

Roscosmos

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Roscosmos

- *In 2015 the Russian government merged Roscosmos with the United Rocket and Space Corporation, the re-nationalized Russian space industry, to create the Roscosmos State Corporation.*
- *Before, since 1992, Roscosmos was a part of the Russian Aviation and Space Agency (Russian: Росси́йское авиационно-космическое агентство, Rossiyskoe aviatsionno-kosmicheskoe agentstvo, commonly known as Rosaviakosmos).*

The Roscosmos State Corporation for Space Activities (Russian: Государственная корпорация по космической деятельности «Роскосмос», Gosudarstvyennaya korporaciya po kosmicheskoy dyeyatyel'nosti "Roskosmos"), commonly known as Roscosmos (Russian: РОСКОСМОС), is a state corporation responsible for the wide range and types of space flights and cosmonautics programs for the Russian Federation.

Originally being a part of the Federal Space Agency (Russian: Федера́льное косми́ческое аге́нтство, Federal'noye kosmicheskoye agentstvo), the corporation evolved and consolidated itself to the national state corporation on 28 December 2015 through a presidential decree. Before, since 1992, Roscosmos was a part of the Russian Aviation and Space Agency (Russian: Росси́йское авиационно-космическое аге́нтство, Rossiyskoe aviatsionno-kosmicheskoe agentstvo, commonly known as Rosaviakosmos).

The headquarters of Roscosmos are located in Moscow, while the main Mission Control space center site is in the nearby city of Korolev as well as the Yuri Gagarin Cosmonaut Training Center located in Star City of Moscow Oblast. The launch facilities used are Baikonur Cosmodrome in Kazakhstan (with most launches taking place there, both manned and unmanned), and Vostochny Cosmodrome being built in the Russian Far East in Amur Oblast.

The current director since May 2018 is Dmitry Rogozin. In 2015 the Russian government merged Roscosmos with the United Rocket and Space Corporation, the re-nationalized Russian space industry, to create the Roscosmos State Corporation.



Patch of the Russian Space Agency, 1991-2004



The Hall of Space Technology in the Tsiolkovsky State Museum of the History of Cosmonautics, Kaluga, Russia. The exhibition includes the models and replicas of the following Russian/Soviet inventions:

- the first satellite, Sputnik 1 (a ball under the ceiling);*
- the first spacesuits (lower-left corner);*

*the first human spaceflight module, the Vostok 3KA (center);
the first Molniya-type satellite (upper right corner);
the first space rover, Lunokhod 1 (lower right);
the first space station, Salyut 1 (left);
the first modular space station, Mir (upper left).*

History

- *The Russian Space Agency was formed on February 25, 1992, by a decree of President Yeltsin.*
- *The creation of a central agency after the separation of Russia from the Soviet Union was therefore a new development.*
- *The Soviet space program did not have central executive agencies.*

The Soviet space program did not have central executive agencies. Instead, its organizational architecture was multi-centered; it was the design bureaus and the council of designers that had the most say, not the political leadership. The creation of a central agency after the separation of Russia from the Soviet Union was therefore a new development. The Russian Space Agency was formed on February 25, 1992, by a decree of President Yeltsin. Yuri Koptev, who had previously worked with designing Mars landers at NPO Lavochkin, became the agency's first director.

In the early years, the agency suffered from lack of authority as the powerful design bureaus fought to protect their own spheres of operation and to survive. For example, the decision to keep Mir in operation beyond 1999 was not taken by the agency; instead, it was made by the private shareholder board of the Energia design bureau. Another example is that the decision to develop the new Angara rocket was rather a function of Khrunichev's ability to attract resources than a conscious long-term decision by the agency.

Crisis years

- *[citation needed] Scientific missions, such as interplanetary probes or astronomy missions during these years played a very small role, and although Roscosmos has connections with Russian aerospace forces, its budget is not part of the defense budget of the country, nevertheless, Roscosmos managed to operate the space station Mir well past its planned lifespan, contributed to the International Space Station, and continued to fly additional Soyuz and Progress missions.*
- *This resulted in Roscosmos' leading role in commercial satellite launches and space tourism.*

The 1990s saw serious financial problems because of decreased cash flow, which encouraged Roscosmos to improvise and seek other ways to keep space programs running. This resulted in Roscosmos' leading role in commercial satellite launches and space tourism.[citation needed] Scientific missions, such as interplanetary probes or astronomy

missions during these years played a very small role, and although Roscosmos has connections with Russian aerospace forces, its budget is not part of the defense budget of the country, nevertheless, Roscosmos managed to operate the space station Mir well past its planned lifespan, contributed to the International Space Station, and continued to fly additional Soyuz and Progress missions.

