The NEO problem: current activities in Russia

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Basic aspects of the NEO problem

Major constituents of the NEO (Asteroid/Comet Impact Hazard - ACH) problem are:

- Detection and characterization
- Risk assessment
- Protection and mitigation

We work in all areas at both national and international levels.

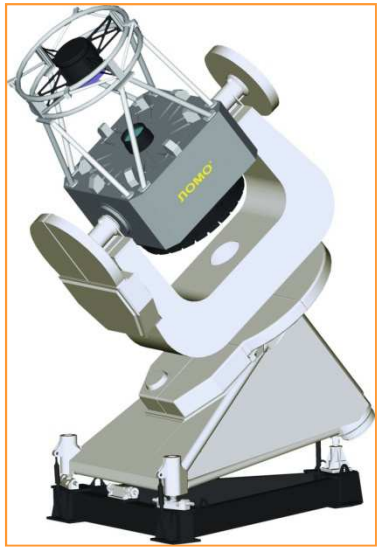
General activities (Feb 2014 – Feb 2015)

- Studies of the Chelyabinsk meteorite;
- Completion of the 1.6 m telescope for NEO detection;
- Work on the development of a moderate aperture telescope national network aimed to detection and monitoring of NEOs;
- Various projects of space based means to detect and to counteract dangerous bodies;
- Construction of a data-bank on impact consequences.

Some lessons of the Chelyabinsk event (15 Feb, 2013):

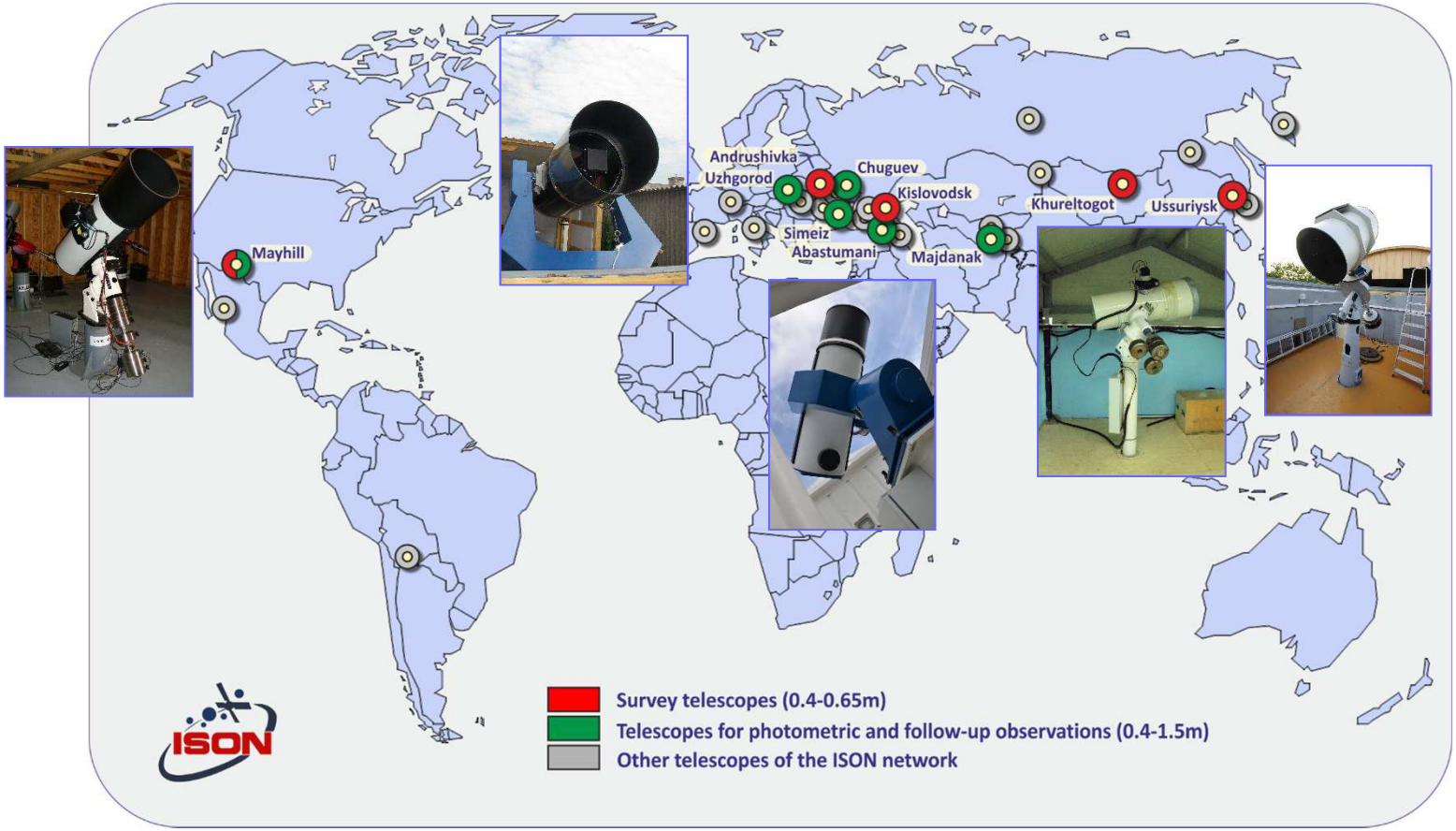
- Asteroids of decameter size could be very dangerous;
- We need to know about coming threat reasonably in advance;
- Day time asteroids are unobservable by any ground based facilities.

