

Change ACMS mode from SCM to OCM
File: H_FCP_AOC_3004.xls
Author: dsalt-hp



Procedure Summary

Objectives

The objective of this Herschel ACMS procedure is to perform a mode transition from SCM to OCM, primarily to support routine delta-v activities (H_FCP_AOC_3001).

The procedure involves the following activities:

- verify ACMS mode
- switch ON the thruster catbed heating, as appropriate (calls H_FCP_AOC_5CBH)
- check RCS status and thruster temperatures for OCM entry
- command mode change to OCM (TPF=OFP)
- command RWL bias & hold (calls H_FCP_AOC_4R34)
- check wheel speed trends

Summary of Constraints

1. ACMS mode is SCM
2. TPFs for mode change (OFP) and wheel bias & hold (RWL) delivered by FD and available on the MCS

Spacecraft Configuration

Start of Procedure

ACMS mode is SCM

End of Procedure

ACMS mode is OCM, with reaction wheels held at constant torque via bias & hold function

Reference File(s)

Input Command Sequences

Output Command Sequences

NULL01

Referenced Displays

ANDs GRDs SLDs

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ZAA01999 ZGZ07999
 ZAA02999
 ZAA06999
 ZAA07999
 ZAZ30999
 ZAZ31999
 ZAA10999
 ZAA11999
 ZAA00999

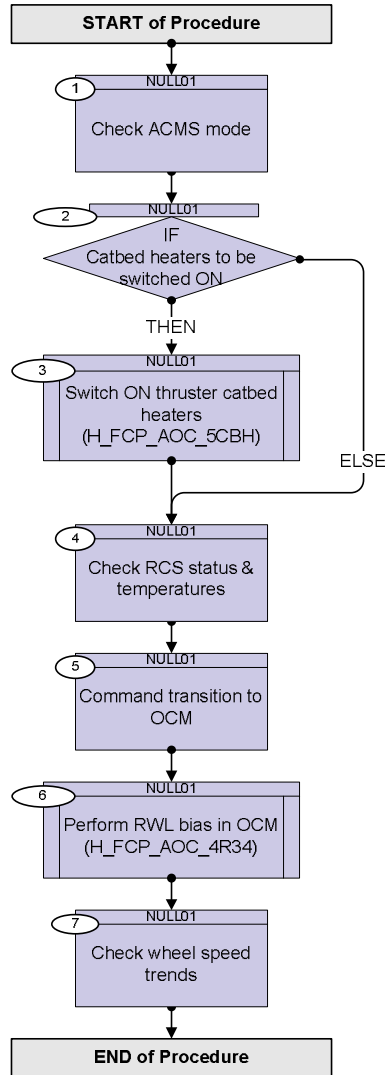
Configuration Control Information

DATE	FOP ISSUE	VERSION	MODIFICATION DESCRIPTION	AUTHOR	SPR REF
03/08/08	1	1	Created	dsalt-hp	
15/10/08		2	Modified TM checks for LCL and catbed heaters (Step 2-8)	dsalt-hp	
02/12/08	2	3	Initial steps for RCS thruster catbed heater switching ON removed and replaced with call to procedure H_FCP_AOC_5CBH. <input type="checkbox"/> Additional warning added in Step 5.1 to ensure TPF (OFF) for OCM transition leaves RCS in coarse pointing.	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: <input type="checkbox"/>				
1		Check ACMS mode		Next Step: 2
		Verify Telemetry AcmsMode AESMG002	= SCM	AND=ZAA01999
		Verify Telemetry AcmsSubstate AESMF002	= SCM Pointing	AND=ZAA01999
		Verify Telemetry AcmsMain AID AESM3002	= SCM Point Fine	AND=ZAA01999
2		IF Catbed heaters to be switched ON		Next Step: THEN 3 ELSE 4
3		Switch ON thruster catbed heaters (H_FCP_AOC_5CBH)		Next Step: 4
		Execute Procedure: H_FCP_AOC_5CBH Switch ON thruster catbed heaters		
4		Check RCS status & temperatures		Next Step: 5
4.1		Verify nominal RCS branch		<input type="checkbox"/>
		Verify Telemetry Nom Conf RCS AESCF002	= RCS-A = RCS-B	AND=ZAA01999
4.1.1		Check RCS-A health, if flagged as nominal branch		<input type="checkbox"/>
		Verify Telemetry RCSA Health Sts AESK1002	= Healthy	AND=ZAA02999
4.1.2		Check RCS-B health, if flagged as nominal branch		<input type="checkbox"/>
		Verify Telemetry RCSB Health Sts AESK2002	= Healthy	AND=ZAA02999

