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Universidad del Zulia
Facultad Experimental de Ciencias
Departamento de Ciencias Humanas
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The role of Baikonur in the context of military-political cooperation between Kazakhstan and Russia

Ramilya Chukalova

Academy of public administration under the President of the Republic of Kazakhstan, Kazakhstan, 010000 Astana city, 33 Abai Str.

rami_lay85@mail.ru

Zarina Kakenova

L.N. Gumilyov Eurasian National University Kazakhstan, 010000 Astana city, 2 Satpayev Str.

z_kakenova@mail.ru

Almagul Kushpaeva

Sh. Ualikhanov Kokshetau State University, Kazakhstan, 020000 Kokshetau, 76, Abay Street

kushpaevaab@mail.ru

Amirzhan Alpeisov

L.N. Gumilyov Eurasian National University Kazakhstan, 010000 Astana city, 2 Satpayev Str.

alpeissov@mail.ru

Galina Kakenova

L.N. Gumilyov Eurasian National University Kazakhstan, 010000 Astana city, 2 Satpayev Str.

ayazhani09@list.ru

Abstract

The military partnership between Russia and Kazakhstan illustrates the multifaceted and mutually beneficial nature of relations between these two countries. In particular the joint use of the unique complex “Baikonur” is considered. Russia’s leading role is shown in the preparation of Kazakhstan’s own space program. All these issues are considered on the basis of an analysis of the legal framework for cooperation between the two states in the use of the Baikonur Cosmodrome. Particular attention is paid to the problem of environmental safety of the territory of the Republic of Kazakhstan associated with the operation of the Baikonur Cosmodrome.

Keywords: Kazakhstan, Cosmodrome, Baikonur, environmental safety, space program.

El papel de Baikonur en el contexto de la cooperación militar-política entre Kazajistán y Rusia

Resumen

La asociación militar entre Rusia y Kazajistán ilustra la naturaleza multifacética y mutuamente beneficiosa de las relaciones entre estos dos países. En particular, se considera el uso conjunto del complejo único "Baikonur". El papel principal de Rusia se muestra en la preparación del propio programa espacial de Kazajistán. Todos estos temas se consideran sobre la base de un análisis del marco legal para la cooperación entre los dos estados en el uso del Cosmódromo de Baikonur. Se presta especial atención al problema de la seguridad ambiental del territorio de la República de Kazajistán relacionado con el funcionamiento del cosmódromo de Baikonur.

Palabras clave: Kazajistán, Cosmódromo, Baikonur, seguridad ambiental, programa espacial.

1. INTRODUCTION

Baikonur is the largest and in its way unique space harbor, which started the first launches and flights into space. At present, manned launches, missile launches, satellites, and etc. are being carried out here. After gaining independence by Kazakhstan, it became quite logical and possible to develop its domestic space programs, but it should be noted that this sector is at the same low level. The space center was leased, so it is not possible to carry out independent space launches, but Kazakhstan can take part in individual programs and get economic benefits from

commercial launches. It is important to emphasize that the presence of Baikonur brings us not only positive moments in the form of economic benefits and world fame, but also a lot of negative consequences that arise after the accidents of Russian missiles and damage to the ecology of the region.

The relevance of the problem of international importance to the cooperation of Russia and Kazakhstan on the use of the Baikonur Cosmodrome has been repeatedly stressed in the speeches of the Presidents of these states, since it has great practical significance for the development of both the space and the national economy of both countries. Today, the exploration of outer space is considered more as a study and use of achievements in the military sphere. Hence the military and political cooperation between Kazakhstan and Russia has a positive trend, and such cooperation between states on the Baikonur Cosmodrome is unique. In this article author will consider the issues of cooperation of the Republic of Kazakhstan with the Russian Federation regarding the Baikonur Cosmodrome, highlight the pros and cons of this union. It will be determined the prerequisites for cooperation between Russia and Kazakhstan in the field of space exploration, will be analyzed the existing difficulties in using the Cosmodrome after the collapse of the USSR, as well as environmental safety in the process of mastering outer space. Based on the analysis of available Russian and Kazakh sources, as well as the regulatory and legal framework, author will try to summarize the international experience of cooperation between the two states on the use of the Baikonur Cosmodrome, and outline the stages of cooperation. This article analyzes priority directions of military-political cooperation

between the Russian Federation and the Republic of Kazakhstan in the field of space exploration.

2. METHODOLOGY

Diplomatic relations between the Russian Federation and the Republic of Kazakhstan were established on October 22, 1992. Bilateral relations and collaboration rest on a framework of solid international treaty (more than 300 treaties and agreements have been employed). Kazakh-Russian Intergovernmental Commission for Cooperation where function Subcommittees on "Baikonur" Complex, Transport, Frontier Cooperation, Investments and Military-Technical Cooperation was proven in 1997. Military/Technical collaboration of Russia and Kazakhstan has especially close character. The methodological foundations of the article are the principles of historical science: historicism, objectivity, comprehensive study, reliability, which allowed to see international processes in their real development and interrelations, to conduct a comprehensive analysis and assessment of specific facts. Problem-chronological, comparative, quantitative content analysis, SWOT-analysis will be used as well.

