Soviet Spaceflight Medallions

by
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The Soviet space program and the "Space Race" with the United States was a defining feature of U.S.-Soviet relations for a number of decades. Many of the scientists, missions and events in the program were commemorated by various Soviet numismatic issues. The author was fortunate to obtain the collection illustrated here, many of which were acquired in the early 2000s.

The Russian space program can trace its origin to Konstantin Eduardovich Tsiolkovsky (1857-1935), a pioneer of astronautic theory. In the late 1800s he studied space travel and rocket design, being the first person to conceive of a space elevator (a tower reaching geosynchronous orbit) in 1895, and in 1896 proposed the ideal rocket equation which associated a rocket's velocity to its fuel mass as it is consumed. In his 1903 work *Exploration of Outer Space by Means of Rocket Devices* he used his equation to calculate the speed needed to orbit the earth, and conceived of rockets divided into three sections: the pilot and copilot in the first, and liquid oxygen and liquid hydrogen as fuel in the second and third, a design still used today. In 1929 he proposed true multistage rockets in his book *Space Rocket Trains*.

The 125th anniversary of his birth is commemorated by this 50 mm bronze presentation medallion of the Cosmonautics Federation, minted by the Moscow Mint in 1982. The obverse shows a portrait of Tsiolkovsky and the reverse his name, Константи́н Эдуа́рдович Циолко́вский, surrounding the commemoration dates.

On October 3, 1967, his memory was honored by the opening of the Konstantin E. Tsiolkovsky State Museum of the History of Cosmonautics in Kaluga (the town in which Tsiolkovsky had lived on the outskirts of), the first museum in the world

dedicated to space exploration. The person most responsible for the creation of the museum was Sergei Korolyov, and the cornerstone was laid by Yuri Gagarin on June 13, 1961 – two names that will appear again in this article. The obverse of this aluminum 54 mm medal shows Tsiolkovsky, and the reverse the museum with its location and opening year below.

After the Russian Revolution, the first study of solid fuel rockets began at a military laboratory in 1921 led by Tikhomirov and supported by Artemyev, with the first test firing of a solid fuel rocket in March 1928 that flew for about 1,300 meters. Development of missiles for military purposes continued into the 1930s. Stalin's Great Purge in the late 1930s retarded progress because scientists were among those targeted, but during World War II research continued.

After the war, as the United States did with Operation Paperclip, the Soviets obtained German technology and scientists to aid in their rocketry program. With this help, by October 1948 the Soviets had a working replica of the V-2 rocket called the R-1. This led to the creation of short to intermediate range ballistic missiles including the R-2, R-5 and R-14, and parallel development of liquid-fueled rockets led to intercontinental ballistic missiles (ICBMs) such as the R-7 successfully tested in August 1957.

In 1930, Ukrainian aircraft engineer Sergei Korolev became interested in using liquid-fueled rockets to propel airplanes (a technology further developed during World War II), and became part of the Soviet space program over the next few years. Although caught up in Stalin's purge with other engineers and imprisoned in the Gulag, he was moved in 1940 to a prison for scientists and engineers. After the war he helped coordinate the knowledge transfer from the German scientists and went on to design ballistic rockets. During this time he kept his interest in space travel secret, but with the U.S. announcement in July 1955 of its plan to launch a satellite, Korolev convinced Soviet leader Nikita Khrushchev to support his plan of doing it first.

Using the R-7 as a basis for a launch vehicle, Sputnik 1 was successfully launched on October 4, 1957, orbiting the earth operationally for three weeks until its batteries ran out, and for two months more until it fell back to Earth on January 4, 1958. Beating the U.S. to orbit was the trigger for the start of the Space Race because the U.S. felt obligated to respond.

This 65 mm presentation medal of the Cosmonautics Federation from 1982 commemorates 25 years since the launch of Sputnik 1 in 1957. It was intended for veteran participants of

the launch. The obverse shows Sputnik 1 orbiting earth with CCCP on it below. The reverse reads “in honor of the launch of the world’s first artificial satellite in the USSR.”

