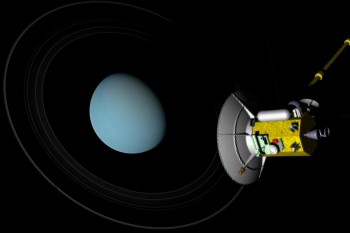


OCEANUS

Multi-Spacecraft Flagship Mission Concept to Explore Uranus and Saturn



A conceptual Uranus and Saturn flagship mission design developed by the Astronautical engineering students of Purdue University.

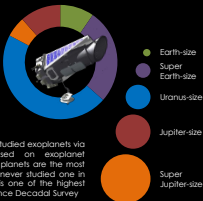
The Ice Giants

Uranus belongs to a class of planets called ice giants. "Ice" in this context refers to volatile materials that are solid at the low temperatures of the outer Solar System (e.g., water, ammonia, and methane).

Humankind's last close encounter with the Ice Giants was when NASA's Voyager 2 spacecraft made its closest approach on January 24, 1986.

In the 30 years since Voyager, we have studied exoplanets via the Kepler space observatory. Based on exoplanet observations we believe ice giant-sized planets are the most common type of planet, yet we have never studied one in great detail. Thus, a mission to Uranus is one of the highest priority missions as per the Planetary Science Decadal Survey.

Exoplanets Commonality by Size



Science Overview

OCEANUS major science goals:

- Validate planetary formation models
- Explore unusual magnetosphere of Uranus
- Study unknown atmospheric conditions
- Determine the origin of Rings and Satellites
- Determine the interior structure

To carry out these objectives, OCEANUS carries a complement of 9 dedicated scientific instruments, as well as two probes which will descend into Saturn's and Uranus' atmospheres.

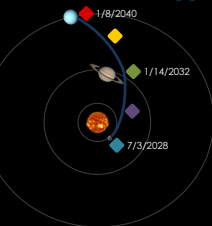


Saturn Probe Opportunity

Along the route to Uranus, OCEANUS passes by Saturn and performs a gravity assist, which is an opportunity to deploy a probe.

A probe has never been deployed into Saturn, so OCEANUS mission provides a unique opportunity to study Saturn's atmosphere in detail.

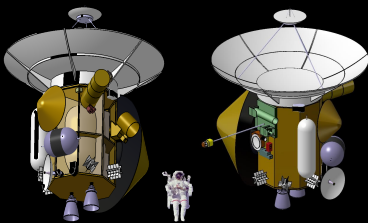
Mission Trajectory



- OCEANUS is launched from Earth.
- 130 days before the Saturn flyby, the first probe is released.
- OCEANUS performs a gravity assist at Saturn, placing the orbiter on a trajectory to Uranus.
- 130 days before the Uranus arrival, the second probe is released.
- OCEANUS arrives at Uranus and captures into a 20 day science orbit.

OCEANUS Spacecraft

Uranus Orbiter (shown with probes)



Shared probe design

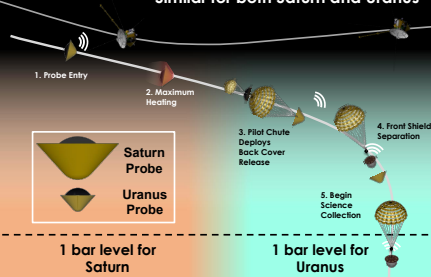
Why "OCEANUS"?

In Greek mythology, Oceanus was the firstborn son of Gaia and Ouranos. He was revered by the Ancient Greeks as the divine symbol of the Ocean, or the waters beyond the Mediterranean Sea.

In the Roman names, "Ouranos" is Uranus, and "Gaia" is the goddess associated with the Earth, and remembering Kronos (Saturn) is the brother of Oceanus, it became natural to name our mission OCEANUS.

Probe Operations

Similar for both Saturn and Uranus



1 bar level for Saturn

1 bar level for Uranus