

## **Geospatial structure of the air transport system of Ukraine as a factor of safe functioning**

*The article examines theoretical aspects of the functioning of air transport, characterizes the most important categories that represent the geospatial structure of the air transport system of Ukraine. Peculiarities of the geospatial structure of the air transport system, such as its polystructurality and linear-nodal character, have been studied. The work also focuses on the main system-forming elements and connections that ensure the structure and stable functioning of the national air transport system. The influence of macroeconomic and socio-cultural factors on the activity of the air transport system, which is currently destructive, is analyzed.*

From a geographical point of view, aviation transport can be seen as a sectoral socio-geographical system. The systematic presentation of air transport provides an opportunity to learn about its structure, functioning mechanisms, assess the level of organization, the rationality of connections and processes, implement a forecast and practical measures to improve its activity. Constant changes in the external environment, in particular crisis phenomena in the economy, positive and negative trends in the development of air transport in recent years in Ukraine require thorough research into directions for further sustainable and safe functioning of the air transport system. The number of publications of a scientific and educational nature on the systematic geographical study of air transport in the domestic literature is insufficient, in particular, in terms of the functioning of the air transport system in unstable conditions.

Based on generally recognized theoretical and methodological provisions of social geography, there are necessary grounds to assert that transport is a diverse system entity consisting of subsystems of various types of transport. One of such subsystems is the air transport system. The systemic character of the object of research implies a mandatory analysis of the structure, namely a set of stable connections between the components of the system, which ensure its integrity and which acts as the framework of the system and reflects the general laws of its functioning [ 1]. According to I. Dudnyk, such connections in the system are essential and organic, as they are a manifestation of the internal functional essence of the component parts and reflect the content and target orientation of the development of the system as a whole [4]. As a result, a change in one element causes certain changes in all other parts of the system, and sometimes the system at all. The presence of such a close interaction, organic interconnection of components is the reason that in various processes, in interaction with the environment, the system acts as a single, integral entity. This is manifested in the fact that the internal connections between the system components are much closer and more stable than the connections of this system (or its individual components) with other material objects of the external environment.

One of the most important geographical characteristics of the air transport system

is its geospatial structure, which is a set of territorial elements of air transport, in which branch and institutional-functional components are combined in a certain way. The peculiarities of the air transport system are its polystructure and linear-nodal nature, which is due to the combination (overlapping, overlapping) of *linear elements* (airways), *discrete forms* (points, nodes and small point elements (infrastructural points)), and *areal formations* (air transport areas - macro-, meso- and micro-level).

Polystructurality should be considered in functional-component, functional-management and functional-territorial aspects. The functional-component aspect of the structure involves the allocation of two leading elements: passenger and cargo transport, where various aviation enterprises (airlines, aviation engineering enterprises and air traffic management enterprises) operate. In the geospatial (functional-territorial) structure of the air transport system, point (points, centers and hubs), linear (airways) and planar (areal) elements are distinguished.

The systemic qualities of the air transport system are manifested at the macro, meso, and micro levels. At the first (highest) level, a unified air transport system of the country (national air transport system) is being formed, at the second level - the air transport system of the region, and at the micro level - the system of regional and district socio-geographical complexes.

At the level of the region, a regional air transport system is being formed, which is imagined as an interconnected (in the production-technological and management-organizational sense) set of airports and airfields (together with accompanying facilities) and airlines within the boundaries of a territory that is integral in the natural and economic sense (region, socio-geographical district). According to the most common zoning schemes in Ukraine, nine regional air transport systems can be distinguished, which were formed as a specific element of the territorial and sectoral structure of the district: Carpathian, Podilsk, North-Western, Stolychna, Central, North-Eastern, Dnipro, Donetsk and Southern systems [1].

It is worth mentioning that a specific feature of the system-forming process directly in the regional air transport system is the predominance of construction, management, and addition links compared to passenger and cargo exchange links, because direct passenger and cargo exchange connections between elements of the same RATS are episodic (irregular). This is due to the fact that passenger and cargo flights between Lviv and Ivano-Frankivsk or Kyiv and Chernihiv, for example, are impractical. Therefore, in the context of our study, traditional connections (passenger and cargo flows) play the role of mainly external connections, and in the vast majority go far beyond not only the specific regional air transport system, but also the national air transport system of Ukraine in general.

Based on the above, the primary system-forming element of the air transport system at any level is the airport, the role of which is determined based on its capacity, multifunctionality, the scale of its activities and the territorial zone of influence. To ensure the integrity of the air transport system at any hierarchical level, all airports must interact with each other, both functionally and productively, and territorially. That is, there should be both direct connections and indirect relations between them. The closeness of such connections is directly dependent on the territorial proximity of airports. It is the presence of such interrelationships within a territory that is integrated in the administrative and economic sense and determines the formation of territorial

air transport systems [3].

Today the availability of connections within the air transport system is threatened by destructive economic, territorial and functional changes. This is facilitated by factors of system formation, which in the theory of geography are divided into internal and external (by content), genetic and artificial. External factors affecting the dynamics of the stable functioning of the air transport system in general, and the regional air transport system in particular, include transsystem general economic connections, macroeconomic and political conditions, as well as certain circumstances of a subjective nature: principles of administrative and territorial organization, state regional policy etc. In today's realities, the processes taking place in Ukraine disrupt the balance in the air transport system at all levels (macro, meso, and micro levels).

Now the influence of macroeconomic and socio-cultural factors, due to dependence on the political situation, acquires a tangible destructive character in air transport. Therefore, air transport and its polystructure (functional-component, functional-management and functional-territorial) are in the process of acquiring new qualities, which come into force due to the change of connections between the elements of individual structures and structures of different levels. In general, this means a change in the form and nature of interaction between them, and in a more specific case – improvement (optimization) of the processes implemented in the system.

**Conclusion.** The air transport system of any level must satisfy the needs of the population and public production in passenger and cargo air transportation and in special aviation works and services despite the conjunctural changes in the system of economic and political life of the country. We have proven that the proper functioning of the air transport system should support the effectiveness of socio-geographical systems in new dynamic conditions, overcoming resistance to changes and adopting leading methods and techniques of air transport system management.

## References

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