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## SPACE EXPLORATION TARGETS WITH THE HELP OF AUTOMATIC AIRCRAFT

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Space exploration is a very relevant field of investment. States annually spend tens billions of dollars on space exploration. However, spending such resources can we consider if the results of space activities will be effectively used by mankind?

The meteorites contain various substances, valuable metals, gases, and so on. Imagine what would happen if we could mine them right in space. The Moon at first glance is just a huge boulder that affects the tides and so on, it is also a profitable source of Helium-3, which is used at nuclear power plants. The astronauts helped the «Prolia» company test a drug that today can save older people from osteoporosis. It was easier to test the drug on astronauts, who lose 1.5 % of bone mass each month, than on an elderly woman on Earth who loses 1.5 % annually due to osteoporosis [2].

The United States began to explore deep space in 1968. An Atlas-Centaur rocket carrying NASA's heaviest and most ambitious unpiloted satellite at the time blasted into the sky from Launch Complex 36B at Cape Canaveral Air Force Station, Florida. OAO (Orbiting Astronomical Observatory) 2 provided the first orbital stellar observations in ultraviolet light, shorter than wavelengths in the visible range spanning 3,800 (violet) to 7,500 (red) angstroms. Much of UV light is screened out by the atmosphere and unavailable to ground-based telescopes. Stargazer's experiments made nearly 23,000 measurements, showed that young hot stars were hotter than theoretical models of the time indicated. It confirmed that comets are surrounded by vast clouds of hydrogen and discovered a curious feature of the interstellar medium that would take decades to understand. OAO 2 was shut down in February 1973 due to problems with sensitivity in its modified TV tube detectors, called uvicons. By then, the Telescope had captured some 8,500 images across 10 percent of the sky, and Whipple's team ultimately published a catalog of 5,068 UV stars [3].

In 1970 the Soviet Union creates the world's first orbital station with the name «Salyut». The results of this work are recognized by the world community as one of the most priority achievements of Russia in the field of manned cosmonautics. The Orion ultraviolet telescope was installed on Salyut-1. The astronauts used it to obtain spectrograms of Vega and Agena – thanks to this, it was possible to refine the theoretical model of the photosphere of high-temperature stars. In December 1973, the Salyut-2 went into space. Its crew managed to obtain 10,000 spectrograms of dim or distant stars, the catalog took a whole decade to compile!, and it was published in 1984. The history of the Salyut-4 is no less interesting, he had a constructive miscalculation due to which its automatic guidance system turned out to be defective, that is why Alexey Gubarev and Georgy Grechko had to switch to manual control. In addition, these 2 people accomplished a real feat – for the first time in history, they repaired a telescope in space. To significantly improve the image quality, on February 2, 1975, they sprayed aluminum onto its mirror. The next crew on June 18 was lucky to observe a solar flare. Shooting in the visible part of the spectrum was carried out by employees of the Crimean Astrophysical Observatory. Telescopes were also installed on Salyut-6 and Salyut-7: a submillimeter telescope with a one and a half meter mirror, a radio telescope, a Elena

gamma-ray telescope and an X-ray telescope. At the same time, Soviet scientists learned how to design observatories independent of manned ships and stations, controlled from ground stations. In the 1980s, they launched the Astron, Granat and Gamma satellites for research in the X-ray and gamma bands, and the Kvant astrophysical module with the X-ray observatory was docked to the Mir orbital complex. It is unfortunate that with the collapse of the Soviet Union, many promising projects were frozen [4].

In April 24, 1990: Hubble Becomes Big Eye Above Sky. NASA's telescope, named for American astronomer Edwin Hubble, was placed into Earth orbit by the space shuttle Discovery. In 1946, astrophysicist Lyman Spitzer spelled out the advantages such an observatory had over its earthbound counterparts: Being free of atmospheric interference, a space telescope is able to bring distant objects such as stars into much sharper focus. Additionally, the absence of an atmosphere makes it possible for a telescope to observe unrestricted infrared and ultraviolet light. Despite enthusiasm in the scientific fraternity for a more powerful Large Space Telescope, or LST, the politicians who would provide the funding were not so easily impressed. In 1974 the project was scrapped altogether as part of deep congressional budget cuts. The road to success had a few potholes, though. After the telescope became operational, it was discovered that the main mirror had been made to the wrong specs, causing a blurring of images. That resulted in the first of several shuttle visits to the orbiting telescope by a maintenance-and-repair crew. The mirror problem resolved, Hubble finally began earning its keep. Hubble has provided the deepest view of the universe yet, allowing astronomers to measure its precise age. It is about 14 thousand billion years! It has also confirmed the existence of dark energy [5].

The Spektr-R spacecraft was launched on July 6, 2011 and was located in a highly elliptical near-Earth orbit. It was equipped with a radio telescope and was part of the astrophysical observation system «Radioastron». During its existence, the Radioastron project has set several records: it has become the largest scientific instrument in the history of mankind; surpassed world achievements in angular resolution; the interferometer base of the system is 350 thousand km; was listed in the Guinness book. So we can proudly say that our success in space exploration is of great importance for all subsequent projects [1].

To date, about 5 thousand planets in 4 thousand systems have already been discovered. The most interesting thing is that about 2 trillion galaxies have been discovered at the same time.

*Thanks to these studies, we can learn the history of the origin of galaxies, their formation, find habitable planets besides the Earth, create a huge file cabinet of various stars and planets.*

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