2.1. The main part: Periodization of the cooperation stages (the first stage or Soviet period 1957-1991)

Since the construction and official launch of the Baikonur Cosmodrome more than 60 years have passed, if we analyze this time

interval, then it is possible to break it into unique stages: the initial or the Soviet stage of 1957-1991, the transitional period - 1991-2004, and the current stage of 2004-2022. On October 4, 1957, for the first time an artificial object, Sputnik, was placed in orbit around the Earth. A few months later it became known that this satellite was launched from the steppes of Kazakhstan, in an unknown place – Baikonur. A lot of work and investments were invested to turn the deserted corner of the Kazakh steppe into the largest civil and military space launch pad in the world. For a long time Baikonur was closed to outsiders. The end of confrontation between the West and the USSR allowed to fully appreciate the achievements, tragedies, failures and prospects for the existence and activities of the Baikonur space platform. In 1954, the USSR decided to start the production of an intercontinental ballistic missile, a need arose for a new launch pad outside Kapustin Yar (near Volgograd) built in 1946. The choice fell at the end of 1954 on the Kyzyl-Orda region in the Republic of Kazakhstan, to be more precise, in the vicinity of a small railway town of Turatam. The first squad, consisting of about 30 soldiers, arrived in Turatam on January 12, 1955. Its role was to conduct initial land surveys and prepare premises where various groups of workers would be located. Outside the launch pad, the task was to build two radio control systems, nine monitoring centers, telemetry and trajectory tracking and, of course, an operational support infrastructure. But the earliest task was to create an automobile and railway network. As Jacques Villain (1999) noted, the sent teams lived on the banks of the Syrdarya River, about 30 km from the Turatam. In order to preserve secrecy from the West between the railway station and the Syrdarya, the construction of the first wooden houses in the village, originally called Zarya, then No. 10 or Tashkent 50

began. Since January 28, 1958, it was called Leninsk. This city was to become the heart of Baikonur (Villain, 1996).

On November 1, 1955, after six months of getting started the work, an important milestone was reached: the completion of the entire laying of the railway and the road network. Then the concreting of the starting table began, and a year later the State Commission announced its official opening of the base. This happened a few weeks after the first launch of SS6, which occurred on May 15, 1957. The Baikonur Commodore is located 2100 km from Moscow, 160 km east of the Aral Sea, about 800 km west of Tashkent and 370 km south-west of the small town of Baikonur. To confuse the West, the Soviet officials who were required to register the first flight of the cosmonaut - Gagarin in 1961 was decided to give the Cosmodrome the name Baikonur, rather than the Turatam. Soviet disinformation tactics reached the pointers installation with the name Baikonur at the entrance to the Cosmodrome. At the same time, various Soviet publications on space always gave the coordinates of the base map as 47.4° N- 63.4° E, and the real coordinates were - 45.6° N- 63.4° E (Villain, 1996). Thus, two objects were built, one was located directly in Baikonur, which was a protected model, and the Cosmodrome in the town of Turatam, from where all the launches were made.

After the launch of the Vostok-1 rocket with Yuri Gagarin on April 12, 1961, the name “Baikonur” was assigned to the operating Cosmodrome (Skvorzov, 2004). The Baikonur apogee coincided with the space activities of the former Soviet Union and covers the period from 1976 to 1986. This was the time when about 150 operational Soviet satellites were in orbit, of which 80-90% were intended for military use. In individual years, the total number of launches of spacecraft reached

100, or was once in three or four days. It should be noted that about 60% of these launches took place at the space base in Plesetsk, and not at Baikonur (Villain, 1996). The Baikonur complex includes a Cosmodrome and a city. The area of the complex is 6717 km² (which is approximately equal to 2.5 squares in Moscow after the expansion of the territory). The territory of the Cosmodrome includes 12 launching complexes, six of which are in operation; 11 assembly and testing buildings in which 39 technical complexes for assembling, testing and prelaunch preparation of launch vehicles, upper stages and space vehicles are located; two refueling stations, a universal filling station and a technical filling station for refueling spacecraft and upper stages with rocket fuel components and compressed gas; a measuring complex with a computer center and an oxygen-nitrogen plant with a total capacity of up to 200 tons of cryogenic products per day. The Cosmodrome supplies the developed power supply network: more than 600 transformer substations and 6000 kilometers of power lines. The infrastructure also includes two airfields of the first class, more than 400 kilometers of railways and 1,000 kilometers of highways, and 2,500 kilometers of communication lines (Skvorzov, 1998).

2.2. The second stage (1991-2004)

The second stage was characterized by the formation of space activities of Kazakhstan. 1991-1993 are considered to be a crisis for Baikonur. After the collapse of the USSR, the Cosmodrome actually became part of Kazakhstan. But in 1994, an agreement was signed between Russia and Kazakhstan, according to which Russia will operate the Cosmodrome for an annual rent. Initially, the lease period was 20

years. In 1997, the phased transfer of the spaceport facilities from the Russian Ministry of Defense to the Federal Space Agency was started. In 2004, the term was extended until 2050. Russia continues to rent Baikonur and in parallel builds new special space objects on its territory (Bjornerud, 2004). As known, in the signed agreement between the Russian Federation and the Republic of Kazakhstan as of May 25, 1992, the parties agreed on cooperation in the field of fundamental scientific research, in which the priority role was assigned to the joint use of outer space on the basis of the scientific and technical potential of the Baikonur Cosmodrome. This was an important decision, since after the collapse of the USSR and the formation of a new sovereign state of Kazakhstan, the situation at the Cosmodrome also changed. In particular, in fact, submitting to the military space forces of the Russian Federation, it legally became the property of Kazakhstan (Bjornerud, 2004). In this regard, problems arose between the two states, primarily due to the fact that the republic did not have its own space program, scientific and technical personnel, the necessary funding for maintaining a unique complex, etc. Due to these problems, Kazakhstan was forced to lease the spaceport to Russia for 20 years, which in turn, based on uneasy negotiations with the republic, decided to build its own Cosmodrome in the area of Plesetsk.

