

Recovery from Separation Straps 3 and 4 (Double) Failure  
File: H\_CRP\_AOC\_0S34.xls  
Author: dsalt-hp



## Procedure Summary

### Objectives

The ACMS onboard software uses two separation straps signals (straps 3 and 4) to recognise separation from the launcher. The values of separation strap status obtained through the I/O block are OR-ed by the software so that separation can still be recognised even if the status of one of the strap signals does not change (this can be due a failure of the separation strap, the harness or the receiving circuit in the ACC).

The separation handling logic is so critical for the survival of the spacecraft that even though a failure of the ASW to recognise separation is possible only in case of a double hardware failure which would prevent both straps 3 and 4 from operating properly, the design of the ACMS provides an additional back-up mechanism. Separation can be forced using a dedicated TC, which forces the ASW to recognise separation and writes a forced separation flag in the RM context register so that separation will be recognised in the case of a reset or reconfiguration of the PM (the flag stored in the RM is used as the third input OR-ed with the separation straps).

#### USAGE:

The procedure should be applied immediately after the first contact with the spacecraft if TM indicates that the ACMS remains in PRE\_SEPARATION substate of SBM, even though other TM data show that the spacecraft has separated from the launcher.

### Summary of Constraints

N/A

### Spacecraft Configuration

#### Start of Procedure

N/A

#### End of Procedure

N/A

### Reference File(s)

#### Input Command Sequences

#### Output Command Sequences

HRA0S34A  
HRA0S34B  
HRA0S34C

### Referenced Displays

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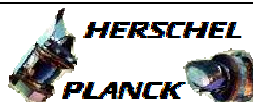


**ANDs**      **GRDs**      **SLDs**  
 ZAA21999  
 ZAA07999  
 ZAAM0999

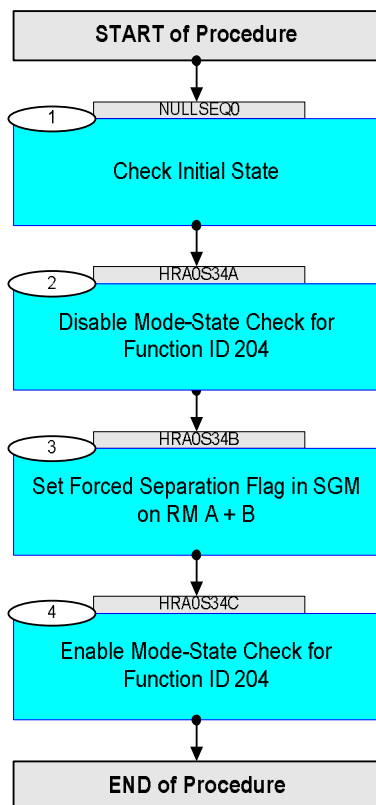
**Configuration Control Information**

DATE	FOP ISSUE	VERSION	MODIFICATION DESCRIPTION	AUTHOR	SPR REF
10/01/09	2	1	Created	dsalt-hp	
22/03/09	2.2	2	Comments added at Step 2 to make disabling of mode-state check optional	dsalt-hp	
21/04/09	2.3	3	Step for time-tagged safety TC removed and sequence ID names modified accordingly	dsalt-hp	

