Dr. Sergey V. Cherkas (Russia)
Maximov Space Systems Research Institute - Branch of Khrunichev Federal Space Centre (ROSCOSMOS);
IGMASS Project Sub-Manager from International Academy of Astronautics (IAA)

International Global Monitoring Aerospace System

IGMASS – New Approach to the Disaster Management Issue

Committee of Peaceful Uses of Outer Space
Fifty-Third Session
Vienna, June 17, 2010
As a result of the Icelandic Eyjafjallajökull volcano week lasting eruption European airlines daily lost up to 200 million Euros. According to the International Air Transport Association the total losses of airports and airlines in those days exceeded 1.7 billion Euros. Over 7 million passengers were total affected.
Technogenic, ecological disaster continues to unfold in the Gulf of Mexico off the coast of the U.S., where on April 20, 2010 oil pipe burst, which led to leakage of oil, and then oil platform “Deepwater Horizon”, owned by Swiss Transocean company leased to the British oil corporation British Petroleum (BP) sank. Reality - this is an oil slick, which area daily increases by tens of square kilometers. The elimination of water pollution and coastal areas as well as compensation for damage from oil spills, according to experts, would cost its perpetrators in at least 12 billion US dollars. "We can rightly be called the catastrophe" oil Chernobyl ", said the Greenpeace representative.
On October 8, 2009, Earth approaching unobserved asteroid busted at upper atmosphere (15-20 km.) directly under South Sulawesi province (Indonesia). According NASA, this fatal destruction of 10 m size stone object, which entered into dense atmosphere on the speed more than 20 km per second, realized energy 50 thousands tons TNT equivalent (three times more powerful than Hiroshima nuclear blast). The event was fixed by West Ontario University Observatory, distant 16000 km. away from its epicenter. Now, we know about dozens asteroids and comets approaching our planet (for example, 99942 Apophis, 1997VRZ, 1994 WK12), which in case of its fall down into the Earth, could trigger off global catastrophe.
Results of satellite image with cloudy fields anomalies upper activated subduction zones just before earthquake, which appeared more than day before the disaster.

Image from TERRA Satellite

Jan.11, 2010 2.55 p.m.

Cloud fields erosion stressed by red lines

Done by researcher Dr. Lidya Morozova, Far East Branch, Russian Academy of Sciences
International Global Aerospace Monitoring System (IGMASS) is a 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.
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 recourses for global threats protection and solving of general humanitarian issues

global and efficient forecasting of natural disasters and man-caused emergencies on the Earth and at outer space on the basis of integrated utilization of world wide space monitoring potential
### IGMAS’ Priority Missions

<table>
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<tr>
<th>Mission</th>
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<tr>
<td><strong>Permanent and continuous space monitoring of the Earth lithosphere, atmosphere, ionosphere and outer space</strong> with the purpose of revelation early signs of dangerous natural disasters and man-caused emergencies</td>
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<td>Collecting, onboard satellite processing and transmitting monitoring data into ground space information receiving stations</td>
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<td>Generalising and integrated processing global monitoring data, which has been collected from space-based, air-born and ground facilities, at national, regional and international emergency centres; monitoring information interpretation, storage and visual displaying</td>
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<td>Near real-time communication to states concerned and specialized UN structures about educible natural and man-made risks and threats</td>
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Proper navigational and telecommunicating acquisition consumers all over the world for emergency operations, catastrophe’s medicine, humanitarian operations; transport Corridors systems creation, optimisation cargo and people transfer; abolition of illiteracy, preservation of cultural values, distant learning concept and experts training development

Effective warning about global risks an threats in and from outer space: asteroid danger and anomaly phenomena

Gradual forming unified planetary “informational environment of security” for the convenience of reducing global risks and arising threats protection
<table>
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<th>IGMASS Structure</th>
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**Ground Segment:**
- International Monitoring Data stations
- International and Regional Crisis Management Centers
- Launching and Flight Control facilities
- Global Distant Learning
- Catastrophe’s Medicine Communication Infrastructure

**Orbital Segment:**
- Own Developed IGMASS
- Small, micro monitoring satellites equipped by variety of advanced instruments for detection of early signs of natural disasters and technogenic catastrophes

**Air-born Segment:**
- GEOS, KOSPAS-SARSAT, GMES
- Sentinel Asia, DMC, GCOS
- Disaster Charter, IONOSAT

**International, regional and national projects and programmes of monitoring of natural disasters and emergencies:**
- Disaster Charter
- IONOSAT

