CASSINI TOST T109 SEGMENT

Rev 210 Handoff Package

Segment Boundary 2014-344T03:30:00 – 2014-346T07:00:00

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Science Highlights

Notes & Liens

DOY 344 (Dec. 10): T107 is the second pass in the Solstice Mission where INMS and the navigation team will simultaneously measure Titan's atmosphere. This is critical to understanding the differences in the calculated densities of INMS, Nav, AACS and UVIS. Navigation will determine Titan's atmospheric density by measuring the acceleration of drag on the spacecraft with Doppler shift observations during this NAV 10-point flyby. On the inbound wing, CIRS focuses on high spectral resolution observations in the far-infrared to determine the abundances of trace species. ISS will acquire a mosaic of mid-southern latitudes, including northern Tsegihi, on Titan's sub-Saturnian hemisphere. ISS will also ride along with CIRS and VIMS, to image Titan's surface and atmosphere at mid-southern latitudes on sub-Saturnian hemisphere . VIMS will ride along with CIRS and ISS and will acquire low resolution images (50 km/pixel) of the sub-Saturn hemisphere, observe the evolution of the South Pole vortex, and monitor cloud activity. T107 is a low altitude (980 km) dayside high inclination flyby similar to T106, T105 and T104 occurring in the midnight sector of Saturn's magnetosphere. With closest approach near the terminator, Cassini will be able to study the draping and the diffusion of the external magnetic field within the ionosphere over the flank facing Saturn.

DOY 345 (Dec. 11): The INMS, Nav, AACS and UVIS simultaneous measurement of Titan's atmosphere continues. VIMS will acquire global images of the North Pole area and will monitor the cloud activity at high northern latitudes. It will also look for specular reflection in an area between Ligeia Mare and Kraken Mare. CIRS focuses on high spectral resolution observations in the far-infrared to determine the abundances of trace species.

ISS will ride along with CIRS and VIMS to image Titan's surface and atmosphere at high phase angles.

DOY 346 (Dec. 12): Flyby data are downlinked to Earth.

No Y bias windows for this segment because the encounter is on thrusters.

NONSTANDARD Dual Playback (NAV/INMS)

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?)
T107	T107-30 min	T107+30 min	254 Mb	Yes	Yes	Yes	Yes

Playbacks contiguous, *high value period is during a downlink block*
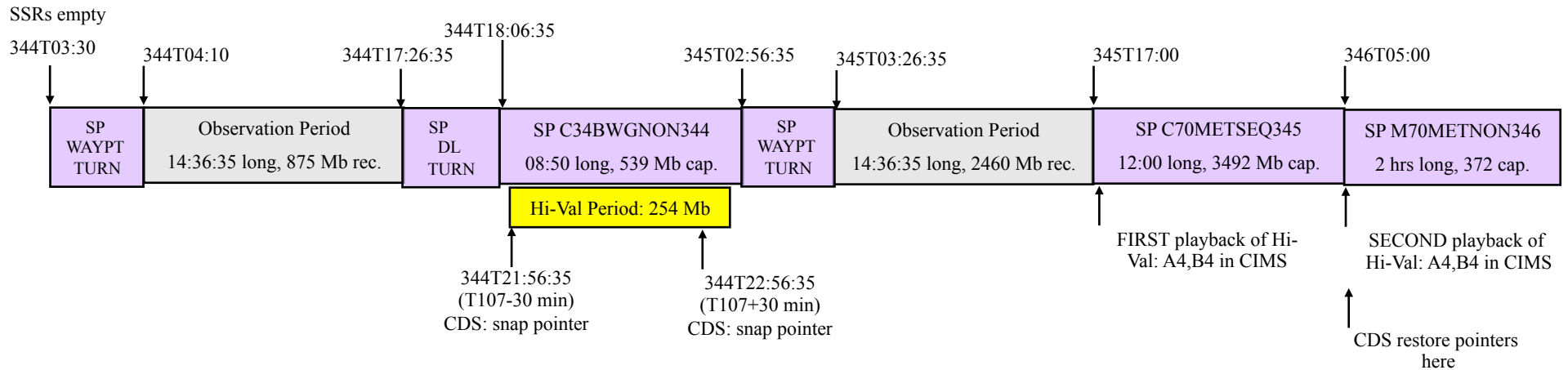
Reminder - ALL instruments' data is played back twice during P4 dual playback periods

