SOST Highlights of S98

There are no segments in S98, but there are four types of key scientific observations, represented by 11 PIEs

- Plume observations (3 PIEs)
- Enceladus S. Pole heat monitoring (2 PIEs)
- Occultations (2 PIEs of Dione and one PIE of Enceladus)
- One of the “Five Fabulous Flybys” of the Rocks (one PIE); Rings also has one “Fabulous Flyby” of Pan; on additional Epimetheus as well

Also:

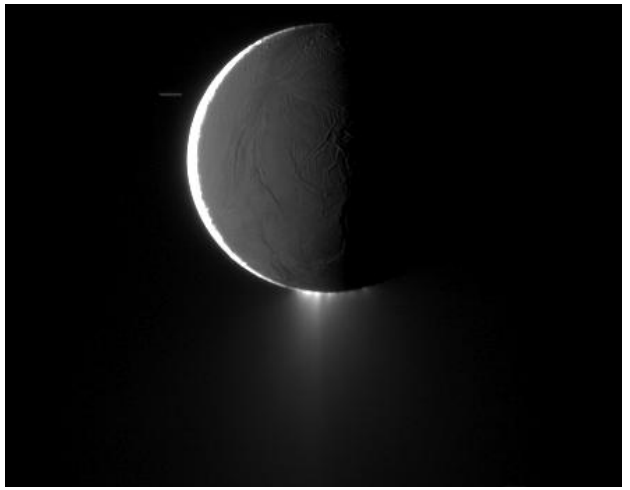
- Red Tethys
- Zero phase observation of Iapetus

S98: SOST Plume PIE Observations

Why so many plume observations?

1. To obtain different viewing geometries which better characterize plume morphology, particle size, and the relationship between individual jets and surface features and thermal anomalies. Specific jets are mapped to specific locations. In addition, large distances are required for context and to understand the relationship of the plumes to E-ring.

2. To understand the variability of geologic activity on Enceladus. The same viewing conditions at different times are required.

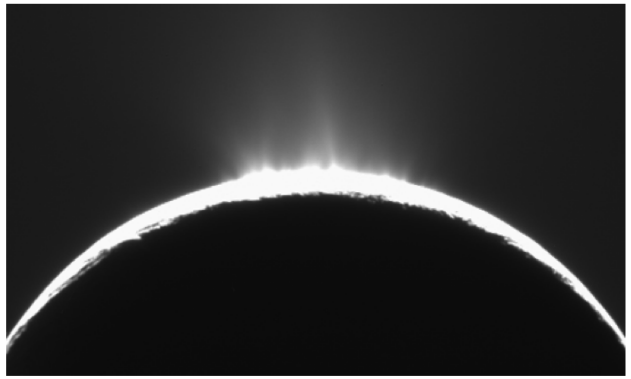


PLUME PIEs in S98 (ORS are in ridealong)

RINGS Rev 260 segment
ISS_260EN_PLUME001_PIE
2017-039T19:15:00--040T03:05:00

SATURN Rev 264 segment
ISS_264EN_PLUME001_PIE
2017-068T12:35:00-14:43

SATURN Rev 267 segment
ISS_267EN_PLUME001_PIE
2017-090T07:10:00- 14:05:00



S98: Enceladus S. pole heat-monitoring PIEs

South pole observations:

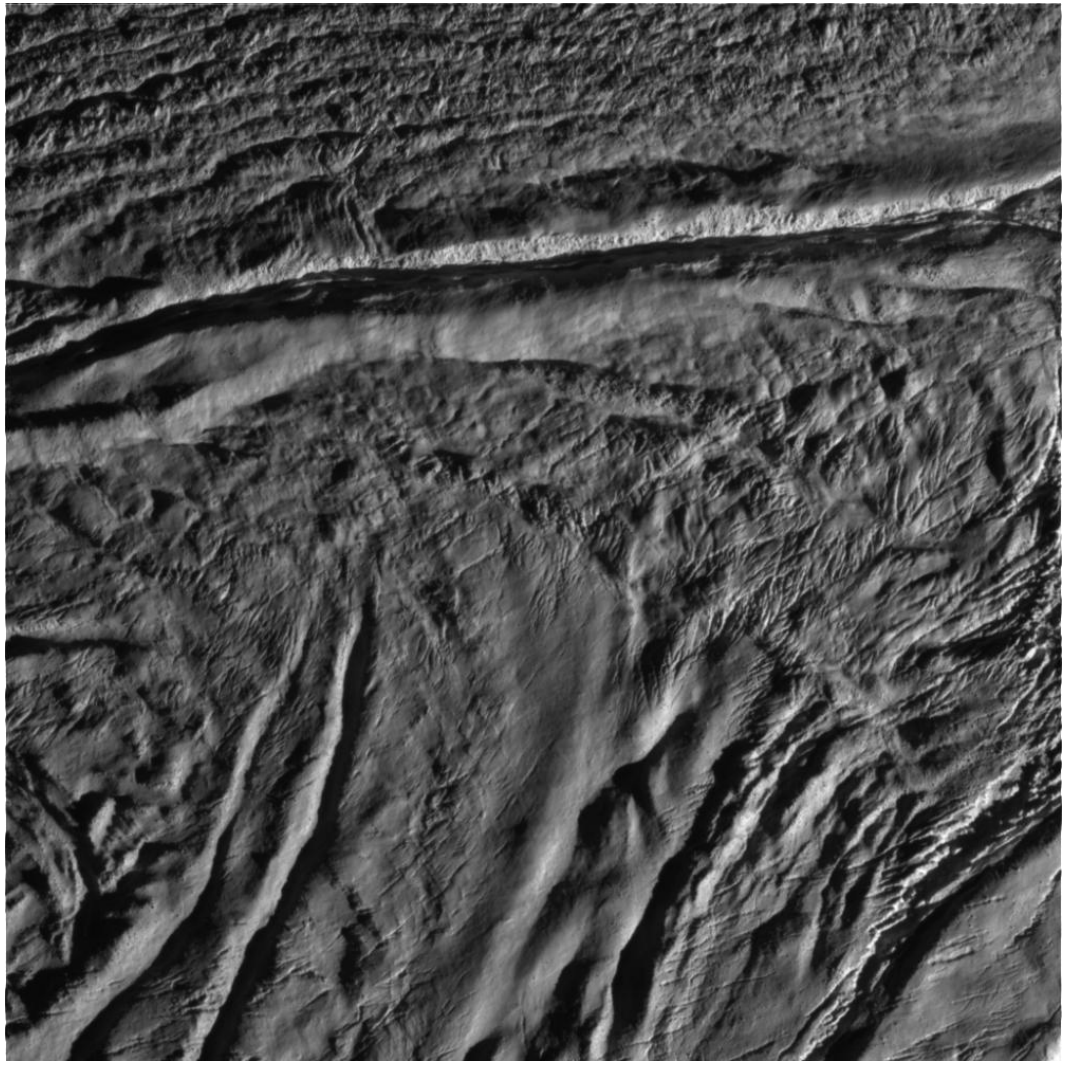
MAPS Rev 263

CIRS_263EN_SP005_PIE
2017-059T16:30:00--060T05:44:00

SATURN Rev 267

CIRS_267EN_SP006_PIE
2017-088T06:48:00-13:30:00

The purpose of the S. Pole observations is to characterize the heat flow, including the background heat production, and its variability with time and with mean anomaly. Other ORS are in ridealong



S98: SOST UVIS Stellar Occultations: Dione and Enceladus

DIONE:

MAPS Rev 263
UVIS_263DI_ICYEXO001_PIE
2017-058T19:41:00-21:05:00
Actual occ is from 20:23:32 to 20:25:09

RINGS Rev 268
UVIS_268DI_ICYEXO001_PIE
2017-095T02:49:00-04:04:00
Actual occ is from 03:22:32 to 03:25:02

The main goal of these occultation is to search for possible volatiles (CO_2, O_2, OH, H_2, etc.) in the vicinity of Dione that would indicate the presence of a plume or atmosphere. Chemical and impact processes may leave products which are captured into a tenuous atmosphere of Dione, or the moon may be active.

CIRS, VIMS and ISS are riding along in this observation (although the stars are UV-bright).

ENCELADUS:

SATURN Rev 267
UVIS_267EN_ICYEXO001_PIE
2017-086T13:58:00-15:22:00
Actual occ is from 14:39:02 to 14:40:18

The purpose of Enceladus occultations is to understand the structure of the plume, its variability, and composition. ORS are in ridealong

