THE STATE NATIONAL PROJECT OF RUSSIA
THE HISTORY OF REUSABLE ROCKETS AND REUSABLE SPACEPORTS.

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Abstract. In 2024, the U.S. spaceports at Cape Canaveral began implementing the 50-year U.S. plan for the development of reusable spaceports *by private's investors* (for the period from 2024 to 2074). Extensive infrastructure upgrades are underway (including at the Port of Canaveral) to ensure a higher expected launch frequency and create landing sites for a new reusable generation of spacecraft.

The project of the Eastern spaceport on the Kuril Islands, DKK, has been proposed as an extension of the line of Japanese spaceports *to the North*. The Western spaceport project on the island of Cuba has been proposed as an extension of the Cape Canaveral spaceport line *to the South*. *The DKK project should probably receive the status of a national project of Russia for the next 50 years, as has already been done in the United States.*

The possibility of reuse of launch vehicles has had a huge impact on the space industry, on the development of reusable spaceports, without the development of which it is impossible to take advantage of reusable launch vehicles. Reusable rocket. Reusable spaceport. The disposable [or single-use] rocket. The disposable spaceport. Unified global space navigation. Unified 25th lunar time zone. The Panama Canal.

Keywords. Seismicity. The Kuril Islands. Alaska. The Kodiak Launch Complex. The Uchinoura Space Center. Tanegashima Space Center. Yoshinobu Launch Complex. Cuba. Cape Canaveral. DKK is the Far Eastern Space Complex.

I. THE ERA OF SINGLE-USE ROCKETS AND SINGLE-USE SPACEPORTS

All spacecraft created in the first decades of space exploration were disposable. This statement is true for both satellites and space probes designed for long-term stays in space, as well as for any objects designed to return to Earth, such as space capsules by people on board or sample return canisters on missions to collect cosmic matter, such as Stardust (1999-2006) or the Hayabusa mission (2005-2010).

Next, the development of reusable space systems began. Among the first, the most significant and well-technically developed, the project developed in 1952 by *Wernher von Braun*, a German designer who moved to the United States, should be noted. He developed a project for a giant Ferry Rocket weighing about 6,400 tons with a wingspan of 48 meters.

The first stage was supposed to return to Earth using a steel mesh parachute, and on approach to the surface of the Earth, additional engines were turned on for a soft landing in the ocean.

The second stage returned in the same way as the first, and the *third stage* landed on the airfield like the regular airplane. *bcs-express.ru; siriusmag.ru*

Among the projects of the 1960s were those of engineer Philip Bono of the Douglas Space and Missiles Company, who developed a series of rockets capable of reaching orbit using a single stage (SSTO system) and taking off/landing vertically (VTOVL system).

His projects include ROOST, ROMBUS, Ithacus, Hyperion and Pegasus. dzen.ru. These early developments had no physical implementation.

The second stage differs from the first by the fact of physical realization. It was the Space Shuttle reusable space shuttle program. It was established in the USA and in the USSR in the period from 1972 to 2011.

These were programs with partial reuse of structural elements. The Space Shuttle (USA) began development in 1972. Only the orbiter itself, designed for 100 flights, was fully reusable, and two solid-fuel boosters were detached after completing the task and parachuted to Earth. The fuel tank burned up in the atmosphere.

As part of the program, only five shuttles were built, which made a total of 135 flights. *bcs-express.ru; siriusmag.ru*

Soviet and Russian projects took place in the period from 1974 to 2020. The first Soviet program was the reusable space shuttle system Energia — Buran, launched in 1974. The Buran space ship orbiter made its first and only unmanned flight on November 15, 1988. The project was closed in 1993. *bcs-express.ru; ru.wikipedia.org*; ru.ruwiki.ru*

The Baikal project was developed by the Khrunichev State Space Research and Production Center and the Molniya Scientific and Production Association. After launching the payload into orbit, the cruise first stage of the launch vehicle lands on its own at the airfield as a drone. Not implemented. *life.ru*

A full-size engineering mock-up of the Baikal was presented at the Paris Air Show in Le Bourget in July 2001. Similar models were tested in wind tunnels of the Central Aero and Hydrodynamic Institute (TsAGI) at speeds from 0.5 to 10 Mach. en.wikipedia.org [1] Since 2019, development has continued in the Krylo-SV project.[2]

The Russian *Korona* project was developed by the Academician V. P. Makeev State Rocket Center. It was assumed that the single-stage carrier would be able to launch up to 7 tons of payload into low-Earth orbit and return as one. iz.ru Roscosmos announced that in 2026, development work will begin on the creation of Russia's first reusable launch vehicle, the Korona. The project is being led by the Makeev State Rocket Center. One device is designed for about 100 launches.

