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*Modern ontology: reflection on the continuity of cyberspace and virtual reality*

**Ontología moderna: reflexión sobre la continuidad del ciberespacio y realidad virtual**

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**Abstract**

The article demonstrates that information and communication technologies, which are actively implemented in modern life, have no analogues in the past. Reality, characterized by the concept of “cyberspace”, has become one of the main factors of socio-cultural reality, a special living environment with which all spheres of public life are connected – economic, social, political, spiritual. Modernity is characterized by the emergence of electronic virtual reality, which significantly changes the language, bringing in new elements of communication. Today, the Internet in some way is a global information space that unites all existing telecommunications and information networks. It is stated that the formation of global information networks has become a direct consequence of computer technology, so the global information space is primarily

cybernetic (computer) in nature. The question is raised about the spatial and temporal characteristics of virtual reality and their ontological substantiation, because cyberspace presupposes the existence of a certain world, characterized by the length and metrics represented in consciousness. The thesis about the sociality of cyberspace is substantiated. It is shown that cyberspace is artificially maintained and developed by real space, so it is concluded that it is impossible and inexpedient to study it as an independent phenomenon.

**Keywords:** cyberspace; virtual reality; information processes; Internet space; computer technologies

### Resumen

El artículo demuestra que las tecnologías de la información y la comunicación, que se implementan activamente en la vida moderna, no tienen análogos en el pasado. La realidad, caracterizada por el concepto de “ciberespacio”, se ha convertido en uno de los principales factores de la realidad sociocultural, un entorno de vida especial con el que están conectadas todas las esferas de la vida pública: económica, social, política, espiritual. La modernidad se caracteriza por el surgimiento de la realidad virtual electrónica, que cambia significativamente el lenguaje, aportando nuevos elementos de comunicación. Hoy en día, Internet de alguna manera es un espacio de información global que une todas las redes de telecomunicaciones e información existentes. Se afirma que la formación de redes de información global se ha convertido en una consecuencia directa de la tecnología informática, por lo que el espacio de información global es principalmente de naturaleza cibernética (informática). Se plantea la cuestión de las características espaciales y temporales de la realidad virtual y su fundamentación ontológica, porque el ciberespacio presupone la existencia de un mundo determinado, caracterizado por la longitud y métricas representadas en la conciencia. Se fundamenta la tesis sobre la socialidad del ciberespacio. Se demuestra que el ciberespacio es mantenido y desarrollado artificialmente por el espacio real, por lo que se concluye que es imposible e inconveniente estudiarlo como un fenómeno independiente.

**Palabras clave:** ciberespacio; realidad virtual; procesos de información; espacio de Internet; tecnologías informáticas

### Introduction

The information and communication technologies that have no analogues in the past are actively introduced in the life of a modern man. Their development provoked the introduction into scientific discourse of the concepts of “cyberspace”, “virtual reality”, “network society”. Today we can safely say about the symbiotic coexistence of man and technology. This phenomenon was first noted in Joseph Licklider’s article “Man-Computer Symbiosis”<sup>1</sup>, which describes the cooperative interaction between the man and computer, where machine intelligence played a significant role in expanding and intensifying the human mind. Half a century later, the predicted computer-human symbiosis became a fait accompli. As V. melin rightly states in this context, “high-tech mediums imperceptibly and softly envelop us, intertwine with everyday life, expand organisms, become flesh, blood

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<sup>1</sup> LICKLIDER, J. C. R. (1960). *Man-Computer Symbiosis*. URL: <https://groups.csail.mit.edu/medg/people/psz/Licklider.html>.

and nerves. By merging with technology, a man finds himself on the verge of becoming a cyborg”<sup>2</sup>.

Reality, denoted by the concept of “cyberspace”, has become one of the main factors of social and cultural environment, a special living environment with which all spheres of public life are connected – economic, social, political, spiritual. In addition, the emergence of cyberspace has contributed to the formation of a global information space, the formation of a “network society”, the basis of which is the generation, processing, transmission and updating of the information social and cultural field. Cyberspace mediates the communication of a modern man, affects his daily experience and behaviour. The importance of cyberspace for modern civilization intensifies its study as a social and cultural factor influencing the formation of a network society.

Despite the huge number of scientific works devoted to virtual reality, cyberspace and virtualization of society, in the modern scientific literature there is no generally accepted approach to cyberspace as a factor contributing to the formation of a modern network society<sup>3</sup>. The presence of different, sometimes contradictory, views on the essence of these phenomena only exacerbate this uncertain situation. The variety of interpretations and approaches to defining the concepts of “cyberspace”, “virtual reality”, “network society” dictates the need for philosophical research on the phenomenon of cyberspace. Therefore, the aim of the article is to try to comprehend cyberspace, its connection with virtual reality, their philosophical justification in the most general terms.

## Methodology

The methodology of the research of cyberspace and virtual reality in the context of the dynamics of the information society development involves the consistent application of general scientific, philosophical and special methods and approaches. This sequence allows achieving the above aim.

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<sup>2</sup> EMELIN, V. A. (2013). Kiborgizatsiya i invalidizatsiya tehnologicheskii rasshirenogo cheloveka. *National Psychological Journal*, 1 (9), 62-70.

