

SPACE PHOTOGRAPHY AND ITS USAGE

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Abstract. *Currently, in the field of geodesy and cartography, it is necessary to use the most complete satellite navigation systems for the implementation of high-speed capabilities of satellite systems. In this field, thanks to the experience of the Russian Academy of Sciences in the early 1990s, the workstation was the main satellite observations, satellite geodetic networks, satellite verifiers equipment and scientific and technical activities Space geodesy, celestial mechanics and geodesy and astronomy institutes worked and achieved high results. In space geodesy, the main sources of accurate information about the earth are obtained through GPS and GLONASS modern technologies. Nowadays, space photography and their use of satellite image data are in great demand in various fields, such as agriculture, forestry and water management, environmental protection, urban planning and utilities, oil and gas industry, geology and mining, etc.*

Keywords: *earth, celestial bodies, science, innovative technologies, remote sensing of the earth's surface, space photography, earth satellites, spacecraft, other space phenomena, etc.*

The first works related to the space field were carried out in the second half of the 18th century. However, since the 60s of the 20th century, earth satellites have been used to solve space issues. There are also geometrical and dynamic issues of the space sphere. Determining the mutual situation of points on the surface of the Earth and on the surface of the spacecraft in a coordinate system is a geometrical problem; Determining the parameters of the earth's gravity field based on the orbital elements of space vehicles is a dynamic issue.

According to the President of the Republic of Uzbekistan Shavkat Mirziyoev's “Strategy of Actions on Five Priority Areas of Development of the Republic of Uzbekistan in 2017-2021”, new programs have been developed to raise the development of our country to a new level in all areas and sectors. [1]

This program was developed specifically for the space industry, as well as for all other fields. In particular, on February 12, 2018, the President of the Republic of Uzbekistan Sh.M.Mirziyoev signed a decree “On measures for the development of space research and technologies in the Republic of Uzbekistan”. [2]

The main purpose of the order is to study the experience of advanced foreign countries, which have become a locomotive of economic growth, an additional factor in attracting foreign investments, in the implementation of innovative ideas, developments and technologies in the field, space and road It implies the creation of a whole system for managing the space sector by establishing a unified state policy in the field of related technologies.

The scale of space photography of the Earth is 1:1000000 - 1000000, which covers a very large area of several tens of thousands of square meters. km. from almost to the surface of the Earth's hemisphere, it is possible to capture an image of a whole character.

Methods of space photography:

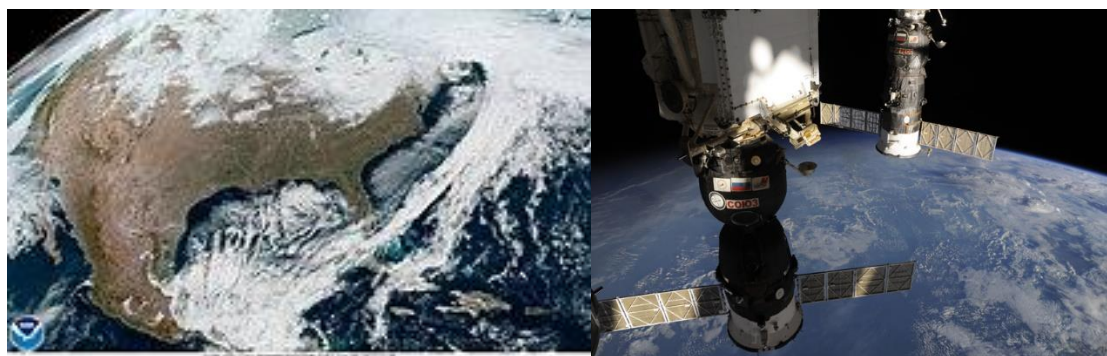
From an altitude of 150-300 km with the help of spacecraft with a short rotation period,
Photographing from an altitude of 300-950 km with the help of spacecraft with a long rotation period,

Transmission of images to the ground based on radio and television systems, receiving and transmitting images from geostationary satellites at an altitude of 36 thousand km,

- There are methods such as photographing the earth from the surface of the moon and planets and transmitting information to the earth by radio and television.

Photographs taken from space allow studying the regional, structural and global characteristics of the earth's atmosphere, lithosphere, hydrosphere and biosphere. It is also possible to repeatedly photograph a certain region of the earth in a short period of time through space photography. This creates conditions for studying the dynamic structure of phenomena such as periodic, daily, seasonal and episodic, volcanic eruptions, forest fires, floods, etc., various forms of economic activities, harvesting, irrigation, filling water reservoirs, etc. [5;6;7;8]

Photography from space was first started in 1946 by rockets, by Earth satellites in 1960, and by spacecraft in 1961. In space photography, in addition to black-and-white, color photo and television photography, infrared, microwave, spectrometric and photoelectron images are also taken.



1 – figure: Space photography of the Earth

Space photography is one of the methods of remote sensing of the earth's surface and the earth's atmosphere using spacecraft in orbit. To date, satellite images of the earth are the most cost-effective way to obtain geospatial information. Spatial resolution of space images is 10 m. varies from low to 30 cm very high, which allows to solve different tasks for government, science and business. Satellite imagery data is easily converted to digital format for further processing to provide fast and comprehensive information about the area of interest.

The use of space photographs, satellite image data is in demand in various fields: agriculture, forestry and water management, environmental protection, urban planning and utilities, oil and gas industry, geology and mining. -mining industry and others. In the economy, with the help of satellite images of plots, it is possible to monitor the actual boundaries of land and buildings, monitor illegal landfills, the condition of green spaces, the transport network, etc.

Satellite imagery data in forestry is indispensable for forest inventory, damage assessment from fires, illegal logging and forest diseases. The use of satellite images in agriculture and the agro-industrial complex makes it possible to quickly identify potential threats to crops, monitor their condition, and predict the germination of various crops.

Features of space photography, features of satellite images in the oil and gas industry, monitoring the infrastructure of production and transport facilities, determining areas of damage to control zones and underground pipelines, determining the level of subsidence of the earth's surface in production facilities, geology, satellite images of land plots are used to search for mineral deposits, monitor geological processes, create geological maps, etc. Archival satellite images of soil are suitable for solving many problems. [5;6]

Night photography from space If you need ultra-high-definition images captured by satellite at night, we can offer several solutions for you. ImageSat International's Israel's EROS-B satellite and China's Jilin 1 Video satellites 04/05/06/07/08 Chang Guang Satellite Technology co., Ltd Commercially available ultra-high resolution night are spacecraft that provide images. Jilin 1 Video satellites also capture nighttime video images of the Earth. Below are some examples of night photography from the spacecraft.

Night photography of the Earth's surface is widely used in the following areas:

Defense and intelligence, night search and rescue operations, ship detection, protection of state borders, light pollution monitoring in the analysis of the illumination and growth of urbanized areas, obtaining additional information about the illumination of individual blocks and streets to public utilities, large allows monitoring of fires and gas wells. Modern space photography and aerial laser scanning, in this case, photography is carried out using special devices that scan the area using laser beams. A laser photo is a very accurate representation of this land. Therefore, it is usually used to improve maps, geological prospecting and create images of areas where dangerous geological processes have occurred.

Using both space photography and modern spacecraft, you can get not only a detailed list of the area, but also its exact coordinates on the ground. Such a service is quite expensive, and space photography is usually ordered by government agencies and the Ministry of Defense.

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