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"DA!Fest!" is an information and educational resource, devoted to the present and the future of architectural vizualization

Evgeny Bruchas: “What a visualizer should know about architecture”.

What will Developers Build in 10 Years’ Time?

String Technologies Unitsky (STU) is a multifunctional project of design engineer Mr. Anatoly Yunitskiy, capable of providing a solution for numerous global problems that our civilization has faced in the XXI century. One of such problems today is transport. It is especially acutely felt in modern cities, where road and transport infrastructure, developed as a system in the XVIII–XIX centuries and aimed, primarily, at animal-drawn wheeled transport, failed to satisfy the demands of the era of internal combustion engine. Modern automobile transport, with capacity of hundreds of horsepower each, has to waste hours in traffic jams of many kilometers. Fast transportation of passenger and cargo flows has become dependent on carrying capacity of main roads caught in the clutches of the existing urban development. The current concept of wheeled transport development and road construction on the whole cannot solve the transport problem of megalopolises as all these technologies have now become old-fashioned from a moral and technical point of view.

Based on the research and developments carried out by Mr. Yunitskiy, there was created a concept of the optimal overhead transport system, later called SkyWay, which has a string rail as its main principle. Such a technology allows to create not only the most efficient, but also the safest and the most eco-friendly transport. The positive effect of STU application becomes even more obvious when project capabilities are considered on a global scale. For example, if an alternative world transport and infrastructure network “Transnet” under SkyWay technologies is built in the coming decades, it will save about 100 mln people’s lives by the end of the century, who, otherwise, would die in traffic accidents. Moreover, it will prevent about 1 bln people from becoming handicapped for the same reason. Territories having the area of five and a half areas of Great Britain — exactly this amount of land is at present “rolled” into asphalt and “buried” under sleepers — will be returned for productive land use. A tenfold bigger territory of soil will be saved from ecological degradation. There will be saved hundreds of billions of tons of fuel at the cost of hundreds of trillions of dollars. In addition, trillions of tons of atmospheric oxygen vital for our breathing will be saved from burning in engines of cars, locomotives and planes.

By now, SkyWay technologies have already passed to the stage of field tests. The creators have no doubts as to successfulness of achieved results. Thus, unprecedented opportunities to improve transport infrastructure are already today open before the governments of most progressive countries that rely on socially responsible economy.

Such global changes will inevitably affect related spheres, such as civil engineering. Developers will get fantastic opportunities to construct objects of residential and commercial architecture on territories, which were absolutely inaccessible in the past. The architectural look of buildings will change drastically.

DA!Fest talked with the creators and developers of SkyWay technology about the specific changes that will happen to our cities in the coming decade.

DA!: Who is involved in the development of concepts and architectural and space-planning solutions for development projects within SkyWay project?

SkyWay: The concept of all development projects SkyWay belongs to the General designer – Mr. Anatoly Yunitskiy. At different times, different engineering companies, created and headed by him, were involved in project development. At present, it is specifically employees of SkyWay Technologies Co., based in Minsk, who carry out development projects. The company includes 15 design bureaus, design center and pilot and experimental production “Unibus”.

Development project “Oasis” — infrastructural cluster of urban type settlement. Image is taken from website yunitskiy.com

DA!: How many development projects within SkyWay technology are there at present, and what is their development stage? Have all of these projects been published?

SkyWay: For now, we have presented only the most large-scale projects, which combine a big number of targeted developments SkyWay. All development projects SkyWay differ in their aim, function and geography of application, but all of them are based on the principle of string technologies. At this development stage, all efforts of SkyWay Group of Companies are put to ensure prompt implementation and certification of string transport system. For this purpose, on the territory of the Republic of Belarus (Minsk region, town of Maryina Gorka), there is carried out construction of SkyWay demonstration center – “EcoTechnoPark” (ETP). Therefore, some development projects

are temporarily “frozen”, and others, vice versa, are being actively realized within ETP construction. Thus, ETP demo complex will include the transport and logistics hub combined with an anchor support (the most important element of SkyWay transport infrastructure). The project of this structure includes development of the technology of roof planting and combining the urban passenger station with the intercity station within one construction, which is an essential component of SkyWay linear cities project. Also, ETP will include the urban transport complex, where a flexible uncut track structure will be demonstrated. This track structure is not an analogue to the cable way, although they are both characterized by lightness and flexibility. The projected cargo complex, which will become an example of using string transport technologies in industry, cannot go unmentioned, either.

