



## Report

SPIRE HCSS v0.3.3 Acceptance Test Report  
Sunil Sidher, Steve Guest & Asier Aramburu

**Ref:** SPIRE-RAL-REP-002587  
**Issue:** 1.0  
**Date:** 2<sup>nd</sup> March 2006  
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Sunil Sidher, Steve Guest and Asier Aramburu  
2<sup>nd</sup> March 2006



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## 1. INTRODUCTION

This acceptance test report is based on the tests carried out by SPIRE at RAL on the Herschel Common Science System (HCSS) version 0.3.3 build #812 on 16<sup>th</sup> – 28<sup>th</sup> February 2006. This acceptance test was part of a wider testing of the SPIRE EGSE in preparation for the third-phase testing of the proto-flight model of the instrument (PFM3). The documentation listed in section 2 was used for the execution of the tests. Section 3 describes the RAL system setup and configuration for these tests. In section 4 the results from the execution of each test are described.

### 1.1 Conventions

Commands entered are in indented courier new font:

```
dbuser -add -P egse@lichfield
```

Output from the system is in the same font but starting without indentation:

```
Exception in thread "main" java.lang.NullPointerException  
    at herschel.cus.gui.CusEditor.<init>(CusEditor.java:98)  
    at herschel.cus.gui.CusEditor.main(CusEditor.java:1332)
```

## 2. DOCUMENTATION

### 2.1 Applicable Documents

AD01	Database MIB Import ICD, Version 5.2, 2 <sup>nd</sup> July 2003, S2K-MCS-ICD-0001-TOS-GIC
AD02	CUS Functionality to Support Command Lists for SPIRE, HCSS SCR-0110 (see <a href="http://www.rssd.esa.int/herschel_webapps/servletsuite/ProblemReportServlet?area=hc&amp;mode=displaypr&amp;id=110">http://www.rssd.esa.int/herschel_webapps/servletsuite/ProblemReportServlet?area=hc&amp;mode=displaypr&amp;id=110</a> ), Ken King and Sunil Sidher, 13 <sup>th</sup> Aug 2002.
AD03	Contents of SPIRE VM Table File, Issue 1.0 Draft 2, 5 <sup>th</sup> Feb 2004, SPIRE-RAL-NOT-001907
AD04	SPIRE EGSE-ILT Startup Procedures, Issue 0.7, 24 <sup>th</sup> June 2003, SPIRE-RAL-DOC-001630

### 2.2 Reference Documents

RD01	HCSS Acceptance Test Plan, Issue 1.1, 6 <sup>th</sup> Jan 2006
RD02	<a href="#">MIB User Guide</a>
RD03	<a href="#">HCSS telemetry ingestion software user manual</a>
RD04	<a href="#">Common Uplink System User's Guide</a>
RD05	<a href="#">HCSS Installation Instructions</a>
RD06	EGSE TestControl User Guide, Draft 5, 16 <sup>th</sup> Dec 2003, PICC-ME-MN-002

## 3. TEST SETUP

### 3.1 System Setup

The SPIRE setup for the acceptance test was as follows.



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**Lincoln:** SCOS 2000 w/s running Linux SuSE 7.3, SCOS2000 v2.3e P5 + TOPE, EGSE part of the TestControl. The sops23e account was used.

**Lichfield:** Data Server running Linux SuSE 9.3, plus test control support (tcl/tk 4.4.12, tcl thread 2.6.2, tclBlend 1.3.2), Versant 7.0.1.1. The sg55 account was used.

**Salisbury:** QLA machine running Linux 9.3, Versant 7.0.1.1. The qla account was used.

All machines were installed with:

- Java 1.5.0\_05-b05
- SPIRE build #252 (contains QLA 3.0 beta release)
- HCSS build #812 (HCSS 0.3.3 release)

## 3.2 Preliminary Steps

These steps were performed in order to carry out the acceptance test. They were carried out as required, i.e. they were not all performed before the acceptance test steps were started.

