

Perform RWL bias in OCM  
File: H\_FCP\_AOC\_4R34.xls  
Author: dsalt-hp



## Procedure Summary

### Objectives

The objective of this Herschel ACMS procedure is to command the reaction wheels to maintain a specific angular rate in OCM.

The procedure involves the following activities:

- verify ACMS status and mode (=OCM)
- verify RWL power and health status
- select specific TPF (RWL) on manual stack
- command RWL momentum bias and hold

It relies on the bias and hold loop which brings the wheels to the commanded rate (except for a steady state controller offset due to friction) and maintains them at constant speed.

#### NOTE:

The procedure can also be used for the initial wheel run-in after power-on in orbit. After prolonged storage and during operations on ground the RWL's have a higher loss torque because of non-uniform distribution of lubricant on the bearings. A run-in at constant speed in orbit has been recommended by the supplier as a way to guarantee a uniform layer of lubricant and reduce the loss torque.

### Summary of Constraints

1. ACMS pointing in OCM
2. All RWL's powered.
3. Specific TPF (RWL) delivered by FD and available on MCS

### Spacecraft Configuration

#### Start of Procedure

Spacecraft initial conditions  
- ACMS pointing in OCM  
- all RWLs switched ON

#### End of Procedure

Spacecraft final conditions  
- same as initial conditions

### Reference File(s)

#### Input Command Sequences

#### Output Command Sequences

AERWL\_00

### Referenced Displays

ANDs      GRDs      SLDs

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ZAA01999  
 ZAA00999  
 ZAA02999