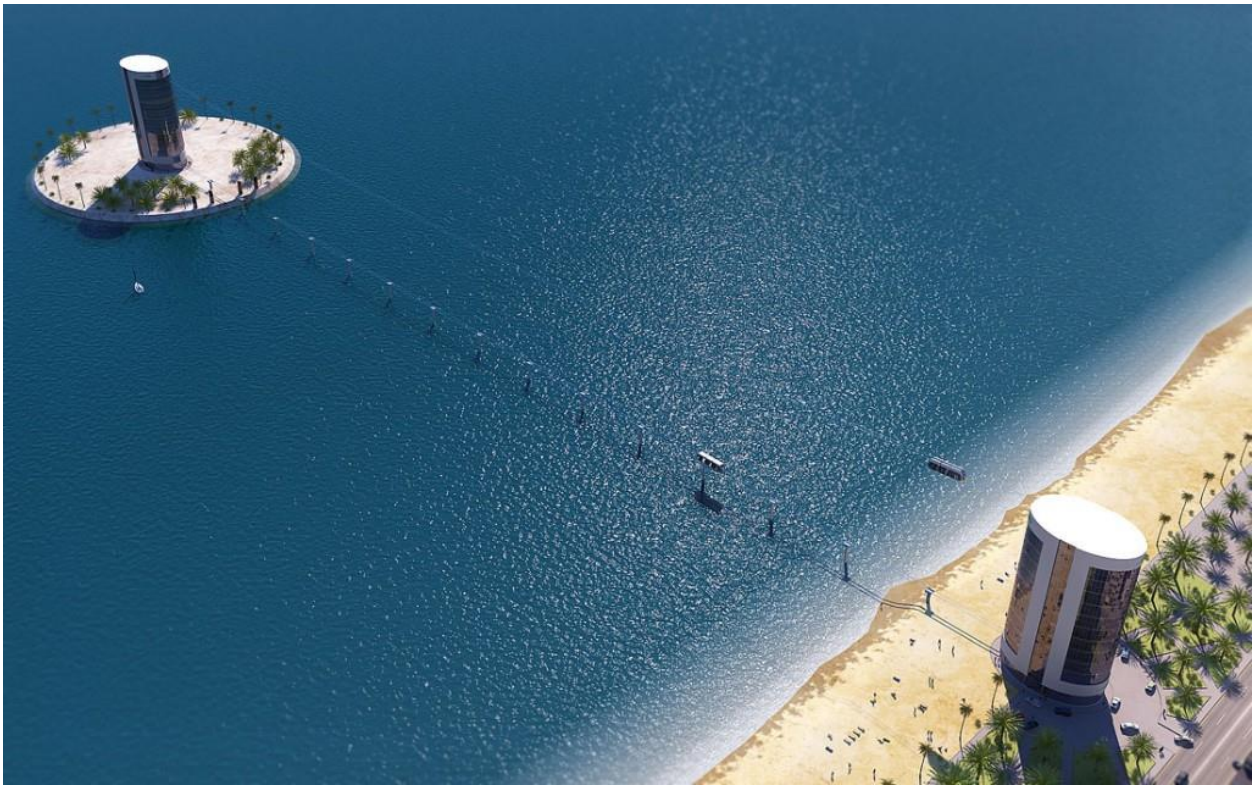
Runway based on string technologies.
Image is taken from website yunitskiy.com

Furthermore, technologies for creating some elements for string runways, bridges and viaducts, vacuum glass, technologies for soil enrichment with humus, for optimization of sewage systems, fitness transport and safeguarding system, called “Intellectual fencing SkyWay” as well as a range of other technologies are already being developed and improved within ETP project.

