

HIGH RESOLUTION VESTA HAMO ATLAS DERIVED FROM DAWN FC IMAGES. Th. Roatsch¹, E. Kersten¹, K.-D. Matz¹, F. Preusker¹, F. Scholten¹, R. Jaumann¹, C. A. Raymond², and C. T. Russell³, ¹Institute of Planetary Research, German Aerospace Center (DLR), Berlin, Germany, Thomas.Roatsch@dlr.de, ²JetPropulsion Laboratory, California Institute of Technology, Pasadena, CA, ³Institute of Geophysics, UCLA, Los Angeles, CA.

Introduction: NASA's *Dawn* spacecraft entered orbit of the inner main belt asteroid 4 Vesta on July 16, 2011, and is spending one year in orbit to characterize the geology, elemental and mineralogical composition, topography, shape, and internal structure of Vesta before departing to asteroid 1 Ceres in late 2012. One of the major goals of the mission is a global mapping of Vesta.

Data: The Dawn mission is mapping Vesta from three different orbit heights during Survey orbit (2700 km altitude), HAMO (High Altitude Mapping Orbit, 700 km altitude), and LAMO (Low Altitude Mapping Orbit, 210 km altitude) [1]. The Dawn mission is equipped with a framing camera (FC) [2] which was the prime instrument during the HAMO phase. Dawn orbited Vesta during HAMO in 6 cycles between end of September end early November 2011. The framing camera took about 2,500 clear filter images with a resolution of about 70 m/pixel during these cycles. The images were taken with different viewing angles and different illumination conditions. We selected images from one cycle (cycle #3) for the mosaicking process to have similar viewing and illumination conditions. Cycle 3 with 518 images was selected since it was the first cycle with almost complete global coverage. Very minor gaps in the coverage were filled with a few images from cycle #2.

Data Processing: The first step of the processing chain is to ortho rectify the images to the proper scale and map projection type. This process requires detailed high-resolution information of the local topography of Vesta and high-accurate orbit and pointing information. Both the global topography and the improved orbit and attitude data were calculated during the stereo processing of the HAMO images [3] and were used here. The shape model was used for the calculation of the ray intersection points while the map projection itself was done onto a sphere with a mean radius of 255 km. The next step was the mosaicking of all images to one global mosaic of Vesta, the so called base-map.

Vesta map tiles: The Vesta atlas was produced in a scale of 1:500,000 and consists of 15 tiles that conform to the quadrangle scheme proposed by Greeley and Batson [4] and widely used for example for the Icy Saturnian satellites [5]. A map scale of 1:500,000 guarantees a mapping at the highest available DAWN resolution in HAMO and results in an acceptable printing scale for the hardcopy map of 7 pixel/mm. The individual tiles were extracted from the global mosaic and reprojected.

Nomenclature: The Dawn team proposed to the International Astronomical Union (IAU) to use the names of vestal virgins and famous Roman women as names for the craters and to use names of places and festivals associated with vestal virgins for other feature names. This proposal was accepted by the IAU and the team proposed 29 names for geological features to the IAU which were also approved [6]. These feature names were applied to the map tiles and are shown in Figure 1. The entire Vesta atlas consisting of 15 map tiles will become available to the public through the Planetary Photojournal and the PDS.

Future work: The Northern part of Vesta will be illuminated during a second HAMO phase later this year. The images which will be taken during the second HAMO will allow us to fill the gaps in the Northern map tiles.

