

Executive Secretariat of the International Committee on the IGMASS Project Implementation



ABOUT THE IGMASS PROJECT PROMOTION IN THE YEAR OF HALF-CENTURY ANNIVERSARY OF FIRST MANNED SPACE FLIGHT



THE IGMASS. What Does it Mean?

The IGMASS Project is actively promoting throughout last two years at the international level on the auspicious of IAA Russian initiative to create special aerospace system for early warning of the international community about approaching natural and man-made disasters to the global scale, including threats of cosmic origin.

IGMASS



International Global Monitoring Aerospace System

International Global Monitoring Aerospace System (IGMASS) is large organizational and technical system, integrating itself side by side, especially designing and creating space constellation of small and micro satellites with onboard equipment to monitor and detect early signs of destructing emergencies and existing and advanced national and international airborne and ground facilities (contact and distant sensors), Earth observation facilities, meteorological, space communications and navigation systems (or especially allocated informational or organizing and technical resources), including appropriate launch, control and satellite acquisition devices and infrastructure, variety of receiving and processing monitoring data equipment.

IGMASS purpose:
Forehanded warning of world community about risks and threats of natural disasters and man-caused emergencies, next step forward development and integration of planetary informational and navigation-telecommunication resources for global threats protection and solving of general humanitarian issues.

Space segment

- Small, micro monitoring satellites, equipped by variety of advanced instruments for detection early signs of natural disasters and technogenic catastrophes
- Special space early warning NEO system (also called "space watch") from three big spacecrafts with IR-telescopes in the deep space.

Air-born segment

- Nationalair-born facilities with special disaster monitoring equipment

Ground segment

- International Monitoring Data stations
- International and Regional Crisis Management Centers
- Launching and Flight Control facilities
- Global Distant Learning etc.
- Catastrophe's Medicine Communication Infrastructure

Membership of the International Committee on the IGMASS project implementation



- Austria
- Holland
- Belarus
- Ukrain
- France
- Greece
- Israel
- Indonesia
- Italy
- Kazakhstan
- Cameroon
- Canada
- UN
- Germany
- Malaysia
- CIS
- USA
- India
- Taiwan
- Chile
- Switzerland
- Sweden
- South Korea
- Nigeria
- China
- Latvia
- Japan
- Kenia
- Bulgary
- Russia

IGMASS Project is an opportunity of unifying world community efforts in the frameworks of new, joint strategy of peaceful space exploration, which is focusing into providing secure and social sustainable development of globe society in XXI century, based on common and imperishable values of joint, irreversible solving global issues of modern Humanity and preserving the life on the Planet; prospects of strengthening political, diplomatic, economical and scientific positions of countries-participants of IGMASS Project on the ways of parrying unexpectedness's and abruptness's (risks and threats) of contemporary world.



**GEOS DMC GCOS
GMES CN3 GEOS
Disaster Charter
NORAD-CHN IONOSAT
Sentinel ASIA SPIDER-UN**

International, region and national projects and programmes of monitoring of natural disasters and emergencies

International, region and national space systems

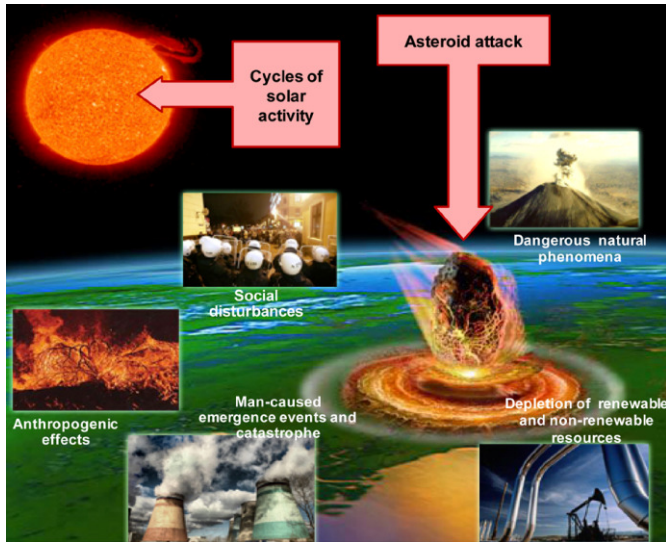
**METEOROLOGICAL
NAVIGATIONAL
Observation and RPC
COMMUNICATION**

International, region and national ground facilities (contact and distant sensors) for monitoring natural disasters and outer space

27, Tikhonravova str,
Yubileyny, Moscow region,
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tel./fax: 8 (495) 785-79-29
8 (498) 300-29-21
igmass@mail.ru, office@iaamall.org
www.spacesystems.ru