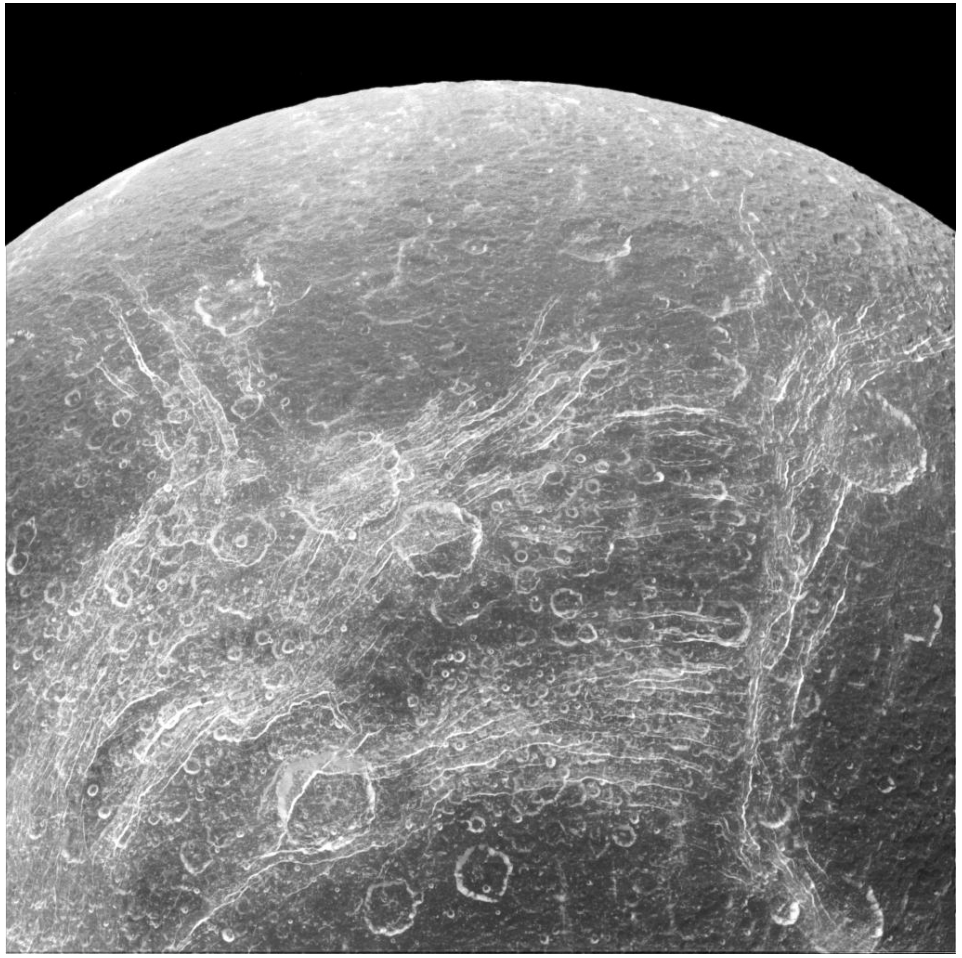


Image of Dione from the last targeted flyby (D5)

Five Fabulous Flybys (Best ever!): Two in S98

Object	Date	Closest approach (km)
Pandora	18 Dec 2016	20,000; closest by almost a factor of 3
Daphnis	16 Jan 2017	17,600; closest by over an order of magnitude
Epimetheus	30 Jan 2017	5900; closest by factor of 6
Pan **S98**	7 March 2017	25,350; closest by a factor of 2 **RINGS PIE in SATURN_264**
Atlas **S98**	12 April 2017	13,170; closest by factor of 2 **SOST PIE in RINGS_269**

