

**PDC2015**  
**Frascati, Roma, Italy**

- Planetary Defense – Recent Progress & Plans**
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**IAA-PDC-15-P-27**

**ABOUT DEVELOPMENT OF BASE COMPONENTS OF THE INTERNATIONAL  
PLANETARY DEFENCE SYSTEM “CITADEL”**

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**Keywords:** *planetary defence system, civil defence, forecasting, simulation*

**ABSTRACT**

One of possible ways of counteractions against asteroid-comet hazard can be the creation of the International Planetary Defence System (PDS) (conventional name “Citadel”). A basis of this system can be presented by an Echelon of short-term (operational) reaction (ESTR) called “Citadel-1” and the Forecasting service of areas and consequences of dangerous celestial bodies (DCBs) falling.

The ESTR is designed for protection from DCBs, which can be detected several days-months before collision. An ESTR will include:

- Ground- and Space-Based Surveillance Service for DCBs detection and investigation;
- two Segments of the Reconnaissance and Interception Service – “East” and “West” for identification of DCBs characteristics and for protection from DCBs;
- two Regional Planetary Defence Centres “East” and “West” for managing ESTR services.

Results of development of these components of ESTR are presented. It is shown, that modern rocket-space and nuclear technologies allow creating the operative protection from DCBs of size up to several hundred meters. Defence from remaining asteroids and comets, if they can be detected well in advance, will be performed by an Echelon of long-term reaction.

Since the PDS has not yet been created, the analysis of probabilities and risks and the minimisation of damage from possible collisions become increasingly important. For mitigating the damage, it is necessary to determine in advance location, time and explosive power of the collision and also affecting factors and their consequences for the population and territories. For this purpose, a forecasting Service of areas and consequences of DCBs falls should be created.

At the request of the EMERCOM of Russia we developed principles for building such Service. A software system is the most important element of this Service. It combines a variety of computer programs that simulate catastrophic scenarios associated with the asteroid and comet falls.

The report presents the results of quantitative assessments of vulnerability and possible damage to the ground infrastructure and the Earth's biosphere from affecting factors due to DCB falling, obtained as a result of test simulation using the developed demonstration model of the software system.