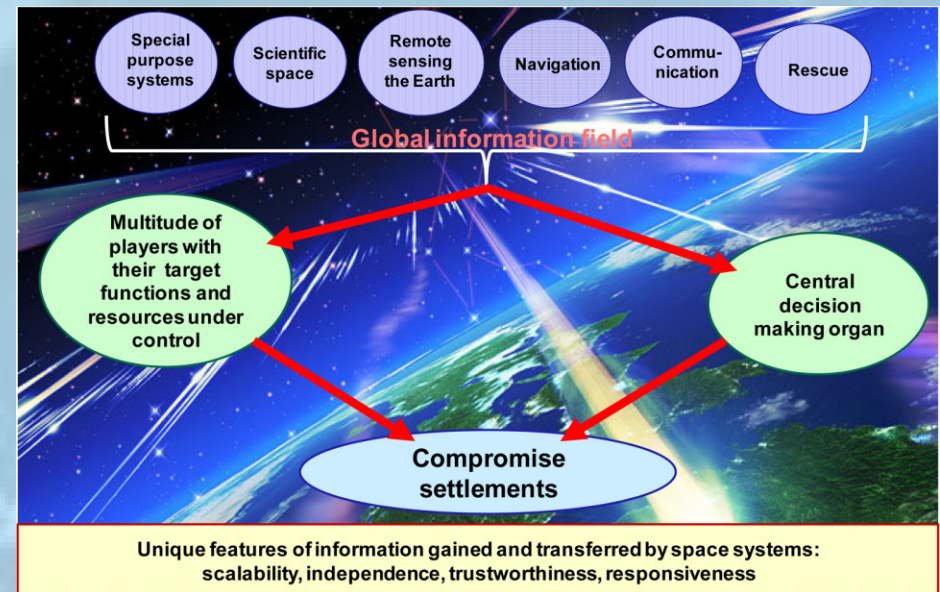


NATURAL DISASTERS AND SUSTAINABLE DEVELOPMENT OF UMANITY



Variety the natural and manmade threats prevents to sustainable development of modern civilization. In 2008 only all over the world took place 137 natural and 174 man-made disasters caused nearly a quarter of a million human lives. According to the estimates of international organizations for 1970-2000 only amount of total damage from natural and man-made disasters exceed 1.5 trillion U.S. dollars.

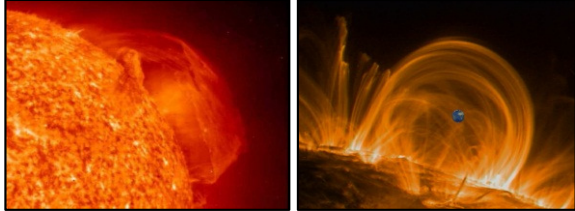
The most prevalent sources of natural catastrophes meteorological, climatic and tectonic events. Predict their attack, warn of such events and resulting disasters and (or) man-made catastrophes, in all respects more advantageous than to respond to subsequent devastating consequences. Since apperance of one third of technogenic emergencies cause to naturaldisasters, the effective monitoring and control of geophysical conditions in the vicinity of complex technical systems position would avoid many accidents and disasters.



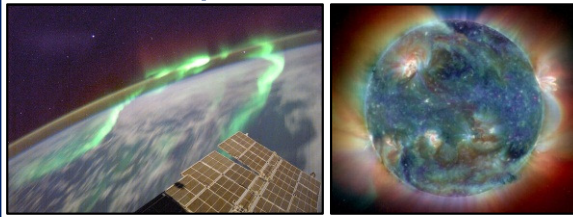
GLOBAL THREATS TO THE PLANET AND HUMANITY

Threats of solar, moon and cosmic origin

Anomaly Solar activity



Anomaly geomagnetic field perturbations



Asteroids/comet and UFO Threats

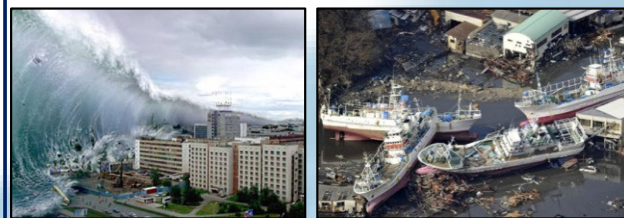


Dangerous and Catastrophic Natural Disasters

Earthquakes M>6...7



Gaunt Tsunami



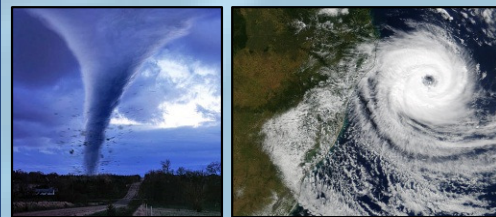
Volcano Eruptions



Forest Fires



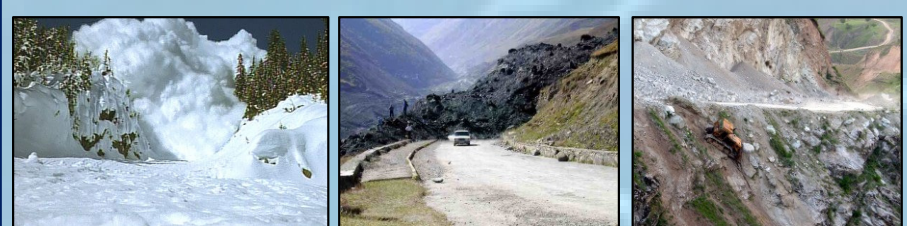
Hurricanes, tornadoes



Droughts



Avalanches, landslides, mudflows



Floods and floodings



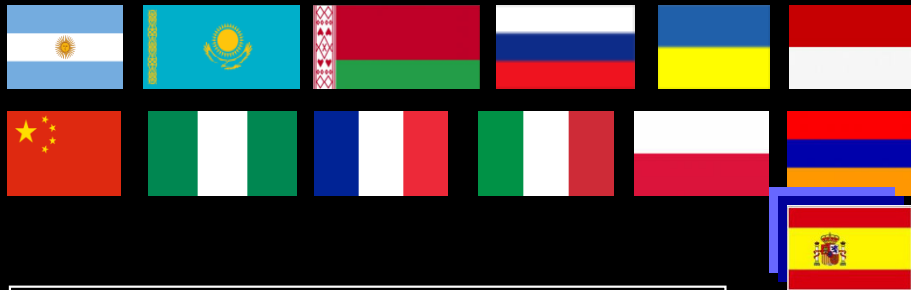
Recent natural catastrophe in Japan

At the beginning of March 2011 Japan was shocked by a series of powerful earthquakes of 9 point magnitude. As a result of earth shocks and tsunami, caused by them, the country was exposed to the most significant (for the last eighty years) destructions, affected almost every object of the world's most advanced infrastructure. Thousands of people died or lost. Particular risk caused the destruction of nuclear energetic objects, accompanied by radioactive emission in the atmosphere.



