

**EUROPEAN SPACE AGENCY**

**HERSCHEL**

**HSC-MOC (MCS) Integration Test  
Report**

**HERSCHEL-HSC-REP-0970**

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**1<sup>st</sup> August 2008**

## Document Approval

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## **Acronym List**

<b>AD</b>	Applicable Document
<b>FDS</b>	Flight Dynamics System
<b>FTS</b>	File Transfer System
<b>HSC</b>	HERSCHEL Science Centre
<b>ICCs</b>	Instrument Control Centre
<b>ICD</b>	Interface Control Document
<b>IOBS</b>	Instrument On-board Software image
<b>MCS</b>	Mission Control System
<b>MOC</b>	Mission Operation Centre
<b>RD</b>	Reference Document
<b>SDB</b>	Satellite Database (bridge files)
<b>SGS</b>	Science Ground Segment
<b>TPF</b>	Task Parameter File
<b>TSF</b>	Timeline Summary File

# 1. Introduction

## 1.1 Purpose

This document contains the test report of the integration tests held between the Herschel Science Centre & the Mission Control Subsystem (MCS) of the Herschel Mission Operations Centre (MOC).

The following integration tests are covered by this document:

- FTS Integration test:HSC-MCS, Test reference = HGS-IT-H01-1.0
- HSC-MCS DDS data retrieval test, Test reference = HGS-IT-H01-3.0

The aim of these two integration test was to verify and technically validate the mechanism of notification and transfer of products as well as the correct application on both sides of the Interface Control Documents.

Issue 1.0 of this document gives a report on the status of data transfers/retrievals as at the date of issue of the document.

## 1.2 Scope

This document presents the report for testing the interfaces between the Herschel Science Centre & the Mission Control Subsystem (MCS) of the Herschel Mission Operations Centre (MOC).

A separate document contains the report for testing the interfaces between the Herschel Science Centre and the Flight Dynamics System (FDS) of the Mission Operations Centre (MOC) [RD1]. Note that [RD 1] also covers data transfers between the FDS & the Planck ground segment/..

In addition, a separate document will contains the report for testing the interfaces between the HSC and the ICCs [RD 2].

This current document represents a lower level report document derived from the requirements defined in the Herschel/Planck Ground Segment System Test Plan [AD 1] and the Herschel Science Ground Segment Integration & Test plan [AD 2].

## 1.3 Participants

The participants to the tests were:

- the Herschel Science Centre (HSC)
- the Herschel MOC Mission Control System (MCS)



## **1.4 Test environment**

The tests were carried out using the operational interfaces as defined in [AD 3] and [AD 4]. The location of the software & the environment from which the tests take place at the HSC & MOC shall be specified in the relevant integration test report.

The 1<sup>st</sup> HSC-MOC(MCS) test was run on the 9<sup>th</sup> May 2007.

Further tests have taken place since that date until the date of issue of this document. These dates are recorded in the relevant subsections of this document.

All tests have now been completed between the HSC & the MOC following release of this document.

## **1.5 Methodology**

The documentation used for selecting the features to be tested has been the Interface Control Document (ICD) relevant for each interface. User manuals might also be used during tests where necessary for outlining the procedure steps. Any specific pre-requisite has been highlighted for each test case.

All input and output data used for the tests are kept in the dedicated Integration & test data accounts.

Pass/fail criteria have been envisaged for each test case.

Test failures will be also reported in the HSC SxR system and in the ARTS system in order to instigate the necessary actions to solve the problems found.

## **1.6 Identification of Problems found**

Only one minor problem was raised during the test of the 9<sup>th</sup> May 2007 related to the fact that the HSC Action procedures did not start when expected. This was resolved during the test and confirmed with the HSC QA to have been resolved successfully.

## **2. Related documents**

### **2.1 Applicable documents**

- [AD.1] Herschel/Planck Ground Segment System Test Plan (GSSTP) Document, PT-CMOC-MGT-PL-7202-OPS-ONV, 2.0
- [AD.2] Herschel Science Ground Segment Integration & Test Plan (SGS I&T), Herschel-HSC-DOC-0589, 1.2
- [AD.3] HERSCHEL/PLANCK File Transfer System ICD, PT-CMOC-MCS-ICD-3107-OPS-GDS, Issue 1.6
- [AD.4] Herschel/Planck DDS ICD, PT-CMOC-MDS-ICD-3108-OPS-GDS, Issue 1.6
- [AD.5] Herschel HSC-MOC (MCS) Integration test Plan, HERSCHEL-HSC-DOC-0920
- [AD.6] SCOS-2000 OBSM External Interfaces ICD – S2K-MCS-ICD-0014-TOS-GCI
- [AD.7] Ground Segment Interface Requirements Document, Issue 2.6, 15<sup>th</sup> Dec 2006

### **2.2 Reference documents**

- [RD.1] HERSCHEL/PLANCK FDS-SGS Interface test Plan, PT-CMOC-FD-SAD-2006-OPS-GFT, Issue 1.1
- [RD.2] HSC-ICCs Integration Test Report,

### 3. Interfaces between HSC and the MOC MCS

The following interfaces listed in the tables below have been identified between Herschel Science Centre and the Herschel MOC Mission Control System.

