

Procedure for pointing in OCM
File: H_FCP_AOC_00CM.xls
Author: dsalt-hp



Procedure Summary

Objectives

The objective of this Herschel ACMS procedure is to execute an attitude pointing manoeuvre in OCM.

The procedure involves the following activities:

- check ACMS/RCS status & configuration
- disable TC check on RCS mode, or switch RCS to Fine
- command OCM pointing attitude via TPF (OFP)
- verify pointing manoeuvre completion
- enable TC check on RCS mode

Summary of Constraints

Main Constraints:

- S/C must be in a stable OCM pointing attitude with RCS in coarse mode
- a valid TPF=OFP from Flight Dynamics must be available via the Manual stack

Spacecraft Configuration

Start of Procedure

ACMS mode is OCM with RCS in Coarse

End of Procedure

ACM mode is OCM with updated attitude and RCS in Coarse

Reference File(s)

Input Command Sequences

Output Command Sequences

HFA00CMA
HFA00CMX
HFA00CMB

Referenced Displays

ANDs	GRDs	SLDs
ZAA01999		
WALC1584		
WALC2584		
ZAA06999		
ZAAL2999		
ZAA00999		

Configuration Control Information

Status : Version 6 - Updated
Last Checkin: 04/03/10

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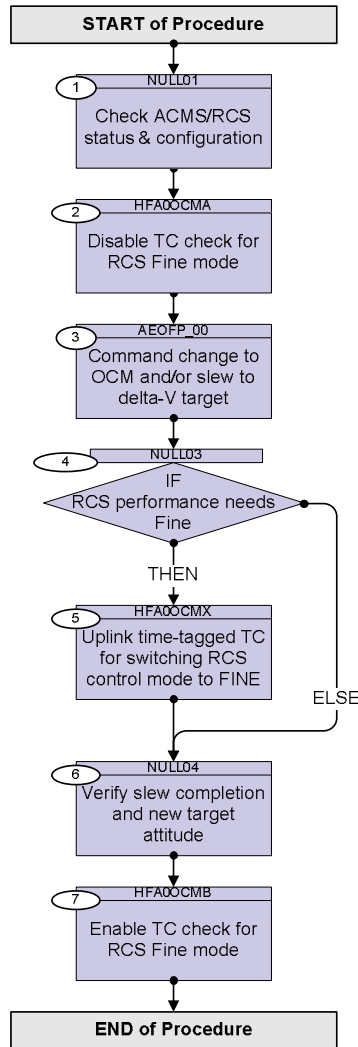


DATE	FOP ISSUE	VERSION	MODIFICATION DESCRIPTION	AUTHOR	SPR REF
23/03/09		1	Created	dsalt-hp	
23/03/09		2	Step 1 checks corrected for OCM only	dsalt-hp	
24/03/09		3	Procedure name change only	dsalt-hp	
24/03/09	2.2	4	Sequence AEOFP_00 now included in this procedure (was in H_FCP_AOC_3001)	dsalt-hp	
06/10/09	2.5	5	Redundant sequence references removed from end of procedure	dsalt-hp	
04/03/10	3	6	All sequences now Plannable with SubSchedule=20	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				
TC Seq. Name : NULL01 (Null sequence 01)				
TimeTag Type: Sub Schedule ID: □				
1		Check ACMS/RCS status & configuration		Next Step: 2
1.1		Check ACMS mode		□
		Verify Telemetry AcmsMode AESMG002	= OCM	AND=ZAA01999
		Verify Telemetry AcmsSubstate AESMF002	= OCM Pointing	AND=ZAA01999
		Verify Telemetry AcmsMain AID AESM3002	= OCM pnt coarse	AND=ZAA01999
1.2		Check LCL status for the RCS		□
		LCL's 17 - 18 power the catbed heaters of the two RCS branches.		
		Verify Telemetry CBH_N_L17_S WMA2H565	= ON	AND=WALC1584
		Verify Telemetry CBH_N_L17_I WMA13565	>= 0.0 A <= 0.069 A	AND=WALC1584
		Verify Telemetry CBH_R_L18_S WM12H565	= ON	AND=WALC1584
		Verify Telemetry CBH_R_L18_I WM113565	>= 0.0 A <= 0.069 A	AND=WALC1584
		LCL's 45 - 46 power the flow control valves of the two RCS branches.		
		Verify Telemetry RcsThrsA_L45_1S WM22D565	= ON	AND=WALC2584
		Verify Telemetry RcsThrsA_L45_2S WM22J565	= ON	AND=WALC2584
		Verify Telemetry RcsThrsA_L45_I WM209565	>= 0.0 A <= 3.08 A	AND=WALC2584
		Verify Telemetry RcsThrsB_L46_1S WM92D565	= ON	AND=WALC2584

