

Cassini-Huygens is an international mission to study the Saturnian system. It was launched in 1997 and is in orbit around Saturn since 2004. Thousands of images of Saturn and its satellites have been returned to Earth since then, among them images of Rhea, Saturn's second largest satellite (diameter ~ 1528 km).

We have performed topographic mapping of Rhea using Cassini stereo images. Applying methods of digital photogrammetry, we derived a regional terrain model (DTM) with horizontal resolutions of 5-10 km and vertical accuracies of some hundreds of meters covering more than half of Rhea's total surface. Compared with earlier Voyager based studies which were limited both in stereo coverage and radiometric resolution of the images, this terrain model greatly extends our knowledge about the topography of Rhea and is particularly suitable both for cartographic applications and morphologic studies of the surface.

In the first step of the mapping procedure, a control-point network was set up to correct the camera pointing angles (spacecraft positions were fixed throughout the modeling) within a least-squares adjustment. Next, conjugate points were determined in stereo image pairs by methods of automated digital image correlation. Third, ground surface points (x,y,z) were computed from the conjugate points and referenced to the topographic datum to obtain the points' latitudes, longitudes and heights. Finally, latitudes and longitudes were subjected to a map projection and then interpolated to form a contiguous DTM grid.