving suspended uPod.

Residential buildings will unite as a single architectural and functional system, like a multi-apartment "horizontal skyscraper" or a high-rise building lying on its side. The "tower's" dimensions, including its length, vary over a fairly wide range, from 100 meters to one kilometer. Each house would need a living area of 100–300 square meters to accommodate an average family of five. The homes will have two or three floors: a semi-basement, a living floor, and an attic.

It would be expedient to have them built as frame houses with panels made of vacuum glass, which is my know-how. For thermal insulation, the panels will have a thickness of 20 millimeters, equivalent to a brick wall one and a half meters thick. If necessary, the panels could be electronic screens to display images. The primary construction material is sand; there is enough on the planet for trillions of such skyscraper-type accommodations.

In terms of energy efficiency, each "horizontal skyscraper" in the cluster will be designed as a "house plus energy," per the European classification. When a house like this includes all the utility equipment, including solar panels, collectors, heat pumps, and recuperators, it generates more energy than it consumes.

Conventional roads in the cluster will be green, made of aerated concrete with grass, combined with pedestrian and bicycle paths, and suitable for light electric vehicles. In addition, provisions will exist for heavier traditional vehicles, such as ambulances, fire engines, and farming equipment. The same goes for dirt roads with grass embankments between the houses to access each household plot.

Therefore, each cluster is a self-sufficient urban-type settlement, although as per the living arrangements, it is more likely to belong to rural settlements. Everything for its production will be provided including food, water, energy, transport, and all the services needed to ensure the linear city's food, energy, environmental, infrastructural, social, and other security even amidst pandemics, lockdowns, or other natural and human-made disasters.

Optimization of urban planning constructions, buildings, structures, and infrastructure ("linear skyscrapers," roads on the first and second levels, adjacent territories and common land plots, engineering networks, landscaping, etc.) will reduce the cost of housing and living in a linear city by two to three times that of conventional urban development while improving the quality of the living environment and the standard of living of urban residents.

2021. Linear city (visualizations)

Food Capacity of the Biosphere and Food Production for Humanity

The total dry biomass of the biosphere is about 2.4 trillion tons, of which over a trillion tons is carbon. At the same time, the primary biomass on the planet is green land plants, while all other living organisms and microorganisms have a total mass of only 38–46 billion tons (less than 2%), counting the underground biomass located at depths of up to five kilometers.

Contemporary humankind is about 350 million tons of biomass in live weight (about 45 kilograms per person, including children), or about 100 million tons in terms of dry biomass (about 13 kilograms per person), which is about 0.004% in comparison with the entire biomass of Earth.

The large biomass and variety of terrestrial living organisms are accounted for by humus, a complex organic matter due to which any soil becomes fertile. In the most fertile soils, chernozems, up to 10–15% is humus. The basis for producing organic food for humans is living fertile soil.

The most fertile chernozems soils contain up to

10–15%
of humus.

An average person consumes about 700 kilograms of food per year, or about 150 kilograms of dry matter. As a result of metabolism, each person excretes approximately the same amount of waste into the environment, primarily through their digestive system.

Suppose this waste, converted into humus, is brought back into the same soil where the crops were grown. In that case, the natural circulation of living matter, disturbed by contemporary humankind, will be restored.

Currently, food grows in one place, and waste is generated in another, thousands of kilometers away. At the same time, the billions of tons of nutrients taken from living fertile soil do not return in exact quantities. Only about three chemical elements (nitrogen, potassium, phosphorus) return to the ground, although plants, during their growth, take almost the entire periodic table from it. Moreover, simple and soluble industrial chemical fertilizers feed the soil of farmland instead of complex organic insoluble humates created by life, as it was during the previous hundreds of millions of years of the evolution of life and the Earth's biosphere.

Agricultural Production in a Linear City

It is only possible to imagine a real ecohouse by producing a variety of organic foods for the needs of each household, including vegetables, fruits, meat, milk, eggs, mushrooms, and fish.

The roofs of houses of "horizontal skyscrapers" in each cluster of a linear city will exist as glass greenhouses (orangeries in hot climates) combined. They would have a unique technological road along the entire length of the "horizontal skyscraper" in the center for service vehicles. In addition, the semi-basement floor built on the common foundation for the whole "skyscraper" length will also have a road in the center for service vehicles. This layout would enable growing vegetables and fruits in greenhouses on the roof and breeding mushrooms, poultry, fish, and seafood, both marine and freshwater, and other products for consumption on the semi-basement floor. At the same time, an enclosed agricultural zone can be attended to by a gardener and an agronomist typical for each "tower" and hired by each household.

Microgreens and green food from the greenhouses, orangeries, and vertical farms will nourish the human and animal residents of the linear city cluster. According to this technology, the root systems of the plants and fungi receive a nutrient-rich solution, and they begin to grow from plant seeds (or spores) within five to seven days. This technology is natural, in contrast to the conventional nature-like hydroponics based on chemical mineral substances, as evolutionarily, plants feed on organic humus.

Humus – insoluble salts of humic acids stored in the soil – is converted into a soluble form by a community of thousands of species of aerobic and anaerobic soil microorganisms directly in the root system of plants. Therefore, agricultural farms of a linear city will employ a new process we at the Unitsky's Farm Enterprise in Maryina Gorka call "humusoponics." According to this technology, plants feed on liquid humus, in which insoluble salts of humic acids have pre-converted into a dissolved form.

Microgreens grown on humusoponics are natural organic foods, originally rich in easily digestible nutrients and vitamins. Their cultivation technology has no industrial fertilizers or chemicals like pesticides, herbicides, and GMOs. For example, in comparison with dry food for animals – mixed fodder, meadow hay – humusoponic fodder from wheat germs is better absorbed, more energy-intensive, and contains two to three times more proteins and fats. At the same time, it exceeds dry food tenfold in terms of its content of carbohydrates, sugar, and vitamins. It is also much healthier and more efficient than fresh grass and hay. Unlike other forage eaten outside the pasture, this feed comes in the living form at the peak of its growth, preserving all the vitamins and digestive enzymes that animals need, especially in winter.

Another fundamental difference: the animal eats the aboveground part and the remnants of seeds with starch and the root, rich in sugars and proteins. Meanwhile, diverse organic waste materials generated in the cluster can become a substrate: straws, press cake, and even specially prepared wood chips,

which microorganisms and plant roots convert, through fermentation, into easily digestible food. The result is balanced, complete, and stable in its composition and quality fodder, ensuring the herbivorous animals get all the essential nutrients they need.

Regardless of the season and natural and climatic conditions (droughts, torrential rains, heat, and frost), humusoponic installations will provide animals and people with fresh green food all year round, which is especially important in case of vitamin deficiency in winter.

Growing one ton of green forage requires about two tons of water, while the conventional field method requires 400 tons, i.e., 200 times more. Moreover, it takes one hectare of land to feed one head of livestock. In contrast, the proposed technology of all-year-round vertical humusoponic farms, arranged, for example, in the semi-basements of buildings and structures, requires about one square meter of floor space, which is 10,000 times less. This comparison excludes the tilling, fertilization, sowing, harvesting, transportation, and drying.

Year-round cultivation of agricultural products in greenhouses under protected ground conditions, for example in the Netherlands today, yields an average of up to 50 kilograms per square meter per year. To sustain a family of five with fruits, vegetables, berries, and herbs, up to 100 square meters of greenhouse area is enough. Moreover, if greenhouses occupy the roofs of "horizontal skyscrapers" and replace conventional roofs with year-round conservatories, then each house could feed the family living there with plant food. In this case, such a house does not destroy natural soil, as it will be moved to the roof from under the foundation of the house, enriched with humus, and become greener and more productive even if the foundation is on desert sand.

Mushrooms, fish, seafood, small animals, and poultry will also be grown and bred in the semi-basement of each home in these proposed "towers."

To populate the linear cities described above with 10 billion people, two billion dwelling ecohouses will be necessary if we assume that a nominal average family consists of five people. With the maximum estimated area of greenhouses (approximately 40 square meters per person), these ecohouses will occupy an area of no more than 400,000 square kilometers, or only 1/337 of land (excluding Antarctica), or 1/1,275 of the planet's surface if houses are made buoyant and placed on the water – on the sea shelf, on the lake, in the open sea. In addition, such ecohouses will occupy the land nominally since the area of fertile living soil on the planet will not decrease but increase. The new land will appear on the roofs of settlements and even in the place of today's deserts and permafrost.

Production of Meat and Biohumus

Let's consider the production of organic meat using the example of cattle since cows allegedly cause much more damage to the Earth's ecology than, for example, cars and airplanes combined. Experts made this conclusion from the Food and Agricultural Organization of the United Nations (FAO). According to the FAO, about 1.5 billion cows live on Earth, emitting 18% of supposedly all 100% of greenhouse gases, which exceeds the emissions of all transport on the planet.

This 18% comes from 22% of the greenhouse gases, carbon dioxide. That is, their effect is only 0.18 × × 22% = 4%, since the leading greenhouse gases – water vapor – for some reason were not taken into account, although the significance of H_2O in creating the greenhouse effect in the Earth's atmosphere, as described above, is 3.5 times higher than CO_2.

A cow eats about 20 tons of green fodder annually and produces roughly 20 tons of manure. Hence, all 1.5 billion cows in the world will require about 30 billion tons of animal feed; they will provide 30 billion tons of waste, or in terms of dry matter, 3.5 billion tons, or 1/55 of the biomass produced by the biosphere.

The annually dying biomass, for example grass, regardless of whether cows ate it or not, would still require processing by the biosphere during one season into humus by the same microorganisms as in the stomachs of cows, with the release of the same associated gases, primarily methane, and CO_2, and in the exact amounts.

So, cows in no way change the biosphere processes and do not harm Live Nature because the biosphere is utterly indifferent to where this organic matter, with the absorption of oxygen and the release of methane and CO_2, is processed, whether in the soil or the digestive system of an animal. At the same time, cows speed up processing organic matter into humus since this living biofactory turns dry grass into almost ready-made biohumus within a day. In the soil, these processes take several months.

Each cow produces several items, among which the surplus value of its biospheric waste – manure and urine as organic raw materials for the production of humus – is commensurate with the cost of milk and meat it produces.

One cow can annually supply 100 kilograms of nitrogen, 50 kilograms of potassium, and 140 kilograms of phosphorus as part of natural

The Food and Agriculture Organization of the United Nations (FAO) – an organization that is a part of the UN system; its main task is to fight hunger. Within the framework of FAO, countries discuss and agree on policy decisions in the field of food security. FAO serves as a source of information and aids developing countries in improving agricultural, forestry, and fish farming practices as well as in ensuring healthy diets and food security.

30
billion tons of biohumus

will allow the cultivation of as much organic agricultural products as will be enough to feed more than 20 billion people.

organic fertilizer with almost 100% assimilation in soil. In addition to replacing nutrients taken out by plants from the ground, all types of manure increase the proportion of humus in the soil and restore the fertile layer of any land.

Therefore, the vilification of organic beef in the works of some researchers, including under the auspices of the UN, is just a commissioned work to transfer human nutrition to synthetic meat in the interests of the producers of this dangerous food product.

As mentioned earlier, 30 billion tons of manure, converted annually into living fertile humus, for example, in relict solar biopower plants, will cost about $10 trillion on the world market. However, these 30 billion tons of biohumus will make it possible to cultivate many organic agricultural products (primarily in linear cities) to feed more than 20 billion people – without using chemical fertilizers, pesticides, and GMOs. This solution will solve the problem of hunger on our planet.

A car, on the other hand, does not produce anything useful except for transport services, while its industrial waste (exhaust gases, wear products of tires and asphalt, deicing salts, etc.) contains more than 100 carcinogens that can poison all life on the planet in territories exceeding, for example, an area of Great Britain several tenfold. Therefore, comparing a cow and a car from the standpoint of danger to the biospheric habitat is incorrect and sinful.

Recycling of Civilization Waste (Trophic Capacity and Technogenic Bioecology)

A person, on average, excretes 1.5 kilograms of urine and feces per day, containing a large number of nutrients, including almost the entire periodic table. This liquid should not be discharged from the toilet directly into the ground, where it will overload the soil and can enter groundwater or nearby bodies of water. Food waste generated in the kitchen – from banana and potato peels to fish bones and scales – is up to half the food consumed by weight. This organic waste could be separated from water, for example, in dry sewerage, yielding approximately 150 kilograms of dry organic matter for each person annually, which is about the same amount by weight as they eat.

Therefore, people can feed themselves with their waste if, where they live, all organic waste, including sewage runoffs, is processed into humus, which enriches the farmland soil, and new food grows on it. This process can be done in an environmentally friendly way if you use toilet facilities and sewerage, where the organic matter is machine-separated from the water.

The wastewater of a linear city (on average about 50 tons of hot and cold water per person per year) can become service water for watering household plots. For example, it takes about 700 tons of water to grow a ton of apples in the open air. Only dissolved minerals and organic fertilizers will remain in such water, mainly from urine and feces, in a quantity less than 0.01%. These organic substances in such amounts are entirely safe for the soil. Moreover, they will increase soil fertility and the yield of organic products on household plots just as in the pre-industrial era, when all organic waste on the farm, including that from domestic animals, was disposed of directly on the household plot.

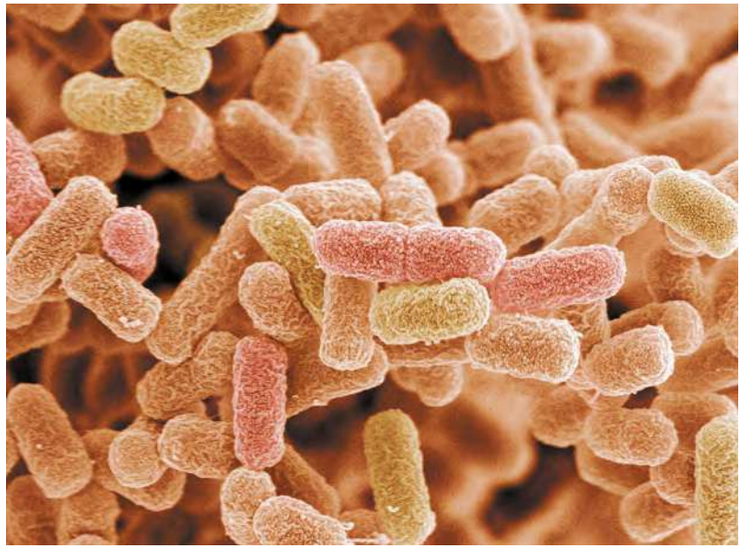
Separation of water from dissolved organic matter in sewage drains is much easier than, for example, desalination of seawater containing hundreds of times more mineral salts (about 3%), whose molecules are much smaller than the molecules of organic substances. Therefore, modern water desalination technologies are helpful in the treatment of sewage to regulate the content of substances dissolved in them and cut off pathogenic microflora and microfauna, which are even more prominent.

For 10 billion people, this will amount to 1.5 billion tons of dry organic matter waste annually (less than 1% of the living matter produced by the biosphere in dry weight) and 500 billion tons of sewage water per year, which will be used multiple times, primarily for the output of agricultural products in linear cities. With an average global rainfall of about 1,000 millimeters in a year and an average linear townland area of 300 square meters per person, recyclable sewage water (50 tons per person in a year) will be equal to 1/6 of the precipitation. It will become an effective biologically active additive, increasing soil fertility on household plots.

Biologically Safe Capacity of the Biosphere for the Technogenic Human Population

About a trillion living organisms currently populate the planet, of which we know less than 0.0001%: animals, plants, fungi, and microorganisms (microbes, viruses, bacteria, protozoa, etc.), whilst the non-microscopic species (visible to the naked eye) account for no more than one million species. All these living beings have been residing on planet Earth for millions and some for billions of years. In the course of evolution, everything here has evolved together, so everything in the Earth's biosphere is harmoniously arranged, there is nothing redundant, and there is no need to "improve" anything.

We do not need to fight microorganisms; we must learn how to coexist. We will lose any war declared on microbes because more than 10,000 species of bacteria, viruses, archaea, and fungi live in our bodies. The human microbiome has an astounding number of inhabitants, about 100 trillion bacterial cells. They constitute a highly complex human ecosystem and are the basis of the immune system, especially the intestinal microbiota, which consists mainly of soil microorganisms. A person has much fewer own cells – about 30 trillion, so there is a risk of harming them, since it is impossible to fight a single representative of unwanted viruses (for example, COVID-19) without disturbing the developed over millions of years symbiosis between trillions of species of useful microorganisms and the human body.



The medicine prescribed by the doctor may fix one thing while it breaks another. It is not the treatment itself that is more important but the prevention of diseases by strengthening the immune system, which is our universal medicine; this requires:

– healthy lifestyle, both physical and spiritual;

– proper and healthy nutrition, grown on living fertile soil without chemical fertilizers and pesticides;

– living natural spring low-mineralized drinking water;

– clean air that is replete with phytoncides from medicinal plants and flowers.

Even if 100 billion people live and work on the planet, their biomass will be only 0.05% of the Earth's biosphere biomass. And this in no way will lead to global problems if, of course, humanity stops fighting nature and begins to coexist with it, as one of the biological species, according to the biospheric laws that have developed over billions of years of evolution.

Problems are created not by humanity itself, as a living substance, but by the dead technosphere created by it, which like a cancer cell of a sick person destroys its owner, in this case the biosphere that occupies the same niche in space. But today's humanity is ill on the system level, and if not treated on that level, it will die in the foreseeable future.

The civilization that we know and of which we are a part can not only be saved but provided with a driver for sustainable development for millennia to come if we bring the industrial part of the Earth's technosphere into near space, creating a paradise and planting gardens on Earth, which could feed tens of billions of people. At the same time, the remaining part of the technosphere on the planet must be made friendly to the biosphere.

To do this, we need to restructure the following:

– agriculture. It must be localized where people live, within walking distance, making it highly productive on living fertile humus, wholly natural and organic, without using chemical fertilizers, pesticides, and genetic modification. Food will grow here, while its waste, including sewage runoff, will be turned here into biohumus, on which new food will thrive, which corresponds to the natural cycle of living matter in the biosphere;

If 100 billion people live and work on the planet, their biomass will be only

0.05%

of the Earth's biosphere biomass.

– terrestrial transport (land, water, air, space). All transport must be moved to the second level, without linear support on the surface of ground, and made more efficient, safe, and environmentally friendly by order of magnitude. After all, modern roads are taking away thousands of acres of land, while airplanes, sea ships, and space rockets must have huge land-based airports, seaports, and spaceports (thousand hectares each). There are thousands of them on Earth, and they occupy the best lands in every country. All this territory can return to land users, and gardens can thrive there. And only one type of transport meets these requirements, the Unitsky String Transport. That is why it will become the leading mode of transport on the planet as early as the middle of the 21st century;

– terrestrial power industry. It must be made biospheric by analogy with living organisms, which, while generating energy, produce living fertile humus as the final biowaste. This technology can be employed only by relict solar biopower plants (using brown coal, shales, peat, wood, thatch, and any other solid organic energy raw materials), which over 50 years, can transform the entire planet dryland in a blooming garden, planted on the rich chernozem, even on the place of today's deserts;

– residential and industrial infrastructure. It should exist in linear cities with a total length of about five million kilometers; the area for 10 billion inhabitants will be approximately five million square kilometers. Such cities will occupy only 1/27 of the land area. This occupation will be conditional since gardens will grow on their roofs; accordingly, the size of fertile soil on the planet will not decrease. The remaining 26/27 land area can become national parks, reserves, wildlife sanctuaries, and reservations with moderate land tenure systems. The main infrastructure facility on the planet will be the Equatorial Linear City, with a length of about 40,000 kilometers, which will pass along the equator of Earth and will become a land-based research, production, and operation platform for bringing the environmentally hazardous part of the terrestrial industry into space and its functioning;

– space industrialization. It will have to be carried out on a planetary industrial scale basis by the middle of the 21st century to gain access to the infinite resources of the Universe: energy, mineral, spatial, and fundamentally new technological capabilities, such as zero gravity, deep vacuum, technical purity (without dust and microorganisms), and others. Only the General Planetary Vehicle (GPV) propelled solely by electric power can solve this problem. After all, the GPV can deliver in an environmentally safe and affordable fashion up to 10 million tons of cargo and up to 10 million passengers into orbit in one flight. This system has an efficiency factor of 97–98% and is about a thousand times cheaper than a rocket.

The GPV has an efficiency factor of

97–98%.

2019. Industrial Space Necklace "Orbit" (visualization)

The Industrial Space Necklace "Orbit" (ISN "Orbit") created around the planet in the equatorial plane will become a springboard for the expansion of the Earth's civilization into deep space, and it will fulfill the tasks of protecting the world from space threats, including oncoming asteroids. While humans explore outer space, a significant part of the Earth's civilization will begin to live in orbit in EcoCosmoHouses, where we will create enclosed ecosystems, duplicating the best natural and climatic conditions of the planet, the subtropics, including gravity, by using centrifugal forces. But still, the central part of humanity, united by common goals and objectives, will live in its cradle, planet Earth, which is a blooming garden. Now you see the general outline of the EcoSpace program I am proposing and developing today.

PART 10

Technogenic Civilizational Fork: Hope or Hopelessness

Lake of Hope

I have already spoken about the economic and political reasons that the so-called "global elites" (the term is in quotation marks, because for me it is unacceptable and I have justified my point of view above; without quotation marks – pseudo- or quasi-elites) use to spread destructive fear about the future to the world's populations. The grounds include:

– overpopulation;
– the need to slow down the pace of industrial development;
– rapid depletion of the Earth's resources;
– the certainty of a sharp reduction in the world population.

However, some reasons are more significant than the global ecology and climate, turned by globalists into climate extremism and a worldwide scam. These reasons lie in the sphere of spiritual life. The most important of them is that the quasi-elites and their mainly European culture have lost hope since the scientific approach was put forward as the dominant and development-determining condition. After that, they steadily and inevitably began to sink into a hellish state. It is no coincidence that at the gates of hell, the great Dante read: "Abandon all hope ye who enter here."

Europe has been in a state of hopelessness or despair since the beginning of the Renaissance. From the assumption of Giordano Bruno that Earth is not the center of the Universe but only an insignificant speck of dust in boundless space, there have been fewer and fewer reasons to hope for anything more. Instead, arrogance became typical for individuals, states, and civilizations. Until some point, European rationalism and mushrooming technologies reinforced man's faith in himself. Then there were world wars, which showed all the horror that humanity had come to, having lost hope and yet driven by good intentions. Civilization and, first of all, the European quasi-elites sank themselves into the depression of postmodernism, according to which there is nothing significant and insignificant, great and vain, right and wrong. Everything is allowed, and nothing matters. We must keep just what we have, however populations increase, especially in third world countries. If you cannot rely on them, they become a threat.