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
4.2		Verify LV status for MAIN branch RCS		<input type="checkbox"/>
4.2.1		Verify LV status for RCS-A, if MAIN branch		<input type="checkbox"/>
		Verify Telemetry RCS-A LV closed AMTL2109	= FALSE	AND=ZAA06999
		Verify Telemetry RCS-A LV open AMTL1109	= TRUE	AND=ZAA06999
4.2.2		Verify LV status for RCS-B, if MAIN branch		<input type="checkbox"/>
		Verify Telemetry RCS-B LV open AMTL3109	= TRUE	AND=ZAA07999
		Verify Telemetry RCS-B LV closed AMTL4109	= FALSE	AND=ZAA07999
4.3		Verify FCV temps for MAIN branch RCS		<input type="checkbox"/>
4.3.1		Verify FCV temps for RCS-A, if MAIN branch		<input type="checkbox"/>
		NOTE: The temperatures used in the verification criteria above are those the CDMU ASW derives by averaging data from three individual thermistors mounted on the same thermal node. The positions of the nodes are as follows: #22 - FCV A1A #42 - FCV A2A #41 - FCV C1A #23 - FCV C2A #44 - FCV C3A #51 - FCV C4A		
		Verify Telemetry ThermAvgTemp022 DEA8D170	< 65.0 deg C > 10.0 deg C	AND=ZAZ30999
		Verify Telemetry ThermAvgTemp042 DEAA1170	< 65.0 deg C > 10.0 deg C	AND=ZAZ31999
		Verify Telemetry ThermAvgTemp041 DEAA0170	< 65.0 deg C > 10.0 deg C	AND=ZAZ31999
		Verify Telemetry ThermAvgTemp023 DEA8E170	< 65.0 deg C > 10.0 deg C	AND=ZAZ30999

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Telemetry ThermAvgTemp044 DEAA3170	< 65.0 deg C > 10.0 deg C	AND=ZAZ31999
		Verify Telemetry ThermAvgTemp051 DEAAA170	< 65.0 deg C > 10.0 deg C	AND=ZAZ31999
4.3.2		Verify FCV temps for RCS-B, if MAIN branch		<input type="checkbox"/>
		NOTE: The temperatures used in the verification criteria above are those the CDMU ASW derives by averaging data from three individual thermistors mounted on the same thermal node. The positions of the nodes are as follows: #03 - FCV A1B #09 - FCV A2B #08 - FCV C1B #04 - FCV C2B #28 - FCV C3B #10 - FCV C4B		
		Verify Telemetry ThermAvgTemp003 DEA7A170	< 65.0 deg C > 10.0 deg C	AND=ZAZ30999
		Verify Telemetry ThermAvgTemp009 DEA80170	< 65.0 deg C > 10.0 deg C	AND=ZAZ30999
		Verify Telemetry ThermAvgTemp008 DEA7F170	< 65.0 deg C > 10.0 deg C	AND=ZAZ30999
		Verify Telemetry ThermAvgTemp004 DEA7B170	< 65.0 deg C > 10.0 deg C	AND=ZAZ30999
		Verify Telemetry ThermAvgTemp028 DEA93170	< 65.0 deg C > 10.0 deg C	AND=ZAZ30999
		Verify Telemetry ThermAvgTemp010 DEA81170	< 65.0 deg C > 10.0 deg C	AND=ZAZ30999
5		Command transition to OCM		Next Step: 6
5.1		Select TPF (OFF) to Perform OCM Pointing		<input type="checkbox"/>
		Check with Flight Dynamics the exact name of the TPF instance to be uplinked		

