

No TM Recovery
 File: H_CRP_SYS_NOTM.xls
 Author: F. Keck



Procedure Summary

Objectives

Regain TM in case of unexpected LOS or missing AOS.
 The ground segment related steps may be run by the SPACON alone;
 for the steps containing S/C reconfigurations by blind
 commanding, the On-Call FCT person must be in charge.

Summary of Constraints

Ground Station Nominal Configuration:
 - LEOP first AOS: 5k/4k
 - Rest: 150k/4k
 Ground Station Safemode Configuration:
 - 500/125

The procedure can recover TM if the S/C attitude is not DTCP
 pointing by switching to the LGA. Before rejoining nominal
 operations the antenna configuration must be set back to MGA
 first.

Spacecraft Configuration

Start of Procedure

Unknown (because no TM)

End of Procedure

TX-1 or TX-2 in use
 MGA or LGA in use
 TM Encoder A or B in use

Reference File(s)

Input Command Sequences

Output Command Sequences

Referenced Displays

ANDs GRDs SLDs

Configuration Control Information

DATE	FOP ISSUE	VERSION	MODIFICATION DESCRIPTION	AUTHOR	SPR REF
04/11/2008		1	Created	F. Keck	
22/12/2008		1.01	Validation : Update procedure reference	F. Keck	
06/01/2009		1.02	Validation : Adding more ground segment checks for SPACONS	F. Keck	
13/01/2009	2	2	Updated steps for TTC reconfigurations	F. Keck	
02/03/2009	2.1	3	Update after routine simulations	F. Keck	
02/04/2009		4	Updating some comments	F. Keck	
20/04/2009	2.3	5	Adding comments to external analysis	F. Keck	
11/05/2009		6	Adding some comments	F. Keck	