The refueling system and built-in shock absorbers simplify preparations for the next flight. The Vostochny cosmodrome is being considered for launches. Checking the engines and the hull between flights takes less time than with traditional disposable carriers. The rocket will combine the functions of cargo delivery and work with orbiters. It will take off and land vertically, use liquid hydrogen and oxygen, and operate in a multiple cycle. *hi-tech.mail.ru*. [3]

These are purely orbital spacecraft - the American Space Shuttle orbiter and the Soviet Buran were an integral part of the launch system (providing acceleration).

They were used *only as orbiting* spacecraft of average duration of flight in space. However, since 2017, there has been an understanding in the United States of the importance of colonizing the Moon. The Moon colonization program was adopted by Trump, the 45th President of the United States, who issued Decree No. 1 on colonization of the Moon on December 11, 2017.

This Decree de facto launched the modern process of total industrialization of space.

II. COLONIZATION OF SPACE THROUGH REUSABLE ROCKETS AND REUSABLE SPACEPORTS

Falcon 9 (SpaceX). After testing the technology based on the Falcon 1 rocket, SpaceX began to create partially reusable Falcon 9 launch vehicles (according to the number of engines).

The first stage should return to Earth after the flight. Jeff Bezos from Blue Origin [New Shepard Suborbital Flight Program] was the first to realize this.

In 2015, SpaceX carried out the first successful landing of the first stage of the Falcon 9, which was a breakthrough in the field of reusable space technologies. *science.mail.ru*.

Falcon Heavy (SpaceX). A superheavy launch vehicle consisting of three Falcon 9 first stages connected together. At the time of 2024, SpaceX had conducted 11 successful launches of this giant, returning 21 first stages to Earth intact. *siriusmag.ru*

Starship (SpaceX). A fully reusable superheavy launch vehicle being developed by SpaceX. It consists of two stages: the Super Heavy accelerator and the Starship spacecraft. Both stages are being developed capable of returning to the launch pad using vertical jet landing technology.

Neutron (Rocket Lab). A partially reusable mid-range rocket, launched in 2025. *China*. In January 2025, the Chinese state-owned company SAST conducted a test launch of the Longxing-2 stage, which is planned to be used in a reusable rocket. *ru.wikipedia.org *; bcs-express.ru*

March 30, 2026. An absolute record for reusable space launches has been set. From the Cape Canaveral Space Center (SLC-40) The Falcon 9 rocket launched another batch of 29 Starlink satellites into low Earth orbit.

A few minutes after launch, the first stage, the absolute leader of the SpaceX fleet, made an accurate landing on the Just Read the Instructions marine unmanned platform ship in the Atlantic. It was a dynamic, powered, fully controlled, precise landing at a pre-arranged location at sea, rather than a passive parachute landing.

This is the 34th flight of the same accelerator in just over five years of operation. B1067 has already flown with NASA cargo (including Crew and CRS missions), with European and Asian satellites. A significant part of the flights is devoted to the deployment of the Starlink constellation. The 33rd flight took place about a month ago. The company continues to increase the life of boosters: the goal is to bring them up to 40 or more flights.

The revolutionary shift from single-use spaceports and rockets to reusable ones has consequences. The limited number of reusable spaceports in the United States threatens the country with congestion in terms of launches, according to The Wall Street Journal. Almost all-American launches are carried out only from three eco-friendly reusable spaceports located in Cape Canaveral, Florida, due to strict environmental restrictions.

In 2023, 145 rockets were launched, 134 of which were carried out by Elon Musk's SpaceX company. In 2024, the Cape Canaveral Space Center in Florida became the most popular and busiest — 93 rockets were launched from it (21 more than in 2023). The problem is particularly acute for small space companies, which have to adjust to the schedule of larger players in the space industry.

In search of a solution, the space industry has turned its attention *to alternative* sites, including the northern spaceport on Kodiak Island in Alaska, right on the border with Russia. Currently, the American Kodiak cosmodrome in Alaska is undergoing a permit procedure for up to 25 launches per year, which may partially relieve existing spaceports and provide new opportunities for small space companies. [the Vostochny cosmodrome in Russia is designed for about 10 one-time launches per year] [4]

The westernmost and northernmost Kodiak cosmodrome in the United States was built in Alaska at Cape Narrow (Cape Thin) of Kodiak Island. The decision to build it was made in July 1991. The first experimental rocket launch from the Kodiak cosmodrome took place on *November 5, 1998*. The first orbital launch took place on September 29 (30 UTC), 2001, when the Athena-1 launch vehicle launched 4 small satellites into orbit.

III. THE WESTERN REUSABLE SPACEPORT PROJECT IN CUBA AS AN EXTENSION OF THE CAPE CANAVERAL SPACEPORT LINE FROM NORTH TO SOUTH

It can be assumed that NASA can significantly expand the capacity of its unique modern reusable spaceports by opening its branch in Cuba. Logistically, this is an ideal location for the sea transportation of large rockets from factories in Texas and California (via the Panama Canal in the latter case).