Continuing the race with America, Korolev used the R-7 again as a basis for the launch vehicle for Luna E-1 No. 1, intended to impact on the Moon. Originally scheduled for August 17, 1958 to match a U.S. lunar launch, problems with the R-7 design were worked on quickly to meet the deadline. As the problems were not fully corrected by that date, Korolev held back the launch, intending that the Luna probe could still reach the Moon first due to its faster speed. However, the U.S. launch of Pioneer 0 ended with a booster explosion, so Korolev had time to fully correct the problems leading to a successful launch on September 23, 1958 with a successful third stage booster separation on January 2, 1959. Unfortunately, a ground control problem caused an incorrect engine burn causing the craft to miss the Moon by 5,995 km on January 4 and instead enter a heliocentric orbit between Earth and Mars. Even though the mission was not successfully concluded, it was the first spacecraft to leave Earth orbit and the first to the vicinity of the Moon.

This 65 mm bronze medal minted for the Academy of Science by the Moscow Mint was issued in 1959 to commemorate the flight. The obverse shows the University of Lomonosov, one of the largest scientific institutions in the Soviet Union with the inscription “In the glory of the great motherland” and is dated January 1959. Around the reverse reads “in honor/commemoration of the launch of the first in the world space rocket” and the center has a quote from Tsiolkovsky: “I believe that many of you will be witnesses of the first out of atmosphere journey.” The pentagonal image is of the “pennant” placed aboard the rocket. Instances of this medal were presented to scientists and designers and were not released publicly.

Incidentally, the University of Lomonosov (M.V. Lomonosov Moscow State University) was founded by polymath Mikhail Vasilyevich Lomonosov in 1755. Lomonosov made contributions to a number of fields including physics, chemistry, geology, geography and poetry.

His astronomical contributions included discovering the atmosphere of Venus and creating an improved design of a reflecting telescope. This 65 mm medal was issued for the 250th anniversary of his birth and was owned by cosmonaut and designer Georgiy Grechko. The reverse quotes from one of his poems: "The Russian soil indeed is able to give birth to its own Platos and sharp-minded Newtons."

After unmanned missions, the next achievement for Soviet astronautics was to be a manned flight, but that required a crewed spacecraft to be designed. For this, Korolev developed Vostok, which contained an instrument package, engine system and, most importantly, a descent module which could house a cosmonaut and return him safely back to Earth.

The Moscow Mint produced this 65 mm medal in 1976, ten years after the death of Korolev (1906-1966). The obverse shows a profile of Korolev and the reverse his hands designing Vostok. It also features a quote of his from the newspaper *Pravda* on December 10, 1957: "A dependable bridge to the cosmos is created by the launch of Soviet artificial sputniks (satellites) of earth… the road to the stars is open." This medal features the artwork of Shagin, and has a mintage of no more than 1000 pieces. It was not released to the public, but was intended for scientists and designers in the Soviet space program during the birthday celebration.

This 60 mm USSR Academy of Science presentation medal also commemorates Korolev's birthday. The reverse features a rocket, his signature, and a quote from him: "Cosmonautics has an infinite limitless future and its prospects are boundless as the universe itself."

Korolev, along with German (and later United States) scientist Wernher von Braun, also appears on this 90 mm x 40 mm medal minted in 1994 by the Moscow Mint for the Association of Cosmonautics Museum (with artwork by A.S. Zabaluyev). It has a mintage of 1000 pieces and was not distributed to the public. This particular one was owned by the president of the association, the fourth Soviet cosmonaut Pavel Romanovich Popovich.

The first crewed flight of Vostok, Vostok 1, launched from Baikonur Cosmodrome, carried Yuri Gagarin into orbit on April 12, 1961. The flight consisted of a single orbit around Earth (196 km / 91 nautical miles at its lowest point), and lasted 108 minutes from launch to landing with Gagarin parachuting to the ground.