En route to the NEO detection



The telescope AZT-33VM (∅ 1.6 m) for the mass detection of NEOs at large distances is nearing completion. First light is expected in the fall of 2015.

ISON telescopes for NEO surveys and follow-up observations



ISON (International Scientific Optical Network) – one of the largest Russian networks capable to observe NEOs at near space.

ISON : results on asteroids

Hundreds of light curves were constructed for tens of NEAs

(3122) Florence, (20187) Janapittichova, (25916) 2001 CP44, (162004) 1991 VE, (7888) 1993 UC, 1998 VO, (47035) 1998 WS, 2000 WN22, 2001 RZ11, 2001 WC47, 2002 GT, 2003 GS, 2012 EG5, 2012 DX75, 2012 KP24, 2012 KT42, 2012 LZ1, 2012 QG42, 2012 TC4, 2012 DA14…

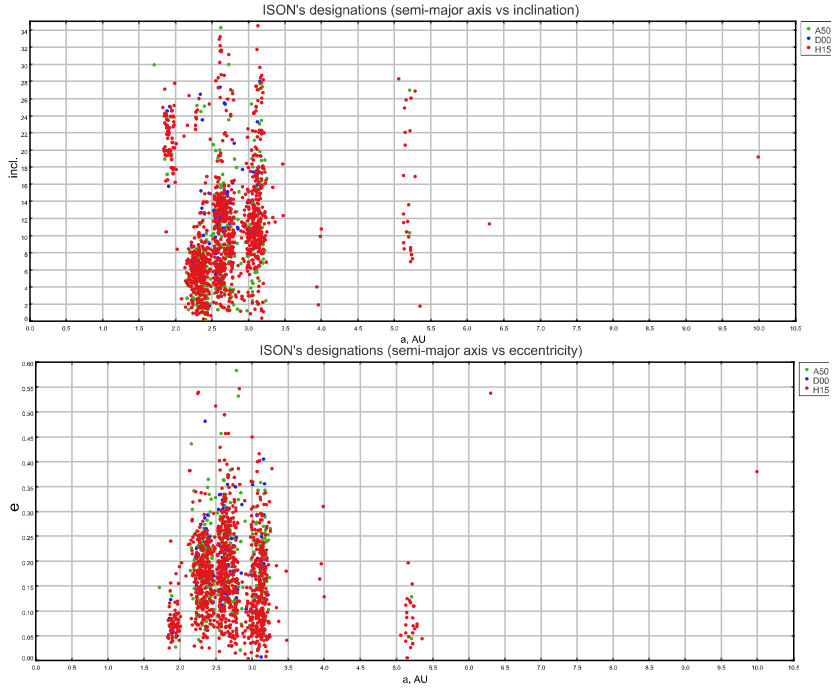
YORP-effects is estimated: (2100) Ra-Shalom и (88710) 2001 SL9

Binarity of asteroids:

(3352) McAuliffe, (8373) Stephengould, (7888) 1993 UC, (68216) 2001 CV26, (137170) 1999 HF1, (329437) 2002 OA22, (8306) SHOKO, (175706) 1996 FG3

Discoveries: 9 comets - C/2010 X1 (Elenin), P/2011 NO1 (Elenin), C/2012 S1 (ISON), C/2013 V3 (Nevski), C/2013 N4 (Borisov), C/2013 V2 (Borisov), C/2014 Q3 (Borisov), C/2014 R1 (Borisov), P/2014 X1 (Elenin)

9 NEAs - 2007 QA2, 2008 KB12, 2010 RN80, 2011 QY37 2012 RQ16, 2013 TB80, 2013 TV135, 2014 KH2, 2014 YU43 and 2000+ MBAs



Network of Roscosmos observatories

3x75 cm, 3x65 cm (+6 in future), 6x40 cm telescopes
is able to survey all sky per each night

MASTER Project

Network of twine 40-cm telescopes for search of optical transients of GRB is to be used for NEO observation