**International, regional and national space systems:**
- Meteorological
- Navigational
- Observation and RSC
- Communication

**International, regional and national ground facilities (contact and distant sensors) for monitoring natural disasters and outer space:**
- KOSPAS-SARSAT

**GMES:**

**GEOSS:**
NATIONAL AND REGIONAL CENTRES CRISIS MANAGEMENT
NATIONAL AND REGIONAL EMERGENCIES FORCES
REGIONAL CENTRES OF AIR-BORNE AND GROUND SENSORS MONITORING DATA COLLECTING AND PROCEEDING
INTERNATIONAL MONITORING DATA RECEIVING STATIONS (5 stations all over the world)

LOW LEVEL: receiving and proceeding of monitoring data
MEDIUM LEVEL: interpretation of monitoring data
UPPER LEVEL: utilization of monitoring information

INTERNATIONAL CRISIS MANAGEMENT CENTRES

INTERNATIONAL CRISIS MANAGEMENT CENTRES
NATIONAL AND REGIONAL EMERGENCIES FORCES
REGIONAL CENTRES OF AIR-BORNE AND GROUND SENSORS MONITORING DATA COLLECTING AND PROCEEDING
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INTERNATIONAL CRISIS MANAGEMENT CENTRES
NATIONAL AND REGIONAL CRISIS MANAGEMENT CENTRES
REGIONAL CENTRES OF AIR-BORNE AND GROUND SENSORS MONITORING DATA COLLECTING AND PROCEEDING
INTERNATIONAL MONITORING DATA RECEIVING STATIONS (5 stations all over the world)
Orbital Constellation of International, Regional and Domestic Telecommunication Systems

Galileo

GLONASS

GPS NAVSTAR

Orbital constellation Global Navigation Systems

Medical Offices:
National centres of Catastrophes Medicine, its regional and territorial branches, clinical bases; telemedicine systems

Casualties:
- participants of extreme expeditions;
- jammed up at the zones of emergencies;
- persons requested permanent medical control

Mobile terminals

sensors

Purpose: stature control, medical consulting the victims of emergencies
**Main satellite characteristics**

Mass (max): 120 - 400 kg;  
Mass of payload: 40÷120 kg.  
Lifetime: Satellite of upper level – up to 10 years,  
Satellite of lower level – 5 - 7 years

**Orbital structure:**

Number of satellites in constellation:  
Satellite of upper level – 6,  
Satellite of lower level – 3-4.  
Orbits:  
Satellite of upper level – GEO with even distribution of satellites in orbit plane,  
Satellite of upper level – SSO, H=600-700 km, with even distribution of orbit planes along longitude of ascending node

**Payload**

Highly sensitive radiometric visible and IR range equipment, low (LF) and high frequency (HF) wave complexes, plasma complexes, complexes to monitor charged particles, magnetometer, s mass-analyzers, spectrometers
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<tr>
<th>Activity</th>
<th>Location(s)</th>
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<tr>
<td>Presenting on profile International scientific forums</td>
<td>Dnepropetrovsk, Ukraine (2007, 2009); Korolyov, Russia; Tunis; Shanghai, China (2008); Versailles, France (2009); Rome, Italy; Haifa, Israel; Paris, France; Moscow and Kazan, Russia; Donetsk, Ukraine; Beijing, China; Bonn, Germany (2010)</td>
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<td>Project Manager Assignment and IGMASS’ working experts group creation</td>
<td>Paris, France (2009)</td>
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<td>Project Researches and preparing of IGMASS’ working experts group</td>
<td>Yubileynyy, Russia (2009)</td>
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<tr>
<td>conclusion</td>
<td>Daejon, Republic of Korea (2009)</td>
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<td>Submitting Project Researches and IGMASS’ working experts group</td>
<td>Limassol, Cyprus (2009)</td>
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<td>conclusion to the IAA</td>
<td>Vienna, Austria (2010)</td>
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<td>Project detailed discussion and making decision about its submitting to</td>
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<tr>
<td>the UN</td>
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<td>Project submitting to the UN level (STS COPUOS)</td>
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Some Results of IGMMASS Realization

✓ Wide-spectrum nonmaterial research on the Project including foreign expert participation are carrying out.

✓ Active promotion of IGMMASS Project on International level.
...I would like to confirm the interest and the full support of GEO Secretariat for this initiative.

