OPEN JOINT STOCK COMPANY
“UNITSKY SCIENTIFIC & PRODUCTION COMPANY”

PROPOSAL

HIGH-SPEED TWO-WAY CARGO AND PASSENGER STRING TRANSPORT ROUTE

“ABU DHABI – DUBAI – SHARJAH”

Moscow 2002

High-Speed Two-Way Cargo and Passenger String Transport Route "ABU DHABI – DUBAI – SHARJAH" (138 km)

Unitsky String Transport System (UST) represents a string-rail road with four wheeled high-speed transport modules (***avtolets or autoplanes***) moving over them at the speeds of 100 to 500 km per hour and having passenger capacity of 1 to 40 persons, and nominal cargo load of 10 tons.

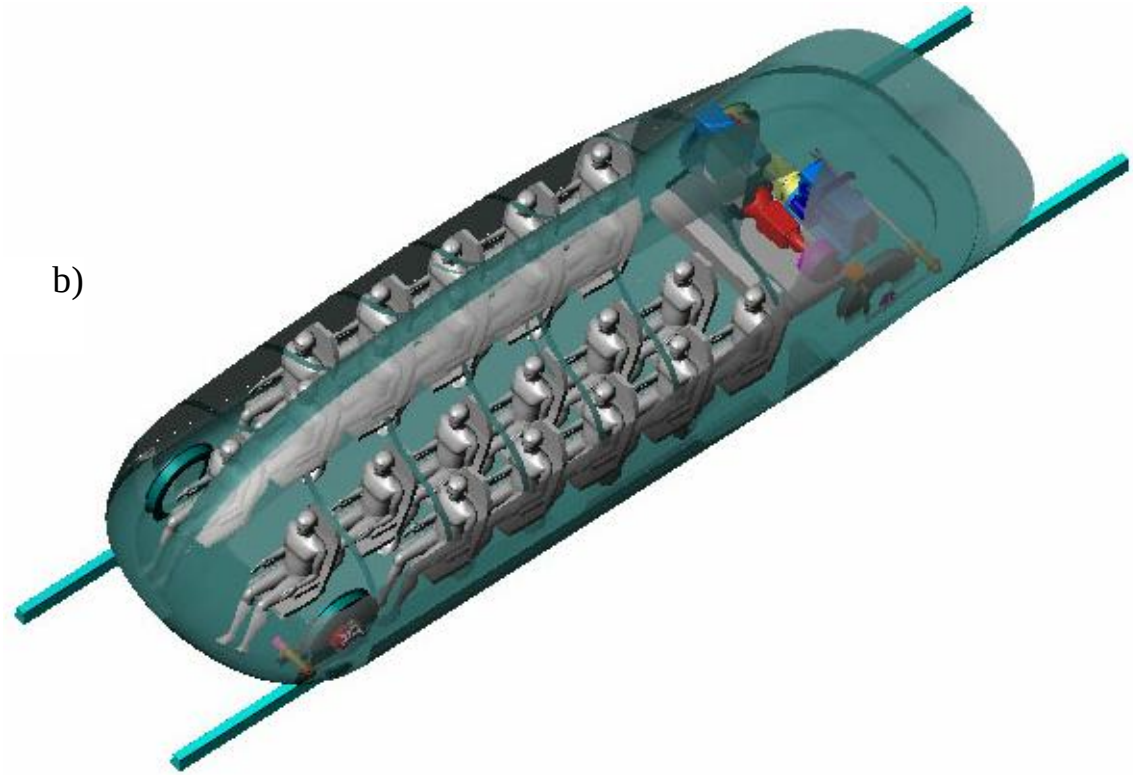
The distinguishing feature of the system is the strings inside a rail, pulled out with the total force of about 250 tons per one string-rail.

Strings are tightly attached to the anchor supporters, placed at every 500-2000 m. The intermediate supporters of 10-50 m high, placed at every 50-100 m, support the string route structure.

