

Switch ON thruster catbed heaters
File: H_FCP_AOC_5CBH.xls
Author: dsalt-hp



Procedure Summary

Objectives

The objective of this Herschel ACMS procedure is to switch ON the appropriate set of RCS thruster catbed heaters.

The procedure involves the following activities:

- check ACMS/RCS status & configuration
- switch ON appropriate RCS heaters
 - C & A thrusters (RCS-A, nominal or redundant)
 - C & A thrusters (RCS-B, nominal or redundant)
 - C thrusters only (RCS-A, nominal or redundant)
 - C thrusters only (RCS-B, nominal or redundant)
- WAIT 40 minutes
- verify RCT preheat temperatures

Summary of Constraints

Only one orbit control/acceleration (A) thruster is to be used at the same time and so only the associated catbed heater would normally be switched ON.

[N.B. A request has been made to Project for keeping ALL catbed heaters switched ON throughout the mission, which would minimise the number of expected calls to this procedure and its associated sequences]

Spacecraft Configuration

Start of Procedure

Catbed heaters for C and/or A thrusters is switched OFF

End of Procedure

Catbed heaters for C and/or A thrusters is switched ON

Reference File(s)

Input Command Sequences

Output Command Sequences

HFA5CBHA
HFA5CBHB
HFA5CBHC
HFA5CBHD
HFA5CBHE
HFA5CBHF
HFA5CBHG
HFA5CBHH
HFA5CBHI
HFA5CBHJ
HFA5CBHK
HFA5CBHL
HFA5CBHM
HFA5CBHN
HFA5CBHO
HFA5CBHP

Referenced Displays

Status : Version 2 - Unchanged
Last Checkin: 21/04/09

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ANDs **GRDs** **SLDs**
 ZAA01999
 WALC1584
 WALC2584
 ZAA04999

