FANTASTIC CONTROLLED IMAGES OF ENCELADUS AND WHERE TO FIND THEM

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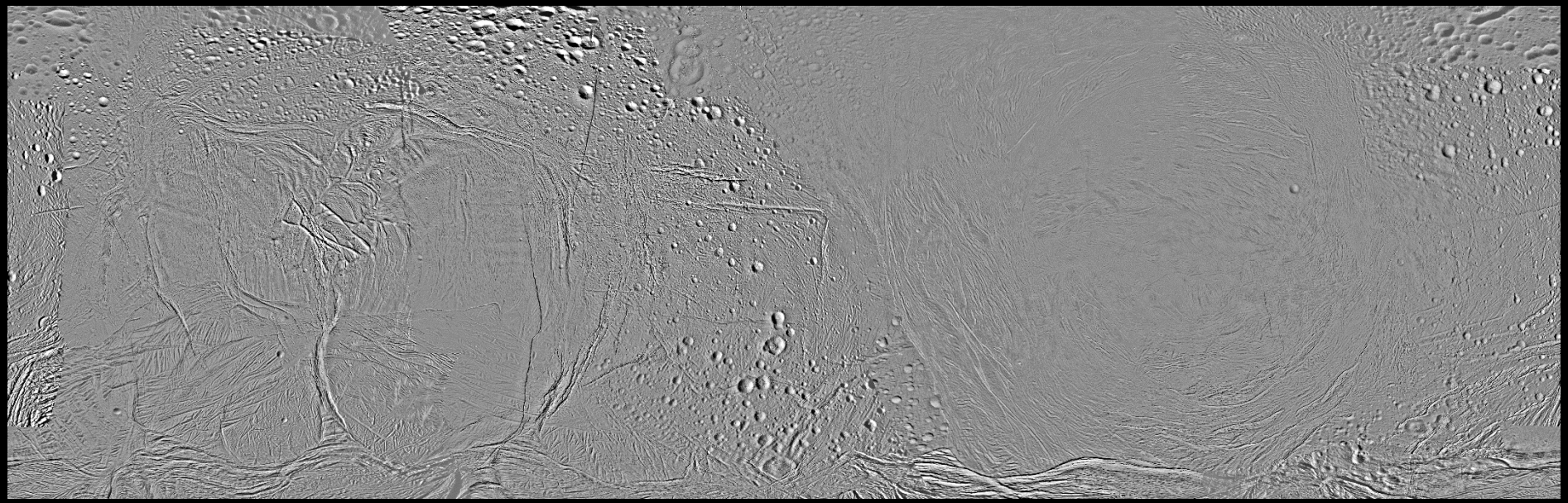