Gagarin and his flight are arguably the most commemorated cosmonaut and mission in Soviet spaceflight with numerous coins, notes and medals issued from multiple countries – not just ones in the Soviet bloc, but are as diverse as from Malawi, the Cook Islands and even appearing on a Shell Oil token in 1969 obtained from their stations when a customer filled their tank with gas.

This medal was issued in 1971 for the 10th anniversary of Gagarin's mission. It is encased in a red plastic pentagon, and blue versions also exist. The obverse shows a helmeted Gagarin with his name and mission date. The reverse shows a rocket launching into space and the legend "10 years since the first manned flight into space." САРАТОВ (Saratov) is the city where Gagarin landed at the end of his 108 minute orbit. The medal measures 60 mm itself, and the holder 83 mm.

Minted in 1961, this 75 mm medal has a profile of Gagarin on the obverse and his signature on the reverse. At the 20th anniversary celebration at the Baikonur cosmodrome of the flight, an engraving was added to to the reverse: “20 years of flight of man into space from cosmodrome Baikonur” and the medal was presented to launch team officers who had participated in the Vostok 1 launch.

Also on the 20th anniversary this 31 mm one rouble coin was issued by the U.S.S.R. featuring the national arms on the obverse and Gagarin flanked by the Vostok rocket and Salyut space station with two docked Soyuz spacecraft. The reverse reads “20 Years of the First Flight of Man in Space” with dates across and Gagarin’s name below.

On the 30th anniversary of the flight in 1991 this 40 mm medal was issued with a helmeted Gagarin on the obverse, Vostok on the reverse, and inscribed “First man in space 12.IV.1961.” It is made from metal from a Soviet spacecraft flown in space and has a mintage of 160,000 pieces.

For the 40th anniversary in 2001, a related 40 mm medal was released by the Space Federation of Russia in that it was also made from metal from a flown Russian spacecraft. It also features a helmeted Gagarin and Vostok, though the reverse shows the International Space Station. The mintage is much lower, though, at only 12,000 pieces.

Other commemoratives were also issued at the 30th anniversary of the flight. This 70 mm x 48 mm medal minted at the St. Petersburg mint as a souvenir of the "Cosmos at service of peace and progress" conference shows both a helmeted Gagarin and Sputnik on a star field on the obverse and reads "To the stars 91." The reverse inscription reads "XXX years of the first man of the century into space." It has a mintage of 10,000 pieces.

This 60 mm presentation medal minted at the Moscow Mint shows a helmeted Gagarin on the obverse, and exhaust from a rocket as it lifts off a pad with the inscription "Cosmodrome Baikonur."

A 39mm 3 rouble one ounce silver coin was also issued that same year by the Soviet Union. The obverse shows the national arms and the reverse the Yuri Gagarin Monument. It has a mintage of 35,000 pieces. The monument is a 40-foot statue made of cast titanium standing on a 90-foot granite pedestal and was unveiled in June 1980. It was designed by sculptor Pavel Bondarenko and architect Yakov Belopolskiy.

Gagarin also appears on this 45 mm souvenir medallion for guests at the Cosmonaut Training Center in Star City - what had been a guarded military installation but is now under civilian control. As of June 19, 2001, only two production runs of 1,000 pieces each had been completed.

In 1994 the Moscow Mint produced this 40 mm medal for the Cosmonautics Museum. The obverse shows Gagarin and Vostok 1 and the reverse the emblem of the Central Museum of Cosmonautics. It is made from metal of the launcher used to lauch Mir space station modules into orbit.

This 50 mm Gagarin commemorative medal shows his capsule in orbit around Earth with the caption “The first flight of the age into space” along with the mission date, name, and country.

Along the same lines, this 50 mm bilingual Gagarin "first cosmonaut of the Earth" medal shows his capsule after landing, with him standing next to it and its parachute unfurled. This was issued by the Association of Museums of Cosmonautics (AMCOS) for display in Russian museums and not for public distribution. This was designed by A. Zavaluyev, and minted at the Moscow Mint in 1992.

