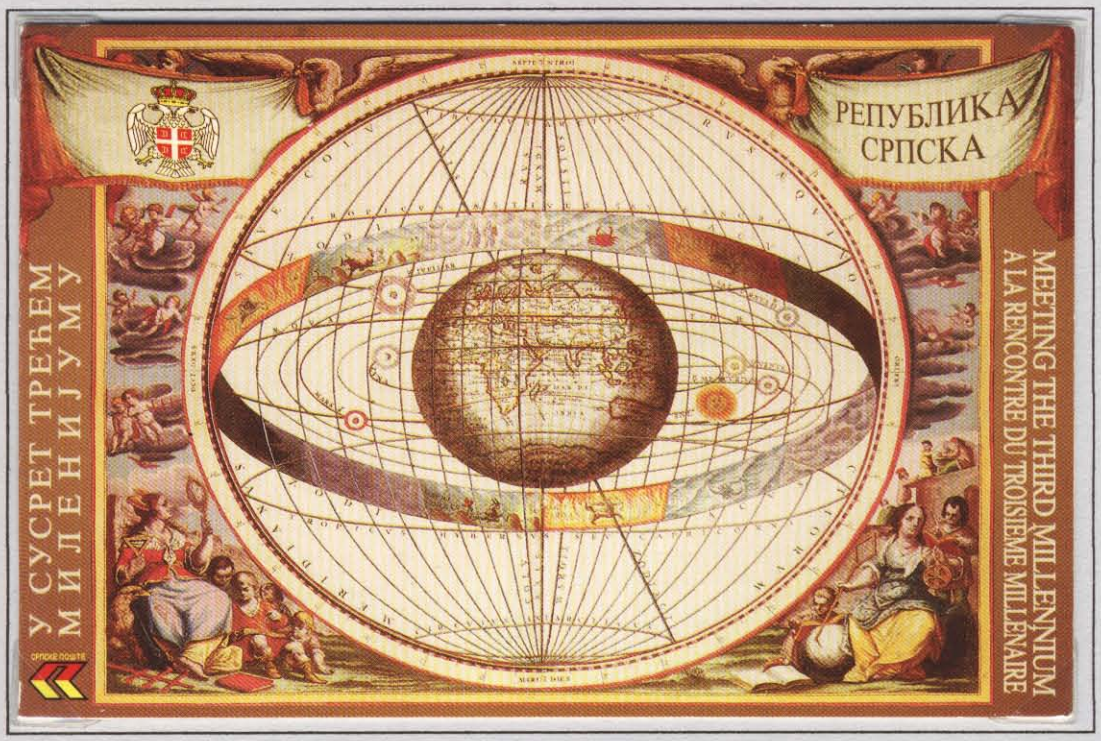
The Cognition of the Universe



The geocentric Ptolemaic system of the universe depicted by Andreas Cellarius, 1660/61 (booklet - 2000)

The myriad stars of the sky, the regular movements of the sun and the moon have always fascinated man. This fascination has evolved itself into a branch of science called astronomy. At the global level astronomy is a vast subject dealing with the creation of universe, movements of planets, stars and galaxies, gravitation, time space and space exploration. It also deals with instruments used for quantifying the various phenomena. Clocks and Calendars have their base in astronomy. No less fascinating, to a discerning eye, however, is the world of Astronomy depicted on small bits of gummed paper called the postage stamps. It is a pleasure to go out on a clear summer night and look up at the stars and listen to the stories they tell. On cold cloudy nights the stamps too tell the story, but do we care to listen?

Exhibit plan

Franklin Gothic Book, 9 pts, Italic ⇦ thematic text
Times New Roman, 8 pts ⇦ philatelic text

Dzmitry Kotau Brest, Republic of Belarus

1. The origin of astronomy

Зарождение астрономии

People have been looking up, trying to explain the universe for as long as there have been people. All his life man has been striving for guessing a great secret of the Universe which the ancient philosophers named the Space.

Brazil 1894 The first postcard with the imprint of the star

specimen

The Star of Bethlehem is a star in Christian nativity tradition that revealed the birth of Jesus to the magi and later led them to Bethlehem.

Looking back in history of astronomy shows it to be the oldest science. Astronomers of early civilizations performed methodical observations of the night sky, and astronomical artifacts have been found from much earlier periods. Astronomy knowledge helped seamans to find the way by celestial navigation

Mr & Mrs R Brickman
20 Francis Road
PINNER
Middx
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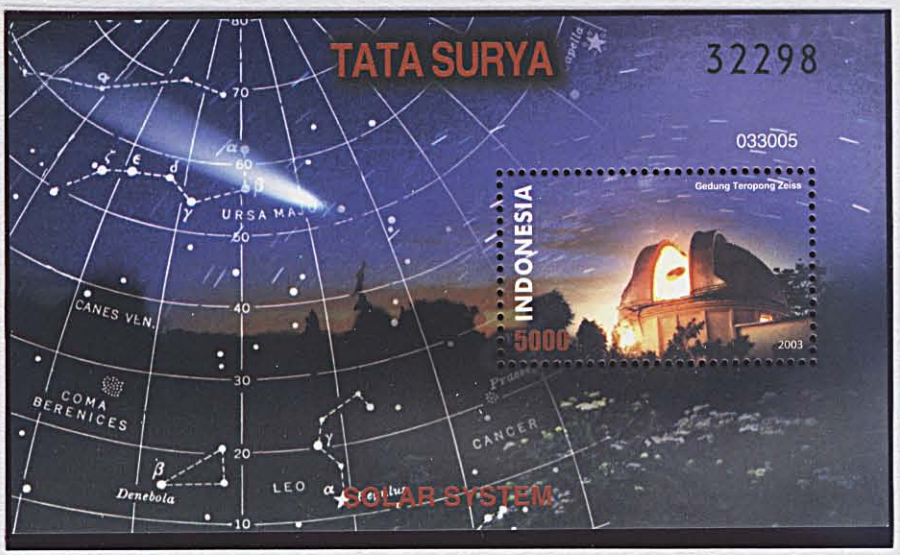
Starry Sky

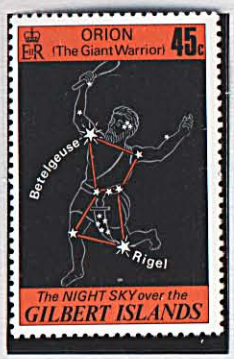
Звездное небо

A CONSTELLATION is a group of stars that are connected together to form a figure or picture. Some well-known constellations contain striking and familiar patterns of bright stars.

The International Astronomical Union (IAU) divides the sky into 88 official constellations with exact boundaries, so that every direction or place in the sky belongs within one constellation. In the northern celestial hemisphere.

The Southern Cross Constellation





The Orion constellation

The Scorpion constellation

the Cancer constellation

The Bull constellation

The Great Dog constellation

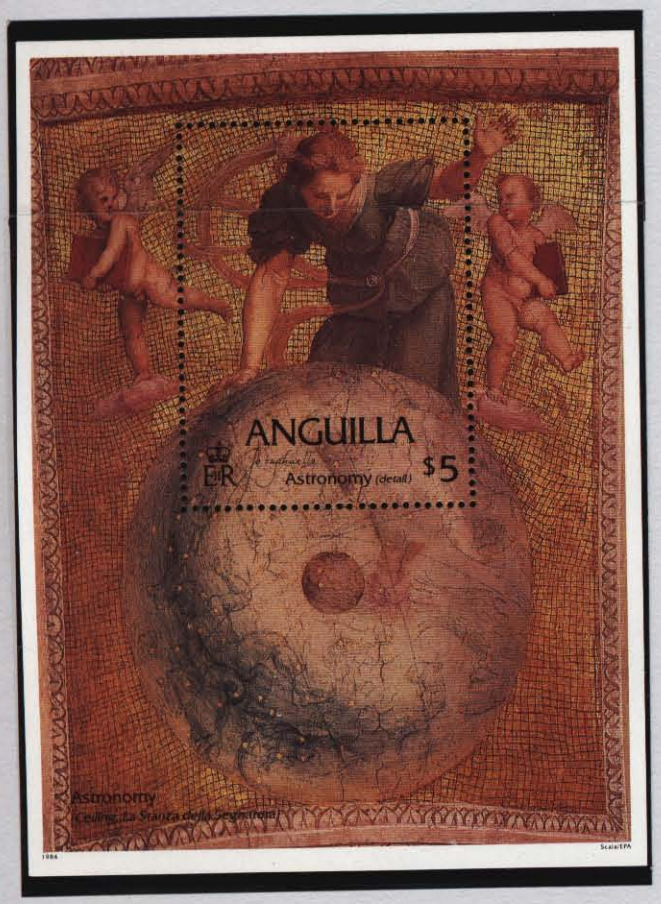
In the evening sky is the so-called Summer Triangle of stars (Deneb, Vega and Altair), while he red planet Mars hovers in the twilight.

There are the circumpolar constellations Ursa Major, Ursa Minor, and Draco (2000 was the Chinese Year of the Dragon).

The Summer Triangle is in the sky, Venus and Mercury have risen, overhead passes the International Space Station.

Astronomy in the Ancient Greece

Астрономия в Древней Греции



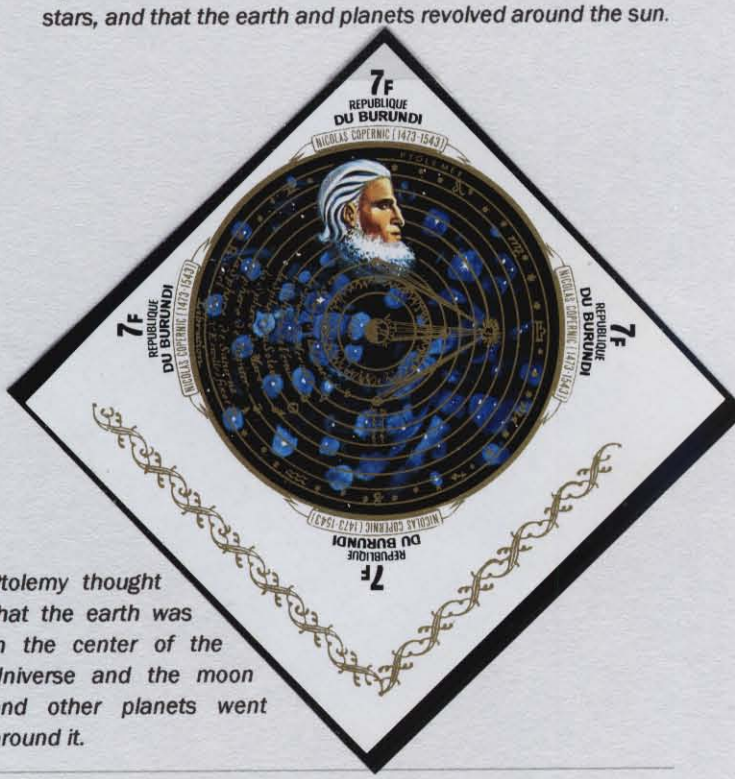
The universe was assumed as something ultimate and was limited to the sphere beyond which there was no matter.

People saw special creatures in the clusters of stars of the future constellation. Schumer's astronomers divided the sky into to twelve signs of zodiac 6000 years ago.

Aristarchus of Samos (3rd century BC) considered the sizes and distances of the sun and the moon. He advanced the theory that the sun was at rest at the center of the sphere of fixed stars, and that the earth and planets revolved around the sun.

Aristotle was the first who put forward the idea of the interrelationship of the properties of matter, space, and time.

Hipparchus (2nd century BC) continued the work of Aristarchus in calculating the distance of the moon by measuring its parallax against the sphere of fixed stars.



Ptolemy thought that the earth was in the center of the Universe and the moon and other planets went around it.

Islamic astronomy

Астрономия в странах Востока

Ibn Sina Avicennais well known as physician, besides he mused on universe. He denied the Aristotelian notion and held that "every motion occurs through a power in the moving object by which it is impelled" .

Abū al-Rayhān al-Bīrūnī's introduction of the experimental method into astronomy, he speculating that the Milky Way galaxy is a collection of numerous nebulous stars

The astronomical tables of Al-Khwarizmi served as important sources of information for Latinized European

Nasreddin Toussi (1201-1274) made up the catalogue of the stars and tables of the planet movements.

The Arabian celestial globe of 1279. Constructed by Muhammed ben Mu'aijad al-Ardi of Meragha in Persia, it illustrates the positions of about one thousand stars arranged into 47 constellations, following ideas of Ptolemy.

Monarch Mohammed Ulug Beg, (1394 –1449) Monarch of Samarkand (Uzbekistan) well-known astronomer and mathematician.

Chinese astronomy

Астрономия в Китае

In the ancient China 2000 B.C. the visible movements of the Sun and the Moon were so well studied that the Chinese astronomers could predict the sun and moon eclipses.

Armillary sphere, Ming Dynasty

Chang Heng (78-139) was a Chinese astronomer, geographer, and mathematician. He constructed a celestial globe, believing that the world was round

SCHALL von BELL Johann Adam (1592-1666), Jesuit missionary and astronomer who became an important adviser to the first emperor of the Ch'ing dynasty.

Zhang Sui (683-727), was the first to describe proper stellar motion, or the apparent motion of stars across the plane of the sky relative to more distant stars.

VERBIEST Ferdinand (1623-1688), Belgian Jesuit Missionary and astronomer. He had the permission to work at the "Chinese Calendar". The Government asked him to establish the Observatory in Peking.

Copernicus' Heliocentric System

Гелиоцентрическая система Коперника

Nicolaus Copernicus (1473-1543), a Polish astronomer, proposed a heliocentric theory of the universe in which the planets orbited the sun, rather than the earth. It marked the end of the world with man and the earth at its center. Nicolaus Copernicus explained that the Moon goes around the Earth and the Earth itself goes around the Sun. It marked the end of the world with man and the earth at its center.

Since 1487 Prof. Yuri Drogobych taught Astronomy, Astrology, and Medicine in Yagellon University (Cracow). Nikolas Copernicus was among his students.

issued 1942, Nov 20

issued 1943, May 23

Issued under German Occupation

Austria 1973 Special Postmark devoted to the Copernicus's 500 anniversary of birth

Poland - 1993 - Stationary Registered sent from Frombork. On the stamp picture of Copernicus's scheme of the heliocentric system of the planets system (from the book of A. Collary "Harmonia Macrocosmica" – 1660)

The theory of the planet motion

Теория движения планет

Johann Kepler discovered the laws of planet movements, explained the theory of ebb and flow as result of moon's influence. In 1634 Kepler's work was published "Dream or Astronomy of the Moon".

Johannes Kepler (1571-1630) is remembered for his three laws of planetary motion.

