



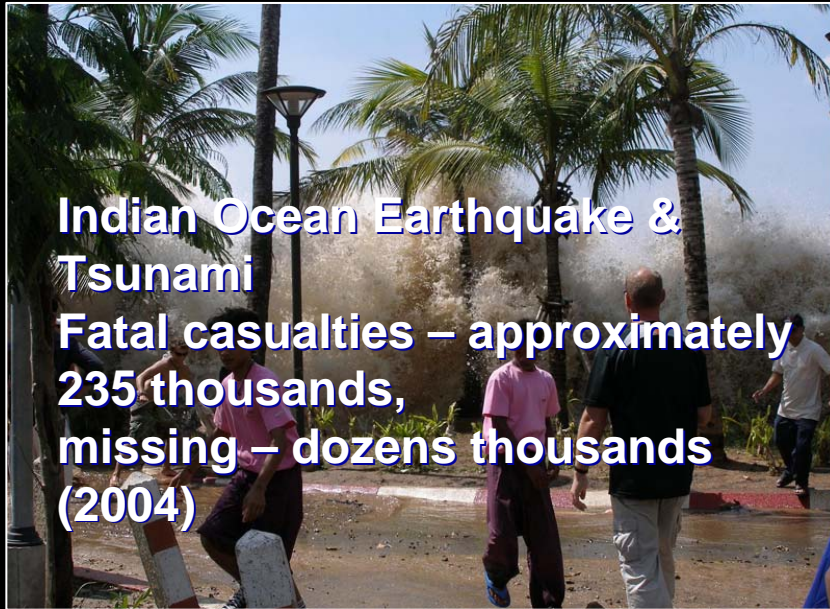
Prof. Valeriy A. Menshikov (Russia)

International Academy of Astronautics (IAA), Member of Board of Trustees,
Russian Academy of Cosmonautics named after K.E.Tsiolkovskiy, Vice-President,
IGMASS Project Manager from IAA

International Global Monitoring Aerospace System IGMASS

Scientific and Technical Subcommittee
Committee of Peaceful Uses of Outer Space
Forty-Seventh Session
Vienna, February 8-19, 2010

Global Natural Disasters Aftermaths



Indian Ocean Earthquake & Tsunami
Fatal casualties – approximately 235 thousands,
missing – dozens thousands
(2004)

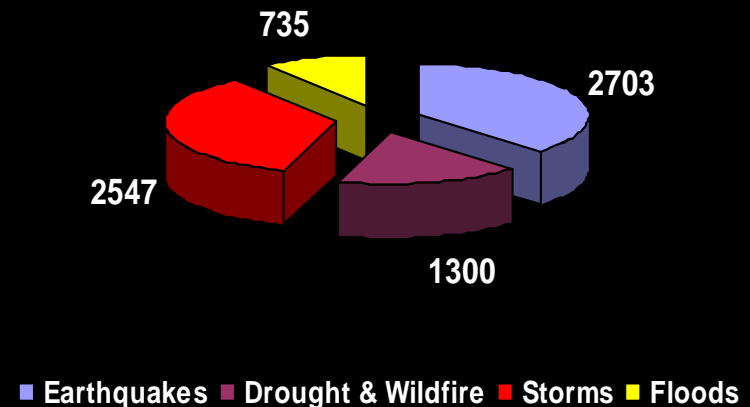


Haiti Earthquake
Fatal casualties – hundreds thousands
(2010)



Sichuan Earthquake
Fatal casualties: 69,227
374,643 injured
17,923 missing
(2008)