The last Vostok mission, Vostok 6, also launched from Baikonur, carried Valentina Vladimirovna Tereshkova, the first woman in space. Launched on June 16, 1963 it orbited the Earth 48 times for a total mission duration of 2 days, 22 hours and 50 minutes.

In 1983, on the 20th anniversary of her flight, this Soviet 31 mm one rouble coin was issued with the national arms on the obverse and a helmeted bust of her on the reverse with the mission dates below.

Although the Soviets had early success in spaceflight, by the later 1960s efforts started to flounder. Vostok was replaced by the Soyuz spacecraft, and the program had the goal of orbiting a cosmonaut around the Moon in 1967 and a landing in 1968. However, with the death of Korolev in 1966 the space program suffered. Vasily Pavlovich Mishin, engineer and rocket pioneer, took over the design bureau and became Chief Designer, but the Soviet program faltered under his leadership.

Design problems caused the first Soyuz flight, Soyuz 1, launched on April 23, 1967, to result in the death of cosmonaut Vladimir Komarov when his descent module crashed due to a parachute failure, the first in-flight fatality of the Soviet space program.

The Soviets were beaten to Moon orbit by the Americans with Apollo 8 in 1968, though it was hoped that the new N1 heavy-lift launch vehicle could still let the Soviets perform a Moon landing before the U.S. However, the four attempted launches, the first on Feburary 21, 1969, were all failures and ensured the U.S. would reach the Moon before the Soviets with Apollo 11 in

July 1969. The repeated failure of the N1 caused the program to be suspended in 1974 and canceled in 1976 by Mishin's successor, Valentin Glushko. By this time, Mishin was regarded as a not very capable administrator and had become an alcoholic due the pressures of his failures which also included additional cosmonaut deaths on the Salyut 1 mission in 1971 due to Mishin's decision to not have the cosmonauts wear pressure suits. Incidentally, the explosion of the second attempted N1 launch when the rocket fell back to its pad was one of the largest non-nuclear explosions by that time estimated as the equivalent of a thousand tons of TNT.

Under Glushko's administration the Soviet program improved, with the most noteworthy mission the Apollo-Soyuz Test Project in conjunction with the United States in July 1975. An American Apollo spacecraft docked with a Soviet Soyuz capsule and is considered a symbol of détente during the Cold War and the end of the Space Race between the nations.

The three U.S. astronauts, Thomas P. Stafford (U.S. commander), Vance D. Brand, and Deke Slayton, and the two cosmonauts Alexei Leonov (Soviet commander) and Valeri Kubasov, performed individual and joint experiments, and the cooperation provided a model for later joint missions such as with the Shuttle/Mir and Interational Space Station programs. The ASTP mission encompassed 96 Earth orbits by the Soyuz and 148 by the Apollo craft, and durations of 5 days, 22 hours, and 30 minutes by the Soyuz and 9 days, 1 hour and 28 minutes by Apollo. This was the last crewed U.S. spaceflight until April 12, 1981 with the launch of the first Space Shuttle.

The ASTP is commemorated on this 60 mm USSR Academy of Science Intercosmos Council experimental flight of space ships medal. The obverse shows the docked Soyuz and Apollo craft over the Earth, and the reverse helmeted images of the astronauts and cosmonauts along with flags of both countries. This was presented to scientists and officials associated with the Apollo-Soyuz Test Program.

This 65 mm medal has a similar obverse, but with a reverse showing two men floating in space (an allegory of the two nations?). It is made

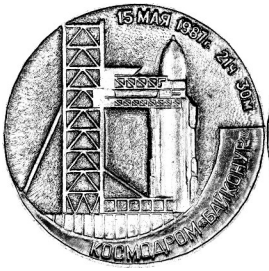
of titanium flown on the ASTP mission and was owned by Alexei Leonov, the Soviet commander.

Leonov himself is featured on this 40 mm medal from 1975 that acknowledges the ASTP in the obverse legend. The reverse shows his signature.

