Innovative Tricks of Adaptations the Architectural Objects as Alternative Ecosystem

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Abstract. The article is devoted to an actual problem the formation of Adaptive space environment as the principle of creating architectural objects. The purpose of article is to consider innovative techniques of adaptation in the shaping of architectural space as alternative ecosystem. It is proposed that a promising approach to the Organization of contemporary spatial environment as adapt-system. Identified the hierarchical levels, types and methods of adaptation, enable you to maintain proper balance space habitats and environment. A leading approach to the study of this problem is based on analytical of research methods such as: integrated design object as a system, a method of structural analysis and the informational methods. Materials can be useful to the theory and practice of forming the space habitat as opens completely new possibilities in architecture and construction.

1. Introduction
In modern conditions of development of society occurs adaptation of social system to the new information environment, adaptability has become one of the most important and essential qualities of a modern space of habitats. In this regard, the prediction of the lifestyle changes of society and the creation of architectural environment, able to adapt to them, becomes one of the main components of the project process. Therefore, the challenge of architectural theory should be directed at search tools and techniques of constructing Adaptive space that has the many scripting and scads of probabilistic forecasts of development. The processes of adaptation, fully located in the surgical field of architectural activities, cause the need to identify the changes that occur in the system Office of the professions in the context of the use of information technology [1].

The basic principle of adaptive architecture is the reaction on human as a variable to an existing system in real time. Therefore, when considering space habitat as a system, the combination of natural and artificial environmental spaces is in constant interaction with man and his requests. In the world of architectural theory and practice over the past years there has been a lot of work that can be seen as the emergence of a new architectural vision of eco-sustainable spatial environment [2]. The logic of development this architectural space suggests an alternative understanding of adaptable architecture as a new spatial system.

2. Relevance of the issue
Feature of our time is related to the constant change in the behavior of people and their living conditions. Adaptability as a fundamental principle of evolution produces the concept of adaptive
architecture. Relevance of adaptive architecture is caused due to the fact that humanity has reached a new level of understanding of the world and nature.

The magnitude and importance of solving scientific problems is to establish the concept of formation of the self-organizational architectural space according to the needs of the dynamic development of society through the use of modern scientific paradigms and concepts. In terms of development of scientific and technological progress occurs attraction to architectural research new knowledge. This allows the formation of an entirely new shape eco-space, ensuring the quality of life of its inhabitants.

The complex technological and economic requirements for creating such architectural objects cause the search for new approaches and the use as analytical research methods such as: integrated design object as a system, a method of structural analysis and the informational methods. This problem solution has attracted many professionals involved in the formation of Adaptive environment, and offers concrete solutions and theoretical development made in the framework of this concept. Of special interest are the problems of formation of Adaptive environment as a principle of formation of architectural objects [3], as well as identifying adaptation properties of space habitats [4].

Theoretical and design research incorporated provisions of the specialists and architects on adaptability as a system property of environment architectural objects [5], [6], [7], [8], [9], [10], [11], [12], [13], [14], [15]. It also notes the desirability of developing new and innovative approaches to the formation of architectural objects, taking into account changes of Adaptive space over time [15], [16], [17], [18], [19], [20]. However, in scientific works and project remained a little the identification the questions of innovative techniques of adaptation of architectural objects as alternative ecosystem. The development of this concept requires a deep research in connection with exceptional complexity and relevance of this issue.

3. Problem statement
The purpose of this article is to consider innovative techniques of adaptation in the shaping of architectural space as alternative ecosystem. This will require addressing a number of research tasks:

- Analysis of adaptation as a principle of formation of architectural objects.
- Disclosure of the adaptation properties of space habitats. Consideration of adaptation as a system property of environment habitats.
- Identification of features of modern spatial environment as adapt-system.
- Disclosure of techniques of spatio-temporal pulsations of Adaptive space ripple in the context of reversibility and cyclical systems.

The main task of the article is aimed at identifying innovative techniques address the issue. This causes the need to identify ways and methods for creating an artificial environment that’s practically are not used in modern architecture and practice of construction.

4. Theoretical part
Architectural space should correspond to its functional purpose, which varies significantly more often than the architectural object. It is therefore important to find and develop ways of organizing environment, using the flexibility and mobility of the architectural object. Here continuous in time the transformation is one of the forms of its existence. This necessitates consideration of the features of manifestation of adaptation in the shaping of space habitats.