This logic led to the plans for the "great reset" of Klaus Schwab and the Power behind him. The pseudo-elite have real and colossal power, just like they have trillion-dollar levers and tools for its application. The logic is perverted and, as I said earlier, contrary to the very nature and essence of life. Therefore, instead of the terminology applicable to the tip of the iceberg – "global elites" and "quasi-elites" – we will refer to the iceberg itself. An iceberg is invisible underwater, but what exists below the tip of the iceberg is deep and powerful.

Renaissance (French *Renaissance*, Italian *Rinascimento*, from Latin *renasci* – to be born again, to be reborn) – a cultural and historical era, a turning point for the history of Europe between the Middle Ages and the New Age, which laid the foundations of a new European culture. In Italy, the beginning of the Renaissance dates back to the 14th century. The heyday of the Renaissance culture falls on the 15th–16th centuries. In the countries of Central and Northern Europe, the Renaissance came later and acquired specific features: the Northern Renaissance and the French Renaissance. A feature of the Renaissance is the secular nature of culture, its humanism and anthropocentrism, the increased interest in antiquity as well as the development of commodity-money relations and manufacturing production. The turning point in spiritual culture arose as a result of the natural evolution of the religious worldview and the expansion of ideas about the world around.

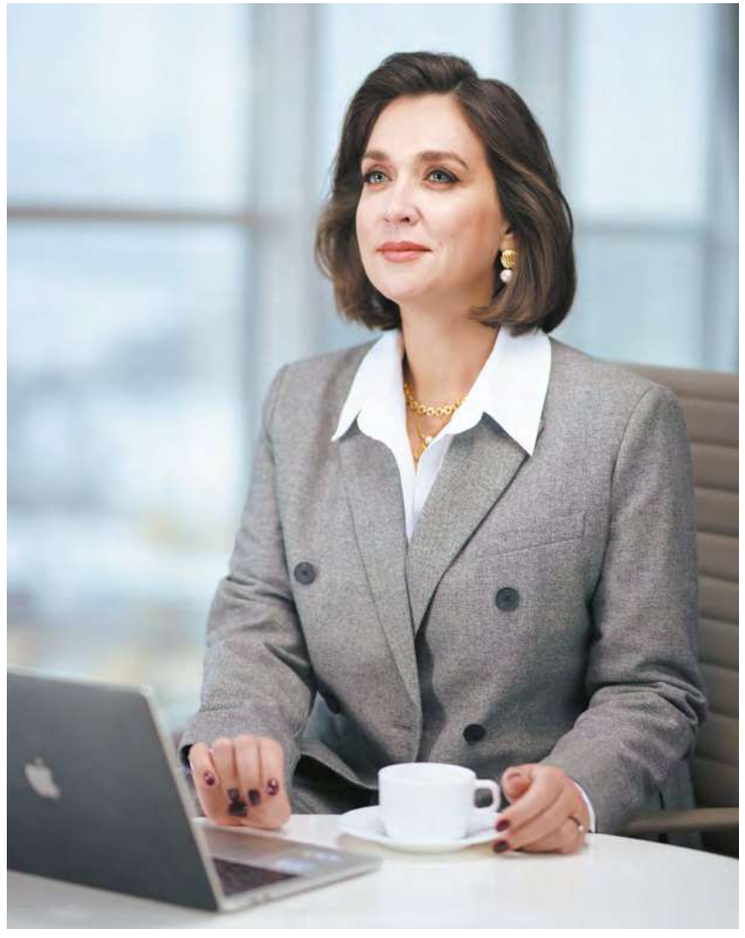
Without hope, everyone relies on planning, and "deep power" is no exception. Yet, paradoxically, "deep power's" lack of hope strengthens the hope in the rest of us. After all, the presence of a plan, even the most well-thought-out one, does not mean it's feasible. It is enough to see how many undertakings, carefully worked out in business or wars, failed – for instance, Napoleon or Hitler, who "deep power" financed. And vice versa, how many obscure start-ups and crazy battles were crowned with success, although they did not have clear plans but exemplified hope? For example, it happened when I decided to become a farmer for the second time.

My farm is close to the EcoTechnoPark created in Maryina Gorka, 60 kilometers from Minsk. There, just like on the territory of the test center, there was recently a wasteland; it was swampy, and in Soviet times, it was home to a tank training ground. While landscaping the site around the string transport test complexes, we found it in a lowland. In spring and autumn, water from neighboring areas flowed under the foundations. So we began digging behind the fence along a storage channel 300 meters long for excess water. Upon finishing, I thought: "Why not put fish in there?" And so we did. Then an idea arose to build a chicken coop, a worm composter, a cowshed, and a stable on the bank of a stocked canal and to build a farm around.

I began to find out if it was possible for me, as a farmer, to use this waste and just over 100 hectares of useless land. It turned out not. According to the laws of Belarus, one cannot be a farmer and simultaneously be the General Director of an enterprise. And I held just such a position in our head engineering company Unitsky String Technologies Inc., as General Director and General Designer. However, it didn't stop me. On the contrary, it opened up new possibilities. I decided that the moment had come to shift the administrative work to someone else. Then there will be more time for science, engineering, invention, and farming.

2015. Territory of the future farm

2019. City of Maryina Gorka. Lake of Hope, named after my wife



2021. Nadezhda Kosareva, General Director of Unitsky String Technologies Inc.

As the director, I chose my wife, Nadezhda, who had been by my side for 18 years by then and constantly helped me and learned from me. She was the primary support in my life, and I could entrust only her with the engineering foundation on which is built all my string technologies.

When I told Nadezhda that I wanted to appoint her CEO, she went through all the stages of accepting the inevitable: denial, anger, struggle, depression, and acceptance. She said that she could not, didn't know how to, and would not, but in the end agreed with her husband's will, for which I am incredibly grateful. Through this, I became a farmer for the second time, and she became a CEO for the first time. Since then, on working days, I have been a General Designer in Minsk, and on weekends, I am a farmer in Maryina Gorka. We both did well. I can proudly say: "The student has surpassed the teacher." Nadezhda is the best General Director I could only dream of, and there were many of them in my life.

I became angry when I looked at what was built for me as a farmer, at my expense, for a chicken coop, a worm composter, a cowshed, and a stable. Among my observations were the massive foundations, thick walls, high ceilings, floor-to-ceiling windows, and so on. It was my fault due to lack of time. I entrusted the project to a hired farm manager and only saw what happened when it was too late to change. Then, of course, I had to fire the negligent manager. It became clear that he had never seen a cow or a horse since he was building such mansions for them. I had to come up with a different purpose for the buildings. It came out ridiculous. Today they accommodate as follows: in the "chicken coop," there is a production facility where we make the best sushi in the district (and I think in the Minsk Region) and bake unique pizzas in a firewood stove from Italy – perhaps the only such oven in Belarus. In the "worm composter," there is an affordable restaurant with haute cuisine where we often hear compliments from VIP visitors – ministers and mayors – that "probably, even the government doesn't even eat this well." In the "cowshed," there is a delicatessen shop and bakery, where queues line up for our yeast-free bread and delicious cakes. Finally, in the "stable," there is now a brewery where they already brew several varieties of tasty beer, 100 tons per year, made with authentic ingredients. We then built new structures for the cattle and created a zoo with almost two dozen enclosures to house more than 50 species of animals and birds.

Greenhouses now exist on the roofs of the first four buildings, and more buildings occupy the space around them. There are bungalows for guests, a fishing village, and multi-room complexes.

2021. The gray desert swampy area, as it was quite recently, has turned into a bright all-season place for recreation - the Aquarelle EcoPark

2021. Unitsky's Farm Enterprise is one of the best places in Belarus for recreation and fishing

We laid communications and built roads everywhere, deployed production facilities, and deepened and expanded the water reservoir on the territory; in fact, the puddle, which Soviet tanks once plowed during the exercises. We have turned an ordinary pool into a network of deep lakes and ponds – more than 10. The soil taken from the reservoirs we created did not disappear because we raised the level of the ground, and the quasi-swamp, which was just impassable mud, disappeared. It is no more.

Today, our lakes and ponds are home to more than 20 species of precious fish, for example five types of sturgeons, including a 100-kilogram beluga and a 30-kilogram paddlefish brought to Belarus from America. International fishing competitions as well as trout fishing, are already being held. It is remarkable to behold since it was recently a swamp and a tank training ground here. There were no rivers, no streams, and no springs. Everyone said to me while making a cuckoo sign: "What are you, an idiot? What sturgeon, what trout, it will all die here!"

In three years, Unitsky's Farm Enterprise has gone from a tank training ground to one of the best recreational and fishing places in Belarus; this is not just my opinion but that of our visitors, who account for up to 1,500 people per day. Everyone who wishes to do so can read these enthusiastic reactions in the Guest Book. Only later did I remember that I had fulfilled my promise to the local city administrator in this way. When I came to ask for land for the construction of the EcoTechnoPark in the spring of 2015, he told me: "Of course, I don't believe in any of your fables about uPods and string roads. It will never work.



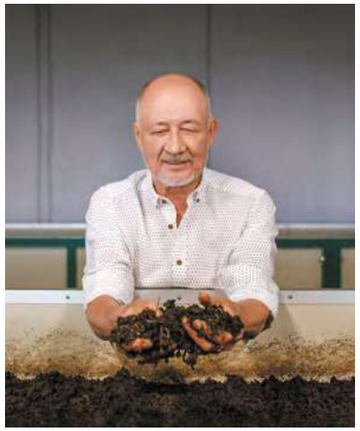


2021–2022. Aquarelle EcoPark: let it always be a holiday!

But it won't hurt us anyway. Nobody wants this land. Please take it. I only ask that you arrange a recreation area there, otherwise, the people of our city, and the region, have nowhere to go."

I promised him verbally. We did not write down any documents, and we did not put our signatures and seals there. However, I managed to do even more. Everything happened subliminally, like much of what I do and what is planted somewhere deep in me, in my soul and heart. After all, there were no precise plans, let alone business plans. But there was something more, a great idea, a clear goal, and hope that the world had already begun to change for the better. This goal is the harmonious arrangement of the planet for the life of people in unity with nature. String transport is, at its starting point and core, the point of biospheric technologies growth. And just as an abandoned tank training ground around string transport lines has turned into a blossoming garden with orchards and vineyards of more than 20,000 fruit and berry varieties, the whole planet – our only home in the boundless expanses of the Universe – can and will change for the better.





2021. The joy of being in touch with nature

Hope for a great future, combined with the knowledge that everything is achievable, allows us not to give up. It is no wonder that hope, along with faith and love, is one of the most important Christian virtues. If today the world is on the verge of death, we must never forget, constantly repeat and comprehend what is evident to me: he, without hope, perishes before his time. That is why I named the largest central lake on the farm – deepened, stocked, and landscaped – the Lake of Hope. It just so happened that the name was given in honor of my wife whose name is Nadezhda, which means "hope" in Russian, and in honor of my direct superior. After all, she is the General Director, and I am merely a General Designer.

If I hadn't had hope and faith in success and if I hadn't had faith in those people who were and remain close to me, would I then have bought tens of tons of fish and run it into a pond, a reservoir of rain and melt water created on the land, that didn't even belong to me? Would I have built a farm on the area of the former tank training ground soaked with diesel fuel, overgrown with weeds, swampy, and located far from places usually considered suitable for such a business? Would it have occurred to me to open

a restaurant in a building designed as a worm composter, where I planned to breed Californian worms and produce humus? (By the way, we have worm composters, but they are entirely different, with a unique technology for obtaining relict humus.) And could this restaurant otherwise become one of the best not only in the town but also in the country? And anyway, what would a person be without hope?

Someone may retort that hope alone is not enough and must also do one's work. I won't argue. It is true. It's just that hope and work are inextricably linked; one does not and cannot exist without the other. And neither one nor the other can live without a goal. A goal is achievable by ordering things within reason. The square of active human life takes shape from these four elements: hope, reason, purpose, and work. In such a life, nothing becomes lost, and everything is fixable. The notion also applies to the active life of our civilization as a whole, which has all it takes for development but has lost some side or vertex of the said square.

The history of the emergence of the Lake of Hope confirms that the presence of a plan does not guarantee its execution, and the absence does not mean that the desired result will not come true. It is much more important to know what you want, to do everything in your power to get what you want, to be guided in your actions by reason, and, despite any difficulties, not to give up. Therefore, despite its satanic plans and fabulous money, the "deep power" may have yet to work out. It is already ready to give up because, having everything at its disposal, it has long lost hope; this is the difference between the programs it offers and mine.

The hopelessness, dictated by the scientific view, comes from the fact that we are not the center of the Universe, and the Universe is inaccessible to us. Before I invented the GPV, this was true. But the GPV brings back hope since the Universe is open for knowledge and development by a terrestrial person with unlimited growth potential.

The "deep power" has had on its side, that is, on the dark side, for hundreds of years enormous resources, but it does not have goal-setting. Instead, it acts chaotically and does not always calculate the long-term consequences, although it always works inhumanly, as any devil does. Therefore, to transform the world according to the scenario proposed by me, that is, on the bright side, it is necessary to walk a path where there are practically no resources, but there is a goal, there is a vector of movement towards that goal, and there is the will to execute the plan. Our Earth's technocratic humanity, for its salvation, must inevitably become industrial-cosmic and to do so before the civilization reaches a point of no return.

It is necessary to build linear cities for 10 billion people and a transport and infrastructure road network of a new generation with a length of millions of kilometers to switch the world's energy and agriculture to a fundamentally new path of development, the biospheric one. We must also remove deserts from the planet and plant forests and gardens instead.

I don't just scold the past and criticize the present. There are plenty of such couch experts in our capitalist world, steadily sliding into the idea of a brave new world. I provide solutions and show a way out. I know why it's crucial and what the world should be like, where the next generations will live safely and comfortably thousands and even millions of ages. You can argue with me, swear, make a cuckoo sign, and call me a conspiracy theorist. Do my critics and bawlers have solutions and suggestions for saving the world? Or are they just like the frog described above, which is put in cold water and does not realize that the pot is soon to boil? Due to its short-sightedness, ignorance, and low level of intelligence, the frog also believes that the fire beneath is a conspiracy theory. It is comfortable here and now, so why leave its comfort zone and worry about tomorrow? Especially about day after day after tomorrow.

A Wedding in Time of Plague

As long as a person is alive and he is hopeful, nothing is lost, and everything is fixable. In my life, I have seen it proved more than once, about which I tell you, the reader, in detail in the first part of the book. Of course, I am not talking about providential or predetermination of everything that happens. No. The primary laws of the Universe are not a product of planning and predetermination but chance and error. A person can learn from the mistakes made and build a sequence of his own life on his way, even from a series of accidents. He can be something like a bullet flying toward his goal over the misfortunes of accidents he has already overcome.

If something in life does not go as you would like, as you think it should, then very often, you should accept what is happening as it is. Try to squeeze the most out of what you get. Then, move a little further with this. Wait until the circumstances develop so that you can try to fix what happened. And, finally, do it without losing anything, without giving up anything but gaining more than you could expect. Although they say that a spoon is dear when lunchtime is near, this does not mean that you need to give up on your lunch if there is no spoon or a spoon if it is not yet lunchtime. As we continue to live and move towards the goal, the moment will surely come when all the necessary elements come together. Then you will look back to the past and ensure everything was correct and on time.

I am the confirmation of everything I've written here, not only by chance but also by choice. Talking about what I would like to fix in my life, I always regretted only one thing. I need to give my wife a decent wedding. Earlier in the book (remember?), I told you that I married Nadezhda while in a hospital bed with a broken leg. Instead of me, my driver went to the registry office to get married in a civil ceremony. And at the very last moment, when the ceremony was about to take place, Nadezhda noticed a wedding ring on his finger. He was already married. They tried to remove his wedding ring, and it didn't work. This situation happens often. Then they all rushed to the restroom to soap the ring off his finger, laughing at the absurdity of what was hap-pening. It worked! My wedding ring was put on the driver's liberated, albeit swollen, finger. It was fun, of course, and in the end, we got the whole hospital department drunk. The lights stayed on until dawn. The wedding commenced, but we would like it to be in a different way. Nadezhda did not have a wedding dress with a veil, and she did not throw a bouquet,

among many other traditions a bride anticipates. And I decided to fix the situation 21 years later, an incredible number that certainly brings good luck in the 21st century and helps materialize my hope.

So I came up with the idea to celebrate a real wedding 21 years after it had already taken place. Everything I write here is real. An employee of the registry office came from Moscow, where we allegedly got married. Guests and relatives came from different parts of the world; Crimea, Kazakhstan, the United Arab Emirates, Ukraine, and Russia. And a splendid festive program materialized with congratulations, fireworks, and an ice show on the Lake of Hope ("Lake of Nadezhda" in Russian) to the eponymous song by Alla Pugachyova.

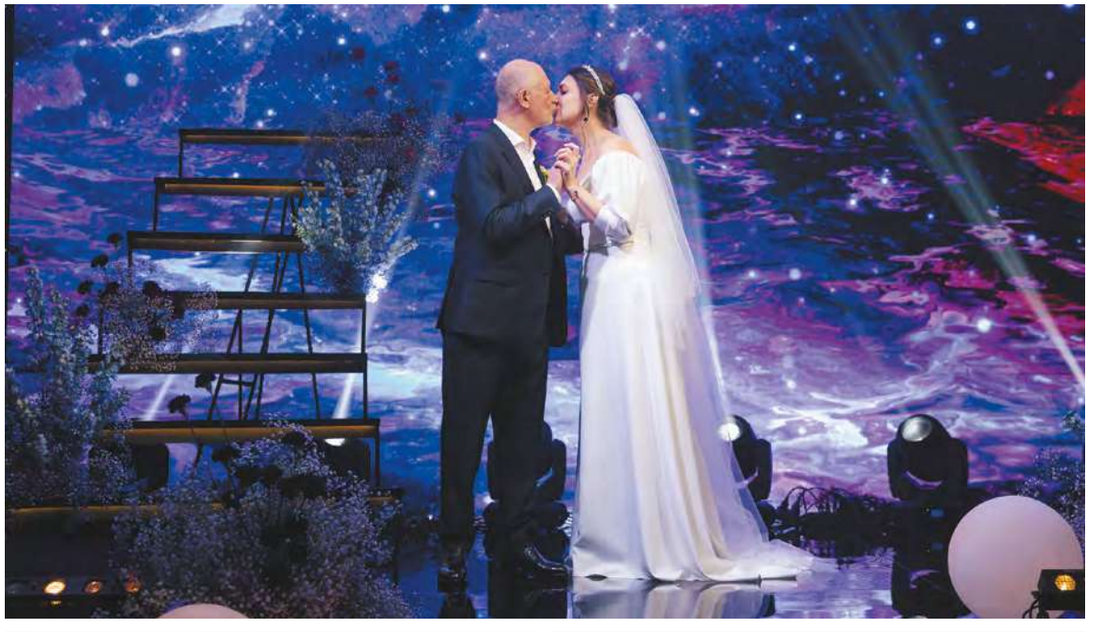
I was never afraid to be misunderstood because I was sure I was doing the right thing. Such a fear would mean valuing someone else's judgment above my own. Why should I care about someone else's opinion if I do not understand the causes, circumstances, or goals? All I know is my own understanding of what is happening; obviously, it is the most complete and significant one. All of that is with one caveat: one should not violate cultural traditions as they contain the experience of many generations, and one can and should look back at them. I have never broken such practices.

Starting our wedding 21 years after the official marriage, I realized that not everyone would understand me. The truth is, I did not do this for everyone, but only for those I hold closest. I did it, realizing that at the current stage of my life, in these historical conditions, it became essential to learn something myself and to have any persuasions myself but to show and prove to others. I know I am not eternal; therefore, I must pass the knowledge and experience I gain to others. Then my disciples will continue my work in confrontation with the "deep power," which planned to bring us all to what I call a digital concentration camp. Take note!

What did I want to say with this story of our wedding? First of all, I love and will love my wife until the end of my days. Then the fact that everything is fixable and nothing is lost. Next is that trees, people, actions, and ideas are judge-able by their fruits and not by breed, variety, or spoken plans. So let me explain in more detail each of these points. I'll start, of course, with love.

In a situation where quasi-elites openly question the value of marriage and family, it was vital for me to set an example to the contrary. The family is not just a cell of society but a natural organization of everyday human life and the basis for forming cultural traditions and continuity. During archaeological excavations, the first evidence of the existence of a civilization turns out to be by no means artifacts such as fish hooks, arrowheads, and so on. On the other hand, if found, a fractured and healed femur bone will already be ample evidence. An animal with such an injury is guaranteed to die. However, a person would have survived if someone had cared for him, and this could only occur thanks to the mastery of fire and the skills of making hooks and arrows. It is only through the concern for one's neighbor that civilization begins to take shape, and this is where the family unit is born. The attempts to destroy the modern family I observe today are a crushing blow to this long-developed civilization. The need to protect and defend this value was the first thing I wanted to express.

The second meaning of my postponed wedding is that there is no inevitability and irreparableness of fate that you should accept. Fate is a series of accidents; we can use them to create ourselves according to our understanding and purposes, and if it doesn't work out once, it doesn't mean it won't work out ever. There's always the opportunity for revenge and the chance to start over again; you need courage. The philosopher Socrates had the courage in his old age to master the flute. Such an occupation was considered a youth hobby, and fellow citizens began to mock the elderly thinker. To this, he replied: "It's never too late to learn what you don't know how to do." I'll add: it's always possible to fix what didn't work.



