

TOST: RE-Delivery

069TI (T44)

Segment: 2008-085T01:35:00 – 2008-087T01:20:00

Titan C/A: 2008-149T08:24:32, Altitude = 1000 km

Epoch: GMB_E069_Titan44

Dec 6, 2007

Jo Pitesky, Douglas Equils, Trina Ray, Kim Steadman

High-Level Science Objectives

- RADAR: Inbound and outbound scatterometry, altimetry, low and high rate SAR. Outbound radiometry.
- CIRS: Determine the mean thermal gradient across Saturn's many-particle-thick rings by executing radial scans of Saturn's main rings (A, B, C) over multiple illumination geometries (including phase, S/C inclination, and solar elevation) on the lit and unlit sides of the rings. Information on thermal structure of Titan's stratosphere. Obtain information on CO, HCN, CH₄ (both DOY 149 *and* 150).
- ISS: NAC *and* WAC nightside imaging, search for and monitor lightning/aurora. *NAC global map. WAC photometry. NAC monitoring of surface and atmosphere; attempt to see surface color variations; monitor limb hazes*
- VIMS: Cloud map, *regional map*
- UVIS: EUVFUV imaging, slow scans across visible hemisphere to form spectral images.

(plain text = DOY 149; *italics* = DOY 150)



TOL for 069TI (T44)

069TI (T44)

Start Time	End Time	Prime Activity	Obs. Detail	Op Mode	TLM Mode	Comments
148T04:43	148T05:13	SP Turn to waypoint		DFPW Normal	S_N_ER_3	-Y to Titan, +X to NTP
148T05:13	148T05:29	OD Uncertainty Dead Time		DFPW Normal	S_N_ER_3	
-1T03:05	-1T00:05	CIRS-Rings Observation	Rings	DFPW Normal	S_N_ER_3	
-1T00:05	-16:00	CIRS	Mid-IR Temp Map	DFPW Normal	S_N_ER_3	Template M (modified)
-16:00	-15:00	ISS		DFPW Normal	S_N_ER_3	Template M
-15:00	-13:00	CIRS		DFPW Normal	S_N_ER_3	Template M
-13:00	-09:00	VIMS	Cloud Map	DFPW Normal	S_N_ER_3	Template O
-09:00	-05:00	UVIS	EUVFUV	DFPW Normal	S_N_ER_3	Template P
-05:00	-03:00	UVIS	EUVFUV	RADWU	a/S_N_ER_5	Template U; S_N_ER_5a for 15 minutes at -5:00
-03:00	-02:00	ISS		RADWU	S_N_ER_3	Template U;
-02:00	-01:39	Transition RWA to RCS		RADRCS	S_N_ER_3	Deadband (2,2,20)
-01:39	-01:31	SP Turn to Waypoint		RADRCS	S_N_ER_8	-Z to Titan, -X to RADEC 276, -56
-01:31	-0:30	RADAR	Scatterometry	RADRCS	S_N_ER_8	
-0:30	-0:15	RADAR	Altimetry	RADRCS	S_N_ER_8	
-0:15	-0:07	RADAR	SAR	RADRCS	S_N_ER_8	
-0:07	+0:07	RADAR	Hi-SAR	RADRCS	S_N_ER_8	
+0:07	+0:15	RADAR	SAR	RADRCS	S_N_ER_8	
+0:15	+0:30	RADAR	Altimetry	RADRCS	S_N_ER_8	
+00:30	+00:54	Transition RCS to RWA		RADRWA	S_N_ER_8	
+0:54	+01:38	RADAR	Scatterometry	RADRWA	S_N_ER_8	
+01:38	+04:37	RADAR	Radiometry	RADRWA	S_N_ER_8	Template E
+04:35	+05:05	RADAR Turn to RADAR Waypoint	30 min turn	RADRWA	S_N_ER_8	
+05:05	+05:24	SP turn to new waypoint	19 min turn	RADRWA	S_N_ER_3	-Y to Titan, +X to NTP
+05:24	+08:36	ISS	Global Map	DFPW Normal	S_N_ER_3	Template H
+08:36	+09:00	ISS	WAC Photom	DFPW Normal	S_N_ER_3	Template H
+09:00	+11:00	CIRS	FP1	DFPW Normal	S_N_ER_3	Template D
+11:00	+13:00	ISS	Mosaic	DFPW Normal	S_N_ER_3	Template D
+13:00	+14:00	VIMS	Regional Map	DFPW Normal	S_N_ER_3	Template D
+14:00	+16:00	VIMS	Global Map	DFPW Normal	S_N_ER_3	Template B (modified)
+16:00	+16:30	SP Turn to Earth for Downlink				
+16:30	+18:30	Goldstone 70m		DFPW Normal	RTE_N_SP B	
+18:30	+1T02:53	VIMS	Global Map	DFPW Normal	S_N_ER_3	Template B (modified) Pickup at -Z to Earth
150T11:27	150T11:42	OD Uncertainty Dead Time		DFPW Normal	S_N_ER_3	
150T11:42	150T12:12	SP Turn to Earth for downlink		DFPW Normal	S_N_ER_3	
150T12:12	150T21:12	Madrid 70-m Array		DFPW Normal	RTE_N_SP	



