



**SUBJECT: RTA-HCSS Data  
Interface Control Document**

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## Change Record

ISSUE	DATE	
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## 1. INTRODUCTION

### 1.1 Purpose

This document specifies an interface for transferring TC history data and OOL data between RTA and the Herschel Common Science System (HCSS) in ILT.

### 1.2 Scope

This document corresponds to ICD#8 in the list of ICDs [RD3].

This ICD is only applicable to the ILT phase of the Herschel mission.

This ICD defines the interface for TC history data and OOL data transfer only and does not cover the structure of the TC history file [RD4] or the OOL data record file [RD5].

### 1.3 Applicable Documents

<b>AD1</b>	Herschel Ground Segment Design Description Document	FIRST/FSC/DOC/0146	1.1	10 December 2001
<b>AD2</b>	Herschel Ground Segment IRD	FIRST/FSC/DOC/0117	2.0	6 December 2001

### 1.4 Reference Documents

<b>RD 1</b>	HCSS User Requirements Document	FIRST/FSC/DOC/0115	2.0	3 May 2001
<b>RD 2</b>	FIRST Common Science System: Use Case Definitions	FIRST/FSC/DOC/0158	1.0	7 November 2000
<b>RD 3</b>	Ground Segment List of ICDs	FIRST/FSC/DOC/0150	1.0	24 November 2000
<b>RD 4</b>	TC History Interface Control Document	SPIRE-ICS-DOC-000900	1.0	30 October 2002
<b>RD 5</b>	OOL Data Interface Control Document	SPIRE-ICS-DOC-000974	1.0	30 October 2002

### 1.5 List of Acronyms

<b>AD</b>	Applicable Document
<b>CCS</b>	Central Checkout System
<b>DDID</b>	Data Delivery System ICD
<b>EGSE</b>	Electrical Ground Segment Engineering



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<b>HCSS</b>	Herschel Common Science System
<b>IA</b>	Interactive Analysis
<b>ICD</b>	Interface Control Document
<b>ILT</b>	Instrument Level Test
<b>IST</b>	Instrument System Test
<b>MIB</b>	Mission Information Base
<b>MOC</b>	Mission Operations Centre
<b>OOL</b>	Out Of Limits
<b>ORF</b>	OOL Record File
<b>RD</b>	Reference Document
<b>RTA</b>	Real-Time Assessment
<b>SCOS</b>	Spacecraft Operating System
<b>TBC</b>	To be confirmed
<b>TBW</b>	To be written
<b>TC</b>	Telecommand
<b>THF</b>	TC History File
<b>TM</b>	Telemetry





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## 2. OPERATIONAL ASSUMPTIONS AND CONSTRAINTS

### 2.1 Communications

N/A

### 2.2 Hardware

N/A

### 2.3 Software

N/A

### 2.4 User

N/A

### 2.5 Timing

N/A



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## 3. REQUIREMENTS

### 3.1 Functional Requirements

These requirements have been extracted from the Ground Segment IRD (see [AD1]).

**IR-4.4-10:** The RTA shall make available to the HCSS the TC history data for any given testing period.

**IR-4.4-20:** The TC history data shall include the necessary information for the HCSS to be able to associate (when relevant) the TC to the instrument or TE command mnemonics exported by the FCSS. *The TC history is expected to have the same format in ILT/IST as in Ops.*

**IR.4.4-30:** The HCSS shall pull the TC History from the RTA.

**IR-4.4-40:** The RTA shall make available to the HCSS its logs for any given testing period.

**IR-4.4-50:** The HCSS shall pull the RTA logs data from the RTA.

### 3.2 On-Line Delivery Requirements

The THF and the ORF will be delivered from SCOS-2000.

### 3.3 Off-Line Delivery Requirements

N/A



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## 4. INTERFACE CHARACTERISTICS

### 4.1 Interface Location and Medium

This interface consists of a server-side application and a client-side application. It is anticipated that the server resides on the same host as SCOS-2000. The THF and ORF will be transferred as files over a communication line (LAN) between the server and the client.

### 4.2 Hardware Characteristics and Limitations

N/A

### 4.3 Data Source, Destination and Transfer Mechanism

The data source is EGSE-ILT. Data will be exported to the HCSS when requested. The transfer mechanism can be on a local machine or via TCP/IP. Note that data that is transferred across a network is subject to Java serialization.

### 4.4 Node and Device Addressing

Initiation of the server requires that the listening port be specified.

Connection to the server requires the IP address of the host and the listening port be specified.

The default server is 127.0.0.1 (localhost) and the default port is 3187 for THF and 3188 for ORF.

### 4.5 Relationship with other interfaces

The server-side application interfaces with the SCOS-2000 interfaces that retrieve the requested TC or OOL data. These are either TCP/IP-based (version 2.3e) or CORBA-based (future versions).



## **5. ACCESS**

### **5.1 Programs generating or using the Interface Data**

The main programs using the interface are the HCSS TCH Ingestor to transfer THFs and the the HCSS OOL Ingestor to transfer ORFs; however, there are no restrictions on other programs using it.