Germany 1971 : Postmark with illustration of the Kepler's second law

Newton's law of universal gravitation applies not only to apples falling from trees, but also describes the relationship of mutual attraction between planets and celestial bodies in the Universe

USSR -Oct.8,1987 - First Day Postmark: Newton reflecting telescope

The mathematical theories of the Moon and planets movement were explored by Edmond Halley, Leonard Euler, and Aleksandr Lyapunov

Perforation: line 12 ½ comb. 12 ½ : 12

Astronomical observations

Астрономические наблюдения

TYCHO BRAHE (1546-1610) was an astronomer who set out to make accurate observations in order to be able to determine whether the Ptolemaic or Copernican system was the more correct. He discovered and also observed the supernova of 1572, the constellation Cassiopeia, which inspired him to write "De Nova Stella", what brought him glory.

The constellation Cassiopeia

Galileo Galilei (1564-1642), first to devise and use a telescope for astronomical observations, discovered the four moons of Jupiter, and the motion of sunspots across the solar disc - sign of a less than perfect sun, which also rotated! His many observations confirmed the Copernican theory of the motion of earth and planets around the sun.

Galileo made numerous celestial observations between 1609 and 1610. The satellites of Jupiter were discovered in 1610. This great discovery was announced in the "Sidereus Nuncius".

Italy : issue March 29, 1933

issue October 22, 1943

Italy : issue September 22, 1943

Berthold Brecht is the author of the play "Life Galileo" (1946).

Astronomical observations
Astronomers

Астрономические наблюдения
Астрономы

Johann Hevelius (1611-1687) was a wealthy brewer in Danzig who dedicated his life and fortune to the study of astronomy. He built enormously long telescopes and other outsize apparatus on the roof of his house. He mapped and named craters and mountains on the Moon and in 1647 published Selenographia, the first illustrated work of astronomy dealing exclusively with the Moon. He also published a stellar atlas, Firmamentum Sobiescianum, observed and mapped nebulosities including the Andromeda nebula, and recorded several decades of sunspot observations

Post card Free Town Danzig, was sent November 13. 1936 from Sopot

Different pictures of the celestial map

Astronomical observations
Astronomers

Астрономические наблюдения
Астрономы

The Royal Astronomical Society, founded in 1820, encourages and promotes the study of astronomy, solar-system science, geophysics and closely related branches of science.

Great Britain Jan 2008 - Machine Cancelation 'Royal Astronomical Society' London.

In 1753 the Croation astronomer Rudgie Boshkovich proved that the Moon had no atmosphere.

Lambert QUETELET established in 1833 an Observatory in Brussels, studied meteor showers.

Oton Kučera - Croatian astronomer. He accepted the position of the head of the Zagreb Observatory, created in 1903, which he had helped found.

Yugoslavia Oct. 1964 – Special Postmark Oton Kučera

Friedrich Bessel was a German mathematician and astronomer, he cataloged the position of 50.000 stars down to the ninth magnitude.

USSR, May 1984 - Postal stationary Friedrich Wilhelm Bessel (July 22, 1784 – March 17, 1846)

Astronomical observations
Russian astronomers

Астрономические наблюдения
Русские астрономы

Sukharev Tower

In 1702 by Peter the First's order the first Russian observatory was created in Sukharev Kremlin Tower.

In 1728 the observatory was opened in the building of Kunstkamera in St. Petersburg. Michael Lomonosov carried out research there.

light color

\colorful image

Ivan Kulibin – russian inventor. He developed the new technology of telescope lens making

In 1839 the observatory was opened in Pulkovo.

The first Astronomic Society was founded in Russia in 1888 in Nizhni Novgorod.

Astronomical observations
Equipment for observation

Астрономические наблюдения
Приборы для наблюдений

Astrolabe

Armillary sphere

Sextant

Galileo's telescope

Telescope — refractor *Telescope — reflector*

Modern telescope

Spectrum analysis of heavenly bodies

The spectroscopy are an important method for study stars light. The dark lines in the solar spectrum that had been observed by Joseph von Fraunhofer were interpreted as the basis of classical physics, and called "Fraunhofer lines".

The Jesuit Pietro Secchi (1818-1878), an Italian astronomer, was the first to apply spectroscopy and photography to astronomy, taking spectra of the stars and photographs of the sun during eclipses.

Astronomical observations
Observatories

Астрономические наблюдения
Обсерватории

For optical telescopes, most ground-based observatories are located far from major centers of population in order to avoid the effects of light pollution. The ideal locations for modern observatories are sites that have dark skies, a large percentage of clear nights per year, dry air, and are at high elevations.

The Pulkovo Astronomical Observatory, near St Petersburg (1839)

Palomar Mountain Observatory, USA

Observatory Pic du Midi France (1908)

Okayama Astrophysical Observatory Japan (1960)

Kiev (Ukraine) Astronomical Observatory (1845)

Vatican Observatory, Lake Castelgandollo (1935)

Cerro Calan Observatory, Department of Astronomy of the University of Chile

GDR, Jan. 10, 1985 — Special postmark with the occasion of the 35 years of the Erfrut Astronomical Observatory

Astronomical observations
Observatories

Астрономические наблюдения
Обсерватории

With the help of modern telescopes astronomers observe objects which can be as far as 10 billions light years which is 9,5-1022 km.

Crimean Astrophysical Observatory has a mirror telescope with the diameter of 2,6 m.

Mountain Pastukhov (The Northern Caucasus, 1998) the optical telescope with the diameter of 6 m.

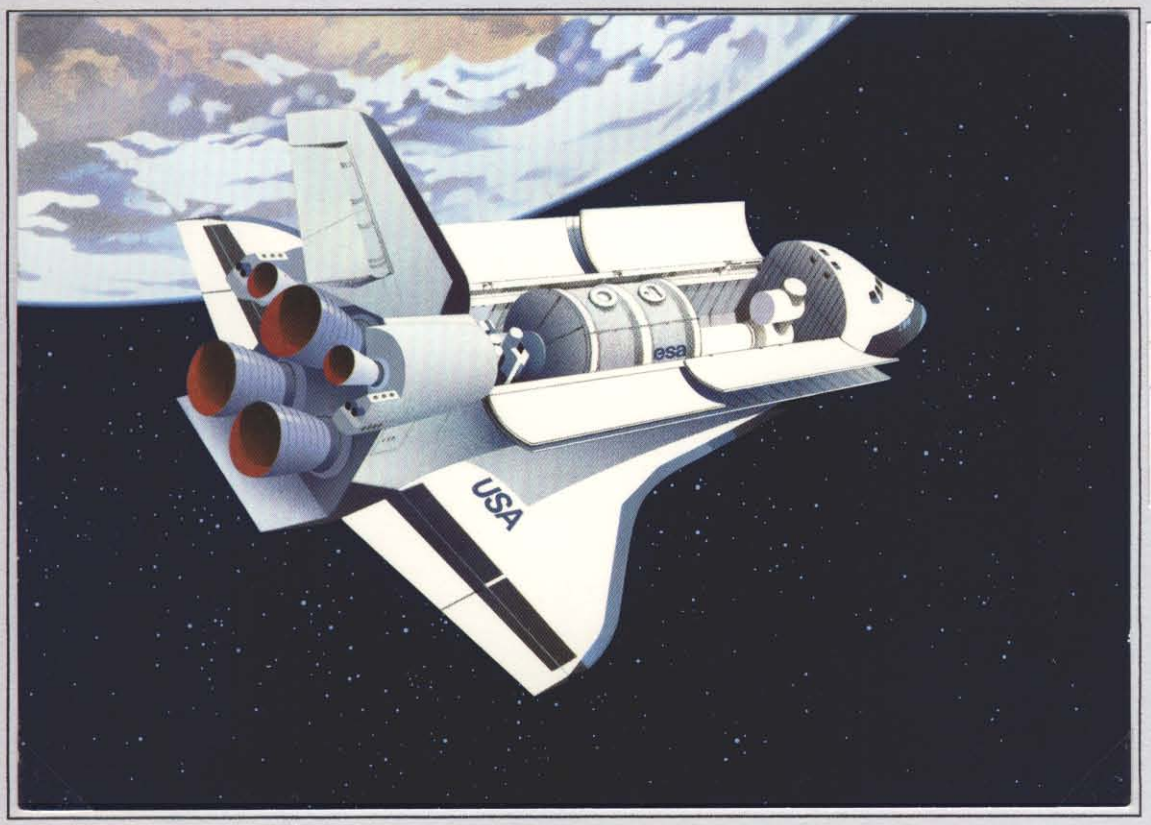
La Silla Observatory is an astronomical observatory in Chile with eighteen telescopes.

Beginning in the 1930's, radio telescopes have been built for use in the field of radio astronomy. Some of the major radio observatories are at Socorro, in New Mexico, USA, Jodrell Bank in the UK, Arecibo, Puerto Rico and Parkes in New South Wales, Australia.

Astronomical observations
Space telescope

Астрономические наблюдения
Космический телескоп

On 24 April 1990, shuttle mission STS-31 saw Discovery launch the Hubble Telescope successfully into its planned orbit



Switzerland, May 1981 – Stationary 'Space Shuttle'

To date, there have been four servicing missions.

Exploded view of the Hubble Telescope

2. The beginning of the space era
The Great Prediction

Начало космической эры
Великое предвидение

In 1865 a French writer Joule Verne in his novel "From the Earth to the Moon" described the first flight of a man around our satellite. The author described the flight in details much earlier than scientific grounds of space flights were put forward to.

April 15, 1970 – Germany - Special Postmark -105 years of Joule Verne's novel "From the Earth to the Moon"

Theorists of space flights — *Теоретики космических полетов*

In 1903 г. Constantine Tsiolkovsky was the first to prove the possibility of using rockets for inter planets communications and found a row of important engineering decisions for building rockets and a rocket engine.

Tsiolkovsky's equation

issue 1951,
picture size: 22,5 x 33 mm

issue 1955
picture size: 21,5 x 32 mm

Distinction in color: ultramarine

pale blue

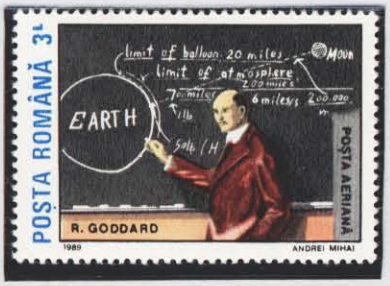
In 1924 Frederic Tsander published his article "Flights to the another planets", in which he proposed an idea of combination of a ballistic rocket and aircraft for the flights from the Earth using Moon's gravitation for a jumping off place to other planets.

In 1929 Yuri Kondratyuk (true name is Alexander Shargey) published his article "Conquering Interplant Spaces" which became the foundation for calculating flights to the Moon of American astronauts on the spaceship Apollo.

Theorists of space flights *Теоретики космических полетов*

As well Constantine Tsiolkovsky, to arrived at the same conclusions a Frenchman Eno-Peltry in 1912 and an American Robert Goddard in 1925 and a German Oberth in 1925.

Eno-Peltry (France)



Robert Goddard (USA)

Theodor von Karman (USA)

Germany - 1970 - Special postmark with illustration Orberth's principle

German Oberth (Germany)

In 1923 German Oberth published his fundamental research on space problems: "A Rocket in the Interplanetary Space"

Reinhold Tiling was a German engineer, developed re-usable rocket planes, which start as a rocket and land with swinging out wings. This principle is used until today by NASA for flights of the space shuttle.

Germany - 1971 - Special postmark with Tiling portrait

Austria - 1982 - Special postmark with the occasion of the centenary of the birth of France Heft

In 1924 France Heft (Germany) suggested the program in which he put forward the necessity of building of rockets which could be used for shooting the invisible side of the Moon.

Rudolf Nebel (German Engineer), played a key role in promoting early rocketry efforts in Germany.

Germany - 1970 - Special postmark with the occasion of the 40-years centenary of the Berlin rocket airfield

Constructors of spaceships

Конструкторы космических кораблей

In the 50s of the 20th century there was a real possibility to build a spaceship which could overcome the Earth gravitation. In the USSR the work over the space program was led by Sergey Korolyov, Vladimir Chelomey, Valentin Glushko. Mathematical calculations of creating a manmade satellite of the Earth were carried out under guidance of Mstislav Keldysh.

Valentin Glushko

Mstislav Keldysh

Cancellation of Cosmodrome Baikonur of April 12, 1979 — Cosmonautics Day

The first satellites

Первые спутники

The new era of the research space began on October 4, 1957 with the launching of the first artificial earth satellite.

USSR 1957 – Overprint :
"4/10-57 The first in the world artificial sputnik of the Earth"

Paper color: white light blue

November 3 - 1957 in the Soviet Union was lunched the second artificial sputnik. It was rigged up equipment for exploration of sun radiation and space rays. The man made satellite was supplied with devices for researching of the Sun's radiation and space rays.

1958 May 15 in the Soviet Union was lunched the third artificial sputnik. During the flight there was a research of electrostatic and magnetic fields of the Earth and corpuscular radiation of the Sun.

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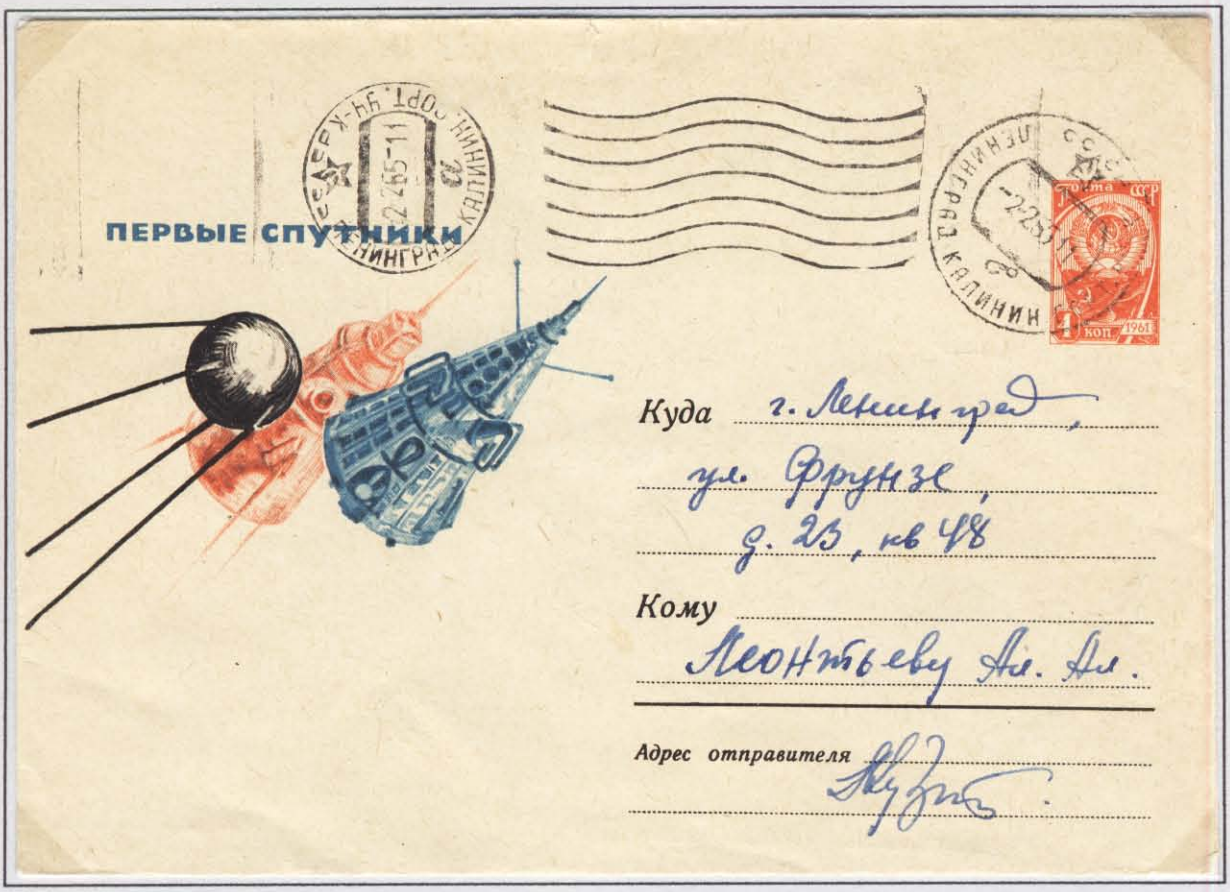
point after "кг"



Postal cover "Firsts Sputniks" sent 02.02.65 from Leningrad

The era of manned flights began with Yuri Gagarin's flight on April 12, 1961.

