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Space-system-based disaster management support

**Project to create the International Global Monitoring
Aerospace System as a forward-looking new initiative in
predicting and mitigating the consequences of natural and
man-made disasters**

Working paper submitted by the Russian Federation*

Summary

The initiative to implement the International Global Monitoring Aerospace System (IGMASS) project has been actively promoted by Russian scientific and voluntary organizations for the past four years. The aim of the project is to establish an authoritative international mechanism that, using effective resources, makes it possible to alert individual countries and the international community as a whole to potential natural and man-made disasters and other global threats, including threats originating in space. Activities being considered for possible implementation under the IGMASS project include monitoring of the geophysical environment (space weather) and early warning of asteroid and comet hazards and threats posed by space debris.

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1. The initiative to create the International Global Monitoring Aerospace System (IGMASS) is supported in the Russian Federation by the Russian Federal Space Agency (Roscosmos). In 2009, the International Academy of Astronautics established a group of experts, which, following the multilateral consideration of issues relating to the creation of the system, issued a positive conclusion and recommended the continuation of the work to implement the IGMASS project. The project has been publicized outside the Russian Federation through a number of relevant international symposiums held in Cyprus, Latvia and other countries, in meetings of the United Nations system (including at sessions of the Economic and Social Commission for Asia and the Pacific and the Committee on the Peaceful Uses of Outer Space and its Scientific and Technical Subcommittee), and through numerous presentations made at relevant international events held in Europe, Asia, Africa, North America and Australia. One of the main outcomes of those activities to further the initiative has been the official registration, within the Ministry of Justice of the Russian Federation, of the International Committee on IGMASS Project Implementation, a non-profit partnership comprising 90 official members and observers from 36 States. The objectives of the Committee's activities are to draw public attention to the IGMASS project; to consolidate the efforts of scientists, experts, enterprises and organizations working in the field worldwide in order to establish, on a practical level, the framework for development of the system, including its design; to implement new ideas and technical solutions for the prediction of natural and man-made disasters; and to identify administrative and financial resources for the implementation of IGMASS. The Committee has already signed more than 80 framework memorandums of cooperation with national and international organizations working on the challenges faced in combating natural and man-made disasters. Two rounds of negotiations on the subject of the IGMASS project have been held with the China National Space Administration, as well as separate consultations with the Secretariat of the Association of Southeast Asian Nations, the Space Policy Unit of the Government of Australia (part of the Department of Innovation, Industry, Science, Research and Tertiary Education) and the Economic and Social Commission for Asia and the Pacific Committee on Disaster Risk Reduction.

2. The IGMASS project is not intended to replace endeavours undertaken in the Russian Federation and other countries, including at the international level, in the area of the monitoring of natural and other disasters. IGMASS is intended as a framework for taking advantage of the specific capacities and organizational potential of all high-profile Russian and international projects in the area of Earth remote sensing and to obtain information on natural and man-made disasters. While a number of international initiatives with similar objectives are aimed primarily at providing post-event information for the purpose of mitigating the consequences of disasters, the purpose of IGMASS is to ensure capacity to provide reliable information based on satellite data as a means of warning of potentially dangerous events so that preventive measures can be taken, which, in the opinion of Russian experts, is of vital importance in implementing the project.

3. The IGMASS project is supported by a number of States members of the Commonwealth of Independent States. Positive experience in work in the same area has been acquired in the framework of the Multifunctional Space System of the Union State of the Russian Federation and Belarus.

4. In the medium term, it is planned to undertake a preliminary design of IGMASS, with emphasis on the functional linking of existing technical resources, software and procedures with the aim of addressing a number of specific forecasting tasks; the integration of forecast and monitoring data received from space and from ground-based data transmission systems; research on ionospheric precursors of seismic events; and the creation of a subsystem providing users with forecast and monitoring information relating to natural and man-made disasters likely to occur in the Russian Federation (including earthquakes, volcanic eruptions, floods, forest fires and emergencies caused by pipeline failures, leaks or explosions).

5. Construction of the Russian segment of IGMASS is to be initiated on the basis of the integration of technological and information resources and information management systems, including space monitoring systems, at the State, inter-agency and agency levels. The development of the IGMASS information framework is to be linked with the "single wide-area information system" created by Roscosmos. In order to develop and update the information infrastructure of the future system, the Russian segment of IGMASS will be able to integrate and, subject to certain conditions established by prior agreement, use the resources of existing information management systems: the multipurpose space system "Arktika" (Roscosmos), the computer-based information management system "Unified State system for disaster prevention and management" and an agency-level communications system (Ministry for Civil Defence, Emergencies and Management of Natural Disasters), the "Unified State system of information on conditions in the Pacific Ocean" and the "Computer-based ice information system for the Arctic" (Federal Service for Hydrometeorology and Environmental Monitoring (Roshydromet)), the "Integrated system for communications and data transmission", the "Unified system for navigational and time reference support", the "Single system for air traffic control", federal systems for the monitoring of natural resources that are strategically important and/or hazardous objects and the monitoring and control of the transportation of dangerous goods, and the International Satellite System for Search and Rescue (COSPAS-SARSAT). The necessary integration of the resources of information management systems at the State, inter-agency and agency levels will be carried out on the basis of a common technical policy that takes into consideration the interests of all relevant federal executive authorities and other organizations of the Russian Federation.

6. The system design of IGMASS, to be completed in 2012, will be based on the following:

(a) The efficient design and orbital characteristics of a special IGMASS space segment with advanced equipment for recording precursors of natural and man-made disasters;

(b) Ways and means of, and resources for, integrating at the technical level existing information, telecommunications and monitoring resources into a single system;

(c) The development of ground-based infrastructure for receiving, processing, integrating, interpreting and distributing forecast monitoring data that can be used to generate warning information at the international and national levels;

(d) Cooperation among Russian organizations and organizations of other States (space-sector enterprises and scientific research institutions) that may participate in the development of the IGMASS project.

7. There is good reason to believe that the launch of the pilot implementation of the IGMASS project in the Russian Federation, with the support of Roscosmos, will lead to significant practical results.

8. During the implementation of international cooperation activities under the IGMASS project, efforts are to focus chiefly on the development of scientifically proven methods of predicting natural and man-made disasters, thus enabling the international community to take informed decisions in response to early warnings. To that end, it will also be necessary to address the international legal aspects of related activities, including the conclusion of relevant international agreements.

9. The political declaration on the consolidation of efforts by the international community to use aerospace capabilities to generate alerts of global natural and man-made threats has been made available on the IGMASS website.¹

¹ http://igmass.com/index.php?option=com_content&view=article&id=168:-1-r-catid=15:publications&Itemid=49.