4.1. Adaptations as the principle of formation of architectural objects
Adaptation of architectural space formation manifests itself in a static (stationary, traditional) and dynamic (flexible, evolving) form [3]. In fact, the static architectural adaptation is the traditional reconstruction with unintended earlier change their functional and spatial organization. On the construction and operation of architectural objects dynamic adaptation is understood as a transformation, which may be reversible or irreversible processes. The dynamic adaptation of architectural objects is understood as a transformation that can be reversible or irreversible processes.
Depending on the nature of the change in time processes of dynamic adaptation of architectural objects can be cyclic (with the possibility of the return of the spatial characteristics of environment in its original state) and acyclic (lack of the possibility of reversion, when there is an irreversible change of the spatial characteristics of environment). Cyclicality of transformation determines the possibility of changing the architectural space in time which can be short-term or periodic (daily, regular and seasonal) [3].

The not cyclical processes dynamic adaptation called evolutionary conversion, because they are carried out throughout the lifetime of the architectural object. Irreversible changes of the building or its internal space can occur in connection with the requirements of the dynamically changing reality through their changes or extensions.

From the point of view of the problem will be most rational consideration of the principles of dynamic adaptation, based on the cyclical and reversible processes converting it. The main forms of implementing such processes are transformation and mobility. Dynamic adaptation of architectural objects can be used from the time of its implementation as seasonal and daily, as well as other types of manifestations.

Thus, in terms of adaptability of architectural objects there are static (unexpected) adaptation and dynamic (envisaged) adaptation, transformation processes which can be not-cyclical (irreversible) and cyclical (reversible). The main way of acyclic processes is the evolutionary transformation and cyclic-transformation and mobility.

4.2. The properties of adaptation of space of environment

One of the main means of manifestation of dynamic adaptation of architectural objects to the changed conditions and requirements of their exploitation is transformation. This is the most suitable alternative to their optimum organization, using constructive solutions with static in the (process) and dynamic (during mounting and dismounting) properties. Depending on the nature of the transformation of architectural objects are distinguished [3]:

- "Qualitative" change of architectural object by converting internal elements while maintaining its overall sizes. In this case, the internal processes of adaptation of the architectural object occur within its outer shell.
- «Quantitative» change of general dimensions of buildings associated with its constructive transformation. In this case, the external adaptation processes of architectural object by changing its outer shell.

Mobility, as a concept, applies to the various types of human activity, established and in architecture. This is due to the need to address the many challenges of architecture, taking into account the dynamic factors such as population growth, its social mobility and migration are associated with rapid urban growth, active exploration of new areas, etc. Mobility characterizes the compliance and responsiveness of the building to the changing needs and lifestyles, as well as physical mobility as a willingness to change locations in space. The achievement of the great mobility of architectural objects contributes to the ability to change the volume and dimensions of both during installation and during operation. The high factory readiness elements create to such buildings and facilities great benefits [3].

Self-regulation, as the process, can use of its principles in the organization of adaptive inhabited space. Use of the synergistic approach in tackling this problem allows you to refer to the concept of fractal self-organization, which generates spatial environment on the principle of fractals. This approach provides maximum flexibility of the architectural object in relation to the external environment and uses modularity and allows you to get truly adapted system [4].

Practically the principles of transformation, mobility and self-regulation of architectural objects can be applied in all cases of human needs in changing architectural space, and to any conditions of the process: when reversible and irreversible processes of transformation, the quantity and quality of its manifestations. This technique can be implemented when using transformable constructive systems in...
cases like reversible cyclic and irreversible transformation by increasing spatial parameters of buildings.

4.3. The formation of the modern spatial environment as the adapt-system

Consideration of adaptively as the system property of environment specifies a particular type of relationship between the elements of the system, taking into account the social, cultural and psychological human needs [5]. In this case, the adaptive property environment serves as the ability to maintain a sustainable balance subject-spatial structure by formal and substantive changes caused by the dynamic development of society [6].

The primary quality of any system is its stability. A condition in which the system is able to return, called steady state equilibrium [7]. For the complex systems are characterized by various forms of structural stability, such as reliability, survivability, etc. When considering the concept of adaptation in various areas of use many assessments and approaches, but mostly used basic signs [8].

Adaptation as a process of continuous change and adaptation of the system to the specific properties of the architectural object and the environment has hierarchical levels, corresponding to the various stages of the formation of a complex object: parametric and structural adaptation [9].

Parametric adaptation relates to the correction of object parameters at each stage of its operation. Adaptation of options linked to their identity and allows you to adjust the model at each step of management. When the special manage can be achieved two goals — management and adaptation of model. This allows you to get information about the specificity of the object in order to use this information to correct of the model [10].

Structural adaptation occurs in situations where in the process of evolution of objects its structure changes. Structural adaptation procedure occurs when changing from one alternative model to another. Alternative models require the identification of parameters, which is implemented by methods of parameter adaptation [10].