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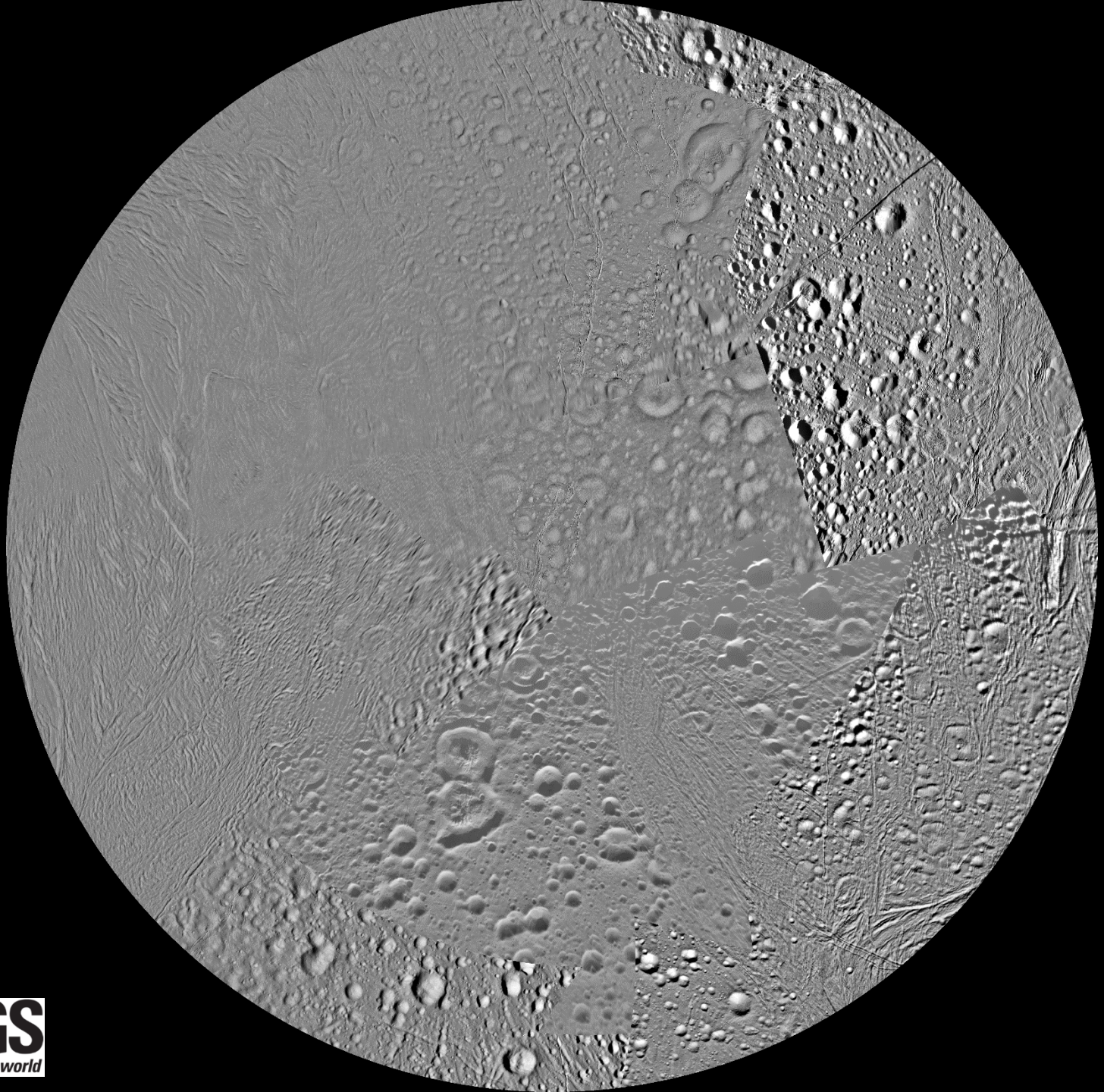
With support from: Cassini Data Analysis Program, Planetary Geology and Geophysics, NASA-USGS IAA
And thanks to: The Cassini imaging team



