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THE DESIGN CONCEPT OF THE AIRSHIP AS A MOBILE RESIDENTIAL BUILDING

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The article deals with General issues related to the development of the design concept of the airship as a mobile residential building. For a specific purpose, this airship is a tourist hotel. It is a largely autonomous energy-efficient facility that generates electricity and heat from renewable energy sources.

One of the most important tasks of ensuring the sustainable development of human civilization is the development and implementation of measures that allow the efficient use of energy. And in the modern context, energy saving on the ways to achieve greater energy efficiency means simultaneously improving the quality of life in its various aspects. Including in the most seemingly unexpected and exotic-for example, in the use of airships as the main elements of advanced tourist systems. It is these aircraft experiencing a second youth, and is devoted to the study presented in the article or, more precisely, its initial stage.

The airship as a mobile residential building of hotel type with specific interiors and engineering equipment was chosen as the object of the esearch.

The object of the study can be named as follows:

1) airship – tourist hotel (veresion 1);

2) airship-hotel (version 2);

3) THA-airship (version 3; THA – tourist hotel airship).

The subject of the research is design harmonization of TNA-airship.

The aim of the study is to develop a holistic design concept of the TNA-airship which is a comfortable, energy efficient and environmentally friendly, without damaging the environment, the object.

The research tasks:

1. Analyse the existing experience in airship construction and use of airships in tourism including mobile hotels.

2. Analysy the existing experience in wind and solar power, adapted for large land, water and air vehicles including airships.

3. Analyse the exterior and interior solutions of large land, water and air vehicles including airships.

4. Analyse the typological range and space-planning solutions of hotels suitable for implementation in an adapted form in TNA-airships.

5. Develop variants of the initial design concept of the TNA-airship reflecting mainly its three-dimensional solutions.

6. Develop a simplified (schematic) design concept of infrastructure for TNA-airship and related logistics.

7. Develop variants of functional and technological scheme of TNA-airship.

8. Develop technical diagrams of THA-airship.

9. Develop variants of the functional scheme of the hotel part, or N-part, THA-airship.

10. Develop variants of space-planning solutions of the THA-airship N-part.

11. The development of options for the interiors of the THA-airship N-part.

12. Select and design adaptation of engineering equipment including wind and solar power systems.

13. Bring to completion the options of a holistic design concept of THA-airship and its corresponding infrastructure and logistics components of the overall design complex.

14. Determine the approximate technical, energy, environmental and economic characteristics of the variants of the TNA-airship and the corresponding infrastructure and logistics components of the overall design complex.

To date, a wealth of experience in creating energy-efficient buildings has been accumulated. With respect to TNA-airship special attention to the stationary ground targets like passive house and windbreaks.

A feature of the passive house as a specific type of energy-efficient buildings is the absence of the need for the usual, powerful enough heating system due to the extremely low energy consumption through the use of passive energy saving methods. Ideally, a passive house can be non-volatile, does not require the cost of maintaining a comfortable temperature in the premises. The passive house receives a significant share of thermal energy in the form of heat generated by household appliances and people and animals living in it. Renewable

energy sources – heat pumps, solar water heaters (solar collectors), solar photovoltaic modules and wind power plants-increase energy security and energy efficiency of passive houses.

Relatively recently began to develop above-ground (air) passive houses, which are designed to be fully Autonomous architectural and technical objects. An example of such developments can be found in Russia.

The Russian project is based on the airship, in which it is planned to install the currently available energy saving technologies and the smart home system. In the present study is considered as TNA-airship itself and the whole system of "spot – the dirigible and the corresponding infrastructure". One of the sketch images of TNA-airship is shown in figure 1.