However, the implementation of this program required a long period of time, large financial injections and the training of highly qualified personnel (Villain, 1996). And the uniqueness of the Baikonur Cosmodrome was that it could launch all existing types of launch vehicles, and in all its scientific and technical characteristics it was the only Cosmodrome in the world (BJORNERUD, 2004). In turn, the leadership of Kazakhstan began preparations with the help of Russia

create its own space program. In particular, the treaty of May 25, 1992 began, in which the third article stated that “the coordination of scientific and industrial activities in the preparation and implementation of space programs, as well as the use of space technologies in the interests of science and the national economy, are carried out by space research agencies of the Republic of Kazakhstan and the Russian Space Agency” (Mansurov, et al., 2004). This has saved the unique Cosmodrome, which has great international significance, taking into account the fact that in the modern world the space problem is of paramount importance. In this connection it is necessary to emphasize that at present the space industry is one of the most priority and knowledge-intensive areas of human activity. Participation in space activities largely determines the international prestige of any state, its economic and scientific and technical power. Many of the most important directions of the national economy, not to mention economic and military-strategic, are already unthinkable without the use of special space systems. Their use in many cases becomes economically profitable. The modern development of space activity testifies to the desire of the majority of states to strengthen their space potential. Among them, Russia and Kazakhstan occupy an honorable place, which have priority in the international space sphere. In particular, one of the most important priorities, for example, for Kazakhstan is the development of cooperation with Russia, involving the implementation of joint space projects. This allowed Kazakhstan, together with Russia, to enter the world market of space launch services, create a technological base for the design and manufacture of spacecraft elements and target onboard equipment, expand the effective participation of Kazakhstani specialists in the operation of the facilities of the world’s largest Cosmodrome. In this regard, it should be noted that in the world

practice there is no experience of renting a part of the territory of another state by one state, similar to the practice of lease by Russia of the Baikonur complex. Russia and Kazakhstan have created the necessary legal framework for the effective development of international space law. In 1994, an Agreement was signed on the basic principles and conditions for the use of this Cosmodrome. Under the agreement of December 23, 1995, for the lease period, the Kazakh city Baikonur was given the status corresponding to the status of a Russian city of federal significance, but with a special regime for the operation of facilities, enterprises and organizations, as well as citizens' residence. All the above-mentioned agreements were the beginning of the formation of an international legal framework for the Baikonur space complex.

If we consider the statistics on the launches in different stages, from the Baikonur in the period from 1957 to the end of 1993, about 950 take-offs of the satellites-launchers were performed-an average of 26 launches per year or more than two per month. In 1987, there were 45 launches. In 1993, the annual launch capacity of the CIS was 230, and the actual number of launches was only 47. In 1994, there were 49, that is 50% of what was in 1976. In 1993, 212 three- and four-stage protons and 21 Zenit rockets were launched from Baikonur. The remaining launches is about 700 - included various versions of the Zemiorka, Cyclone and Cosmos missiles and two Energia launches. Among the Zemiorka launches, 77 were engaged in manned flights (between 1961 and 1993), of which about 90% conducted using three versions of the "Soyuz" spacecraft were. It should also be noted that on March 17, 1988, Baikonur hosted the 3000th launch in the world. Its task was to place in the orbit of the Indian remote sensing satellite IRS 1A. The statistics for launching

missiles are more difficult to establish. From 1957 to the end of 1992, 1100 ballistic missiles were tested at Baikonur.

According to ITAR-TASS, during the operation of the Baikonur from October 4, 1957 to February 25, 2002, the number of successful launches was 1077, partially successful - 35, emergency. In 50 years, more than 1500 space vehicles for various purposes, about 100 intercontinental ballistic missiles were launched from Baikonur, more than 130 domestic and foreign cosmonauts started to orbit. In addition, in its 60th anniversary - in 2015, 18 launch vehicles were launched from the launch site, in the second place was Cape Canaveral Space Center - 17 launches per year, the third - the Guiana Space Center with 12 launches per year. The transitional stage is a stage characterized as complicated. Kazakhstan was not ready to provide the Cosmodrome neither financially nor technically. The question arose how not to let “die” and stand up to Baikonur. The economic position of Moscow had to be changed to the status of a tenant. Since 1994, the Russian Federation has rented Baikonur for \$115 million a year. At this stage, Kazakhstan and Russia had to “learn” to cooperate or “divide” the Cosmodrome. The colossal work was done, it should be noted that there is no such precedent that is observed around the above object.