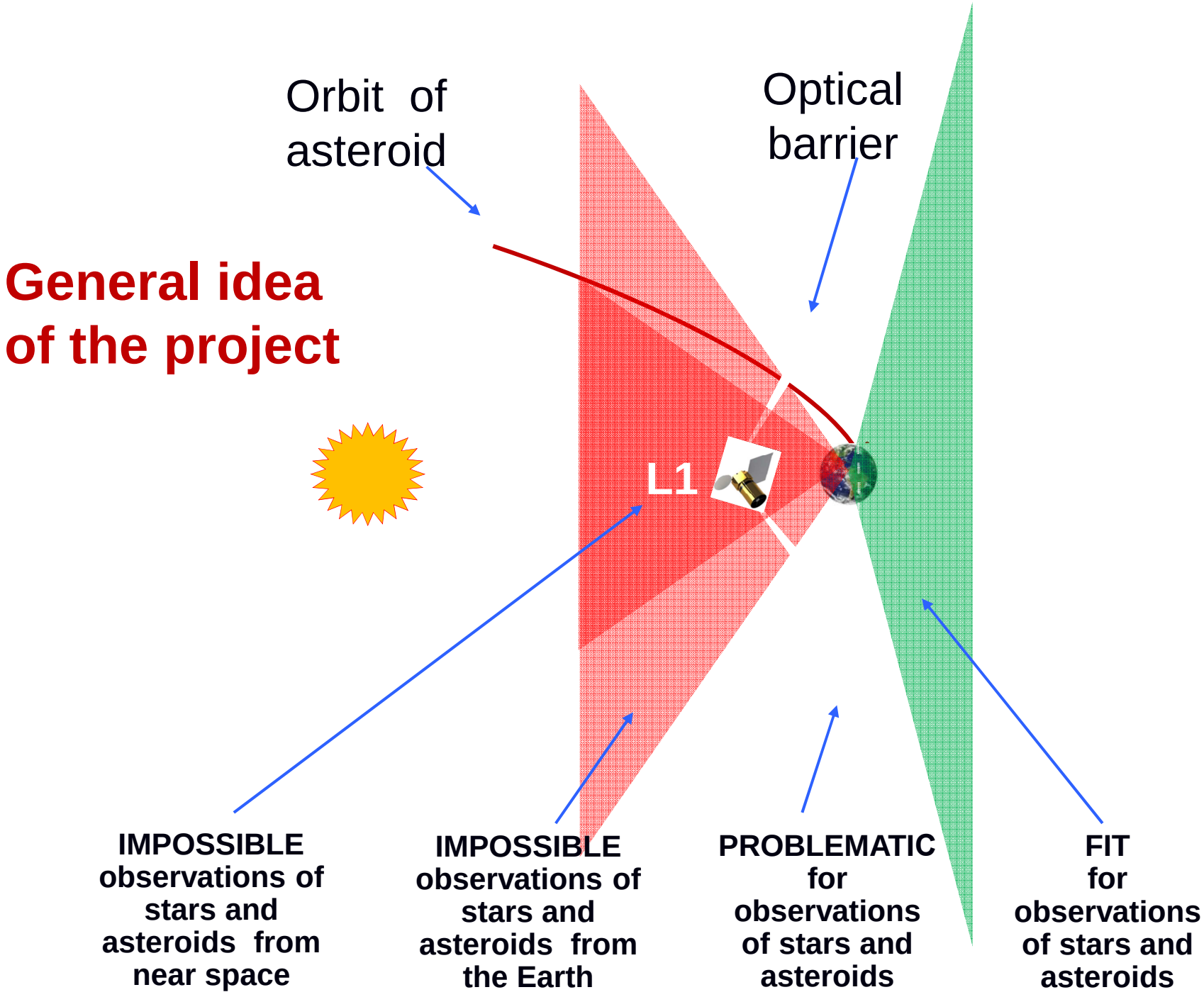
We consider participation in the IAWN as an important step to the real international cooperation in detection and characterization of dangerous celestial bodies.

Space projects

Various projects of space based means to detect and to counteract dangerous bodies are suggested.

We consider participation in SMPAG as an important step to cooperation in space to counteract asteroid-comet threat.

General idea of the project



An initiative for construction of the international bank of impact consequences

It is suggested to construct a data-bank of impact consequences. The data bank is considered to be similar to those elaborated and/or being under creation for tsunami and climatic hazards in some countries.

The consequences of a collision are very dependent on properties of celestial bodies. The suggestion is to pre-calculate the consequences for all the most “sensitive” regions on the Earth. This will speed up and facilitate decision-making process. It is clear that for some countries it will be problematic to construct an own part of the relevant data bank.

A dedicated international program would be helpful.

NEO problem: time to work together!