We are talking about a reusable spaceport project in Cuba in the Western Hemisphere of the Earth. Can it be made "for five or six": the USA, Cuba, China, India, Brazil and Russia?

In a geopolitical sense, the middle and southern parts of Cuba's territory may be convenient for equipping the latest reusable spaceports and launch pads. In addition to the three existing reusable spaceports at Cape Canaveral, NASA can easily add up to 50 new spaceports and launch sites in Cuba.

The strategic and commercial interest here is obvious. Cuba is closer to the equator than Florida, and is more convenient in terms of logistics for sea and air transportation. In Cuba, it is convenient to use mobile sea-based landing platforms for precisely refloated reusable rocket stages.

The United States and Russia can either take the necessary territory on a long-term lease from the Cuban government, or work together with Cuba. India, China, Brazil and other interested parties may well join this team.

Today, according to The Wall Street Journal, there is a worldwide shortage of reusable eco-friendly spaceports due to the sharply increased need for the coming era of space Industrialization.

In the United States, only two giant factories of Elon Musk intend to produce up to 10,000 rockets per year and launch up to 1,000 rockets per month into space to the Moon alone. Thus, up to 200 rockets per day will have to be launched per launch window [for comparison, the Vostochny cosmodrome in Russia is designed for about 10 launches per year].

IV. PARADIGM SHIFT: RUSSIA INSTEAD OF THE USSR

The collapse of the USSR is considered a "geopolitical" catastrophe. This disaster has two types of consequences: 1) direct and 2) remote. Russia's space program turned out to be a remote problem. The USSR ended its existence in 1991. Gradually, over the course of 35 years, deep developments of the Soviet period in space were developed and consumed by inertia. Today, in 2026, they are mostly over.

The launch tables No. 31 and the Gagarin table [which belongs to Kazakhstan], which were created in 1961, that is, 65 years ago, remained on Baikonur.

And today, in the era of reusable rockets, they are completely outdated, both physically and mentally.

Figuratively speaking, according to Murtazin, is Russia today, unfortunately, "at a broken disposable trough"? New ideas of *a fundamental level have not yet emerged in Roscosmos.*

The patching of old holes from old stocks from the warehouses of the Soviet past has been going on and continues.

There are actually only two launch desks in operation at Baikonur today: No. 31 and Gagarin. Roscosmos does not have a backup site for servicing the ISS. The accident at table No. 31 occurred on November 27, 2025. This accident is being eliminated from the parts found in the Tambov arsenal of the Space Forces. The date of their manufacture 50 years ago is 1977.

We brought all the bundles on 18 trucks. 130 people were involved in emergency work. There was only one incomplete set in stock for the whole of Russia, which was originally intended for the overhaul of one launch pad.

The assembly took place from incomplete disparate nodes by fitting them to the site of the accident at Baikonur. The equipment has long been outdated. There is no new one. The technology of 50-year-old disposable rockets has been restored. There is no other one yet. How long will this emergency repair last?

Does such a space "strategy" of Russia's one-time spaceports resemble a strategic dead end today? Is there no way to launch reusable and (super)heavy modern rockets?

The space age of disposable rockets of the USSR definitely ended in 2026. The USSR cosmodromes were not calculated in principle for launching reusable rockets.

V. R. MURTAZIN'S VERDICT ON THE ENTIRE "DISPOSABLE SPACE" IN THE USSR AND IN RUSSIA

In May 2025, the head of the ballistics department of RSC Energia, Rafail Murtazin, publicly pointed out in an interview with MK that reusable flights from the Vostochny cosmodrome were objectively impossible. "Our rockets, when launched from the Vostochny cosmodrome, fly over mountains and gorges at almost all inclinations. And where there are no mountains, there is a frozen, uninhabited tundra. In the case of disposable rockets, it doesn't matter what kind of terrain is underneath."

"Since there was no program to create reusable launch vehicles in 1993, no one took this circumstance into account when choosing the location of the Vostochny cosmodrome. And even if there was such a program, no one offered any other place

for the cosmodrome except Vostochny." "Roscosmos planned to carry the return stage after landing on the world's largest Mi-26 helicopter.

And there are no guarantees that such an operation will take place without damage to the stage or helicopter. In short, in our conditions, you may not get any economic effect." On the contrary, there are only continuous losses. The use of mobile sea-based landing platforms on land is, of course, impossible.

"Instead of placing production on site, somewhere in Komsomolsk-on-Amur, space technology is transported across the country by rail, which has restrictions on the weight of cargo and its dimensions."