Files being transferred	File Description	Generation by	Transfer Mechanism	Transfer to
IOBS	Instrument Memory Image	ICCs	FTS	MCS (via HSC)
TPF_	Task Parameter File	HSC	FTS	MCS

**Table 1 List of products sent by Herschel SGS**

Files being transferred	File Description	Generation Details	Transfer Mechanism
TSF_	Manual Stack Dump File	Generated by MCS	FTS
IOBS	Instrument Memory Image	Generated by MCS	FTS
SDB_	Spacecraft Database (bridge files)	Generated by MCS	FTS
N/A	Consolidated S/C HK TM	All output from the MCS and archived in the DDS for retrieval by the HSC	DDS
N/A	Consolidated Instrument HK TM		DDS
N/A	Consolidated Science TM		DDS
N/A	Instruments derived parameters		DDS
N/A	Telecommand History file		DDS
N/A	Out of Limit Data		DDS
N/A	Time Correlation File		DDS
N/A	FTS transferred data e.g. Orbit, PSF etc		DDS

**Table 2 List of products received by Herschel SGS**

## **4. FTS Integration tests : HSC-MCS - HGS-IT-H01-1.0**

### **4.1 Test Report for provision of OBSM images to MOC MCS**

#### **4.1.1 Provision of OBSM images**

OBSM images shall be made available to the HSC from the Instrument Control Centres via email. These are placed on the HSC DB server machine in a dedicated directory whereby they will then be placed in a dedicated FTS wrapper file and sent to the MOC MCS.

#### **4.1.2 Test cases**

<b>Test identification</b>	<b>Test description</b>	<b>Product delivered</b>	<b>Target</b>
HGS-IT-H01-1.1-01	Delivery of SPIRE OBSM image from HSC to the MOC MCS	IOBS	MOC MCS
HGS-IT-H01-1.1-02	Delivery of PACS OBSM image from HSC to the MOC MCS	IOBS	MOC MCS
HGS-IT-H01-1.1-03	Delivery of HIFI OBSM image from HSC to the MOC MCS	IOBS	MOC MCS

### 4.1.3 Test reports

#### 4.1.3.1 HGS-IT-1.1-01

<b>Test ID</b>	HGS-IT-H01-1.1-01		
<b>Subject</b>	Delivery of SPIRE OBSM image from HSC to the MOC MCS		
<b>Date</b>	09/05/2007	<b>Test Iteration</b>	1
<b>Test participants</b>			
HSC			
MOC(MCS)			
<b>SW configuration</b>			
SPIRE OBSM image files were provided by SPIRE ICC via email. These were generated by the SPIRE OBSM system for the S/C AIV tests.			
S/W files that were transferred related to 2.2.G of the PRAM and DRAM software.			
<b>Test performance</b>			
File names were according to the corresponding ICD. These were :			
SPDPRMDA_000022G_REF_2007_030T120007.IMG			
SPDPRMPG_000022G_REF_2007_030T120008.IMG			
Files were successfully placed in an FTS wrapper by the HSC script and transferred to the MOC via the FTS			
Files were confirmed to be successfully unwrapped at the MOC side and placed in the expected OBSM directory.			
<b>Identified problems</b>		<b>AR Reference</b>	
None			
<b>Remarks</b>			
<b>Test successfully performed (YES/NO)</b>	YES		
<b>Test Coordinator</b>	<b>Signature</b>	<b>Date</b>	
Laurence O'Rourke		9 <sup>th</sup> May 07	

**4.1.3.2 HGS-IT-1.1-02**

<b>Test ID</b>	HGS-IT-H01-1.1-02		
<b>Subject</b>	Delivery of PACS OBSM image from HSC to the MOC MCS		
<b>Date</b>	09/05/2007	<b>Test Iteration</b>	1
<b>Test participants</b>			
HSC			
MOC(MCS)			
<b>SW configuration</b>			
6 PACS OBSM image files were provided by PACS ICC via email. These were generated by the PACS OBSM system for the S/C AIV tests.			
S/W files that were transferred related to vs. 13.6 of the SPU			
<b>Test performance</b>			
File names were according to the corresponding ICD. These were :			
PASPEPSL_0000136_REF_2007_030T120006.IMG			
PASPRMSL_0000136_REF_2007_030T120001.IMG			
PASPEPSL_0000136_REF_2007_030T120002.IMG			
PASPRMSL_0000136_REF_2007_030T120003.IMG			
PASPEPSL_0000136_REF_2007_030T120004.IMG			
PASPRMSL_0000136_REF_2007_030T120005.IMG			
Files were successfully placed in an FTS wrapper by the HSC script and transferred to the MOC via the FTS			
Files were confirmed to be successfully unwrapped at the MOC side and placed in the expected OBSM directory.			
<b>Identified problems</b>			
None		<b>AR Reference</b>	
<b>Remarks</b>			
<b>Test successfully performed (YES/NO)</b>		YES	
<b>Test Coordinator</b>		<b>Signature</b>	<b>Date</b>
Laurence O'Rourke			9 <sup>th</sup> May 07