Picture 1. Variant of the UST route "Abu Dhabi – Dubai – Sharjah"

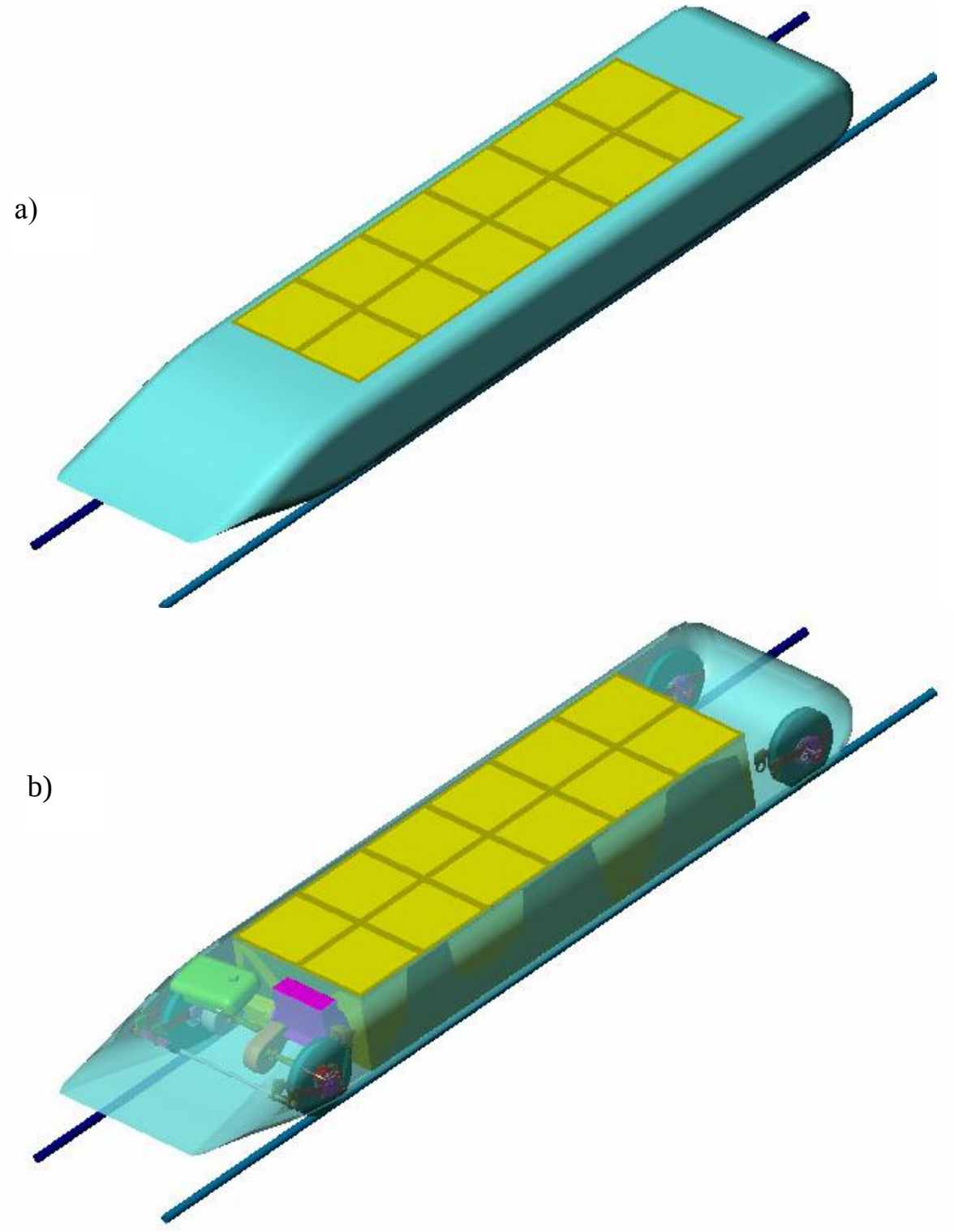
a)

b)



