Start/Stop Thermal Control function
File: H_CRP_TCS_MANG.xls
Author: E. Picallo

Procedure Summary

Objectives

This procedure describes the steps needed to switch ON or OFF the
ASW function "Thermal Control".

Summary of Constraints

Default status of the function: "Running".

Note that after completion of the CDMU ASW initialisation the
function is active, though only really starts after a predefined
delay (currently 120 seconds, defined by the constant
HPSDB_TC_START_OFFSET).

During the start delay period the function is enabled, and it can
receive and execute commands, but the thermal monitoring and
commanding is only started after the start delay has elapsed.

The start delay can be bypassed by the following command
sequence:
- TC(8,4,114,3) Arm stopping;
- TC(8,2,114) Stop function;
- TC(8,1,114) Start function.
When the function is stopped, it does not accept any other
telecommands than the:
- Start Function TC(8,1,114);
- Report Function Status TC(8,5,114).

Before starting the function it is recommended to check the
contents of the TCT. As the TCT contents cannot be modified while
the function is stopped, it might be necessary to modify it
immediately after starting the function.

Spacecraft Configuration

Start of Procedure

CDMU in default configuration, that is:
- PM A or B ON (nominally A)
- TM Encoder/OBT A or B active (nominally A)
- RM A and B enabled
- MM A and B ON

End of Procedure

CDMU in default configuration, that is:
- PM A or B ON (nominally A)
- TM Encoder/OBT A or B active (nominally A)
- RM A and B enabled
- MM A and B ON

Reference File(s)

Input Command Sequences

Output Command Sequences

HRTMANG1
HRTMANG2

Status   : Version 2 - Unchanged
Last Checkin: 08/12/08

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Referenced Displays

ANDs	GRDs	SLDs
ZAZ28999		

Configuration Control Information

DATE	FOP ISSUE	VERSION	MODIFICATION DESCRIPTION	AUTHOR	SPR REF
24/07/08	1	1	Created	E. Picallo	
08/12/08	2	2	Modify TCT(if necessary) after function start added	E. Picallo	
18/03/09	2.2	2.01	Validation : Minor correction (call to H_CRP_TCS_TCTupdated)	E. Picallo	

Status   : Version 2 - Unchanged
Last Checkin: 08/12/08
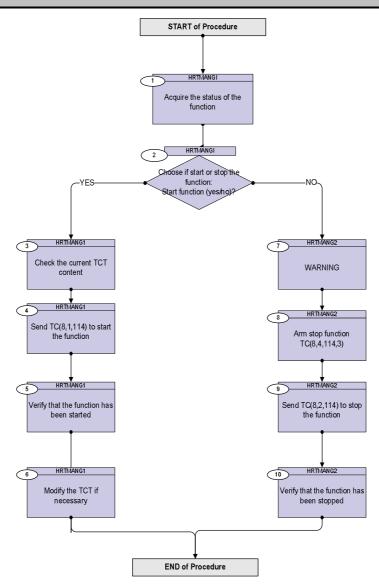
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Procedure Flowchart Overview

```
                    START of Procedure
                           │
                           ▼
              ┌─ HRTMANGI ──────────────┐
         (1)  │ Acquire the status of the │
              │         function          │
              └───────────────────────────┘
                           │
                           ▼
              ┌─ HRTMANGI ──────────────┐
         (2)  │  Choose if start or stop the
                        function:
                  Start function (yes/no)? ◇
     YES ◄─────────────┤          ├─────────────► NO
         │                                         │
         ▼                                         ▼
  ┌─ HRTMANG1 ─────┐                    ┌─ HRTMANG2 ─────┐
(3)│ Check the current TCT              (7)│    WARNING     │
  │      content    │                    │                │
  └────────────────┘                    └────────────────┘
         │                                         │
         ▼                                         ▼
  ┌─ HRTMANG1 ─────┐                    ┌─ HRTMANG2 ─────┐
(4)│ Send TC(8,1,114) to start         (8)│ Arm stop function
  │   the function  │                    │   TC(8,4,114,3)  │
  └────────────────┘                    └────────────────┘
         │                                         │
         ▼                                         ▼
  ┌─ HRTMANG1 ─────┐                    ┌─ HRTMANG2 ─────┐
(5)│ Verify that the function          (9)│ Send TC(8,2,114) to stop
  │  has been started                   │   the function  │
  └────────────────┘                    └────────────────┘
         │                                         │
         ▼                                         ▼
  ┌─ HRTMANG1 ─────┐                    ┌─ HRTMANG2 ─────┐
(6)│ Modify the TCT if                (10)│ Verify that the function
  │   necessary     │                    │  has been stopped
  └────────────────┘                    └────────────────┘
         │                                         │
         └──────────────┬──────────────────────────┘
                        ▼
                 END of Procedure
```