**4.1.3.3 HGS-IT-1.1-03**

<b>Test ID</b>	HGS-IT-H01-1.1-03		
<b>Subject</b>	Delivery of HIFI OBSM image from HSC to the MOC MCS		
<b>Date</b>	09/05/2007	<b>Test Iteration</b>	1
<b>Test participants</b>			
HSC			
MOC(MCS)			
<b>SW configuration</b>			
1 HIFI OBSM image files were provided by HIFI ICC via email. These were generated by the HIFI OBSM system for the S/C AIV tests.			
S/W files that were transferred related to HIFI OBSW V4.3.2			
<b>Test performance</b>			
File name was according to the corresponding ICD. These were :			
HIDPRMPG_0000432_REF_2007_030T120009.IMG			
The file was successfully placed in an FTS wrapper by the HSC script and transferred to the MOC via the FTS			
The File were confirmed to be successfully unwrapped at the MOC side and placed in the expected OBSM directory.			
<b>Identified problems</b>			<b>AR Reference</b>
None			
<b>Remarks</b>			
<b>Test successfully performed (YES/NO)</b>	YES		
<b>Test Coordinator</b>	<b>Signature</b>	<b>Date</b>	
Laurence O'Rourke		9 <sup>th</sup> May 07	

## 4.2 Test Report for provision of OBSM image dumps to HSC

### 4.2.1 Test approach for file provision

OBSM image dumps are made available to the HSC from the MOC MCS. These are then passed to the Instrument Control Centres.

### 4.2.2 Test cases

Test identification	Test description	Product delivered	Target
HGS-IT-H01-1.2-01	Dump of SPIRE OBSM image and transfer of image from MOC MCS to the HSC	IOBS	HSC
HGS-IT-H01-1.2-02	Dump of PACS OBSM image and transfer of image from MOC MCS to the HSC	IOBS	HSC
HGS-IT-H01-1.2-03	Dump of HIFI OBSM image and transfer of image from MOC MCS to the HSC	IOBS	HSC



## 4.2.3 Test reports

### 4.2.3.1 HGS-IT-1.1-01

<b>Test ID</b>	HGS-IT-H01-1.2-01		
<b>Subject</b>	Delivery of SPIRE OBSM image dump from MOC MCS to the HSC		
<b>Date</b>	09/05/2007	<b>Test Iteration</b>	1
<b>Test participants</b>			
HSC			
MOC(MCS)			
<b>SW configuration</b>			
MOC used HP MCS release HPMCS-30_i2r0 for the test			
<b>Test performance</b>			
<p>The Images provided by the HSC were successfully imported into the MOC MCS OBSM system whereby a comparison was performed of each image with a previously provided (by email) image. No differences were found. At this point, the images were exported from the OBSM system as dump images, and then a script run to place them in the FTS wrapper file to be transferred to the HSC.</p> <p>Files were received by the HSC and were successfully unwrapped and placed in the expected OBSM directory on the HSC Operational machine.</p> <p>A diff was performed with one of the files to confirm that it was the same as what was provided. The differences e.g. file header change, were fully explainable and in effect no differences were found.</p> <p>File names were received were according to the corresponding ICD. These were :</p> <p>SPDPRMPG_0002001_DUM_2007_129T093904.IMG          SPDPRMDA_0002001_DUM_2007_129T093841.IMG</p>			
<b>Identified problems</b>			<b>AR Reference</b>
None			
<b>Remarks</b>			
<b>Test successfully performed (YES/NO)</b>	YES		
<b>Test Coordinator</b>	<b>Signature</b>	<b>Date</b>	
Laurence O'Rourke		9 <sup>th</sup> May 07	