Cooperation in the frameworks of the IGMASS Project

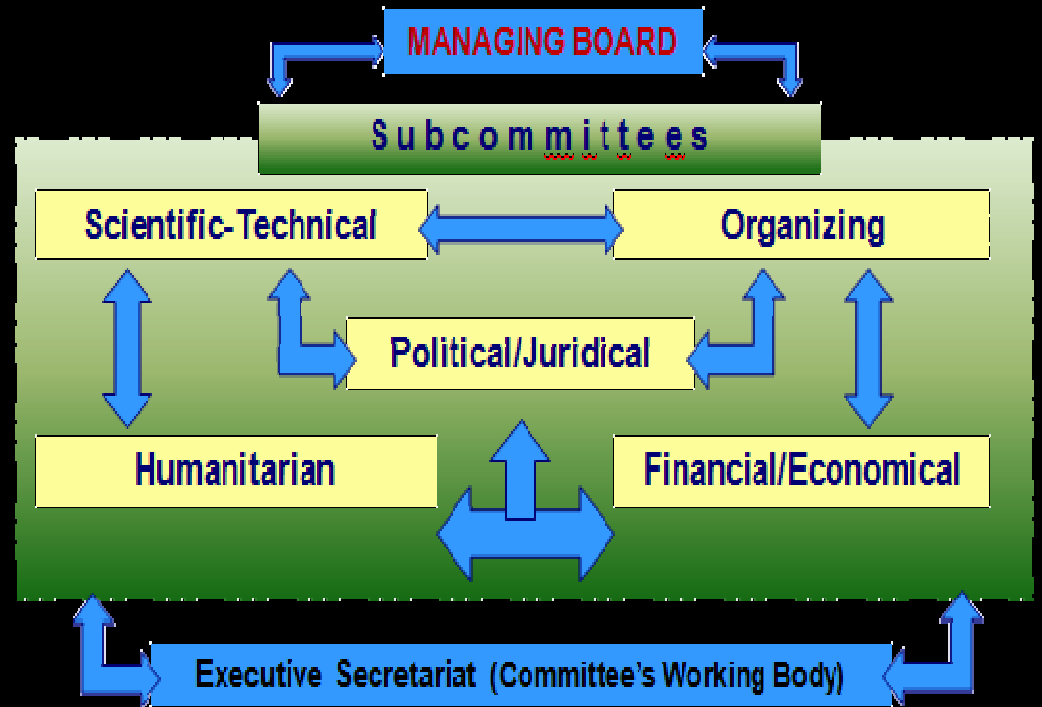
Space agencies and specialized government institutions



International organizations and private companies



Space-rocket and profile enterprises



Academician institutions



Non-governmental organizations



Research organizations, Institutions of higher education



Current back-log to Start the IGMASS System Designing



Maximov Space Research Institute jointly with Russian Academy of Cosmonautics named after K.E.Tsiolkovsky carried out its own researches on the main issues of the IGMASS Project. The results of such researches confirm technical realizability of main scientific ideas, which the Project is based on.

The volume of the reporting materials exceed 4000 pages.



Dynamics of the IGMASS Project development (variant)

1st Stage: Research Engineering

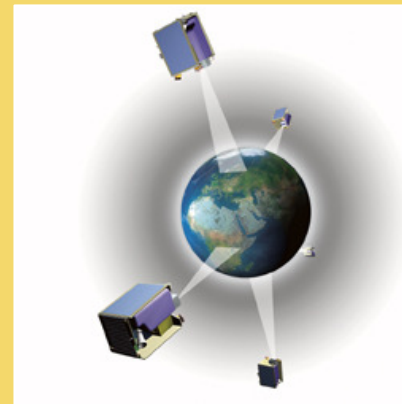
Researches directed at:

- Specification of the system architecture,
- Analysis of technical and technological possibilities of creation of system's elements,
- Further investigation of signs betokening natural and man-caused disasters and capabilities of corresponding equipment to register this signs,
- Technical and economic analysis of development, creation and operation of the system,
- Determination of requirements specification for development work to create system.

2nd Stage: Development Work

Carrying out of the development work to design and create system including:

- Development of system's pilot project (2010),
- Development of draft design, development of experimental patterns and key elements of system, development of technical documentation to manufacture preproduction (test) models, systems and mock-ups (2011-2012),
- Manufacture of preproduction (test) models, autonomous tests and correction of technical documentation (2012-2013),
- Assembly tests and correction of technical documentation (2014),
- Flight tests, preparation of technical documentation for series manufacture of system's elements, system's commission (2015)



3rd Stage: Deployment

Deployment of system including:

- Serial production, launches and putting into operation,
- Extra equipping of ground control stations (if necessary),
- Deployment of orbital constellation of global system to provide customers with monitoring data,
- Deployment of international remote education (distance learning) system.

