Voyager Bulletin

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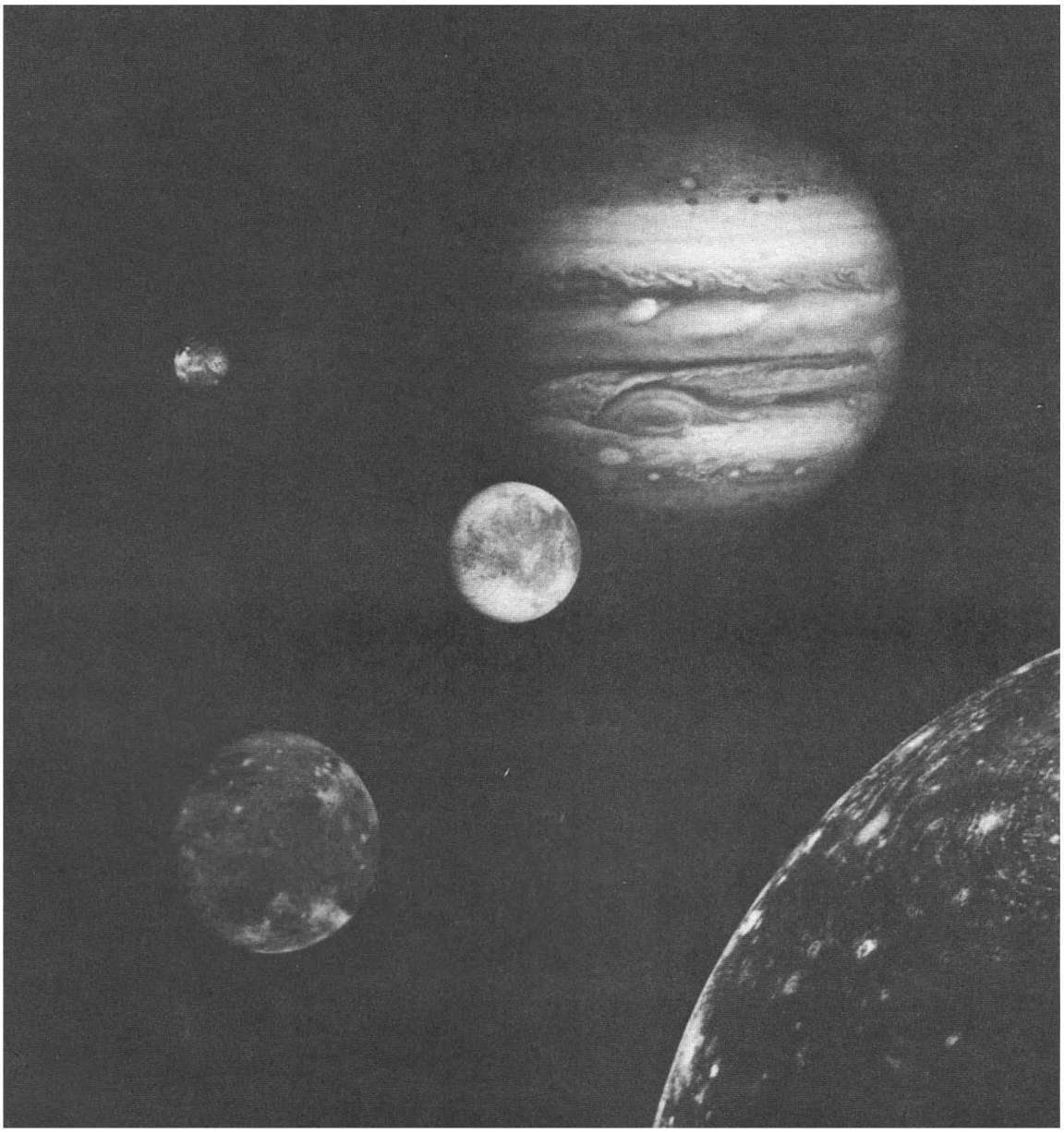

MINIATURE SOLAR SYSTEM — An artist's montage of Jupiter and its four largest satellites, the Galileans, shows the bodies in their relative positions, although not to scale with respect to Jupiter. Startling new discoveries by Voyager 1 have resulted in additions to Voyager 2's mission design, including observations of a faint particle ring encircling Jupiter and a time-lapse sequence of Io and its eight active volcanoes. Voyager 2 will see opposite faces of the satellites than seen in March by Voyager 1, first encountering the outermost Galilean, Callisto, (lower right) then Ganymede, Europa (center), Amalthea (not shown), Jupiter, and lastly Io (left).