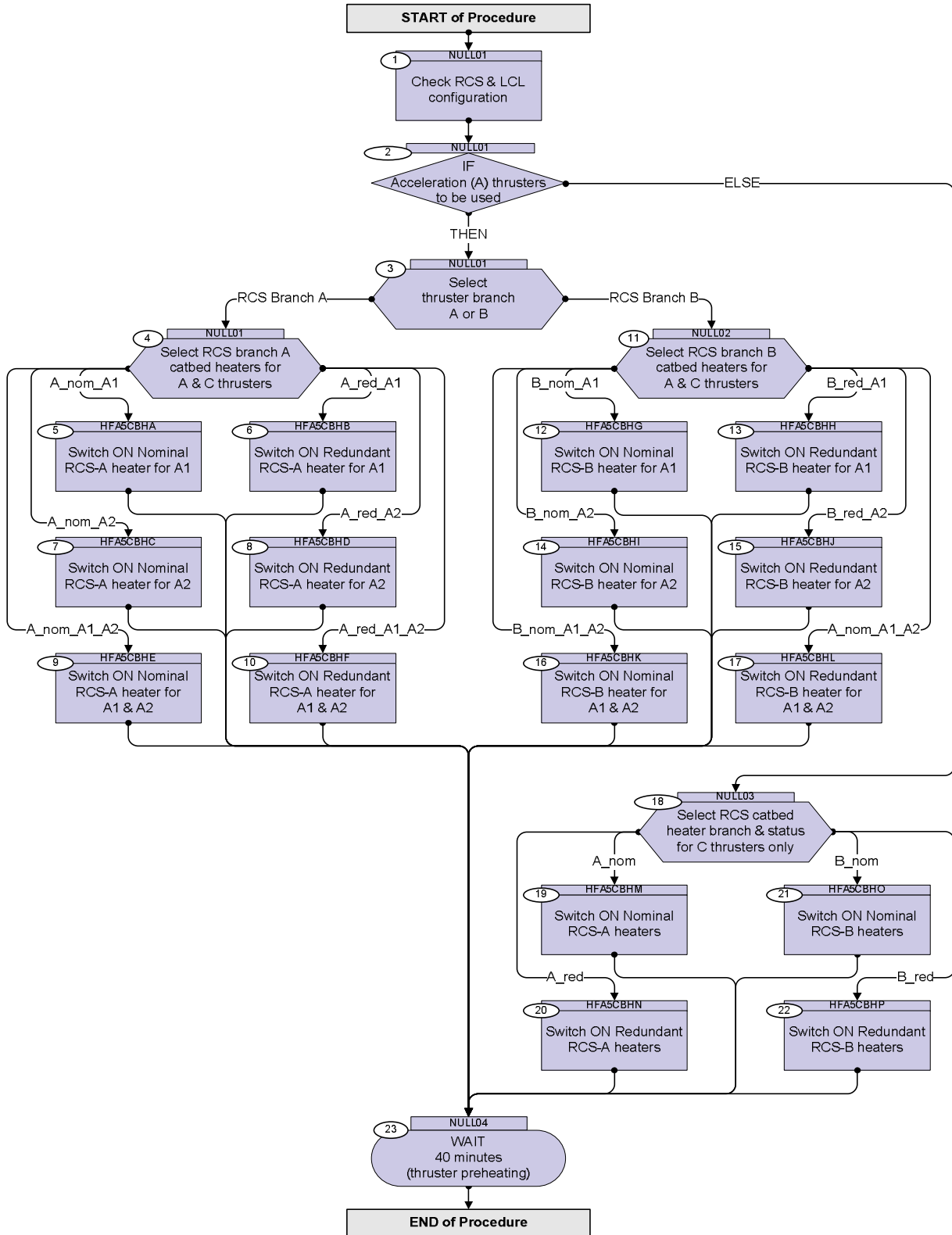
Configuration Control Information

DATE	FOP ISSUE	VERSION	MODIFICATION DESCRIPTION	AUTHOR	SPR REF
02/12/08	2	1	Created	dsalt-hp	
21/04/09	2.3	2	TM check of LCLs corrected in all branches	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: N				
Sub Schedule ID:				
□				
1		Check RCS & LCL configuration		Next Step: 2
1.1		Check RCS nominal configuration (MAIN branch)		□
		Verify Telemetry Nom Conf RCS AESCF002	= RCS-A = RCS-B	AND=ZAA01999
1.2		Check LCL status for the RCS		□
		LCL 17 powers the NOMINAL SURVIVAL 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
		LCL 18 powers the REDUNDANT SURVIVAL catbed heaters of the two RCS branches.		
		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 45 power the NOMINAL cat bed heaters and 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
		LCL 46 powers the REDUNDANT cat bed heaters and flow control valves of the two RCS branches.		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Telemetry RcsThrsB_L46_1S WM92D565	= ON	AND=WALC2584
		Verify Telemetry RcsThrsB_L46_2S WM92J565	= ON	AND=WALC2584
		Verify Telemetry RcsThrsB_L46_I WM909565	>= 0.0 A <= 3.08 A	AND=WALC2584
		LCL's 47 - 48 power the latch valves of the two RCS branches.		
		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.		
2		IF Acceleration (A) thrusters to be used		Next Step: THEN 3 ELSE 18
3		Select thruster branch A or B		Next Step: RCS Branch A 4 RCS Branch B 11
4		Select RCS branch A catbed heaters for A & C thrusters		Next Step: A_nom_A1 5 A_red_A1 6 A_nom_A2 7 A_red_A2 8 A_nom_A1_A2 9 A_red_A1_A2 10

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		<p>The heater to be switch ON is defined by the <u>current nominal RCS branch</u> and the <u>selected "acceleration " thruster.</u></p> <p>Use of nominal and/or redundant heater to be decided on TBD criteria, based upon heater health and power budget considerations</p>		
		<p>NOTE: The "acceleration" thruster to be used (i.e. A1 or A2) is selected by FD and <u>defined within the associated TPF (DVH)</u> for this specific OCM.</p>		
<p>TC Seq. Name :HFA5CBHA (Heat A_nom_A1)</p> <p>TimeTag Type: Sub Schedule ID:</p> <p style="text-align: center;">□</p>				
5		Switch ON Nominal RCS-A heater for A1		Next Step: 23
		<p>Execute Telecommand</p> <p style="text-align: right;">C-A1 nomHTR RCS-A ON</p> <p>Command Parameter(s) :</p> <p style="margin-left: 40px;">RCSCfg DF86 Cmd AH8R3001 Enable 86</p> <p style="margin-left: 40px;">RCSCfg DD86 Cmd AH8R4001 Enable 86</p> <p>TC Control Flags :</p> <p style="margin-left: 100px;">GBM IL DSE</p> <p style="margin-left: 100px;">--Y -- ---</p> <p>Subsch. ID : 20 Det. descr. : TC(8,1) Command RCS config - Herschel C-A1 nomHTR RCS-A ON</p>	ACZC9109	
		<p>Execute Telecommand</p> <p style="text-align: right;">Fire Cmd RCS config</p> <p>Command Parameter(s) :</p> <p style="margin-left: 40px;">FireFun DF86Cmd AH8F1001 Enable 86</p> <p style="margin-left: 40px;">FireFun DD86Cmd AH8F2001 Enable 86</p> <p>TC Control Flags :</p> <p style="margin-left: 100px;">GBM IL DSE</p> <p style="margin-left: 100px;">--Y -- ---</p> <p>Subsch. ID : 20 Det. descr. : TC(8,4) Fire Command - Fire Cmd RCS config</p>	ACZ2M109	
		Check RCS catbed heater status & current		
		<p>Verify Telemetry</p> <p style="margin-left: 40px;">CBH_N_L17_S WMA2H565 = ON</p>		AND=WALC1584
		<p>Verify Telemetry</p> <p style="margin-left: 40px;">CBH_N_L17_I WMA13565 >= 0.5 A</p>		AND=WALC1584

