



1. INTRODUCTION

This document reports on the acceptance tests performed on the OBS version 2.1.G_02032006 (non official delivery) on DPU CFM to be used for PFM3 cold testing.

Note:

The official delivery for PFM3 test campaign was 2.1.E delivered on Dec 2005. Integration tests with the QM2 DRCU electronics on February 2006 showed that the implementation of the FDIR protocol in v2.1.E was incompatible with the nominal operations of the DRCU and would affect the nominal instrument operations. (c.f [HR-SP-RAL-NCR-0142](#))

1.1 Scope

This report judges the success or failure of a functional test by checking that

- the commands were correctly received and executed by the instrument subsystem
- no error or exception reports were generated
- the appropriate telemetry parameters changed in an expected manner

No detailed analyses of the test data has been performed at this stage.

1.2 Reference Documents

- RD01 SPIRE On-Board Software Verification and Validation Plan/Acceptance Test Plan
- RD02 SPIRE Data ICD (SPIRE-RAL-PRJ-001078), Issue 1.1, 25th May2004
- RD03 SPIRE OBS URD
- RD04 SPIRE EGSE-ILT Startup Procedures (SPIRE-RAL-DOC-001630), Issue 0.7, 24th June 2003
- RD05 SPIRE OBS Acceptance Test Plan [SPIRE-RAL-DOC-002552](#) Issue 1.0 19th Dec 2005
- RD06 Switch ON Procedure and Telemetry Packets User Manual Draft 2 20 Mar 2003

1.3 Acceptance Test Configuration

1.3.1 SPIRE EGSE Setup/Configuration

- CDMS Simulator v.2.5
- SCOS 2000 2.3e Patch Level 5 + TOPE - running on a Linux SuSE 7.3
- OBS 2.1.G to be acceptance tested
- HCSS v0.3.3 (build #812) – includes the EGSE router and gateway running on Lichfiled
- SPIRE MIB 2.1.E1

- EGSE Test Tool PacketDisplay (build #812) running on Truro to display TC and TM packet contents
- Test control server (build #812) running on Lichfiled with TclBlend 1.3.2 .Tcl/Tk 8.4.12. Tcl Thread 2.6.2

2. PRE-TEST PREPARATIONS

- The latest version of the OBS should be installed on the Q drive. A folder with the OBS version number (e.g. 1.2J) should normally be created in Q:\OBS\OBS_Source. Because of access restrictions the OBS test team has found it appropriate to install the latest version under Q:\ICC\OBS.
- Ensure that the pcs.jar file containing the PACS supplied OBS loader program is present in directory /home/sops23e/SPIRE/OBS/OBSLoader.
- To load the OBS using the Load Memory telecommands (service 6,2), the zipped file containing the commands will need to be placed in the SCOS 2000 account in a directory under /home/sops23e/SPIRE/OBS/OBSLoader. For example, the telecommands to be loaded for installing 1.2J would be placed in directory /home/sops23e/SPIRE/OBS/OBSLoader/OBSTCs_1.2J.
- The shell script to load the OBS may need to be modified to point to the location of the Load Memory telecommands.

2.1 Assumptions

Before the start of the OBS acceptance tests the remainder of the SPIRE EGSE is to be set up and configured using RD03 and RD04. For each set of tests the following minimum steps were also executed beforehand if they were not already activated.

Step #	Description	Status Parameter Values Before/After	Test Step Status/ Success/Fail
1	Start TM ingestion	09/03/06 TM ingestion process stopped and restated on Lichfiled . Telemetry will be ingested into drcu_qm2_at@lichfiled database. NO NEW DB WILL BE CREATED FOR THIS AT.	Success Comment: TM_Ingest_DPU_CFM_OBS_2.1.G_A T_09032006.log is the telemetry ingestion log for this test.
2	Start Test Control Server running on Lincoln	09/03/06 Already running on Lichfiled	Success

3	The DPU is switched on	<p>Power recycled the CFM DPU. When the Boot Software perform checks , generates a (5,1) event packet with the following contents:</p> <p>ID: 0D00 Seq: C000 Len: 0019 0000: 0D00 C000 0019 0005 0100 8000 0000 0000 8008 0003 ABAB CDCD 0051 AAAA 0000 AE6C</p> <p>This is the expected behaviour; no errors are reported in the penultimate 16 bit word.</p>	Success
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3. OBS ACCEPTANCE TESTS

Note:

After several failed attempts to boot the OBS via FORCE_BOOT_PRIMARY command decided to reload OBS 2.1.G_02032006 using the ObsLoader Program located in

3.1 Loading of the new OBS

3.1.1 Loading the new OBS using Load Memory Service (6,2)

- Execute the script to issue the Load Memory commands. For version 1.2J the script is called ObsLoader_1.2J. Typically four telecommands are sent per second; For version 1.2J it takes about 6 minutes to finish loading the new OBS.