**4.2.3.2 HGS-IT-1.2-02**

<b>Test ID</b>	HGS-IT-H01-1.2-02		
<b>Subject</b>	Delivery of PACS OBSM image dump from the MOC MCS to the HSC		
<b>Date</b>	09/05/2007	<b>Test Iteration</b>	1
<b>Test participants</b>			
HSC			
MOC(MCS)			
<b>SW configuration</b>			
MOC used HP MCS release HPMCS-30_i2r0 for the test			
<b>Test performance</b>			
<p>The Images provided by the HSC were successfully imported into the MOC MCS OBSM system whereby a comparison was performed of each image with a previously provided (by email) image. No differences were found. At this point, the images were exported from the OBSM system as dump images, and then a script run to place them in the FTS wrapper file to be transferred to the HSC.</p> <p>Files were received by the HSC and were successfully unwrapped and placed in the expected OBSM directory on the HSC Operational machine.</p> <p>A diff was performed with one of the files to confirm that it was the same as what was provided. The differences e.g. file header change, were fully explainable and in effect no differences were found.</p> <p>File names were according to the corresponding ICD. These were :</p> <p>PASPRMSL_0004001_DUM_2007_129T093342.IMG          PASPEPSL_0004001_DUM_2007_129T093239.IMG          PASPRMSL_0005001_DUM_2007_129T093631.IMG          PASPEPSL_0005001_DUM_2007_129T093310.IMG          PASPRMSL_0006001_DUM_2007_129T093731.IMG          PASPEPSL_0006001_DUM_2007_129T095048.IMG</p>			
<b>Identified problems</b>			<b>AR Reference</b>
None			
<b>Remarks</b>			
<b>Test successfully performed (YES/NO)</b>		YES	
<b>Test Coordinator</b>		<b>Signature</b>	<b>Date</b>
Laurence O'Rourke			9 <sup>th</sup> May 07

**4.2.3.3 HGS-IT-1.2-03**

<b>Test ID</b>	HGS-IT-H01-1.2-03		
<b>Subject</b>	Delivery of HIFI OBSM image dump from the MOC MCS to the HSC		
<b>Date</b>	09/05/2007	<b>Test Iteration</b>	1
<b>Test participants</b>			
HSC			
MOC(MCS)			
<b>SW configuration</b>			
MOC used HP MCS release HPMCS-30_i2r0 for the test			
<b>Test performance</b>			
<p>The Image provided by the HSC were successfully imported into the MOC MCS OBSM system whereby a comparison was performed of the image with a previously provided (by email) image. No differences were found. At this point, the image was exported from the OBSM system as a dump image, and then a script run to place them in the FTS wrapper file to be transferred to the HSC.</p> <p>Files were received by the HSC and were successfully unwrapped and placed in the expected OBSM directory on the HSC Operational machine.</p> <p>A diff was performed with one of the files to confirm that it was the same as what was provided. The differences e.g. file header change, were fully explainable and in effect no differences were found.</p> <p>The File name was according to the corresponding ICD. This was :        HIDPRMPG_0002001_DUM_2007_129T093158.IMG</p>			
<b>Identified problems</b>		<b>AR Reference</b>	
None			
<b>Remarks</b>			
<b>Test successfully performed (YES/NO)</b>		YES	
<b>Test Coordinator</b>		<b>Signature</b>	<b>Date</b>
Laurence O'Rourke			9 <sup>th</sup> May 07

## 4.3 Test Report for provision of TPF files to MOC MCS

### 4.3.1 Test approach for file provision

TPFs are made available to the HSC from the Instrument Control Centres. For the purpose of this test, they may be provided by email.

### 4.3.2 Test cases

Test identification	Test description	Product delivered	Target
HGS-IT-H01-1.3-01	Delivery of SPIRE TPF from HSC to the MOC MCS	TPF	MOC MCS
HGS-IT-H01-1.3-02	Delivery of PACS TPF from HSC to the MOC MCS	TPF	MOC MCS
HGS-IT-H01-1.3-03	Delivery of HIFI TPF from HSC to the MOC MCS	TPF	MOC MCS

### 4.3.3 Test reports

#### **HGS-IT-H01-1.3-01 ; Delivery of SPIRE TPF from HSC to the MOC MCS**

As of GSRR, there are no SPIRE TPF to be transferred from HSC to MOC MCS. There is no ICD for this because no files have yet been identified by SPIRE. As a result, this test case is considered to DELETED. If a test needs to be performed then it should be straightforward due to the fact that this has been validated for HIFI already.

#### **HGS-IT-H01-1.3-02 ; Delivery of PACS TPF from HSC to the MOC MCS**

As of GSRR, the identification of TPFs for PACS is still underway. An ICD is being generated for PACS but until that becomes an issue 1.0 then no tests will be performed. In most recent discussions it is still unclear whether or not PACS will use TPFs. No TPFs were used during SVT-1.

A test was performed on the 8<sup>th</sup> January 2008 to validate the file transfer system delivery of TPF files. The file sent was TPF\_\_HSCSDA\_D\_081107T140300\_00001.HERS was sent and it contained a dummy test file. It was successfully received.

On this basis, the test of PACS TPFs delivery is considered PASSED from the interface perspective. When an ICD becomes available then a further test shall be performed to place the file within this TPF\_ wrapper.

**HGS-IT-H01-1.3-03 ; Delivery of HIFI TPF from HSC to the MOC MCS**

Two tests were performed on this. The first one was to confirm correct execution of the File Transfer System for files called TPF\_\_. This was performed on the 8<sup>th</sup> January 2008. The file: TPF\_\_HSCSDA\_D\_081107T140300\_00001.HERS was sent and it contained a dummy test file. The confirmation of its reception was as follows by E.Valido It has been received and processed at **hmcb.ops.esa.int**.