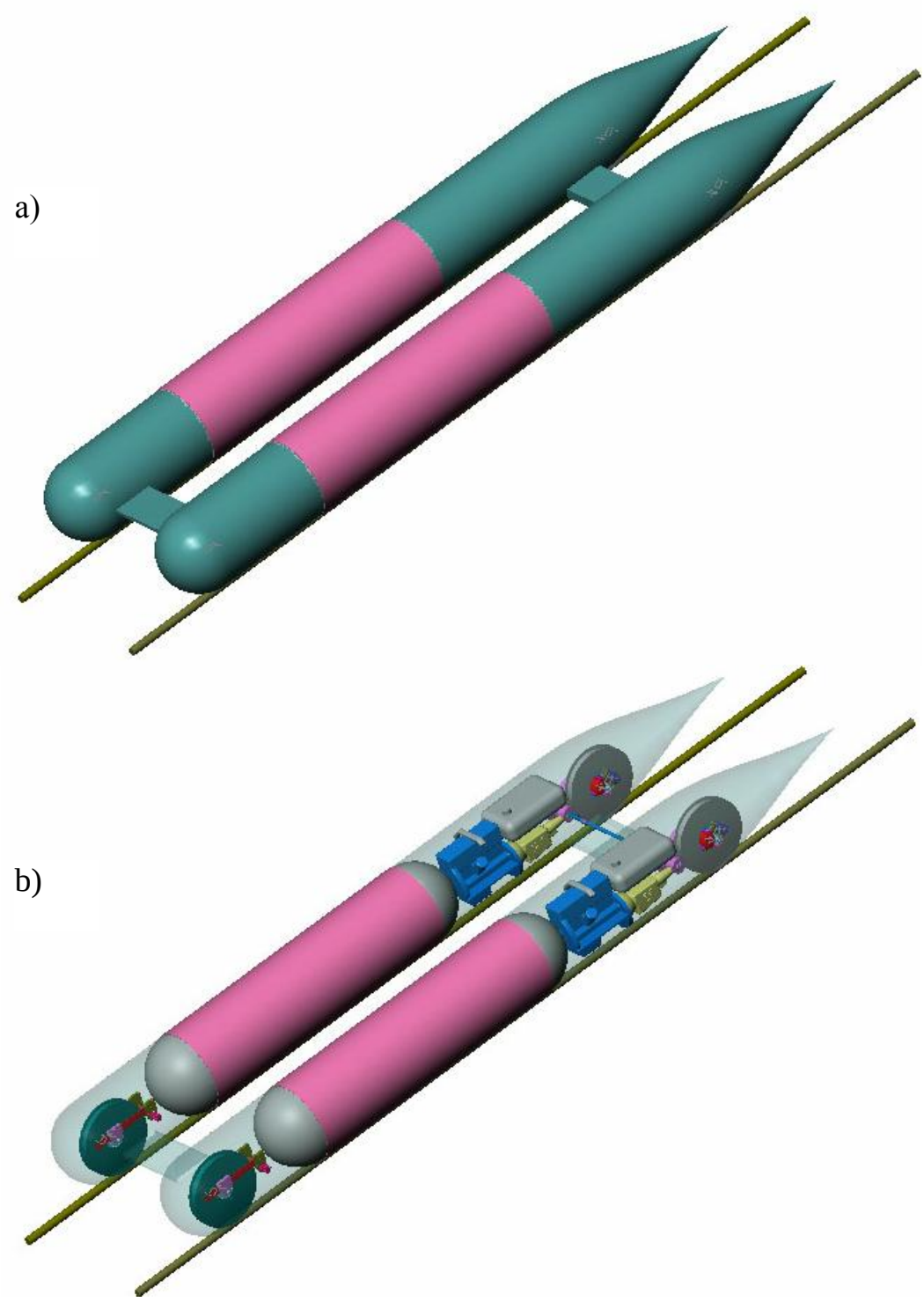
Picture 2. Passenger module: a) exterior design; b) interior.

- Capacity – 25 passengers.
- Calculated cruise speed – 250 km/h.
- Design (ultimate) speed – 350 km/h.
- Engine drive: internal combustion engine (diesel) – 120 KWt powerful.
- Fuel consumption (diesel fuel) at the cruise speed of 200 km/h – 12 litres per 100 km.



Picture 3. Cargo module for container deliveries:
a) exterior design; b) arrangement of cargo and parts.

- Cargo capacity – 6000 kg.
- Calculated cruise speed – 250 km/h.
- Design (ultimate) speed – 350 km/h.
- Drive: internal combustion engine (diesel) – 75 KWt powerful.
- Fuel consumption (diesel fuel) at the cruise speed of 250 km/h – 7.5 litres per 100 km.