### 3.2.1 Router and Gateway

We started the Router and EGSEGateway from sg55 on Lichfield (had to change EGSE\_EGW\_SERVER to lichfield.bnc.rl.ac.uk in the MISCconfig file on sops23e@lincoln):

```
> router R
> router S -scosapids 1280,1282,2036-2038
```

We note that these commands have changed from previous releases. We were unaware of this. Furthermore we could not find documentation for these commands on the HSCDT pages. The syntax for these commands was discovered by typing the “router” command on its own.

### 3.2.2 Database setup

We used the DB Admin Manual HSCDT/TN044, Issue Draft 0.14, 14<sup>th</sup> Feb 2006, linked from the HCSS Documentation Tree. We were unable to find a version of this document specifically applicable to HCSS 0.3.3.

We first tried this command:

```
> db_admin -I HCSSv0.3.3_AT
```

This failed with a “Usage” error, which led us to suspect that the version of the manual we were following was *not* the version applicable to HCSS 0.3.3. We tried again with a small “i”, now giving the error:

```
Database name must be in lower case: HCSSv0.3.3_AT
```

We then tried again with lower case DB name and with host name specified:

```
/home/sg55> db_admin -i hcsvg0.3.3_at@lichfield
```

This time we got the error:

```
VException(7181:LIC_ERR_NODE: Component not licensed)
```

We logged in as root on lichfield and changed the group for the db directory from root to users. The same command then appeared to be successful

```
/spired/versant> db_admin -i hcsvg0.3.3_at@lichfield
17-Feb-2006 16:04:42 herschel.share.log.util.LogInitialiser init
```



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```
INFO: Cannot read logging configuration file
/home/sg55/.hcss/userlogging.properties. Using default HCSS log
settings
17-Feb-06 16:04:42.532 Configuration: Build number is 812
Initializing new database system...
[makedb] New database directory created: hcsvg0.3.3_at@lichfield
[profile.be] Updated profile.be for database: hcsvg0.3.3_at@lichfield
[createdb] New database created: hcsvg0.3.3_at@lichfield
[SchemaTool]
[DBI]
17-Feb-06 16:04:47.235 ReplicatingTransaction: Initializing normal
Store: hcsvg0.3.3_at@lichfield (main), shadowing disabled.
[initv]
Initializing database "hcsvg0.3.3_at@lichfield"
17-Feb-06 16:04:47.483 ReplicatingTransaction: Initializing normal
Store: hcsvg0.3.3_at@lichfield (main), shadowing disabled.
Initializing database using
herschel.ccm.tools.BasicMissionInitializer
BasicMissionInitializer
17-Feb-06 16:04:47.613 InstrumentModelRegistryImpl: Create new model
registry for instrument HIFI
17-Feb-06 16:04:47.614 InstrumentModelRegistryImpl: Create new model
registry for instrument PACS
Database system initialization finished.
Finished.
```

However, we thought it strange that no registry for the SPIRE instrument was created! This was an error in the value of the property `hcss.ccm.mission.basic.models` – there was a dot where there should have been a comma. We deleted the database and recreated it after correcting this.

We then checked the schema of the DB:

```
sg55/.hcss> schema_tool -v hcsvg0.3.3_at

Database schema version = 22
Class schema version = 22
```

We then discovered that the Versant command `dbtool -Fv` is not recognised anymore. The new command is

```
sg55/.hcss> dbtool -space -volume -all hcsvg0.3.3_at

VERSANT Utility DBTOOL Version 7.0.1.1
Copyright (c) 1989-2005 VERSANT Corporation

Percentage of free space in DB : 99%
Total available free space in DB : 8379008KB
```

We were surprised to see that the DB size was 8GB by default, and wondered how we create a smaller one to start with. After checking this, we found that this is the maximum size it can expand to, and does not take up this much space to start with.

We checked to see if the `db_admin` command had created any indexes:

```
sg55/.hcss> dbtool -index -info -list hcsvg0.3.3_at
VERSANT Utility DBTOOL Version 7.0.1.1
```



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Copyright (c) 1989-2005 VERSANT Corporation

Class: VAssociate  
Domain: char

Attribute: VAssociate::name  
Length: variable

Index: UNIQUE BTREE  
Number of pages: 3  
Creation time: Fri Feb 17 16:04:47 2006  
Located in volumes:  
    /spired/versant/db/hcssv0.3.3\_at/system/sysvol

It hadn't, so we created one on the time field of the telemetry packets:

```
sg55/.hcss> dbtool -index -create -btree  
herschel.versant.ccm.TmSourcePacketImpl  
_time hcssv0.3.3_at
```

VERSANT Utility DBTOOL Version 7.0.1.1  
Copyright (c) 1989-2005 VERSANT Corporation

Creating btree index on  
herschel.versant.ccm.TmSourcePacketImpl.\_time...

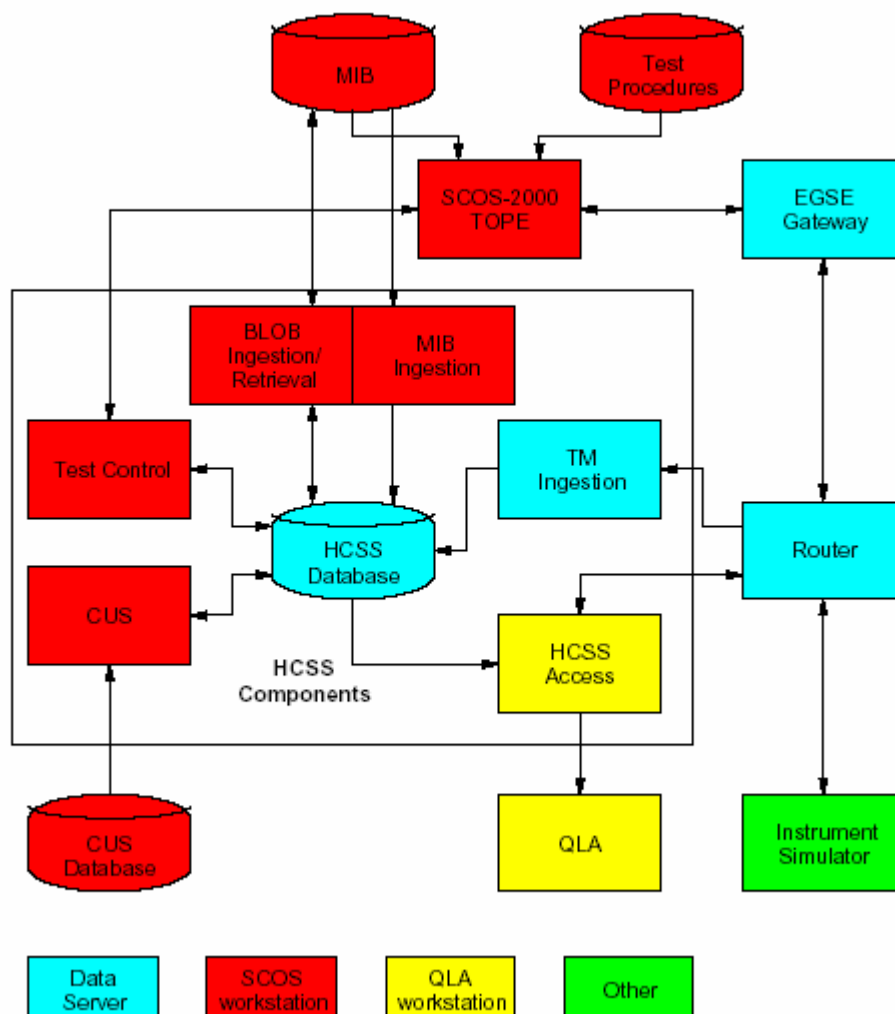


Figure 1: Configuration for the HCSS Acceptance Test

## 4. HCSS TEST CASES

### 4.1 TC-ICC-01: MIB Ingestion

The following steps were performed on lichfield:

- Checked that the siteid is set to 3 in the .hcss/user.props file
- Created directories for the MIB:
 

