

SPIRE OBS 3.0.B Acceptance Test Report

Sunil D. Sidher & Tim Grundy
SPIRE-RAL-REP-003167, Issue 1.0
4th November 2008



INTRODUCTION

This document reports on the OBS v3.0.B acceptance tests performed using the CFM-2 DPU on the FS. The tests were started with version 3.0.0. Minor changes were found to be necessary during the course of testing. The full set of tests was completed successfully with OBS 3.0.B. Therefore the new software can be installed on the FM DPU.

Scope

The coverage of this test is limited to basic OBS functionality.

- commanding reception acknowledgement and execution.
- error condition identification and reporting.

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

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

This report also tests the implementation of all open SxRs.

Reference Documents

- RD01 SPIRE On-Board Software Verification and Validation Plan/Acceptance Test Plan
RD02 SPIRE Data ICD (SPIRE-RAL-PRJ-001078), Issue 2.1, 12th July 2007
RD03 SPIRE OBS URD
RD04 SPIRE EGSE-ILT Startup Procedures (SPIRE-RAL-DOC-001630), Issue 0.7, 24th June 2003
RD05 SPIRE On-Board Software User Manual (SPIRE-IFS-PRJ-001391 Issue 2.9.1 22nd January 2008

Acceptance Test Configuration

SPIRE EGSE Setup

- CDMS Simulator v3.0.
- SCOS 2000 2.3e Patch Level 5 + TOPE installed and running on Truro.
- Lincoln Server running Linux SuSE 7.3 OS.
- OBS 3.0.B installed on the CFM-2 DPU.
- HCSS v0.6.0, Build #1430.
- EGSE Router and Gateway running on Chichester.
- Symbolic link for the SPIRE MIB

ASCII ->
/home/sops23e/SCOS2.3eP5/data/FS1_2.2.H1_PRwithCDMSSim11TFCS15TFTS13/

- Symbolic links for the SCOS archive:



SPIRE REPORT

SPIRE OBS 2.2.H Acceptance Test Report
Sunil D. Sidher

Ref:	SPIRE-RAL-PRC-003167
Issue:	1.0
Date:	4 th Nov 2008
Page:	2 of 13

```
TMD -> /spired/TMD/FS1_TEST3
hfiles -> /spired/hfiles/FS1_TEST3/
```

- EGSE Test Tool PacketDisplay running on Lichfield to display TC and TM packet contents.

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 pcss.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.
Copied file spire.zip as received and unzipped into /home/sops23e/SPIRE/OBS/3.0.B/result.
Obtained 2128 command files.
- The shell script to load the OBS may need to be modified to point to the location of the Load Memory telecommands.
The script is ObsLoader_Issue3.0.B, in the OBSLoader subdirectory.

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	TM ingestion process running (on Chichester)	<p style="background-color: #00ff00; color: black; margin: 0;">Running</p> <p>TM ingestion log: TMIngestion_7Apr2008_10:20:09BST.log</p> <p>located on Lichfield in directory /home/sg55/logs/tmingest/.</p> <p>DB: fs1_test@lichfield Mission config: fs1_perf_config30 var.model: FS1</p>
2	Start Test Control	Test control server	Running



SPIRE REPORT

SPIRE OBS 2.2.H Acceptance Test Report
Sunil D. Sidher

Ref: SPIRE-RAL-PRC-003167

Issue: 1.0

Date: 4th Nov 2008

Page: 3 of 13

	Server running on Lichfield	process running (on Lichfield)	
3	The DPU is switched on		OK

OBS ACCEPTANCE TESTS

Loading of the new OBS

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. Three telecommands are sent per second; it takes about 12 minutes to finish loading the new OBS.
- 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.

Log: [OBS 3.0.0 upload was done by Nino and written to partition 1 \(secondary\).](#)

~~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.~~

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.

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)



SPIRE REPORT

SPIRE OBS 2.2.H Acceptance Test Report
Sunil D. Sidher

Ref:	SPIRE-RAL-PRC-003167
Issue:	1.0
Date:	4 th Nov 2008
Page:	4 of 13

- Is the time on the CRITICAL HK PARAMETERS display page (top right corner) updating once every two seconds?

