

# E20: Rev 223

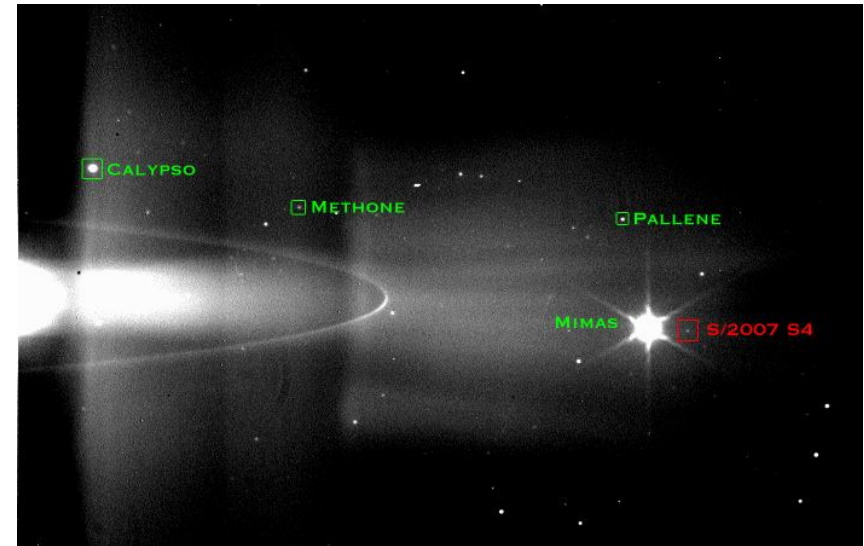
**2015-287T10:41:29.74 (14 Oct 2015)**  
**1842.3 km**

The main goal of this flyby is to obtain the first detailed ORS study of the northern polar regions of Enceladus. Approach imaging at <20 m is the goal with sunlit views in Northern and Northern temperate latitudes. Chance to look at regions affected by plume. ISS will be observing with ORS ridealong

Other observations include a CIRS Dione observation to understand the thermal properties of this moon, 2 Enceladus jet observations, a UVIS occ, and two outer irregular moon observations.

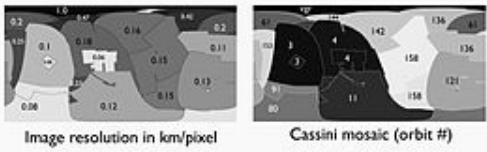
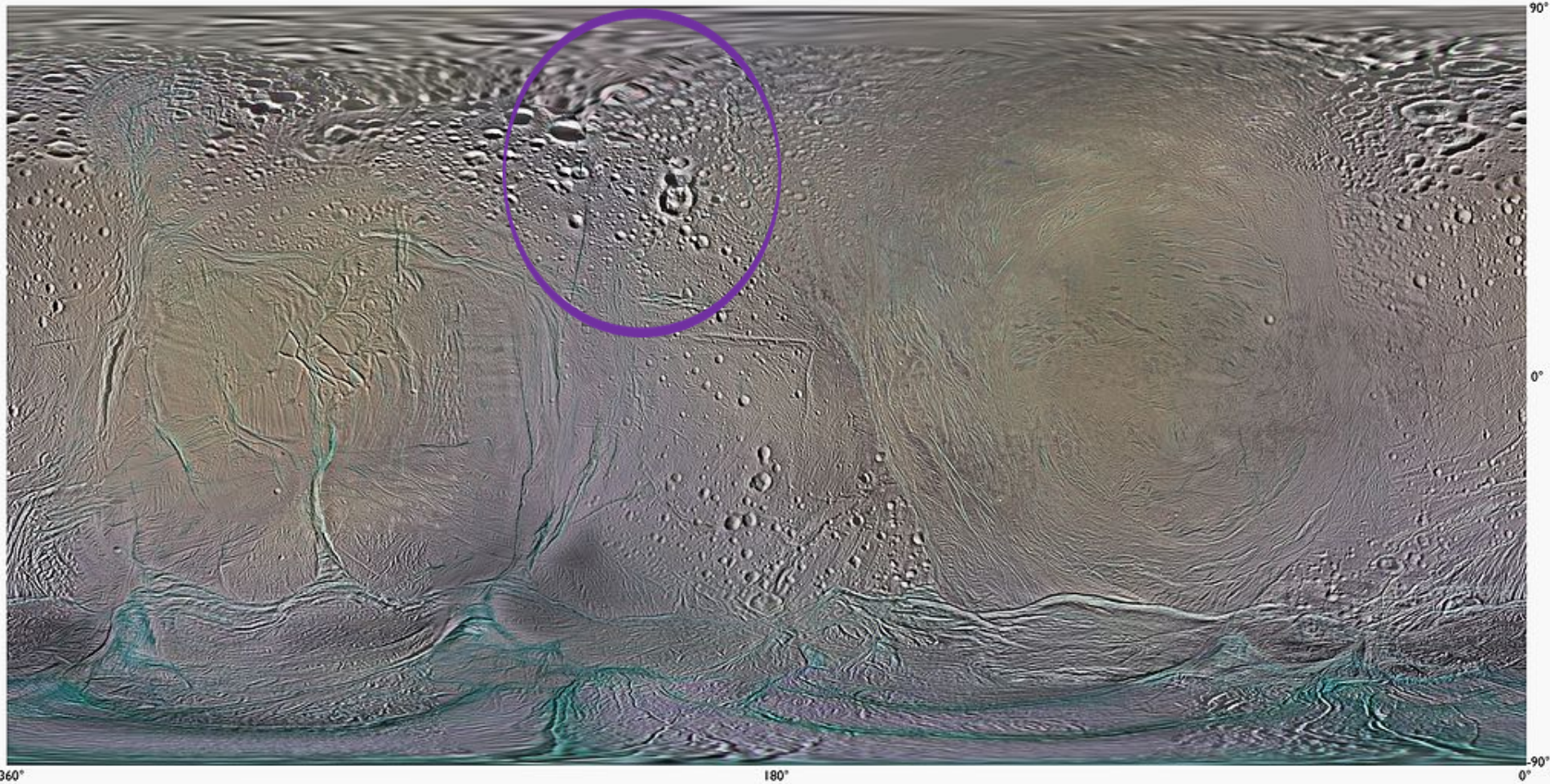
Also, there is a CDA measurement of the dust environment around Pallene, which may be the source of the tenuous ring that shares its orbit.