<sup>3</sup> AKVAZBA, E. O., BOGDANOVA, V. P., UZLOVA, N. V., PATRUSHEVA, I. V. (2019). Problems and prospects of the Russian information society. *Amazonia Investiga*, 8 (20), 310-322; BYTIK, Y., DANILYAN, O., DZEBAN, A., KALINOVSKY, Y., CHALAPKO, V. (2020). Information society: the interaction of tradition and innovation in communicative processes. *Amazonia Investiga*, 9 (27), 217-226; GETMAN, A., DANILYAN, O., DZEBAN, A., KALINOVSKY, Y., HETMAN, Y. (2020). Information security in modern society: sociocultural aspects. *Amazonia Investiga*, 9 (25), 6-14; GRIGORESCU, A., CHITESCU, Razvan-Ion. (2018). Cyberspace – a challenge. *Challenging the Status Quo in Management and Economics*: 11-12 october 2018 (P. 824-838). Bucharest: National University of Political Studies and Public Administration; KUZMYCH, V. I. (2019). Heometrychni vlastyivosti metrychnykh prostoriv. *Ukrainian Mathematical Journal*, 71 (3), 382-399; SENDULA-JENGIC, V., SENDULA-PAVELIC, M., HODAK, J. (2016). Mind in the gap between neural and social networks – cyberspace and virtual reality in psychiatry and healthcare. *Psychiatria Danubina*, 28 (2), 100-103; SOKOLOV, K. O., HUDYMA, O. P. (2019). Pidkhid do rozrobky elementiv struktury systemy vyavlenia destruktivnoho vplyvu u kiberprostorii. *Science-intensive technologies*, 4, 426-432; TIKHONOVA, S.V., (2016). Social networks: problems of Internet socialization. *Polis-politicheskiye issledovaniya*, 3, 138-152.

At the first stage, a comparative analysis of the most significant scientific publications was carried out, which relate to various aspects of the dynamics of the information society, understanding the nature and features of virtual reality and cyberspace in the latest social and cultural conditions, etc. Special attention has been paid to the coverage of information processes and features of the application of the latest information technologies in social reality.

At the second stage, the relationship between cyberspace and virtual reality was directly studied. The application of the system approach allowed to investigate the contradiction of such interrelation as a consequence of the growing interaction between man and complex technical systems. Analytical and synthetic method, as well as methods of comparison and analogy provided an opportunity to compare theoretical and methodological concepts of understanding the essence of the development of the information society, as well as to identify features of certain aspects of virtualization in this context. A logical addition to the previous approaches and methods was functional approach, which allowed to characterize the features of various forms of virtual reality and to conclude that cyberspace has special characteristics: integration of hypertext and hyperreality, which expands human capabilities.

At the final stage, in substantiating the prospects for the development of virtualization processes in the information society, the methods of all three levels were comprehensively applied, resulting in generalized arguments in favour of the authors' hypothesis that virtual reality should be considered an integral part of culture.

Based on the complementarity of various methods, there are the reasons to conclude that new forms of virtual reality and cyberspace should be considered multifaceted and ambiguous: on the one hand, they are a continuation and new dimension of traditionally formed social processes, and on the other hand, they are sociocultural and technological innovations which are able to influence in a new way the quality of life of the individual, the functionality and dynamics of development of society and its institutions. In addition, it was concluded that cyberspace is becoming an infrastructure technology that covers almost all areas of human life in a network society, and virtual reality in cyberspace is characterized by a pronounced instrumental nature, interactivity, modification of spatio-temporal characteristics.

## **The results and discussion**

In recent years, the development of information technology has allowed to create technical and psychological phenomena, which in the popular and scientific literature are called "cyberspace". In the world Humanities literature, the term "virtual reality" is usually used in a broad and narrow sense of the word. In the first sense, the virtual is identified with the realm of the imaginary. In the second sense, the virtual is connected with the world, modeled by technical means, first of all, computers. Usually, virtual reality created with the help of computer technology is called cyberspace.



The development of programming techniques, the rapid growth of the productivity of semiconductor chips, the development of special means of transmitting information to humans, as well as the feedback - all this has created a new quality of perception and experience. The external effect was that the person got into a world very similar to the real one, or premeditated, written by a programmer. The most impressive achievement of the new information technology, of course, is the opportunity for a person who has entered the virtual world not only to observe and experience, but also to act independently. A person earlier could get into the world of virtual reality, for example, by immersing him/herself in contemplation of a picture, a movie or just excitedly reading a book. However, in all such cases, a person's activity was limited by the position as a spectator or reader; he/she him/herself could not join the action as an active character. Subsequently, there is an expansion of the notion of virtual reality.

Modernity is characterized by the emergence of electronic virtual reality, which significantly changes the language, bringing new elements of communication: semiotic elements, similar to hieroglyphs. Visualization of electronic text occurs due to its saturation with iconic components (for example, "smilies"), hyperlinks, "materialized" connotations<sup>4</sup>.

The phenomenon of the Internet emergence can be seen as a consequence of the scientific and technological revolution, which along with biological (humanity has learned to read, write and create genetic information, thus putting biological evolution under control and actually appropriating the functions of the Creator), has had a tremendous impact on the modern world community development. The possibility of obtaining data as close as possible to reality about the object, which together constitute its image, has become a qualitatively new aspect of informatization of society.

Proceeding from the fact that any operation on information is called an information process we note that any information process involves several components: first, input information, i.e. information that the system perceives from the environment or uses it; second, the system; third, output information.