No TM Recovery
 File: H_CRP_SYS_NOTM.xls
 Author: F. Keck

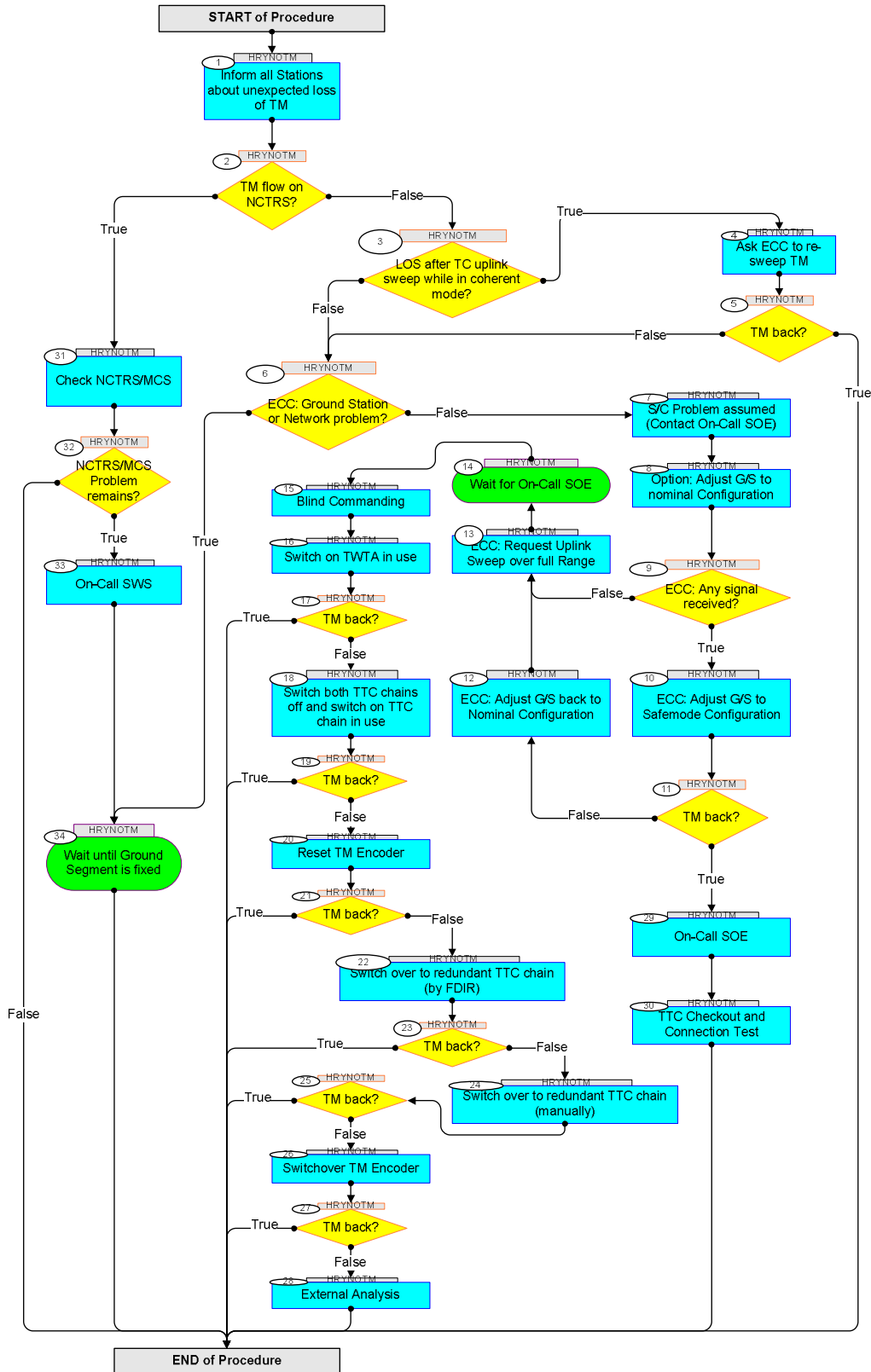


22/09/2009		7	Full uplink sweep (+/- 130kHz) included before blind commanding	F. Keck	
06/10/2009	2.5	8	Step added to cover LOS while in high TM rate	F. Keck	
06/05/2011		9	Minor update and improvement after simulation	F. Keck	
09/08/2011		10	Recovery of TM in case of bad S/C attitude by switching to LGA. Additional comments.	F. Keck	
12/08/2011	3.1	11	Added Long Loop Data Flow Test for ground station checkout. Replaced manual switchover with H_CRP_TTC_T201 to cover bad-attitude case by using the LGA.	F. Keck	

No TM Recovery
 File: H_CRP_SYS_NOTM.xls
 Author: F. Keck



Procedure Flowchart Overview



No TM Recovery
 File: H_CRP_SYS_NOTM.xls
 Author: F. Keck



Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
Beginning of Procedure				
<p><i>TC Seq. Name : HRYNOTM ()</i></p> <p><i>TimeTag Type:</i> <i>Sub Schedule ID:</i></p> <p style="text-align: center;">□</p>				
1		Inform all Stations about unexpected loss of TM		Next Step: 2
		<p>This step is only applicable for LEOP (when all stations are continuously manned).</p> <p>Checks of Ground Segment:</p> <ul style="list-style-type: none"> - MCS - NCTRS and Network - Ground Station (Correct pointing? Any signal?) <p>Checks of last available TM:</p> <ul style="list-style-type: none"> - TTC - DHS 		
2		TM flow on NCTRS?		Next Step: False 3 True 31
		<p>Check NCTRS:</p> <ul style="list-style-type: none"> - Does the VC-0/4 links show GOOD? - Are all links in process? 		
3		LOS after TC uplink sweep while in coherent mode?		Next Step: False 6 True 4
		The RF lock in coherent mode causes a jump in the TM downlink frequency. This can cause a loss of TM lock on the Ground Station.		
4		Ask ECC to re-sweep TM		Next Step: 5
		<p>Call ECC:</p> <ul style="list-style-type: none"> - Report no AOS - Request TM re-sweep 		
5		TM back?		Next Step: False 6 True END
6		ECC: Ground Station or Network problem?		Next Step: False 7 True 34

