

Update STR Alignment Quaternion
 File: H_FCP_AOC_1STO.xls
 Author: dsalt-hp



Procedure Summary

Objectives

The objective of this Herschel ACMS procedure is to update the STR alignment quaternion values in the OBDB.

The procedure involves the following activities:

- disabling of all STR related FDIR checks
- sending values via dedicated TC
- check OBDB for updated values via DTM for OBDB2 or dumps
- enabling of all STR related FDIR checks

The procedure specifies a series of OBDB loads necessary to update OBDB parameters related to STR alignments.

Summary of Constraints

Flight Dynamics must have analysed the S/C data, derived updates for the Star Tracker Alignment quaternions and generated a specific TPF (STO) containing these updated values.

No other ACC critical command armed.

Spacecraft Configuration

Start of Procedure

n/a

End of Procedure

n/a

Reference File(s)

Input Command Sequences

Output Command Sequences

HFA1STOA
 AESTO_00
 HFA1STOB

Referenced Displays

ANDs **GRDs** **SLDs**
 ZAA01999
 ZAA06999

Configuration Control Information

DATE	FOP ISSUE	VERSION	MODIFICATION DESCRIPTION	AUTHOR	SPR REF
11/03/2009		1	Created	dsalt-hp	

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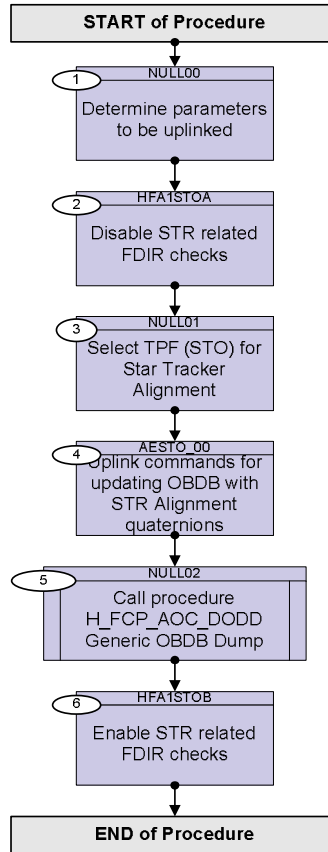


23/03/2009	2.2	2	Correction to TC time-tags in Step 3	dsalt-hp	
25/08/2009	2.5	3	Step 2 & 6 added to disable/enable all STR related FDIR checks to avoid possible triggering when STR misalignments are updated	dsalt-hp	
24/02/2011	3.1	4	Step 6.1 updated to disable STR HK check to ensure coherence with latest onboard configuration	dsalt-hp	

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Procedure Flowchart Overview



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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
Beginning of Procedure				
<p><i>TC Seq. Name : NULL00 (Null Sequence 00)</i></p> <p><i>TimeTag Type:</i> <i>Sub Schedule ID:</i></p> <p style="text-align: center;">□</p>				
1		Determine parameters to be uplinked		Next Step: 2
		<p>Determine the values of Star Tracker Misalignment quaternions for both STR units.</p> <p>The results should be used to derive the following matrices: H_NOM_AUX_STR1_QUAT_BRF_** (a 4x1 maxtrix representing STR1 Alignment quaternion). H_NOM_AUX_STR2_QUAT_BRF_** (a 4x1 maxtrix representing STR2 Alignment quaternion).</p>		
<p><i>TC Seq. Name : HFA1STOA (DisableSTRrelatedChecks)</i></p> <p><i>TimeTag Type:</i> <i>Sub Schedule ID:</i></p> <p style="text-align: center;">□</p>				
2		Disable STR related FDIR checks		Next Step: 3
		<p>NOTE: This procedure updates the STR misalignment matrix and so the resulting shift in the STR measured quaternions is <u>likely to trigger the STR related FDIR checks</u>.</p> <p>The following TCs are therefore used to disable these checks.</p>		
2.1		Command disabling of STR related FDIR checks		□
		<p>Verify Telemetry</p> <p style="text-align: center;">Curr STR in use AES18002 = STR 2</p>		AND=ZAA01999