```
/home/sg55> mkdir MIB
/home/sg55> mkdir MIB/PFM3_Issue2.1.E1
/home/sg55> mkdir MIB/PFM3_Issue2.1.E1/ascii-tables
/home/sg55> mkdir MIB/PFM3_Issue2.1.E1/auxil
```
- Copied the MIB tables from Lincoln.
- Ran gencmddurns

```
ascii-tables/synthetic> cd ../../
MIB/PFM3_Issue2.1.E1> gencmddurns ascii-tables auxil/tc-durns
```



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```
Using ascii-tables/ccf.dat to create a TEMPLATE command duration
file auxil/tc-durns ..
Done.
```

- Ran the program to check the MIB

```
MIB/PFM3_Issue2.1.E1> mibchecker -properties
hcss.mib.datadir=$PWD > mib.log 2>&1 (using bash shell)
```

This failed with the following error messages:

```
=== MonParam QM000490 START
A problem was found. Events prior to problem:
ERROR: InvalidMonitoringParam
herschel.mib.utils.ProblemMnemonicEntryPlfMibException: For
mnemonicQM000490, expected only *one* entry of 190004490 in PLF
table. However 0 entries were found.
+++++++Summary of Validation Problems+++++++
InvalidMonitoringParam 1
=== MonParam QM000490 END.
```

This failure occurred for all 21 parameters QM000490 to QM020490. The failure appears to be the result of event reports TFTS DPU Counter Error, TFTS Unidex 500 Limit Error and TFTS Unidex 500 Feedback Error sharing the same Event ID (viz. 769), although the SIDs in each are unique, i.e. 2, 4 and 8 respectively. The same problem was seen last time with HCSS v0.3. This was due to a known problem with the MIB for the Test Fourier Transform Spectrometer. It was fixed by making the Event IDs unique and updating the PCF, PLF and PID tables.

We then ran mibchecker again, this time successfully. However, there were a number of warning messages:

1. For some packet types and subtypes of our test equipment APIDs 2036-2038 and also for science APID 1288:

```
=== Packet definition apid=1288, type=21, subtype=1, sid=1040 START
A problem was found. Events prior to problem:
Warning: PacketPrefixNotFound Software limitation: A packet prefix
for APID=1288 cannot be found. Assuming a prefix of 'Unknown'
+++++++Summary of Validation Problems+++++++
PacketPrefixNotFound 1
=== Packet definition apid=1288, type=21, subtype=1, sid=1040 END
```

```
=== Packet definition apid=1288, type=21, subtype=1, sid=1554 START
A problem was found. Events prior to problem:
Warning: PacketPrefixNotFound Software limitation: A packet prefix
for APID=1288 cannot be found. Assuming a prefix of 'Unknown'
+++++++Summary of Validation Problems+++++++
PacketPrefixNotFound 1
=== Packet definition apid=1288, type=21, subtype=1, sid=1554 END
```

```
=== Packet definition apid=1288, type=21, subtype=1, sid=2592 START
A problem was found. Events prior to problem:
Warning: PacketPrefixNotFound Software limitation: A packet prefix
for APID=1288 cannot be found. Assuming a prefix of 'Unknown'
```





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```
+++++++Summary of Validation Problems+++++++  
PacketPrefixNotFound 1  
=== Packet definition apid=1288, type=21, subtype=1, sid=2592 END
```

These particular warnings have no adverse consequences for SPIRE tests.

### 2. Unsupported format for command parameter:

```
=== Command SCM00500 START  
A problem was found. Events prior to problem:  
Warning: EngParamWithRawValue Software limitation: Parameter of mnemonic  
SPM0N500 has a CPC_INTER value of 'R' which is not currently supported for  
Engineering parameters. Assume a default value of null.  
+++++++Summary of Validation Problems+++++++  
EngParamWithRawValue 1  
=== Command SCM00500 END.
```

This warning caused us no problems but will be investigated further.

### 3. A few command parameter raw types not supported for engineering parameters:

```
Warning: EngParamWithRawValue Software limitation: Parameter of  
mnemonic QPT0N485 has a CDF_INTER value of 'R' which is not currently  
supported for Engineering parameters. Assume a default value of null.
```

Again these warnings caused us no problems. These problems will be investigated further.

- Now we attempted to ingest the MIB into the DB:

```
MIB/PFM3_Issue2.1.E1> ingestmib -properties  
hcscs.mib.datadir=$PWD
```

```
17-Feb-2006 18:51:44 herschel.share.log.util.LogInitialiser init  
INFO: Cannot read logging configuration file  
/home/sg55/.hcscs/userlogging.properties. Using default HCSS log  
settings  
17-Feb-06 18:51:44.445 Configuration: Build number is 812  
[HS]: miblocation=/home/sg55/MIB/PFM3_Issue2.1.E1  
Exception in thread "main" java.lang.IllegalArgumentException:  
Database not registered: hcscsv0.3.3_at@localhost  
In case the database has been restore from a backup from a  
differentdatabase or server, please consider using 'db_admin -n' to  
fix.  
    at  
herschel.versant.ccm.replication.DatabaseRegistry.getDetails(Database  
Registry.java:78)  
    at  
herschel.versant.store.ReplObjectStoreVers.checkOptions(ReplObjectSto  
reVers.java:629)  
    at  
herschel.versant.store.ReplObjectStoreVers.init(ReplObjectStoreVers.j  
ava:139)  
    at  
herschel.versant.store.ReplObjectStoreVers.<init>(ReplObjectStoreVers  
.java:78)
```



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```
at  
herschel.versant.store.ReplStoreFactoryImpl.createStore(ReplStoreFact  
oryImpl.java:77)  
at herschel.mib.tools.IngestMib.exec(IngestMib.java:60)  
at herschel.mib.tools.IngestMib.main(IngestMib.java:108)
```

This error appears to have occurred because the format of the DB name in the db\_admin command has to be exactly the same as the properties that point to it. For example hcssv0.3.3\_at@localhost, hcssv0.3.3\_at@lichfield and hcssv0.3.3\_at@lichfield.bnsc.rl.ac.uk are not recognised as being the same DB. We changed the property var.database.server to be the same as entered in the db\_admin command i.e. "lichfield", removed the DB and started again.

After making some TFTS updates, we were able to ingest the MIB.

We started the CUS.

```
➤ cusgui&
```

From the MIB tab selected the "Set the current MIB as default and commit" option.

**Test successful.**

## 4.2 TC-ICC-02: CUS: TC Definition File Import

This test is obsolete as its purpose it now covered by TC-ICC-01.

## 4.3 TC-ICC-03: CUS: Observing Mode Import

We copied the observing mode, building block and calibration table defns using ftp from /home/sops23e/SCOS2.3eP5/tcl/TC/AT\_Scripts on lincoln into /home/sg55/CUSScripts/HCSSv0.3.3:

```
scp sops23e@lincoln:/home/sops23e/SCOS2.3eP5/tcl/TC/AT_Scripts/CUS_BBlocks/* .  
scp sops23e@lincoln:/home/sops23e/SCOS2.3eP5/tcl/TC/AT_Scripts/CUS_ObsModes/* .  
scp sops23e@lincoln:/home/sops23e/SCOS2.3eP5/tcl/TC/AT_Scripts/CUS_CalTables/* .
```

We merged the BBlock and ObsModes files using the cat command into a single file CUS.script.

Corrected several DRCU command parameter errors, missing ';'s, wrong comment characters (viz #). The import into the CUS was eventually successful.

From the Registry tab we selected the Upload Calibration Table and loaded PSW\_PeakUp.txt. Committed the table to Registry and viewed the table – looks OK.

**Test successful.**

## 4.4 TC-ICC-04: TOPE: Issuing Telecommands

We imported test procedure TOPE\_test.tcl from directory /home/sops23e/SCOS2.3eP5/tcl/TC/AT\_Scripts/TestControlScripts  
We then ran this test procedure.

