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SPACE PROGRAMS OF KAZAKHSTAN

The article deals with the development of space in Kazakhstan, the state programs in the field of space industry, which affect the overall telecommunications development, on satellite broadcasting in the country. The beginning of the space era begins with the launch of the Soviet satellite in 1957. Since that time, practical development of outer space for the transmission of information over long distances has begun. The advantages of satellite communication were immediately appreciated, they make satellite communications a unique and effective means of transmitting information. The specificity of Kazakhstani communications is determined by the special geographical location of the country. With a low population density, large transit traffic flows through Kazakhstan. These conditions create favorable prerequisites for the development of satellite communications in the country.

The purpose of the article is to show the development of the space industry and the implementation of state programs in the space sphere in Kazakhstan. In many countries, the strategic importance of information and communication technologies, telecommunications and aerospace industry is realized. Socio-economic conditions in Kazakhstan up to the 1990s of the last century did not contribute to the realization of this task. Thanks to purposeful state policy, this goal has become real now in the 21st century.

Key words: space programs and projects, information technologies, telecommunications, space industry, satellite communications, satellite TV.

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Қазақстанның ғарыштық бағдарламалары

Мақалада еліміздің спутниктік хабар таратуы мен жалпы телекоммуникациялық дамуына ықпал ететін ғарыш саласындағы мемлекеттік бағдарламалар мен Қазақстандағы ғарыш саласының дамуы жайлы айтылады. Ғарыш ғасыры 1957 жылғы кеңестік спутниктің ұшырылуынан бастау алды. Сол кезеңнен бастап ғарыш кеңістігінде ұзақ қашықтықтан ақпарат таратуға тәжірибелер жасалуда. Қазақстандық коммуникация елдің ерекше географиялық орналасу жағдайымен анықталады. Халықтың аз қоныстануына қарамастан Қазақстан арқылы үлкен транзиттік трафик өтуде. Бұл жағдайлар елдегі спутниктік байланыстың дамуына мүмкіндік беруде.

Мақаланың мақсаты – Қазақстандағы ғарыш саласындағы мемлекеттік бағдарламалар мен ғарыш саласының дамуын көрсету. Көптеген елдерде ақпараттық-коммуникациялық технологиялар, телекоммуникациялық және аэроғарыштық индустрия саласындағы стратегиялардың маңыздылығы мойындалған. 1990 жылдардың соңына дейін Қазақстанның әлеуметтік-экономикалық жағдайы бұл міндеттердің жүзеге асырылуына мүмкіндік бермеді. ХХІ ғасырда бұл мақсат арнайы қабылданған мемлекеттік бағдарламалардың нәтижесінде жүзеге асырылуда.

Түйін сөздер: ғарыштық бағдарламалар мен жобалар, ақпараттық технологиялар, телекоммуникациялар, ғарыштық индустрия, спутниктік байланыс құралы, спутниктік ТВ.

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Космические программы Казахстана

В статье изучается развитие космоса в Казахстане, государственные программы в области космической отрасли, которые влияют на общее телекоммуникационное развитие, на спутниковое вещание в стране. Начало космической эры начинается с запуска советского спутника в 1957 году. С этого времени началось и практическое освоение космического пространства для передачи информации на большие расстояния. Преимущества спутниковой связи сразу были по достоинству оценены, они делают спутниковую связь уникальным и эффективным средством передачи информации. Специфика казахстанских коммуникаций определяется особым географическим положением страны. При низкой плотности населения через Казахстан идет большой транзитный трафик. Эти условия создают благоприятные предпосылки для развития спутниковой связи в стране.

Цель статьи – показать развитие космической отрасли и реализацию государственных программ в космической сфере в Казахстане. Во многих странах осознана стратегическая важность информационно-коммуникационных технологий, телекоммуникационной и аэрокосмической индустрии. Социально-экономические условия в Казахстане вплоть до 1990-х годов прошлого столетия не способствовали реализации этой задачи. Благодаря целенаправленной государственной политике эта цель стала реальной в настоящее время, в XXI веке.

Ключевые слова: космические программы и проекты, информационные технологии, телекоммуникации, космическая индустрия, средства спутниковой связи, спутниковое ТВ.