After the ASTP the Soviet space program did have success with long-duration spaceflights with cosmonauts in orbit multiple months to a year. The Salyut program led to four scientific and military reconnaissance space stations from 1971 to 1986, with Salyut 1 becoming the world's first crewed space station. Salyut was supported by the Soyuz crewed modules and the Progress cargo spacecraft.

Several long-duration records are commemorated on this red brass 65 mm medal issued by the USSR Cosmonautics Federation. It was designed by A.V. Kozlov and produced by the Lenningrad Mint with a mintage of 1,500 pieces. Three cosmonauts are shown: Vladimir Afanasyevich Lyakhov, Leonid Ivanovich Popov, and Valery Victorovich Ryumin. The reverse shows a rocket over Earth with the Soviet Union marked and a Soyuz capsule docked with the Salyut 6 station. The inscription reads "Long duration space flights of Soviet cosmonauts V. Lyakhov, L. Popov – 6 months and V. Ryumin – 1 year on board of orbiting complex 'Salyut-Soyuz-Progress' 1979-1980 with international teams" referring to the time they spent on the Salyut 6 station during those years. These medals were presented to the cosmonauts and flight preparation personnel with this particular one owned by Lyakhov.

With the cancellation of the N1, a new heavy lift vehicle was needed, so Glushko began the Energia program specifically for use with the Buran orbiter, the U.S.S.R.'s response to the U.S. Space Shuttle. The Energia program began in 1976, though only two flights to orbit in 1987 and 1988 were made before the program was discontinued.



The first flight is commemorated by this 40 mm medal that is made from flown metal of that flight. The obverse shows the Energia on its launch pad with the legend "15 May 1987, 21:30 PM, cosmodrome Baikonur." The reverse reads "This medal is minted from original metal of rocket-carrier Energia."

The first flight is also commemorated by this 63 mm presentation medal. The obverse shows Energia and its date of launch, and the reverse the text "universal booster" and "to the participant of the first launch."

The second flight of Energia on November 15, 1988 was the one and only flight of Buran, and it was uncrewed. Buran orbited Earth twice and then landed at Baikonur. Construction of Buran began in 1980 and the first full-scale orbiter was completed in 1984. A second uncrewed flight was planned for 1993, but the breakup of the Soviet Union caused funding to disappear and the launch never occurred. On May 12, 2002, the hangar it was stored in collapsed due to poor maintenance and the vehicle was destroyed. Two other Buran variants not suitable for spaceflight still exist, however.

As with the Gagarin medal, in 1994 the Moscow Mint also produced this 40 mm medal for the Cosmonautics Museum. The obverse shows Buran – very similar to the U.S. Space Shuttle but with CCCP on the wing. Also as with the other medal, the reverse shows the emblem of the Central Museum of Cosmonautics, and is also made from metal of the launcher used to launch Mir space station modules into orbit.

Made by the Space-Earth company in Moscow, a company that promotes the Russian Space Agency, for fundraising purposes, this 40 mm medal features the date of flight and Buran on the obverse and a hologram of Buran on the reverse. About 5,000 were minted out of metal from equipment used to construct Buran - it is not made from flown metal itself. Other medals of identical design were made of flown metal, however.

The Baikonur cosmodrome is located in southern Kazakhstan, and Kazakhstan has issued various 31 mm 50 Tenge coins commemorating launches from Baikonur, such as this one from 2014 featuring Buran. Other releases include a Sputnik issue in 2007, Vostok in 2008, Apollo-Soyuz in 2009, Gagarin in 2011, and Venera 10 (a Venus probe) in 2015.

Baikonur is still in operation. Originally established on June 2, 1955 by the Soviet Ministry of Defense it is now used as a spaceport for military, scientific and commercial missions, such as being the launch point from Russia to the International Space Station. Baikonur itself has been commemorated on various medals.

This 60 mm medal commemorates 30 years of Baikonur operation in 1985 and was presented to the first test field launch team that launched the first Soviet satellites and spaceships in the 1950s and 60s.