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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>				
TC Seq. Name : NULLSEQ0 ( )  TimeTag Type: N Sub Schedule ID:  <input type="checkbox"/>				
1		Check Initial State		Next Step: 2
		<i>The procedure should be applied immediately after the first contact with the spacecraft if TM indicates that the ACMS remains in PRE_SEPARATION substate of SBM, even though other TM data show that the spacecraft has separated from the launcher.</i>		
1.1		Mode Status in case of Separation Strap (3 + 4) Failure		<input type="checkbox"/>
		Verify Telemetry <b>AcmsMode</b> <b>AESMG002</b>	= SBM	AND=ZAA21999
		Verify Telemetry <b>AcmsSubstate</b> <b>AESMF002</b>	= SBM Pre-sep	AND=ZAA21999
1.2		Separation Strap Status in case of Double Failure		<input type="checkbox"/>
		Verify Telemetry <b>Sep strap 3B</b> <b>AMC3B021</b>	= Not Separated	AND=ZAA21999
		Verify Telemetry <b>Sep strap 4B</b> <b>AMC4B021</b>	= Not Separated	AND=ZAA21999
TC Seq. Name : HRA0S34A (EnaModStateChkFid204)  TimeTag Type: Sub Schedule ID:  <input type="checkbox"/>				
2		Disable Mode-State Check for Function ID 204		Next Step: 3
		<i>IF the ACMS mode is SBM, <u>this step can be skipped.</u></i>		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		<p><i>NOTE:</i>            This step disables the mode-state check for function ID 204 because, in all modes other than SBM, the separation override commands are rejected by the ASW.</p>		
2.1		Uplink Sequence HRA0S34A		□
		<p>Execute Telecommand</p> <p style="text-align: right;"><b>DisChkMode-StateFID 204</b></p> <p>Command Parameter(s) :</p> <p style="padding-left: 40px;"><b>DisChk DF86Cmd                    AH8C1001                    Enable 86</b>  <b>DisChk DD86Cmd                    AH8C2001                    Enable 86</b></p> <p>TC Control Flags :</p> <p style="padding-left: 100px;"><b>GBM IL DSE</b>  <b>--Y -- --</b></p> <p>Subsch. ID : 20            Det. descr. : TC(8,1) - Disable Command check-DisChkMode-StateFID 204</p>	<p><b>ACY8M109</b></p> <p><b>Enable 86</b> <b>Enable 86</b></p>	
		<p>Execute Telecommand</p> <p style="text-align: right;"><b>Fire Disable Check</b></p> <p>Command Parameter(s) :</p> <p style="padding-left: 40px;"><b>FireFun DF86Cmd                    AH8F1001                    Enable 86</b>  <b>FireFun DD86Cmd                    AH8F2001                    Enable 86</b></p> <p>TC Control Flags :</p> <p style="padding-left: 100px;"><b>GBM IL DSE</b>  <b>--Y -- --</b></p> <p>Subsch. ID : 20            Det. descr. : TC(8,4) Fire Command - Fire Disable Check</p>	<p><b>ACZ7M109</b></p> <p><b>Enable 86</b> <b>Enable 86</b></p>	
<p>TC Seq. Name :HRA0S34B (SetForcedSepFlag)</p> <p>TimeTag Type:            Sub Schedule ID:            □</p>				
3		Set Forced Separation Flag in SGM on RM A + B		Next Step: 4
		<p>This step forces the ASW to recognise separation and writes a forced separation flag in the RM context register so that separation will be recognised in the case of a reset or reconfiguration of the PM (the flag stored in the RM is used as the third input OR-ed with the separation straps).</p>		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
3.1		Uplink Sequence HRA0S34B		<input type="checkbox"/>
3.1.1		Disable RM A		<input type="checkbox"/>
		Execute Telecommand <b>Ext_ACC_RM_A_Disable</b> TC Control Flags : Subsch. ID : 10 Det. descr. : External ACC RM A Disable - Mission Specific GBM IL DSE --Y -- --	DCM22170	
		Verify Telemetry <b>RMA_fromTTR-RMA</b> <b>AEE91050</b>	= DISABLED	AND=ZAA07999
		Verify Telemetry <b>RMA_fromTTR-RMB</b> <b>AEE92050</b>	= DISABLED	AND=ZAA07999
3.1.2		Set Forced Separation Flag on RM A		<input type="checkbox"/>
		Execute Telecommand <b>RMA Separated</b> Command Parameter(s) : <b>SepOver DF86Cmd</b> <b>AH8Y1001</b> <b>SepOver DD86Cmd</b> <b>AH8Y2001</b> TC Control Flags : Subsch. ID : 20 Det. descr. : TC(8,1) Separation - RMA Separated GBM IL DSE --Y -- --	ACZ2L109  Enable 86 Enable 86	
		Execute Telecommand <b>Fire Set Sep Status</b> Command Parameter(s) : <b>FireFun DF86Cmd</b> <b>AH8F1001</b> <b>FireFun DD86Cmd</b> <b>AH8F2001</b> TC Control Flags : Subsch. ID : 20 Det. descr. : TC(8,4) Fire Command - Fire Set Sep Status GBM IL DSE --Y -- --	ACZ9L109  Enable 86 Enable 86	
3.1.3		Verify Post-Separation Status (immediately after setting the separation flag and before the auto-transition into SAM)		<input type="checkbox"/>



