POLITICAL SCIENCE ISSUES

ISSUE 4(34), 2019

Academic journal

MOSCOW, 2019

POLITICAL SCIENCE ISSUES

Academic journal

ESTABLISHED BY LLC "PUBLISHING HOUSE "SCIENCE TODAY"

The Journal is published with the participation of the Institute of modern policy of the Peoples' Friendship University (RUDN)

The Journal is registered by the Federal Service for Supervision of Mass Media, Communications and Protection of Cultural Heritage

Reg. Number PI No.FS77–46176 of August 12, 2011
The Journal is published quarterly

The journal is included in the database of the Russian Science Citation Index

The Five-year Journal's impact factor is 0,808

The Journal is included in Ulrich's Periodicals Directory

Academic papers published in the journal undergo obligatory editorial checking.

The authors' opinion not always coincides with the opinion of the Editorial Board. At reprint of the article or a part of it the reference to the Journal is obligatory.

Address of the editorial office:
10, Zagoryevskaya street, building 4, office 4, Moscow, Russia, 115598
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Signed for printing on 25.12.2019
Format 60x84/16. Offset paper.
Offset print.
Number of printed sheets 49151.
Circulation 500 copies.
Order 0000.

Printed at the LLC "PrintUP"
Nagorny drive, 12c1,
Moscow, Russia, 117105
Tel.: +7 (495) 925-00-06

ISSN 2225-8922 (print)
12 issues a year plus
4 issues a year of the translated (eng.) version
Languages: Russian and English
http://voprospolitolog
Included in the list of peer-reviewed scientific publications of the Higher Attestation Commission of the Russian Federation
Included in the Ulrich's Periodicals Directory
Materials of the journal are placed on the RSCI platform of the Russian scientific electronic library – Electronic Journals Library Cyberleninka
Subscription index of the journal in the Rospechat Agency catalogue is: 70035

Objectives and themes

Academic journal "Political Science Issues" is an international peer-reviewed scientific periodical in the field of political studies. The journal has an international character because of the composition of its Editorial Board, its editors, its contributing authors and topics of its publications.

The scientific journal is published since 2011 at the "Publishing House "Science Today". Translated (eng.) version of the journal is published since 2016. Since its inception, the journal was guided by high scientific and ethical standards and today it is one of the leading political science journals in Russia.

The purpose of the journal is to promote scientific exchange and cooperation between Russian and foreign political scientists.

The journal is intended for the publication of the results of fundamental and applied scientific research. Thematic focus of the journal is reflected in the following permanent headings: "History and philosophy of politics," "Political institutions, processes and technologies," "Political regionalism and ethno-politics," "Political culture and ideologies," "Political problems of international relations and globalization."

Format of publications: scientific articles, reviews, scientific materials, materials of round tables, scientific reviews, scientific reports devoted to research problems in the field of politics and political science.

The Editorial Board and the editors of the journal in their activities are guided by the principles defined by VAK of Russia for scientific journals, including: presence of the institute of peer review for the expert quality assessment of scientific articles; information openness of the publications; availability and compliance with the rules and ethical standards for the submission of manuscripts by the authors.

The target audience of the journal is Russian and foreign specialists-political scientists, as well as graduate students and masters in the fields of political science, state and municipal management and international relations.

The journal strictly adheres to the international publishing standards and publication ethics identified in the *COPE (Committee on Publication Ethics)* document. **http://publicationethics.org.**

Full details of the journal and its editorial policy, requirements to the preparation and publication of articles, archive (issues since 2011) and additional information are available on the website: **http://voprospolitolog.ru**

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DOI 10.35775/PSI.2020.34.4.001

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MOON RACE: LESSONS, CHALLENGES AND PERSPECTIVES

Since the second half of the twentieth century, promising, far-reaching space exploration tasks were put in the USSR among the priority and strategic ones, and were in the sphere of increased attention of the state leadership, the general public, and the media. The Soviet Union launched an artificial earth satellite for the first time in the world, Yuri Gagarin was the first person to fly into space, V. Tereshkova was the world's first female cosmonaut, A. Leonov was the first earthman to walk in space. The USSR was also the first to study the planets of the Solar system with space automata, and the first object among them was the Moon, the natural satellite of the Earth. The article contains convincing evidence that the so-called lunar race of the two space superpowers of the USSR and the United States that unfolded at that time was conducted at the limit of their scientific, technical and economic capabilities, and the resulting preponderance of forces in favor of the United States during the spontaneously planned flights to the moon by both countries was purely volitional, without taking into account the opportunities to develop its territory and natural resources in the same rhythm. After several manned flights, the first of which took place exactly 50 years ago, the United States lost interest in the lunar project, found it burdensome for the budget and stopped funding it.