Considering society as an open information system, the elements of which are people, information processes can be divided into internal (thinking) and external (communication).

Virtualization, on the one hand, is an external process (replacement of information in any form by means of information technologies, structuring and transformation of images when using communication networks); on the other hand, it is an internal process, as the perception of the received image depends only on the person extracting information from it. The results of the virtualization process are ever-changing cyberspace.

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<sup>4</sup> ARTO, A. (1993). *Teatr zhestokosti. Teatr i ego dvoynik*. Moskva: Martis.

The term “cyberspace” to describe the entire body of information contained in computer networks was firstly used by William Gibson in his novel *Neuromancer*<sup>5</sup>. This term quite accurately reflects the possibility of perception of computers and their networks as a special “psychological space”. For people who actively work with computers, write e-mails, play games, simultaneously communicate with people on different continents it is difficult not to imagine all this as a special space where they get with the help of their computer.

The creators of interactive services for users contribute to the creation of this image, calling certain parts of their products “worlds”, “rooms”, “territories”. These factors and the involvement in the Internet traveling from one site to another cause people to perceive computers as an extension of their identity in a space that reflects their tastes and interests.

In terms of psychoanalysis, computers and cyberspace can be considered as a type of “transitional space” that expands the inner mental world of man. This state can be so fascinating that sometimes there is dissolution of one’s own “self” and identification, for example, with the personality of the character of the game that takes place on the screen. When cyberspace is perceived as an extension of the mind, the intermediate space between the “self” and others is a wide open door for all sorts of fantasies and transference reactions that can be projected onto that space. If earlier the result of the process of virtualization were art worlds, now the result is virtual reality, built with the help of new computer methods and technologies, depending on their further development.

Some authors<sup>6</sup> attribute the emergence of cyberspace to the end of the XIX century, linking it with the development of electrical and radio communications. There is a special point of view, whose supporters believe that cyberspace has always existed, but not in an updated form, and became available to man (open to him) only with the invention of telephone communication.

According to some Ukrainian researchers<sup>7</sup>, cyberspace, especially the Internet, can generally be considered as the cybernetic equivalent of an ecosystem. The latter statement could be fully accepted if cyberspace and real space existed separately from each other. But, as rightly pointed out by S. Hutornoy, “... cyberspace at present is no more than the information projection of the real world and its development is a consequence of the development of real social and economic systems of the global world”<sup>8</sup>.

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<sup>5</sup> GIBSON, U. (1984). *Neuromancer*. URL: <https://readli.net/chitat-online/?b=350412&pg=1>.

<sup>6</sup> BARLOW, J. P. (1991). Coming into the new country: cyberspace, the new datasphere. *Communications of the ACM*, 34 (3), 19-22.

<sup>7</sup> KOVACH, M. Y. (2016). Rol i mistse internet-ekonomiky v suchasny ekonomichny systemi. *Scientific Bulletin of Uzhhorod University. Series: Economics*, 1 (2), 188-192; SMOLIANIUK, O. V. (2012). Internet yak chynnyk rozvytku ekonomiky. *Agrosvit*, 2, 42-47; ZOZULOV, O. V., POLTORAK, K. A. (2013). Rol internet-tekhnologii u protsesi uzgodzhennia ekonomichnykh interesiv subiektiv rynku. *Economic Bulletin of the National Technical University of Ukraine «Kyiv Polytechnic Institute»*, 10, 399-403.

<sup>8</sup> HUTORNOY, S. N. (2013). *Kiberprostranstvo i stanovlenie setevogo obschestva*. Candidate’s thesis. Voronezh State University of Architecture and Civil Engineering, Voronezh. 37.

Today, the Internet is to some extent a global information space that exists, and at the same time does not exist uniting all existing telecommunications and information networks. The formation of global information networks has become a direct consequence of computer technology, so the global information space is primarily cybernetic (computer) in nature. In recent scientific publications of Ukrainian researchers, the term “cyberspace” is mainly used to denote the totality of all electronic systems, i.e. in fact to denote the global information volume<sup>9</sup>. In its content, this concept coincides with the concept of “Internet space” used in the broadest sense of the word.

The analysis of cyberspace raises the question of the spatiotemporal characteristics of virtual reality and their ontological justification, as cyberspace presupposes the existence of a certain world characterized by length and metrics (a way of measuring the distance in space between components of processes or phenomena) represented in consciousness. Thus, new areas of knowledge appear, such as “cybergeography”.

It is possible that in the minds of different people, cyberspace is represented differently. The main feature of cyberspace is that distance in the traditional sense of the word has no meaning to it; the traditional notion of time also changes significantly<sup>10</sup>. “Virtualization of human life and society characterizes a fundamentally new type of symbolic existence of man, society, culture. Instantly overcoming distances with the help of supernova telecommunications and high-speed vehicles allows organizations and individuals to spend time together without direct spatial convergence, which includes them in plastic multidimensional structures that smoothly transit into existing and constantly updated networks. Time is largely destroyed by the instantaneous connection between computers, the levers of public life that were effective a few years ago are no longer effective today. Changes in time limits, the emergence of timeless concepts in the information age are also associated with the latest reproductive technologies of human body, including through cloning. All these phenomena can be regarded as virtualization deformations of the essence of the space-time continuum in the information age and as cardinal transformations of its understanding”<sup>11</sup>.

