

Update RWL misalignment
 File: H_FCP_AOC_4R44.xls
 Author: dsalt-hp



Procedure Summary

Objectives

The objective of this Herschel ACMS procedure is to update the Reaction Wheel Inertias and Alignment Matrices values in the OBDB.

The procedure involves the following activities:

- sending values via dedicated TC
- check OBDB for updated values via DTM for OBDB1 & OBDB2 or dumps, as necessary

The procedure specifies a series of OBDB loads necessary to update OBDB parameters related to wheel alignment.

Summary of Constraints

Flight Dynamics must have analysed the S/C data, derived updates for the reaction wheel inertias & alignment matrices and generated a specific TPF (RWA) containing these updated values

Spacecraft Configuration

Start of Procedure

n/a

End of Procedure

n/a

Reference File(s)

Input Command Sequences

Output Command Sequences

AERWA_00

Referenced Displays

ANDs GRDs SLDs

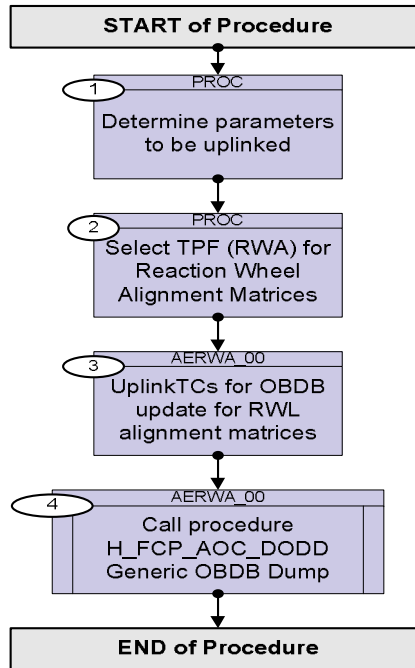
Configuration Control Information

DATE	FOP ISSUE	VERSION	MODIFICATION DESCRIPTION	AUTHOR	SPR REF
03/08/08	1	1	Created	dsalt-hp	
21/05/09	2.5	2	All TCs now time-tagged	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				
PROC Procedure Properties				
SSID :				
1		Determine parameters to be uplinked		Next Step: 2
		Determine the values of alignment vectors for all RWL units. The results should be used to derive the following matrices and vectors: H_NOM_AUX_RWL_ORIENT (a 3x4 maxtrix, with columns representing the alignment vector of a single wheel). H_NOM_AUX_RWL123_ORIENT_INV (inverse transformation matrix using frame 1,2,3); H_NOM_AUX_RWL124_ORIENT_INV (inverse transformation matrix using frame 1,2,4); H_NOM_AUX_RWL134_ORIENT_INV (inverse transformation matrix using frame 1,3,4); H_NOM_AUX_RWL234_ORIENT_INV (inverse transformation matrix using frame 2,3,4); H_NOM_AUX_RWL_V1 (null space vector of the wheel alignment matrix).		
		Uplink onboard the parameters determined in the previous step. Note that all inverse transformation matrices are stored in consecutive locations in the OBDB and can be loaded in a single step.		
2		Select TPF (RWA) for Reaction Wheel Alignment Matrices		Next Step: 3
		Check with Flight Dynamics the exact name of the <u>TPF instance</u> to be uplinked		
TC Seq. Name :AERWA_00 (Update RWA)				
TimeTag Type: B Sub Schedule ID: 20 Formal Parameter List : RWL_ALI_1_1 RW_11= <dec> RWL_ALI_1_2 RW_12= <dec> RWL_ALI_1_3 RW_13= <dec> RWL_ALI_1_4 RW_14= <dec> RWL_ALI_2_1 RW_21= <dec> RWL_ALI_2_2 RW_22= <dec> RWL_ALI_2_3 RW_23= <dec> RWL_ALI_2_4 RW_24= <dec> RWL_ALI_3_1 RW_31= <dec>				

