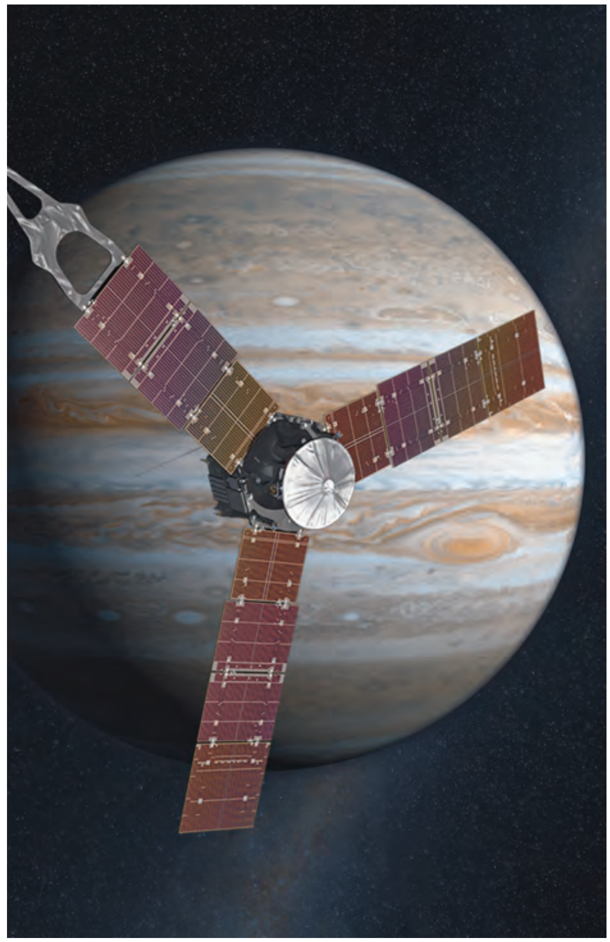
National Aeronautics and Space Administration

NASA Facts

Juno Mission to Jupiter

Juno's primary goal is to reveal the story of the formation and evolution of the giant planet Jupiter. Using a microwave observational technique for the first time, Juno detects the thermal radiation from several layers deep below the clouds simultaneously. This allows Juno to determine the all-important water abundance. The motion of the spacecraft near Jupiter provides information on Jupiter's gravity field, whether a solid core exists and how the giant planet rotates. Multiple orbits provide Juno the ability to precisely measure the magnetic field and investigate its auroras—the strongest in the solar system. An understanding of the origin and evolution of Jupiter, as the archetype of giant planets, can provide the knowledge needed to understand the origin of our solar system and planetary systems around other stars.



Launch Period (Launch from Cape Canaveral)	August 2011
Earth Flyby (Earth Gravity Assist)	October 2013
Arrival at Jupiter	August 2016
End of Mission (Deorbit)	October 2017
Spacecraft Mass	3625 kg
Solar Arrays (3)	2.65 m x 8.9 m (435 W total at end of mission)

Science Objectives		Instrument
Atmospheric Composition and Dynamics	Measure the water and ammonia abundance in Jupiter's atmosphere	Microwave Radiometer (MWR) and Infrared Spectrometer/Imager (JIRAM)
Magnetic Field	Determine magnetic field and time variability	Fluxgate Magnetometer (MAG)
Gravity Field	Measure the gravity field to explore how mass is distributed inside the planet	X- & Ka-band uplink and downlink
Polar Magnetosphere	Explore and characterize the three-dimensional magnetosphere and auroras	Juno Energetic Particle Detector Instrument (JEDI), Jovian Auroral Distributions Experiment (JADE), Ultraviolet Spectrometer (UVS), Radio and Plasma Waves Experiment (WAVES), Infrared Spectrometer/Imager (JIRAM)
Visible Imaging Camera	Public processing of unprecedented close-up images of Jupiter and the first views of its poles	JunoCam

Jupiter

The largest planet in our solar system, Jupiter is more massive than all of the other planets combined. Composed mostly of hydrogen and helium, Jupiter resembles a star in composition. There are hundreds of Jupiter-like planets now being discovered in orbits around other stars, and the study of this strange and mysterious world will help us understand the formation of these planetary systems throughout our galaxy and beyond.

Jupiter's appearance is a tapestry of beautiful colors and atmospheric features. Most of the visible clouds are composed of ammonia. Water clouds exist deep below. Jupiter's "stripes" are created by strong east–west winds in the planet's upper atmosphere. Within these belts and zones are storm systems that can rage for decades. The Great Red Spot, a giant spinning storm, has been observed for more than 300 years.

The composition of Jupiter's atmosphere is similar to that of the Sun—mostly hydrogen and helium. Deep in the atmosphere, pressure and temperature increase, compressing the hydrogen gas into a liquid. At depths about a third of the way down, the liquid hydrogen becomes electrically conducting, like a metal. In this conducting layer, Jupiter's powerful magnetic field is generated by electrical currents driven by the planet's fast rotation in ways that we don't yet understand. At the center, the immense pressure may support a solid core more than ten times the mass of Earth.

Jupiter's enormous magnetic field traps swarms of charged particles (electrons and ions) whose high-speed motion around the planet creates immense currents that drive Jupiter's powerful auroras. The Jovian magnetosphere, comprising these particles and fields, balloons 1 million to 3 million kilometers (600,000 to 2 million miles) toward the Sun and tapers into a wind-sock-shaped tail extending more than 1 billion kilometers (600 million miles) behind Jupiter as far as Saturn's orbit. Jupiter's magnetosphere is thus the largest structure in the solar system, even larger than our Sun.

A Cassini view of Jupiter in 2000.

Jupiter has three thin rings around its equator that are fainter than the rings of Saturn. The rings appear to consist mostly of fine dust particles and may be formed by dust associated with the giant planet's four small inner moons.

Jupiter's four largest moons—Io, Europa, Ganymede, and Callisto—were discovered by Galileo in 1610. Io is the most volcanically active body in our solar system. Ganymede is the largest planetary moon and is the only moon in the solar system known to have its own magnetic field. Europa appears to possess a liquid water ocean beneath its frozen crust, and similar oceans may also lie within Callisto and Ganymede. Astronomers have discovered more than 60 moons orbiting the giant planet in total. Numerous small, outer moons may be asteroids captured by Jupiter's gravity.

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For more information about Juno, go to:
http://www.nasa.gov/juno
http://newfrontiers.nasa.gov/missions_juno.html