Two approaches to determining distance in cyberspace have been described in the Ukrainian scientific literature<sup>12</sup>. The connection time between two computers can be

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<sup>9</sup> Foros, H. V. (2018). Pravovi osnovy zakhystu informatsii v kiberprostorii. *Constitutional state*, 30, 181-186; SAMOILENKO, O. A. (2018). Pryroda kiberprostoru yak obiekta kryminalistychnoho doslidzhennia. *Forensics and forensics*, 63 (1), 174-184; SOKOLOV, K. O., HUDYMA, O. P. (2019). Pidkhid do rozrobky elementiv struktury systemy vyavlennia destruktivnogo vplyvu u kiberprostorii. *Science-intensive technologies*, 4, 426-432.

<sup>10</sup> DZOBAN, O. P. (2017). Suchasnyi virtualnyi prostir: konhenialnist virtualnosti y mifu. *Strategic priorities. Philosophy Series*, 3, 163-170.

<sup>11</sup> DZOBAN, O. P. (2018). Temporalna skladova u prostorovo-chasovomu kontynuumi virtualnoi realnosti. *Strategic priorities*, 2 (47), 118-126.

<sup>12</sup> ASEEV, G. G. (2017). Sootnoshenie razlichnykh metriceskikh issledovaniy v naukovedenii. *Information processing systems*, 1, 119-126; HAHANOV, V. I., CHUMACHENKO, S. V. (2002). Modeli prostranstv v nauchnykh issledovaniyah. *Radio electronics and informatics*, 1, 124-132; HAHANOV, V. I., CHUMACHENKO, S. V., LITVINOVA, E. I., MISCHENKO, A. S., ADAMOV, A. S. (2018). *Infrastruktura*



considered the first method of determining the distance. The second approach is “information connectivity theory”, as all information servers are connected to each other by numerous information links. Hyperlinks provide information unity of the Internet. The distance in this case is the average number of links that are needed to reach a particular site. But the main characteristic of cyberspace is not the length, but connectivity and content completeness, i.e. the reflection of all positions and points of view.

Cyberspace is social because it is filled with people, more precisely, images of people generated by texts, video and audio information, images. The study of cyberspace as a social space, on the one hand, implies the analysis of the content, therefore, work with hypertext; on the other hand, the study of hypertext is the study of the relationship between cyberspace and reality. The main information process that connects reality and cyberspace is the process of changing information through hypertext – a form of presenting information on the Internet. This form involves the presence of text, images, audio information, hyperlinks in a single language, creation of web-documents (html – Hypertext Markup Language). If before, without knowledge, it was impossible to imagine writing such documents, now the presence of a huge number of programs - web-editors - has made it easy for any user, not just for professionals. Accessibility has allowed accelerating the growth rate of the number of personal web-resources, where people are not represented in all their subjectivity, but reduced: as a set of texts produced by themselves (or other people about them), saturated with additional elements. In the view to the above, it is erroneous to consider cyberspace (and, consequently, the Internet) as an independent phenomenon. It is the product of the work of a huge number of people, managed and controlled. Moreover, hypertext, like any text, can be considered as an objectified (but indirect) reflection of the interests of the parties involved in the communication process.

In the context of this article, the question of the relationship between artificial (cyberspace) and real is interesting. There are two extreme points of view. The first is: cyberspace is a completely independent phenomenon, i.e. it can exist independently of real space<sup>13</sup>. According to this point of view, the Internet has the properties of the system, i.e. it is characterized by integrity and unity, complexity and self-referentiality. From the standpoint of the methodology of synergetics and quantum mechanics, the Internet is a complex self-organized self-referential communication system that has emergent properties<sup>14</sup>. Representatives of another point of view believe that cyberspace is only an information projection of the activities of real space structures<sup>15</sup>.

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analiza i informatsionnoy bezopasnosti kiberprostranstva. URL: [https://openarchive.nure.ua/bitstream/document/2210/1/RI\\_2011\\_2-040-060.pdf](https://openarchive.nure.ua/bitstream/document/2210/1/RI_2011_2-040-060.pdf); KUZMYCH, V. I. (2019). Heometrychni vlastyvoli metrychnykh prostoriv. *Ukrainian Mathematical Journal*, 71 (3), 382-399.  
<sup>13</sup> TARATUTA, E. E. (2007). *Filosofiya virtualnoy realnosti*. Sankt-Peterburg: Izd-vo Sankt-Peterburgskogo universiteta. 12.

<sup>14</sup> ARSHINOV, V. I., DANILOV, Yu. A., TARASENKO, V. V. (2010). *Metodologiya setevogo myshleniya: fenomen samoorganizatsii*. URL: <http://spkurdyumov.ru/what/metodologiya-setevogo-myshleniya/>.

<sup>15</sup> HUTORNOY, S. N. (2013). *Kiberprostranstvo i stanovlenie setevogo obschestva*. Candidate's thesis. Voronezh State University of Architecture and Civil Engineering, Voronezh; KULIKOV, S. B. (2015). *Informatsionnye kanalyi, obrazyi nauki i fenomenologiya. Philosophical problems of information*

It seems that the second position is more reasonable, although in cyberspace there are a number of objects that have no analogues in the real world. However, cyberspace is artificially maintained and developed by real space, so it is not possible to talk about it as an independent phenomenon. Thus, J. Baudrillard notes that “human, too human and functional, too functional interact closely: when the human world is imbued with technical expediency, then the technology itself is necessarily imbued with human expediency – for good and evil”<sup>16</sup>.