A second test was performed with actual use of the interface in preparation of SVT-1 as defined in the table below :

<b>Test ID</b>	HGS-IT-H01-1.3-03		
<b>Subject</b>	Delivery of HIFI TPF from HSC to the MOC MCS		
<b>Date</b>	28 <sup>th</sup> February 2008	<b>Test Iteration</b>	1
<b>Test participants</b>			
HSC			
MOC(MCS)			
<b>SW configuration</b>			
MOC used their SVT-1 MCS configuration for this			
<b>Test performance</b>			
These were contained in a zip file that also contains a delivery note. The zip file "HIFI_TPF_v0003.zip" has been placed in the FTS wrapper (TPF__HSCSDA_D_080228T174500_00001.HERS) and has been sent via FTS to the MOC a few minutes ago:			
Files were received by the MOC and were successfully unwrapped and placed in the expected TPF directory on the MCS.			
The File name was according to the corresponding ICD. This was : TPF__HSCSDA_D_080228T174500_00001.HERS			
The files were used during SVT-1 successfully.			
<b>Identified problems</b>			<b>AR Reference</b>
None			
<b>Remarks</b>			
<b>Test successfully performed (YES/NO)</b>		YES	
<b>Test Coordinator</b>	<b>Signature</b>	<b>Date</b>	
Laurence O'Rourke		28 <sup>th</sup> Feb 08	

## **4.4 Test Report for provision of TSF to HSC**

### **4.4.1 Test approach for file provision**

The Timeline Summary file is generated when the MOC SPACON generates a “manual stack dump file” based upon printing into a file a set of commands that have been loaded by him/her on the SCOS 2000 manual stack display.

### **4.4.2 Test Cases**

Test identification	Test description	Product delivered	Target
HGS-IT-H01-1.4-01	Delivery of TSF from MOC MCS to the HSC	TSF	HSC

### 4.4.3 Test reports

#### 4.4.3.1 HGS-IT-1.4-01

<b>Test ID</b>	HGS-IT-H01-1.4-01		
<b>Subject</b>	Delivery of TSF from MOC MCS to the HSC		
<b>Date</b>	09/05/2007	<b>Test Iteration</b>	1
<b>Test participants</b>			
HSC			
MOC(MCS)			
<b>SW configuration</b>			
<b>Test performance</b>			
The manual stack was loaded with a sequence which was then dumped using the manual stack dump mechanism. It was then successfully placed in an FTS wrapper by the MOC script and transferred to the HSC via the FTS			
File was confirmed to be successfully unwrapped at the HSC side and placed in the expected TSF directory. It was then opened using vi and found to be as expected.			
File name of Manual Stack Dump file that was sent within the FTS wrapper was HRMS0UU2_FTS_test.txt.			
<b>Identified problems</b>			<b>AR Reference</b>
None			
<b>Remarks</b>			
<b>Test successfully performed (YES/NO)</b>		YES	
<b>Test Coordinator</b>		<b>Signature</b>	<b>Date</b>
Laurence O'Rourke			9 <sup>th</sup> May 07

## 4.5 Test Report for provision of SDB\_ to HSC

### 4.5.1 Test approach for file provision

The Spacecraft Database file (SDB) is generated by the MOC Analyst as a result of there being an update made to it which needs to be passed to the HSC. The data file is transferred via the HERSCHEL/PLANCK File Transfer System.

### 4.5.2 Test Cases

Test identification	Test description	Product delivered	Target
HGS-IT-H01-1.5-01	Delivery of Database files from MOC MCS to the HSC	SDB_	HSC

### 4.5.3 Test reports

Two tests were performed on this. The first one was to confirm correct execution of the File Transfer System for files called SDB\_\_ This was performed on the 11<sup>th</sup> January 2008. The confirmation of its reception was made by telephone with E.Valido.

The Second test was in fact actual delivery of the HPSDB to be used by HSC for the FM RMS test. This is described in the table below:

<b>Test ID</b>	HGS-IT-H01-1.5-01		
<b>Subject</b>	Delivery SDB from MOC MCS to the HSC		
<b>Date</b>	15/01/2008	<b>Test Iteration</b>	1
<b>Test participants</b>			
HSC			
MOC(MCS)			
<b>SW configuration</b>			
<b>Test performance</b>			



Email from A.Tomescu (MOC)

The HPFTS test seems to be completed successfully. See below:

```
Tue Jan 15 10:23:08 GMT 2008
Directory: /home/hftsops/FTS/admin
Directory: /home/hftsops
hsdsb /home/hftsops> /home/hftsops/FTS/admin/sendSDB.sh
/home/hftsops/FTS/tmp/ASCII_H_200801151100.zip
ASCII_H_200801151100.zip
Sending file: SDB__SDAHSC_D_080115T102359_00001.HERS
File SDB__SDAHSC_D_080115T102359_00001.HERS transmitted successfully
rm: cannot remove
`/home/hftsops/FTS/tmp/SDB__SDAHSC_D_080115T102359_00001.HERS': No such file or
directory
```

The latest Herschel MIB dataset has been used for this test, wrapped in a ZIP archive.