2.3. The third stage (2004 - 2022)

January 9, 2004, after the signing in Astana of an agreement between the two states on the development of cooperation on the effective use of the Baikonur complex a new stage of cooperation between the

states began. This document fixed the term extension of the lease. On July 3, 2005, Russia and Kazakhstan got a long-term agreement for the rent of Baikonur by Russian Federation. The Russia agreed to pay \$120 million for the rent of the space center, some more million dollars were required per year for the maintenance and development of the facility. Despite existence of this text, five years later, Russian space officials still complained about various stumbling blocks in the usage of Baikonur for the goals of the Russian space program. In the September 2007, a crash of the Proton rocket in the Karaganda Region occasioned in a twomonth ban on all missions of the Russian workhorse launcher and in a \$62 million compensation bill from the Kazakhstan. Only on May 8, 2010, Kazakh president Nursultan Nazarbaev ratified an agreement with Russia on joint operation of Baikonur. As many as 60 interim agreements, covering various aspects of the Russian-Kazakh cooperation on Baikonur, had been required in between. Considering the situation around Baikonur today we can find the interesting facts as: the mayor of the city is appointed by decrees of two presidents - Kazakhstani and Russian. Both laws are in force there. Law enforcement agencies of both states operate smoothly there, two vessels, two military commissariats, two registry offices and two currencies in the process. And most importantly interesting - there live citizens of Russia, and citizens of Kazakhstan.

One of the advantages for Kazakhstan is that over the next few years, the republic intends to launch two more satellites, and the country will immediately enter an elite club from 25 countries that have two or more satellites in orbit. In the framework of Kazakh-Russian cooperation, the Baiterek project was developed. The Baiterek rocket and space complex will be built on the basis of the infrastructure of Zenit complex.

Within the framework of the joint project, Russia will work to create a medium-sized Soyuz-5 medium-weight carrier rocket with a carrying capacity of up to 17 tons, and Kazakhstan will repair and modernize the Zenit-M launch and technical complex. The project will allow Kazakhstan to provide independently space launch services. The first launch of the missile from the Baiterek complex is planned in 2022 (Baiterek missile complex will be built on the basis of “Zenith” ..., 2017). According to (Mansurov, et al., 2004), the Baiterek project will become the starting point that will allow Kazakhstan to integrate into the system of the world economy and become a real space power (Space Industry in Kazakhstan, 2014). Nowadays the active work is being done to attract partners for the provision of launch services and training specialists. As Roskosmos and its Kazakhstan partners suggested that the United Arab Emirates (UAE) Space Agency uses the capabilities of the Cosmodrome. The space agency of the UAE and Roskosmos stated a corporation plan to create a joint technical committee for the implementation of space projects. In 2018 - 17 launches of carrier rockets from Baikonur are planned.

3. ENVIRONMENTAL SAFETY

With the existing advantages as the rent, the growth of the country's authority as a space state and the possibility of applying scientific achievements in everyday life, the issue of environmental safety of the Kazakhstani territory, connected with the operation of this Cosmodrome, remains urgent, especially in view of the fact that with about 70% of all launches of Russian spacecraft were made at Baikonur. As a result, the area where the separating parts fall occupies about 4

million hectares. These facts could lead to the possible explosions and contamination of significant areas of the country with environmentally harmful waste rocket engines. In particular, after contamination of the terrain with fuel, asymmetric dimethyl hydrazine (heptyl), used in the Proton launch vehicle, their traces remain for 80-100 years. In accordance with the Agreement between the Government of Kazakhstan and Russian Government on the procedure for cooperation in the event of an accident in the launch of missiles from the Baikonur, signed in Astana on November 18, 1999, the parties recognized the need to improve the level of environmental safety of rocket and space activities on the territory of Kazakhstan with the use firstly, of upgrading the existing and creating new environmentally safer space-rocket complexes to Baikonur for subsequent phasing operation rockets using toxic propellants (amyl, heptyl); secondly, joint work to ensure environmental safety and address environmental issues related to the implementation of rocket and space activities, etc. This agreement also established that in the event of an accident, the Russian side suspends the launches of these missiles until the causes of the accident are clarified. As a result of these measures, since 1999, Kazakhstan has periodically suspended the flights of Proton-type missiles due to accidents with serious environmental consequences. In particular, the launches took place:

- 1) July 5, 1999, when the military satellite “Raduga 1” was launched from Baikonur. The launch was postponed twice on May 6 and 7 due to a deviation in the operation of the new Breeze-M upper stage control system. The rocket with satellites fell on the territory of Kazakhstan, with a partial spill of rocket fuel.

Kazakhstan paid \$ 270,000 to the Russian side to compensate for the damage caused by the accident;

2) October 7, 1999 during the launch of the Proton-K rocket with the Express-A communication satellite from Baikonur. On the fourth minute of the flight, the rocket ignited. The wreckage of the carrier fell on the territory of Kazakhstan;

3) September 6, 2007, the Proton-M rocket with the Japanese communication satellite started from Baikonur and on the 139th second of the flight at an altitude of 76 kilometers the rocket ignited.

At the same time, it should be noted that all the above-mentioned spacecraft accidents did not cause victims from Kazakhstani or Russian side. Nevertheless, despite this, Russia strictly adheres to the fulfillment of Baikonur lease agreement of 1994. This document states that in case of damage caused by the activities of Russian space programs, Russia is responsible as a launching state in accordance with the Convention on international liability for damage caused by space objects dated March 29, 1972. According to the Convention document, the states took upon themselves the obligation to replenish the material damage inflicted on the territories, property or health of citizens of a particular country as a result of their space activities. The Convention provides for effective rules and procedures for liability for damage caused by space objects. Recently, the Russian media have discussed the plans of the Russian leadership on the possible transfer of missile launches to their new Cosmodrome, in particular, the Svobodny Cosmodrome, Plesetsk city in the Arkhangelsk Region and Kapustin Yar of the Astrakhan Region. And Baikonur will

remain for a while the main Russian Cosmodrome. In this regard, Kazakhstan proposes: firstly, to make appropriate changes to bilateral Russian-Kazakh agreements, based on the principles of the Convention of 1972; secondly, to demand compensation for the actual damage to Kazakhstan not only from Russia, but also from any of the launching international organizations and foreign states that are jointly liable under the Convention; thirdly, to create a system for the environmental security of Kazakhstani territory in the operation of rocket and space complexes and to obtain a full picture of the impact on the ecological system of Kazakhstan, to create a republican fund “Ecocosmos”, where the funds will be sent from the Baikonur lease, insurance receipts, etc.

