



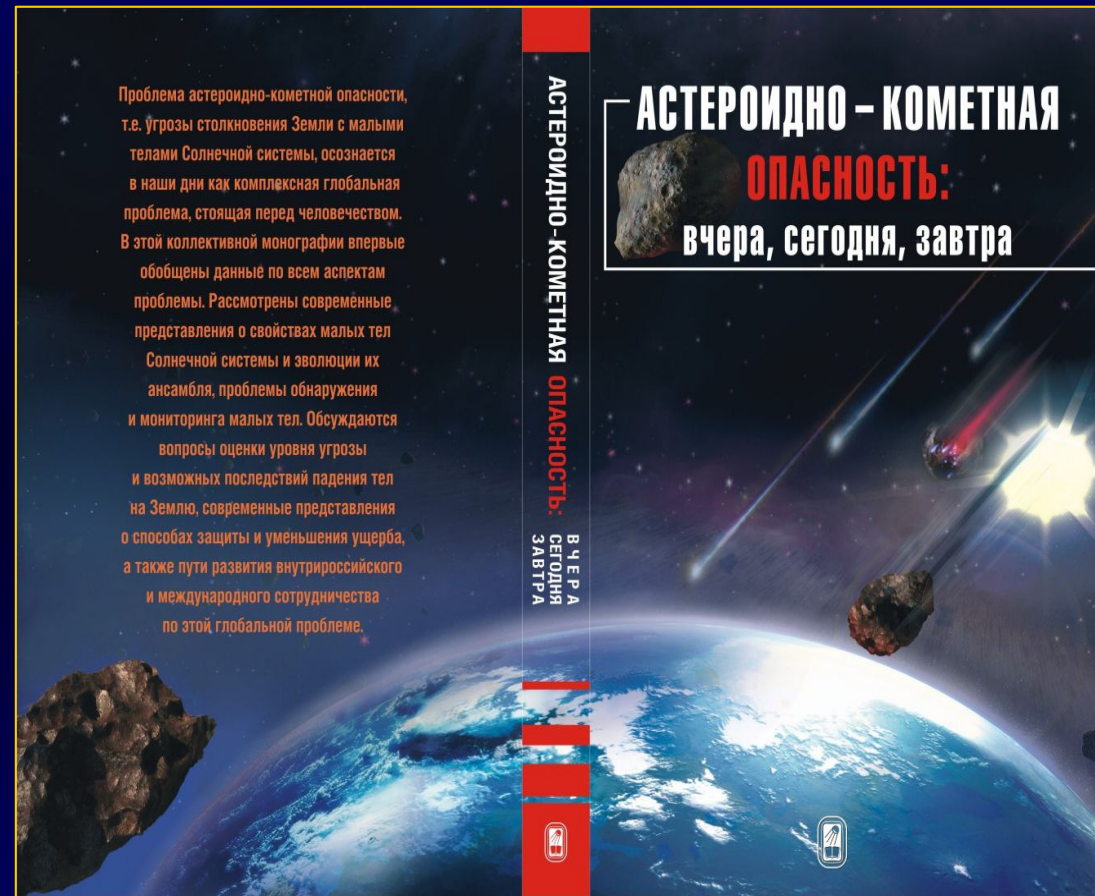
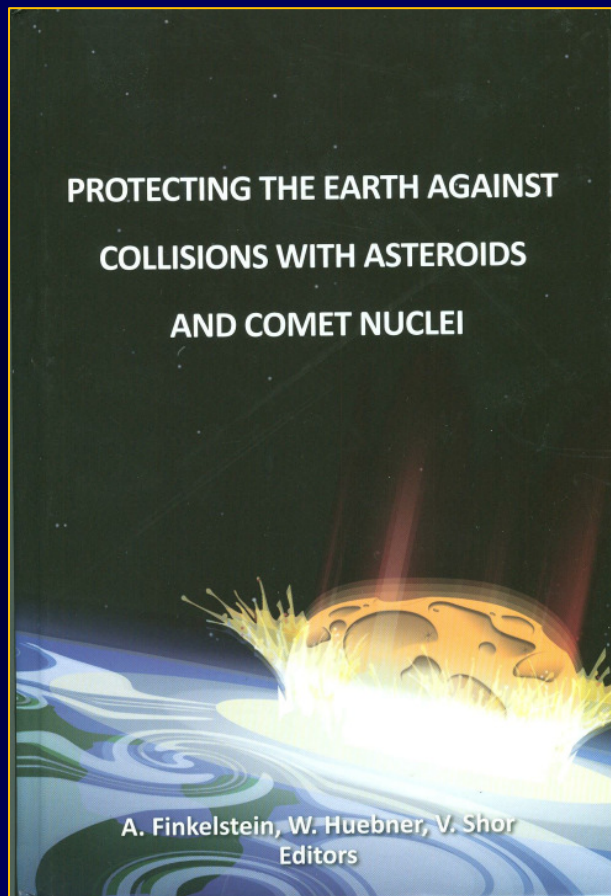
Towards the National NEO Program