File was confirmed to be successfully unwrapped at the HSC side and placed in the expected SDB directory. It was then used by the HSC for FM RMS planning

File name of Manual Stack Dump file that was sent within the FTS wrapper was  
**SDB\_\_SDAHSC\_D\_080115T102359\_00001.HERS**

Identified problems		AR Reference
None		
<b>Remarks</b>		
<b>Test successfully performed (YES/NO)</b>	YES	
<b>Test Coordinator</b>	<b>Signature</b>	<b>Date</b>
Laurence O'Rourke		15 <sup>th</sup> Jan 08

## 5. HSC-MCS DDS data retrieval tests – HGS-IT-H01-3.0

### 5.1 Test scenario for provision of DDS files to the HSC

#### 5.1.1 Test approach for file provision

The MOC Data Disposition System (DDS) is an archive which contains all S/C HK, Instrument HK and Instrument Science TM packets that have been received from the satellite by the MOC Mission Control System. In addition to this data, additional files are placed in the DDS, namely :

- Instruments derived parameters
- Telecommand History file
- Out of Limit Data
- Time Correlation File
- Orbit files
- PSF files
- Other files that are nominally provided by the FTS system but which are placed in the DDS

Finally specific data types such as consolidated packets can be retrieved from the DDS linked to the TM received by the MOC...

#### 5.1.2 Test Cases

Test identification	Test description	Product delivered	Target
HGS-IT-H01-3.1-01	Delivery of Consolidated S/C HK data to the HSC	S/C TM	HSC
HGS-IT-H01-3.1-02	Delivery of Consolidated Instrument HK data to the HSC	Instrument TM	HSC
HGS-IT-H01-3.1-03	Delivery of Consolidated Science TM data to the HSC	Science TM	HSC
HGS-IT-H01-3.1-04	Delivery of TC history file to the HSC	TC History	HSC
HGS-IT-H01-3.1-05	Delivery of OOL file to the HSC	OOL	HSC
HGS-IT-H01-3.1-06	Delivery of Derived parameter data file to the HSC	Derived parameters	HSC
HGS-IT-H01-3.1-07	Delivery of Time Correlation data to the HSC	Time Correlation	HSC
HGS-IT-H01-3.1-08	Delivery of Consolidated packets to the HSC	Consol.	HSC
HGS-IT-H01-3.1-09	Delivery of Non-Consolidated packets to the HSC	Non-Consol	HSC
HGS-IT-H01-3.1-10	Delivery of FTS transferred data files e.g. Orbit, PSF	Time Correlation	HSC
HGS-IT-H01-3.1-11	Test of Error message response – DDS ICD	Error	HSC

	appendix B	Message	
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### 5.1.3 Test reports

#### Status as at draft issue 1.0 of the document – 17<sup>th</sup> May 07

Although the formal test run of the test cases has not yet been performed, a pre-test was carried out in early January 2007 whereby the HSC used the DDS client to connect to the DDS and retrieve data files.

These files were successfully received in the predefined ftp directory.

This means therefore that the DDS interface set up by the HSC is in a very good state. When useful data becomes available in the DDS and various DDS known problems have been addressed then these test cases will be run.

#### Status as at issue 1.0 of this document

The DDS data retrieval interface with the MOC has been tested since then on a number of occasions.

#### **(a) 11<sup>th</sup> December 07 test setup**

The actual formal interface was established with user accounts on the 11<sup>th</sup> December as defined in an email from E.Valido :

Hi Kevin,

I have reconfigured the user accounts:

hsc -> ESAC

hsctest -> ESTEC

You can check the user account details following this link:

**[http://hsdsb.esoc.ops.esa.int:9080/protected/view\\_user.jsp](http://hsdsb.esoc.ops.esa.int:9080/protected/view_user.jsp)**

Please, let me know if the FTP details are OK and you receive the files on both machines.

Yes, I will ensure that the RMS AVM data is available to you.

You should use: **hsdsb.esoc.ops.esa.int:9080**

(hsdsa is always connected to the A-Chain which is used by the FCT)

Best regards,

#### **(b) 13<sup>th</sup> December 07 test setup**

The first test took place with the operational account hsc on the 13<sup>th</sup> December & defined the final ftp account details. LO'Rourke sent an email stating this :

**Laurence O'Rourke/vilspa/ESA**

13/12/2007 17:31

Hi Eduardo,

Having successfully tested the DDS interface from the herfts01 machine, please find below the new FTP account information to be applied for files being sent from DDS to the HSC :

Machine is the same i.e. herfts01.esac.esa.int  
account = hsc  
pwd = esacxxxxx

whereby the xxxxx should be obvious as this is the old name of esac.....starting with v :-)

Directory to transfer files to = /home/hsc/data/tm/incoming

regards,  
Larry

### (c) 17<sup>th</sup> to 19<sup>th</sup> December 2007

The first formal test of the DDS therefore with operational accounts & FTP directories was performed during the 17<sup>th</sup> to 19<sup>th</sup> December 2007 time period in which test data sets of S/C HK, Instrument HK & Science Data were retrieved.