Schematic  
drawing of occ



Pallene and its kin

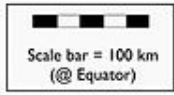




### Global 3-Color Map of Enceladus (IR3-GRN-UV3)

April 2014

Cartographic control and digital mosaic construction by Dr. Paul Schenk (LPI, Houston)  
 Cassini ISS images acquired 2004-2014  
 Simple cylindrical map projection at 100 meters/pixel (@ Equator)



**The N. Pole E20 observations will focus on the above area.**



# E21: Rev 224

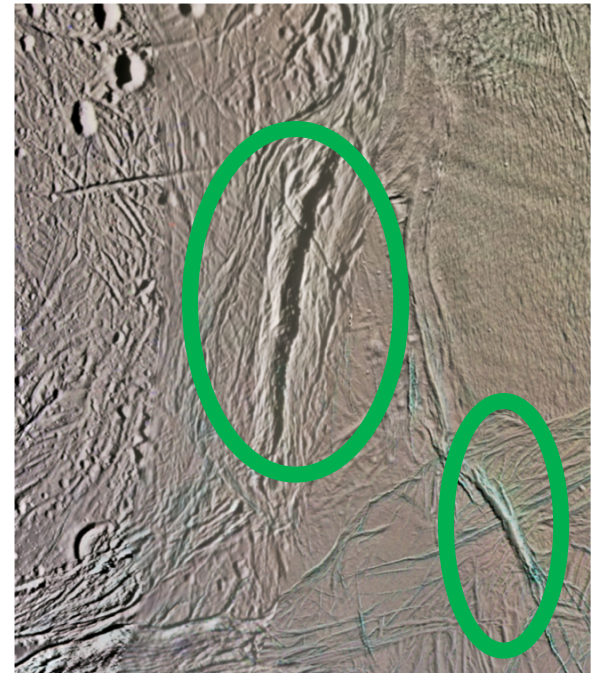
2015-301T15:22:46.97 (28 Oct 2015)

52.7 km

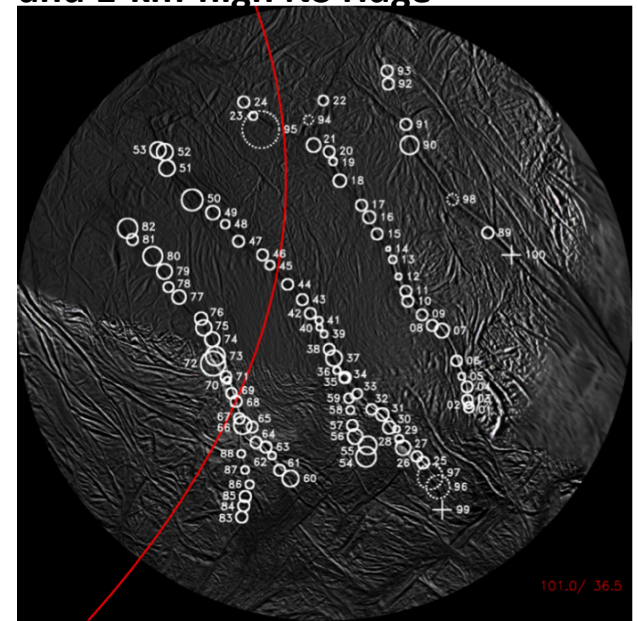
During this lowest-ever plume crossing, CDA is performing in-situ measurements of plume composition, number densities, and size distribution of freshly ejected ice particles . One of the main objectives is to use INMS's open source neutral beaming mode to constrain estimates of H<sub>2</sub>. There is also an ORS drag.