YES (Success) / NO (Failure)

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 as specified in the release note	3.0.B	Success	OBSVER_C is 0x3000, OBSVER1/2/3 are 3, 0, 0 respectively
TM MODE	0 - Nominal TM Mode	0	Success	Parameter removed from TM Display
DPUP5V	~5.0 V	5.13 V	Success	Expected values are for the AVM-1 DPU
DPUP15V	~14.70 V	15.41 V	Success	Expected values are for the AVM
DPUM15V	~-14.98 V	-15.51 V	Success	Expected values are for the AVM
DPUTEMP	~304.68 K	302.8 K	Success	Expected values are for the AVM
DPUP2_5V	~2.48V	2.48V	Success	Expected values are for the AVM
CPULOAD	< 300	~0x2a	Success	
LSLOAD	< 700000	Switching between 34125 and 35625	Success	Units of 16 microseconds.
MONSTAT	Depends on test configuration If DPU is STANDALONE must be 0x222 (RD05)	0x0	Success	DPU was not in standalone mode and MONSTAT was 0x0
FIFO_DF_FLAG	Refer (RD05)	7	Success	No data requested, so this result is correct.
LOSTTCBLOCK	0	0	Success	
LOSTVBLOCK	0	0	Success	
LOSTHKBLOCK	0	0	Success	
LOSTNTBLOCK	0	0	Success	
LOSTSDBLOCK	0	0	Success	
LOSTRPBLOCK	0	0	Success	

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	Success	
SET_OBSID(OBSERVATION_ID=0x3000000)	OBSID	0xd05	2008.309.10.56.53.01 0x30000000	Success	The SET_OBSID command



SPIRE REPORT

SPIRE OBS 2.2.H Acceptance Test Report
Sunil D. Sidher

Ref:	SPIRE-RAL-PRC-003167
Issue:	1.0
Date:	4 th Nov 2008
Page:	5 of 13

Command (Parameters)	HK parameter name	Value before	Value after	Result Success /Failure	Comments
SET_OBSID(OBSERVATION_ID=0)	OBSID	0x30000000 0	0 0	Success	The SET_OBSID command
SET_BBID(BUILDING_BLOCK_ID= 0x80000000)	BBID	0	0x80000000	Success	
SET_OBSID(OBSERVATION_ID=0x30 000000)	OBSID BBID	0 0x80000000	0x30000000 0x80000000	Success	The SET_OBSID command did not reset the BBID to 0 – correct behaviour
SET_OBS_STEP(OBSERVATION_ STEP=0xffff)	STEP	0	0xffff	Success	A (5,1) New Step Report should be generated. The step report contains two parameters, mode and step number.
SET_OBS_STEP(OBSERVATION_ STEP=0)	STEP	0xffff	0	Success	A (5,1) New Step Report should be generated
SET_OBS_MODE(OBSERVING_ MODE=1)	MODE	0	1	Success	A (5,1) New Obs Mode Report should be generated
SET_OBS_MODE(OBSERVING_ MODE=0)	MODE	1	0	Success	A (5,1) New Obs Mode Report should be generated
SET_OBS_MODE(OBSERVING_ MODE=0xffff)	MODE	0	0xffff	Success	A (5,1) New Obs Mode Report should be generated
SET_OBS_STEP(OBSERVATION_ STEP=0xffff)	STEP	0	0xffff	Success	A (5,1) New Step Report should be generated. The mode parameter is 0xffff.
SET_OBS_STEP(OBSERVATION_ STEP=0)	STEP	0xffff	0	Success	A (5,1) New Step Report should be generated. Mode is still 0xffff
SET_OBS_MODE(OBSERVING_ MODE=0)	MODE	0xffff	0	Success	A (5,1) Obs Mode Report should be generated
clear_HK_report.tcl	Packet Ids 0x300 & 0x301			Success	Critical and nominal and HK reports should be cleared.
define_new_HK_report.tcl	Packet Ids 0x300 & 0x301			Success	Default critical and nominal reports should start to be generated Ran TOPE script define_new_HK_repo rt.tcl - OK

Log:



SPIRE REPORT

SPIRE OBS 2.2.H Acceptance Test Report
Sunil D. Sidher

Ref:	SPIRE-RAL-PRC-003167
Issue:	1.0
Date:	4 th Nov 2008
Page:	6 of 13

04-Nov-2008-10:59:54

Cleared the Critical HK report generation from the MSTK.

