



CASSINI SOST SEGMENT

Rev 286 Handoff Package

Segment Boundary 2017-212T14:16:00 – 2017-215T07:12:00

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Science Highlights

Notes & Liens

This document has been reviewed and determined not to contain export controlled technical data

DOY 212:

UVIS_286_AURSLEW001_PIE is a long (14 hours 53 minutes) observation of the northern auroral zone ideal for UV imaging by slewing the spacecraft. The observations are obtained with a sub-spacecraft latitude of 29-56N, providing a clear view of the auroras, at an unusually close range (10.9-1.7 Rs). This will provide some of the highest resolution auroral images of the mission, allowing UVIS to image multiple arcs and spots of emissions and search for satellite footprints.

DOY 213:

VIMS_286SA_AURSTARE001_PRIME is a VIMS stare at the southern aurora with CIRS and UVIS riding. This is the closest auroral observation VIMS will make (starting post-periapsis at h~23000 km) during the entire mission, giving the highest spatial resolution of the H3+ emission morphology. The stares are pointed at the sub-spacecraft longitude and 75S latitude. This is one of only two VIMS-optimised auroral observations during the proximal orbits and thus provides important coverage of the long-term variability of the aurora.

CIRS_286EN_SPOLE001_PRIME will be taken during orbit 286, which is a designated cold orbit. Since CIRS will be cold its signal to noise is higher, and data taken can be well calibrated. At the time of the observation Enceladus' south polar region in winter, thus its passive emission is minimized making it an ideal time to determine its endogenic emission. This observation is a 3 hr and 40 min distant (~170,000 km) observation of Enceladus' active south polar terrain. The observation time will be used to make many slow CIRS FP3 scans of Enceladus' active south polar terrain region. This observation (together with the following CIRS_286EN_SP007_PIE) provides CIRS a final opportunity to determine Enceladus' endogenic heat flow and monitor its spatial and temporal variability.

DOY 213 continued:

CIRS_286EN_SP007_PIE is the seventh and final observation in a long campaign during Cassini's XXM to determine whether Enceladus' heat varies with orbital location (as its plumes are known to). At the time of the observation Enceladus' south polar region is in winter, thus its passive emission is minimized making it an ideal time to determine its endogenic emission. It is a 3 hr 11 min observation of Enceladus taken during orbit 286 which is a designated cold orbit, which increases CIRS' signal to noise and data taken to be well calibrated. The observation time will be used to make many slow CIRS FP3 scans of Enceladus' active south polar terrain region. Differences between these scans, and those from other observations in the campaign, will be looked for to determine the temporal variability of Enceladus' thermal activity.

ISS will perform two plume search observations at Dione. The first, ISS_286DI_PLUMESEAR011_PRIME, begins at 2017-213T16:20 and lasts for 5hr 05min. During the observation, the range to Dione increases from 751000 to 779500 km, resulting in spatial resolutions of 4.5 to 4.7 km/pxl (NAC full-res.). The phase angle decreases from 165 deg to 161 deg. Sub-spacecraft point is over the Saturn-facing hemisphere at ~15 deg South latitude / 33 to 54 deg West longitude. This puts the limb with the thin crescent just over the wispy-streak area

DOY 214

The ISS_286EN_PLUME001_PIE observation is part of the plume monitoring campaign tracking the plume brightness with Enceladus's mean anomaly and looking for long term variations in the plume. This observation covers the peak brightness as well as the falloff and is the next to last plume observation in the mission.

The second Dione Plume Search, ISS_286DI_PLUMESEAR012_PRIME, will start at 2017-214T20:15 and last for 1hr 06 min. The Dione range will again increase from 713200 km to 748600 km, the spatial resolution of the NAC from 4.3 to 4.5 km. Phase shrinks from 153 to 151 deg, the sub-spacecraft point on Dione moves from -6/213 to -5/221 deg. This puts the illuminated limb again over the wispy streak area, but this time, Cassini's sight is from the other (anti-Saturn) side with less Saturnshine.