**Test successful.**



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### 4.5 TC-ICC-05: TestControl: Running Test Observation using the HCSS

At this point we were unable to continue until Test Control was fully configured on lichfield, which has a 64-bit XEON processor. This requires installation of tclBlend. However, we were not able to install it on this machine in its standard configuration. Eventually it was concluded that it was necessary to perform a complete reinstall of Linux to build it in 32-bit mode. We also understand that Versant does not work correctly on 64-bit Linux. After this reinstall it proved possible to install tclBlend. The acceptance test then resumed (some days later).

We ran a similar test as in IC-ICC-04 from the HCSS after importing it from lichfield. In TOPE HCSSTest.tcl, we had to change the procedure name to Mode\_TOPE\_HCSS\_Test.

**Test successful.**

### 4.6 TC-ICC-06: End to End: Run a Test Observation, Ingest TM packets, run QLA

Starting this test involved the following actions:

1. TM ingestion started OK on sg55@lichfield. Logs being written to ~sg55/logs/tmingest directory. Script tmingest to start TM ingestion is in ~sg55/bin
2. Started QLA from qla@salisbury. We noticed two problems.
  - a. The keyboard mapping was not correct.
  - b. It was not correctly configured for two screens.
3. Ran TOPE\_HCSSTest again: success

We then left it running with nominal housekeeping collection over the weekend. The following Monday we checked:

1. Telemetry ingestion log – no errors, warnings or exceptions spotted.
2. Messages on the Router and EGSE gateway konsoles - no errors or warnings.

**Test successful.**

### 4.7 TC-ICC-07: End to End: Run RTA/QLA on observation data stored in the HCSS database

We started QLA from qla@salisbury. The same machine configuration problems as noted in the previous test were still present.

The TM playback initially failed. Investigation revealed that some shared libraries were missing in the Versant installation. The following actions were taken:

- Reinstalled Versant on Salisbury selecting J/Versant in addition to defaults. We note that the installer has changed from Versant 7.0.1 to 7.0.1.1, despite it being a minor version change.
- Made the test database publicly accessible (dbuser -add -P hcstv0.3.3\_at) from lichfield.
- Changed the value of the property hcstv0.3.3.store.factory from the old store to the replicating one.

Playback was then possible. Playback both by time and by test observation was performed. We checked a number of HK parameter values with both SCOS and QLA. No data appeared for PHOTMCLKDIV



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and SPECMCLKDIV on the QLA clock displays, even though Packet Dump showed valid values for these parameters. SPIRE SPR-0470 was raised on QLA.

**Test successful.**

### 4.8 TC-ICC-08: SPIRE Command List functionality in the CUS

We copied using scp the table Flash\_Table\_2.1.3\_1.1\_050127112906.tbl from /home/sops23e/SCOS2.3eP5/tcl/TC/VMTables/Table070-Flash/TC on lincoln into ~sg55/VMTables/HCSSv0.3.3.

The table was successfully created and committed to CUS registry. We checked the definition Flash\_Table in the registry - OK.

**Test successful.**

### 4.9 TC-ICC-09: Ingest a Calibration Table and check size functionality in the CUS

With the CUS GUI we created a short procedure (CheckTableSize) which would print the table size for PSW\_Peakup. We ingested it, ran it, and verified that the size was correct.

**Test successful.**

### 4.10 TC-ICC-10: Correct setting of the OBSID values according to Site Id in the CUS

This was verified using the "Check Command" button of the CUS GUI.

**Test successful.**

### 4.11 TC-ICC-11: Correct setting of command parameter values in the CUS

This was verified using the "Check Command" button of the CUS GUI.

**Test successful.**

### 4.12 TC-ICC-12: TC History and OOL data retrieval and ingestion

We tested this first as a manual Procedure (IST mode), and then as an automatic one (ILT client-server mode).