Is the Vostochny cosmodrome today an expensive technological dead end for all of Russia's disposable cosmonautics, which fundamentally cannot be reusable without modernization either at the Vostochny cosmodrome or at all other remaining 5 cosmodromes in Russia? This is a systemic, strategic problem with the 1966 [Soyuz] and 1965 [heptyl Proton] single-use missiles]. [5]

VI. "CONCLUSION" BY IVAN MOISEEV, HEAD OF THE INSTITUTE OF SPACE POLICY

During the development of Soyuz-5, the possibility of [passive] return of the first stage by parachutes was considered. This made it possible to make the rocket [passively] reusable. The Falcon 9 and Soyuz-5 are almost comparable in payload capacity, but on condition that the first stage of the Falcon 9 is non—returnable.

If the first stage of the Falcon 9 is dynamically returned to earth on the engine, then its payload capacity automatically becomes 15.6 tons instead of 22.8 tons [part of the fuel is spent on braking the rocket before landing].

The single-use Soyuz-5 is more spacious than the reusable returnable version of Elon Musk's rocket by about 10-15%. In the Falcon 9, the first stage returns when there is an excess of power, when the rocket is not fully loaded with payload.

In the reusable version, it flies with an underload of about 25-30%. And when it is necessary to launch a heavy satellite, the first stage of the Falcon 9 is made disposable, it does not return, and then the Falcon 9 becomes more powerful than the Russian Soyuz-5.

In the Russian Soyuz-5, the first stage is heavier than the Falcon-9 by almost 10 tons. This is because the domestic rocket is made of more massive aluminum-magnesium alloys, while SpaceX uses aluminum and lithium-based alloys.

The latter are 40% lighter than aluminum and magnesium alloys, although it costs more. Therefore, the payload of the Soyuz-5 is ≈10 tons less than that of the Falcon 9, all other things being equal. [6] The first stage of the Soyuz-5 rocket is not returnable. *3dnews.ru* In 2020, the head of the RCC Progress announced that there were no plans to create actively recoverable [engine braking] stages for Soyuz-5.

VII. THE OFFENSIVE MISSILE POTENTIAL OF THE UNITED STATES IN THE NORTH OF RUSSIA

1). Greenland is a space safety dome in the Northern United States.

2). The deployment of the new [LGM-35 Sentinel] 450 ICBM missile silos in Greenland brings them closer to the northern border of Russia along its entire length by more than two times, relative to the location of the old 450 continental ICBM missile silos in the United States [Minuteman III] in five states on the border with Canada [Montana, North Dakota, Nebraska, Wyoming, and Colorado].

3). Any point on the territory of Russia is located almost within the same radius from the point of launch of combat missiles from Greenland, which provides the United States with simultaneous, simultaneous and optimal destruction of all major strategic facilities on the territory of Russia.

4). The territory of Greenland will provide the United States with a unique strategic global position against continental Russia, and the territory of Canada, Norway and Alaska - against the Northern Sea Route.

VIII. THE EASTERN REUSABLE SPACEPORT PROJECT ON THE KURIL ISLANDS

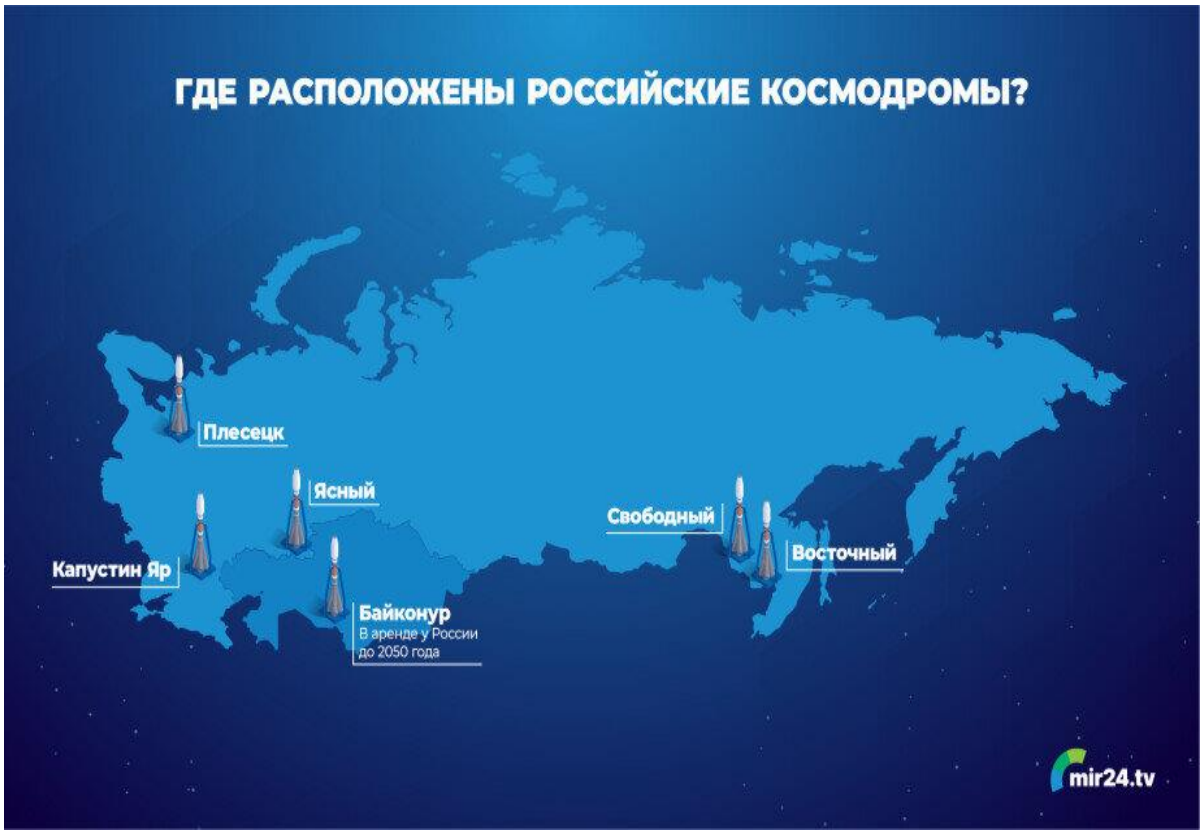
Russia has 6 one-time spaceports on its southern geographical arc:

1). Plesetsk;
2). Kapustin Yar;
3). Yasny;
4). Baikonur;
5). Free;
6). Vostochny

All of them were designed for disposable missile systems. Therefore, even if Russia acquires or manufactures reusable missile systems itself, it will not be able to physically use them. "Instead of placing production on site, somewhere in Komsomolsk-on-Amur, space technology is transported across the country by rail, which has restrictions on cargo weight and dimensions." It's very expensive. These are objective limitations for all Soyuz-5 series missiles and Angara series missiles.

The Vostochny Space Launch Center is today, unfortunately, perhaps an expensive one–time technological dead end for disposable Russian cosmonautics, which practically cannot be reusable *without modernization* either at the Vostochny Space Launch Center or at all other 5 cosmodromes in Russia?

This one-time spaceport problem, along with the 1966 [Soyuz] and 1965 [heptyl Proton] disposable rockets themselves It is a negative birthmark of the former USSR, which has been inherited by modern Russian cosmonautics. [5]



If Russia wants to stay in the trend of space industrialization, it must build new reusable spaceports for the use of reusable rocket systems.

The "conclusion" on the entire "disposable space" in the USSR and in Russia, as a technologically backward dead end, was made by Rafail Murtazin, head of the ballistics department of RSC Energia.

In this regard, it makes sense to consider the possibility of creating a strategic Russian Far Eastern Reusable Space Complex on the Magellanic date change line - the Russian Eastern Spaceport for reusable rocket systems on the Kuril Islands, as a continuation of the Japanese spaceports line.

This project should probably receive the status of the national project in Russia for the next 50 years, as it has already been done in the United States. Why?

This option technically solves the issue of overcoming the impasse of the impossibility of using reusable rockets of any mass at 6 old Soviet obsolete disposable spaceports. In the DKK, missile systems will be mostly reusable. Russia will have a powerful missile defense system along the entire northern arc from Murmansk to Vladivostok and protection along the entire length of the Northern Sea Route from Alaska to the North Sea.

During the Great Patriotic War, German submarines operated in Norway, in the Soviet Arctic, including in the mouths of Siberian rivers and on the Northern Sea Route. *vk.com; svpressa.ru*

I.D. Papanin, head of the Main Northern Sea Route in 1939-1946, led the fight against them. During the Second World War, German submarines had secret bases in the mouths of Siberian rivers flowing into the Arctic Ocean, and repeatedly reached Japan and back to Germany with secret military supplies and technologies. Therefore, we have proposed to build:

1). The Russian Far Eastern Reusable Space Complex (DKK) on the Kuril Islands, as well as to participate in the creation of

2). Reusable spaceport in Cuba. Technically, these projects are very similar.

IX. REUSABLE FAR EASTERN SPACE COMPLEX - DKK

1). The DKK center should preferably be located on Sakhalin. Sakhalin will become a kind of "capital" of the state program of space industrialization. Rocket factories for the production of the entire range of missiles should be located there.

This approach will fully resolve the issue of Russia's national space security. Convenient logistics will reduce the cost of missile production several times.

2). Cooperation with Far Eastern shipbuilders should be ensured for the production of multi-tonnage special vessels for the transportation of large-sized parts of reusable heavy and superheavy rocket systems from production sites to places of operation at spaceports.

It will be a cascade of 20-50 reusable, full-fledged, environmentally friendly spaceports and launch pads at the world ecological level. Most of the space activity on Earth will be concentrated here. Sakhalin should become one of the industrial capitals of the highly developed space industry in the world.