The resources of the fund will be directed to compensatory payments to residents of relevant problem areas, comprehensive chemical-biological, soil science and sanitary-hygienic research. This will allow obtaining environmental data of Kazakhstani territories that are affected by the activities of rocket and space complexes, develop programs for continuous environmental monitoring of the study areas, develop measures for the rehabilitation of contaminated areas, and develop and approve a mock-up of environmental passports for the areas of falling separating carrier rockets. It should be emphasized that the Cosmodrome is intended for the preparation and launching of spacecraft communications, navigation, top geodetic, meteorological and scientific, including manned and interplanetary ships and stations. To date, it includes industrial facilities for the installation, testing of rocket and space technology (RST), the manufacture and assembly of its individual units, 9 launching complexes equipped with 15 launchers, 34 technical complexes and 3 filling stations. In addition to technical and launching facilities, the

Baikonur is equipped with the necessary ground infrastructure, including a command and measurement complex, a computer center, “Krainiy” and “Yubileyniy” airfields, communication systems, power, water and heat supply, roads and railways. The areas of fall of the detachable parts of the launch vehicles are intended for receiving the spent stages of launch vehicles, head fairings and tail sections. They are located at a considerable distance from the position area (300-1600 km). In these territories there are no buildings, structures or systems used in the interests of the Cosmodrome. The presence of areas of falling separating parts of carrier rockets is a prerequisite for launching spacecraft into orbit. According to Baikonur lease contract, there are 22 fall zones with 46 areas of fall of the separated parts of launch vehicles with a total area of 41,364.7 km² in Kyzylorda, Karaganda, Kostanay, Akmola, North Kazakhstan, East Kazakhstan, Pavlodar oblasts.

The operation of such facilities is accompanied by emissions of nitrogen oxides and carbon, hydrogen sulphide, sulfuric and nitric acid aerosols, ammonia, ethylene and other contaminants. During the launch and flight of the rocket, chemical pollution of the atmosphere occurs during its operation. The products of combustion or evaporation of rocket fuel, depending on the composition of it and weather conditions, can be distributed in the gas, aerosol or liquid phase. The heat emitted by the RC along the flight path into the atmosphere, as well as the combustion products, diffuse rather intensively in the air. After 1-2 days, the concentration of heat and impurities is within the limits permissible for the environment. The impact of the rocket fuel on soils can be expressed in the form of chemical and mechanical contamination. Chemical contamination of soils during the regular operation of the fuel occurs as a

result of the settling of the combustion products of the starting cloud and as a result of the strains of SRF. Soil contamination with hydrocarbon combustible substances (HCS) leads to significant physicochemical transformations, manifested in changes in the microelement composition of the soil, its air and oxidation-reduction regimes. Intense activity has, unfortunately, a downside – the impact of unfavorable factors of rocket and space activities on the environment is increasing. Kazakhstani laws do not provide for mandatory insurance of life, health and property of the population against possible harm in the implementation of the RSA. At the same time, the Convention of 1972 and Baikonur lease agreement between Kazakhstan and Russia (Article 8, paragraph “g”) provide for liability for any damage caused. The Ecological code of the Republic of Kazakhstan defines the procedure for calculating damage caused by a nature user to the environment in the course of economic activities (art. 108-110). The social tension in adjacent areas has worsened after two crashes of the RC “Proton” in 1999, the emergency falls of the RS-20 “Dnepr” in 2006 and the RC “Proton-M” in 2007. At the same time, according to NASA, there is no confrontation between the rocket and space complexes and the population in the USA. Areas of the fall are marked, all the necessary information is available and every citizen can get any documents on the Internet related to ensuring the safety of the population in the implementation of the RSA. In most of the space-rich countries, the society views the Cosmodromes as a welcome source of welfare enhancement. There is a competition among several states that want to build a new Cosmodrome in U.S. Protection of the population from environmentally hazardous activities is provided by insurance. The insured is the owner of a hazardous industry or the state. For example, in

Japan, fishery organizations receive compensation for acoustic pollution (noise), created by Japanese Cosmodromes.

Thus, the international experience of public participation in providing security in the areas affected by the Cosmodromes most likely simply does not exist, since all possible problems in this area have been solved all over the world at the design, construction and legal maintenance of the activities of such complexes. The principles of the “Declaration on environment and development” stipulate that states should develop national laws on liability and compensation for the negative consequences of environmental damage caused by activities that are conducted under their jurisdiction or control, to areas outside their jurisdiction. In accordance with these principles, Kazakhstan takes measures to improve national legislation in the field of environmental protection and environmental safety of the national economy, including on issues related to the environmental safety of the RSA. The location and active functioning of the Baikonur in Kazakhstan, its status and scope of activities, as well as current and long-term political and economic interests of the state objectively require the application of new approaches in the field of legal regulation of environmental relations in the field of space activities, taking into account international principles of environmental protection.