In March 2004,[clarification needed] director Yuri Koptev was replaced by Anatoly Perminov, who had previously served as the first commander of the Space Forces.

Improved situation in 2005–2006

- *Under the current 10-year budget approved, the budget of the Space Agency shall increase 5–10% per year, providing the space agency with a constant influx of money.*
- *This resulted in the Russian Duma approving a budget of 305 billion rubles (about 11 billion USD) for the Space Agency from 2006 January to 2015, with overall space expenditures in Russia total about 425 billion rubles for the same time period.*

The Russian economy boomed throughout 2005 from high prices for exports, such as oil and gas, the outlook for future funding in 2006 appeared more favorable. This resulted in the Russian Duma approving a budget of 305 billion rubles (about 11 billion USD) for the Space Agency from 2006 January to 2015, with overall space expenditures in Russia total about 425 billion rubles for the same time period. The budget for 2006 was as high as 25 billion rubles (about 900 million USD), which is a 33% increase from the 2005 budget. Under the current 10-year budget approved, the budget of the Space Agency shall increase 5–10% per year, providing the space agency with a constant influx of money. In addition to the budget, Roscosmos plans to have over 130 billion rubles flowing into its budget by other means, such as industry investments and commercial space launches. It is around the time US-based The Planetary Society entered a partnership with Roscosmos.

New science missions: Koronas Foton (launched in January 2009), Spektr R (RadioAstron, launched in July 2011), Intergelizond (2011), Spektr RG (Roentgen Gamma, 2015), Spektr UV (Ultra Violet, 2016), Spektr M (2018), Celsta (2018) and Terion (2018)

Resumption of Bion missions with Bion-M (2013)

New weather satellites Elektro L (launched in January, 2011) and Elektro P (2015)



Cosmonaut on EVA (February 2012)

2006-2012

- *In 2011, the government spent 115 billion rubles (\$3.8 bln) in the national space programs.*
- *The budget for the whole space program is 169.8 billion rubles.*
- *Priorities of the Russian space program include the new Angara rocket family and development of new communications, navigation and remote Earth sensing spacecraft.*

The federal space budget for the year 2009 was left unchanged despite the global economic crisis, standing at about 82 billion rubles (\$2.4 billion).

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The proposed project core budget for 2013 to be around 128.3 billion rubles. The budget for the whole space program is 169.8 billion rubles. (\$5.6 bln).

By 2015, the amount of the budget can be increased to 199.2 billion rubles.

Priorities of the Russian space program include the new Angara rocket family and development of new communications, navigation and remote Earth sensing spacecraft. The GLONASS global navigation satellite system has for many years been one of the top priorities and has been given its own budget line in the federal space budget. In 2007, GLONASS received 9.9 billion rubles (\$360 million), and under the terms of a directive signed by Prime Minister Vladimir Putin in 2008, an additional \$2.6 billion will be allocated for its development.

Space station funding issues

- *Some observers have pointed out that this has a detrimental effect on other aspects of space exploration, and that the other space powers spend much lesser proportions of their overall budgets on maintaining human presence in orbit.*
- *Due to International Space Station involvements, up to 50% of Russia's space budget is spent on the manned space program as of 2009[update].*

Due to International Space Station involvements, up to 50% of Russia's space budget is spent on the manned space program as of 2009[update]. Some observers have pointed out that this has a detrimental effect on other aspects of space exploration, and that the other space powers spend much lesser proportions of their overall budgets on maintaining human presence in orbit.

Despite the considerably improved budget,[when?] attention of legislative and executive authorities, positive media coverage and broad support among the population, the Russian space program continues to face several problems. Wages in the space industry are low; the average age of employees is high (46 years in 2007), and much of the equipment is obsolete. On the positive side, many companies in the sector have been able to profit from contracts and partnerships with foreign companies; several new systems such as new rocket upper stages have been developed in recent years; investments have been made to production lines, and companies have started to pay more attention to educating a new generation of engineers and technicians.

