

HIATUS

An uncertain future faces U.S. planetary spacecraft

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For earthlings, the Interplanetary Age can be said to have begun on Dec. 14, 1962, when a little space probe called Mariner 2 flew past Venus at a distance of about 33,440 kilometers, providing the first close-up measurements of another world. For the United States, it inaugurated a series of missions whose successes have included 23 visits to earth's moon, five to Venus (nine if one counts the Pioneer Venus project's cluster of probes individually), eight to Mars, three to Mercury (all by the same spacecraft), four to Jupiter and three to Saturn.

With such an armada, it has been easy to feel that the planetary spectaculars just keep on coming — as natural a part of the space program as weather satellites or the communications relays that bring the whole world, live, to the evening news. Following Mariner 2, it was a year and a half before Ranger 7 successfully added another target to the list (six prior Rangers failed in the attempt), providing 4,316 pictures of the moon on the way to an intentional crash landing in Mare Nubium. Since that time, however, the longest gap in the planetary data flow has been less than nine months, between the loss of signal from Surveyor 7 and the arrival in circumlunar orbit of Apollo 8. Since Nov. 17, 1969, in fact, the flow has been essentially unbroken. On that date, Apollo 12 entered lunar orbit, after which two of its astronauts descended to the moon's surface and deployed a set of instruments that operated until well after the Viking landers — one of which is still operating — had begun work on Mars.

But the Great Hiatus has arrived. And to the scientists and others who use the term, it is anything but great. Beset for years by increasingly tight budgets, the U. S. space program will see no new planetary encounter until 1986, when Voyager 2 gets to Uranus. Only the Galileo orbiter and probe of Jupiter is a serious planetary contender in the present NASA budget (a Venus-Orbiting Imaging Radar is mentioned, but only in the most preliminary and thus tentative way) and Galileo, which would not reach Jupiter until the late 1980s, faces tough sledding with administration cost-cutters, as well as problems with the space shuttle's launching capabilities. Mariner 2 and its successors have rewritten virtually the entire book of the solar system, but many chapters remain unfinished. As with most mysteries, the denouement is yet unclear. □

AMERICA TOURS THE SOLAR SYSTEM

Successful U. S. spacecraft studies at the moon and planets, in order of arrival.

ENCOUNTER	TARGET	SPACECRAFT (launch date)	MISSION DURATION and/or STATUS
Dec. 14, 1962	Venus	Mariner 2 (8/27/62)	Flyby
July 31, 1964	Moon	Ranger 7 (7/28/64)	Photos till impact
Feb. 20, 1965	Moon	Ranger 8 (2/17/65)	Photos till impact
Mar. 24, 1965	Moon	Ranger 9 (3/21/65)	Photos till impact
July 14, 1965	Mars	Mariner 4 (11/28/64)	Flyby
June 2, 1966	Moon	Surveyor 1 (5/30/66)	Loss of Signal 1/7/67
Aug. 14, 1966	Moon	Lunar Orbiter 1 (8/10/66)	Photos till 8/29/66
Nov. 10, 1966	Moon	Lunar Orbiter 2 (11/6/66)	Photos till 11/25/66
Feb. 8, 1967	Moon	Lunar Orbiter 3 (2/4/67)	Photos till 2/23/67
Apr. 20, 1967	Moon	Surveyor 3 (4/17/67)	Loss of signal 5/4/67
May 8, 1967	Moon	Lunar Orbiter 4 (5/4/67)	Photos till 5/13/67
July 22, 1967	Moon	IMP-5 (7/19/67)	Orbital operations till 8/1/73
Aug. 5, 1967	Moon	Lunar Orbiter 5 (8/1/67)	Photos till 8/19/67
Sept. 11, 1967	Moon	Surveyor 5 (9/8/67)	Loss of signal 12/17/67
Oct. 19, 1967	Venus	Mariner 5 (6/12/67)	Flyby
Nov. 10, 1967	Moon	Surveyor 6 (11/7/67)	Loss of signal 12/14/67
Jan. 10, 1968	Moon	Surveyor 7 (1/7/68)	Loss of signal 2/21/68
Dec. 24, 1968	Moon	Apollo 8 (12/21/68)	20 hours*
May 21, 1969	Moon	Apollo 10 (5/18/69)	62 hours*
July 19, 1969	Moon	Apollo 11 (7/16/69)	60 hours*; surface instruments off 8/27/69
July 30, 1969	Mars	Mariner 6 (2/24/69)	Flyby
Aug. 4, 1969	Mars	Mariner 7 (3/27/69)	Flyby
Nov. 17, 1969	Moon	Apollo 12 (11/14/69)	89 hours*; ALSEP off 9/30/77**
Feb. 4, 1971	Moon	Apollo 14 (1/31/71)	67 hours*; ALSEP off 9/30/77**
July 29, 1971	Moon	Apollo 15 (7/26/71)	145 hours*; ALSEP off 9/30/77**
Nov. 13, 1971	Mars	Mariner 9 (5/30/71)	Orbital operations till 10/27/72
Apr. 19, 1972	Moon	Apollo 16 (4/16/72)	126 hours*; ALSEP off 9/30/77**
Dec. 10, 1972	Moon	Apollo 17 (12/7/72)	148 hours*; ALSEP off 9/30/77**
June 15, 1973	Moon	RAE-2 (6/10/73)	Orbital operations till 4/30/77
Dec. 3, 1973	Jupiter	Pioneer 10 (3/2/72)	Flyby
Feb. 5, 1974	Venus	Mariner 10 (11/3/73)	Flyby en route to Mercury
Mar. 29, 1974	Mercury	Mariner 10 (11/3/73)	First of three flybys
Sept. 21, 1974	Mercury	Mariner 10 (11/3/73)	Second flyby
Dec. 2, 1974	Jupiter	Pioneer 11 (4/5/73)	Flyby; re-aimed to Saturn
Mar. 16, 1975	Mercury	Mariner 10 (11/3/73)	Third flyby
June 19, 1976	Mars	Viking 1 orbiter (8/20/75)	Orbital operations till 8/17/80
July 20, 1976	Mars	Viking 1 lander (8/20/75)	Surface operations still in progress
Aug. 7, 1976	Mars	Viking 2 orbiter (9/9/75)	Orbital operations till 7/24/78
Sept. 3, 1976	Mars	Viking 2 lander (9/9/75)	Surface operations till 4/12/80
Dec. 4, 1978	Venus	Pioneer Venus orbiter (5/20/78)	Orbital operations still in progress
Dec. 9, 1978	Venus	Pioneer Venus probes (8/8/78)	Descent data till impact
Mar. 5, 1979	Jupiter	Voyager 1 (9/5/77)	Flyby; re-aimed to Saturn
July 9, 1979	Jupiter	Voyager 2 (8/20/77)	Flyby; re-aimed to Saturn
Sept. 1, 1979	Saturn	Pioneer 11 (4/5/73)	Flyby
Nov. 12, 1980	Saturn	Voyager 1 (9/5/77)	Flyby
Aug. 25, 1981	Saturn	Voyager 2 (8/20/77)	Flyby; re-aimed to Uranus

* Time in circumlunar orbit; Apollo 11, 12, 14-17 include lunar module surface operations

** Apollo Lunar Surface Experiments Package, deployed by astronauts