Benefits of GPEKS elevated High Speed - ultra Light Rail (eHS-uLRT)

BASIC BENEFITS

Lowest construction costs	Economic	Lowest transportation costs
Top Environment safety	Technical	Highest Efficiency in Transport
Highest System longevity	Environmental	Highest Traffic safety
Superior overall socially desirability	Social	Minimum land acquisition
Most Comfortable transit	Technological	Energy efficiency of system
Top Resistance to vandalism & terrorism	Lowest Risks	Innovation (technical, financing…)

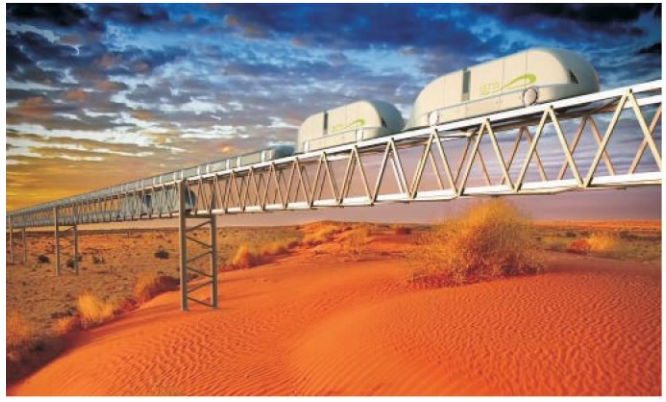
ADDITIONAL BENEFITS

High speed: • Urban: up to 150 km/hour • Inter-city: up 500 km/hour	Possible implementation on virtually any urban or rural areas
All-weather operation (snow, ice…)	Ability to use smaller/lighter vehicles
Operates in widest temperature range	High level of automation possible
Availability and perennial of construction development, including hard-to-reach mining areas	Most Effective implementation on water areas such as rivers, lakes…
Opportunity to deploy on new territories	

SOCIAL IMPACTS

Implementation of GPEKS Rail project through the creation of innovative highly effective over-ground transport network provides jobs and economic development opportunities for the city/region, province and country, including the involvement of underdeveloped areas in the commercialization:

- **increased employment rate, creating new jobs, both during construction and operational phases of transport system**
- **increases job opportunities, creating new demand for labor, both in the transport sector and in related economic sectors**
- **increased municipal and other tax revenues**
- **improved quality of life, supporting a dynamic economy by generating highly skilled personnel**



New Cost effective freight Transport Opportunities

New infrastructure opportunities

High speed rail competes effectively with air travel

EFFICIENCY OF SYSTEM

The Russian Academy of Sciences
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"I assent"

Director of Institute of Transportation Problems
Named after N.S. Solomenko RAS
Honoured Worker of Science of RF
Doctor of Engineering Sciences, Professor
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Executive Summary
Of Innovative Transport Technology
"String Transport Unitsky"

I. Introduction

Analysis of transport state-of-the-art and its perspectives was carried out as the part of the Transport Strategy of Russian Federation till 2030. It proves that there arc a number of limitations for transport development in Russia. Among them one can mention high rale of capital and energy output. severe climatic conditions, long period of project implementation. low transport infrastructure payback.

In such conditions formation of competitive transport services market is impossible without progressive achievements of techniques and technologies which arc in conform to the security standards. The most important development direction becomes the implementation of innovative technologies in transport sphere. Therefore. introduction of Unitskiy String Transport (S•11)) may become one of the most perspective directions in innovative transport technologies development. In November, 2008 'transport Committee of State Durna of the Federal Assembly of the Russian Federation admitted STU to be the best innovative project in terms of Consultative Council Transport unites Russia" on project "Innovative Types of XXI Century Transportation in Russia". STU was also recommended for early implementation to the economic scheme of the country.