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		<p>WARNING: The setting of the last command parameter determines the RCS mode in OCM and must be set to COARSE.</p> <p>Check the TPF delivered by Flight Dynamics (TPF=OFP) and ensure that the last command parameter (AHRM002) is 01=coarse and not 10=fine.</p> <p>N.B. Staying in OCM with RCS in Fine pointing will cause severe use of propellant and so end the mission!</p>																																
		<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 (Def)</td></tr> <tr><td>AcmsH DF86 Cmd</td><td>AH8G1002</td><td>Enable 86</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></td></tr> <tr><td>AcmsH Cmd TQ2r</td><td>AHHC7002</td><td></td></tr> <tr><td>AcmsH Cmd TQ3r</td><td>AHHC8002</td><td></td></tr> <tr><td>AcmsH Cmd TQ4r</td><td>AHHC9002</td><td></td></tr> <tr><td>AcmsH T_slew</td><td>AHHD1002</td><td></td></tr> <tr><td>AcmsH RCS Mode</td><td>AHRM002</td><td></td></tr> </table> <p>TC Control Flags :</p> <p style="text-align: center;">GBM IL DSE --Y -- --</p> <p>Subsch. ID : 20 Det. descr. : TC_PERFORM_OCM_POINTING This Telecommand will not be included in the export</p>	ASW Function ID	AHFUN002	ACMSMain (Def)	AcmsH AID Cmd	AHHF0002	OCM prep point (Def)	AcmsH DF86 Cmd	AH8G1002	Enable 86	AcmsH DD86 Cmd	AH8G2002	Enable 86	AcmsH Cmd TQ1r	AHHC6002		AcmsH Cmd TQ2r	AHHC7002		AcmsH Cmd TQ3r	AHHC8002		AcmsH Cmd TQ4r	AHHC9002		AcmsH T_slew	AHHD1002		AcmsH RCS Mode	AHRM002		ACAD1002	
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AcmsH Cmd TQ4r	AHHC9002																																	
AcmsH T_slew	AHHD1002																																	
AcmsH RCS Mode	AHRM002																																	
5.2		<p>Check the control state is reached within the specified period T_slew (AHHD1002)</p>		<input type="checkbox"/>																														
		<p>Verify Telemetry</p> <table border="0"> <tr><td>AcmsMode</td><td>AESMG002</td><td>= OCM</td></tr> </table>	AcmsMode	AESMG002	= OCM		AND=ZAA10999																											
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5.3		<p>Check attitude quaternion is close to commanded target</p>		<input type="checkbox"/>																														
		<p>Verify Telemetry</p> <table border="0"> <tr><td>Est Attitude Q1</td><td>AESA6001</td><td>as commanded</td></tr> </table>	Est Attitude Q1	AESA6001	as commanded		AND=ZAA11999																											
Est Attitude Q1	AESA6001	as commanded																																
		<p>Verify Telemetry</p> <table border="0"> <tr><td>Est Attitude Q2</td><td>AESA7001</td><td>as commanded</td></tr> </table>	Est Attitude Q2	AESA7001	as commanded		AND=ZAA11999																											
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		Verify Telemetry Est Attitude Q3 AESA8001	as commanded	AND=ZAA11999
		Verify Telemetry Est Attitude Q4 AESA9001	as commanded	AND=ZAA11999
5.4		Check attitude errors		□
		Verify Telemetry Attitude err X AESBX002	= +/- 0.50 deg	AND=ZAA00999
		Verify Telemetry Attitude err Y AESBY002	= +/- 0.25 deg	AND=ZAA00999
		Verify Telemetry Attitude err Z AESBZ002	= +/- 0.25 deg	AND=ZAA00999
6		Perform RWL bias in OCM (H_FCP_AOC_4R34)		Next Step: 7
		Execute Procedure: H_FCP_AOC_4R34 Perform RWL bias in OCM		
		NOTE: If reaction wheels are not commanded to maintain a fixed angular momentum while in OCM, friction will slow them down and result in speeds that may be incompatible with any later transition back to SCM.		
7		Check wheel speed trends		Next Step: END
		Verify Telemetry RWL1 wheel spd AEWS1002		GRD=ZGZ07999
		Verify Telemetry RWL2 wheel spd AEWS2002		GRD=ZGZ07999
		Verify Telemetry RWL3 wheel spd AEWS3002		GRD=ZGZ07999
		Verify Telemetry RWL4 wheel spd AEWS4002		GRD=ZGZ07999
End of Procedure				