The entire Far Eastern scientific complex will be involved in the structure of space industrialization. The cost of creating and launching rockets will decrease several times. Almost all of them will be reusable.

3). The Kuril Islands are a chain of 56 islands of volcanic origin located between the Russian Kamchatka Peninsula and the Japanese island of Hokkaido. The archipelago stretches for 1,200 km and separates the waters of the Sea of Okhotsk and the Pacific Ocean. Today, 20,842 people live permanently on the four islands. If a CDP is created, up to a million people will eventually live in it.

X. THE CASCADE OF REUSABLE SPACEPORTS ON THE KURIL ISLANDS IS A KEY STRUCTURE OF THE FAR EAST SPACE LAUNCH COMPLEX [DKK], A CONTINUATION OF THE JAPANESE`S SPACE CENTER LINE FROM SOUTH TO NORTH

4). It is proposed to build the cascade of 20-50 state-of-the-art reusable Space Launch Center and world-class launch pads for various purposes on the Kuril Islands.

Today, there are no more than 10-11 units Space Launch Centers per the entire globe [out of about 60 available]. DKK will become one of the global centers of progress in the era of space industrialization.

5). The location of the DKK space complex has a unique character in terms of its environmental safety.

It is an environmentally safe place to launch reusable rockets of any power, including the largest and super-large, without any restrictions in their number and frequency of launches.

The use of offshore platforms for landing reusable rocket stages, as well as mobile ocean launch platforms, will be very effective.

6). Connect the islands with each other through underwater tunnels, starting with tunnels to Sakhalin from the mainland and ending with Kamchatka. It is possible to connect businesses of the Japanese island of Hokkaido to the structure of the DKK.

7). The developed underground and underwater infrastructure should become the backbone of the entire space system of the Space Station.

8). The energy sector of the DKK will be represented by powerful gas and oil power plants on Sakhalin itself, as well as tidal power plants on Penzhinskaya Bay, nuclear, wind and geothermal power plants, which will be optimally distributed throughout the territory of the DKK.

XI. DKK ECONOMIC CRITERIA

9). DKK, having an excess of cheap electricity, will build hydrogen production plants and use hydrogen as the main environmentally friendly fuel for rockets.

The strategy for the development of the Russian energy sector today assumes an increase in exports of hydrogen fuel **to 2 million tons** by 2035.

10). Based on this plan, it can be assumed that by the middle of this century, the export of environmental raw materials should replenish the Russian budget by **$100 million annually**. *The project has the potential to invest in its own development*.

11). This perspective will allow the Russian Federation to move away from dependence on the export of non-renewable resources and dictate conditions in the new energy market, as well as earn money by providing global services in the field of launching spacecraft from its new space launch sites. The need for reusable eco-storage facilities will only increase worldwide.

12). Russia will be able not only to become a leader in hydrogen production and make super profits, but also to influence the political balance in the status of an energy, scientific and space world superpower.

XII. DKK'S PRODUCTION STRUCTURE

Will be built:
13). Geothermal power plants using volcanic and underground heat.
14). Nuclear power plants.
15). An aviation plant in Komsomolsk-on-Amur will be involved.
16). A center for the design and production of robots will be created.
17). A Space Financial Center of the DKK will be created.
18). The DKK will provide an air defense and missile defense dome over the whole of Russia.
19). The colonization of the Moon and all Russian space developments will be created in the DKK.

Close international cooperation with the DPRK, the People's Republic of China, the Republic of South Korea, the United States and Japan is embedded in this DKK project.

XIII. UNIFIED GLOBAL SPACE NAVIGATION

The proposed Western reusable spaceport in Cuba is located geopolitically in the Western Hemisphere of the Earth.

The proposed eastern reusable spaceport is located geopolitically in the Eastern Hemisphere of the Earth. But functionally, it is the same planetary space system, dialectically interconnected through the Panama Canal.

Global space industrialization will physically develop through the construction and interaction between these two spaceports.

Figuratively speaking, these will be the objects of K.E. Tsiolkovsky's unified sixth space socio-economic formation.

The unified linear reference standard of lunar coordinated time - the unified **25th lunar time zone** - is considered in this context as the unified, universal, absolute, global time of the world civilization. [9]

It is objectively the basis for unified space and terrestrial navigation and time synchronization between the Eastern and Western spaceports.

