
**COSMOGLOBALISTICS:
INTERRELATION OF GLOBAL AND COSMIC PROCESSES**

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The paper develops the concept antropogeocosmizm, emanating from the fact that the main purpose of space activity in the short term is the historical use of space to solve global problems and in the long term socio-natural transition to the sustainable development of the planet. In this study based on the ideological origins and formation of a new direction and globalization, exploring the relationship of global and cosmic factors, the impact of the latter on the development of global processes and systems, the problem of space on the planet and escalating global processes in space. It is about the relationship of space and planetary processes, the transformation of the global response to space activities (and their interaction), and global development in the cosmic evolution.

Taken as the position that global studies examining global processes and systems, and global processes are understood by the natural, social and socio-natural processes unfolding on planet Earth and have evolutionary significance. It is shown that global processes and issues affecting the world at large, is to some extent a manifestation of the global-space character of the contradictions associated with the expansion of spatial boundaries of human activity, including the conquest of space.

Special attention is paid to the potential global catastrophes and geospatial software security. Considering the introduction of a substantive field cosmoglobalistik natural processes, prospects globally exoplanet space research, as well as "global methodology" search for extraterrestrial intelligence. We consider the discovery of dark matter forms that give rise to a very substantial transformation attitude and stimulate the formation of global-cosmological research, which will consider mainly the global characteristics of matter, manifested in three main fragments of the Universe.

Key Words: anthropocosmism, extraterrestrial civilization, geocosmic security, globalism, globalistics, global disaster, global studies, cosmoglobalistics, dark matter, exoplanets.

**КОСМОГЛОБАЛИСТИКА:
ВЗАИМОСВЯЗЬ ГЛОБАЛЬНЫХ И КОСМИЧЕСКИХ ПРОЦЕССОВ**

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В статье развевывается концепция антропогеокозмизма, исходящая из того, что основной целью космической деятельности в ближайшей исторической перспективе явля-

ется использование космонавтики для решения глобальных проблем и в перспективе перехода к социоприродному устойчивому развитию на планете. На этой мировоззренческой основе исследуются истоки и становление нового направления глобалистики, исследующей взаимосвязь глобальных и космических факторов, воздействие этих последних на развитие глобальных процессов и систем, проблему развития космонавтики на планете и перерастание глобальных процессов в космические. Речь идет о взаимосвязи общепланетарных и космических процессов, о трансформации глобальной деятельности в космическую деятельность (а также об их взаимосвязи), а также глобального развития в космическую эволюцию.

Принимается в качестве исходного положение, что глобалистика изучает глобальные процессы и системы, причем под глобальными процессами понимаются природные, социальные и социоприродные процессы, развертывающиеся на планете Земля и имеющие эволюционную значимость. Показано, что глобальные процессы и проблемы, затрагивающие мир в целом, есть в известной степени проявление глобально-космического характера противоречий, связанных с расширением пространственных границ человеческой деятельности, включая и освоение космоса.

Особое внимание уделяется проблеме возможных глобальных катастроф и обеспечения геокосмической безопасности. Рассматриваются возможности введения в предметное поле космоглобалистики природных процессов, перспективы развития экзопланетных глобально-космических исследований, а также «глобальной методологии» поиска внеземных цивилизаций. Рассматривается открытие темных форм материи, которые дают толчок к весьма существенным трансформациям миропонимания и стимулируют становление глобально-космологических исследований, в которых будут рассматриваться в основном глобальные характеристики материи, проявляющиеся в трех основных фрагментах Вселенной.

Ключевые слова: антропокосмизм, внеземные цивилизации, геокосмическая безопасность, глобализм, глобалистика, глобальные катастрофы, глобальные исследования, космоглобалистика, темная материя, экзопланеты.

1. Anthropocosmism and cosmoglobalistics of K.E. Tsiolkovsky

Half a century ago a man enters space, continuing the exploration of extraterrestrial space, which began with the launch of the first man-made Earth satellite by the Soviet Union in 1957. In 1960, the National Astronomical Laboratory of the USA made the first attempt to communicate with the inhabitants of other worlds. This action was encouraged by the achievements of practical astronautics (whose historical significance will only increase over time), but went almost unnoticed in the scientific community.

The beginning of the second half of XX century was rich in space achievements, opening a new era in mankind's history – the era of space exploration. The man's entry in the Universe in its broadest sense meant basically a new turn in the relationship between mankind and nature, the interaction with which was limited primarily to terrestrial nature. To some extent astronautics also influenced global studies and created a new area of both space and global studies, that in the mid 80s of the last century was proposed to be called cosmoglobalistics [Ursul, Dronov, 1988]. In fact, cosmoglobalistics in its most concentrated form demonstrates the idea of the spatial world exploration by the man, of the overcoming many, including terrestrial restrictions, although this aspect, as it will be shown further, expresses only the external side of the deeper processes of the human culture's evolution.

Space exploration continues those global processes and challenges that characterize not only social development, but also its interrelation with nature. Social and natural part of global issues and processes, from our point of view, constitutes the

foundation for further global development of mankind expressing the interrelation of the earthly and the cosmic. But this idea of interrelation is rooted in the distant past.

The idea of the unity of the man and the Universe, micro-and macrospace has a firm tradition in the eastern (Indo-Iranian) and western (Greco-Roman) antiquity [Asimov, Tursunov, 1978]. In the extensive sense, we can speak about ancient form of anthropocosmism considering a man as part of the space and basing on their interpenetration and assimilation. Naively naturalistic and religious interpretations of ancient anthropocosmism had a significant influence on its subsequent development. Along with teoanthropocosmism [Kazyutinsky, 2003: pp. 470–472] there appeared "naturalistic anthropocosmism", the main representatives of which are K.E. Tsiolkovsky, V.I. Vernadsky, A.L. Chizhevsky and partially N.G. Holodny.

Vernadsky was considering the possible man's entry into space, arguing, in particular, about the prospects of development of the science that he created – biogeochemistry [Vernadsky, 1991: p. 147]. Moreover, he noted that: "In the future, we see possible fantastic dreams: the man seeks to go beyond the planet in outer space. And he probably succeed" [Vernadsky, 1991: p. 242]. The scientist developed a cosmic point of view in manifold fields of his research. However, the major contribution to the development of the idea of space exploration, of course, was made by K.E. Tsiolkovsky.

Analyzing the scientific legacy of K.E. Tsiolkovsky, as well as the works of Vernadsky, we face the inescapable fact that again and again we open new sides, ideas and concepts that previously were either not understood or did not attract the attention of researchers. In this sense we can say that the legacy of Tsiolkovsky is inexhaustible. And one of the reasons for this inexhaustibility of legacy of a brilliant scientist who, like V.I. Vernadsky, completed his work in the first half of the XX century, lies in the factor of the renewal of thinking which pose new challenges in the light of which we feel the urgency of work of the founder of theoretical astronautics.

We can talk about the philosophical and ideological views of Tsiolkovsky not only in connection with the exploration of space, although the latter attracts attention first of all: it is these views that played the role of Ariadne's thread in the labyrinth of search for a means to step into space. His scientific and philosophical views are important not only for astronautics, but also for the development of a man and of the whole mankind, where space exploration should take its place, but the place that will help it to determine a holistic worldview that K.E. Tsiolkovsky meant offering a rocket as a means to explore extraterrestrial space, and that philosophy, to which he eventually came and to which he paid his attention [Tsiolkovsky, Etika].

Tsiolkovsky largely anticipated the discussion of the problems that we now attribute to global competence, especially problems related to the environment. He believed that mankind would be a global factor of development and would radically transform the planet because in its nature there are "many imperfections" (and in fact, going into space is also a means of "fixing" these imperfections). For example, he considered complete destruction of all things harmful to agriculture and human health, animals and plants (beside he even put forward specific projects to implement this idea) to be an important improvement. He wanted to turn the entire planet into greenhouses and farmlands where a man will fully manage the environment, where the machines will make the nature work as a slave [Tsiolkovsky, 1916: p. 1; Tsiolkovsky, 1928: p. 1]. He was not a supporter of human adaptation to nature, on the opposite – its transformation. "Now people are weak, but they still transform the Earth's surface," – wrote Tsiolkovsky. – After millions of years their power to the ex-

tent that they will change the surface of the Earth, its oceans, atmosphere, plants and themselves.

They will control the climate and will rule in the solar system, as well as on the Earth itself. And they will travel outside the solar system, will discover other Suns and use their fresh energy instead of their dying luminary. They will even take advantage of the materials of the planets, Moons and asteroids not only to build their own facilities, but also to create new living beings out of them" [*Tsiolkovsky, Razum kosmosa: p. 7*].

Of course, from the position of science at the beginning of the XXI century we can hardly agree with the absolutization of transformation functions of mankind treating nature as merely a "slave". This attitude, coupled with the dehumanization of technology development, has already led to the global ecological crisis that threatens with the planetary catastrophe in this very XXI century. That is why there is a challenge now of preserving the Earth's nature, of transition to such methods of environmental management, which would not threaten with the suicide of the human race. And one of such methods is the exit of technology and production into space, the industrialization of the latter in order to lessen human pressure on nature, especially on the Earth's biosphere (but, of course, its industrialization in the most ecologically sound version).