2009 First Semester Natural Disaster Economic Damage (Million US\$)

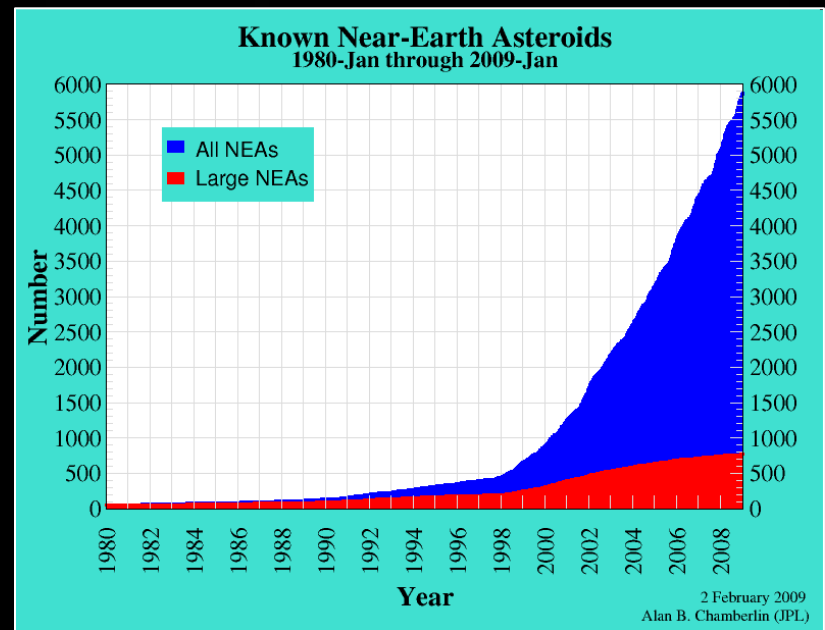


Global Outer Space Risks and Threats

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 Apophysis, 1997VRZ, 1994 WK12), which in case of its fall down into the Earth, could trigger off global catastrophe.



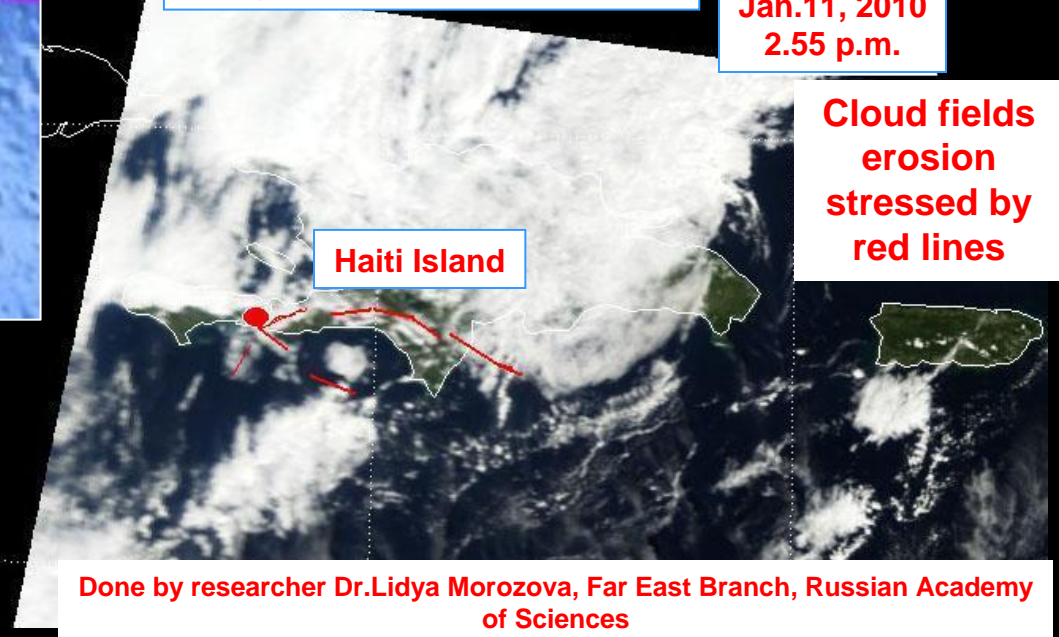
Some Signs of Recent Haiti Disaster



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.



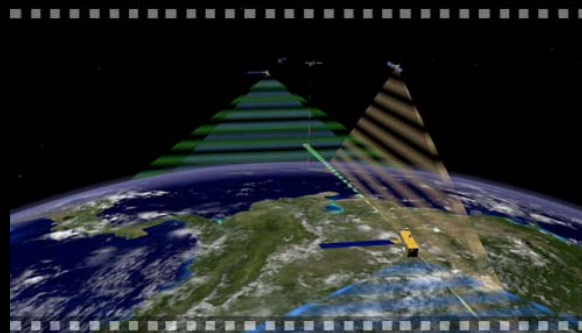
Done by researcher Dr.Lidya Morozova, Far East Branch, Russian Academy of Sciences

IGMASS - What Does It Mean?