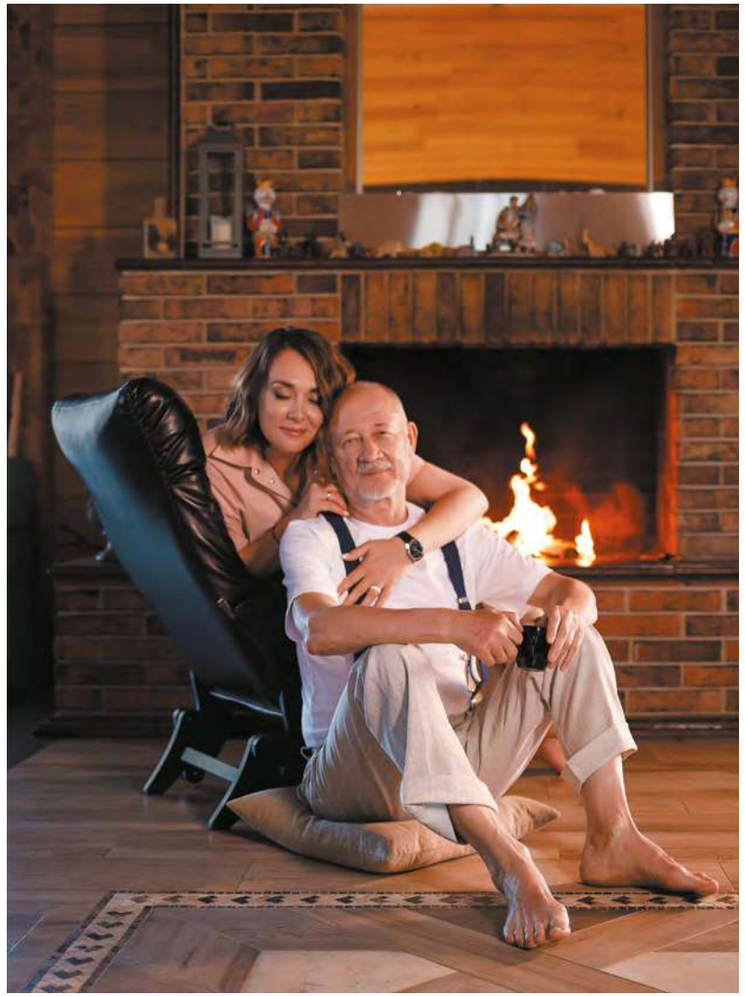
2022. Our wedding. The bride and groom 21 years after the official wedding. True happy family

2021. With my beloved wife in the greenhouse of ecohouse

The third message of my wedding is that the assessment of the correctness of specific actions, ideas, and words is possible only according to their results. During the ceremony, more than one person came up to me and said that this is the way to celebrate the wedding when its expediency and happiness are already evident. No need to vow eternal love at the altar only to cool down and be tormented by the betrayal of the oath a couple of years later. No need to make promises, only to be unable to keep them. It is enough to love, trust, hope, and have the courage to move forward together, supporting each other in difficult situations. If it works out, then everything is correct, and you deserve congratulations. It would be great to start a similar practice in other areas of life. In politics, for example, presidential terms would not begin with inaugurations and congratulations but end with them. Plans and promises are only meaningful with follow-through. We must not promise things without fulfilling those plans; instead, we should only do without promising. Plans are nothing. It is essential to understand the goal and hopes for success and act at a reasonable progressive pace.

I may have overestimated the significance of what happened that day. Still, regarding my relationship with friends and followers, this wedding is even more than the conferences on non-rocket space industrialization. Those events now happen annually, whereas the wedding is unique. Despite their practical orientation, industry summits are further from the practice of life than a wedding. There is less of a human act in conferences. The most important thing for which a person lives is family, home, and land; all this is pronounced in a conference's speakers' presentations and at the panel discussions. While here, on my wedding day, life was happening.

Amid the pandemic, amid a forever changing world, we were affirming the value of family and life as the highest value, and in this, we found the strength not to give up. I'm happy with what happened. I saw that all those invited appreciated the courage of our actions and understood my idea. For me, the event that took place was the final Rubicon and a new initiation. I have shown that I am open to those who surround me, rely only on myself and my loved ones, and resist the madness of the world; that I invite all who are ready to fight to follow me. Only in this way, not being afraid to speak and act truthfully, believing in ourselves, and relying on each other, we will escape the trap they built for us. This setup is already apparent. All events – the further, the more – scream about it.



2021. My closest and dearest person, my support – my wife Nadezhda

War and Rome

Twenty days after my wedding with Nadezhda, a special military operation of the Russian Federation in Ukraine began. As I write these lines, it is far from over. But it is impossible to bypass it in the context of what else I write here. Everything that happens too clearly fits into the general outline; the "deep power" manifests itself too clearly. Today's events are either part of its plan or someone's attempt to thwart those plans. Time will tell, but a lot, be that as it may, has already become apparent.

Russia announced the goals of the operation, the denazification and demilitarization of Ukraine, and the protection of the interests and lives of the two republics on the border territory. The republics declared their independence in 2014, recognized by Russia but not recognized by Ukraine, which for eight years kept these regions under siege. After that, however, the troops entered inland, as far as Kherson, Mariupol, and Kyiv. At the same time, part of the equipment and soldiers crossed the border, moving through Belarus, where our main office sits.

While the army was attacking in the traditional sense, the Western media staged the most potent information attack I have ever seen on Russia. Belarus was declared an accomplice of the aggressor. Many expected that the Belarusian troops were about to cross the line and that mobilization was about to be announced. Fearing this, people left en masse, wherever they could. They gave up everything, work and real estate. Our company is no exception. More than a dozen or even two dozen people quit, voicing arguments like, "I am Ukrainian. Now the KGB will come to arrest me." I did not understand if this was serious. Were these people in their right minds? It was only clear that there was nowhere to run, and therefore it was pointless. If everything goes according to the worst scenario, then hiding will not work. However, hiding will not work in any case with lines crossed.

It is clear that the plan, which I have called "5D plan," is aimed at a global reorganization. It will take place only if all the central world states join it. The most significant danger to its implementation is if one or more big countries decide to leave the conspiracy. In this case, an alternative and unacceptable center of power for the 5D plan will arise, the center of the economy, ideology, and development, not controlled by the authorities of the owners of the digital concentration camp, where we come to slaughter. They, of course, can continue to build the desired brave new world at home, but they want more.

They want to command everywhere and everyone because only then can they guarantee their safety and eliminate risks.

It is very likely that Russia, having launched a military operation and then gradually deployed repressive tools against liberal institutions that uphold the values of the 5D and the fifth column entrenched in the rear, has become precisely the force that went against the general globalist movement. The subsequent unprecedented sanctions and unity, with which Western "elites" responded to the decision of the Russian authorities, testify in favor of this. But all I see is that they do this under the guise of protecting the population of Ukraine. However, we already know that they always say things that are not what they do and do things that are not what they say. It's also apparent that no one in the world needs this quasi-country and that it will be purged according to the logic "to the last Ukrainian" – the faster, the more weapons and the dollars and euros that have become toxic will be supplied to it.

I was born and raised in the post-war period, and I've seen what war brings. I grew up in poverty and ate whatever crumbs I could get, even dandelions and nettles. My generation grew up on the principle of "if only there was no war." And here I am no exception. Killing people is horrible, ugly, unacceptable, and evil. The only thing that could be worse is destroying all humanity, our entire Earth's civilization. But that is the level of destruction happening now. At the very least, there are clear plans to eliminate most of the world's population, which I already wrote about in detail. The weapons of such a war are not machine guns and missiles but unnecessary pandemics or even smartphones, computer shooter games and disaster films, toxic social networks and advertising campaigns of fashionable gender brands, and overblown environmental problems.

One of the main goals of all of the above is to slow down the growth of the world population and then, very soon, reduce its number to better utilize the "golden billion." We are not talking about thousands, hundreds of thousands, or even millions of people but billions. Therefore, such a quiet and cynical war differs from any armed clash we've seen before in its catastrophic destructiveness. So, maybe Russia today, as many times earlier in history, is a peacemaker, not an aggressor? Some Russian elites may be aware of the impasse or even the trap we find ourselves in now. Or did this uprising against the forces of evil begin unconsciously? However, everything happening may be part of a general conspiracy to solve as quickly as possible. With nuclear weapons, the task of disposing of humanity is facing the "deep power." The confrontation between the two worlds in Ukraine may end through these means. One way or another, the world will change dramatically due to the events unfolding.

In any case, Russia, having launched an operation in Ukraine, opposed itself to the West and the murderous values it implants in civilizations. Was it possible to do otherwise and still preserve peace? Probably not. Under the circumstances, isolating yourself and rebuilding the system is impossible. It would stubbornly resist. The Russian elites would not accept the closure of pro-Western media, the expulsion of pro-Western financial institutions, etc. Without a good reason, neither the elites nor the population is willing to sacrifice the comfort of a consumer society. Doing so requires a solid foundation with historical and cultural background. The defense of the fraternal people, on the one hand, and the defense of one's security and sovereignty, on the other, can become such a basis. Suppose the motives of what is happening are good and not a part of some even more monstrous and comprehensive plan to exterminate people. In that case, even a nuclear war and the opportunity, having lost a lot, to maintain at least the basis of independence and part of the free population is a better outcome than the loss of any freedom in the face of a growing and rising digital leviathan as part of a global "digital concentration camp."

I admit that Russia needs to act more consciously. Yes, the country wants to be sovereign. What it doesn't want is to weaken its statehood to please corporations. How to achieve this, however, needs to be clarified. It is possible that what happened is only a response of a powerful country to continuous and prolonged pressure from the West and to the West's attempts to impose the rules of the game in everything from the economy to politics to everyday life. In this case, the military operation can and should still become a breaking point for the plans of the "global elites," leading to the impossibility of implementation. Only one thing will be obvious. The dead end that the world has fallen into and the need to find a way out that suits everyone.

Likely, the current war, the scale of which is only growing, and the prospects for development are becoming increasingly gloomy, up to the possibility of a third world war, will be the turning point that forces the civilization to change its mind. Of course, I don't want to believe that to this end, we will need to exterminate each other and poison the planet for many years to come, making it unsuitable for life. However, even if the current conflict soon subsides and we try to return to the original pre-war state of affairs, it certainly will be brief.

As I have already said, the explosions in Ukraine and the more than one-month ban on leaving home in Milan are not the same, but they have a lot in common. The capitalist consumer vector of the development of a technogenic civilization has exhausted its creative abilities. As a result, sophisticated schemes of confrontation and infliction of damage are being invented, for example, a pandemic or a total economic blockade of separate states, such as Russia. But it ends up hurting other market participants as well. In this case, the most developed European countries depend on Russia and Ukraine for energy and food.

No one wants nuclear attacks because then the representatives of the "elites" will be disadvantaged as they will not be able to relax on yachts in the Mediterranean Sea. So, one needs to reconcile; but capital does not want this, because otherwise a global crisis will break out. Therefore, conflicts of various kinds and natures will inevitably arise time and again, as has happened throughout the history of capitalist countries. The only difference is that the global economy will not allow these conflicts to foment somewhere outside of it.

When, for example, they mention Russia's dependence on raw materials, they usually forget that this problem involves more than just Russia. A dependent state with rich hydrocarbon reserves sells them at a low price to other states where post-industrial economies are developing. A ban on purchasing Russian gas and oil as a punishment for the aggression in Ukraine punishes European plants and factories that can't be as efficient without access to cheap energy sources.

Everything looks like a pyramid. Above is a "deep power," and below are quasi-elites who want to retain power and privilege. To do so, they need to minimize the number of freeloaders they consider human biomass, including office workers (plankton), medium and small businesses, and so on. Near the bottom of the pyramid are the most developed countries expressing the same desire as the "elites," but at their level, from the point of view of their citizens. These countries also want to eliminate freeloaders and possible competitors, like third and fourth world countries, such as Russia, located at the very bottom of the pyramid. However, only some people at the bottom agree with this state of affairs.

Incidents and riots occur from time to time in Iraq, Iran, Syria, Libya, and Russia, which express their desire to leave the system in different ways. They are there to be suppressed, which sometimes works. The upper layers of the pyramid again lay down the rules, take root, and continue leaching off the lower layers. But outbreaks occur in new places and become increasingly more difficult to control.

The damage from this is becoming more and more tangible. The pyramid does not grow proportionally; the upper levels increase less intensively compared to the lower ones. At the top, there is a lower birth rate, fewer qualitative changes in the way of life, and degradation at the social and genetic levels – only stability and comfort, attacked from the outside. The great Roman Empire is nothing compared to the rest of the vast world, which wants to live just like the Romans, yet presses on Rome, eventually destroying that empire.

The analogy with the Roman Empire is appropriate. At the dawn of this state, the existing world order seemed unshakable. Then, however, Rome did fall. Shepherds grazed goats on the streets of the eternal city, and women stretched ropes and dried washed clothes between the columns of the Roman Capitolium. In 2021, supporters of US President Donald Trump, who disagreed with the results of the election, in which their candidate lost the chance of a second term in office, stormed the US Capitol, an impressive omen of the worst. What follows is the collapse of the world order and what humanity has already gone through before – troubled times.

For several centuries, there were no stable states or political associations on the territory of the fallen Rome. Gangs ruled there, and the same can be expected here and now. The peculiarity of the moment in which I am writing these lines is that the West, for the first time since the collapse of the USSR, has entered into such a sharp confrontation with a state that has so many nuclear weapons that half of the countries can cease to exist on Earth in half an hour. Everything can only continue if we find a solution for all. It's vital, that the solution exists. The only way that I've been pointing to for 50 years. And there is hope that what is happening will make us see it.

The Road to a Dead End – the Path to a Road Fork

When people see photos of string transport, they often cannot believe they are not in front of computer-generated imagery; that's how perfect our systems look, and this is no coincidence.

Trains and cars came to fruition a very long time ago. At that time, the value of some parameters could not be predicted and somehow calculated, and many shortcomings are now becoming apparent. The afterthought is one of the fundamental imperfections of modern transportation. No one took into account the scaling factor, and no one thought that over time the roads would occupy vast areas, disrupt natural landscapes and natural ecosystems, and change the hydrology of soils and their quality. At the same time, today, it is no longer possible to eliminate the named flaw and revise other underlying decisions, which would mean the need to redo everything – millions of kilometers of asphalt pavements and rail grids, infrastructure, energy networks, and more. Therefore, manufacturers must twist and turn to compensate for their systems' inherent depravity. The vice itself persists, as do the problems arising from it. For example, everyone already knows that constructing new roads does not eliminate traffic jams and congestion in cities but leads to more cars and further problems. There was a good comparison in some movie: cars are like cancer, and the increase in road networks only allows the disease to metastasize.

Creating fundamentally new transport and infrastructure complexes is the only way to eliminate the critical imperfections of the predecessors. To do this, one must think and design in an underutilized way; this was the most significant difficulty in implementing string transport, but this is also our colossal advantage. String transport doesn't just look perfect. From the outset, and yet we aimed to implement the ideal.

If the flaw is in the appliance itself, then any attempts to rework and improve are meaningless. No matter how much you improve a dinosaur, it will remain a dinosaur and never have a future. Therefore, it is necessary to reconsider the basics and go through all the stages from the very beginning, from scratch. Invent a new principle and a new appliance. This approach is applicable not only in inventing things but also in life in general.

Buddhists tell a story about their enlightened teacher, Prince Siddhartha Gautama, who sought the truth for a long time, had gone a long way, and tried everything possible but could not reach the goal. Finally, at an impasse, he was ready to give up. Once, during meditation, he had a vision: a white elephant, a symbol of rebirth, told the future Buddha that he must return to where he started, under the same tree. Siddhartha followed the advice. Having traveled the road back, once again being at the origins, he understood the reasons for the failures and discovered Buddhism's now-known noble truths. This way is the only one leading from such an impasse. If you need help with the forest paths, try to return to where you lost your way. I have always tried to do just that, taking the time to go back and start over. I understand that in trying to break through the walls of dead-end decisions and situations, I will spend much more time and effort without gaining anything. Perhaps even losing everything.

If you look a little differently, any dead end is also a fork in the road. Existentialists describe that situation: "a person is doomed to choose" because he "is doomed to be free." There are a few options. Stand still and die. Try to go ahead through an impassable barrier and die. Turn back to the origins of technocratic revolutions and the changes that have taken place in the world over the past 200 years. Rethink everything from the position of accumulated experience. Recognize that all transformations occurred intuitively, without a clear plan. And it is the lack of purpose that has brought us where we are, to the situation of a technogenic civilizational fork. Now, I will present and describe the main milestones of this path.

Buddhism – an Indian religion or philosophical tradition based on a number of teachings attributed to Gautama Buddha. It originated in ancient India as a tradition of shramanas around the 6th and 4th centuries B.C. and spread throughout the most part of Asia. It is the fourth largest religion in the world with over 520 million followers, representing over 7% of the world's population, known as Buddhists. Buddhism includes many traditions, beliefs, and spiritual practices based largely on the teachings of the Buddha (born as Siddhartha Gautama, lived in the 5th or 4th century B.C.) and their subsequent philosophical interpretations.

2020. String transport (visualization)

History of Civilization from an Engineering Point of View – Technogenic Epochs

From the Universe's positions with billions of stellar systems, the Solar System and Earth are a set of little grains of sand. That means that in the vast Universe, no one is concerned about our future except ourselves.

Human civilization differs from other Earth's civilizations, for example, from such a purely biological civilization as dolphins. Dolphins occupied a natural niche in the biosphere, which had remained unchanged for millions of years. Although humans and dolphins are somewhat similar, those marine mammals differ from other animals in their high intellect. Besides, they have a language even more complex than humans, so the intelligence of dolphins may be even higher than that of humans.

Unlike other Earth's civilizations, our civilization is a technocratic, or technogenic, social system. Its genesis is the development of science, engineering, technology, and production, as well as the highly urbanized environment formed around these systems – the technosphere, which occupies the same natural niche on our planet as the biosphere – not only the surface of Earth but also many kilometers of sea and land depths and the bottom part of the atmosphere. And this alien life technosphere exists and develops according to approximately the same antagonistic principles as, for example, a cancer cell in a living organism, which is booming due to the suppression and destruction of healthy cells. And now, only two scenarios are possible: either the body's immune system kills cancer, or cancer defeats the body and then dies itself.

The engineering technologies agree with the laws of macroworld as opposed to the micro- or digital worlds based on physics, not philosophy and society. These technologies have created the modern human technogenic civilization in a short time by historical standards.

The technogenic world is not just the world of science, technology, and engineering, which is not a bad thing in itself, but also the world of the material: material production and consumption, material relations and contacts. The real strength of modern civilization – agriculture, industry, transport, energy, electronics, computers, smartphones, the internet, cities, roads, etc. – is created by engineers, not bankers, business people, officials, poets, and philosophers. The same is true of humanity's




current and future global problems: if people had not invented transport, would smog and traffic jams have appeared in cities, and would cities appear by themselves if engineers had not created bricks, concrete, and asphalt? If the industry did not develop, would there be oil and other wars for resources and territories? And would there have been wars if engineers hadn't invented deadly weapons?

Before engineers understand how to save the planet, the biosphere, and our technogenic civilization, it is worth looking back and tracing the entire history of the Earth's civilization from an engineering point of view. It is also helpful to look at the relationships between two global ecosystems: the biosphere, shaped over billions of years of evolution by Live Nature, and the technosphere, created by the intelligent man, or more precisely, *Homo technocraticus*.

Various types of civilizations have different definitions and multiple sets of features. However, as an engineer, I intend to study and analyze the main component of modern human civilization: its technogenic (technological), engineer-centric vector of development. Moreover, since I am an engineer of transport routes by primary education, the study will prioritize the most important (from my point of view) component of our civilization: communications – transport (movement of people and goods), energy, and information.

The presented analysis uses a systematic approach based on engineering logic and various available numerical data sources. Due to their wide variety, I had to average some indicators from the disparate and contradictory research findings.

Human as a living being and as a single organism is very complex, consisting of trillions of cells, thousands of organs, and biomechanisms. For reference, up to 53 facial muscles work only when we smile. Even the most minor component of our cells, a DNA molecule, contains billions of atoms, yet it is an incredibly more multi-faceted engineering structure from an engineering standpoint. DNA is about a million times more complex in design than an airplane. However, would it be possible to integrate various DNA macromolecules into cells, later cells into organs, and organs into a human body, without bioengineering communications (nervous, cardiovascular, respiratory, digestive, excretory, reproductive, endocrine, immune, and integumentary systems with millions of complex "sensors" – receptors) and with information channels from the senses (vision, hearing, smell, touch, etc.)? If they did, could such a body exist as a random set of "parts" and "bricks," as something whole and stable without the listed transport and communication bioengineering systems, including 100,000 kilometers of vessels and 200,000 kilometers of nerve fibers in such a tiny human body?

Technogenic Epoch Technosphere 1.1
(two million years B.C. – 5,000 years B.C.)

The technological vector of human development, which has now turned into an industrial one, was chosen about two million years ago by our distant ancestor, primitive man. It began when not yet a man but not already a simian invented the first engineering technologies; he lighted a fire, fried meat on it, dressed animal skins, and made the first primitive tools. Furthermore, people have domesticated the wolf, which allowed them to improve the hunts' efficiency and win the interspecies battle. Later on, our ancestors, the Cro-Magnons, made a fundamental evolutionary leap by inventing speech due to their inherent and anatomical features, insignificant at first glance, like the structure and location of the vocal cords. It enabled accumulation and transmitted oral knowledge from one person to the others. It became the most important social invention, with which the further development of engineering technology was possible.

It can be identified as the first technological development level for different tribes or clans when the concept of "humanity" had not yet existed. This period lasted about two million years until around 5000 B.C. when ancient engineers invented the wheel, saddled the horse, and harnessed it to the first wagon. The communicativeness of early men, like any other animal, was limited in the first epoch only by the biological parameters: muscular strength (running and walking is a material and energy components), vision, voice, and hearing (information component).

It was the first floor of the ascent up the infinitely long technological ladder of the infinitely high building of engineering knowledge. However, even then, scattered tribal civilizations experienced their first local ecological crises. People burned bonfires and dressed animal skins in a cave, which was their home, and died of lung cancer at the age of 20. The disease came from the severe smog and carcinogens contained in process waste. Although the power of the "technological equipment" – a fire – was low (about 10 kilowatts), and the "technological fuel" – firewood – was quite safe.

Nevertheless, they survived by realizing they needed to take their first technologies outside their cave homes to the surrounding environments. This technological solution required the creation of additional transport communications, essentially footpaths. The movement volume then was small, and the distance was short since a person physically cannot carry a heavy load far. However, this was unnecessary as primitive "production facilities" were near the caves.

Tribes became the first technogenic communities. Gradually, these tribes initiated the formation of nations, and primitive nations came together in the common interests formed around ancient technologies. This distinction fundamentally separates us from, for example, the same dolphin civilization mentioned above, which developed parallel to man but did not use any engineering solutions in its development.

The invention of the spear about 500,000 years ago and the creation of the bows and arrows in the 12th millennium B.C., which were the primary type of weapon up to the 17th century, played a crucial role in the life of our ancestors. With these weapons, hunters could kill animals and birds at a distance of up to 150 meters. The bow and the arrows are the first complex composite hunting tool, which took a whole epoch of human thinking, observation, centuries of experience, considerable mental abilities, and knowledge of other ancient inventions, including spears, spring traps, and throwing sticks.