2011: New director

- *Popovkin is a former commander of the Russian Space Forces and First Deputy Defense Minister of Russia.*

On 29 April 2011, Perminov was replaced with Vladimir Popovkin as the director of Roscosmos. The 65-year-old Perminov was over the legal age for state officials, and had received some criticism after a failed GLONASS launch in December 2010. Popovkin is a former commander of the Russian Space Forces and First Deputy Defense Minister of Russia.

2013-2015 reorganization of the Russian space sector

- *The United Rocket and Space Corporation was formed as a joint-stock corporation by the government in August 2013 to consolidate the Russian space sector.*
- *In 2016, the state agency was dissolved and the Roscosmos brand moved to the state corporation, which had been created in 2013 as the United Rocket and Space Corporation, with the specific mission to renationalize the Russian space sector.*

As a result of a series of reliability problems, and proximate to the failure of a July 2013 Proton M launch, a major reorganization of the Russian space industry was undertaken.

The United Rocket and Space Corporation was formed as a joint-stock corporation by the government in August 2013 to consolidate the Russian space sector. Deputy Prime Minister Dmitry Rogozin said "the failure-prone space sector is so troubled that it needs state supervision to overcome its problems."

Three days following the Proton M launch failure, the Russian government had announced that "extremely harsh measures" would be taken "and spell the end of the [Russian] space industry as we know it."

Information indicated then that the government intended to reorganize in such a way as to "preserve and enhance the Roscosmos space agency."

More detailed plans released in October 2013 called for a re-nationalization of the "troubled space industry," with sweeping reforms including a new "unified command structure and reducing redundant capabilities, acts that could lead to tens of thousands of layoffs."

According to Rogozin, the Russian space sector employs about 250,000 people, while the United States needs only 70,000 to achieve similar results. He said: "Russian space productivity is eight times lower than America's, with companies duplicating one another's work and operating at about 40 percent efficiency."

Under the 2013 plan, Roscosmos was to "act as a federal executive body and contracting authority for programs to be implemented by the industry."

In 2016, the state agency was dissolved and the Roscosmos brand moved to the state corporation, which had been created in 2013 as the United Rocket and Space Corporation, with the specific mission to renationalize the Russian space sector.

In 2018, Russian President Vladimir Putin said "it 'is necessary to drastically improve the quality and reliability of space and launch vehicles' ... to preserve Russia's increasingly threatened leadership in space." In November 2018 Alexei Kudrin, head of Russian financial audit agency, named Roscosmos as the public enterprise with "the highest losses" due to "irrational spending" and outright theft and corruption.

Current programs



The Zarya module was the first module of the ISS, launched in 1998.

ISS involvement

- *RKA also provides space tourism for fare-paying passengers to ISS through the Space Adventures company.*
- *The Russian Space Agency is one of the partners in the International Space Station (ISS) program; it contributed the core space modules Zarya and Zvezda, which were both launched by Proton rockets and later were joined by NASA's Unity Module.*

The Russian Space Agency is one of the partners in the International Space Station (ISS) program; it contributed the core space modules Zarya and Zvezda, which were both launched by Proton rockets and later were joined by NASA's Unity Module. The Rassvet module was launched aboard Space Shuttle Atlantis and will be primarily used for cargo storage and as a docking port for visiting spacecraft. The Nauka module is the last component of the ISS, due to be launched in November 2019. Roscosmos is furthermore

responsible for expedition crew launches by Soyuz-TMA spacecraft and resupplies the space station with Progress space transporters. After the initial ISS contract with NASA expired, RKA and NASA, with the approval of the US government, entered into a space contract running until 2011, according to which Roscosmos will sell NASA spots on Soyuz spacecraft for approximately \$21 million per person each way (thus \$42 million to and back from the ISS per person) as well as provide Progress transport flights (\$50 million per Progress as outlined in the Exploration Systems Architecture Study study). RKA has announced that according to this arrangement, manned Soyuz flights will be doubled to 4 per year and Progress flights also doubled to 8 per year beginning in 2008.

RKA also provides space tourism for fare-paying passengers to ISS through the Space Adventures company. As of 2009, six space tourists have contracted with Roscosmos and have flown into space, each for an estimated fee of at least \$20 million (USD).