Boris Shustov[^] & Yuri Makarov^{}*

[^]) Russian Academy of Sciences

^{*}) Federal Space Agency

Activity on the NEO problem in Russia is rising up



Books on the NEO problem, published in Russia in 2010

Cooperation of countries required

The NEO problem or, more specifically speaking, the Asteroid-Comet Impact Hazard (ACH) problem, is a global one by nature. The efficient approach to the problem implies the need of efficient international collaboration, i. e. cooperation of countries.

Encouraging precedent is the participation of Russia and the United States in the preparation of the project "Mitigation" under the European Program FP7. In 2010 the EU offered the U.S. and Russia to participate in the pilot study of the methods of mitigation and has allocated funds for this project.

National NEO program is a practical way to the effective international cooperation

The establishing of national NEO program seems to be a practical way to the real international cooperation.

Good examples of (inter)national programs were provided by NASA's NEO program and European SSA program.

We believe that for the effective participation of Russia in the international cooperation on the NEO problem we need to develop a comprehensive national (federal) program.

Arguments for a national (federal) program

1. The NEO problem is a multi-problem. Various organizations are to be involved (coordinated);
2. The capabilities of research centers are not sufficient for implementation and support modern service of detection and monitoring of NEO, in particular those requiring space facilities;
3. The expensive technologies of preventing collisions and mitigation can be proposed but not be realized under the responsibility of research institutions;
4. Cooperation of countries on the NEO problem implies the involvement of Russia Government.

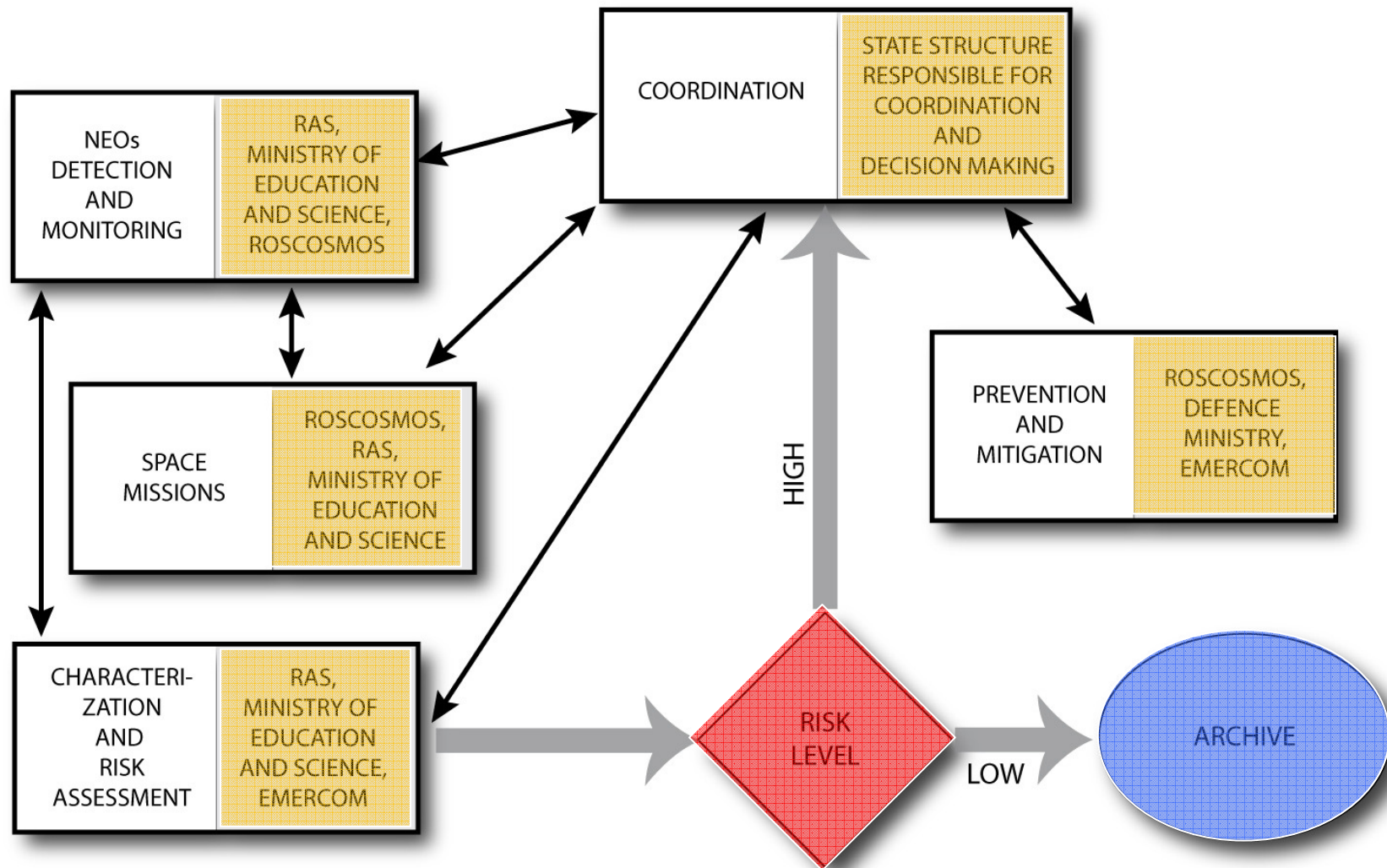
Preparation of the national NEO program is going on