On August 6, 1961 G.Titov made the first shooting of the Earth from the space while piloting the space ship "Vostok-2"

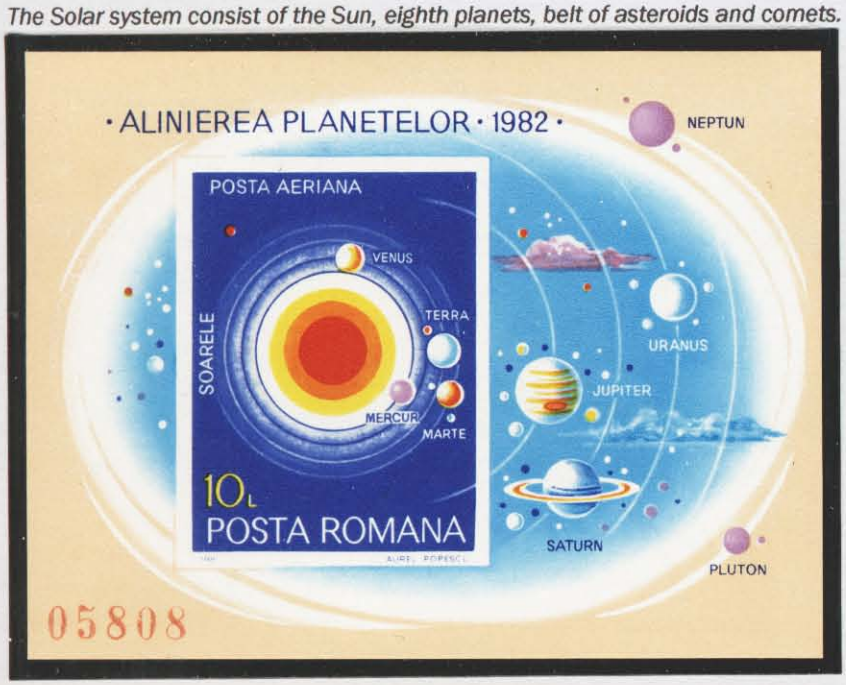
USSR 1961— Special postmark Vostok 2 in space

N.Krushchev with cosmonauts

The success of designers of space ships was used by the Soviet leaders as the mean of propagandizing of the advantages of the socialist system.

"Socialism is the most reliable starting pad from which the Soviet Union launches its space ships". N.Krushchev's words are quoted on the stamp.

The Solar system consist of the Sun, eighth planets, belt of asteroids and comets.



At ancients times the five planets were called by names of Hellenic Gods.

At IX century were introduced into practice signs for denote planets in the Solar system

(1981 Sweden stamps booklet "Night and Day")

Tipe I

Tipe II

In 1637 Rene Deckart tried to build the first unique physics space and cosmogony picture of the universe on the base of heliocentrism.

In the mid XVII the German philosopher I. Kant proposed his theory of the birth of the solar system based on the law of the gravitation.

In 1796 P. Laplace described in detail the hypothesis of the origin of the Sun and the planets from the spinning gas nebula

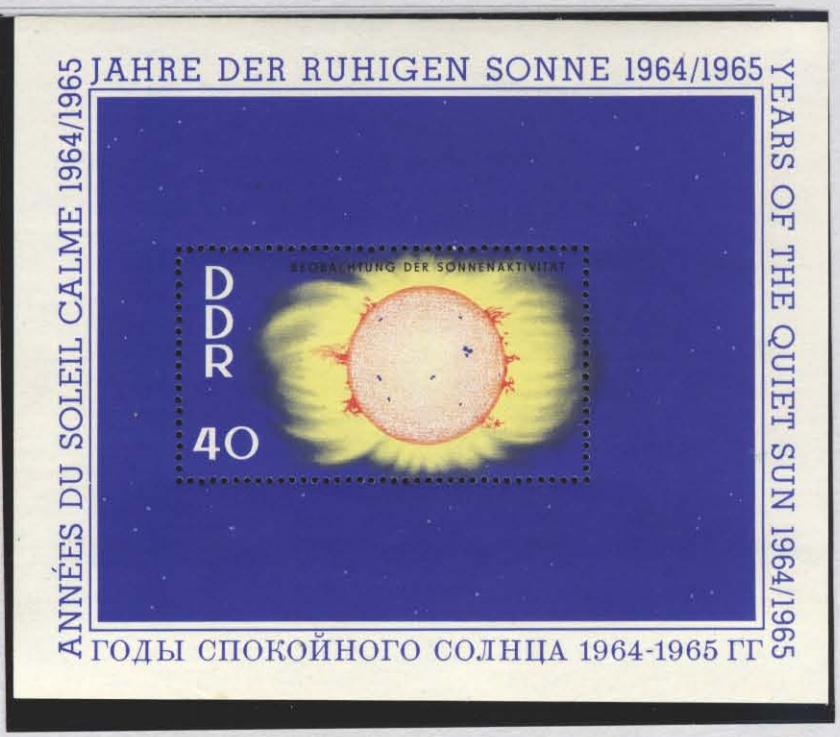
In 1940 Otto Schmidt suggested a new cosmological hypothesis on the formation of the Earth and other planets of the Solar system.

The Sun

Солнце

The history of the Sun study began with the observation of Galileo in 1611. He discovered spots on the surface of the Sun.

In 1861 G.Kirchhoff made the first description of the chemical composition of the sun corona.



Study the solar activity

Sonnblick Observatory was building in 1886

In 1959 the moon space rockets discovered the sun wind i.e. the movement of the particles produced by the sun corona.

"Intershok" is the project for study of striking waves provoked by the plasma stream.

The project Coronas-1 (1994) is the research of the nature-160 minute-fluctuation of the sun brightness.

The Earth and the Moon

Земля и Луна

The Earth is the third planet in the Solar System. It is unique planet, where is a life.

The picture of the Earth was taken by the automatic station "Zond 7" from the height 70 000 km.

The Moon is the nearest body, the natural satellite, which is as far as 385 000 km from the Earth.

Visible moon movement takes place as the result of real reflection of the movement of the Moon around the Earth, which is accompanied by changes of outer view of our satellite.

Poland -1973, August 31 - Special postmark with picture of moon phases

Solar eclipse

A solar eclipse takes place when the New Moon passing between the Sun and the Earth, blocks the solar light and casts its shadow on the Earth.

During a solar eclipse, the Moon can sometimes perfectly cover the Sun because its apparent size is nearly the same as the Sun when viewed from the Earth.

The mentioning of the sun eclipse in "The Word about Igor's Regiment" allowed precisely to determine the dates of historical events.

Lunar eclipse

Lunar eclipses occur when the Moon passes through the Earth's shadow. Since this occurs only when the Moon is on the far side of the Earth from the Sun, lunar eclipses only occur when there is a full moon.

~260 BC: Aristarchus, watching the shadow on the Moon during the Moon eclipse, devised geometric methods to estimate distance to the Moon.

Exploration of the Earth
Exploration of the stratosphere

Изучение Земли
Изучение стратосферы

In the 1930ies air balloons were used for the research of stratosphere

The first air balloon was constructed and built by Switzerland science August Piccard who was to use it in his research of space rays. On May 27, 1931 August Piccard made his first flight to the stratosphere and reached the height 15,785 km.

On November 3, 1933 the air balloon USSR-1 was launched and it reached the height 19000m.

issued 1934

issued 1944

In the USSR Osoaviahim-1 was launched with the crew P.F.Fedoseenko, A.B.Vasenko, and I.D.Ussyskin on Jan 30, 1934. The air balloon reached the height 22 000 m.

Reverse of Poland postal envelope special cancellation, sent from Zakopane on Sept. 30 1938, and received in Warsaw on Oct 24 1938

Front of the postal envelope

Exploration of the Earth from space
Research of the magnetic field of the Earth

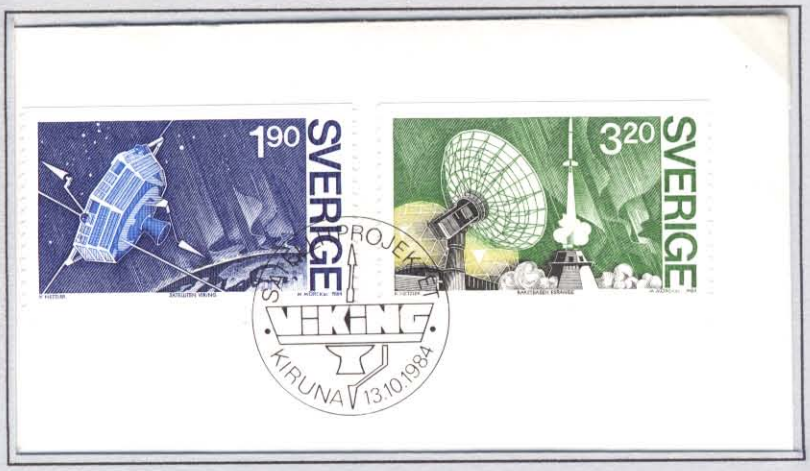
Outside and inside radiation zones of the Earth

Artificial earth satellites "Electron" were used for research of the magnetic field of the Earth and the solar radiation.

Изучение Земли из космоса
Изучение магнитного поля Земли

The existence of the Earth magnetic field was known in ancient China.

Geomagnetic field of the Earth defend from charged particles from space The solar wind deforms the magnetic filed of the Earth, compressing it from the Sun side.



Stamps and special postmark consecrates by the Viking satellite project: to make measurements in the part of the magnetosphere that lies between 4 000 and 15 000 km over the surface of the earth.

Northern lights

The stream of electric charged particles covers the distance from the sun to the earth, grasped by the earth magnetic field, and provokes the fluorescence in the upper layers of the earth atmosphere (Northern lights).

Exploration of the Earth from space
Research of the Earth resource

Изучение Земли из космоса
Изучение ресурсов Земли

There are different methods of the exploration of the Earth from space.

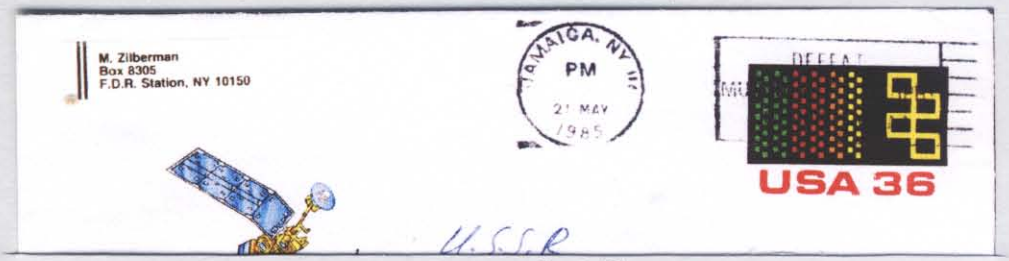
Meteorology: the European Meteosat weather satellite is seen looking down on the Earth

Oceanography: the European ERS-1 satellite is seen scanning the seas

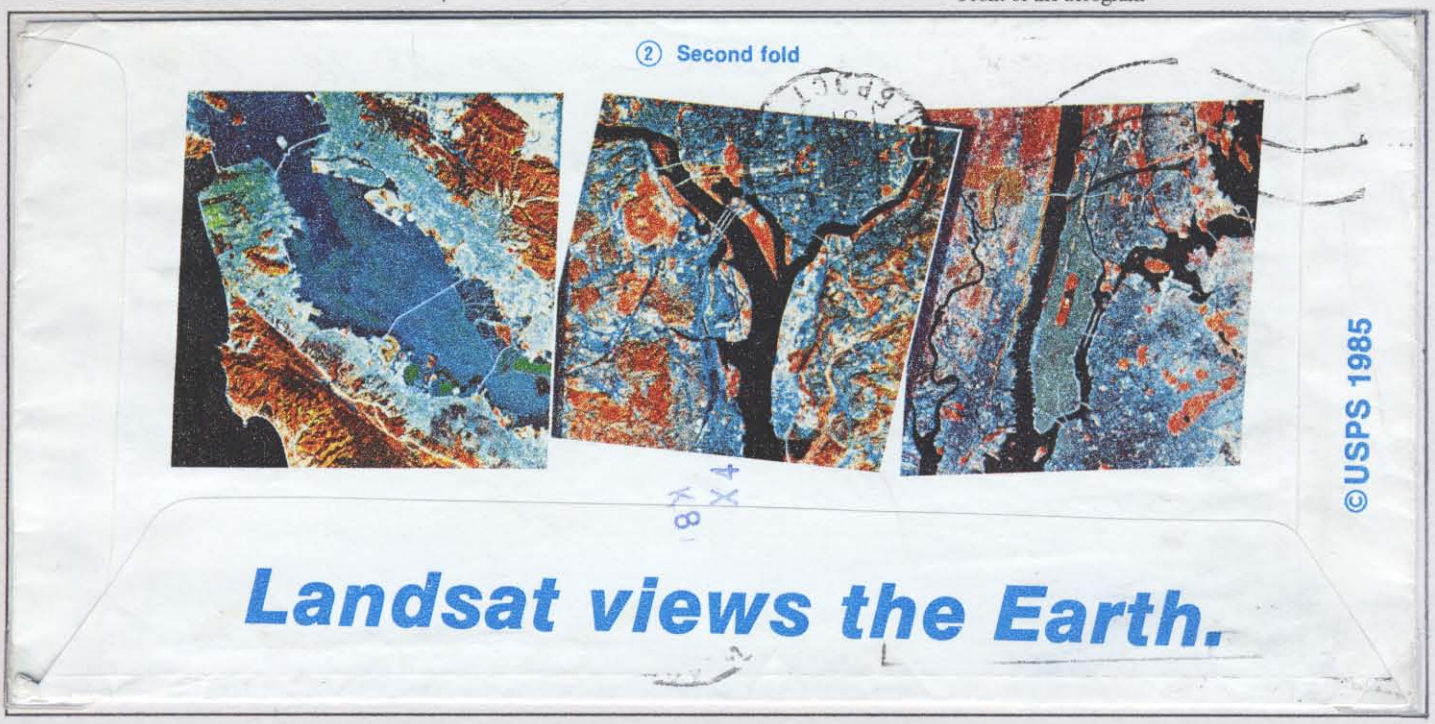
Exploration of the earth resources

The Landsat 5 satellite scanning the Earth with its Thematic Mapper

Exploration of the Earth resources from the space stations



Front of the aerogram



USA 1985 — Aerogram (backside) with Landsat pictures of the Earth

Soviet Moon program
Luna 1

Лунная программа СССР
Луна 1

"Luna" - the name of the series of automatic interplant stations launched in the USSR.