The article contains a correct analysis of all the main stages of the emergence and development of human interest towards the Moon, attempts to understand and use the possibilities of its conquest and space exploration. Special attention is paid to the twelve-year competition between the USSR and the United States for leadership in the newly discovered space prospects, as the highest point in space exploration, a kind of lunar race that existed before, but was rather scientific, theoretical and experimental in nature.

The author notes the increasing attention of modern business to the development of research on the Moon and Mars and the role of private space agencies

coming to the forefront in this activity and pursuing primarily their own commercial interests.

Key words: *leadership in space, interplanetary flights, lunar race, landing of people on the Moon, colonization of planets, commercialization of space, international cooperation in the field of space.*

The seemingly imperceptible 50th anniversary of the flight of people to the Moon has stirred up the world community, immersed in the depths of a systemic crisis, when it is piled on the most acute political and socio-economic crises, natural disasters, military conflicts in various places of the globe, the dangerous balancing of the planet on the brink of a deadly world war. Then, half a century ago, the astronauts, who first landed on the Moon, made what seemed incredible: just 66 years after the first flight of the Wright brothers, the success of the Apollo 11 expedition became a model and example of the unthinkable audacity and ingenuity of people.

This flight confirmed the brilliant ideas of K. E. Tsiolkovsky, a mathematics teacher, author of scientific works and fantastic stories that it was feasible to move to the stars. It is important, experts emphasize, that modern rocket science still follows his calculations relating to the beginning of 1900, which allowed overcoming the earth's gravity by using a multi-stage rocket equipped with a liquid jet engine [3. P. 64].

The increased interest towards the Moon, as well as some other planets of the universe, undoubtedly originates at the dawn of human civilization and persists to this day. The earliest period of steady and growing interest in the Moon, its secrets, and the peculiarities of its impact on the daily life of the inhabitants of the Earth is the time of great antiquity, when about five thousand years ago the priests of Ancient Babylon and Chinese astrologers demonstrated the primary ideas about the space and celestial bodies. Subsequently, the palm in the study of space and nearby planets passed to the ancient Greeks. History has preserved the names of the astronomers Thales of Miletus, Pythagoras of Samos, his associate Aristarchus of Samos, who, anticipating Copernicus, proposed the same planetary system, made an attempt to measure the relative distance of the Sun and the Moon from the Earth.

The famous philosopher Eratosthenes first got the first idea of the size of the Earth, allowing other ancient scientists to imagine the size of the moon, the distance to it, in General, the scale of cosmic distances. At the same time, there were assumptions about the existence of other worlds similar to earth. So, Plutarch, proving the infinity of the Universe, put forward the idea that the Moon is the second Earth, which, in his opinion, is inhabited by ... devils, who from time to time come to Earth. His book “About the disk that can be seen in the orbit of the Moon” gave dreams of space exploration and interplanetary travel a practical

character. Soon, the Greek sophist and satirist Lucian of Samosata in his works described the feeling about traveling to the Moon.

The European Inquisition of the Middle Ages forever discouraged freethinkers desire to describe other worlds and planets, however, without knowing it, made the so-called "revolution in astronomy," allowing the use of the invented telescope and printing of some books, including "On the circulation of the celestial spheres" by Nicholas Copernicus of Torun (1543), "On the movements of Mars" by Johann Kepler (1609) and "Star Herald" by Galileo Galilei (1609). According to modern experts, these works have caused a wave of interest in the surrounding world [10. P. 8] and laid the foundation for the dreams of new interplanetary movements of earthlings, and posthumously printed a new work by Kepler "Dream" (1634) was a fantastic description of the nature and inhabitants of the moon.