Two observations of Bestla , an outer irregular moon, and two plume PIEs are discussed below. There is an approach ISS map of Enceladus, with ORS ridealong, and a UVIS occ. There is also a CDA dust measurement about 9 hours before closest approach.

The ORS groundtrack near C/A



Highlights in E21 include NS fracture, and 1-km-high NS ridge



# SOST Plume PIE Observations (Recap)

## 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.

### JET PIES: in rev 223:

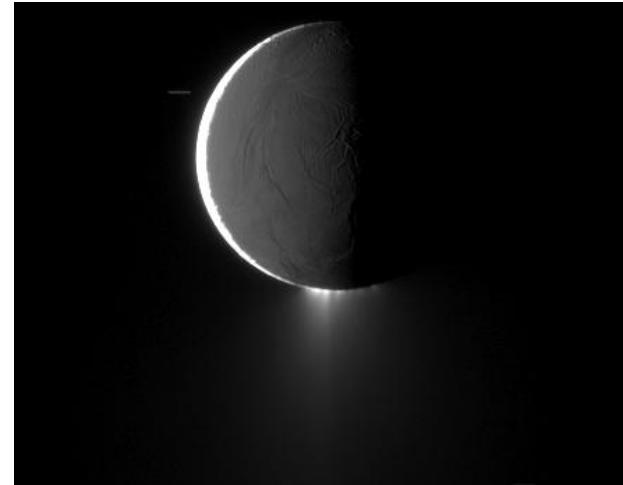
2015-287T16:55:00 for one hour

2015-288T08:18:00 for 07:12 hours

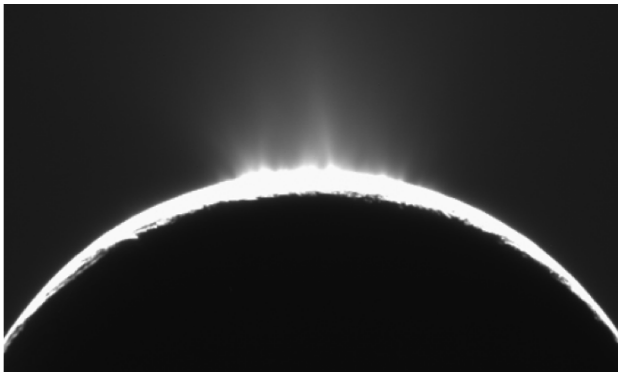
### PLUME PIES in rev 224:

2015-301T20:00:00 for 1:09 hours

2015-302T07:25:00 for 02:35 hours



Nov. 30, 2010



# “Rock” observations (not PIEs)

## *Rock observations in S91*

There are two observations in each of revs 223 and 224 of the outer irregular moons, two of Hati (S48) in rev 223 and two of Bestla (S54) in rev 224. The main goal of these observations is to determine the moons’ rotational pole positions, with secondary goals of refining our knowledge of their shapes and rotational periods.

## *Science goals in general for these observations of rocks:*

To obtain observations of the rotational states of the outer irregular moons of Saturn, to understand their collisional and dynamical history. The compilation of data on many moons will provide clues regarding theories of the early history of the Solar System, e.g., the Nice Model

Tilman Denk’s Participating Scientist project



“Rocks”

# Two PIEs not in SOST segments

SATURN\_222 (DIONE\_OR\_S PIE)  
**2015-273T07:00:00-273T11:00:00**

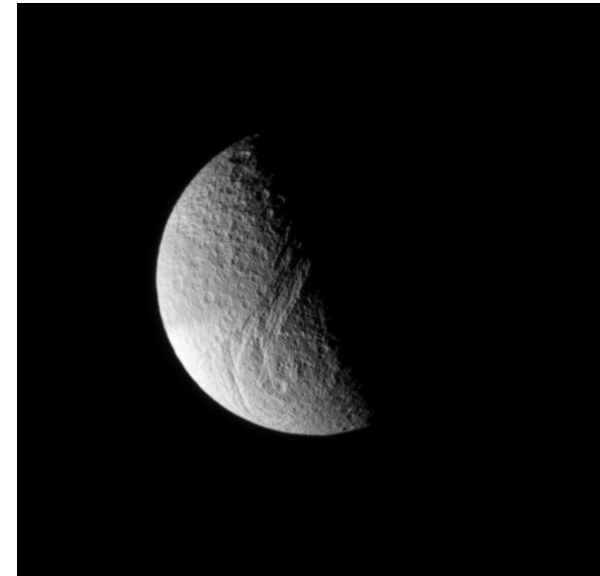
The closest approach is around 41,000 km with moderate to high solar phase angles. Right before 11:00 UT Titan nearly occults Dione for a great photo opp. The main scientific goals of this PIE are to increase phase angle and longitude coverage .