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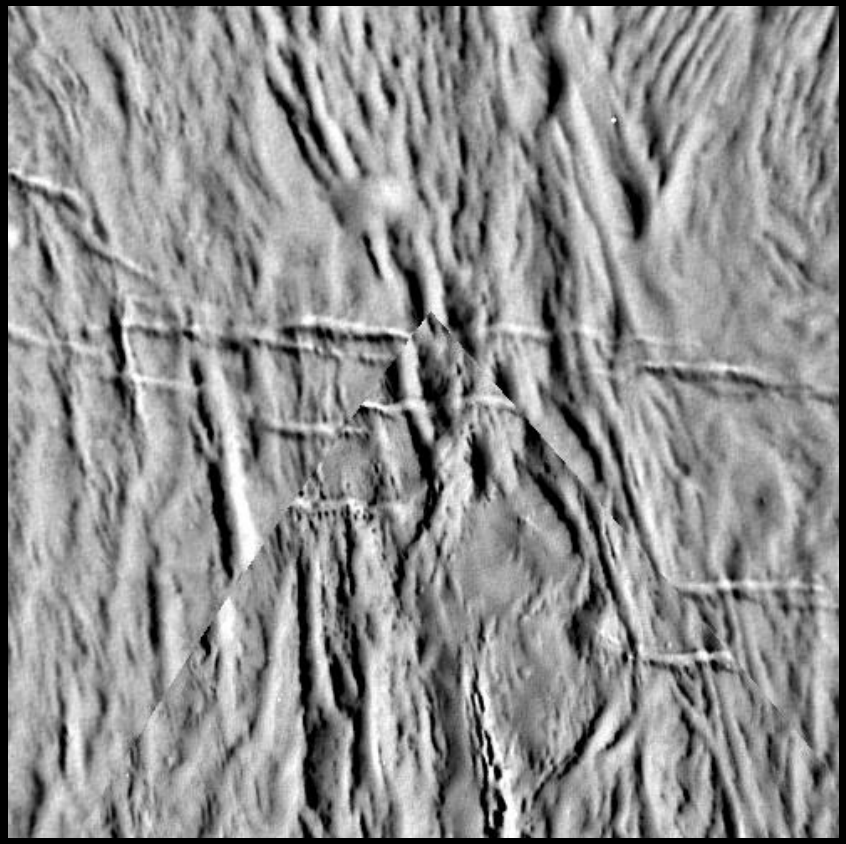
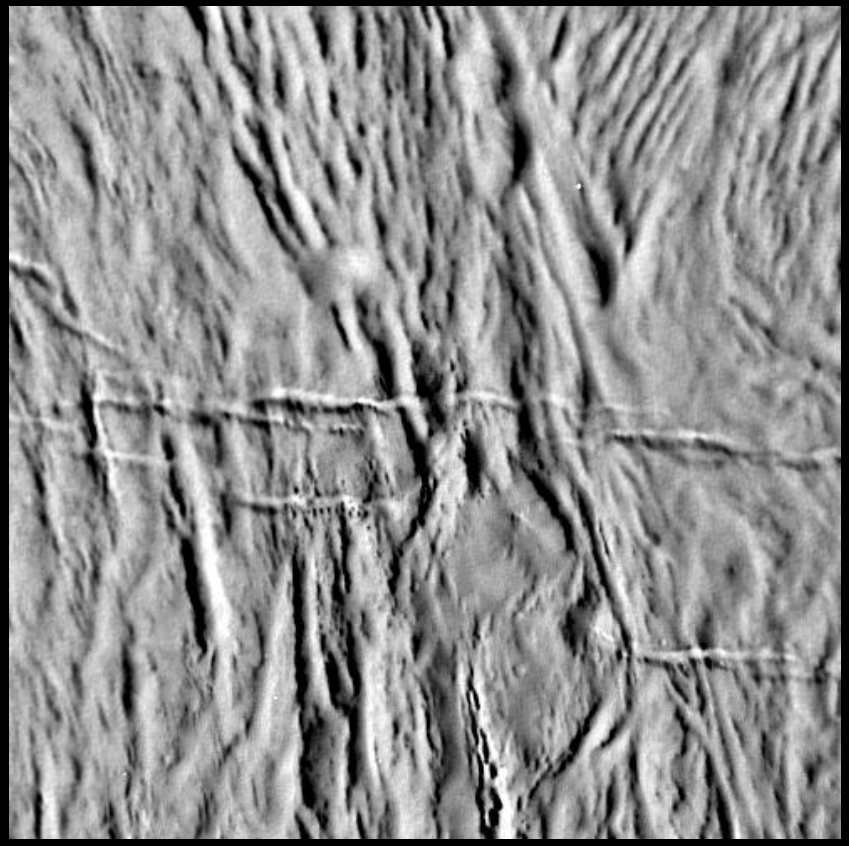
More than a mosaic…

- 586 controlled images of Enceladus
- Resolution better than 500 m/pixel
- CLR, GRN, UV3, IR3

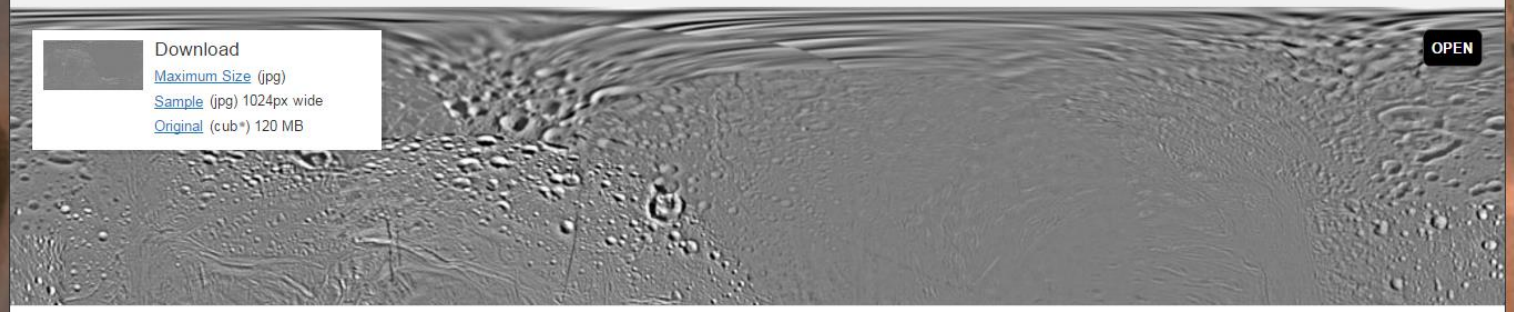
We put the pixels where they belong so you can do science



