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A WIDE FIELD SURVEY OF NEAR-EARTH OBJECTS

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ABSTRACT

After the Chelyabisk event it is evident that not only large asteroids but also ~10 m size meteoroids pose a substantial hazard to the Earth civilization. Although the number of near-Earth objects has been growing rapidly in this century due to special surveys such as Spacewatch, LINEAR, LONEOS, NEAT, Catalina Sky Survey, Pan-STARRS and space-based NEOWISE there are large uncertainties in the population count, physical properties and dynamical characteristics of small asteroids. In particular, recent studies of bolide events indicate that the number of impactors with diameters of ~10 m may be an order of magnitude higher than estimates based on telescopic surveys.

We propose a wide field optical survey that is aimed at small near-Earth objects. The semi-automatic survey will be able to cover the entire visible sky several times per night. This survey will discover many small asteroids and also serve as a warning system for imminent impactors. All the telescopes of the survey will be combined in the united system connected with more powerful follow-up telescopes. At first we plan to use the existing infrastructure of the Institute of Astronomy of RAS, Moscow (observatories in Terskol and Zvenigorod, as well as a new station in Kislovodsk) and the Crimean Observatory as the sites of the survey.

At the moment there are funds for the first project phase consisting of two VT-78d 25-cm aperture telescopes designed by V. Terebizh. The work on construction of these telescopes is in progress. Each telescope should have a 78.5 square deg field of view. The telescopes will be equipped with 4096 × 4096 pixel CCD cameras with the scale of 6.3 arcsec/pixel in the focal plane. The predicted limiting magnitude for 30 sec exposure will be about 18 mag in the unfiltered mode.