We created the following directories for storing TC history and OOL data and log files on sg55@lincoln:

```
> mkdir THF_DAT ORF_DAT logs/tchingest logs/oolingest
```

We noticed an anomaly in the reported date (4<sup>th</sup> Feb instead of 24<sup>th</sup> Feb, see existing HCSS SPR-1898).

```
lincoln/home/sg55/.hcss> thfserver
```

```
28-Feb-06 09:06:56.504 Configuration: Build number is 812
28-Feb-06 09:06:57.244 FileServer: TC server starting on
lincoln.bnsc.rl.ac.uk/130.246.32.24 at Tue Feb 28 09:06:57 GMT 2006
28-Feb-06 09:06:57.252 FileDetails: Initializing configuration for tch
```



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```
28-Feb-06 09:06:57.254 FileDetails: Database for ingestion is
sg55_hcss@localhost
28-Feb-06 09:06:57.256 FileDetails: Setting start time to Fri Feb 04
15:00:00 UTC 2006
28-Feb-06 09:06:57.257 FileDetails: Checking can find host 127.0.0.1
28-Feb-06 09:06:57.259 FileDetails: Found server host /127.0.0.1
28-Feb-06 09:06:57.444 FileRetriever: Checking can find SCOS host 127.0.0.1,
port 2209
28-Feb-06 09:06:57.446 FileRetriever: Found SCOS host /127.0.0.1
```

```
lincoln/home/sg55/.hcss> cat FileServer.props
```

```
hcss.tchool.tch.starttime = 2006/02/24-15:00:00
hcss.tchool.oool.starttime = 2006/02/24-15:00:00
```

We had to set properties `hcss.tchool.tch.server`, and `hcss.tchool.tch.starttime`, plus the equivalents for `ool`.

We checked any for ingestion errors and used `vdbspector` to verify that the objects had been created and correctly associated with building blocks and telecommands.

We also attempted to reproduce SPR-1689 by starting the THF server and the TC ingestor (client), then stopping the SCOS server. We tried the same for OOL. In each case the server reported a "connection refused" error and the client an EOFException. Both client and server recovered when the SCOS server was restarted. So the exact behaviour of the SPR was not reproduced.

Note that the behaviour of the server when connection to SCOS is lost is not specified in the Use Cases.

**Test successful.**

### 4.13 TC-ICC-13: Overnight test at nominal SPIRE data rate

This test is essentially the same as TC-ICC-06, but with a higher data rate, and run overnight. The logs for telemetry ingestion, router and gateway were checked: no errors. The QLA reported some unknown event packets (not an HCSS or QLA problem).

**Test successful.**

### 4.14 TC-ICC-14: Database Replication Test

This test was not performed as it is not planned to use this functionality during the test campaign.

### 4.15 TC-ICC-15: Playback data from database into the EGSE router

This test was not performed as it is:

1. Not needed for the test campaign.
2. Difficult to perform without corrupting the SCOS telemetry history.

## 5. CONCLUSIONS

The Acceptance Test of HCSS 0.3.3, build #812 was successful, with some minor anomalies observed. Table 1 below lists all the Non Conformance Reports (NCRs) resulting from these tests and our response in each case.



## Report

SPIRE HCSS v0.3.3 Acceptance Test Report  
Sunil Sidher, Steve Guest & Asier Aramburu

**Ref:** SPIRE-RAL-REP-002587

**Issue:** 1.0

**Date:** 2<sup>nd</sup> March 2006

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**Table 1 List of NCRs raised during the acceptance test**

<b>NCR Details</b>	<b>Action taken</b>
<b>NCR-01:</b> QLA machine incorrectly configured	Configuration files changed. To be rebooted March 3 <sup>rd</sup> and rechecked.
<b>NCR-02:</b> Some parameters not displayed by QLA	SPIRE SPR-0470 raised.
<b>NCR-03:</b> Date anomaly in TCH/OOL	Updated already existing HCSS SPR-1898.
<b>NCR-04:</b> TFTS MIB errors	Corrected the Event IDs for the TFTS event reports.