

## SPACE

# U. S. May Win Venus

U. S. chances to beat USSR in the space race to Venus seem likely, but will depend on the success of Mariner II, the second U. S. Venus probe, Lillian Levy reports.

► THE UNITED STATES, now behind Russia in the race to the moon, may win the space race to Venus.

The Russians were first to try for Venus; but their attempt on Feb. 12, 1961, was unsuccessful in that the communication system failed before the probe got near the planet. The Soviets have not repeated the effort and an American victory in this difficult interplanetary course now looks promising.

U. S. chances to win, however, will depend largely on the success of Mariner II, the second U. S. Venus probe now scheduled for launch before September 10. Mariner I was destroyed less than five minutes after it rocketed skyward last month (July 22) because of a mathematical miscalculation concerning the planned flight path. Every effort is being made to prevent a similar mistake.

There is no back-up spacecraft for a third try this year if Mariner II should fail. Such a failure would put the U. S. out of the race for Venus for at least 19 months, since it will be that long before Venus again will be close enough to earth for another try. (This year the period of earth-Venus maximum proximity began mid-July and will be over by the 10th of September.)

Only 41 pounds of the 447-pound Mariner are allocated for the six scientific ex-

periments it will carry. These experiments have the same objective as those set by Soviet scientists for probing Venus: to gather evidence about the chemistry and temperature of the atmosphere of Venus which may yield clues to its surface structure, to measure radiation in interplanetary space and near Venus, to measure flow and density of solar plasma and cosmic dust which could be hazardous to man on interplanetary space missions and to transmit this information to earth over a distance of 36 million miles.

According to a National Aeronautics and Space Administration spokesman, once Mariner II is launched, its success or failure largely will be determined by the effectiveness of its communications system. The United States still holds the record for distance communications. Pioneer V transmitted information to earth from 22 million miles.

The sensitive transmission system for Mariner has been designed to remain in precise working order for three to five months, using solar energy for a power source. An electronic timing device has been built into Mariner's data conditioning system (DCS) so that as the spaceship begins its interplanetary voyage one second of information from each scientific experi-

ment is relayed to earth on a rotating basis for 20.16 seconds. The scientific telemetry then switches off and engineering telemetry takes over for 16.8 seconds. This cycle is repeated continuously as Mariner travels towards Venus.

Ten hours before Mariner II is scheduled to pass Venus, its DCS switches over to transmitting scientific data and only scientific data are transmitted to earth for the rest of the ride.

Flight time will vary from 92 days to 117 days, depending on launch date. On Aug. 17, for example, the distance from earth to Venus will be approximately 191 million miles. The closest that Mariner II will come to Venus is about 10,000 miles.

An Atlas D-Agena B will boost Mariner to an altitude of 115 statute miles and an orbital speed of 18,000 miles per hour.

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## Manned Launch Pads May Be Next USSR Space First

► THE NEXT SOVIET space spectacular scheduled for next year may be a permanent manned space laboratory station. It probably will be used to assemble an interplanetary spaceship and later to serve as a launching and receiving pad. And by 1965, the Russians will have landed a man on the moon.

Before these events take place, however, they will be preceded by orbital flights of 10 days or longer carrying three or more cosmonauts. These flights not only will demonstrate that man can overcome the barrier of weightlessness but they will be used to develop and perfect methods for rendezvous techniques.

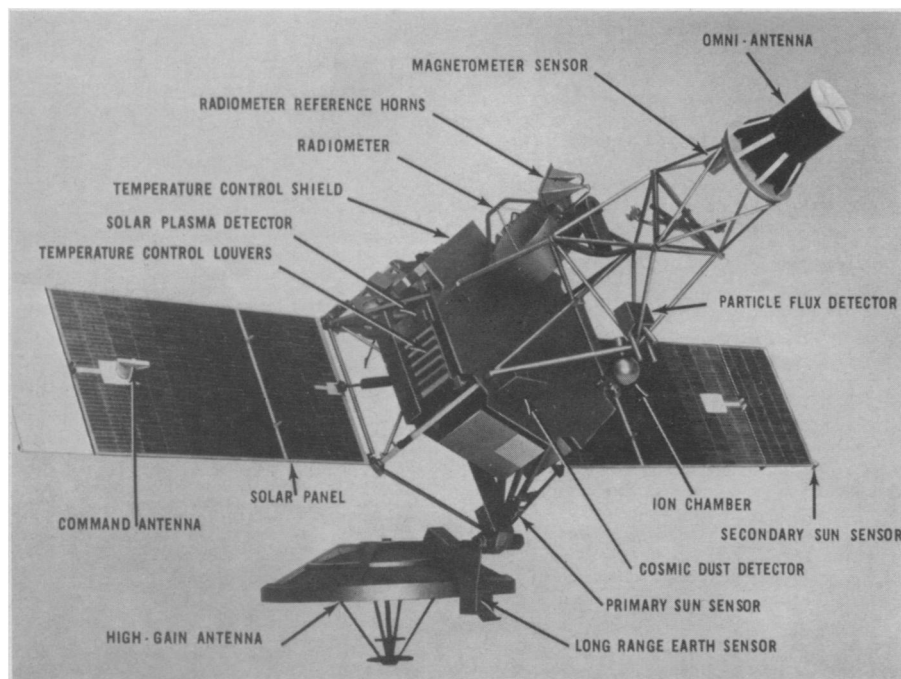
This outline of future Soviet space plans is contained in a staff report prepared for the Senate Committee on Aeronautical and Space Sciences, released May 31 of this year.

On Aug. 11, 1961, a year to the day that the Russians launched Cosmonaut Andrian G. Nikolayev, C. L. Zakhartchenko, a consultant to the Bendix Corporation of Detroit, Mich., predicted that in 1962 Soviet manned spaceships would have flights of several days duration (five to 10 days), the staff report reveals. His prediction followed a statement in April, 1961, made by Soviet Prof. N. A. Varvarov on Soviet plans for future space explorations following the first manned space flight of Cosmonaut Yuri Gagarin.

Prof. Varvarov said, "This will be followed by the construction of flying laboratories with crews of several men, the launching of satellites to Mars and Venus, and the landing of a rocket with scientific instruments on the moon. After having orbited the moon and returned to earth, rockets with crews will be launched to land on the moon and return to earth. All these tasks have been thoroughly thought out and can be implemented in the coming years."

On the basis of Soviet deed as well as word, Mr. Zakhartchenko also predicts that in 1964-65 the Russians will try to launch several "either manned or automatic probes" toward Mars or Venus, depending on their success in developing life support systems adequate for long voyages and radiation protection measures.

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**MARINER II**—The scale model of Mariner II shows some of the scientific and engineering equipment aboard the Venus spacecraft. It was developed by the California Institute of Technology Jet Propulsion Laboratory for the National Aeronautics and Space Administration.