T44 SPASS

Request	Riders	Start (SCET)	Start (Epoch)	Duration	End (SCET)	Primary	Secondary	Comments
Sequence S040, length = 42 ...		2008-110T07:18:00	E065_SEQUENCE_040+000T00:00:00	041T21:09:00	2008-152T04:27:00			
TOST rev 69 Segment		2008-148T04:43:00		002T16:29:00	2008-150T21:12:00			
SP_069TI_WAYPTTURN148_PRIME	M	2008-148T04:43:00		000T00:30:00	2008-148T05:13:00	ISS_NAC to Saturn	POS_Z to North_Pole_Dir	SP Turn to Waypoint
NEW WAYPOINT		2008-148T05:13:00		000T03:06:32	2008-148T08:19:32	ISS_NAC to Saturn	POS_Z to North_Pole_Dir	
SP_069TI_DEADTIME148_PRIME	M	2008-148T05:13:00		000T00:06:32	2008-148T05:19:32	ISS_NAC to Saturn	POS_Z to North_Pole_Dir	
CIRS_069RI_TEMPL25LP001_PRIME	C, M, V	2008-148T05:19:32	GMB_E069_Titan44-001T03:05:00	000T02:25:00	2008-148T07:44:32	CIRS_FP1 to Rings	POS_Z to NSP	
SP_069TI_WAYPTTURN448_PRIME	M	2008-148T07:44:32	GMB_E069_Titan44-001T00:40:00	000T00:24:00	2008-148T08:08:32	ISS_NAC to Titan (0.0,0.0,55.0 deg. offset)	POS_X to North_Pole_Dir	SP Turn to Waypoint
SP_069TI_WAYPTTURN548_PRIME	M	2008-148T08:08:32	GMB_E069_Titan44-001T00:16:00	000T00:11:00	2008-148T08:19:32	ISS_NAC to Titan	POS_X to North_Pole_Dir	SP Turn to Waypoint
NEW WAYPOINT		2008-148T08:19:32		000T22:14:00	2008-149T06:33:32	ISS_NAC to Titan	POS_X to North_Pole_Dir	
CIRS_069TI_MIDIRTMAP001_PRIME	C, I, M, U, V	2008-148T08:19:32	GMB_E069_Titan44-001T00:05:00	000T08:05:00	2008-148T16:24:32	CIRS_FP1 to Titan	POS_X to North_Pole_Dir	
ISS_069TI_NIGHTNAC001_PRIME	C, M, V	2008-148T16:24:32	GMB_E069_Titan44-000T16:00:00	000T01:00:00	2008-148T17:24:32	ISS_NAC to Titan	POS_X to North_Pole_Dir	
CIRS_069TI_FIRNADCMPO01_PRIME	C, I, M, V	2008-148T17:24:32	GMB_E069_Titan44-000T15:00:00	000T02:00:00	2008-148T19:24:32	CIRS_FP1 to Titan	PIC	
VIMS_069TI_CLOUDMAP001_PRIME	C, I, M	2008-148T19:24:32	GMB_E069_Titan44-000T13:00:00	000T04:00:00	2008-148T23:24:32	ISS_NAC to Titan	NEG_X to Sun	
UVIS_069TI_EUVFUV001_PRIME	C, I, M, R, V	2008-148T23:24:32	GMB_E069_Titan44-000T09:00:00	000T06:00:00	2008-149T05:24:32	UVIS_FUV to Titan	POS_X to North_Pole_Dir	
