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OMB Approval No. 2700-0085

# **CYDONIA REGION**

## Classified Mission Photographic Analysis File #Pme/W 170 - 41961

## EYES ONLY

### Code Identification: croatoan link to data@wh / defcon project





OMB Approval No. 2700-0085

### Flight Status Report

Friday, 1 May 1998

This week, the Mars Global Surveyor flight team closed out a successful month of dedicated science operations. For over sixty consecutive orbits starting in early April and ending on Tuesday, the spacecraft's scientific instruments collected data near the low point of its 11.6-hour orbit. Every day of that month, Surveyor transmitted nearly 25 megabytes of data back to Earth.

Much of the publicity generated by April's science collection activities focused on targeted observations of several selected sites on the Martian surface. Because explicit targeting is not part of the Surveyor spacecraft's inherent abilities, these operations involved a substantial collaborative effort between Dr. Michael Malin's camera team, Dr. David Smith's laser altimeter team that assisted with Mars map corrections, and project engineering elements such as mission planning, spacecraft systems, and navigation.

Major imaging highlights included three photographs of the Cydonia region in the northern hemisphere. This area is home to a one-mile (1.5-km) wide object known popularly as the "face on Mars." One of the three Cydonia images shows the so-called face at 14.1-feet (4.3 meters) per pixel, a resolution about 10 times better than the best Viking Orbiter image from 1976.

In addition to the Cydonia images, Surveyor's camera also obtained two photographs of the Viking 1 landing site in Chryse Planitia, and one image of the Mars Pathfinder landing site in the Ares Valles region. Some of the objects visible in the Pathfinder image include major landmarks photographed on July 4th, 1997, including the famous "twin peaks" and "big crater." However, the lander and rover are not discernible in part because at the imaging range of about 497 miles (800 km), their size in the photograph is less than one pixel.

Despite this fact, the resolution of the current image still exceeds the best photograph of Ares Valles taken during the Viking Orbiter mission over twenty years ago. During mapping operations next year, the camera may have an opportunity to image the Pathfinder landing site again at ranges as low as 235 miles (378 km). In those images, small objects such as the lander and parachute may be visible.

The Viking 2 lander site at Utopia Planitia was also targeted by the camera for observation. Unfortunately, clouds obscured the site during each one of the three attempts. Similar to the situation with the Pathfinder site, further attempts at imaging the Viking 2 site may occur next year during mapping operations.



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Other experiments on the spacecraft have also been busy acquiring data. Besides the camera, the laser altimeter, magnetometer, thermal emission spectrometer, and radio science investigation teams have also collected data since the beginning of April. These measurements include northern hemisphere topography by the laser, local and global magnetic properties by the magnetometer, atmosphere and mineralogy studies by the spectrometer, and atmosphere and gravity field experiments by the radio science team.

Of particular interest, Dr. David Smith's laser altimeter team has been gathering data about the Martian north polar ice caps. On every orbit, the laser measures the cap's topography in order to calculate its thickness. In June, the ice cap's thickness will reach a maximum during the height of the northern winter season. Thickness measurements from April compared to those that will be taken in June will contribute toward a greater understanding of the Martian cap formation.

Although extremely successful, the flight team temporarily suspended science operations on Tuesday in preparation for a month-long event called solar conjunction. Starting this weekend, communications with the spacecraft will degrade as Mars begins to pass behind the Sun's corona as viewed from the Earth. As a consequence, the radio signals sent to and from Surveyor will experience a noise effect from solar electromagnetic interference. During the middle of the month, the Sun will directly eclipse the red planet and physically block radio communications with the spacecraft.

Solar conjunction will end in late May as Mars moves out from behind the Sun. At that time, the flight team will re-establish commanding capability and resume science operations. Data collection will then continue until the restart of aerobraking on September 11th. The goal of this next phase of aerobraking will be to lower the current, highly elliptical, 11.6-hour orbit to a low, circular, two-hour mapping orbit by April 1999.

After a mission elapsed time of 540 days from launch, Surveyor is 229.36 million miles (369.12 million kilometers) from the Earth and in an orbit around Mars with a high point of 11,108 miles (17,877km), a low point of 108.3 miles (174.3 km), and a period of 11.6 hours. A special, multi-week solar conjunction command sequence is currently executing on the spacecraft, and all systems continue to perform as expected. The next status report will be released sometime late May.

Status report prepared by:

\_\_\_\_\_

Office of the Flight Operations Manager Mars Surveyor Operations Project NASA Jet Propulsion Laboratory California Institute of Technology Pasadena, CA 91109



National Aeronautics and Space Administration

OMB Approval No. 2700-0085





Clearance Level: Majic-12



National Aeronautics and Space Administration

OMB Approval No. 2700-0085



From: National Security Council - Top Secret - Eyes Only -Codename: Altair Subject: Conspiracy Project File: #17 - Cydonia Region Agency: NASA

Clearance Level: Majic-12



National Aeronautics and Space Administration

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MEDIA RELATIONS OFFICE TELE PHONE (818) 354-5011 http://www.jpl.nasa.gov

#### CYDONIA OBSERVATION PHOTO CAPTION

Orbit: 258 Range: 409.53 km Resolution: 3.46 m/pixel Image dimensions: 1024 X 9600 pixels, 3.5 km x 33.2 km Line time: 0.50 msec Emission angle: 29.90 degrees Incidence angle: 69.59 degrees Phase angle: 60.62 degrees Scan rate: ~0.15 degree/sec Start time: periapsis + 410 sec Sequence submitted to JPL: Wed 04/22/98 21:45:00 PDT Image acquired by MOC: Thu 04/23/98 12:23:02 PDT Data retrieved from JPL: Fri 04/24/98 09:00 PDT Processing Performed by Tim J. Parker, Geologist Mars Pathfinder Science Support, JPL.

Image Processing Steps:

(1) Vertical banding in raw image removed using Vicar software with long, narrow, highpass box filter, oriented parallel to banding in image.

(2) Performed moderate histogram stretch in Adobe Photoshop on Macintosh desktop computer.

(3) "Flattened" broad shading variations in scene by copying image and creating a "mask" in Photoshop with the shading inverted with respect to the original image. This mask was then merged with original scene and a second histogram stretch performed.



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Processing Performed by MIPL, JPL

Image Processing Steps:

(1) The image is sized down by interpolation by a factor of two to reduce some of the noise.

(2) A long, narrow high-pass filter is applied in a vertical orientation to help reduce some of the instrument signature. This signature is seen as the streaking that is noticeable in the original data.

(3) A long, narrow low-pass filter is applied in a horizontal orientation to create an intensity average for the image.

(4) The results of these filtering operations are the stretched to approximate a Gaussian distribution.

(5) The results of the high-pass and low-pass processing steps are averaged together to form the final product.

(6) The image is flipped about the vertical axis to correct for the camera orientation.

Mars Global Surveyor Mars Orbiter Camera Release:

Mars Global Surveyor Mars Orbiter Camera Image ID:

MOC2-45A, -45B, -45C, -45D 577826559.25801 P258-01 (WA image) 577826601.25803 P258-03 (NA image)

Latitude and Longitude of four targets located in East longitude

Target	Latitude	Longitude
Cydonia Region Pathfinder Viking 1 Lander Viking 2 Lander	41.0° North 19.01° North 22.27° North 47.67° North	350.5° East 326.48° East 312.03° East 134.48° East