Cyrano de Bergerac wrote two books on interplanetary travel: "Flights to the Moon" (1649) and "Space history of the states and empires of the Sun." Borrowing a lot from his predecessors, he introduced the "iron crew" and almost the first accidentally correctly justified the principle of jet flight.

The above authors were not the only ones who were interested in the interplanetary theme in the middle ages. Experts know the work dedicated to the journey to the Moon, which belongs to Bishop Francis Godwin "Man on the Moon, or the story of the journey there." The author describes in detail the specifics of the climate and the appearance of the inhabitants of the Moon. Following him, another Bishop, John Wilkins published his work, laying a new genre of works in this area popular science. Along with the fantastic exaggerations characteristic of such literature, he predicted the possibility of building a "flying chariot" flying several people, the invention of mechanisms for controlling the ship and lifting to a height permitting pilots to reach the Moon.

Thus, over time, the problems of interplanetary travel, more and more concentrated around the lunar theme, allowed the authors of fantastic by nature works about the Moon, separated by tens and hundreds of years, more and more accurately predict some characteristics of the lunar surface and climate, and the mechanisms of its achievement. In particular, this applies to missiles, which appeared first in the form of conventional naval ships, and then "iron crew" and "flying crew," later embodied in the form of a balloon. Ancient and medieval thinkers came close enough to the principle of jet flight and the need to develop space navigation devices.

All this gives reason to believe that philosophers, mathematicians, astronomers, writers of the past, apparently without knowing it, were drawn and then introduced the enlightened public to the popularized knowledge about the Moon, interplanetary travel, i.e., involvement in the unfolding initial phase of the lunar race, when the gap between science fiction and scientific fact over time, inexorably narrowed. Such theorists as N. Kibalchich, K. Tsiolkovsky, G. Obert, and

R. Goddart tried to simulate the real technical conditions of space flights. Only the appearance of liquid-fueled rockets in the twentieth century brought the space age dramatically closer, revealed the scientific and organizational talent of S. Korolev and his associates. At the same time, in the United States, a prisoner of war, from the defeated Nazi Germany V. von Braun began his bright activity as a rocketeer, who did much to bring America to the leaders of space exploration.

The new stage of the space race unfolded at the turn of the 1950s and 60s and the great hopes associated with it had a decisive impact on the science, education and culture of the time, which, in turn, influenced the way of life of most people on the planet. Thus, the launch of the first Soviet Sputnik on October 4, 1957 was a powerful cultural shock for the United States and Western Europe, and the subsequent launch in November of another satellite, in fact, proclaimed the beginning of a new space era, the leader of which was the USSR. The propaganda campaign launched in the US press, according to experts, was a "ridiculous mixture of skepticism, concern over Soviet plans and growing anxiety about unprecedented national humiliation" [7. Pp. 85-94].

The mood of national unease quickly became an acute political character, Lyndon B. Johnson, later the leader of the Democratic majority in the Senate, argued that Sputnik 1 is equivalent to the modern Pearl Harbor, and Edward Teller, a nuclear physicist and supporter of tension and the «cold» war, responded even more harshly: "the United States lost a more important battle than Pearl Harbor," and he was right. An attempt to launch an early American satellite with the promising name Vanguard before the end of its tests, ended in a shameful disaster in front of millions of viewers.

The United States met the new year 1958 was in a state of general national depression. However this only increased the desire to catch up with the Russians [7. Pp. 94-97], which at this time started the «moon race», having achieved significant results. A number of changes were made in the US leadership, the National Aeronautics and Space Administration (NASA) was established, the system of training engineers and scientists was revised, and the role of the federal government in reducing the educational gap between the US and the USSR was increased. Having subsequently launched more than one satellite of its own, the United States recovered from the shock caused by the Soviet Sputnik-1 and were ready to compete with the Soviet Union in the new field of unpiloted space lunar stations [7. Pp. 104-105].

After the orbital flight of Yuri Gagarin, the space race moved to the forefront in the program of the US President J. F. Kennedy, who on April 14, 1961 at a meeting of the chief administration officials who offered their options for the US response to the latest Russian achievement in space, suddenly asked: "Can we fly around the Moon before them? Can we be the first to land a man on the Moon? Can we jump above them?" [7. Pp. 134-135]. A week later, in a public statement, J.F. Kennedy expressed his thoughts even more clearly: "If we can

get to the Moon before the Russians, then we must do it." The second manned flight around the Earth for a whole day carried out by Herman Titov and their tours with Yuri Gagarin made the superiority of the USSR in space generally recognized [7. P. 143].