No TM Recovery
 File: H_CRP_SYS_NOTM.xls
 Author: F. Keck



Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		<p>Call ECC:</p> <ul style="list-style-type: none"> - Report no AOS - Request check of ground station and network status - Request receiver status of ground station (signal, modulation and lock) <p>To definitely exclude ground station failures, ask ECC to configure 2 chains to the expected TM rate. If both chains receive no TM, a S/C problem can be assumed.</p>		
		<p>If you don't trust the ground station status (or the ECC operator's report...) request a "Long Loop Dataflow Test". This test will fully check the ground station status.</p> <p>The corresponding ECC procedure is named "If no AOS at expected time, suggest to Spacon to stop the track and set up a test loop".</p> <p>Attention:</p> <p>This dataflow test will create dummy TM, which would pollute the MCS if the NCTRS links are connected.</p> <p>Disconnect all NCTRS links for this test!</p>		
7		<p><i>S/C Problem assumed (Contact On-Call SOE)</i></p>		Next Step: 8
		<p>Contact the On-Call SOE: Report TM problems probably caused by S/C anomaly.</p> <p>On-Call SOE must come in for</p> <ul style="list-style-type: none"> a) Blind commanding to regain TM, and/or b) Checkout of S/C <p>Proceed while On-Call SOE is on the way.</p>		
8		<p><i>Option: Adjust G/S to nominal Configuration</i></p>		Next Step: 9
		<p>Should TM have been lost during a DTCP while on high TM rate, an onboard reconfiguration can result in a change of TM rate to medium.</p> <p>In this case, ask ECC to configure for TM/TC = 150k/4k</p> <p>Should TM come back, goto step 27.</p>		
9		<p><i>ECC: Any signal received?</i></p>		Next Step: False 13 True 10

No TM Recovery
 File: H_CRP_SYS_NOTM.xls
 Author: F. Keck



Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Call ECC: - Does the ground station receive any kind of signal from the S/C? WARNING: Wait at least 4 minutes after the unexpected LOS. This ensures that an ongoing TX pre-heating is completed and the reception of a S/C signal is possible.		
10		<i>ECC: Adjust G/S to Safemode Configuration</i>		Next Step: 11
		TM/TC = 500/125		
11		<i>TM back?</i>		Next Step: False 12 True 29
12		<i>ECC: Adjust G/S back to Nominal Configuration</i>		Next Step: 13
		LEOP first AOS: TM/TC = 5k/4k Rest: TM/TC = 150k/4k		
13		<i>ECC: Request Uplink Sweep over full Range</i>		Next Step: 14
		To have a maximum chance for a TC onboard lock, request a re-sweep over the full range (+/-130kHz).		
14		<i>Wait for On-Call SOE</i>		Next Step: 15
		Up to here the SPACON may run this procedure alone. The following steps contain S/C reconfigurations by blind commanding, which must be run under responsibility of the On-Call person. Wait for the On-Call SOE to arrive.		
15		<i>Blind Commanding</i>		Next Step: 16
		Comment: Without TM the TTC configuration is unknown. It could be that a TC lock is only possible via low TC rate. First run all following steps using high TC rate. Should this fail, the external analysis will propose to re-run the procedure using low TC rate. Blind commanding: - Only possible in BD mode - Disable dynamic PTV		

No TM Recovery
 File: H_CRP_SYS_NOTM.xls
 Author: F. Keck



Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Without TM following trick can be used (anytime) to verify the RF and bit lock of the uplink: Send the TCs to switch the TX in use off and on. In parallel monitor the ground station IFMS (check via VSIDS or ask ECC) for loosing and reacquiring/regaining the lock on the downlink. This would indicate the successful execution of the TCs.		
16		Switch on TWTA in use		Next Step: 17
		Execute Procedure: H_FCP_TTC_TU01 Switch ON TX and TWTA in use		
17		TM back?		Next Step: False 18 True END
18		Switch both TTC chains off and switch on TTC chain in use		Next Step: 19
		When running following procedure, the ground station IFMS (check via VSIDS or ask ECC) could indicate the successful execution of the TX off and on TCs by loosing and reacquiring/regaining the lock on the downlink.		
		Execute Procedure: H_CRP_TTC_TU01 Switch ON Tx and TWTA in use contingency		
19		TM back?		Next Step: False 20 True END
20		Reset TM Encoder		Next Step: 21
		Should the ground station report no signal at all, skip this step.		
		Execute Procedure: H_CRP_TTC_ENCR Reset TM Encoder Parameters: EncNoUse TmEncoderId TmEncInUseLog		