Introduction

The beginning of the space era begins with the launch of the Soviet satellite in 1957. Since that time, practical development of outer space for the transmission of information over long distances has begun. The advantages of satellite communications were immediately appreciated. The communication link via the satellite repeater has a large bandwidth, covers huge distances, due to the low level of interference can transmit information with high reliability. These advantages make satellite communications a unique and effective means of communicating information. The specificity of Kazakhstani communications is determined by the special geographical location of the country. With a low population density through Kazakhstan, there is a large transit traffic, and therefore domestic communications must have a high transit capacity. These conditions create favorable prerequisites for the development of satellite communications in the country. Forecasting the development of satellite television, it can be assumed that on satellites that have a sufficiently long lifetime, it is possible to replace analogue channels – digital ones. The beginning of the development of satellite television in sovereign Kazakhstan was made in the early 1990s after the state project of the national satellite TV broadcasting “Zharyk” was implemented in the republic. In 1991, through the Russian satellite retransmitter “Horizon-80E”, and later in 1994

from the satellite “Intelsat-57E” the program of the Republican Television was adopted. Since that moment, Kazakhstan has begun to purchase satellite receiving equipment. Simultaneously with the “Zharyk” project, another commercial project on the reception and retransmission of foreign satellite television programs was developing. After the launch of new satellites after 1997, into the zone of which Kazakhstan got, the more intensive development of satellite TV began in the republic. Currently, the most popular companion is “Espress-6”. Broadcasting four Russian channels. From foreign satellites reception is possible in most areas of the republic. The most popular foreign satellites in Kazakhstan: PanAmSat with MTV, BBC, CNN and five Indian channels; the second satellite - Intelsat 703/704 transmits European programs and Chinese programs.

Materials and methods

The sources of the research are works, articles of Kazakh and Russian researchers on the telecommunication industry, space projects and programs of Kazakhstan, on the development of the space industry in various countries of the world. The actual material of the study is: state programs and projects in the space sphere, statistics on satellite broadcasting in the world and in Kazakhstan, articles in the mass media of Kazakhstan on the topic of telecommunication development in the country. The main research methods are: the principles of historical, dialectical, complex and system analysis, the basic concepts of

the development of television broadcasting, the generalization of historical, socio-political and information phenomena acting as the main factors of mass communication processes.

Literature review

The authors of this article relied on the studies, works of Kazakh and Russian scientists in the field of telecommunications industry, in the space sphere. Among Kazakh scientists, it should be noted works: M.K. Barmankulov "Possibilities of space TV" (Barmankulov M.K.,1993), Barlybaeva S.Kh. Cable and satellite broadcasting in Asia "(Barlybaeva S.1997), Barlybaeva S., Rakhimzhanova G. New media in the world and in Kazakhstan (Barlybaeva S.,Rakhimzhanova G.,2013), collective monograph" Information development of the XXI century «(2014) and others. In the field of telecommunication development, cable and satellite broadcasting, studies are conducted by G. Bakulov «Cable and satellite broadcasting in Europe» (Bakulev G.,1996), N. Golyadkin. «A short essay on the formation and development of domestic and foreign television» (Golyadkin, 1996), Tkacheva N.V. On the way to the information society «(Tkacheva N.,2000), Sapunov V.M. Philosophical problems of mass information and TV and radio communications» (Sapunov V.,1998) and other works, which reflect the development trends of the telecommunications industry and the space sphere of development in the world and in Kazakhstan.

Review and discussion

The information and space industry is moving to a new level of development. The space industry is one of the priority and knowledge-intensive areas of society. Leading countries of the world are making significant efforts to increase their space potential. In 2002, the volume of capital investments in the development of technologies for world space activities grew more than twofold as compared with 1996. Participation in space relations determines the political prestige of the modern state, its economic, scientific, technical and defense power. In many countries, the strategic importance of information and communication technologies, telecommunications and aerospace industry is realized. Socio-economic conditions in Kazakhstan up to the 1990s of the last century did not contribute to the realization of this task. Thanks to purposeful state policy, this goal has become real at the present time. In 2005, the volume of the telecommunications market in the country was estimated at \$ 1.5 billion. Our country in terms of the number of hours spent in space ranks third after Russia and the United States. Kazakhstani scientists and specialists prepared and successfully im-

plemented 4 complex programs of research and experiments onboard the Mir orbital complex and the International Space Station with the participation of Kazakh cosmonauts T. Aubakirova (1991), T. Mubabaeva (1991, 1998, 2001), A. Aimbetov (2015). The country has created scientific, technological and organizational prerequisites for the development of space activities, has accumulated a certain scientific and technical potential (Meluhin I.S, 1997:3).

