

S86 Rev 210 Titan T107

- T107 Titan NAV Atmospheric Density Experiment
 - Titan Closest Approach 344/2357 ERT
 - Altitude 980 km
 - Ka-band ON
 - Telemetry ON, Coherent mode (2-way and 3-way)
 - Spacecraft on thrusters C/A +/- 1 hr
 - Covered by Goldstone and Canberra
- Science Highlights

T107 is one of two flybys 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 atmospheric density calculated by 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. For these reasons, T107 is one of the two most scientifically important NAV (and INMS) Titan flybys in the Solstice Mission.
- The first experiment was T87 on November 13, 2012 (2012/318)
- This is not an RSS science experiments, but we will be supporting and acquiring backup open-loop data

DSN Antennas

- DSN Coverage

	Pre	BOT	EOT	Post											
14 344	1400	1530	2250	2305	DSS-25	CAS	TP	NV	RS	ATM	EXP	6282	N748	1A1	
14 344	1650	1825	0520	0535	DSS-34	CAS	TP	NV	RS	ATM	EXP	6283	N750	1A1	

This is a DSN Level 3 activity

DSS-25 BOT is about an hour before anything happens

- Originally thought uplink would start 40 minutes earlier than current plan, but that time is used to turn to Earth point

- Receivers scheduled

- 2 closed-loop receivers per BWG antenna
- Open-loop receivers
- Closed-loop data are prime. Open-loop data are backup
- LCP not required. Only RCP

S86 T107 Open-Loop Assignment

DSS Prdx Mode	Operator	Station	Open-loop Receiver	Channels	Subchannels	Bandwidths KHz
25	Dustin/ Aseel	rsops1	RSR1	RSR1A -> XRCP RSR1B -> KRCP	1, 2, 3, 4 1, 2, 3, 4	1, 8, 16, 50 1, 8, 16, 50
34	Aseel/Elias	rsops1	RSR2	RSR2A -> XRCP RSR2B -> KRCP	1, 2, 3, 4 1, 2, 3, 4	1, 8, 16, 50 1, 8, 16, 50

RSSG will be in Ops Room at 5:50 am on Wednesday, December 10 (344/1350)

Backup receivers:

RSR2 and RSR3 at Goldstone

RSR1 at Canberra

Timeline

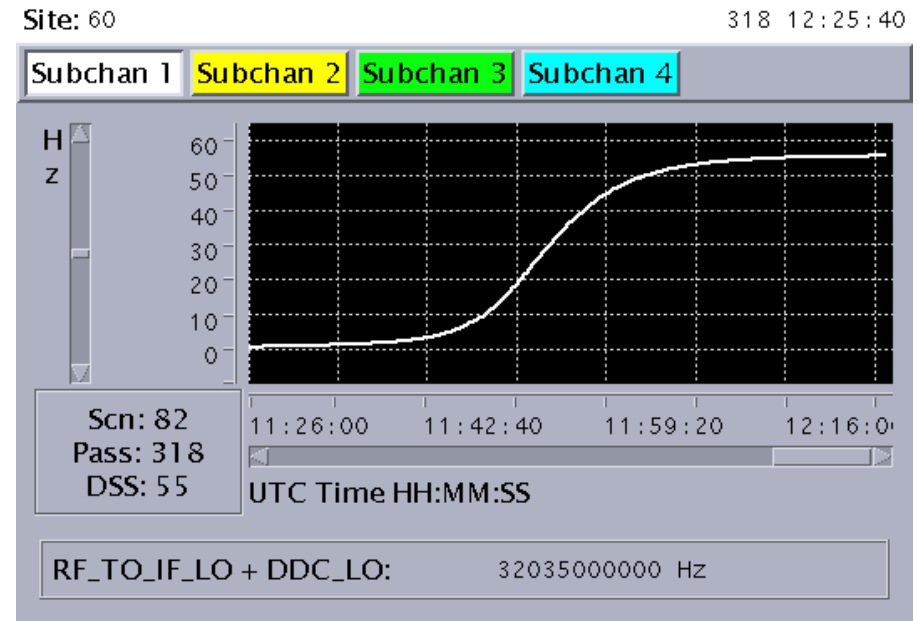
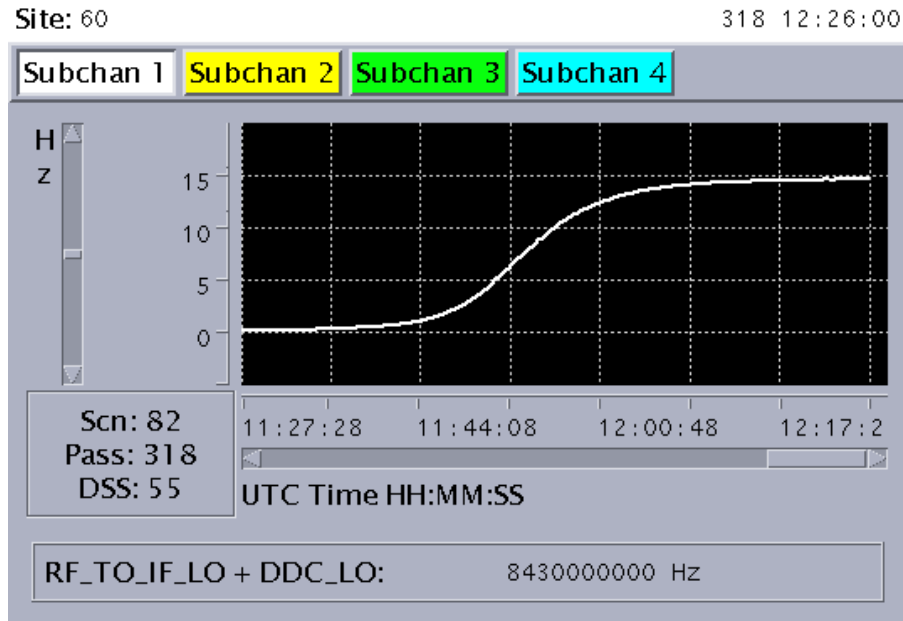
- Per DKF/SOE
- Not in DKF:
 - Transition to thrusters