Periapse Quicklooks

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UVIS_286SA_AURSLEW001_PIE
VIMS_286SA_AURSTARE001_PRIME
Periapse R = 1.046 Rs, lat ...
CIRS_286EN_SPOLE001_PRIME
CIRS_286EN_SP007_PIE
ISS_286DI_PLUMESPEAR011_PRIME

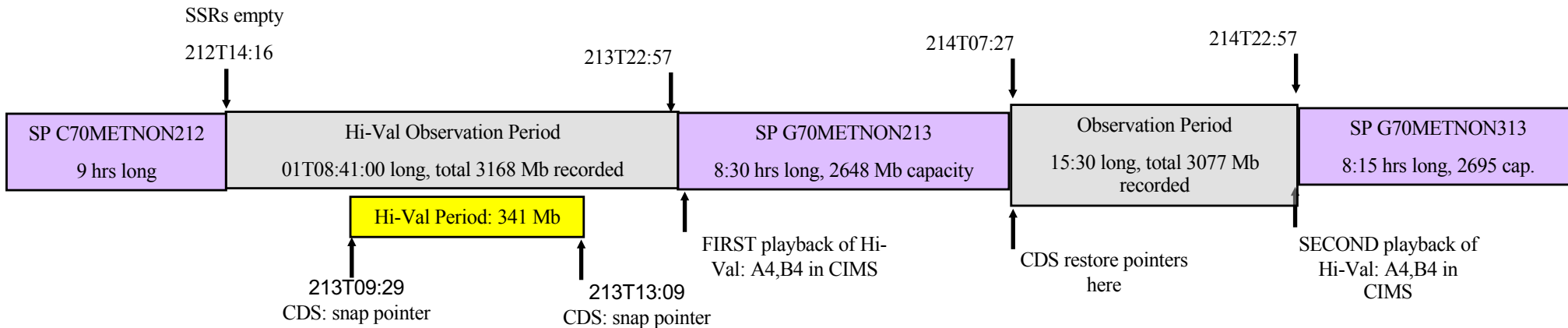
- UVIS_286_AURSLEW001_PIE is a long observation of the northern auroral zone ideal for UV imaging. The observations are obtained with a sub-spacecraft latitude of 29-56N, providing a clear view of the auroras, at an unusually close range (10.9-1.7 Rs). This will provide **some of the highest resolution auroral images of the mission**, allowing UVIS to image multiple arcs and spots of emissions and search for satellite footprints.
- **VIMS_286SA_AURSTARE001_PRIME is the closest auroral observation VIMS will make (starting post-periapsis at h~23000 km) during the entire mission, giving the highest spatial resolution** of the H3+ emission morphology. This is one of only two VIMS-optimised auroral observations during the proximal orbits and thus provides important coverage of the long-term variability of the aurora.
- CIRS_286EN_SPOLE001_PRIME targets Enceladus' active south polar region from a distance of ~170,000 km. Since it is winter in the southern hemisphere, the passive emission is minimized, making it an ideal time to determine Enceladus' endogenic emission. The instrument makes many slow CIRS FP3 scans of Enceladus' active south polar terrain region. **This observation (together with the following CIRS_286EN_SP007_PIE) provides CIRS a final opportunity to determine Enceladus' endogenic heat flow and monitor its spatial and temporal variability.**
- **ISS will perform two plume search observation at Dione.** During the first, ISS_286DI_PLUMESPEAR011_PRIME, the range to Dione increases from 751000 to 779500 km, resulting in spatial resolutions of 4.5 to 4.7 km/pxl (NAC full-res.). The phase angle decreases from 165 deg to 161 deg. Sub-spacecraft point is over the Saturn-facing hemisphere at ~15 deg South latitude / 33 to 54 deg West longitude. This puts the limb with the thin crescent just over the wispy-streak area

Dual Playback **SOST 286**

SOST rev 286

Flyby	BEGHIVAL	ENDHIVAL	P4 Dual Playback Data Volume	SSR empty before hi-val observation period? (if not verify any carryover on A fits with Hi-Val data)	SSR-A empty after first playback?	PPL set to A4,B4 for first AND second playbacks?	SSRs empty after second playback? (if not does any Hi-Val data carry over?)
	<u>CIRS 286EN SPOLE001 PRIME</u>						
Rev 286	213T09:29	213T13:09	341 Mb	Yes	Yes	Yes	No, No