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		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
<p>TC Seq. Name :HFA5CBHB (Heat A_red_A1)</p> <p>TimeTag Type: Sub Schedule ID:</p> <p>□</p>				
6		Switch ON Redundant RCS-A heater for A1		Next Step: 23
		Execute Telecommand C-A1 redHTR RCS-A ON Command Parameter(s) : RCSCfg DF86 Cmd AH8R3001 RCSCfg DD86 Cmd AH8R4001 TC Control Flags : GBM IL DSE --Y -- -- Subsch. ID : 20 Det. descr. : TC(8,1) Command RCS config - Herschel C-A1 redHTR RCS-A ON	ACZD4109 Enable 86 Enable 86	
		Execute Telecommand Fire Cmd RCS config Command Parameter(s) : FireFun DF86Cmd AH8F1001 FireFun DD86Cmd AH8F2001 TC Control Flags : GBM IL DSE --Y -- -- Subsch. ID : 20 Det. descr. : TC(8,4) Fire Command - Fire Cmd RCS config	ACZ2M109 Enable 86 Enable 86	
		Check RCS catbed heater status & current		
		Verify Telemetry CBH_R_L18_S WM12H565	= ON	AND=WALC1584
		Verify Telemetry CBH_R_L18_I WM113565	>= 0.5 A	AND=WALC1584
		Verify Telemetry RcsThrsB_L46_1S WM92D565	= ON	AND=WALC2584

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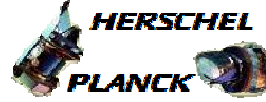
Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Telemetry RcsThrsB_L46_2S WM92J565	= ON	AND=WALC2584
		Verify Telemetry RcsThrsB_L46_I WM909565	>= 0.0 A <= 3.08 A	AND=WALC2584
<p>TC Seq. Name :HFA5CBHC (Heat A_nom_A2)</p> <p>TimeTag Type: Sub Schedule ID: □</p>				
7		Switch ON Nominal RCS-A heater for A2		Next Step: 23
		Execute Telecommand C-A2 nomHTR RCS-A ON Command Parameter(s) : RCSCfg DF86 Cmd AH8R3001 RCSCfg DD86 Cmd AH8R4001 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 20 Det. descr. : TC(8,1) Command RCS config - Herschel C-A2 nomHTR RCS-A ON	ACZD1109 Enable 86 Enable 86	
		Execute Telecommand Fire Cmd RCS config Command Parameter(s) : FireFun DF86Cmd AH8F1001 FireFun DD86Cmd AH8F2001 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 20 Det. descr. : TC(8,4) Fire Command - Fire Cmd RCS config	ACZ2M109 Enable 86 Enable 86	
		Check RCS catbed heater status & current		
		Verify Telemetry CBH_N_L17_S WMA2H565	= ON	AND=WALC1584
		Verify Telemetry CBH_N_L17_I WMA13565	>= 0.5 A	AND=WALC1584
		Verify Telemetry RcsThrsA_L45_1S WM22D565	= ON	AND=WALC2584
		Verify Telemetry RcsThrsA_L45_2S WM22J565	= ON	AND=WALC2584

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Telemetry RcsThrsA_L45_I WM209565	>= 0.0 A <= 3.08 A	AND=WALC2584
<p>TC Seq. Name :HFA5CBHD (Heat A_red_A2)</p> <p>TimeTag Type: Sub Schedule ID: <input type="checkbox"/></p>				
8		Switch ON Redundant RCS-A heater for A2		Next Step: 23
		Execute Telecommand C-A2 redHTR RCS-A ON Command Parameter(s) : RCSCfg DF86 Cmd AH8R3001 RCSCfg DD86 Cmd AH8R4001 TC Control Flags : GBM IL DSE --Y -- -- Subsch. ID : 20 Det. descr. : TC(8,1) Command RCS config - Herschel C-A2 redHTR RCS-A ON	ACZD5109 Enable 86 Enable 86	
		Execute Telecommand Fire Cmd RCS config Command Parameter(s) : FireFun DF86Cmd AH8F1001 FireFun DD86Cmd AH8F2001 TC Control Flags : GBM IL DSE --Y -- -- Subsch. ID : 20 Det. descr. : TC(8,4) Fire Command - Fire Cmd RCS config	ACZ2M109 Enable 86 Enable 86	
		Check RCS catbed heater status & current		
		Verify Telemetry CBH_R_L18_S WM12H565	= ON	AND=WALC1584
		Verify Telemetry CBH_R_L18_I WM113565	>= 0.5 A	AND=WALC1584
		Verify Telemetry RcsThrsB_L46_1S WM92D565	= ON	AND=WALC2584
		Verify Telemetry RcsThrsB_L46_2S WM92J565	= ON	AND=WALC2584
		Verify Telemetry RcsThrsB_L46_I WM909565	>= 0.0 A <= 3.08 A	AND=WALC2584