The relationship between reality and cyberspace is extremely close, and if cyberspace cannot exist without real people, then people can do without cyberspace. The computer is created by man, and man does not become a machine, and the machine acts as his tool.

In the last decades of the XX century, thanks to the development of information technologies, a new form of virtual reality generated by the global Internet appeared. The main problem that arises in the reflection on this type of virtual reality - cyberspace - is the question of the features of this reality and its ontological status. This kind of being synthesizes the properties of many others. For example, virtual reality has a number of properties of objective-ideal existence, because its actual existence is possible only through computer systems, in which the laws of logic play a paramount role. At the same time, it has the properties of subjective-ideal being, because its parameters can change at the will and desire of the subject, not to mention that its actualization, i.e. the existing being for the subject is determined by it.

Cyberspace, along with the properties of ideal being in virtual reality, reproduces the properties of material being: the influence of virtual being on the human senses is almost identical to the influence of real material objects. Science is still far from any definitive conclusions, but one thing is for sure that virtual reality does not have its own essence, even at least in terms of independence from other forms of existence. Its existence is the result of complementarity and interaction of material and ideal forms of existence.

A new understanding of anthropocentrism in combination with modern views on development has been embodied in the theory of sustainable development, the core of which is the idea of coevolution of nature and society. The essence of the latter is to determine the parameters and mechanisms of development of human civilization in accordance with the fundamental laws of nature. At the same time, the fact should be taken into account that not only the phenomenon develops, but also the essence underlying it. For example, today it is stated that the period of formation and development of post-

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*technology and cyberspace. Electronic scientific journal*, 1 (9), 8-22. URL: [http://cyberspace.pglu.ru/upload/uf/02e/new\\_sbornik-1\\_2015-9.pdf](http://cyberspace.pglu.ru/upload/uf/02e/new_sbornik-1_2015-9.pdf); LURE, D. A. (2009). Problemyi virtualizatsii sovremennogo obschestva i ih sotsiologicheskoe osmyslenie. *Philosophy and Society*, 4 (56). URL: <https://www.socionauki.ru/journal/articles/130537/>; USANOVA, D. O. (2012). *Virtualnost kulturnogo prostranstva: klyuchevyie variatsii osmysleniya*. URL: <https://cyberleninka.ru/article/n/virtualnost-kulturnogo-prostranstva-klyuchevye-variatsii-osmysleniya/viewer>.

<sup>16</sup> BODRIYYAR, Zh. (1968). *Sistema veschey*. URL: <https://gtmarket.ru/laboratory/basis/3496/3501>.

industrial society is characterized by intensive exchange between people not of matter and energy, but of information, which becomes the main object of human activity. Substance and energy become means of operating information. If we take into account the trend of information technology – reducing material and energy costs for production – we can predict the expansion of virtual reality. From this we can conclude that virtual reality is a consequence of the coevolution of nature and society, natural and artificial, material and ideal, and finally, objective and subjective.

The concept of cyberspace in modern publications is used to denote the set of spaces of all electronic systems, i.e. in fact, to denote the global information space or, at least, its main (currently) computer part. With the development of global computer networks and the penetration of digital technologies in all spheres of society, there is an expansion of the use of the term “cyberspace” through the introduction of a new concept of “cybergeography”<sup>17</sup>. The subject of research in modern cybergeography is the study of territorial and organizational structure of cyberspace. Currently, most research on cybergeography abroad is carried out mainly in English-speaking countries, primarily in the United Kingdom and the United States. In addition, some work is carried out in Germany, Ireland, Italy, France and New Zealand. Despite more than a decade of history in the development of cybergeography in the West, it has not yet been formed as a single research direction. Due to the fact that cybergeography first was an attempt to study the information spaces of individual computers and then small computer networks, cybergeography is now often understood in a narrow sense – as a field of geography that studies the internal structure of virtual spaces of computer networks and (at best) their impact on other social and economic systems.

It is difficult to predict what cyberspace may become in the near future, as the forms of manifestation of cyberspace, its impact and interaction with social territorial systems may change significantly with the development of computer and information technology.

The structure of information space coincides with the territorial structure of real space only in that most objects of cyberspace are information projection of the same objects in real space. In general, the concept of cyberspace structure, although based on real space objects, is different from the usual understanding of it in geography, at least because it is impossible to measure the distance between objects in cyberspace in ordinary units of distance - meters or kilometers. It is possible, of course, to measure the physical distance between individual computers, but it only makes sense to find out how many meters of wire are needed to connect these computers.

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<sup>17</sup> DEVTEROV, I. V. (2011). Kiberheohrafiia yak sotsialno-instytutsiine yavvshche. *Gileya: scientific bulletin: a collection of scientific papers*, 49 (7), 426-431; PERFILEV, Yu. (2003). Kibergeografiya. *Energiya, ekonomika, tehnika, ekologiya. Energy, economics, technology, ecology*, 11, 57-61.

