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Title of Paper	NASA's Near Earth Asteroid Scout Mission
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Abstract

NASA is developing solar sail propulsion for a near-term Near Earth Asteroid (NEA) reconnaissance mission and laying the groundwork for their future use in deep space science and exploration missions. The NEA Scout mission, funded by NASA's Advanced Exploration Systems Program and managed by NASA MSFC, will use the sail as primary propulsion allowing it to survey and image one or more NEA's of interest for possible future human exploration. NEA Scout uses a 6U cubesat (to be provided by NASA's Jet Propulsion Laboratory), an 86 m² solar sail and will weigh less than 14 kilograms.

The solar sail for NEA Scout will be based on the technology developed and flown by the NASA NanoSail-D and The Planetary Society's Lightsail-A. Four ~7 m stainless steel booms wrapped on two spools (two overlapping booms per spool) will be motor deployed and pull the sail from its stowed volume. The sail material is an aluminized polyimide approximately 3 microns thick.

NEA Scout will launch on the Space Launch System (SLS) first mission in 2018 and deploy from the SLS after the Orion spacecraft is separated from the SLS upper stage. The NEA Scout spacecraft will stabilize its orientation after ejection using an onboard cold-gas thruster system. The same system provides the vehicle ΔV sufficient for a lunar flyby. After its first encounter with the moon, the 86 m² sail will deploy, and the sail characterization phase will begin. A mechanical Active Mass Translation (AMT) system, combined with the remaining ACS propellant, will be used for sail momentum management. Once the system is checked out, the spacecraft will perform a series of lunar flybys until it achieves optimum departure trajectory to the target asteroid. The spacecraft will then begin its two year-long cruise.

About one month before the asteroid flyby, NEA Scout will pause to search for the target and start its approach phase using a combination of radio tracking and optical navigation. The solar sail will provide continuous low thrust to enable a relatively slow flyby of the target asteroid under lighting conditions favorable to geological imaging.

Once complete, NASA will have demonstrated the capability to fly low-cost, high ΔV cubesats to perform interplanetary missions.