International Global Aerospace Monitoring 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' Creation 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 recourses for global threats protection and solving of general humanitarian issues



IGMASS' Applicability

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

IGMASS' Priority Missions

Permanent and continuous space monitoring of the Earth lithosphere, atmosphere, ionosphere and outer space with the purpose of revelation early signs of dangerous natural disasters and man-caused emergencies



Collecting, onboard satellite processing and transmitting monitoring data into ground space information receiving stations



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



Near real-time communication to states concerned and specialized UN structures about educible natural and man-made risks and threats

IGMASS' Advanced Missions

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



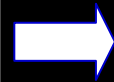
Effective warning about global risks and threats in and from outer space: asteroid danger and anomaly phenomena



Gradual forming unified planetary “informational environment of security” for the convenience of reducing global risks and arising threats protection

IGMASS Project Initialization

Presenting on profile
International scientific forums



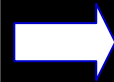
Dnepropetrovsk, Ukraine (2007,
2009); Korolyov, Russia; Tunis;
Shanghai, China (2008); Versailles,
France (2009); Rome, Italy (2010),

Official presenting to the
International Academy of
Astronautics (IAA)



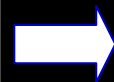
Glasgow, Scotland (2008)

Project Manager Assignment and
IGMASS' working experts group
creation (from IAA)



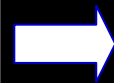
Paris, France (2009)

Project Researches and
preparing of IGMASS' working
experts group conclusion



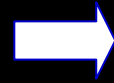
Yubileynyy, Russia (2009)

Submitting Project Researches
and IGMASS' working experts
group conclusion to the IAA.



Daejeon, Republic of Korea (2009)

Project detailed discussion and
making decision about its
submitting to the UN



Limassol, Cyprus (2009)

IGMASS Structure

SPIDER-UN

GEOSS

KOSPAS-SARSAT

GMES

Sentinel Asia

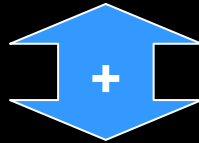
DMC

GCOS

Disaster Charter

IONOSAT ...

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



International, regional and national space systems

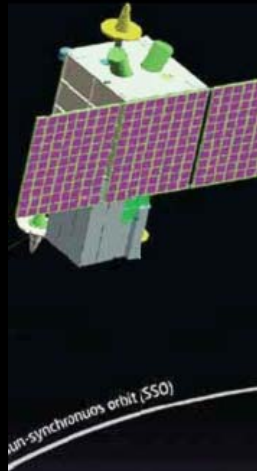
Meteorological

Navigational

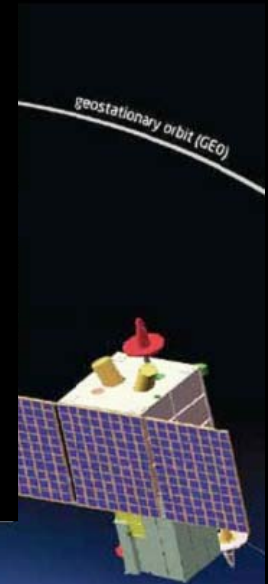
Observation and RSC

Communication

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



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



Air-born segment

NATIONAL AVIATION CONSTELLATIONS FOR EARTH OBSERVATION



IGMASS Ground Segment: International Monitoring Data stations, International and Regional Crisis Management Centers; Launching and Flight Control facilities, Global Distant Learning etc and Catastrophe's Medicine Communication Infrastructure

Monitoring Information Management Hierarchy



UN



INTERNATIONAL CRISIS MANAGEMENT CENTRES

UPPER LEVEL: utilization of monitoring information

NATIONAL AND REGIONAL EMERGENCIES FORCES



NATIONAL AND REGIONAL CENTRES CRISIS MANAGEMENT

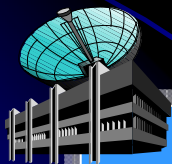


REGIONAL CENTRES OF AIRBORNE AND GROUND SENSORS MONITORING DATA COLLECTING AND PROCEEDING



MEDIUM LEVEL: interpretation of monitoring data

NATIONAL AND REGIONAL MONITORING DATA RECEIVING STATIONS



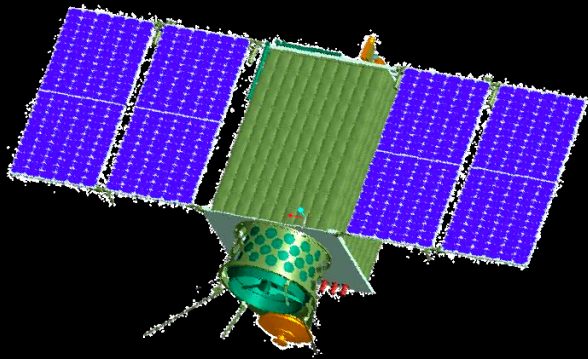
International, regional and national ground facilities (contact and distant sensors)



