

Update GYR scale factors and misalignments  
 File: H\_FCP\_AOC\_1GSM.xls  
 Author: dsalt-hp



## Procedure Summary

### Objectives

The objective of this Herschel ACMS procedure is to update the GYR scale factor and misalignments values in the OBDB.

The procedure involves the following activities:

- sending values via dedicated TC
- check OBDB for updated values via DTM for OBDB1 or dumps

The procedure specifies a series of OBDB loads necessary to update OBDB parameters related to GYR scale factor and misalignments.

### Summary of Constraints

Flight Dynamics must have analysed the S/C data, derived updates for the GYR scale factor and misalignments and generated a specific TPF (GSM) 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**

AEGSM\_00

### Referenced Displays

ANDs      GRDs      SLDs

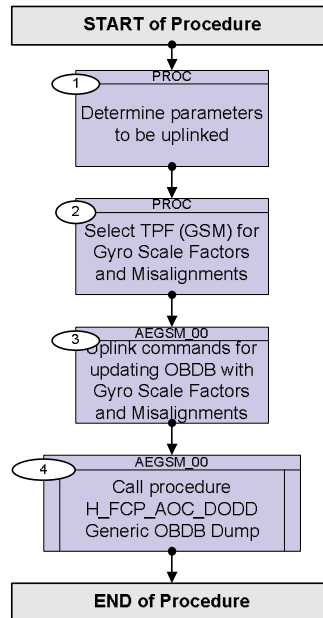
### Configuration Control Information

DATE	FOP ISSUE	VERSION	MODIFICATION DESCRIPTION	AUTHOR	SPR REF
01/08/08	1	1	Created	dsalt-hp	
23/03/09	2.2	2	Addition of time-tags to TCs in Step 3	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>				
PROC Procedure Properties				
SSID :				
1		Determine parameters to be uplinked		Next Step: 2
		<p>Determine the values of Gyro Scale Factors and Misalignments for all GYR units.</p> <p>The results should be used to derive the following vector and matrices:            H_NOM_AUX_GYR*_SCALE (a 4 element vector, representing the 4 gyro scale factors).            H_NOM_AUX_GYR123_ORIENT_INV_*_* (a 3x3 matrix for Gyro123 inverted orientation)            H_NOM_AUX_GYR124_ORIENT_INV_*_* (a 3x3 matrix for Gyro124 inverted orientation)            H_NOM_AUX_GYR134_ORIENT_INV_*_* (a 3x3 matrix for Gyro134 inverted orientation)            H_NOM_AUX_GYR234_ORIENT_INV_*_* (a 3x3 matrix for Gyro234 inverted orientation)</p>		
2		Select TPF (GSM) for Gyro Scale Factors and Misalignments		Next Step: 3
		Check with Flight Dynamics the <b>exact name of the TPF instance</b> to be uplinked		
TC Seq. Name : AEGSM_00 (Update GSM)				
TimeTag Type: B Sub Schedule ID: 20 Formal Parameter List : DbLoad Data word GYR_SC_1= <dec> DbLoad Data word GYR_SC_2= <dec> DbLoad Data word GYR_SC_3= <dec> DbLoad Data word GYR_SC_4= <dec> GYR123_INV_1_1 G_123_11= <dec> GYR123_INV_1_2 G_123_12= <dec> GYR123_INV_1_3 G_123_13= <dec> GYR123_INV_2_1 G_123_21= <dec> GYR123_INV_2_2 G_123_22= <dec>				

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		GYR123_INV_2_3 G_123_23= GYR123_INV_3_1 G_123_31= GYR123_INV_3_2 G_123_32= GYR123_INV_3_3 G_123_33= GYR124_INV_1_1 G_124_11= GYR124_INV_1_2 G_124_12= GYR124_INV_1_3 G_124_13= GYR124_INV_2_1 G_124_21= GYR124_INV_2_2 G_124_22= GYR124_INV_2_3 G_124_23= GYR124_INV_3_1 G_124_31= GYR124_INV_3_2 G_124_32= GYR124_INV_3_3 G_124_33= GYR134_INV_1_1 G_134_11= GYR134_INV_1_2 G_134_12=	<dec> <dec> <dec> <dec> <dec> <dec> <dec> <dec> <dec> <dec> <dec> <dec> <dec> <dec> <dec>	
		GYR134_INV_1_3 G_134_13= GYR134_INV_2_1 G_134_21= GYR134_INV_2_2 G_134_22= GYR134_INV_2_3 G_134_23= GYR134_INV_3_1 G_134_31= GYR134_INV_3_2 G_134_32= GYR134_INV_3_3 G_134_33= GYR234_INV_1_1 G_234_11= GYR234_INV_1_2 G_234_12= GYR234_INV_1_3 G_234_13= GYR234_INV_2_1 G_234_21= GYR234_INV_2_2 G_234_22= GYR234_INV_2_3 G_234_23= GYR234_INV_3_1 G_234_31= GYR234_INV_3_2 G_234_32=	<dec> <dec> <dec> <dec> <dec> <dec> <dec> <dec> <dec> <dec> <dec> <dec> <dec> <dec> <dec> <dec>	
		GYR234_INV_3_3 G_234_33=	<dec>	
3		Uplink commands for updating OBDB with Gyro Scale Factors and Misalignments		Next Step: 4
		Uplink onboard the parameters determined in the previous step.  Note that the matrices for Gyro123, Gyro 124 and Gyro134 are stored in consecutive OBDB locations and so can be loaded in a single step.		
3.1		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 6 <dec>	

