Both STRs unhealthy
File: H_CRP_SYS_BLIND.xls
Author: F. Keck

Procedure Summary

Objectives

Procedure to be run when both STRs are unhealthy, i.e. ACMS in gyro-only mode.

Summary of Constraints

In this situation all pointing commands (slews) are rejected by the ACMS and therefore the S/C does not slew to the planned DTCP attitude for a pass.

This can lead to a situation where the ground station is not in the FOV of the MGA; in a worst case there will be no TM at all available at AOS.

This worst case (no TM at AOS) is covered by the No-TM-CRP; a manual switchover to TX-2 and LGA will recover TM.

Spacecraft Configuration

Start of Procedure

TM is available (perhaps after No-TM recovery)
ACMS mode = SCM
Both STRs are unhealthy (ACMS in gyro-only)
TX-1 or TX-2 is in use
MGA or LGA is in use

End of Procedure

At least one STR is healthy and in use
S/C is in an DTCP attitude (i.e. MGA coverage)

Reference File(s)

Input Command Sequences

HLRMGAR2
HCRTTC1

Output Command Sequences

HRYBLIND
HRYBLIN1
HRYBLIN2
HRYBLIN3

Referenced Displays

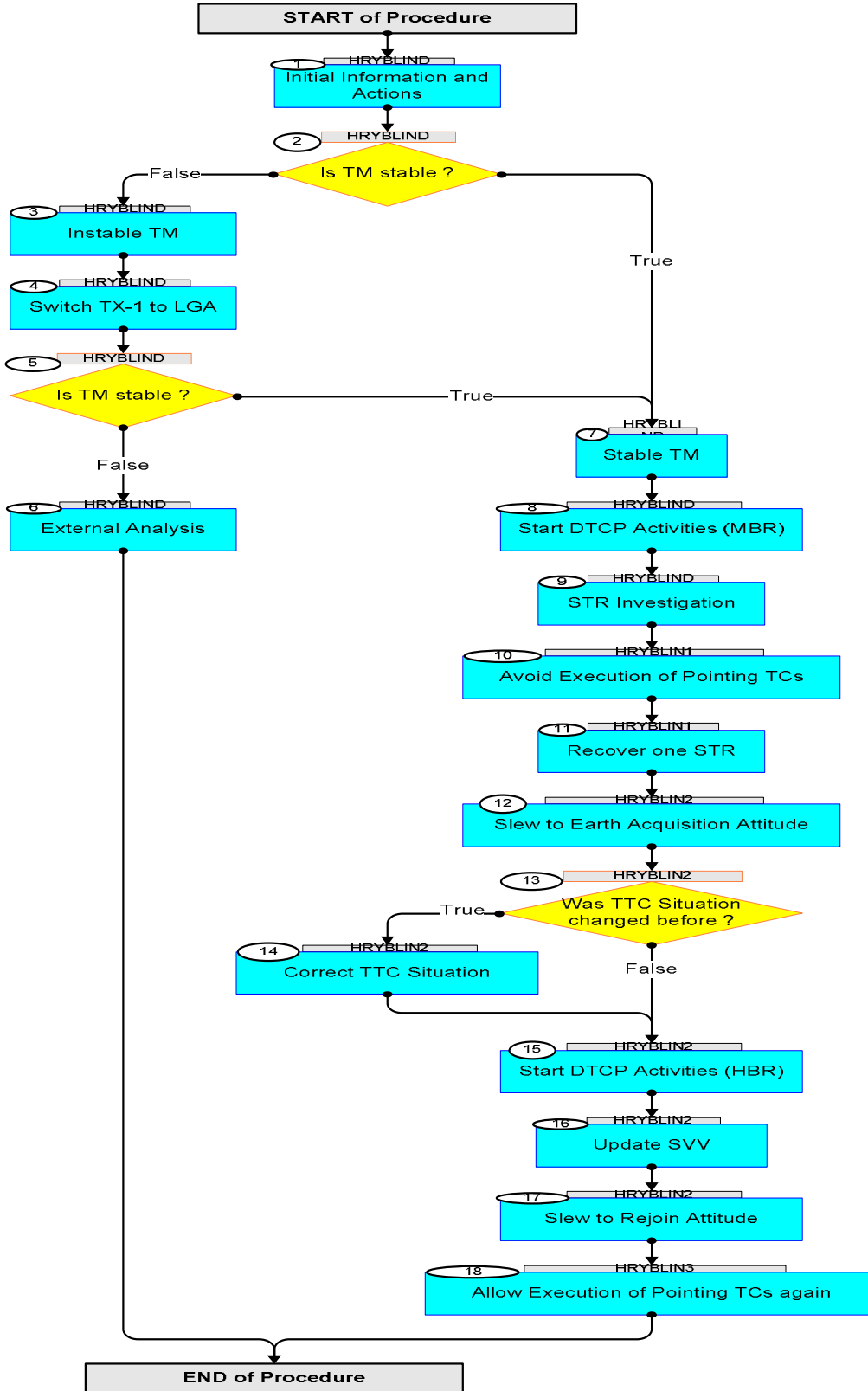**ANDs   GRDs   SLDs**
                        (None)