2009

2010

2011

2012

2013

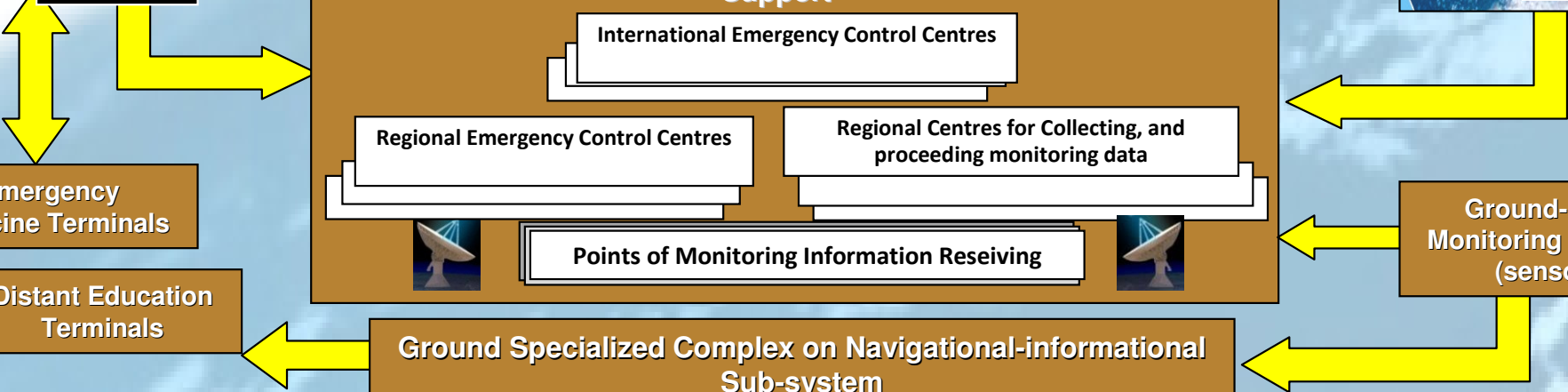
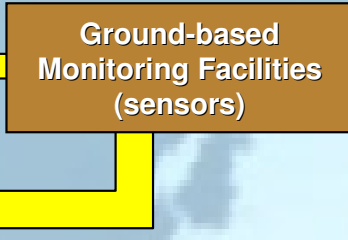
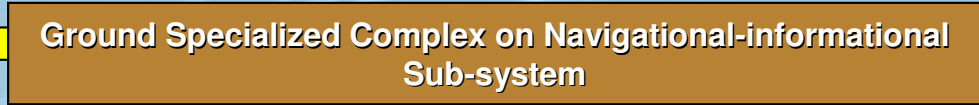
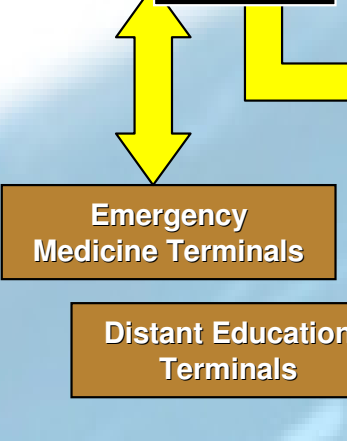
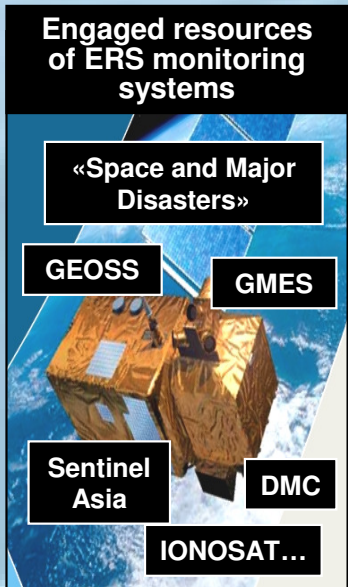
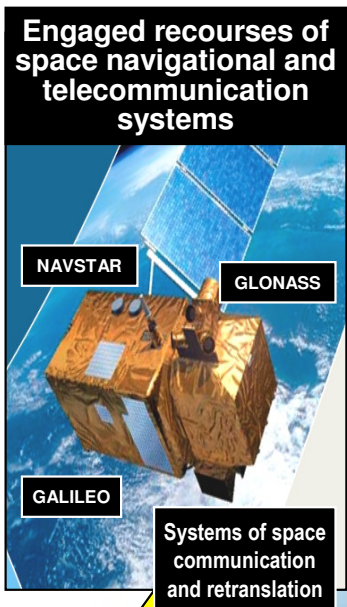
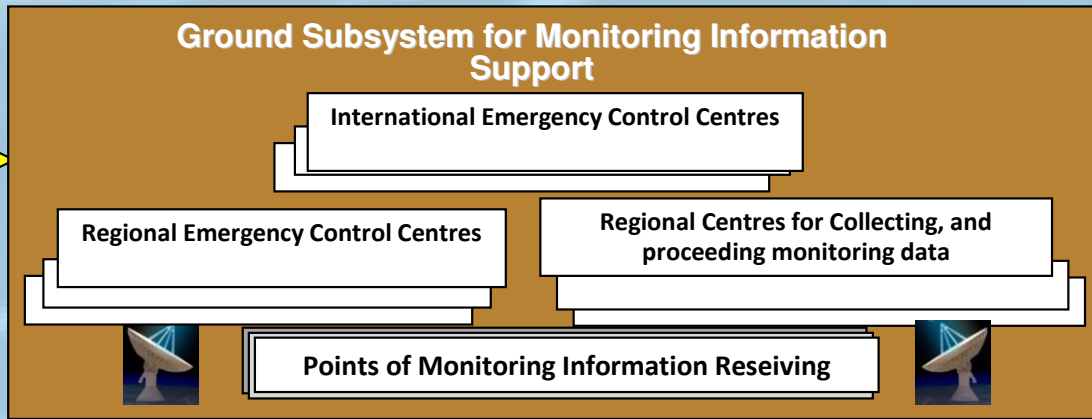
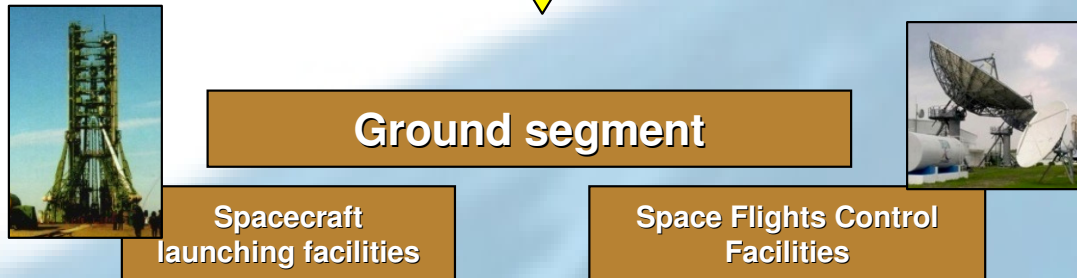
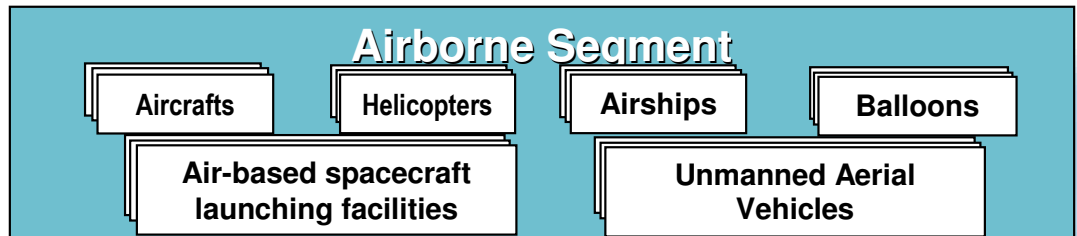
2014

