





Viking Orbiter 1 Mars Mosaic

It has been more than 15 years since the Viking mission spacecraft first approached Mars. There were four spacecraft that made the journey to the red planet. The Viking 1 and 2 landers entered Mars's thin atmosphere and, by using parachutes and then breaking rockets, came to rest on the surface. Viking Orbiters 1 and 2 remained in orbit. Although all Viking spacecraft are now silent, the data collected by them is still providing scientists with new insights about this solar system neighbor.

Using the Planetary Image Cartography System (PICS) developed at the U.S. Geological Survey, Flagstaff, Arizona, Tammy Becker, Alfred S. McEwen, and Larry Soderblom recently processed 102 Viking Orbiter 1 images taken of Mars in 1980 to form this dramatic mosaic of nearly a full hemisphere of the planet. PICS, a computer-based system, permitted each image to be aligned with the others in a manner like fitting together the pieces of a jigsaw puzzle. Image distortions were adjusted by PICS to provide perfect border matches. To bring out detail, color variations of the dark materials were enhanced by a factor of about two and brightness variations of the images adjusted to provide consistency across the hemisphere. The view is comparable to what would be seen from a spacecraft orbiting 2,500 kilometers above the surface of the planet.

The center of the Mars mosaic shows the entire Valles Marineris, a canyon system that stretches over 3,000 kilometers in length and is up to 8 kilometers deep. The Grand Canyon of Earth compares to just one of the tributary canyons of this giant system. Layers of bright material in the eastern and central region of the canyon may be carbonate-rich sediments deposited in an ancient lake. Huge ancient river channels, such as Kasai Valles, stretch northward from the central and western regions of the canyon.

South of Valles Marineris is very ancient terrain covered by many impact craters. North of the eastern end of the Valles Marineris is the Chryse Planitia. The Viking 1 spacecraft landed in the place indicated on the sketch map.

To the west of Valles Marineris lie three of Mars's huge volcanoes. The Tharsis volcanoes, as they are known, appear as dark reddish spots. Each volcano is about 25 kilometers high, over 350 kilometers in diameter, and has a central crater at its summit. The most famous member of the Tharsis volcanoes, Olympus Mons, is not visible in the mosaic. It lies approximately 1,100 kilometers west of Ascræus Mons.

For the Classroom

1. Research the Latin roots of surface feature names on Mars such as labyrinthus, mons, planitia, and valles.
2. Learn about the life and accomplishments of Percival Lowell.
3. To visualize the size of the Martian features found on this mosaic, draw an outline of the United States on a separate piece of paper to the same scale as the mosaic. Cut out the outline and place it on the mosaic for comparison. (The distance between the central craters of Ascræus Mons and Pavonis Mons is approximately 700 km.)

References

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