K.E. Tsiolkovsky thought of a man as the master of the Earth, who will manage not only the life of plants and animals, but also other, fossil components of the geosphere, besides he believed that he will become the master of the land, ocean, air, weather, plants, and of he himself only when the population will grow a thousand times [*Tsiolkovsky, Iz predisloviya: p.3*]. It is also a misconception, because it is now becoming clear that the rapid population growth is a major factor that brings the possibility of solving global problems to nothing.

Of course, Tsiolkovsky meant the possibility of solving the state of overpopulation of the Earth due to the settlement of cosmic bodies and spaces. But the development of astronautics is now going not so fast that this task could be set even in the next century. But ecocatastrophe threatens global civilization in the XXI century.

That is why the "cosmic growth" of the population will be possible only in a much more distant future when the material basis for human life outside the planet will be formed and first of all the industry will be highly developed beyond Earth, the development of which the scientist also predicted. Since weight (gravity) really hinders the development of technology, movement and social interaction, then where this gravity can be overcome, "in the ether, in the kingdom of continuous light and the six-side space, industry and the evolution of sentient beings... must achieve unprecedented success... The goals of industry in the ether are, in general, the same as on the Earth, only a lot more extensive" [*Tsiolkovsky, 1954: p.258*]. This idea of K.E. Tsiolkovsky is now recognized as a very promising and "industry in the ether" began to develop in modern spacecrafts, especially in long-term orbital stations. Tsiolkovsky's idea about the wide settling of the space can be realized only in the future, when the astronautics first proves to be effective in solving global problems of the Earth.

Though with reservations, but perhaps we can assume that the scientist absolutized the technical and transformation activity. For example, he rightly pays attention to the fact that "the farther people get on the path of progress, the more the natural is replaced with the artificial" [*Tsiolkovsky, 1933: p. 76*]. However, in his time ecological suicide (towards which, following this principle, the mankind moves) did not

yet threaten, and some negative consequences could be ignored. Therefore, this principle, which was in correlation with the growth of the technical power of mankind, unlimited growth of its transformation power, was not thought of by scientists as the social development dead end.

However, if on the planet the replacement of the natural with the artificial actually takes place, and for many (not only Tsiolkovsky) it seems to be a trend of progress, then the same trend is transferred into space. "In this ethereal space artificiality will only reach its extreme limit, but people on the other hand will be in conditions most favorable for themselves" [*Tsiolkovsky*, 1962: p.205]. In space, indeed, a man cannot exist without the artificially created conditions and in this sense the scientist is right, but he did not assume that not all the conditions of space (especially weightlessness) – are good, and all earthly things – are evil. And now much of what he considered necessary to fight (harmful insects and bacteria, plants and animals, gravity, high and low temperature etc.) is not presented as negative from the viewpoint of the modern science. On the contrary, "natural presumption" triumphs now on the planet that significantly rejects the replacement of natural factors of development with purely artificial.

And yet, not noticing that human activity on the planet, especially the development of technology and production, are not only fraught with negative but with disastrous consequences, Tsiolkovsky proposed, quite reasonably, one of the possible ways to prevent the destruction of mankind on the planet – space exploration and the mankind's going beyond the planet – the cradle. The scientist was one of the first (perhaps following his teacher in the Moscow period of his life – N.F. Fedorov) not only to suggest the possibility of entry into space, but also to suggest a specific method that only two decades after the death of the scientist proved his idea brilliantly. Tsiolkovsky considered cosmic expansion of the sociosphere to be a common human advance need and the real opportunity to meet it turned out already to be an astro-sociological principle of all the anthro-like (and not only them) cosmic sentient beings. "If life did not extend throughout the Universe, – the scientist wrote, – if it was tied to the planet, then this life would often be imperfect and prone to tragic end..." [*Tsiolkovsky*, *Sovershenstvo zhizni*].

Thus, Tsiolkovsky proves his appeal to space by humanistic considerations, showing that without the exploration of extraterrestrial spaces the progress of mankind for long, astronomical times is essentially impossible. By the way, we should note that the famous physicist, cosmologist Stephen Hawking supported this idea and urged the mankind to explore the space more actively, if it wants to continue to exist. In his opinion, the mankind won't live even a thousand years, if it does not leave the boundaries of our fragile planet.

The new wider – cosmic point of view, proposed by Tsiolkovsky, is not just a kind of extensive expansion of the scope of activity of the earthly mankind but a fundamental qualitative shift in the worldview and mode of existence of civilization. This is a new stage in the development of anthropocosmism concept and the thinker from Kaluga is not just his successor, along with others, as it often seems, when it comes to the concept of anthropocosmism. Now there's being approved the point of view that the entry of mankind in the endless spaces of the Universe in the future will change in many ways our understanding of the mankind itself.

Indeed, it is the space where there will appear in the full extent those humanistic and universal human ideals towards which we move not only in time but also in space. And just as the Renaissance was marked by great philosophical and cosmic discoveries (especially thanks to D. Bruno and N. Copernicus), the current revival of

humanism and interest to human dignity and freedom are associated with discoveries in the field of space. Modern "cosmic renaissance" includes not only the denial of outdated worldview values of the precosmic era, but also the update of the socio-political and cultural values, highlighting universal humanistic invariants in them.

In the "cosmic" works of Tsiolkovsky humanitarian, universal human ideas, values, goals take the priority place. "Working on rocket appliances, – wrote the scientist, – I had peaceful and high aims: to conquer the Universe for the benefit of mankind [*Tsiolkovsky, Reaktivnyy pribor*: p. 9]. And in another place he writes: "The main idea of my life is to do something useful for people, to advance the mankind at least a little bit ahead" [*Tsiolkovsky, 1913*: p. 1]. And it is not by chance that a lot of his works contain a little-used in his time concept of "mankind" (his works such as "Public organization of the mankind", "The Future of the Earth and the mankind," "Man. The life of mankind", etc.).

Right now in the course of globalization and prospects for transition to sustainable development, we turned again to the civilizational values and ideals, including in the area of morality and mankind. And in this sense, many thoughts of Tsiolkovsky correspond with our times. He based them on the fact that the purpose of knowledge and activity is the happiness of a man, his infinite development and improvement. However, in his opinion, this goal is unattainable on the Earth just because our planet depends on the rest of the space and therefore it is threatened by such impact, which will make life on the planet impossible over time. In astronomical prospect, due to natural factors, the life of a man, of society (and in general of any living beings) in the world cannot achieve this goal. As it has already been noted, he believed that the death of all the living on the Earth can be avoided by only knowing the laws of the Universe and creating the means for people to go beyond the boundaries of the planet on which they could travel to other cosmic sources of energy.

He formed the idea of social immortality, the idea that received the greatest philosophical and scientific reaction. Freeing man from the disastrous effects on the planet, according to the scientist, the astronautics provides the means guaranteeing the infinity of progress, gives us hope for the destruction of the death of mankind. And it is no coincidence that the second part of his famous work "The study of world spaces by rocket appliances" (1911) is crowned by the idea that "there is no end of life, the end of mind and of mankind's improving. His progress is eternal. And if so, it is impossible to doubt the achieving of immortality" [*Tsiolkovsky, 1954*: p. 139.].

All the above mentioned ideas of Tsiolkovsky's cosmic philosophy from the standpoint of new, humanistic oriented thinking are associated with the problem of mankind's survival and the emergence of noosphere. However, a lot of ideas of the scientist resonate with the concepts of V.I. Vernadsky. Tsiolkovsky can also be considered one of the pioneers of the concept of the sphere of mind, although he did not use the Greek name "noosphere". But he used the concept of mind, and it is certainly not the term that matters but the content and direction of the concepts of the sphere of mind that both scientists developed in a similar direction as well as their concepts of anthropocosmism (which will be discussed further). By the way, neither of them used the concept of anthropocosmism, and it was introduced only in 1947 by N.G. Holodny.

K.E. Tsiolkovsky in his ideas about the sphere of mind stands out among many modern researchers who identify the sphere of mind to the sphere of human dissemination. Homo sapiens does not make his life environment more rational during his development, moreover, he advances himself to the global catastrophe. To do this, he

must shift to a different type of development, when the highly developed collective ("higher" mind as Tsiolkovsky considered) is able to direct differently its evolution and development of lower beings. He put the degree of development of the social organism as a whole in direct dependence on its rationality. And this intelligence, in his opinion, is connected with the ethical and humanistic characteristics and parameters, since he believed that there is something common between all beings who have achieved perfection.

2. Evolution of anthropocosmic worldview

Synthesis of social science and natural science in the concept of anthropocosmism significantly depends on the scale and depth of cosmization of social sciences, which fall far behind cosmization of natural and engineering fields of science. It is in the further cosmization of socio-humanitarian knowledge where there's seen one of the most important reserves for further development of anthropocosmism – a serious ideological and methodological foundation for further theoretical and practical space exploration by the mankind in the formation of future cosmic human life environment. Naturally, it is possible in the case when there are significantly developed philosophical and humanitarian aspects of anthropocosmism that are worked out in line with the direction, known as the philosophical problems of space exploration. Philosophical understanding of astronautics is the core of the humanitarian problems of space exploration. However, the latter include a whole range of issues related to space sciences. Thus, the current general scientific concept of anthropocosmism being the development and generalization of the previous anthropocosmic versions should be built on the foundation of sciences related not only to the space but also to the man.