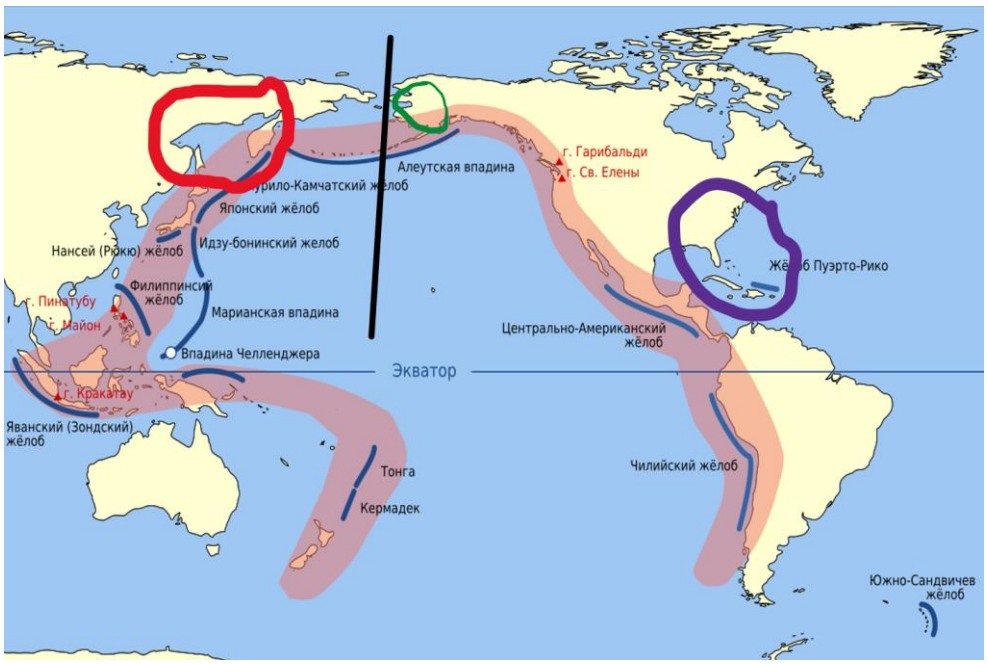
Both global spaceports [East and West] will complement each other perfectly logically through the Panama Canal.

After the launch of these two global projects, up to 80% of all space launches will take place through them.

These two convenient spaceports represent the future of world space exploration in the 21st century.

In the pictures has the territory of the proposed Far Eastern space complex [DKK – *red circle*] has been allocated – the Eastern Reusable Spaceport on the Kuril Islands;

the US Kodiak cosmodrome in Alaska [*green circle*];
the US spaceports at Cape Canaveral in Florida– and
the Western Reusable Spaceport in Cuba [*purple circle*]



The geopolitical alignment of the eastern and western world spaceports of the "Japan-Kuril-Sakhalin" Pacific seismic belt

The westernmost and northernmost Kodiak spaceport in the United States was built in Alaska at Cape Narrow (Cape Thin) of Kodiak Island. The decision to build it was made in July 1991.

XIV. THE PROBLEM OF EARTHQUAKES IN THE KURIL ISLANDS

Increased seismicity is not so much a geological fact, but *it is a purely engineering task.*

Cities, roads, ports, pipelines, and power transmission lines on Sakhalin and the Kuril Islands are designed with possible tremors in mind. Building codes require special requirements for foundations, connections, and materials.

Buildings must withstand certain levels of acceleration without collapsing like a house of cards. Engineers put earthquake-resistant solutions into their projects: rigid frames, damping elements, and the correct configuration of buildings.

Calculations show that high-rise construction in Tokyo is safer than in Moscow. By 2030, Moscow plans to build almost 260 residential skyscrapers without limiting the number of floors to about 400 meters in height. [8]

The main strategy of high—rise construction is not to wait for an accurate earthquake warning, but to build infrastructure with a safety margin, train the population, and develop warning and training systems. [7]

Earthquakes in the Kuril Islands occur no more frequently than in Japan, Seattle, Canada, Panama, California and Chile. This is the same "Japanese-Kuril-Sakhalin" seismic belt.

Earthquakes on the Kuril Islands occur daily. dzen.ru At the same time, aftershocks of 3-4 points are practically not felt, and earthquakes of 5-6 points occur no more than 1-2 times a year.

It's the same in Japan, in Seattle in the USA, and in California.[7] At the same time, massive high–rise construction is underway in Japan, Canada, Washington, Oregon, California, and Chile - the tallest skyscrapers in the world [up to 250-400 meters high] are being built, designed for earthquakes of up to 9-11 magnitude (such have never been seen in nature). [7]

In such difficult seismic conditions, three spaceports and one launch complex have been successfully operating for many years today:

1). the Kodiak cosmodrome in the USA in Alaska; as well as two spaceports and one launch complex in Japan:

2). Uchinoura,

3). Tanegashima, and the launch complex

4). Yoshinobu at the Tanegashima Cosmodrome).

The Uchinoura Space Center was founded in February 1962. Construction of the complex, designed for experimental launches of large rockets, began in 1961.

