Mars Safeguarding Through Asteroid Redirection Spacecraft (STARS) Mission

Background

In September 2022, NASA's space-based Double Asteroid Redirection Test (DART) mission successfully tested a *spacecraft impactor* concept on a real asteroid named *Dimorphos*. They used the *kinetic impact* of having the DART spacecraft forcefully, deliberately collide with the asteroid to redirect its trajectory. Post-collision analysis showed the collision itself did have some effect, but the plume of *ejecta*—dust and small rocks—the impact displaced changed the asteroid's trajectory much more significantly.

A large enough "Near Earth Object" (NEO), such as an asteroid, on a collision course with Earth could pose a significant threat to mankind. Manned missions to Mars might encounter a similar situation, creating the need to protect the Red Planet from significant "Near Mars Objects" (NMOs). Using a system similar to DART could be the answer.

For thirty years running, the STEM Academy's Mission to Mars activity for fifth graders has used real-world space technology advancements to create mission objectives for a simulated trip to Mars.

This Year's Mission Objective

Mission to Mars scientists and engineers will use technology similar to NASA's DART to protect those living and working on Mars. To that end, they are undertaking the **Safeguarding Through Asteroid Redirection Spacecraft (STARS) Mission**.

The key focus of this mission is to install and test a system capable of deploying up to thirty STARS impactors towards any asteroids on a path that may bring them too close to Mars. The system will use an adaptive optics telescope to identify approaching NMOs and determine if they pose a threat to Mars. If necessary, one or more STARS impactors will be dispatched to the NMO to safely direct it away from the Red Planet.

Personnel supporting the **2023-2024 Mars STARS Mission** *(hey, that rhymes!)* will require a colony of long-term living quarters and food on Mars. Fifth grade students participating in this year's Mission to Mars will plan and build the necessary facilities and life support resources, and present them at the culminating Link-Up Day event in the spring.

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