Configuration Control Information

DATE	FOP ISSUE	VERSION	MODIFICATION DESCRIPTION	AUTHOR	SPR REF
12/08/2011	3.1	1	Created	F. Keck	

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Procedure Flowchart Overview

START of Procedure

1 HRYBLIND
Initial Information and Actions

2 HRYBLIND
Is TM stable ?

False →

3 HRYBLIND
Instable TM

4 HRYBLIND
Switch TX-1 to LGA

5 HRYBLIND
Is TM stable ?

True →

False ↓

6 HRYBLIND
External Analysis

True ↓

7 HRYBLIND
Stable TM

8 HRYBLIND
Start DTCP Activities (MBR)

9 HRYBLIND
STR Investigation

10 HRYBLIN1
Avoid Execution of Pointing TCs

11 HRYBLIN1
Recover one STR

12 HRYBLIN2
Slew to Earth Acquisition Attitude

13 HRYBLIN2
Was TTC Situation changed before ?

True →

14 HRYBLIN2
Correct TTC Situation

False ↓

15 HRYBLIN2
Start DTCP Activities (HBR)

16 HRYBLIN2
Update SVV

17 HRYBLIN2
Slew to Rejoin Attitude

18 HRYBLIN3
Allow Execution of Pointing TCs again

END of Procedure

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Beginning of Procedure		
		TC Seq. Name :HRYBLIND () *TimeTag Type: N* *Sub Schedule ID:*		
1		*Initial Information and Actions*		Next Step: 2
		Warning: This procedure is only applicable if **both** STRs are unhealthy.		
		SPACON Instructions: Do not start DTCP commanding yet.		
		Contact FD On-Call person: Both STRs are unhealthy. Following 3 TPFs will be required to complete today's recovery (urgent!): - SVV update - SCM pointing to rejoin DTCP attitude - RWO We will trigger the slew to the stored Earth Acquisition Attitude (later in this procedure). The TPFs shall continue from this attitude.		
2		*Is TM stable ?*		Next Step: False 3 True 7
		Check NCTRS and MCS log for loosing VC-0/4 TM Frames.		
3		*Instable TM*		Next Step: 4
		SPACON Instructions: Do not start DTCP commanding yet, wait until TM is stable.		
		Check the Earth Acquisition Angle (would show 0 for perfect Earth pointing).		
		Verify Telemetry **ACMS EAA XD029990**		(None)
		Ground Station VSDS: Verify TM margin (good if "Es/No of subcarrier" > 10 dB at MBR) See attached screenshot.		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
4		*Switch TX-1 to LGA*		Next Step: 5
		The MGA is not Earth pointing; a switch over to LGA will stabilise TM. Comment: Medium TM rate works with LGA.		

		Execute Sequence
		HLRMGAR2 Switch RX2toMGA COP v02
		  Sequence Grouping = –
		
		  This Sequence Reference is not included in the generated sequence
		SSID : 0
				SEQ

		This sequence is maintained by following procedure:		
		Execute Procedure: **H_LEO_TTC_MGAR** **Switch RX2 to MGA**		
5		*Is TM stable ?*		Next Step: False 6 True 7
		Check NCTRS and MCS log for loosing VC-0/4 TM Frames.		
6		*External Analysis*		Next Step: END
		This situation should not occur. TM via the LGA should be stable independent of the S/C attitude.		
7		*Stable TM*		Next Step: 8
		TM may be stable at this time, but switching to HBR shall still wait until a slew to Earth pointing is completed.		
8		*Start DTCP Activities (MBR)*		Next Step: 9
		SPACON Instructions: The SPACON can start the MBR part of the DTCP procedure now. The Packet Store 1 dump shall be brought forward to be done in MBR. This will provide the CEL and SEL for investigations. The start of the HBR part of the DTCP procedure will be announced later in this procedure.		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
9		*STR Investigation*		Next Step: 10
		Search for 21 instances of "STR initial quaternion check". Each instance separated by ~50 seconds.		
		Verify Packet Reception **AccAsw TM_5_1_16402 - Fdir Str Initquat Check** *Packet Details:*	A51STR1NC109	
		APID:	512	
		Type:	5	
		Subtype:	1	
		PI1:	16402	
		PI2:	0	
		This is the **only** case for which you can immediately start the STR recovery; proceed with this procedure. Should the STR anomalies were caused by other events, further asessment by ACMS SOE (and perhaps industry) is required; suspend the procedure here!		
		TC Seq. Name :HRYBLIN1 (Disable ACMS MTL) *TimeTag Type: N* *Sub Schedule ID:*		
10		*Avoid Execution of Pointing TCs*		Next Step: 11
		To ensure that no pointing commands will be executed until the STR recovery is fully completed, the ACMS subschedule must be disabled.		