In 1959 January 2, the station "Luna 1" was launched to the space with the help of a carrier rocket "Vostok". In 34 hours later "Luna 1' passed the satellite of the Earth at the distance about 6 000 km

The carrier rocket "Vostok"

Trajectory of the flight

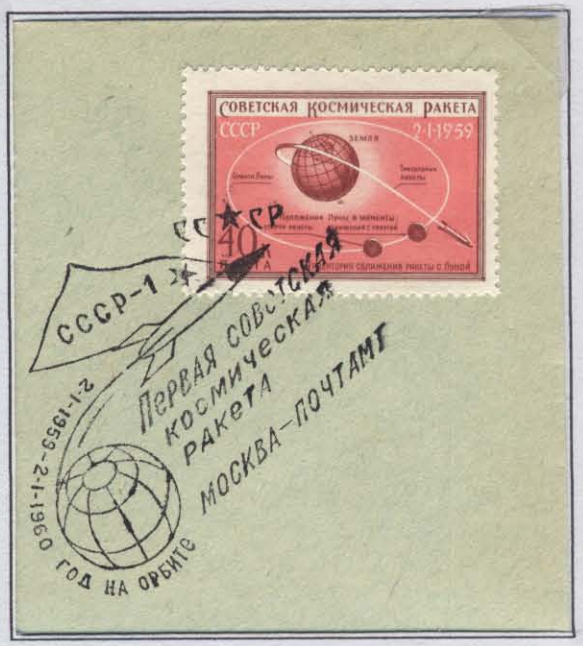
The station "Luna 1"

Overprint "Riccone 23-8-1964"

The USSR showed the duplicate of the station "Luna 1" on the international exhibition in Riccone.

Postmark with three dates, fixing the main stages of the flight: launching (2. I. 59), passing near the Moon (4. I. 59) and putting on orbit around the Sun (8. I. 59)

Devices of "Luna-1" determined the absence of gravitation within the Moon. The space environment and space radiation which are not distorted by the influence of atmosphere and magnetic field of the Earth were studied.



The station "Luna-1" gathered the second space speed overcame the earth gravitation and became the first artificial satellite of the solar system.

Soviet Moon program
Luna 2

Лунная программа СССР
Луна 2

On September 2, 1959 in the USSR "Luna 2", the automatic station, was launched.
On September 14, 1959 'Luna 2" reached the moon surface near the central meridian.

Overprint : 22^h 02' 34'' - the time of landing on the moon surface

Envelop issued on the occasion of reached the moon surface the station "Luna 2"

"Luna 2" brought on the surface of the moon a pennant with the image of state coat of arms of the USSR. The station opened the beginning of the moon research. The device mantled on the station made measurements before landing on the surface.

USSR, 1959 October 4 - Special postmark on the occasion of reached of the moon surface

Soviet Moon program
Luna 3

Лунная программа СССР
Луна 3

4 In October, 1959 the automatic station "Luna-3" was launched. On board of it there were photo and television devices with automatic processing of the film. Moving on the trajectory, curving the moon the station passed within 6200 km from the surface of the moon.

Envelop issued 1959,October 26, on the occasion of reached the moon surface the station "Luna 3"

7 In October, 1959 "Luna 3" flew around the moon and took pictures of the other side of it. These were the first pictures which were transmitted from the space.

USSR, 1960 October 7 - special postmark - picture of the backside of the moon

On the moon map new names appeared in honor of the famous scientists

Soviet Moon program — Лунная программа СССР

Automatic Space Station "Luna - 9"

On February 3, 1966 "Luna-9" made the first soft mooning on the surface of the moon.

The stamp with overprint "Luna - 9 on the moon"
USSR Fabr. 3, 1966 - Special Postmark "Luna - 9 on the moon"

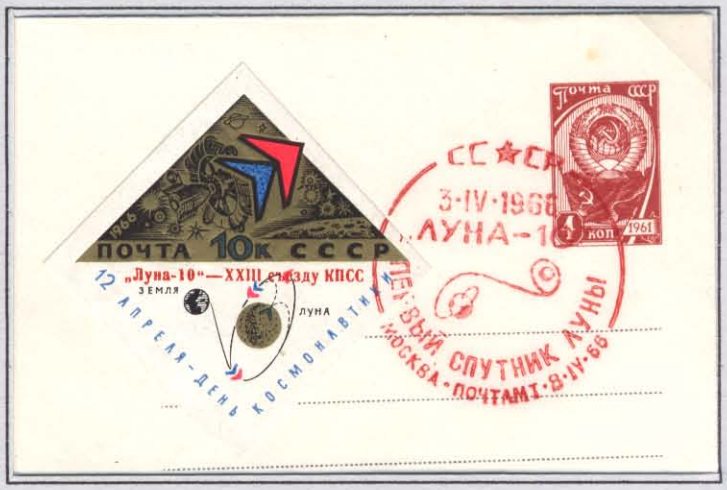
After mooning the upper part of the automatic station "Luna - 9" made four petal antennas and a television camera began shooting the moon landscape. On the Earth 27 shots were transmitted with pixel till a few millimeters.

On the stamps of GDR and Hungary there is inaccuracy i.e. at moment of the mooning of the "Luna - 9" the earth faced to the moon with the unit side and couldn't be seen from the moon.

The Post Department of Polish People Republic passed a resolution to destroy 212 000 this stamps on January 31 in 1971.

Automatic Space Stations "Luna"

Automatic Stations "Luna 10": for the first time the distance measurements of the chemical component of the moon surface were taken and the results were transmitted to the Earth.



USSR MoskovApril 8, 1966 - Special Postmark "Luna 10 is the first artificial satellite of the moon"

On August 28, 1966 Automatic Stations "Luna - 11" was put on the moon orbit. During 38 days it made 277 orbits and did research of spectral composition of infra-red and gamma radiation of the moon.

USSR Kiev, April 9, 1966 - Special Postmark "Luna 10 is the first artificial satellite of the moon" - in Ukrainian

The Automatic Stations "Luna - 12" was the third Soviet satellite of the moon. It made 602 orbits. On board there was photo-telesystem which transmitted large scale images of the moon surface.

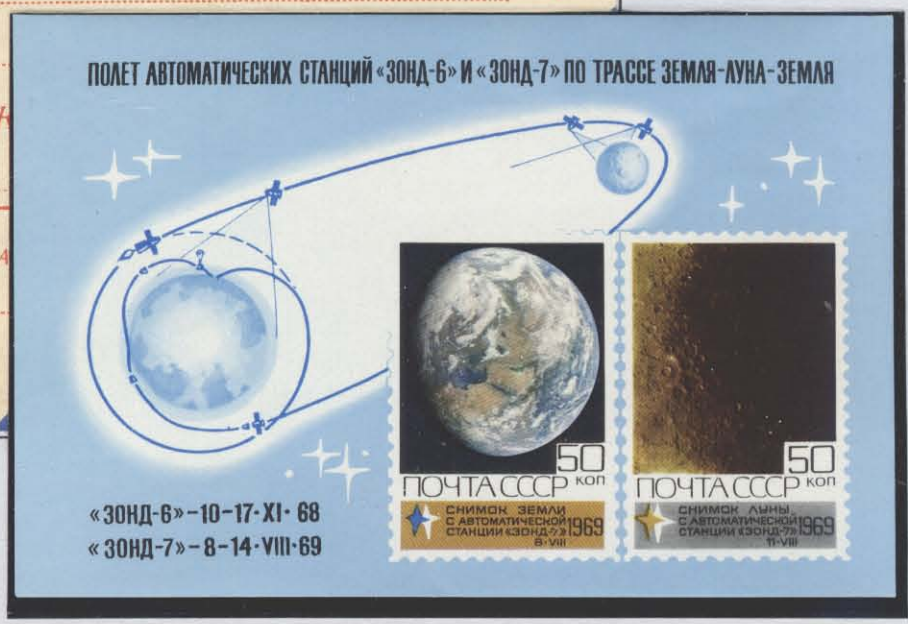
On December 24, 1966 the Automatic Stations "Luna - 13" made a soft mooning in the vicinity of the Ocean of the Storms and its out devices explored the composition of the moon surface and its television cameras photographed the moonscape.

Automatic Space Stations "Zond"

An unmanned missions of the space ship "Souz 7K-L1" were officially recognized as flights of series "Zond"

The station «Zond - 3" launched Jul.18, 1965

The station «Zond - 5" launched Sept.15, 1968



The station «Zond - 6" launched Nov.10, 1968

The station «Zond - 7" launched Aug. 8, 1969

Soviet Moon program

Лунная программа СССР

Delivery of the Moon's soil

On September 12, 1970 the AS "luna - 16" was launched in the USSR. On September 17, "Luna - 16" mooned in the Abundance Sea. On the descending module there was drilling equipment for getting of soil samples and the rocket "Luna-Earth" for delivering these samples on to the Earth.

USSR Sept. 24, 1970 - Special postmark "Station LUNA - 16. 12 - 24 - 70"

Overprint "LUNA 16 premiers prelevements automatiques sur la lune Septembre 1970"

Hungary, FDC, sent Jan.15,1971 from Debrecen to Riga (received Jan. 21, 1971)

Soviet Moon program

Лунная программа СССР

Delivery of the Moon's soil

The AS "Luna-16" successfully mooned, took the samples of the soil and brought to the Earth.

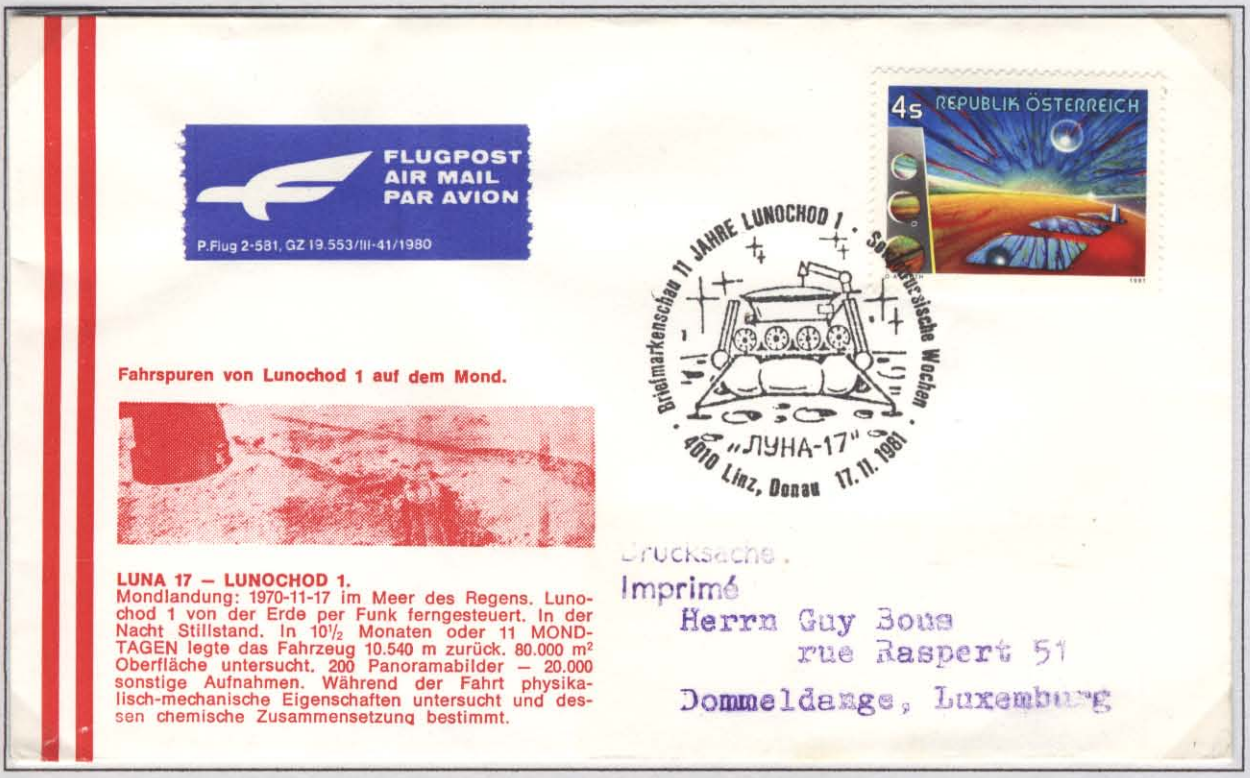
On Sept.24 the ascent stage successfully landed.

On February 1972 the automatic station "Luna - 20" successfully mooned, took the samples of the soil and brought to the Earth.

The researches of the moon by Soviet automatic stations were ended with the space apparatus 'Luna-24" which was launched on August 9, 1976 and drilled the moon soil to the depth of two meters and delivered 170 grams of the moon rock to the Earth.

Lunochod on the Moon

On November 17, 1970 the Soviet AS "Luna-17" brought the first self propelled moon laboratory "Lunochod - 1".



Austria - Nov. 17, 1981 - Postal Stationary

USSR - FCD March 16, 1971 Postmark Type I

Postmark Type II

Soviet Moon program

Лунная программа СССР

Lunochod on the Moon

The lunar laboratory took parameters of physical and chemical properties of the moo soil and identified chemical elements of it. The mantled laser light reflector on the board permitted with great accuracy to calculate the distance between the Earth and the Moon.
On October 4, 1971 the lunar rover-1 ceased its work.

Mistake - on the Cuba stamp 1978 inscription is "Lunochod II" but show Lunochod I

On January 8, 1973 the AS Luna--21 was launched with the second self-propelled laboratory on board.
"Lunochod - 2" worked for 5 months. The equipment was in order but the lunar rover got into an accident.
On June 3, 1973 the TASS declared about the end of work with the lunar rover.