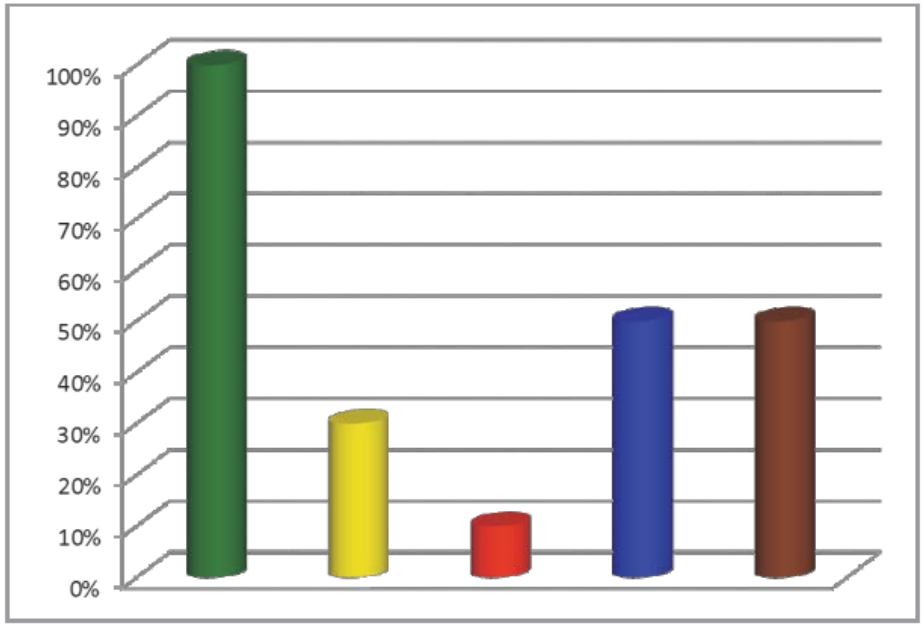
From the Execute Summary of the Institute of Transportation Problems of the Russian Academy of Sciences:

... String Transport Unitskiy (now known as SkyWay) is the most economical transport system ever known.

Compared with:

- **Rapid rail: 3 X cheaper**
- **Plane: 8 X cheaper**
- **Magnetic Trains: 9 X cheaper**

ENVIRONMENTAL SAFETY



Comparative level of environmental safety:

SKYWAY	100%
Rail transport	30%
Automobile transport	10%
Monorail	50%
Train on the magnetic suspension	50%

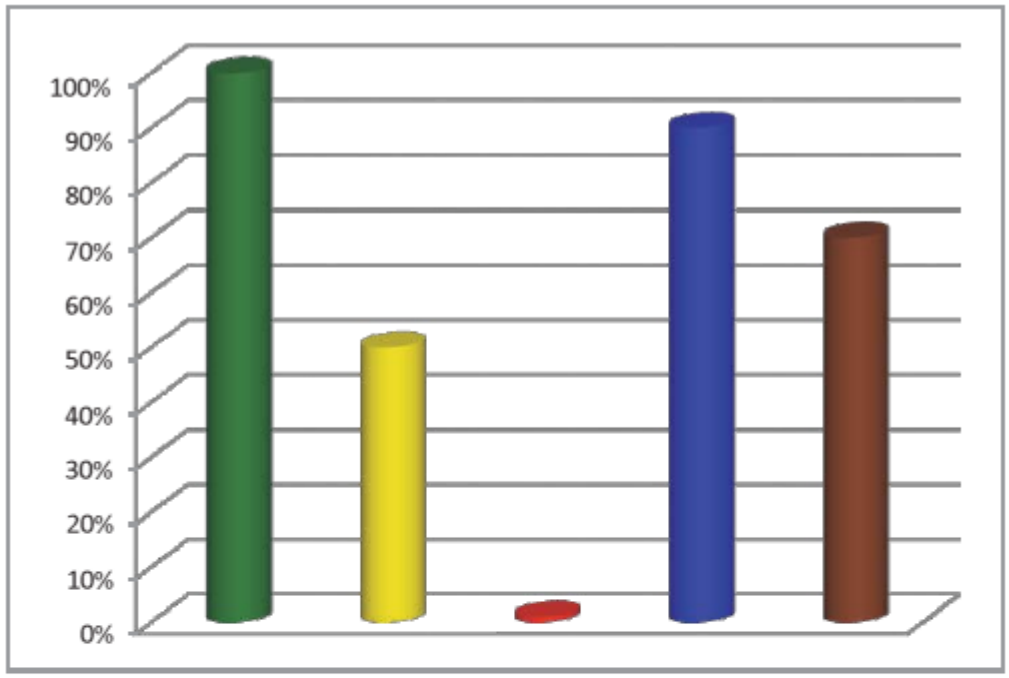
Pollution reduction thanks to:

- **No dust and environmentally dangerous embankments and excavations**
- **No barriers to animal migration**
- **No of preconditions for creating of swamp soil, in the absence of obstacles to the natural water flow**
- **Lowest proportion of fuel required to move people and goods**
- **No need for high electric voltages and strong electromagnetic fields for electric traction**

TRAFFIC SAFETY

Factors for high traffic safety:

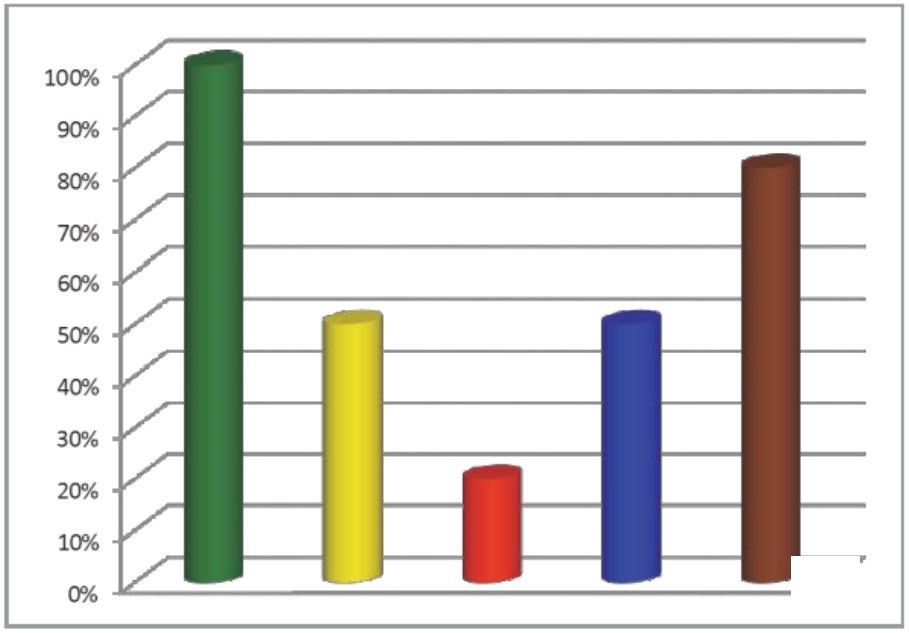
- **High stability of the rolling stock due to anti-derailment system and independent suspension for each wheel**
- **Avoiding of collisions with vehicles, people, animals, due to the placement of track structure above the ground on supports**
- **Reduction of emergency accidents due to lack of the possibility of grounds erosion by groundwater and surface water**
- **High sustainability of transport system for floods, tsunamis, earthquakes and other natural disasters because of above-ground placement, the continuous construction and pre-tension**



Comparative level of traffic safety:

SKYWAY	100%
Rail transport	50%
Automobile transport	1%
Monorail	90%
Train on the magnetic suspension	70%

COMFORTABLE TRANSIT



Comparative level of traffic comfort:

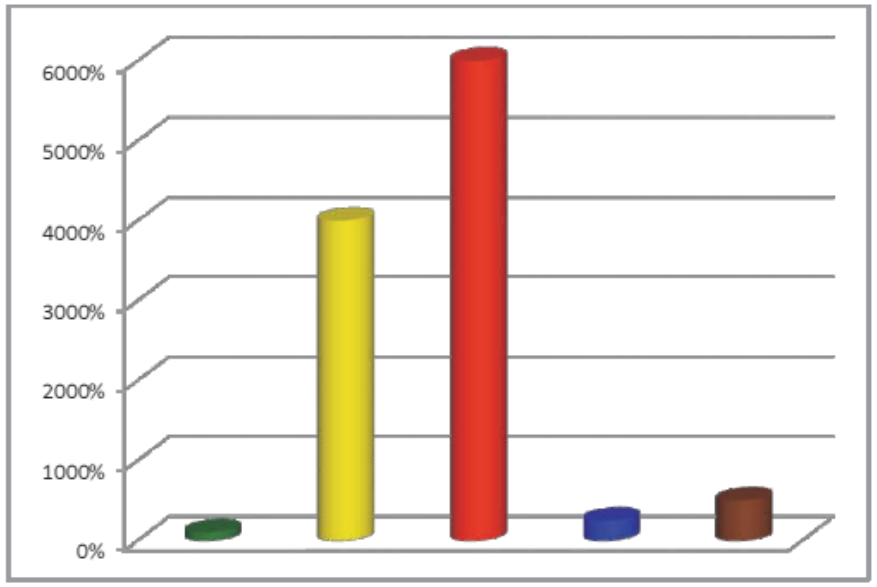
SKYWAY	100%
Rail transport	50%
Automobile transport	20%
Monorail	50%
Train on the magnetic suspension	80%

Passenger comfort:

- Automated control system and the absence of dangerous and unreliable transport interchanges
- High smoothness of route and low noise while moving
- Low speeds of acceleration and deceleration of rolling stock due to lack of obstacles
- Lack of "blocks" on the "second level" of the movement
- Low waiting time and time in transit, as well as an opportunity to travel "door to door" with the use of individual transport modules

MINIMUM LAND ACQUISITION

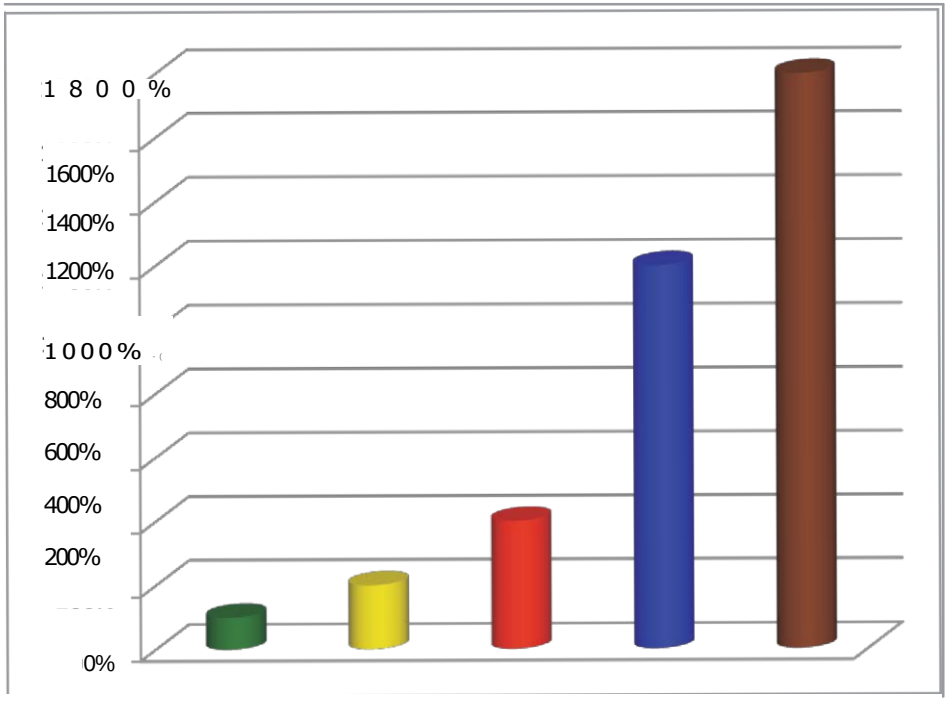
- Lack of embankments, cuts, culverts, grade intersections, due to above-ground placement on supports
- Except for bridges, overpasses and interchanges, on the way to which a high and extended mound is required for roads and railways
- Lower cross-section of supports compared to monorail 2-3 times, thus bearing of supports on the minimum area of land foundation