There is no doubt that appropriate for modernity, and even for the future concept of unity of man and space, the role of mind in the Universe should be based not only on the natural knowledge, but also on the modern science of the interrelation of all its fields and directions. Special contribution can be made by theoretical and methodological innovations, characteristic not only for the space era, but for the entire period of renewal of the fundamental ideas that initiate the world civilization process in connection with the problem of survival and a new civilization choice as a global transition to sustainable development.

In the most general form under anthropocosmism we understand the philosophical concept that shows the connections and relations of man and space, and is noticed in various fields of activity [Russkiy kosmizm, 1993; FRK, 1996; *Tsiolkovsky*, 2001]. That is, we should be interested in the impact of space on the man – cosmogenic relation, cosmization, as well as in the human impact on the space – anthropogenic relation, socialization of the space. In other words, anthropocosmism should largely coincide with sociocosmism – the concept that reflects the relation of "society – the Universe". In the holistic concept of anthropo (socio) cosmism there will be achieved harmonious interrelation of the generalized knowledge of basic science fields expressing aspects and directions of both cosmization of the man and social development and socialization of the Universe. Obviously, the strengthening of the interrelation of the space and the man, society will take place largely due to the extensive space exploration.

Increasingly extensive space exploration is predicted not in general terms, as the tendency of sociosphere's expansion during the formation of its cosmic expansion – cosmosphere, but as a number of specific stages of the industrialization of extrater-

restrial spaces. So, until the end of our century further development of space information systems will be the main focus of industrial space exploration. In subsequent phases, projected until 2700, there will be organized industrial production at the orbital factories of improved and completely new materials for the national economy and public health; space energy and power complexes, including space (solar and nuclear) power stations; orbital reflectors, devices providing removal of excess energy from the Earth; widespread use of extraterrestrial resources – the substance of the Moon, asteroids, other planets, the development of large-scale space construction. Promoting human rights in the Universe will be accompanied by the development of material production beyond the Earth, the transition from the "two-dimensional" infrastructure of economics to the "three-dimensional". Just as from the beginning of the neolithic revolution material production became the basis for acceleration of the socio-economic development, nowadays production activity on the Earth and beyond it becomes the foundation for man's entry into space. This fundamental conclusion lets us focus on the pros and cons of industrial exploration of the Universe.

Of course, our cosmic future depends on the peaceful development of the human space activity, prevention of "Star Wars". The alternative – death or immortality (as indefinitely continued sustainable development of civilization) – is yet under the control of mankind. First steps inspire confidence in the possibility of nuclear disarmament in the world, prevention of further militarization of space, full humanization and rationalization of international relations, although these problems are far from the final decision. It is important for a reasonable degree of control of the international community to increase steadily. However, survival and sustainable development of the mankind depend on a complex of factors connected with the solution of not only earth, but also space problems.

The appearance of astronautics was caused by the pressing needs of the man and society. In the course of its development the traditional relations between the man and the space have changed: contemplative attitude to the space was replaced by the substantively practical one. Space means opened to the man prospects of transition to sustainable development on the Earth and in the space. Astronautics was a powerful boost of socio-economic development, the shift of the whole social activity to the intensive way of development. There appeared, however, deformations in the development of astronautics that are dangerous to society and far from rational humanistic goals.

At the initial stage of the implementation of the ideas of astronautics its founders and followers dreamed of the man's going beyond the planet, the mass relocation of people in the space of the Universe. So, Tsiolkovsky considered the mankind migrated into space to be a kind of a nomad, who left his home planet, and then the Solar system, wandering across the Universe in search of new sources of energy and negentropy. Tsiolkovsky thought of the space as that very ecological environment, those processes and forces that could accelerate social progress on the planet, eliminate the threat of geological and later cosmic catastrophes. These were environmental considerations of a dreamer from Kaluga that gave space orientation to his mind, brought to the invention of a rocket as a means of conquering space.

Environmental problems arise before the mankind not only on the Earth, but also in the space. Apparently, they will accompany the mankind everywhere: both on the planet and in the space [Osvoeniye kosmosa, 1990; *Vlasov, Krichevsky*, 1999]. So starting the ecological restructuring by means of astronautics, we should strive to reduce anthropogenic pressure on the surrounding planetary environment and si-

multaneously ecologize to the maximum extent the development of space activities outside the planet. The turn of the space technology at the present stage towards the solution of the earth, and above all global environmental problems reflects the anthropocentric orientation of the astronautics development. Space tools pursue the goal of which Tsiolkovsky dreamed: "to conquer the Universe for the benefit of mankind". So now not the mass migration of people into space is important (it is somewhat unrealistic), but the use of space achievements for the benefit of the man on the Earth. At the present stage of space exploration the most important priority is the use of space means for scientific, technical, socio-economic and environmental development of the world. The concept, showing that the focus of the whole space activity as the process of space exploration should be the man and the mankind, their sustainable development, was named "anthropogeocosmism" or "sociogeocosmism". This concept implies that for a long time the center of ecosystem, consisting of the Earth and the surrounding space, will be our planet. But it will happen in the relatively distant historical perspective, along with the Earth there will appear other centers of space activities – human settlements on artificial constructions and natural celestial bodies, suitable for life, for example, on the Moon, on the Mars, and perhaps on some satellites of the outer planets (Europe, for example).

But when there appear new centers the Earth will be for a rather long time the dominant center, directing space activity of human civilization. The emergence of new centers of knowledge and activity cannot be imagined only as the decentralization process, the disappearance of the old centers. It is rather a process of increasing the number of activity centers. Thus, overcoming the geocentrism does not mean that the Earth has ceased to function as a center of knowledge and theoretical activity. On the contrary, the entry in the space finally convinced in the uniqueness of our planet, in the need to preserve it for future generations.

At the initial stages of space activity the mankind will not engage in the radical transformation of the space, such as division of the outer planets. Because it is necessary to transform in such a way as to meet at the most the needs of social development, minimally change the nature and even improve it. Here the principle of social and economic effectiveness growth is connected with the principle of the environmental reasonability. If we are to undertake the transformation of the space that has been called cosmocreatics [Grishin, Leskov, 1987; Leskov, 1996], then considering the possible consequences, only in absolutely necessary cases, trying not to change the naturally occurring cosmic processes. As you can see, this universal methodological principle of the minimum transformation of the ecological environment will get in the space its full development. Assuming the possibility of the relatively long-lasting sustainable development of the space civilization, the mankind together with the ones who are like them in mind can become a powerful factor in the evolution of the Universe.

In this regard, the question about the boundaries of space exploration in the astronomical perspective of space and time arises. Given the possibility of accelerating scientific and technological progress on our planet, it is impossible to put any preliminary spatial boundaries. However, any cosmic civilization processes will always remain the part of the Universe, acting as a metaecosphere. For any rational human-like civilization in the space must be surrounded by the established biosphere brought there, which in terms of volume should be more than the organic body of civilization. Anthropocosmism has deep nature: the space in a broader sense broadly produced the man, but the man having appeared on the Earth, was not, as many believe, a purely biosphere being not connected with the Universe through some fun-

damental relationship. Human interest in the space has deeper foundation than just thirst a desire of knowledge and adventure. Anthropocosmism as a worldview that emerged in ancient times has still not fully recognized basis in something needed for human existence and life. And if so, the man's need in space, essentially, should be attributed to the basic necessities of life, on which the new concept and strategy for the sustainable development of civilization focuses [Ursul, 1993].

There is an astronomical aspect along with "Astronautical" option of the concepts of cosmic consciousness and the sphere of mind becoming. Obviously the question is not so much about man's perception of the space by means of astronomy, it is about specifying man's place in orderliness of the Universe, mind in the universe, about the genetic and structural link between man and space, determined by the anthropic principle in cosmology. Specifying the idea of the Universe as an inhabited system, space ecological environment of human forming and development and coming noosphere, the anthropic cosmological principle reveals a connection between global properties and characteristics of the Universe, especially the fundamental constants of physics and processes of self-organization and occurrence of the hierarchy of matter structural levels, complication of which led to the appearance of a person. It is a brand new point in understanding the origin of life, human, mind forming, as bio-evolution and anthroposociogenesis were previously considered dependent only on the local planetary features of the ecological environment. Development of the anthropocosmologic principle will influence considerably on the concept of anthropocosmism and will help to identify possible degrees of human and other sentient beings and societies impact on the evolution of matter in the Universe.

Perhaps in future we will need a very broad definition of man and mankind, the definition of the relevant, essential (invariant) characteristics, common to all cosmic civilizations. It is necessary not only because under the influence of entirely new factors of ecological environment a new type of man, a kind of "celestial", who cannot live on Earth, will appear in space, but also because the concept of anthropocosmism is connected with the problem of extraterrestrial civilizations, mind in the universe different in origin. Studying these issues, of course, is not only scientific and not only technical, but requires active and dominating participation of humanities and philosophy. Mastering the "social space" by the earth mankind is different from the development of extraterrestrial inanimate nature, as this phenomenon still not empirically discovered has the public and likely noospheric character. There is no doubt, that the identification of the essence of the social motion in the Universe which is invariant for all the civilization noospheric processes will make a fundamental contribution to the concepts of anthropocosmism and formation of noosphere. Drastic changes in these concepts will occur only when other representatives of civilization processes in outer space, extraterrestrial noosphere of distinct origin will be found. In the meantime, we cannot exclude the uniqueness of life and mind in the universe.

