

Exploration of Near-Earth Asteroids (4)
Exploration of Near-Earth Asteroids (2) (2)

Author: Ms. Elena Pavlova
Keldysh Institute of Applied Mathematics of RAS, Russian Federation

PREVENTION OF NEO HAZARD: THE RUSSIAN APPROACH

Abstract

Reliable and timely warning of NEO hazard is one of the modern challenges of humankind. This is a global element of ensuring the sustainability of space activities. At present, the Russian approach in case of NEO hazard has moved from a theoretical plane to a practical one. The solution to the problem of warning of NEO hazard is of a systematic nature. The goals and objectives of this approach are the timely detection of an object approaching the Earth, the calculation and prediction of the trajectory of motion, the determination of the physical properties of the asteroid, the assessment in accordance with the hazard criteria. If the near-Earth object threatens to fall to the Earth, the most important task is to determine the time and coordinates of the place of a possible fall. However, in order to solve the listed tasks and reach the goals, the elements of the NEO prevention system should be well-coordinated. The presentation shows the ways of organizing such a system. In our opinion, the constituent elements of the approach to the organization of a system when the system can respond quickly to assigned tasks are the following: - technical means (optical telescopes, radars) that can enable the planning of observations, detection and tracking of potentially dangerous asteroids; - advanced mathematical methods for solving astrobolic problems associated with determining the trajectory and calculating possible fall zones; - maintenance of a database on the orbital and physical characteristics of objects of natural origin in near-earth space, including potentially dangerous asteroids and comets; - the classification of NEO hazard in order to determine the criteria and degree of risks and probable consequences. The report considers the current state and prospects of the Russian contribution to the prevention of NEO hazard. The structure of the asteroid database developed by KIAM RAS and the NEO part of hazardous situations classifier are presented. Statistical data on the dynamics of observation of minor planets by Russian telescopes are shown. The report is accompanied by illustrations of potentially dangerous objects in the sky, telescopes of the International Network of Optical Telescopes (ISON), coordinated by the KIAM RAS.