3.1. Baikonur in the assessment of the expert community

On December 19, 2012 in Moscow, the Presidents of the two countries signed the Joint Operating Plan for Kazakhstan and Russia for

the Years 2012-2015, a strategic document, determining key tasks of bilateral co-operation. The word “Baikonur” is known practically to everyone on earth. But never the less, there is few reliable information on the Cosmodrome. The press often refers to the name of the world’s largest Cosmodrome and various views on the problems associated with it. The interest related to complex increased after the collapse of the USSR. Before the collapse of the Soviet Union, the Cosmodrome was hidden from the public. The press often covers such issues as: international cooperation of Kazakhstan with foreign countries; Baikonur, as a link in the system of integration and so on. Basically, the issues under consideration are purely political in nature. The origins of the problems of Baikonur lie in the disintegration of the USSR, which cut off it from the Russian territory. As noted, Russia rents it since 1994 for \$115 million a year, whereas launches are mostly carried out by private companies for customers from around the world. Astana received from Moscow more than two billion dollars, with 928 million euros of this amount went to pay for repairs and infrastructure. In 2004, the countries signed a new lease agreement for Baikonur until 2050, under which Russia assumed the obligation to use less environmentally hazardous fuel in the missiles.

Baikonur is known not only for its “star” launches, but also for accidents. As already noted, several incidents with “Proton” rockets occurred here, which can only be launched at the moment from Baikonur. In 1999 and 2007, rockets fell into Kazakh territory, and dozens of tons of fuel spilled led to significant fires. The world community is vividly watching both victories and accidents associated with launches from the complex. As reported in the European press, after every serious incident, Kazakhstani president decides to suspend the launches. The actions of

President Nazarbayev in this situation can be considered legitimate, since it is a question of guaranteeing the security of his state and its citizens. It is not uncommon for negative assessments of Baikonur's activities, as the following point of view was expressed in the publication of the "Kazakhs lose patience. The presence on the Kazakh territory of the legendary Russian Cosmodrome is a constant source of tension, which poisons the already not brilliant relations between the two countries. The payments offered by Moscow do not satisfy Astana, and on November 23, the Kazakh authorities decided to block the launch of the European satellite on the carrier "Proton".

Indeed, the launch was canceled. This is confirmed by the official representative of Roskosmos Alexander: "All documents with Kazkosmos were agreed in advance, we fully completed the necessary preparatory work, but at the last minute Kazakhstan did not give permission to launch." He does not give further comments. In this regard, the European press sees the reasons for the cancellation of the launch in the following: "The authorities of independent Kazakhstan since 1991 have failed to blow. They want to get the right to participate in the management of the Cosmodrome, in particular in the matter of reducing risks. And, of course, they need more money. Further, Gerrik Ponce reports: "Meanwhile, Russia is looking for other solutions to the problem. For this purpose, the carriers of "Soyuz" are now transported to the Kura, the space gate of Europe. Two missiles are now being sent to Guiana, and the first launch is scheduled for 2010. The European space agency and Roskosmos signed a treaty allowing Russia to use the Guiana space center. Being located much closer to the equator, the French Cosmodrome makes it possible to put into orbit much more massive satellites. And this will make Baikonur less

popular” .What conclusion can be drawn from this? The space connections between Kazakhstan and Russia are viewed by the European analysts in the most favorable light. It is especially unpleasant that Kazakhstan is regarded as a “parasite”, seeking in these relations only financial benefit. The Cosmodrome is perceived negatively. Also, one cannot agree with the opinion that there are strained relations between Kazakhstan and Russia for this period of time. As for the opinion of Kazakh analysts, there is a very different trend. The Kazakh journalist regards the Cosmodrome as a link in integration system. First, it determines what Kazakhstan is now and proposes to combine all the available positive components into a kind of strategy, the implementation of which in the future will give a great potential in development, and will serve the benefit. The main idea of this strategy is to turn Baikonur into an international space harbor. To this end, Berkimbaev (2010) proposes a program that requires the creation of 4 autonomous sectors on the territory of the present complex, from which the launches of space vehicles of various countries will be carried out (Berkimbaev, et al., 2016).

Such unification into the blocs is explained by the following: “These countries are conditionally united in blocks, are already currently integrated among themselves within existing regional associations, such as the League of Arab states, the UES and ASEAN ...” The question arises, why in this case the countries of the western hemisphere are not taken into account? The Kazakh analyst believes that the states of the western hemisphere, firstly, are economically disadvantaged in this project, and secondly, in the near future, a Cosmodrome that can be used by all Latin American countries. It is impossible not to agree with the opinion, since the use of Russia as a sole Cosmodrome, makes it a kind of

monopoly. Kazakhstan is to some extent dependent. The countries listed above have large financial resources and rich scientific and technical potential. Already, the development of science in these countries is largely related to space and space technologies. In the future this direction will only intensify. The above mentioned facts and possible interest on the part of financially secured and scientifically developed countries makes the project of the development of Kazakhstani space program quite viable. At the initial stage, simple levying of rent for land and for each space launch will be made. Secondly, there must be an inevitable reorientation of the country's economy from raw materials to a higher-tech one to meet the needs of developing space programs. We agree with the opinion that the implementation of this project will make our country competitive, not dependent only on natural resources. Kazakhstan has already appeared as a state that has abandoned nuclear weapons. It is likely that, in the future, Kazakhstan with its space programs can conquer those positions in the world that Switzerland currently occupies in the banking business, that is, the status of a neutral country, free from wars and armed conflicts, necessary for all mankind in the development of space programs.

