CARTOGRAPHY OF ASTEROID 4 VESTA AND DWARF PLANET CERES Th. Roatsch[1], E. Kersten[1], K.-D. Matz[1], F. Preusker[1], F. Scholten[1], R. Jaumann[1], C. A. Raymond[2], and C. T. Russell[3], [1]Institute of Planetary Research, German Aerospace Center (DLR), Berlin, Germany, Thomas.Roatsch@dlr.de, [2]JetPropulsion Laboratory, California Institute of Technology, Pasadena, CA, [3]Institute of Geophysics, UCLA, Los Angeles, CA.

Introduction: The Dawn mission mapped the surface of the asteroid 4 Vesta over a period of nearly ten months from altitudes below 700 km [1]. Image data from the Dawn Framing Camera [2] were collected in a Survey imaging campaign at the beginning and in three primary mapping phases: High Altitude Mapping Orbit One (HAMO-1, September 29 - October 31, 2011) and Two (HAMO-2, June 24 - July 24, 2012) near 700 km altitude and the Low Altitude Mapping Orbit (LAMO, December 15, 2011 - April 30, 2012) near 200 km altitude. During the two HAMO campaigns, the surface of Vesta was almost completely mapped in the clear plus seven band-pass filters.

Dawn arrived at dwarf planet Ceres in March 2015 and will map Ceres in similar orbit phases as Vesta, the orbit altitudes will be approximately twice as at Vesta.

Data Processing: The first step of the processing chain towards the cartographic products is to ortho-rectify the images to the proper scale and map projection type. This process requires detailed information of the Dawn orbit and attitude data and of the topography of the targets. Both, improved orientation and high-resolution shape models, are provided by stereo processing (bundle block adjustment) of the Survey and HAMO stereo image datasets [3], while processing of the LAMO dataset is based upon semi-controlled SPICE kernels [4] for the spacecraft's orbit and attitude. Vesta's and Ceres's HAMO shape models are used for the calculation of the ray intersection points while the map projection itself will be done onto reference spheres for Vesta and Ceres. The final step is the mosaicking (controlled for Survey/HAMO and semi-controlled for LAMO) of all images to global mosaics of Vesta and Ceres, the so called basemaps.

Map tiles: The tiling schemas for small bodies where proposed by Greeley and Batson [5]. The Vesta and Ceres atlases follow the proposed rules and consist of 4 (Survey), 15 (HAMO), and 30 (LAMO) tiles [6,7].

Vesta 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 106 names for geological features to the IAU which were also approved [8]. These feature names were applied to the map tiles and are shown in Figure 1. The entire Vesta atlases are available to the public through the Dawn GIS web page [http://dawn_gis.dlr.de].

Ceres Nomenclature: The Dawn team proposed to the International Astronomical Union (IAU) to use the names of gods and goddesses of agriculture and vegetation from world mythology as names for the craters and to use names of agricultural festivals of the world for other feature names. This proposal was accepted by the IAU and the team will start in Survey to propose names for geological features to the IAU based on the mosaics. These feature names will be applied to the map tiles. The entire Ceres atlases will become available to the public through the same web page as the Vesta atlases.

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 et al., 2013, In: LPI Workshop "Vesta in the Light of Dawn", Abstract #2027; [4] http://naif.jpl.nasa.gov; [5] Greeley, R. and Batson, G., 1990, Planetary Mapping, Cambridge University Press; [6] Roatsch et al. 2012, Planet. Space Sci.73, 283-286; [7] Roatsch et al. 2013, Planet. Space Sci.85, 293-29; [8] http://planetarynames.wr.usgs.gov/Page/VESTA/target
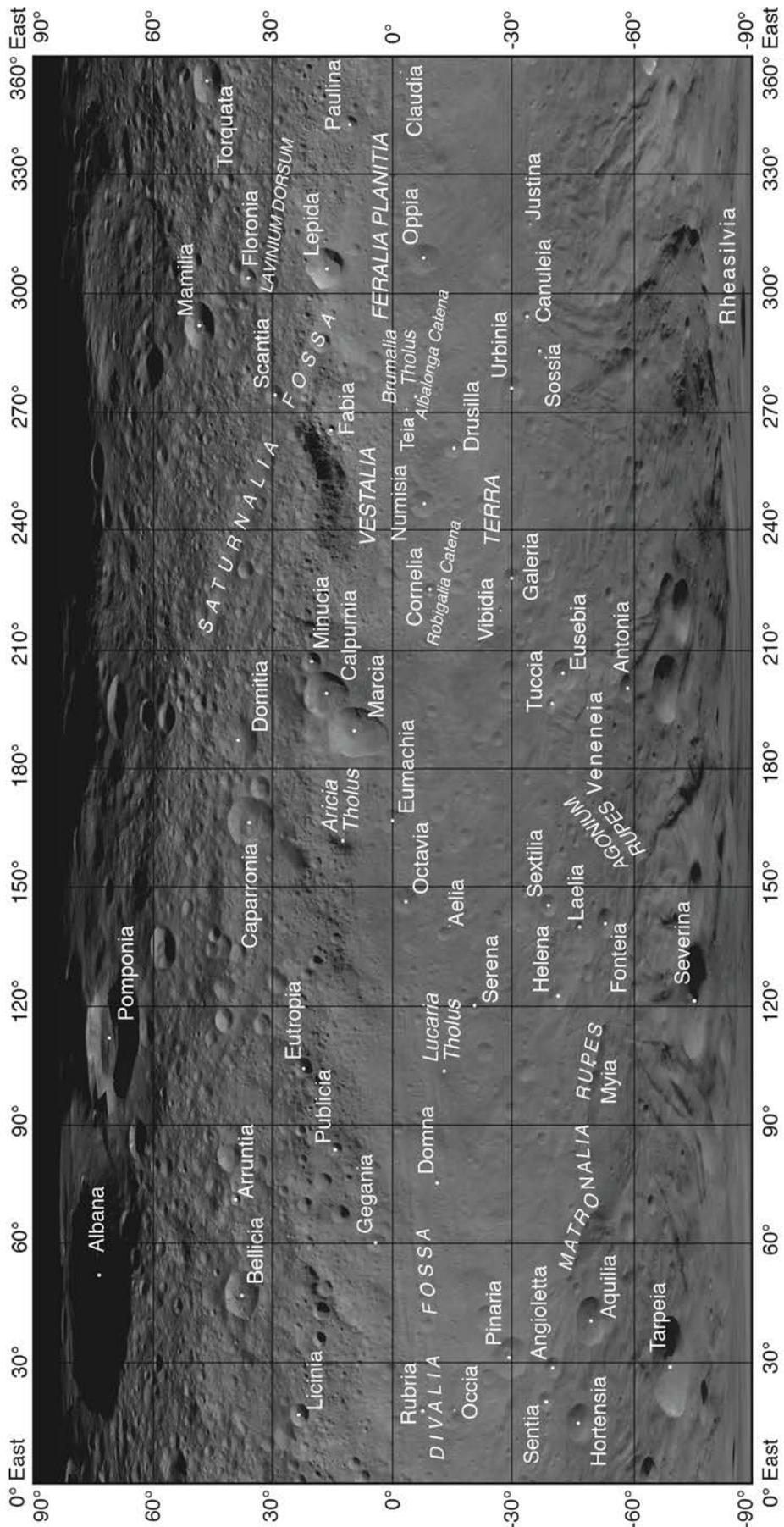
Fig. 1: Global mosaic of Vesta with approved nomenclature for geological features.