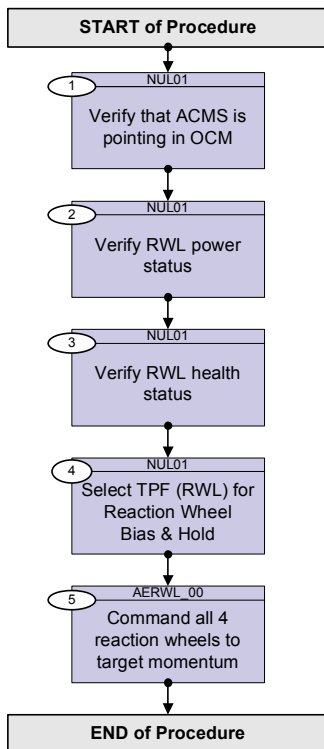
**Configuration Control Information**

DATE	FOP ISSUE	VERSION	MODIFICATION DESCRIPTION	AUTHOR	SPR REF
03/08/08	1	1	Created	dsalt-hp	
05/09/08		2	Sub Schedule ID now defined (SSID=20) for the MPS	dsalt-hp	
24/09/08		3	Formal parameters for RWL ID removed in Step 5 and replaced with fixed values.	dsalt-hp	
27/11/08		4	Sequence AERWL_00 updated to be planable by all sources and -ve time-tags applied to 1st & 2nd TCs in Step 5.	dsalt-hp	
05/12/08	2	5	Timet-tag on 3rd TC in Step 5 changed to relative time to ensure correct time deltas between all 3 TCs	dsalt-hp	
22/03/09		6	Updated to enable SCM pointing TC execution with RCS in Coarse (Step 6-9) as nominal, as per Section 2.1.2 of H-P-4-DS-MA-002 (Issue 2, Rev.5) □ NOTE: These additional TCs are linked to the TPF=RWL to ensure autonomous loading during routine Delta-Vs and all other OCM-to-SCM transitions that require wheel bias/hold conditions	dsalt-hp	
23/03/09		7	Name and offset for OBDB parameters corrected in Step 7 & 8 after Industry updates to Section 2.1.2 of H-P-4-DS-MA-002 (Issue 2, Rev.5)	dsalt-hp	
23/03/09		8	Correction of TC time-tags in Step 7	dsalt-hp	
23/03/09		9	Correction of TC time-tags in Step 7 & 8	dsalt-hp	
23/03/09		10	Small correction to TC time-tags in Step 8	dsalt-hp	
25/03/09	2.2	11	Comment added to Step 6-9 to remove TCs from the Manual Stack if the sequence is run under ground supervision, as they are also include in H_FCP_AOC_0SCM	dsalt-hp	
04/05/09	2.4	12	TCs to enable transition from OCM to SCM in RCS Coarse now removed (transferred to H_FCP_AOC_0SFX)	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>				
TC Seq. Name :NUL01 (Null Sequence 01)				
TimeTag Type: Sub Schedule ID:  □				
1		Verify that ACMS is pointing in OCM		Next Step: 2
		Verify Telemetry <b>AcmsMode</b> <b>AESMG002</b>	= OCM	AND=ZAA01999
		Verify Telemetry <b>AcmsSubstate</b> <b>AESMF002</b>	= OCM Pointing	AND=ZAA01999
		<p><i>NOTE:</i>            After prolonged storage and during operations on ground the RWL's have a higher loss torque because of non-uniform distribution of lubricant on the bearings. A run-in at constant speed after power-on in orbit has been recommended by the supplier as a way to guarantee a uniform layer of lubricant and reduce the loss torque.</p> <p>The procedure relies on the bias-and-hold loop in OCM to control the wheel at a constant rate for a prolonged time (of the order of 1 - 2 days).</p>		
2		Verify RWL power status		Next Step: 3
		Verify Telemetry <b>RWL1 power</b> <b>AE4P3002</b>	= ON	AND=ZAA00999
		Verify Telemetry <b>RWL2 power</b> <b>AE4P4002</b>	= ON	AND=ZAA01999
		Verify Telemetry <b>RWL3 power</b> <b>AE4P5002</b>	= ON	AND=ZAA01999
		Verify Telemetry <b>RWL4 power</b> <b>AE4P6002</b>	= ON	AND=ZAA01999
3		Verify RWL health status		Next Step: 4
		Verify Telemetry <b>RWL1 Health Sts</b> <b>AES45002</b>	= Healthy	AND=ZAA02999
		Verify Telemetry <b>RWL2 Health Sts</b> <b>AES46002</b>	= Healthy	AND=ZAA02999
		Verify Telemetry <b>RWL3 Health Sts</b> <b>AES47002</b>	= Healthy	AND=ZAA02999



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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=TR- 00.00.05 UT=+	Execute Telecommand  Start Function  Command Parameter(s) : Any Function ID                    AHFUN109  TC Control Flags :  GBM IL DSE --Y -- ---  Subsch. ID : 20 Det. descr. : TC(8,1) Start Function	AC081109  Biasing	
		Send BiasHold command with formal parameters defined by FD in specific TPF (RWL) version.		
	ET=TR+00.00.00 UT=+	Execute Telecommand  Bias and hold RWLs  Command Parameter(s) : ASW Function ID                    AHFUN002 Biasing AID Cmd                    AHFWB002 Bias DF86 Cmd                      AH8E1002 Bias DD86 Cmd                      AH8E2002 Bias Nrof RWL                      AHFWN002 Biasing RWL ID                      AHFWW002 Bias H_RWL1 h                      AHFWC002 Biasing RWL ID                      AHFWW002 Bias H_RWL2 h                      AHFWD002 Biasing RWL ID                      AHFWW002 Bias H_RWL3 h                      AHFWE002  Biasing RWL ID                      AHFWW002 Bias H_RWL4 h                      AHFWF002  TC Control Flags :  GBM IL DSE --Y -- ---  Subsch. ID : 20 Det. descr. : TC_BIAS_RWL_hold	ACWH1002  Biasing (Def) BiasHold (Def) Disable 86 (Def) Disable 86 (Def) 4 <dec> (Def) 1 <dec> (Def) HW_1 2 <dec> (Def) HW_2 3 <dec> (Def) HW_3  4 <dec> (Def) HW_4	
		Wait about 30 seconds to allow the status of the bias and hold loop to be modified in TM.		
		Verify Telemetry CurrentBiasAid                      AESM9002	= BiasHold	AND=ZAA01999
<b>End of Procedure</b>				