

MISSION STATUS BULLETIN

VOYAGER

January 16, 1978



No.14

"We have put our ships into the cosmic ocean. The waters are benign and we have learned to sail. No longer are we bound to our solitary island . . . Earth!"
— Carl Sagan

"So far we have satisfied all of our objectives . . . thanks to all of you. I look forward with excitement to the discoveries that Voyager holds in store for us."
— John Casani
Outer Planets Project Manager
Jet Propulsion Laboratory

"The development of a spacecraft with the engineering and scientific sophistication and capability of Voyager extends engineers, scientists, and managers to the frontiers of creativity and technology . . . Congratulations to the Voyager Team. . ."

— A. Thomas Young
Director, Lunar and Planetary Programs, NASA Office of Space Sciences



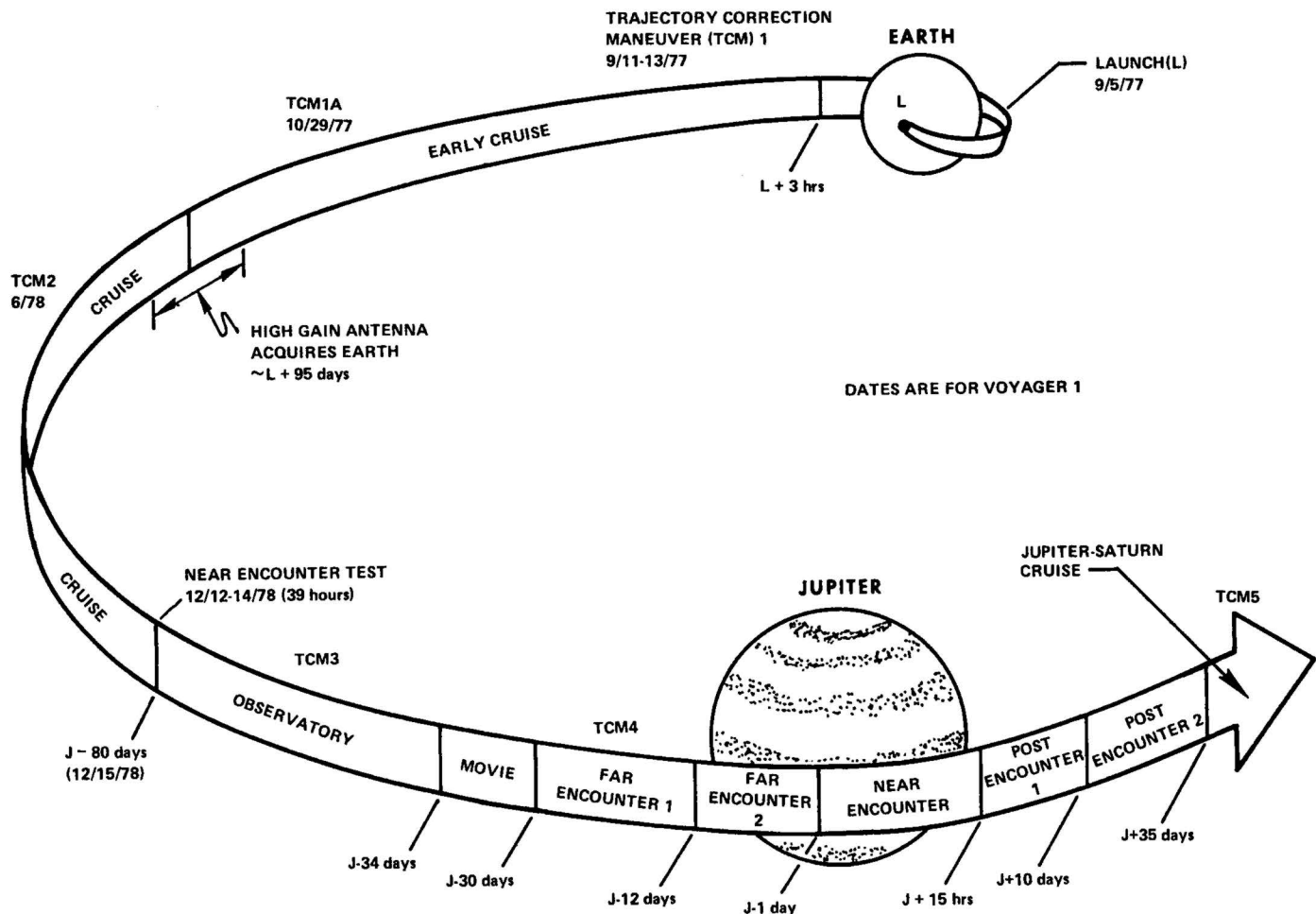
EARTH AND MOON — This picture of a crescent-shaped Earth and Moon — the first of its kind ever taken by a spacecraft — was recorded September 18, 1977, by Voyager 1 when it was 11.66 million kilometers (7.25 million miles) from Earth. The Moon is at the top of the picture and beyond the Earth, as viewed by Voyager. In the picture are eastern Asia, the western Pacific Ocean and part of the Arctic. Voyager 1 was directly above Mt. Everest (on the night side of the planet at 25 degrees north latitude). The photo was made from three images taken through color filters, then processed by the Image Processing Lab at the Jet Propulsion Laboratory. Because the Earth is many times brighter than the Moon, the Moon was artificially brightened by a factor of three relative to the Earth by computer enhancement so that both bodies would show clearly in the prints.