### (d) 15<sup>th</sup> - 17<sup>th</sup> July 2008

During the months of 2008, the DDS interface was used quite regularly. On the 15<sup>th</sup> & the 17<sup>th</sup> July 2008, a full replay of the AVM RMS Data set was performed at MOC to test the consolidation process and the HSC capability to retrieve the data on-line during the test. This test was successful.

Most data sets were retrieved during that test in such a way that the actual test case status can now be formally closed out with that test.

Test identification	Test description	Product delivered	Status
HGS-IT-H01-3.1-01	Delivery of Consolidated S/C HK data to the HSC	S/C TM	Tested
HGS-IT-H01-3.1-02	Delivery of Consolidated Instrument HK data to the HSC	Instrument TM	Tested
HGS-IT-H01-3.1-03	Delivery of Consolidated Science TM data to the HSC	Science TM	Tested
HGS-IT-H01-3.1-04	Delivery of TC history file to the HSC	TC History	Partially Tested – Empty file as no data in archive but request successful
HGS-IT-H01-3.1-05	Delivery of OOL file to the HSC	OOL	Partially Tested - No OOL file available but a file was retrieved from ESTEC.
HGS-IT-H01-3.1-06	Delivery of Derived parameter data file to	Derived parameters	TEST CASE DELETED. THIS

	the HSC		INTERFACE IS NOT TO BE USED AT PRESENT.
HGS-IT-H01-3.1-07	Delivery of Time Correlation data to the HSC	Time Correlation	Tested
HGS-IT-H01-3.1-08	Delivery of Consolidated packets to the HSC	Consol.	Tested
HGS-IT-H01-3.1-09	Delivery of Non-Consolidated packets to the HSC	Non-Consol	Tested
HGS-IT-H01-3.1-10	Delivery of FTS transferred data files e.g. Orbit, PSF	Orbit etc	Tested – our DDS client is not set up to retrieve these files but we can if we wish to use the web interface. From our perspective, having performed a lot of data transfers with the DDS, we are confident this works fine.
HGS-IT-H01-3.1-11	Test of Error message response – DDS ICD appendix B	Error Message	Tested – we have iterated on a lot of error messages during our tests. We consider this tested as an inherent part of the tests we have performed.

## 6. Test execution summary table

Test case	Execution date	Test result	Comment
HGS-IT-H01-1.1-01	09/05/2007	PASS	
HGS-IT-H01-1.1-02	09/05/2007	PASS	
HGS-IT-H01-1.1-03	09/05/2007	PASS	
HGS-IT-H01-1.2-01	09/05/2007	PASS	
HGS-IT-H01-1.2-02	09/05/2007	PASS	
HGS-IT-H01-1.2-03	09/05/2007	PASS	
HGS-IT-H01-1.3-01	DELETED	DELETED	
HGS-IT-H01-1.3-02	08/01/2008	PASS	Interface validated for TPF transfers. PACS TPF not transferred within wrapper file as a formal ICD is not yet existing.
HGS-IT-H01-1.3-03	08/01/2008 28/02/2008	PASS	
HGS-IT-H01-1.4-01	09/05/2007	PASS	
HGS-IT-H01-1.5-01	09/05/2007	PASS	
HGS-IT-H01-3.1-01	Early Jan 07 13/12/2007 17 to 19/12/2007 15 to 17/07/2008	PASS	
HGS-IT-H01-3.1-02		PASS	
HGS-IT-H01-3.1-03		PASS	
HGS-IT-H01-3.1-04		PASS (partly)	Empty file retrieved as no data in archive. Examples provided to HSC however.
HGS-IT-H01-3.1-05		PASS (partly)	Empty file retrieved as no data in archive. Examples provided to HSC however.
HGS-IT-H01-3.1-06		DELETED	Derived Parameter interface is being maintained with MOC but no data is identified/required to be transferred.
HGS-IT-H01-3.1-07		PASS	
HGS-IT-H01-3.1-08		PASS	
HGS-IT-H01-3.1-09		PASS	
HGS-IT-H01-3.1-10		PASS	
HGS-IT-H01-3.1-11		PASS	

## 7. Validation of Interface Requirements

[AD 7] contains the list of interface requirements relevant to the Herschel Ground Segment. Those that are relevant to the interfaces tested in this test plan/report are listed below with their validation status :