USSR - Postcard - Glory of the performances of October Revolution - painter J.Rjachovsky

Project "Apollo"

Werner von Braun was one of the first supervisors of NASA. Under his leadership a rocket-carrier was worked out in the series of "Saturn" and a space ship "Apollo" for piloting flights on the moon.

John F. Kennedy and Wernher Von Braun

Austria. Special Postmark July 21, 1079 with Wernher Von Braun picture

Wernher von Braun suggested creating a super powerful rocket on the base of "Saturn".

Special postmarks: Germany - June 14, 1989 - Hermann Oberth museum; Austria - June 23 1989—Space Congress in Salzburg

Moon program of the USA

Лунная программа США

Pioneer

The working out of space sounding "Pioneer" for flying near the moon and getting on the moon orbit was done by the Office of Perspective Researches of Defense Ministry of the USA and later by NASA.

Surveyor

The program «Surveyor» included the detailed shooting of the moon from the near moon orbit and included the soft mooning. The purpose of the program was a choice of the place for mooning of space ships series 'Apollo". On June 2, 1966 the station «Surveyor -1» softly mooned in the Ocean of Storms and transmitted pictures and results of measurements to the Earth.

Lunar Orbiter

To explore the moon surface the series of the moon soundings was created and named Luna Orbiter. From 1966 to 1967 five apparatuses of this series were launched. All of them were successful and theses soundings became satellites of the moon.

Moon program of the USA

Лунная программа США

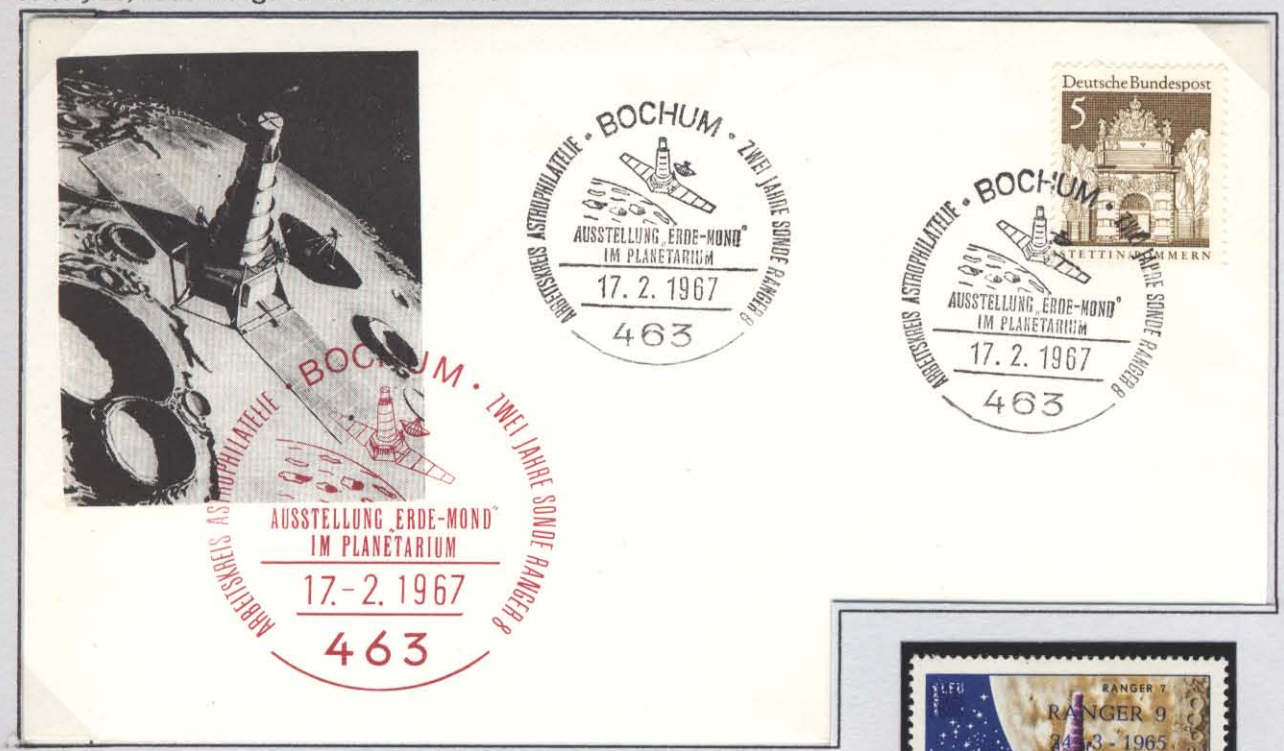
Ranger

Great scale of taking pictures of separate visible parts of the moon was done by American space zonding system of the series "Ranger".

On January 30, 1964 in the USA "Ranger-6" was launched which was to transmit pictures of the moon surface, but when it reached the moon on February 2, 1964 the video camera didn't work.

On July 30, 1964 "Ranger-7" transmitted 4716 moon shots to the earth.

On February 20, 1965 "Ranger-8" transmitted more than 17 000 shots of the moon..

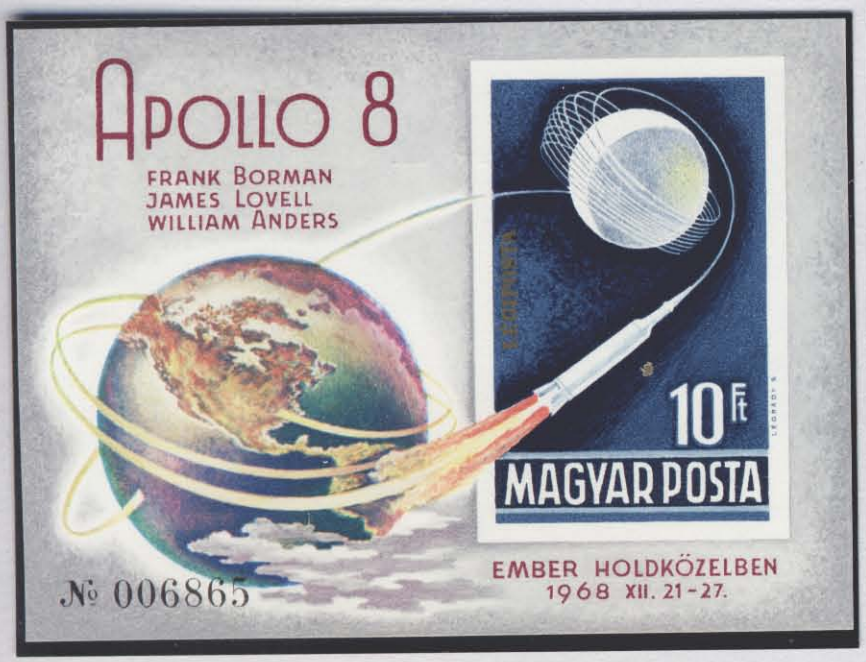


"Ranger-9" the aim of the flight was to taking pictures of the crater Alphons for finding more convenient places for landing of the astronauts in the future. 5 814 shots were transmitted to the Earth.

Overprint RANGER 9
24 - 3 - 1965
5 Lei

"Apollo 8"

On December 21, 1968 from the launching complex of the Space Center after Kennedy the "Apollo - 8" was launched. The crew consisted of three astronauts: Frank Borman, James Lowell, Williams Anders.



The mission of the flight was to test systems of the ship during steering flight to the moon and to train the maneuvering on the moon orbit. The space ship made 20 orbits around the moon.

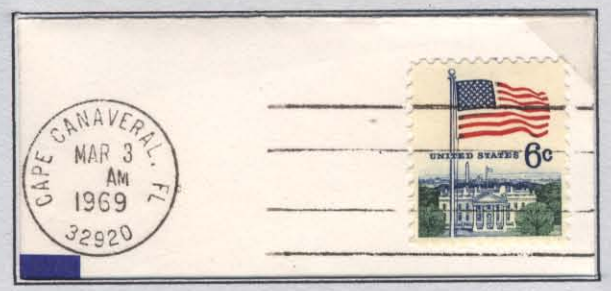
USA. May 5, 1969 - Houston - Postal Stationary with First Day Postmark

Moon expeditions *Лунные экспедиции*

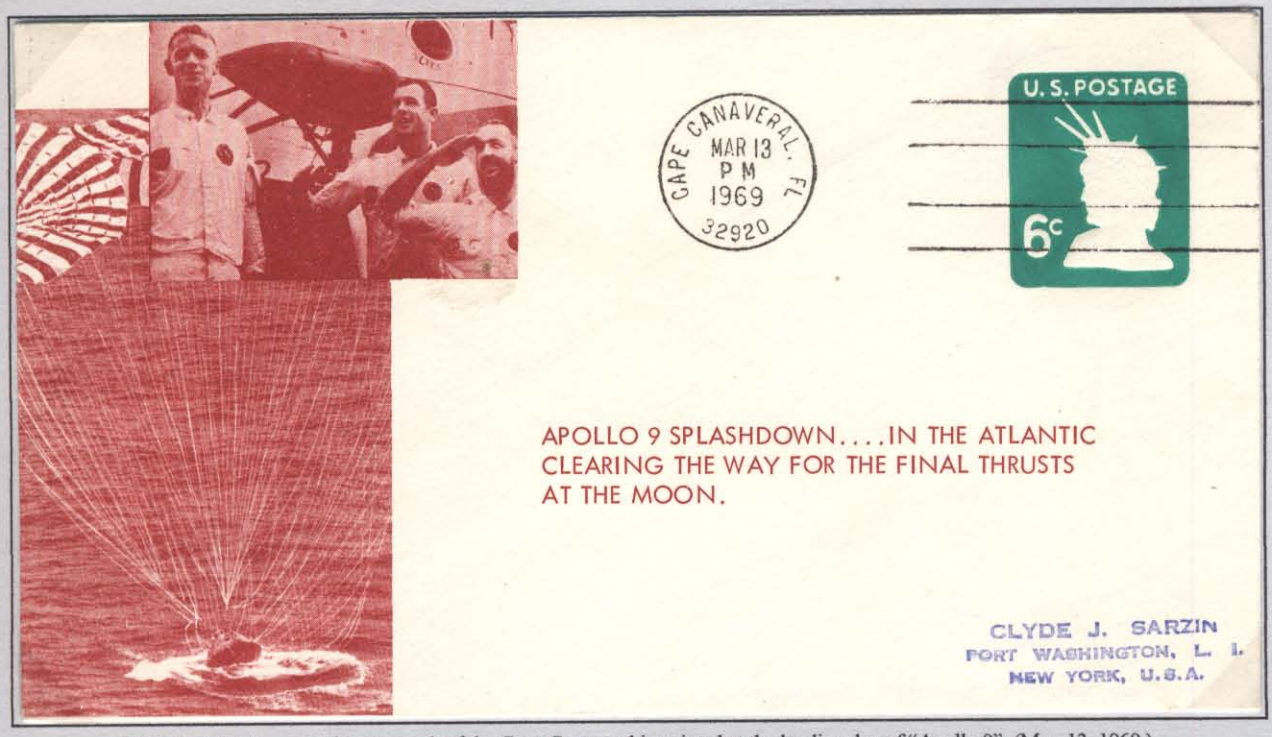
"Apollo 9"

"Apollo 9" was the first manned flight of the Command/Service Module (CSM) along with the Lunar Module (LM). Its three-man crew Jim McDivitt, Dave Scott, and Rusty Schweickart tested several aspects critical to landing on the moon including the LM engines, backpack life support systems, navigation systems, and docking maneuvers.

The space ship "Apollo 9" was in the flight for 10 days, 1 hour and 54 seconds.



USA Mar.3, 1969 - Postmark of the Cape Canaveral imprinted at the launching day of "Apollo 9"



USA Postal stationary with postmark of the Cape Canaveral imprinted at the landing day of "Apollo 9" (Mar. 13, 1969)

"Apollo 10"

USA May. 18, 1969 - Postmark of the Cape Canaveral imprinted at the launching day of "Apollo 10"

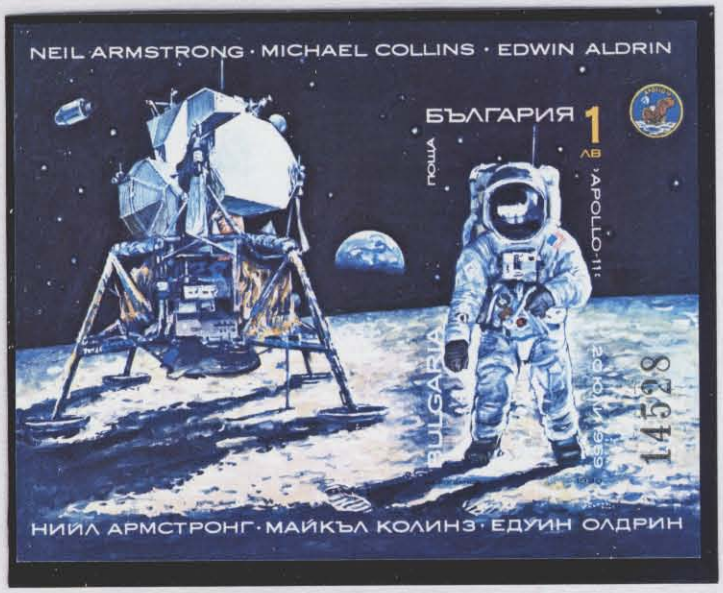
On May 18, "Apollo 10" was launched. The mission of the "Apollo 10" was to be the last test before mooning of a man. The crew consisted Thomas Stafford, John Young, and Eugene Cernan was to carry out all stages of mooning except mooning itself

Moon expeditions *Лунные экспедиции*

"Apollo 11"

USA, Postal Stationary - Cape Canaveral, July 16 1969 (launch of Apollo-11)

With the launch of Apollo 11 on July the 16th 1969, that a manned lunar landing became a reality. The Apollo 11 astronauts were Neil Armstrong - Mission Commander, Edwin Aldrin - Lunar Module Pilot, and Michael Collins - Command Module Pilot. The Spacecraft went into lunar orbit 110 kilometers above the Moon's surface.



On July 20, Armstrong and Aldrin landed the Lunar Module Eagle on the Moon's Sea of Tranquility at 4:18 P.M. At 10:56 Eastern Daylight Savings Time, Armstrong put his left foot down on the rocky plain.

Moon expeditions *Лунные экспедиции*

"Apollo 11"

"That's one small step for man, one giant leap for mankind", the famous words of Neil Armstrong echoed from Moon on July 20, 1969.

The cover with hand stamp First Day Cancel

The cover with machine stamp First Day Cancel

While not specifically naming Neil Armstrong (living persons cannot be identified on US postage), this commemorative stamp designed by Space Artist Paul Calle clearly tributes the "first man on the moon.", it was released on September 9, 1969.