Picture 4. Cargo module for transportation of the liquids (oil and oil products, potable water, etc.):
a) exterior design; b) arrangement of tanks and parts.

- Cargo capacity – 6000 kg.
- Calculated cruise speed – 250 km/h.
- Design (ultimate) speed – 350 km/h.
- Drive: internal combustion engine (diesel) – 75 KWt powerful.
- Fuel consumption (diesel fuel) at the cruise speed of 250 km/h – 7.5 litres per 100 km.

Technical and Economic Characteristics
of a two-way UST High-Speed Route
"ABU DHABI – DUBAI – SHARJAH"

Type of string road route – cargo and passenger route.
Distance range – 138 km.
Cost – USD 280 mln (See Table 1).
Calculated optimal speed of transport modules – 250 km per hour.
Time en route – 42 min.
Average height of supporting pillars – 25 m.
Average flyover between the supporters – 50 m (at sea – 100 m).
Maximal passenger turnover:

- Passenger – 50 mln passengers per year.
- Cargo – 100 mln tons per year.

Self-cost of transportation (distance 138 km):

- One passenger – USD 1.5.
- One ton of cargo – USD 1.5.

Expected passenger turnover (distance 138 km) – 12 mln passengers per year.
Expected cargo turnover (distance 138 km) – 6 mln tons per year.

Table 1

Approximate cost of the UST route "Abu Dhabi – Dubai – Sharjah"

UST Route Composition Elements	Volume of the work	Cost of one unit of work, in thousand, USD	Total cost, in mln, USD
1. Transport route, total, including:	138 km	-	142.8
1.1. Route structure	138 km	450	62.1
1.2. Basements and supporters	138 km	550	75.9
1.3. Technical control system over the sate and condition of route structure	138 km	11.6	1.6
1.4. Radio rely system of control of transport traffic	138 km	23.2	3.2
2. Cost of infrastructure, total, including:	-	-	60
2.1. Stations	3	5000	15
2.2. Cargo terminals	3	10000	30

UST Route Composition Elements	Volume of the work	Cost of one unit of work, in thousand, USD	Total cost, in mln, USD
2.3. Depot and repair shops	1	15000	15
3. Modules, total, including:	-	-	16.4
3.1. Passenger modules	90	100	9
3.2. Cargo modules	220	20	4.4
3.3. Technical support reserve modules	30	50	1.5
3.4. Technical control over the state of the route and emergency support	10	150	1.5
4. Cost increase on more complicated route crossings (going through mountain, costal sea, trespassing the communications)	30 km	500	15
5. Engineering prospecting works	150 km	20	3
6. Design works for route structure, modules, infrastructure and control systems	-	-	20
7. Other costs and unforeseen costs	-	-	21.3
Total, mln:	-	-	278.5

Expected passenger turnover

1 two-way trip for each country resident and tourist: 12 mln passengers per year (2 trips x (3 mln people + 3 mln people).

Expected cargo turnover

2 tons of cargo per each country resident: 6 mln tons per year.

Amount of transport modules needed

1. Passenger module (25 seats).

One module will make 24 shuttle trips per 24 hours. At the average occupancy coefficient of 0.8 and average module use coefficient of 0.8, each module will transport 384 passenger per 24 hours, and 140 000 per year. That is in order to transport 12 mln of passengers per year 86 modules are needed.

2. Cargo module (capacity 6 tons).

One cargo module will make 20 shuttle trips per 24 hours. At the loading coefficient of 0.8 of and module use coefficient of 0.8, each module will transport 76 tons of cargo per 24 hours and 27 700 tons per year. In order to transport 6 mln tons of cargo per year 220 cargo modules are needed.

Time en route

Time for passenger trip from Abu Dhabi Center to Sharjah Center will be 42 min (See Table 2).

