# Mariner 69 Mission Description

## Mission Overview

The Mariner program consisted of ten exploration probes launched between 1962 and 1973. The spacecraft were designed by NASA's Jet Propulsion Laboratory to investigate the planets Mars, Venus, and Mercury.

All Mariner missions were launched on Atlas rockets, with early missions using Atlas-Agena, and later missions using Atlas-Centaur. Because of reliability issues with available launchers, the missions tended to use pairs of spacecraft launched on separate rockets. Ultimately three Mariner missions failed due to launch vehicle or payload shroud failures. In each case, the duplicate spacecraft was able to complete the mission.

Mariner 6 (Mariner F), was launched on 24 February 1969. The spacecraft successfully flew by Mars in July 1969. The mission returned images of the Martian surface. Mariner 7 (Mariner G) was launched on 27 March 1969. The spacecraft successfully flew by Mars in August 1969. The mission returned images of the Martian surface. Each spacecraft carried a wide angle and narrow angle camera, mounted to two degree-of-freedom scan platforms to point the cameras at Mars during encounter. Each spacecraft implemented Far Encounter and Near Encounter sequences. Mariner 6 took 49 Far Encounter images and 25 Near Encounter images while Mariner 7 took 94 Far Encounter images and 31 Near Encounter images (Collins, 1971, Dunne, et. al., 1971, Leighton, et. al., 1969, Leighton and Murray, 1971, Smith, 1970, and Rindfleisch, et. al., 1971).

The mission was designed to have two spacecraft encounter Mars within a 5 day period, with TV images sent to Earth beginning 2-3 days before closest approach. Analysis of Mariner 6 data was required in time to reprogram Mariner 7. Mariner 6 was targeted for a nearly equatorial flyby, with Mariner 7 taking a southerly route to enhance viewing of the south polar cap. All original plans for data return volume were exceeded by substantial margins. Refer to NASA SP-225 and other references for more information. Mission start date given is for authorization given to JPL to proceed with the project.

Mission Phases  
Encounter Phase – Mariner 6

The encounter phase for Mariner 6 began with pointing of the scan platform at Mars, so that the planet sensor could track Mars for the narrow-angle TV camera. All science instruments except the infrared spectrometer were activated at this time. Picture acquisition began 2 hours later. The IR spectrometer filter motor and cooler were started at 35 min. before closest approach. The second Mars tracker viewed the Mars limb at -15 min., at 05:03 GMT July 31, starting the analog and digital tape recorders. After closest approach, data playback continued for several days.

Near Encounter – Mariner 6

Spacecraft Id: MR6

Target Name: MARS  
Mission Phase Start Time: 1969-07-29  
Mission Phase Stop Time: 1969-07-30  
Spacecraft Operations Type: FLYBY  
   
Far Encounter – Mariner 6

Spacecraft Id: MR6  
Target Name: MARS  
Mission Phase Start Time: 1969-07-31  
Mission Phase Stop Time: 1969-07-31  
Spacecraft Operations Type: FLYBY

Encounter Phase – Mariner 7

The encounter phase for Mariner 7 began with pointing of the scan platform at Mars, so that the planet sensor could track Mars for the narrow-angle TV camera. All science instruments except the infrared spectrometer were activated at this time. After closest approach, data playback continued for several days. The spacecraft returned to cruise mode for engineering tests, communications performance test, and science operations including star photography and scans by the UV spectrometer of the Milky Way and an area containing comet 1969-B.

Near Encounter – Mariner 7  
Spacecraft Id: MR7  
Target Name: MARS  
Mission Phase Start Time: 1969-08-02  
Mission Phase Stop Time: 1969-08-04  
Spacecraft Operations Type: FLYBY  
   
Far Encounter – Mariner 7  
Spacecraft Id: MR7

Target Name: MARS  
Mission Phase Start Time: 1969-08-05  
Mission Phase Stop Time: 1969-08-05  
Spacecraft Operations Type: FLYBY  
  
  
Mission Objectives  
The objectives of the program were

(1) To conduct flyby missions to make exploratory investigations of Mars that will set the basis for future experiments, particularly those relevant to the search for extraterrestrial life

(2) To develop the technology needed for succeeding Mars missions

The scientific experiments selected to achieve the primary objective were

(1) Television

(2) Infrared spectroscopy

(3) Infrared radiometry

(4) Ultraviolet spectroscopy

(5) S-band occultation

(6) Celestial mechanics

The first four investigations required onboard instruments that viewed the planet; the last two required no instruments but used radio tracking data acquired by the tracking and data system equipment.  
  
To achieve the mission objectives, functional capability, instrument performance, and power capacity superior to those of any previous Mariner were required. For the first time, one spacecraft of a dual-spacecraft mission would gather Mars data and experience that would be used to benefit the second spacecraft's planetary encounter just 5 days later.

References

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