Science programs

- *Luna-Glob Moon orbiter with penetrators, planned in 2025*
- *Future projects include the Soyuz successor, the Prospective Piloted Transport System, scientific robotic missions to one of the Mars moons as well as an increase in Lunar orbit research satellites.*
- *RKA operates a number of programs for earth science, communication, and scientific research.*

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Luna-Glob Moon orbiter with penetrators, planned in 2025

Venera-D Venus lander, planned in 2025

Fobos-Grunt Mars mission, lost in low Earth orbit in 2012

Rockets

- *Roscosmos uses a family of several launch rockets, the most famous of them being the R-7, commonly known as the Soyuz rocket that is capable of launching about 7.5 tons into low Earth orbit (LEO).*
- *Currently rocket development encompasses both a new rocket system, Angara, as well as enhancements of the Soyuz rocket, Soyuz-2 and Soyuz-2-3.*

Roscosmos uses a family of several launch rockets, the most famous of them being the R-7, commonly known as the Soyuz rocket that is capable of launching about 7.5 tons into low

Earth orbit (LEO). The Proton rocket (or UR-500K) has a lift capacity of over 20 tons to LEO. Smaller rockets include Cosmos-3M, Rokot, and other Stations.

Currently rocket development encompasses both a new rocket system, Angara, as well as enhancements of the Soyuz rocket, Soyuz-2 and Soyuz-2-3. Two modifications of the Soyuz, the Soyuz-2.1a and Soyuz-2.1b have already been successfully tested, enhancing the launch capacity to 8.5 tons to LEO.

New piloted spacecraft

- *While Roscosmos had reached out to ESA and JAXA as well as others to share development costs of the project, it also stated that it will go forward with the project even without the support of other space agencies.*

One of RKA's projects that was widely covered in the media in 2005 was Kliper, a small lifting body reusable spacecraft. While Roscosmos had reached out to ESA and JAXA as well as others to share development costs of the project, it also stated that it will go forward with the project even without the support of other space agencies. This statement was backed by the approval of its budget for 2006–2015, which includes the necessary funding of Kliper. However, the Kliper program was cancelled in July 2006, and has been replaced by the new Federatsiya (Prospective Piloted Transport System) project. As of 2016[update] no crafts were launched.

Space systems

- *Create HEO space system "Arctic" to address the hydrological and meteorological problems in the Arctic region and the northern areas of the Earth, with the help of two spacecraft "Arktika-M" and in the future within the system can create a communications satellite "Arktika-MS" and radar satellites "Arktika-R."*
- *"Resurs-P" is a series of Russian commercial Earth observation satellites capable of acquiring high-resolution imagery (resolution up to 1.0 m).*

"Resurs-P" is a series of Russian commercial Earth observation satellites capable of acquiring high-resolution imagery (resolution up to 1.0 m). The spacecraft is operated by Roscosmos as a replacement of the Resurs-DK No.1 satellite.

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The launch of two satellites "Obzor-R" (Review-R) Remote Sensing of the Earth, with the AESA radar and four spacecraft "Obzor-O" (Review-O) to capture the Earth's surface in normal and infrared light in a broad swath of 80 km with a resolution of 10 meters. The first two satellites of the projects planned for launch in 2015.

Gonets: Civilian low Earth orbit communication satellite system. On 2016, the system consists of 13 satellites (12 Gonets-M and 1 Gonets-D1).

Gecko Mating Experiment

- *When the satellite returned to earth after its planned two-month mission was cut short to 44 days, the geckos were reported by the space agency researchers to have all perished during the course of their travels.*
- *The Russian Federal Space Agency Roscosmos launched on 19 July 2014 the Foton-M4 satellite containing among other animals and plants, a group of five geckos.*

The Russian Federal Space Agency Roscosmos launched on 19 July 2014 the Foton-M4 satellite containing among other animals and plants, a group of five geckos. The five geckos, four females and one male, were used as a part of the Gecko-F4 research program aimed at measuring the effects of weightlessness on the lizards' ability to procreate and develop in the harsh environment. However, soon after the spacecraft exited the atmosphere, mission control lost contact with the vessel which led to an attempt to reestablish communication that was only achieved later in the mission. When the satellite returned to earth after its planned two-month mission was cut short to 44 days, the geckos were reported by the space agency researchers to have all perished during the course of their travels.