Ancient people began to use hunting weapons in another social capacity: people chose war to battle for new territories, food sources, resources, and partners. So, one of the very first professions appeared, a warrior with only one skill, to effectively kill others with the help of special murderous weapons invented by primitive engineers that chopped, struck, and impaled.

The life energy used by our ancestors in this epoch was solar energy, which travels along the food chain from phytoplankton and green plants to animals and humans. Likewise, the technological energy consumed by ancient people, such as firewood, is also solar energy.

The world population reached 10 million people by 5000 B.C., and *Homo sapiens* interacted with the surrounding world in ways. The first is its biological basis, numbering about four billion years of evolution

of living matter on planet Earth. The second is his intelligence's technological, or technogenic, engineering activity. The root of all modern global problems is precisely in the second component of the intelligent man. Therefore, this problem will become more important in this work.

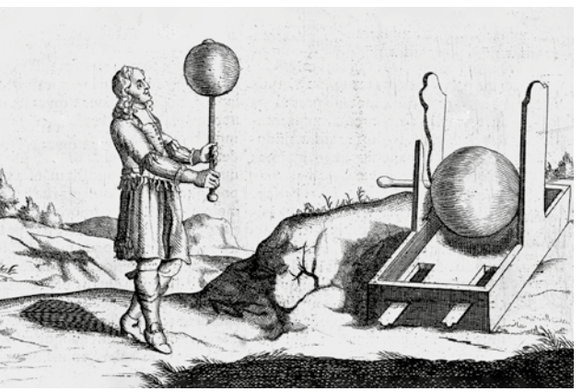
Technogenic Epoch Technosphere 1.2
(5,000 years B.C. – the last quarter of the 18th century)

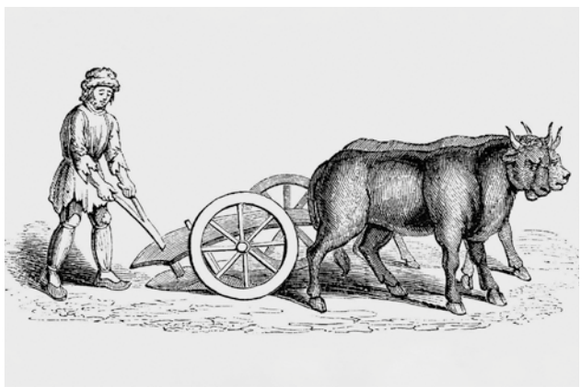
The next technogenic epoch, Technosphere 1.2, absorbed all the achievements of the bronze, iron, and ancient eras of human history and the Middle Ages. During this period, a large number of discoveries occurred, followed by the breakthrough inventions and creation of innovative industrial technologies such as:

– ore mining and the inception of non-ferrous and ferrous metallurgy;
– blacksmithing and the first manufactures;
– wooden plow, harrow, plow, and agriculture;
– wheel, bridle, yoke, saddle and other harnesses, cart and horse-drawn transport, which used a horse capable of developing a power of about five kilowatts, which is an order of magnitude higher than human energy capabilities;
– first glasses, microscope, and telescope;
– lever, nail, rivet, brick, gear, bolt, nut, and various complex mechanisms, machines, structures, and tools on their basis, including those made for scientific research.

It was during the epoch of Technosphere 1.2, when mathematics, philosophy, physics, the sciences of the microworld and stellar world appeared, as well as the sailing fleet, which enabled explorers to make the first geographical discoveries from which people have begun to realize themselves as humanity and civilization living in a resource-limited and confined planet Earth.

Humans continued to improve the existing weapons to create new ones to kill other humans, including clubs, maces, swords, throwing mechanisms, axes, sables, daggers, swords, dirks, and other blade weapons. Moreover, they invented gunpowder, firearms (small arms, artillery, and grenade launchers), and the simplest powder-based missiles.





Upon the formation of the first states came the first armies. The wars embraced more and more territories and became more and more protracted and bloody; for instance, the duration of some civil strife exceeded 100 years. The loss of human life from the technocratic vector of development began to grow in proportion to this development, even when a person had not yet coined terms like "ecology."

The invention of painting, pictographs, cuneiform writing, the calendar, papyrus, manuscripts, paper, and printing initiated the innovations that made knowledge of technologies transferrable. It became possible to create, accumulate, and transmit knowledge recorded on a physical medium without the need for direct human-to-human contact, which later played a vital role in the inception and development of engineering technologies and the entire Earth's industry.

The development of the pack and wheeled transport on land as well as sailing vessels on rivers, seas, and canals led to the formation of the first road network on our planet. Looking back 2,000 years ago, a developed network of communications came into existence in Europe and Asia, including transcontinental connections such as the Great Silk Road, the Royal Road between Egypt and Persia, networks between Egypt, Anatolia, and Mesopotamia, the Amber Road between the Mediterranean Sea and Baltic States, the Lapis Lazuli and Jade Roads, and the Tin Road between the Cornwall Peninsula in Great Britain and the Mediterranean.

The Sumerians, who invented the wheel, and then the Assyrians founded relatively long road networks about 3,000 years ago, for which special engineering troops formed within the army, and even reference guides and road signs came into existence. A network of horse-drawn roads began to start worldwide, and ancient cities immediately began to develop along them.

Hundreds of thousands of kilometers of horse-drawn roads, mostly unpaved, have been built on the planet. Eventually, transportation volume reached millions of tons per year with a traveling distance of hundreds or even thousands of kilometers. However, the average travel speed, including rest stops, remained extremely low, less than the speed of a pedestrian, so the long journeys took days, weeks, and even months.

The size of spontaneous cities had a single infrastructure criterion limiting it, transport accessibility. Back then, a man understood that it is comfortable to live where there is everything needed for the lifestyle and that the traveling distance should be defined by half an hour at any weather condition. In ancient cities, the primary transportation mode was walking. Thus, in half an hour you could walk several kilometers – this was the size of Ancient Rome, Athens, Jerusalem, and other cities. During the Middle Ages, people used horses and carriages, which increased their traveling speed and enabled them to cover 10 kilometers in 30 minutes. Consequently, the size of cities like Paris, Moscow, and London reached nearly comparable figures.

This epoch relied only on solar energy, from firewood and charcoal to horses (feed) and sailboats (wind). By the end of this epoch, the world's population reached close to one billion people.

Technogenic Epoch Technosphere 1.3
(the last quarter of the 18th century – the beginning of the 20th century)

Principal features of the technogenic epoch, called Technosphere 1.3, include:
– technological revolution in the textile industry, like spinning machines;
– canal construction, the invention of the water engine, and later of the steam engine;
– the appearance of the steam locomotives and the mass integration of railways;
– steamship construction;
– the rapid development of the coal industry and ferrous metallurgy;
– the invention of the telegraph;
– the introduction of the first vehicles with steam or internal combustion engines, presentation of the first power plants followed by the first electric transport, such as trams and electric cars;
– the creation of building composites and the initial use of reinforced concrete and asphalt globally;
– the discovery of radio waves and the creation of radio;
– the emergence of the automobile industry and the beginning of large-scale construction of paved roads;
– the invention of the first tractor and the beginning of the mechanization of the agricultural industry;
– the first flight by plane and the creation of aviation;
– the rapid development of popular sciences (mathematics, physics, mechanics, chemistry, philosophy, biology, and others);
– the explosive growth of industry and cities, the industrialization of whole countries, which continue to grow and develop.

The extraction of raw materials for construction, industry, and transport exceeded one billion tons annually, including stones, clay, sand, ore, coal, oil, etc. In addition, the world's population reaching two billion people.

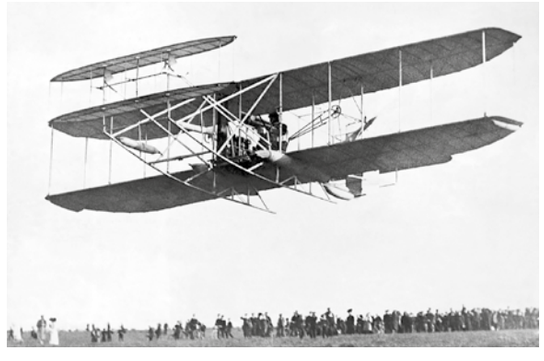
The road network began to expand, and there were qualitative changes in logistics infrastructure, such as the length of railways and gravel roads amounting to 10 million kilometers and more. At the same time,

the average speed of movement on the railway also increased and significantly exceeded the rate of pedestrian travel.

The capacity of thermal engines using fossil fuels grew and reached thousands of kilowatts for steam locomotives and tens of thousands for steamboats; for example, the Titanic needed 40,000 kilowatts. The annual production of such machines, including cars, increased and exceeded the value of one million units.

The industry and its servicing cities began to develop rapidly along the railways. Traffic volumes drastically increased to more than a billion tons per year. The scale of construction, even using simple tools like the ax and shovel, was set at a high rate even for modern standards. For example, while Russia was analyzing the need for the Trans-Siberian Railway going from St. Petersburg through Moscow to Vladivostok (the Ministry of Transport offered an alternative project: to develop horse-drawn transportation in Central Russia) the United States had built more than 20 railways of a comparable scale for 15 years, from 1880 to 1895, with a combined length of 187,000 kilometers. It created a sustainable foundation for the most powerful economy in the world.

Along the way, more and more fertile lands became land for transport infrastructure and industrial facilities, withdrawing them from the biospheric processes. Subsequently, they were not used to grow green plants and did not produce the oxygen necessary for living creatures. As a result, the volume of industrial waste released into the biosphere. It led to regional environmental problems, such as deforestation in areas



surrounding cities, roads, and industrial zones, and waste heaps and smog in the cities with developed industries. In addition, there were multinational corporations and wealthy people who could concentrate the considerable resources in their hands to make a profit from engineering technologies, including socio-economic and military-political. This flow of capital became the primary criterion for developing individual enterprises and organizations as well as most countries.

This epoch used only solar energy from non-renewable coal and oil to renewable sources, like windmills and hydroelectric power plants.

Technogenic Epoch Technosphere 1.4

(the beginning of the 20th century – the third quarter of the 20th century)

The technogenic epoch Technosphere 1.4 based itself on the following:

– the production and rolling of steel;

– the development of heavy engineering industry;

– the construction of giant hydro-, thermal-, and nuclear power plants and transnational transmission of power;

– the industrial development of inorganic chemistry products and the beginning of chemical-assisted agriculture;

– the mass development of the automotive industry;

– the development of aviation and aircraft industry.

Atomic and hydrogen bombs were invented as well as powerful multi-stage launch vehicles for them on solid and liquid fuels.

The rocket and space industry began to develop rapidly, both for military and peaceful purposes; and the following breakthrough technologies came about:

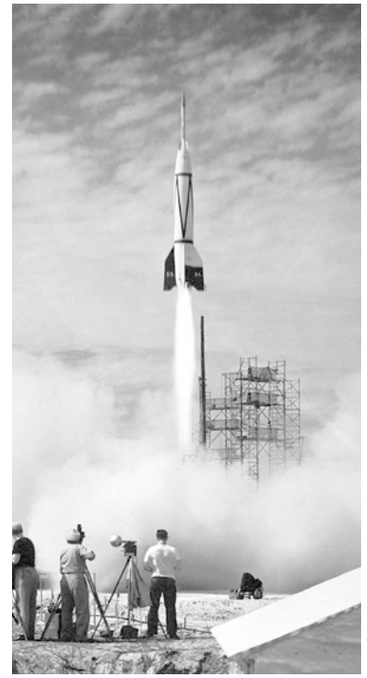
– the first artificial satellite of Earth, after which man for the first time went to near space and, later, he was able to visit the Moon (although it's not a sure thing that Americans flew there, and Hollywood didn't make up a "movie" about it);

– television and electronics.

Further development and improvement took place in the internal combustion engine and vehicles, aviation and shipbuilding industries, non-ferrous metallurgy, production of synthetic materials and composites, organic chemistry products, and extraction and refining of oil.

Large-scale construction of highways began. As a result, the production of new vehicles with internal combustion engines increased dramatically. Rolling stocks, such as cars and trucks produced by tens of millions a year, ships that included hovercraft and hydrofoils, aircraft, helicopters, airfoil boats, and surface-effect airborne ships as well as launch vehicles.

Access to personal vehicles and highways created the American-like one-story suburbs supported by mortgage services. It initiated the possibility of dozens living kilometers away from the city where they worked – the bedroom community. Simultaneously, the average speed of public transportation



increased to five or seven times higher than the pedestrians' travel speed. The car became the dominant mode of transport because, unlike the railway, it provides transportation service from "door-to-door" and became purchasable by any family or wealthy individual.

The rapid development of all industry sectors, from agriculture and household chemicals to electronics and automobiles, occurred with a single goal of making it profitable by satisfying the ever-increasing and specially cultivated consumption of manufactured products and services, including food.

The fast growth of a new type of technogenic employer – transnational corporations and oligarchs working exclusively for profit – led to the formation of new goals and objectives for them. That includes limiting the Earth's civilization's growth, including eliminating extra mouths. This concept is how the "golden billion" theory emerged.

The rough expansion of cities and megacities increased the world's population to five billion.

The development of technology and transport has created a robust military-industrial complex in many countries. Along the way, two world wars occurred, the bloodiest in the history of humanity. As a result, we saw the death of about 200 million people. These wars manifested the inhuman actions of the finally established "deep power." Through the destructive forces, the technological progress began to cause more and more actual damage to the industrial civilization from which it came.

The power of machines and equipment using fuel, the combustion products released into the environment, mainly into the atmosphere, reached tremendous values: the tens thousands of kilowatts – by aircrafts, the millions – by power plants, and over 100 million – by heavy launch vehicles.

The energy source used in this era was predominantly solar, from coal and oil to hydro, wind, and solar power plants. Finally, a new energy source also appeared: nuclear fuel. Nuclear is stellar energy because all heavy chemical elements, including radioactive uranium, could be formed only by the supernovae explosion. Such is the fate of the evolution of many luminaries in our Universe. That is why our planet and humans consist of "stardust."

Technogenic Epoch Technosphere 1.5
(the third quarter of the 20th century – present)

Achievements of the technogenic epoch Technosphere 1.5:
– the rapid development of the electronic industry;
– the creation of microchips, microelectronic components, and personal computers;
– the emergence and large-scale spread of the internet and wireless communications;
– the intensive development of fiber-optic communications and telecommunications;
– the development of complex computer software;
– the widespread use of robotics;
– a large-scale production and the processing of natural gas;
– the comprehensive provision of informational services;
– the emergence of 3D printing and artificial intelligence.

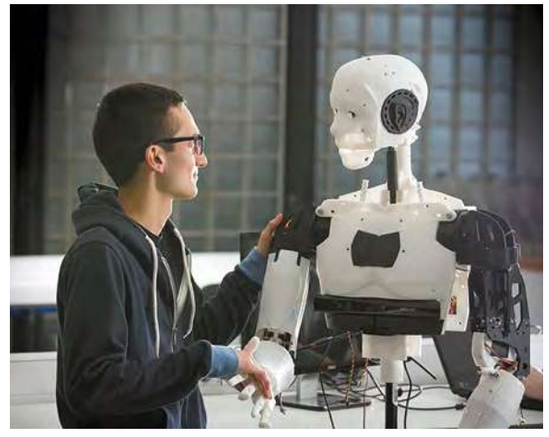
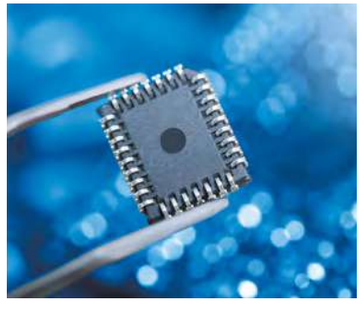
The Earth's population has reached a total of about eight billion people. There is ongoing accelerated urbanization with the growth of urban agglomerations into megacities having a population exceeding 10 million people each. Nowadays, there are 16 megacities built around the world. The urban population has begun to predominate over the country population exceeding the 50% mark in 2007. The hallmark of this

epoch is the birth of a new kind of human tech consumer: "the man of asphalt and smartphone" who has an atrophied connection with Live Nature and the Earth's biosphere that gave birth and raised him.

The construction of motorways is progressing rapidly, and a network of high-speed railways is developing. The total length of roads globally has exceeded 65 million kilometers, with more than 35 million paved.

This process leads to the development of multiple-hour and multi-kilometer traffic jams. The average traffic speed in megacities drops sharply to that of pedestrians. Furthermore, it creates excessive gas pollution and smog, consisting of exhaust gases, tire and asphalt wearing-off process output, and industrial gaseous and dust wastes, which might contain more than 100 carcinogens. As a result, a sharp deterioration of the quality of life in cities has begun, including worsening transport accessibility. These processes require three to five hours daily to get to and from workplaces, a significant portion of the day. Additionally, deteriorated air quality has created unsafe conditions for people and pushed them to wear face masks, even before the COVID-19 pandemic.

Engineering technologies have declared war on technogenic civilization. Transport in this invisible conflict is the most dangerous invention in the history of technical development. Approximately 1.5 million people die annually on the world's highways alone. Some die in hospitals from accident-related injuries and therefore do not fall into traditional statistics. More than 10 million have become injured and disabled.

These numbers are the known damage. In continuing local wars, human-made disasters, and terrorist activities, several times fewer people die every year. If the third world war happens with nuclear weapons, capable of bringing untold misfortunes and losses for humanity, then the transport will also be to blame for many victims. Atomic warheads will be delivered and dropped on peaceful cities by vehicles (missiles, planes, ships, and submarines) invented by modern engineers.

This epoch marks the increasing use of mineral fertilizers and pesticides in agriculture, which has led to a catastrophic deterioration of the biogeocenosis of soils and food grown on them. Food is a source of energy and building material for cells and organs in biological processes. Our cells live on average

for about six months, then die and get removed from the body and replaced by new ones. At the same time, the building material of life should comprise more than 80 chemical elements in the form of a variety of organic compounds taken by plants from the living and fertile humus. However, degraded soil can provide only some nutrients. Therefore, to avoid starvation, humanity has started to widely use biological crutches in the form of genetically modified foods and biologically active supplements. The food genocide of humanity has begun for easy profit, and you can earn and make huge profits off this.

Pharmacology has received a decisive boost also for profit. Healthy people are unnecessary here since you can earn more from a chronically ill person. Genetic engineering began to develop rapidly. Man, as an engineer, began to "improve" living organisms, something that he could not understand and comprehend the consequences of due to the limitations of his mind and knowledge, just as he could not foresee the unpredictable long-term results of such activities and the potential harm to humanity in the future. Hence, for example, the spread of coronavirus; honestly, it does not matter whether it is of natural or artificial origin.

An ongoing formation of the ideology declares the planet is now over capacity. Therefore, the civilizational values are being reviewed and shifted in the field of maximizing the use of new and surplus wealth through new houses, new cars, new computers, new smartphones, new clothes, and new everything, including new transportation services (a permanent increase in the length of roads and travel distances by private transport), energy (construction of new thermal power plants, including nuclear power stations), and information (internet, mobile phones, TV, ubiquitous digitalization).

Consumers' transition from material to virtual digital-based reality is broadly accepted, as it is easier to earn a significant profit there with fewer costs. In addition, the cult of emotional marketing has turned the vector of excessive consumption into an information component: the market began to sell not the product but the emotions from the products. This approach has dramatically reduced the quality of products as there's no sense to produce reliable and durable car or smartphone if a consumer buys a new one in a year or two. There's no sense to reconstruct an old building because it is easier to demolish it and build a new one of a lower quality. Moreover, this transition proportionally increased the resource intensity of all industries and raised the technogenic footprint for the biosphere.

The widespread digitalization of society only aggravates the global problems of humanity since it relies on the material component of the technosphere. In particular, the capacity of two power plants, like the Chernobyl Nuclear Power Plant, is already being spent on supporting the global Bitcoin network.

More than 5,000 satellites have already been launched into the Earth's orbit to ensure internet and mobile communications functioning. Meanwhile, soon, only Elon Musk alone, based on the global number of launches, is planning to put more than 40,000 additional satellites into orbit, which will require about 700 launches of Falcon 9 (heavy launch vehicle) with 60 minisatellites.

The modern era declaratively proclaimed as the epoch of resource-saving (energy, raw materials, mineral, spatial, financial, labor, time, food, etc.) without a systematic understanding of the general aim of these savings. So, over the past century, the world's population has grown by six times, followed by GDP growing by 20 times, which has significantly increased the demand for some resources.

At the same time, humanity has entered an epoch of expensive resources. Furthermore, an increase in the world's middle-class population by three billion people in the next 20 years will only increase the resource demand. Meanwhile, searching for alternative sources of mineral and energy-contained materials, energy, food, and water will become more complex and too expensive.

A shortage of resources or an increase in prices for one type of resource passes on to others. According to some analysts, an attempt to meet the progressive demand by balanced production growth will require more than $10 trillion of investments in the world economy annually soon. This need can become another trampoline to the point of no return for the Earth's technogenic civilization.

At the same time, services are not widely considered the critical resource, among which transport and logistics are the main ones; yet, our civilization can only exist with them. Furthermore, only some people optimize these services, which are the most environmentally dangerous, costly, and resource-intensive.

Roads and infrastructure, power plants and power lines, communication satellites, and the internet provide humanity with qualitatively new transport, energy, and information services, which should be more efficient, affordable, economical, environmentally friendly, and cheaper, or less resource-intensive. Additionally, they maximize the savings of time, which is the most valuable and non-renewable human resource. However, this is in theory, but practice demonstrates the opposite.

The energy source used in this era is primarily solar (coal, oil, hydro, wind, and solar power plants) and stellar (nuclear fuel). However, engineers also had a dream: to use the energy of the singularity, that is thermonuclear fusion, and the fuel for it – light chemical elements, including hydrogen – formed about 14 billion years ago during the Big Bang. However, so far, there are no examples of solutions that utilize this type of energy, even though tens of billions of dollars have gone to developing this technology since the 1950s.

This dream, for which humanity spent 70 years and tens of billions of dollars, is unpromising from an engineering point of view since it already comes from a natural thermonuclear reactor, the Sun. Unlike Chernobyl and Fukushima, the Sun has not had a single accident in five billion years of operation, and there will be no accidents in the next five billion years. Furthermore, converting the fusion energy obtained in the Sun into electricity is much easier than that produced in a tokamak (manufactured thermonuclear reactor). Therefore, people have been using solar power plants for a long time, but whether tokamaks will function still needs to be questioned.

