

NASA'S JUNO SET TO REACH HALFWAY MARK OF JUPITER MISSION

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This undated artist's rendering shows NASA's Juno spacecraft making one of its close passes over Jupiter. | Photo Credit: [AP](#)

NASA's solar-powered Juno spacecraft will soon reach the halfway point in data collection of Jupiter when it makes its 16th science pass of the gas giant, the U.S. space agency said.

On December 21, the Juno spacecraft will be 5,053 kilometers above Jupiter's cloud tops and hurtling by at speed of 207,287 kilometers per hour.

This will mark the spacecraft's halfway point in data collection during its prime mission, NASA said.

Juno is in a highly-elliptical 53-day orbit around Jupiter. Each orbit includes a close passage over the planet's cloud deck, where it flies a ground track that extends from Jupiter's north pole to its south pole.

"With our 16th science flyby, we will have complete global coverage of Jupiter, albeit at coarse resolution, with polar passes separated by 22.5 degrees of longitude," said Jack Connerney, Juno deputy principal investigator from the Space Research Corporation in the US.

"Over the second half of our prime mission — science flybys 17 through 32 — we will split the difference, flying exactly halfway between each previous orbit," said Mr. Connerney.

"This will provide coverage of the planet every 11.25 degrees of longitude, providing a more detailed picture of what makes the whole of Jupiter tick," he said.

Launched on August 5, 2011, the spacecraft entered orbit around Jupiter on July 4, 2016. Its science collection began in earnest on the August 27, 2016, flyby.

During these flybys, Juno's suite of sensitive science instruments probes beneath the planet's obscuring cloud cover and studies Jupiter's auroras to learn more about the planet's origins, interior structure, atmosphere and magnetosphere.

"We have already rewritten the textbooks on how Jupiter's atmosphere works, and on the complexity and asymmetry of its magnetic field," said Scott Bolton, principal investigator of Juno, from the Southwest Research Institute in the US.

"The second half should provide the detail that we can use to refine our understanding of the depth of Jupiter's zonal winds, the generation of its magnetic field, and the structure and evolution of its interior," said Mr. Bolton.

Two instruments aboard Juno, the Stellar Reference Unit and JunoCam, have proven to be useful not only for their intended purposes, but also for science data collection.

The Stellar Reference Unit (SRU) was designed to collect engineering data used for navigation and attitude determination, so the scientists were pleased to find that it has scientific uses as

well.

“We always knew the SRU had a vital engineering job to do for Juno,” said Heidi Becker, Juno’s radiation monitoring investigation lead at NASA’s Jet Propulsion Laboratory in the U.S.

“But after making scientific discoveries in Jupiter’s radiation belts and taking a first-of-its-kind image of Jupiter’s ring, we realised the added value of the data. There is serious scientific interest in what the SRU can tell us about Jupiter,” Ms. Becker said.

The JunoCam imager was conceived as an outreach instrument to bring the excitement and beauty of Jupiter exploration to the public.

“While originally envisioned solely as an outreach instrument to help tell the Juno story, JunoCam has become much more than that,” said Candy Hansen, Juno co-investigator at the Planetary Science Institute in the US.

“Our time-lapse sequences of images over the poles allow us to study the dynamics of Jupiter’s unique circumpolar cyclones and to image high-altitude hazes,” said Ms. Hansen.

“We are also using JunoCam to study the structure of the Great Red Spot and its interaction with its surroundings,” she said.

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