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Topographic Mapping of the Huygens Landing Site on Titan

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The Huygens probe successfully accomplished the first descent and landing on Saturn's moon Titan on 2005 January 14. The onboard Descent Imager-Spectral Radiometer (DISR) experiment[1] included three imaging cameras: high resolution (HRI), medium resolution (MRI), and side looking (SLI), which returned the first ever high resolution (~60 m/pixel to a few mm/pixel) images of the surface of Titan. Approximately 596 separate images were returned. Many of these images were taken above ~40 km and showed no surface detail due to haze, or were repeated images of the same scene from the surface. Still, about 40% of the images show surface features of Titan (e.g. Figure 1).

Although not possible in some areas due to lost images, we plan to photogrammetrically derive topographic information from these images, from which detailed geologic studies can proceed. As part of this process we expect to recover a history of spacecraft pointing and position, constrained in part by altimetry and Earth-based VLBI tracking, thus providing a trajectory estimate with which other (e.g. atmospheric) data can be associated. Planned products consist of a series of image mosaics, digital elevation models, and orthomosaics, at multiple resolutions and nested within each other as appropriate. We plan to present early versions of such products. Later efforts will also concentrate on analyzing and merging the imaging and topographic information of these images with that of the Cassini RADAR, ISS, and VIMS imaging experiments, to develop a consistent global (horizontal and vertical) reference system for Titan to which these and future data sets can be referred.

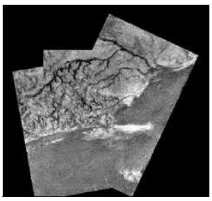

Figure 1: A mosaic of 3 DISR HRI images (http://photojournal.jpl.nasa.gov/catalog/PIA07236)

Reference

[1] M. Tomasko et al. *Spc.Sci. Rev.* **104**, 469-551 (2002).