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
TC Seq. Name : HFA5CBHE (Heat A_nom_A1_A2) TimeTag Type: Sub Schedule ID: <input type="checkbox"/>				
9		Switch ON Nominal RCS-A heater for A1 & A2		Next Step: 23
		Execute Telecommand <p style="text-align: center;">C-A1-A2 nomHTR RCS-A ON</p> Command Parameter(s) : RCSCfg DF86 Cmd AH8R3001 RCSCfg DD86 Cmd AH8R4001 TC Control Flags : <p style="text-align: right;">GBM IL DSE --Y -- ---</p> Subsch. ID : 20 Det. descr. : TC(8,1) Command RCS config - Herschel C-A1-A2 nomHTR RCS-A ON	ACZD2109 Enable 86 Enable 86	
		Execute Telecommand <p style="text-align: center;">Fire Cmd RCS config</p> Command Parameter(s) : FireFun DF86Cmd AH8F1001 FireFun DD86Cmd AH8F2001 TC Control Flags : <p style="text-align: right;">GBM IL DSE --Y -- ---</p> Subsch. ID : 20 Det. descr. : TC(8,4) Fire Command - Fire Cmd RCS config	ACZ2M109 Enable 86 Enable 86	
		Check RCS catbed heater status & current		
		Verify Telemetry <p style="text-align: center;">CBH_N_L17_S WMA2H565</p>	= ON	AND=WALC1584
		Verify Telemetry <p style="text-align: center;">CBH_N_L17_I WMA13565</p>	>= 0.5 A	AND=WALC1584
		Verify Telemetry <p style="text-align: center;">RcsThrsA_L45_1S WM22D565</p>	= ON	AND=WALC2584
		Verify Telemetry <p style="text-align: center;">RcsThrsA_L45_2S WM22J565</p>	= ON	AND=WALC2584
		Verify Telemetry <p style="text-align: center;">RcsThrsA_L45_I WM209565</p>	>= 0.0 A <= 3.08 A	AND=WALC2584

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
TC Seq. Name : HFA5CBHF (Heat A_red_A1_A2) TimeTag Type: Sub Schedule ID: <input type="checkbox"/>				
10		Switch ON Redundant RCS-A heater for A1 & A2		Next Step: 23
		Execute Telecommand <p style="text-align: center;">C-A1-A2 redHTR RCS-A ON</p> Command Parameter(s) : RCSCfg DF86 Cmd AH8R3001 Enable 86 RCSCfg DD86 Cmd AH8R4001 Enable 86 TC Control Flags : <p style="text-align: right;">GBM IL DSE --Y -- ---</p> Subsch. ID : 20 Det. descr. : TC(8,1) Command RCS config - Herschel C-A1-A2 redHTR RCS-A ON	ACZD6109	
		Execute Telecommand <p style="text-align: center;">Fire Cmd RCS config</p> Command Parameter(s) : FireFun DF86Cmd AH8F1001 Enable 86 FireFun DD86Cmd AH8F2001 Enable 86 TC Control Flags : <p style="text-align: right;">GBM IL DSE --Y -- ---</p> Subsch. ID : 20 Det. descr. : TC(8,4) Fire Command - Fire Cmd RCS config	ACZ2M109	
		Check RCS catbed heater status & current		
		Verify Telemetry <p style="text-align: center;">CBH_R_L18_S WM12H565</p>	= ON	AND=WALC1584
		Verify Telemetry <p style="text-align: center;">CBH_R_L18_I WM113565</p>	>= 0.5 A	AND=WALC1584
		Verify Telemetry <p style="text-align: center;">RcsThrsB_L46_1S WM92D565</p>	= ON	AND=WALC2584
		Verify Telemetry <p style="text-align: center;">RcsThrsB_L46_2S WM92J565</p>	= ON	AND=WALC2584
		Verify Telemetry <p style="text-align: center;">RcsThrsB_L46_I WM909565</p>	>= 0.0 A <= 3.08 A	AND=WALC2584

