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**DESIGN OF THE FLIGHT SCHEME AND S/C NAVIGATION SUPPORT ENSURING
THE GOALS OF THE BLAST DEFLECTION DEMONSTRATION MISSION TO THE
POTENTIALLY HAZARDOUS ASTEROID 2001 JV1**

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In the given paper the results of the celestial-mechanical investigations and the detailed ballistic & navigation development of the spacecraft's (SC) flight scheme to the potentially hazardous asteroid (PHA) 2001 JV1, chosen as a target object for a blast deflection demonstration mission, are presented. Investigations and calculations were carried out in the assumptions, that considered mission can be organized on the basis of space-rocket facilities and space technologies, available nowadays or capable be created in the near future, and in accordance to capabilities and characteristics of such means.

Numerous transfer trajectories of the spacecraft to the asteroid, including the trajectories, allowing an interception of an asteroid before its close approach to the Earth, in the nearest possible launch window in 2021 were calculated and analyzed. Both the energy expenditures (ΔV) required for the mission realization and flight conditions of SC rendezvous with the asteroid are estimated. The scheme of precise approaching of the spacecraft with the asteroid as well as the mission profiles in the vicinity of the asteroid are proposed. The characteristics and capabilities of these schemes are calculated and estimated. The theoretical estimates, confirmed by the numerical calculations, about the character and the quantity of the change of the asteroid's orbit, that appear as a result of a blast deflection, depending on the direction of a characteristic velocity ΔV , are obtained. The scheme of a spacecraft's flight in the mode of "escort" of the asteroid after the explosion is offered. This scheme on the basis of using onboard and ground based measurements allows to confirm the fact of a modification of the asteroid's orbit due to an explosion and to obtain a quantitative

assessment of this effect in the period from one to several months, i.e. during the mission performance.

Thus, it is shown, that the designed flight scheme and the proposed program of the navigation measurements ensure the fulfillment of the demonstration mission requirements on the delivery of a spacecraft with a nuclear device to the potentially hazardous asteroid within enough short period of time, preparation and execution of a nuclear explosion close to the PHA, and the estimation of the asteroid's orbit changing as a result of a blast effect.

Thereby, the carried out flight design analysis confirms a capability of a practical feasibility (from the ballistic and navigation point of view) of the blast deflection demonstration mission to the asteroid 2001 JV1 already in the next decades.