



GENERAL NOTES

This map sheet is the 21st of a 30-quadrangle series [1] covering the entire surface of Vesta at a nominal scale of 1:200,000. The source of map data was the Dawn imaging experiment [2].

The Dawn spacecraft journeys to the center of the main asteroid belt to orbit and explore the two most massive main belt asteroids, (4) Vesta and (1) Ceres [3,4]; it entered Vestian orbit in August 2011 and left it in August 2012. The spacecraft was developed by Orbital Sciences Corporation under the management of the Jet Propulsion Laboratory (JPL).

The Dawn framing camera (FC) features one clear filter and 7 band-pass filters covering the wavelengths from the visible to the near-IR (0.4 to 1.05 microns). The camera has a focal length of 150 mm and a field of view of 5.5 degrees. At the heart of the camera is a charged coupled device (CCD) detector consisting of a 1024 square array of pixels, each 12 microns on a side. All images used in this atlas were taken during the Low Altitude Mapping Orbit (LAMO) at an altitude of about 210 km.

MAP SHEET DESIGNATION

Av-L Asteroid Vesta - LAMO resolution
 200K Scale 1:200,000
 -15/247.5 Center point in degrees consisting of planetocentric latitude/east longitude
 UMT Uncontrolled photomosaic with nomenclature and contour lines
 2013 Year of publication

ORTHOIMAGE MOSAICKING

For the Dawn mission, spacecraft position and camera pointing data are available in the form of SPICE kernels. SPICE is a data system providing ancillary data such as spacecraft and target positions, target body size, shape, and orientation, spacecraft orientation and instrument pointing used for planning space science missions and recovering the full value of science instrument data returned from missions (<http://naif.jpl.nasa.gov>).

For each map sheet of this series, about 400 Dawn FC images of the Low Altitude Mapping Orbit (LAMO) were used for ortho-rectification. The LAMO image resolution is about 20 m. The topographic reference for this ortho-rectification process was a digital terrain model (DTM) at 93 m lateral resolution that had previously been derived from stereo images of the High Altitude Mapping Orbits (HAMO 1+2) [5]. LAMO images generally do not comprise sufficient stereo characteristics; thus, orientation data (s/c position, pointing, etc.) were used without further photogrammetric block adjustment within this first version of this map series. Automated seam lines at the center of image overlaps and weighted averaging within these overlaps were used within the final generation of uncontrolled orthoimage mosaics for each map sheet.

The crater Claudia, measuring approximately 620 m in diameter, at 1.66°S and 356°E was chosen to define the Vesta longitude system. All positions used by the Dawn project are in that Claudia system [6].

MAP PROJECTION

Mercator projection
 Scale is true at 0° latitude
 Adopted figure: sphere
 Mean radius: 255 km
 Grid system: planetocentric latitude/east longitude

CONTOURS

Contour lines were derived from a digital terrain model (DTM) of Vesta [5]. The 3D control point accuracy is ± 7.5 m. The lateral resolution of the DTM is 93 m/pxl. The heights are geometric heights and refer to an oblate ellipsoid with a semi-major axis of 285 km and a semi-minor axis of 229 km.

Contour equidistance 2,000 m
 Contour line values point to increasing heights.

NOMENCLATURE

Names are approved by the International Astronomical Union (IAU). For a detailed list of IAU-approved names on Vesta, see the Gazetteer of Planetary Nomenclature at <http://planetarynames.wr.usgs.gov/Page/VESTA/target>.

REFERENCES

- [1] Greeley, R. and Batson, G., 1990. Planetary Mapping, Cambridge University Press, Cambridge.
- [2] Serks, H., Keller, H.U., Jaumann, R., Michalik, H., Behnke, T., Bubenhausen, F., Böttner, I., Casenry, U., Christensen, U., Enge, R., Fiehle, B., Güllner, Margolis, P., Harwig, H., Krüger, H., Kühne, W., Maue, T., Mottola, S., Nathues, A., Reiche, K.-J., Richards, M.L., Roatsch, T., Schröder, S.E., Szemery, I., Tschentscher, M., 2011. The Dawn Framing Camera, Space Science Reviews 163, 263-327.
- [3] IAU, Minor Planet Names List: <http://www.minorplanetcenter.net/iau/lists/MPNames.html>.
- [4] Russell, C.T. and Raymond, C.A., 2011. The Dawn Mission to Vesta and Ceres, Space Science Reviews 163, 3-23.
- [5] Preusker, F., Scholten, F., Matz, K.-D., Roatsch, T., Jaumann, R., Joy, S.P., Raymon, M.D., Raymond, C.A., and Russell, C.T., 2012. Stereo-photogrammetrically derived topography of asteroid (4) Vesta, AGU Fall meeting, Abstract 2012.
- [6] Russell, C.T., Raymond, C.A., Coradini, A., McSween, H.Y., Zuber, M.T., Nathues, A., De Sanctis, M.C., Jaumann, R., Konopliv, A.S., Preusker, F., Asmar, S.W., Park, R.S., Gaskell, R., Keller, H.U., Mottola, S., Roatsch, T., Scully, J.E.C., Smith, D.E., Tricarico, P., Toplis, M.J., Christensen, U.R., Feldman, W.C., Lawrence, D.J., McCoy, T., Prettyman, T.H., Reedy, R.C., Sykes, M.E., Titus, T.N., 2012. Dawn at Vesta: Testing the Protoplanetary Paradigm, Supplementary Material, Science 336, 684-686.

Image processing: Scholten, F., Eigner, S., Kersten, E., Matz, K.-D., Preusker, F., Roatsch, T.
 Cartographic production and design: Kersten, E.

EDITOR

German Aerospace Center (DLR), Institute of Planetary Research, Roatsch, T.
 Please send comments, suggestions, and questions to Thomas.Roatsch@dlr.de.