However, it is too early to speak about the speedy implementation of the program. The opinion of Russian analysts on the problems of the Cosmodrome is far to be optimistic. At first glance, it seems that Russia should support Kazakhstan in every possible way due to the joint history. In addition, Russia is one of the main partners of Kazakhstan in the international arena. However, in view of the construction of the "Vostochny" Cosmodrome, the main question is if Russia really needs Baikonur. The Roskosmos is assured that today there is no alternative to Baikonur. There is no question of any "verdict" on the "Baikonur"

Cosmodrome and the complex as a whole. Rosaviakosmos does not exclude in the future the possibility of parallel operation of both Cosmodromes simultaneously. It is already obvious that both “Proton” and “Soyuz” will be used in Baikonur in the coming decades, - said at the board of the Federal Space Agency Roskosmos deputy head Viktor Remishevsky. Plans, as we see, are optimistic and friendly. However, it is not a fact that the Kazakh side will let them come true. This will happen for a purely trivial for Russia reasons - ecological. For example, after the accident in September 2008, when the launched “Proton” rocket fell only 50 km from Dzhezkazgan, Astana banned Russia from using this type of complexes. The launch of the “Protons” is only partially permitted from the territory of Kazakhstan until April 1, 2008. It should be noted that the Proton heavy-duty rocket is the backbone of Russia’s transport space system and is actively used to remove satellites in the interests of foreign customers. For Moscow Baikonur is also a lucrative business. In 2016 Russia ranked first in the world in terms of the number of commercial launches. On the average, “Roskosmos” carries out more than 20 launches annually, many of which start from the Baikonur on “Proton” rocket carriers. Unlike the USA and China, which were ahead of Russia last year, the Russian space agency offers the lowest price on the market - about \$50 million per launch. The list of Roskosmos customers for commercial launches is impressive: from the European aerospace and defense concern, aircraft manufacturers Boeing and Airbus to Japanese Mitsubishi. For the last decade the most practical heavy rocket “Proton” suffered nine starting failures, as well as two major accidents with the spread of toxic fuel heptyl in the territory of Kazakhstan and the destruction of the road telecommunication satellites.

After the above-mentioned accidents, in 2007 and 2013 Astana announced a two-month moratorium on launches. Since, after the launch, the “Proton-M” rocket crashed near Baikonur and there were about 600 tons of highly toxic heptyl on board, and an estimated \$89 million in damage to the Kazakh side. However, the Russian space agency defended its position on the harmlessness of the heptyl accident. As a result, three years later, the negotiations between both states ended without determining the amount of environmental damage. There are also negative opinions on the exploitation of Baikonur by Russia. According to Kazakhstan Baikonur is also not justified hopes for participation in space projects. Extending the lease for almost half a century to Russia for a formal fixed price of \$115 million in 2004, Kazakhstan could count on a joint modernization of the Soviet space center. At the same time, the Kazakh-Russian project “Baiterek”, a space complex for light and environmentally friendly carrier rockets “Angara” instead of the heptyl “Proton”, was launched. However, after 11 years Russia’s demands to increase the cost of the project almost 9 times (from \$223 million to \$2 billion), delays in the implementation of Roskosmos for four years and the reorientation of the “Angara” to the Eastern project under construction have been frozen. According to Kazkosmos made in the Senate in 2015, to give up completely from cooperation with Russia to modernize the Cosmodrome in favor of the proposals of Ukraine or France, the committee did not give the possibility of a half-century lease. After lengthy intergovernmental negotiations, the deadline for completion of the new “Baiterek” complex and the creation of a light Kazakhstan carrier rocket “Sunkar” was postponed to 2025. Moscow declares about expansion of cooperation with Astana on Baikonur. This official position was recently announced on the site of the Eurasian economic community

in Bishkek by Russian president Vladimir Putin. However, such statements do not attach such an encouraging tone to complex bilateral relations.

Among Kazakh analysts and politicians, there is a split of opinions on cooperation between Kazakhstan and Russia in using the complex. So, has a negative attitude to such cooperation and says that “Kazakhstan must now decide and admit its mistake in using the Cosmodrome, admit that having given it to Russian farming has lagged technologically. I say with all responsibility that the recent events connected with the Vostochniy Cosmodrome and the development of Russian military-industrial complex have shown two things: first, it is technologically and scientifically backward, the second is the corruption inherent in authoritarian regimes. The world is developing. Elon Mask outstripped the former Soviet Union with its nuclear and space potential for years to come. Do we need such an expensive content, rather archaic in use, an ecologically very dangerous complex? I think we need a political solution. But for this, we must solve the most important issue - the lease agreement of Baikonur by Russia, which was signed on bonded terms. It was signed under Yeltsin, where did the figure of 110 million dollars come from? This money can be received back for two flights now”.

M. Eleusizov (2016) adheres to the opposite point of view, he links the viability of Baikonur exclusively with Russia (Eleusizov, 2006). The main reason for the foggy future of the Baikonur is Kazakhstan's unwillingness to develop the space industry, therefore, with the complete withdrawal of Russia, Kazakhstan will not be able to control Baikonur, says ELEUSIZOV (2006). The opinion of the politician is ready to be challenged by the president of the Union of Scientists of Kazakhstan O.

