



Farnborough International Airshow 2010



# ROSCOSMOS

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 **Farnborough**  
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**AIRSHOW**  
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# RUSSIAN FEDERAL SPACE AGENCY



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## The Federal Space Agency is a federal executive body responsible for Russian space activities which accomplishes the following basic functions:

- implementation of government policies and regulatory activity;
- rendering government services and management of the government assets involved into space activities;
- awarding government contracts for development, production and procurement of space technologies and space infrastructure objects, diversification of space technology production;
- development and widening of international cooperation through implementation of joint space projects and programs, signing international contracts in accordance with an established order;
- arrangement of conditions for utilization of space activities results in the interests of social and economic development of Russia and its regions.

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'



Anatoly N. Perminov, Head of the Russian Federal Space Agency

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. 

# FEDERAL STATE UNITARY ENTERPRISE 'SCIENTIFIC-PRODUCTION ASSOCIATION 'TECHNOMASH'



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The FSUE 'NPO Technomash' is the head organization of the Federal Space Agency ('Roskosmos') on technological support of building the items of the rocket-and-space equipment (RSE). The enterprise was established in 1938. At first it advanced as the head enterprise in the technology of artillery armament production. Since August, 1946 the enterprise has been participating in activities aimed at manufacturing the RRSE products. Today the FSUE 'NPO Technomash' is the leading scientific and technological enterprise of the rocket-and-space industry (RSI) of Russia in the field of production technologies.

The main task of the enterprise consists in complex solution of technological problems of manufacturing the RSE items at stages of experimental-design developments and mass production, contribution to overcoming the negative tendencies in machine-building, instrument-building and material-science complexes of the RSI by optimizing the technical refitting of the enterprises of the industry, development and introduction of promising, breakthrough and supporting technological processes of RSE production.

A range of work fulfilled by the FSUE 'NPO Technomash' covers all main machine-building technologies, from getting the workpieces to assembly and functional tests of the items, from non-destructive test methods and metrological support to standardization and certification of technologies, equipment and items. The main processes are casting, plastic working, all types of dimensional processing, including machining, electrochemical processing, electrophysical processing, getting welded and soldered joints, assembly, laser technologies; technology of applying multifunctional coatings, non-destructive test methods and aids, checking of air-tightness, other types of tests and functional diagnostics of complex technical systems.

The team of employees of the enterprise has created basic, unique technological processes and special process equipment for all basic stages of technological process. Progressiveness and actuality of technical solutions for development and manufacture of the RSE items have been confirmed by 77 Russian patents.

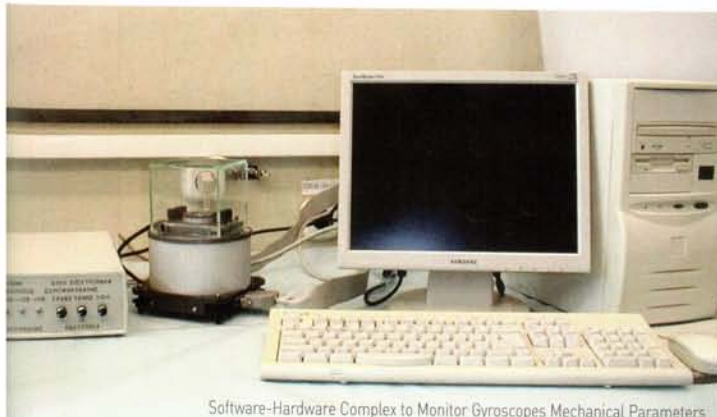
The FSUE 'NPO Technomash' is not only proud of its history, but is doing everything needed to comply with the cutting-edge requirements for developing the industry and is facing the future with certainty.



Aleksandr N. Korov, General Director

The enterprise is participating in the effective federal target-oriented programs of the Roskosmos, conducts R&D work to create the perspective technological processes, specialized technological equipment, instruments and aids of technological tooling in the fields of machine-building and instrument production, material sciences, standardization and metrology.

The enterprise is implementing a deep modernization of the special equipment with the use of modern management