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		RWL_ALI_3_2 RW_32= RWL_ALI_3_3 RW_33= RWL_ALI_3_4 RW_34= RWL_123_INV_1_1 R123V_11= RWL_123_INV_1_2 R123V_12= RWL_123_INV_1_3 R123V_13= RWL_123_INV_2_1 R123V_21= RWL_123_INV_2_2 R123V_22= RWL_123_INV_2_3 R123V_23= RWL_123_INV_3_1 R123V_31= RWL_123_INV_3_2 R123V_32= RWL_123_INV_3_3 R123V_33= RWL_124_INV_1_1 R124V_11= RWL_124_INV_1_2 R124V_12= RWL_124_INV_1_3 R124V_13=	<dec> <dec> <dec> <dec> <dec> <dec> <dec> <dec> <dec> <dec> <dec> <dec> <dec> <dec> <dec> <dec>	
		RWL_124_INV_2_1 R124V_21= RWL_124_INV_2_2 R124V_22= RWL_124_INV_2_3 R124V_23= RWL_124_INV_3_1 R124V_31= RWL_124_INV_3_2 R124V_32= RWL_124_INV_3_3 R124V_33= RWL_134_INV_1_1 R134V_11= RWL_134_INV_1_2 R134V_12= RWL_134_INV_1_3 R134V_13= RWL_134_INV_2_1 R134V_21= RWL_134_INV_2_2 R134V_22= RWL_134_INV_2_3 R134V_23= RWL_134_INV_3_1 R134V_31= RWL_134_INV_3_2 R134V_32= RWL_134_INV_3_3 R134V_33=	<dec> <dec> <dec> <dec> <dec> <dec> <dec> <dec> <dec> <dec> <dec> <dec> <dec> <dec> <dec> <dec>	
		RWL_234_INV_1_1 R234V_11= RWL_234_INV_1_2 R234V_12= RWL_234_INV_1_3 R234V_13= RWL_234_INV_2_1 R234V_21= RWL_234_INV_2_2 R234V_22= RWL_234_INV_2_3 R234V_23= RWL_234_INV_3_1 R234V_31= RWL_234_INV_3_2 R234V_32= RWL_234_INV_3_3 R234V_33= RWS_V1_1 RW_V1_1= RWS_V1_2 RW_V1_2= RWS_V1_3 RW_V1_3= RWS_V1_4 RW_V1_4=	<dec> <dec> <dec> <dec> <dec> <dec> <dec> <dec> <dec> <dec> <dec> <dec> <dec> <dec> <dec>	
3		UplinkTCs for OBDB update for RWL alignment matrices		Next Step: 4
		Uplink onboard the parameters determined in the previous step. Note that all inverse transformation matrices are not stored in consecutive locations in the OBDB and so cannot be loaded in a single step.		
3.1		Activate loading		<input type="checkbox"/>