The way to measure the distance in cyberspace can be considered online time between two objects of cyberspace<sup>18</sup>. This is the opinion of researchers – cybergeographers. Some foreign authors use this approach to create three-dimensional tree-like maps of cyberspace. Creating such maps is tantamount to mapping the earth's surface based on not geographic coordinates, but, for example, on isochrones (lines that connect the points of simultaneity of a phenomenon, event), transport accessibility from any particular centre, which for cyberspace is currently actually Silicon Valley in California.

Not only the spatial characteristics of virtual reality in its computer-technical form are of interest to researchers, but also its temporal forms of existence. It is known that the term “virtual reality” owes its birth to the Web, introduced in 1989 by Jaron Lanier, one of the leading experts in the field of computer technology. In one interview, he defined the essence of virtual reality created by new technologies, “We are talking about a technique by which people, through computer intervention, synthesize a common reality. It takes our relationship with the physical world to a new level ...”<sup>19</sup>. In this context, virtual reality refers to techniques that allow a person to integrate into a computer-generated developing environment, in contrast to a pure computer simulation, in which there is no such integration, or, in other words, immersion.

Virtual reality means that the real is replaced by an artificial world from a computer: a person can plunge into this new reality as if it were real. In contrast to animation, everything here happens in real time, i.e. each reaction is instantly displayed in cyberspace. The technique of virtual reality corresponds to many human feelings – sight, hearing, touch and possibly smell. The virtual environment as an interface corresponds to the intuitive understanding of a person to a much greater extent than previously established ways of communicating with a computer through menus, windows or the mouse. One of the most important characteristics of virtual reality is real time (this is its difference from cyberspace). Thanks to the concept of “real time”, virtual worlds give the impression of real worlds: as a result of user actions, they change almost instantly, so that the user in the virtual world feels a sense of penetration into this world (Walk-Through-Effect).

Quite interesting in the context of this article is the question of spatio-temporal properties of virtual reality created by cyberspace. It should be noted that a more or less complete list of characteristics of virtual reality refers to a certain ideal model, to very complex virtual environments. However, the tendencies of formation of virtual reality as changes of paradigms of interaction of the person and the computer, that is, paradigms of interfaces are fixed in them. Virtual environments, implemented in practice today, do not meet all of these criteria, and even then, only in the tendency.

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<sup>18</sup> CHESWICK, W. (1999). Mapping the Internet. *IEEE Computer*, 32 (4), 97-98; HIRTLE, S. C. (1998). *Classification structures for cognitive maps. Data Science, Classification and Related Methods*. URL: [https://link.springer.com/chapter/10.1007/978-4-431-65950-1\\_44](https://link.springer.com/chapter/10.1007/978-4-431-65950-1_44).

<sup>19</sup> *Virtual worlds – Interview with Jaron Lanier* (2010). URL: [https://elektrovesti.net/1490\\_virtualnye-miry](https://elektrovesti.net/1490_virtualnye-miry)

A. Byul names the following spatio-temporal properties of virtual reality created by cyberspace<sup>20</sup>:

- immersion: the user is immersed in a computer-generated changing environment, as if he enters the space behind the screen;
- multidimensionality: computer-generated two- and three-dimensional space in which the user is immersed;
- multisensory: the ability for the user to perceive this reality simultaneously through several senses (sight, hearing, smell, touch, etc.);
- real time: user actions correlate with the change of environment immediately, without any time delay;
- adequacy: the user of the environment created by the computer perceives the images adequate to his actions;
- interaction: the user can actually interact with this environment - change, move objects, etc.;
- permeability: in cyberspace, the user can move back and forth, look right and left. If there are several levels in this space, he can move up and down;
- reality effect: the virtual environment is programmed in such a way that the user has a sense of its reality;
- effect of many users: in the environment created by the computer the user can interact with other users, solve common problems, etc.

Many researchers link the virtual reality feature generated by the Internet to a combination of hypertext and hyperreality. It should be noted that in this context, the concept of “hyperreality” differs from its postmodernist interpretation as a simulated reality, free from cognitive meaning and one that turned out to be more real than reality itself<sup>21</sup>.

For N. Terashima, J. Tiffin, hyperreality is, first of all, a technological metaconcept<sup>22</sup>. Hyperreality means a reality in which there are special dimensions of virtual reality along with normal physical reality. But this is not just a complement to another opportunity. For humanity, this will be a fundamental reworking of its perception of reality and the world in which it lives. Thus, according to Terashima and Tiffin, hyperreality arises precisely due to the “seamless” mixing of virtual reality with physical reality, artificial intelligence and human intelligence. It is something more than the sum of physical and virtual reality; it is based on a systematic interactivity between two components of reality.

The relationship between physical reality and virtual reality in hyperreality is achieved through the use of computers and telecommunications in the transmission of 3D

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<sup>20</sup> BYUL, A. (1994). *Virtualnoe obschestvo XXI veka. Sotsialnyie izmeneniya v digitalnuyu epohu*. Moskva: Kanon.

<sup>21</sup> BODRIYYAR, Zh. (2000). *Simvolicheskiy obmen i smert*. Moskva: Dobrosvet.

<sup>22</sup> TERASHIMA, N., TIFFIN, J. (2005). *HyperReality: Paradigm for the Third Millenium*. URL: <https://www.amazon.com/HyperReality-Paradigm-Millenium-Nobuyoshi-Terashima-ebook/dp/BoooOIoUXK>.



images from one place to another. 3D images can later become part of real things and interact synchronously with virtual ones. This allows creating the illusion of full physical presence at a given time. Real and unreal objects are placed in the same place in order to create an area called the hyperworld. In it, imaginary, real and artificial life forms, real and artificial objects that came from different parts to one place thanks to information technology, can act and exist together.