### **5.2 Failure Protection, Detection and Recovery Procedures**

Any failure in transferring the data between the EGSE-ILT and the HCSS, e.g. timeout, is detected during transfer, an exception is throw and a request for the data from the EGSE-ILT is reissued. The number of times that a request is reissued is configurable but the default is 10. If this is exceeded then another exception is thrown and the current client terminates.

Errors in the THF and ORF are detected during processing (ingestion) by the HCSS.

### **5.3 File Naming Conventions**

The THF/ORF are transient files but require a naming convention (at least for HCSS v0.1) to prevent overwriting by successive files on the EGSE-ILT (SCOS-2000) side (see [RD4, RD5] for details).

### **5.4 Storage and File Deletion Requirements**

The EGSE-ILT and HCSS should have sufficient space to temporarily store the THFs/ORFs.

### **5.5 Security Requirements**

Servers must be kept up-to-date with the latest security patches, especially if not protected by a firewall. An unauthorised user must not be able to modify the data in any way.

### **5.6 Data Integrity Checks**

None - processing of the data by the HCSS will detect any data integrity problems in the transferred files.

### **5.7 Backup Requirements**

None – backup of the source data and the ingested data is the responsibility of the EGSE-ILT and HCSS respectively.

### **5.8 Input / Output Protocols, Calling Sequence**

See section 8.

### **5.9 Synchronisation Requirements**

- The server-side application will only handle one request for a THF/ORF at a time – this limitation is imposed by the SCOS-2000 interfaces.



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- A locking mechanism must be used to prevent data being extracted from the database whilst it is in the process of being written or modified.

## 5.10 Error Handling

All unhandled errors will cause an exception to be thrown.



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## 6. DETAILED INTERFACE SPECIFICATION

### 6.1 Data Structure

The structure of the THF is described in [RD4] and the structure of the ORF is described in [RD5].

### 6.2 Generation Method

The client sends a request to the server for a THF/ORF. The server forwards this request to the SCOS-2000 server via a TCP/IP interface, which generates the appropriate file. The server then transfers this file to the client, where it is ingested and the data put into a HCSS database.

Each file covers a specific time window reported in the file header in terms of both its start and end times and its length.

### 6.3 Data passed across the interface – direction of transfer

THFs and ORFs are passed from the EGSE-ILT to the HCSS.

### 6.4 Size and Frequency of Transfers

It is envisaged that one THF and one ORF per operation period (day?) will be produced on average.



## 7. DATA DEFINITION

### 7.1 Configuration files

These files are used to specify the values of default parameters. There is a separate file for the server and the client parameters. The server and the client access these parameters via the **getProperty** method of the **Configuration** class in the **share.util** package. In the following, **package** refers to either **tchingest** or **oolingest** depending on context

#### 7.1.1 Server-side parameters

**hcss.package.port** Port number to listen on (default is 3187 for THF and 3188 for ORF)

#### 7.1.2 Client-side parameters

**hcss.package.server** IP number of server host (default is 127.0.0.1 (localhost))

**hcss.package.port** Port number of socket connection (default is 3187 for THF and 3188 for ORF)

**hcss.package.maxfileattempts** Maximum number of attempts to retrieve a file (default is 10)

#### 7.1.3 File example

```
# Default properties file for the TC History ingestion process.
```

```
#
```

```
# Author M.J.Graham IC/SPIRE
```

```
# Test file server and port.
```

```
hcss.tchingest.server = 127.0.0.1
```

```
hcss.tchingest.port = 3187
```

```
# Number of attempts to get THF
```

```
hcss.tchingest.maxfileattempts = 10
```



## 8. APPLICATION PROGRAMMING INTERFACE

This section specifies the client and server applications that comprise this interface.

### 8.1 Client-side

Within the TC history and OOL data ingestion packages (**tchingest** and **oolingest** respectively), there is a method called **getFile**:

```
public void getFile (Date startTime, Date endTime) throws IOException;
```

This enacts the following operations:

1. Opens a connection to the server
2. Gets object streams to read from and write to the server
3. Passes the startTime and endTime arguments to the server
4. Reads the returned object and checks that it is an instance of a file
5. Sets up a LineNumberReader on the file for the ingestion procedure

### 8.2 Server-side

The abstract class **AbstractFileServer** is extended within the TC history and OOL data ingestion packages (**tchingest** and **oolingest** respectively) to produce specific servers to handle THF and ORF files from different sources (SCOS-2000 interfaces, depending on which version of SCOS-2000 is being run (**TBW**); test class):

#### 8.2.1 AbstractFileServer

##### 8.2.1.1 Constructor

```
public AbstractFileServer (int port);
```

##### 8.2.1.2 Methods

```
protected handle();  
public void getFile (Date startTime, Date endTime);
```

##### 8.2.1.3 Description

An instantiation of the class will open a **ServerSocket** on the specified port. When a client request is received, the **handle** method:

1. Opens object streams on the socket to read and write to the client
2. Gets the startTime and endTime arguments from the client
3. Passes these to the appropriate interface to retrieve the data via **getFile**
4. Writes the appropriate data file to the client
5. Closes the connection to the client
6. Waits for the next client request





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