Adaptability of environment as one of the properties of the space formation characterized by dynamism and is carried out thanks to the interaction of two complementary processes - on the one hand, people and society, and on the other - the spatial environment [11]. Such an approach acquires value in the development of new spatial structures and associated with the need to take into account and assess the many factors in conditions of uncertainty and lack of awareness [12].

Thus, the formation of the modern spatial environment as the adapt-system is extremely complex and important so as it is crucial in the development of the future development of mankind [13]. Use of the notion of adaptation of architectural objects is linked to brutal necessity due to the fact that their establishment and operation would not be able to exist without the support of the algorithms of adaptation [14].

The need for a systematic approach to organizing the inhabited space relates to the relevance of its adaptation to ensure optimal conditions of human existence in environment that gives the ability to generate resources environment as healing and rehabilitating system [15]. Such an approach to organizing residential space aimed at ensuring optimum conditions of human existence in environment.

4.4. The spatio-temporal pulsation of adaptive space in the context of reversibility and cyclically systems

Due to the fact that periodic changes of architectural environment easily predicted, this allows you to take them into account at the design stage and provide the ability to change environment with the passage of time [16]. In this case, the prerequisites for such interactions becomes cyclically. Changes in space and time, taking place in the architectural environment, linked to the pulsation, which is one of the fundamental principles of maintenance of the architectural objects of optimal parameters under the impact of the changing external factors and needs of human [17].

In the theory of architecture in the context of the Organization of Adaptive space the direction reacting or responsive architecture is closely related to the factor of time, requiring from the
architecture a maximum flexibility. Adaptive ability in this case manifests itself in transformation, mobility, which provides the ability to create morphogenetic structure. In this case, the architect is not the author, but the filmmaker [18].

In architecture, the concept of return with feedback is closely associated with paradigm of cyclic, which is a powerful accelerator of methodological integration of training apparatus as a unified science of nature, society, technology and man [19].

Considered spatio-temporal pulsation of environment in the context paradigm of cyclic allows go to a different level forming of environment, using the natural principles of flexibility and the elasticity of living matter [20]. Flexible Adaptive structure of object allows you to actively adapt to changing conditions and factors, which impact on the object.

5. Practical the significance of the
Listed innovative approaches to forming of space habitats illustrate the paradigm of ecological balance of natural and technological component of society. The Adaptability as a principle of formation of architectural objects allows you at the stage of design found opportunities planning transformation for the future, without the considerable material resources.

The ideas of Adaptive help you create expressive architectural solutions, which do not lose their relevance and meet the needs of society. In this regard, there is a need to address the issue of adaptation, not only in terms of energy savings during the operation of the building, as well as to anticipate possible changes of operating conditions. Introduction of principles of adaptation of architectural objects holds great promise for use in architecture of scientific and technical developments, which generate new ideas.

6. Conclusion
As a result, innovative tricks of adaptations of architectural objects as alternative ecosystems identified in this review in the context of the following described in article tendencies:

- Adaptations as the principle of formation of architectural objects manifested in static (stationary, traditional) and dynamic (flexible, evolving) form. Dynamic adaptation can be seasonal and daily, as well as other types of manifestations. Conversion processes can be cyclical (reversible) and acyclic (irreversible). The main way of cyclic processes is the transformation and mobility and of acyclic - the evolutionary conversion.

- The properties of adaptation of space of environment are: transformation, mobility and self-regulation of the architectural objects, which can be applied to any of the conditions of their implementation with quantitative and qualitative manifestations of the transformation. These properties can be carried out both in reversible cyclic and irreversible transformation of architectural objects. The achievement of the great mobility of architectural objects contributes to the possibility of changing their dimensions as during installation and during operation.

- The formation of the modern spatial environment as the adapt-system has a hierarchical levels, corresponding to the various stages of the formation of architectural object: parametric and structural adaptation related to the governance of alternative models of the system. The necessity of a systematic approach to organizing the inhabited space based on his adaptation, as is essential in order to ensure optimal conditions of human existence in environment.

- The spatio-temporal pulsation of adaptive space in the context of reversibility and cyclically systems, developments in architectural environment, associated with the pulsation that occurs within the paradigm of cyclically. Adaptive ability of space environment as manifested in the following directions of its development: reacting or responsive architecture and architecture of return with feedback.

Diversity and rapidly changing needs of the population become the fundamental factors in the formation of modern spatial environment. Prediction of the lifestyle changes of society and the
creation of architectural environment, able to easily adapt to him, becomes one of the main components of the project process.

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