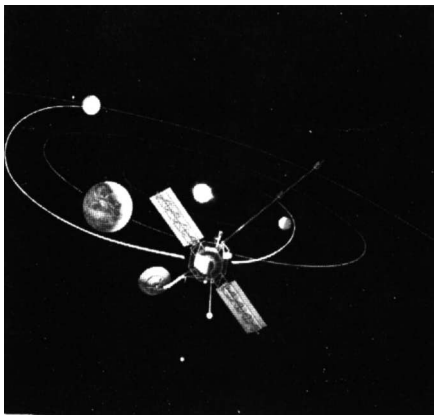
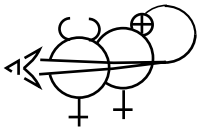


MARINER VENUS / MERCURY 1973
STATUS BULLETIN
MARINER 10 PROBES RIDLE OF EARTH'S SISTER PLANET - VENUS

Mariner 10's television cameras took this first wide-angie picture of Venus at 9:49 a.m. PDT on February 5, 1974. The photo shows the lighted cusp of Venus at the North Pole. Mariner 10 was approaching Venus from the night side at more than 20,000 miles per hour. The picture was taken from about 5000 miles. Twelve minutes later, Mariner made its closest approach to the surface at an altitude of about 3600 miles.

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



5 February 1974
BULLETIN NO. 17

Precisely on schedule, Mariner 10 began its scientific exploration of Venus and reached its closest approach point at an altitude of 3585 miles. This altitude is less than one Venus radius above the planet's surface and was within 15 miles of the originally planned altitude after a flight of 107 million miles. Closest approach occurred at 10:01 a.m. PDT, within one minute of the time scheduled before launch. After six minutes, Mariner 10 moved behind the planet as seen from Earth, and was occulted for about 20 minutes. The radio signal was recovered without difficulty after occultation.

Several hundred excellent TV pictures of Venus were received from Goldstone and from Canberra, Australia. Ultraviolet, infrared and radio experimental data concerning the Venus atmosphere and surrounding environment were also received at the Jet Propulsion Laboratory. The TV pictures are being computer processed to provide greater contrast.

Mariner is now heading toward its primary objective, Mercury, at a speed of 19,000 miles per hour. It will continue to study Venus from the sunlit side for the next 14 days as it continues its journey. Several thousand additional pictures and great quantities of other scientific data will be returned along the way.

Project Manager Walker E. (Gene) Giberson stated that Mariner 10 is performing admirably and is doing precisely what it was designed to do. Television Team Leader Bruce Murray of Caltech was also very pleased with the spacecraft performance and indicated the cameras were being held very steady, thus avoiding any smeared pictures.

The next trajectory correction maneuver (TCM-3) is scheduled for 14 February.

THE MARINER 10 TELEVISION CAMERAS

The Mariner 10 twin Television Cameras (Fig. 1), which were fabricated by Xerox Electro Optical Systems, are powerful enough to read classified ads in a newspaper at 400 meters (a quarter-mile) away. It takes the radio signals, which transmit the TV pictures over a distance of 28 million miles, about 2.5 minutes to arrive from Venus. Every 42 seconds, one camera sends its scanned image back while the other prepares to take the next shot in the sequence so that a continuous real-time series of pictures can be received during encounter. The narrow-angle, or high-magnification, cameras have a view field of 0.°36 x 0.°48; and the wide-angle attachment permits greater area coverage while passing the shadow's edge or terminator when very near a planet.

The light from the planet is reflected through a 8-aperture filter wheel which may be commanded to step to any desired position either from the ground or with on-board stored sequences. Bandpass characteristics of the 6 transmissive elements are shown in Fig. 2. Positions 1 and 7 are non-transmissive, Position 1 has the periscope mirror which blocks the light from the main telescope and substitutes the auxiliary wide-angle image, Filter Position 7 contains a defocusing Fabry lens for inflight cruise calibration purposes. After the image has passed through the filter wheel, a shutter-blade permit exposure of the 9.8 x 12.3-mm image face of a vidicon for an interval which may be varied between msec and 12 seconds. The light image formed on the photosensitive surface produces an electrostatic charge according to the relative brightness gradients in the image. During vidicon readout, an electron beam scans the back side of the vidicon and neutralizes part of the charge, causing electric current variations proportional to the point charge being scanned at a given moment.

Each TV frame consists of 700 vidicon scan lines. The analog signals produced from the vidicon readout process are electronically digitized as 835 discrete dots or picture elements (pixels) per line and are presented to the Flight Data Subsystem in the form of 8-bit elements for transmission. All timing and control signals such as frame start, line start/stop, frame erase, shutter open/close, and filter wheel step are provided by the subsystems.

