

PDC2017
Tokyo, Japan

IAA-PDC-17-02-P03

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INASAN NEO finder (INF) project

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Keywords: *Near-earth objects, survey telescope*

ABSTRACT

After the Chelyabinsk event it is evident that not only large asteroids but also ~10 m size meteoroids pose a substantial hazard.

The number of near-Earth objects has been growing rapidly due to special surveys such as Spacewatch, ATLAS, Catalina Sky Survey, Pan-STARRS, space-based NEOWISE and others. But we have no system for massive detection of small (10 m) bodies.

INASAN propose to build a dedicated network of robotic telescopes to detect 10 m asteroids coming in the near Earth space. Several hours of warning time provided by INF project is enough for emergency actions.

The project is named INF (INASAN NEO Finder).

The INF project main features are:

- global network of 6-12 observational sites with INF telescopes to provide 24/7 service;
- short cadence time (1 h) of all-sky survey and moderate limiting magnitude (>19^m) without filters;
- possibility of carrying out the additional scientific program.

INASAN today is close to finish the construction of INF telescope prototype. The INF prototype consists of 2 identical wide-field telescopes (Terebizh VT-78d) equipped with 4k x 4k CCD cameras on fast-track mount. First light is expected at the middle of 2017. The VT-78d telescope provides unique combination of parameters: aperture (250 mm), field of view (10 deg diameter, 78.5 square deg) and image quality (5 arcsec).

The full-scale INF multiaperture telescope should consists of 8 VT-78d telescopes on a fast mount. We suggest to use modern single-chip CMOS detector GSENSE6060BSI (6kx6k, 61x61mm) with electronic shutter and ~1s readout or

ANDOR Balor 17F CMOS camera. One image of INF multiaperture telescope will cover 574 sq. deg (298 Mpixels) with 5.2 arcsec/pix resolution. The limiting magnitude without filters will be 18.9^m@30s and 19.4^m@100s exposure. INF project will be capable to get all-sky (20000 sq. deg) survey in 1h down to 19.4^m. The INF survey performance (8 visit of every point on the sky per night) gives us a possibility not only to detect NEOs but also to calculate their orbit and to sent an alert for follow-up observation with more powerful telescopes.

To provide 24 h operation we need to install several INF multiaperture telescopes in the northern and southern hemispheres at places with low sky background. It will help us to get 6-30 h warning time for 10 m impactors coming from 2π sr.

The necessity of collaboration with other projects that will focus on detection of NEOs on day sky (for example space project SODA, see A. Shugarov presentation) in order to provide detection of impactors coming from all directions is emphasized.
