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Concept of High-Speed Track SkyWay on the Route Heraklion-Chania, Crete

Pre-Project Proposal



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The construction of the innovative transport and infrastructure complex with an overpass rail-string track structure SkyWay is offering as an alternative to the existing transport connection. It uses the main advantages of railway transport, and its location on the “second level” above the ground surface ensures safety and sustainable use of land and other resources.

In addition, the comfort of a railway carriage and a convenient flexible timetable, similar to that of a private car, will combine with the speed comparable to that of an airplane, with the absence of inconveniences related to each of these kinds of transport. The cost of construction and operation will be significantly lower compare to the existing transport and infrastructure solutions.

Technical and Economic Features of SkyWay Track

The proposed route for the high-speed track SkyWay between Heraklion International Airport “Nikos Kazantzakis” and Chania airport with stops in Souda and Rethimno is shown in Fig. 1.



Fig. 1. Proposed route for high-speed SkyWay track “Heraklion-Chania, Crete” (variant)

Considering the dense development, it is proposed to build the stations at the entrance to the city (near the stopping points of local transport) and connect them with the center via the urban lines SkyWay, or via the existing kinds of urban transport. The total length of the track is 130 km. The travel time between the terminal stations will not exceed 25 minutes.

The estimated cost of a double-track transport complex SkyWay according to the cost elements is given in Table 1 below.

Table 1

The estimated cost of a double-track transport system SkyWay according to the cost elements

Name of track elements	Cost for 1 unit of work, thousand Euro	Amount (scope of works)	Unit of measurement	Total cost, thousand Euro
1. Transport overpass				490 000
1.1. Transport overpass on flat track sections	3 500	120	km	420 000
1.2. Transport overpass on sections with a large height difference in a mountainous area	7 000	10	km	70 000
2. Infrastructure				81 500
2.1. Stations at main stopping points (a transport part only)	6 500	4	pcs	26 000
2.2. Section for unibus maintenance and repair (depot)	3 500	1	pcs	3 500
2.3. Automated system of safety, control, energy supply and communications	400	130	km	52 000
3. Rolling stock (up to 360 kmph unibuses)	500	100	pcs	50 000

4. Design and survey work	350	130	km	45 500
5. Miscellaneous and contingency costs	100	130	km	13 000
TOTAL:				680 000

It is necessary to pay attention to the different nature of investment costs for SkyWay projects compared to the conventional transport systems. For example, the highway construction cost does not include the cost of automobiles or the cost of infrastructure facilities — filling stations, garages, pedestrian crossings, etc. In contrast, SkyWay is a transport and infrastructure complex, the cost of which includes not only a transport overpass, but also rolling stock, the automated system of safety, control, energy supply and communications, transport and logistics infrastructure, etc. The CAPEX structure is shown graphically in Fig. 2.

