LANDING SITE MAP COMPILATION AND HAZARD ASSESSMENT FOR PHOENIX. L. M. Barge[1] and T. J. Parker[2], [1]University of Southern California, Los Angeles, barge@usc.edu. [2]Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA, timothy.j.parker@jpl.nasa.gov.

Introduction: The objective of this investigation is to produce image base maps and hazard assessment maps of the Phoenix B landing site region to: aid the science team in their selection of final landing site; aid the navigation team in determining whether course corrections will be needed by the spacecraft en route; assess surface hazards to Entry, Descent, and Landing; accurately identify surface features for localization after landing.

Method: All maps are being compiled using commercial graphic arts software (in this case, Canvas X). This enables compilation of a high-quality image map as multi-layer "virtual map" file. It allows for the rapid inclusion of the latest orbiter images and derived data products as they are received while preserving all previous versions of the map. This method does not require images of different pixel scales be resampled in order to project them at a common value, so the original data is preserved (and can be recovered from the map, if needed).

MOLA topography is used as a control base map (whereas MDIM1 and 2 base maps were used for MPF and initially for MER). THEMIS Daytime IR images were initially registered to the MOLA base, and were used to fill out the map with image coverage, but these data have been less important for Phoenix map compilation due to extensive Themis VIS coverage.

THEMIS VIS coverage is currently quite good, with 100% coverage of the initial "butterfly box" region near the center of the map (Fig 1). As of this writing, two additional boxes have been identified and are being placed. VIS coverage for these boxes is less, but currently about 75%.

MOC images are being added and registered to the MOLA and THEMIS VIS data. The coverage is currently rather sparse, however, so these images are used to assess meter-scale hazards and larger slope hazards [1].

HIRISE images will be included when acquired and made available to the project.

Derived products, such as Thermal Inertia, Rock abundance models and rock counts [e.g., 2] are also being assessed and will be incorporated as needed.

Identification of Hazard Units based on topography: For Phoenix, there is more potentially suitable area than was available to MER for landing (other things being equal), due to fixed lander versus MER's airbag landing system. This allows us to consider flat crater floors, as potentially "safe" to land on without concern for regional slopes, as was a problem for MER.

Hazard units were defined similar to MER:

Green - "safe" - flat expanses or gentle "smooth" slopes (at available image scales).

Yellow - "safe," with some small, scattered hazards (e.g., small craters, hills with modest shading suggesting gentle slopes).

Orange - Potentially serious hazards - avoid if at all possible (e.g., modest slopes in MOLA with image shading suggestive of moderate to slopes)

Red - "Death", e.g., fresh crater walls, steep hill slopes. It should be noted, however, that the MOLA 20 meter contours used in these maps would be need to be 75 meters apart in order to exceed the spacecraft's design limits, assuming slope were resolved. Because the slopes may not be fully resolved (particularly parallel to the MOLA groundtracks) we've elected to "err" on the side of caution, so "red" hazard units are probably larger than they need to be.

Once completed, the hazard maps are converted into simple raw grayscale images in raw format for incorporation into EDL team's software to assess probabilities for successful landing in specific landing sites.

References: [1] Kirk R. L. et al. (2006) this conference, [2] Marlow, J (2006) this conference