		Execute Telecommand
		        DisableRelOfTcs_Templ
		
		Command Parameter(s) :
		      N_Repetition DH041170
		      SubscheduleId DH053170
		      M_nrOfApids DH054170
		
		TC Control Flags :
		                    GBM IL DSE
		                    --Y -- ---
		Subsch. ID : 10
		Det. descr. : TEMPLATE DisableReleaseOfTcs, TC(11,2)
			DCT23170
			
			1 **<dec>** (Def)
			20 **<dec>**
			0 **<dec>**	

11		*Recover one STR*		Next Step: 12
		Execute Procedure: **H_CRP_AOC_4S01** **STR Reconfiguration**		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Above procedure calls following procedure:		
		Execute Procedure: **H_FCP_AOC_8ON1** **Make STR1 operational and configure mode**		
		TC Seq. Name :HRYBLIN2 (Slew Earth Pointin) *TimeTag Type:* *Sub Schedule ID:*		
12		*Slew to Earth Acquisition Attitude*		Next Step: 13
		The following two TCs will set and reset the CIR to fake a CDMU reboot to the ACMS. The ACMS will slew to the stored Earth Acquisition Attitude (and bring the MGA into the FOV of the ground station).		

		Execute Telecommand
		
		        Set_CIR_Relay
		
		TC Control Flags :
		
		       GBM IL DSE
		       --Y LR ---
		Subsch. ID : 10
		Det. descr. : Set CIR Relay - High Priority Standard
			DCA20170	

	ET=+ UT=+00.00.01	Execute Telecommand **Reset_CIR_Relay** *Subsch. ID : 10* Det. descr. : Reset CIR Relay - High Level	DCH43170	
		Wait until the slew is completed.		
13		*Was TTC Situation changed before ?*		Next Step: False 15 True 14
		Was the No-TM procedure executed to get TM via TX-2 and LGA ? Or was TM stabilised by switching TX-1 from MGA to LGA ?		
14		*Correct TTC Situation*		Next Step: 15
		Now the MGA is pointing to Earth, so TM via TX-1 with MGA should work again.		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Check the Earth Acquisition Angle (would show 0 for perfect Earth pointing).		
		Verify Telemetry **ACMS EAA** **XD029990**		(None)
		Ground Station VSDS: Verify TM margin (good if "Es/No of subcarrier" > 10 dB at MBR) See attached screenshot.		
14.1		*If on TX-2*		
		Switch back to TX-1. Use the MR branch of following procedure:		
		Execute Procedure: **H_CRP_TTC_T10R** **Switch to chain 1 after XPND1 or TWTA1 failure**		
14.2		*If on TX-1 but via LGA*		
		Connect TX-1 back to MGA.		

		Execute Sequence
		HCRTTC1 Switch TTC1 to MGA v03
		  Sequence Grouping = -
		
		  This Sequence Reference is not included in the generated sequence
		SSID : 0
				SEQ

		This sequence is maintained by following procedure:		
		Execute Procedure: **H_COP_TTC_TTC1** **Switch TTC chain 1 to MGA**		
15		*Start DTCP Activities (HBR)*		Next Step: 16
		SPACON Instructions: The SPACON can continue with the HBR part of the DTCP procedure now.		
16		*Update SVV*		Next Step: 17

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		The Spacecraft Velocity Vector (SVV) values must be updated as soon as possible, using a TPF generated by Flight Dynamics. The TPF will be time-tagged, so TCs loaded on Manual Stack will need to be edited for manual release and immediate execution.		
17		*Slew to Rejoin Attitude*		Next Step: 18
		SCM pointing to rejoin DTCP attitude		
		RWO after slew		
		TC Seq. Name :HRYBLIN3 (Enable ACMS MTL) *TimeTag Type: N* *Sub Schedule ID:*		
18		*Allow Execution of Pointing TCs again*		Next Step: END
		Re-enable the ACMS subschedule at the rejoin time.		

		Execute Telecommand
		                    EnableRelOfTcs_Templ
		
		Command Parameter(s) :
		            N_Repetition DH041170
		            SubscheduleId DH053170
		            M_nrOfApids DH054170
		
		TC Control Flags :
		                         GBM IL DSE
		                         --Y -- ---
		Subsch. ID : 10
		Det. descr. : TEMPLATE EnableReleaseOfTcs, TC(11,1)
			DCT22170
			
			1 **<dec>** (Def)
			20 **<dec>**
			0 **<dec>**	

		End of Procedure		

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"Es/No of subcarrier"