Transnet
international transport system
as basis for the consolidation of economies and peace

Over 120 years passed, since that time when the governor of Colorado (USA) William Giplin proposed the idea of connecting North America and Europe by rail link across the Bering Strait. In the early XXth century, this project was approved by Emperor Nikolay II and Russia's prime minister, Sergey Vitte. Although project was considered feasible technically and justified economically in the early XXth century, it has not yet been implemented.

The XXth century became the century of confrontation between two socio-economic systems. Realization of such an ambitious project was impossible during the "cold war", especially because of political reasons in global USSR-USA opposition. Objective political conditions arise for the realization of this strategically important project, with the warming of relations between USA and Russia at the turn of the century, not only for the development of Russia and United States economies but for the entire world community.

New technical possibilities for this project appeared in the XXI century. But the construction of transport crossing over the Bering Strait will not go into practical path, if Russia, USA and Canada will not agree about the terms of construction of Eurasian and American sections of transport system and appropriate infrastructure.

If incorporate into a traditional rail network, it will be needed to build about six thousand kilometers from Russian side and about two thousand kilometers of rail road from U.S. and Canada, plus a tunnel through the Bering Strait, whose length is about 100 kilometers at the underwater version.

Total costs for the full range of construction works will be about 100 billion U.S. dollars. But it is known that for the realization of project, especially on the Russian side, due to the features of territory on which transportation corridor will be located, these costs may increase by several times.

At the same time this transport corridor has significant operating costs in the extreme conditions of the North. Operating experience of the northern railway lines confirms that total operating costs can exceed the investment costs for construction greatly. It is necessary to take into account the fact that this route should be rapid-route in order to overcome long distances quickly, and that will lead to the increase in construction and operation costs that can make a fantastic amount of one trillion U.S. dollars.

And overcoming the Bering Strait by traditional underwater tunnel may take decades. Estimated costs of this tunnel may also increase significantly. If we consider the time and cost expenditures in the aggregate, the construction of land railways and highways by the old technologies, as well as overcoming the strait in an underwater version, it is unrealistic for the implementation of project in the short term.

Implementation of this project is important not only in terms of world community's economies, but also is the basis for expanding and strengthening the relations between civilizations. Increasing integration of economies on a reciprocal basis, their specialization and cooperation - this is the way to strengthen universal peace.

Increased interaction of interdependent economies, and on this basis – creation of conditions for their mutual development, is the basis to reduce tensions between the countries. And from

this perspective, the faster this project will be implemented, the faster we will create the economic basis for peace throughout the world.

Russia, United States and Canada should take the initiative to implement this project. Countries bordering Russia in the Far East: Japan, South and North Korea, China may become project participants. This will increase production turnover of these countries with the countries from the West.

Implementation of project is constrained not only by enormous costs, but also because it can become an international long-term construction. As well as Russia and the U.S., these countries have problems in the development of their economies. Hence, the implementation of such project in the short term may be irrelevant for them. But in the long-term perspective the involvement in this project for them will be no less important than for those countries on whose territories this international transport corridor will be located.

The proposed transcontinental transport corridor should be under the jurisdiction of those countries whose territory it crosses. With regard to the route via the Bering Strait, it should be under international jurisdiction. It is needed to provide the ability to disable rapid transport system, for example, for the movement of unwanted or hostile vehicles via an international transport corridor.

Acceleration over time and significant reduce of construction and operation costs, is possible with the use of new, breakthrough transport technologies. Why should the tunnel be underwater, and transport component must be automobile and railway? Why not use above-ground and surface trestle road based on String Technologies Yunitskiy (STY)?

Length of existing world transport communications is about 35 million kilometers in total, more than 32 millions of which are automobile roads, more than 1.2 million - railways, nearly 1 million kilometers - pipelines. But transport systems based on string technologies are absent.

Despite the fact that for 34 years of development in this direction the fourth generation of string transport system is researched, none of these researches were implemented. There are laboratory and bench tests, although there are many positive expert opinions and gold awards, recognizing STY prospects.

Strings – a system of pre-stressed high-strength wires - are widely used in modern bridge construction and pre-stressed concrete structures. The basis of STY transport system is a special hollow rail, the strings are strained inside of it, and put into a solid monolithic and rigid concrete of a special design. Steel wheel of a rail car - yunibus - is rolling by rail, equipped by side rollers. Rails with string core are set on the anchor and intermediate supports - a kind of transport racks the type of suspension and cable-stayed bridges. Characteristics - strength, flatness, rigidity, durability - meet current standards for bridges and flyovers for rapid transport. This design as bearing one can be used in any other "second level" transport (for rapid rail, trains on magnetic suspension and the monorail), instead of expensive and material-intensive load-bearing beams.