Original, reconstructed SPICE



“Smithed” SPICE



Download
Maximum Size (jpg)
Sample (jpg) 1024px wide
Original (cub*) 120 MB

Enceladus Cassini Global Mosaic 100m

This mosaic represents the completion of a global control network of Enceladus containing Cassini Imaging Science Subsystem (ISS) images. A total of 586 images in CLR, GRN, UV3, and IR3 filters were selected for the control network. The image selection criteria were based on coverage, quality, and a spatial resolution between 50 and 500 m/pix with phase angles less than 120 degrees. While this collection of images was sufficient for global coverage of Enceladus, the coverage in some filters, specifically UV3 and IR3, were inadequate. A high pass filter has been applied to the images in order to achieve a uniform brightness (the low frequency albedo has been removed) and then converted to an 8bit data range. All images were map projected to the IAU mean radius (252.1 km/px). GeoTiff version of the file are available under the ancillary section as well as north and south polar versions in both ISIS3 cub format and GeoTiff format.

The Cassini Equinox Mission is a joint United States and European endeavor. The imaging team consists of scientists from the US, England, France, and Germany. The imaging operations center and team lead (Dr. C. Porco) are based at the Space Science Institute in Boulder, Colo.

Under ancillary (on the right), you will find polar files in ISIS3 cube and GeoTiff formats for the final controlled mosaics. You will also find several derived images generated during the creation of this mosaic including Equirectangular a polar versions for phase angle, emission angle, incidence angle, and ground resolution of the original input images. Also available are the updated SPICE kernels for the processed images. Please see the available readme for more information for using these SPICE files. Lastly a graphical PDF is available to show the image locations within the mosaic (and PDF file mapping the image id to the full image name).

Reference: Becker, T.L., et. al., 2016, Lunar and Planetary Science Conference XLVII, Abs. #2342. URL: http://www.hou.usra.edu/meetings/lpsc2016/pdf/2342.pdf

Mimetype: application/isis
Filename: Enceladus_Cassini_ISS_Global_Mosaic_100m_HPF.cub*
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Publication Date: 15 February 2016
Author: Tammy Becker, Mike Bland, USGS Astrogeology Science Center
Originator:
Cassini Team, Jet Propulsion Laboratory, Space Science Institute, Applied Physics Laboratory
Group: PDS*
Added to Astropedia: 18 March 2016
Modified: 4 August 2016

General

Purpose: This effort was in support of a new global geologic map of Enceladus.

Geospatial Data Presentation Form: Global Mosaic, Control Network*, Remote-sensing Data
Edition: Feb. 2016
Native Data Set Environment: ISIS v3
Supplemental Information: http://www.hou.usra.edu/meetings/lpsc2016/pdf/2342.pdf

Project, clip, convert format (e.g. PDS, GeoTIFF, Jpeg) and download this product with Map a Planet (requires account)
CLICK HERE for login advice for *Chrome* users.

Process

Ancillary Products

Enceladus_Cassini_ISS_Global_Mosaic_100m_HPF.tif* (tif) 106 MB
Enceladus_Cassini_ISS_NPole30N_100m_HPF.cub* (cub) 32 MB
Enceladus_Cassini_ISS_NPole30N_100m_HPF.tif (tif) 24 MB
Enceladus_Cassini_ISS_SPole30S_100m_HPF.cub (cub) 32 MB
Enceladus_Cassini_ISS_SPole30S_100m_HPF.tif (tif) 28 MB
Enceladus_Global_EQUI_400m_HPF_8bit_OUTLINE.pdf (pdf) 14 MB
Enceladus_Global_EQUI_400m_HPF_8bit_OUTLINE_Image_Index.pdf (pdf) 177 kB
Enceladus_Cassini_ISS_Global_Mosaic_EmissionAngle.zip (zip) 17 MB
Enceladus_Cassini_ISS_Global_Mosaic_GroundResolution.zip (zip) 767 kB
Enceladus_Cassini_ISS_Global_Mosaic_IncidenceAngle.zip (zip) 16 MB
Enceladus_Cassini_ISS_Global_Mosaic_PhaseAngle.zip (zip) 1 MB
Enceladus_Cassini_ISS_Global_Mosaic_Updated_SPICE.txt (txt) 3 kB
Enceladus_Cassini_ISS_Global_Mosaic_Updated_SPICE.zip (zip) 306 kB

Related Products

Enceladus Cassini Global Mosaic 110m

The Cassini Equinox Mission is a joint United States and European...

