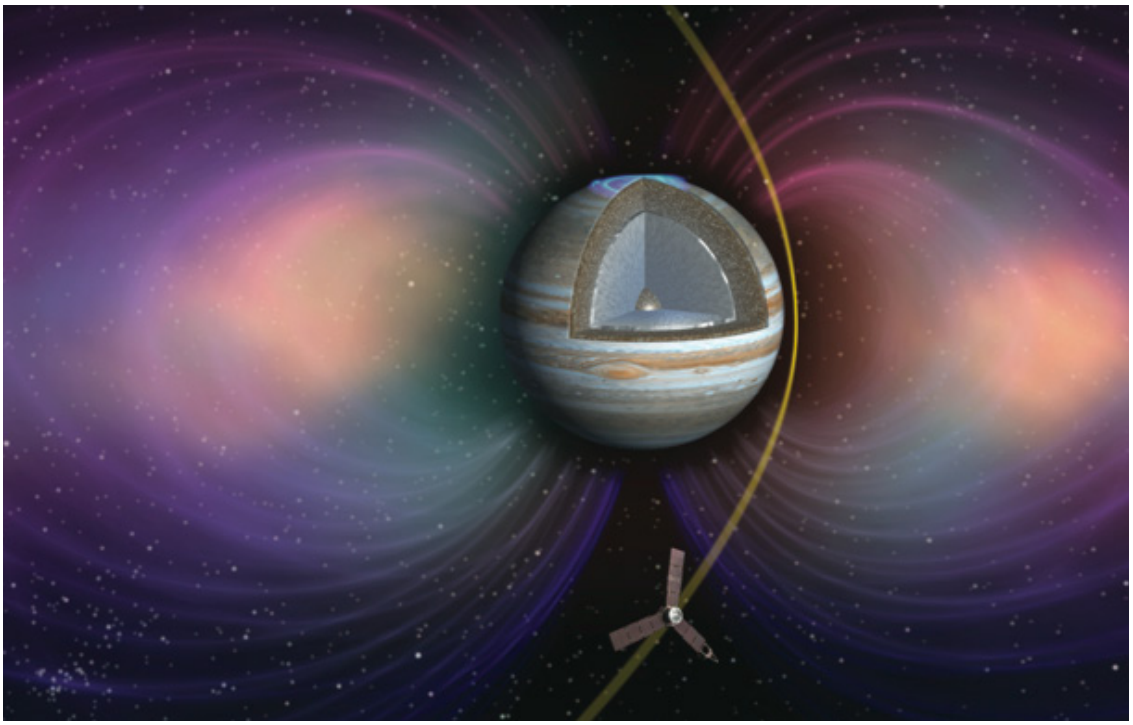
National Aeronautics and Space Administration

NASAfacts

Juno Mission to Jupiter



Unlocking Jupiter's Secrets

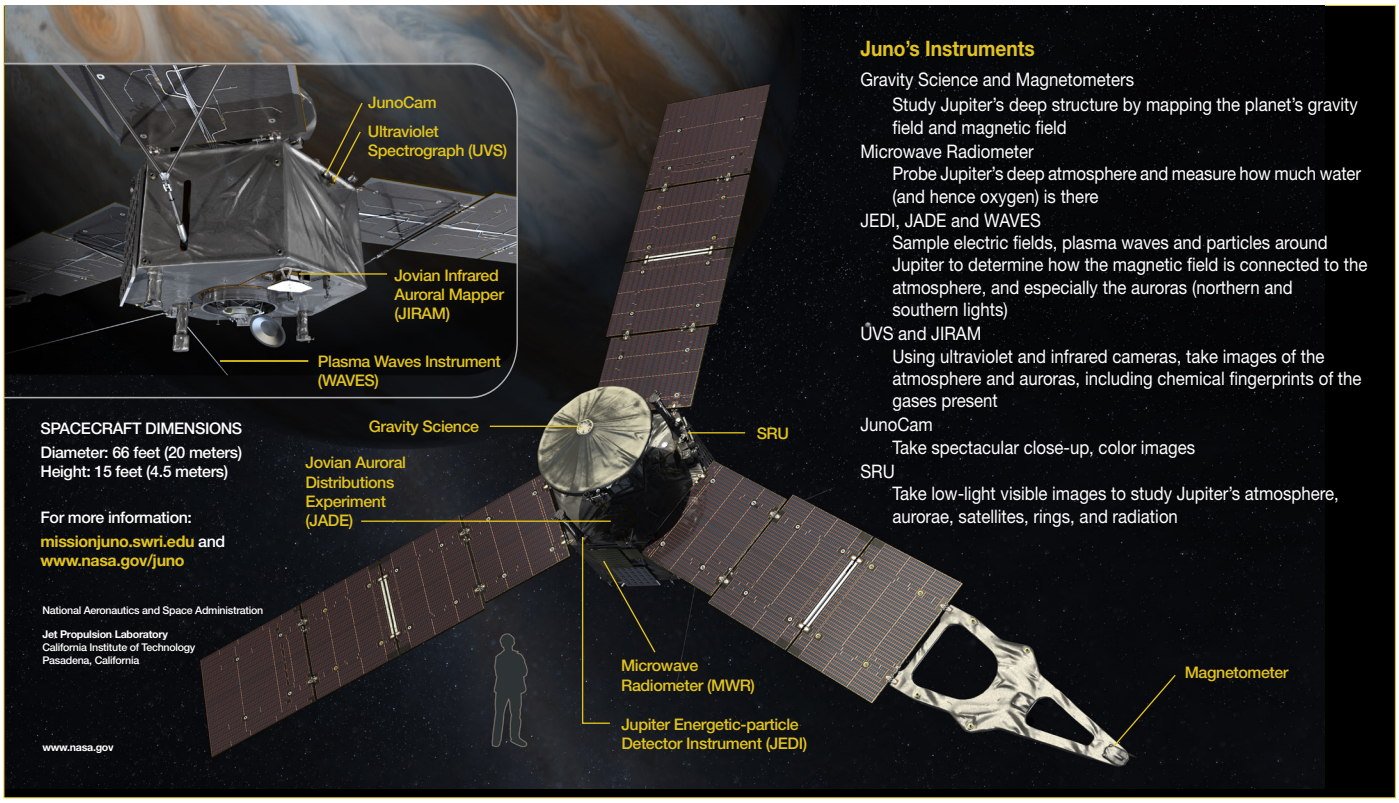
On August 5, 2011, NASA's Juno spacecraft embarked on a 5-year journey to our solar system's largest planet — the gas giant Jupiter. Its mission: to probe beneath the planet's dense clouds and answer questions about the origin and evolution of Jupiter, our solar system, and giant planets in general across the cosmos. Juno arrived at Jupiter on July 4, 2016, after a 5-year, 1.7-billion-mile journey, and settled into a 53-day polar orbit stretching from just above Jupiter's cloud tops to the outer reaches of the Jovian magnetosphere.