T87 on Thrusters

Frequency Residuals During C/A

X-band

Ka-band



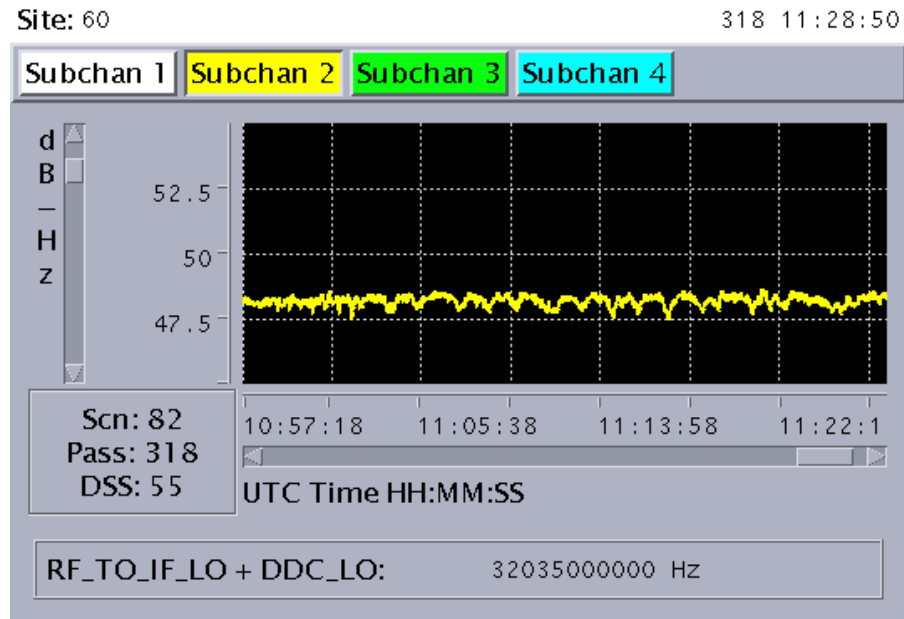
T87 on Thrusters

Power History

During Transition from RWA to RCS

Deadband (0.5, 0.5, 2)

