Off to Mercury with a cold glance

Mercury ho! Mariner 10 is on its way.

Venus ho, too. Launched at 12:45 a.m. (EST) on Nov. 3, Mariner should pass within 3,300 miles of Venus on Feb. 5. It will then become the first spacecraft to use a technique, proposed some 12 years ago, of letting the gravitational field of one planet bend its course around toward a second objective. That's Mercury, of course, where it will arrive less than two months later, on March 29. After that it will swing around the sun and come back for a second look at Mercury 176 days later, and possibly a third (SN: 10/6/72, p. 220).

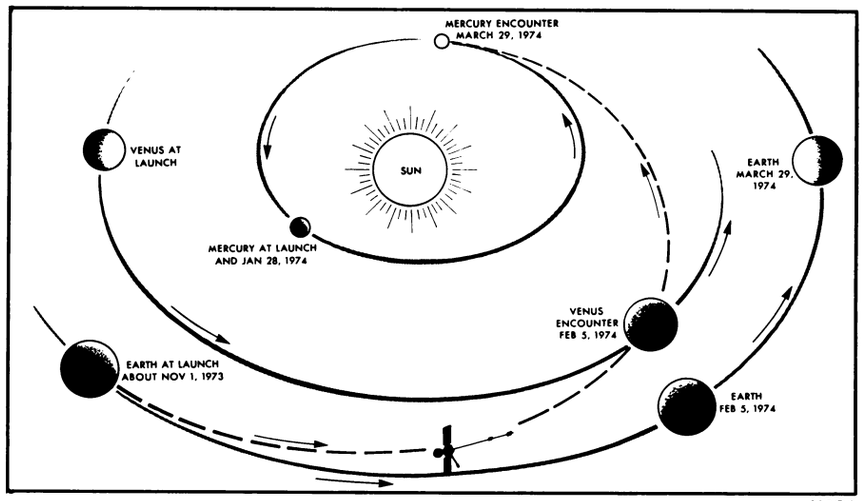
Mariner's most exciting data may come from a pair of television cameras, which should provide the first close look at the sun's nearest planetary companion, revealing surface features less than a mile across. But there's a problem.

After 53 minutes after launch, when flight controllers signaled the spacecraft to turn on the 12 heaters that are supposed to protect its delicate components from the cold of space, the two heaters for the cameras failed to respond. This posed a double threat: the absolute cold itself, and the difference in temperature between the front and rear ends of the telescopes that will magnify the cameras' view. If the difference gets too great, the barrels holding the telescope lenses could warp, distorting the TV images.

With the heaters working, the cameras' vidicon tubes should each be at 60 degrees F., the rear ends of the telescopes (protected by the spacecraft) at 47 degrees and the front ends at 40 degrees. Instead, by Nov. 6 the vidicon tubes had chilled to 14 degrees, the telescope rears to minus four degrees, and the front ends to minus 22 degrees. In early test pictures taken of the moon and earth, scientists running the mission at Jet Propulsion Laboratory at one point thought they saw some distortion, but later changed their minds.

NASA

Looking at Mercury from 621 miles.



NASA

Thanks to Venus, Mariner 10 will be the first spacecraft to visit Mercury.

Another problem appeared when an experiment designed to study a range of energy levels in the solar wind stuck at the high end of its voltage sweep. "It's getting a few cosmic ray-type particles," said an official, "but none of the solar wind." This, too, was believed to be a possible heater problem, since the instrument was "performing as it would with a cold start."

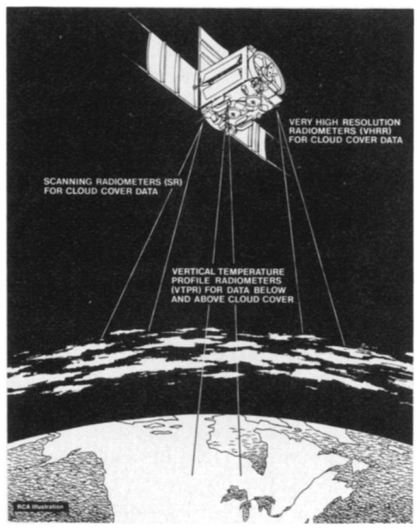
Officials planned to send "on-off-on" commands to the heaters in hopes that they will respond, after first trying the procedure on a backup spacecraft on the ground at the Kennedy Space Center in Florida. □

Broadcasting the air's temperatures from space

Ten years ago the eighth of the Tiros weather satellites was launched into orbit, carrying an experimental device that allowed anyone to receive photos of the earth directly from the satellite. Users needed only relatively inexpensive equipment and no longer had to wait for the satellite's signals to be processed and delivered from a central computer complex.

As recently as a year ago, says Marvin Harper, a sensor engineer for RCA Corp., which has built most of the U.S. civilian weather satellites, it was assumed that this direct-readout capability would be needed only for photos. For more detailed data such as temperature profiles, users would presumably be willing to wait up to 12 hours for centralized processing and delivery. But since then, some 25 countries have shown an interest in just such a readout capability for other data.

This week they got their wish. NOAA-3, the newest U.S. weather satellite, was launched Nov. 7 from California with a device to let users receive directly from the satellite temperature profiles measured at six altitudes ranging from the surface of the earth up to about 20 miles. Data can be received when the satellite is above a spot as far as 1,800 miles away from the ground station, so that, for example, India could watch for conditions indicating an approaching monsoon.



RCA

NOAA-3 *tells temperatures for anyone.*

Except for the direct readout equipment, NOAA-3 is virtually identical to NOAA-2, launched Oct. 15, 1972, and with another satellite that would have been NOAA-3 but failed to reach orbit in July of this year. The profile sensor has a resolution of about 30 miles; another temperature probe provides half-mile resolution, but it requires a receiving antenna that would be too expensive to interest most direct users. The satellite is expected to cover every point on the globe twice a day. □