Along with technological solutions, development and creation of innovative technologies, there arise green issues. Integration with nature is one of the main requirements when designing and creating the demo center.

All transport lines are included into the uniform ensemble with nature. Near SkyWay lines, there will grow fruit trees and berry shrubs, there will be created water basins and flower arrangements, attracting bees from beeyards also located on the ETP territory. SkyWay transport will create a harmonious whole with nature, not destroying or doing harm to the environment. The synthesis of technologies, nature and human – the triunity of these components is necessary, if we want to pass the Earth with all conditions for a fulfilling life to the next generations. The track structure and components of the related infrastructure for SkyWay string transport system, construction of the first full-scale operating section of which will be finished already in autumn this year, are designed so that their main components (the system of string anchoring, the technology of pumping concrete mixture in pre-stressed lengthy structures, the technology of greening rooves and building terraces, etc.) can be further used when implementing other projects based on string technologies. There will be created the so-called “off-the-shelf solutions”. In addition, many of them are designed with regard to further adjustment for climatic conditions of other countries and continents. In this case, separate technical solutions will be taken to the market already in the closest time, before transport system certification. In particular, this refers to the technology of roof greening, production of in-

wheel motor and string fencing, regarding which representatives of SkyWay Technologies Co. are already conducting negotiations with potential customers.



Development project “Shore — Island”. Image is taken from website yunitskiy.com

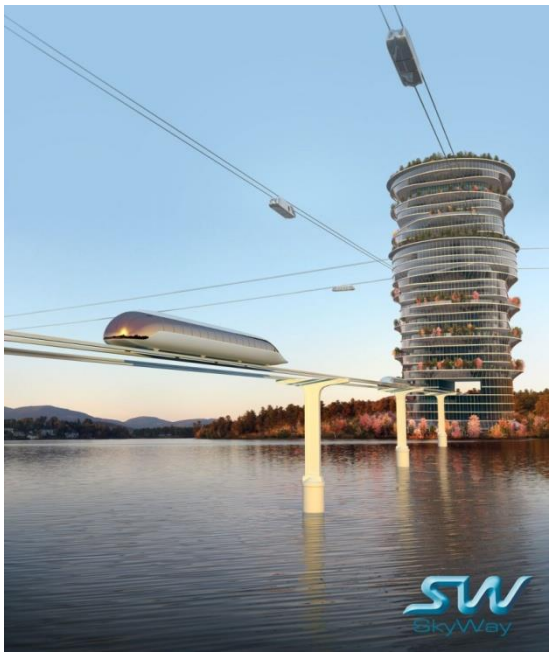
DA!: To what extent are these development projects innovative on their own (without regard to their interrelation with STU) and feasible for practical implementation (construction) in the coming years?

SkyWay: The innovative character of SkyWay technology is attributed to the original and effective combination of widely known engineering and technological solutions, and the main innovative component is the technology of string rail itself. For the most part, each element of SkyWay project taken individually is not that unique. However, the character of combining these components into the single structure ensures unprecedented design and operating features. Thus, the projects to be implemented are not innovative as to the materials and design elements used, and also include some conventional technical solutions, but, at the same time, they are innovative when being considered comprehensively.

DA!: Is it planned, within EcoTechnoPark project, to build any trial objects related to industrial or residential architecture?