Ka-band



T87 on Thrusters

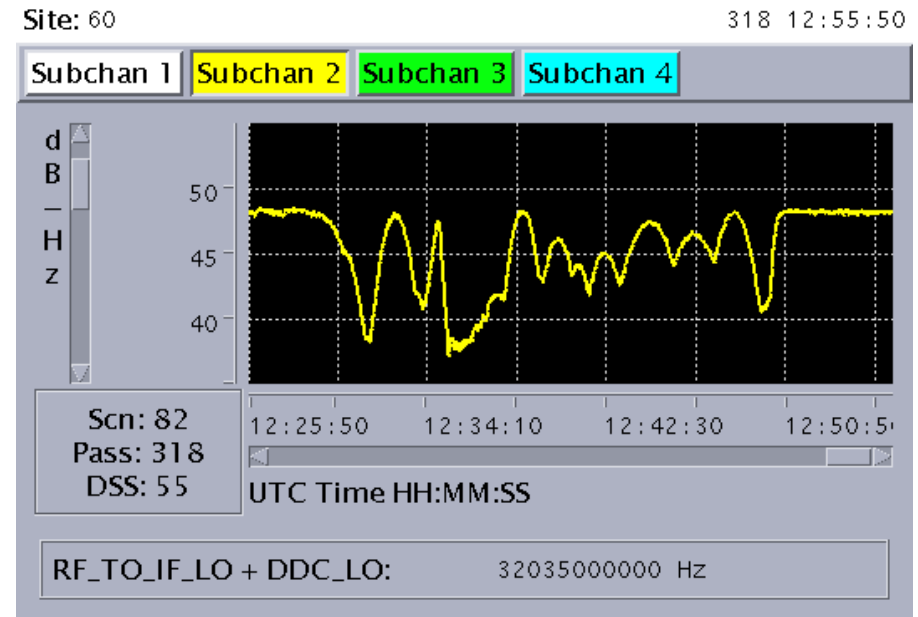
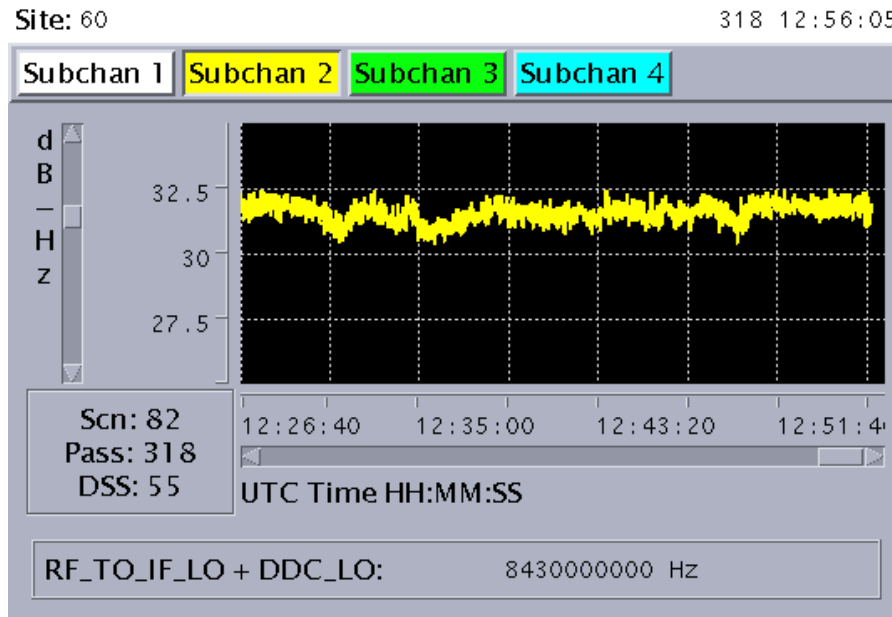
Power History

During Transition from RCS to RWA

Deadband (2, 2, 2)

X-band

Ka-band



Misc

ORTs

- None officially planned, but DSS-25 and DSS-34 tracks during the RSS SCE were nominal

14 312 1750 1850 2155 2210 DSS-25 CAS TP RSS SCE11 6250 N006 1A1

14 323 1945 2115 2215 2230 DSS-34 CAS TP RSS SCE11 6262 N750 1A1

14 324 2015 2145 0615 0630 DSS-34 CAS TP RSS SCE11 6263 N750 1A1

NOPEs - Equipment status?

- (DSS-25 and DSS-34)

Downlink Predicts

- Use SPS Predicts
 - RSS will not be generating predicts

Uplink Plan

- Ramped uplink predicts throughout
 - No requirement for unramped uplink predicts
- Per SOE/DKF

Pointing Plan

- Enable monopulse throughout observation. If problematic, stay with blind pointing
- Stations to wait for RSSG to request monopulse enable

SNT

- Enable at all throughout

Misc Cont'd

Closed-loop Receivers during closest approach

- High signal dynamics. Widen carrier loop bandwidth?

AWVR

- Elias: Schedule AWVR at Goldstone