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Project SEUSS: Save Earth Using Solar System Assets

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Geological evidence indicates that the extinction of the dinosaurs over 65 million years ago was the result of an asteroid impact. While the probability of an extinction-class body colliding with the Earth is small, the consequences of such an impact are cataclysmic, as punctuated in Earth's geologic history. For the first time in history, the human species has the knowledge and means to mitigate the impact risk of a global killer. This concept aims to prevent mankind's extinction through timely deflection of a threatening body.

Using the gravity assist principle that is thought to have flung asteroid fragments far out into the Oort cloud early in the evolution of our solar system, clearing the orbits of Jovian planets, the SEUSS-A concept proposes to use the Jovian giants as well as other planets to catapult asteroid fragments attached to propulsion units, transforming them into high energy kinetic-kill vehicles, precisely tailoring and aligning trajectories to intercept rogue bolides like near Earth asteroids or comets.

They are proposed to be commissioned with very long(TBD) operational life. The kinetic Kill propulsion device will utilize solid propellants because it is easily (and safely) stored for long periods of time. These systems will distributed around strategic as well as opportune "armament rich" locations in our solar system. Adaptability for the SEUSS-A architecture to move the propulsion systems to various locations provides another dimension in architectural flexibility to align the best intercept trajectories with rogue bolide at any time.

Lastly, additional areas for concept refinement and future studies include selection of the initial launch vehicle for of these kinetic kill systems, identification of a range of asteroidal assets in strategic locations around the solar system including suitable, strategic Trojan/Hilda/Greek asteroid fragments in Jovian orbital system, extremely long-life, agile and reliable spacecraft systems, and a robust and secure communication architecture for the kill vehicles. In addition, other factors such as orbital geometry and intercept trajectory as well as precise “Earth miss” transit window and distance analysis will be employed to determine the final deflection strategy. Complex missions flown in the past including the Deep Impact mission to Tempel 1, Muses-C/Hayabusa to asteroid Itokawa, Stardust and various asteroid and comet rendezvous missions and the current Dawn and New Horizons spacecrafts as well as the Rosetta mission that successfully touched down the Philae lander on Comet 67 P/Churyumov-Gerasimenko in November 2014 are all examples of architectures that allow insight into project SEUSS-A design and execution strategy