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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Execute Telecommand <b>Ext_ACC_RM_B_Disable</b>  TC Control Flags :  Subsch. ID : 10 Det. descr. : External ACC RM B Disable - Mission Specific	DCM25170	
		Verify Telemetry <b>RMB_fromTTR-RMA</b> <b>AEE93050</b>	= DISABLED	AND=ZAA07999
		Verify Telemetry <b>RMB_fromTTR-RMB</b> <b>AEE94050</b>	= DISABLED	AND=ZAA07999
3.1.7		Set Forced Separation Flag on RM B		<input type="checkbox"/>
		Execute Telecommand <b>RM B Separated</b>  Command Parameter(s) : <b>SepOver DF86Cmd</b> <b>AH8Y1001</b> <b>SepOver DD86Cmd</b> <b>AH8Y2001</b>  TC Control Flags :  Subsch. ID : 20 Det. descr. : TC(8,1) Separation - RM B Separated	ACZ4L109  Enable 86 Enable 86	
		Execute Telecommand <b>Fire Set Sep Status</b>  Command Parameter(s) : <b>FireFun DF86Cmd</b> <b>AH8F1001</b> <b>FireFun DD86Cmd</b> <b>AH8F2001</b>  TC Control Flags :  Subsch. ID : 20 Det. descr. : TC(8,4) Fire Command - Fire Set Sep Status	ACZ9L109  Enable 86 Enable 86	
		Verify Telemetry <b>SepOverrideSts</b> <b>AESMR002</b>	= Override activ	AND=ZAA21999
3.1.8		Verify Update via RM B Status Report		<input type="checkbox"/>



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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Execute Telecommand  Get RM-B status  Command Parameter(s) : RMStat DF86Cmd AH841001 Enable 86 RMStat DD86Cmd AH842001 Enable 86  TC Control Flags : GBM IL DSE --Y -- ---  Subsch. ID : 20 Det. descr. : TC(8,1) - Get RM-B status	ACZZ5109	
		Verify Packet Reception TM 8-6 for RM Status parametrized Packet Details: APID: 512 Type: 8 Subtype: 6 PI1: 41600 PI2: 1	A86_RMStatus	
		Verify Telemetry MiscCfg SepOver AEW32109	= Separated	AND=ZAAM0999
3.1.9		Enable RM B		<input type="checkbox"/>
		Execute Telecommand  Ext_ACC_RM_B_Enable  TC Control Flags : GBM IL DSE --Y -- ---  Subsch. ID : 10 Det. descr. : External ACC RM B Enable - Mission Specific	DCM24170	
		Verify Telemetry RMB_fromTTR-RMA AEE93050	= ENABLED	AND=ZAA07999
		Verify Telemetry RMB_fromTTR-RMB AEE94050	= ENABLED	AND=ZAA07999
TC Seq. Name :HRA0S34C (DisModStateChkFid204)  TimeTag Type: Sub Schedule ID:  <input type="checkbox"/>				
4		Enable Mode-State Check for Function ID 204		Next Step: END
		<i>IF the ACMS mode is SBM, <u>this step can be skipped.</u></i>		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		NOTE: This step enables the mode-state check for function ID 204. This check ensures that in all modes other than SBM the separation override commands are rejected by the ASW.		
4.1		Uplink Sequence HRA0S34C		<input type="checkbox"/>
		Execute Telecommand <b>EnaChkMode-StateFID 204</b> Command Parameter(s) : <b>EnaChck DF86Cmd</b> <b>AH8F3001</b> <b>EnaChck DD86Cmd</b> <b>AH8F4001</b> TC Control Flags : <b>GBM IL DSE</b> <b>--Y -- --</b> Subsch. ID : 20 Det. descr. : TC(8,1) - Enable Command check - EnaChkMode-StateFID 204	<b>ACZDJ109</b>  <b>Enable 86</b> <b>Enable 86</b>	
TC Seq. Name :HRA0S341 (EnaModStateChkFid204)				
TimeTag Type: N Sub Schedule ID: <input type="checkbox"/>				
TC Seq. Name :HRA0S342 (SendRmABenableToMtl)				
TimeTag Type: B Sub Schedule ID: <input type="checkbox"/>				
TC Seq. Name :HRA0S343 (SetForcedSepFlag)				
TimeTag Type: N Sub Schedule ID: <input type="checkbox"/>				
TC Seq. Name :HRA0S344 (DisModStateChkFid204)				
TimeTag Type: N Sub Schedule ID: <input type="checkbox"/>				
<b>End of Procedure</b>				