But Kennedy's call to land on the Moon has already received widespread approval from the US public from the very beginning, and the Congress expressed its support by allocating huge financial assistance. It should be borne in mind that this happened at the time of cold war, when everything but triumph was regarded as a humiliation of national dignity. As a result, on both sides, in the USSR and in the United States, in equal measure, the officials and specialists involved in ensuring victory in the lunar race, had a keen sense of national importance, and considered the task facing them as extremely important, say modern experts [7. Pp. 134-232].

Experienced administrators and the best design forces of the United States were involved in the lunar race, and the selection of options for landing on the Moon was discussed in open mode, in front of the public, which gave the participants the determination to succeed in their plans. It is important to emphasize that the project was also financially supported in volumes unthinkable for peacetime. So, in 1966, the number of employees of NASA increased to 36 thousand, compared with 10 thousand in 1960. At the beginning of the unfolding lunar program, NASA decided to attract external researchers, universities and private enterprises for most of the work in the total number of 36.5 thousand in 1960 in 1965 the number of such specialists reached 376.7 thousand (i.e. grew more than 10 times!) NASA's budget has grown from US$ 500 million up to US$ 5.2 billion, reaching 5.3% of the total Federal Budget [7. P. 234].

It must be assumed that no less organizational and financial efforts were spent during this period by the Soviet Union, because even, practically, the same type of disaster as happened to Apollo-1 (January 1967), happened to Soyuz-1 (April 1967) due to the haste in the assembly of aircraft, which led to human casualties. Some NASA employees claimed that the Space Agency had neglected security in the intense race with the USSR to win the space competition [7. Pp. 236-240]. The details of the accident on the Soviet spacecraft and the death of cosmonaut V. Komarov, which became available years later, say, however, that by that time the Soyuz spacecraft was more perfect in comparison with the Apollo and the program of the flight to the Moon and the exit to its surface of the Soviet cosmonauts was more inventive and complex [7. Pp. 239-240].

Having achieved, since the historic flight of Yuri Gagarin in 1961, a number of victories in the space that were designated by the epithet the "first," the Soviet Union, however, began to experience serious crisis management of the space program, technological difficulties, and failed in attempts to reach the Moon before the Americans. The first and serious blow, which had enormous negative consequences, was the premature death of S. Korolev in January 1966. According

to foreign experts, he towered over his contemporaries as a strong-willed and progressive leader who worked tirelessly to keep the USSR at the forefront of the new space age [7. Pp. 245-246].

Due to a number of objective and subjective reasons, by the end of 1965 the S. Korolev's burden had increased significantly and he found himself in a difficult position trying to keep the Soviet program viable. His control over the country's space program was complicated, if not completely destroyed, with the arrival of new rivals: V. Chalomey and V. Glushko, determined to leave their mark on space activities. From time to time, the military strongly resisted the space program, believing that it absorbed all the resources that could be more reasonably allocated to research and development of missiles [7. P. 245].

The dramatic test of the new H-1 rocket in February 1969, and its two additional launches, also unsuccessful, in 1971 and 1972, meant the end of all hopes of flying around the Moon and keeping up with the American Apollo program. However, the inability to keep up with the Americans, according to American experts, was largely not in technical factors, but in the fact that the fierce resistance between the main Soviet designers created great confusion, causing the space program the heaviest blows [7. P. 249].

At the same time, NASA steadily moved forward and in December 1968 Apollo-8 made a flight to the Moon named in the press as "the most stunning and unprecedented space flight of the century," which largely predetermined the success of the landing of American astronauts in July 1969, but modestly announced in a NASA's press release as "the implementation of a manned landing on the Moon and return to Earth" [7. Pp. 267-273].