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Voyager 2: Jupiter Minus 10 Days

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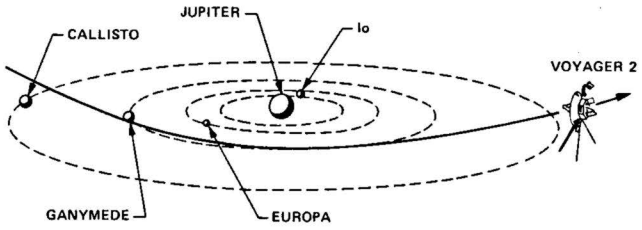


Voyager 2's Swing through the Jovian System – July 8-10, 1979.

Voyager 2 Highlights

For the last nine weeks, Voyager 2 has been following much the same routine as Voyager 1 did during its inbound flight to Jupiter: daily imaging of Jupiter converting to mosaicking as the planet's diameter grew too large to be captured in a single narrow-angle frame; daily scans of the satellite system in the ultraviolet; periodic tests and calibrations; infrared composition searches; and monitoring of the interplanetary medium surrounding the spacecraft.

Voyager 2's close encounters will be distinctly different, however. The second craft will make its closest approaches to Callisto, Ganymede, Europa, and Amalthea before encountering Jupiter, unlike the first Voyager which encountered all of the satellites after Jupiter closest approach.

Voyager 2 will make its Jupiter pass deep in the southern hemisphere, unlike Voyager 1 which flew by just south of the equator.

The two trajectories are unique and were designed for specific observations at both Jupiter and Saturn. Since Voyager 2 could be destined for a Uranus flyby in 1986, it has been targeted to fly further from Jupiter and its intense radiation than did Voyager 1. For this reason, Voyager 1 will not have a close flyby of Io.

Several highlights of the Voyager 2 near encounter include:

– High-resolution pictures of Europa, about ten times better than the March photos. Voyager 1 showed Europa to be laced with huge, intersecting linear features, even from a range of nearly 2 million kilometers.

– Ring observations, crossing the ring plane twice and making observations before and during each crossing. An attempt will be made to obtain a color picture of the thin ring of particles circling Jupiter.

– An Io "volcano watch", ten-hours of intensive imaging of Io to possibly provide a brief time-lapse history of erupting volcanoes on the satellite. The eruptions will probably not be evident as the pictures are received from the spacecraft but will require processing and color reconstruction.

Voyager 2 Operations

A final tweaking of Voyager 2's flight path before encounter was accomplished on June 27. The next trajectory correction, shortly after closest approach to Jupiter on July 9, will use the planet's gravity to slingshot the spacecraft towards Saturn.

After a two-month-long heat soak designed to retard further degradation of bonding material in the infrared interferometer spectrometer (IRIS), the instrument was turned on June 21 and is operating as planned. On the approach to the Jovian system, IRIS is measuring temperature differences in specific satellites as they disappear into Jupiter's shadow and then reappear into sunlight. IRIS is also measuring the energy budgets of specific satellites.

On June 24, the spacecraft was maneuvered off the earth line to allow ultraviolet observations across Io's orbit to measure vertical space above and below the satellite system.

The fields and particles instruments – the magnetometers, and plasma, low-energy charged particle, and cosmic ray detectors – continue to monitor interplanetary space and are detecting Jupiter's presence.

The spacecraft is expected to cross the bowshock for the first time about July 5, about 4.5 million kilometers from the planet. The bowshock is the line at which the supersonic stream of particles from the sun (the solar wind) meets the subsonic particles trapped by the planet's gravity field. Voyager 1 crossed the bowshock five times as the solar pressure varied.

The planetary radio astronomy and plasma wave experiments are also receiving strong indications of Jupiter's effect on its environs.

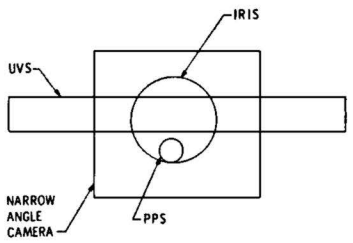
Photometry of Io and Europa this weekend will characterize and map the sodium distribution.

Summary

Ten days before its closest approach to Jupiter, Voyager 2 is 9.5 million km (5.9 million mi) from the giant planet, travelling with a heliocentric velocity of 9.9 km a second (22 thousand miles an hour). The pull of Jupiter's gravity will steadily accelerate it until it surpasses 27 km a second (60 thousand miles an hour) soon after closest approach to the planet. The effect of Jupiter's gravity will curve the spacecraft's trajectory, enabling its course to be set toward Saturn.

Radio signals now require about 51 minutes to travel one way between Earth and Voyager 2.

The lead ship, Voyager 1, is now about 113 million km (70 million mi) beyond Jupiter, travelling with a heliocentric velocity of about 23 km a second (51 thousand miles per hour) since its boost by Jupiter's gravity. Radio signals between earth and the ship travel 54 minutes.



FIELDS OF VIEW – The fields of view of the optical instruments on Voyager 2's scan platform overlap so their data can be correlated.