This 58 mm medal was issued for the 35th anniversary of Baikonur. The obverse shows Vostok on the left, and Buran attached to the Energia heavy lift vehicle in the center.

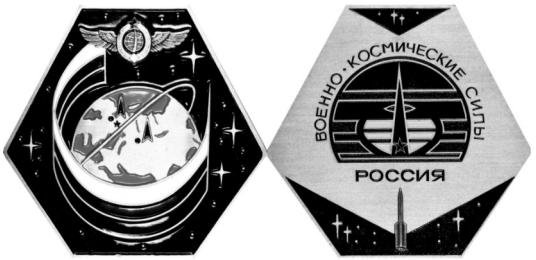
This 70 mm presentation medal from the Russian Space Agency (RKA) to Kazakhstan officials is bronze with an attached white metal representation of a launching Soyuz. The RKA, российское космическое агентство as it appears on the reverse, was established on Feburary 25, 1992, was restructured in 1999, and is now known as Roscosmos, so this medal is from the era before the restructuring. It has a mintage of 50 pieces.

Although Baikonur is the best known Russian cosmodrome, it is not the only one. The Plesetsk Cosmodrome is located 200 km south of Arkhangelsk and 800 km north of Moscow. It was created in 1957 primarily for ICBM and military launches and was kept secret until 1983. With the breakup of the Soviet Union, Baikonur is now located in foreign territory and Kazakhstan has charged a $115 million yearly usage fee, so Plesetsk, still within the confines of Russia, has seen greater activity.

In 1992 the Space Flight Europe-America 500 goodwill mission was launched from Plesetsk. In honor of 500th anniversary of Columbus' landing in America, the 35th anniversary of both the beginning of space era (Sputnik 1 1957-1992) and the European community and International Space year announced by UNESCO, a Resurs 500 capsule (derived from the Vostok design) was launched on November 16, 1992. It carried messages to the American people and Russian promotional materials such as toys, gifts, examples of the last 1 rouble Soviet notes and other items. The capsule orbited Earth for 7 days before parachuting into the Pacific Ocean 120 miles off of Grays Harbor in Washington State on November 22. It was recovered and brought to Seattle on November 24. The mission spawned a major local event with many dignitaries in attendance and even residents hosting the crew of the Russian recovery ship in their homes. The mission spawned other social development programs, such

as an internship that over time hosted 10,000 young people in a 4 to 6 week American program for the development of entrepreneurial skills.

The mission was commemorated by this 60 mm presentation medal minted at the St. Petersburg mint. With artwork by A. Baklanov these were given to Russian and American officials of the joint space project.



One of the items flown in the capsule was this metal 84 mm x 87 mm enameled "pennant." The obverse depicts the wing emblem of the Russian Space Forces over the globe and the Russian flag. On the map of Russia arrows identify both the Baikonur (right arrow) and Plesetsk (left arrow) cosmodromes. The reverse shows the emblem of the space divisions of Russia which launched the craft.

As with the Space Flight Europe-America 500 mission, the U.S.S.R. has had some success with unmanned missions. As mentioned before, Sputnik 1 was the first satellite in orbit, and Luna 1 reached the vicinity of the Moon before a United States mission did. The Venera probe series to Venus also produced a number of firsts, such as the first man-made object to enter the atmosphere of another planet (Venera 3 on March 1, 1966), make a soft landing on another planet (Venera 7 on December 15, 1970), return images from a planet's surface (Venera 9 on June 8, 1975), record sound on another planet (Venera 13 on October 30, 1981) and the first to perform high-resolution radar mapping (Venera 15 on June 2, 1983). For its problems, even Buran did orbit Earth and land successfully while uncrewed.

As with Luna 1, though, not every unmanned mission could be considered fully, or even partially, successful. The Phobos 1 and 2 missions, launched just days apart on July 7 and July 12, 1988 were such missions, with Phobos 2 the last space probe designed by the Soviet Union.