Looking back over the journey, you can see that humanity has developed in spurts. But, by and large, there were only two significant leaps. The first is the Neolithic revolution, the domestication of animals, fire, the invention of tools, simple mechanisms, and devices – the wheel and axle, wedge, lever, inclined plane, screw, and pulley. In a short time, a colossal breakthrough of civilization was ensured, and then for a long time we developed not intensively (qualitatively) but extensively (quantitatively).

The second revolution is related to discovering the scientific method and approach. This stage produced an even sharper and more radical shift, but it also appears to be limited to qualitative transformation. Of course, we could continue to evolve quantitatively, but the forces awakened during the second leap, above all the industrial powers, do not allow us to hope for that. If the same approaches persist, we, and our technogenic civilization, will perish rather quickly in agony and convulsions. That's why I described the current situation as the socio-technogenic dead end or the civilizational technogenic fork.

Staying where we are in the civilizational context is hardly viable, although discussed earnestly. Hence, the concept of "zero growth," zero impact on the environment, exists. However, these programs have a humanly and philosophically understandable and accepted contradiction. What does not grow dies and presents us with only two scenarios.

Two Possible Scenarios for Technogenic Civilization

By now, humanity has found itself at a civilizational technogenic fork with two possible directions.

Scenario No. 1

The Earth's civilization continues rapidly developing its technogenic vector that became industrial two centuries ago. It is limited only by the size and resources of the planet. At the same time, resource consumption stays constant since the world economy relies on outdated and resource-intensive technologies:

– the construction of conventional roads (motorways and railways) for the historically formed rolling stock; development of traditional buildings and structures (using concrete and steel); usage of conventional thermal power plants that operate on coal, gas, or nuclear fuel;

– the use of traditional rapid vehicles, which are presented by motor and electric cars, high-speed railway trains, Maglev trains, jet aircraft, and multi-stage launch vehicles to get into space.

Conventional infrastructure facilities, like airports and cosmodromes, traditionally require land. They also traditionally pollute the land, air, and water with billions of tons of toxic and carcinogenic wastes. Additionally, according to statistics, more than 365 million animals are killed in road accidents annually in the USA alone. The studies carried out in the territory of the European Union highlighted that up to 27 million birds are killed on the roads every year.

As was argued above, about 500 billion tons of minerals on the planet are extracted, processed, and moved over an average distance of several tens of kilometers annually, of which more than 400 billion tons are ordinary soil, including rocks that go to the dump pit. At the same time, certain raw materials and resources travel using inefficient and environmentally dangerous transport over distances exceeding 10,000 kilometers.

The total installed capacity of equipment on the planet using fossil fuels, including boiler houses, power plants, and all types of vehicles (road, railway, aviation, sea transport, missiles), exceeded the value of 100 billion kilowatts.

Energy, raw material extraction, exceeds 15 billion tons annually, from which coal is about eight billion tons, oil is 4.5 billion tons, and natural gas, including shale, stands for more than three billion tons.

Then, the fuel burns, using air. The global oxygen consumption for this purpose has come close to 50 billion tons annually. While in the pre-industrial era, oxygen went toward natural processes, such as oxidation. Thus, the Earth's industry currently burns more than 1/3 of the oxygen the biosphere produces annually in 145 billion tons. This value will soon reach the 50% point, which I consider critical.

Meanwhile, the biosphere's productivity is only a little over 200 billion tons of living matter per year (in terms of dry weight; in its natural state, this will be about one trillion tons since all living organisms consist of water by 70–90%). Studies also showed that the biosphere's productivity is directly related to the content of free CO_2. Besides, it experiences an annual deficit of carbon dioxide contained only in the Earth's atmosphere, at least 200 billion tons. Consequently, the increase in carbon dioxide in the atmosphere, which everyone is so afraid of, will lead not to global warming but to more oxygen production by green plants, as their biomass will increase. Thus, it makes no sense to go crazy about limiting CO_2 emissions (according to the Kyoto Protocol and other decisions of the quasi-elites) since plants will bind excessive carbon dioxide while increasing agricultural yield. This process will further help to address the food problems of humanity.

Space transportation causes the most extensive damage to the environment. For example, a single launch of a heavy launch burns a hole, or rather a tunnel, the size of France in the planet's ozone layer (with a chemically active, high-temperature, and high-speed jet stream). As a result, we experience up to one million tons of ozone depletion per ton of payload delivered to orbit, depending on the fuel used. Since the mass of atmospheric ozone is about three billion tons (0.000064% of the planet's atmosphere mass), the entire ozone layer and, accordingly, life on Earth will end when only 3,000 tons of cargo (0.38 grams of freight for each inhabitant of the planet) enter orbit in a short period. This amount corresponds to about 100 launches of space shuttle type vehicles.

The direct damage caused to the planet's biosphere when starting the launch vehicle is about $100 million for each ton of payload. Consequently, governments should charge space carriers the appropriate biosphere environmental tax. For this reason, the cost of rocket geocosmic transportation cannot be below $100 million per ton of cargo delivered in orbit.

Aviation, especially supersonic stratospheric aircraft, also significantly contributes to the destruction of the ozone layer with its high-speed and high-temperature exhaust gases from jet engines and the creation of inversion trails, which might have a length of thousands of kilometers,

About
$100 million
per ton of payload is the damage caused to the biosphere during the takeoff of a launch vehicle.

in terms of flight range. Exhaust gases stay for a long time in the form of stratospheric clouds, the surface of which catalyzes the ozone decomposition reaction. The stratospheric wind spreads clouds over the planet's entire surface, including the Arctic and Antarctic areas. Ozone holes there can reach an area of more than 20 million square kilometers. The impact of the rockets and jet planes is evident, although scientists had not recorded ozone layer holes before the rocket and jet plane epoch began.

The power of solar energy reaching the Earth's surface is about 200 trillion kilowatts. However, the ozone layer traps almost 3% of the solar energy in the most life-threatening ultraviolet spectrum. Therefore, the power of the "thermal blanket" of the planet equals about six trillion kilowatts. This fact means that the destruction of only 1% of the ozone layer, meaning the delivery of 30 tons of cargo by a heavy rocket to orbit, increases the terrestrial solar radiation by 60 billion kilowatts previously trapped by the ozone layer high in the atmosphere.

This power, which heats the planet's surface, significantly exceeds the on-stream capacity of the entire terrestrial industry, including the power generation sector and transport. Therefore, heavy launch vehicles are the biggest threat to the planet's biosphere. They are the leading cause of global warming, not freons, coal-fired power plants, industrial CO_2 emissions, or cattle that allegedly emit too much methane, as is generally believed at globalists' bidding.

Thus, plans to relocate earthlings to Mars and other planets using Elon Musk's rockets, which have become especially popular in recent years, are utopian and extremely dangerous for humanity.

The average power of solar energy reaching the planet's surface, considering its shaded side, is around 350 watts per square meter. The average thermal power of the annual continuous combustion of all industrial fuel in the atmosphere (about 15 billion kilowatts), reduced to one square meter of the planet's surface, is 0.027 watts per square meter, which is 1/12,500 of the similar power of solar energy supplied to Earth. This additional energy can raise the planet's temperature by 0.02 °C or less.

The primary resources that are wastefully consumed and destroyed by the technocratic man in favor of the techno-consumerist man are not mineral and fuel resources, as is commonly believed, but the following:

– air-based oxygen, including its derivative – ozone;

– fertile surface area of Earth in square meters where green plants can grow, producing oxygen and utilizing atmospheric CO_2;

– humus, or living fertile soil;

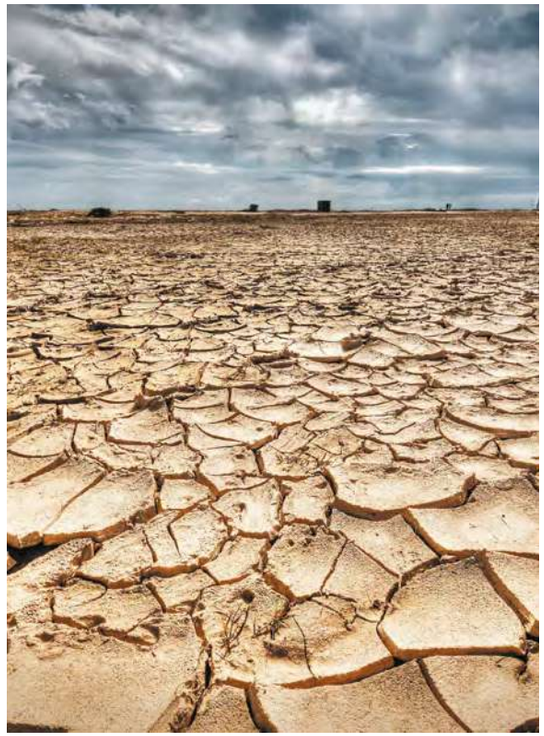
– soil under the fertile soil, sometimes covering the extracted raw materials with a layer of a kilometer or thicker.

The excessive and increasing consumption of these resources, which are an integral part of the common biosphere heritage of humankind – not the "deep power," quasi-elites, or an individual country – is the root of all global problems of our time lies. Consequently, an industrial environmental tax must also exist for their irrational use. As additional atmospheric CO_2, the greenhouse effect, hundreds of toxic substances, and carcinogens result from burning oxygen from the atmosphere and further release high-temperature combustion products into the environment.

The weakening of the human immune system and most diseases, including in the form of epidemics and pandemics, are the consequences of depletion and deterioration of the immune system of the entire biosphere, i.e., of the living soil and its thousands of species of beneficial microorganisms adding up to a trillion per kilogram of soil like chernozem. Through the healthy food grown in it, they feed, give to drink, and even treat us in the soil and our intestines. A vast army of microscopic workers numbering tens of trillions of them in each person processes and converts food into the state and type the animal and human body can assimilate. Fertile soil is the basis of life on the planet's land surface. Unfortunately, it is not only more and more increasingly covered in asphalt and buried under sleepers the size of five of Great Britain's territories, but also plowing, mineral fertilizers, pesticides, herbicides, other toxic chemicals, and hundreds of carcinogens from exhaust and flue industrial gases are killing its infusive force.

A human consumes an average of 250 kilograms of oxygen annually for breathing. Simultaneously, more than 2,000 kilograms of various fuels are burned per person on the planet annually. This process consumes about 7,000 kilograms of oxygen (28 times more than we need to breathe) contained in 35,000 kilograms of air, equivalent to 28,000 cubic meters. All this air passes through high-temperature combustion in boiler and power plant furnaces and internal combustion engines from cars and ships to airplanes and helicopters. In the burning processes, oxygen from the air is simultaneously burned out and replaced with hundreds of various toxic substances and carcinogens, including CO_2 and methane, which are harmful to an earthling and the biosphere. These gases are exhaled, for example, by cows.

In the 21st century, for our civilization we can put a stop in the experiment that has been continuing on Earth for thousands of years, similar to the experience in a Petri dish, not in a local but in a planetary ecosystem. We know mold inevitably dies quickly after eating up limited resources and polluting the entire space with waste products. The main reason is that there is no cycling of matter, energy, and information in the dish, and there are no trophic (food) chains when one species of living organisms feeds on other species and their waste. As a result of these processes that have been going on continuously on the planet for billions of years of evolution, the main biosphere waste (humus and oxygen) forms. A dead Petri dish returns to its original dead state according to the second law of thermodynamics, the increase in entropy of any closed system.



I called the scenario Civilization-21 because it is in the 21st century when in one generation, or maximum two, that is in the middle of the 21st century, or the third quarter of it, the "technogenic vector of development" experiment may end with the point of no return. I think that after passing this point, nothing will be able to save the Earth's civilization from degradation, extinction, and death.

Scenario No. 2. Reloading of the Earth's Technosphere. Technogenic Epoch Technosphere 2.1
(the second quarter of the 21st century – the end of the 21st century)

The Earth's engineers (not politicians, entrepreneurs, officials, artists, or scientists) will find solutions to open the "civilizational Petri dish" and provide the Earth's industry with access to the unlimited resources of outer space. These resources include infinite space, matter, energy, and new technological conditions: weightlessness, deep vacuum, and cosmic radiation. At the same time, inefficient transport and infrastructure technologies, which additionally pose the greatest threat to the biosphere, should be replaced by more advanced transportation means.

In meeting the mentioned requirements, humanity will have broad opportunities for further sustainable development both in space and in time, along the technological vector, which we, now living, as noted above, have yet to be allowed to cancel. However, I already discovered the solutions necessary for tackling this problem more than 40 years ago, which are simple.

On Earth. The optimal option is Unitsky String Transport, Equatorial Linear City with a takeoff and landing overpass for geocosmic string transport, and the General Planetary Vehicle, with a length of just over 40,000 kilometers.

The string transport, which has the maximum characteristics allowed by physics (in terms of efficiency, economy, environmental friendliness, safety, and resource intensity), will fully supply humanity's annually growing transport needs. According to the UN, people's transportation needs by the middle of the 21st century should increase by two to three times, with a subsequent significant increase in the speed and distance of travel.

At the same time, string transport will ensure double savings for humanity.

Firstly, freight roads will enable a low-cost transportation mode to currently inaccessible mineral resources located in mountains, tundra, vast swamps, and permafrost; on the shelves of seas and oceans, including the Arctic Ocean with its enormous resources; deep in vast deserts, islands, or continents, such as Australia. It will make these resources more accessible and less costly, establishing continuous sustainable development of the world economy.

Secondly, cargo and passenger string rail roads will allow the creation of an approximately 25 million kilometers long global network of transport and infrastructure communications uNet, combining the transportation network with energy and information networks. It would use less material, land, labor, and financial resources and cost less. Next, we will automate control systems for the rolling stock of this large-scale megacomplex for integration into the residential infrastructure of linear cities, whose clusters will also generate clean energy and information for their own needs and the needs of third-party users, including using blockchain technology.

The uNet network will include about five million kilometers of high-speed (up to 500–600 kilometers per hour) and hypervelocity forevacuum lines (1,200–1,500 kilometers per hour) placed above the ground, underground, and underwater. The remaining 20 million kilometers become the urban, suburban, cargo, and passenger routes with 100–350 kilometers per hour traveling.

During the 21st century, almost all transport will move to the second level, letting nature and people have the first. Mainly, it will free up farmland six times the size of Belarus, currently occupied solely by motor roads. The liberated territories can be made fertile again. It will require about 25 billion tons of living humus.




2020–2021. String transport (visualizations)

This will allow enriched soil to produce about one billion tons of agricultural products annually or about 100 kilograms per human. In response, the greenery will enable oxygen production and capture atmospheric CO_2 at about one ton of CO_2 from a hectare daily.

The construction of a slender overpass track structure above the ground at the second level reduces material consumption and as a result lowers costs and consumption of mineral resources, such as steel and steelwork, non-ferrous metals, reinforced concrete, concrete, crushed stone, sand, and soil.

In comparison with the roads built above the ground in the form of overpasses, like high-speed railways and magnetic levitation trains, the relative savings of basic construction and structural materials will reach up to 250 billion tons of steel and rolled steel and about three trillion tons of reinforced concrete when creating a uNet world network with a length of 25 million kilometers. Furthermore, such efficient use of resources will prevent the extraction, relocation, and processing of more than three trillion tons of various exhaustible minerals on Earth. Therefore, overburdening operations with transportation of about 20 trillion tons of ground and fertile soils to the dumping site for many kilometers will not be necessary for this scenario. Additionally, subsequent reclamations will be avoided to the vast territories.

As a result of saving resources, about a trillion tons of environmentally hazardous and carcinogenic substances will not become solid and gaseous wastes. We will use less energy, land, labor, financial, and other resources. Global environmental and other grave problems would not arise in producing and installing buildings weighing over three trillion tons of steel and concrete.

Building an uNet network with its track structure on the second level will reduce earthwork by more than 100 times compared to laying the same length of the roads in a linear roadbed. In addition, savings on the road network of 25 million kilometers will amount to more than a trillion tons of soil, and it will not

2022. String transport (visualizations)

2020–2022. String transport (visualizations)

have to come from the quarry for tens of kilometers. Consequently, the natural landscape and biogeocenosis will remain healthy, and land reclamation will be unnecessary in the construction zones and ground and sand mines. This part is crucial when passing the route on permafrost and weak soils that cannot withstand the additional load from the weight of the roadbed and higher temperature loads in summer.

Here there will be no embankments and dugouts, sometimes reaching 10 meters or more like the modern roads and railways have. Such structures disrupt the migration of domestic and wild animals, depress natural biodiversity, and hinder the movement of agricultural and other equipment. Furthermore, there will be no swampy or deserted territories along the second level roads, especially on rough terrains, since each roadbed is a low-pressure earth dam that interferes with surface and groundwater movement. The soil in it should compact only 10% compared to the natural occurrence.

This technology will save about 100 million people from death in car accidents in the 21st century and about a billion people from injuries and traumas. At the same time, string roads will not kill trillions of large and small animals that do not trap under the wheels since it is second level transport. In addition, land users of the planet will get back more than a million square kilometers of land that is rolled up in asphalt and buried under sleepers today. Significantly larger soil areas will not continue to degrade due to the proximity to motor roads and railways.

The string transport rolling stock is the picture of unprecedented efficiency. So, compared to the Tesla electric car with pneumatic tires, the efficiency of the rail electric vehicles on steel wheels (uPods) is five to seven times higher. This indicator is also due to the absence of an airfoil effect because string tracks do not have a solid roadbed, and traffic occurs on thin string rails. This aspect alone improves the aerodynamic drag of the uPods by two to two and a half times.

2022. String transport (visualization)

The described advantages are especially noticeable for large-scale transportation systems. For example, about 10 million high-speed uPods will run on the routes of linear cities with an average capacity of 40 passengers. That equals three to five passengers for family cars to 150–250 passengers for trains made up of uPods. For comparison, the world's car fleet alone is about one billion units at the time. Furthermore, steel wheels, unique aerodynamics, and the absence of an airfoil effect reduce the power of resistance to movement at a speed of 500 kilometers per hour by 2,500 kilowatts, which will save up to 25 billion kilowatts for the mentioned uBus fleet. With a uBus utilization rate of 0.75 (18 hours per day), these parameters will save about 40 billion tons of fuel annually, worth about $40 trillion. In addition, approximately 120 billion tons of oxygen will not be burned out of the planet's atmosphere yearly, including that in thermal power plants that generate energy for electric transport. Plus, we will eliminate almost 200 billion tons of exhaust and flue gases from entering the atmosphere.

This supposition is the real, rather than declarative, saving of resources in the 21st century and only accounts for the high-speed component of the global transport and communications industry:

– steel – 250 billion tons;
– reinforced concrete – three trillion tons;
– exhaustible mineral raw materials – more than three trillion tons;
– soil (including fertile soil) – one trillion tons;
– fuel – 40 billion tons annually;
– atmospheric oxygen – 120 billion tons annually;
– environmental resource – the absence of annual emissions into the biosphere of about 400 billion tons of solid and gaseous technogenic wastes, including gases from exhaust and flues.

I estimate the cost of saved resources at about $1,000 trillion. No less valuable will be the billions of people's and animals' lives saved in the 21st century and about a million square kilometers of land returned to the true landowner, the biosphere of planet Earth. It is also essential that the planet's biosphere will not contain 400 billion tons of fuel combustion products and technogenic pollution.

The existing global road network, at more than 65 million kilometers in length, will be replaced by at most 25 million kilometers of string routes connected to the global uNet network, passing through linear cities and their vicinities. String transport will not require the construction of new highways in the future since it will be able to serve the world's population of up to 25 billion people at the rate of 1,000 people per kilometer of the length of string-rail roads, or one person per meter.

The efficiency of electric vehicles on steel wheels is

5–7 times

higher than of a Tesla electric vehicle on pneumatic tires.

2021. Linear city (visualization)

By the time the world's transport and communication network of the new generation exists, about 10 billion people will be living on the planet. At the same time, a network of linear cities with a total length of about 10 million kilometers will cover an area of about 10 million square kilometers, or about 1/15 of the Earth's land area. That means that 14/15 of the land and all the oceans and seas can become national parks and nature reservation zones.

The Soviet Union's food problems were being solved by allocating 600 square meters of land per family (about 200 square meters per person) which contributed to the provision of basic nutrition for the citizens. As a rule, the allocated land was sparsely fertile, but due to the efforts of summer residents, for 10 years it turned into a highly productive area with gardens and green yards. The linear cities will provide five times more land per person – that's 1,000 square meters. Moreover, infrastructure, including buildings, structures, residential buildings, and string routes, will not remove significant natural resources. On the contrary, these new facilities will give way to more crops when barren land from under the foundations will be enriched with humus and transferred to the flat roofs of the buildings within linear cities. The idea is to create many types of urban gardens, including multi-level ones.

A similar green experiment has existed for five years in the EcoTechnoPark and Unitsky's Farm Enterprise in Maryina Gorka, Belarus. Six such buildings are already operating, including those with a subtropical greenhouse and an indoor garden. The garden works on the principle of a natural ecosystem. All effluents in the house (including from the kitchen and toilets) go to the root system of the plants, where they become two products: fertile humus and industrial water, enriched with liquid humus, with the use of specially selected natural communities of microflora and microfauna numbering several thousand species. This experiment proved my hypothesis that man could feed himself and another individual with biowaste without poisoning nature, enriching it with living fertile humus.

I propose the linear cities to be single-story and low-rise clusters with areas of about 100–200 hectares each, designed to accommodate 1,000–5,000 residents and existing within walking distance around high-rise dominant terminals and stations, combined with shopping centers, hotels, and other public institutions. Industrial, sports and entertainment, shopping, educational, scientific, and other clusters will be located nearby, with limited transport and plenty of bicycles. Clusters can exist independently since all necessary resources – water, heat and electricity, food – will be produced internally within them.

Residential and industrial buildings will rise using frame-type structures with vacuum glass panels. An external vacuum panel with a thickness of 20 millimeters is equivalent in its thermal insulation properties to a brick wall with a thickness of 1.5 meters, which will result in savings on heating in winter and air conditioning in summer. The primary raw material in construction is sand. A sufficient amount is available on the planet for trillions of such houses. Glass walls of buildings will combine with photovoltaic panels or, if necessary, made in the form of screens for a unique external and internal appearance.

In addition to solar power, each cluster will include a power plant for all-day energy supply for transport and infrastructure. The plant will operate on brown coal and shale, and the waste from such a power plant will participate in obtaining organic food. Available resources of brown coal will be able to supply

2021. EcoTechnoPark. Ecohouses, during the construction of which green technologies and environmentally friendly materials were used

2021. EcoTechnoPark. Anatoli Unitsky, scientist and inventor, is in the greenhouse of ecohouse, located in the central part of the building. The greenhouse provides the residents of ecohouse with a favorable microclimate and is also a source of environmentally friendly products

such systems for at least 1,000 years, and the available shale resources will provide additional 10,000 years of operation. In much less time during the 21st century, thanks to the efforts of *Homo sapiens* (or, more precisely, the *Homo engineer*), deserts and barren lands will disappear from the planet since it is possible to recreate fertile land like chernozem in their place and ensure the general appearance of forests, gardens, meadows, and fields.

