

Perform a severe patch  
 File: H\_CRP\_DHS\_3036.xls  
 Author: S. Manganelli



## Procedure Summary

### Objectives

This procedure describes the steps needed to perform a "Severe Patch" on EEPROM (code plus data). The procedure is based on the consideration that if both RM logs are cleaned up then a PM reset will cause both BSW and ASW to boot using EEPROM data. Moreover this configuration also lead the ASW to restart in EAM. The Survival register has to be changed to ask for the BSW using the nominal bus side

### Summary of Constraints

A "Severe patch" refers to a CDMU OBSW change that has impacted also the definition of the data stored in SGM. In this case it is necessary to reboot using the default tables and data stored in EEPROM. In fact data retrieval from SGM is not possible since the previous data structures would not match the new ones and would cause unpredictable SW behaviour

### Spacecraft Configuration

**Start of Procedure**

S/C in Nominal mode

**End of Procedure**

S/C in Earth Acquisition mode

### Reference File(s)

**Input Command Sequences**

**Output Command Sequences**

HRD3036C  
 HRD3036F  
 HRD3036G  
 HRD3036H

### Referenced Displays

<b>ANDs</b>	<b>GRDs</b>	<b>SLDs</b>
ZAZAA999		
ZAZAF999		

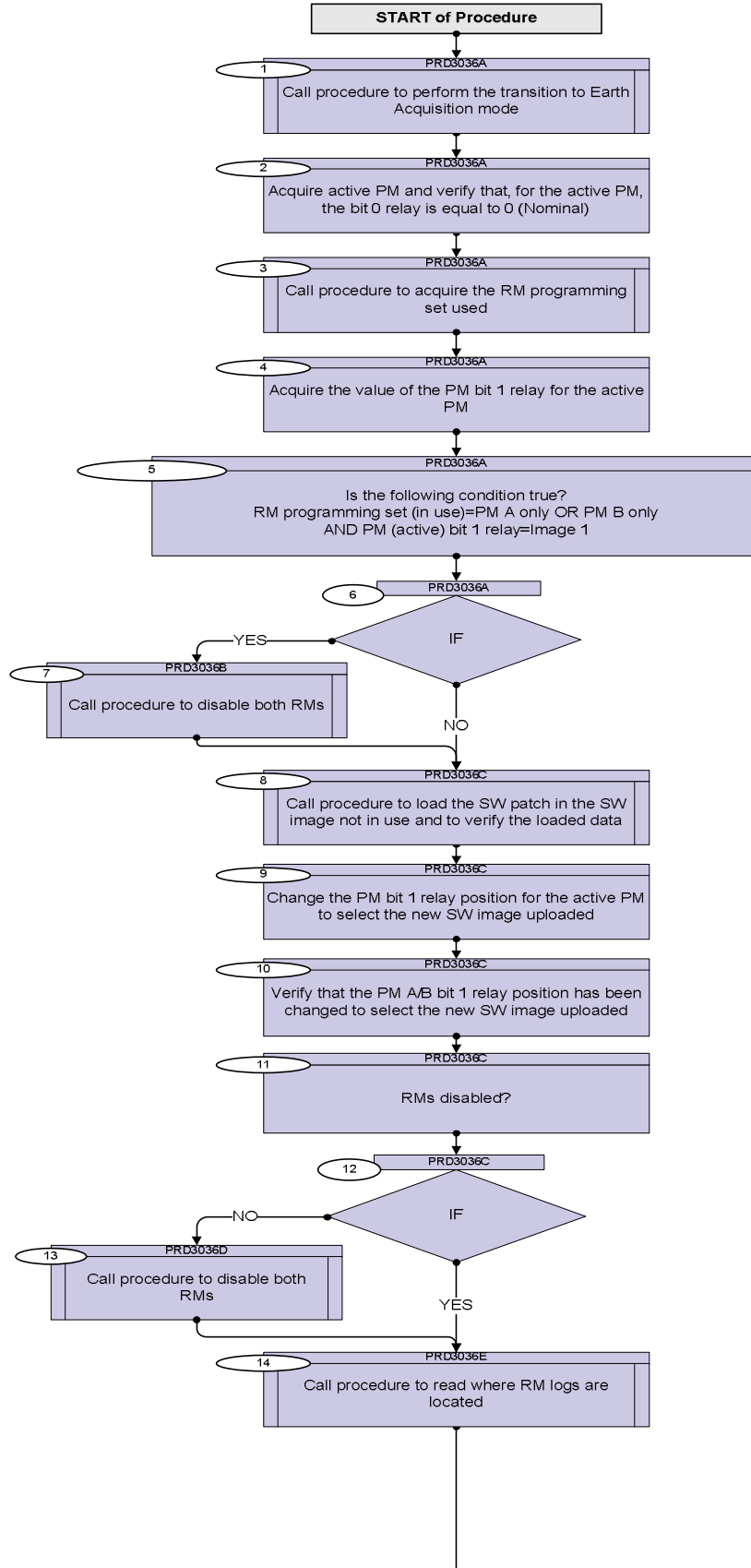
### Configuration Control Information

DATE	FOP ISSUE	VERSION	MODIFICATION DESCRIPTION	AUTHOR	SPR REF
08/12/08	2	1	Created	S. Manganelli	

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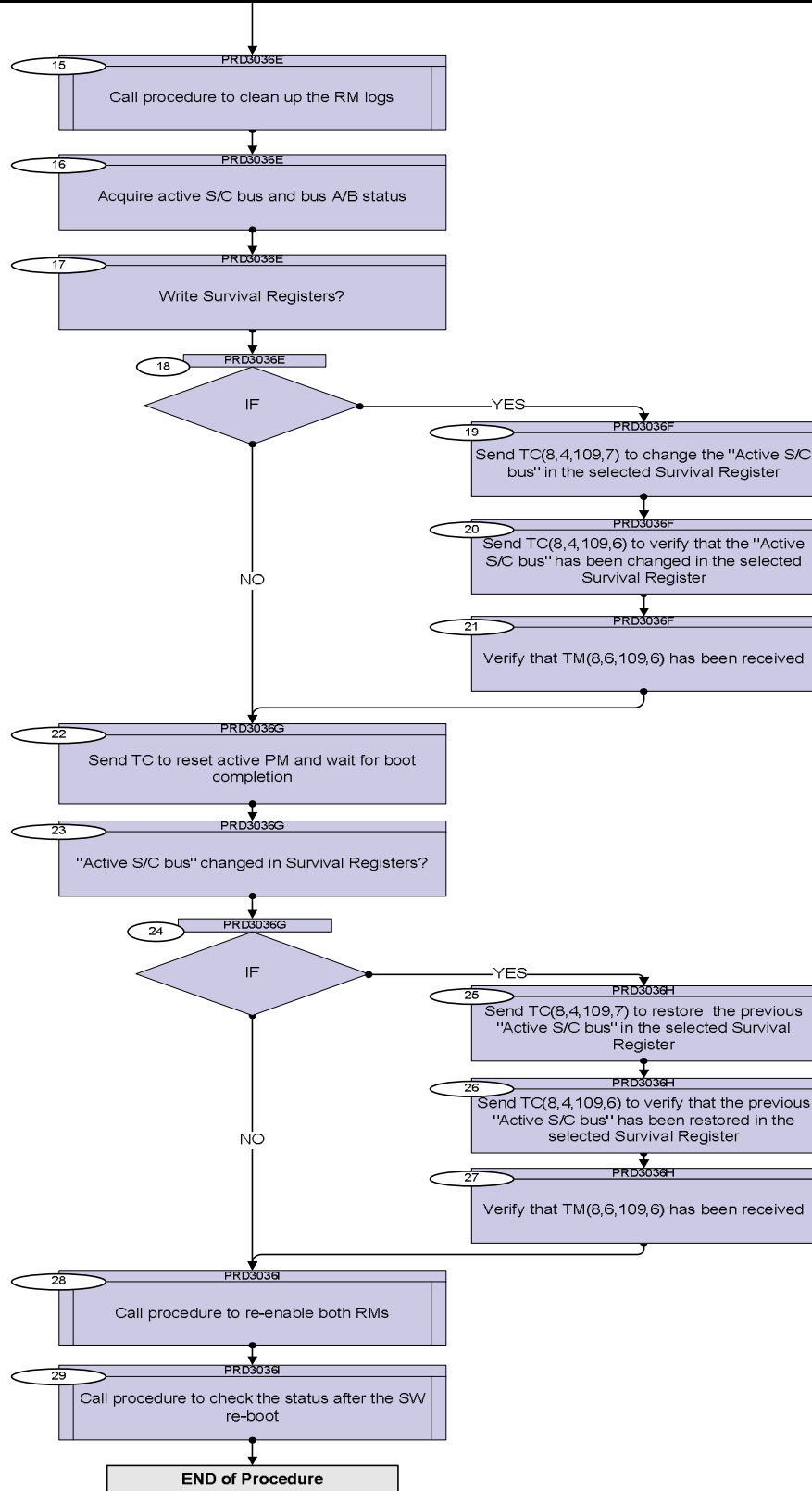
## Procedure Flowchart Overview