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
<p>TC Seq. Name : NULL02 (Null sequence 02)</p> <p>TimeTag Type: Sub Schedule ID:</p> <p>□</p>				
11		Select RCS branch B catbed heaters for A & C thrusters		Next Step: B_nom_A1 12 B_red_A1 13 B_nom_A2 14 B_red_A2 15 B_nom_A1_A2 16 A_nom_A1_A2 17
		<p>The heater to be switch ON is defined by the <u>current nominal RCS branch</u> and the <u>selected "acceleration " thruster</u>.</p> <p>Use of nominal and/or redundant heater to be decided on TBD criteria, based upon heater health and power budget considerations</p>		
		<p>NOTE: The "acceleration" thruster to be used (i.e. A1 or A2) is selected by FD and <u>defined within the associated TPF (DVH) for this specific OCM.</u></p>		
<p>TC Seq. Name : HFA5CBHG (Heat B_nom_A1)</p> <p>TimeTag Type: Sub Schedule ID:</p> <p>□</p>				
12		Switch ON Nominal RCS-B heater for A1		Next Step: 23
		<p>Execute Telecommand</p> <p style="text-align: center;">C-A1 nomHTR RCS-B ON</p> <p>Command Parameter(s) :</p> <p style="text-align: center;">RCSCfg DF86 Cmd AH8R3001 Enable 86 RCSCfg DD86 Cmd AH8R4001 Enable 86</p> <p>TC Control Flags :</p> <p style="text-align: center;">GBM IL DSE --Y -- ---</p> <p>Subsch. ID : 20 Det. descr. : TC(8,1) Command RCS config - Herschel C-A1 nomHTR RCS-B ON</p>	ACZD8109	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Execute Telecommand Fire Cmd RCS config Command Parameter(s) : FireFun DF86Cmd AH8F1001 FireFun DD86Cmd AH8F2001 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 20 Det. descr. : TC(8,4) Fire Command - Fire Cmd RCS config	ACZ2M109 Enable 86 Enable 86	
		Check RCS catbed heater status & current		
		Verify Telemetry CBH_N_L17_S WMA2H565	= ON	AND=WALC1584
		Verify Telemetry CBH_N_L17_I WMA13565	>= 0.5 A	AND=WALC1584
		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
TC Seq. Name : HFA5CBHH (Heat B_red_A1) TimeTag Type: Sub Schedule ID: <input type="checkbox"/>				
13		Switch ON Redundant RCS-B heater for A1		Next Step: 23
		Execute Telecommand C-A1 redHTR RCS-B ON Command Parameter(s) : RCSCfg DF86 Cmd AH8R3001 RCSCfg DD86 Cmd AH8R4001 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 20 Det. descr. : TC(8,1) Command RCS config - Herschel C-A1 redHTR RCS-B ON	ACZE3109 Enable 86 Enable 86	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Execute Telecommand Fire Cmd RCS config Command Parameter(s) : FireFun DF86Cmd AH8F1001 Enable 86 FireFun DD86Cmd AH8F2001 Enable 86 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 20 Det. descr. : TC(8,4) Fire Command - Fire Cmd RCS config	ACZ2M109	
		Check RCS catbed heater status & current		
		Verify Telemetry CBH_R_L18_S WM12H565	= ON	AND=WALC1584
		Verify Telemetry CBH_R_L18_I WM113565	>= 0.5 A	AND=WALC1584
		Verify Telemetry RcsThrsB_L46_1S WM92D565	= ON	AND=WALC2584
		Verify Telemetry RcsThrsB_L46_2S WM92J565	= ON	AND=WALC2584
		Verify Telemetry RcsThrsB_L46_I WM909565	>= 0.0 A <= 3.08 A	AND=WALC2584
TC Seq. Name :HFA5CBHI (Heat B_nom_A2) TimeTag Type: Sub Schedule ID: <input type="checkbox"/>				
14		Switch ON Nominal RCS-B heater for A2		Next Step: 23
		Execute Telecommand C-A2 nomHTR RCS-B ON Command Parameter(s) : RCSCfg DF86 Cmd AH8R3001 Enable 86 RCSCfg DD86 Cmd AH8R4001 Enable 86 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 20 Det. descr. : TC(8,1) Command RCS config - Herschel C-A2 nomHTR RCS-B ON	ACZD9109	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Execute Telecommand Fire Cmd RCS config <i>Command Parameter(s) :</i> FireFun DF86Cmd AH8F1001 Enable 86 FireFun DD86Cmd AH8F2001 Enable 86 <i>TC Control Flags :</i> GBM IL DSE --Y -- --- <i>Subsch. ID : 20</i> Det. descr. : TC(8,4) Fire Command - Fire Cmd RCS config	ACZ2M109	
		Check RCS catbed heater status & current		
		Verify Telemetry CBH_N_L17_S WMA2H565	= ON	AND=WALC1584
		Verify Telemetry CBH_N_L17_I WMA13565	>= 0.5 A	AND=WALC1584
		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
TC Seq. Name : HFA5CBHJ (Heat B_red_A2) TimeTag Type: Sub Schedule ID: <input type="checkbox"/>				
15		Switch ON Redundant RCS-B heater for A2		Next Step: 23
		Execute Telecommand C-A2 redHTR RCS-B ON <i>Command Parameter(s) :</i> RCSCfg DF86 Cmd AH8R3001 Enable 86 RCSCfg DD86 Cmd AH8R4001 Enable 86 <i>TC Control Flags :</i> GBM IL DSE --Y -- --- <i>Subsch. ID : 20</i> Det. descr. : TC(8,1) Command RCS config - Herschel C-A2 redHTR RCS-B ON	ACZE4109	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Execute Telecommand Fire Cmd RCS config Command Parameter(s) : FireFun DF86Cmd AH8F1001 Enable 86 FireFun DD86Cmd AH8F2001 Enable 86 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 20 Det. descr. : TC(8,4) Fire Command - Fire Cmd RCS config	ACZ2M109	
		Check RCS catbed heater status & current		
		Verify Telemetry CBH_R_L18_S WM12H565	= ON	AND=WALC1584
		Verify Telemetry CBH_R_L18_I WM113565	>= 0.5 A	AND=WALC1584
		Verify Telemetry RcsThrsB_L46_1S WM92D565	= ON	AND=WALC2584
		Verify Telemetry RcsThrsB_L46_2S WM92J565	= ON	AND=WALC2584
		Verify Telemetry RcsThrsB_L46_I WM909565	>= 0.0 A <= 3.08 A	AND=WALC2584
TC Seq. Name : HFA5CBHK (Heat B_nom_A1_A2) TimeTag Type: Sub Schedule ID: <input type="checkbox"/>				
16		Switch ON Nominal RCS-B heater for A1 & A2		Next Step: 23
		Execute Telecommand C-A1-A2 nomHTR RCS-B ON Command Parameter(s) : RCSCfg DF86 Cmd AH8R3001 Enable 86 RCSCfg DD86 Cmd AH8R4001 Enable 86 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 20 Det. descr. : TC(8,1) Command RCS config - Herschel C-A1-A2 nomHTR RCS-B ON	ACZE1109	