Until 2003, when the Japan Aerospace Exploration Agency (JAXA) was formed, the Uchinoura Space Center belonged to the Institute of Space and Astronautics (ISAS) and was designated as the Kagoshima Space Center.

I. The Uchinoura Space Center is a Japanese spaceport located on the Pacific coast near the village of Kimotsuki, in Kagoshima Prefecture, on the island of Kyushu.

The Uchinoura Space Center will launch solid-fuel launch vehicles, which were used for all launches of Japanese scientific spacecraft, as well as geophysical and meteorological rockets.

The launched spacecraft may have an orbital inclination ranging from 29° to 75° to the plane of the equator. The Center has deep space communication stations for interplanetary station flights.

II. Tanegashima Space Center, abbreviated TNSC, is Japan's second and largest spaceport.

The Tanegashima Space Center was founded in 1969 and is operated by JAXA. It is located on the southeastern coast of Tanegashima Island, in the south of Kagoshima Prefecture, 115 km south of Kyushu Island. Spacecraft launches are possible with an orbital inclination of up to 99° to the equator plane. According to JAXA, this spaceport is the most beautiful and picturesque launch pad in the world.

The heaviest Japanese H-IIA and H-IIB launch vehicles, which are now the main rockets launching from this cosmodrome, as well as small rockets designed for suborbital scientific launches, are launched from the spaceport.

III. Yoshinobu Launch Complex (launch pad for large rockets, also known as Launch Area Y or Area Y or LA-Y) is a launch complex at the Tanegashima Space Center, located on the Japanese island of Tanegashima, 115 km south of Kyushu Island.

The complex is used to launch H-II and H-IIA launch vehicles. The complex is also used for H-IIB rockets, the first of which was launched on September 10, 2009 with the HTV-1 spacecraft for retrofitting the International Space Station.

This is the northernmost launch complex at the Tanegashima Space Center, which, like the Osaki Launch Complex (currently inactive), is used for orbital launches.

The Yoshinobu launch complex consists of two launch pads, however, launches are carried out only from the launch complex of site 1, which was built in 1993 under the H-II program.

Construction of Site 2 was completed around 2000, however, shortly after the H-II rocket was retired in favor of the H-IIA, the site was no longer used for launches.

The complex also contains a test bench for firing engines [LE-7], which are used in the first stage of the H-II rocket and its derivatives. Rocket preparation is carried out before launch, in an upright position in the building of the assembly complex.

The rocket is rolled out to the launch pad on a mobile launch platform twelve hours before the scheduled launch. It takes about thirty minutes to take the rocket from the assembly shop to launch pad 1.

XV. SOURCES AND LITERATURE

1. Baikal (rocket booster). 2025
https://tr-page.yandex.ru/translate?lang=en-ru&url=https%3A%2F%2Fen.wikipedia.org%2Fwiki%2FBaikal_%28rocket_booster%29

2. Baikal - Angara. 2015.
https://xn--h1ajim.xn--p1ai/%D0%91%D0%B0%D0%B9%D0%BA%D0%B0%D0%BB-%D0%90%D0%BD%D0%B3%D0%B0%D1%80%D0%B0
3 The Korona rocket will be created in 2026: what is interesting about Russia's new flagship? Technologies. November 2, 2025 Source: Hi-Tech Mail
https://hi-tech.mail.ru/news/136744-koronu-sozdadut-v-2026-godu-chem-interesen-novyj-flagman-rossii/
4. An acute shortage of spaceports is already being felt in the United States: almost all launches are carried out from only three spaceports. The authorities are looking at alternative sites. 2025-01-06
https://www.ixbt.com/news/2025/01/06/v-ssha-ozhidajutsja-kosmicheskie-zatory-v-strane-ostro-oshushaetsja-nehvatka-kosmodromov.html
5. The Eastern "stumbling block": there are "pitfalls" in the way of implementing space projects. The idea of reusable space rocket stages may not work in Russian conditions. 29.06.2025
https://www.mk.ru/science/2025/06/29/vostochnyy-kamen-pretknoveniya-na-puti-realizacii-kosmicheskikh-proektov-est-podvodnye-kamni.html
6. Soyuz-5: Falcon 9 Killer or Roscosmos' Last Hope? October 15, 2021
. https://dzen.ru/a/YWhoWhu_QkAg-ont
7. Seismic activity in Sakhalin and the Kuril Islands: why it shakes so often here November 21st, 2025. https://dzen.ru/a/aSAu8zvg0wAARNw0
8. Almost 260 residential skyscrapers will be built in Moscow by 2030. Syrtsov from Metrium: almost 260 residential skyscrapers will be built in Moscow by 2030. 06/02/2025. https://realty.ria.ru/20250602/neboskreby-2019982063.html
9. Sergei L Morozov. A time zone for the Moon. London. ROOM №35, 2024, pp.86-89. https://calendar-morozov.space/files/lunartime.pdf