

PRECISION MARS CARTOGRAPHY
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Viking Orbiter images of the Mars Pathfinder landing site were included in an extended stereo cartographic reduction process to produce a high resolution and precision control network of 568 control points within the landing site. This control network covers an area of only a few degrees in latitude and in longitude providing a very dense set of control points. The cartographic reduction was performed using the latest IAU recommended pole and prime meridian for Mars, which shifts the longitude of the new map coordinates about 12 km compared to most published map products of the site based upon older pole and prime meridian values. Thirteen different Viking Orbiter image sequences providing 48 images taken 4 different orbits were used to obtain tremendous overlap and convergence angles of up to 90 deg, enabling the individual control points to be observed up to 15 times. In addition to estimating the Mars body-fixed latitude, longitude and elevation of each control point, corrections to the 4 orbits and corrections to the camera pointing of the 48 images were also estimated. The resultant control network has an absolute position accuracy of 1 km (1 sigma) with relative position accuracies of 15 m in position and elevation. The associated controlled photomosaic of the Pathfinder landing site, registered to the precision control network, will be useful in locating the lander relative to features observed from Viking Orbiter.

The current reconstructed location of the Pathfinder landing site shows the cartographic map produced here had no error in longitude and about 2 km error in latitude. These possible errors will be reevaluated once Mars Global Surveyor is in orbit about Mars and its planetary ephemeris error is reduced and the MOLA laser altimeter determines precision Mars radii at the Pathfinder and Viking landing sites. .

This paper represents the results of work carried out at the Jet Propulsion Laboratory, California Institute of Technology under contract to the National Aeronautics and Space Administration to support Mars Data Analyses.