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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
<b>Beginning of Procedure</b>				
<p><i>TC Seq. Name :HRD3036A (Perform transition t)</i></p> <p><i>TimeTag Type:</i>  <i>Sub Schedule ID:</i></p> <p style="text-align: center;">□</p>				
1		<p><i>Call procedure to perform the transition to Earth Acquisition mode</i></p> <p><b>Use procedure H_FCP_DHS_4005</b></p>		Next Step: 2
2		<p><i>Acquire active PM and verify that, for the active PM, the bit 0 relay is equal to 0 (Nominal)</i></p> <p>Verify Telemetry  <b>Active_PM_Board</b>                      <b>DEDM1160</b></p> <p>Verify Telemetry  <b>PMA_R0_TTR-RM_A</b>                      <b>DEEX1160</b></p> <p>Verify Telemetry  <b>PMB_R0_TTR-RM_B</b>                      <b>DEEX3160</b></p>		Next Step: 3  AND=ZAZAA999  AND=ZAZAA999  AND=ZAZAA999
3		<p><i>Call procedure to acquire the RM programming set used</i></p> <p><b>WARNING: the following procedure has to be executed twice to check both the CROMES.</b></p> <p><b>In the called procedure, at the step 2, it is necessary to choose the CROME ID and the CROME Register Address (0700_5830).</b></p> <p><b>Use procedure H_FCP_DHS_3010</b></p>		Next Step: 4
4		<p><i>Acquire the value of the PM bit 1 relay for the active PM</i></p> <p><b>If PM A/B bit 1 relay = 1 the image selected is "Image 1" while if it is equal to 0 the image selected is "Image 2".</b></p> <p>Verify Telemetry  <b>PMA_R1_TTR-RM_A</b>                      <b>DEEX2160</b></p> <p>Verify Telemetry  <b>PMB_R1_TTR-RM_B</b>                      <b>DEEX4160</b></p>		Next Step: 5  AND=ZAZAA999  AND=ZAZAA999

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
5		Is the following condition true? RM programming set (in use)=PM A only OR PM B only AND PM (active) bit 1 relay=Image 1		Next Step: 6
6		IF		Next Step: YES 7 NO 8
<p>TC Seq. Name :HRD3036B (Disable both RMs.)</p> <p>TimeTag Type:            Sub Schedule ID:</p> <p><input type="checkbox"/></p>				
7		Call procedure to disable both RMs		Next Step: 8
		<b>This step will prevent the possibility to select automatically the SW Image 2 and run it while patching.</b>		
		<b>WARNING: the called procedure must be executed 4 times; in fact it is necessary to disable both RMs sending the TC(2,3) ("Standard") via CPDU A and B.</b>		
		<b>In the called procedure, at the step 3 choose "disable" and then at the step 10 choose the RM.</b>		
		Use procedure H_CRP_DHS_3011		
<p>TC Seq. Name :HRD3036C (Load new OBSW image)</p> <p>TimeTag Type:            Sub Schedule ID:</p> <p><input type="checkbox"/></p>				
8		Call procedure to load the SW patch in the SW image not in use and to verify the loaded data		Next Step: 9
		<b>In the called procedure, at the step 3, choose the "EEPROM" branch.</b>		
		Use procedure H_CRP_DHS_3023		
9		Change the PM bit 1 relay position for the active PM to select the new SW image uploaded		Next Step: 10