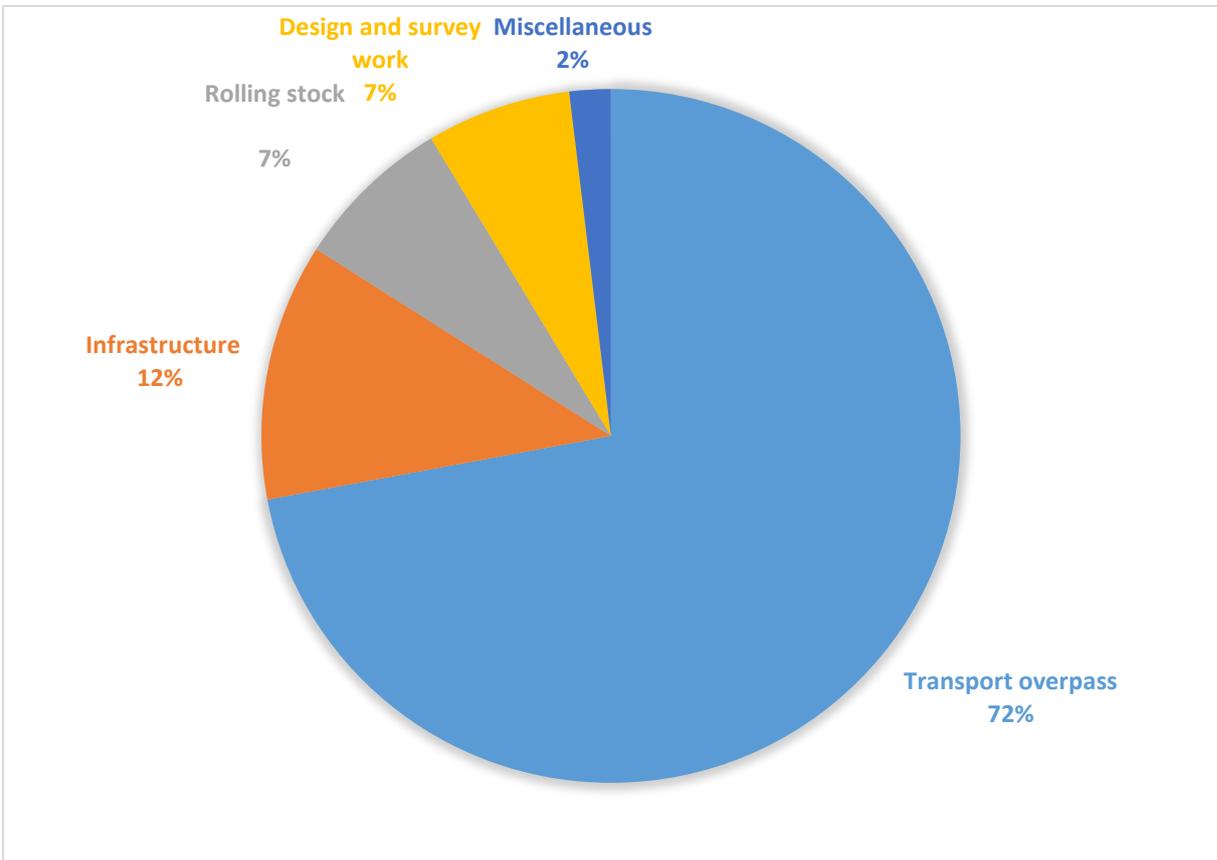


Fig. 2. CAPEX structure

Evaluation of Passenger Flow

A high-speed transport and infrastructure complex SkyWay will provide a absolutely new qualitative level of passenger transportation, which will lead to a manifold increase in the passenger flow. It will be a fundamentally new, innovative product, capable of changing people’s habits and way of life. Therefore, a number of users of this new service will be by times higher; consequently, the passenger flow will exceed the existing indices manifold¹.

According to our evaluation, the planned passenger flow on the route will make at least 22 mln people per year, with 3,500 passengers per hour in low season and up to 10,000 passengers per hour in high season. Considering the possibility of travelling quickly, comfortably, at any time and at an affordable price, the total passenger flow will continue to grow.

The Project Payback Period

The urban transport system SkyWay will allow to reduce the travel time by 2–4 times due to the increased travel speed and absence of delays related to traffic jams and waiting at the traffic lights. At present, the minimum travel cost between Heraklion and Chania in bus service 15 Euro. It is planned to set the average fare on the SkyWay track at the level of the existing prices — 15 Euro for a Heraklion-Chania trip. Then, the expected annual revenue will be about 330 mln Euro.

Table 2

The estimated annual revenue from the operation
of SkyWay transport system

Route	Ticket price, Euro	Passenger flow, mln people per year	Revenue, mln Euro
TOTAL:	15	22	330

¹ By analogy with communications services – a mobile phone has provided a new quality of service compared to a landline phone; therefore the mobile traffic, its cost and operators’ revenue have increased by times.

The operation costs for the transport and infrastructure complex SkyWay will be approximately 85,74 mln Euro annually.

Table 3

The estimated cost of SkyWay transport system operation per year

Cost item	Amount of costs, mln Euro per year
Rolling stock depreciation	1,97
Transport overpass depreciation	12,27
Payroll fund with deductions	30
Electric energy	34
Miscellaneous	7,5
TOTAL:	85,74

The economic effect from passenger transportation will make about 244 mln Euro per year. Consequently, the economic effect for 50 years of SkyWay transport system operation will be about 12 bln Euro, with the project cost of 680 mln Euro.

The project payback period will make about 7 years. The project will be profitable and will yield revenue even at the fare of 10 Euro (net cost of travel for one passenger — 3,9 Euro).

The estimated payback period for high-speed tracks built under the SkyWay technology will be much shorter compared to other similar expensive and unprofitable infrastructure projects. It also should be noted that the structure of the payback period for similar infrastructure projects can be significantly improved due to the properly and reasonably built residential, production and trade infrastructure, as well as infrastructure for recreation, entertainment, sport, etc. For example, a network of high-speed railway Shinkansen in Japan is paid off up to 80% due to its infrastructure, and only 20% — due to its transport services. The built high-speed track can be used for the movement of suspended vehicles (on the “lower floor”) to transport passengers and cargo. Such a suspended system can function as an urban track, with the travel speed up to 150 km/h and frequent stops, every 1–3 km. Then, an environmentally

sustainable smart linear city for pedestrians can be built along the track, where all the property will be located within walking distance from urban stations SkyWay.

Therefore, the SkyWay complex payback period can be reduced to 6–7 years and less, with regard to the fact that the transportation volume can increase with the course of time by several times, thanks to a new transport service located on the “second level”, which contributes to its safety, sustainability, comfort and cost-effectiveness.

A detailed Prefeasibility Study with regard to the individual peculiarities of the project will allow to additionally optimize the investment construction costs by 10–15% and more of the project cost.