Software-Hardware Complex to Monitor Gyroscopes Mechanical Parameters

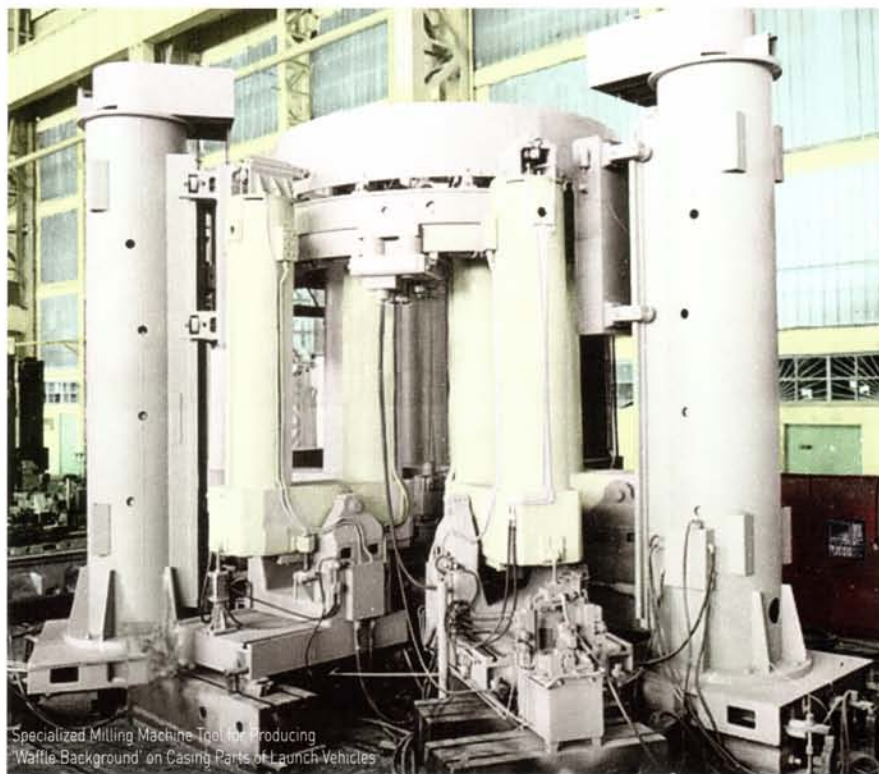


Hardware-software system for dynamic balancing of gyro rotors

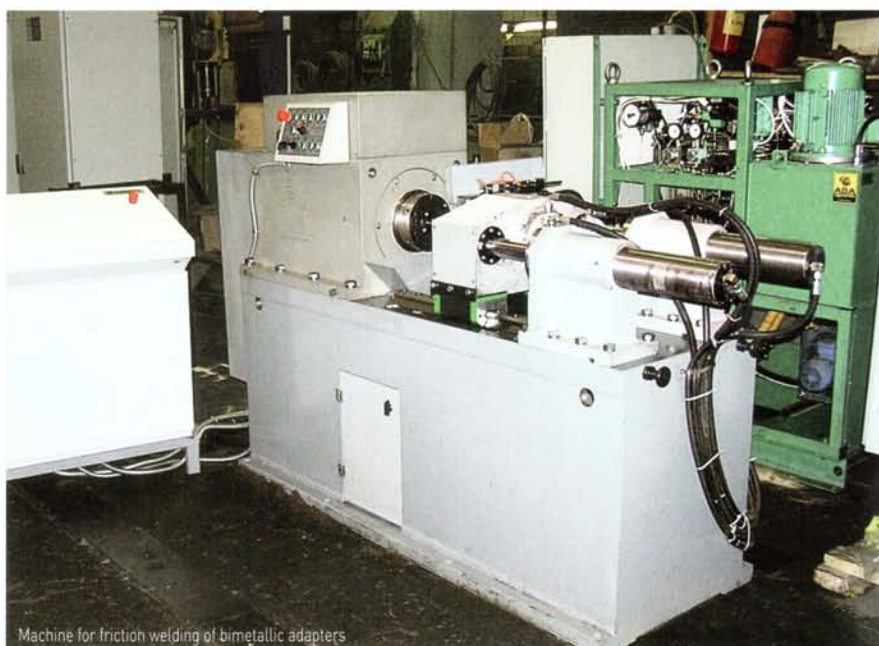
systems and new engineering solutions. These are machine tools to produce 'waffle background' on cylindrical, conical and spherical parts of casings of launch vehicles, to mill the cooling passages of liquid-fuel rocket engines (LFRE) combustion chambers; a spectrum of special winding-and-outfit machines; machines to balance and monitor the gyroscope rotor dynamic moments, with mass of 1 to 30 kg; welding equipment, technologies of applying various types of coatings and other types of special equipment and industrial technologies.

In order to form a unified technical policy, determine priority-oriented directions in developing the technologies and materials and also to ensure special technological equipment inside the industry, a scientific and analytical center has been founded at the enterprise to investigate the systems and predict the possibilities for developing new space-production technologies of special machine-building, instrument engineering and materials for the RSE, develops proposals on implementing them by program and target methods within the framework of federal target-oriented programs at the branch and inter-branch levels.

The Center arranges investigations and developments ensuring creation of branch system of through automated designing and production of module RSE, including the basic load-bearing structures with built-in electronic and



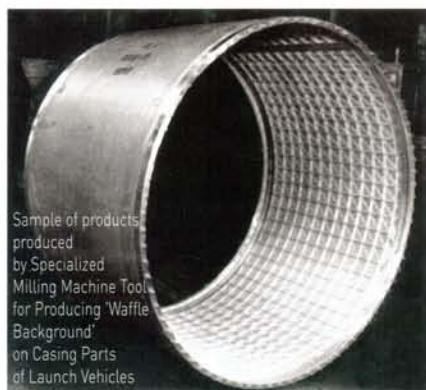
Specialized Milling Machine Tool for Producing 'Waffle-Background' on Casing Parts of Launch Vehicles



Machine for friction welding of bimetallic adapters



GNS-series universal welding head



Sample of products produced by Specialized Milling Machine Tool for Producing 'Waffle-Background' on Casing Parts of Launch Vehicles

microelectromechanical devices and appliances for wide nomenclature of space on-board and ground radio electronics.

It creates scientific and technical and experimental reserves required for implementation of multifunctional technological space systems and space production robots, and also systems for their functional support. The necessary basis to implement the highly-technological international space projects may be an inter-branch information and analytical

system ensuring net automatic search, formation of proposals required to market the innovation production technologies in adjacent highly-technological branches of industry.

The FSUE 'NPO Technomash' due to its scientific and technical potential is ready to further expansion of scientific investigations and developments in the field of industrial technologies to create and manufacture the science-intensive products and to carry out fruitful cooperation with foreign partners in these directions. ✈