Secure | https://astropedia.astrogeology.usgs.gov/download/Enceladus/Cassini/ancillary/En

Apps | Astrogeology Intranet | USGS Flagstaff Scienc | USGS Intranet | USGS Astrogeology S | Gmail

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This directory contains an updated version of the target body kernel (pck)
with a modified value for the prime meridian offset (W0) for Enceladus
and the c-smithed camera pointing kernel (ck).

pck: cpck28Aug2015-PMmod.tpc
c-smithed ck:  CISS_Enceladus_SmithedCK.bc
c-smithed ck details (output of ckwriter): CISS_Enceladus_SmithedCK.README

It is important to note that this ck file contains only records for
images that were included in the bundle adjustment and supplied
as input to the ckwriter application that generated the c-smithed ck.

List of images:
    CISS_Enceladus_SmithedCK_ImageList.dat

Camstats output for all adjusted images:
    CISS_Enceladus_SmithedCK_camstats.csv

To apply these kernels to any of the included images, run spiceinit
as follows:

spiceinit from=one-of-the-included-images.cub \
          ck=/path/CISS_Enceladus_SmithedCK.bc \
          extra=/path/cpck28Aug2015-PMmod.tpc

Note: It is recommended that you include the full directory path where
these kernels reside in your environment. This ensures that ISIS geometry
applications (qview, cam2map, etc.) can locate these kernels.


Updated Prime Meridian Offset (W0) details:

For IAU standards for Enceladus, refer to the "2009" (published 2012) WGCCRE report.
http://astrogeology.usgs.gov/groups/IAU-WGCCRE and the links under "Report 11".

As indicated in Table 2, footnote h, the crater Salih has been chosen
to define the prime meridian of Enceladus. The longitude of Salih has been
defined at 5 degrees west longitude.

The current approved IAU value for the prime meridian offset (W0) is 6.32 degrees.

An initial bundle solution was run with the IAU approved value for W0.
One control point in the network is located at center of the crater Salih.
A total of 69 images contain measurements for this control point. The bundle result
placed Salih at 355.76882 degrees (positive longitude east). To maintain Salih
at the defined longitude of 355.0 degrees, we modified W0 by adding to 6.32 the
difference between the adjusted longitude of Salih and 355.0 (0.769 degrees).
The updated value of W0 (7.089 degrees) is in the updated Cassini pck supplied here.

To ensure the correctness of our computation of W0 we re-ran spiceinit on all input
images using the updated pck. We then re-ran the bundle adjustment with the updated
value for W0. The resulting longitude for Salih was 355.00728 degrees
(positive longitude east) thus confirming our process.  The adjusted uncertainty on
the longitude of Salih is 34.837 meters.

The Enceladus Radius was constrained to the IAU values
NAIF:BODY602_RADII = (256.6, 251.4, 248.3) Kilometers

Map projection needs to be set to the IAU Mean Radius: 252.1 kilometers

"cam2map" map templates for Equirectangular and Polar Stereographic are available:

Enc_MeanR_PosEast360_100m.map
Enc_MeanR_PosEast360_100m_NP.map
Enc_MeanR_PosEast360_100m_SP.map

Enc_MeanR_PosWest360_100m.map
Enc_MeanR_PosWest360_100m_NP.map
Enc_MeanR_PosWest360_100m_SP.map

Contact: Tammy Becker, tbecker@usgs.gov
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https://astrogeology.usgs.gov/search/map/Enceladus/Cassini/Enceladus_Cassini_ISS_Global_Mosaic_100m_HPF

Contact:

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- Trent Hare (thare@usgs.gov)