Moon expeditions

Лунные экспедиции

"Apollo 12"

USA Nov.14, 1969 - Postmark of the Kennedy Space Center imprinted at the launching day of "Apollo 12"

On November 14, 1969 there was a launch of the space ship "Apollo-12". November 18 moon module successfully mooned in the given region within 200 meters form the automatic apparatus "Saveyor-3"

The astronauts Charles Conrad and Richard Gordon were 32 hours on the moon surface. And gathered 34 km of the moon soil and installed the unique science equipment. The crew moved from the moon module as far as 450 meters.

Austria. Jan. 18, 1969 - Postal stationary with Special Postmark

Moon expeditions

Лунные экспедициии

"Apollo 13"

On April 11, 1970 the space ship "Apollo-13" was launched. James Lowell, John Suigert, and Fred Hase had to moon and make scientific experiments. The mission was interrupted after the explosion of oxygen balloon in the technical module. Thus there was a serious damage of main parts of the ship. Only professionalism and courageous of the crew allowed them to return home

USA Apr.11, 1970 - Postmark of the Cape Canaveral imprinted at the launching day of "Apollo 13"

On the stamp of Togo (200 F) there is a portrait of T. Mettii who was changed by D.Swyator before launching.

Germany. Apr. 17, 1970 - Postal stationary with Special Postmark at the landing day of Apollo 13 from Bohum, Institute of Space Exploration

Moon expeditions *Лунные экспедиции*

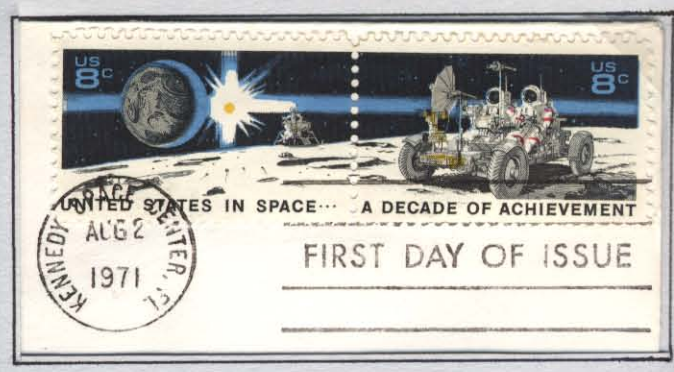
"Apollo 15"

The space ship "Apollo -15' was launched on July 26, 1971. Traditionally there were three members: David Scott, Alfred Warden, James Irvin.

Rumania 1971 - unperforated Souvenir Sheet

USA. Jul. 26. 1971. Postmark of the Kennedy Space Center imprinted at the launching day of space ship "Apollo 15"

It was the first time when for moving of the astronauts self-propelled lunar rover was used. The maximum distance from the ship which astronauts reached was 5 km. The crew spent 67 hours on the moon.



USA. Aug. 2.1971. Kennedy Space Center. First Day Postmark

Germany., Hamburg Jui.30, 1971. Special postmark Apollo 15 on the moon

Moon expeditions *Лунные экспедиции*

"Apollo 16"

On April 16, 1972 Apollo-16 was launched to the moon. The astronauts John Young, Thomas Mattingly, and Charles Duke were the members of the fifth moon expedition.

Germany. Apr.16, 1972. Special postmark of the Observatory in Bochum imprinted at the launching day of Apollo 16

Along with the Moon Mountains and craters the crater "Hort Ray" was explored. The astronauts gathered samples and took some measurements and pictures. The astronauts discovered that what was thought to have been a region of volcanism was actually a region full of impact-formed rocks.

Germany, Kiel. Apr.20, 1972 – Special postmark imprinted at the moonlanding day of Apollo 16.

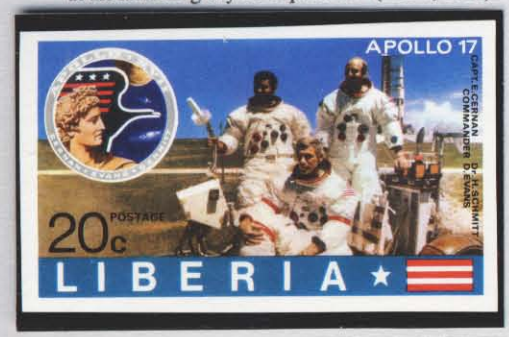
Moon expeditions *Лунные экспедиции*

"Apollo 17"

Space ship "Apollo-17" was launched on December 7, 1972. On board there were Eugene Sernon, Ronald Evans, and Harrison Schmidt.

Postmark of the Kennedy Space Center imprinted at the launching day of "Apollo 17" (Dec 7, 1972)

Austria - Special Postmark (Dec 11, 1972)



The scientific purposes of the flight were geological research and gathering materials, installing equipment on the surface, and taking pictures of the moon during the orbital flight. The highlight of the trip was the discovery of The Orange Rock, whose geological significance with respect to the age and formation of the Moon

Hungary, FDC, sent Jan.13, 1973 from Debrecen to Riga (received Jan. 25, 1973)

Exploration of the planets
Venus

Изучение планет
Венера

Venus is the second-closest planet to the Sun. Venus reaches its maximum brightness shortly before sunrise or shortly after sunset, for which reason it is often called the Morning Star or the Evening Star.

Lomonosov was the first person to hypothesize the existence of an atmosphere on Venus based on his observation of the transit of Venus of 1761

Venus's surface shows evidence of extensive volcanism

The first robotic space probe mission to Venus, and the first to any planet, began on February 12, 1961 with the launch of the Venera 1 probe. The first craft of the otherwise highly successful Soviet Venera program, Venera 1 was launched on a direct impact trajectory, but contact was lost seven days into the mission, when the probe was about 2 million km from Earth

The United States exploration of Venus also started badly with the loss of the Mariner 1 probe on launch. The subsequent Mariner 2 mission enjoyed greater success, and after a 109-day transfer orbit on December 14, 1962 it became the world's first successful interplanetary mission.

Exploration of the planets
Venus

Изучение планет
Венера

Eight probes from the Venera series successfully landed on Venus and transmitted data from the surface (as well as one Vega program probe of similar design). In addition, three Venera probes successfully transmitted data from the atmosphere of Venus.

USSR – Kiev, Oct. 19, 1967 – Special Postmark "Venera 4"

Venera 4 (October 18, 1967) - crushed by atmospheric pressure before impact.

Venera 5, Venera 6 (May 16 / 17, 1969) - atmospheric probe; crushed by atmospheric pressure before impact

USSR – Kaluga, Oct. 4, 1972 – Special Postmark

Venera 7 (December 15, 1970) - first successful soft landing on another planet; transmitted from surface for 23 minutes

Venera 9 (October 22, 1975) - soft landing; transmitted from surface for 53 minutes. First pictures from surface.

Venera 10 (October 25, 1975) - soft landing; transmitted from surface for 65 minutes

Pioneer Venus (Dec. 9, 1978)

One of four atmospheric probes survived impact and continued to transmit for 67 minutes

Venera 13, 14 (March 1 / 5 1982)

Vega 1, 2 (June 11, 15 1985) - soft landing; instruments failed to return data

Exploration of the planets
Mars

Изучение планет
Марс

In 1609, Mars was viewed by Galileo, who was first to see it via telescope.

Mars is the fourth planet from the Sun in the Solar System. The planet is named after Mars, the Roman god of war. It is also referred to as the "Red Planet" because of its reddish appearance as seen from Earth. Mars has two tiny natural moons, Phobos and Deimos.

In 1877 Italian astronomer Giovanni Schiaparelli discerned long straight lines on the surface.

Mars 1 was an automatic interplanetary station launched in the direction of Mars on Nov.1, 1962, the first of the Soviet Mars probe program, with the intent of flying by the planet at a distance of about 11 000 km.

Overprint "Earth – Mars 1.XI"

USSR Nov.13, 1962
Postal stationary
"Earth – Mars 1.XI.62"

Exploration of the planets
Mars

Изучение планет
Марс

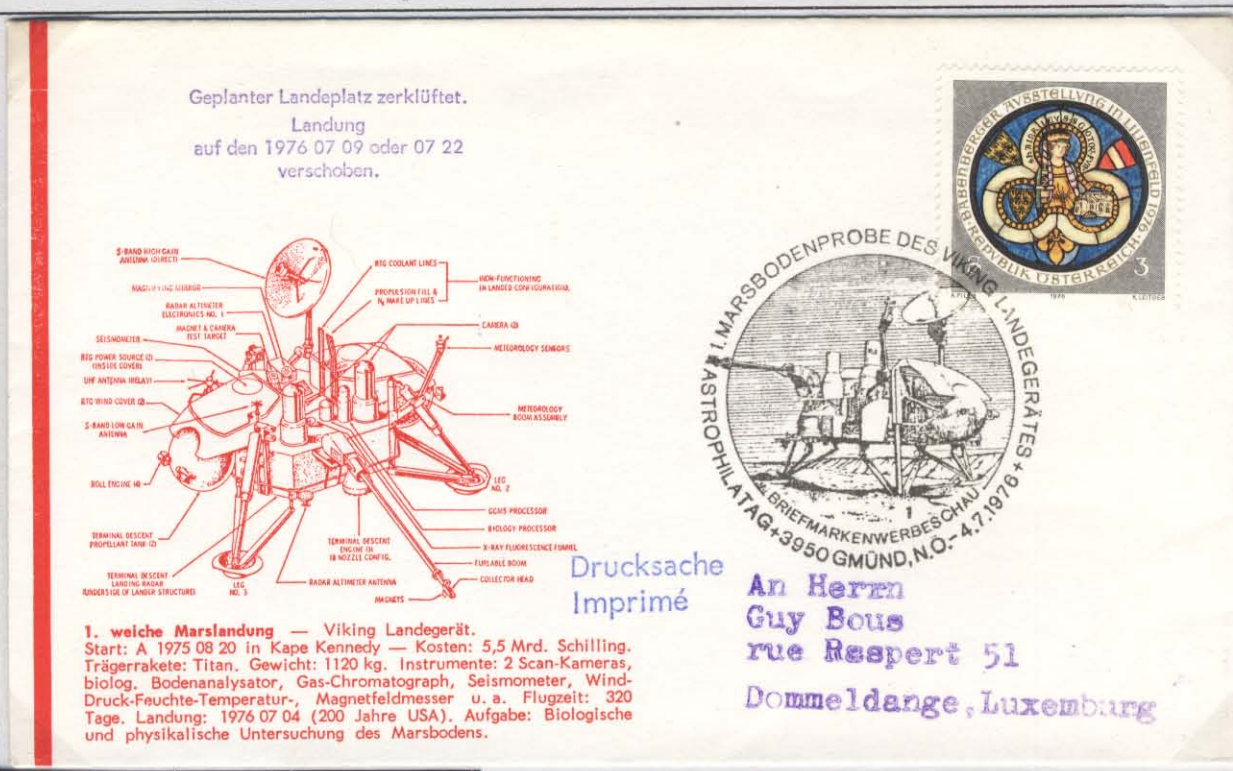
Mariner 4 (Nov.28 1964)
it was first successful flyby.

The first successful objects to land on the surface were two Soviet probes, Mars 2 and Mars 3, launched in 1971, but both lost contact within seconds of landing.

Austria Feb.14, 1972 - Special Postmark with "Mariner 9" and "Mars 2, 3"

Mars 4, Mars 5 (1973)
Mars 6, Mars 7 (1974)

Probe Viking above Mars



Probe Viking 2 on Mars surface

In 1975 NASA launches of the Viking program, which consisted of two orbiters, each having a lander; both landers successfully touched down in 1976 and remained operational for 6 and 3 years, for Viking 1 and Viking 2 respectively. The Viking landers relayed the first color pictures of Mars and also mapped the surface of Mars so well that the images are still sometimes used to this day.

The Soviet probes Phobos 1, Phobos 2 were sent to Mars in 1988 studied Mars and its two moons

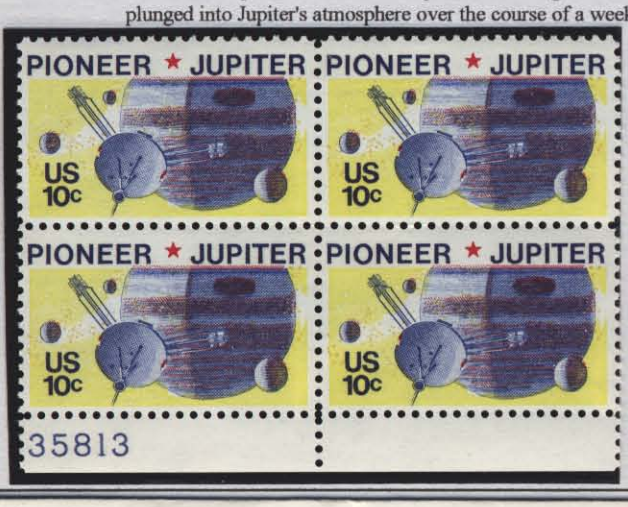
Exploration of the planets
Jupiter

Изучение планет
Юпитер

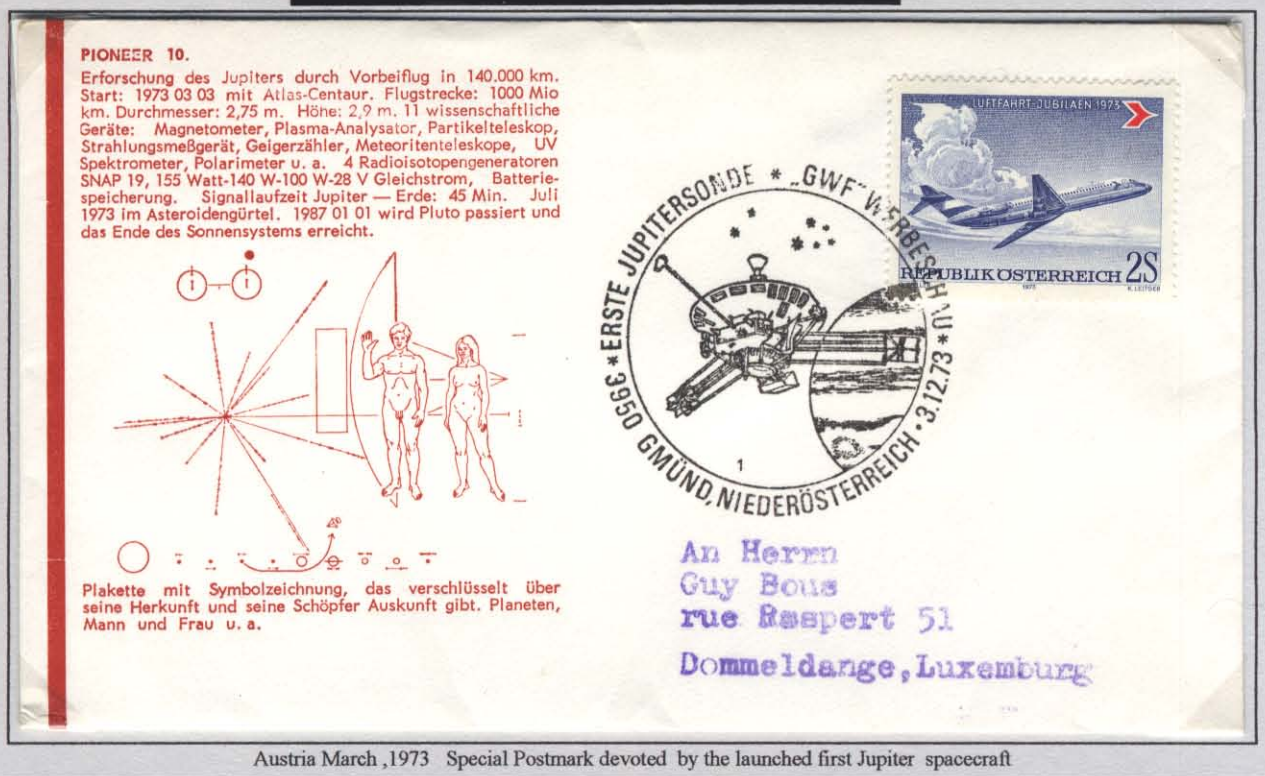
Jupiter is the fifth planet from the Sun and the largest planet within the Solar System.