2015

2016

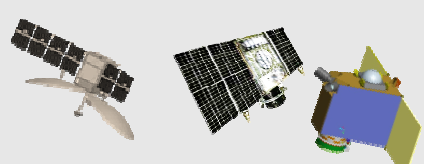
2017

IGMASS STRUCTURE



Precursors of major earthquakes and evaluating opportunities of its using in seismic forecasting



Precursors of earthquakes with magnitude $M \geq 5$	Development time				Opportunity of discovering precursors by hardware			Development authenticity (together with other precursors)
	Months	Days	Hours	Minutes	space	aviation	ground	
	(1-12)	(1-30)	(1-24)	(1-60)				
Lithospheric								
Little foreshock earthquakes	3...1	30...1			+	—	Seismographs	High
Geomagnetic field disturbance		30...5			+	+	Magnetometer	Medium
Temperature development in near-surface layers and Earth surface		30...1			+ IR-survey	Aerial photography in IR-range	+	Medium
Gravitational field change	6	30...1			+	—	Gravimeter	Low
Earth movement and deformation of earth material	120...12				+ Radar-survey	+ Radio interferometer	Survey using laser sources. Triangulation network	Medium
Ionospheric								
Changes in the structure of lower ionosphere		30...10			 <p>Using of small and micro-satellites with a wide range of special on-board equipment: ionosondes, magnetometer, low and high frequencies radio signal receiver; Fourier spectrometer; elementary particles detector; IR-radiometer, etc.</p>		Medium	
Increasing intensity of magneto-electric radiation in upper ionosphere			2	10...20		Medium		
Geomagnetic vibration appearance (0,02-0,1 Hz)			2	10...30		Low		
Interaction between magneto-electric radiation with plasma particles			12...2			Low		
Lower ionosphere modification		5				Low		
Ionosphere bottom edge deformation		30...10				Low		
Energetic particles flow augmentation from magnetosphere to upper ionosphere		5	8...1	59...0		High		
Sharp change in the concentration of electronic component in layer F2 of ionosphere, appearance in it massive dissimilarities		3...2				High		
Changing of critical frequency and density of E и F ionosphere layers			10	59...0		Medium		
Temporary variations of the ionosphere full electronic content		3...1	23...2			Medium		

Using of the ISS Facilities for the IGMASS Development

www.calxibe.com

Experiments on the ISS

“Relaxation” – ionosphere research.

“Lightning-gamma” - research of atmospheric flashes of gamma and optical radiation during storms.

“Hurricane” – research of natural and technogenic catastrophes.

“Impulse” - ionosphere research.

“Seismic forecasting-SM” – research of physic phenomena – earthquake precursors.

“Hydroxyl” – research of optical radiation in the upper atmosphere and its resonance on anomalous natural and technogenic phenomena.

Perspective equipment for experimentation in the IGMASS interests

- Low and very low frequency amplifier – wave complex for measurement and analysis of wave radiation in a frequency range of 0,1 Hz – 23 Hz;
- High frequency wave complex for measurement of magneto-electric radiation spectrum in a range of 0,1-15 MHz and electron density;
- Measure of electrostatic field for 3-component quasi-constant electric field dimension;
- Spectrometer of energetic particles for measurement of energy distribution and variations of electrons and ions flux density with energy of 20 keV – 2 meV;
- Optical complex for measurement of atmospheric emissions characteristics;
- Plasma complex for measurement of ionic and neutral content, density, variations of density and component of plasma drift velocity.

Promotion of the IGMASS Project in 2010

IAA Golden Jubilee Summit in Washington on November 17, 2010, which brought together leaders of 29 national space agencies and similar profile organizations representing Argentina, Austria, Belarus, Brazil, Britain, China, Germany, European Union, India, Israel, Italy, Kazakhstan, Canada, China, Mexico, Netherlands, Nigeria, Norway, Russia, Romania, Saudi Arabia, Thailand, Ukraine, Czech Republic, Chile, France, South Korea, Japan, as well as participating of the Chairman of the UN COPUOS, has once again demonstrated sincere and genuine interest to the Project.



Draft of Political declaration

About Consolidation the International Community Efforts on Using Aerospace Capabilities to Warn About Global Natural and Man-made Threats



Political declaration

About Consolidation the International Community Efforts on Using Aerospace Capabilities to Warn About Global Natural and Man-made Threats

States Parties to this Declaration,

recognizing that natural and man-made disasters continue to be among the main threats to sustainable human development, causing enormous damage to the States and the world at large,

inspired by the success of space exploration, reached in the area of aerospace monitoring and remote sensing control and by scientific results in forecasting natural and man-made disasters,

believing that there is the need for the world community to move from the methods of reacting to natural and manmade disasters to the techniques of effective warning of their occurrence,

desiring to contribute, addressing many humanitarian problems of humanity, coupled with the need to eradicate illiteracy, distant education and telemedicine, preservation of cultural, natural and historical heritage, information technology equipment in remote regions of the planet,

recalling resolutions "International Decade for Natural Disaster Reduction" A/RES/50/117 from February 16, 1996; "Implementation of the International Strategy for Disaster Reduction" A/56/68-E/2001/63 from May 8, 2001; "Capacity-building strategy of the United Nations Platform for Space-based Information for Disaster Management and Emergency Response" A/AC.105/947 from November 9, 2009; Agenda item 50: "International cooperation in the peaceful uses of outer space" (Group discussion on the topic "Space and emergency situations") A/65/20 and A/C.4/65/L.2 from October 12, 2010, as well as the declaration of Heads of Space Agencies Summit in Washington in November 17, 2010,

taking account of existence of global threats in space and from space, related to meteor-asteroid danger, and the phenomenon of "space debris",

convinced that the initiative of Russian scientific and public organizations to implement the project of the International Global Monitoring Aerospace System (IGMASS) could be considered as a tool for consolidating the efforts of the international community on the use of aerospace capabilities for the early warning about natural and manmade threats being realized only in the broadest interstate cooperation,

have agreed on the following:

Article I

IGMASS as a "system of systems" is based on the principles of specialized global, integrated monitoring network formation, within which it is supposed to combine functional information, navigation and telecommunication resources of the traditional

space systems for national, regional and international affiliation, and at the same time create its own specialized capacity for collecting, processing and integrated interpretation of diverse data about the precursors of approaching natural and man-made disasters through an integrated use of land, air and space facilities. Taking account of the fact that IGMASS is allotted a task of comprehensive solution to problems promptly and short-term forecast of destructive natural phenomena and man-made disasters, it could become the backbone idea for the beginning of a new, unified strategy for space exploration - to ensure environmental sound and socially sustainable development of the world community based on common, enduring values of preserving life on the planet.

The IGMASS Project, which in 2009-2011 was presented at scientific forums and talks in Vienna (Austria), Limassol (Cyprus), Rome (Italy), Haifa (Israel), Paris (France), Bonn (Germany), Riga (Latvia), Stockholm (Sweden), Donetsk (Ukraine), Beijing (China), Moscow and Kazan (Russia), Prague (Czech Republic), Washington (USA), Bona (Cameroon), Jakarta (Indonesia), Melbourne (Australia), not an alternative to a variety of projects and programs aimed at use of space technologies to the management of natural and technological disasters (GROSS, DMC, GMES, Sentinel Asia, the Charter "Space and Major Disasters"), since the problems solved by using the build systems have definitely expressed by the predictive orientation.

Joining of States, international institutions, enterprises and organizations of different ownership forms to the IGMASS Project is done on a voluntary basis through its governing bodies.

Article II

R&D activities to use aerospace capabilities for predicting natural and man-made disasters, including in the frameworks of the IGMASS Project, are carry on for the benefit of all States, irrespective of their degree of economic or scientific development, and the activities results are the heritage of all mankind.

R&D activities to use of aerospace capabilities for predicting natural and man-made disasters, including in the IGMASS Project are open to participation by all States without any discrimination on the basis of equality and in accordance with international law, with free access to the entire scientific technical and other information.

Since the subject of research and development within the IGMASS Project is free for scientific and technical exchange, States Parties to the Declaration facilitate and encourage international cooperation in research and development.

Article III

States Parties to the Declaration shall carry out the activities on the use of aerospace capabilities for predicting natural and man-made disasters, including the IGMASS Project, in accordance with international law, including the Charter of the United Nations to maintain international peace and security and promoting international cooperation and mutual understanding.

Article IV

States carrying out any activities on the use of aerospace capabilities for predicting natural and man-made disasters, including the IGMASS Project, carry out such activities exclusively for peaceful purposes. Dual and military applications of predictive monitoring data, as well as scientific, technical and technological achievements under the auspices of the IGMASS Project are prohibited.

Article V

States carrying out activities on the use of aerospace capabilities for predicting natural and man-made disasters, including the IGMASS Project, immediately inform the other States Parties to the Declaration or the Secretary General of the United Nations of any discovered phenomena, which could be harmful for human health and life or for infrastructure, ecology, Earth and Space.

Article VI

States Parties to the Declaration bear international responsibility for national activities on the use of aerospace capabilities for predicting natural and man-made disasters, including the IGMASS Project regardless of whether the governmental agencies or non-governmental entities, and for ensuring that national activities are carried out in accordance with the provisions contained in this Declaration. Non-governmental entities activities of the State Party on the use of aerospace capabilities for predicting natural and man-made disasters, including the IGMASS Project, have to carry out on the authorization and permanent supervision of such State Party only.

Article VII

States Parties to the Declaration, carrying out activities on the use of aerospace capabilities for predicting natural and man-made disasters, including the IGMASS Project, guided by the principles of cooperation and mutual assistance, with due regard for the interests of all other States Parties, avoiding adverse changes terrestrial environment (lithosphere, hydrosphere, atmosphere and ionosphere) as well as the harmful contamination of near space as a result of such activities or experiments, if necessary by taking appropriate action. If a State has a reason to believe that such activity or experiment would cause potentially harmful interference with activities of other States, the State concerned before proceeding with any such activity or experiment shall undertake appropriate international consultations. A State that has a reason to believe that an activity or experiment on the use of aerospace capabilities for predicting natural and man-made disasters, particularly in the frameworks of the IGMASS Project planned by another State would cause potentially harmful interference with, or to lead to adverse changes in the terrestrial environment (lithosphere, hydrosphere, atmosphere and ionosphere) as well as the contamination of near space may request consultation concerning the activity or experiment.

Article VIII

To promote international cooperation efforts in using aerospace capabilities for predicting natural and man-made disasters, including the IGMASS Project, States

Parties to the Declaration will be on an equal basis to consider requests of each other providing them an opportunity to monitor such activities. Nature and conditions of the above-mentioned features are determined by agreement between the States concerned.

Article IX

To promote international cooperation in using aerospace capabilities for predicting natural and man-made disasters, including the IGMASS Project, States Parties to the Declaration agree to as much as possible and practicable, inform the Secretary General of the United Nations, as well as the public and the international scientific community about the nature, conduct, locations and results of such activities.

Article XII

All ground stations, installations, equipment and space objects used in the work on the use of aerospace capabilities for predicting natural and man-made disasters, including the IGMASS Project, open to representatives of other States Parties to this Declaration, on the basis of reciprocity.

Article XIII

The provisions of this Declaration apply to the activities of States Parties, regardless of whether such activities are carried out by one State Party or jointly with other States, including in the framework of international intergovernmental organizations.