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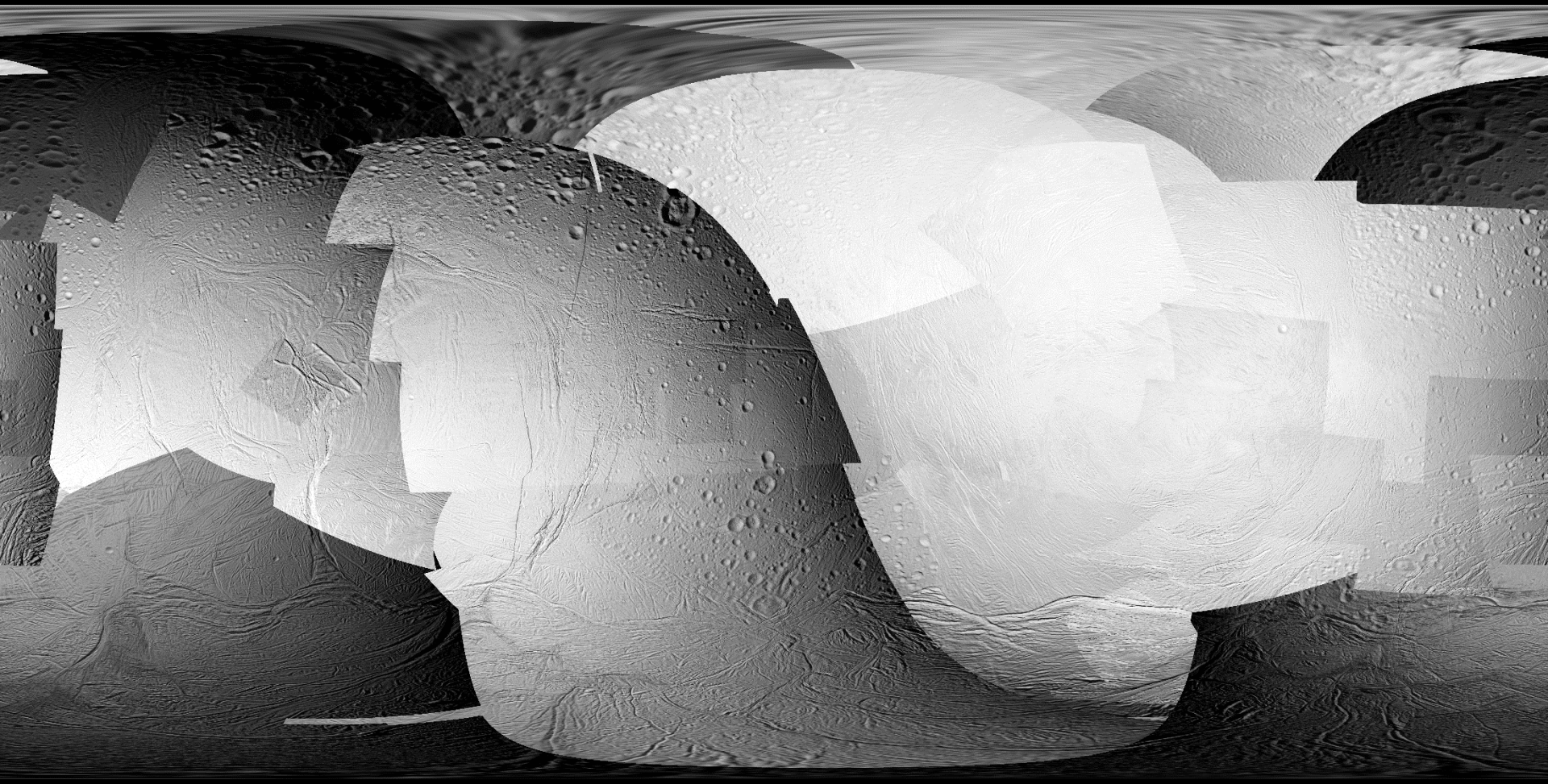
Photometric control… is difficult

- Highly variable illumination
- High emission and incidence



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Lessons learned for multi-flyby missions

Variable illumination creates challenges for…

- Reconstructed SPICE
- Image control (e.g., feature matching)
  - Digital Terrain Models creation
  - Shape and rotation (libration!)
- Photometric control
  - Comparison to previous data sets
- Image interpretation
- Change detection

A friendly reminder for missions…

- Consider community data usability EARLY
- ISIS requires camera models
- Development easiest when…
  - Mission team is involved
  - occurs early

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