Leading countries of the world are making significant efforts to increase their space potential. In 2002, the volume of capital investments in the development of technologies for world space activities grew more than twofold compared to 1996. In 2003, according to the consulting firm «Euroconsult», the financing of space programs amounted to: in Russia - 245 million dollars, the European Union - 4.515 million, India - 500 million, Japan - 2.257 million, the United States - 15 billion dollars. In recent years, space telecommunication systems, as well as remotely sensed means and methods are actively growing in the world. Only in the past five years, revenues in the satellite communications sector increased from \$ 7 billion to \$ 14 billion in 2003 (Brown T.2005:8).

In January 2004, US President George W. Bush unveiled a new national space strategy at the headquarters of NASA. The ultimate goal of the program is to land on Mars in two or three decades. The flight to the Red Planet must be preceded by an expedition to the Moon, where it is planned to build a permanent base. In 2005, NASA announced the resumption of manned flights to the Moon in 2018. The same intention was announced by the authorities of China and Malaysia. The flight of the first Chinese astronaut on the «Sacred Rook-6» cemented the PRC's success in the space sphere. India announced the beginning of the tenth five-year plan for the exploration of outer space. She intends to spend 1.63 billion dollars on this plan, while only 592,000 dollars were spent for the implementation of the Ninth Five-Year Plan. Breaks into a big space and Brazil. One of the reasons for this interest is economic: experts seriously consider the issue of mining the main lunar fossil - helium 3. The European spacecraft Smart-1 has been launched into the lunar orbit (Brown T.,2005:8).

As shown, the USA, Russia and China are leaders in the number of space orbital launches. The second conditional category of countries in terms of the number of space launches, after the Top 3 countries, are the EU countries, India, Japan. The third conditional category includes countries with the least number of space launches - Israel, Iran and North

Korea. In the period 2010-2015 in the EU countries the number of orbital launches was from 6 to 11 units. In India, in the same period, there has been a steady increase in the number of space launches - from 3 in 2010 to 6 in 2016. Japan from 2010 to 2015 produced from 2 to 4 launches, whereas in 2016 the number of scheduled launches was 2 units. It is worth noting that in 2016 the number of orbital launches in all the above-mentioned countries decreased. Taking into account the huge territory, low population density, diversity of natural conditions and mineral resources, the development of satellite communications and space monitoring systems is an important direction for the republic. In Kazakhstan, in accordance with the Resolution of the Cabinet of Ministers of the Kazakh SSR of March 13, 1991, No. 166, a targeted integrated program «Kazakhstan-Space» was developed, later named «Garish», which laid the main directions of space research in Kazakhstan. In 1997, the Space Research Institute of the Ministry of Education and Science of the Republic of Kazakhstan started developing proposals for the creation of a multi-purpose space platform for the transfer of payloads to low and geostationary orbits. Every year the country's needs for space resources are increasing. At present, for the rental of satellite resources, Kazakhstani operators pay \$ 18 million a year to foreign satellite companies (Brown T., 2005:8).

In 2004, the country adopted the sectoral program «Development of the National Space Monitoring System of the Republic of Kazakhstan for 2004-2006», which is based on the key priorities of the «Kazakhstan-2030» Strategy. In Astana, the Space Monitoring Center, created by the Ministry of Education and the Institute of Space Research Republic of Kazakhstan on the basis of the Eurasian National University.

In January 2004, at the meeting of the presidents of Kazakhstan and Russia, historical documents were signed, opening a new stage in the development of bilateral relations, giving a new impetus to the operation of the Baikonur cosmodrome. The Agreement on the development of cooperation on the effective use of the complex was signed and a Memorandum on further development of cooperation on the issues of ensuring the functioning of the Baikonur complex was signed. Russia has its own interests in preserving Baikonur - both economic and geopolitical. In turn, Kazakhstan is also interested in preserving the Russian presence at the cosmodrome - this is objectively the guarantee that the country will participate in the development of the space industry, while not all countries have such an opportunity. So, under the

agreement of Russia and Kazakhstan, the lease term of the Baikonur cosmodrome was extended from 2020 to 2050, and the rent for Russia since 1994 remained the same - \$ 115 million per year. Russia, in turn, undertook to decommission the Proton toxic rocket, in exchange for a new and safe Angara missile, on the basis of which in 2004 Russia and Kazakhstan signed an agreement on the creation of the Baiterek missile and space complex on the territory of Kazakhstan, which is under construction. In this regard, the joint experience of Russia and Kazakhstan is a strategic vector, aimed at the development of the above-mentioned areas.