ISS_069TI_NIGHTWAC001_PRIME	C, M, R, V	2008-149T05:24:32	GMB_E069_Titan44-000T03:00:00	000T01:00:00	2008-149T06:24:32	ISS_NAC to Titan	POS_X to North_Pole_Dir	May do mosaic in lit hemisphere but need at least 1 minute dwell time to satisfy VIMS requirement
ENGR_069SC_RADRCS001_PRIME	M	2008-149T06:24:32	GMB_E069_Titan44-000T02:00:00	000T00:01:00	2008-149T06:25:32			Actual duration = 20:50
SP_069TI_WAYPTTURN949_PRIME	M	2008-149T06:25:32	GMB_E069_Titan44-000T01:59:00	000T00:08:00	2008-149T06:33:32	NEG_Z to Titan	NEG_X to 276.0/-56.0	on thrusters. 7 min. turn, 1 minute margin
NEW WAYPOINT		2008-149T06:33:32		000T07:15:00	2008-149T13:48:32	NEG_Z to Titan	NEG_X to 276.0/-56.0	
RADAR_069TI_T44INSCAT901_PRIME	M	2008-149T06:33:32	GMB_E069_Titan44-000T01:51:00	000T01:21:00	2008-149T07:54:32	NEG_Z to Titan	POS_X to North_Pole_Dir	
RADAR_069TI_T44INALT901_PRIME	M	2008-149T07:54:32	GMB_E069_Titan44-000T00:30:00	000T00:15:00	2008-149T08:09:32	NEG_Z to Titan	POS_X to North_Pole_Dir	
Start of T44 high value dat...		2008-149T08:01:32	GMB_E069_Titan44-000T00:23:00	000T00:00:01	2008-149T08:01:33			
RADAR_069TI_T44INLSAR901_PRIME	M	2008-149T08:09:32	GMB_E069_Titan44-000T00:15:00	000T00:08:00	2008-149T08:17:32	NEG_Z to Titan	NEG_X to Titan_SC_RAM	
RADAR_069TI_T44HISAR901_PRIME	M	2008-149T08:17:32	GMB_E069_Titan44-000T00:07:00	000T00:14:00	2008-149T08:31:32	NEG_Z to Titan	NEG_X to Titan_SC_RAM	
End of T44 high value data ...		2008-149T08:24:32	GMB_E069_Titan44+000T00:00:00	000T00:00:01	2008-149T08:24:33			
69TI (t) T44 TITAN Outbou...		2008-149T08:24:35		000T00:00:01	2008-149T08:24:36			
RADAR_069TI_T44OUTLSAR901_PRIME	M	2008-149T08:31:32	GMB_E069_Titan44+000T00:07:00	000T00:08:00	2008-149T08:39:32	NEG_Z to Titan	NEG_X to Titan_SC_RAM	
RADAR_069TI_T44OUTALT901_PRIME	M	2008-149T08:39:32	GMB_E069_Titan44+000T00:15:00	000T00:15:00	2008-149T08:54:32	NEG_Z to Titan (0.0,0.0,45.0 deg. offset)	POS_X to North_Pole_Dir	
ENGR_069SC_RADRWBIAS949_PPS	M	2008-149T08:54:32	GMB_E069_Titan44+000T00:30:00	000T00:21:41	2008-149T09:16:13	NEG_Z to Titan (0.0,0.0,45.0 deg. offset)	POS_X to North_Pole_Dir	
RADAR_069TI_T44OUTSCT901_PRIME	M	2008-149T09:16:32	GMB_E069_Titan44+000T00:52:00	000T00:47:00	2008-149T10:03:32	NEG_Z to Titan (0.0,0.0,45.0 deg. offset)	POS_X to North_Pole_Dir	