N. Terashima, emphasizing the special features of hyperreality, notes that communication in the field of joint action will be conducted through words and gestures and over time through touch and movement. Domain knowledge supports a field of joint action to allow participants to perform joint tasks<sup>23</sup>. The field of joint actions is a place of interactivity of the present participants, both real and virtual, for solving joint tasks.

Of course, the realization of hyperreality as an infrastructure technology is a matter of the future, when digital information paths will provide mega-bandwidth with and without wires.

According to J. Tiffin, hyperreality lies somewhere between the media and the Internet<sup>24</sup>. The key difference between the Internet and the media is the contrast between the linearity of the media, in which the message has a beginning, continuation and end, and the hypertextuality of the Internet, in which you can move from one text to another. Hyperreality makes it possible to move from one field of joint action to another, like switching television programs or flipping through newspaper pages.

The hypertextuality of the Internet allows moving with the content. The user can make logical connections and search for similar meanings on other websites. "... Hyperreality, on the contrary, is synchronous in nature. Participants in a common field of action gather together to act purposefully in real time"<sup>25</sup>. J. Tiffin believes that nanotechnology, artificial intelligence can have a significant impact on the development of hyperreality: to recognize language, language syntax and images. Computers began to learn to see, hear and speak and are slowly becoming experts in solving certain problems.

Thus, the most complex of modern virtual realities, computer technical, contributes to a certain (synthesis of hyperreality and hypertext) reality expansion. In addition, the spatio-temporal parameters of computer-technical virtual reality differ in the "loss of time effect", diversity of spatio-temporal flows, their multidimensionality, reversibility and discreteness. We are not talking about the complete replacement of real material reality with virtual reality, as only some of its characteristics are modeled (for example, a user can take objects, rearrange them, observe them from any side in a computer-created world).

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<sup>23</sup> *Ibid.*

<sup>24</sup> *Ibid.*

<sup>25</sup> *Ibid.*

Thanks to virtual reality techniques, complex data entered into a computer become visible, i.e. receive the spatial form and properties of reality. For example, in computed tomography, measured data that is invisible, i.e. has no visually perceptible characteristics, is converted by a computer into a visual model. With the help of computer modeling (simulation) there is a complex subject that can be studied in a new and more complete way and understood, as it becomes available for studying from different angles. However, it is clear that this is not a full-fledged virtual reality, which meets its definition (in tomography, for example, the researcher can not enter the brain and feel its texture).

At present, we have only an approximation to virtual reality, which meets all its characteristics, which, even in an incompletely deployed form, has a tremendous impact on man and society. In addition, the following should be noted. Some researchers, in the spirit of postmodern methodology, identify virtual reality generated by electronic technology with a “plausible world” similar to actual reality, but in fact its simulation. It seems that cyberspace is a world of simulacra. In fact, cyberspace is perceived as a virtual reality that involves remote communication and the transmission of information mediated by computers. Cyberspace cannot be reduced to the world of simulacra and that’s why. Cyberspace is a communication system that includes various activities from advertising, publishing magazines, newspapers, distance education to sales in online stores. It is an “augmented reality” that expands human capabilities that lead to the formation of hyperreality, becoming an infrastructure technology that covers practically all areas of human life: from home care and older generation care in an aging society to automotive design, global education, games and recreation<sup>26</sup>. Thus, it is possible to create hyperclinics in which the doctor and the patient are in different places and to provide medical services at a distance. Probable are visits to virtual art galleries or museums; on-demand production, when the buyer chooses the design of a certain product, communicating with the designer, which is generated by a computer and programmed to communicate with the buyer. This is possible in the field of joint action, in which the buyer and the image of the designer have common knowledge about the product and its parameters. To facilitate the task, the buyer can create a 3D model of the product and view it from all sides, and after all the wishes are taken into account, the design solution will be sent to the production shop. In this way you can buy furniture and create an apartment design, travel and get an education.

In cyberspace, virtual reality has a pronounced instrumental nature: the ability to sell via the Internet, conduct financial transactions, play on the stock exchange and more. In addition, cyberspace has a huge potential for active use of technical virtual reality in the modernization of education, science, creates opportunities for social activity of people with disabilities and more. That is why, we can agree with the conclusion of E. Taratuta that “... the Internet as a means of production and reproduction of signs and meanings may generate fewer simulacra than previous media ...”<sup>27</sup>.

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<sup>26</sup> *Ibid.*

<sup>27</sup> TARATUTA, E. E. (2007). *Filosofiya virtualnoy realnosti*. Sankt-Peterburg: Izd-vo Sankt-Peterburgskogo universiteta. 129.

Cyberspace is used less to construct simulacra than, for example, telecommunications, because communication on the Internet is mainly through a text environment that is alien to simulation. The peculiarities of creating virtual reality with the help of cyberspace are manifested in the fact that it provides great opportunities to influence actual reality through the expansion of the space of freedom. In our opinion, it is impossible to assess freedom in the XXI century so categorically negatively as the freedom of a man who “freed himself from duty, faith, tradition, roots, which did not give, as it seemed to him, freedom and flight, which turned out to be an ‘absurd hero’, free but not valuable to anyone”<sup>28</sup>.