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Execute Telecommand <p style="text-align: center;">DisChkSTR - all</p> <i>Command Parameter(s) :</i> DisChk DF86Cmd AH8C1001 DisChk DD86Cmd AH8C2001	ACY6V109 Enable 86 Enable 86	
		<i>TC Control Flags :</i> <p style="text-align: center;">GBM IL DSE --Y -- ---</p> <i>Subsch. ID : 20</i> Det. descr. : TC(8,1) - Disable check FDIR - DisChkSTR - all		
		Execute Telecommand <p style="text-align: center;">Fire Disable Check</p> <i>Command Parameter(s) :</i> FireFun DF86Cmd AH8F1001 FireFun DD86Cmd AH8F2001	ACZ7M109 Enable 86 Enable 86	
		<i>TC Control Flags :</i> <p style="text-align: center;">GBM IL DSE --Y -- ---</p> <i>Subsch. ID : 20</i> Det. descr. : TC(8,4) Fire Command - Fire Disable Check		
		Execute Telecommand <p style="text-align: center;">DisChkGYR-STR cross</p> <i>Command Parameter(s) :</i> DisChk DF86Cmd AH8C1001 DisChk DD86Cmd AH8C2001	ACY8F109 Enable 86 Enable 86	
		<i>TC Control Flags :</i> <p style="text-align: center;">GBM IL DSE --Y -- ---</p> <i>Subsch. ID : 20</i> Det. descr. : TC(8,1) - Disable check FDIR - DisChkGYR-STR cross		
		Execute Telecommand <p style="text-align: center;">Fire Disable Check</p> <i>Command Parameter(s) :</i> FireFun DF86Cmd AH8F1001 FireFun DD86Cmd AH8F2001	ACZ7M109 Enable 86 Enable 86	
		<i>TC Control Flags :</i> <p style="text-align: center;">GBM IL DSE --Y -- ---</p> <i>Subsch. ID : 20</i> Det. descr. : TC(8,4) Fire Command - Fire Disable Check		
2.2		Verify disabling of STR related FDIR checks		□

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Telemetry STR alive check AES47001	= Disabled	AND=ZAA06999
		Verify Telemetry STR cont check AES48001	= Disabled	AND=ZAA06999
		Verify Telemetry STR covar check AES49001	= Disabled	AND=ZAA06999
		Verify Telemetry STR loss check AES4A001	= Disabled	AND=ZAA06999
		Verify Telemetry STR hk data chk AES4B001	= Disabled	AND=ZAA06999
		Verify Telemetry GYRSTR xchk AES57002	= Disabled	AND=ZAA06999
<p>TC Seq. Name :NULL01 (Null Sequence 01)</p> <p>TimeTag Type: Sub Schedule ID:</p> <p style="text-align: center;">□</p>				
3		Select TPF (STO) for Star Tracker Alignment		Next Step: 4
		Check with Flight Dynamics the exact name of the TPF instance to be uplinked		
<p>TC Seq. Name :AESTO_00 (Update STO)</p> <p>TimeTag Type: B Sub Schedule ID:</p> <p>Formal Parameter List :</p> <p>DbLoad Dwd Real STO1_11= <dec> DbLoad Dwd Real STO1_21= <dec> DbLoad Dwd Real STO1_31= <dec> DbLoad Dwd Real STO1_41= <dec> DbLoad Dwd Real STO2_11= <dec> DbLoad Dwd Real STO2_21= <dec> DbLoad Dwd Real STO2_31= <dec> DbLoad Dwd Real STO2_41= <dec></p>				
4		Uplink commands for updating OBDB with STR Alignment quaternions		Next Step: 5
		Uplink onboard the parameters determined in the previous step. Note that the Star Tracker Alignments quaternions for each STR are stored in consecutive OBDB locations and so can be loaded in a single step.		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
4.1		Activate loading		<input type="checkbox"/>
	ET+=00.00.00 UT=+	Execute Telecommand Start database loading Command Parameter(s) : ASW Function ID AHFUN001 DbLoad DF86 Cmd AH8D1001 DbLoad DD86 Cmd AH8D2001 DbLoad Nr Cmds AHFDL001 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 20 Det. descr. : TC_START_DATABASE_LOAD	ACDS1001 DB loading (Def) Enable 86 Enable 86 2 <dec>	
		Following the Start_database_loading command the following commands must each be sent within C_ALL_OPS_ASW_CRIT_CMD_TIMEOUT (=180 seconds default) of the previous command to avoid the started status of the function timing-out.		
4.2		Load values		<input type="checkbox"/>
	ET+=00.00.05 UT=+	Execute Telecommand Load databaseReal Command Parameter(s) : DbLoad DF86 Cmd AH8D1001 DbLoad DD86 Cmd AH8D2001 DbLoad StartInd AHFDS001 DbLoad Nr Wrds AHFDN001 DbLoad Dwd Real AHFDZ001 DbLoad Dwd Real AHFDZ001 DbLoad Dwd Real AHFDZ001 DbLoad Dwd Real AHFDZ001 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 20 Det. descr. : TC(8,4) - Load database Real	ACZTY109 Enable 86 Enable 86 296 <dec> 4 <dec> STO1_11 STO1_21 STO1_31 STO1_41	
	ET+=00.00.05 UT=+	Execute Telecommand Load databaseReal Command Parameter(s) : DbLoad DF86 Cmd AH8D1001 DbLoad DD86 Cmd AH8D2001 DbLoad StartInd AHFDS001 DbLoad Nr Wrds AHFDN001 DbLoad Dwd Real AHFDZ001 DbLoad Dwd Real AHFDZ001 DbLoad Dwd Real AHFDZ001 DbLoad Dwd Real AHFDZ001 TC Control Flags : GBM IL DSE	ACZTY109 Enable 86 Enable 86 328 <dec> 4 <dec> STO2_11 STO2_21 STO2_31 STO2_41	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		<p style="text-align: right;">--Y -- ---</p> Subsch. ID : 20 Det. descr. : TC(8,4) - Load database Real		
4.3		Activate values		<input type="checkbox"/>
	ET=+00.00.05 UT=+	Execute Telecommand <p style="text-align: right;">Fire critical command</p> Command Parameter(s) : FireFun DF86Cmd AH8F1001 Enable 86 FireFun DD86Cmd AH8F2001 Enable 86 FireFun CritFID AHFFH001 201 <dec> TC Control Flags : <p style="text-align: right;">GBM IL DSE --Y -- ---</p> Subsch. ID : 20 Det. descr. : TC_FIRE_COMMAND	ACFC1001	
TC Seq. Name : NULL02 (Null Sequence 02) TimeTag Type: Sub Schedule ID: <input type="checkbox"/>				
5		Call procedure H_FCP_AOC_DODD Generic OBDB Dump		Next Step: 6
		NOTE: This procedure enables a direct dump of the OBDB from RAM or Safe-Guard Memory (SGM), as well as reading the OBDB via diagnostic telemetry (DTM) packets		
		<u>Relevant details for use with H FCP AOC DODD</u> Based upon the latest ASW ICD (H-P-4-TASW-IF-0002, Issue 3 F), this procedure loads the following parameters into specific OBDB offset locations in RAM: H_NOM_AUX_STR1_QUAT_BRF_*_* are at OBDB offsets 296-299 H_NOM_AUX_STR2_QUAT_BRF_*_* are at OBDB offsets 328-331 These are located in Block 2 of the OBDB These parameters are not copied in SGM		
5.1		Dump via DTM		<input type="checkbox"/>

