

USGS Experiences Mapping the Mars Pathfinder Landing Site

Randolph L. Kirk (rkirk@flagmail.wr.usgs.gov)

U.S. Geological Survey, 2255 N. Gemini Drive, Flagstaff, AZ 86001, USA

The Imager for Mars Pathfinder (IMP) obtained 5 full panoramic sets of images, varying in color and stereo coverage and degree of data compression, from the highly compressed First Look to the losslessly compressed, 15-filter Super Pan. These sequences permit detailed mapping of the landing site out to 10s of meters from Sagan Memorial Station. Our experiences mapping with a combination of in-house (USGS's ISIS) and commercial (LHZ Systems' SOCET Set) software will be reported. We have constructed a 3D control network from points measured in the losslessly compressed sequences and registered the remaining images to it. The control net and revised camera pointing will be published, and are being used to construct seamless panoramic and planimetric mosaics and a preliminary digital terrain model (DTM) of the landing site. We are also using SOCET Set to collect a much more densely sampled DTM that will be distributed digitally, and will be used to generate:

- (1) single frames and panoramic mosaics with as many as 15 filter bands, with parallax between images from the two cameras removed;
- (2) orthorectified mosaics in planimetric (overhead) view;
- (3) arrays of (x,y,z) coordinates and surface normal vectors registered to the images and mosaics; and
- (4) contours of elevation and range.

Panoramas and planimetric maps at scales of 1:25 and 1:50 will be published, with and without topographic contours and nomenclature. Photometric modeling using the DTM may also make it possible to produce spectral datasets precisely corrected for the subtle variations of solar and sky illumination. Interactive stereomatching may permit mapping of selected landforms to ranges of 100s of meters from the spacecraft, bridging the gap between the IMP-derived maps, those planned to be made from Mars Global Surveyor data, and our topographic map compiled from 40 m/pixel Viking Orbiter images during the site selection process.