

RWL health check
File: H_FCP_AOC_5014.xls
Author: dsalt-hp



Procedure Summary

Objectives

The objective of this Herschel ACMS procedure is to lists all activities necessary to assess the health and status of the RWL.

The procedure involves the following activities:

- check RWL status
- check RWL speeds
- check RWL bearing temperatures
- check LCLs and external temperatures

Summary of Constraints

n/a

Spacecraft Configuration

Start of Procedure

n/a

End of Procedure

n/a

Reference File(s)

Input Command Sequences

Output Command Sequences

Referenced Displays

ANDs GRDs SLDs

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ZAA01999 (None)
 ZAA00999
 ZAA02999
 ZAA04999
 ZAA05999
 ZAD91999
 ZAD93999
 ZAD94999
 ZAD41999
 ZAD02999
 ZAD92999
 ZAD04999
 ZAD1B999
 ZAD05999

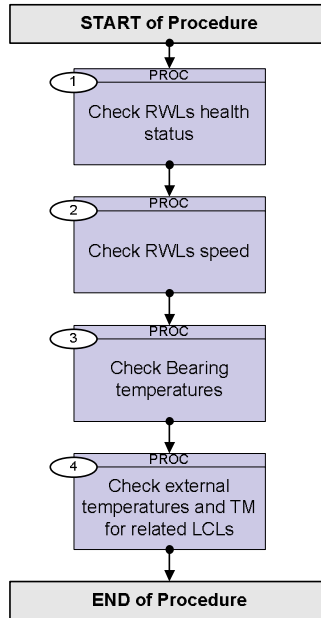
Configuration Control Information

DATE	FOP ISSUE	VERSION	MODIFICATION DESCRIPTION	AUTHOR	SPR REF
03/08/08	1	1	Created	dsalt-hp	
02/02/09	2	2	Checked-in foe FOP release (02/02/09)	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		Check RWLs health status		Next Step: 2
1.1		RWL1 in use and powered		<input type="checkbox"/>
		Verify Telemetry Curr RWLs use AES21002	<> RWL 2-3-4	AND=ZAA01999
		This is the only configuration where RWL1 is not used.		
		Verify Telemetry RWL1 power AE4P3002	= ON	AND=ZAA0999
1.2		Check RWL1 health status		<input type="checkbox"/>
		Verify Telemetry RWL1 Health Sts AES45002	= Healthy	AND=ZAA02999
		In case the status is set to "unavailable" wait 1 ETM cycle and check again.		
1.2.1		Unhealthy and in AFO?		<input type="checkbox"/>
		Verify Telemetry RWL1 Health Sts AES45002	= Unhealthy	AND=ZAA02999
		Verify Telemetry FdirMode AESMJ002	= AFO rcfg ena	AND=ZAA01999
1.2.2		Contingency		<input type="checkbox"/>
		Even though in AFO the reconfiguration did not take place as RWL1 is still flagged as in use. A fallback to SAM should be considered.		
1.2.3		Unhealthy and in AFS?		<input type="checkbox"/>
		Verify Telemetry RWL1 Health Sts AES45002	= Unhealthy	AND=ZAA02999
		Verify Telemetry FdirMode AESMJ002	= AFS rfg dis	AND=ZAA01999