In the history of the XX century, the Apollo-11 light naturally appears as an outstanding moment of obtaining new, most human amazing experience, and the TV show of astronauts Armstrong and Aldrin, exploring the distant lunar surface, caused mixed feelings of delight and horror. But the real horror, I think, began at the same time and continues to this day: there is a strong belief that the flight of Apollo 11 with the crew on board in July 1969 was a Hollywood dramatization, filmed in the pavilion! Sociological survey conducted in 2018 by VTSIOM has shown the firmness of such opinion, at least in Russia, where 57.0% of respondents believe that the landing of people on the Moon did not happen. And this is despite the fact, says the journalist, popularizer of cosmonautics V. Egorov, that the most convincing confirmation of the reliability of flights to the Moon is the fact that for five years no real sign of "forgery" has been found [11. P. 8].

Perhaps the persistence of this myth is that, ironically, the flight of Apollo 11 and the five successful lunar voyages of the Apollos that followed it, did not proclaim a new era of human space exploration for the United States, and this legendary flight completed an era, but did not open a new one? Really, in the summer of 1969, when the fanfare for conquerors of the Moon died down, Americans found themselves facing all the same earthly problems: the strife sowing war in

Vietnam, acute racial conflicts and growing social discord, which drowned out any desire to celebrate anything, experts say [7. P. 275].

To understand the logic and course of the lunar race, experts point to a fundamentally different structure of the space programs of the USSR and the United States. From the very beginning, the US large industrial corporations participated in the military exploration of space and the state was engaged only in civil projects, in which the main place (after the flight of Yuri Gagarin) was assigned to the only goal – the landing of an American astronaut on the Moon. In the USSR, space exploration has always been only an element of the general military program, missiles were created primarily for defense and then they were adapted for space exploration [5. P. 88].

Quite naturally, for several years after 1961, during which the Americans systematically, with the strain of human and financial resources, worked on the program of landing a man on the lunar surface, the Soviet cosmonautics did not consider this goal – at least as the main one. Priority in this period of time was given to the creation of a new Soyuz spacecraft for manned flights and training of the docking process in space on it, and other measures to create powerful military orbital stations, but the option of landing a man on the Moon was practically not developed [5. Pp. 88-89]. At the same time, experts point out that, despite the leadership of the USSR at the initial stage of the space, and then in the lunar race, the US lag was situational, but not principled, because due to the higher quality of management and labor organization, manifested since the mid of 1960s, American experts worked more systematically than the Soviet [5. P. 89].

The hostile attitude and personal conflict of the two main designers S. Korolev and V. Glushko seriously affected the course of events [5. P. 90], because of that, the engine for a promising rocket N-1 was produced at the aviation (!) factory, and its capacity was four times lower than possible. A truly powerful engine that would ensure a successful rocket launch appeared when it was no longer needed. After the collapse of the Soviet Union, enterprising Americans, because of the high perfection of these engines, made for the future for the lunar program, purchased them and used them for their own and Japanese launches [5. Pp. 92-93].

At the same time, the Americans, after reviewing a number of possible scenarios for the lunar expedition, chose the simplest and did not distract from it as the main direction, whereas the USSR state management system, unable to cope with the personal conflict of the chief designers, could not choose a priority space program. Even lunar projects were constantly transformed, some ideas were abandoned, others were returned to and their implementation started again [5. P. 93].

Only in August 1964, more than three years after the "lunar" speech of J. F. Kennedy, the Central Committee of the CPSU adopted a secret resolution in which the landing of a man on the Moon was recognized as the main goal of the entire Soviet space program. This document was supported by N. Khrushchev's

emotional demand and at the same time a promise: "Do not give the Moon to the Americans! We will find as much money as we need." The intensity of propaganda, which put forward a new slogan: "the Soviet man will be the first on the Moon!", was such that a firm expectation that the landing of the Soviet cosmonaut on the Moon will take place to the 50th anniversary of the Great October, already in 1967, spread not only in society but also among the country's leadership.

Modern experts agree that there was no real basis for such plans, the lunar program did not even have the necessary launch vehicle. Nevertheless, the intense expectation of a new triumph, allowed the society, and many managers and specialists not associated with the development of the lunar project, to survive the revenge of American space, which occurred in the second half of the 1960s [5. P. 94]. It should be noted that before the first flights of the Jemmini spaceships, the USSR was confidently ahead of the United States by all available types of indicators of manned cosmonautics, which, according to experts, testified to the inertia of the Beria's Special Committee [5. Pp. 73-76]. By the way, according to researchers S. Goryanov and M. Kalashnikov, if the work of the Special Committee continued in the 50s and the 60s, the USSR would have started to carry out manned space flights in the late 1950s [5. P. 76].