Both of these hypotheses have a right to exist and compete. Apparently science will solve the problem of extraterrestrial life and intelligence for a long time and it will ultimately lead to a deeper understanding of humanity as a becoming civilization of space and also principles of cosmic noosphere formation.

Life and mind are not as widespread as it was considered before the age of the space, and it intensifies the responsibility for our future. To save life and civilization is the pathos of "supernova" – noospheric-cosmic thinking. In fact, we are talking about the fate of matter development, which should not be interrupted at the social

level. The following issue is raised: either to create noosphere as a part of the Universe, or the civilization will be destroyed. Life and mind are not ordinary phenomena of the Universe, such, planets, and other celestial bodies, repeatedly "replicated" in the Universe. Life and mind are the unique result of many billions of years of matter evolution and in a certain sense the crown of the progressive development of nature. That is why the emergence of the noosphere is a survival strategy not only for civilization on the planet, but also the mind in the Universe in whole.

Along with the development of anthropocosmism perception of the global trends was presented in the works of T. Malthus, Kant, Lamarck, Spengler, Toynbee, Karl Jaspers, and others that prepared the public mind to understanding that humanity is a single entity linked with the such planetary envelope as a biosphere, geographical environment, space, which await common destiny and common responsibility for the future of the planet [Chumakov, 2013]. Moreover, these global and space issues intersected in the works of different scientists especially V.I. Vernadsky, A.L. Chizhevsky, K.E. Tsiolkovsky and others whom it is appropriate to consider not only anthropocosmists but also globalists (cosmoglobalists).

Currently, the transition to the present stage of development on the basis of general scientific anthropocosmism approaches and achievements of science space era occurs under the influence of understanding of natural science option of anthropocosmism, development of interdisciplinary researches and philosophical and methodological problems of astronautics, astronomy, cosmology and cosmogony. Contemporary anthropocosmism which is developed on the basis of the global evolution as a scientific principle, combines some general provisions of the social, natural and technical sciences, trends of humanization, globalization and cosmization of the science towards its unity into the integral vision.

Globalistics and cosmism are combined in the concept anthropogeocosmism particularly seamlessly [Ursul, 1977]. Concept of anthropogeocosmism integrates cosmism, humanism and globalistics and can be considered primary until the proposed version of cosmoglobalistics as the type of outlook linking terrestrial and cosmic aspects of human activity as well as terrestrial and outer space. To this extent cosmoglobalistics differs from geocentrism and cosmism in its simple straightforward version.

Anthropogeocosmism concept judges from the fact that the main purpose of space activity in short historical perspective is the use of space for solution of global problems and social and natural transition to sustainable development on the planet, and to some extent in the near-Earth space in perspective. This stage includes also cosmoglobalistics which is now an important part of current and future anthropocosmism, especially in its anthropogeocosmic version. We will refer to it further.

3. Space problems in the emerging globalistics

Globalistics as a discipline and at the same time integrative direction of scientific research studies global processes and systems, including the diversity of phenomena peculiar to the society in its global, planetary quality of integrity and interaction with the environment of the planet and the space. Globalistics, as already mentioned, cannot be isolated from the space problems even due to natural and spatial connection of the planet with extraterrestrial environment, and even more because of initiate extra-planetary exploration of the environment. Moreover, this connection acquires the special role for the biosphere as "the only area of the planet naturally associated with the space" [Vernadsky, 1977: p. 425].

At the beginning of development cosmonautics was a global problem to the extent that before man space walk and it is basically now; this integrative field of science, technology and production had and has now a globally-terrestrial biospheric and activity-practical basis. In the same sense cosmization, unfolding simultaneously with globalization, contributed significantly to this latest global process. Global issues and processes, as well as their cosmization and spacewalk are a natural consequence of socio-economic and technological development of civilization.

Cosmonautics takes a special place in this process: it expands the boundaries of our civilization existence, outputs civilization activity beyond the globe, and at the same time a number of straight global problems. Also it was noted that if some of them are not solved on Earth, they will continue to exist outside the planet, developing already in space form. And globalization therefore will complete its "geocentric being", and human problems, ceasing to be only global, will find their extraterrestrial being.

It is now possible to stand out a special section in the "branch" structure of globalistics that is a special area or destination of cosmic globalistics, or, more briefly, cosmoglobalistics. It should be noted that, since this name is not established yet this area should be referred to as globally-space researches. The study of general patterns and trends in global-space extent, place and role of space exploration in the system of other global problems (and processes), opportunities and prospects of participation of cosmonautics in their solving is among the issues and tasks of cosmoglobalistics, or globally-space researches. On the one hand, cosmoglobalistics is a forming and making its first steps sphere of globalistics, which studies the influence of cosmic factors on the development of global processes, the problem of development of cosmonautics on the planet and escalating of global processes into space ones. On the other hand, it becomes clear that cosmoglobalistics in the spatial sense (on the border of the planet and near-Earth space) is limited and it will likely refer in future to space researches and particularly the Earth from space. In short, there is an interconnection between planetary and space processes, the transformation of global activities into space activities (and their interconnection), and global development into space evolution.

However as it emerges now from the position of evolutionary globalistics this activity approach should be extended by adding global and space natural processes in their interconnection into cosmoglobalistics. It will provide necessary wholeness to this area of cosmoglobalistics and at the same time cosmonautics and space researches. In fact new field of scientific research emerges: global-space research as an interconnection of previously autonomously developing global studies and space researches.

Adding of the natural global-space processes in their relation to human and humanity to the cosmoglobalistics (or globally-space researches) is not just an extension of subject area of scientific knowledge, but also certain theoretical and methodological innovation, conditional to a broad understanding of globalistics, occurrence of evolutionary globalistics, and their vision in the context of global evolutionism [*Il'in, Ursul, 2009; Il'in, Ursul, Ursul, 2012*].

Global processes and problems affecting the world as a whole to a certain degree are the manifestation of global-space character of the contradictions associated with the expansion of the spatial boundaries of human activity, including progress in the Universe. In addition to the above-mentioned point of view of Tsiolkovsky, other conceptual ideas appeared, for example, theory of "transcending boundary" [*Turner,*

2009] formulated by F. Turner in the early centuries. Although this model of development was proposed not for space exploration, it was severely criticized, but following the doctrine of "transcending boundary" American model of space exploration is constructed on the basis of the increment to their public ownership of outer space, giving natural means to enhance their national wellbeing.

So, E. Dolman proposed the concept of astropolitics or geopolitics of outer space in which the United States should take a dominant position (continuing world domination) in the fight for the planets of the solar system and their resources [Dolman, 2003]. In fact, in the U.S. has been developing new doctrine for decades, that is "geocosmopolitics" logically continuing extensive doctrine of "geopolitics", based on the idea of transcending life boundaries within the Earth. This "geocosmopolitical" doctrine of the Frontier now forms one of the most extravagant parts of the U.S. strategy of neoglobalistics, which has nothing to do with the strategy of the global transition of SD.

However, it must be noted that the development of geopolitics turned out to be associated with globalistics as well as the development of cosmoglobalistics is accompanied with cosmogeopolitics formation, despite the different names that are given by the scientists. Now this last trend is considered to be on the first stage of establishment and Russian authors came to this conclusion as well as American authors independently of each other [Modestov, 2011; Pyrin, 2011].

Two important aspects can be marked out in general trend of global-space research: first one – the things that astronautics brings in the content which make changes in the nature of global studies; the second one – which kind of practical means it gives for solution of global problems and elimination of the negatives of globalization and other global processes. Analysis of "global-space" research shows that the second aspect has received greater coverage. It is connected with the fact that the professionals working in various fields of expertise (international law, politics, economics, ecology, natural sciences and engineering, etc.) turned to this topic. The first aspect requires, first of all, philosophical and methodological reflection, and in this regard some philosophers have proposed statement of problems and approaches in the previously mentioned works.

Spatial characteristics play an important role in understanding global processes [Ursul, 2012a; Ursul, 2012b]. This fact is evidenced by the very name of the term "global", taken from the Latin name of the globe. The term appeared in 60th years of the XX century and it was not used in social knowledge, studying the beginning of human history, or even two centuries ago, and so were the reasons: human development, accompanied by expansion of the boundaries and extent of interaction with nature only in the last decades has found its global parameters and restrictions. By the way, these restrictions have, in principle globally cosmic nature: with the "inner" side having planetary character, and with the "external" side having extraterrestrial, space character.

Thus, global processes and problems affecting the world as a whole, to a certain degree are the manifestation of the global-space character of the contradictions associated with the expansion of the spatial boundaries of human activity, including expansion into space and the Universe.