INTERNATIONAL MONITORING DATA RECEIVING STATIONS (5 stations all over the world)

LOW LEVEL: receiving and proceeding of monitoring data

Own Developed IGMASS Orbital Segment



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.

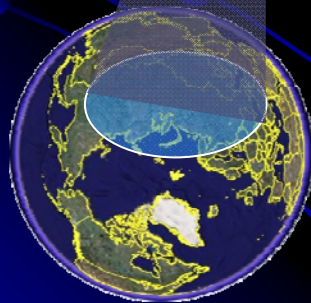
Orbits:

Satellite of upper level – GEO with even distribution of satellites in orbit plane,

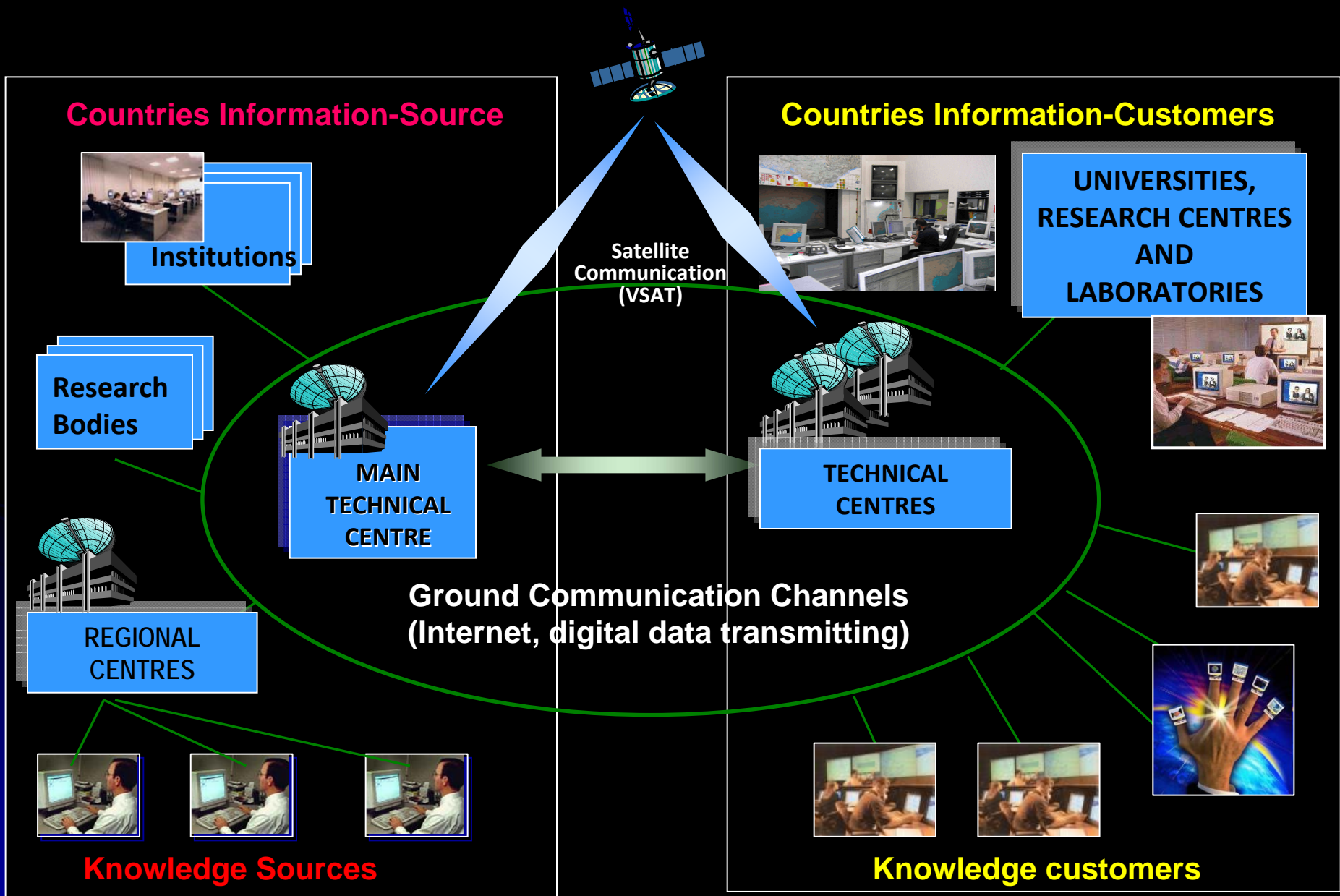
Satellite of upper level – SSO, H=600-700 km, with even distribution of orbit planes along longitude of ascending node