Phobos 1, launched from Baikonur, was intended to explore Mars, including its two moons, Phobos and Deimos. Unfortunately, a political argument between

Moscow and ground control in Yevpatoria divided mission responsibility – Moscow would remain in control but Yevpatoria would check and send all transmitted commands. A technician in Yevpatoria left out a hyphen in a command, but the computer that proofread commands had malfunctioned. Rather than waiting for the computer to be repaired so the command could be verified, the technician sent the unknowingly faulty command anyway in breach of protocol on August 28, 1988. Execution of the command deactivated the attitude thrusters on the spacecraft causing it to lose its lock on the Sun. Since it was solar powered, its batteries could no longer be charged because the solar power arrays were not oriented properly and the spacecraft was lost – an expected transmission on September 2, 1988 never arrived.

Phobos 2, also launched from Baikonur, had greater success. It did reach Mars and was able to return 37 images of Phobos, and did provide other data such as from an infrared spectrometer, but was unable to fulfill its full mission of releasing two landers on to Phobos itself. Three computers were on board the probe and operations were "voted" on to ensure spacecraft health. By the time the probe reached Mars however, one computer was dead, and another had started to malfunction. As such, one computer could not correctly control the craft because it could not "outvote" the others, so the Phobos landers failed to launch. Subsequently, signals from the probe, due to the failing computers, could not be reacquired on March 27, 1989 formally ending the mission.

This 60 mm medal commemorates the Phobos 2 mission. The obverse reads "international project Phobos" around the rim and "flight control center" between the stars. The reverse shows the Phobos 2 probe above Phobos with the two landers successfully deployed.

The Soviet space program was a significant component of the relationship between the U.S. and the U.S.S.R. and it is interesting to see it expressed in numismatics.

References

Many medal descriptions and all provenance courtesy of Alex Panchenko of USSR-Russian Aviation & Space Collectibles (http://www.ussr-airspace.com/).

Michael, Schmidt. *2018 Krause Standard Catalog of World Coins 1901-2000 45th ed*. Krause Publications, 2017.

Luna 1
https://nssdc.gsfc.nasa.gov/nmc/spacecraft/display.action?id=1959-012A

Luna 1 Spacecraft. (Images and Video)
http://forum.worldoftanks.com/index.php?/topic/523660-luna-1-spacecraft-images-and-video/

Resurs 500 Capsule
https://www.museumofflight.org/spacecraft/resurs-500-capsule

Yuri Gagarin Monument in Moscow
https://havecamerawilltravel.com/places/yuri-gagarin-monument-moscow/

Wikipedia:
https://en.wikipedia.org/wiki/Apollo%E2%80%93Soyuz
https://en.wikipedia.org/wiki/Baikonur_Cosmodrome
https://en.wikipedia.org/wiki/Energia
https://en.wikipedia.org/wiki/Konstantin_Tsiolkovsky
https://en.wikipedia.org/wiki/Largest_artificial_non-nuclear_explosions
https://en.wikipedia.org/wiki/List_of_Soviet_human_spaceflight_missions
https://en.wikipedia.org/wiki/Mikhail_Lomonosov
https://en.wikipedia.org/wiki/Phobos_1
https://en.wikipedia.org/wiki/Phobos_2
https://en.wikipedia.org/wiki/Plesetsk_Cosmodrome
https://en.wikipedia.org/wiki/Roscosmos
https://en.wikipedia.org/wiki/Salyut_programme
https://en.wikipedia.org/wiki/Sergei_Korolev
https://en.wikipedia.org/wiki/Soviet_space_program
https://en.wikipedia.org/wiki/Space_Flight_Europe-America_500
https://en.wikipedia.org/wiki/Sputnik_1
https://en.wikipedia.org/wiki/
Tsiolkovsky_State_Museum_of_the_History_of_Cosmonautics
https://en.wikipedia.org/wiki/Venera
https://en.wikipedia.org/wiki/Vostok_(spacecraft)
https://en.wikipedia.org/wiki/Vostok_6