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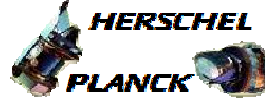
Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		<p>Relevant details for use with H FCP AOC DODD</p> <p>The following parameters H_NOM_AUX_STR1_QUAT_BRF_*_* are at OBDB offsets 296-299 H_NOM_AUX_STR2_QUAT_BRF_*_* are at OBDB offsets 328-331 These are located in Block 2 of the OBDB</p>		
		<p>Use sequence HFADODDB</p>		
		<p>NOTE: The contents of diagnostic packet A3DH0BDB2109 {DTM with Herschel OBDB data2} are spread over a group of 4 monitoring displays:</p> <p>ZAZ64999 DTMOBDB2_1 <- values are in this display ZAZ65999 DTMOBDB2_2 <- values are in this display ZAZ66999 DTMOBDB2_3 ZAZ67999 DTMOBDB2_4</p>		
		<p>NOTE: This step enables diagnostic packets that contain data from specific blocks of the OBDB, where each block contains 250 onboard database parameters.</p> <p>The Herschel onboard database currently contains 2134 parameters and there are 8 diagnostic packets defined to cover the first 2000 entries. In HP-4-TASW-IF-0002 (ACC ASW_ICD) section 6.1 you can find a list of Herschel OBDB parameters ordered by offset.</p>		
5.2		<p>Dump from RAM</p>		□
		<p>Relevant details for use with H FCP AOC DODD</p> <p>Based upon the latest ASW ICD (H-P-4-TASW-IF-0002, Issue 3 F), this procedure loads the following parameters into specific OBDB offset locations in RAM:</p> <p>H_NOM_AUX_STR1_QUAT_BRF_*_* are at OBDB offsets 296-299 H_NOM_AUX_STR2_QUAT_BRF_*_* are at OBDB offsets 328-331</p> <p>The <u>absolute address</u> of offset 296 is therefore: 020A = Memory ID D3B8 = Start Address</p> <p>The <u>absolute address</u> of offset 300 is therefore: 020A = Memory ID D438 = Start Address</p>		
		<p>Use sequence HFADODDL</p> <p>to dump <u>all</u> the OBDB in RAM, or edit: Start Address = CF18 Length = 8552</p>		

