

Topographic Mapping of Phoebe and Iapetus – Results from Cassini-ISS Stereo Image Analysis

B. GIESE¹, T. DENK², G. NEUKUM², T. ROATSCH¹, P. C. THOMAS³, C. C. PORCO⁴,
and the CASSINI-ISS TEAM

¹*DLR-Institute of Planetary Research, Berlin, Germany*

²*Department of Earth Sciences, Freie Universität Berlin, Germany*

³*Department of Astronomy, Cornell University, Ithaca, NY*

⁴*Space Science Institute, Boulder, CO*

During Cassini's encounter with the Saturnian satellites Phoebe (~107 km radius) and Iapetus (~734 km radius) the ISS camera on board acquired series of images with resolutions much improved over the early Voyager data. Subsets of these images formed stereo pairs that allowed us to carry out unprecedented regional topographic mapping of the satellites. For Phoebe, a subset of 14 high-resolution images (70-250 m/pxl) was considered. In the first step of the modeling, a bundle block adjustment was performed to improve the camera pointing parameters. Simultaneously, the orientation of the spin pole was re-evaluated. To this end, a control network of 127 points has been established (Fig. 1). In the second step, methods of digital image correlation were applied to determine large numbers of conjugate image points. Subsequently, using the improved camera pointing data, the (x, y, z) coordinates of corresponding ground points were calculated and finally transformed into a map projection. The obtained digital radius model of Phoebe has a horizontal resolution of 1-2 km and a vertical accuracy of 50-100 m. It covers about ~40% of the total surface.

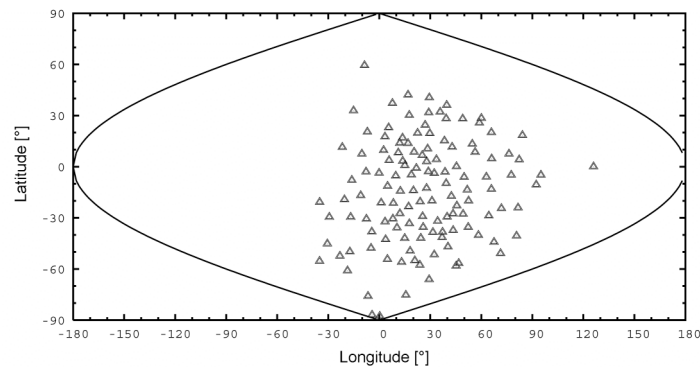


Figure 1. Distribution of control points on Phoebe.

At the time of writing, topographic modeling of Iapetus is still in progress.