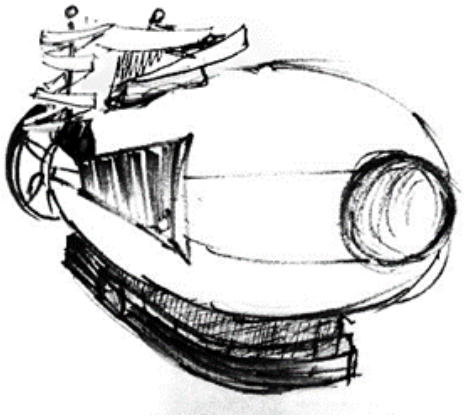
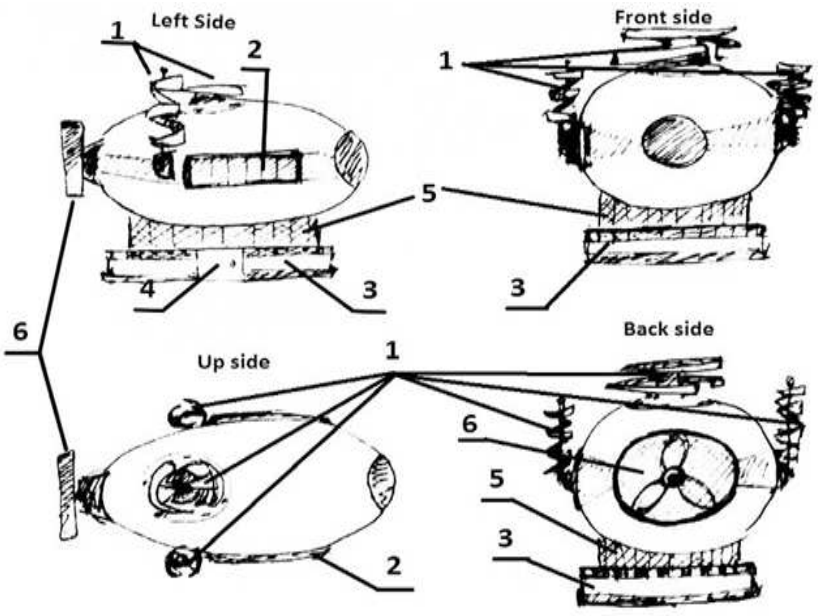


Figure 1. – General view of TNA-airship (figurative solution)

This airship seems massive in appearance design smooth curvilinear outlines. Figure 2 shows one of the schemes of the general architectural and technical solutions.



1 – vertical-axial wind power plants; 2 – solar photovoltaic modules and solar collectors; 3 – walking platform; 4 – docking platform; 5 – hotel (residential) part

Figure 2. – Scheme of the general architectural and technical solution of TNA-airship

The energy intensity of the airship-hotel located above the clouds and clouds is much higher compared to the ground object of the same useful volume and area of the hotel part. At the height and the number of hours of sunshine, and wind energy is much more than the earth and on earth.

As a constructive prototype of the airship – a tourist hotel, a hard-type airship was chosen due to its greater load-bearing capacity and reliability compared to non-rigid airships.

To provide the crew and residents of the THA-airship with drinking water and food, as well as other purposes, it is proposed to create special landing bases. They are special towers or towers. To maintain the full (long-term) autonomy of the THA-airship in the air, its external maintenance can be carried out directly in flight mode with the help of special refueling airships.

Provision of THA-airship with hot water is assumed by means of heat pumps and solar collectors located on its body. Electricity will be generated by either one large wind power plant or two or three relatively small ones. It is assumed to use their vertical-axial versions with helicoid blades and spatial wind flow concentrators.

As for the sewage system, the best for the THA-airship is a closed-type sewerage system operating on the principle of liquid recirculation. This liquid is initially taken from a special tank, which is filled before departure. In flight, the sewage liquid is filtered, and the filtered liquid is used for reuse – for example, for flushing toilets. In this case, substances for disinfection and deodorization of the liquid are added to the tank. After refueling THA-airship all the impurities, as filtered and liquid, is extracted in a special tank of the refueling airship-tanker and transported. If necessary, the same refueller refuels the tank of THA-airship fresh chemicals through the filling pipe on the service panel toilets. In the gondola part (N-part), THA-airship is provided an observation deck. THA-airship must be equipped with the "smart home"-system. Furniture and interior equipment will be presented in the form of modular structures. Some of them, in order to save space and create more space, it is supposed to hide in the walls and call either on the signal of the user, or automatically thanks to the capabilities of the "smart home" system. Interior elements should be as variable as possible.

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