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		<b>WARNING: only one of the following telecommand must be sent according to the telemetry acquired in steps 2 and 4. Moreover, each TC must be sent twice, via CPDU A and B.</b>		
		<b>IF PM in use=PM A AND SW Image in use=SW Image 2</b>  <b>must be sent the following TC:</b>		
		Execute Telecommand  PM_A_bit_1_SW_Image_1  TC Control Flags :  GBM IL DSE --Y -- ---  Subsch. ID : 10 Det. descr. : Set PM A bit 1 = Select SW Image 1 - High Priority Standard	DCA58170	
		<b>IF PM in use=PM A AND SW Image in use=SW Image 1</b>  <b>must be sent the following TC:</b>		
		Execute Telecommand  PM_A_bit_1_SW_Image_2  TC Control Flags :  GBM IL DSE --Y -- ---  Subsch. ID : 10 Det. descr. : Reset PM A bit 1 = Select SW Image 2 - High Priority Standard	DCA59170	
		<b>IF PM in use=PM B AND SW Image in use=SW Image 2</b>  <b>must be sent the following TC:</b>		
		Execute Telecommand  PM_B_bit_1_SW_Image_1  TC Control Flags :  GBM IL DSE --Y -- ---  Subsch. ID : 10 Det. descr. : Set PM B bit 1 = Select SW Image 1 - High Priority Standard	DCA62170	
		<b>IF PM in use=PM B AND SW Image in use=SW Image 1</b>  <b>must be sent the following TC:</b>		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Execute Telecommand  PM_B_bit_1_SW_Image_2  TC Control Flags :  Subsch. ID : 10 Det. descr. : Reset PM B bit 1 = Select SW Image 2 - High Priority Standard  GBM IL DSE --Y -- --	DCA63170	
10		Verify that the PM A/B bit 1 relay position has been changed to select the new SW image uploaded		Next Step: 11
		Verify Telemetry PMA_R1_TTR-RM_A DEEX2160		AND=ZAZAA999
		Verify Telemetry PMB_R1_TTR-RM_B DEEX4160		AND=ZAZAA999
11		RMs disabled?  <b>If the RMs have been previously disabled choose "YES" else "NO".</b>		Next Step: 12
12		IF		Next Step: NO 13 YES 14
TC Seq. Name :HRD3036D (Disable both RMs)  TimeTag Type: Sub Schedule ID:  <input type="checkbox"/>				
13		Call procedure to disable both RMs  <b>This is needed anyway both for updating the Survival Registers and for sending a PM reset.</b>  <b>WARNING: the called procedure must be executed 4 times; in fact it is necessary to disable both RMs sending the TC(2,3) ("Standard") via CPDU A and B.</b>  <b>In the called procedure, at the step 3 choose "disable" and then at the step 10 choose the RM.</b>		Next Step: 14
		Use procedure H_CRP_DHS_3011		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
<p><i>TC Seq. Name :HRD3036E (Clean RM logs)</i></p> <p><i>TimeTag Type:</i>  <i>Sub Schedule ID:</i></p> <p>□</p>				
14		Call procedure to read where RM logs are located		Next Step: 15
		<p>The RM Log is located at addresses given by the RM Log Pointer Register.</p> <p>In the called procedure at step 2, it is necessary to choose the CROME ID and the CROME Register Address (0700_582C).</p> <p><b>WARNING:</b> the called procedure must be executed twice to check both the CROMES.</p>		
		Use procedure H_FCP_DHS_3010		
15		Call procedure to clean up the RM logs		Next Step: 16
		<b>WARNING:</b> the called procedure must be executed 4 times; in fact to clear each RM log, two consecutive TC(6,2) are necessary to write 256 bytes with zeroes.		
		<p>In the called procedure at the step 3 choose the branch "COMM_RAM/TTR_RAM0".</p> <p><b>WARNING:</b> in TC(6,2) it is necessary to set as "Start Address" the address (internal) achieved reading the content of the RM Log Pointer Register; moreover in TC(6,2) it is necessary to consider the logical address.</p> <p><b>TTR A RAM 0:</b>          - Logical address 0xAFC000 - 0xAFFFFFFF          - TTR internal address 0x3004000 - 0x3007FFFF</p> <p><b>TTR B RAM 0:</b>          - Logical address 0xDFC000 - 0xDFFFFFFF          - TTR internal address 0x3004000 - 0x3007FFFF</p>		
		Use procedure H_CRP_DHS_3023		
16		Acquire active S/C bus and bus A/B status		Next Step: 17
		Verify Telemetry Active_Bus_A_B                  DEFJ1160		AND=ZAZAF999
		Verify Telemetry BusA_HealthySts                  DEFJ2160		AND=ZAZAF999
		Verify Telemetry BusB_HealthySts                  DEFJ3160		AND=ZAZAF999