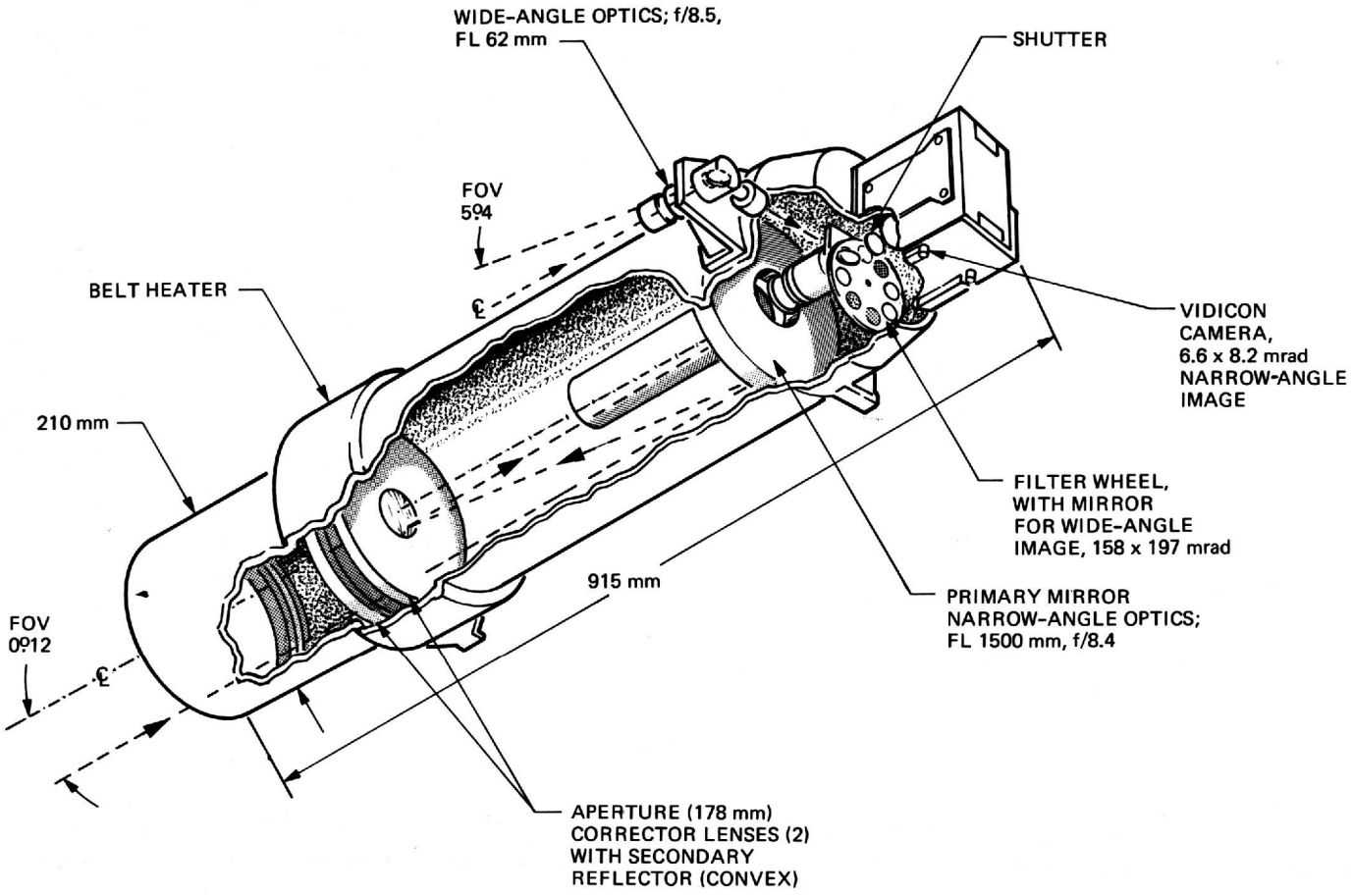


Fig. 1. Cutaway View of One Mariner 10 Television Camera

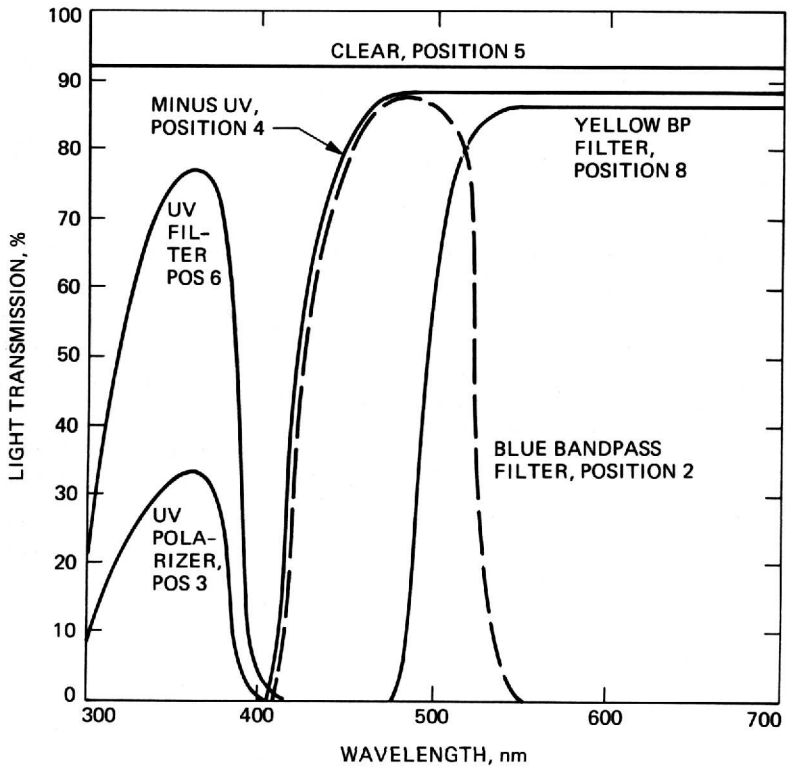


Fig. 2. Filter Wheel Transmissive Elements
with Band-Pass Characteristics

Scheduled Venus Encounter Sequence of Events

Day 37 - Wednesday, 6 February 1974

12:15 PDT	Madrid tracking. Start TV mosaic, 64 frames (UV and UV polarizing filters) average resolution: 8.9 kilometers.
01:00 PDT	TV mosaic, 64 frames, UV and Orange, 9.3 kilometers resolution.
01:45 PDT	TV mosaic, 64 frames, UV and UV polarizing, 9.7 kilometers resoiution.
02:30 PDT	TV mosaic, 64 frames, UV and Blue filters,10.2 kilometers resolution.
03:15 PDT	TV mosaic, 64 frames, UV and Orange,10.7 kilometers resolution.
04:00 PDT	TV mosaic, 64 frames, UV and Minus UV filters, 11.2 kilometers resolution.
04:40 PDT	TV mosaic, 64 frames, UV and UV polarizing, 11.6 kilometers resolution.
05:25 PDT	TV mosaic, 36 frames, UV and Blue,12 kilometers resolution.
05:50 PDT	TV mosaic, 36 frames, UV and Orange,12.3 kilometers resolution.
06:15 PDT	Conclude Venus Encounter TV. *PICTURES OBTAINED TO THIS POINT: APPROX. 1740. Of the total, about 710 relayed to JPL from all three tracking stations; about 1000 recorded on magnetic tape at Canberra and Madrid; and 36 recorded on board Mariner.