Switch ON thruster catbed heaters
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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Execute Telecommand Fire Cmd RCS config <i>Command Parameter(s) :</i> FireFun DF86Cmd AH8F1001 Enable 86 FireFun DD86Cmd AH8F2001 Enable 86 <i>TC Control Flags :</i> GBM IL DSE --Y -- --- <i>Subsch. ID : 20</i> Det. descr. : TC(8,4) Fire Command - Fire Cmd RCS config	ACZ2M109	
		Check RCS catbed heater status & current		
		Verify Telemetry CBH_N_L17_S WMA2H565	= ON	AND=WALC1584
		Verify Telemetry CBH_N_L17_I WMA13565	>= 0.5 A	AND=WALC1584
		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
TC Seq. Name : HFA5CBHL (Heat B_red_A1_A2) TimeTag Type: Sub Schedule ID: <input type="checkbox"/>				
17		Switch ON Redundant RCS-B heater for A1 & A2		Next Step: 23
		Execute Telecommand C-A1-A2 redHTR RCS-B ON <i>Command Parameter(s) :</i> RCSCfg DF86 Cmd AH8R3001 Enable 86 RCSCfg DD86 Cmd AH8R4001 Enable 86 <i>TC Control Flags :</i> GBM IL DSE --Y -- --- <i>Subsch. ID : 20</i> Det. descr. : TC(8,1) Command RCS config - Herschel C-A1-A2 redHTR RCS-B ON	ACZE5109	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Execute Telecommand Fire Cmd RCS config Command Parameter(s) : FireFun DF86Cmd AH8F1001 FireFun DD86Cmd AH8F2001 TC Control Flags : GBM IL DSE --Y -- -- Subsch. ID : 20 Det. descr. : TC(8,4) Fire Command - Fire Cmd RCS config	ACZ2M109 Enable 86 Enable 86	
		Check RCS catbed heater status & current		
		Verify Telemetry CBH_R_L18_S WM12H565	= ON	AND=WALC1584
		Verify Telemetry CBH_R_L18_I WM113565	>= 0.5 A	AND=WALC1584
		Verify Telemetry RcsThrsB_L46_1S WM92D565	= ON	AND=WALC2584
		Verify Telemetry RcsThrsB_L46_2S WM92J565	= ON	AND=WALC2584
		Verify Telemetry RcsThrsB_L46_I WM909565	>= 0.0 A <= 3.08 A	AND=WALC2584
TC Seq. Name : NULL03 (Null sequence 03) TimeTag Type: Sub Schedule ID: <input type="checkbox"/>				
18		Select RCS catbed heater branch & status for C thrusters only		Next Step: A_nom 19 A_red 20 B_nom 21 B_red 22
TC Seq. Name : HFA5CBHM (Heat A_nom_C) TimeTag Type: Sub Schedule ID: <input type="checkbox"/>				
19		Switch ON Nominal RCS-A heaters		Next Step: 23