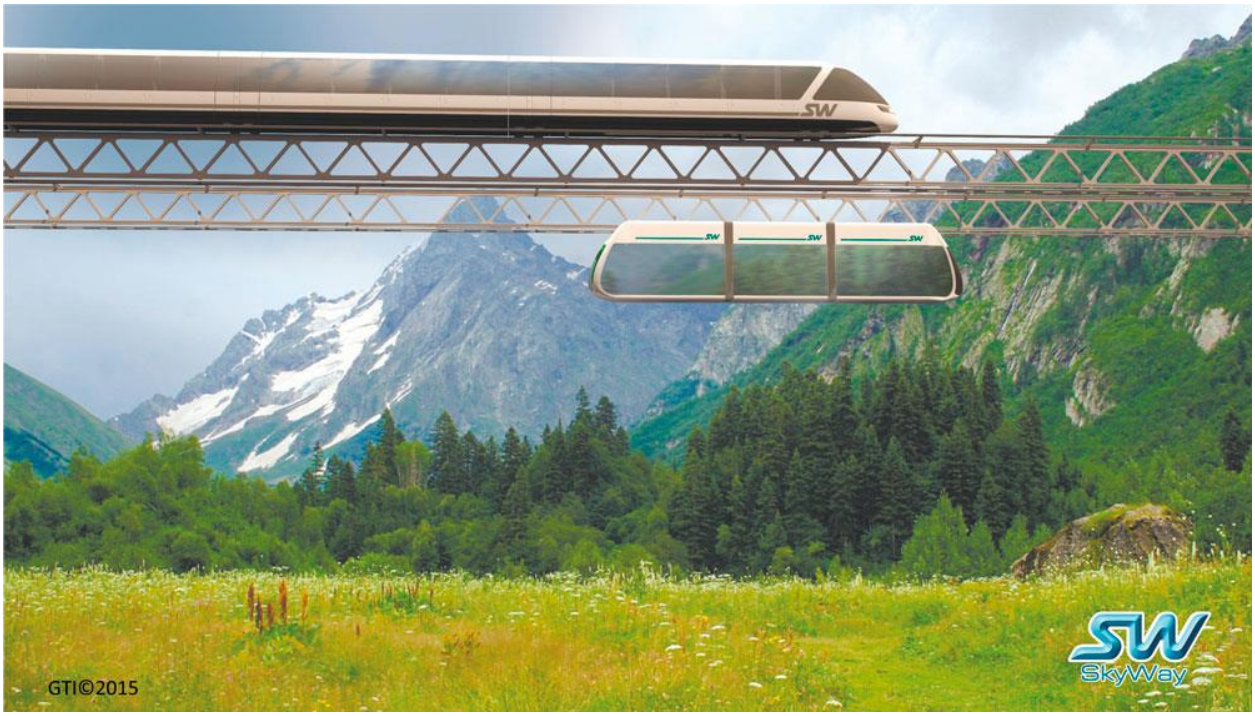
SkyWay: Yes, they are multifunctional anchor supports and eco-cottages. In ETP, the functions of an anchor support will be combined with the functions of two passenger stations (urban – on the second floor, high-speed together with a garden – on the third), automated dispatch center, electric generation center of about 1,000 kW power, and SkyWay museum. On customer’s request, an anchor support can be combined with residential buildings, trade centers and any other construction objects. Another unique feature of the building is that it will actually not require soil withdrawal due to roof greening, where a full-scale garden will be planted, which is especially valuable for

megalopolises. All soil taken for construction will be enriched with humus and then taken up, to the “second level”. Apart from that, creating green rooves in urban environment contributes to local improvement of air quality, improved conditions for buildings operation as they are cooled down and heat losses are reduced. There is created additional living environment for birds and insects, plants and humans, as well as additional places for cosy and ecologically clean relaxation. And this is already a great step on the way to ecologically clean and healthy cities.