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EARTH-TO-JUPITER MISSION PHASES. While Voyager flies on toward Jupiter, work continues on Earth for the planetary and satellite encounters to come. This sketch of the mission shows the planned Earth-to-Jupiter phases for both missions; dates and times given are for Voyager 1, launched September 5, 1977.

The early cruise phase lasted from post-launch to about 95 days into the flight. One trajectory correction maneuver (TCM) and a "clean-up" TCM were executed during the early cruise phase.

The cruise phase officially began when the high-gain antenna was turned toward Earth to remain in that position for most of the mission. The antenna must point toward Earth for communications. During the long cruise phase, nearly a year, one TCM is planned.

In December 1978, during the last three days of the cruise phase, the near encounter test (NET) will be performed. The NET will be an actual performance of the activities scheduled for the period of closest approach to Jupiter.

Eighty days and approximately 80 million kilometers (50 million miles) from the Giant Planet, the Jupiter observatory phase will begin, about December 15, 1978. Following a quiet period over the holidays, periodic imaging with the narrow-angle camera will begin on January 4, 1979. A third TCM is planned during this period.

In early February 1979, a four-day movie sequence will record 10 revolutions of the planet, photographing the entire disk.

Following the movie phase will be the far encounter phases, as the spacecraft zeroes in on the planet, closing to 30 million kilometers (18.6 million miles) at 30 days out. The far encounter phases, from early February to early March 1979, will provide unique observation opportunities for the four largest satellites — Io, Europa, Ganymede and Callisto — and a crossing of the bow shock of the Jovian magnetosphere, of great interest to all of the fields and particles instruments. One TCM is planned during the far encounter phase.

For Voyager 1, near encounter will be a 39-hour period packed with close-range measurements by the spacecraft's 11 science experiments. On the outbound leg, five Jovian satellites — Amalthea, Io, Europa, Ganymede, and Callisto will also receive close-range scrutiny by the various science instruments. Passing 280,000 kilometers (174,000 miles) from the visible surface of Jupiter, Voyager 1 will then whip around the backside of the planet, passing out of view of the Earth for a brief two hours.

The post encounter phases, from the end of near encounter to about 35 days later, will continue observations as the planet is left behind. Using the gravity of Jupiter to slingshot it on its way, Voyager 1 will flash onward toward the ringed planet Saturn, about 800 million kilometers (500 million miles) and 19 months distant. Voyager 1 will study Saturn from August through December 1980.