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Telemetry RcsThrsB_L46_2S WM92J565	= ON	AND=WALC2584
		Verify Telemetry RcsThrsB_L46_I WM909565	>= 0.0 A <= 3.08 A	AND=WALC2584
		<i>LCL's 47 - 48 power the latch valves of the two RCS branches.</i>		
		Verify Telemetry RcsLvA_L47_1S WM12E565	= ON	AND=WALC2584
		Verify Telemetry AccLvA_L47_2S WM12J565	= ON	AND=WALC2584
		Verify Telemetry AccLvA_L47_I WM110565	>= 0.0 A <= 0.83 A	AND=WALC2584
		Verify Telemetry AccLvB_L48_1S WMA2E565	= ON	AND=WALC2584
		Verify Telemetry AccLvB_L48_2S WMA2J565	= ON	AND=WALC2584
		Verify Telemetry AccLvB_L48_I WMA10565	>= 0.0 A <= 0.83 A	AND=WALC2584
		NOTE: All of these LCL's must be closed throughout the mission. An explicit check is added before any operation involving the RCS to protect against inadvertent switching of these LCL's.		
1.3		Check RCS nominal configuration (MAIN branch)		<input type="checkbox"/>
		Verify Telemetry Nom Conf RCS AESCF002	= RCS-A = RCS-B	AND=ZAA01999
TC Seq. Name :HFA00CMA (DisableFinePointTCch) TimeTag Type: Sub Schedule ID: 20 <input type="checkbox"/>				
2		Disable TC check for RCS Fine mode		Next Step: 3
		Verify Telemetry SGM TC Chk Sts AE3U0002	<to be read>	AND=ZAA06999

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Execute Telecommand <p style="text-align: center;">DisChkMode-StateFID 101</p> <i>Command Parameter(s) :</i> DisChk DF86Cmd AH8C1001 Enable 86 DisChk DD86Cmd AH8C2001 Enable 86 <i>TC Control Flags :</i> <p style="text-align: right;">GBM IL DSE --Y -- --</p> <i>Subsch. ID : 20</i> Det. descr. : TC(8,1) - Disable Command check - DisChkMode-StateFID 101	<p style="text-align: center;">ACY8P109</p>	
		Execute Telecommand <p style="text-align: center;">Fire Disable Check</p> <i>Command Parameter(s) :</i> FireFun DF86Cmd AH8F1001 Enable 86 FireFun DD86Cmd AH8F2001 Enable 86 <i>TC Control Flags :</i> <p style="text-align: right;">GBM IL DSE --Y -- --</p> <i>Subsch. ID : 20</i> Det. descr. : TC(8,4) Fire Command - Fire Disable Check	<p style="text-align: center;">ACZ7M109</p>	
		Verify Telemetry <p style="text-align: center;">SGM TC Chk Sts AE3U0002</p>	<p style="text-align: center;"><note change></p>	<p style="text-align: center;">AND=ZAA06999</p>
<p><i>TC Seq. Name : AEOFP_00 (command OFP)</i></p> <p><i>TimeTag Type: B</i> <i>Sub Schedule ID: 20</i> <i>Formal Parameter List :</i> AcmsH Cmd TQ1r Q_FIN_X= <dec> AcmsH Cmd TQ2r Q_FIN_Y= <dec> AcmsH Cmd TQ3r Q_FIN_Z= <dec> AcmsH Cmd TQ4r Q_FIN_S= <dec> AcmsH T_slew T_SLEW= s AcmsH RCS Mode RCS_MODE=</p>				
3		Command change to OCM and/or slew to delta-V target		Next Step: 4
3.1		Select TPF (OFP) to Perform OCM Pointing		□