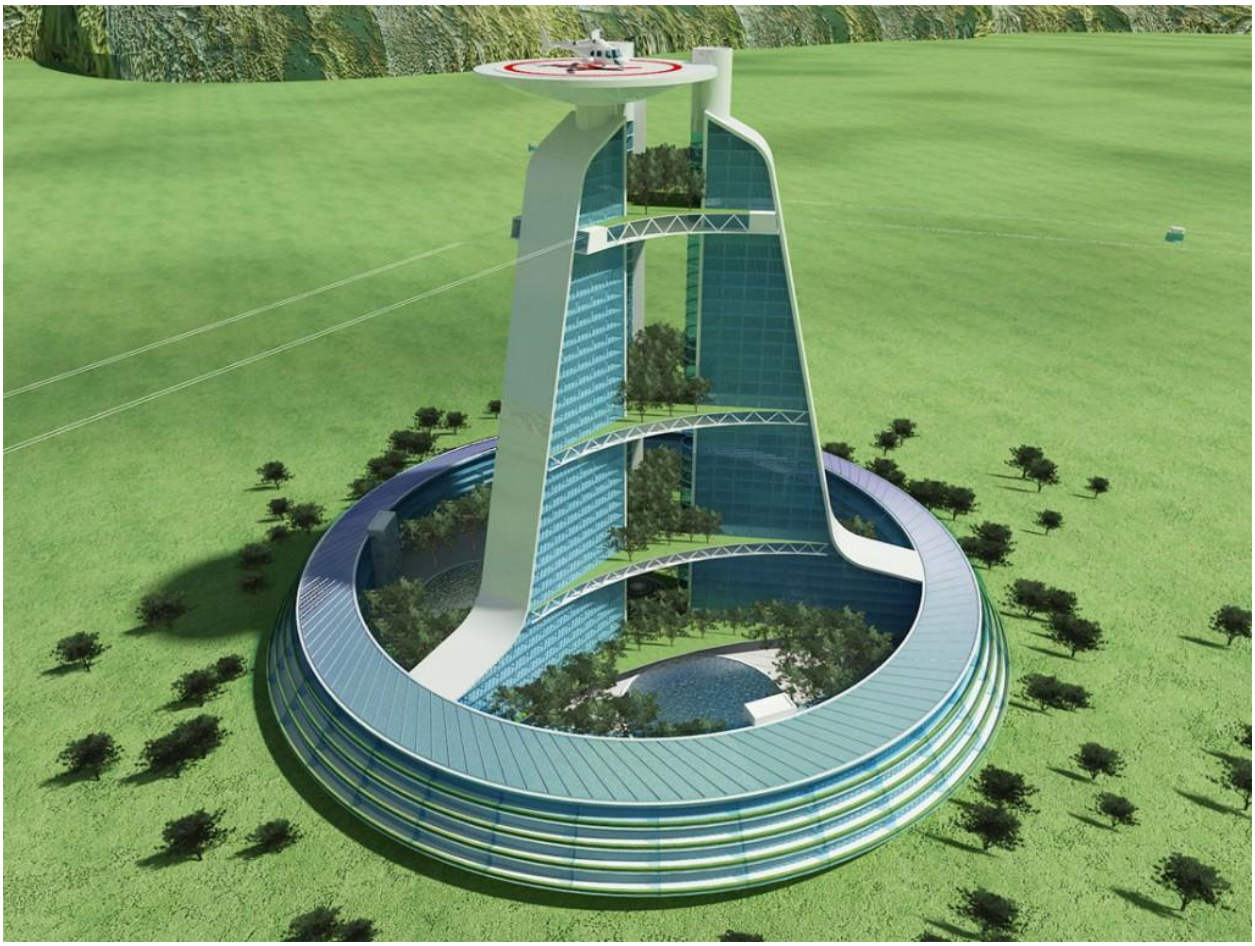
Another example of combining different functions in one object with an anchor support is the use of anchor supports for the light urban system, which are built with regard to a possibility of their further reconstruction, as well as the space between them, to make a multifunctional complex. Such complex will include a full-scale station for this system, administrative and office premises, an accessible roof area with fruit-tree gardens, a café and an observation platform. In eco-cottages, there will be realized the principle of self-sustainable accommodation, with a garden and a vegetable plot on the roof, which is capable of providing with all the things necessary for life: protection from negative natural impact, self-contained heat and electric energy, food, water, etc.

