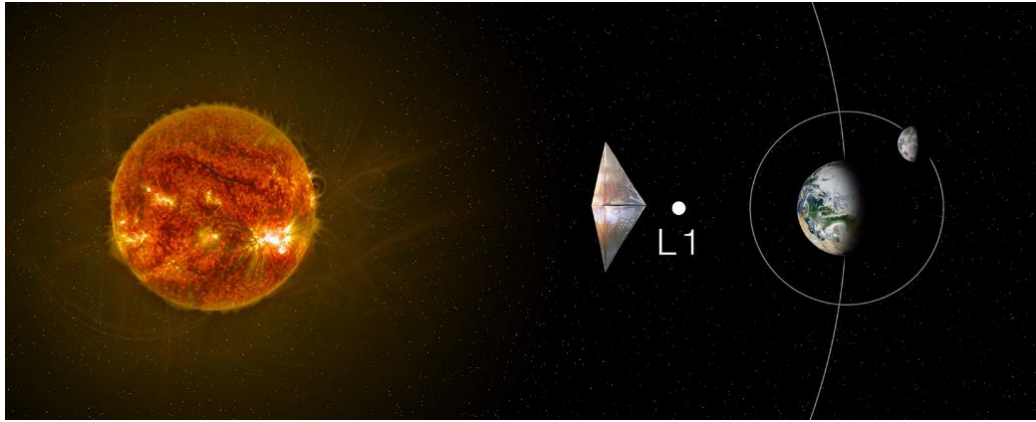




Solar Cruiser

PI: Les Johnson/NASA MSFC



Mission

Solar Cruiser will mature solar sail propulsion technology to enable near-term, compelling space missions for Heliophysics science, NASA, and other users.

Solar Cruiser will launch as a secondary payload on the NASA IMAP mission in 2025. Using a solar sail, it will cruise past Sun-Earth L-1, demonstrating a solar sail's ability to fly a non-Keplerian trajectory, perform propellantless station keeping at an artificial equilibrium point (sub L-1), change heliocentric inclination, and demonstrate other solar sail propulsion unique maneuvers.

Mission Technology Goal

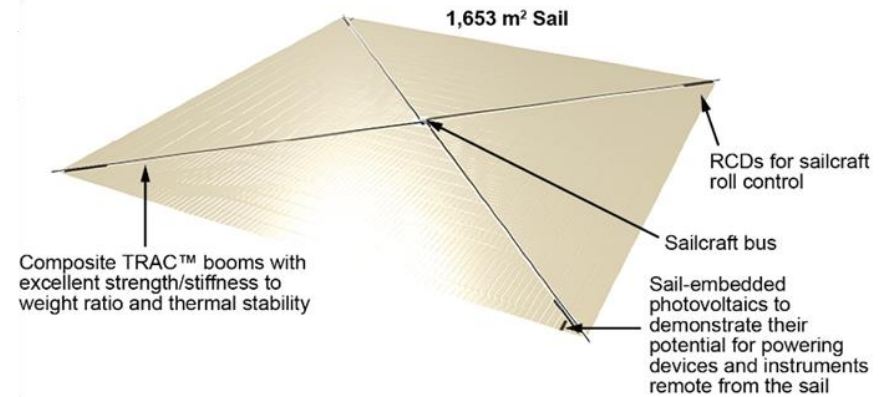
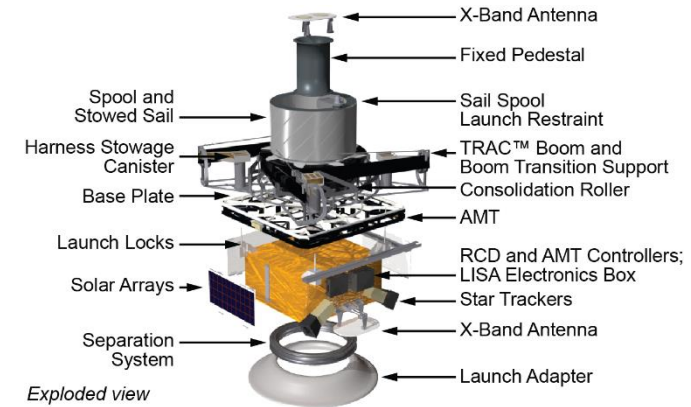
Demonstrate solar sail propulsion technology to enable near- and mid-term Heliophysics science missions up to and including high solar inclination orbits, sub-L1 halo orbits, non-Keplerian solar and other planetary orbits. Specifically, mission goals include demonstrating:

- Solar sail operation
- Sailcraft pointing control and stability
- Scalability of sail technologies
- Sail-embedded photovoltaic power generation



Mission Design Details

- Access to Space: Rideshare with IMAP
- Orbit: Sub Sun-Earth-L1 artificial halo orbit (Periodic Northern Halo with an out of plane amplitude of 179517 km, Beta = 0.0202)
- Systems: One spacecraft propelled by a 1653 m² solar sail
- Operations: Mission Operations Center (MOC) at NASA MSFC



Solar Sail Technical Details

- Deployed Area: 1653 m²
- Fabric: 2.5 micron thick Colorless Polyimide-1
- Composite Boom Lengths (X4): 29.5 m each
- Characteristic Acceleration: >0.12 mm/s²

- Momentum Management: Reaction Wheels, Active Mass Translation (AMT), Reflective Control Devices (RCDs)
- Embedded Photovoltaic Power Generation