The main reason for inhibition of the practical implementation of STY is not in the technical and scientific planes, but, paradoxically, in the low cost and high efficiency of the project. For example, compared with trestle rapid railway, trestle string route will be cheaper by 10-15 times, and for fuel consumption (energy) rapid STY yunibus would be more efficient then rapid rail train by 5-7 times (in terms of a single passenger).

Like any other trestle, string-rail track structure can be designed for any calculated moving load, for a wide range of speeds and for different lengths of the spans from 10 meters to 3

kilometers. With a lower materials consumption (at the level of expense on steel rails), such a structure would be cheaper than traditional trestle, but equal in durability.

Exclusion of embankments, excavations, bridges, viaducts and culverts allows building of cheap roads on the broken grounds, in mountains, swamps and on permafrost, as well as in other difficult climatic conditions.

Speaking about Russian economy, it remains expensive. This allows a considerable stratum of the population to ensure employment, and for the bureaucracy – to have the opportunities for enrichment. We can not say that Western economies are very different. Thus, besides the psychological rejection of all new, there is a motivational brake in advancing of innovative technologies. At the same time officials do not have necessary political will even to permit the construction of a prototype site, which could test the individual elements and overall innovative transport system.

They may not know that each year about 1.5 million people in the world die (including post-accident deaths) in car accidents, more than 50 million people are injured, maimed and crippled, which is unacceptable neither from the standpoint of humanity, neither in terms of sustainable and effective development of the international community.

If we calculate the amount of land occupied by the traditional roads, and the amount of environmental damage by vehicles, it becomes clear that there are no sensible and reasonable alternatives for the elevated trestle roads, both on land and over water.

Construction, of rapid elevated trestle roads and "coverage" by "second tier" transport of planet's global space, in parallel with the existing transportation systems, is one of the most effective ways to overcome the global economic crisis.

Transport systems of countries - are huge industries, and they are on the threshold of major changes associated with the following objective factors:

1. Dependence on oil reserves which are not infinite. Different ways of improving the efficiency of oil usage can move, but will not prevent, the coming of time when petroleum products become unavailable for use in transport.
2. Excessively high resource and investment capacity of existing technologies construction as well as high costs of exploitation of modern transport systems, as resource and financial.
3. Low efficiency and economy, including fuel (energy), of existing transport systems.
4. High risk to the environment, including human, especially from automobile systems, located directly on the surface of the earth.
5. Low speed and many limitations that have the increase of it, in practice.

The share of the transportation component in the cost of production is constantly increasing, and in Russia it is much higher than in industrialized countries. Automobile roads only occupy more than 60 million hectares of land on the planet now, and this area is constantly expanding, which is wasteful. So the time of new transportation technologies has come, and it is becoming more and more relevant for the further development of mankind.

String transport systems will provide a high volume of traffic due to:

- High speed (up to 500 km / h) at low cost for construction and operation;
- High level of environmental friendliness and small-area land uses;
- High safety of operation;
- Usage of electric traction with subsequent conversion to renewable energy sources without significant additional costs.

STY is particularly relevant for cities, because rapid "second tier" transportation network (over urban development, using high-rise buildings as specially constructed trestles) can solve their transportation problems today. At the same time, these transport systems will disperse the cities in space, minimizing the harm to the environment. There is no alternative for this form of transport when crossing the wetlands, jungle, tundra, permafrost, and transportation of minerals from hard to reach areas.

For more than 120 years, there were only talks about the need of transport link for continents via the Bering Strait, there was no real action. International transcontinental transport system Japan - South Korea - North Korea - Russia - U.S. with surface crossing of the Bering Strait, is a noteworthy goal which can be based on STY at the initial stage of formation of an international string transport network - Transnet. This worldwide network created by the same standards, will have more than 10 million kilometers in XXI century. Therefore, the project of crossing the Bering Strait would only be a small but very important element of Transnet network.

Of course, the interest of countries' governments is required for this project. And its implementation is possible on public-private basis. We can start with the construction of test section having the length of 150-200 km, for example, in South Korea (Busan - Daegu - Seoul).