Section of IRD	Description	Status of testing
<b>3.1.1</b>	<b>CONSOLIDATED TELEMETRY</b>	
<b>3.1.1.1</b>		
FGS-IR-3.1-10	The MOC shall make available all spacecraft and instrument telemetry data to the HSC	TESTED
FGS-IR-3.1-20	The MOC shall make available telemetry data to the HSC as consolidated telemetry data	TESTED
FGS-IR-3.1-30	The MOC shall make available telemetry data (spacecraft and instruments) to the HSC in a format from which the source telemetry packets generated on-board can be extracted	TESTED
<b>3.1.1.2</b>		
FGS-IR- 3.1-75	The HSC shall request the MOC to make available consolidated telemetry data for a given operational period	TESTED
FGS-IR-3.1-80	The MOC shall make available to the HSC the consolidated telemetry data separately according to the following categories	TESTED
FGS-IR-3.1-90	The MOC shall indicate the availability of consolidated telemetry data on a time period basis	TESTED
FGS-IR-3.1-100	The MOC shall push the consolidated telemetry data to the HSC.	TESTED
<b>3.1.1.3</b>		
FGS-IR-3.1-110	The MOC shall make available to the HSC any sequence of any category of consolidated telemetry data from dump telemetry not later than 10 minutes after the last "bit" of this sequence has been received by the MOC	TESTED

<b>3.1.7</b>	<b>MISSION TIMELINE SUMMARY</b>	
FGS-IR-3.1-270	The MOC shall make available to the HSC the mission timeline summary corresponding to any given operational period	TESTED
FGS-IR-3.1-280	The HSC shall poll the MOC to know of the availability of a new mission timeline summary	TESTED
FGS-IR-3.1-290	The HSC shall pull the new mission timeline summary from MOC.	TESTED
FGS-IR- 3.1-295	The MOC shall make available the mission timeline summary before the uplink of the corresponding mission timeline to the	TESTED

	spacecraft	
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<b>3.1.8</b>	<b>TELECOMMAND HISTORY</b>	
FGS-IR-3.1-300	The MOC shall make available to the HSC the telecommand history information for any given operational period	TESTED
FGS-IR-3.1-310	The telecommand history data shall include the necessary information for the HSC to be able to associate (when relevant) the telecommand to the instrument or spacecraft commanding requests in the corresponding observations schedule	TESTED
FGS-IR-3.1-320	The HSC shall request the MOC to make available telecommand history data for a given operational period	TESTED
FGS-IR-3.1-330	The MOC shall push the telecommand history data to the HSC.	TESTED
FGS-IR-3.1-340	The MOC shall make available to the HSC the telecommand history for a given operational period at the same time as the consolidated housekeeping telemetry for this period	NOT TESTED as no real data in AVM RMS DB. To be tested with FM RMS data set.

<b>3.1.11</b>	<b>TIME CORRELATION</b>	
FGS-IR-3.1-420	The MOC shall make available to the HSC the time correlation data	TESTED
FGS-IR-3.1-430	The time correlation data shall allow to correlate the spacecraft time and UTC time with a precision of better than 500 ms at any time of the spacecraft mission	TESTED
FGS-IR- 3.1-435	The HSC shall request the MOC to make available time correlation data for a given operational period.	TESTED
FGS-IR- 3.1-436	The MOC shall push the time correlation data to the HSC.	TESTED
FGS-IR-3.1-440	The MOC shall make available to the HSC the time correlation data for a given operational period at the same time as the spacecraft consolidated housekeeping telemetry for this period.	TESTED

<b>3.1.14</b>	<b>INSTRUMENT MEMORY IMAGE</b>	
FGS-IR-3.1-490	The MOC shall make available to the HSC the instrument memory image corresponding to an instrument memory dump requested by an ICC.	TESTED
FGS-IR-3.1-495	The MOC shall notify the HSC of the availability of dumped instrument memory images.	TESTED
FGS-IR-3.1-496	The HSC shall pull dumped instrument memory images from the MOC.	TESTED
FGS-IR-3.1-498	The MOC shall make the image of an instrument memory at the latest one hour after the last telemetry data of the	TESTED



	memory dump has been received by MOC.	
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<b>3.1.15</b>	<b>SPACECRAFT AND INSTRUMENTS DATABASES</b>	
FGS-IR-3.1-500	The MOC shall make available to the HSC the spacecraft and instruments reference databases	TESTED
FGS-IR-3.1-505	The MOC shall notify the HSC of the availability of new instruments reference databases.	TESTED
FGS-IR-3.1-506	The HSC shall pull new instruments reference databases from the MOC.	TESTED

<b>3.4.2</b>	<b>INSTRUMENT ON-BOARD SOFTWARE UPDATES</b>	
FGS-IR-3.4-80	The HSC shall make available to the MOC instrument on-board software updates	<b>TESTED</b>
FGS-IR-3.4-100	The HSC shall push On-board software updates to the MOC.	<b>TESTED</b>