RADAR_069TI_T44OUTRAD901_PRIME	M	2008-149T10:03:32	GMB_E069_Titan44+000T01:39:00	000T03:26:00	2008-149T13:29:32	NEG_Z to Titan (0.0,0.0,45.0 deg. offset)	POS_X to North_Pole_Dir	Use -Y_NTP (0,0,45) for the 2nd polarization. Leave at -Z_TI, -X_RA/DEC 276/-56.
SP_069TI_WAYPTTURN950_PRIME	M	2008-149T13:29:32	GMB_E069_Titan44+000T05:05:00	000T00:19:00	2008-149T13:48:32	ISS_NAC to Titan	POS_X to North_Pole_Dir	Use 18 minutes for turn time, 1 min margin
NEW WAYPOINT		2008-149T13:48:32		000T11:29:28	2008-150T01:18:00	ISS_NAC to Titan	POS_X to North_Pole_Dir	
ISS_069TI_GLOBMAP901_PRIME	C, M, V	2008-149T13:48:32	GMB_E069_Titan44+000T05:24:00	000T03:12:00	2008-149T17:00:32	ISS_NAC to Titan	NEG_X to Sun	
ISS_069TI_PHOTOMWAC001_PRIME	C, M, V	2008-149T17:00:32	GMB_E069_Titan44+000T08:36:00	000T00:24:00	2008-149T17:24:32	ISS_NAC to Titan	POS_X to North_Pole_Dir	
CIRS_069TI_FIRNADCMPO02_PRIME	C, I, M, V	2008-149T17:24:32	GMB_E069_Titan44+000T09:00:00	000T02:00:00	2008-149T19:24:32	CIRS_FP1 to Titan	PIC	
ISS_069TI_MONITORNA001_PRIME	M, V	2008-149T19:24:32	GMB_E069_Titan44+000T11:00:00	000T02:00:00	2008-149T21:24:32	ISS_NAC to Titan	NEG_X to Sun	
VIMS_069TI_GLOBMAP003_PRIME	C, I, M	2008-149T21:24:32	GMB_E069_Titan44+000T13:00:00	000T01:00:00	2008-149T22:24:32	ISS_NAC to Titan	NEG_X to Sun	
VIMS_069TI_GLOBMAPFA002_PRIME	C, I, M	2008-149T22:24:32	GMB_E069_Titan44+000T14:00:00	000T02:00:00	2008-150T00:24:32	ISS_NAC to Titan	NEG_X to Sun	
SP_069TI_DEADTIME950_PRIME	M	2008-150T00:24:32	GMB_E069_Titan44+000T16:00:00	000T00:22:28	2008-150T00:47:00	ISS_NAC to Titan	POS_X to North_Pole_Dir	
SP_069EA_DLTURN149_PRIME	M	2008-150T00:47:00		000T00:31:00	2008-150T01:18:00	XBAND to Earth	POS_X to NEP	
NEW WAYPOINT		2008-150T01:18:00		000T19:54:00	2008-150T21:12:00	XBAND to Earth	POS_X to NEP	
SP_069EA_G34BWGNON150_PRIME	M	2008-150T01:18:00		000T02:00:00	2008-150T03:18:00	XBAND to Earth	Rolling	
VIMS_069TI_GLOBMAPFA003_PRIME	C, I, M	2008-150T03:18:00		000T08:54:00	2008-150T12:12:00	ISS_NAC to Titan	NEG_X to Sun	
Apoapse Per = 7.1 d, inc = ...		2008-150T09:15:58		000T00:00:01	2008-150T09:15:59			
SP_070EA_M70METSEQ952_PRIME	C, M	2008-150T12:12:00		000T09:00:00	2008-150T21:12:00	XBAND to Earth	5_Hr_Rolling	



