



Near Earth Asteroid Scout Mission Update

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Near Earth Asteroid Scout Mission Overview



The Near Earth Asteroid Scout Will

- Image/characterize a NEA during a slow flyby (~m/s)
- Demonstrate deployment and navigation using a solar sail

Key Spacecraft & Mission Parameters

- 6U CubeSat
- ~86 m² solar sail propulsion system
- Manifested for launch on the Space Launch System Artemis 1, in 2021
- 1 AU maximum distance from Earth

Leverages: combined experiences of MSFC and JPL with support from GSFC, JSC, & LaRC



Target Reconnaissance with medium field imaging Shape, spin, and local environment



Close Proximity Imaging Local scale morphology, terrain properties, landing site survey



NEA Scout Approximate Scale



Deployed Solar Sail

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Near Earth Asteroid Scout Science Overview





1. Target Detection and Approach: 50K km, Light source observation SKGs: Ephemeris determination and composition assessment 2. NEA Reconnaissance <100 km distance at encounter 50 cm/px resolution over 80% surface SKGs: volume, global shape, spin properties, local environment 3. Close Proximity Science High-resolution imaging,
 10 cm/px over >30% surface
 Strategic Knowledge Gaps
 (SKGs): Local morphology Regolith properties



JPL

Baseline Target Asteroid





- Target changes with launch date and trajectory baseline from SLS
- Current target is 2019 GF1
- Available for launch dates from August 2021 thru February 2022

NASA

Concept of Operations Overview





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Flight System Overview

NEAS	cout

Payload	 Updated OCO3 Context Camera 	
Mechanical & Structure	 "6U" CubeSat form factor <14 kg total launch mass Modular flight system concept 	
Avionics	 Radiation tolerant architecture 	
Electrical Power System	 Deployable solar arrays with GaAs cells (~51.2 W EOL at 1 AU solar distance) 6.2 Ah Battery 10 -12.3 V unregulated, 5 V regulated 	
Telecom	 JPL Iris 2.1 X-Band Transponder; 4 W RF output power, supports doppler, ranging, and D-DOR 2 pairs of INSPIRE-heritage LGAs (RX/TX) 8x8 element microstrip array MGA (TX); ~1 kbps to 34m DSN at 0.8 AU 	
Attitude Control System	 15 mNm-s (x4) Active mass translation system VACCO R-236fa (refrigerant gas) Reaction Control System Nano StarTracker, Coarse Sun Sensors & MEMS IMU for attitude determination 	
Propulsion	 ~86 m² aluminized CP-1 solar sail (based on NanoSail-D2) 	





Assembly, Integration, and Test (AI&T) Overview







Solar Sail Construction and Deployment



Credit: Planetary Society, Jason Davis







NASA

Avionics Box Delivery – August 2019





Full Spacecraft Integration







NEAS Status Summary

NEA

- Spacecraft integration ~95% complete, delayed by pandemic
 - Awaiting final installation of solar panels
- System level testing planned to begin once integration is complete
 - Functional
 - EMI/EMC
 - Vibration
 - Thermal Vacuum
 - Day in the Life
- Delivery to SLS/ Tyvak for flight