This infrared picture shows two impacts of the fragmented comet Shoemaker-Levy 9 as these fragments plunged into Jupiter's atmosphere over the course of a week in July 1994.

In March 1972, NASA launched the Pioneer 10 spacecraft. The goal was to observe the asteroid belt and Jupiter. Arriving at Jupiter in December 1973, Pioneer 10 revealed Jupiter's intense radiation output, its tremendous magnetic field, and the probability of a liquid interior.



The Galileo orbiter went into orbit around Jupiter on Dec. 7, 1995. It orbited the planet for over seven years, conducting multiple flybys of all of the Galilean moons



Austria March ,1973 Special Postmark devoted by the launched first Jupiter spacecraft

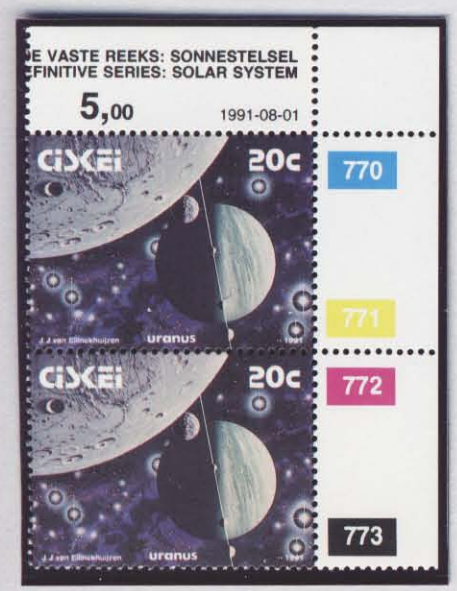
Exploration of the planets *Изучение планет*

Uranus

Neptune

Friedrich Bessel noted irregularities in the motion of Uranus and suggested that they were caused by an unknown planet, but died just before the discovery of Neptune.

Pluto



In 1986, NASA's Voyager 2 visited Uranus, then flew by the Neptune on August 25, 1989.

Austria Aug. ,1989 Special Postmark devoted by the Voyager 2 flight

Comets

Кометы

As the Big Flanets, comets rotate around the Sun by elliptical orbits. While approaching to the Sun, a comet becomes warmer and gas evaporates from the skin, generating the bright tail.

Long time people regard, that Comets are herald of adversity. Albert Durer depicts Comet as a symbol of deep melancholy.

People fancy comets like caudate monsters

La Comète AREND-ROLAND

In 1907 professor Peter Lebedev experimentally discovered light pressure, which is the cause of appearance of the tail of a comet.

Fyodor Berdichin was Russian scientist, which investigated comet's forms.

Comets
Halley comet

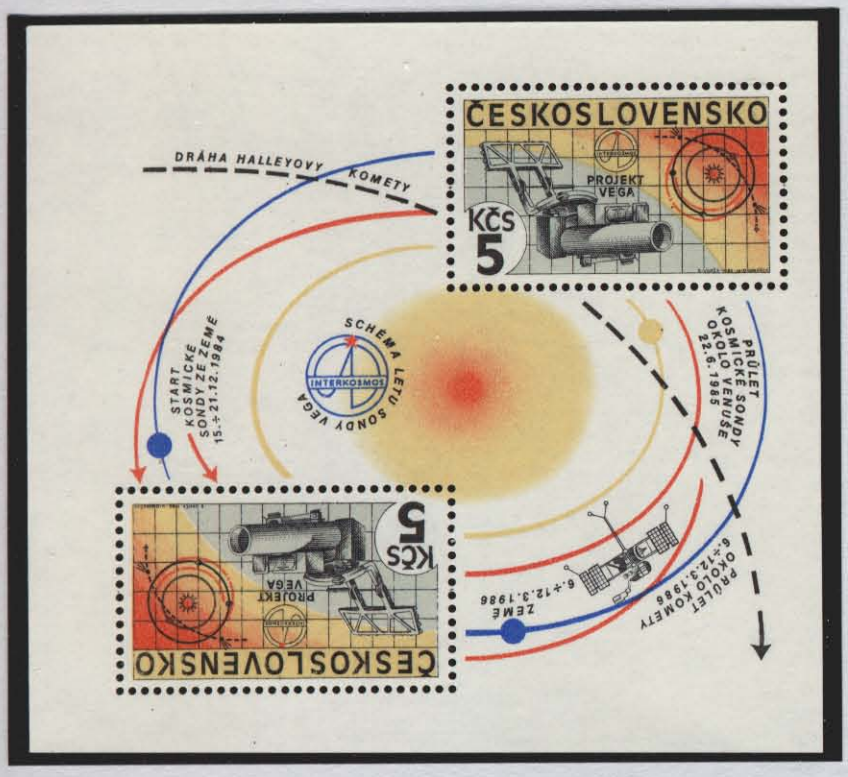
Кометы
Комета Галлея

King Harold, and the Comet (1066); picture of the Bayeux Tapestry.

Edmund Halley computed the orbit of a comet and predicted that it would return in 1758. This happened as predicted and the comet was named as Halley's comet. The comet has a period of 76 years and it was first sighted in 240 BC.

For studying Galileo Comet ground survey stations were used and manmade satellites Giotto (program ESA) and Vega (program INTERKOSMOS).

USSR 1984 FDC Postmark devoted by VEGA - 1



The comet has a speed of 128000 km/h and passed by the earth in November 1985 and April 1986. It was observed by two soviet space crafts Vega 1 and Vega2.

Austria 1986 Special Postmark devoted by VEGA - 1

Meteorites

Метеориты

A meteorite is a natural object originating in outer space that survives an impact with the Earth's surface. When it enters the atmosphere, air resistance causes the body to heat up and emit light, thus forming a fireball, also known as a meteor or shooting star. Meteorites are always named fo the place where they were found.

People's Republic China, 2003, FDC – Dispersal of falling meteorites

On June 30, 1908 there was a fall the meteorite in the district of the river Podkamennaya Tunguska (Eastern Siberia). In 1928-1930 Leonid Alexeevich Kulik made the research of the meteorite fall place.

The picture of the falling of Sihote-Alinskogo meteorite on February 12, 1947 was painted by the artist Medvedev who saw the falling of the meteorite while working with a sketch.

Perf.: comb.12½:12

Perf: line 12½

4. Modern astronomy

Современная астрономия

In the 20th century Out of Galaxy Astronomy began to develop. The creation of optical and radio telescopes with high resolution and application of man made satellites for out of atmosphere of astronomical observations brought to the discovering of new space objects such as radio galaxies, quasars, pulsars, and the sources of X-rays

Earth's group planets *Jupiter* *Saturn* *Uranus, Neptune*

Spiral galaxy

X-ray satellite "Astro-E11"

Satellite "Hayabusa"

Earth & asteroid

Telescope

Galaxy

Mars

Magellan Cloud & radio telescope

Galaxies

Галактики

A nebula is an interstellar cloud of dust, hydrogen gas and plasma. It is the first stage of a star's cycle. Originally nebula was a general name for any extended astronomical object, including galaxies beyond the Milky Way.

A galaxy is a massive, gravitationally bound system consisting of stars, an interstellar medium of gas and dust, and dark matter. Galaxies have been categorized according to their apparent shape : elliptical galaxy, spiral galaxies, peculiar galaxies, neighboring galaxies.

Large Magellan Cloud

Small Magellan Cloud

Omega Centauri Globular Cluster

Eta Carinae Nebula

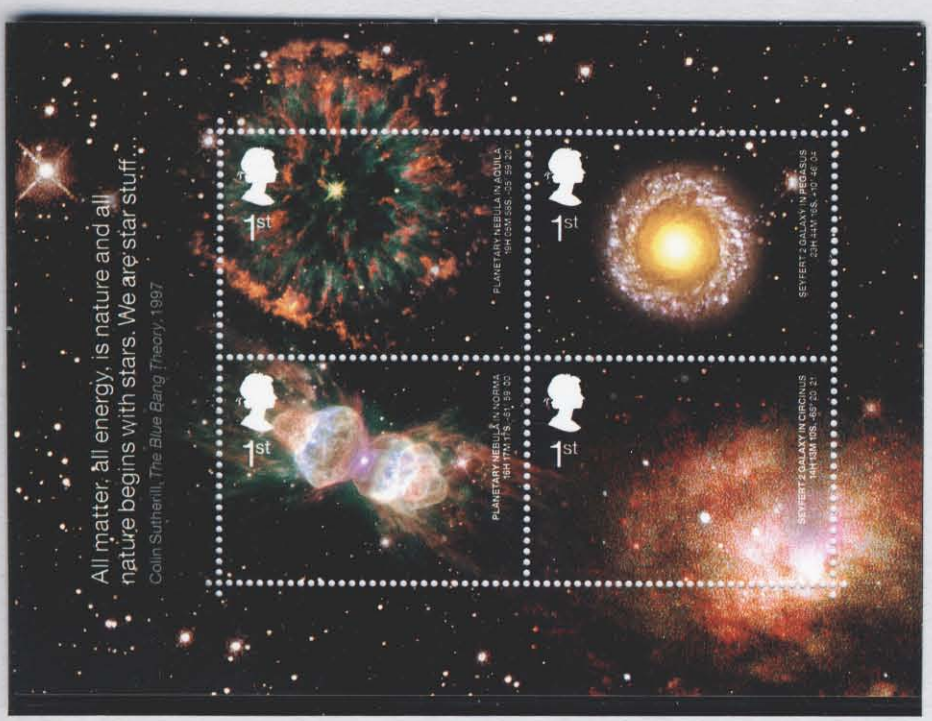
Astrophysics Congress and the inauguration of an observatory at Tonanzintla (Feb. 17, 1942)

Black Cloud in Orion A154

Spiral galaxy in the "Hunting Dogs"

Spiral Galaxy NGC 4594

Planetary Nebula in L



A typical spiral galaxy (Sketch of the Whirlpool Galaxy by Lord Rosse in 1845)

1 Planetary nebula in Aquila	*2 Seifert 2 galaxy in Pegasus*
3 Planetary nebula in Norma	*4 Seifert 2 galaxy in Circinus*

Galaxies

Галактики

Eskimo Nebula in the constellation of Gemini

In the result of modern development of astronomy and the appliance of strong optical and radio telescopes our conception of the Universe was radically changed. Even in the mid XX the Universe was a kind of the space of immovable stars which were in a certain equilibrium state. Now we observe stars which are fast evolved.

Saturn Nebula in the constellation of Aquarius

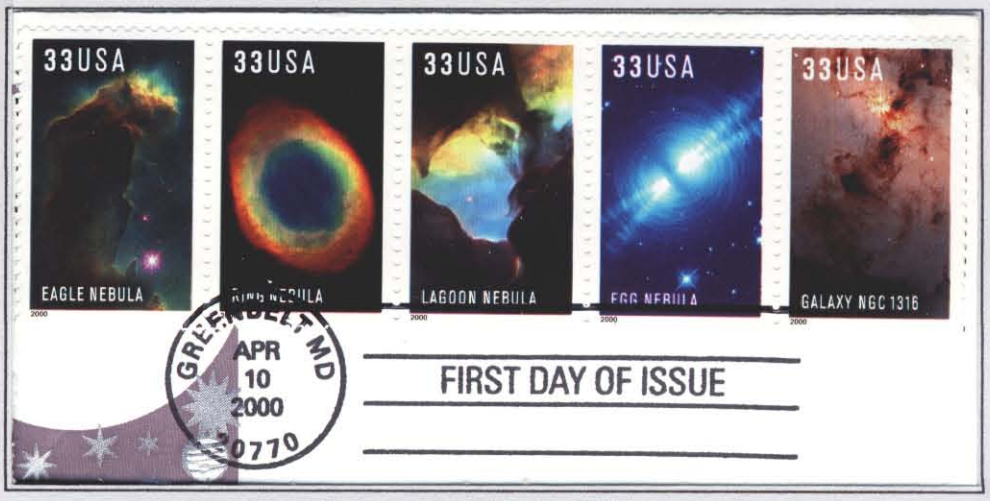
A lenticular galaxy the Spindle C53 in the constellation of Sextant

Flaming Star Nebula in the constellation of Auriga

Cat's Eye Nebula in the constellation of Draco

Helix Nebula in the constellation of Aquarius

Telescope "Hubble"



Images of the galaxies, as viewed by the Hubble space telescope.