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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch																				
17		Write Survival Registers?		Next Step: 18																				
		<b>WARNING: the Survival Registers have to be written only if both the buses are "healthy", otherwise next boot will cause running on the other bus.</b>  <b>In fact if both the buses are healthy means that the bus set in the Survival Register is not the active bus.</b>																						
18		IF		Next Step: YES 19 NO 22																				
<p>TC Seq. Name :HRD3036F (Change active bus in)</p> <p>TimeTag Type: N            Sub Schedule ID:            □</p>																								
19		Send TC(8,4,109,7) to change the "Active S/C bus" in the selected Survival Register		Next Step: 20																				
		<b>WARNING: the following TC has to be sent twice to write both the Survival Registers.</b>  <b>WARNING: only the "Active S/C bus" bits (bit 0 in bytes 0 and 1 of SURV_BITS_2) has to be changed and must be equal to the active S/C bus acquired in step 16.</b>																						
		Execute Telecommand <p style="text-align: right;">WriteSurvContxt</p> <p>Command Parameter(s) :</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 30%;"></td> <td style="width: 20%;">RmId</td> <td style="width: 20%;">DH093170</td> <td style="width: 30%;">RMID</td> </tr> <tr> <td></td> <td>SurvBits1</td> <td>DH100170</td> <td>SURVBIT1</td> </tr> <tr> <td></td> <td>SurvBits2</td> <td>DH101170</td> <td>SURVBIT2</td> </tr> </table> <p>TC Control Flags :</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 30%;"></td> <td style="width: 20%;">GBM</td> <td style="width: 20%;">IL</td> <td style="width: 30%;">DSE</td> </tr> <tr> <td></td> <td>--Y</td> <td>--</td> <td>---</td> </tr> </table> <p>Subsch. ID : 10            Det. descr. : TEMPLATE Write Survival Context            TC(8,4,109,7)</p>		RmId	DH093170	RMID		SurvBits1	DH100170	SURVBIT1		SurvBits2	DH101170	SURVBIT2		GBM	IL	DSE		--Y	--	---	DCT61170	
	RmId	DH093170	RMID																					
	SurvBits1	DH100170	SURVBIT1																					
	SurvBits2	DH101170	SURVBIT2																					
	GBM	IL	DSE																					
	--Y	--	---																					
20		Send TC(8,4,109,6) to verify that the "Active S/C bus" has been changed in the selected Survival Register		Next Step: 21																				
		<b>WARNING: the following TC has to be sent twice to read both the Survival Registers.</b>																						