Notes

- Pointing:
  - Waypoint (downlink) during C/A has SRU violations from Titan, but downlink is non-rolling so there is enough quiescent period to suspend start tracker
  - No YGAP window because flyby is on thrusters
- Data Volume:
  - Dual PB has high-priority data period over a DOWNLINK. CDS, pay attention!!!!!
  - Odd p/b priority list order due to dual p/b.
- DSN:
  - Added C34BWGNON344 (to support RSS during c/a) and M70METNON346 (for dual playback)
  - C34BWGNON344 should be Level 3 support
  - DSS-25 pass on DOY 344 during maintenance; pass requires Ka-band support and DSS-26 is in extended downtime so we have no other options.
  - Handover from DSS-43 to DSS-63 on DOY 346: ap_downlink provides less than 15 minutes overlap, so Madrid playback pause was increased.
- Resource checker:
  - See opmode and data volume sections
- Opmodes:
  - Unusual opmode strategy which appears to be a mismatch but is verified by SCO (see TOST T107 master timeline at end of package)
- Hydrazine:
  - AACS analysis TBD: TOST predict is 300g, T87 flyby (similar) actual was 123g
  - (0.5, 0.5, 2) deadband saves hydrazine over optimal (0.5, 0.5, 0.5)
- Special Activities:
  - RSS is supporting NAV/INMS activity but not using the data, so no RSS activity in CIMS

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

Liens

Sequence Liens (should all be SPLAT items):

- Dual Playback (note unusual timing—high value period during a downlink block)

210TI_T107	980

Start Time	End Time	Prime Activity	Obs. Detail	Op Mode	TLM Mode	Comments
2014-344T03:30:00	2014-344T04:10:00	SP Turn to WP	NEG_Y to Titan, NEG_X to NTP	DFPW Normal	S_N_ER_3	NEG_X to NEP would also work
2014-344T04:10:00	C/A-18:01:35	OD Uncertainty Dead Time		DFPW Normal	S_N_ER_3	
C/A-18:01:35	-14:00	CIRS	A3 (Tc1b)	DFPW Normal	S_N_ER_3	ISS rider
-14:00	-09:00	CIRS	C (TN1c)	DFPW Normal	S_N_ER_3	VIMS rider
-09:00	-07:05	ISS	(TN1a)	DFPW Normal	S_N_ER_3	
-07:05	-05:00	ISS	(TN1a) KA band warm up for RSS	RSS_K_RWAF	S_N_ER_3	Warmup mode can accommodate ORS instruments
-05:00	-04:20	SP Turn to Earth for downlink		RSS_K_RWAF	S_N_ER_3	
-04:20	0 ?	Canberra 34m, NAV/INMS	HGA to Earth, NEG_X to RAM Tc2a	RSS_K_RWAF, RSS3RCS @-01:00. Change to RSS2RWAP_Full at -00:39:12 to turn off S-band. Change to RSS_K_RWAF at +00:38 for RCS to RWA transition	S_N_ER_3	NAV/INMS requires early uplink, Work transition times with NAV and INMS (riders). RWA to RCS transition rider @-01:00. Use (0.5, 0.5, 2) to save hydrazine. Two-part opmode transition: Going from RSSKRWAP-FULL to RSS3RCS in two steps. ORSRWA to ORSRCS then DFPW_normal to RSS2RWAP-FULL. Deadband is (2,2,2) during outbound. transition back to RSSKRWAP-FULL in two steps RSS2RWAP-FULL to RSSKRWAP-FULL then ORSRCS to ORSRWA
2014-344T22:26:35		CLOSEST APPROACH	XBAND to EARTH, NEG_X to RAM (Tc2a)		S_N_ER_3	Work the transitions with NAV. If the transition is out at -5 hr then ok. If closer in, work MAPS issue.
0 ?	+04:30	Canberra 34m, NAV/INMS	Tc2a	RSS_K_RWAF	S_N_ER_3	
+04:30	+05:00	SP Turn to WP		DFPW Normal	S_N_ER_3	
+05:00	+09:00	VIMS	Q (TN1a (Specular reflection of lakes-depending on geometry))	DFPW Normal	S_N_ER_3	
+09:00	+13:00	CIRS	N1 (Tc1b, TN1c aerosol)	DFPW Normal	S_N_ER_3	
+13:00	C/A+17:38:25	CIRS	M4 (Tc1b (TN1c on outbound))	DFPW Normal	S_N_ER_3	
C/A+17:38:25	2014-345T16:20:00	OD Uncertainty Dead Time		DFPW Normal	S_N_ER_3	
2014-345T16:20:00	2014-345T17:00:00	SP Turn to Earth for downlink		DFPW Normal	S_N_ER_3	
2014-345T17:00:00	2014-346T05:00:00	Canberra 70M		DFPW Normal	RTE_N_SPB	
2014-346T05:00:00	2014-346T07:00:00	Madrid 70M		DFPW Normal	RTE_N_SPB	Dual playback -00:30 to +00:30