Virtual Machine

It is assumed that all the latest VM tables are included in the OBS 3.0.B delivery.

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

Execute TCL script
UpdateTable3.1.tcl

Check for successful script execution on the TOPE command window and monitor command execution on the SCOS 2000 TC History Display

Success

Input VM Table File:
PTC_TC0.txt

SCOS 2000 directory:
tcl/TC/VMTables
directory

REPORT_TABLE(
TABLEID=0x67,
INDEX=0,
COUNT=0)

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

Contents of Reports (21,4) agree with contents of table updated by UPDATE_TABLE command.

Note that the (21,4) report length is in units of 16 bit words, while the length set in the SET_TABLE TC is in units of 32 bit words.

Two (21,4) reports were received, first with 0x1EE 16-bit words and the second with 0x12 16-bit words, which add up to 0x200 16-bit words, i.e. 0x100 32-bit words.

The initial values of all the locations in the table are now set to 0x7f00 0000 in OBS 3.0.0. They used to be set to 0 in previous versions.



SPIRE REPORT

SPIRE OBS 2.2.H Acceptance Test Report
Sunil D. Sidher

Ref: SPIRE-RAL-PRC-003167
Issue: 1.0
Date: 4th Nov 2008
Page: 7 of 13

Command (Parameters)	Action	Result Success/Failure
RUN_VM	<p>Ran PCAL flash VM with warm low/high bias settings:</p> <p>Table ID =0x46 Index = 0 N params= 9 Param 1 = 4 Param 2 = 20 Param 3 = 15 cycles Param 4 = 4000000 microseconds Param 5 = 0 DCU data mode Param 6 = 135 Param 7 = 9344 Param 8 = 0 Param 9 = 0</p>	<p>Success – PCAL flashed at the set levels</p> <p>VMSTAT changed from 0Xffff to 0x46, 0x64 and 0x46 before turning back to 0Xffff – as expected.</p> <p>Received science packets for APIDs 0x504 (21,2) and 0x508 (21,1).</p> <p>17:43: Run HALT_VM, TM(1,8) with failure code 0x80A – No Command List running. Correct behaviour.</p>
REPORT_TABLE (7,0,0)	<p>Check contents are consistent with table supplied by Ken King to IFSI</p>	<p>Success</p> <pre>ID: 0D08 Seq: C002 Len: 005D 0000: 0D08 C002 005D 0015 0400 5FA2 8856 38F8 020A 0000 0D05 0000 0000 0007 0000 0020 0020: 0000 0000 0000 0000 0000 0000 0000 FFFF 0000 0000 0000 0000 0000 0000 0000 0000 0040: 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0060: 81D7 3F37</pre> <p>Only the Jiggle Step word (location 3) is set to 0xFFFF. All other words are set to 0.</p>



SPIRE REPORT

SPIRE OBS 2.2.H Acceptance Test Report
Sunil D. Sidher

Ref:	SPIRE-RAL-PRC-003167
Issue:	1.0
Date:	4 th Nov 2008
Page:	8 of 13

Command (Parameters)	Action	Result Success/Failure
RUN_VM	Ran Jiggle Map VM:	
Saved Stack JiggleMapVM.lincoln	Table ID =0x48 Index = 0 N params= 10 Param 1 = 50 – Position Table ID Param 2 = 0 – Position Table Index Param 3 = 16 – Position Table Length Param 4 = 16 - Chop Cycles Param 5 = 500000 Chop Period us Param 6 = 0 – DCU Data Mode Param 7 = 9 – DCU samples per chop position Param 8 = 35000 – DCU Time Delay Param 9 = 19 – Number of BSM samples per chop position Param 10 = 1 – Number of Repeats	Success – Chopped and Jiggled as expected

TC Verification Reports

Command (Parameters)	Action	Result Success/Failure
REPORT_TABLE(TABLEID=0x27, INDEX=0, COUNT=0x25)		Success Failed as expected. Failure code 0x811 – table not defined.
REPORT_TABLE(TABLEID=0x500, INDEX=0, COUNT=0x100)		Success Failed as expected. Failure code 0x805 – Illegal_Table_ID. The User Manual now correctly refers to available table range 0 – 255
REPORT_TABLE(TABLEID=0x67, INDEX=0x100, COUNT=0x100)		Success Failed as expected. Failure code 0x80D – Illegal_Table_index.
HALT_VM	Sent command while no VM is actually running	Success Failed as expected. Failure code 0x80A – VM Inactive.
FLUSH_FIFO(FIFO_FLAGS=0)		Success Failed as expected .Failure code 0x80F- Illegal_FIFOFlags



