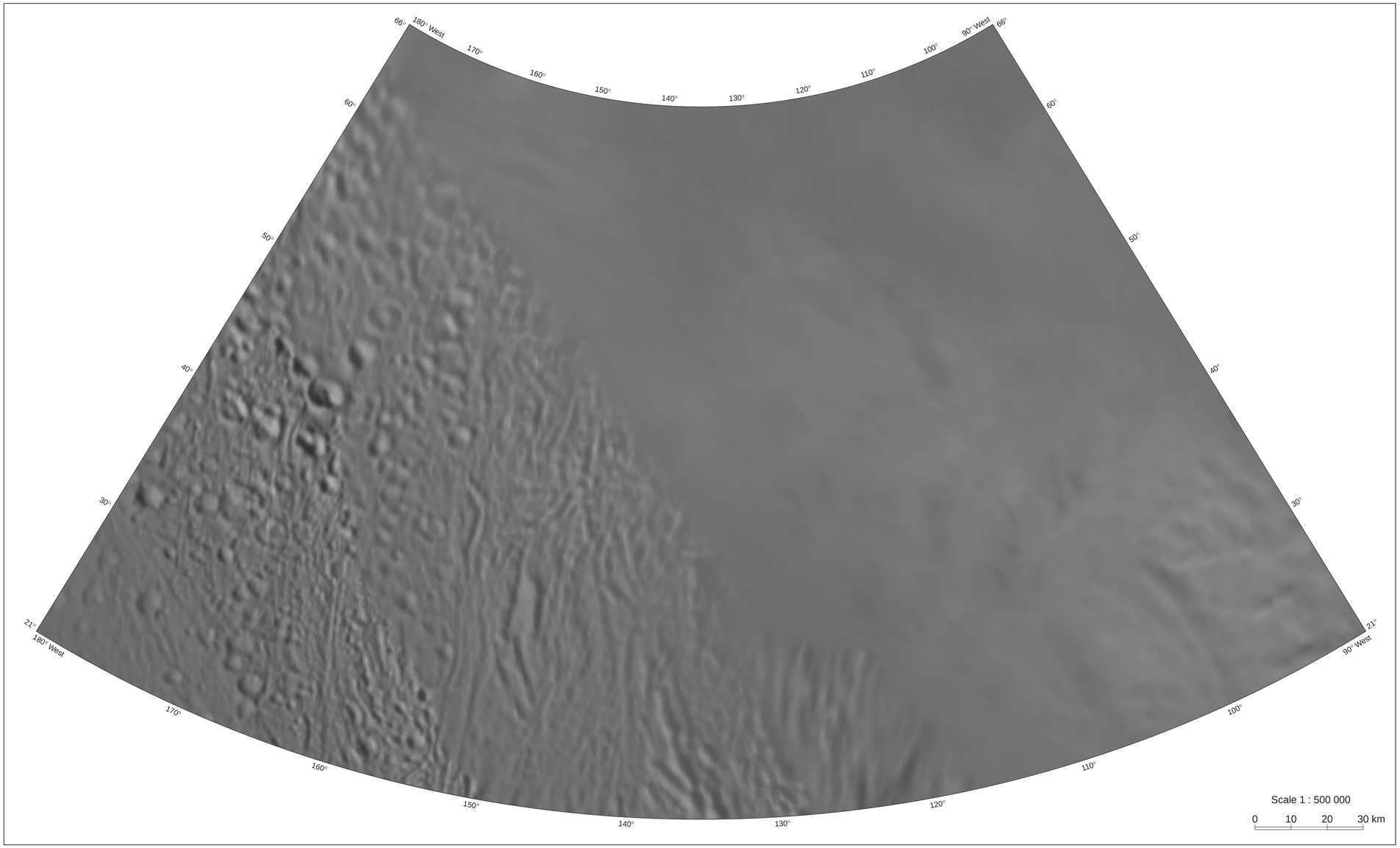
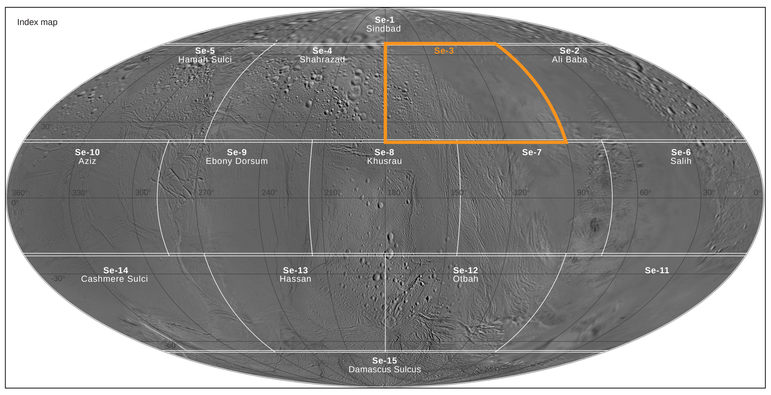
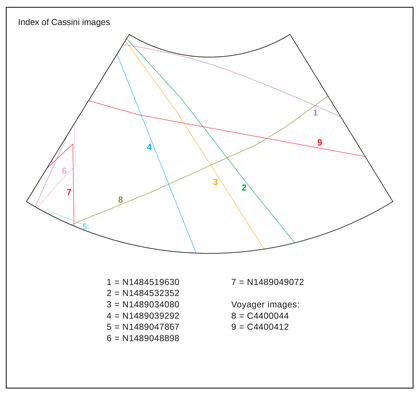
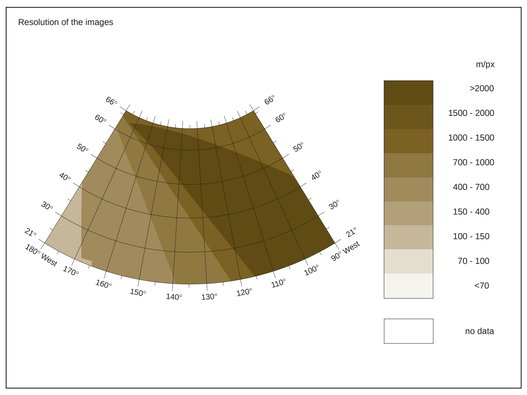
Controlled Mosaic of Enceladus