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		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_GYR1_SF  Command Parameter(s) : DbLoad DF86 Cmd            XH191990 DbLoad DD86 Cmd            XH192990 DbLoad Data word           XH196990  TC Control Flags :  GBM IL DSE --Y -- ---  Subsch. ID : 20 Det. descr. :	XC008990  Enable 86 (Def) Enable 86 (Def) GYR_SC_1	
	ET=+00.00.02 UT=+	Execute Telecommand  OBDB_GYR2_SF  Command Parameter(s) : DbLoad DF86 Cmd            XH191990 DbLoad DD86 Cmd            XH192990 DbLoad Data word           XH196990  TC Control Flags :  GBM IL DSE --Y -- ---  Subsch. ID : 20 Det. descr. :	XC011990  Enable 86 (Def) Enable 86 (Def) GYR_SC_2	
	ET=+00.00.02 UT=+	Execute Telecommand  OBDB_GYR3_SF  Command Parameter(s) : DbLoad DF86 Cmd            XH191990 DbLoad DD86 Cmd            XH192990 DbLoad Data word           XH196990  TC Control Flags :  GBM IL DSE --Y -- ---  Subsch. ID : 20 Det. descr. :	XC014990  Enable 86 (Def) Enable 86 (Def) GYR_SC_3	

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	ET=+00.00.02 UT=+	Execute Telecommand  OBDB_GYR4_SF  Command Parameter(s) : DbLoad DF86 Cmd XH191990 DbLoad DD86 Cmd XH192990 DbLoad Data word XH196990  TC Control Flags :  Subsch. ID : 20 Det. descr. :	XC016990  Enable 86 (Def) Enable 86 (Def) GYR_SC_4	
	ET=+00.00.02 UT=+	Execute Telecommand  OBDB_GYR1XX_ALI_INV  Command Parameter(s) : DbLoad DF86 Cmd XH191990 DbLoad DD86 Cmd XH192990 GYR123_INV_1_1 XH033990 GYR123_INV_1_2 XH034990 GYR123_INV_1_3 XH035990 GYR123_INV_2_1 XH036990 GYR123_INV_2_2 XH037990 GYR123_INV_2_3 XH038990 GYR123_INV_3_1 XH039990 GYR123_INV_3_2 XH040990 GYR123_INV_3_3 XH041990	XC009990  Enable 86 (Def) Enable 86 (Def) G_123_11 G_123_12 G_123_13 G_123_21 G_123_22 G_123_23 G_123_31 G_123_32 G_123_33	
		GYR124_INV_1_1 XH042990 GYR124_INV_1_2 XH043990 GYR124_INV_1_3 XH044990 GYR124_INV_2_1 XH045990 GYR124_INV_2_2 XH046990 GYR124_INV_2_3 XH047990 GYR124_INV_3_1 XH048990 GYR124_INV_3_2 XH049990 GYR124_INV_3_3 XH050990 GYR134_INV_1_1 XH051990 GYR134_INV_1_2 XH052990 GYR134_INV_1_3 XH053990 GYR134_INV_2_1 XH054990 GYR134_INV_2_2 XH055990 GYR134_INV_2_3 XH056990	G_124_11 G_124_12 G_124_13 G_124_21 G_124_22 G_124_23 G_124_31 G_124_32 G_124_33 G_134_11 G_134_12 G_134_13 G_134_21 G_134_22 G_134_23	
		GYR134_INV_3_1 XH057990 GYR134_INV_3_2 XH058990 GYR134_INV_3_3 XH059990  TC Control Flags :  Subsch. ID : 20 Det. descr. :	G_134_31 G_134_32 G_134_33  GBM IL DSE --Y -- ---	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=+00.00.02 UT=+	Execute Telecommand  OBDB_GYR234_ALI_INV  Command Parameter(s) : DbLoad DF86 Cmd            XH191990 DbLoad DD86 Cmd            XH192990 GYR234_INV_1_1            XH060990 GYR234_INV_1_2            XH061990 GYR234_INV_1_3            XH062990 GYR234_INV_2_1            XH063990 GYR234_INV_2_2            XH064990 GYR234_INV_2_3            XH065990 GYR234_INV_3_1            XH066990 GYR234_INV_3_2            XH067990 GYR234_INV_3_3            XH068990	XC012990  Enable 86 (Def) Enable 86 (Def) G_234_11 G_234_12 G_234_13 G_234_21 G_234_22 G_234_23 G_234_31 G_234_32 G_234_33	
		TC Control Flags :  Subsch. ID : 20 Det. descr. :  GBM IL DSE --Y -- ---		
3.3		Activate values		<input type="checkbox"/>