Switch ON thruster catbed heaters
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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Execute Telecommand <p style="text-align: right;">C nom HTR RCS-A ON</p> Command Parameter(s) : RCSCfg DF86 Cmd AH8R3001 Enable 86 RCSCfg DD86 Cmd AH8R4001 Enable 86 TC Control Flags : GBM IL DSE --Y -- -- Subsch. ID : 20 Det. descr. : TC(8,1) Command RCS config - Herschel C nom HTR RCS-A ON	ACZC8109	
		Execute Telecommand <p style="text-align: right;">Fire Cmd RCS config</p> Command Parameter(s) : FireFun DF86Cmd AH8F1001 Enable 86 FireFun DD86Cmd AH8F2001 Enable 86 TC Control Flags : GBM IL DSE --Y -- -- Subsch. ID : 20 Det. descr. : TC(8,4) Fire Command - Fire Cmd RCS config	ACZ2M109	
		Check RCS catbed heater status & current		
		Verify Telemetry <p style="text-align: right;">CBH_N_L17_S WMA2H565</p>	= ON	AND=WALC1584
		Verify Telemetry <p style="text-align: right;">CBH_N_L17_I WMA13565</p>	>= 0.5 A	AND=WALC1584
		Verify Telemetry <p style="text-align: right;">RcsThrsA_L45_1S WM22D565</p>	= ON	AND=WALC2584
		Verify Telemetry <p style="text-align: right;">RcsThrsA_L45_2S WM22J565</p>	= ON	AND=WALC2584
		Verify Telemetry <p style="text-align: right;">RcsThrsA_L45_I WM209565</p>	>= 0.0 A <= 3.08 A	AND=WALC2584
TC Seq. Name :HFA5CBHN (Heat A_red_C) TimeTag Type: Sub Schedule ID: <input type="checkbox"/>				
20		Switch ON Redundant RCS-A heaters		Next Step: 23

Switch ON thruster catbed heaters
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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Execute Telecommand <p style="text-align: right;">C red HTR RCS-A ON</p> Command Parameter(s) : RCSCfg DF86 Cmd AH8R3001 Enable 86 RCSCfg DD86 Cmd AH8R4001 Enable 86 TC Control Flags : GBM IL DSE --Y -- -- Subsch. ID : 20 Det. descr. : TC(8,1) Command RCS config - Herschel C red HTR RCS-A ON	ACZD3109	
		Execute Telecommand <p style="text-align: right;">Fire Cmd RCS config</p> Command Parameter(s) : FireFun DF86Cmd AH8F1001 Enable 86 FireFun DD86Cmd AH8F2001 Enable 86 TC Control Flags : GBM IL DSE --Y -- -- Subsch. ID : 20 Det. descr. : TC(8,4) Fire Command - Fire Cmd RCS config	ACZ2M109	
		Check RCS catbed heater status & current		
		Verify Telemetry <p style="text-align: right;">CBH_R_L18_S WM12H565</p>	= ON	AND=WALC1584
		Verify Telemetry <p style="text-align: right;">CBH_R_L18_I WM113565</p>	>= 0.5 A	AND=WALC1584
		Verify Telemetry <p style="text-align: right;">RcsThrsB_L46_1S WM92D565</p>	= ON	AND=WALC2584
		Verify Telemetry <p style="text-align: right;">RcsThrsB_L46_2S WM92J565</p>	= ON	AND=WALC2584
		Verify Telemetry <p style="text-align: right;">RcsThrsB_L46_I WM909565</p>	>= 0.0 A <= 3.08 A	AND=WALC2584
TC Seq. Name :HFA5CBHO (Heat B_nom_C) TimeTag Type: Sub Schedule ID: <input type="checkbox"/>				
21		Switch ON Nominal RCS-B heaters		Next Step: 23

