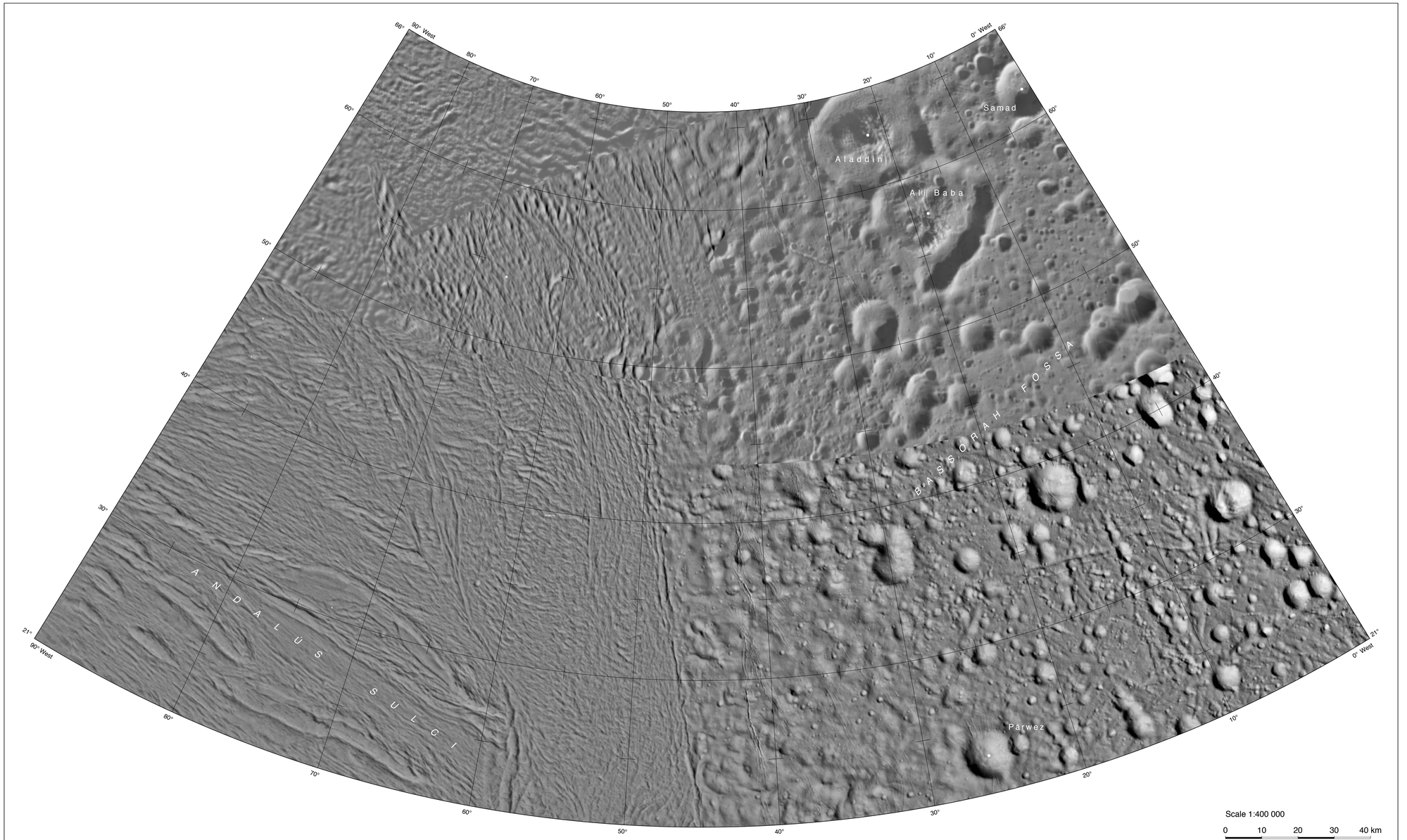

Scale 1:400 000

0 10 20 30 40 km

GENERAL NOTES

This map sheet is the 2nd of a 15-quadrangle series covering the entire surface of Enceladus at a nominal scale of 1: 400 000. This map series is the third version of the Enceladus atlas and supersedes the release from 2016[1]. The source of map data was the Cassini imaging experiment (Porco et al., 2004)[2]. Cassini-Huygens is a joint NASA/ESA/ASI mission to explore the Saturnian system. The Cassini spacecraft is the first spacecraft studying the Saturnian system of rings and moons from orbit; it entered Saturnian orbit on July 1st, 2004.
The Cassini orbiter has 12 instruments. One of them is the Cassini Imaging Science Subsystem (ISS), consisting of two framing cameras. The narrow angle camera is a reflecting telescope with a focal length of 2000 mm and a field of view of 0.35 degrees. The wide angle camera is a refractor with a focal length of 200 mm and a field of view of 3.5 degrees. Each camera is equipped with a large number of spectral filters which, taken together, span the electromagnetic spectrum from 0.2 to 1.1 micrometers. At the heart of each camera is a charged coupled device (CCD) detector consisting of a 1024 square array of pixels, each 12 microns on a side.