MAPS\_226 (TETHYS\_OR\_S PIE)  
**2015-327T20:00:00-327T23:30:00**

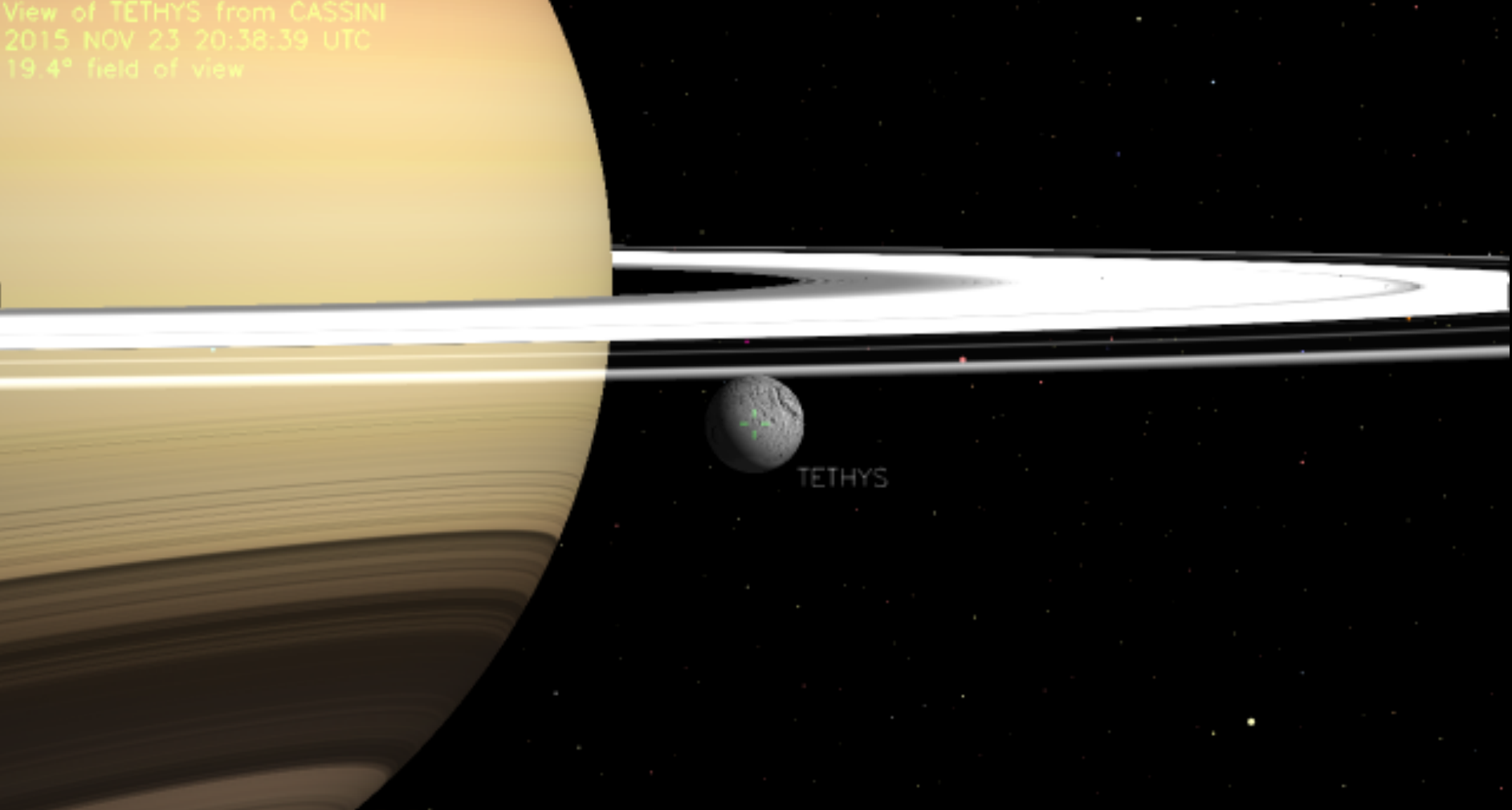
This ~18,000 km flyby of Tethys gives additional phase angle and longitude coverage, plus another great photo opp, as the moon slides along the main ring system of Saturn before C/A (see next page).



Dione (above); Tethys (below)



View of TETHYS from CASSINI  
2015 NOV 23 20:38:39 UTC  
19.4° field of view



TETHYS

SATURN

Solar System Simulator v4.0

Photo opp on rev 226 PIE