The draft concept of the long-term federal NEO program was prepared by the Expert Working Group on ACH by the Space Council of the RAS.

In June 2010 a special joint meeting of the heads of the Federal Space Agency (Roscosmos) and the Space Council of the Russian Academy of Sciences was held. The draft concept was discussed.

FEDERAL SCI-TECH PROGRAM (FSTP)

„NATIONAL SYSTEM OF SAFEGUARD AGAINST THE ASTEROID AND COMET HAZARD“



To the generalized Program

System of mitigation of space threats

The overall project was approved. During the discussion Roscosmos and Russian Academy of Sciences expressed their wish to integrate issues of NEO and space debris in the unified federal program. It was noted that the first step in this direction would be to develop the concept of a generalized program with preliminary name “System of mitigation of space threats”.

An unified concept is under preparation.

Detection and monitoring

Tasks:

Detection:

Construction of new optical instruments for massive discovery of the NEOs.

Monitoring:

Organization of a coordinated network of existing astronomical instruments and/or construction of uniform series of instruments specially designed for monitoring

Data handling:

Establishing the national information center responsible for collection, storage, analysis, dissemination of observational data and interaction with world centers

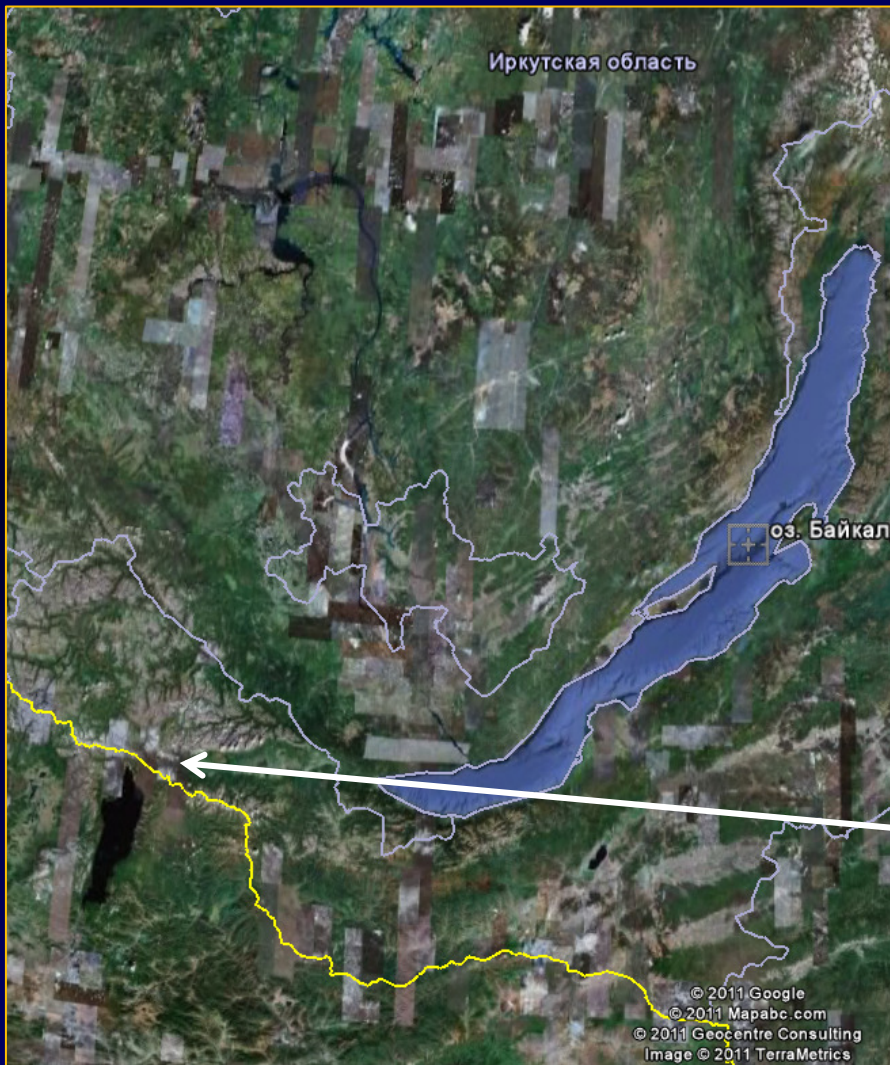
Wide-angle telescope AZT-33VM

Spectral range	400-1100 nm
F	5600 mm
focal ratio	1:3,5
2ω	$2,8^{\circ}$
$2y'$	277 mm



Institute of Solar-Terrestrial Physics, Siberian Branch of the RAS

Dome for the telescope AZT-33VM



October 2010

Radar technology for NEOs



Комплекс П-2500 в Евпатории

Evpatoria,
Ukraine



Комплекс П-2500 в Уссурийске

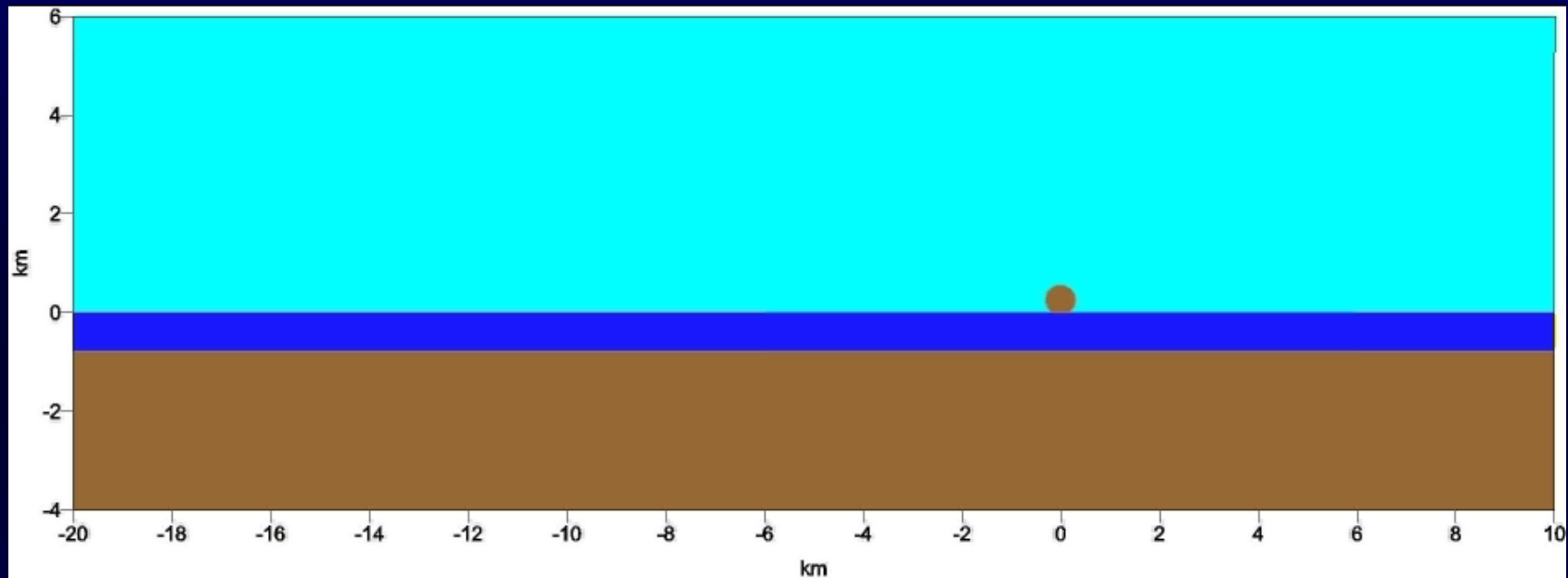
Ussuriisk,
Russia

Characterization of Potentially Hazardous Bodies and Risk Assessment

Tasks:

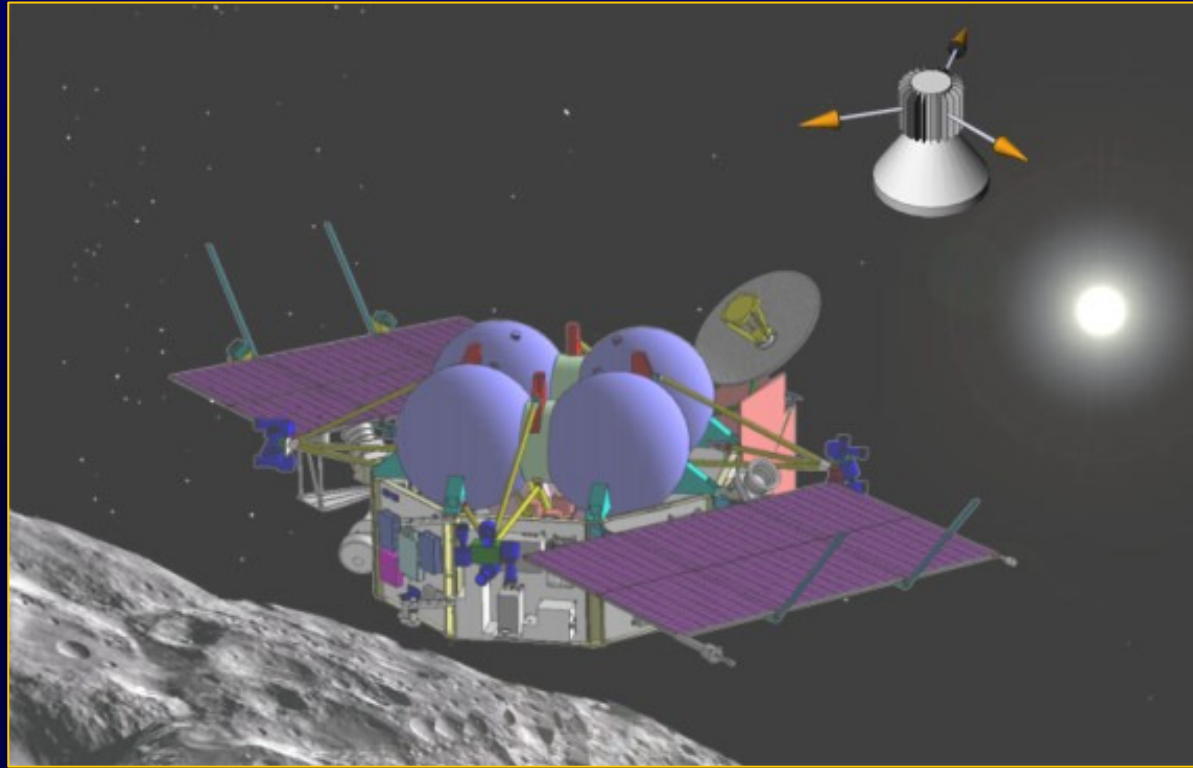
1. Reliable estimate of the collision probability ;
2. Estimate of possible consequences;
3. Risk assessment and informing the decision making bodies.

Formation of the Lockne meteorite crater



The crater has been formed about 450 million years ago by the impact of 600 meters asteroid into the sea depth of 0.5 - 1 km. Celestial body caused tsunami waves that had a height of 40 - 50 m at a distance of about 1 thousand km. Model by Shuvalov.

Space mission “Apophis”



In 2010 Phase A study was completed.

Heritage (experience and technical solutions) of the Phobos-Grunt Mission is used.

Phobos-Grunt S/C to be launched in November 2011.

Conclusion

Russia continues to create a national program of mitigation of space threats. Its implementation will allow Russia to participate effectively in international cooperation on the issue.

Thank you for your attention!