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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		<b>WARNING: only one of the following telecommand must be sent according to telemetry acquired at the step 2. Moreover, the selected TC must be sent twice, via CPDU A and via CPDU B</b>		
		<b>If PM in use=PM A, the following TC must be sent:</b>		
		Execute Telecommand <div style="text-align: right;">PM_A_Reset</div> TC Control Flags : <div style="text-align: right;">GBM IL DSE --Y -- ---</div> Subsch. ID : 10 Det. descr. : PM A Reset - High Priority Standard	DCA52170	
		<b>If PM in use=PM B, the following TC must be sent:</b>		
		Execute Telecommand <div style="text-align: right;">PM_B_Reset</div> TC Control Flags : <div style="text-align: right;">GBM IL DSE --Y -- ---</div> Subsch. ID : 10 Det. descr. : PM B Reset - High Priority Standard	DCA68170	
		Control Execution <div style="text-align: right;">0000.00.20.000</div>	WAIT	
23		"Active S/C bus" changed in Survival Registers?		Next Step: 24
		<b>If in step 18 the Survival Registers have been written choose "YES" else "NO".</b>		
24		IF		Next Step: NO 28 YES 25
TC Seq. Name :HRD3036H (Restore active bus i)  TimeTag Type: N Sub Schedule ID:  <input type="checkbox"/>				
25		Send TC(8,4,109,7) to restore the previous "Active S/C bus" in the selected Survival Register		Next Step: 26
		<b>WARNING: the following TC has to be sent twice to write both the Survival Registers.</b>  <b>WARNING: only the "Active S/C bus" bits (bit 0 in bytes 0 and 1 of SURV_BITS_2) has to be changed and must be the opposite of the one selected in step 19.</b>		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Execute Telecommand  <div style="text-align: right;">WriteSurvContxt</div> Command Parameter(s) : <div style="display: flex; justify-content: space-between;"> <div>RmId</div> <div>DH093170</div> <div>RMID</div> </div> <div style="display: flex; justify-content: space-between;"> <div>SurvBits1</div> <div>DH100170</div> <div>SURVBIT1</div> </div> <div style="display: flex; justify-content: space-between;"> <div>SurvBits2</div> <div>DH101170</div> <div>SURVBIT2</div> </div> TC Control Flags : <div style="display: flex; justify-content: space-between;"> <div></div> <div>GBM IL DSE</div> <div></div> </div> <div style="display: flex; justify-content: space-between;"> <div></div> <div>--Y --</div> <div>---</div> </div> Subsch. ID : 10 Det. descr. : TEMPLATE Write Survival Context TC(8,4,109,7)	DCT61170	
26		Send TC(8,4,109,6) to verify that the previous "Active S/C bus" has been restored in the selected Survival Register		Next Step: 27
		<b>WARNING: the following TC has to be sent twice to read both the Survival Registers.</b>		
		Execute Telecommand  <div style="text-align: right;">ReadSurvContxt</div> Command Parameter(s) : <div style="display: flex; justify-content: space-between;"> <div>RmId</div> <div>DH093170</div> <div>RMID</div> </div> TC Control Flags : <div style="display: flex; justify-content: space-between;"> <div></div> <div>GBM IL DSE</div> <div></div> </div> <div style="display: flex; justify-content: space-between;"> <div></div> <div>--Y --</div> <div>---</div> </div> Subsch. ID : 10 Det. descr. : TEMPLATE Read Survival Context TC(8,4,109,6)	DCT60170	
27		Verify that TM(8,6,109,6) has been received		Next Step: 28
		<b>WARNING: the following TM will be acquired twice.</b>		
		Verify Packet Reception <b>TM 8-6-109-6 TTR Management - Survival Context Report</b> Packet Details: <div style="display: flex; justify-content: space-between;"> <div>APID:</div> <div>16</div> <div></div> </div> <div style="display: flex; justify-content: space-between;"> <div>Type:</div> <div>8</div> <div></div> </div> <div style="display: flex; justify-content: space-between;"> <div>Subtype:</div> <div>6</div> <div></div> </div> <div style="display: flex; justify-content: space-between;"> <div>PI1:</div> <div>27910</div> <div></div> </div> <div style="display: flex; justify-content: space-between;"> <div>PI2:</div> <div>0</div> <div></div> </div>	SurvCntxRpt	
		Verify Packet Telemetry (Pkt = SurvCntxRpt)  <div style="display: flex; justify-content: space-between;"> <div>Function_ID</div> <div>DE008170</div> <div>= TTR_Manag</div> </div>		(None)
		Verify Packet Telemetry (Pkt = SurvCntxRpt)  <div style="display: flex; justify-content: space-between;"> <div>TtrManRptActId</div> <div>DE368170</div> <div>= SurvCntxRpt</div> </div>		(None)
		Verify Packet Telemetry (Pkt = SurvCntxRpt)  <div style="display: flex; justify-content: space-between;"> <div>SID</div> <div>DE010170</div> <div>= 0 &lt;dec&gt;</div> </div>		(None)

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Packet Telemetry (Pkt = SurvCntxRpt)  RmId DE283170		(None)
		Verify Packet Telemetry (Pkt = SurvCntxRpt)  SurvBits1 DE343170		(None)
		Verify Packet Telemetry (Pkt = SurvCntxRpt)  SurvBits2 DE344170		(None)
<p>TC Seq. Name :HRD3036I (Enable both RMs and )</p> <p>TimeTag Type: Sub Schedule ID:  <input type="checkbox"/></p>				
28		Call procedure to re-enable both RMs		Next Step: 29
		<b>WARNING: the called procedure must be executed 4 times; in fact it is necessary to re-enable both RMs sending the TC(2,3) ("Standard") via CPDU A and B.</b>  <b>In the called procedure, at the step 3 choose "enable" and then at the step 4 choose the RM.</b>		
		Use procedure H_CRP_DHS_3011		
29		Call procedure to check the status after the SW re-boot		Next Step: END
		Use procedure H_FCP_DHS_4004		
<b>End of Procedure</b>				