	ET=+00.00.02 UT=+	Execute Telecommand  Fire critical command  Command Parameter(s) : FireFun DF86Cmd            AH8F1001 FireFun DD86Cmd            AH8F2001 FireFun CritFID            AHFFH001	ACFC1001  Enable 86 Enable 86 201 <dec>	
		TC Control Flags :  Subsch. ID : 20 Det. descr. : TC_FIRE_COMMAND  GBM IL DSE --Y -- ---		
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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		<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><b>H_NOM_AUX_GYR*_SCALE</b>            at offsets 82, 111, 122, 124  <b>H_NOM_AUX_GYR1**_ORIENT_INV_*</b>            at offsets 83-109  <b>H_NOM_AUX_GYR234_ORIENT_INV_*</b>            At offsets 112-120</p> <p>These are located in <b>Block 1</b> of the OBDB</p> <p>It also copies the following parameters into specific OBDB offset locations in SGM</p> <p><b>H_NOM_AUX_GYR*_SCALE</b>            to offsets 96-99</p>		
4.1		Dump via DTM		<input type="checkbox"/>
		<p>Relevant details for use with H_FCP_AOC_DODD</p> <p>The following parameters</p> <p><b>H_NOM_AUX_GYR*_SCALE</b>  <b>H_NOM_AUX_GYR1**_ORIENT_INV_*</b>  <b>H_NOM_AUX_GYR234_ORIENT_INV_*</b></p> <p>are located in <b>Block 1</b> of the OBDB</p>		
		Use sequence <a href="#">HFADODDA</a>		
		<p>NOTE:            The contents of diagnostic packet A3DH0BDB1109 {DTM with Herschel OBDB data} are spread over a group of 4 monitoring displays:</p> <p>ZAZ60999 DTMOBDB1_1  <b>ZAZ61999 DTMOBDB1_2 &lt;- values are in this display</b>            ZAZ62999 DTMOBDB1_3            ZAZ63999 DTMOBDB1_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>		
4.2		Dump from RAM		<input type="checkbox"/>



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		<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><b>H_NOM_AUX_GYR*_SCALE</b>            at offsets 82, 111, 122, 124</p> <p><b>H_NOM_AUX_GYR1**_ORIENT_INV_*_*</b>            at offsets 83-109</p> <p><b>H_NOM_AUX_GYR234_ORIENT_INV_*_*</b>            At offsets 112-120</p> <p>The <u>absolute address</u> of offset 82 is therefore:  <b>020A = Memory ID</b>  <b>D060 = Start Address</b></p> <p>The <u>absolute address</u> of offset 111 is therefore:</p>		
		<p><b>020A = Memory ID</b>  <b>D0D4 = Start Address</b></p> <p>The <u>absolute address</u> of offset 122 is therefore:  <b>020A = Memory ID</b>  <b>D100 = Start Address</b></p>		
		<p><b>Use sequence HFADODDL</b></p> <p>to dump <u>all</u> the OBDB in RAM, or edit:            Start Address = <b>CCB8</b>            Length = 172</p>		
		<p><b>NOTE:</b></p> <p>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		□

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		<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 copies the following parameters into specific OBDB offset locations in SGM <b>H_NOM_AUX_GYR*_SCALE</b> to offsets <b>96-99</b></p> <p>The <u>absolute address</u> of offset <b>96</b> is therefore:  <b>BA017C</b> in SGA (=12190076 &lt;dec&gt;)  <b>EA017C</b> in SGB (=15335804 &lt;dec&gt;)</p>		
		<p><b>Use sequences HFADODDJ &amp; HFADODDK</b> to dump <u>all</u> the OBDB in SGMA &amp; SGMB, or edit:            Start Address = <b>BA0188</b> / <b>EA0188</b>            Length = <b>16</b></p>		
		<p><b>NOTE:</b>            The address of a parameter with a given ID can be calculated as follows:</p> <p><b>SGMA</b>            Address = 0xBA0000 + (ParamID-1) * 4</p> <p><b>SGMB</b>            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**