Comparative level of land acquisition:

SKYWAY	100%
Rail transport	4000%
Automobile transport	6000%
Monorail	250%
Train on the magnetic suspension	500%

LOW CONSTRUCTION COSTS



Comparative level of construction costs:

SKYWAY	**100%**
Rail transport	**200%**
Automobile transport	**400%**
Monorail	**1200%**
Train on the magnetic suspension	**1800%**

Components of low cost of construction of transport system, including track structure and supports, rolling stock and infrastructure:

- **Minimum amount of land acquisition and minor earthworks**
- **Low material consumption of string-rail track structure, supports, rolling stock and the basic infrastructure**
- **Low cost of components due to the use of traditional materials, machine components and assemblies**
- **High production rate and the rate of "second level" route and infrastructure construction in all climatic conditions**

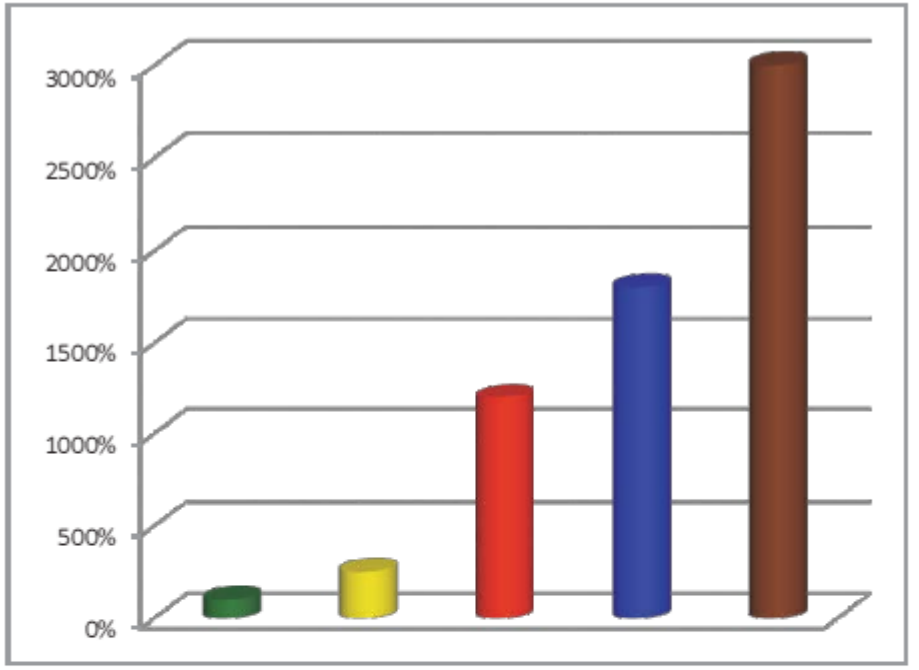
LOW TRANSPORTATION COSTS (Cont.)

Low cost of passenger and freight transport:

- **Low construction cost:**
  - Minimum area of land acquisition
  - Low volume of excavation
  - Low materials consumption of track, rolling stock and infrastructure
  - High productivity of construction and manufacturing of all components of the system

- **Low operating costs:**
  - All-weather
  - High speed of transportation
  - Automatic control system
  - Low fuel consumption (energy) on movement
  - Low crowded system maintenance