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
1.2.4		<i>Contingency</i>		<input type="checkbox"/>
		If possible one should reconfigure to use the fourth wheel not in the current configuration (if healthy) or if already 4 wheels are selected remove RWL1 from the configuration in use.		
1.3		<i>RWL2 in use and powered</i>		<input type="checkbox"/>
		Verify Telemetry Curr RWLs use AES21002	<> RWL 1-3-4	AND=ZAA01999
		This is the only configuration where RWL2 is not used.		
		Verify Telemetry RWL2 power AE4P4002	= ON	AND=ZAA09999
1.4		<i>Check RWL2 health status</i>		<input type="checkbox"/>
		Verify Telemetry RWL2 Health Sts AES46002	= Healthy	AND=ZAA02999
		In case the status is set to "unavailable" wait 1 ETM cycle and check again.		
1.4.1		<i>Unhealthy and in AFO?</i>		<input type="checkbox"/>
		Verify Telemetry RWL2 Health Sts AES46002	= Unhealthy	AND=ZAA02999
		Verify Telemetry FdirMode AESMJ002	= AFO rcfg ena	AND=ZAA01999
1.4.2		<i>Contingency</i>		<input type="checkbox"/>
		Even though in AFO the reconfiguration did not take place as RWL2 is still flagged as in use. A fallback to SAM should be considered.		
1.4.3		<i>Unhealthy and in AFS?</i>		<input type="checkbox"/>
		Verify Telemetry RWL2 Health Sts AES46002	= Unhealthy	AND=ZAA02999
		Verify Telemetry FdirMode AESMJ002	= AFS rfg dis	AND=ZAA01999
1.4.4		<i>Contingency</i>		<input type="checkbox"/>

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		If possible one should reconfigure to use the fourth wheel not in the current configuration (if healthy) or if already 4 wheels are selected remove RWL2 from the configuration in use.		
1.5		<i>RWL3 in use and powered</i>		<input type="checkbox"/>
		Verify Telemetry Curr RWLs use AES21002	<> RWL 1-2-4	AND=ZAA01999
		This is the only configuration where RWL3 is not used.		
		Verify Telemetry RWL3 power AE4P5002	= ON	AND=ZAA00999
1.6		<i>Check RWL3 health status</i>		<input type="checkbox"/>
		Verify Telemetry RWL3 Health Sts AES47002	= Healthy	AND=ZAA02999
		In case the status is set to "unavailable" wait 1 ETM cycle and check again.		
1.6.1		<i>Unhealthy and in AFO?</i>		<input type="checkbox"/>
		Verify Telemetry RWL3 Health Sts AES47002	= Unhealthy	AND=ZAA02999
		Verify Telemetry FdirMode AESMJ002	= AFO rcfg ena	AND=ZAA01999
1.6.2		<i>Contingency</i>		<input type="checkbox"/>
		Even though in AFO the reconfiguration did not take place as RWL3 is still flagged as in use. A fallback to SAM should be considered.		
1.6.3		<i>Unhealthy and in AFS?</i>		<input type="checkbox"/>
		Verify Telemetry RWL3 Health Sts AES47002	= Unhealthy	AND=ZAA02999
		Verify Telemetry FdirMode AESMJ002	= AFS rfg dis	AND=ZAA01999
1.6.4		<i>Contingency</i>		<input type="checkbox"/>

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		If possible one should reconfigure to use the fourth wheel not in the current configuration (if healthy) or if already 4 wheels are selected remove RWL3 from the configuration in use.		
1.7		<i>RWL4 in use and powered</i>		<input type="checkbox"/>
		Verify Telemetry Curr RWLs use AES21002	<> RWL 1-2-3	AND=ZAA01999
		This is the only configuration where RWL4 is not used.		
		Verify Telemetry RWL4 power AE4P6002	= ON	AND=ZAA01999
1.8		<i>Check RWL4 health status</i>		<input type="checkbox"/>
		Verify Telemetry RWL4 Health Sts AES48002	= Healthy	AND=ZAA02999
		In case the status is set to "unavailable" wait 1 ETM cycle and check again.		
1.8.1		<i>Unhealthy and in AFO?</i>		<input type="checkbox"/>
		Verify Telemetry RWL4 Health Sts AES48002	= Unhealthy	AND=ZAA02999
		Verify Telemetry FdirMode AESMJ002	= AFO rcfg ena	AND=ZAA01999
1.8.2		<i>Contingency</i>		<input type="checkbox"/>
		Even though in AFO the reconfiguration did not take place as RWL4 is still flagged as in use. A fallback to SAM should be considered.		
1.8.3		<i>Unhealthy and in AFS?</i>		<input type="checkbox"/>
		Verify Telemetry RWL4 Health Sts AES48002	= Unhealthy	AND=ZAA02999
		Verify Telemetry FdirMode AESMJ002	= AFS rfg dis	AND=ZAA01999
1.8.4		<i>Contingency</i>		<input type="checkbox"/>