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	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 4 <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.		
3.2		Load values		□
	ET=+00.00.02 UT=+	Execute Telecommand OBDB_RW_ALIGN Command Parameter(s) : DbLoad DF86 Cmd XH191990 DbLoad DD86 Cmd XH192990 RWL_ALI_1_1 XH087990 RWL_ALI_1_2 XH088990 RWL_ALI_1_3 XH089990 RWL_ALI_1_4 XH090990 RWL_ALI_2_1 XH091990 RWL_ALI_2_2 XH092990 RWL_ALI_2_3 XH093990 RWL_ALI_2_4 XH094990 RWL_ALI_3_1 XH095990	XC022990 Enable 86 (Def) Enable 86 (Def) RW_11 RW_12 RW_13 RW_14 RW_21 RW_22 RW_23 RW_24 RW_31	
		RWL_ALI_3_2 XH096990 RWL_ALI_3_3 XH097990 RWL_ALI_3_4 XH098990 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 30 Det. descr. :	RW_32 RW_33 RW_34	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=+00.00.02 UT=+	Execute Telecommand OBDB_RW_1XX_ALI_INV Command Parameter(s) : DbLoad DF86 Cmd XH191990 DbLoad DD86 Cmd XH192990 RWL_123_INV_1_1 XH099990 RWL_123_INV_1_2 XH100990 RWL_123_INV_1_3 XH101990 RWL_123_INV_2_1 XH102990 RWL_123_INV_2_2 XH103990 RWL_123_INV_2_3 XH104990 RWL_123_INV_3_1 XH105990 RWL_123_INV_3_2 XH106990 RWL_123_INV_3_3 XH107990	XC019990 Enable 86 (Def) Enable 86 (Def) R123V_11 R123V_12 R123V_13 R123V_21 R123V_22 R123V_23 R123V_31 R123V_32 R123V_33	
		RWL_124_INV_1_1 XH108990 RWL_124_INV_1_2 XH109990 RWL_124_INV_1_3 XH110990 RWL_124_INV_2_1 XH111990 RWL_124_INV_2_2 XH112990 RWL_124_INV_2_3 XH113990 RWL_124_INV_3_1 XH114990 RWL_124_INV_3_2 XH115990 RWL_124_INV_3_3 XH116990 RWL_134_INV_1_1 XH117990 RWL_134_INV_1_2 XH118990 RWL_134_INV_1_3 XH119990 RWL_134_INV_2_1 XH120990 RWL_134_INV_2_2 XH121990 RWL_134_INV_2_3 XH122990	R124V_11 R124V_12 R124V_13 R124V_21 R124V_22 R124V_23 R124V_31 R124V_32 R124V_33 R134V_11 R134V_12 R134V_13 R134V_21 R134V_22 R134V_23	
		RWL_134_INV_3_1 XH123990 RWL_134_INV_3_2 XH124990 RWL_134_INV_3_3 XH125990 TC Control Flags : Subsch. ID : 20 Det. descr. : GBM IL DSE --Y -- --	R134V_31 R134V_32 R134V_33	
	ET=+00.00.02 UT=+	Execute Telecommand OBDB_RW_2XX_ALI_INV Command Parameter(s) : DbLoad DF86 Cmd XH191990 DbLoad DD86 Cmd XH192990 RWL_234_INV_1_1 XH126990 RWL_234_INV_1_2 XH127990 RWL_234_INV_1_3 XH128990 RWL_234_INV_2_1 XH129990 RWL_234_INV_2_2 XH130990 RWL_234_INV_2_3 XH131990 RWL_234_INV_3_1 XH132990 RWL_234_INV_3_2 XH133990 RWL_234_INV_3_3 XH134990	XC020990 Enable 86 (Def) Enable 86 (Def) R234V_11 R234V_12 R234V_13 R234V_21 R234V_22 R234V_23 R234V_31 R234V_32 R234V_33	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 20 Det. descr. :		
	ET=+00.00.02 UT=+	Execute Telecommand OBDB_RW_V1 Command Parameter(s) : DbLoad DF86 Cmd XH191990 Enable 86 (Def) DbLoad DD86 Cmd XH192990 Enable 86 (Def) RWS_V1_1 XH358990 RW_V1_1 RWS_V1_2 XH359990 RW_V1_2 RWS_V1_3 XH360990 RW_V1_3 RWS_V1_4 XH361990 RW_V1_4 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 20	XC065990	
		Det. descr. : TC_LOAD_DATABASE		
3.3		Activate values		<input type="checkbox"/>
	ET=+00.00.02 UT=+	Execute Telecommand Fire critical command Command Parameter(s) : FireFun DF86Cmd AH8F1001 Enable 86 FireFun DD86Cmd AH8F2001 Enable 86 FireFun CritFID AHFFH001 201 <dec> TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 20 Det. descr. : TC_FIRE_COMMAND	ACFC1001	
4		Call procedure H_FCP_AOC_DODD Generic OBDB Dump		Next Step: END
		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		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		<p><u>Relevant details for use with H FCP AOC DODD</u></p> <p>Based upon the latest ASW ICD (H-P-4-TASW-IF-0002, Issue 3 F), the current procedure loads the following parameters into specific OBDB offset locations in RAM:</p> <p>H_NOM_AUX_RWL_ORIENT at offsets 180-191 H_NOM_AUX_RWL_1**_ORIENT_INV at offsets 204-230 H_NOM_AUX_RWL_2**_ORIENT_INV at offsets 236-244</p> <p>These are located in Block 1 of the OBDB</p> <p>H_NOM_AUX_RWS_V1 at offsets 255-258</p> <p>These are located in Block 2 of the OBDB</p> <p>None of these parameters are copied to SGM</p>		
4.1		Dump via DTM		☐
		<p><u>Relevant details for use with H FCP AOC DODD</u></p> <p>The following parameters H_NOM_AUX_RWL_ORIENT H_NOM_AUX_RWL_1**_ORIENT_INV H_NOM_AUX_RWL_2**_ORIENT_INV are located in Block 1 of the OBDB, while H_NOM_AUX_RWS_V1 are located in Block 2 of the OBDB</p>		
		<u>Use sequence HFADODDA</u>		
		<p>NOTE: The contents of diagnostic packet A3DH0BDB1109 {DTM with Herschel OBDB data1} are spread over a group of 4 monitoring displays:</p> <p>ZAZ60999 DTMOBDB1_1 ZAZ61999 DTMOBDB1_2 ZAZ62999 DTMOBDB1_3 <- values are in this display ZAZ63999 DTMOBDB1_4 <- values are in this display</p>		
		<u>Use sequence HFADODDB</u>		
		<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 ZAZ66999 DTMOBDB2_3 ZAZ67999 DTMOBDB2_4</p>		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		<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>		
4.2		Dump from RAM		<input type="checkbox"/>
		<p><u>Relevant details for use with H_FCP_AOC_DODD</u></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_RWL_ORIENT at offsets 180-191 H_NOM_AUX_RWL_1**_ORIENT_INV at offsets 204-230 H_NOM_AUX_RWL_2**_ORIENT_INV at offsets 236-244 H_NOM_AUX_RWS_V1 at offsets 255-258</p> <p>The <u>absolute address</u> of offset 180 is therefore: 020A = Memory ID D1E8 = Start Address</p>		
		<p>The <u>absolute address</u> of offset 204 is therefore: 020A = Memory ID D248 = Start Address</p> <p>The <u>absolute address</u> of offset 236 is therefore: 020A = Memory ID D2C8 = Start Address</p> <p>The <u>absolute address</u> of offset 255 is therefore: 020A = Memory ID D314 = Start Address</p>		
		<p><u>Use sequence HFADODDL</u> to dump <u>all</u> the OBDB in RAM, or edit: Start Address = CE40 Length = 316</p>		

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		<p><i>NOTE:</i> 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>		
4.3		Dump from SGM		<input type="checkbox"/>
		<p><u>Relevant details for use with H_FCP_AOC_DODD</u></p> <p>This step can be ignored - parameter not copied to SGM</p>		
		<p><i>NOTE:</i> 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>		
End of Procedure				