What concerns industry, ETP envisages cargo system construction, which will demonstrate string transport operation when transporting different kinds of cargo, their loading and unloading at special loading/unloading terminals. It is also planned to locate a production building, where processes on assembling the required components for track transport structures and transport itself will be carried out.



DA!: Are there at present at least partial examples of development projects implementation with the prospect of their further connection to SkyWay network?

SkyWay: Yes, as it was said above, such example includes Intellectual string fencing, which by now has been installed around ETP perimeter and is a component of SkyWay string transport system. In the soonest possible time, there will be launched a project related to the use of roof greening technology, in Minsk.

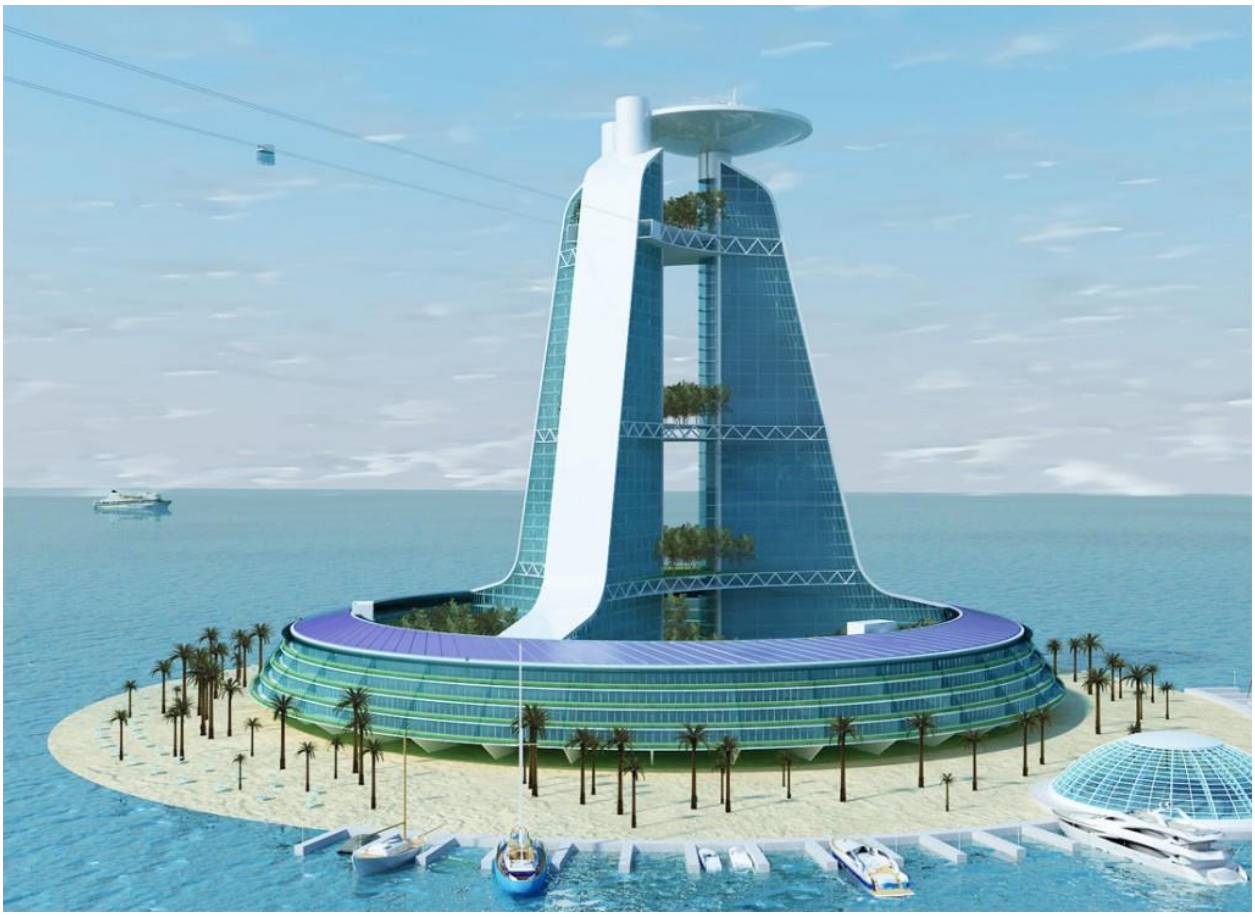


Development project “Azure”. Image is taken from website yunitskiy.com

DA!: If we take a closer look at the development projects related to residential construction, which have already been published, we can notice that all of them have a radial form in plan view. It is partly attributed to a technical radius at terminal or reversal sections of SkyWay track. However, it is important only for transport nodes. But in these projects, even those elements of buildings and neighbouring territories, which are not in contact with the road, have a round or oval form in plan view. What is the reason for that?