However, the situation developed in such a way that while in the USSR there were non-constructive perturbations in the space sphere, the Americans worked and worked out a huge potential, which began to be realized in the second half of the 60s. Since 1965, they began to fly into space with the regularity of a commuter bus, setting new records in each flight [5. P. 94-95]. In March 1965, the USSR was the last time ahead of the United States in the field of manned flights, it happened when A. Leonov walked into space.

And yet, even by the end of 1968, the parity in the lunar race was largely intact: the most important components of the lunar expedition, including the entry into earth orbit, the flight to the moon, its flyby and return to Earth, seemed to be worked out by both sides. Only the question of the readiness of launch vehicles remained unclear, Saturn-5 and H1 – Saturn flew only without astronauts, and not quite successfully, and H1 never took off. In this difficult situation, fearing the "unpredictability of the Russians," forcing events, unable to withstand the tension, the Americans finally took a chance.

Such risk was fully justified, the rocket launched on December 21, 1968 brought into space Apollo-8 with a crew of three people, which, after taking a course to the Moon and completing the program in its orbit, returned safely, thus even before the dramatic landing on the Moon marking the victory of the United States in the lunar race [5. P. 100].

One can only wonder, but the subsequent colonization, settlement and economic development of the Moon after the entry of man on its surface did not happen, although these flights were prepared by the Americans, no doubt, very carefully. As you know, from 1969 to 1972, US astronauts landed at six points,

each of which was chosen with certain scientific goals in mind. All landings were made on the cratered visible side of the Moon, where the terrain had already been studied by the artificial satellites, and the mission control center could maintain direct contact with the astronauts [3. P. 72].

No less surprising is the fact that many very lofty odes and wishes about the event on July 20, 1969 by the mass media, famous personalities who form the public opinion of the entire American society, were not feasible. So, three years after the event, the Americans interrupted the implementation of their lunar project, its heroes began to be forgotten and assurances that for the people of the future landing on the Moon would be "the most important event of all time," sunk into oblivion, as well as the enthusiastic comparison of that achievement with "the dispersal of our species throughout the land, the conquest of the oceans and air space, because the mankind would have to explore and even populate new worlds. We will become space travelers... we must ... become an interplanetary species of living beings, and the concept of "earthlings" will remain only in the annals of history" [12. P. 86]. Twelve people (all US citizens) have visited the Moon, last time was in 1972, since then, no human has set foot in space anywhere other than Russian orbital stations [12. P. 88].

"It is obvious that we are not at all where many thought we should be half a century ago," wrote Sam Howe Verhovek [12. P. 95]. Thomas O. Payne, then Head of NASA, spoke not only about Mars, in his opinion, we should have already reached the moons of Jupiter, and many other celestial bodies, and thousands of people, even during his lifetime, would be able to fly to the Moon just on vacation. "There is no doubt that we will be able to reduce the cost of traveling to the Moon to the cost of current air travel," he said in an interview with *Time* magazine shortly before the Apollo 11 expedition [12]. Modern experts are much more restrained, they believe that "maybe the great hopes of 1969 will come true sometime, closer to the 100th anniversary of the Moon landing" [12].

Today, the Moon is again in the sights, this time for a new generation, which will actually test whether the science of space and space itself can become profitable, so, apparently, from now on, the desire for discovery will be accompanied by a race for profit [3. Pp. 58, 85]. Space agencies of different countries, and now more than 120 countries of the world are involved in space activities, send unmanned vehicles to remote points of the Solar system. Space probes have explored 60 other moons, and one of them Titan, Saturn's moon, landed. On our Moon, unmanned lunar Rovers have left footprints in four places.

By launching the Chang'e-4 interplanetary station to the far side of the Moon this year, China has rightfully made history. They also announced "a new Chapter" in lunar research: Chinese drone made a soft landing on the dark side of the Moon, where the lunar Rovers didn't get and the Chinese expressed an intention in the next decade to build a research station near the South Pole of the Moon [3. P. 89].