Table 2

№	Type of transportation process	Time, in min
1	Waiting for boarding	1
2	Passenger boarding	1.5
3	Waiting for trip	0.5
4	Merging the transport module into the traffic flow	0.5
5	Boosting the speed up to 250 km/h	1.5
6	Moving en route	32
7	Breaking the transport module	1.5
8	Entering the station	1
9	Unboarding passengers	1.5
10	Unforeseen losses of time	1
	Total:	42

Yearly economic efficiency and profit return

At the cost of passenger trip “Abu Dhabi – Dubai – Sharjah” at USD 5 (self-cost of the trip is USD 0.724 per passenger) and the cargo tariff of USD 5 per ton (self-cost is USD 0.989 per ton), the yearly return from the string route exploitation will be:

$$D = 12 \text{ mln passengers} \times (5 - 0.724) \text{ USD/passenger} + 6 \text{ mln t} \times (5 - 0.989) \text{ USD/t} = 75.378 \text{ mln USD}.$$

The route will return the investments in 4.9 years.

Average capital investments per 1 km of route – 2.02 mln USD.

General profit efficiency of the route will be 307.36%, depending he level of taxation, including:

a) efficiency of cargo transportation – 237.13%;

b) efficiency of passenger transportation – 355.29%.

Comparative technical and economic figures of the route "Abu Dhabi – Dubai – Sharjah" (138 km) operation, depending on the density of cargo and passenger turnover (one passenger ticket price and one ton cargo tariff are fixed at $ 5 USD per 100 km), See Table 3

Table 3

	Cargo/Passenger flow, mln t/mln passengers, per year							
	0.5/5	**1/6**	**1.5/7**	**2/8**	**3/9**	**4/10**	**5/11**	**6/12**
Self-cost:								
- cargo transportation, USD/t	11.866	5.933	3.955	2.997	1.978	1.483	1.187	0.989
- passenger transportation, USD/pass.	1.739	1.449	1.242	1.087	0.966	0.869	0.790	0.724
Net yearly profit from:								
- cargo transportation, mln USD	-5.25	-3.01	-0.77	1.47	5.96	10.44	14.93	19.41
- passenger transportation, mln USD	11.23	15.72	20.20	24.69	29.17	33.66	38.14	42.63
General efficiency, %	29.61	62.94	96.27	129.60	174.04	218.48	262.92	307.36
Cargo transportation efficiency, %	-64.16	-36.77	-9.38	18.01	72.79	127.57	182.35	237.13
Passenger transportation, efficiency, %	93.61	130.99	168.37	205.76	243.14	280.52	317.90	355.29
Yearly investment return	46.59	21.92	14.33	10.65	7.93	6.32	5.25	4.49

Table 3 shows, that even if the passenger turnover falls down to 5 mln passengers per year, and cargo turnover falls down to 0.5 mln tons per year, the total efficiency of the UST route operation will remain positive at the expense of higher efficiency of passenger transportation.

Diagrams 5-7 show the dependence of different technical and economic parameters on the density of cargo and passenger transportation.