SkyWay: It is related to the fact that linear cities are of pedestrian type. A radial form allows to minimize the distance between buildings and, consequently, the route required for a person to walk from the dominant building, which is a transport node, trade or entertainment center, etc., to their house. Besides, it is made with the purpose to ensure the architectural unity of such cities, as buildings-stations are an architectural centerpiece and other buildings are adjusted to them. Also, it is no secret for many

people that buildings round in plan view have a range of significant advantages compared to buildings with corners. With the same area in plan view, “round” buildings have a significantly less area of cladding, which decreases heat losses in cold seasons, saves construction and finishing materials, which, in turn, decreases labour costs. A cylinder shape makes the building structure more rigid, solid and stable, which is especially important when carrying out construction in places prone to sagging and landslides, as well as in more earthquake endangered zones.



Development project “Island”. Image is taken from website yunitskiy.com

DA!: Studying development projects SkyWay further, there catches the eye the fact that almost all of them are, primarily, designed for implementation in a warm climate. Not only the projects on the shore or islands, but also individual houses in “Oasis” project refer to the architecture of a moderate climatic region. Is it connected with the hopes for implementation of such projects primarily in countries with a warm climate, or are there any other reasons for such architectural solutions?

SkyWay: Obviously, it is connected, and there are specific grounds for this – in fact, before starting the development of some project, one must be sure that the project, like any other product, will have demand.