Space exploration has a peculiar position in the total number of global issues and processes. It seems to satisfy the characteristics of globality in its "problematic" expression. Firstly, the need for space exploration was typical for all countries and peoples of the world, for humanity as a whole. Characteristically, the founder of theoretical astronautics K.E. Tsiolkovsky could not conceive the designated use of space

activity in a different way. He never judged from narrow national interests and believed that only ways to increase living space and human settlement in space will help all earthly humanity to acquire new energy, space, raw material sources of expansion of material production. From this perspective, it is obvious that the available space for human practice must belong and in fact, belongs to all humanity.

Secondly, the cost of space projects increases more and more with each new successful advancement into space, and it exceeds the capacity of individual, even the largest countries, especially with regard to the development of the Moon, Mars and other solar system objects. It is clear that even the two major space powers, Russia and the United States (not to mention European Union, China, India and Japan catching with them), cannot implement large-scale projects in the nearest decades alone ¹.

Thirdly, space exploration affects deep essence of human civilization existence, it is a natural consequence of the planetary self-organization of world society, an important outcome of the continuous expansion of globalization and a number of other global processes. It means that the impossibility of space exploration would place significant restrictions on the path of global development, it would be a brake. Moreover, successful practical implementation of cosmonautics will likely have a serious assistance in removing a number of global crises related to both social and socio-natural interactions (information, environmental, energy, etc.).

Some global problems grow with time into space ones, but they are preceded by a transitional time interval and spatial boundaries, which are beyond the planet, but still not rushing far into space. This exchange of activities between the Earth and space in mentioned global-space "corridor" is the basic "core subject" of cosmoglobalistics. Global human activity develops into space activities, but does not become just space, tearing away from its earth globality, as some spacecrafts do, going beyond the solar system. Activity of international space platform which is like a "space top" of the cosmized global activity, that takes place on Earth, is a kind of technical and technological model of global space activity.

Cosmization of global issues and processes lays in the impact of cosmonautics and space factors on their development and decision. As it was shown space means [Ursul, Dronov, 1985] is the powerful factor of intensification that can significantly contribute to "sustainable" solution to global problems through the use of the space, forces and processes beyond the planet, thanks to the opportunity to see the globe outside. There is literally no single global problem, any economical, scientific, technical and other problems of the modern human that did not have a positive impact of space means, of course, on the way of peaceful and sustainable use of space.

Thus, space exploration in the main features is the world, universal, global problem. However, the very nature of "space" determination of mankind, acting in this process in its still unrealized globality, is filled with objective contradiction, the essence of which is that globalizing humanity, and some of its problems develop into planetary level with the beginning of the space age. The question arises: what are the underlying causes that force humanity to rush into space? And asking this question, we mean not obvious "space dividends" and the technosphere, staked off the planet, without which humanity no longer imagines further development. It's about the reasons which lead not to space, but essentially cause globalization and make humanity let involved in other global processes.

¹ On the prospects of the world's cosmonautics see: [Kosmonavtika XXI veka, 2011].

Spatial expansion and significant complication of the social stage of development occur, which is not typical for the pre-social stages of global (or universal) evolution as a permanent self-organization of material systems in inanimate nature, living matter and society, continuing further in the social and natural shape and embracing a real piece of the Universe. As noted above, trend of narrowing the spatial and energy parameters of the material systems evolving in the process of self-organization during climbing the stairs of more ordered structures and shapes, that was set in the beginning as a result of empirical generalization, and further by the synergetics, functions in the pre-social or pre-social natural evolution.

In order to explain this trend in the global evolution hypothesis was proposed in the second half of the twentieth century to justify the access of mankind into space from the standpoint of global evolutionism (although this term was not used then) [Ursul, 1967]. It was about the orientation of the access of human activity beyond the planet with a "target" to fit into the global evolution superhighway as a "regular" stage of the process) [Ursul, Ursul, 2012b].

On the global evolution superhighway, along with information criterion and the vector demonstrating the growing accumulation of information in material systems (at least in the stages of development and their main components), the trend of narrowing the evolutionary corridor developed that is reducing the space of distribution and mass-energy volume of occurring more complex structures. On the one hand, growth of the information content of each structural unit, increase of the variety of kinds and forms of existence of all structural levels occur, and on the other hand, the narrowing of their overall total volume occurs. Change of this trend of "evolutionary corridor" narrowing occurs only on the social stage of evolution and during the process of development of planetary as well as extraterrestrial space.

And, it should seem that the point mainly is not only about spaces and energy and raw materials, as this is mainly written by economists. However, the expansion of volume of the planet and space is the chase for information and negentropy and not only for light and space, as suggested by K.E. Tsiolkovsky.

This phenomenon of expansion of the social stage called Big social explosion has deep informational nature, the expansion of the volume of the planet and space is mastering the information and negentropy of environment. In fact it's not so much civilizational but cultural and informational phenomenon, which means that further self-organization of matter will continue to be carried out through culture.

The emergence of the social stage of evolution in this sense is a kind of "second singular" point, a turning point, which changes sharp the evolutionary processes in the Universe, fills them with social and natural dialectics, promoting "socialization" of the natural evolution of space. Evolution of matter emerges from this perspective as a process unfolding not only in the "extensional", space environment, but also in the temporal dimension, linking astronomical past of the Universe and cosmological future necessary for human into evolving integral whole. This process, which has already started to return degrading humanity to superhighway of global evolution, can be considered by analogy a big social, or even social natural "explosion". Big social natural explosion, i.e. fast according to cosmogonical time scales (but not inflation) spatial-temporal extension of social and natural dimensions, it is about the same astrosociological regularity as the process of globalization is now seen.

Social stage fundamentally differs from its previous stage. It is connected with the fact that the possibility of expanding this stage first through the volume of the planet and then beyond it. This fundamental difference makes it possible to consider it if the initial cosmological singularity "point", but at least the kind of "singular

stage", in the sense that it completes the narrowing trend of globally evolutionary corridor and gives rise to the extension of the stage, which is called by analogy great social explosion. It is not, of course, an explosion in the physical sense. But it is the explosion in social and cosmological perspective of Mega-history if it will be allowed to call it that way in future. Moreover, as already noted in the preceding discussion, the reason for this planetary space "explosion" is the specificity of information processes in society, requiring supra accumulation, storage and transformation of information for their continuation. Expansion of the spatial and energy parameters of this social information is looks as the external side of this global-space phenomenon.

4. Global catastrophes and geocosmic security

The modern world is filled with new dangerous content, and we are talking about the threats and dangers of a world scale, which are caused by internationally accepted way of managing and uncontrolled orientation on economic and technological growth, the production of new artificial needs. Multiplication of challenges, threats and dangers during the deployment of global processes means that ensuring of the national, global and other forms and types of security is one of the major human aims, values and challenges of the XXI century, providing the preservation and further development of civilization.

One reason for the rapid development of globalistics is that the phenomena of global modernity showed a strong dependence of the fate of our civilization on further development of global processes. Security issue, in our view, is evidently underestimated in science and requires much more attention than it now holds. The same remark can be attributed to the development of globalistics, that virtually there are few researches of security problems in the global and evolutionary perspective [*Ursul, Ursul, 2012a*]. Although the problem of security, we will specifically consider in one of the following chapters, still we will get a view of this problem from the perspective of cosmoglobalistics here.

We noted above that Tsiolkovsky believed that there are threats and dangers on Earth and in space, or, as he wrote, "the world hostile forces that can destroy humanity if it does not take appropriate action for salvation against them. Knowledge of all the threatening forces of the space will help the development of people, i.e., threatening death will make them be alert, make them exert all their mental and technical means to defeat nature" [*Tsiolkovsky, Zemnyye katastrofy*]. This idea, which is rather specific for Tsiolkovsky, allows making some important conclusions. First of all (which is confirmed by many of his works), the scientist realized that the security issue (as it is now called) is inextricably linked with the development of man and society, humanity as a whole, in order civilization could develop effectively, it is necessary to ensure the safety of this development (and vice versa). Scientist identifies these possible hostile forces threatening mankind either with stagnation or even death: powerful volcanic processes, floods, tectonic disaster, danger of falling fireballs, possible cooling of the sun, etc. However, modern science recognizes (with some correction) all the possible threats and dangers of cosmic catastrophes, and adding new, more specific risks (for example, the probability of collision a large asteroid with the Earth).

Moreover, as already noted, the scientists believe that the Earth's gravity strongly hinders the progress of mankind, so enter to the free from gravity space will significantly accelerate this process. Analyzing works of Tsiolkovsky, we can con-

clude: it is the knowing of the problem of security played an important role in the fact that he became the founder of theoretical astronautics. Thinking about the safety of further progress of humanity, he invented a tool that is able to provide this safety in "free space" (as the scientist referred to space).

As a universal and non-existent in his time parry mode (mode of prevent) of these threats Tsiolkovsky proposed the creation of space-rocket means by which humanity can explore not only circum-solar space, but space of other stars, "fresh energy" of which can be used for the development. Ability to save humanity of disastrous accidents on the planet through space (or, as the scientist wrote, Astronomy) on the way of the development of extraterrestrial spaces gives hope to prevent the death of civilization having the Earth as a cradle.

