

Scientific space centers and global achievements.

The modern stage of economic development and the forecast of its future are characterized by rapid penetration of high technology into all areas of human activity.

Aerospace, robotics, information technology, telecommunications, new technology, heavy-duty plastic materials, energy saving technology and other promising areas of modern science and technology are radically changing the lifestyle of people, create new opportunities for solutions of social, economic and defense issues.

Space activities should be allocated to the highest priorities of Russia, it is necessary to provide comprehensive and sustained public support. That's why in Russia was created many scientific centers such as "The Russian Federal Space Agency, Roscosmos", "Keldysh Research Center", "The Skolkovo Innovation Center".

The Russian Federal Space Agency, Roscosmos provides state services and administration of the state space assets, as well as management of the international cooperation in joint space projects and programs. In order to maintain effectively socioeconomic and political interest of Russia as a space nation, the Federal Space Agency, together with other federal executive authorities, Russian Academy of Sciences and regions of Russia, actualizes the following primary areas of the space activities:

- monitoring of the natural environment, control of critical emergencies and accident management, exploration of the natural resources, improvement of the Earth remote sensing systems on the basis of the following projects: immediate acquisition of hydro and meteorological data; study of the Earth natural resources and ecological monitoring; multi-zone high-resolution photographing of the Earth; development of the advanced Earth remote sensing system (the system for environmental space monitoring, natural disaster and emergency situation caution);

- support of global communication and TV-broadcasting over entire territory of the Russian Federation, improvement of space communication and TV-broadcasting

on the basis of direct TV-transmission, fixed communication, TV-program transmission and mobile satellite communication projects;

- evolution of the orbital crew missions, including the activities under the international crew mission program and implementation of the international agreements on the International Space Station (ISS) development and support;
- validation of new and high-pure material production space technologies, evolution of space technologies and production of the materials with unique properties; scientific research of the near-Earth space, outer space and planets;
- creation and improvement of the space vehicles, and launchers.

Keldysh Research Center is the leading organisation in Russia in the field of rocket engine manufacturing and space power. Keldysh Research Centre is included in the structure of the Federal Space Agency and takes an active part in formation and realization of the Federal Space Program. It develops, manufactures and tests promising prototypes of various types of rocket engines, space power systems, high-energy beam generators and particle accelerators.

At the present the Centre keeps its famous traditions both in the field of rocket production and introduction of ecologically-safe space technologies and processes into the national economy owing to its active scientific work. The Keldysh Research Centre has succeeded to enter the world market. It has the direct contacts with leading aerospace companies of USA, Europe, and Asia.

The Skolkovo Innovation Center is a planned high technology business area built at Skolkovo near Moscow, Russia. This building is a highly modern complex created to encourage science and technology companies, to develop start-ups and to market them correctly. The Space Technology and Telecommunications cluster is intended to strengthen Russia's position in the respective industries. The scope of activity is wide: from space tourism to satellite navigation systems. Russian companies aim to increase their market share in this global market, the total volume of which is estimated at \$300 billion.

There are many scientific achievements in Russian and International space programs. In November 1993, the International Rosetta Mission was approved as a Cornerstone Mission in ESA's Horizons 2000 Science Programme.

Since then, scientists and engineers from all over Europe and the United States have been combining their talents to build an orbiter and a lander for this unique expedition to unravel the secrets of a mysterious 'mini' ice world, a comet.

Initially scheduled for January 2003, the launch of Rosetta had been postponed due to a failure of an Ariane rocket in December 2002. The adventure began March 2004, when a European Ariane 5 rocket lifted off from Kourou in French Guiana.

During a circuitous ten-year trek across the Solar System, Rosetta will cross the asteroid belt and travel into deep space, more than five times Earth's distance from the Sun. Its destination will be a periodic comet known as Comet 67P/Churyumov-Gerasimenko. The Rosetta orbiter will take up with Comet 67P/Churyumov-Gerasimenko and remain in close proximity to the icy nucleus as it plunges towards the warmer inner reaches of the Sun's domain. At the same time, a small lander will be released onto the surface of this mysterious cosmic iceberg.

In December 2015 the Rosetta will touch the ground. By then, both the spacecraft and the comet will have circled the Sun and be on their way out of the inner Solar System.

The Rosetta mission will achieve many historic firsts.

- Rosetta will be the first spacecraft to orbit a comet's nucleus.
- It will be the first spacecraft to fly alongside a comet as it heads towards the inner Solar System.
- Rosetta will be the first spacecraft to examine from close proximity how a frozen comet is transformed by the warmth of the Sun.
- Shortly after its arrival at Comet 67P/Churyumov-Gerasimenko, the Rosetta orbiter will despatch a robotic lander for the first controlled touchdown on a comet nucleus.
- The Rosetta lander's instruments will obtain the first images from a comet's surface and make first analysis to find out what it is made of.

- Rosetta will be the first spacecraft ever to fly close to Jupiter's orbit using solar cells as its main power source.

Scientists will be eagerly waiting to compare Rosetta's results with previous studies by ESA's Giotto spacecraft and by ground-based observatories. These have shown that comets contain complex organic molecules: compounds that are rich in carbon, hydrogen, oxygen and nitrogen.

Intriguingly, these are the elements which make up nucleic acids and amino acids, the essential ingredients for life as we know it. Did life on Earth begin with the help of comet seeding? Rosetta may help us to find the answer to this fundamental question.

In conclusion, I'd like to say that it is essential to understand that space activities allows us to use the unique possibilities of the Space in the interests of strengthening the economic, military and defense security of Russia, and also to ensure the welfare of its citizens and to solve global problems of mankind on the planet Earth.

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