Siberia and Russian Far East - are regions rich and unique in nature, having a few roads. And there is no need to build them in that form in which they are built today: it's very expensive. Ecosystem that is unique to those regions can be destroyed. In such circumstances, it is cheaper and easier to construct string roads. It is necessary to build not one, but a network of roads (cargo, passenger and cargo-passenger), with the prospect for 100 years - this is the life of STY trestles. System of string roads is developed at present - by analogy with other natural transport system, circulatory, which has the capillaries, arteries, aorta. STY vary in design speeds (100, 200, 300, 400 and even 500 km / h) and the design load - for rolling stock with different passenger and load capacity. In all the proposed variants of track structure and rolling stock design, technology and cost vary significantly. Therefore, each "second tier" string road in Transnet should be optimized for the challenges in traffic volumes and long-term objectives, based on the specific climatic conditions and terrain.

STY does not have high lobbyists. Therefore, more costly, less effective but clear to all projects are taken to implementation. Although there are talks on all levels of government recently about the fact that Russian economy should be innovative, not raw, but nothing is done really in this respect. Russian officials fear these innovations, especially in the transport field. However, it always was so. For example, main opponent of railways construction in Russia in the XIX century was ... Russian Ministry of Transport: at first, they resisted the construction of Czarko-Selskiy railway (first Russian railway), then Moscow - St. Petersburg road, and then - Trans-Siberian Railway. Ministry 18 times rejected offers from progressive circles of country to build a Trans-Siberian Railway. The argument was basically the same: it is impractical, because the development of horse-drawn transport in the European part of the country is more promising.

There is nothing strange in this, as Ministry of Transport consists of a big number of officials involved into operation of existing transport modes. Just as cabby or even a professor of cartage science, was not able to understand the railroad at the time, so modern-railroad official is unable to understand string road - in fact it has no ties, no gravel pads or embankment or wheel-set. And it wouldn't "play" like a guitar or balalaika as it seems to most critics.

In the XXI century in Russia it is necessary to construct at least 2-3 million kilometers of high-effective "second tier" roads, and in the first place in the Ural-Siberian region. Russia, with the area of 1.8 times larger than U.S., has almost ten times smaller total road network length. What

kind of accelerated economic development may we talk about? Strong economy, first and foremost is the need for low-cost movement of people, raw materials and consumer products.

Usage of STY in forming of national transportation systems, including the intersection of the Bering Strait, is strategically important task for the improvement of Russian and other countries economy efficiency, of those who are involved into the creation of an international transportation system based on innovative technologies.

Eurasian part from the Bering Strait may have:

- South direction - through Yakutia to the Trans-Siberian with necessary forks;

- East direction - along the eastern coast of Russia via Vladivostok to North and South Korea, to Japan;

- North direction - along the shore of Arctic Ocean through the territory of Russia with branching from Murmansk to the south to Astrakhan, as well as to Scandinavia and Europe.

Three areas can be covered from the Bering Strait on American side:

- North line, which crosses the territory of United States (Alaska) and then - from west to east on the territory of Canada;

- South direction - this is the intersection of Canada, then U.S., to the Panama Canal and on to South America;

- West - along the Pacific coast by the territory of Canada and by western U.S. territories.

Numerous branches on both sides of the international transport corridor, as on the Eurasian and the American sides are possible, considering the economic development in areas adjacent to the track area.

String transport system consists of radically new high-tech and low-cost track structure, as well as efficient, economical and environmentally friendly rolling stock and "second tier" infrastructure. However, these innovative systems are "composed" of elements produced by the global industry for decades. Figuratively speaking, they consist of the same "nuts and bolts" as bridges, culverts, stations, train stations, airports, cars, trains, airplanes. But this "nuts and bolts" are collected in the STY system a bit different. Of course, during the process of practical realization various difficulties may arise, but it would be surmountable difficulties in the implementation and growth.

Billions of dollars may be invested into the development of moral aging world auto industry, but you can invest much less money into breakthrough transport technology that provides rapid international transport. The entire necessary engineering, construction and raw material base exists in the world - large-scale creation of Transnet may soon be initiated not only in Russia but also abroad. Over the time, as higher rates of movement will be required - STY tracks can be placed in evacuated tunnels, that will help to reach the speeds of 1000 km / h and higher. Since STY rolling stock has small mass, these tunnels can be placed into the water column. Tunnels with zero buoyancy, placed at a depth of 100 meters, regardless of the depth of the ocean, will link together countries and continents by the shortest rapid lines.

Dr. Anatoly Yunitskiy
General Director, General Designer
String Transport Yunitskiy LLC
Moscow, Russia
www.yunitskiy.com
a.yunitskiy@gmail.com