069TI SMT Report

DATA VOLUME SUMMARY --- TRANSFER FRAME OVERHEAD INCLUDED (80 BITS PER 8800-BIT FRAME)

DOWNLINK PASS NAME	Start doy hh:mm	End doy hh:mm	OBSERVATION_PERIOD							DOWNLINK_PASS							
			P4				P5	RECORDED		PLAYBACK							
			START (Mb)	SCI (Mb)	HK+E (Mb)	TOTAL (Mb)	CPACTY (Mb)	MRGN (Mb)	OPNAV (Mb)	SCI (Mb)	ENGR (Mb)	TOTAL (Mb)	CPACTY (Mb)	MARGN (Mb)	NET_MARGN (Mb)	CAROVR (%)	CAROVR (Mb)
SP_069EA_G34BWGNON150_PRIME	150 01:18	150 03:18	0	3229	206	3435	3552	117	0	29	12	3476	170	-3306	-531	-12%	3305
SP_070EA_M70METSEQ952_PRIME	150 12:12	150 21:12	3305	741	38	4084	35	-531	0	236	53	3841	3792	-49	0	0%	48

Data volume cuts to be made in SOPU to accommodate changes to DSN strategy in suppo9rt of Phoenix EDL.

DATA VOLUME REPORT --- TRANSFER FRAME OVERHEAD NOT INCLUDED

Event	Start doy hh:mm	End doy hh:mm	CAPS (Mb)	CDA (Mb)	CIRS (Mb)	INMS (Mb)	ISS (Mb)	MAG (Mb)	MIMI (Mb)	RADAR (Mb)	RPWS (Mb)	UVIS (Mb)	VIMS (Mb)	PROBE (Mb)	ENGR (Mb)	TOTAL (Mb)
OBSERVATION_NOR	148 04:43	150 01:18	218.7	13.0	286.8	25.2	647.0	155.7	152.4	700.6	323.8	159.9	501.2	0.0	53.6	3238.1
OBSERVATION_SI	148 04:43	150 01:18	0.0	0.0	15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0
SP_069EA_G34BWGNON150_PRIME	150 01:18	150 03:18	7.2	0.0	0.0	0.4	0.0	5.5	6.3	0.0	9.4	0.0	0.0	0.0	0.0	28.8
DAILY TOTAL SCIENCE	148 04:43	150 03:18	225.9	13.0	301.8	25.6	647.0	161.3	158.6	700.6	333.3	159.9	501.2	0.0		
OBSERVATION_NOR	150 03:18	150 12:12	32.0	3.4	120.5	1.6	80.0	53.0	38.4	0.0	210.1	0.0	195.0	0.0	7.3	741.3
SP_070EA_M70METSEQ952_PRIME	150 12:12	150 21:12	32.4	9.7	86.4	1.6	0.0	19.4	38.9	0.0	42.4	2.5	0.0	0.0	0.0	233.4
DAILY TOTAL SCIENCE	150 03:18	150 21:12	64.4	13.1	206.9	3.2	80.0	72.5	77.3	0.0	252.5	2.5	195.0	0.0		
TOTAL RECORDED (OPNAV data not included)			290.3	26.2	508.7	28.8	727.0	233.7	236.0	700.6	585.8	162.4	696.2	0.0		



Telemetry Modes

TELEMETRY MODE REPORT

EPOCH RELATIVE	UTC	DURATION	TELEMETRY MODE	REQUEST
	2008-148T04:43:00.000	22:41:32	S_N_ER_3	SP_069NA_G70OBSSEQ948_NA
GMB_E069_Titan44-000T05:00:00	2008-149T03:24:32.000	00:15:00	S_N_ER_5A	SP_069NA_G70OBSSEQ948_NA
GMB_E069_Titan44-000T04:45:00	2008-149T03:39:32.000	02:46:00	S_N_ER_3	SP_069NA_G70OBSSEQ948_NA
GMB_E069_Titan44-000T01:59:00	2008-149T06:25:32.000	07:04:00	S_N_ER_8	SP_069NA_G70OBSSEQ948_NA
GMB_E069_Titan44+000T05:05:00	2008-149T13:29:32.000	11:48:28	S_N_ER_3	SP_069NA_G70OBSSEQ948_NA
	2008-150T01:18:00.000	01:09:00	RTE_N_SPB_33180	SP_069EA_G34BWGNON150_PRIME
	2008-150T02:27:00.000	00:51:00	RTE_N_SPB_27650	SP_069EA_G34BWGNON150_PRIME
	2008-150T03:18:00.000	08:54:00	S_N_ER_3	SP_069NA_M70OBSSEQ950_NA
	2008-150T12:12:00.000	00:15:00	RTE_N_SPB_110600	SP_070EA_M70METSEQ952_PRIME
	2008-150T12:27:00.000	00:45:00	RTE_N_SPB_124425	SP_070EA_M70METSEQ952_PRIME
	2008-150T13:12:00.000	07:15:00	RTE_N_SPB_142200	SP_070EA_M70METSEQ952_PRIME
	2008-150T20:27:00.000	00:45:00	RTE_N_SPB_124425	SP_070EA_M70METSEQ952_PRIME



DSN Requests

CASSINI DOWNLINK/DSN COVERAGE SUMMARY for T44_071205.apf on 2007-Dec-05 11:16:40
(+ = pass overlaps with previous pass; * = conflicts with DSN maintenance; o = overlaps occultation)