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		If possible one should reconfigure to use the fourth wheel not in the current configuration (if healthy) or if already 4 wheels are selected remove RWL4 from the configuration in use.		
2		Check RWLs speed		Next Step: 3
		only for wheels in use and powered		
2.1		RWL1 in use and powered		<input type="checkbox"/>
		Verify Telemetry Curr RWLs use AES21002	<> RWL 2-3-4	AND=ZAA01999
		This is the only configuration where RWL1 is not used.		
		Verify Telemetry RWL1 power AE4P3002	= ON	AND=ZAA0999
2.2		Check RWL1 speed		<input type="checkbox"/>
		Verify Telemetry RWL1 tacho spd AEW1A002	<= 200.0 rd/s >= 21.0 rd/s	AND=ZAA04999
2.3		RWL2 in use and powered		<input type="checkbox"/>
		Verify Telemetry Curr RWLs use AES21002	<> RWL 1-3-4	AND=ZAA01999
		This is the only configuration where RWL2 is not used.		
		Verify Telemetry RWL2 power AE4P4002	= ON	AND=ZAA0999
2.4		Check RWL2 speed		<input type="checkbox"/>
		Verify Telemetry RWL2 tacho spd AEW2A002	<= 200.0 rd/s >= 21.0 rd/s	AND=ZAA04999
2.5		RWL3 in use and powered		<input type="checkbox"/>
		Verify Telemetry Curr RWLs use AES21002	<> RWL 1-2-4	AND=ZAA01999
		This is the only configuration where RWL3 is not used.		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Telemetry RWL3 power AE4P5002	= ON	AND=ZAA00999
2.6		Check RWL3 speed		<input type="checkbox"/>
		Verify Telemetry RWL3 tacho spd AEW3A002	<= 200.0 rd/s >= 21.0 rd/s	AND=ZAA04999
2.7		RWL4 in use and powered		<input type="checkbox"/>
		Verify Telemetry Curr RWLs use AES21002	<> RWL 1-2-3	AND=ZAA01999
		This is the only configuration where RWL4 is not used.		
		Verify Telemetry RWL4 power AE4P6002	= ON	AND=ZAA01999
2.8		Check RWL4 speed		<input type="checkbox"/>
		Verify Telemetry RWL4 tacho spd AEW4A002	<= 200.0 rd/s >= 21.0 rd/s	AND=ZAA05999
3		Check Bearing temperatures		Next Step: 4
		Verify Telemetry RWL1 bear temp AEWTA002	>= 263.0 K <= 338.0 K	AND=ZAA05999
		Verify Telemetry RWL2 bear temp AEWTB002	>= 263.0 K <= 338.0 K	AND=ZAA05999
		Verify Telemetry RWL3 bear temp AEWTC002	>= 263.0 K <= 338.0 K	AND=ZAA05999
		Verify Telemetry RWL4 bear temp AEWTD002	>= 263.0 K <= 338.0 K	AND=ZAA05999
4		Check external temperatures and TM for related LCLs		Next Step: END
		Need to create an AND containing <u>all</u> the following TM parameters		