Diagram 5

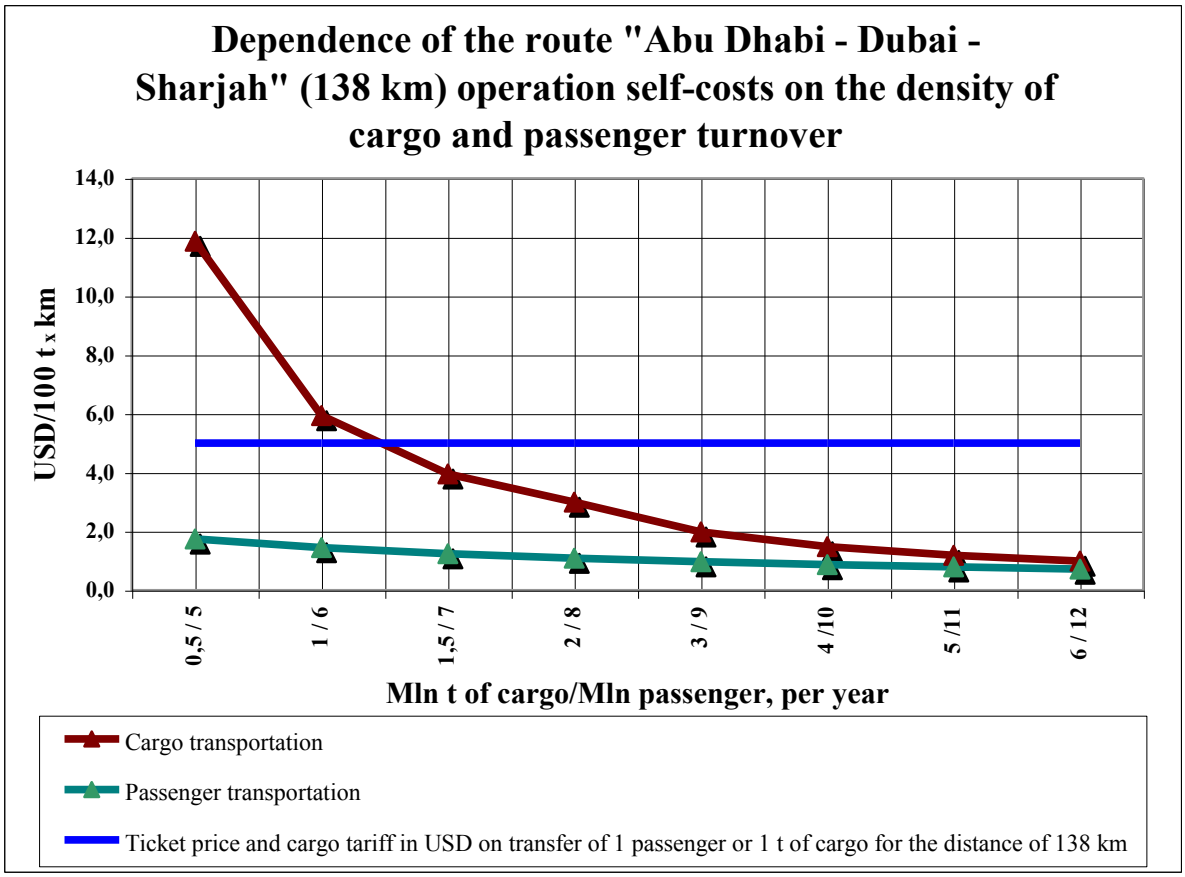


Diagram 6

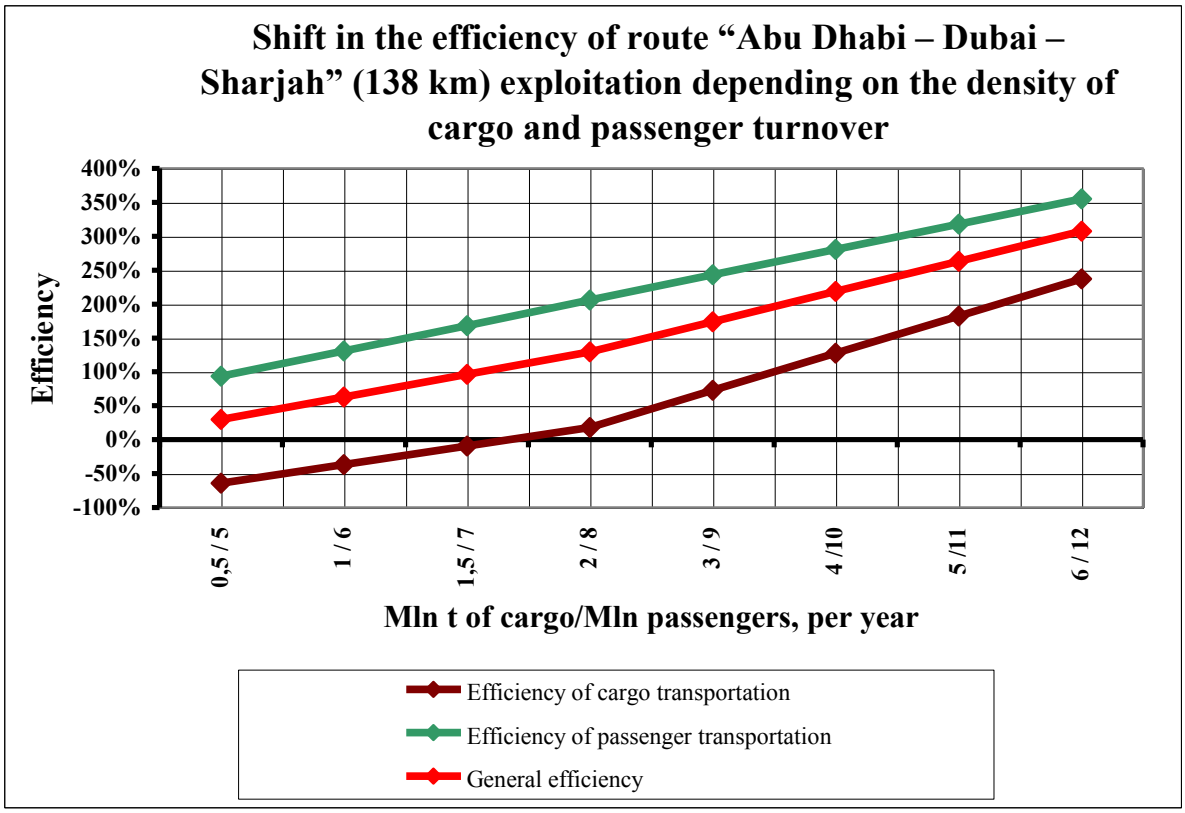
