PLANETARY GIS ON THE WEB FOR THE MER 2003 LANDERS. T. M. Hare, K. L. Tanaka, J.A. Skinner, 2255 N. Gemini Dr., U.S. Geological Survey, Flagstaff, AZ, 86001; thare@usgs.gov

Introduction. PIGWAD or "Planetary Interactive GIS-on-the-Web Analyzable Database," has been operational since May of 1999. It currently provides GIS database support for the research and academic planetary science communities. We are now focused on creating a Mars Exploration Rover (MER) web-based landing-site analysis page. Along with the NASA Ames Research Center's web site [1], the PIGWAD web server also contains mission information including engineering constraints. The marriage of these two web sites gives scientists a great resource of information to analyze for landing-site selection.

Background. The use of Geographic Information Systems (GIS) [2] has continued to boom in the planetary sciences [3-11]. Not only does it bring together post-mission datasets to address science issues, but now it plays an important roll in pre-mission phases to assess feasibility and safety and to formulate objectives. GIS was used in the selection of landing sites for the Mars Polar Lander and the Mars Surveyor 2001 Lander and is being used for camera targeting for Titan. NASA's Planetary Geology and Geophysics Program, which enabled PIGWAD to evolve from the drawing board to a useable system on the internet, as well as NASA's Mars Data Analysis Program, offer support and guidance as this product develops.

Approach. Our current choices for web mapping applications are based on Environmental Systems Research Institute's (ESRI) ArcView Internet Map Server and Arc Internet Map Server [12]. We rely heavily on the ArcView application for our MER landing-site analysis page, because ArcView supports high-level customizations through its programming language called Avenue. For example, to help with Mars landing-site selection, we can offer planetary scientists a landing-site ellipse generator (Fig. 1), which gathers statistical information about a site's rock abundance, elevation, slope, morphological descriptions and other data needed to choose an optimally safe and scientifically interesting landing site (Table 1).

Currently, users have access to the Viking digital image mosaic versions (MDIM) 1 and 2 [13], Viking image- and stereo-resolution maps, geologic maps, Mars Orbiter Laser Altimeter (MOLA) tracks, MOLA topography, MOLA shaded relief, Mars Orbiter Camera (MOC) footprints and image centers, and Viking Infrared Thermal Mapper Data (IRTM). Slight misalignments among these datasets will be present until they have been registered to a new, common spheroid definition.

Schedule. PIGWAD's MER 2003 website is currently on-line at http://webgis.wr.usgs.gov (Fig. 1). We will update our site as needed, which means that some of our pages occasionally will be down for brief periods. We will add more Mars Global Surveyor datasets including MOC context and narrow-angle imagery, MOLA topographic-point data and datasets derived from the Thermal Emission Spectrometer.

Summary. GIS provides the tools (1) to view and reference diverse sets of image, vector, textual, and numerical data together, and (2) to perform various spatial/statistical analyses, including advanced spatial intersections, unions, and robust conditionals. By incorporating this functionality into a user-friendly web environment, investigators can easily implement the analytical power of PIGWAD to assist with MER landing-site selection.

References. [1] NASA/Ames MER web site: http://marsoweb.nas.nasa.gov/landingsites/ (webmaster G. Gulick) [2] Environmental Systems Research Institute (1995) *Understanding GIS: The ARC/INFO Method*, GeoInformation International, United Kingdom, *i,* 1-10. [3] Carr, M.H. (1995) *JGR 100*, 7,479. [4] Zimbelman, J.R. (1996) *GSA Abs. 2*8, A-128. [5] Lucchitta, B.K. and Rosanova, C.E. (199*7), LPSC XXVIII, 839-840*. [6] Dohm, J.M., et al. (in press) *USGS Map I-2650.* [7] Tanaka et al. (1998) *JGR 103*, 31,407-31,419. [8] Hare, T.M. et al. (1997) *LPSC XXVIII,* 515. [9] Gaddis, L. et al. (1998) *LPSC XXIX*, 1807-1808. [10] Rosanova, C. E. et al. (1999) *LPSC XXX,* #1287. [11] Lias, J. H. et al., (1999) *LPSC XXX,* #1074. [12] Hare, T.M and Tanaka, K.L. (2000) *LPSC* #1889. [13] Kirk, R.L. et al, (2000) *LPSC XXXI,* #2011.