The exact cause that led to the deaths of the geckos was declared unknown by the scientific team in charge of the project. Reports from the Institute of Medical and Biological Problems in Russia have indicated that the lizards had been dead for at least a week prior to their return to earth. A number of those connected to the mission have theorized that a failure in the vessel's heating system may have caused the cold blooded reptiles to freeze to death.

Included in the mission were a number of fruit flies, plants, and mushrooms which all survived the mission.

Launch control

- *The military counterpart of the RKA is the Military Space Forces (VKO).*

The military counterpart of the RKA is the Military Space Forces (VKO). The VKO controls Russia's Plesetsk Cosmodrome launch facility. The RKA and VKO share control of the Baikonur Cosmodrome, where the RKA reimburses the VKO for the wages of many of the flight controllers during civilian launches. The RKA and VKO also share control of the Yuri Gagarin Cosmonaut Training Center. It has been announced that Russia is to build another spaceport in Tsiolkovsky, Amur Oblast. The Vostochny Cosmodrome is scheduled to be finished by 2018.

Subsidiaries

- *As of 2017, Roscosmos had the following subsidiaries:*

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Historic Russian (Soviet) space gallery

People

- *The first human in space and to orbit the Earth, Yuri Gagarin.*
- *Cosmonaut Valentina Vladimirovna Tereshkova was the first woman to fly in space, aboard Vostok 6 on 16 June 1963.*

Sergey Korolev was the mastermind behind the first satellite, the first craft to deliver a human into orbit and the craft from which Aleksei Leonov performed the first spacewalk.

The first human in space and to orbit the Earth, Yuri Gagarin.

Cosmonaut Aleksei Leonov, the first person to perform an EVA (spacewalk), in 1965.

Cosmonaut Valentina Vladimirovna Tereshkova was the first woman to fly in space, aboard Vostok 6 on 16 June 1963.

Spacecraft

- *Vostok was the first spacecraft to carry a human being in space*
- *Russia and the US are the main partners of the International Space Station (ISS).*
- *The Soviet space program produced the canceled Space Shuttle Buran based on the discontinued Buran program.*
- *First permanently manned space station, the Soviet/Russian Mir, which orbited the Earth from 1986 until 2001*

Vostok was the first spacecraft to carry a human being in space

Soyuz is the longest-serving manned spacecraft design in history (1967–), upgraded regularly

Progress is the longest-serving unmanned cargo spacecraft (1978–)

First permanently manned space station, the Soviet/Russian Mir, which orbited the Earth from 1986 until 2001

Russia and the US are the main partners of the International Space Station (ISS).

The Soviet space program produced the canceled Space Shuttle Buran based on the discontinued Buran program.

Launch vehicles

- *Proton rockets are the heavylift workhorse of Russian space industry*
- *Soyuz rockets are responsible for launching all Soyuz and Progress spacecraft into space*

Soyuz rockets are responsible for launching all Soyuz and Progress spacecraft into space

Proton rockets are the heavylift workhorse of Russian space industry

See also

- *Russian space industry*
 - Ministry of general Machine Building of the Soviet Union*
 - TsNIIMash (Russian: ЦНИИмаш) is the Central Research Institute of Machine Building, an institute of the Russian aeronautics and space formed in 1946*
 - List of cosmonauts*
 - List of Russian aerospace engineers*
- *United Rocket and Space Corporation*
- *International Space Olympics*
- *American space program*

United Rocket and Space Corporation

American space program

Russian space industry

Ministry of general Machine Building of the Soviet Union

TsNIIMash (Russian: ЦНИИмаш) is the Central Research Institute of Machine Building, an institute of the Russian aeronautics and space formed in 1946

List of cosmonauts

List of Russian aerospace engineers

Timeline of Russian inventions and technology records

International Space Olympics

Medal "For Merit in Space Exploration"

List of government space agencies

References

External links

- *Russian Space Program*
- *⟨See Tfd⟩(in Russian) RKA home page in Russian*

- *The future of the Russian space program.*

⟨See Tfd⟩(in Russian) RKA home page in Russian

RKA home page in English

Russian Space Program

The future of the Russian space program. Infographics from RIA Novosti.