Israel was both happy and upset in April 2019 when the non-profit Space IL consortium launched a private spacecraft into the lunar orbit for the first time in

history, which unfortunately failed to make a soft landing and crashed into the ground. However, the consortium intends to continue the project and will try again [3. P. 92]. The situation confirmed the old truth: "space is harsh," which over the years has not ceased to be true, disruptions and delays remain inevitable satellites of progress in the space sphere [3. P. 88].

The Japanese space Agency JAXA at the beginning of the year announced a joint work with the Toyota company to create a lunar Rover on which astronauts will be able to travel on the lunar surface over 10.0 thousand km [3. P. 92].

The desire of the United States to keep up with the mainstream, was the reason for the upcoming launch of a series of landers designed to test new technologies for manned flights to the Moon [3. P. 72]. Two American companies, Space X and Boeing, intend to soon receive an official certificate for their spaceships and NASA will once again start sending "American astronauts into space on American rockets from American territory" [3. P. 88].

Two other private companies Virgin Galactic and Blue Origin have made progress in building spaceships designed for space tourism and lifting wealthy tourists to an altitude of about a hundred kilometers. Blue Origin also plans to bring people to the Moon, it announced construction of an unmanned lander capable of lifting 6.5 tons of cargo on board, and by 2024 to land astronauts on the lunar surface [3. Pp. 88-89].

"The closest goal in US space activity is undoubtedly Mars," says Sam Howe Verhovek, but "for now, the main task is to send astronauts to the Moon again, to test the capabilities of both people and technology" [12. P. 94]. He is echoed by the head of NASA D. Bridenstine: "the Moon is a test site, and Mars is a target, barely visible on the horizon." Experts do not rule out that the Moon in general may eventually become a launch pad for flights to different objects of the solar system, since the gravity on it is six times less than on Earth, and, consequently, there will be much less energy needed for a take-off [12. P. 95].

As the study showed, the end of the Cold war opened a new era of space exploration, making international cooperation the norm, with all its advantages and disadvantages. This applies to the end of the epic with the International space station, during the work on which (as of April 2019) 236 domestic cosmonauts and foreign astronauts have visited it as a part of international crews [8. P. 75]. On the agenda is an ambitious US program "Gateway to Deep Space," where the first step should be a station in lunar orbit. Two years ago, NASA and Roscosmos signed a cooperation agreement and working groups of Russian and American experts are working on the contours of the future star port. This station will become an important base from which crews will start both for further study of the Moon and for the construction of a stationary base on its surface [10. P. 425].

There are also other joint topical international projects. In the summer of 2019, a unique four months experiment SIRIIUS-19 started which simulated a flight to the Moon, during which an international crew (four Russian and two American par-

ticipants) "got" to the Moon, circled it in search of a place to land, and then made a landing on the Moon, repaired the all-terrain vehicle, remained for another week in orbit, remotely controlling it, and then returned to the Earth [2. P. 3].

A distinctive feature of this experiment, especially for Russia, where women do not fly on the ISS now, was the unusual gender diversity of the crew: three girls and three men, and before that, the experiment was conducted: "Luna" – in its crew there were only girls [2].

According to some experts, today's increased activity in the field of rocket industry is largely the result of intense competition between several Western super-billionaires with significant ambitions. First, the spaceships created by their order are different from the previous ones, because they are developed not only for the needs of science. Their aircrafts are designed to provide real profit, fulfilling the expensive desires of the owners, for example, to deliver valuable minerals from the asteroids, quickly transfer people from one side of the planet to another and turn the earthlings into "interplanetary living beings" [12. P. 92].

Secondly, the captains of the space business have a fairly frequent and apparently well-paid by media the idea of what should the world get from their activities, how to present its ethical aspects to the people and its very expediency. So, Jeff Bezos, the ideologist of space commerce, while advocating a quite reasonable idea that there is enough space in the solar system for a trillion people and they will inevitably include "a thousand Einsteins and a thousand Mozarts," invites earthlings to go to populate the heavens, while not forgetting about the main thing and asks the question: will it be possible to order a pizza through the service Amaz on Prime?