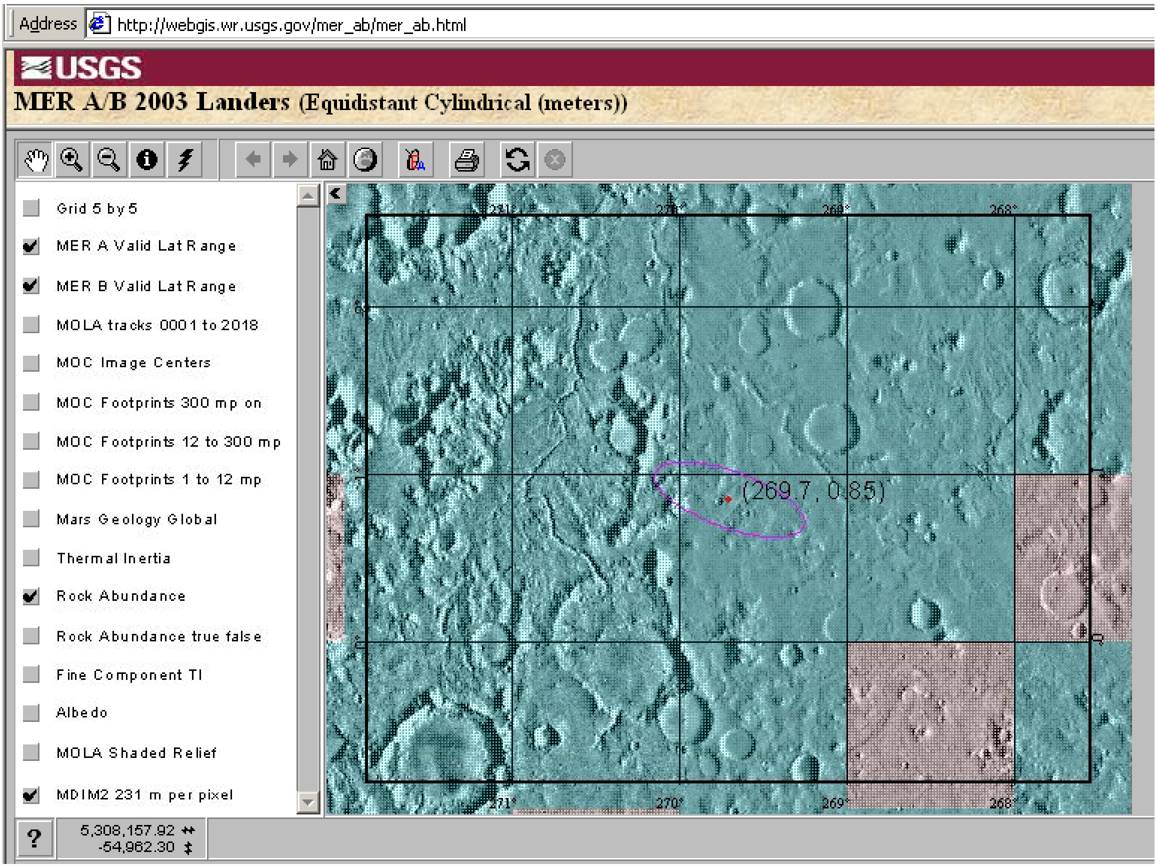

Figure 1. The MER 2003 ArcView IMS interface showing the Mars Digital Image Mosaic version 2 (gray scale), Viking-derived rock abundance (color squares), and user-generated ellipse (intersected data shown in Table 1). This example does not use the ellipse definitions for either MER lander.

Table 1. Data table generated from the ellipse shown in Fig. 1. Other statistical data including elevation, slope, and geologic units will be generated in future versions of the program.

Ellipse Generated for Lon = 269.7 Lat = 0.85 - Landing Diameter: 28km - Map Scale: 1:2000000
Theme: Thermal Inertia / Count: 2 / Mean: 77 / Range: (74,80) / Standard Deviation: 4
Theme: Rock Abundance / Count: 3 / Mean: 9 / Range: (7,11) / Standard Deviation: 2
Theme: Fine Component TI / Count: 4 / Mean: 72 / Range: (68,79) / Standard Deviation: 5