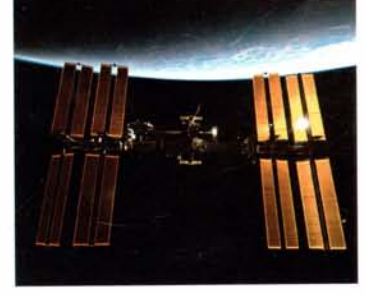


ROSCOSMOS



FIDAE 2010





At present more than 100 countries of the world conduct space activity. However, only three of them (USA, China and Russia) implement all directions of this activity, including a full-scope of piloted cosmonautics.

Last year the intensity of launches of the Russian launch vehicles has increased considerably. The total number of launches was 32. 29 national and 20 foreign space vehicles have been injected into orbit. It makes 43% of all launches of the launch vehicles in the world during last year.

In accordance with the federal space program 13 space vehicles were launched in 2009.

The space vehicle 'Koronas-Foton' was injected into orbit in January 2009 for investigating the physics of the Sun and solar-terrestrial relationship within the framework of the multiannual Russian program of investigating the physics of the Sun and solar-terrestrial relationship. The Russian and foreign scholars have implemented a program of scientific investigations by means of this vehicle.

The new-generation meteorological space vehicle 'Meteor-M' launched on September 17 will allow to significantly increase the accuracy of weather forecasts.

The Roskosmos enterprises have increased two-fold a number of launches of piloted space ships 'Soyuz TMA' and unmanned 'Progress'-type cargo ships.

In recent years the importance of a dependable navigation support, effected through the use of satellite navigation systems, has increased. The orbital group of domestic system GLONASS, which provides for a global coverage of the territory of Russia by a navigation field, has been replenished with the new vehicles. In 2009 a Federal network operator of the Russian navigation system was established and its functions were determined.

A successful operation of the up-to-date Earth remote sensing SV 'Resurs-DK' launched in June 2006 continues. The major volumes of work in manufacturing the SV 'Elektro-L' and 'Kanopus-V' have been fulfilled for the purpose of further build-up of the Russian orbital

group of the Earth remote sensing SVs and hydrometeorological surveying. The launching and putting them into operation will ensure provision of the meteorological services with the required information about weather, will allow to effect a very prompt detection of catastrophic events and accidents, timely warn about forest fires.

The scheduled launch of a small space vehicle MKA-FKI for fundamental investigations is now planned to be effected this year as a launch co-current with SV 'Kanopus-V' and Byelorussian satellite.

Totally 105 scientific experiments have been conducted in the field of materials science, space biology and technologies by means of technological laboratory 'Foton-M' launched in autumn 2007, including 37 European, 2 Chinese, 59 Russian and seven Russian-European experiments. The development and manufacture of new-generation 'Express'-series communication SV continues, 'Express-AM44' and 'Express-MD1' vehicles have been launched due to which the Russian space communication and broadcasting systems are being dynamically developed. Again, the work is underway for building the advanced space retranslation system based on SV 'Luch' and systems of personal satellite communication based on SV 'Gonets-M'.

Within the framework of fundamental space investigations program the Russian scientists continue the work with 'Konus-A' equipment on-board the American SV Wind, scientific complex 'Rim-Pamela' comprised by the SV 'Resurs-DK', equipment for investigating the atmosphere of planets: instruments OMEGA and 'Spika-M' on-board the European vehicle Mars Express, instrument 'Spika-V' on-board the European station Venus Express. The major volume of work on manufacturing the astrophysical observatories 'Spektr-R' and 'Spektr-RG' has been fulfilled.

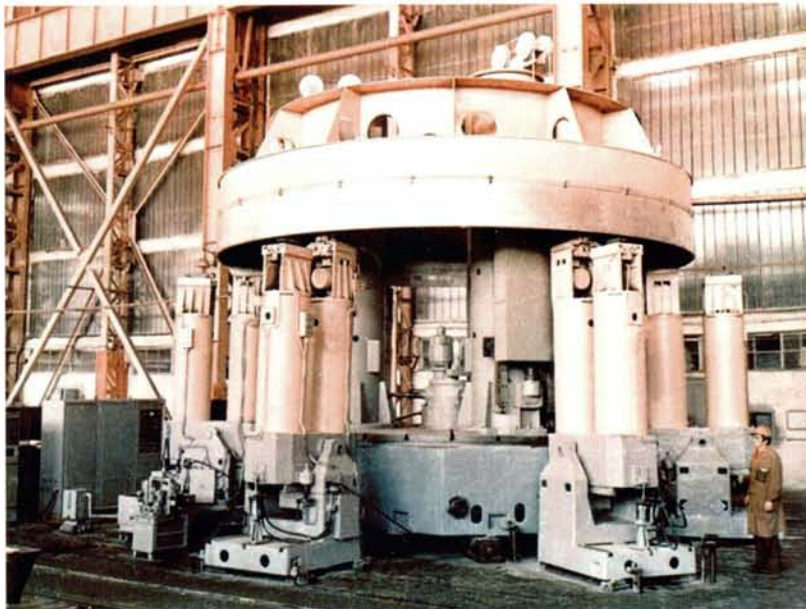
We are hopeful that the businessmen from the countries of Latin America will more actively step in the International cooperation and become reliable partners for the Russian enterprises.

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FEDERAL STATE UNITARY ENTERPRISE SCIENTIFIC-AND-INDUSTRIAL ASSOCIATION TECHNOMASH



The FSUE NPO Technomash is a headquarter organization of the Federal Space Agency (Roskosmos) in the field of technological support of building articles for the space-and-rocket equipment (SRE).