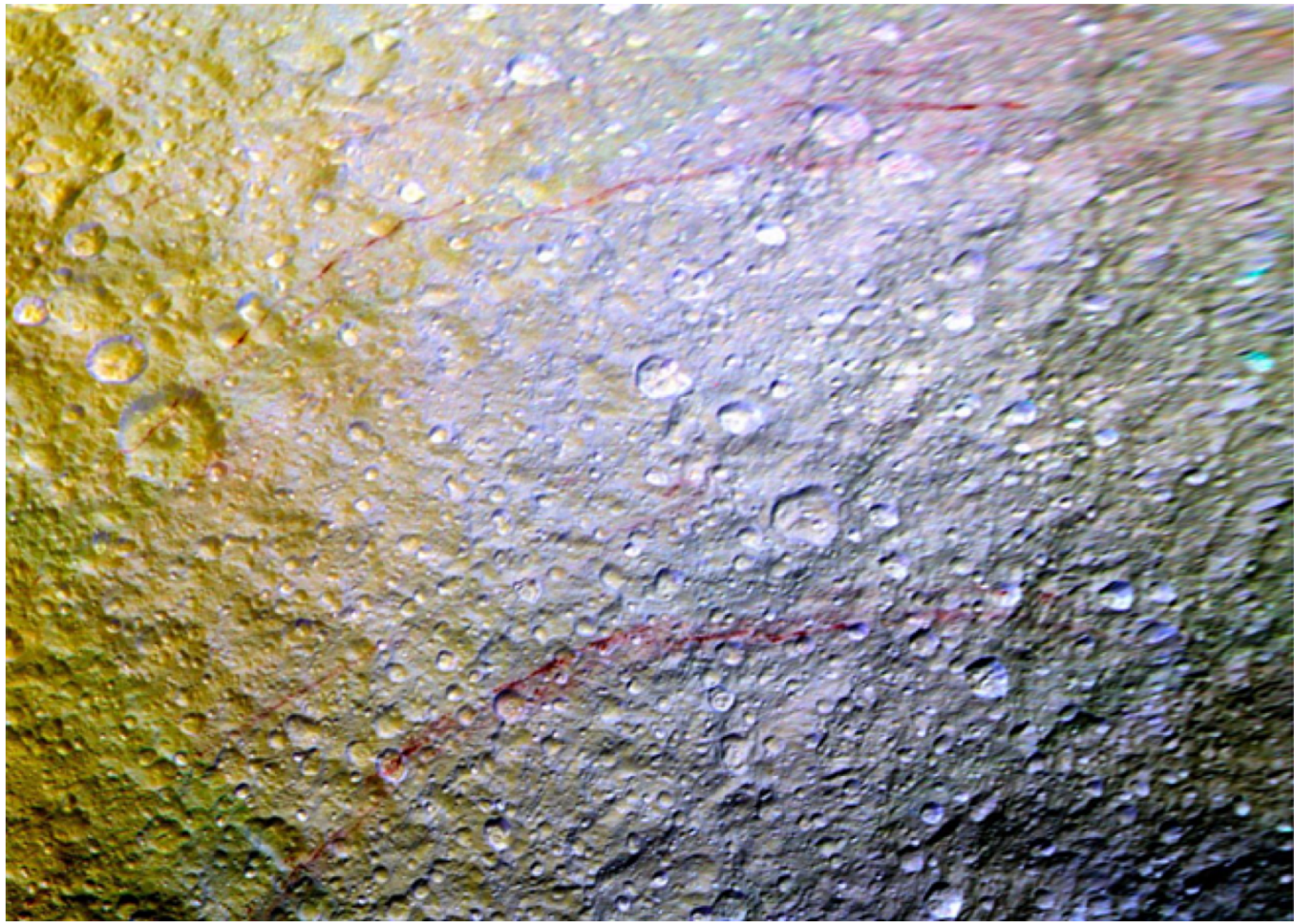
Additional Epimetheus:

RINGS Rev 262
ISS_262EP_EPIMETHEU001_PIE
2017-052T09:33:00-10:43:00
C/A at ~10:03 is 10,500km at a solar phase angle of 74°; ORS is in ridealong

The number of observations accumulated on the small moons is approaching the point where real physical characterizations can be done, including construction of geologic maps, solar phase curves and light curves, and spatially-resolved spectroscopy

Red Tethys MAPS_265_267 segment ISS_265TE_REDTETHYS001_PIE 2017-073T20:35:00-21:05:00

- This observation is designed to further map the mysterious red streaks on Tethys
- Full disk, equatorial regions; only expect good ISS data (~400,000 km range, moderate solar phase angle).



Iapetus significant observation (not a PIE) in XD 264

ISS_264IA_ZEROPHASE001_PRIME

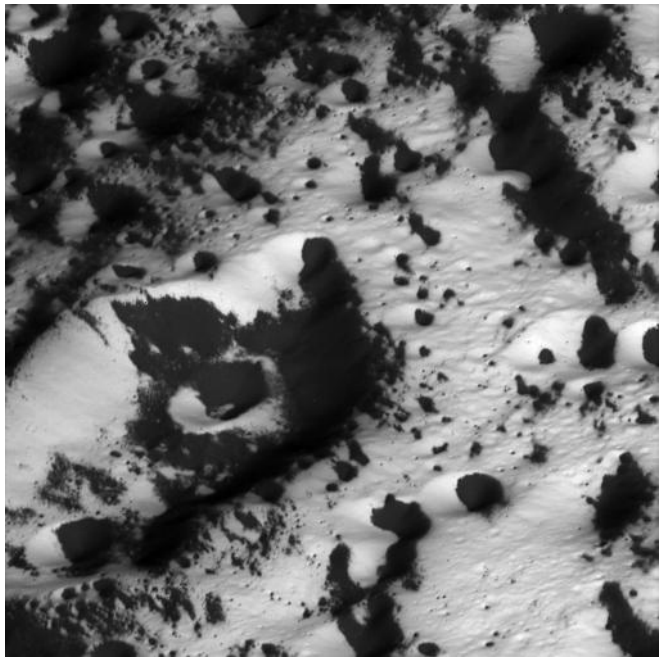
2017-070T00:13:00-14:43

VIMS and UVIS in Ridealong

Science Goals:

To obtain observations of Iapetus at small solar phase angles to determine the micro-texture of its surface and its geometric albedo. Ultimately the latter quantity is important in determining its bolometric Bond albedo, which in turn is key to models of volatile transport.

Gets down to 0.2 º, which is not the lowest, but it is low.



ISS image of Iapetus showing complexity of surface