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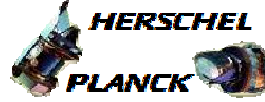
Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
4.1		RWL1		<input type="checkbox"/>
		Verify Telemetry THM_071_RWL1 TM071601	>= -10.0 degC <= 65.0 degC	AND=ZAD91999
		Verify Telemetry THM_119_RWL1 TM119601	>= -10.01 degC <= 64.97 degC	AND=ZAD93999
		Verify Telemetry THM_167_RWL1 TM167601	>= -10.01 degC <= 64.97 degC	AND=ZAD94999
		Verify Telemetry ThermAvgTemp033 DEA98170	<= 65 degC >= -10 degC	AND=ZAD41999
		Verify Telemetry Rwl_1_L55_I WM211565	>= 0.1 A <= 3.5 A	AND=ZAD02999
		The minimum corresponds approximately to the quiescent power consumption of the electronics. The maximum is derived assuming the maximum power consumption of 90W at the main bus voltage of 26V.		
		Verify Telemetry Rwl_1_L55_1S WM22F565	= ON	AND=ZAD02999
		Verify Telemetry Rwl_1_L55_2S WM22L565	= ON	AND=ZAD02999
		Nominally only the LCL current needs to be checked, though in case the current is very close to 0 the status should also be checked.		
4.2		RWL2		<input type="checkbox"/>
		Verify Telemetry TCS_THM_69 TM069601	>= -10.0 degC <= 65.0 degC	AND=ZAD91999
		Verify Telemetry TCS_THM_117 TM117601	>= -10.0 degC <= 65.0 degC	AND=ZAD92999
		Verify Telemetry TCS_THM_165 TM165601	>= -10.0 degC <= 65.0 degC	AND=ZAD92999
		Verify Telemetry ThermAvgTemp036 DEA9B170	<= -10 degC >= 65 degC	(None)
		Verify Telemetry Rwl_2_L56_I WM911565	>= 0.1 A <= 3.5 A	AND=ZAD04999

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		The minimum corresponds approximately to the quiescent power consumption of the electronics. The maximum is derived assuming the maximum power consumption of 90W at the main bus voltage of 26V.		
		Verify Telemetry Rwl_2_L56_1S WM92F565	= ON	AND=ZAD04999
		Verify Telemetry Rwl_2_L56_2S WM92L565	= ON	AND=ZAD04999
		Nominally only the LCL current needs to be checked, though in case the current is very close to 0 the status should also be checked.		
4.3		RWL3		<input type="checkbox"/>
		Verify Telemetry TCS_THM_72 TM072601	>= -10.0 degC <= 65.0 degC	AND=ZAD91999
		Verify Telemetry TCS_THM_120 TM120601	>= -10.0 degC <= 65.0 degC	AND=ZAD92999
		Verify Telemetry TCS_THM_168 TM168601	>= -10.0 degC <= 65.0 degC	AND=ZAD92999
		Verify Telemetry ThermAvgTemp034 DEA99170	>= -10.0 <degC <= 65.0 <degC	AND=ZAD1B999
		Verify Telemetry Rwl_3_L57_I WM111565	>= 0.1 A <= 3.5 A	AND=ZAD02999
		The minimum corresponds approximately to the quiescent power consumption of the electronics. The maximum is derived assuming the maximum power consumption of 90W at the main bus voltage of 26V.		
		Verify Telemetry Rwl_3_L57_1S WM12F565	= ON	AND=ZAD02999
		Verify Telemetry Rwl_3_L57_2S WM12K565	= ON	AND=ZAD02999
		Nominally only the LCL current needs to be checked, though in case the current is very close to 0 the status should also be checked.		
4.4		RWL4		<input type="checkbox"/>
		Verify Telemetry TCS_THM_70 TM070601	>= -10.0 degC <= 65.0 degC	AND=ZAD91999

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Telemetry TCS_THM_118 TM118601	>= -10.0 degC <= 65.0 degC	AND=ZAD92999
		Verify Telemetry TCS_THM_166 TM166601	>= -10.0 degC <= 65.0 degC	AND=ZAD92999
		Verify Telemetry ThermAvgTemp032 DEA97170	<= 65 degC >= -10 degC	AND=ZAD1B999
		Verify Telemetry Rwl_4_L58_I WMA11565	>= 0.1 A <= 3.5 A	AND=ZAD05999
		The minimum corresponds approximately to the quiescent power consumption of the electronics. The maximum is derived assuming the maximum power consumption of 90W at the main bus voltage of 26V.		
		Verify Telemetry Rwl_4_L58_1S WMA2F565	= ON	AND=ZAD05999
		Verify Telemetry Rwl_4_L58_2S WMA2K565	= ON	AND=ZAD05999
		Nominally only the LCL current needs to be checked, though in case the current is very close to 0 the status should also be checked.		
End of Procedure				