Practical issues that may arise in relation with activities of international intergovernmental organizations on the use of aerospace capabilities for predicting natural and man-made disasters, including the IGMASS Project are solved by the States Parties to the Declaration or with the appropriate international organization or with one or more States members of this international organization, has joined this Declaration.

Article XIV

This Declaration shall be open to all States for signature. Any State may accede to it at any time.

Article XV

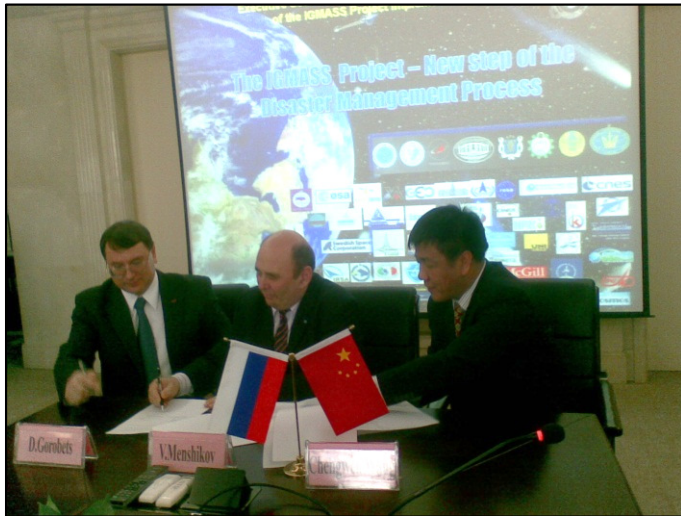
This Declaration, of which the English and Russian texts are equally authentic, shall be deposited in the archives of the Depositary Governments. Duly certified copies of this Declaration shall be transmitted by the Depositary Governments to the Governments of the signatory and acceding States.

IN WITNESS WHEREOF the undersigned, duly authorized, have signed this Declaration.

DONE in duplicate at the city of Madrid (Spain), the thirteenth day of May 6 two thousand and eleven.

Prof. Anatoly N. Perminov,
ICPI CHAIRMAN,
Former Head, Russian Federal Space Agency (Russia)

Recent contacts in Beijing and Jakarta on the IGMASS Collaboration



During January, 2011 the ICPI representatives hold several profile meetings in Beijing and Jakarta with participation of representatives of National space agencies of China and Indonesia (CNSA and LAPAN) for introduction the Project at both these countries.

Chinese and Indonesian experts much interested in applied researches at the field of searching disasters pre-signs, complex proceeding and using monitoring information via ground infrastructure facilities of the countries.

Exclusive attention was drawn into the questions of small and micro satellites as well as up-to date geophysical equipment, which has to design in the frame of the Project.

As the meetings results some MOUs and protocols were signed and discussed, including preliminary agreements about regional South Asian cooperation (APSCO and ASEAN).

CIS countries cooperation in the frameworks of the IGMASS Project

From the Russian Federation



Federal Space Agency
Maximov Space Systems
Research Institute, JSC
"Russian Space Systems"

From the Republic of Belarus



National Academy of Sciences of Republic of Belarus
Scientific- Engineering Unitary enterprise
"Geoinformational Systems"

From the Republic of Kazakhstan



National Space Agency of the Republic of Kazakhstan
JSC " National Centre of Space Researches
and Technologies

