THE SPACECRAFT JUNO VISIT TO PLANET JUPITER

The JUpiter Near-polar Orbiter (Juno) is a NASA New Frontiers mission currently en route to the planet Jupiter. Juno was launched from Cape Canaveral Air Force Station on August 5, 2011 and will arrive on July 4, 2016.

The spacecraft is to be placed in a polar orbit to study Jupiter's composition, gravity field, magnetic field, and polar magnetosphere. Juno will also search for clues about how the planet formed, including whether it has a rocky core, the amount of water present within the deep atmosphere, how its mass is distributed, and its deep winds, which can reach speeds of 618 kilometres per hour. Juno will be the second spacecraft to orbit Jupiter, following the Galileo probe which orbited from 1995–2003.

Artist impression of the Juno spacecraft at Jupiter, with its 9 metres solar panels

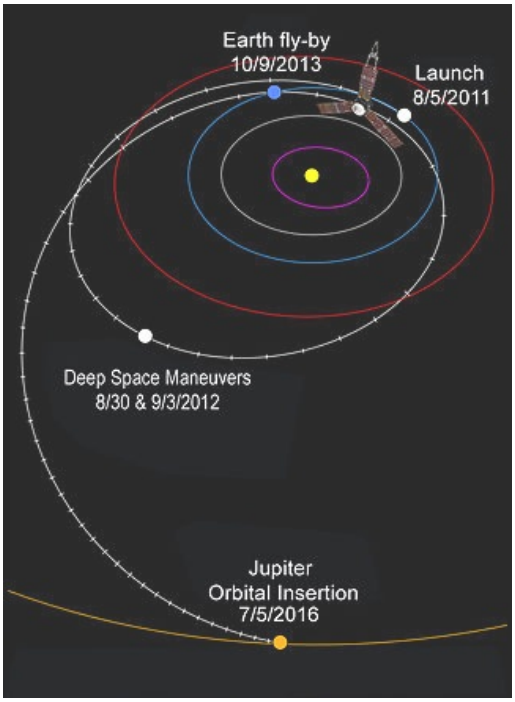
The spacecraft's name comes from Greco-Roman mythology. The god Jupiter drew a veil of clouds around himself to hide his numerous mischiefs, but his wife, the goddess Juno, was able to peer through the clouds and see Jupiter's true nature. Like its namesake, Juno will try to look into and though the clouds covering Jupiter to learn more about its true nature.

The Juno spacecraft is powered by solar arrays, commonly used by satellites orbiting Earth and working in the inner Solar System, whereas radioisotope thermoelectric generators are commonly used for missions to the outer Solar System and beyond. For Juno, however, three solar array wings, the largest ever deployed on a planetary probe, will play an integral role in stabilizing the spacecraft and generating power.

Testing one of the three Solar Panels in the workshop

Juno is on a five-year cruise to Jupiter, with arrival expected on 4 July 2016. The spacecraft's trajectory used a gravity assist speed boost from Earth, accomplished through an Earth flyby two years launch. After an orbit insertion burn to slow the spacecraft enough to allow capture by the planet, it will do two 53-day orbits before performing another burn that will bring it into a 14-day polar orbit.

Once in the 14-day orbit, infrared and microwave instruments will begin to measure the thermal radiation emanating from deep within Jupiter's atmosphere. These observations will complement previous studies of its composition by assessing the abundance and distribution of water, and therefore oxygen. This data will provide insight into Jupiter's origins. Juno will also investigate the convection that drives general circulation patterns in Jupiter's atmosphere. Other instruments aboard Juno will gather data about its gravitational field and polar magnetosphere as well as measurements of the orbital frame-dragging, known also as **Lense–Thirring precession** caused by the angular momentum of Jupiter. Frame dragging is a prediction of General Relativity, consisting of a precessions of the longitude of the ascending node of a test particle freely orbiting a central spinning mass endowed with angular momentum. **On Earth a Foucault pendulum would have to oscillate for 16000 years to precess 1 degree by the effect**



Juno's interplanetary trajectory, including Earth slingshot pass; tick marks at 30-day intervals

The Juno mission is set to conclude in February 2018 when the probe will burn up in Jupiter's outer atmosphere to avoid any possibility of contamination of one of its moons.

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