SPIRE REPORT

SPIRE OBS 2.2.H Acceptance Test Report
Sunil D. Sidher

Ref:	SPIRE-RAL-PRC-003167
Issue:	1.0
Date:	4 th Nov 2008
Page:	9 of 13

Command (Parameters)	Action	Result Success/Failure
CLEAR_HK_REPORT(0x300) CLEAR_HK_REPORT(0x301)	Sent these commands while the nominal housekeeping report was still being generated after the critical house keeping report had already been cleared.	Success Failed as expected for critical housekeeping. Failure code 0x829.- Unallocated HK packet ID

Time completed 17:47, 31/10/2008.

Check of SxRs

SxR-0655 – Wrong DCU GetHK command ID in the critical HK report

Command (Parameters)	Action	Result Success/Failure
REPORT_TABLE(0,0,0)	Checked the value of the 8 th 32-bit word from the end of the table ID 0.	Success Reported value is 0x8c3f0017

SxR-0608 – VM parameters need to be defined and inserted in the NHK report

Command (Parameters)	Action	Result Success/Failure
REPORT_TABLE(1,0,0)	Checked byte offsets 470 to 476	Success in 3.0.B

SxR-0657 – Selection table parameters have incorrect values

Command (Parameters)	Action	Result Success/Failure
	Checked the value of SMECSELECTTAB on the SMEC Parameter Display	0x61D0 – what does this value mean?? Expected value: 0xFFFF

SxR-0647 – The SMEC selection table should be included in the OBS

Command (Parameters)	Action	Result Success/Failure
REPORT_TABLE(0xa,0,0)	Check the contents of the report table	Implemented correctly. Can be closed.

SxR-0165 – The HK command queue size is needed in the NHK report

Command (Parameters)	Action	Result Success/Failure
	Check the contents of the NHK	



SPIRE REPORT

SPIRE OBS 2.2.H Acceptance Test Report
Sunil D. Sidher

Ref: SPIRE-RAL-PRC-003167
Issue: 1.0
Date: 4 th Nov 2008
Page: 10 of 13

	report table at byte offsets 130 and 132	<p>Command IDs 0x04760000 and 0x04770000 (Get_FifoStat_LS_HP and Get_FifoStat_LS_LP respectively) are implemented correctly. The parameter values always seem to be 0.</p> <p>Can it be closed? Checked this with Nino – the HK sampling is not conducive to seeing these parameters change at 1 second interval. So the SCR can be closed.</p>
--	--	--

SxR-0592 – Cannot dump the last word of a memory segment

Command (Parameters)	Action	Result Success/Failure
Send a Dump Memory that reaches the end of a memory segment, for example TC(6,5) SCM01500: DUMP_MEMORY (2,0x3FFFF,0x1)	Is a TM(6,6) report produced with the dump of 1 data word.	<p>Success</p> <p>Should have been closed in 2.2.H. Can be closed now.</p>

SxR-0615 – OBS generates TC sequence error report

Command (Parameters)	Action	Result Success/Failure
NA		Implemented. Can be closed. Note that the counter will jump after resending RESET_DPU TC, as expected.

SxR-0622 – Update to allow definition of SAFE Mode

Command (Parameters)	Action	Result Success/Failure
NA		Implemented in the OBS but not yet tested.

Write the OBS to EEPROM

Done on 04-Nov-2008-10:51. Command WRITE2EEPROM(0x4000, 0x17000, 0, 0). **Successful**

12:18 - Verified with a FORCE_BOOT_PRIMARY after sending the CALL_BOOT TC.