Note: (09/03/06 @ 15:55)

Action :

Used the ObsLoader program ObsLoader_Issue2.1.G_02032006 in directory ~sops23e/SPIRE/OBS/OBSLoader in Lincoln just after the DPU has been switched ON. Using the SPIRE_Nominal.txt bus list.

Result:

Events (5,1) are received for each telecommand LOAD_MEMORY(6,2) state = 0xB BBB event = 0x11 as expected.

- Once the script has stopped execution the LOAD_TC_AND_BOOT command can be sent from the SCOS 2000 Manual Stack to start running the new OBS.

Action:

Sent LOAD_TC_AND_BOOT command from manual stack

Result:

HK reports start as expected (Nominal and Critical)

SeveraleEvents (5,1) are also received:

1. 1 event (5,1).

Contents:

ID: 0D00

Seq: C8AB

Len: 0019

0000: 0D00 C8AB 0019 0005 0100 8000 0000 0000 8008 0003 1D00 C6FB 0011 D0D0 08AB 310A

2. 3 events are to report the non response of the DCU,SCU,MCU codes 0x520,0x521,0x522

3. 1 event with code 0x512

Action:

Cleared HK reports

Power UP DRCU

Restarted HK reports

Result:

2 clearing events are received notifying the response from the SCU and DCU.

3.1.2 Loading of the OBS using the JTAG probe

This should only be attempted if

- DPU and the Warm Electronics are not in the Cryo Lab
- JTAG probe is available and connected between the CPU board of the DPU and ISOPC1 computer
- All attempts to load the new OBS via the OBSLoader program and the LOAD_TC_AND_BOOT command have failed

The load procedure is described in RD04.

Note: (09/03/06 @ 16:20)

N/A

3.2 Housekeeping Generation and OBS Parameter Monitoring

Once the OBS is running HK reports should be generated automatically. The Telemetry Display page DPU AND OBS PARAMETERS on SCOS 2000 displays all the DPU and OBS specific parameters from the nominal HK report. The Telemetry Display page CRITICAL HK PARAMETERS displays the entire contents of the critical HK report.

Note: (09/03/06 @ 16:30 performed the following checks

3.2.1 HK Generation Rate

- On the DPU AND OBS PARAMETERS display page, is the nominal HK packet generation time, THSK, incrementing once every second?
YES (Success) / NO (Failure)
- On the DPU AND OBS PARAMETERS display page, is the nominal HK packet source sequence count, TM2N, incrementing once every second?
YES (Success) / NO (Failure)
- Is the time on the CRITICAL HK PARAMETERS display page (top right corner) updating once every two seconds?
YES (Success) / NO (Failure)

3.2.2 DPU and OBS Parameter Monitoring

The following table lists some of the OBS parameters to be monitored from the DPU AND OBS PARAMETERS display page while the nominal HK reports are being generated.

Nominal HK parameter Name	Expected Value	Actual Value	Success /Failure	Comments
OBSVER	OBS version 2 1 G	2.1G (0x2107)	✓	
TMMODE	0 – Normal TM Mode	0	✓	
DPUP5V	~5.0 V	5.13V	✓	
DPUP15V	~14.70 V	15.42	✓	A bit higher than before
DPUM15V	~-14.98 V	-15.52V	✓	A bit more negative than before
DPUTEMP	~304.68K	300.17 K	✓	A bit higher than before
DPUP2_5V	~2.48V	2.48V	✓	
CPULOAD	??	0x27/0x28	✓	

LSLOAD	??	Switching between 0x89B20 and 0x84530	✓	
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3.3 Command Execution