MAP SHEET DESIGNATION

Se	Enceladus (Saturnian satellite)
400K	Scale 1 : 400 000
43.5/45	Center point in degrees consisting of latitude/west longitude
CMN	Controlled Mosaic with Nomenclature
2018	Year of publication

IMAGE PROCESSING[3]

- Radiometric correction of the images
- Creation of a dense tie point network
- Multiple least-square bundle adjustments
- Ortho-image mosaicking

CONTROL

For the Cassini 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/orientation, spacecraft orientation, and instrument pointing, which is used for planning space science missions and recovering the full value of science instrument data returned from missions (http://naif.jpl.nasa.gov/).

A 3-D control network was set up to correct errors in the nominal camera pointing data. The network utilized all images in the Cassini ISS CLR (effective wavelength λe = 651 nm), GRN (λe = 569 nm), IR3 (λe = 928 nm), and UV3 (λe = 343 nm) filters with a pixel scale between 50 and 500 m/pixel and a phase angle less than 120°; a total of 586 images. The control network consisted of 10,362 tie points and 173,704 individual image measures, averaging nearly 17 measures per tie point. Least squares bundle adjustment resulted in a root mean square (rms) residual of 0.45 pixels, corresponding to rms ground point uncertainties of 66 m, 51 m, and 46 m in latitude, longitude, and radius, respectively. The bundle solution yielded independently determined shape information, resulting in radii (a, b, c axis) slight smaller than, but within the stated uncertainty of, IAU values, and a 0.769° shift in the prime meridian offset (W_0). Using this geodetic control network, updated pointing kernels for every image were calculated, substantially improving image locations. Additionally, a new global mosaic of Enceladus using the best available data from the mission was created.

The longitude system according to Davies and Katayama (1983)[4] and adopted by the IAU/IAG (International Astronomical Union/International Association of Geodesy) Working Group on Cartographic Coordinates and Rotational Elements as standard (Archinal et al., 2018)[5] is defined by crater Salih at 5° west.

MAP PROJECTION

Lambert conic conformal projection with two standard parallels at 58°N and 30°N
Scale is true at 58°N and 30°N
Adopted figure: sphere
Mean radius: 252.1 km
Grid system: planetographic latitude, west longitude

NOMENCLATURE

Names are suggested by the ISS-Camera-Team and approved by the International Astronomical Union (IAU). For a complete list of IAU-approved names on Enceladus, see the Gazetter of Planetary Nomenclature at http://planetarynames.wr.usgs.gov/.

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[4] Davies, M.E. and Katayama, F.Y., 1983, The Control Networks of Mimas and Enceladus, Icarus, 53, 332-340.

[5] Archinal, B.A., Acton, C.H., A'Hearn, M.F., Conrad, A., Consolmagno, G.J., Duxbury, T., Hestroffer, D., Hilton, J.L., Kirk, R.L., Klioner, S.A., McCarthy, D., Meech, K., Oberst, J., Ping, J., Seidelmann, P.K., Tholen, D.J., Thomas, P.C., Williams, I.P., 2018, Report of the IAU Working Group on Cartographic Coordinates and Rotational Elements: 2015, Celestial Mechanics and Dynamical Astronomy, 130, 3, 22.

Image processing (USGS): Becker, T.L., Bland, M.T.
Cartographic production and design (DLR): Kersten, E., Wählisch, M.

EDITOR

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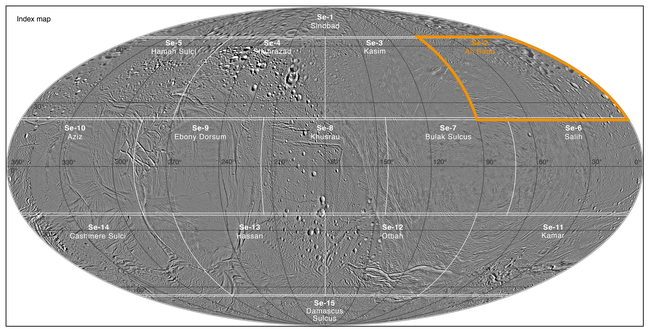
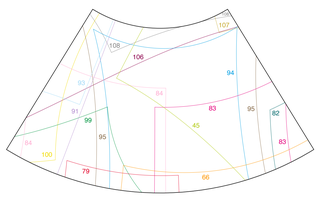
Index map



Index of Cassini images



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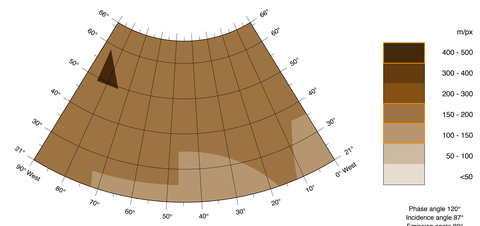
Resolution of the images