



IMAP

INTERSTELLAR MAPPING AND ACCELERATION PROBE

Exploring Our Solar Neighborhood and Its Space Weather

THE MISSION

NASA's Interstellar Mapping and Acceleration Probe (IMAP) will study our heliosphere, decoding the messages in particles from the Sun and beyond and providing vital space weather insights. Like a modern-day celestial cartographer, the mission will map the boundaries of the heliosphere — the electromagnetic bubble surrounding the Sun and planets that is inflated by the solar wind and shields our solar system from cosmic radiation.

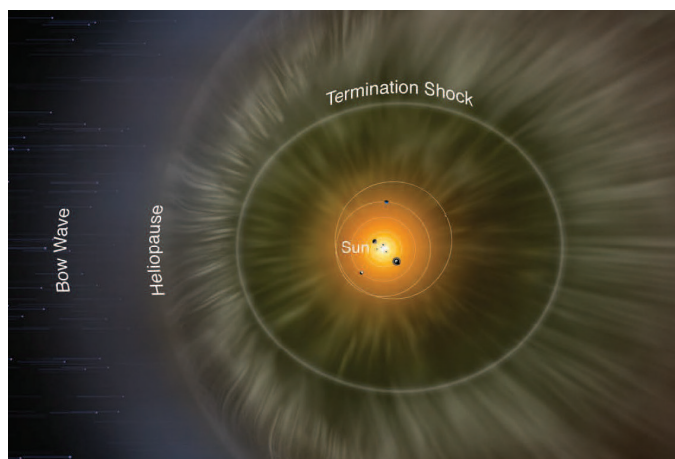
IMAP will investigate and chart the vast range of particles in interplanetary space, helping to investigate how charged particles from the Sun are energized and how the solar wind interacts with interstellar space at the heliosphere's boundary, while continually monitoring space weather to protect space explorers and critical satellite infrastructure.

The mission will answer several important questions about the heliosphere and our place in the galaxy, including exploring what causes some solar particles to get accelerated to nearly the speed of light, and how we can predict when these incidents occur to better protect satellites and astronauts in space.

Orbiting the Sun at a location called Lagrange Point 1 (L1) — about 1 million miles from Earth toward the Sun — IMAP can provide roughly 30 minutes' warning of incoming harmful radiation.

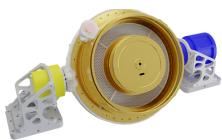
WHAT IS THE HELIOSPHERE?

The heliosphere is the bubble made by charged particles and the magnetic field from our Sun that surrounds our solar system. It is created by the outward-flowing plasma, called the solar wind, that blows against the material between surrounding stars, or the interstellar medium. The heliosphere shields our solar neighborhood from harmful radiation coming from across the galaxy. The IMAP mission will examine how the solar wind and interstellar medium interact through the heliosphere's boundary, an important study in the field of heliophysics.

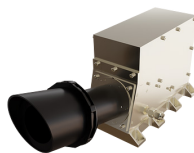


THE SPACECRAFT AND INSTRUMENTS

IMAP will feature a comprehensive set of 10 instruments, equipped to observe different particles, electromagnetic fields, and ultraviolet light across a vast range of energies.



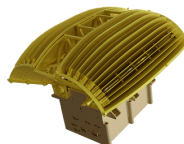
IMAP-Lo: Imager measuring and mapping low-energy energetic neutral atoms (ENAs), particles created where the solar wind and interstellar medium meet, as well as interstellar neutral particles from beyond the solar system



GLOWS: Photometer investigating the ultraviolet glow created by the solar wind to understand how it evolves over time



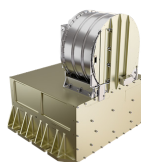
IMAP-Hi: Imager measuring and mapping medium-range ENAs from the edge of the heliosphere



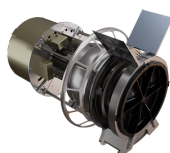
IMAP-Ultra: Imager measuring and mapping ENAs at their highest range from the edge of the heliosphere



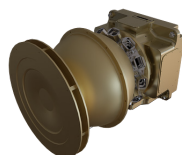
Mag: Magnetometer that will measure the interplanetary magnetic field that originates from the Sun



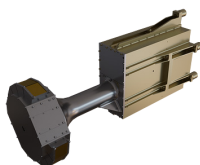
SWE: Instrument used to measure electrons found in the solar wind



SWAPI: Instrument designed to measure ions from the solar wind and particles from beyond the solar system



CoDICE: Instrument designed to measure the mass and electric charge of ions originating from both interstellar space and the solar wind



HIT: Particle telescope studying high-energy ions that come from the solar wind and deep space



IDEX: Instrument measuring the composition of interstellar and interplanetary dust particles

IMAP QUICK FACTS

SPACECRAFT WEIGHT: 1,757 pounds (797 kilograms)

SPACECRAFT DIAMETER: 8 feet (2.4 meters)

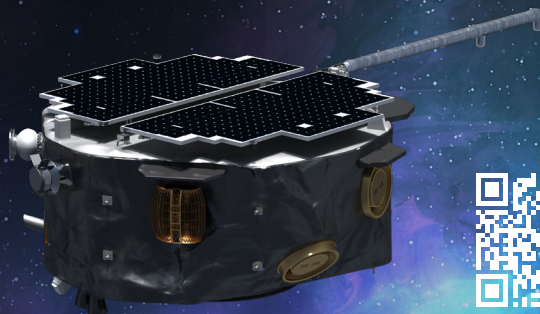
INSTRUMENTS: 10

LAUNCH: 2025

DESTINATION: Earth–Sun Lagrange Point 1 (L1)
(1 million miles from Earth toward Sun)

LENGTH OF TRIP TO L1: 108 days

PRIME MISSION DURATION: 2 years



Learn more about IMAP at
imap.princeton.edu