Command (Parameters)	HK parameter name	Value before	Value after	Result Success /Failure	Comments
RESET_DRCU_COUNTERS()	TRESET	2094.037.06.28.16 (undefined value)	Current Time 2006.068.16.37.45	Success	Tm packet 1.1, 1,3 1,7 received as expected
SET_OBSID(<i>OBSERVATION_ID</i> <i>=0x30000000</i>)	OBSID BBID	0xd05 0	0x30000000 0	Success	The SET_OBSID command also sets the BBID to 0 Tm packet 1.1, 1,3 1,7 received as expected
SET_OBSID(<i>OBSERVATION_ID</i> <i>=0</i>)	OBSID	0x30000000 0	0 0	Success	The SET_OBSID command also sets the BBID to 0 Tm packet 1.1, 1,3 1,7 received as expected
SET_BBID(<i>BUILDING_BLOC</i> <i>K_ID=0x80000000</i>)	BBID	0	0x80000000	Success	Tm packet 1.1, 1,3 1,7 received as expected
SET_OBSID(<i>OBSERVATION_ID</i> <i>=0x30000000</i>)	OBSID BBID	0 0x80000000	0x30000000 0	Success	The SET_OBSID command also sets the BBID to 0 Tm packet 1.1, 1,3 1,7 received as expected
SET_BBID(<i>BUILDING_BLOC</i> <i>K_ID=0x80000000</i>)	BBID	0	0x80000000	Success	Tm packet 1.1, 1,3 1,7 received as expected
SET_OBS_STEP(<i>OBSERVATION_STEP</i> <i>=0xffff</i>)	STEP	0	0xffff	Success Step Report also checked - OK	A (5,1) New Step Report should be generated Tm packet 1.1, 1,3 1,7 and (5,1) received as expected

Command (Parameters)	HK parameter name	Value before	Value after	Result Success /Failure	Comments
SET_OBS_STEP(OBSERVATION_ STEP=0)	STEP	0xffff	0	Success	A (5,1) New Step Report should be generated Tm packet 1.1, 1,3 1,7 and (5,1) received as expected
SET_OBS_MODE(OBSERVING_ MODE=1)	MODE	0	1	Success	Tm packet 1.1, 1,3 1,7 and (5,1) received as expected
SET_OBS_MODE(OBSERVING_ MODE=0)	MODE	1	0	Success	Tm packet 1.1, 1,3 1,7 and (5,1) received as expected
SET_OBS_MODE(OBSERVING_ MODE=0xffff)	MODE	0	0xffff	Success	Tm packet 1.1, 1,3 1,7 and (5,1) received as expected
SET_OBS_MODE(OBSERVING_ MODE=0)	MODE	0xffff	0	Success	Tm packet 1.1, 1,3 1,7 and (5,1) received as expected
clear_HK_report.tcl	Packet Ids 0x300 & 0x301			Success	Critical and nominal and HK reports should be cleared TM stops as expected.
define_new_HK_re port.tcl	Packet Ids 0x300 & 0x301			Success	Default critical and nominal reports should start to be generated TM restarts as expected.

3.4

Virtual Machine

Command (Parameters)	Action	Result Success/Failure
SET_TABLE(TABLEID=0x67, TABLESIZE=0x100)	Check for successful command execution on the SCOS 2000 TC History Display	Success Received (1,1) (1,3) (1,7) command completion reports.
Execute TCL script UpdateTable3.1.tcl Input VM Table File: PTC_TC0.txt SCOS 2000 directory: tcl/TC/VMTables directory	Check for successful script execution on the TOPE command window and monitor command execution on the SCOS 2000 TC History Display	Success Received (1,1) (1,3) (1,7) command completion reports. Command list is updated successfully
REPORT_TABLE(TABLEID=0x67, INDEX=0, COUNT=0x0)	Use PacketDisplay and/or QLA to examine the contents of the (21,4) Report Table Report. Do the packet contents agree with the contents of the VM Table file?	Success Sent command REPORT_TABLE(0x100,0,0) Command successful and two packets (21,4) packet are produced of lengths: 1018 and 66 as displayed by packet display. Examined contents of packets and the contents agree with the updated table command.
SET_TABLE(TABLEID=0x64, TABLESIZE=0x300)	Check for successful command execution on the SCOS 2000 TC History Display	Success