DOWNLINK PASS					DSN PASS						
NAME	START_TO_END SCET	START_TO_END ERT	DUR hh:mm	DATA_RATES kbps	ID	START_TO_END SCET	START_TO_END ERT	DUR hh:mm	CALS min	LABEL	CNFG
G34BWGNON150	150T01:18-03:18	150T02:36-04:36	02:00	33,27	26	150T01:18-03:18	150T02:35-04:40	02:05	60 /15	TGK PASS	N003
M70METSEQ952	150T12:12-21:12	150T13:30-22:30	09:00	110,124,142,124	63*	150T12:12-21:12	150T13:30-22:30	09:00	60 /15	TP ARR	N003



- Added AACS Dual Playback
- Chose RADAR option; reintegration due to shortening of RWA/RCS transition times
 - Added waypoint turn at -001T00:40 after first CIRS observation to save time in accomodating CIRS rings observation.
 - Added 20 minutes to first RADAR observation; now starts 20 minutes earlier at -01:51:00
 - First post-transition-back RADAR obs now starts two minutes earlier due to shortening of RCS to RWA transition
- DFPW Opmode starts at T44 + 05:05:00, at start of SP turn
- PDT Items:
 - WAYPTTURN448 avoids z-axis issues if both TARGETING commands cut z rate from 3.9 to 3.8; z-accel cut from .22 to .20
 - See notes in CIMS SPASS for margins for WAYPTTURN949 and 950
 - CIRS violations on G70METWRE150 and M70ARRERRE952; SRU violations are OK on roll.
- Formal violation of DLTURN preceding a DLBLOCK: we turn to D/L for the first 2 hour DL, AND change the waypoint to earth point. Hence, no DL turn is needed for the second DL.
- Asked SCO to change deadband from 2,2,20 to 0.5, 0.5, 20 per RADAR request.
- ISS will work their EUVFUV observations starting at -09:00 to avoid the change to and from S_N_ER_5.
- Dual Playback occurs in following rev; there is a dummy ENGR DUALPB request in T44 that has been deleted from the delivery (it was only used to get the dual PB data volume). Ignore the CRC message that it has zero data volume, and look for the correct request in the following segment.



TWT/OST Integration Constraint and Guideline Checklist

Below are Target Working Team (TWT) and Orbiter Science Team (OST) constraints that must be followed during segment implementation. Any exceptions to constraint numbers 3, 4, 6, or 7 must be approved by the Science Planning Manager.

Constraint	C=Comply V=Violate N/A=Not Applicable	Comments	Disposition
1. A. SP has checked all waypoints turns to and from waypoints. B. All initial downlink attitudes have been checked as waypoints.	C		
2. All turns to and from waypoints checked for violations and margins. <input type="checkbox"/> CAPS <input type="checkbox"/> CDA <input type="checkbox"/> CIRS <input type="checkbox"/> INMS <input type="checkbox"/> ISS <input type="checkbox"/> MIMI <input type="checkbox"/> MAG <input type="checkbox"/> NAV <input type="checkbox"/> RADAR <input type="checkbox"/> RPWS <input type="checkbox"/> RSS <input type="checkbox"/> UVIS <input type="checkbox"/> VIM S Each Prime Instrument agrees to accept a reduction in observation time during implementation if problems arise.	N/A		
3. Custom handoffs limited to: A. ±3 hours from targeted Icy Satellite flyby B. ±3 hours from targeted Titan Flyby C. OpNavs preceding/following a downlink	N/A		
4. Minimum 30 min SPASS Prime request duration outside ±5 hours from targeted satellite flyby (5 min. integer duration if >30 min.)	C		
5. Live and Ground Movable Blocks include appropriate time margins.	C	K. Klaasen's margin for flyby T31 is 15 min. according to memo dated .	
6. Waypoints changes are ≤3 per day A. All turns that accomplish the waypoint strategy are requested by SP or OpNav.	V		
7. Live Movable Blocks limited to the following orbits: 7, 8, 9, 10, 12, 28, 51, 56, 57, 60, 63, 64	N/A		

Guideline	Yes / No	Comments
1. Were repeatable/reusable templates used where possible?	Yes	
2. During Pre-Integration: Was 30 min. used for 90° RWA turns and/or 10 min. for RCS turns?	Yes	

(DOUBLE-CLICK TO MAKE CHANGES)