All wastes from the coal burning process, including flue gases, sludge, slag, ash, etc., will be mixed with the coal that has not participated in the combustion. And with the help of specially selected communities of microorganisms, the mixture will be converted into insoluble compounds, primarily in insoluble salts of humic acids, in essence, relict humus. Coal is a plant that lived about 100 million years ago. It had received everything necessary for its growth and development, including more than 80 chemical elements, from the ancient soil. All these minerals in the form of organic compounds, mainly humic acid salts (i.e., humus), will be returned to earth again in the 21st century.

For example, sulfur is one of the harmful products of the coal combustion process in terms of its impact on the natural environment. Green environmentalists are now pushing for the widespread closure of coal-fired power plants, including the acid rain creation due to their operation. However, sulfur is necessary as a macronutrient; we each have more than 100 grams. Ideally, we consume this from the soil with food, which I proposed to implement in fundamentally new relict solar bioenergetics, which will use the mineral wealth of ancient humus and the Sun's energy accumulated by plants during the Mesozoic and Cenozoic.

Such a power plant creates its wastes in the form of fertile humus, and it can be applied to any soil in amounts from 2%, for example, to desert sand, to plant apple gardens, vineyards, etc. Such an experiment is currently taking place in Unitsky's Farm Enterprise.

We will send excessive carbon dioxide from the relict solar power plants to the greenhouses in cold regions or orangeries in the tropics to increase their productivity several times. Heat, about 55% of the energy of coal combustion, will be used for the specific needs of clusters within linear cities, heating greenhouses in cold climates, or air conditioning of the orangeries in hot countries. Excess electricity can become additional lighting for the greenhouses and orangeries at night, increasing their productivity.

The entire land area of Earth can be made fertile by natural, not technogenic methods, without chemical fertilizers and pesticides. It will require hundreds of billions of tons of humus and about 50 years to refine non-fertile territories. This time is still shorter than when it took technogenic humanity to pollute and desertify the native planet. So, we will create another large and noble global business, saving the Earth's biosphere, because nowadays, a ton of living humus in the market costs more than ton of oil.

It is also possible to make Antarctica green. Developing it is much more efficient and productive than, for example, extremely distant, cold, and deserted Mars. It is about 50 degrees warmer on the ice continent. The air is consumable without spacesuits and masks and at the normal atmospheric pressure, and plenty of fish in the ocean for food. A ticket here will cost almost a million times less than to Mars. The flight will take several hours, not months, and the probability for a settler to fly alive and healthy to the destination will be higher. Only in Antarctica, at the rate of 1,000 square meters per inhabitant, the future humanity can be settled, fitting more than 10 billion people.

2020. String transport (visualization)

The average speed on long journeys along the linear city will be

400–500 kilometers per hour.

So why do we, decent earthlings, need Mars? However, we can do a very humane and tolerant thing: to let all civilizational mold fly there: “deep power,” quasi-elites, globalists, liberals, and genders of all 300 stripes and colors, except for ordinary men (“he” – from the moment of birth, regardless of age) and women (“she” – from the moment of birth, regardless of age). Better yet, send them all to Alpha Centauri – in about 100 years, this civilizational filth will fall off – die out and turn into fertile humus. And then, for hundreds of thousands of years in a galactic EcoCosmoHouse specially equipped for interstellar flights will exist a normalized and closed ecosystem of biosphere type with a healthy biogeocenosis, flora, and fauna in all its natural diversity, more complete than, for example, in Noah’s Ark. In my opinion, this is a super humane scenario, especially if you compare it to the satanic 5D scenario currently being implemented concerning humanity, where the main “Ds” are digitalization, deindustrialization, decarbonization, desocialization, and depopulation.

And still, people will not initially settle in areas with unfavorable climate conditions but in regions with comfortable natural conditions, especially along the equator.

The average speed on long trips along a linear city will be 400–500 kilometers per hour. Therefore, within a comfortable 30-minute time, it will be possible to travel 200–250 kilometers. At this distance, we can embed a workplace, recreation, or entertainment for city residents in nature. Those megacities “rolled up” in asphalt and concrete will gradually dissolve and disappear from our planet like cancer cells, badly combined with a healthy and comfortable life.

The 40,000 kilometers long Equatorial Linear City will become the backbone of the uNet network. The most considerable portion of it will go across the oceans. About 100 million people – 1% of the world’s population – will live and work there. Along this city, at a safe distance, there will be a takeoff and landing overpass of the General Planetary Vehicle as the vital link between the Earth’s civilization and the growing space industry.

In outer space. The entire terrestrial industry currently exists in the planetary technological environment based on the specific gravity value. Gravitational acceleration is 9.81 meters per second squared, and an air-gaseous and chemical environment under the pressure of 760 millimeters of mercury contains 21% of the very active oxidizing agent, oxygen. For this reason, gravity does not allow the creation of alloys and composites from materials with different densities as gravitational forces delaminate them.

2021. Linear city (visualizations)

Many technological operations are impossible in the air, requiring vacuum systems and special cells. Moreover, obtaining a cubic meter of deep vacuum in terrestrial conditions is more expensive than extracting a ton of oil.

When the molten steel pours out of the blast furnace, it burns and smokes. Thus, the process of metal oxidation with air oxygen takes place, resulting in the metal losing its properties. When obtaining medicines, particularly other highly-purified substances without impurities, ideal conditions are required, so the workshops for their production have a multi-circuit air purification system. However, this does not always help because even the most sterile air contains millions of tiny dust particles and thousands of microorganisms. In addition, the planet's solar power industry does not work at night, in the rain and cloudy weather, and solar panel surfaces need constant cleaning from dust and dirt.

We can continue to list the disadvantages of the planetary technological environment; there are thousands of them, including the limited material and spatial as well as energy and information resources.

The cosmic technological environment has many advantages. Weightlessness is the first one. If gravity is needed, centrifugal forces can help create it: any arbitrarily large object, for example, planet Earth, can be spun around an imaginary axis without support bearings since it is in space in weightlessness. The second advantage is deep vacuum and ultra-purity (including the absence of gases, air, and microorganisms) extending to infinity. Thirdly, solar power plants (slender and light because they are weightless) in high orbits will work around the clock and year-round; they do not need dust and dirt removal.

The geocosmic cargo flow will determine the pace of development of the space industry for the benefit of our civilization, living in our historical home, the biosphere of planet Earth. At the same time, in the future, the annual individual consumption of industrial products should be commensurate with the ergonomics of a person and, above all, with their body weight. So, for 10 billion people, this is at least 100 million tons per year of space products or at least 10 kilograms per resident of the planet.

Thus, the main criterion of the space industry is the number of products manufactured in space and delivered to the Earth's surface to its primary customer, the Earth's humanity. Geocosmic transport (GCT) has to play a vital role in this process.

In contrast to ground transport, a fundamentally different approach will create and optimize the GCT capable of ensuring the industrial development of space and the transition of the Earth's civilization into space.

We are on a planet in a bottomless gravitational pit. We can climb to infinity or fly out of it with the first cosmic velocity, equal to 7,919 meters per second at zero altitudes. And not vertically upwards but passing over to a low circular orbit, i.e., parallel to the planet's surface. Therefore, we must supply each ton of cargo delivered to orbit with a minimum of 8,700 kilowatt-hours of energy. This, for example, corresponds to the kinetic energy of a train about 20 kilometers long and weighing more than 80,000 tons, rushing at a speed of 100 kilometers per hour. The rocket system spends 10 times more energy on this geocosmic work due to the low overall efficiency factor of the system. Traditional ground transport does not need so much energy, and it moves from point A to point B horizontally along the bottom of the "pit" over the planet's surface.

Extremely high energy expenditures during the industrialization of space impose several severe restrictions on the GCT:

– its efficiency factor should be close to 100% since even a relatively small release of energy into the environment, i.e., into the atmosphere through which cargo should enter orbit, will lead to catastrophic environmental problems during the operation of the GCT;

2021. General Planetary Vehicle (visualization)

The cost of building of the GPV and related infrastructure will be about

$3–5 trillion.

– it is necessary to use the most environmentally friendly energy – electricity – as the reference energy for the GCT.

In addition to solving environmental problems, an increase in the efficiency of the GCT will reduce the net cost of delivering cargo to orbit, which is inversely proportional to the efficiency factor of the transportation system, similar to any ground mode of transport.

The General Planetary Vehicle – GPV – meets these and other requirements imposed on the GCT in large-scale space exploration.

In the first years of the GPV operation (presumably 2040–2050), about 100 million tons of equipment, structures, and materials can enter space from Earth, sufficient to create the following elements within the equatorial orbits at an altitude of 300–500 kilometers:

1) solar power plants with a peak capacity of approximately two billion kilowatts (this is the capacity of all power plants in the world today), since about a kilowatt of power can be obtained from each square meter of the surface illuminated in space. Fuel for these and subsequently built power plants from hydrogen in our thermonuclear luminary Sun will be sufficient for another five billion years;

2) several hundred EcoCosmoHouses for long-term residence and work conditions on the orbit for several hundred thousand people;

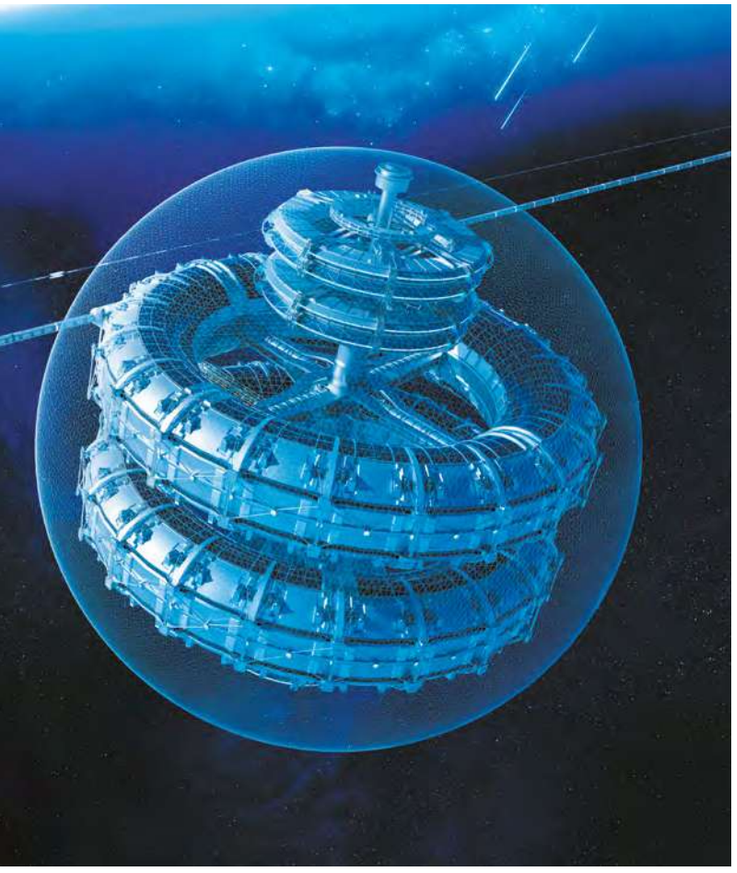
3) the primary linear platform of ISN "Orbit" with the relevant infrastructure communication (transport, energy, and information) along it, made using the string technologies, with a length of more than 42,000 kilometers.

ISN "Orbit" is a transport, infrastructure, industrial, and residential complex that encircles the planet in the equator plane several hundred kilometers away. Externally, the space complex will look like a necklace of cargo and passenger modules delivered to the orbit, being spaced at about 500 meters, connected by "threads," string orbital roads, and energy and information communications.

Around space string communications and infrastructure modules, as catalysts, "crystals" of the orbital industrial ring will grow over time as laboratories, shops, factories, power plants, and other industrial facilities. The personnel servicing the space industry will be able to live and work in the residential biosphere settlements built nearby with more comfortable conditions than on the planet. Eventually, the population will reach about 10 million, or about 0.1% of the Earth's population.

During the 21st century, the central part of the Earth's industry will enter near space on circular equatorial orbits in a space technological environment. To implement this plan, $5 trillion of investment annually will be sufficient, that is a half of what is planned today to spend toward the mentioned resource revolution and the "salvation" of the world economy.

2020. ISN "Orbit" (visualization)



2019–2020. EcoCosmoHouse (visualizations)

This investment will allow within about 50 years to complete reloading of our technogenic civilization to the space vector of development according to a new resource logic under the motto: "Earth – for life. Space – for industry." Moreover, the GPV will be almost the cheapest part of this reloading, with an initial cost of around only $3–5 trillion for construction, with infrastructure.

An anthropogenic biota will take shape on 1/15 of the land, or 1/60 of the planet's surface. It will be able to feed and serve humanity, and the natural biota will exist on the rest of the Earth's territory, equaling 14/15 of land, or 59/60 of the entire surface of the planet. This sectioning will ensure the natural biological regulation of the environment that existed in the pre-industrial era. The central part of the technosphere will be in outer space. At the same time, the remaining terrestrial industries will include agriculture, medical, environmentally friendly transport and infrastructure, ecologically friendly constructions, linear pedestrian cities, individual environmentally friendly structural elements of the general planetary energy generation communications, and mechanical engineering.

Transferring industry into space will open access to the Solar System's inexhaustible mineral resources, hefty metals with less presence on Earth. For example, the asteroid Psyche, located in the asteroid ring of the Solar System between Mars and Jupiter, with a diameter of 250 kilometers and a mass of about 10^{18} tons (a million of trillions of tons), by 90% consists of iron and nickel. And the reserves of gold there are estimated at hundreds of billions of tons.

The Industrial Space Necklace of the planet will become a fundamental element of the protection system from space threats, including meteorites, and a platform for expansion into deep space. Within the EcoCosmoHouses, it should create various biosphere banks delivered from Earth: living fertile soils, microflora, microfauna, flora, and fauna. Consequently, no manufactured or natural disasters on the planet that can kill the Earth's biosphere will be able to destroy thousands of closed and autonomous ecosystems located in orbit in EcoCosmoHouses.

The Earth's technogenic civilization, taught by the bitter experience of complex relations with the surrounding nature, will take careful steps in space to harmoniously fit into the surrounding space environment – in an alien (already cosmic) home, although dead in the vicinity of our planet.

I have little influence on the choice and implementation of one of the described scenarios for the development of humanity, which is currently at the point of the civilizational technogenic fork: to live in a "biospheric Petri dish," trying to extend its comfortable existence in all possible and not always thoughtful and humane ways, or to open a technological exit into space for our Earth's technocracy.

We still have time to make a choice. Still, in 20–30 years, it will be too late because fateful decisions for us, earthlings, are made chaotically and haphazardly by the "deep power" spontaneously assembled from politicians, bankers, and owners of enormous fortunes. At the same time, no single engineer among them can think comprehensively and systematically on a global scale. The "deep power" aims to lead our civilization "into a bright future" according to scenario No. 1 described above and to a place where here and now you can get fabulously high profits from global problems of humanity.

And yet the biosphere does not have a pre-prepared "secret door" through which someone, including the "global elite," can go out and hide. Neither a private island in the ocean, a deep bunker in the mountains nor a Boeing with counter-missile defense can perform such a role. Everyone, without exception, is forced to follow the same biosphere path and go the same way humanity turns, today's story with the coronavirus pandemic confirms this. Going toward its inevitable degradation, extinction, and death, and by historical standards, not in the long term but in the nearest future.

The choice of the ways of development depends little on humanity itself, which has several governing bodies. Only local decision-making centers are organized – the governments of individual countries, primarily industrially developed ones, which are essentially not much different from the tribal leaders who once lived in their separate caves. Yet, simultaneously, they can sit at a negotiating table to jointly choose the only right path to a sustainable future for our planet's biosphere and humanity, described in scenario No. 2 of the technosphere reboot.

In its transformative essence, the reloading of the technosphere, described from an engineering point of view, is summarized in the environmentally friendly EcoSpace program as the possible way to save our civilization.

To survive, humans must remove industrial technology outside the home for the second time in their existence: for the first time outside the cave and the second time outside the Earth's biosphere. This will enable our civilization to survive and develop steadily and infinitely in the time and space of the limitless Universe.

New Socio-Evolutionary Level of Human Development

A fundamentally new infrastructure of settlement, living, working, and recreation of people in linear cities, dovetailed with terrestrial nature, without violating its local and global biogeocenoses that have developed over millions of years of evolution, enables us to look differently at societies historically formed on the planet that are part of the structure of our modern technogenic human civilization.

After inventing the first machine as his servant, man socially mutated over the generations and became his invention's servant and eventually its pawn.

We cannot imagine life today without a smartphone and a car, and we care about them more than about our health. For example, the creation and implementation of the iPhone and MacBook technologies were more important to Steve Jobs than the functioning of his pancreas, from cancer of which he died at the age of 56.

After all, we do not put our smartphone in the microwave for a night because we realize it will quickly fail to function, although we can put it next to our pillow, closer to our brain. And we can even build a house under a high-voltage power line and easily cross it dozens of times daily.

We are afraid of high voltage in the socket. Still, we do not attach importance to getting electric shocks from a doorknob because we are dressed and booted in an electrified insulator. However, our ancestors walked barefoot and had the electrical potential of Earth. We are not bothered by sparks flying when we comb our hair, which speaks of a high, about 100,000 volts, electrical voltage around our head. However, we know that our nervous system and brain are super-complex low-voltage networks that exchange weak electrical impulses sensitive to external electric and electromagnetic fields.

We are afraid to walk up to the verge of the roof of a 20-story building but not scared of the collision with an oncoming car at a speed of 70 kilometers per hour, although hitting the ground after falling from a height of 80 meters will happen at the same relative rate.

We, humans, keep moving further away from the Live Nature that gave birth to us and into the inanimate world of machines, devices, and artificial intelligence. We are happy when our five-year-old child is confident with a computer but are not upset when they think that bread grows on trees, like apples, and sausage is grown in seedbeds, like radishes.

Four sectoral industrial technologies drive the technocratic development vector of our civilization – agriculture (food sector), transport and communications (communications sector), power industry (industrial opportunities), the infrastructure of living, production, and work (habitat). It is going down a blind alley due to the imperfection of these outdated and almost ancient technologies that do not meet the civilizational requirements even of today, let alone the future. Under the guise of global warming, deindustrialization, decarbonization, and other global problems of our time, there is an attempt to zero out the civilizational settings and break the existing industrial civilization code.

It is well known that the solution to any complex issues should always be sought at a higher level of understanding.

The leading causes of the global problems of our time are the activities of humankind on the platform of the mind. For these difficulties to become a thing of the past, every human and humanity needs to rise to a new macrolevel, the level of reason.

Only our ability to reason distinguishes us from animals on a system level. Animals have intelligence, but they can't form reason. The mind is responsible for food, procreation, and other bodily needs required for survival. Therefore, even the coronavirus is smart enough not to set a goal of annihilating its habitat, the human body, where it settles.

Our ability to reason is responsible for spirituality, self-knowledge, self-development, human feelings and emotions, morality, ethics, art, culture, improving relations with others and the surrounding nature, and other spiritual values.

Only the presence of reason makes a man a social person. Concepts such as "society," "sociality," and "socialization" have very similar meanings. All these concepts can be replaced by two simple and familiar to everyone words: human relations.

The presence of reason enables us to consciously improve and develop our relationships with other people, the surrounding nature, and with the entire Universe as a whole. It manifests itself in every person as spirituality and conscience. According to all spiritual, philosophical, and religious teachings, each person should improve and develop himself, building elevated relationships at all levels. For this, nature gave him the gift of reason.

While possessing both mind and reason, man has become binary: he is both a social person and, simultaneously, an individual person.

Individual means intelligent, while social means reasonable. The more reasoning a person does, the higher his spirituality is, and the better he builds relationships with others, the surrounding world, and nature in all its manifestations.

With the development of industrial technologies in a consumer society aimed at satisfying bodily and mental needs and pleasures, we should pay more attention to improving the inner world of people, the level and quality of their relations with one another, and the outside world. And the less humaneness remains in people, the more inhumane offenses they commit, and the more chaos they bring to our world, destroying the God-given Live Nature on Earth.

The technology-based human civilization created by people is a civilization of knowledgeable but very unreasonable people. Modern humans have begun to value individual comfort much more than interpersonal relationships. Such people are, by contemporary medicine standards, "mentally unsound."

The wider the gap a person has between mind and reason, the worse it turns out for the individual and the spiritual environment of his habitat, society. And, vice versa, the more conscious the relationships

between people in the community are, the faster they and society succeed in all areas of their activities with significantly less effort and resources. This point is where the rationality of each person should manifest in the realization that his main personal benefit is his spiritual development and the development of social and interpersonal relations not only with other people but with the surrounding world.

The actual progress of our technogenic civilization, built on engineering and scientific technologies and discoveries, should consist not so much in the development and improvement of industrial achievements as in the progress of humaneness in people making up our tellurian and precisely human civilization, and not any other (dolphins, ants, or bees, etc.). The time has come to build a society consisting not so much of intelligent techno-consumers as of socially reasonable people, for which they need to learn how to create and make social inventions and discoveries, along with technical ones.

Humaneness is a cultural, moral, and community-social state of an individual, the development of their mind, and acquisition of full-fledged morality and ethics of interpersonal relations, conscious responsibility, and a holistic understanding of real life on Earth, in the biosphere of which there are billions of species of living beings inhabiting a shared planet that is just a speck of dust in the infinite Universe.

Humaneness and spirituality reveal the fullness of each person's nature, unique abilities, and talents. By developing these qualities in oneself, one begins to feel the fullness and wealth of the Earth's life – one's own and that of society created together with the likes of oneself.

The completeness of morality is when it's not only our life that we want to make happy, versatile, and high-quality but the lives of our relatives and friends, based on the logic of the six handshakes rule, out of love for them, relying not on self-profit but on higher-order values.

Conscious responsibility is when we take personal responsibility not only for our life and health (physical, spiritual, and moral) but for the health and life of our loved ones, humanity, and the whole planet, and do not shift this responsibility onto others.

The integrity of understanding is when we consciously develop our reason towards understanding how the natural, not virtual and digital, world around us works and functions and the meaning of each life and its purpose.