The Programme Manager of the GEO Secretariat will be delighted to...start the procedure of acknowledgment of IGMASSE as Participating Organization of GEO.

The objective of IGMASSE to develop an aerospace system for the assessment and forecasting of geophysical phenomena and natural/man-made disasters should take full advantage of the Societal Benefit Area of the Disasters in GEOSS.

José Achache
GEO Secretariat Director
April 28, 2010
The topic of this Second International Specialized Symposium [in Riga, Latvia on the topic of IGMASS issues] is well chosen. It is a shared responsibility of all stakeholders to, first of all, analyze what the threats are to the global security of mankind and which measures can, and should, be taken in order to avoid them, or at least mitigate their impact. Space tools provide essential elements in better understanding the overall environment as well as specific events.

It is a stated objective of the Agency to actively participate in tackling the problems that face us, or may face us. This cannot be achieved without increased international cooperation. The International Global Monitoring Aerospace System (IGMASS) can play an important role in this respect.

Chris de Cooker
Head of the International Relations Department, European Space Agency
Some Results of IGMAS Realization

- Development engineering on creation of Multifunctional Space System of the Union State “Russia-Belorussia” as a foretype of IGMAS key segments are pursuing.

- Specialized ground infrastructure of receiving and processing IGMAS space monitoring information are deploying and testing.

- Designed predictable patterns of small satellite prototypes for own developed IGMAS Orbital Segment are testing.
HUMANITARIAN

- preservation of the people’s life and health due to early warning about global natural disasters and emergencies, delivery of extremely health care in case of its uprising and development;
- opportunities on making-up and realization complex of measures on parrying global natural and man-made risks and threats in the framework of spectrum of all possible approaches.

FINANCE-ECONOMICAL

- maintenance of scientific, technological and technical potential of space-rocket industries of the countries-Project participants (construction of new capacities, business spreading etc.);
- preserving and sustaining financial and other aids and appliances courtesy of reducing consequences of natural and man-made emergencies;
- profit earning from monitoring data commercial realisation and using of business opportunities of distant education.
Executive Secretariat (Committee’s Working Body)

Structure of the International Committee on IGMASS Project Implementation

Managing Board

Subcommittees

Scientific-Technical

Organizing

Political/Juridical

Humanitarian

Financial/Economical
Second Specialized International Symposium “SPACE & SECURITY OF HUMANITY”

**Programme**

**July 5, Monday**

09.00-10.00  Registration of Symposium’s delegates
10.00-11.00  Symposium’s Inauguration Ceremony with the participation of Honorable Guests
11.00-13.00  Plenary Session
13.00-14.00  Lunch Break
14.00-16.00  Technical Sessions, IPCI Consistent Seminar
16.00-16.30  Coffee Break
16.30-18.00  Technical Sessions, IAA Working Group Meeting
18.00-18.30  Press Briefing
19.00-21.00  Welcome Reception

**July 6, Tuesday**

09.00-10.30  Technical Sessions, IAA Working Group Meeting
10.30-11.00  Coffee Break
11.00-12.30  Technical Sessions, IPCI Consistent Seminar
12.30-13.00  Lunch Break
13.30-15.00  Technical Sessions, IAA Working Group Meeting
15.00  Guided tour on Old Riga (historical sights)

**July 7, Wednesday**

09.00-10.30  Technical Sessions
10.30-11.00  Coffee Break
11.00-12.30  Technical Sessions, IAA Working Group Meeting; IPCI Meeting
12.45-13.30  Conclusion Plenary Session (adoption of main Symposium’s documents) Spreading ofHonorable Awards of IAA and RACTs. Introducing of new-elected members and Corresponding membersof IAA and RACTs.
13.30-15.00  Conclusion Glass of Wine

**July 8-9, Thursday-Friday***

Travelling Seminar "MNT & Joint Space Projects" on a board of ferry craft “FESTIVAL”, visiting Swedish Academy of Sciences and Stockholm profile enterprises, meetings, excursions, scientific and cultural events, open discussions etc.

**Important Note:** The Symposium Programme mentioned below is changeable. Follow Organizing Committee guidance, please.
IGMASS Project is an opportunity of unifying 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, 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 IGMMASS Project on the ways of parrying unexpectedness's and abruptness's (risks and threats) of contemporary world.
For obtaining additional information about IGMASS Project, please, contact us:

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