Sabden, he believes that the reason for the unilateral use of Baikonur by Russia lies rather not in financing, but in playing the position of Astana in negotiations with Moscow. The Kazakh side, according to the politician, is making unjustified concessions in intergovernmental meetings. Speaking about the future of Baikonur, Sabden is sure that it is necessary to search for a compromise solution and develop further relations with Russia not on a rental basis, but on the condition of equal cooperation (Sabden, 2011).

4. CONCLUSION

Relations of the Russia and the Kazakhstan are rarely example of cooperation of two states which due to will of geopolitical factors, history, cultural proximity have become allies. Unfortunately, recently this term in respect to external partners of Russian Federation which is rather often used in the propaganda purposes to underline rather intention than a real situation. Concerning Kazakhstan the ally idea, it also reflects quirk of interests on a number of the main issues and interdependence. In the military-political, economic, cultural fields we may understand cooperation of two states. The analysis of the problems arising during the implementation of Russian-Kazakhstan cooperation in the exploration of outer space is given, which has the practical importance for the exploration of outer space by both the Russia and Kazakhstan. The Baikonur Cosmodrome is directly connected with the close cooperation of the two states-Russia and Kazakhstan. As we have already noted, the origins of the Cosmodrome are taken from the USSR, in view of the territorial location of the complex, Kazakhstan became the heir to the

cosmic empire. However, due to objective reasons (lack of own space programs, scientific and technical personnel, necessary financing not only for the launch, but for the maintenance of the complex, etc.), it could not become a full-fledged receiver and independently operate the spaceport. And the most optimal solution of that time was the provision of Baikonur in long-term lease of Russia. This has saved the unique Cosmodrome, which has great international significance, taking into account the fact that in the modern world, the space problem is given utmost importance.

Russia has military bases in two states (Kyrgyzstan and Tajikistan), and in Kazakhstan, it rents several test grounds and the Baikonur Space Complex. It is also vitally important for Russia to enhance cooperation with the Stan's on the issues of the prevention of inter-ethnic conflicts, the struggle against traditional forms of international crime, and the new threats and challenges. In the world practice there is no experience of renting a part of the territory of another state by one state, similar to the practice of lease by the Russian Federation of the Baikonur complex. Two states have created the necessary legal framework for the effective development of international space law. Nowadays, the space industry is one of the most priority and knowledge-intensive areas of human activity. Participation in space activities largely determines the international prestige of any state, its economic and scientific and technical power. Many of the most important directions of the national economy, not to mention economic and military-strategic, are already unthinkable without the use of special space systems. Their use in many cases becomes economically profitable.

The close cooperation of two countries allowed it to occupy a place of honor in the international space sphere. In particular, one of the most

important advantages for Kazakhstan is the implementation of joint space projects. This allows Kazakhstan to enter the world market of space launch services, to create a technological base for designing and manufacturing spacecraft elements and target on-board equipment, and to expand the effective participation of Kazakhstani specialists in operating the facilities. One of such priority projects is the satellite “KazSat” and “Baiterek”. However, one should not keep silent about the so-called minuses. Although the definition is more appropriate here - catastrophes in the form of environmental threats in the process of mastering outer space. The main impact on Kazakhstan is compliance with the legislation on maintaining environmental safety is observed, yet environmental damage is significantly affected. If we consider the position of Kazakhstan in relation to the Cosmodrome there is a prospect for the development of the country’s astronautics, with the help of foreign states. At present, Russia invests huge funds for the development of the Baikonur, without taking into account rental fees. And in case of any disasters, Kazakhstan is paid compensation, and this is another expenses. In addition, Russia with international organizations and foreign states that bear joint responsibility, should provide for insurance of risks and liability in favor of Kazakhstan in international insurance organizations for an amount of at least \$500 million for each insurance event associated with the implementation by Russia of space activities. For example, in accordance with the USA Law “about commercial launches”, the licensee, i.e. a party holding a license to launch is required to submit documents – information about funds deposited with the bank or an insurance policy guaranteeing compensation of damages to third parties in the amount of \$164 to \$215 million, depending on the missile launching equipment used. In addition, the licensee is obliged to insure for \$80 million the facilities and equipment of

the launch complex, which are federal property of the US Government. The amount of insurance fluctuate within the limits of \$80-250 million depending on the orbiter and launch vehicles (Bjornerud, 2004). The insurance of space risks in the orbital operation of space vehicles is carried out mainly for one year. The scope of coverage may include the entrepreneurial risk of the owner of the space project. These measures will avoid disagreements and misunderstandings between Kazakhstan and Russia, and in the future will allow fruitful cooperation. In conclusion, we would like to note that today outer space is viewed by the same environment as land, water and air, in this regard, ensuring security is a priority. Baikonur is a major object in military-political cooperation between the two states. Turning to the national legislations of these states it is possible to determine the significance of space activities in military-political cooperation between states. So, in Kazakhstan and Russia there are Laws on space activities, in these legislative acts the understanding and definition of space activity is given directly. Space activities are defined as - activities aimed at the exploration and use of outer space to achieve scientific, economic, environmental, defense, information and commercial purposes. Thus, Baikonur occupies one of the leading places in the military-political cooperation between the two states, however much the question of who benefits more from the exploitation of the Cosmodrome, it would be foolish to measure this, it is necessary to understand that only successful cooperation will bring the same benefits and Kazakhstan and Russia. The space industry of Kazakhstan needs the potential of Russia, taking experience; Kazakhstan will be able to take its place among space powers in the future.

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