The deeper and wider one reveals one's individuality and hidden talents, the wealthy, better, and more interesting one's relationships with others will become. The divine principle of unity in diversity put in by nature is possible only with the disclosure of people's essence, which will only enhance and increase their enjoyment of life and relationships with one another.

The more femininity in women and masculine qualities in men, the more attractive they will become to each other, and the more powerful and more stable their family unions will be. Here lies the divine wisdom so that life should not degenerate but develop eternally from the simple to more complex, sublime, and higher quality. Sociality and interpersonal relations enabled several thousand primitive people to create their first engineering technologies and, over several thousand years of evolution of engineering creativity, to develop into a modern technogenic mega-society called humanity.

The gift of reason, like life itself, has an anti-entropic nature, meaning that reason always strives to increase and arrange knowledge, to understand the essence of the Universe and in its highest manifestation and to comprehend the divinity of Live Nature, and to restore the material and mental relations and connections with it that the techno-consumer human has lost during the development of industrial technologies.

Man, as an entropic matter, is doomed to decay. His intellect and ability to reason is an anti-entropic tool, the purpose of which is to elevate the non-material component of his personality – spirituality. Man develops his individual and, accordingly, collective reason only when, relying on his talents and experience, he brings benefits not so much to himself as to those around him; this is the essence of the concept of human humaneness.

According to all existing religions, the goal of any human life is for each person to be able to reveal all the best in himself and to be reunited with the Universe that created him. Therefore, the main goal of the leadership of each nation-state is to help people living there, which is their social and spiritual responsibility to society.

People on the platform of the mind become individualists and morally degraded due to the wrong priorities and goals of the consumer society imposed upon them by the media working for the highly secretive interests of the global businesses that created them.

In the current reference frame, economic growth and GDP are determinants for all states, not the development of a country's citizens as spiritual people. The actual priorities should be different. There is a well-known saying: don't put the cart before the horse. Material well-being is the cart, while the development of human qualities in a person is the horse of civilizational progress. Correct and safe onward movement is when the horse is harnessed to the cart, not vice versa.

I suppose people move from the economic reference frame, the consumer society, to the social reference frame that stimulates the development of their human qualities and reason. If we do that, our technogenic civilization will develop much faster, more confidently, and more sustainable.

Our priority should be living in a society of humanity, spirituality, and morality, not the desire to become a servant of the rapidly created dead, soulless, and impersonal artificial intelligence, which will control our bodies and souls based on primitive binary and virtual mathematical codes. There is no need for rose-colored glasses to see why this is happening; it is to obtain enormous profits for those who promote this same vector of civilizational development.

Where the bow of the ship points, the ship will sail along that course. Therefore, the state should focus on developing morality, spirituality, and humanity in people. Then it will be assessed upon indications featuring the level and quality of human relations. Accordingly, we can focus all public institutions on improving these indicators.

Today, heads of state are like principals of trendy schools who assess the situation only by technical improvements in their educational institutions. Notably, the educational process itself at school needs to be improved. So, what are children taught? And are they taught anything necessary, meaningful, and valuable? What is the use of the fact that the school is equipped with the latest technology and looks good on the outside when the pupils there, oblivious of their lessons, ferociously fight with one another and "class on class," and can, in the heat of the moment, even kill others? We see it happening now everywhere on our planet, divided, like a patchwork quilt, between 245 nation-states and dependent territories.

The level of development of people of reason, morality, and responsibility determines the quality of their relationship. Therefore, a state should not be assessed by the GDP growth rate, as is common in the age of full-fledged capitalism, but by such factors as the crime level, corruption; depression, stress, conflicts; domestic violence, mental and other diseases, divorces, abortions, suicides; the number of unemployed and homeless people; the number of single-parent or incomplete families and children raised by step-parents; the number of older adults left without the support of their children.

Among the positive factors are birth rate and the level of education and morality; the number of registered family unions and orderly families, the number of gold and diamond weddings; the number of healthy (physically, morally, and spiritually) people leading a healthy and moral lifestyle; an increase in the expectancy and quality of life of each person and society as a whole; attitude towards friends and family and the outside world; the amount of preserved and augmented biosphere resources.

The main task of the education system will be fostering children's high qualities and pursuit of moral and spiritual development. Cinema, television, and mass media should not advertise chewing gum and popcorn for the prosperity of yet another business but spread something more elevated and significant: morality and ethics, co-creation, and a culture of communication aimed at strengthening the family and encouraging people to show their best human qualities in all structures of society, starting at the family and rising to the state and civilization level.

Now society is focused on profit, which develops individualism and the "take it" vector in people. In contrast, commitment to the ideology of morality and humanity extends in people the will to share something meaningful and worthy with others. Moreover, resetting society to the moral vector of development will entail economic growth because where people care for each other's welfare, security and stability will rise, labor efficiency and productivity will increase while living and operating costs and expenses will drop.

The criterion of efficiency and the level of civilization of society and an individual will not be profit but the common good, which will turn the techno-consumer humanity into a socio-technocratic one.

Labor will become the central element of creation and creativity rather than a mechanism for a person to survive in society and civilization on the planet.

Such a development course can bring the world community during the 21st century to harmony and prosperity. Without reducing population and without deindustrialization, as exactly the engineering technologies increased the quality and a standard of life: from the primitive existence of caveman to the current civilizational level, with the simultaneous growth of a small population of two-legged and upright walking semi-animal individuals to billions of reasoned and spiritual individuals.

Human civilization has entered a regime of turbulence and instability due to the rapid development of engineering technologies and against the backdrop of underdeveloped moral and ideological platforms. Attempts to create new totalitarian socio-political and economic-technocratic global international systems will inevitably arise on the ruins of old philosophies and ideologies. To prevent these attempts, one needs to be aware of their symptoms.

These destructive systems block and suppress the development of morality and the manifestation of humanity in people; they do not allow us to find, reveal, and realize the amplitude of our human qualities. Social and educational stratification and restriction of knowledge limit the development of human reasoning, including reducing it to piecewise knowledge. For example, some children are educated more about one subject or another but not on the amplitude of knowledge about the surrounding world's diversity and that everything is connected. Moreover, the education system is perverted: children learn to become consumers and lay people rather than social personalities and creators.

Deterioration of morality begins in childhood and is implemented by focusing people's consciousness on bodily needs. However, spiritual needs mainly come down to entertainment and virtual games, most of them being trivial and primitive shooters in which you need to wipe out as much and many of something and someone as possible or destroy and kill in the most sophisticated manner. From early childhood, this forms a person's individualism and consumer attitude to life, each other, and the entire Universe as a whole, leading ultimately to the disintegration of individuals, societies, and countries, to environmental and manufactured disasters, and economic and socio-political crises.

The destruction of traditional morals, which have formed in society over millennia, occurs, among other things, through the destruction of the institution of the traditional family as well as through the deprivation of parental rights and committing children to the care of a depersonalized and soulless state or third-party or alien and strange individuals and organizations.

People's sense of responsibility gets blocked through the stratification of society, through the systemic subordination of people to the hastily created impersonal, asexual, and unfeeling artificial intelligence as well as through restriction of social rights and freedoms of the human person, which has a nature-given living body, life-creating gender, and living soul.

The planetary consumer society, a contemporary technogenic civilization, created over the last 200 years of capitalism (starting with the George Stephenson railway), now resembles reasonless mold in a Petri dish devouring limited resources, polluting the space around it, and inevitably perishing.

Responsibility can develop in every person only in the space of freedom. The less genuine freedom a person has, for instance, the more the application of protective masks on his face, the more vaccines and microchips he receives, the more often he hides in lockdowns, and the less responsible and free he becomes. Step by step, he turns into a cyborg, a digitalized bioconvergent.

2021. The embodiment of the idea of creating a healthy environment for a happy life

A hindrance to the development of each person's individuality is also the one-size-fits-all approach to assessing the usefulness of his work for society. For example, this was the case in the late Soviet Union; the same income level for all employees, regardless of the volume or existence of the profit they may bring.

Another formidable barrier to discovering the talents inherent in each person is all types of stratification of society, with the absence of personal means of social mobility.

For artificial intelligence not to turn humanity into an obedient herd of zombified enslaved people, a social and moral transformation of our civilization's technogenic vector of development is necessary, which translates into the progress of human relations, morality, ethics, and humanity in people. And all this must exist spiritually for the Earth's society to become a civilization of reasonable people.

It is necessary to start such a civilizational reboot with specific steps: with the construction of the first targeted projects on a fundamentally new planetary eco-infrastructure, such as string-rail second level transport, linear ecocities at the first level, and relict solar ecobiopower plants, whose industrial waste will be living fertile humus and, accordingly, apples and grapes.

Proximity to the earth in a linear city would enable one to return to the origins of nature, whose part one forms and from which one becomes distant, having believed in the idol of scientific and technological progress.

At birth, we receive a body, the only thing at our disposal until the end of our days. Therefore, we must love our body so that it should serve us as long as possible. We know we are what we eat: food is the primary raw material for constructing cells, organs, systems, and the whole organism. And we know that there is a sound mind in a good body and that we all study all our lives in a school called "Life on Planet Earth." The linear pedestrian city harmoniously blended with the Earth's nature is ideal for such studies. Here it will become possible:

1) to walk barefoot on the healing morning dew every day and get up at the crack of dawn;

2) not to fear for the lives of one's children playing on the grass, not asphalt – they will not get run over because there are no cars;

3) to eat only natural organic food, which is healing and gives us health, well-being, endurance, high efficiency, and longevity. Such natural food strengthens the immune system and prolongs our life up to 100 years or more, and is irreplaceable by any of the most innovative and expensive biologically active dietary supplements, medicines, vaccines, vaccinations, and procedures;

4) to breathe freely clean life-giving air, replete with phytoncides of healing field and forest flowers, herbs, and trees;

5) to drink living spring (artesian) water, adequately sourced from the required deep aquifer within one's own or neighboring residential cluster without deterioration of its properties and quality;

6) in one's house or next to it, in one's own or a neighboring cluster to have one's favorite occupation, so there should be no need to spend hours of precious spare time on uncomfortable, unsafe, and not free-of-charge transport to get to work and back home every day. Walking to work will become the norm; based on physiology, walking at least 10,000 daily steps is advisable to invigorate the whole body. Such health-promoting physical treatment is beneficial at any age and has practically no contraindications;

7) communication with nature and strengthening the body and spirit with productive physical activities. Regular activity is indispensable for our body, consisting of many moving elements – 850 muscles, 208 bones, and 360 joints. Such daily practical physical activity on one's land, not in the gym, is vital for us, above all for the lymphatic system, which is the body's internal environment and is the basis

of our immunity and health. Lymph consists of intercellular fluid and is the "gullet," "water pipe," and "sewerage" for every cell of our body; there are about 30 trillion of them. This liquid does not have a heart of its own; therefore, the constant contraction of every one of our muscles is necessary for circulation through the lymphatic capillaries. That is to say, without the formation of zones of stagnation in all of the above moving elements of the human body and the diseases it causes, including cancer;

8) in a linear city each resident will get their primary life profession – a happy person, which means he will become wealthy by creating in themselves the most outstanding human values: health (physical, spiritual, and moral), longevity, and soul profusion.

Clusters of linear cities will become the primary platform for the self-organization of communities for survival in today's fierce global competition, with a decrease in the role and importance of state borders as some socio-economic regulators.

Psychologically, a person continually strives to find support and mutual understanding among a community of people close to them in spirit and way of life. It is not enough to feel oneself just a member of society and a citizen of one's country. A modern person, tired of constant pressure from the authorities, politicians, businesses, and advertising, vitally needs a kind of safety valve: understanding and solidarity, involvement without reaping benefits and gaining profits, self-fulfillment, spiritual and moral guidelines. The common culture and language are also significant: the mother tongue, through which the experience and knowledge of previous generations, culture, and social reference points transmit; and the communicatory (non-native) language, which is spoken by and between billions of people.

Such social needs – socio-cultural ties, shared values, religion, traditions, art, ethnic and interethnic contacts, etc. – are satisfied precisely in small groups with similar interests. Consequently, such self-governing communities of various types, manifesting themselves in multiple respects (spiritual, religious, socio-economic, ethnic, organizational, managerial, communicative, political, educational, historical, and ecological, etc.), can be created in clusters of linear cities.

At the same time, the development of science, culture, and education, small and medium businesses, tourism and the service sector, intellectual and spiritual growth, upbringing of children, communicating with nature, growing organic food for oneself and members of one's family, and other areas of academic, spiritual, and physical activity will become the main work for many residents of linear cities.

Such work will be more exciting and significant for any society, including humanity. Thus, people will receive much higher wages than a coal miner, lathe operator, welder, steel worker, or truck driver. Therefore, unemployment and poverty will become a thing of the past when the bulk of humanity moves from the concrete-asphalt jungles of megacities, torn from nature and life, to pedestrian linear cities, harmoniously blended with Live Nature.

An innovative strategy for transitioning local (cluster) societies of techno-consumers to a new state – a socio-technogenic community – will prevail here. Such a readjustment of the long-term development vector of the Earth's human civilization assumes the conversion of military-industrial complexes and the creation of a new planetary eco-infrastructure – residential, transport, production (including agricultural), energy, and information. As a result, it will become possible to use the social resources of the territories, the spiritual and intellectual potential of each person, energy- and resource-saving technologies, in particular, through the transition from the global export of resources and raw materials to the eco-production of goods and services (from the very same raw materials) in the clusters of linear cities – backed by our strength, interregional interaction, and the human dimension in ecology.

2018-2021. Linear city (visualizations)

Jumping Out of a Car Rushing Toward the Abyss

The story I would like to share, when almost everything is said, happened to me in the 1980s when I worked in Gomel. I just became the head of the non-rocket space exploration section of the USSR Cosmonautics Federation. I received an invitation to Minsk for a meeting with other organization members. Upon arrival, I got into a taxi. The car took a strange route. I asked why and was told that some friend needed to be picked up. And indeed, soon, another passenger turned up on the seat next to the driver. He and the taxi driver began strange communication, odd half-words, allusions, saying we needed to drop by another village. Then we left the city, then ended up in the woods.

At first, I just felt uncomfortable. However, when asked why we were going in a completely different direction, the taxi driver muttered something like "shut up, moron, none of your business," I instantly felt a deadly, sickened horror, instinctively realizing I was in danger. I made a split-second decision, opened the door, and jumped out of the car at 80 kilometers per hour. The taxi didn't even slow down, as if nothing had happened. Rhetorical question: "If a passenger jumped out of a normal taxi on the move, would the taxi driver go further into the woods as if nothing had happened?" I didn't get any bruises or injuries. I automatically tucked myself up, although I wasn't a stuntman; besides, my coat and the winter hat cushioned the blow on the icy road. Jumping to my feet, I ran towards the city, as a safeguard, not along the road but across the field, knee-deep, and in some places waist-deep, in snow. In the end, I got to the site of the scheduled meeting; however, an hour late. Afterward, I learned that in Minsk region, five people were killed and robbed in the woods under similar circumstances. I could well be the sixth.

People living today, countries, and their rulers must somehow escape from that headlong rushing train of technogenic-consumer civilization, in which many have settled so comfortably. Otherwise, they will notice the abyss when it is too late. It's better, of course, to detach your carriage, and if it doesn't work out or they won't let you do it, open the door and jump out of it on the move because the train will never stop at the request of passengers, especially if they are all herded to a "digital concentration camp." Then, upon surviving and even getting bruised, you can quickly rehabilitate and get back into the correct carriage and the right train, capable of taking much further than we expected to those heavenly places we never hoped to visit.

Modern science and technology give us incredible tools for the intelligent transformation of the world. The only problem is that we want to do something other than work. We have become like someone who can tear down a ramshackle cold hut with a leaking roof and build a luxurious palace but does not do it. Instead, we prefer to endlessly patch holes in the building of civilization until it finally collapses on our heads. Strange behavior, but that's how psychology works. This reminds me of a nobleman who did not leave the palace during the war in Spain, knowing that his enemies were about to come and arrest him, perhaps even execute him. Because outside was uncomfortable, it was raining.

The basic rule of my three schools – scientific, engineering, and design – is that at the beginning of the path, a person must discard everything that has happened before him in his field of interest. Do not consider anything related to the practice and experience of predecessors but only view the laws of the objectively existing known world. Traditions are important and necessary only in spiritual and cultural life because we encounter such entities that we cannot and should not change nature. In the engineering sphere, tradition hinders more than it helps. If we were drawing on tradition but not on knowledge, we would still use digging sticks or steam engines because our fathers and grandfathers did so. But should we? No. In contrast to the spiritual sphere, where good remains a static concept, as an act that supports and strengthens life, we can and must constantly change something in engineering. And if the problem is in the principles of engineering systems, we must review them as well.

First, we need to change our understanding of the world, which is still not very far removed from the primitive interpretation of it as a sphere on the ceiling on which the stars exist. We must teach in schools and shout from the rooftops that we live not just on Earth but in space. And that space is the same room for our development and the same resource as our planet.

Everywhere we are obliged to affirm the highest value of human life in the literal sense, in its continuation and multiplication, and not in reducing a person's life to the fact that he is unique, memorable, inviolable, and independent. Such a person is weak and defenseless, like a flower in a pot on the windowsill. We need one like a tree in the forest, developing and becoming more complex from generation to generation in the struggle with other plants for species dominance. The horizon of our development, of course, should be infinite space.

We should reconsider our relationship with Earth, the best place for us in the entire Universe. Today we know how food chains work, how circulation of matter takes place, and the role of microorganisms in forming soil fertility. However, we continue to use tools from the middle of the last century in agriculture. We must end this and switch to biospheric farming, biospheric settlement, and biospheric energy.

It is necessary to destroy the illusions about the possibility of waste-free production or optimization of the industry to a state of sustainable balance with the environment forever. We have seen that this can only happen with a sharp decline in the population, and even then, only for a while. At the same time, it is vitally important for us to understand that the industrial and technological vector of development is the only direction in which we, as a species, can continue to grow and develop. Since industry and the biosphere are simultaneously incompatible in the same space, the main civilizational task for the coming centuries should be the transfer of sectors into space in the logic "Earth – for life. Space – for industry."

When a person accepts the four shown simple truths, he will be ready to be actively involved in implementing the EcoSpace program I proposed and described in this and other books. Only such a human world can exist on Earth in the future. Another option is the future without humans. Recent events as well as wars and pandemics are forcing more and more people to see and understand this.

2019–2021. Sharjah (UAE), Maryina Gorka (Republic of Belarus). Investors

My ideas were accepted and supported by more than a million people from more than

200
countries of the world.

Today, my ideas have been accepted and supported by more than one million people from more than 200 countries, almost half of whom have become our investors. We have united people mentally, even before string transport has done this physically. All of them are not indifferent to the future of the planet, to how our children and grandchildren will live on it. But, unfortunately, society is not at its full responsibility to its descendants.

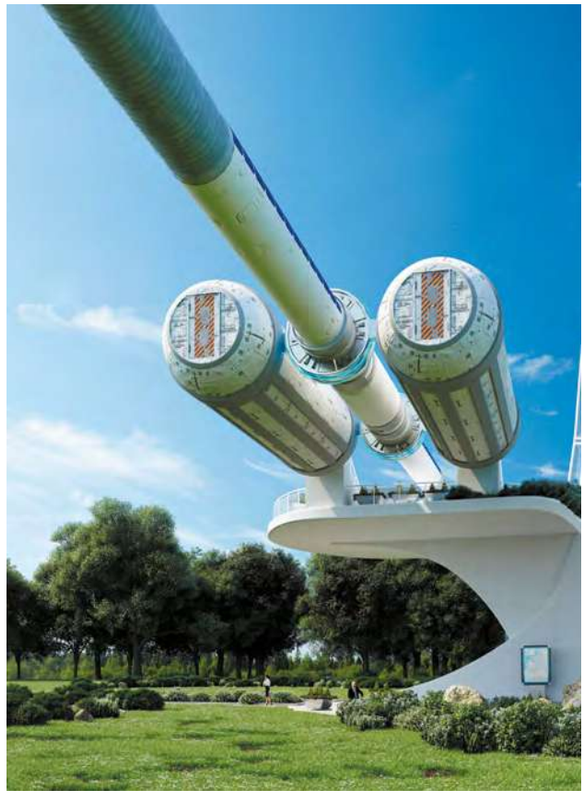
Probably, my major achievement is that I proposed ideas and spent my whole life developing them, which enabled people to look at the world anew and which opened up new, untold opportunities for people. I gave humankind not speculative but quite specific technical solutions, pointed the way, and was able to lead many others along this path. Ideas are what change reality. They are the most tenacious things in the world accessible to human cognition. No sooner does an idea emerge and find a response in the minds of even a dozen people, compelling them to undertake its realization, and the idea will not die. On the contrary, it will strive for realization again and again, subordinating itself, uniting around itself, and directing the thoughts and actions of many people.

I devoted my life to the service of an idea to save civilization from death. String transport on Earth and in space is fully justified scientifically. The basic engineering and technological components needed for its realization have been provided and developed in detail. Many things have already been tested in practice. My “minimum task” soon is to ensure that this world continues even after my passing.

Engineers create practically everything that forms the foundation of our technogenic civilization. Unfortunately, however, this world belongs to others, those for whom personal enrichment is the priority, those who naively suggest that in a situation when Earth is on the brink of death, money can save them. They believe they and their families can hide away on private islands, underground bunkers, submarines, and Boeings with anti-missile defense. But they are mistaken. The planet’s biosphere is one large room without barriers, with nowhere to hide.

Prehistoric people and their leaders once burned fires in caves and died of lung cancer at the age of 20. However, they managed to survive only because they figured out to transfer their primitive technologies, the ordinary fire on wood, beyond the bounds of their own home.

2022. General Planetary Vehicle (visualization)



2022. General Planetary Vehicle (visualizations)

So, we, terrestrial civilization, must now share the technosphere with the billions of fires (now with hydrocarbons) outside our common home – the biosphere. All the engineering solutions for this step, guaranteeing the transfer of humankind to a new stage of civilizational development, are already available.

Of course, working on the creation of the General Planetary Vehicle requires us to overcome a lot of problems in the technical and socio-political sense. The most difficult of them is political since the former tribes (now called nations) still sit in their large and small caves with a completely different name, the country. However, these problems are insignificant compared to those objectives that civilization must solve if it wishes to survive and develop stably. We did not receive the living biosphere of the planet called Earth as an inheritance from our ancestors; we took it on loan from our descendants. We are obliged to work off this debt. Otherwise, none of us have any future, and the terrestrial technogenic civilization will disappear from the planet as a failed experiment of the Universe. We have very little time left for about one generation (20–30 years) before we reach a point of no return when nothing and no one saves us from further degradation, extinction, and death.