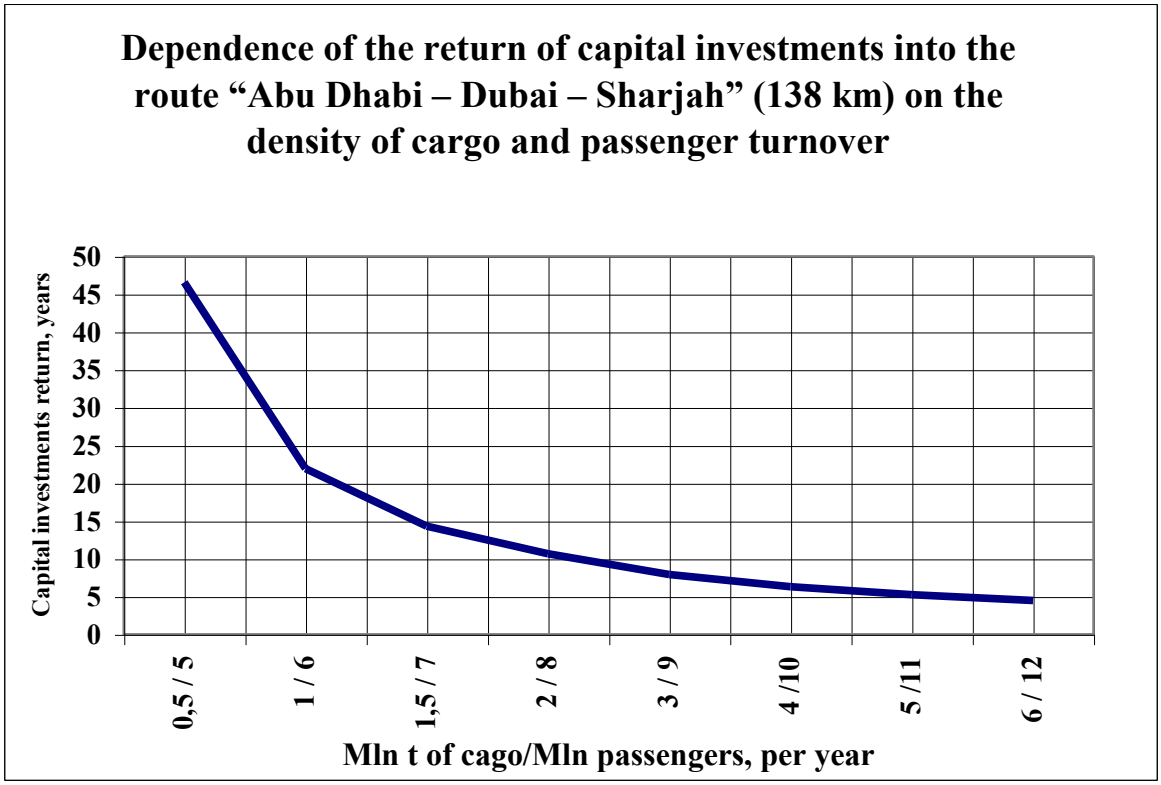


Diagram 7



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