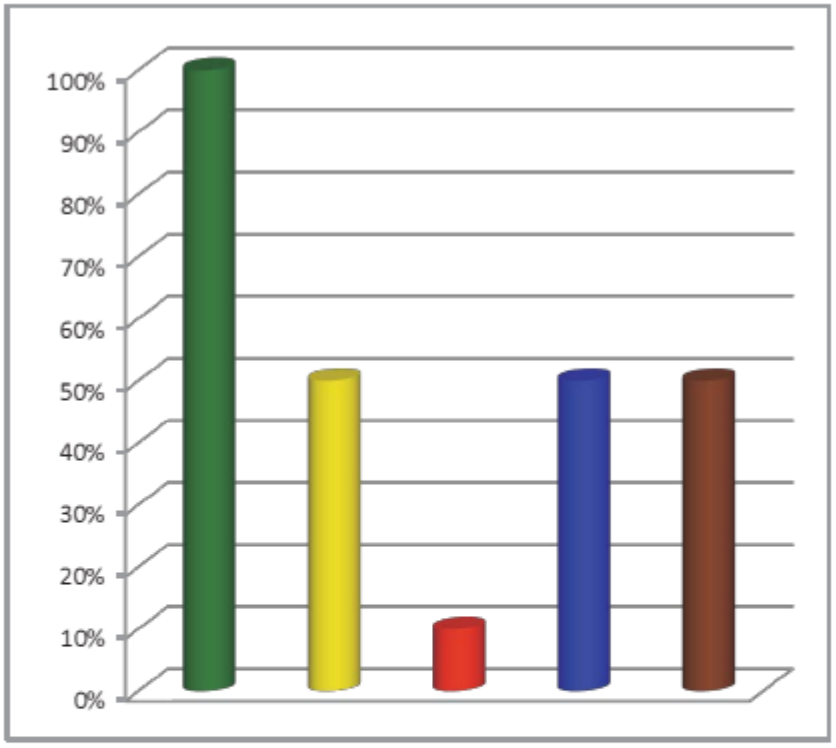
- **Low depreciation charge:**
  - Low-cost of transport system
  - Longer life of track structure, supports,
  - Rolling stock and infrastructure



Comparative level of transportation costs:

SKYWAY	100%
Rail transport	250%
Automobile transport	1200%
Monorail	1800%
Train on the magnetic suspension	3000%

SYSTEM LONGEVITY



Comparative level of durability:

SKYWAY	100%
Rail transport	50%
Automobile transport	10%
Monorail	50%

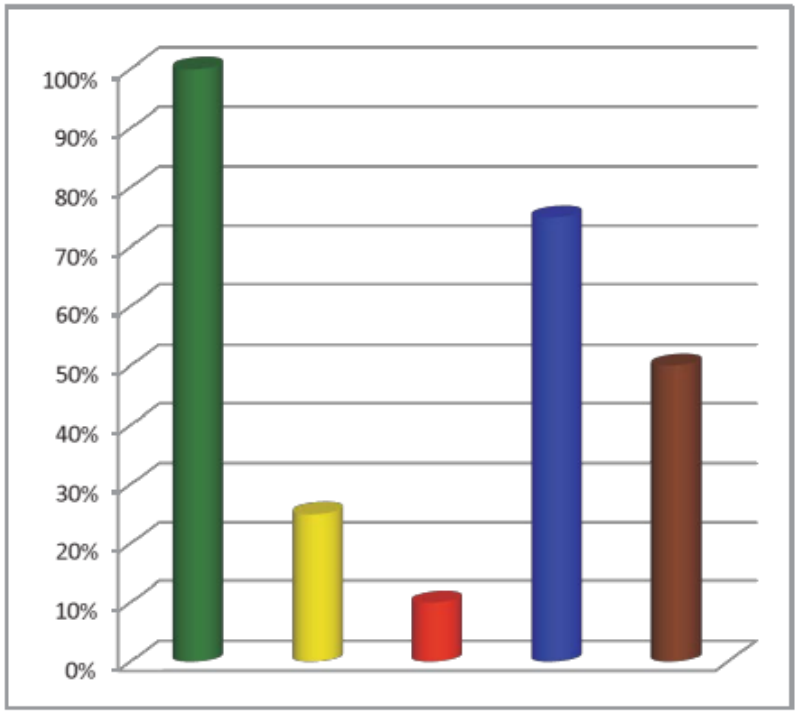
Durability of the system thanks to:

- **Ten-fold margin of safety for supports and track structure**
- **High resistance of transport system to floods, tsunamis, earthquakes and other natural disasters**
- **Transport system is not dependent on the strength and stability of the underlying soils (bogs, permafrost, desert, etc.)**
- **Transport system is not adversely affected by strong frost heat, snow and ice, as well as other adverse climatic factors**
- **Low wear + high resistance to corrosion of string-rail route**
- **Lack of unstable and short-living earth mounds**

RESISTANCE TO VANDALISM & TERRORISM

Anti-vandalism and anti-terrorism protection provided by:

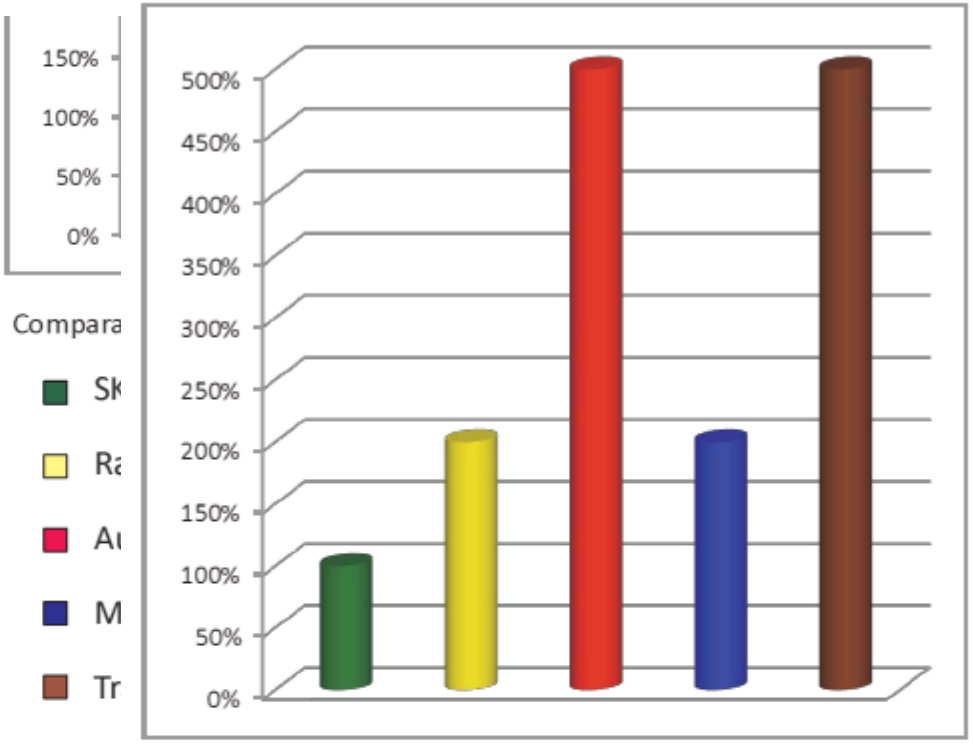
- **«second level» of path location and lack of solid fabric makes placing of mines and of large objects on it, hardly possible**
- **«second level» of path location facilitates the monitoring of security and allows automating it**
- **The need for larger quantity of explosives to destroy the string-rail compared to railway**
- **Fracture of supports and/or fall of several supports in a row are not critical and will not bring down the continuous pre-stressed string-rail route**
- **Strong need for at least 100 kg of explosives to destroy the anchor support (note: to disable an aircraft 100 g is enough)**



Comparative resistance to vandalism and terrorism:

SKYWAY	100%
Rail transport	25%
Automobile transport	10%
Monorail	75%
Train on the magnetic suspension	50%

ENERGY EFFICIENCY OF SYSTEM



Comparative level of specific energy consumption:

SKYWAY	100%
Rail transport	200%
Automobile transport	500%
Monorail	200%
Train on the magnetic suspension	500%

Reduction of energy consumption is provided by:

- Reduction of the design of rolling stock proportion to 200 kg/pass., which is much less than a compartment car on the conventional railroad
- High aerodynamic performance of transport module (compared to a sports-car, it is 4 times more aerodynamic)
- Reduction of the rolling resistance of steel wheels (improved 2 times in comparison to the wheel pair of conventional train)