Playbacks not contiguous:



Reminder - ALL instruments' data is played back twice during P4 dual playback periods

Notes

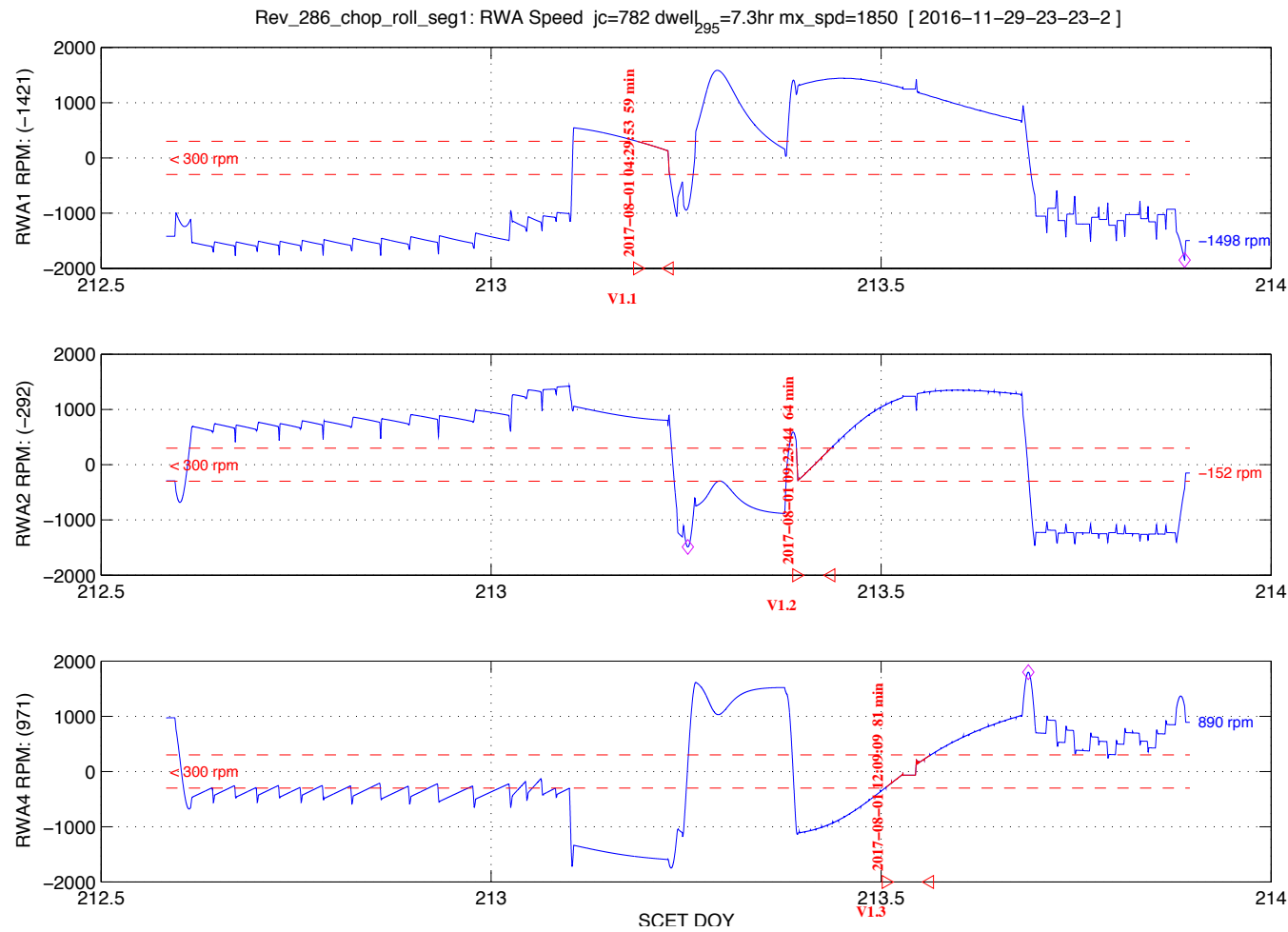
- Pointing:
 - Waypoint goes bad during custom period 212T14:16:00 to 213T21:27:00
 - **Hand-edit** DLTURN213 to have a turn allocation of 00:01:50 and 00:00:10 margin (was 00:00:00, 00:02:00)
- Data Volume:
 - 600 Mb Carryover to RINGS_287
 - SMT warnings are for A4/B4 playback priority for Dual Playback; these are expected
- DSN:
 - AP_Downlink Report check: complains about A4/B4 priority playback list for Dual Playback; this is expected and OK
- Resource checker:
 - Complains about A4/B4 priority playback list for Dual Playback; this is expected and OK
- Waivers:
 - POS_X to SUN CMT needed from 2017-213T06:00:35.400 to 2017-213T06:19:33.400. Minimum angle 76.9 deg at 2017-213T06:10:25.400. During VIMS_286SA_AURSTARE001_PRIME
 - VIMS max temperature reported by PDT: 61.53 K at 213T06:16:30 (during VIMS AURSTARE) (delta of 1.85 K)
 - CIRS max temperature reported by PDT: 78.08 K at 213T06:17:00 (during VIMS AURSTARE) (delta of 3.48 K)
 - Start times of observations, and temperature at that time as reported by PDT shown below. Have been pre-approved