Command (Parameters)	Action	Result Success/Failure
<p>Execute TCL script UpdateTable3.1.tcl twice Input VM Table File: TC0.txt TC1.txt TC2.txt TC3.txt TC4.txt TC5.txt TC6.txt TC7.txt TC8.txt TC9.txt</p> <p>From VMTables/Table100- Functions/TC/ SCOS 2000 directory: tcl/TC/VMTables directory</p>	<p>Check for successful script execution on the TOPE command window and monitor command execution on the SCOS 2000 TC History Display</p>	<p>Success</p> <p>Command list is updated successfully</p>
<p>SET_TABLE(TABLEID=0x44, TABLESIZE=0x100)</p> <p>Execute TCL script UpdateTable3.1.tcl twice Input VM Table File: TC0.txt TC1.txt TC2.txt TC3.txt</p> <p>From VMTables/Table070- Flash/TC/ SCOS 2000 directory: tcl/TC/VMTables directory</p>	<p>Check for successful command execution on the SCOS 2000 TC History Display</p> <p>Check for successful script execution on the TOPE command window and monitor command execution on the SCOS 2000 TC History Display</p>	<p>Success</p> <p>Success</p>

Command (Parameters)	Action	Result Success/Failure
<p>RUN_VM(0x46,0,9,4,2748,15,4000000,0,32,33920,0,0)</p> <p>RUN_VM(0x46,0,9,4,2748,15,4000000,0,32,33920,0,0)</p>	<p>Verified that PCAL flash VM is working.</p> <p>Sent manual commands</p> <p>SEND_DRCU_COMMAND(0x84190095,0)</p> <p>SEND_DRCU_COMMAND(0x84180006,0)</p> <p>To setup DCU frame generation @ ~ 18Hz</p> <p>A second repeat</p>	<p>Success</p> <p>Success</p> <p>PCAL flash command list working NO EVENTS RECEIVED</p> <p>Success</p> <p>PCAL flash command list working NO EVENTS RECEIVED</p>

3.5 TC Verification Reports

Command (Parameters)	Action	Result Success/Failure
REPORT_TABLE(TABLEID=0x99, INDEX=0, COUNT=0x25)	Sent command	Failed as expected. Failure code 0x811 – table not defined.
REPORT_TABLE(TABLEID=0x500, INDEX=0, COUNT=0x100)	Sent command	Failed as expected. Failure code 0x805 – Illegal_Table_ID.
REPORT_TABLE(TABLEID=0x67, INDEX=0x100, COUNT=0x100)	Sent command	Failed as expected. Failure code 0x806 – Illegal_Table_index.
HALT_VM	Sent command while no VM is actually running	Failed as expected. Failure code 0x80A – VM Inactive.
FLUSH_FIFO(FIFO_FLAGS=0)		Failed as expected .Failure code 0x80F- Illegal_FIFOFlags
CLEAR_HK_REPORT(0x300)	Sent this commands after the reports had been already cleared	Failed as expected .Failure code 0x829.- Unallocated HK packet ID
CLEAR_HK_REPORT(0x301)		

3.6 OBS 2.1.G_02032206 burning into EEPROM

This extra section has been added to the report to have a record of the actions taken towards having a persistent OBS 2.1.G_02032006 image in EEPROM which would allow the use of the FORCE_BOOT_PRIMARY to start up the OBS application in PM (program memory) without the need of loading the OBS image via LOAD_MEMORY commands.

Important Note:

Lacking a memory map of the OBS 2.1.G_02032006 which is used to extract the start and end address as the input parameters to the WRITETOEEPROM command, these have been copied from the input parameters for the same command for OBS v2.1.E.

Action:

Sent Manual Stack command:

WRITE2EEPROM(0,x4000,x16000,0,0) Used repeater value 0 for the command parameters

Partition flag 0

WITHOUT STOPPING THE HK

Result:

Command successful AFTER SEVERAL SECONDS

Note:

PROBABLY JUST COINCIDENCE BUT JUST AFERT ISSUING THE WRITETOEEPROM COMMAND received a (5,1) event packet Event code =0x512 NO TIME_SYNC

3.7 Conclusions

The acceptance **cannot** be declared successful unless a power recycle of the DPU + FORCE_BOOT_PRIMARY command results in the start of the generation of both the Nominal and Critical HK reports.

This would confirm (if it occurs) the correct operation of the OBS 2.1.G_02032006 basic functionality tested through the OBS AT procedure.

If this process fails, (as it was the case previously See section 3.1.1), the overall test result is FAILED.