Se 500K 43.5/135 CMN, 2006









GENERAL NOTES

This map sheet is the 3rd of a 15-quadrangle series covering the entire surface of Enceladus at a nominal scale of 1: 500 000. The source of map data was the Cassini imaging experiment (Porco et al., 2004)[1,2].

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)
500K	Scale 1 : 500 000
43.5/135	Center point in degrees consisting of latitude/west longitude
CMN	Controlled Mosaic with Nomenclature
2006	Year of publication

IMAGE PROCESSING[3]

- Radiometric correction
- Geometric correction
- Photogrammetric adjustment using least-square and limb-fitting techniques
- Map projection
- Photometric correction using the Hapke bidirectional reflectance function
- Processing of the mosaic

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, 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/). While the orbit information was sufficiently accurate to be used directly for mapping purposes, the pointing information was improved using limb-fit techniques. Newly derived tri-axial ellipsoid models were used to calculate the surface intersection points. A spherical reference surface is used for map projections.

A 3-D control net was set up to correct errors in the nominal camera pointing data. The adjustment improved the computed camera pointing angles and the 3-D control net with average one sigma errors of 736 m, 335 m, 608 m for the x, y, z coordinates, respectively. Unfortunately, the control points are not equally distributed over Enceladus' surface due to missing stereo data around the prime meridian. The improved pointing data were used to calculate a medium-resolution, controlled mosaic. Finally, the high-resolution mosaic calculated as described above was registered on the controlled mosaic to improve its global accuracy and feature definition.

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[4]

Grid system: planetographic latitude, west longitude

NOMENCLATURE

Names are 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/.

REFERENCES

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[2] Porco, C.C., Helfenstein, P., Thomas, P.C., Ingersoll, A.P., Wisdom, J., West, R.A., Neukum, G., Denk, T., Wagner, R., Roatsch, Th., Kieffer, S., Turtle, E.P., McEwen, A., Johnson, T.V., Rathbun, J., Veverka, J., Wilson, D., Perry, J., Spitale, J., Brahic, A., Burns, J.A., DelGenio, A.D., Dones, L., Murray, C.D., Squyres, S., 2006, Cassini Observes the Active South Pole of Enceladus, Science, 311, 1393-1401.

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