The factory was established in 1938. Since 1946 the factory participates in the activities related to building the articles of SRE.

At present the FSUE NPO Technomash solves in complex the technological issues of production in the field of machine-building, instrument-building, nanotechnologies, materials science, standardization and metrology.

The guidelines of factory's activity encompass all major machine-building technologies.

Machining production

The development of dedicated milling machines for machining of parts of turbo-pump assemblies (TPA), milling of cooling passages of the combustion chambers of the liquid-propellant engines (LPE), machining of non-rotating parts of structural ring-type, wheels, adapters, flanges, edgings, diaphragms, wafer background, parts

of polymer composite materials by means of spinning.

Blanking production

Development of technology, equipment, mechanical means for the specific types of casting, bending of pipes, die forging, sheet-metal stamping facilities and radial-draw forming.

Establishment of new quenching media in the heat-treatment production, shaping of seamless pipe fittings, production of powder parts.

Welding production, brazing and application of coatings

Development of technology, equipment and modes for:

- arc, electron-beam, friction and other advanced types of welding;
- brazing in controlled-atmosphere furnaces, vacuum furnaces, induction furnaces with automatic control and adjustment of brazing conditions.

Aleksandr N. Korov
Ph.D. (Engineering)
Director General



Development of dedicated finishing and cleanout production processes, production processes and equipment for laser cutting and heat treatment, for ultrasound treatment, plasma coating as well as for application of vacuum multifunctional coatings.

Development of furnaces for brazing of assemblies with the use of induction heating featuring automated control of temperature and time parameters of brazing.



Assembly production, testing and non-destructive test methods

- Equipment for testing the moving mass characteristics.
- Benches for controlling quality and proper wiring of the on-board cable networks.
- Development of production processes and devices for checking air-tightness of articles, characteristics of TPA and heat-exchanging units.
- Flaw detection of the welded seams, brazed joints and base material using ultrasound, acoustic-emission, acoustic-topographical and X-ray methods.
- Methodology of automation of the hydrogasodynamic testing of LPE accessories in case of dummy and full-scale tests.
- Development of equipment and technologies for checking quality of assembly of gyros and devices of fine mechanics, for dynamic balancing of rotors, for static balancing, for vibration measurements and vibraton diagnostics.
- Development of automated systems of functional monitoring and diagnostics of status of the liquid-propellant propulsion systems with respect to the data of parameters measured during bench technological tests

based on the mathematical modelling of engine parameters, data of technological characteristics of parts, assemblies and accessories comprised by a specialized database 'Diagnostics'.

Scientific and analytical center

Scientific and analytical center comprised by the factory conducts a system study and forecasts the opportunities of establishing new space-oriented production technologies of special machine-building, instrument-building and materials for the space-and-rocket equipment, elaborates proposals for implementing them using Management by Objectives within a framework of

federal target programs at the industry and inter-industry levels.

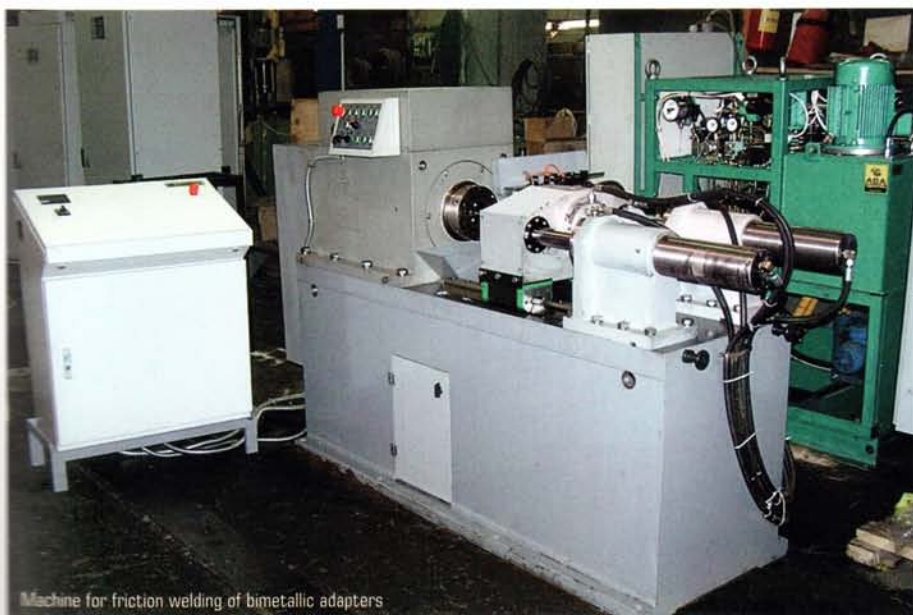
The center conducts system developments and investigations ensuring creation of the branch systems of of the through computer-aided designing and production of modular SRE, including basic load-bearing structures with the built-in electronic and microelectromechanical devices for a wide range of the space on-board and ground radioelectronics. It builds up a scientific-and-technical and experimental stocks required for the implementation of multi-functional technological space systems and space-based production robotic tools as well as the systems of their functional support.



GNS-series universal welding head



Hardware-software system for dynamic balancing of gyro rotors



Machine for friction welding of bimetallic adapters

Establishing a system of engineering-type consulting

The FSUE NPO Technomash establishes a system of engineering-type consulting aimed at further provision of efficiency of implementing projects of technical refurbishment of the industry's factories.

The FSUE NPO Technomash in the context of its scientific and technical potential is ready for further expansion of scientific investigations and developments in the field of industrial technologies for producing the SRE articles and fruitful cooperation with the foreign partners in these branches of activity.