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NEAR EARTH ASTEROID SCOUT - EXPLORING ASTEROID 1991VG USING A SMALLSAT

Abstract

After its deployment from NASA's Space Launch System (SLS) in 2020, the Near Earth Asteroid (NEA) Scout mission will image Asteroid 1991VG on a close flyby using an 86m² solar sail as its primary propulsion. NEA Scout, with a 6U CubeSat form factor, is one of several secondary CubeSat payloads to be deployed from SLS on its maiden flight. The NEA Scout will be ejected from the SLS on a trajectory toward the moon and will use its onboard cold gas propulsion system to attain an elliptical lunar orbit. Once the spacecraft is in orbit, the solar sail will deploy and spacecraft checkout will begin. The NEA Scout will remain in the lunar vicinity until the low-thrust trajectory to the destination asteroid, 1991VG, or another NEA of interest, can be attained. The spacecraft will then begin its 2.0 – 2.5 year journey to the asteroid. About one month before the asteroid flyby, NEA Scout will 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 (10-20 m/s) of the target asteroid under lighting conditions favorable to geological imaging (>50 degree phase angle). Once the flyby is complete, and if the system is still fully functioning, an extended mission will be considered – the reconnaissance of another asteroid or a re-flyby of 1991VG several months later are both options. NEA Scout is funded by the NASA Human Exploration and Operations Mission Directorate.