The role of Baikonur in the implementation of the country's space programs is great. More than 1200 launches of space rockets were carried out from its sites. Approximately 1,400 space vehicles for military, scientific and economic purposes, as well as commercial satellites, have been launched into various orbits. The first lunar station, the first «Venus», the first «Mars» also started from Baikonur. The spaceport remains the world's most working cosmodrome. To the important directions of development for our republic it is possible to carry joint Kazakhstan-Russian projects in space exploration. On Baikonur on the day of his 50th birthday (November 2005), Russian President Vladimir Putin said: «Kazakhstan is a natural cosmic power not only because here is Baikonur. Cooperation between Russia and Kazakhstan in this important area for both countries can be extremely effective and built for many decades to come. « The President of Kazakhstan N.Nazarbayev emphasized that investing money in the space industry is an investment in the future. This is the most profitable investment in new technology and new technologies, which are sought all over the world. We have such a unique opportunity. (Kazakhstan's truth, 2005:3).

In Kazakhstan, the State Program «Development of space activities in the Republic of Kazakhstan for 2005-2007» was adopted. More than 44 million tenge was allocated for its implementation. The program was implemented with the participation of Russian enterprises, also with the participation of organizations of other space powers. The goal of the Program is to develop space activities that contribute to strengthening national and information security, socio-economic and scientific and technical development of the RK through the effective use of space technologies. New prospects of space activity and cooperation in this sphere are opening. Kazakhstan from the lessor becomes an equal partner of space powers. Kazakhstan, which has declared itself as a state of industrial

and innovative development, will enter the world high-tech market for spacecraft launch services, create a national communications and broadcasting system on its own satellite, master the technology of satellite control and management, form the basis for integration with the world community in the field of space activities. (http://iwep.kz/files/attachments/article/2016-09-15/_-_.pdf).

And the first step in the implementation of this program was the creation and launching of the Kazakh communication and broadcasting satellite “Kazsat” into the geostationary orbit. The satellite “Kazsat-1” was launched on June 18, 2006. In 2011, Kazsat-2 was launched, which provides the country’s needs for television and radio broadcasting services and facilitates the transition to digital broadcasting. In 1996, at the 49th session of the UN General Assembly, the Republic of Kazakhstan was accepted as a member of the UN Committee on the Peaceful Uses of Outer Space. In 1997, it joined the five main UN treaties on outer space. The adoption of the Law “On Space Activities of the Republic of Kazakhstan” made it possible to regulate the entire operation of Kazakhstan’s space infrastructure. In 1995, according to the Resolution of the Cabinet of Ministers of the Republic of Kazakhstan “On the National Satellite System for Broadcasting and Data Transmission”, the Katelko joint-stock company was established, which provided for the development of a national network and the transfer of state broadcasting programs to the satellite. Throughout the world, including the CIS countries, there is a steady trend towards an increase in the number of programs broadcast from the satellite. Therefore, the programs are replaced and translated into the digital broadcasting standard. New forms of broadcasting, based on modern technological achievements, are steadily increasing the level of proposals for the residents of the republic (http://iwep.kz/files/attachments/article/2016-09-15/_-_.pdf).

Conclusion

A serious basis for space cooperation between Kazakhstan and Russia is laid, as a result of which a

powerful breakthrough will be made not only in the space sphere, but also across the whole range of new technologies. For the right to cooperate with our country in terms of implementing the largest space programs, several world-famous enterprises are arguing at once. According to experts, Kazakhstan in 7-10 years, subject to sufficient funding of all projects and cooperation with leading foreign partners, can enter the top ten space powers in the world (<http://rfcaratings.kz/5248>).

On October 6, 2016, the President of the Republic of Kazakhstan signed Decree No. 350 on the formation of the Ministry of Defense and Arousal Industry of the Republic of Kazakhstan. The main directions of the Ministry’s activity are the implementation of the state policy in the field of defense, aerospace and electronic industry, information security in the field of information and communication (cybersecurity), mobilization training and mobilization, formation and development of the state material reserve, participation in the implementation of a unified military and technical policy and military - technical cooperation, leadership in the formation, deployment and implementation of the defense order. In general, about 1.5 billion US dollars were financed in the country over the past 10 years for projects in the space industry. Thus, 15.5 billion tenge was allocated from the Republican budget for financing space activities in 2014; 10.4 billion tenge - in 2015; 7.5 billion tenge - in 2016. (http://kodeksy-kz.com/norm_akt/source).

The Republic of Kazakhstan, like some countries that have many years of experience in the space industry, has set a course for commercialization, by renting land-based space complexes and communications satellites, information support services, space tourism, and the military-defense industry.

At present, the aerospace industry is one of the strategic components of the country’s economic development. One hundred and twenty-five countries of the world participate directly or indirectly in space activities, more than two dozen of them create and launch their own spacecraft. Moreover, space is not only economic and scientific interest of countries, but also profitable business.

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