By thoughts of K.E. Tsiolkovsky wide space exploration may in the distant astronomical future ensure the continuous existence and the ongoing development of civilization outside planet. This social natural function and perspective of Astronautics gets huge philosophical significance for the transition to sustainable development on Earth and then beyond. We are talking about the possibility of sustainable existence of the biosphere and humanity on this planet. Unfortunately, the biosphere on Earth is very unstable, and if to consider long periods, it can be lost not only in the result of human activity, but also because of negative cosmic factors (which is proved by the previous evolution of the biosphere).

So, the idea of K.E. Tsiolkovsky about sustainability in space (in its modern interpretation) became one of the first (if not the first) expression of the idea of survival and continuous development of mankind, although the space version of this idea cannot be implemented yet: it is necessary to ensure the survival of humanity on the planet. Anyway, in the next decades (and maybe even centuries) astronautics will have to "work" for the survival and development of civilization on Earth, gradually forming a new socio-natural system "Humanity – Earth – Universe." In the current situation of planetary space situation global processes are more important for understanding the essence of the events in terms of the coming transition to sustainable development.

And when you consider the possibility of asteroid and comet hazard (ACH), the space means may be the only and unique mechanism to prevent possible universal catastrophe. This is the reality of modern existence of civilization, the fate of which depends not only on the planetary-terrestrial factors, but to a lesser extent from space. This dependence on space is becoming understood in recent years, especially after the collision of the comet Shoemaker-Levy 9 with Jupiter, close to Earth Halley's comet motion, asteroid large span between the Moon and Earth, large (several hundred meters in diameter) approaching asteroid Apophis and etc. Asteroid-comet hazard is recognized as a priority one and requires the creation of a united planet defense system, which in principle is quite feasible in the coming years, much less in the decades [AKO, 2010]. Earth may suffer from bombardment of comets, meteors, asteroids – such catastrophes have repeatedly occurred in the evolution of the biosphere, even causing mass extinctions of biota.

Recently, the media and scientists are paying special attention to said large asteroid Apophis, which represents for humanity not only potential, but also a real threat because of its collision with the Earth will entail catastrophe of regional, continental or even global scale. Collision of Apophis with Earth may cause serious climate change throughout the world. If an asteroid falls into the ocean and cause a huge tsunami, the disaster could become a global, billions of tons of water vapor will be released into the atmosphere. After the fall of an asteroid on the land dust will rise into

the air, which will greatly hinder the access of sunlight to the planet's surface, causing effects such as "nuclear winter". Reality of the threat of Apophis collision with Earth in the years 2035–2036 is large enough and now experts are looking for ways to avoid possible disaster, assess how the world will be able to withstand the threat of asteroid and comet from space.

Asteroid-comet hazard acquired particular acuteness in connection with the fall of Shoemaker-Levy9 comet pieces to Jupiter in 1994. The explosion of such power on Earth would lead to the end of civilization. There are a few thousand asteroids potentially flying near the Earth that could cause mentioned catastrophe. Their destruction in case of a threat to mankind is possible only by means of rockets with nuclear warheads with altitudes on the height of several thousand kilometers. Other actions to ensure the safety of the Earth are considered in the literature – withdrawal of asteroids using small or large engine thrust, changing the asteroid's orbit, etc. According to the space agency NASA, in XXI century, more than ten collisions of cosmic bodies with the Earth are possible, four of which occur before mid-century. Despite the possibility of effects of possible extraterrestrial life, yet real and comparable to the environmental hazard threat comes from small celestial bodies – comets (especially dark comets, that are covered with dark crust and therefore invisible) and asteroids.

Protection against ACH and geocosmic security is one of the most urgent and important problems of cosmoglobalistics that must be addressed to the world community via global-terrestrial and space vehicles. Significant attention is paid to this issue in the main International Academy of Astronautics, which has held a series of conferences on protecting our planet from asteroids and comets. However, according to Y.M. Baturin the problem of protecting Earth from ACH will be updated only at the end of the second decade of the XXI century [*Baturin, 2011: p. 847*].

Ambiguousness of the future of the universe concerns also the fate of the human race. Previously, it seemed obvious that people will perish together with the biosphere. Space exploration has given rise to the idea of a mass exit of humanity off the planet, where he will not be afraid of earth and many other large-scale cosmic catastrophes. Many scientists did not see the cause of death in humanity itself, believing that they are hiding in the external factors and circumstances. The situation has now changed. Humanity has accumulated nuclear potential to destroy civilization and life on Earth many times, to throw away its evolution for billions of years ago. But, as it turned out, the possibility of humanity suicide will not disappear even in the case of complete elimination of nuclear and other deadly weapons, wars exclusion, normalization of international relations. Another equally compelling reason lies in the possible death of the irrational that is ecophobic development of economic activities in the model of unsustainable global development.

Particular attention is paid to the forecast of the impact of climate change due to increasing temperature on the planet. Some scientists made a very disappointing outlook, believing that global warming will lead to the fact that some island nations can be flooded over the next century in a result of rising water levels in the oceans, and in a few centuries humanity will not be able to live on our planet. In three centuries about 40% of the land may end up in under water, and the rest of Earth's land will exhaust the available resources and will become uninhabitable. However, there are other points of view, for example, that our planet will have another ice age, stopping the Gulf Stream, cold spell of Western Europe etc.

Research direction, which is engaged in the analysis of various kinds of global catastrophes and potential dangers threatening the destruction of humanity started

to develop recently. Global catastrophes of space, planetary and man-induced character are considered and their impact on the future existence of humanity on planet Earth is assessed [*Turchin, Batin, 2013*].

The global catastrophes of natural or anthropogenic origin (and combinations thereof) refer to the final catastrophe, leading to the death of civilization. It is believed that such disasters have not yet taken place in the history of Earth, but may occur in future. They include, in particular, such assumed global natural disaster as gamma-ray burst near Earth, super-outburst on the Sun, a huge asteroid falling, supervolcano eruption, the destruction of the ozone layer, etc. It is also possible anthropogenic global catastrophes such as biocatastrophe caused by unfortunate genetic engineering (or bioterrorism), thermonuclear catastrophe, unpredictable physics experiment using high-energy, etc.

According to modern science, it is expected that the evolutionary processes of the sun will not significantly affect the temperature regime of the Earth during five or six billion years. It means that this factor does not appear to be the main reason that threatens destruction of mankind (at least in the next millennium). However, this factor and several others cannot be totally ignored because space is not only expansion where man rushes, but also the conditions of its habitat, on which depends the fate of the human race.

All this information confirms the fears of Tsiolkovsky concerning the possibility of a global (telluric according to his terminology) disaster. That's why increasing space exploration is associated with so-called geospatial security, which can be thought of as a condition of protection of Earth (especially the biosphere), humanity from the threats of natural cosmic impacts (asteroids, comets, etc.) and space-related activities and, primarily anthropogenic military activities in space. Despite the potential impact of extraterrestrial civilizations on us, yet real and hazard comparable with the environmental thread comes primarily from small celestial bodies – comets and asteroids. Thus, the space opens new opportunities for development and, at the same time, creates not only global but also cosmic threat to the existence of mankind.

Space available for human practice should be and, in fact, belongs to all humanity and to a certain extent it is already enshrined in the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, 1967 and other treaties and regulations of international space law.

5. Prospects of space extension of global search

It was already mentioned that a purely active approach to cosmoglobalistics is narrow, though it only started to be developed. At present, when we introduced global natural processes in globalistics and global studies, cosmoglobalistics can also be conceived more broadly, including those cosmogonic processes that have shaped our planet, and not only postastronomical history and evolution of Earth. Since the formation of Earth evolution of our planet experienced a significant effect of space that reflects the global cosmization, first natural and then socionatural and social processes. Therefore, such broad understanding of cosmoglobalistics significantly complements its "cosmic pragmatist" initial presentation.

And it also affects connection and correlation of globalistics and cosmoglobalistics. Indeed, the objective field of cosmoglobalistics in this variant is even wider than globalistics because it covers terrestrial and space expansion. However, pragmatist component still prevails on the planet, but the objective content of globalistics

plunges into a new, wider environment. However, this hardly purely formal vision will be seen as general, because globalistics is still largely "tied" to the planet, and cosmoglobalistics to connection of Earth and space, both in pragmatist and the natural aspects. As for the broader vision of the relationship of global and cosmic processes, they appear in the global-space exploration, as well as in universal (global) evolutionism, in which the concept of "global" acquires a very broad sense, extending to the visible Universe.

But even now possible extension of cosmoglobalistics is not exhausted. Since the end of the last century, after the discovery of dozens of planets around other stars, called exoplanets now, or extrasolar planets, it is understood that there are planets in the galaxy in a very significant amount. If recently it was thought that we already found more than five hundred of such planets, but now their number exceeded to one thousand. Their overwhelming majority was detected by the space telescope "Kepler", placed in space by NASA in 2009.