Juno's discoveries have revolutionized our understanding of Jupiter and solar system formation. During the prime mission's 35 orbits of Jupiter, Juno collected more than three terabits (375 gigabytes) of science data and provided dazzling views of Jupiter and its satellites, all processed by citizen scientists with NASA's first-ever camera dedicated to public outreach. Juno's many discoveries have changed our view of Jupiter's atmosphere and interior, revealing an atmospheric weather layer that extends far beyond its clouds and a deep interior with a diluted, or "fuzzy," heavy element core. Near the end of the prime mission, as the spacecraft's orbit evolved, flybys of the moon Ganymede initiated Juno's transition into a full Jovian system explorer.

Extended Mission

Now in its extended mission, the agency's most distant planetary orbiter continues its investigation of the solar system's largest planet through September 2025, or until the spacecraft's end of life. The extended mission's science campaigns expand on discoveries Juno has already made about Jupiter's interior structure, internal magnetic field, atmosphere (including polar cyclones, deep atmosphere, and auroras), and magnetosphere. Jupiter's enigmatic Great Blue Spot — an isolated patch of intense magnetic field near the planet's equator – is the target of a high-spatial-resolution magnetic survey during six flybys early in the extended mission.

Juno is now an explorer of the full Jovian system. As the spacecraft's orbit continues to evolve, additional flybys of the moons Europa



and Io are planned. Juno will also fly through the Europa torus and the Io torus. These are doughnut-shaped clouds of charged particles that surround each moon's orbit. The spacecraft will pass through the tori on multiple occasions, characterizing the radiation environment near these satellites to better prepare NASA's Europa Clipper mission and the European Space Agency's JUICE mission for optimizing observation strategies and planning, science priorities, and mission design. The extended mission also adds a study of dust in Jupiter's faint rings to Juno's extensive list of science investigations.

A Solar-Powered, Spinning Spacecraft

Jupiter's orbit is five times farther from the Sun than Earth's, so the giant planet receives 25 times less sunlight than Earth. Juno is the first solar-powered spacecraft designed by NASA to operate at such a great distance from the Sun, thus the surface area of solar panels required to generate adequate power is quite large. Three solar panels extend outward from Juno's hexagonal body, giving the overall spacecraft a span of about 66 feet (20 meters). Before launch, the solar panels were folded into four-hinged segments so that the spacecraft could fit into the payload fairing of its rocket.

For Juno, spinning makes the spacecraft's pointing extremely stable and easy to control. Just after launch, and before its solar arrays were deployed, Juno was spun-up by rocket motors on its still attached second-stage rocket booster. In orbit at Jupiter, the spinning spacecraft sweeps the fields of view of its instruments through space once for each rotation. At two rotations per minute, the instruments' fields of view sweep across Jupiter about 240 times in the two hours it takes to fly from pole to pole.

Electronics Vault

Juno avoids Jupiter's highest radiation regions by approaching over the north, dropping to an altitude below the planet's radiation belts — which are analogous to Earth's Van Allen belts, but far more deadly — and then exiting over the south. To protect sensitive spacecraft electronics, Juno carries the first radiation shielded electronics vault, a critical feature for enabling sustained exploration in such a heavy radiation environment.

Launch	August 5, 2011
Deep Space Maneuvers	August/September 2012
Earth Flyby Gravity Assist	October 2013
Jupiter Arrival	July 2016
Extended Mission	August 2021
End of Mission	September 2025

National Aeronautics and Space Administration

Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California

www.nasa.gov

JPL 400-1738 4/22

For more information about JUNO, visit: **nasa.gov/juno** and **missionjuno.swri.edu**