The ideas that changed the world in the past always seemed to their contemporaries to be fantastic and unreal, but through the efforts of engineers, they took on practical realization. Today, are we prepared to reconcile ourselves, continuing to build millions of kilometers of automobile roads and considering the rocket the only “key” to space, accepting that we must resettle on Mars at a one-way ticket of a billion dollars to die there? I don’t want to believe it. But, if that is not so, and we wish to live, then we must acquire the courage to change. Every one of us must change.

I remember several cases that taught me what the civilization must learn today. The first occurred when I was not even a year old. Of course, I do not remember this incident and know it from my mother’s telling. Nevertheless, what happened influenced the formation of my character, worldview, and likely even some mental peculiarities. Perhaps it became the reason I always had a very poor memory from my early childhood.

My mother worked in the vegetable garden and left me to be watched by another silly little fellow, her younger brother, who was five or six years old then. Like any child, I began to fuss at some point. The attempts of my little uncle to soothe his nephew were unsuccessful. After a while, he was tired of my tears and whining. Finally, the boy found a rope, wound it around my neck, put me on a stool, and hanged me. My mother felt something was wrong, maybe because the crying stopped, maybe her maternal instinct kicked in. She ran inside the house and dragged me out of the noose at the very last moment. I was already turning blue. Another minute and it would have been too late. One child would have died, and the other would have accidentally become a hangman. Fortunately, it ended well. The episode was only a lesson, however, a very significant one. I perceived it intensely when my personality was still only forming. It showed how important it is to stop wishes and demands in time and not get to an extreme yourself or lead others to it.

I never brought a single difficult situation to a fatal end and never deliberately provoked somebody more robust than me. Humankind, which has not known moderation in its desires and, to the end, has tested the patience of the powerful Live Nature that sustains it, must learn this. That does not mean we should surrender and cease moving toward our goals. All we have to do is search for the means to achieve them without disturbing or inciting the fury of forces that can destroy us like pesky parasites. At the same time, we must think at least a few steps ahead and look at the problems systematically, and not concentrate on one thing, looking for solutions for the “here and now” present as is, unfortunately, the case today.

The same uncle of mine who once accidentally almost took my life of me, already in adulthood, told me about a dramatic and at the same time absurd episode. The story took place when he went to harvest hay for collective farm cattle. In the Soviet Union, there was a practice where groups of urban enterprise workers went for a whole month to the villages to help the peasant population. They would mow the grass and harvest branches of young trees. As a result, urban residents took the scythe for the first time, not knowing how to handle it.

My uncle and his friend were coming back from the field, their scythes over their shoulders, singing songs. Their way passed along the river. Not far away, here and there, there were small shallows with the bottom visible through the transparent water. As they crossed one of the bridges, the men stopped to watch the fry and small fish scurrying below. And then they noticed a rather large pike lurking. The uncle's partner decided to get it by stunning it with a scythe stalk, which was so conveniently at hand. With the passion of a fisherman, he looked only at the pike and waited for the right moment to attack. When the fish swam close, this adult man struck a sharp blow from top to bottom. "Plop." That's what my uncle heard, and instead of a dead pike saw a severed head fall into the water... Neither he nor his deceased companion took notice of the sharp blade of the scythe directly over the bent fisherman's neck, which the scythe easily severed. The two friends focused on something else; the only thing in their field of vision was the potential catch blocking their view. They didn't even think about how dangerous it was to get a pike with a scythe. Two adults behaved so short-sighted that they appeared to be complete intellectual morons. However, isn't the whole of humanity like this, first of all, "deep power" and the "global elites"?

Another incident taught me one more important lesson. It was in Donbass, where my mother worked in the mine. My sister and I, four years old and seven, respectively, went for a walk in town and had some ice cream. Crossing the road, we saw a truck moving in our direction from a distance. The truck was alone, and there were no other cars. We went back, forward, then back again. We hesitated. Forward again. My sister and I fell. The driver managed to react in time only by a miracle. The wheel of this multi-ton vehicle stopped a centimeter from the head of the little girl literally. My indecisiveness nearly became the reason for a tragedy.

In the future, once having made a decision, I always try to chase away any doubts. Doing so requires developing a particular discipline to receive all the possible ifs and buts. It means to look around and, above all, over your own head to be sure there isn't any scythe – it is not for nothing that death takes the form of an older woman with a scythe in her hands. But then I was rid of all worms of doubt eating me. Even now, I do not doubt when all the significant decisions are taken a long time ago. Humankind today must behave in the same way. To cease procrastinating and rushing from one side to the other on issues of global ecology, on whose solutions the survival of our civilization depends.

To moderate desires, to cease caprices, to be guided not only by feelings but reason as well, to designate the goal, to find the means for its realization and decisively move toward it without wasting time on doubts but overcoming the obstacles that emerge along the way, as water flows around stones in a stream, irrepressibly striving for the ocean. Making decisions in this way is the maturing of the human being. All humankind should come to this; it is my way as well.

I have never attacked first. As a rule, I was attacked first, and mostly it came at unexpected times and from those I least expected. When I realized that fighting was pointless and dangerous for my life, I left everything and walked away. I behaved like the Russian military leader, General Mikhail Kutuzov,

Commander in Chief of the Russian Army during the Patriotic War of 1812; he lost all his battles and even surrendered Moscow to the French for looting, but he won the war. And beat the conqueror of Europe, Napoleon Bonaparte.

Thanks to my enemies. They have become my best teachers. They are the ones who forced me to grow and become what I have become. Ordinary friends invite you to barbecues, to karaoke, to the theater. That does not develop you. Entertainment has no development; entertainment is just the consumption of pleasure. But enemies forced me to work. A lot. Stubbornly. Friends must be sought and made. But enemies find themselves. An enemy is not necessarily a person. It is also lousy weather, problems that arise, lack of cash, and sorrow when you feel like wailing. Only now I began to understand the Biblical commandment, "Whosoever shall smite thee on thy right cheek, turn to him the other also," that is, "Do not resist evil." This precept is more constructive than the opposite, "An eye for an eye and a tooth for a tooth."

For decades of working on string technologies, I had everything taken away from me seven times, and each time they could have killed me. I did not surrender, however, and did not lose sight of my goal. On the contrary, I left everything and went away only to survive, rise again, fight anew for the future, and win. Like the single blade of grass breaking through the pavement, despite thousands of feet and tires struggling to trample and destroy it. When other blades of grass follow it and stretch through the crack formed, the pavement will crack, the meadow will turn green, and transportation will disappear forever from the earth's surface, going to a second level.

We have the intellect, which is the main thing that distinguishes us from animals. It is terrifying to lose it as well as the product of our intelligence, that is intellectual property. Take my dollars away, and I will earn euros. It's no big deal if I lose euros as well as I will make rubles in Russia or Belarus then, or maybe other beautifully colored and evenly cut pieces of paper on any of the continents. Or I would invest the virtual Bitcoins I once bought for cheap in real gold. If they take away a villa on the Côte d'Azur, something I never had and never will, I would buy a 200-meter yacht, another thing I also never had and never will. I can go on and on. Material values are interchangeable because they are not unique, and thus their value is illusory. More than once, I had money and possessions taken away from me. And it was seven times and not just a little but completely to zero. However, actual wealth, life, and intellectual property remain. Real wealth is primarily located not on some paper or electronic media but in my brain, which is a unique and incomparable creation of human society and Live Nature, which cannot be repeated or replaced with surrogates, for example, artificial intelligence or quasi-innovations created by it. However, the creator of innovations himself will not be able to replicate or create something similar again due to the uniqueness and originality of what a priori exists only in a single copy, as well as his personality, which is also inimitable. Therefore, the deprivations of material possessions from me are a kind of payment for my studies. Seven deprivations are seven exams passed at the University "Life of the World Engineer." This kind of study is costly. Ultimately, I passed all the exams and received my graduate diploma. My graduate work is the Unitsky Group of Companies and the three Unitsky engineering schools: scientific, design, and engineering. It takes exactly seven years to become a doctor because the main thing in this study is to learn the Hippocratic Oath, which boils down to a few words: "Do no harm and be merciful."

I know that humanity will finally show resolve and cease using reason to exploit nature but try to find an opportunity to live in harmony with the surrounding world with its help. With confidence in this, I continue to bear the burden I have taken up on my shoulders. It is growing heavier with time. And you know, I feel stronger than I've ever felt before.

Instead of an Epilogue...

Aphorisms of the World Engineer

Humanity did not inherit the planet's biosphere from its ancestors,
it borrowed it from its descendants.

Get used to it: whoever comes through your door,
it's always not the one you're so much waiting for.

Very many of the living today deserve execution,
and even more of the dead deserve life.

The mystery of life and existence does not require a solution,
it is a reality existing independently of us, which we must fit in.

The planet – for life. Space – for industry.

True goodness and virtue for each person
is only that which is kind and good for all mankind.

The biosphere of the planet is our home. More precisely, one large bed-sitting room, which does not even have partition walls.

What you are looking for is not visible,
but what is visible is not what you are looking for.

All energy in land transport is spent not on useful work
but on fighting the environment and destroying it.

String transport will save more than 100 million people
from death on the roads and about a billion from injury
and mutilation over the course of a century.

> ***Get to know the world and you will get to know something bigger: yourself in this world.***

> ***Earth's industry, as an unreasonable, ill-mannered, and spontaneously born child of technogenic humanity, can destroy its parent.***

The world is volatility, life is stability in this volatile world.

By creating, we always invest in the new
a piece of the past – what we love.

The efficiency factor of all land transport is zero,
and zero cannot be improved.

A great goal is achieved by persistently moving forward
from failure to failure with ever-increasing enthusiasm.

Humanity today lives on the principle of mold in a Petri dish:
having eaten limited resources and poisoned the environment
with its waste products, it will die in the foreseeable future.

I, like Kutuzov, am ready to lose all local battles in order to win
the world war declared against my biospheric innovations.

The victory of an innovator is passing unscathed
through a field mined by competitors and ordinary people.

Do not deal with someone who helped you
and immediately announced that you owe him.

Even the air-monger Baron Munchausen
has something to teach us – using internal forces
to move in space and to rescue ourselves.

Artificial intelligence, born by an industrial imbecile,
will destroy its creator – technogenic civilization.

> ***We did not create the Earth's biosphere, and we don't have the right to destroy it.***

The most powerful weapon is the intellect,
and not the physical strength engendered by it.

Fashion comes from the concrete-asphalt jungle of cities,
and wisdom comes from the emptiness of deserts.

If you don't want to go deaf and blind, pretend to be deaf and blind.

He who rushes headlong forgets that he will notice
the abyss only when it is already too late.

Fingers on the hands appeared in order to help each other,
hands – to improve the world together; in the same manner
people are born to act together and not to be at enmity
with each other and with the nature that created them.

String transport will return to the true land user –
the Earth's biosphere – seven territories of Belarus,
"paved over" and "buried" under railway sleepers on the planet today.

With my thoughts, words, intentions, actions, and deeds,
I create a reality in which I, my family, friends,
and everyone on our planet can live, work,
and study easily, comfortably, and safely today,
tomorrow, and the day after the day after tomorrow.

Memory is fleeting: ours about the world around us,
and this world's about us – the smallest speck of dust in this world.

Honesty and sincerity should be a habit,
not a compulsion of circumstances.

Let it be as I want, with observance of Your Will, Lord.

True victory is moving persistently towards the goal:
from defeat to defeat with ever-increasing inspiration.

Modern transport is more dangerous than any terrorist,
because it kills on the planet more than a million people
every year and injures more than ten million.

If in the 21st century there is no reset of the Earth's industry
to the space vector of development, then humanity will have no future.

The main laws of the Universe are not plan and predetermination
but chance and error.

> ***Earth is the best home in the Universe, and we must preserve it for our descendants.***

Everything is true to truth lovers, even if it's a lie.

If you want to inflict maximum damage on yourself,
continue to persist in your delusions and ignorance.

To develop spiritual strength, an individual needs difficult times,
problems, all kinds of hardships, deprivation, and oppression.

Finish your business in today's material reality,
otherwise you will have to do it on your deathbed in virtual reality.

A miracle is never late – it comes exactly when it is needed.

I am a bullet flying over accidents of accidents
that I have already overcome.

You need to learn to feel thirsty when you can afford it.

Order in thoughts is success in business and joy in life.

Being stubborn and intrusive means you can
shout and get through to... silence.

The logic of the outgoing “buy and sell” world: “Divide and rule.”
The logic of the new “EcoSpace” world: “Create and prosper.”

I do not give advice, realizing that advice
is a dangerous gift even to the wise from the wise.

What annoys you is not to blame – it is the result of your rejection
of something that you cannot, are not able to, or do not want to change.

“

Happiness is inherent in each of us from the very beginning, you just need to be able to discover it in yourself.

It is we who decide how to live in the time that has chosen us.

The most valuable experience can only be gained
from bad judgments put into practice.

A person is so arranged that inevitably – sooner or later –
he will move away from the one who gave him more than usual.

By making yourself evil and unjust, you run the risk of attracting
even more evil and more injustice of the world around you – likes attract.

Each person is a besieged fortress,
for whom there is a fight between good and evil.

> ***Set the highest bar in your dreams – only the great can awaken people's souls.***

The beginning is crystal delicacy itself,
you need to be extremely careful.

There is no direct road to a lofty goal – it zigzags uphill
through the abyss of misunderstanding, prejudice, envy, and rejection.

It is more important to learn to delve not into the words of speaker
but into his thoughts and soul.

If no person has individuality and goal-setting,
there will be no personalities either – then society becomes
an easily controlled and manipulated crowd.

If people valued humaneness in themselves and others more,
rather than amassing gold, this world would be cozier
and more comfortable.

A good person is honest by nature, not by external circumstances.

A person at the top of the value scale
should have aims which he pursues.

Say what you despise the most and you will say who you are.

The more selfish a person is, the more flawed
and the more dependent on the opinions of others he is.

Avoiding risks today, tomorrow we inevitably generate them
a thousand times more.

The line between good and evil runs along the border
between good intentions, with which the road to hell is paved,
and harm, which is always next to good.

Our Earth's human civilization was not created
by tsars and kings, lords and sirs, bankers and managers
but by thousands of generations of engineers.

The borderline between ignorance and knowledge,
savagery and culture runs along the border
of our relationship to the past and the future.

Every moment given to you by fate
is a priceless gift from the Universe.

Implementing a breakthrough technology
is like walking a long way barefoot on broken glass
of unfair competition.

If you can destroy something, you have control over it.

Don't feel sorry for yourself if you don't want to be despised.

If you want to take revenge on your enemy,
stop being like him.

It is better not to know the source
of people's interests and judgments,
so as not to be disappointed in them.

Each person is able to endure all the hardest
and most difficult bestowed by life.

Anger, as the strongest emotion,
blocks our spiritual mind – the inner voice.

> ***Only he who can change his mind is free, not he who persists in his mistake.***

You can build a tall fence around yourself,
but the world behind it will still exist.

No matter how hard you try, people will make
the same mistakes as computers with outdated programs
hardwired into them.

The inventor lives in the crystal castle of his ideas –
do not try to change his mind by throwing stones of distrust at it.

Only he is happy who seeks harmony in himself
and not in the world around him.

Fairy tales do not end. It is the characters
who appear and disappear, having done their job.

Fear kills the mind. I will let it pass through me.
And where there was only fear, my knowledge
and my experience will remain.

Our world is not furnished rooms,
from which you can move out to other ones of the same kind;
the world is the fortress of our society and our family.

Having a weak memory since childhood,
I had to develop logic and abstract thinking.

The destruction of the personality of an individual
occurs through the destruction of his goal-setting in the world.

It is easy to remain a good person,
despite the misunderstanding, rejection, and antagonism.

The path of an innovator is a perennial struggle
through the jungle of misunderstanding.

Even in the most sophisticated web of fear
and misunderstanding, one can find a weak thread.

Our destiny is what we secretly dream of.

It is not good or evil that matters but their causes and effects.

Society will decide for you who it needs.

The mountain is not seen from the top. In order to make sure
that a mountain is a mountain, it is not necessary to climb it:
any path traveled to the end leads nowhere.

By turning a blind eye to someone else's depravity,
you cultivate that of your own.

He who does not memorize other people's thoughts
can develop his own.

Man invented many machines to become stronger,
smarter, and freer, but after ten generations this was transformed
into the power of a more active and ambitious minority
over a passive and inert majority.

The present does not exist – it is a moment that came from the past.

Wisdom is the recognition of the inevitability of choosing
the most dangerous path when all other roads are cut off.

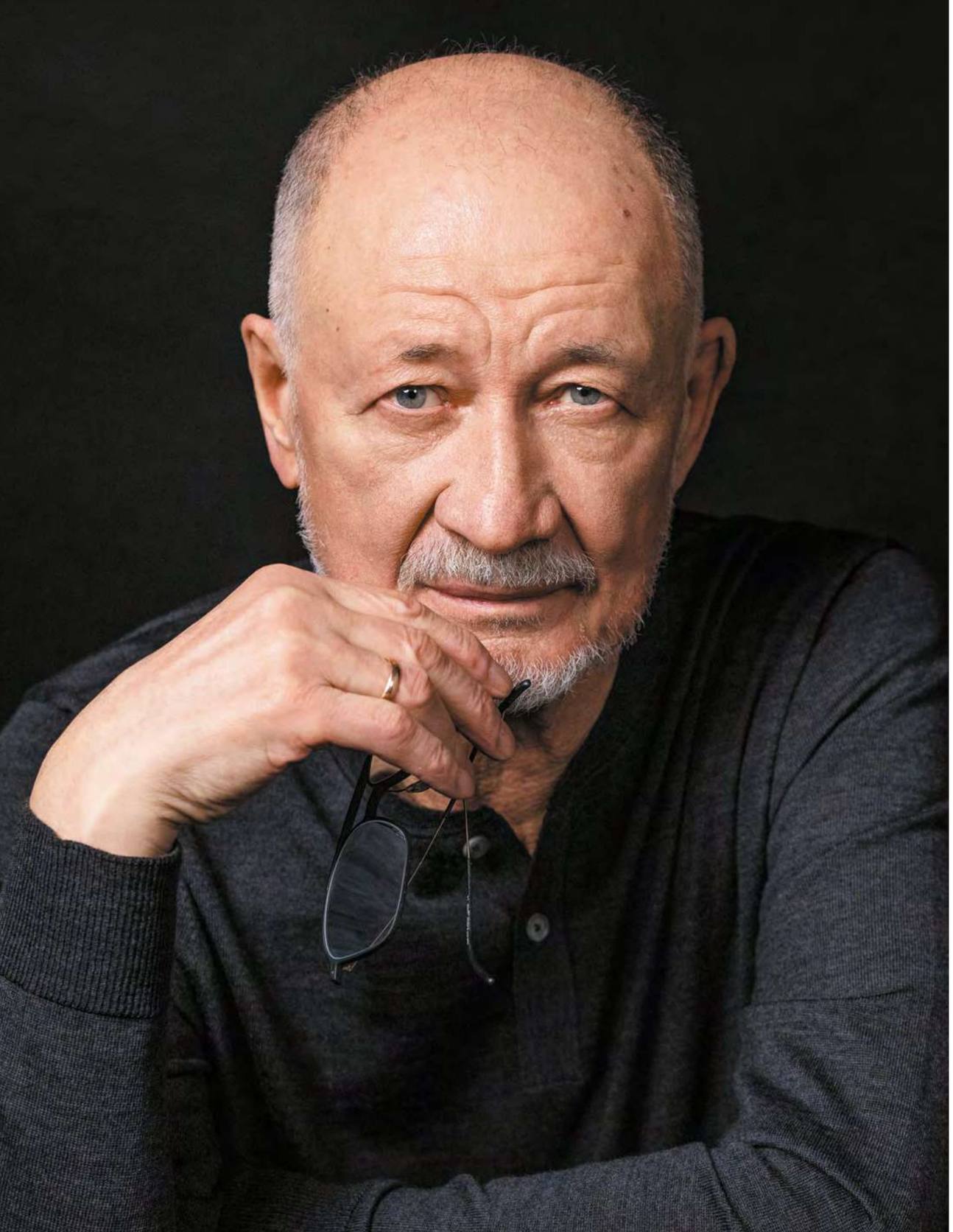
I will remain the way I was created by nature, family, and society,
despite misunderstanding, insults, and humiliation.

He who does not clean his thoughts
from information dirt and dust cannot be happy.

Death is not terrifying if the path towards it was long and happy.

A blind man is the one who remembers
only the first part of the Russian proverb
"Whoever mentions the past shall lose his eye...,"
while forgetting the second part
"...and whoever forgets shall lose both."

***"Appreciate every moment
in your thoughts and deeds –
life is fleeting.***



P. S. Most of the images I have depicted, most of the thoughts and ideas I have expressed are well known, if not banal. Like the Russian language, which I use for thinking, speaking, and writing, like the letters in its alphabet – familiar on planet Earth to hundreds of millions of its children – people. I make no pretense of wisdom – it's just that one of these hundreds of millions of Homo sapiens, a village guy who dreamed of space since childhood in the great country called USSR, had these letters formed into other combinations of words and phrases, thoughts and images, actions and deeds. And the name of this simple guy from an ordinary Soviet village is a Personality who does not want the "elite" Satanists to dehumanize it and to use such recycled material and "biowaste" to sculpt a digital bioconvergent for their anti-human sake.

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Anatoli Unitsky's autobiography "The World Engineer," composed of memories and reflections of the inventor, is an expanded edition of the book "The Engineer" published in 2020.

The events that have taken place since then proved to be of great significance to our world. No one would have thought that the pessimistic predictions made by the engineer Unitsky would come true so quickly. "The World Engineer" is his reconsideration of everything he knew and believed in. The author, as always, speaks as plainly and openly as possible about the future of terrestrial technocratic humankind.

More than 40 years ago, Anatoli Unitsky came up with an idea of the General Planetary Vehicle – a grandiose mega geocosmic engineering structure encircling the Earth along its equator. Later, on the basis of this invention, he developed the original concept of a ground string transport that can become an alternative to the known types of transport today.

Anatoli Unitsky has more than 200 scientific papers, over 20 monographies, about 40 international diplomas, hundreds of patents for inventions. His regalia included membership in the USSR Federation of Cosmonautics and management of works under two UN grants.

However, the reputation of this man is considered ambiguous. You can find out if Anatoli Unitsky is a genius or an adventurist by trying to understand his motives. The only way to do this is to look objectively at the path of his life and, together with the author, to think about the fate of the world.

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