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch																																	
		<p>WARNING: This TC must be time-tagged with an execution time given in the TPF=OFFP.</p> <p>IF: RCS performance required Fine Pointing to support OCM entry, then this TC and the next one are <u>uplinked in reverse Execution Time (ET) order</u> to avoid having the S/C stay in SAM with RCS in Fine mode, should the TC link drop before both can be uplinked.</p> <p>N.B. Staying in OCM with RCS in Fine pointing will cause severe use of propellant and so end the mission!</p>																																			
		Check with Flight Dynamics the exact name of the <u>TPF instance</u> to be uplinked																																			
	ET=+00.00.00 UT=+	<p>Execute Telecommand</p> <p style="text-align: center;">Perform OCM pointing</p> <p>Command Parameter(s) :</p> <table border="0"> <tr> <td>ASW Function ID</td> <td>AHFUN002</td> <td>ACMSMain (Def)</td> </tr> <tr> <td>AcmsH AID Cmd</td> <td>AHHF0002</td> <td>OCM prep point</td> </tr> <tr> <td>AcmsH DF86 Cmd</td> <td>AH8G1002</td> <td>(Def)</td> </tr> <tr> <td>AcmsH DD86 Cmd</td> <td>AH8G2002</td> <td>Enable 86</td> </tr> <tr> <td>AcmsH Cmd TQ1r</td> <td>AHHC6002</td> <td>Enable 86</td> </tr> <tr> <td>AcmsH Cmd TQ2r</td> <td>AHHC7002</td> <td>Q_FIN_X</td> </tr> <tr> <td>AcmsH Cmd TQ3r</td> <td>AHHC8002</td> <td>Q_FIN_Y</td> </tr> <tr> <td>AcmsH Cmd TQ4r</td> <td>AHHC9002</td> <td>Q_FIN_Z</td> </tr> <tr> <td>AcmsH T_slew</td> <td>AHHD1002</td> <td>Q_FIN_S</td> </tr> <tr> <td>AcmsH RCS Mode</td> <td>AHHRM002</td> <td>T_SLEW</td> </tr> <tr> <td></td> <td></td> <td>RCS_MODE</td> </tr> </table>	ASW Function ID	AHFUN002	ACMSMain (Def)	AcmsH AID Cmd	AHHF0002	OCM prep point	AcmsH DF86 Cmd	AH8G1002	(Def)	AcmsH DD86 Cmd	AH8G2002	Enable 86	AcmsH Cmd TQ1r	AHHC6002	Enable 86	AcmsH Cmd TQ2r	AHHC7002	Q_FIN_X	AcmsH Cmd TQ3r	AHHC8002	Q_FIN_Y	AcmsH Cmd TQ4r	AHHC9002	Q_FIN_Z	AcmsH T_slew	AHHD1002	Q_FIN_S	AcmsH RCS Mode	AHHRM002	T_SLEW			RCS_MODE	ACAD1002	
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AcmsH T_slew	AHHD1002	Q_FIN_S																																			
AcmsH RCS Mode	AHHRM002	T_SLEW																																			
		RCS_MODE																																			
		<p>TC Control Flags :</p> <p style="text-align: right;">GBM IL DSE --Y -- ---</p> <p>Subsch. ID : 20 Det. descr. : TC_PERFORM_OCM_POINTING</p>																																			
3.2		Uplink TC from Manual Stack		<input type="checkbox"/>																																	
		Uplink TC to command mode change and/or perform slew to Delta-V target attitude																																			
3.3		WAIT for Time-Tagged Queue confirmation		<input type="checkbox"/>																																	
		WAIT for confirmation that this TC has been successfully placed in Mission Time-Line																																			
		Request confirmation form CDMU engineer																																			

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		IF: confirmation is not possible THEN: abort this procedure ELSE: proceed to next step		
TC Seq. Name : NULL03 (Null sequence 03) TimeTag Type: Sub Schedule ID: <input type="checkbox"/>				
4		IF RCS performance needs Fine		Next Step: THEN 5 ELSE 6
TC Seq. Name : HFA00CMX (RCS to Fine) TimeTag Type: Sub Schedule ID: 20 <input type="checkbox"/>				
5		Uplink time-tagged TC for switching RCS control mode to FINE		Next Step: 6
		WARNING: The following TC must be time-tagged with an execution time exactly 21 seconds before the time-tag given in the TPF=OPF, used in the previous step. These TCs are <u>uplinked in reverse Execution Time (ET) order</u> to avoid having the S/C stay in OCM with RCS in Fine mode, should the TC link drop before both can be uplinked. N.B. Staying in OCM with RCS in Fine pointing will cause severe use of propellant and so end the mission!		
	ET=+00.00.00 UT=+	Execute Telecommand Command Parameter(s) : RCSCtlSelDF86Cm AH8H1002 RCSCtlSelDD86Cm AH8H2002 TC Control Flags : GBM IL DSE --Y -- -- Subsch. ID : 20 Det. descr. : TC(8,1) - Set RCS control fine	ACZ6Z109 Enable 86 Enable 86	