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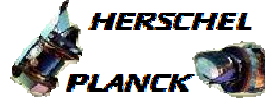
Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		<p>NOTE: The RAM memory address for a parameter with a given OBDB ID can be calculated as follows: RAM address = OBDB start address + parameter offset; OBDB start address = address of Asw_DatabaseManager_Obj + 12; parameter offset = OBDB ID * 4.</p> <p>Parameter ID's are listed in the ASW ICD (H-P-4-TASW-IF-002).</p> <p>Asw_Databasemanager_Obj is an ASW container structure used in the management of the OBDB and its address has to be obtained from the linker memory map valid for the software build currently used onboard.</p>		
5.3		Dump from SGM		<input type="checkbox"/>
		<p>Relevant details for use with H_FCP_AOC_DODD</p> <p>This step can be ignored - parameter not copied to SGM</p>		
		<p>NOTE: The address of a parameter with a given ID can be calculated as follows:</p> <p>SGMA Address = 0xBA0000 + (ParamID-1) * 4</p> <p>SGMB Address = 0xEA0000 + (ParamID-1) * 4</p> <p>Parameter ID's refer to the listing of SGM OBDB parameters in the ASW ICD (H-P-4-TASW-IF-0002) and are not the same as the ID's in the RAM OBDB.</p>		
<p>TC Seq. Name :HFA1STOB (EnableSTRrelatedChecks)</p> <p>TimeTag Type: N Sub Schedule ID: <input type="checkbox"/></p>				
6		Enable STR related FDIR checks		Next Step: END
6.1		Command enabling of STR related FDIR checks		<input type="checkbox"/>

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		Execute Telecommand <p style="text-align: right;">EnaChkSTR covariance</p> Command Parameter(s) : EnaChck DF86Cmd AH8F3001 EnaChck DD86Cmd AH8F4001 TC Control Flags : <p style="text-align: right;">GBM IL DSE --Y -- ---</p> Subsch. ID : 20 Det. descr. : TC(8,1) - Enable check FDIR - EnaChkSTR covariance	ACZBV109 Enable 86 Enable 86	
		Execute Telecommand <p style="text-align: right;">EnaChkSTR continuity</p> Command Parameter(s) : EnaChck DF86Cmd AH8F3001 EnaChck DD86Cmd AH8F4001 TC Control Flags : <p style="text-align: right;">GBM IL DSE --Y -- ---</p> Subsch. ID : 20 Det. descr. : TC(8,1) - Enable check FDIR - EnaChkSTR continuity	ACZBU109 Enable 86 Enable 86	
		Execute Telecommand <p style="text-align: right;">EnaChkSTR - all</p> Command Parameter(s) : EnaChck DF86Cmd AH8F3001 EnaChck DD86Cmd AH8F4001 TC Control Flags : <p style="text-align: right;">GBM IL DSE --Y -- ---</p> Subsch. ID : 20 Det. descr. : TC(8,1) - Enable check FDIR - EnaChkSTR all	ACZBS109 Enable 86 Enable 86	
		Execute Telecommand <p style="text-align: right;">EnaChkGYR-STR cross</p> Command Parameter(s) : EnaChck DF86Cmd AH8F3001 EnaChck DD86Cmd AH8F4001 TC Control Flags : <p style="text-align: right;">GBM IL DSE --Y -- ---</p> Subsch. ID : 20 Det. descr. : TC(8,1) - Enable check FDIR - EnaChkGYR-STR cross	ACZDC109 Enable 86 Enable 86	

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		Execute Telecommand DisChkSTR hk data Command Parameter(s) : DisChk DF86Cmd AH8C1001 Enable 86 DisChk DD86Cmd AH8C2001 Enable 86 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 20 Det. descr. : TC(8,1) - Disable check FDIR - DisChkSTR hk data	ACY7A109	
		Execute Telecommand Fire Disable Check Command Parameter(s) : FireFun DF86Cmd AH8F1001 Enable 86 FireFun DD86Cmd AH8F2001 Enable 86 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 20 Det. descr. : TC(8,4) Fire Command - Fire Disable Check	ACZ7M109	
6.2		Verify disabling of STR related FDIR checks		<input type="checkbox"/>
		Verify Telemetry STR alive check AES47001 = Enabled		AND=ZAA06999
		Verify Telemetry STR cont check AES48001 = Enabled		AND=ZAA06999
		Verify Telemetry STR covar check AES49001 = Enabled		AND=ZAA06999
		Verify Telemetry STR loss check AES4A001 = Enabled		AND=ZAA06999
		Verify Telemetry STR hk data chk AES4B001 = Enabled		AND=ZAA06999
		Verify Telemetry GYRSTR xchk AES57002 = Enabled		AND=ZAA06999
End of Procedure				