Switch ON thruster catbed heaters
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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Execute Telecommand <p style="text-align: right;">C nom HTR RCS-B ON</p> Command Parameter(s) : RCSCfg DF86 Cmd AH8R3001 Enable 86 RCSCfg DD86 Cmd AH8R4001 Enable 86 TC Control Flags : GBM IL DSE --Y -- -- Subsch. ID : 20 Det. descr. : TC(8,1) Command RCS config - Herschel C nom HTR RCS-B ON	ACZD7109	
		Execute Telecommand <p style="text-align: right;">Fire Cmd RCS config</p> Command Parameter(s) : FireFun DF86Cmd AH8F1001 Enable 86 FireFun DD86Cmd AH8F2001 Enable 86 TC Control Flags : GBM IL DSE --Y -- -- Subsch. ID : 20 Det. descr. : TC(8,4) Fire Command - Fire Cmd RCS config	ACZ2M109	
		Check RCS catbed heater status & current		
		Verify Telemetry <p style="text-align: right;">CBH_N_L17_S WMA2H565</p>	= ON	AND=WALC1584
		Verify Telemetry <p style="text-align: right;">CBH_N_L17_I WMA13565</p>	>= 0.5 A	AND=WALC1584
		Verify Telemetry <p style="text-align: right;">RcsThrsA_L45_1S WM22D565</p>	= ON	AND=WALC2584
		Verify Telemetry <p style="text-align: right;">RcsThrsA_L45_2S WM22J565</p>	= ON	AND=WALC2584
		Verify Telemetry <p style="text-align: right;">RcsThrsA_L45_I WM209565</p>	>= 0.0 A <= 3.08 A	AND=WALC2584
TC Seq. Name :HFA5CBHP (Heat B_red_C) TimeTag Type: Sub Schedule ID: <input type="checkbox"/>				
22		Switch ON Redundant RCS-B heaters		Next Step: 23

Switch ON thruster catbed heaters
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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Execute Telecommand C red HTR RCS-B ON Command Parameter(s) : RCSCfg DF86 Cmd AH8R3001 Enable 86 RCSCfg DD86 Cmd AH8R4001 Enable 86 TC Control Flags : GBM IL DSE --Y -- -- Subsch. ID : 20 Det. descr. : TC(8,1) Command RCS config - Herschel C red HTR RCS-B ON	ACZE2109	
		Execute Telecommand Fire Cmd RCS config Command Parameter(s) : FireFun DF86Cmd AH8F1001 Enable 86 FireFun DD86Cmd AH8F2001 Enable 86 TC Control Flags : GBM IL DSE --Y -- -- Subsch. ID : 20 Det. descr. : TC(8,4) Fire Command - Fire Cmd RCS config	ACZ2M109	
		Check RCS catbed heater status & current		
		Verify Telemetry CBH_R_L18_S WM12H565	= ON	AND=WALC1584
		Verify Telemetry CBH_R_L18_I WM113565	>= 0.5 A	AND=WALC1584
		Verify Telemetry RcsThrsB_L46_1S WM92D565	= ON	AND=WALC2584
		Verify Telemetry RcsThrsB_L46_2S WM92J565	= ON	AND=WALC2584
		Verify Telemetry RcsThrsB_L46_I WM909565	>= 0.0 A <= 3.08 A	AND=WALC2584
TC Seq. Name :NULL04 (Null sequence 04)				
TimeTag Type: Sub Schedule ID: □				
23		WAIT 40 minutes (thruster preheating)		Next Step: END
		Control Execution 0000.40.00.000	WAIT	

Switch ON thruster catbed heaters
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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		NOTE: Check to be performed on RCTs in use and to be used for Delta V to ensure they remain above some reasonable "pre-heated" level (200 deg C)		
23.1		Verify catbed temps of Acceleration thruster, if switched ON		<input type="checkbox"/>
		Check the following if OCM will use A1		
		Verify Telemetry A1D1 Ttemp act AETTA001	> 453.23 K	AND=ZAA04999
		Check the following if OCM will use A2		
		Verify Telemetry A2D2 Ttemp act AETTB001	> 453.23 K	AND=ZAA04999
23.2		Verify catbed temps of Control thrusters		<input type="checkbox"/>
		Verify Telemetry C1F1 Ttemp act AETTC001	> 453.23 K	AND=ZAA04999
		Verify Telemetry C2F2 Ttemp act AETTD001	> 453.23 K	AND=ZAA04999
		Verify Telemetry C3U1 Ttemp act AETTE001	> 453.23 K	AND=ZAA04999
		Verify Telemetry C4U2 Ttemp act AETTF001	> 453.23 K	AND=ZAA04999
		NOTE: Unused branch should be around S/C ambient, but check values are above hydrazine's freezing point ~2 degC (to ensure they so could support ACMS survival mode triggering without risk of damage).		
		Verify Telemetry C1F1 Ttmp unuse AETUC001		AND=ZAA04999
		Verify Telemetry C2F2 Ttmp unuse AETUD001		AND=ZAA04999
		Verify Telemetry C3U1 Ttmp unuse AETUE001		AND=ZAA04999
		Verify Telemetry C4U2 Ttmp unuse AETUF001		AND=ZAA04999
End of Procedure				