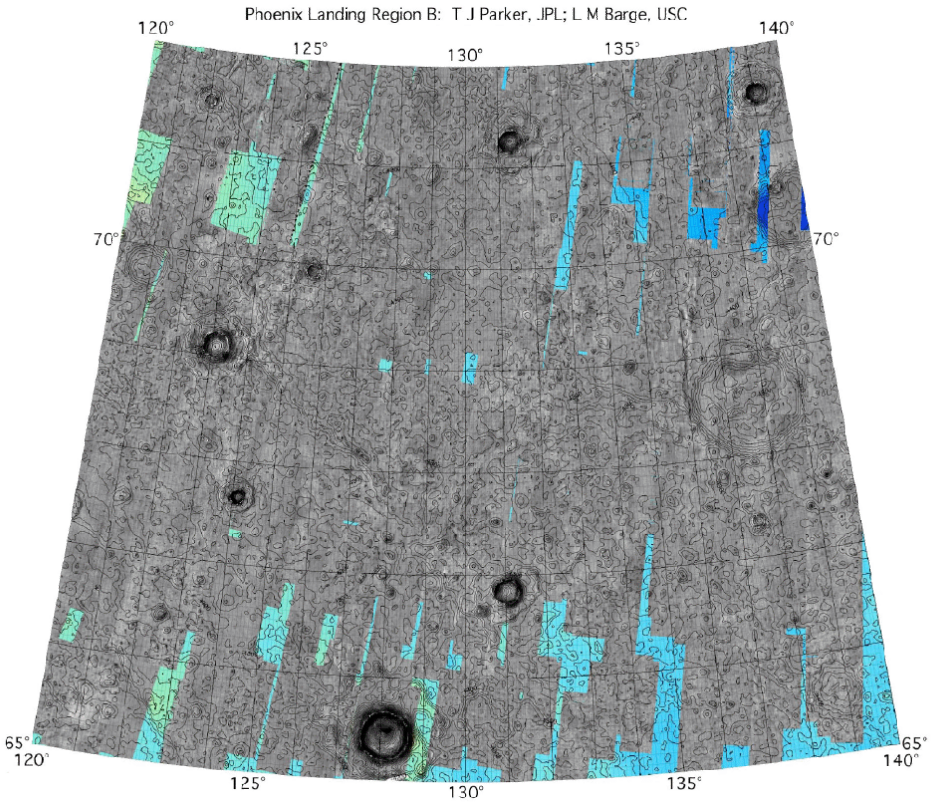

Figure 1: Phoenix B landing site map, Themis VIS coverage (MOLA background and contours).

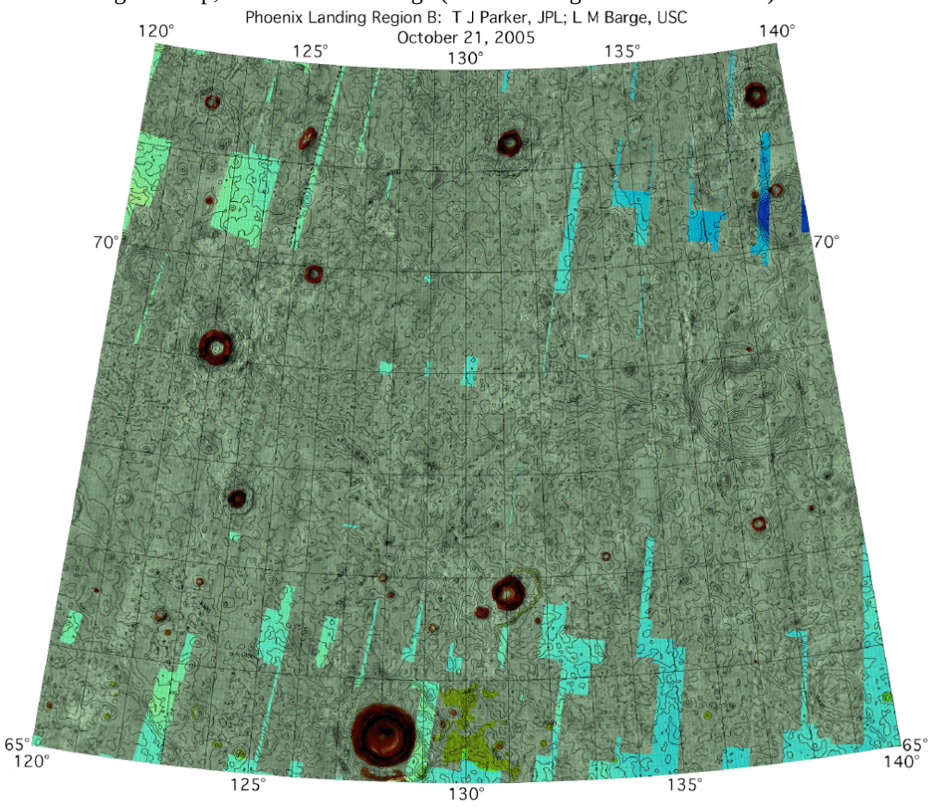

Figure 2: Phoenix B landing site hazards map. See text for key.