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ANALYSIS OF PLANETARY DEFENSE TECHNIQUES AND THE ROLE OF SPACE TECHNOLOGY
IN THE FUTURE EXERCISES

Abstract

In 2019, NASA launched DART for the AIM missions, as the first planetary defense exercise. HERA, the eye witness satellite will be followed later this year, 2024. This exercise has practiced one of the techniques of planetary defense called kinetic impactor. This mission has as purpose to redirect the asteroid from its original orbit. The success of this exercise has been seen at a high percentage that would be completely confirmed by HERA. Several other techniques exist to protect the planet from potential Near Earth Orbit objects mentioning gravity tractor that offers the greatest control, allowing us to carefully direct an asteroid away from Earth, laser ablation that is based on focusing lasers on the surface of an asteroid, vaporizing rock and creating small ejecta plumes, pushing the asteroid and slowly changing its course, Ion Beam Shepherd using ion propulsion to push the asteroid away, and this would be even more efficient than gravity tractor for asteroids under 2 kilometers and Nuclear blast that could blast 99.9% as AIM is partially successful, it would be great to plan the next step and go for future exercises.

This paper will analyze these planetary defense techniques and will present their respective potential risks. It will mainly focus on the existing space technology that will be used for these techniques and present the role played by observation centers to observe, study and identify the NEO object.

Keywords: Planetary Defense techniques, Kinetic impactor, Ion Beam Shepherd, gravity tractor, Nuclear blast, space technology