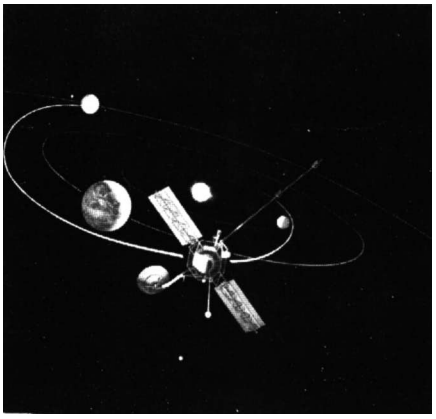

MARINER VENUS / MERCURY 1973
STATUS BULLETIN

First Trajectory Correction Maneuver A Success

Mariner 10 mission status as of 21:45 PST, 13 November 1973 (D317) L + 240 hours on it's 147 day flight to Venus and Mercury is normal with the exception of the TV Optics heaters and the Plasma Science Experiment (PSE) Scanning Electrostatic Analyzer (SEA) problem. The first Trajectory Correction Maneuver (TCM) events occurred as planned. Not unlike some previous Mariners, there was a momentary anxiety when the Canopus acquisition was lost after a normal reacquire, apparently due to a bright particle. Canopus was reacquired and the spacecraft status is normal.

The distance between Mariner 10 and Earth is now over 2, 500, 000 miles and it's speed relative to Earth is approximately 5,433 miles per hour.

The Mariner Venus/Mercury 1973 Status Bulletin will not be issued on a daily basis during the cruise phase to capture Venus' gravity which will propel Mariner into a smaller orbit that intercepts the orbit of Mercury on 29 March 1974.

1. Significant Mission Events/Times

Gyros On	15:00:16 (D317) Tuesday, 13 Nov 73
Transmit via Low-Gain Antenna	15:23:16
DC - 13 Abort Capability Prepared	15:41:09
Start Roll Turn	16:08:32
Stop Roll Turn	16:12:57
Start Pitch Turn	16:21:29
Stop Pitch Turn	16:33:31
Start Burn	16:42:03
Stop Burn	16:42:23
Start Pitch Unwind	16:46:23
Off Battery (on Solar Panel Pwr)	16:56:00
Stop Pitch Unwind	16:58:26
Start Roll Unwind	17:01:26
Stop Roll Unwind	17:05:51
Reacquire Canopus	17:08:51
Lost Canopus	17:30:00
Canopus Reacquired	18:40:00

2. Navigation

The Maneuver performance looked very good. The Navigation Team was able to monitor the ROLL turn and it's polarity (+. 035 Hz max shift), the PITCH turn and it's polarity (+.116 Hz at tart, and -. 080 Hz at the end). These doppler shifts correspond to velocity changes as small as 2 mm/second. The burn should have produced a + 72 Hz doppler shift, but only a + 71 Hz shift was observed. This corresponds to a 1.5 percent error, which is within spec. More analysis will be required, following considerable tracking to redetermine the orbit as well as it was known prior to the TCM. This will take approximately I5 days of tracking.

3. Spacecraft

The TCM-1 was accomplished on 13 November 1973. The maneuver was successful. Real-time analysis indicated turns and burn duration were as calculated.

Subsequent to re-acquiring celestial references, the Canopus Tracker went into a roll search, apparently due to a bright particle. Analysis and corrective action achieved Canopus acquisition a second time. The spacecraft is currently celestial acquired and performing normally .

Commands which were deleted during the Canopus acquisition anomaly were re-established in the sequence and the time line was back to normal at 19:48 PST with one exception. The playback of the Trajectory Correction Maneuver (TCM) data will be repeated since part of the first playback was accomplished over the low-gain antenna (LGA) during roll search. The second playback will be received starting at 20:47 PST and be concluded at 22:56:39 PST.

MARINER VENUS/MERCURY 1973 PROJECT OFFICE
Jet Propulsion Labratory California Institute of Technology
National Areonautics and Space Administration
Pasadena, California

13 November 1973

BULLETIN NO. 7

4. Science

On Monday, 12 November 1973, tests of the Scanning Electron Spectrometer (SES) "A" Channeltron indicated a performance anomaly which is now under investigation. The instrument was switched back to the "B" Channeltron and is presently performing normally (only one Channeltron is required for instrument operation — there are two in the instrument for redundancy). The post TCM-1 PSE turn-on sequence has been changed to avoid switching momentarily to Channeltron "A". MAG (magnetometer) and Charged Particle Telescope (CPT) data continued to look good.

The Plasma Science Experiment (PSE) Scanning Electrostatic Analyzer (SEA) problem was not resolved by the TCM-1 performed on 13 November 1973 (the theory was that the door had not been completely removed and the maneuver would shake it loose).

The PSE (SES) Is presently operating on Channeltron "B" as planned.

5. DSN

During the Trajectory Correction Maneuver (TCM-1) the DSN support was good. A timing error in the telemetry data from DSS 14 was noted at AOS (acquisition-of-signal) and was corrected by a TCD (Telemetry and Command Data Handling Subsystem) reload. The timing error occurred early in the pass, allowing time to correct the problem prior to the actual maneuver. DSS 14 was able to process good telemetry data throughout the maneuver and performance parameters were as predicted.

6. MCCC

The MCCC operations have been routine. The MTC, 360/75 and 1108 computers have been operating with no problems. The MTC 1230 computer recently shipped from Cape Kennedy was powered up 7 hours after arrival at JPL. The system was processing spacecraft telemetry in parallel with the prime system 17 hours later. A swap to this backup system to exercise the PRIME/BACKUP swap procedure was successfully conducted at 09:30 PST, 30 November 1973. Priorities for non-real time processing of the thrust-control maneuver data have been negotiated with the system users.