References: [1] Russell, C.T. and Raymond, C.A., *Space Sci. Review*, 163, 3-23; [2] Sierks, et al., 2011, *Space Sci. Rev.*, 163, 263-327; [3] Preusker, F. et al., this session; [4] Greeley, R. and Batson, G., 1990, *Planetary Mapping*, Cambridge University Press; [5] Roatsch, Th. et al., 2009, *Cartographic Mapping of the Icy Satellites Using ISS and VIMS Data*, in *Saturn from Cassini-Huygens*, 763-782, Springer, NY; [6] <http://planetarynames.wr.usgs.gov/Page/VESTA/target>

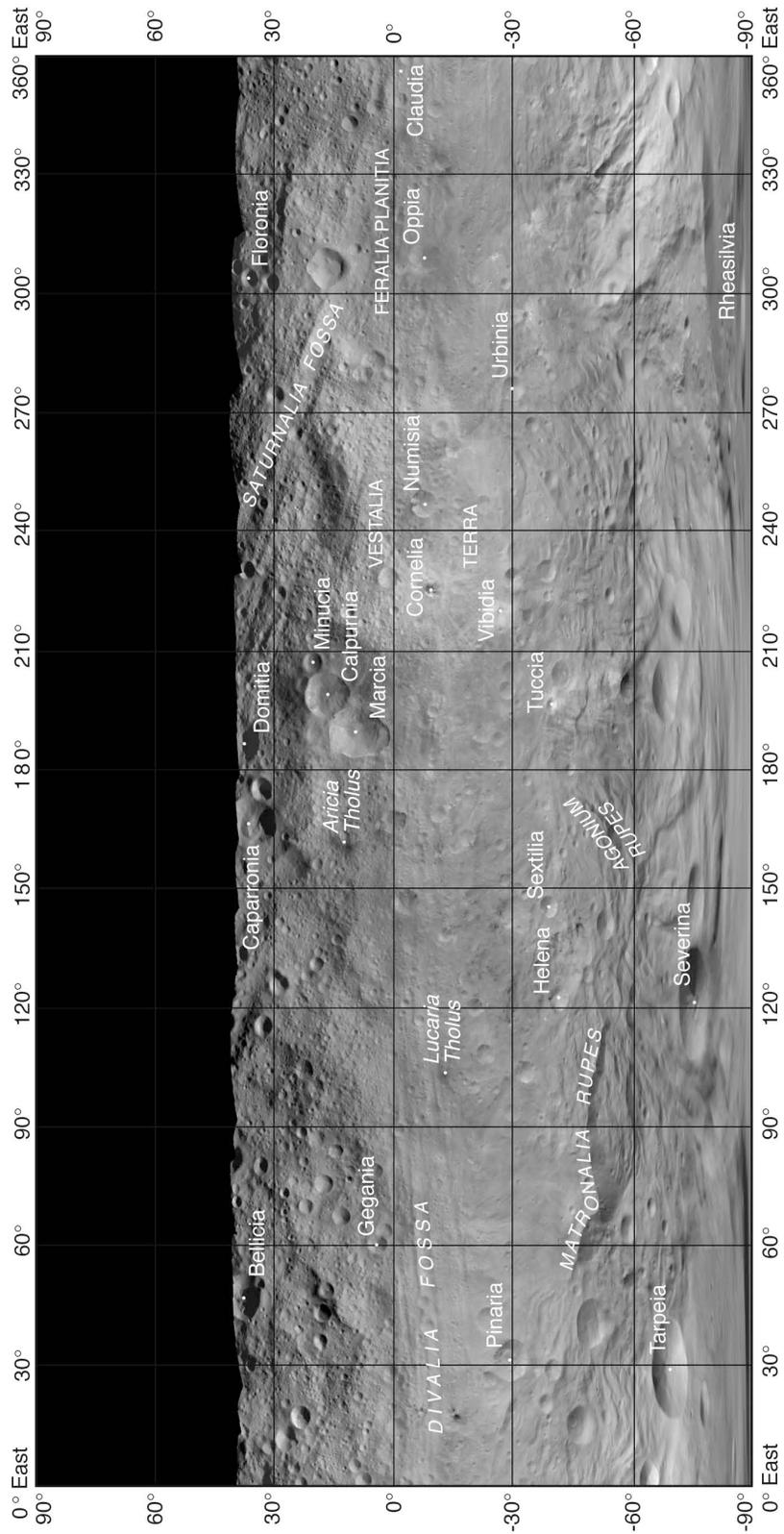


Figure 1: Global Mosaic of Vesta with approved nomenclature for geological features.