No TM Recovery
 File: H_CRP_SYS_NOTM.xls
 Author: F. Keck



Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
21		TM back?		Next Step: False 22 True END
22		Switch over to redundant TTC chain (by FDIR)		Next Step: 23
		Execute Procedure: H_CRP_TTC_FDIR Trigger TTC FDIR Level 1 Recovery		
		Call ECC: Request TC re-sweep. Info: The switchover of the TTC chain changed the RFDN configuration, which can cause a loss of the TC lock.		
		If not successful, try the manual switchover.		
23		TM back?		Next Step: False 24 True END
24		Switch over to redundant TTC chain (manually)		Next Step: 25
		This manual switchover/activation of TX-2 will bring the LGA in use. This makes the TM situation independent from the S/C attitude. If NNO/CEB is in use: Use branch MR-L of the following procedure (TM rate MR). If KRU is in use: Use branch LR2 of the following procedure (TM rate LR2). Info: Medium TM rate is possible via LGA if using CEB/NNO.		
		Execute Procedure: H_CRP_TTC_T201 Switch ON TX2 and TWTA2		
		Call ECC: Request TC re-sweep. Info: The switchover of the TTC chain changed the RFDN configuration, which can cause a loss of the TC lock.		

No TM Recovery
 File: H_CRP_SYS_NOTM.xls
 Author: F. Keck



Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
25		TM back?		Next Step: False 26 True END
		If TM is regained by the previous step: - Check if both STRs have failed (which left the S/C probably in a non-DTCP attitude). In this case proceed with H_CRP_SYS_BLIND. - Don't forget to correct the antenna configuration (back to MGA) before rejoining nominal activities		
26		Switchover TM Encoder		Next Step: 27
		This step is not simple and has a big impact on the CDMS ! Perform only if all previous steps confirmed that there is a strong RF signal without any modulation.		
		Execute Procedure: H_FCP_DHS_3007 Switch to TM encoder B and OBT B		
27		TM back?		Next Step: False 28 True END
28		External Analysis		Next Step: END
		Additional Options: - Re-run procedure, but with ground station configured in Low TC rate (RX-2 on low TC rate via LGA). - Re-run procedure, but use VC-1 for commanding (TTR-A total failure including Decoder-A). - If RF signal is available but without modulation: Perhaps PM problem or interface problem between PM and TM Encoder. Trigger a PM switchover. - Switch to TX-1. Perhaps a TX switchover (1->2) was triggered, but TX-2 is broken (and this procedure tries only to switch over from 1->2, but not 2->1).		
29		On-Call SOE		Next Step: 30

No TM Recovery
 File: H_CRP_SYS_NOTM.xls
 Author: F. Keck



Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Contact FCT On-Call person (if not already done) and provide following (additional) information: - Assumed FDIR level 3/4 has occurred - TM is back - Come in to start investigations according to H_CRP_SYS_ANOM		
30		<i>TTC Checkout and Connection Test</i>		Next Step: END
		Execute Procedure: H_FCP_TTC_QCHK TTC S/S Routine Quick Check-out		
31		<i>Check NCTRS/MCS</i>		Next Step: 32
		Check NCTRS: - Confirm all links are in process - Check if MCS link shows down Check MCS: - Check TM SPACON if TM reception is enabled - Check if packetiser is running - Check for other crashed tasks		
32		<i>NCTRS/MCS Problem remains?</i>		Next Step: False END True 33
33		<i>On-Call SWS</i>		Next Step: 34
		Call immediately SWS according to On-Call-List.		
34		<i>Wait until Ground Segment is fixed</i>		Next Step: END
End of Procedure				