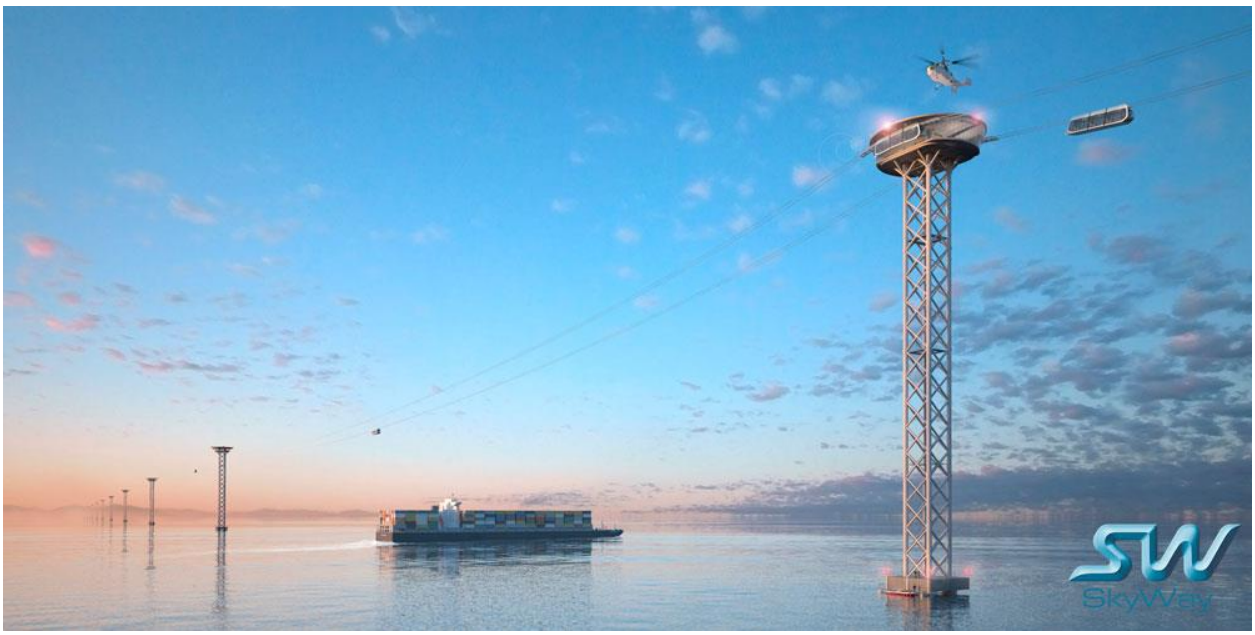
So, cooperation with Australia seems realistic to us already in the immediate future, and there is confirmation to it: just recently the Minsk office of SkyWay Group of Companies has been visited by an Australian delegation headed by Mr. Rod Hook. Rod Hook is a highly respectable and experienced head of Rod Hook and Associates (RHA), Ex-Chief of Planning, Transport and Infrastructure Department of South Australia. Mr. Hook took part in realization of various projects, including those connected with infrastructure, transport, environmental protection. His successful work has transformed the way people live and work in South Australia, particularly, in Adelaide. River port Expressway, underground speedy transport routes, expansion and reconstruction of tramways, pedestrian bridges – this is not a complete list of Mr. Hook's activities. Adelaide jokingly became known as "the city of twenty minutes" – that is how much it takes to get from the outskirts to downtown. Recently, however, the road network has been struggling to cope with increasing traffic.
As in the last 10 years Mr. Hook was responsible for supervising and completing projects under the program of capital investments in transport and infrastructure totaling more than USD 10 billion, he could not help but notice the growing transportation problem. Mr. Rod Hook visited our Minsk office for the first time in September, last year, when the construction of EcoTechnoPark had just started. On June 13, 2016, the Australian delegation comprising more participants visited the capital of Belarus for the second time.

Development project “Resort on the Island”. Image is taken from website yunitskiy.com

By now, Rod Hook has already reached an agreement on the construction of SkyWay track section for Flinders University in Adelaide. Creation of this line will provide a better communication between Bedford Campus and Flinders Medical Center, as well as with the potential railway station “Flinders”, which will continue the existing railway from Tonsley station. The project received a wide public response in Australian media and representatives of several large engineering companies claimed their interest in its development. Upon the results of preliminary negotiations, there was formed a delegation from the list of interested persons headed by Mr. Rod Hook himself, who arrived in Minsk. The purpose of their visit was to carry out expert examination of the technology, get an insight into the current construction stage, as well as negotiate the details of further cooperation.

Rod Hook (on the left) and Anatoly Yunitskiy (in the center) during excursion around EcoTechnoPark.

In the course of their visit, there were considered different variants of the track, stations and intermediate supports with regard to the specific features of the existing climate, relief, development, vegetation, etc. When working out these variants, there were taken into account all existing encumbrances, which were quite a few on a 550 meter section: level difference of 50 m, passing above the roads, multi-level car parks, tall-growing trees, vicinity to buildings and structures, negotiating rather limited areas of land sections in direct vicinity to operating buildings and recreation zones. It is planned not only to solve these tasks, but to do it with minimal impact on the existing natural and urban environment. It cannot go unmentioned that for all that SkyWay system can cost significantly less compared to conventional broad-gauge rail systems and light rail infrastructure.



This targeted project is an excellent opportunity for implementation and demonstration of innovative developments of a new kind of transport, communication technologies, methods and approaches of preservation, restoration and rational use of natural resources. Mr. Rod Hook and Mr. Anatoly Yunitskiy coordinated a road map for SkyWay technology application on the territory of Australia and signed the corresponding documents.