

THE PROSPECTS OF DEVELOPMENT OF INTERNATIONAL MULTIFUNCTION SPACE SYSTEMS ON A NEW GENERATION MICROSATELLITES BASIS

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As far back as the first decades of practical space exploration (1960-1980) outlined steady tendency of a changeover from the use of single satellites to the creation and use of constantly operational orbital space systems. That obligate changeover took place very quickly and had a snowballing character. Already by the middle of XX century eighties the relation of number of single satellites and constantly operational orbital space systems had reached one to ten. The obligation of this changeover was determined by vital necessity of using such capabilities of these systems as real-time data acquisition from every point of the world and its nearly on-line transfer to the users.

Special-purpose large-scale space systems has been constantly expanding active tasks spectrum, reaching out more and more economy branches and scientific areas. The beginning of XXI Century was inaugurated by an emergence of new multifunction space systems on the basis of Earth remote sensing satellites (ERS). Multifunction space systems are internationally-owned as a rule. This is determined either by the size of their territorial coverage or by significant cost of such systems.

The most demonstrative examples of these international multifunction space systems are:

DMC international emergency monitoring system, which is developed and operated by Great Britain, Algeria, Turkey, China, Thailand and Nigeria;

“Sentinel Asia” Disaster Management Support System developed under the auspices of Japan with the participation of 18 countries from the Asia-Pacific Region.

Basic conceptual principles of multifunction space systems development are proposed in this paper for the development of International Multifunction Global Monitoring and Information Space System.. This system, based on multiple new generation 100-120 kg mass microsattellites constellation must meet the challenge of the new global level in Earth surface monitoring, hydrological and meteorological missions, navigation, data communication and relay, global distance learning.

Making the multiple space constellation is impossible without the use of microsattellites. Losing in observation complexity microsattellites has an advantage of cost saving in cases when multispectral homogeneous space data are satisfactory to meet an objectives of a program. The scientific and technological backup in new generation microsattellites design acquired by Khrunichev Space Center A.A. Maksimov Space Systems Research and Development Institute from a series of scientific and technological “Kosmos” programs, sponsored by Russia-Belarus Union State may be used for the development of this space system.

A prospective list of countries involved in the development and use of this space system includes: Russia (project initiator and manager), European countries, United States, Canada, countries of Asia-Pacific Region, Australia, African countries, South and Central American countries.

The International Global Monitoring and Information Multifunction Space System orbital configuration allows for three layers:

- low-orbit based on the earth remote sensing and communication satellites;
- mid-orbit based on the navigation satellites;
- high-orbit based on the communication, relay and hydrometeorological satellites.

Multifunctionality of a proposed international space system with the operating in various layers new generation microsatellites based space segment insures global, continuous and integrated control over objects, processes or phenomena on the ground, water surface, in the atmosphere and in outer space. The real-time position and time referenced information will be provided for the users.

Next phase of space exploration should be the industrialization of space. It feels like space industrialization essential elements set shall include yet closer integration of all space systems in one coherent structure and the transfer from 'information production' to material production in space. The international multifunction space systems are going to play an important role in the times of future space industrialization considering their technological and commercial attraction. Astronautics – the sphere which has traditionally focused all up-to-date achievements of science and engineering is fading into one of the most high-technology and profitable branches of modern economy.