On the contrary, due to cyberspace there are rapid changes in public consciousness and moods of people, accelerating social transformations in society. Freedom of information, “digital libertarianism”<sup>29</sup> faces the problem of censorship in cyberspace. Controlling the dissemination or complete banning of any information that can be published or downloaded from the World Wide Web is precisely in this context has the meaning of Internet censorship, which is technically possible within a single state. In China, for example, a special server (firewall) is used, which is installed on the Internet channel between users and the Internet service provider and deals with the filtering of information transmitted over the channel. Firewall is used by providers to protect against viruses and hackers, but is also used to block access to certain sites<sup>30</sup>. The activities of “digital dissidents” in providing “unfiltered” Internet access in China are severely curtailed. “Thematic filtering” is probably necessary because it eliminates information with elements of pornography, violence, and so on. This is done by many commercial companies, hence the importance of developing law and governance structures in cyberspace in order to block access to sites that contain information that is contrary to national law or morality. At the same time, we emphasize that the boundaries of cyberspace are blurred. If any information is prohibited in one country, users may use the information hosted on servers in another country where the information is not against the law.

Of course, there are general problems in cyberspace that were unlikely in the pre-computer revolution: cyberhumiliation, cyberbullying, and cyberharrasement, which lead to mental breakdowns; availability of pornography, pedophilia; other forms of computer dependence: the possibility of using personal data, invasion of the private sphere, etc. Some researchers believe that with the appearance of cyberspace, the human right to privacy is lost, because the information stored in the database can always be used for other purposes. Moreover, the proliferation of personal computers, which are not subject to centralized control, results in hackers and insiders gaining access to classified information.

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<sup>28</sup> ALEKSEEVA, I., SIDOROV A. (2010). *Informatsionnaya epoha: vyizovyi cheloveku*. Moskva: ROSSPEN.

<sup>29</sup> PERVUSHINA, V. N., HUTORNOY, S. N. (2017). Ideologiya kiberprostranstva. *Voronezh State University Bulletin. Series: Philosophy*, 2 (24), 69-80; TULIKOV, A. V. (2016). Zarubezhnaya pravovaya myisl v usloviyah razvitiya informatsionnyih tehnologiy. *Right. Journal of the Higher School of Economics*, 3, 235-243.

<sup>30</sup> *Tsenzura (kontrol) v Internete. Opyit Kitaya*. (2020). URL: <https://www.tadviser.ru/index.php/>.

The list of hacks includes computer networks of large banks, theft of files with valid credit card numbers, etc. Disinformation is carried out through cyberspace, thus new ethical and legal problems arise. And this has become so relevant that the problems of international Internet governance are discussed at the highest level<sup>31</sup>. The Internet is a “big street” the rules of conduct on which must be explained and followed.

There are other issues: the possibility of outsiders to access to classified information; protection of intellectual property (ideas) from theft; false advertising, etc. Hence there is the need to filter information. On the other hand, creating a VPN (Virtual Private Network) will help to achieve anonymity by having complete encryption from client to server.

It is almost impossible for any structure or state to fully control the World Wide Web. Bill Gates states that he sees no danger to the world at large if anyone tries to restrict the free dissemination of information through the Web. It is impossible to control the Internet. For most people, Google, Facebook, GPS are not control and monitoring systems, but available tools that help to work and live effectively.

## Conclusions

Virtual reality is the result of the interaction of the objective and the subjective, it has the status of a random being, which is not fixed or not fully rooted in the social. Virtual reality is another reality, different from the main one, the boundaries of which are conditional; it is connected with freedom in various forms of its manifestation. In modern ontologies, it acquires a different meaning as something super-empirical, associated with artificially created technical means. There are different forms of manifestation of virtual reality, but they all come down to man, so it is advisable to consider virtual reality in a broad sense – as an integral part of culture.

Cyberspace has special characteristics: a combination of hypertext and hyperreality, which expands human capabilities. It is becoming an infrastructure technology that covers almost all areas of human life of a networked society. In cyberspace, virtual reality is characterized by a pronounced instrumental nature, interactivity, modification of spatio-temporal characteristics.

The need of man for freedom and the need for social interaction are inseparable from each other, are constant conditions of human existence and modern technological communications only help in this. Thanks to them, unprecedented opportunities for group interaction appeared. There are increasing communication tools that create a collective mind, “flowing planetary intelligence”<sup>32</sup> capable of rapid mobilization, the functioning of which is diverse and unpredictable. There is an increase in the value of solidarity, mutual

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<sup>31</sup> ZINOVEVA, E. S. (2011). *Mezhdunarodnoe upravlenie Internetom: konflikt i sotrudnichestvo*. Moskva: MGIMO-Universitet.

<sup>32</sup> HUTORNOY, S. N. (2013). *Kiberprostranstvo i stanovlenie setevogo obschestva*. Candidate's thesis. Voronezh State University of Architecture and Civil Engineering, Voronezh. 59.

assistance (growth of the volunteer movement, selfless work for the benefit of society, an analogue of Soviet subbotniks, increasing the movement of international voluntary assistance), i.e. “social capital” (F. Fukuyama).

Virtual reality, formed by new information technologies, has contributed to the creation of a networked society, and the existence of cyberspace is its basis, which affects all spheres of public life.





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