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, mass-analyzers, spectrometers

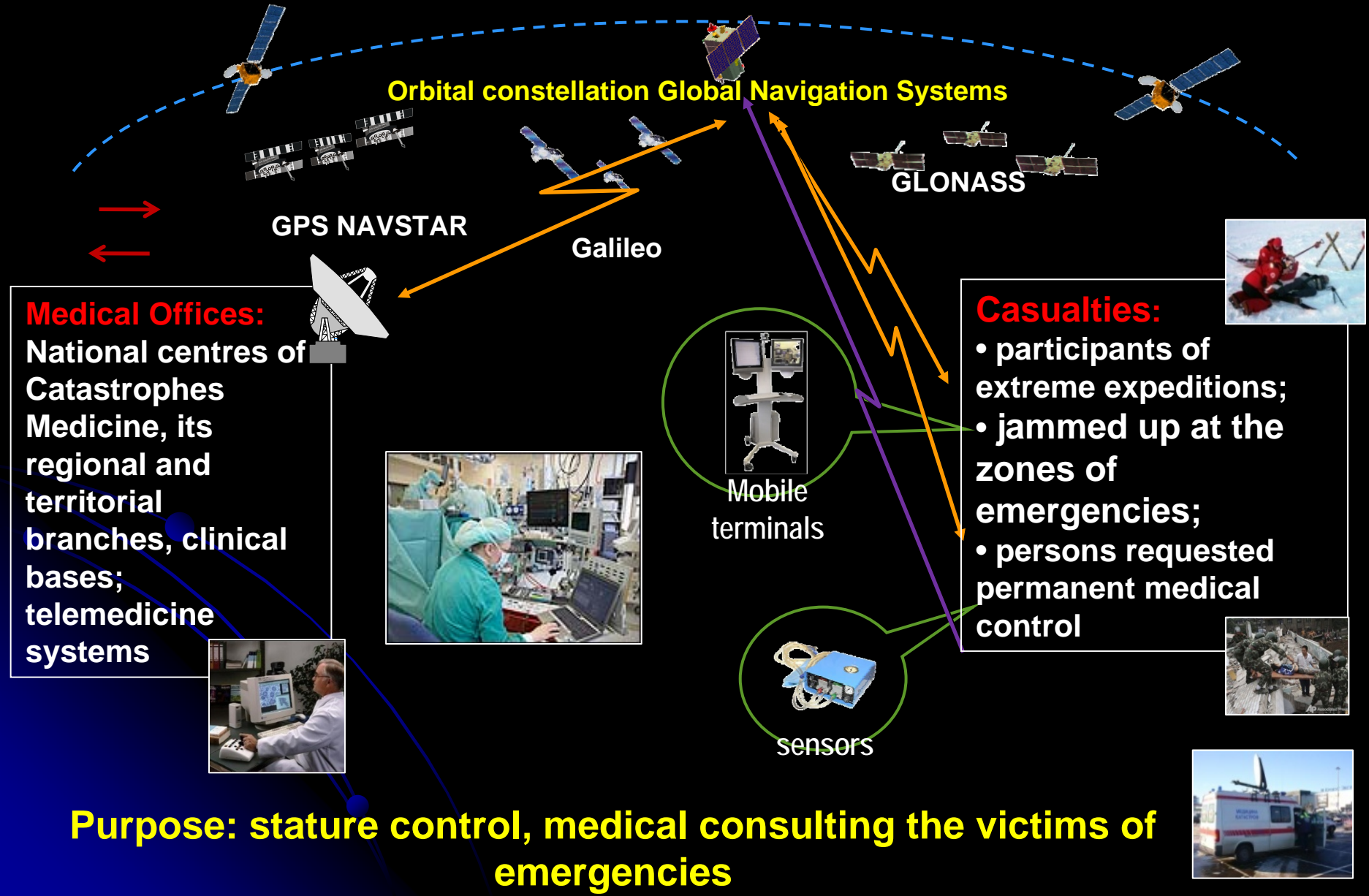


Distant Learning IGMASS Subsystem



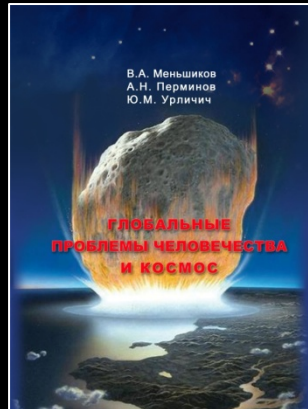
Catastrophe Medicine IGMASS Subsystem

Orbital Constellation of International, Regional and Domestic Telecommunication Systems



Some Results of IGMASS Realization

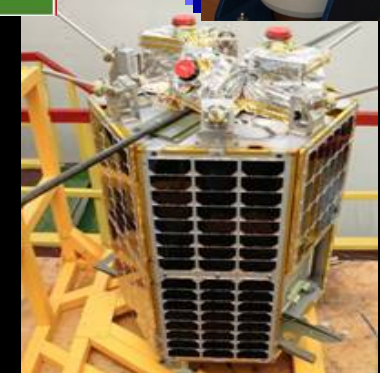
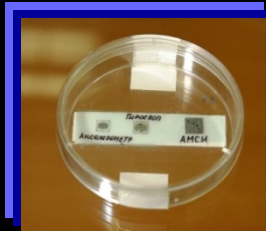
- ✓ Wide-spectrum nonmaterial research on the Project including foreign expert participation are carrying out



✓ Active promotion of IGMASS Project on International level

Some Results of IGMASS Realization

- ✓ development engineering on creation of Multifunctional Space System of the Union State “Russia-Belorussia” as a foretype of IGMASS key segments are pursuing



- ✓ Specialized ground infrastructure of receiving and processing IGMASS space monitoring information are deploying and testing

- ✓ Designed predictable patterns of small satellite prototypes for own developed IGMASS Orbital Segment are testing

IGMASS Project Potential Efficiency

HUMANITARIAN

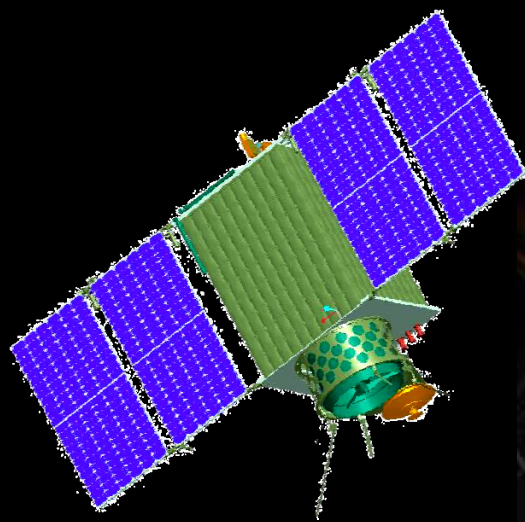


- preservation of the people's life and health due to early warning about global natural disasters and emergencies, delivery of extremely health care in case of its uprising and development;
- opportunities on making-up and realization complex of measures on parrying global natural and man-made risks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




Socio-political significance of IGMASS Project realization 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 IGMASS Project on the ways of parrying unexpectedness's and abruptness's (risks and threats) of contemporary world

Some Proposals of IGMASS Project Designers

1. To support the initiative of IGMASS Project realization in the framework of wide International cooperation under UN aegis, recording it in final documents of 47th Subcommittee Session.
2. To put under consideration of future COPUOS sessions political and juridical aspects of IGMASS Project realization.
3. To form under the Subcommittee special study group on the issues of using advanced space technologies for the purposes of forecasting natural disasters and man-made catastrophes.
4. To engage into “International Public Committee on supporting IGMASS Project”, which has been created due to IAA initiative and resolution of The First International Specialized Symposium (Cyprus, November, 2009), all institutions and persons concerned.





**For obtaining additional information about IGMASS
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