Helix Nebula, the Pleiades, Spiral Galaxy NGC 2997

Exploration of the invisible
Radio astronomy

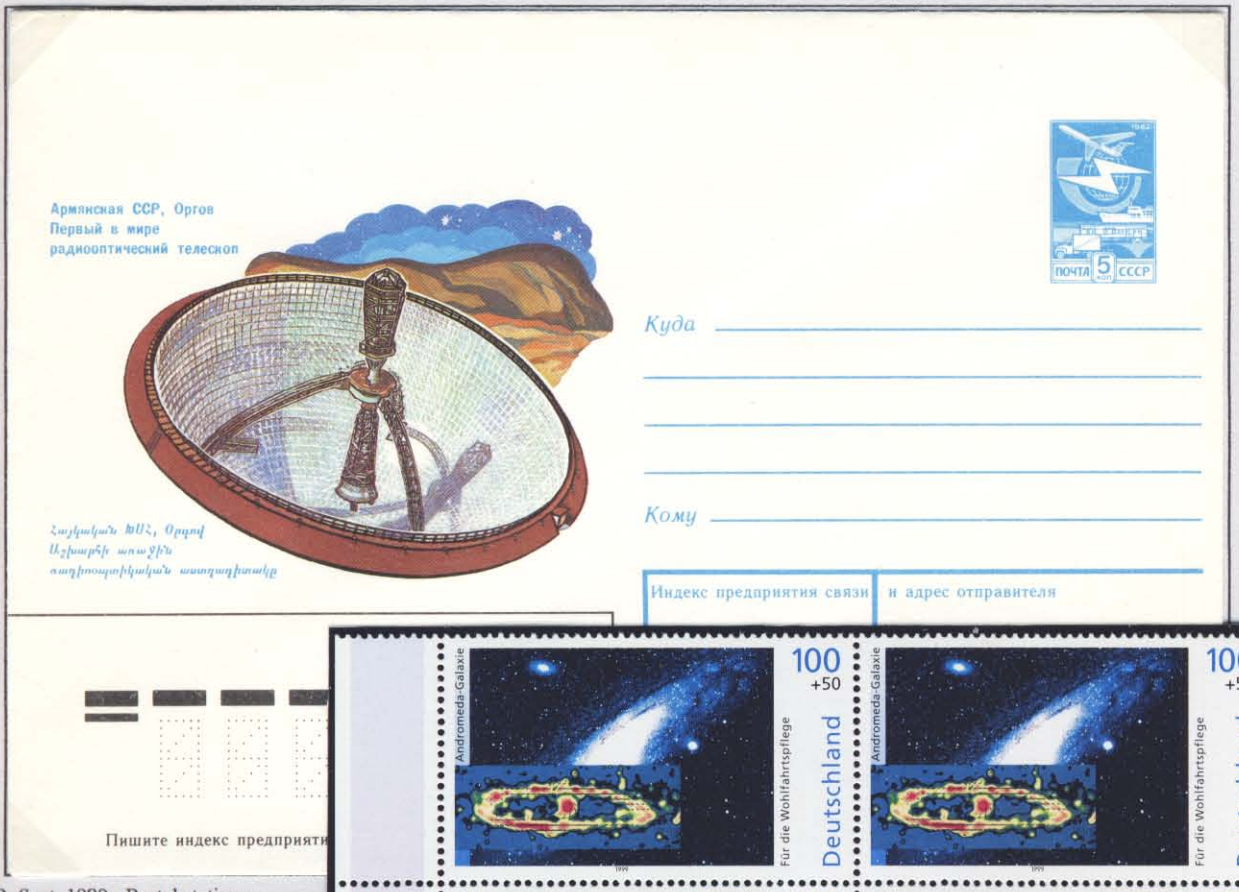
Исследование невидимого
Радиоастрономия

Radio astronomy is different from most other forms of observational astronomy in that the observed radio waves can be treated as waves rather than as discrete photons.

Radio astronomy uses the most sensitive receiving equipment and the largest antenna systems

Radio telescopes penetrated into such space depths which are out of rich for ordinary ones now.

The illustration of a historical star map of the constellation Cygnus, the Swan, from a 1782 atlas, the inset shows the same region again in radio waves.



USSR, Sept. 1989 - Postal stationary
Radio-optical telescope in Orgov (Armenia)

The Andromeda galaxy. The inset shows the same in the radio part of the spectrum

Exploration of the invisible
X-ray astronomy

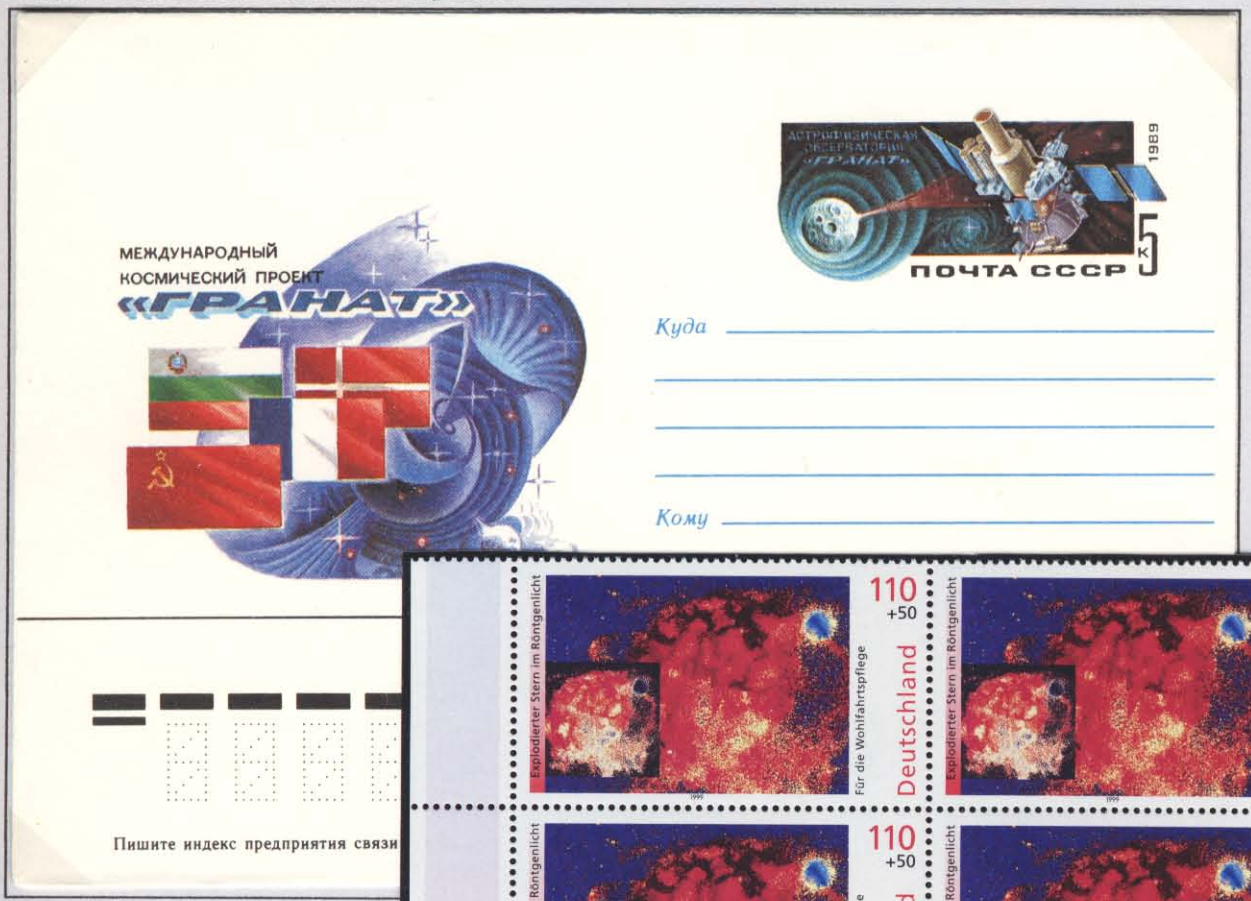
Исследование невидимого
Рентгеновская астрономия

At the end of the 19th century a German Physicists Wilhelm Roentgen discovered invisible rays. In the second half of the 20th century first research was done in X-rays diapason which gave a possibility to discover double stars.

X-ray astronomy is an observational branch of astronomy, which deals with the study of X-ray emission from celestial objects. X-ray radiation is absorbed by the Earth's atmosphere, so instruments to observe X-rays must be taken to high altitude, in the past with balloons and rockets.

The Indian satellite "Ariabata" (was launched on April 19, 1975) intended for X-ray and Gamma ray research.

GRANAT is the Russian x-ray satellite launched Dec.1 1989. Over the 4 years of pointed observations, GRANAT has observed many galactic and extra-galactic x-ray sources with the emphasis of deep imaging and spectroscopy of the Galactic center region, broad-band observations of black-hole candidates and X-ray Novae.



USSR, March 1989 - Postal stationary

The Vela supernova remnant.
Both the large picture and the inset seem to show the Vela nebula in X-rays taken by ESA's ROSAT satellite.

Exploration of the invisible
Gamma ray astronomy

Исследование невидимого
Гамма - астрономия

Ultraviolet astronomy is generally used to refer to observations at ultraviolet wavelengths. Light at these wavelengths is absorbed by the Earth's atmosphere, so observations at these wavelengths must be performed from the upper atmosphere or from space.

Orbiting Astronomical Observatory Copernicus was launched on Aug.21, 1972, and carried an X-ray detector in addition to an 80 cm UV telescope. Copernicus operated until February 1981, and returned high resolution spectra of hundreds of stars along with extensive X-ray observations.

Gamma ray astronomy is the study of astronomical objects at the shortest wavelengths of the electromagnetic spectrum. Gamma-rays coming from space are mostly absorbed by the Earth's atmosphere.

Photographic survey and telescopic observations of stars by crews of Souz 26, Souz 27 and Souz 28.

The stamp represents the entire sky in gamma-radiation.
On the bottom depict NASA's Compton g-ray observatory which captured this image.

modul Kvant

Kvant was addition to the Mir base block, which conducted research into the physics of active galaxies, quasars and neutron stars.

The research of ultra violate rays of the Sun has become the obligatory component owing to the development of satellite astronomy. The sources of ultra-violates are very hot stars of tremendous brightness.

Astrophysics

Астрофизика

Astronomy and Physics are closely connected with each other. The widening of knowledge about elementary particles reveals new features of the space and time. The scientific research of the universe allows guessing the connection of these phenomena and finding out laws controlling them.

Three fundamental discoveries in Physics in the XX-th century changed the views about space, time, causality, and chance. The creation of quantum mechanic by Plank and Bore and the discovery of Heisenberg uncertainty principle led to the creation of the new theory of the universe development.

Max Plank discovered that the energy in the Universe is emitted by portions of light particles called quantum.

- *ANTONY HEWISH (1974) discovered the first pulsar.*
- *S. CHANDRASEKHAR (1983) has developed the theory accounting for the phenomenon of white dwarf stars.*
- *WILLIAM FOWLER (1983) has studied the origin of the elements in the universe.*
  The stamp motif illustrates the structure of heavy atomic nuclei.
- *In the beginning, the universe consisted of hot radiant gas. ARNO PENZIAS and ROBERT WILSON (1978) discovered this cosmic background radiation.*
- *MARTIN RYLE (1974) developed a technique in which several telescopes are used to achieve the same results as a single gigantic telescope.*

The Hertzsprung-Russell diagram (1913) is a graphic relation of the absolute magnitude of stars to their spectral class.

In 1912 Hess made the fundamental discovery of cosmic rays. For this work he shared the Nobel Prize for physics in 1936.

In 1917 Albert Einstein presented a mathematical model of the universe

In 1932 Lev Landau prompted the idea about existing of neutron stars.

1987 Sweden Booklet : Nobel Prize winners in astrophysics.

Conclusion : Mankind turned to the Space
Заключение: Человечество — взгляд в будущее

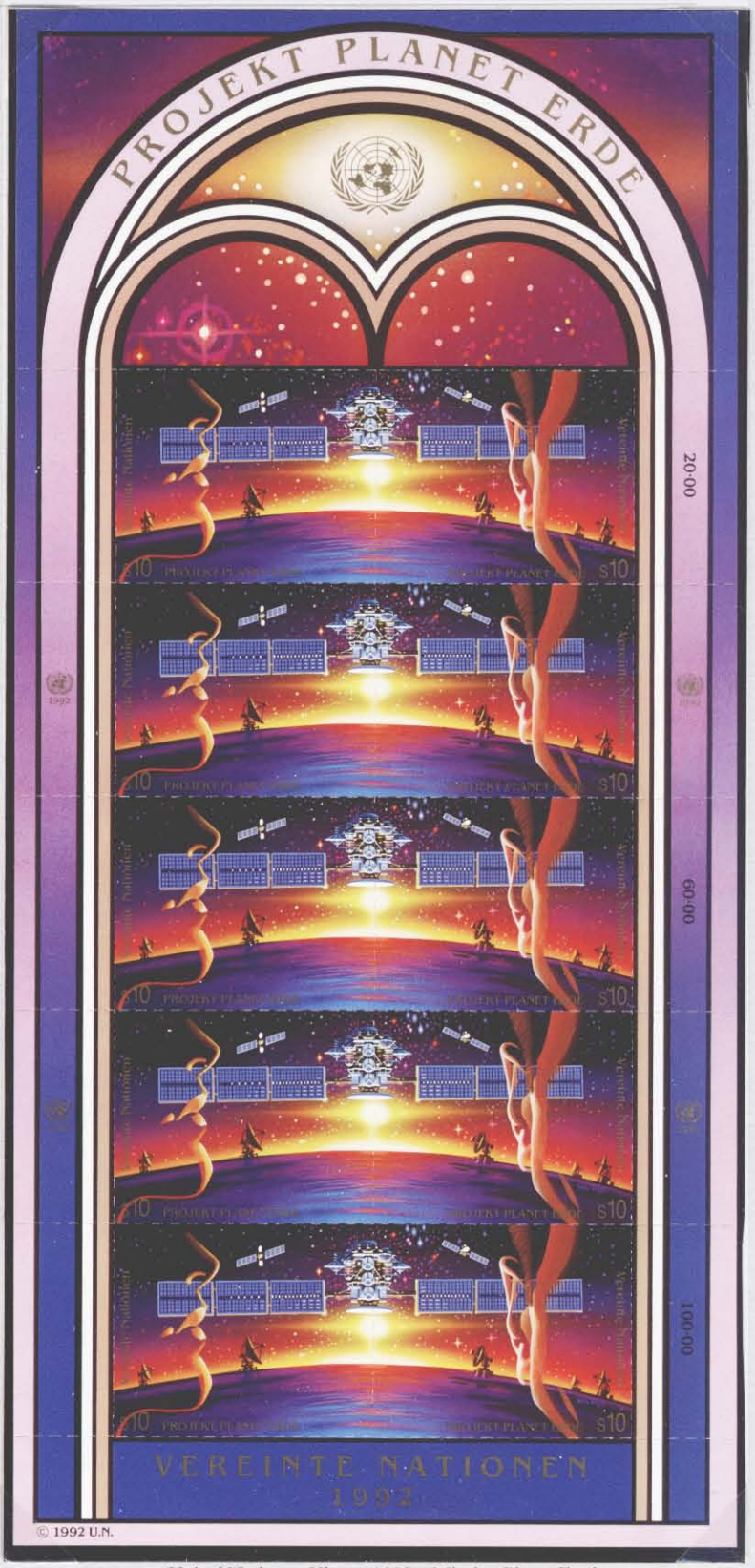
The cognition of the Universe consist of the three stages:

from simple contemplation to abstract thinking,

and from it to practical action

"The mankind will not stay on the Earth eternally but it will exceed the bounds of the atmosphere in the pursuit of the light and space and then it will conquer the Earth space within",
said Konstantin Tsiolkovsky in 1911.

V. Lukjanets - 'The Universe'



United Nations - Vienna 1992 – Mission Planet Earth

In the XX-th century the mankind made its first step from fantastic projects to real space flights of humans to other planets.