It was also found that the characteristics of a large number of extrasolar planets similar to those of terrestrial and Jovian planets in the solar system. The list of the planets, which are most likely to be inhabited is made and priority positions are occupied by exoplanets, which are situated at a distance of tens of light years from Earth. Planets which may theoretically be expected to have life to a significant degree are assessed from the point of similarity of these celestial bodies with Earth. The list of structure characteristics of various space objects compared to our planet includes their size, distance from its star, character of the surface, presence of a magnetic field, mass of the planet and others. It is important to identify the so-called "zone of life" of potential candidates for the possible relocation of mankind on Earth, if such a need will appear in future. It turned out that the planets, comparable to Earth size, are quite common in our galaxy.

The goal of the relocation to "super-Earth", of course, is not set by modern planetology as a complex of sciences studying the planets, their satellites, and our star system as a whole, extrasolar planets and other planetary systems in the universe. However it is possible that in any case cosmoglobalistics will develop as "exoplanet globalistics" in this direction, using data of Planetology, if exoplanetary processes will appear in objective field of global-space research.

However, in future it will not only search for life on extrasolar planets and the possibility of relocation to other suitable celestial bodies in order to prolong the existence of mankind as it was suggested by K.E. Tsiolkovsky, and Stephen Hawking after him. It is possible that one of the areas of space and global studies will be search of extraterrestrial civilizations (EC) and communication with them, as we will discuss further.

6. Global methodology of extraterrestrial civilizations search

Another possible extension of the connection of space and global studies has "exocivilization character." Investigating the problem of EC, we enter the territory of incipient science of noosphere era: there are not fewer hypotheses than in cosmology, but much more in relation to obtaining reliable knowledge. Indeed, cosmology deals with the existing object of study – the Universe, many fragments of which are yet poorly known. Astronomy and astrosociology making its first steps in the search of extraterrestrial mind still did not found their object and have to rely on a kind of "global-extrapolation methodology": to base presentation on a "terrestrial analogy",

focusing on humanity, which seems not to be the desired extraterrestrial object of scientific search.

Origins of civilization formation are connected with a gradual developing of economic and cultural mechanisms that contributed to the biological evolution of social change. Civilizational process expresses essentially a method of reproducing reasonable life of individuals united by a universal connection and mechanisms to ensure the survival of the social stage of evolution [Gurevich, 2010: pp. 278–279].

Identification of common patterns of cosmic evolution of mankind, in our opinion, should not attempt to break away from the study of patterns and trends in the development of other space civilizations alleged by the science, and, consequently from the study of the general laws of development of social stage on Earth and in space of our earthly civilization as well as other representatives of hypothetical intelligent life in the Universe. Thus the question of how the patterns of development and civilization processes in the universe are connected with the principles and general laws of the evolution of matter is raised. Another question about the general definition of civilization for terrestrial and space options for the alleged social stage of evolution of matter is also raised.

Civilization in this very broad sense can be understood as a concrete manifestation of the social stage of the evolution of matter, which is a specifically organized system of rational beings possessing means of above-individual storage, accumulation, transfer and transformation of information and interacting with nature in various forms, aimed at survival and permanent progressive development of this stage of evolution. This definition, in our view, refers to Earth, and to extraterrestrial civilizations (EC), developing as our civilization, i.e. using not only technological, but also cultural and anthropomorphic way.

The concept of culture refers to the concept of civilization, and as everyone knows, they are sometimes identified or opposed. Here we will judge from the fact that civilization expresses the social nature of the human race emerged from the primitive state and actually symbolizes social evolution of the matter in its earthly and cosmic variants of existence. Sphere of culture is an informational semiotic core of civilization – semiosphere – that social invariant, for the sake of which the civilization (and its economy) develops. Culture as fundamentally informational structure, provides self-regulation of social level, its self-reproduction and development, performing various functions aimed at the survival of civilization as a concrete manifestation of this stage of evolution.

If we admit it, then it is logical that culture and civilization are related as part and whole, i.e. culture is information and semiotic component of civilization and civilization consists of a culture and a number of others – non-semiotic information components, and other non-information components. In this sense culture is this "essential" part of civilization, without which the whole cannot exist and defines "evolutionary sense" of emergence and development of social position of matter. Culture, acting as principal information and semiotic content of civilization, also includes real-energy and other material components (all depends on which "coordinate system" or conceptual systems the ratio of culture and civilization are considered). If the notion of civilization "tends" to the material-objective, economic and technical-technological treatment, at the same time presenting a coherent social evolutionary stage, the concept of culture bends towards its spiritual and information component, expressing the deep essence of civilization process.

Material objects of civilization act as cultural phenomena only if they are considered not merely informational and diverse, syntactic perspective, but as semiotic

systems (components of semiosphere) capable of storing and transmitting certain, man-made signs, having not only value, but above all the sense (meaning), influencing and regulating the behavior and activities of man and society. This broad understanding of the relation of culture and civilization is methodologically productive both for understanding of the development of civilization on Earth and beyond it.

Expanding the society "through culture" (including globalization and space exploration) has informative meaning from the beginning of its formation, expressing the presence of a special system of supra-individual and impersonal means of accumulation, storage and transformation of information necessary for the organization of social activities. It is due to the characteristics and qualities that have informational nature and essence, fundamentally distinguishing natural from cultural, social beyond-organismic character of this evolution that provides specific "propensity" of man to reform activities and expansion of human activity on the planet first, and then in space [Ursul, 2011].

It is connected with the fact that the possibility of expanding this stage first through planet expansion, and then beyond. As it was often pointed out on the planet it is the process of global dispersal of humanity, and further globalization as a process of integration and gaining integrity of mankind, not only the creation of the planetary community of civilization, but also a single global social and natural system of "man-society-nature" on the principles of co-evolution.

It is due to the consciousness (which is in its "collective form" must be fundamentally transformed for the further survival of the human race) and information and cultural mode of existence and development of mankind, "unnatural" (lying in culture) possibility of extending the existence of social media stage emerges. It is the extension of human habitat, information, expansion, and mass and energy parameters can be established not only in space (where evolving on Earth biological stage cannot penetrate without a man). Extension of habitat, complexity of connections of disparate societies and radical transformation of nature happening during anthropogenesis first under the "carrying capacity of ecosystems", and then more and more beyond. But the issue is not only about the spatial extension, but also about the appearance of new elements, connections and relationships in the sociosphere that leads to the growth of its information content by beyond-organism is – exogenous information processes both at the stage of the global settlement and globalization, as well as space exploration. Thus, a great social explosion as the spatial distribution of an evolving humanity in its planetary and cosmic embodiments has deep cultural and informational nature. It is possible that the same "information expansion" may be typical for other alleged EC.

EC problem fits into the concept of anthropogeocosmism (sociogeocosmism), which substantiates the idea of the priority role of space development for terrestrial solutions of global problems of mankind and the formation of a single super-system "Humanity-Earth-Universe", a concept which serves as a methodological basis of cosmoglobalistics and other global or cosmic research. One of the most important tasks of these civilizations search is the promotion of the sciences and those earthly problems of humanity (especially global) that require approach to our civilization as a holistic system-progressive developing object.

It seems that such a question, do not focus on the problem of EC, but integrating and cosmizing the humanity and hypothetical for modern science other civilizational processes, and is a methodological stance, allowing to combine organically the research programs in the field of philosophical problems of cosmonautics and me-

thodological problems of EC, update the problem of statement of cosmic entity of social stage of evolution and its role in the global-universal evolution in the result of "invariant synthesis".

Within this approach, "globally-earth aspect" problem of EC, as well as attempts to spread some common characteristics and patterns of development of our terrestrial civilization on them, receive its justification not so much in relation to the EC that has not been yet discovered but to actually existing human civilization, gradually revealing their space potency and becoming a new factor in the evolution of the global space. Thus methodological synthesis, allowing to reveal the way of global patterns of evolution leading to the appearance of its higher (yet) social level and how the evolution of the latter affects the overall trends and characteristics of development of matter in the universe and even the evolution of the universe as a whole on the basis of the achievements of modern science, and especially its astronomical and astronomical complexes of disciplines appear [PPVT, 1981; Goldsmit, Owen, 1983; PPZ, 1986; Rubtsov, Ursul, 1987; Gindilis, 2004; Il'in, Ursul, Ursul, 2012].

Interestingly, the paradigm of scientific search of EC implicitly has fundamentally informational and culturological nature [Rubtsov, Ursul, 1987: pp. 59–72]. Indeed, the emphasis of this research at the very beginning is made on information problems, especially data communication with the EC (This problem was abbreviation CETI – Communication with extraterrestrial intelligence). However, later (around the end of the 70s) a new term – SETI (Search for Extraterrestrial Intelligence) appeared. Replacement of the term from "communication" to "search" is justified as in fact it is necessary to find EC at first [Gindilis, 2007; Panov, 2008]. As you can see, it is also cultural and information aspect, but cognitive emphasis here comes to the fore in relation to the communicative one.

Search of EC comes from the idea that we can find some artifacts in the Universe, i.e. supernatural, unnatural formations created by the activity of other sentient beings as cultural phenomena of extraterrestrial origin. And astronomers are also trying to discover the "world of meanings" and signs that can be interpreted as a message to extraterrestrial culture in the signals coming from space, if it is possible to distinguish them from natural emissions and space noise. And although they say about search of EC and communication with them, in fact, implicit means the discovery of other cultures of extraterrestrial origin, receiving information about them and its transfer between EC and humanity, and other manifestations of a social stage of evolution in the universe.