		CIRS	CIRS Delta	VIMS	VIMS Delta
VIMS_286SA_AURSTARE001_PRIME	2017-213T05:09:00	74.7	0.1	59.9	0.24
CIRS_286EN_SPOLE001_PRIME	2017-213T09:29:00	76.4	1.8	61.3	1.64
CIRS_286EN_SPO07_PIE	2017-213T13:09:00	75.3	0.7	60.9	1.24
ISS_286DI_PLUMESAR011_PRIME	2017-213T16:20:00	74.9	0.3	60.6	0.94

- SPLAT ITEMS:
 - S101000052 opened for Dual Playback
 - S101000053 for target motion, CIRS included a quiescent period in CIRS_286EN_SPOLE001_PRIME from 2017-213T12:42:40 to 13:02:40
 - S101000051 listing pre-delivered PDT designs (S101000241 for the POST designs merge)
- POST SCR:
 - **SCR-119151**

- Pre-Delivered PDT designs
 - UVIS_286SA_AURSLEW001_PIE_RevF.sasf
 - VIMS_286SA_AURSTARE001_PRIME.sasf
 - CIRS_286EN_SPOLE001_PRIME.sasf
 - CIRS_286EN_SP007_PIE.sasf
 - ISS_S101_DLR_2.sasf (Two Dione Plume Search observations)
- Here are the kpt findings (run by AACS, which included the prior downlink):
- 2017-213T06:00:35.400 VIMS_286SA_AURSTARE001_PRIME\$4_7CMD Geometrical CMT Violation POS_X_SUN (DETECT); Initial Angle Sep: 8.313e+01 deg (Min Angle: 7.693551e+01 deg at 2017-213T06:10:25.400). Violation Ending: 2017-213T06:19:33.400
- 2017-213T06:06:56.400 VIMS_286SA_AURSTARE001_PRIME\$4_7CMD FR37B16-1.2: VIMS Temperature Rise is above 2 deg
- 2017-213T09:29:02.300 CIRS_286EN_SPOLE001_PRIME\$4_7CMD FR89B23-2.1: CIRS Trigger while Temp is 76.61 deg K.

Early AACS- RBOT look



This shows the RBOT solution WITHOUT an off-Earth bias at 213T12:40

Here are RBOT related suggestions:

1. The first RWA bias should be after the downlink roll completes (if there is one) on DOY 212.
2. The last RWA bias should be before the downlink roll starts on DOY 213
3. There is a short quiescent period at 213T12:40. Can we use this for an off Earth RWA bias? It is not required, but it makes the solution better. (AACS can use it for a Bias)