From Ukraine

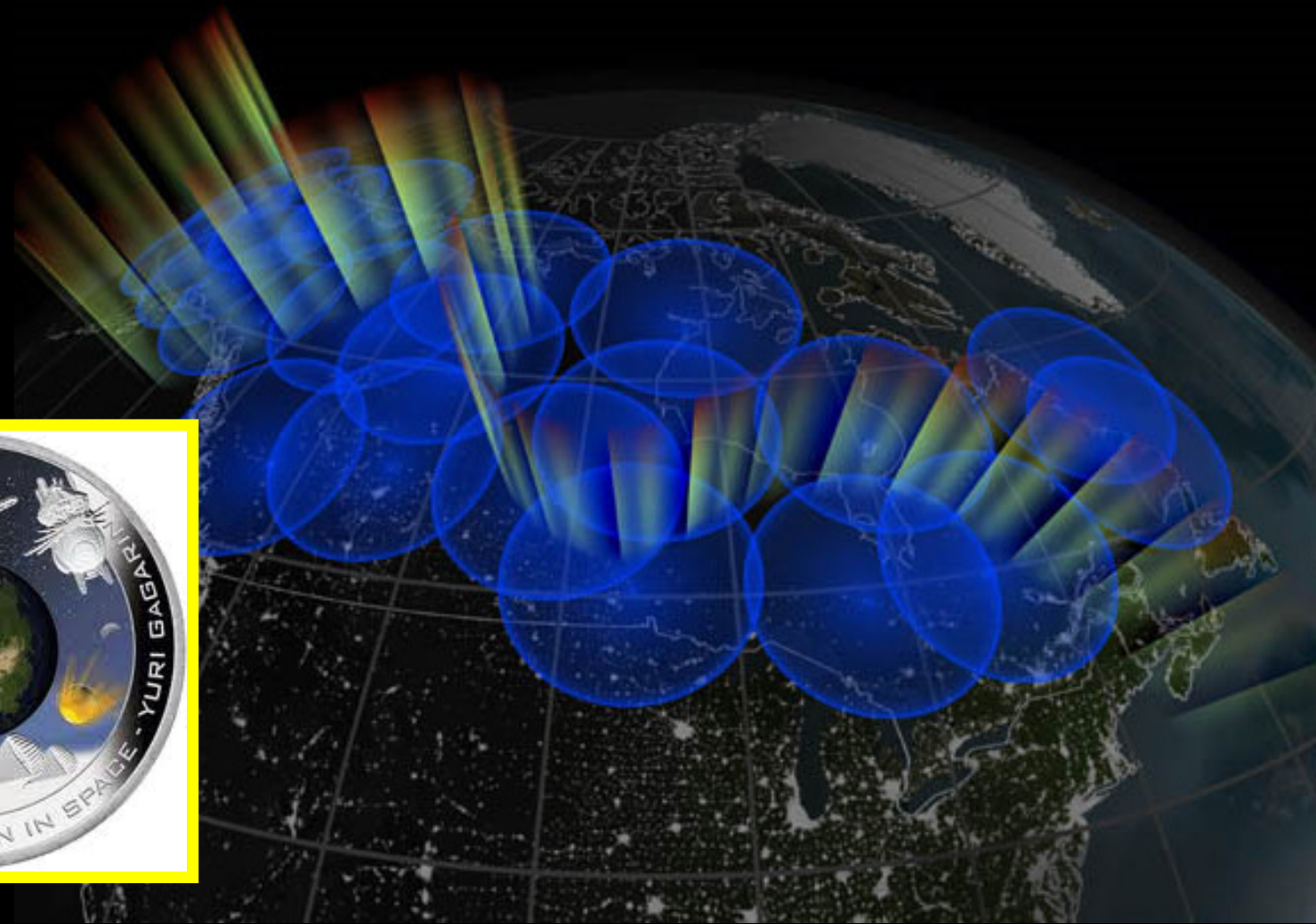


State Space Agency of Ukraine,
National Academy of Sciences
Space Design Office "Yuzhnoye", State
Enterprise "DNIPROCOSMOS", Space
Research Institute of the National
Academy of Sciences of Ukraine &
SSAU

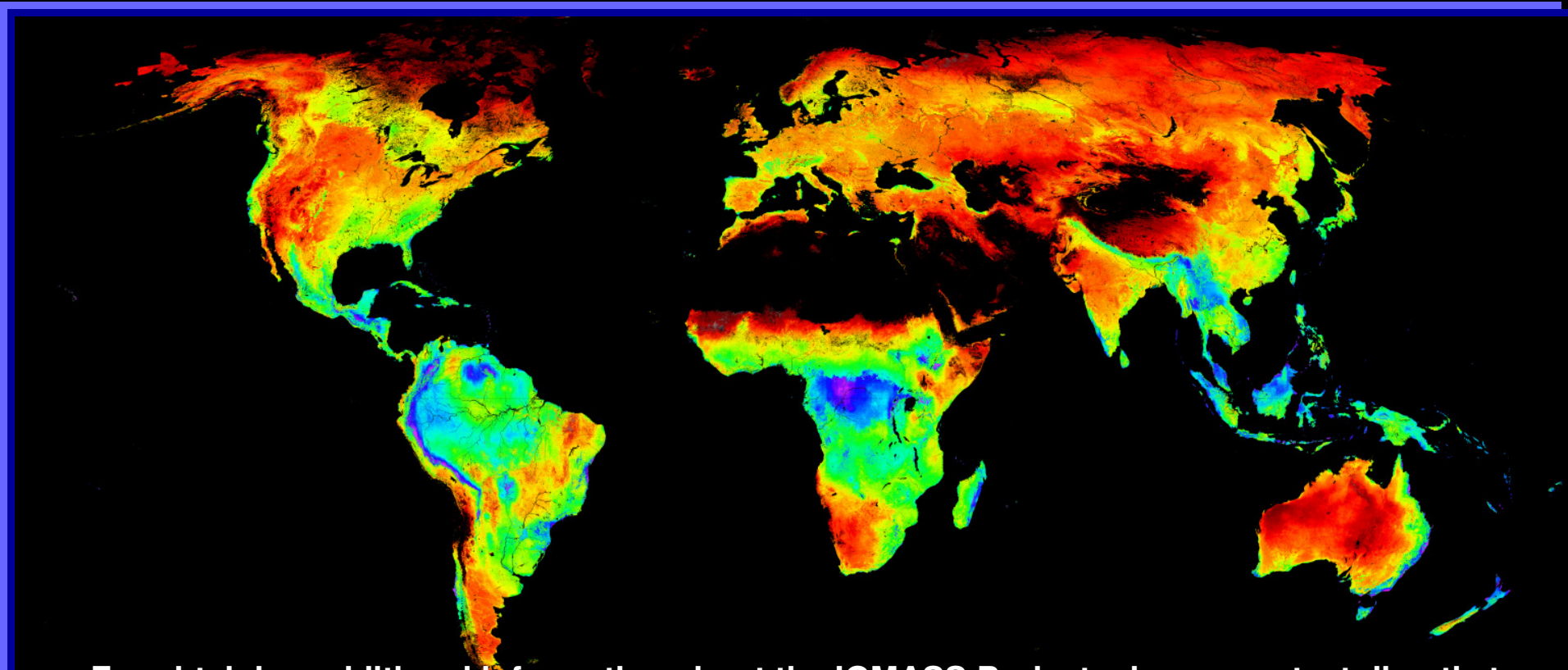
From Republic Armenia



National Academy of Sciences of Armenia
Institute of Geophysics and Engineering Seismology named
after A.G. Nazarov, Institute of Informatics and Automation
Problems, Institute of Radio Physics and Electronics and the
Byurakan Astrophysical Observatory



During the year of 50th Anniversary of Yuri Gagarin Space Flight the IGMASS Project is an unique opportunity to unify world community efforts in the framework of new, joint strategy of peaceful space exploration, which is focusing into providing secure and social sustainable development of globe society in XXI century



For obtaining additional information about the IGMASS Project, please, contact directly to the International Committee on the IGMASS Project Implementation (ICPI):

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Prof. Valeriy A. Menshikov – Director General of the IGMASS Project

2. 6, rue Galilee, B.P. 1268-16, 75766 Paris Cedex 16, France.

Phone: +33 607 022 790; Fax: +33 147 23 82 16; E-mail: sgeneral@iaaweb.org

Dr. Jean Michel Contant – Secretary General, International Academy of Astronautics (IAA)

You may contact also to Federal Space Agency (ROSCOSMOS):

Phone: +7 (495) 631-81-87 Fax: +7 (495) 688-90-63 E-mail: ums@roscosmos.ru