SPIRE REPORT

SPIRE OBS 2.2.H Acceptance Test Report
Sunil D. Sidher

Ref: SPIRE-RAL-PRC-
003167

Issue: 1.0

Date: 4th Nov 2008

Page: 11 of 13

Appendix A – Test of the PERFORM_PEAKUP TC on the FS

4th Nov 2008:

1) Peak Up Test using S/C offset event

**PERFORM_PEAKUP
(DCUDATAMODE=0,
PIXEL=0,
CHOP_TABLEID=71,
CHOP_TABLEINDEX=0,
STARTCHOPPOSN=0xbf11,
CHOPPOSNINCR=0x1f4,
NCHOPPOSNS=5,
STARTJIGGPOSN=0x9c00,
JIGGPOSNINCR=0x64,
NJIGGPOSNS=5,
CHOPOFFSET=0x6161,
JIGGOFFSET=0x9c00,
NCHOPCYCLES=2,
CHOPCYCLEPERIOD=4000000,
NBSMFRAMES=0xFFFF,
NDCUFRAMES=36,
DCUFRAMEDELAY=34959,
CHOPSCALE=1,
JIGGSCALE=1,
OUTPUT=0)**

**4 TM(5,1) Step Reports from the VM for each X-raster position; Event
Code=0x501, SID=0x5113**

**32-bit number following the event count is 0x00004701, 0x00004702,
0x00004703, 0x00004704.**

Peak Up Event Report was correctly produced:

ID: 0D00
Seq: CA9B



SPIRE REPORT

SPIRE OBS 2.2.H Acceptance Test Report
Sunil D. Sidher

Ref: SPIRE-RAL-PRC-003167
Issue: 1.0
Date: 4th Nov 2008
Page: 12 of 13

Len: 001F

0000: 0D00 CA9B 001F 0005 0100 5FA2 8C98 FC3B 0504 5101 0000 0D05 0000 0000
087D 0002
0020: 0002 0002 B00D

Reported the contents of Table 6:

ID: 0D08
Seq: C1DA
Len: 00AD
0000: 0D08 C1DA 00AD 0015 0400 5FA2 8DD9 7CD2 020A 0000 0D05 0000
0000 0006 0000 0048
0020: 0000 0200 0000 03E8 0000 00C8 0000 0000 0000 0000 0005 0000 0005
0000 0005 0000 0000
0040: 0000 0003 0000 0003 0000 0000 0000 0000 0000 FFFF FFFF FFFF FFFF
FFFF FFFF FFFF FFFF
0060: 0000 0003 0000 0003 0000 0000 0000 0000 0000 FFFF FFFF FFFF FFFF
FFFF FFFF FFFF FFFF
0080: 0000 0003 0000 0003 0000 0000 0000 0000 0000 FFFF FFFF FFFF FFFF
FFFF FFFF FFFF FFFF
00A0: 8123 115B 8124 4B34 200E FFFF 401C C1A0 FD89 DC3B

The 2nd and 3rd words contain the offsets with respect to the start chop and jiggle positions. The results are as expected.

2) Peak Up Test using SPIRE BSM offsets

Ran the Peak Up TC again with OUTPUT flag set to 1 and the Chop and Jiggle step sizes doubled (i.e. 0x3e8 and 0xc8 respectively). This time no S/C event was received as expected. Reported the contents of Table 6 :

ID: 0D08
Seq: C4CE
Len: 00AD
0000: 0D08 C4CE 00AD 0015 0400 5FA2 93CB 0447 020A 0000 0D05 0000
0000 0006 0000 0048
0020: 0000 0200 0000 07D0 0000 0190 0000 0000 0000 0000 0005 0000 0005
0000 0005 0000 0000
0040: 0000 0003 0000 0003 0000 0000 0000 0000 0000 FFFF FFFF FFFF FFFF
FFFF FFFF FFFF FFFF
0060: 0000 0003 0000 0003 0000 0000 0000 0000 0000 FFFF FFFF FFFF FFFF
FFFF FFFF FFFF FFFF



SPIRE REPORT

SPIRE OBS 2.2.H Acceptance Test Report
Sunil D. Sidher

Ref: SPIRE-RAL-PRC-003167
Issue: 1.0
Date: 4th Nov 2008
Page: 13 of 13

0080: 0000 0003
0000 0003 0000 0000 0000 0000 FFFF FFFF FFFF FFFF FFFF FFFF FFFF
FFFF
00A0: 8123 2E5D 8124 331E 200E FFFF C01C 333F E498 5BBC

The offset results are as expected.