As in other lofty, but essentially advertising slogans, statements, projects of private companies, there is one general, mandatory statement: space exploration, if it is taken, of course, by America, in fact, should save the Earth and make it better. This approach, which resembles rather the plot of many Hollywood creations, where the United States and its hero save the world, is radically different from the ideas with which the first American astronauts, following the Soviet cosmonauts, went into space. Half a century ago, the answer to the question "why do we fly into space?" was simple: to fly to the Moon, and thus make new discoveries, to increase the prestige of our country, loudly declaring the good will: "We have come in peace on behalf of all mankind!" [12].

And the main thing that everyone knew what they wanted, they wanted to be the first to set foot on the Moon, return safely and then be proud of it. Well-known expert Sam Verhovek not without sadness states that if you ask this question today, you can get a dozen answers. "And it's not easy to decide," he says, "whether we should be in space without a clear idea of what we are doing there or intend to do" [12].

According to some expert forecasts, the space economy will grow more than three times over the period from 2017 to the 2040s, and profits will exceed a tril-

lion dollars. Commercial companies, which account for 80% of the industry, are also expected to grow rapidly. Private satellites, as well as those used for military, scientific and other purposes, are becoming easier and more efficient, and their launches are becoming cheaper [4. P. 95].

But this does not cancel the development of new measures to protect human health in space, which, according to Prof. M. Belakovsky from the Institute of medical and biological problems of the Russian Academy of Sciences, is an aggressive environment for all living organisms [1. P. 3]. New research show that a longer than before human stay on the spacecraft and especially permanent residence on the Moon, Mars, and other planets is fraught with previously unnoticed negative consequences emanating from radiation. Experts warn that in the end, the chances are high that, for example, sick, or even completely mad people will arrive on Mars [10. Pp. 425-429].

In this regard, modern domestic medical developments are increasingly focused on the thorough preparation of each person for the flight to orbit and to return to Earth, allowing those who have been in space to fully adapt to earth conditions in 3-6 months [1. P. 3].

But it is not only solar radiation and other terrible dangers that lie in wait for the man in space and make scientists think about planning space flights. Apparently, for many years to come there will be a danger of the so-called "human factor," other unforeseen problems and accidents that have unfortunately led to victims. Out of 135 space Shuttle launches in the United States two ended in disaster and each claimed the lives of seven people. If accidents occurred in such a proportion in civil aviation, then in this country there would be 500 accidents every day [12. P. 94].

This statistic once again confirms that there are no trifles in preparing for a space flight, even regulating the emotional state of the crew is one of the most important tasks that NASA sets itself before sending people on a multi-month space expedition [12]. Will this requirement be met by a private space agency, that in the face of a fierce competition is forced to save on everything?

Having learned from the difficult and contradictory experience of implementing space programs, the state bodies and institutions of many countries responsible for activities in this area are not in a hurry to specify their plans for the future. For instance, NASA has not yet developed a schedule for launching people to Mars, putting a trip of astronauts to the Moon as the main task for the future, in order to again test the capabilities of both people and technology. According to American experts, it is quite possible to fly to Mars today, but forecasts regarding future colonization are considered unrealistic. Moreover, more and more often there is a half-hearted opinion: there is a possibility to fly but a large-scale colonization is not possible.

One of the most important arguments called by futurologists "insurance policy," i.e. moving away from the Earth in case it becomes uninhabitable is not

perceived as joyfully as 50 years ago. This can happen because of, for example, the fall of a large asteroid, irreversible climate change or nuclear war. Americans now see the Moon race victory in a very different way, comparing it to a football match, few people are interested in who led the most part of the game, the main thing is who won.

If you follow this logic, then the United States is a triumphant and the question is closed. However, in modern Russia, where Soviet-era cosmonauts are national heroes, the space race is perceived in a completely different way, it is more like the winter Olympics, where the USSR won more medals, although the Americans managed to win the prestigious hockey game, says expert Sam Howe Verhovek [12. P. 99]. By the way, according to the directive documents of the Russian Federation, the landing of Russians on the Moon is scheduled for 2030 [6. P. 65]. The United States intend to land on the Moon in 2024 [9. P. 56].

The new stage of the Moon race is just unfolding.

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