06:20 PDT	Playback 36 TV frames and other science data recorded on spacecraft 20 hours earlier. Readout time: 2 hours,17 minutes. (Spacecraft computer is updated during this period for execution of 16 days of far encounter TV.)
07:45 PDT	Transfer tracking Madrid to Goldstone.
08:40 PDT	Real-time TV, one picture every 42 seconds, about 40 frames.
09:20 PDT	Start 2nd playback of encounter tape from spacecraft. Readout time: 2 hours, 17 minutes.
09:50PDT	Charged Particle Telescope calibration 20 minutes.
10:01PDT	Venus encounter plus one day. Venus Range: *PICTURE COUNT: Approximately 1800, 800 of which received at JPL.
11:20 PDT	First of 10 daily Ultraviolet Spectrometer far encounter scans. 20 minutes.
11:40 PDT	Complete 2nd playback of Venus near encounter taped TV frames.
11:40 PDT	Begin far encounter TV. Record 36 frames. Resolution approximately 16 kilometers.
12: 10 PDT	Playback 36 TV frames. Readout time: 2 hours, 17 minutes.
14:20 PDT	Transfer tracking Goldstone to Canberra.
14:30 PDT	Complete TV playback.
14:40 PDT	Record 36 TV frames.
15:10PDT	Playback 36 TV frames.
17:40 PDT	Record 36 TV frames.
18: 10 PDT	Playback 36 TV frames.
20:35— 20:50 PDT	Record 18 TV frames.
20:50— 22:00 PDT	Playback 18 TV frames.
22:05— 22:20 PDT	Record TV frames.
22: 20— 23:40 PDT	Playback 18 TV frames.
23:30 PDT	Transfer tracking Canberra to Madrid.
23:40— 23:55 PDT	Record 18 TV frames.