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Beginning of Procedure		
		TC Seq. Name :HRTMANGI (Start/stop ThCtrl Mg) Start/Stop Thermal Control function *TimeTag Type: N* *Sub Schedule ID:*		
1		*Acquire the status of the function*		Next Step: 2
		Verify Telemetry **ThermSts DEL07170**		AND=ZAZ28999
		The default status of the function is "Running".		
2		*Choose if start or stop the function:* *Start function (yes/no)?*		Next Step: YES 3 NO 7
		Warning: **If the function is runninng sending the TC "Start Thermal Control" will cause a TC Acceptance failure TM(1,2) "Function Already Started".**		
		Warning: **If the function is Stopped sending the TC "Stop Thermal Control" will cause a TC Acceptance failure TM(1,2) "Function Already Stopped".**		
		TC Seq. Name :HRTMANG1 (Start ThCtrl Mgmt) *TimeTag Type: N* *Sub Schedule ID:*		
3		*Check the current TCT content*		Next Step: 4
		Execute Procedure: **H_FCP_TCS_REPO** **Thermal Control Status Report**		
		When the Thermal Control function is stopped one can dump the contents of the TCT though cannot modify it. This is only possible while the function is running. **It is therefore advisable to first check the current settings in the TCT table and change it if necessary once the function has been started.**		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
4		*Send TC(8,1,114) to start the function*		Next Step: 5
		Start Thermal Control telecommand is used for switching on the function. This will allow all enabled loops to be processed.		
		Execute Telecommand **StartThCtrlManag** *TC Control Flags :* **GBM IL DSE** **--Y -- ---** *Subsch. ID : 10* Det. descr. : Start Thermal Control Management TC(8,1,114)	DCN09170	
5		*Verify that the function has been started*		Next Step: 6
		Verify Telemetry **ThermSts** DEL07170	**= Running**	AND=ZAZ28999
6		*Modify the TCT if necessary*		Next Step: END
		Execute Procedure: **H_CRP_TCS_TCT** **Thermal Control Table maintenance**		
		TC Seq. Name :HRTMANG2 (Stop ThCtrl Mgmt) *TimeTag Type:* *Sub Schedule ID:*		
7		*WARNING*		Next Step: 8
		Stopping the Thermal function will result in no more onboard active thermal control. **The thermal related FDIR events will still be raised though it will be up to the Ground to switch ON/OFF the Heater lines when outside the thermal limits.**		
8		*Arm stop function TC(8,4,114,3)*		Next Step: 9

Doc No.   :PT-HMOC-OPS-FOP-6001-OPS-OAH
Fop Issue :   3.0
Issue Date: 13/04/10

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		The telecommand Stop Thermal Control, used for switching off the function, is considered critical, and therefore must be armed before use with a TC(8,4,114,3). *When the function is stopped, it does not accept any other telecommands than the Start Function and Report Function Status TCs.*		
		Execute Telecommand **ArmStopThCtrl** *TC Control Flags :* **GBM IL DSE** **--Y -- ---** *Subsch. ID : 10* Det. descr. : TEMPLATE Arm Stop Thermal Control TC(8,4,114,3)	DC95F170	
9		*Send TC(8,2,114) to stop the function*		Next Step: 10
		Execute Telecommand **StopThCtrlManag** *TC Control Flags :* **GBM IL DSE** **--Y -- ---** *Subsch. ID : 10* Det. descr. : Stop Thermal Control Management TC(8,2,114)	DCN10170	
10		*Verify that the function has been stopped*		Next Step: END
		Verify Telemetry **ThermSts** DEL07170	= Stopped	AND=ZAZ28999
		WARNING Stopping the Thermal Control Function is a slow operation. The Function will be stopped, when the heaters related to all enabled loops are disabled (heaters of disabled loops being already switched off), this occurs when their respective control periods are elapsed.		
		End of Procedure		