Voyager Bulletin

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Make that 14 Known Jovian Satellites

NEW MOON — A new moon of Jupiter, the white streak to the right, was revealed in this computer enhanced photograph taken by NASA's Voyager 2 spacecraft on July 8, 1979 as the spacecraft flew past the giant planet. The moon, called 1979J1, orbits at the edge of the Jupiter ring seen in this photo as a gray diagonal band across the picture. The other white streaks are star tracks. Both the track of the moon and the stars are the result of a long exposure.

NASA
National Aeronautics and
Space Administration
Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California

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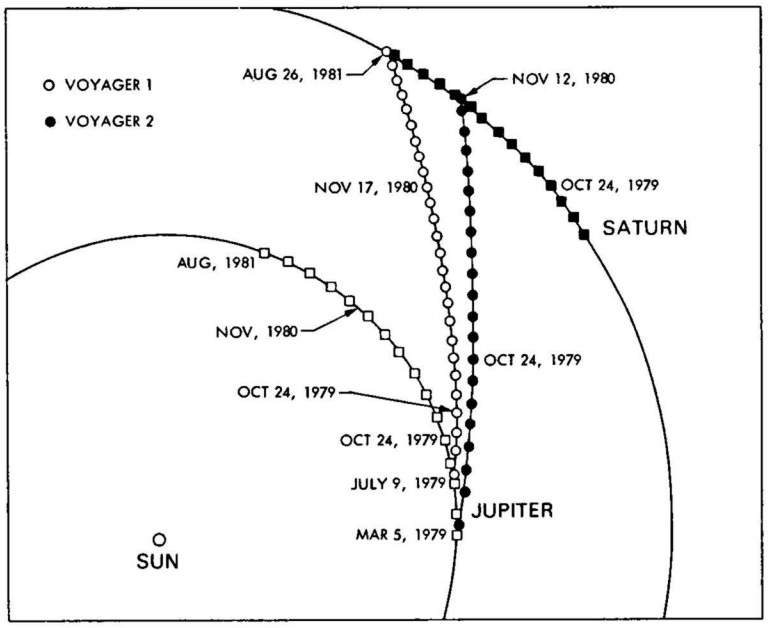

Make that 14 Known Jovian Satellites

Yet another phenomenon has been added to Voyager's already long list of discoveries – a fourteenth satellite at Jupiter.

The newly-identified satellite lies at the outer edge of the ring plane, but inside the orbit of Amalthea, at about 57,800 kilometers (36,000 miles) above Jupiter's cloud-tops. Estimated to be 30 to 40 kilometers (18 to 25 miles) in diameter, it has been temporarily designated 1979J1 (following the guidelines of the International Astronomical Union).

With an orbital period of 7 hours 8 minutes and a velocity of 30 kilometers per second (67,000 miles per hour), 1979J1 is the fastest moving satellite in the solar system.

Because of its proximity to the ring, there is speculation that the satellite may directly influence the composition of the ring by either supplying or sweeping out ring particles.

The discovery was made during analysis of photographs taken by Voyager 2 last July less than 24 hours before closest approach to the planet. Although the object in the photographs was initially thought to be a star trail, an exhaustive data search found no star in the vicinity. Another high resolution photograph of the same area showed the same portion of the ring, the same object, and trails of known stars. The differing angles and lengths of the star trails and the trail of the object led to verification that this was indeed a satellite.

Voyager Imaging Team member G. Edward Danielson of the California Institute of Technology (Caltech) and Caltech graduate student David Jewitt are credited with the discovery. The orbit was calculated independently by Jewitt and optical navigation engineer Stephen Synnott of JPL.

Another Caltech researcher, Charles T. Kowal, discovered Jupiter's 13th satellite in September 1974. Another possible moon may have been seen in Earth-based photos by Kowal several years ago and awaits confirmation.

UPDATE

Communications from Voyager 1 were temporarily lost on October 16 when the spacecraft did not acquire the star Canopus after a 22-hour cruise science maneuver. Cruise maneuvers are performed in a radio blackout since the antenna moves off Earth-line, but radio signals from the ship did not arrive at Earth when expected after the maneuver.

The cruise maneuver consists of steering the spacecraft through a series of 10 yaw and 25 roll turns to allow the fields and particles instruments to view the entire sky. Normally stabilized on three axes using the light intensities of the Sun and Canopus for reference, the spacecraft must lose lock on the star to perform the turns.

However, when the star tracker began its search for Canopus after the maneuver, it fixed on Alpha Centauri, mistaking it for Canopus. In this position, the antenna was pointed about 5° away from Earth.

When the situation was analyzed, the Tidbinbilla, Australia tracking station's powerful 80-kilowatt power carrier was used to send commands through the sidelobe of the spacecraft antenna to switch from the high gain antenna, which has a narrow beamwidth, to the wider beamwidth low gain antenna to make further commanding easier.

The spacecraft was then commanded to roll another 56.8 degrees. At the end of this roll, it was Earth-pointed and within 1 degree of Canopus. After the spacecraft signal was acquired at Earth, Voyager 1 was commanded to acquire Canopus as a reference star and to return to its high gain antenna.