7. Possible cosmological continuation of globally space studies

Further possible extension of the cosmoglobalistics is based on already mentioned coincidence of concepts of global and space. Here we are moving away from a hard peg to the "planetary" globality and we see globality as a characteristic of the entire Universe (the second "spatial" meaning of the term "global").

We also noted that there is pluralism in the use of the terms "local" and "global". This term acquires a meaning of inclusive, universal and all-pervading mainly of its terrestrial planetary significance in the modern globalistics as it emerges in many branches of knowledge, which are now far from globalistics. This value will be widely used here and in the new already significantly expanded understanding of globally-space research.

It is possible that for this area of global (and at the same time cosmological) studies the term "cosmoglobalistics" will not be used, and it the introduction of such

concepts as "globally space research" will be introduced. The global characteristics of matter, which are manifested in three main fragments of the Universe, are mainly considered in this area of globally space research.

A little more than ten years passed since new mysterious substance was discovered that is dark energy, occupying about 74% of the material "filling" of the Universe – the energy density (mass) of the creation. So-called "hidden substance" was referred to dark matter in the first half of the last century, which also does not emit or absorb light. If we consider that this second form of dark matter takes another over a fifth of all the "energy mix" of the Universe, it turns out that all modern science is based only on the study of a few percent of the material content of the Universe. But the issue is mainly about the energy aspect, rather than on information and diverse perspective.

This discovery is already an important argument that science (and especially the fundamental) does not end its existence as a single, all-encompassing and objective form of social consciousness in which J. Horgan tries to convince [Horgan, 1996; Horgan, 2001]. Ten years after the publication of the book by J. Horgan, author confirmed his opinion, considering that fundamentally new discoveries will not come true [Antipenko, 2011]. It means that the discovery of this dark energy is not considered an outstanding achievement in science by this author but most astronomers will not agree with it. American physicists Saul Perlmutter, Adam Riess and Brian Schmidt, observed the distant supernovas and made major cosmological discovery – the existence of dark energy in the Universe, was awarded the Nobel Prize in 2011 with the phrase "for the discovery of increasing the rate of expansion of the Universe."

J. Horgan stated in details the criticism of fault thesis about the end of science in the materials of the roundtable about the prophecy [Antipenko, 2011]. So here we are not going to engage further justification of the fact that fundamental science will evolve as long as humanity and expected EC will exist (which will also help the science to develop).

Modern cosmology nevertheless accepts the hypothesis of the existence of a dominant and stable part of the universe, which can be called dark matter, consisting of two basic forms – dark energy and dark mass. Dark energy and dark matter (mass) can be considered as forms or types of matter (as well as substance, or baryonic matter) having different nature and global characteristics. Under the dark matter we understand invisible densest forms of matter, occupying about 95% of the energy density of the Universe, which includes dark energy (in model of space vacuum) and the dark matter (as invisible matter). For pictorial representation the analogy with an iceberg is offered, where the underwater part, occupying approximately 90% of its volume – is the dark fragments of the Universe, and a surface part is its real luminous component (see also the attached table):

<p>A real piece of the Universe (baryonic matter) – about 5% of mass / energy of the world average mass density is $2 \times 10^{-31} \text{ g / cm}^3$ Features: 1. Evolves (preserved through evolution) 2. Obeys the law of universal</p>	<p>Dark energy (as the space vacuum) – about 74% of the energy / mass of the world average mass density is $7 \times 10^{-30} \text{ g / cm}^3$ the same throughout the universe Features: 1. Does not change or evolve</p>	<p>Dark matter (hidden substance) – about 22% of the energy / mass of the world average mass density is $2 \times 10^{-30} \text{ g / cm}^3$ Features: 1. Changes, but does not evolve 2. Obeys the law of universal</p>
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gravitation 3. Extends for about 7 billion years with an acceleration	2. Has the property of anti-gravity, causing the extension of the Universe 3. Composition and structure are unknown 4. Dark energy is affected neither by substance nor by the dark matter	gravitation 3. It is assumed that it consists of a very heavy and stable elementary particles of uncertain nature
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Fundamental forms of existence of matter in the Universe

Dark energy manifests itself by antigravitation, it opposes gravity, thanks to this unusual property it allows the global characteristic of the Universe to expand with acceleration. However, not only the property of antigravity of the dark energy attracts attention, but also a kind of "immutability" of the existence of the space vacuum as well as the presence of its constant density and negative pressure. It is assumed that the space vacuum, affecting the extension of the Universe (world anti-gravity), nevertheless remains stable (at least, after the Big Bang) matter not changing its form, which is not affected by anything in the world. According to modern concepts in this most common form of matter existence the property of self-preservation in the form of rest over the movement and evolution clearly dominates (most cosmologists believe that the dark energy as space vacuum, in principle, does not evolve and even does not change).

Evolutionary processes at this point are the rarest phenomena in the Universe, which "pursues" "objective" common to all material entities that is its self-preservation. But this self-preservation occurs through most exotic way for matter – self-organization, which ultimately pursues "the objective of perpetuating" of relevant material formations. But they would have to change, become more complex, reducing its entropy by means of their environment. Self-preservation is the most common way of being in nature, and self-preservation through self-organization is a lot of very modest number of material entities in our Universe.

World of dark energy (model of space vacuum) is not subject to evolution, i.e. it exists in the latent form and it is self-perpetuating with the help of some unknown "way", in fact, radically different from the evolution of the real part of the universe.

The dark part of the universe is principal and it is basic component of all material and energy content of the Universe, in which the foundation of self-preservation without movement clearly prevails over the change, and even more for the evolution, which is natural to the visible Universe. Component, which does not change or evolve (dark energy) dominates in the Universe, it is followed by slightly changing and almost not evolving part of the Universe (dark matter), and finally, the most studied evolving fragment in the form of ordinary visible matter. It is a kind of "pyramid" of basic forms of self-preservation and the existence of matter as specific fragments of the Universe with special means of self-preservation different from each other and their global characteristics.

The reasons and the way of dark matter self-perpetuates largely unchanged is not yet clear, but the visible Universe consisting of baryonic matter, chose a different form of its life, in which the principle of self-preservation through self-organization of matter in the most various structures in the Universe works. It hardly makes any sense to talk about the fact that globally universal evolution is subject to the entire Universe as a whole: it is only a "privilege" of its real fragment. As for the changes taking place in the dark masses, then most likely, they can be considered "proto-

evolution" as a kind of intermediate phenomenon between real estate of space vacuum and the evolution of a real fragment of the Universe.

If the Universe really is dominated by dark matter, being the most common and basic component of the Universe, it leads in the distant astronomical future to the script, which was proposed by a number of scientists, taking into account only the effect of dark energy (as the space vacuum). World, which is dominated by the vacuum will be constant in time and homogeneous in space, and consequently the evolution of the world fades, its spatial-temporal framework, against which the cosmological expansion continues, becomes more static, immobile.

But now virtual future of the Universe depends on finding out what is dark energy. We can consider this future, assuming that the dark energy is the space vacuum. However, if the dark energy turns out to be phantom energy (now it is highly unlikely), it will lead to a new type of extension of the Universe – a divergent extension. Here we have in mind that the expanding force of the dark energy (as phantom) will continuously grow, and eventually surpass all other interactions and forces in the Universe. If it is possible and will really happen, the dark (like phantom) energy in the long cosmological period will tear all systems and structures of the Universe connected with gravity, then it will exceed intranuclear forces and electrostatic interactions. Eventually, phantom energy can break atoms, nuclei and nucleons and destroy the Universe in enormous bifurcation catastrophe that has received the name of Big Break.

According to another, but also a very unlikely scenario, dark energy may eventually change the antigravity into attracting effect and then gravity would be dominant, which can lead Universe to a Great Compression. Cosmological scenarios of oscillating or cyclic Universe are also revived. Given here "non-vacuum" scenarios and hypotheses are unlikely, and not yet confirmed by the facts, but they are not finally rejected by cosmologists.

Thus, the idea of matter and motion in general scientific picture of the Universe tends to very significant transformations, fundamentally new understanding of the world is being formed due to the discovery of the dark sides of the Universe. Detection of fragments of dark world around us, which compose its largest part, demands in general an adequate response from philosophy and science, and possibly even revision of accepted provisions that were agreed upon with the most complete data and facts of modern science.

Possible further extension of cosmoglobalistics which panorama of development was schematically and hypothetically explicated here, shows that the new direction of global – or rather, globally-space research can be a great, truly universal future. Even if the proposed scenarios will not be fully realized, however, integrative conceptual potential of outlined cosmic expansion of global studies will play a role in the development of interdisciplinary communication and research and will show where the uncertain boundaries of global scientific research rushing into space lie.

It is appropriate to point out the most likely place of cosmoglobalistics in its various interpretations in the global evolutionism, which has already three major spatial-temporal stages of universal evolution – space, starting with the Big Bang, its further planetary continuation and everything is completed with expanding space exploration. Obviously, cosmoglobalistics and globally-space research will focus on the transitions of the first space stage into planetary and the latter into the next space stage in the process of socio-natural Big Bang.



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