SPIRE ICC

HSC requirements on SPIRE
User Requirements Document

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1 Introduction

1.1 Purpose & Scope

This document describes the requirements put on the SPIRE ICC by the Herschel Science Centre (HSC) such that the HSC is able to perform observations with the instrument and allow the Proposer to receive and, possibly, process the scientific data. This includes interfaces for the provision by the ICC of calibration files, AOTs and data processing software. The requirements also include the need for SPIRE to be able to work with/in environments provided by the HSC such as the HCSS.

1.2 Definitions of Terms and Acronyms

Listing of acronyms that are of specific relevance to this URD

CUS	Common Uplink System
HCSS	Herschel Common Science System
HSC	Herschel Science Centre
IA	Interactive Analysis
QCP	Quality Control Pipeline

In addition two web pages are available describing terms applicable to SPIRE
http://www.ssd.rl.ac.uk/spire/consortium/information/FIRSTacronyms.shtm
http://www.ssd.rl.ac.uk/spire/consortium/information/FIRSTdefinitions.asp

1.3 Related Documents

1.3.1 Applicable Documents

AD-1 FIRST Ground Segment Design Description FIRST/FSC/DOC/0146

AD-2	FSC System Actor Definitions	FIRST/FSC/DOC/0157

1.3.2 Reference Documents

RD-1	SPIRE ICC URD Scope Document	SPIRE-ICS-DOC-000484
RD-2	FIRST Operations Scenario Document	Draft 0.95 22 February 2000
RD-3	FSC System Use Case Definitions	FIRST/FSC/DOC/0158
RD-4	FSC System URD	FIRST/FSC/DOC/0115
RD-5	FINDAS URD	FIRST/FSC/DOC/????
RD-6	FSC IRD	FIRST/FSC/DOC/0117
RD-7	Technical Note on the Coding Standards for the FCSS development	FCSDT/TN-009

1.4 Overview

The HSC is the single-point interface to the outside community, handling proposals and support. It coordinates cross-calibration between ICCs, uplink of schedules to the MOC and provides quality control and scientific product production. It manages the Herschel Common Science System (HCSS) comprising of sub-systems such as the Common Uplink System (CUS) and the Quality Control Pipeline (QCP). At the core of the HCSS is an Object-Oriented database, used to store, distribute and retrieve all mission artifacts relevant to science and instrument operations.

The ICC is responsible for the operation, monitoring and calibration of the SPIRE instrument. To this end the HSC requires from the ICC calibration and engineering observations, observation quality data, instrument onboard software, scientific product production software, instrument procedures and commands and updates to the instrument database, e.g. calibration files. It also requires the ICC to provide instrument and software documentation and support for queries on the instrument behaviour/functionality that may come from the HSC (e.g. arising from QCP), the MOC or the external community.

2 User Characteristics

The descriptions of the users can be found in the document HSC System Actor Definitions.

2.1 HSC-side Specific

Archive User
Astronomer
Configuration Control Board
Configuration Controller
FIRST Observation Time Allocation Committee (FOTAC)
General Public
Helpdesk
Mission Planner
Mission Operations Centre (MOC)
Problem Analyst
Project Science Team (PST)

2.2 ICC Specific

Calibration Scientist
ICC Manager
Instrument Engineer
Instrument Tester
Scientific Software Developer
Scientific Product Analyst

2.3 Either

Software Tester
SW Maintenance Team

3 Requirements

This section describes the actual requirements made on the ICC by the HSC. Note that the Phase flag indicated the *earliest* phase the requirement is made at. It is assumed, unless explicitly stated that the requirement holds for all subsequent phases.

UR-HSC-100 Common Uplink System / Mission Planning

UR-HSC-110 Repetitive observations

Repetitive calibration/engineering observations must be submitted as a series of observations (as opposed to submitting a type of observation once and requesting it be re-executed after some specified intervals).

Source	RD-2[5.2.1]
Importance	Essential
Frequency	Weekly
Phase	ILT

UR-HSC-120 Time-scale for observation planning

Calibration or engineering observations will normally be submitted at fixed times (interval TBD) within the agreed nominal scheduling cycle (duration TBC). For non-nominal instrument behaviour the timescale for submission and planning of an observation will be at least 3 days (TBC).

Source	RD-2[5.2.1]

Importance	Essential
Frequency	Daily/Weekly
Phase	Operations

UR-HSC-130 Mixing calibration and science on OD

FSC schedule to MOC may mix calibration and engineering observations with science observations. i.e. requirement on ICC not to assume a complete OD is available for calibration or engineering observations (unless there is some instrument problem and science observations cannot be performed anyway).

SPIRE must place a UR on HSC to allow it to specify what we want to do in terms of how we submit calibration observations. E.g. we must be able to observe at certain times.

Source	RD-2[5.2.1]
Importance	Desirable
Frequency	Infrequent
Phase	Operations

UR-HSC-140 Re-requesting failed observations

Failed calibration or engineering observations must be specifically re-requested by the ICC. The HSC will only reschedule failed science observations.

Source	RD-2[5.2]
Importance	Essential
Frequency	Daily
Phase	ILT

UR-HSC-150 Modifying observations

A scheduled observation must be unscheduled before it can be modified. I.e. it may not get the same slot on resubmission.

Source	RD-2[5.3.1.2]
Importance	Essential
Frequency	Weekly
Phase	ILT

UR-HSC-160 Observation rejection by MP

Mission Planning can reject a calibration or engineering observation from a particular OD if it results in a poor Figure of Merit for the schedule.

This is a possibility, to be confirmed or otherwise by HSC, that requires the implications to be addressed.

Source	Here
Importance	Desirable
Frequency	Weekly
Phase	Operations

UR-HSC-170 Replacement of schedule by PS

A schedule containing calibration or engineering observations can, on the approval of the Project Scientist, be replaced with one that does not contain the observations, for example in the case of a ToO.

This is a possibility, to be confirmed or otherwise by HSC, that requires the implications to be addressed.

Source	Here
Importance	Desirable
Frequency	Monthly/Yearly
Phase	Operations

UR-HSC-200 Software Deliverables

UR-HSC-210 Java

Any software provided to the HSC for HSC use or use by the community will be written in Java.

For scripting purposes (within IA for example) the JPython scripting language is currently under investigation. It integrates seamlessly with Java .

Source	Use-Case meeting #5
Importance	Essential
Frequency	Monthly
Phase	ILT

UR-HSC-220 Coding standards

Any software provided to the HSC for HSC use or use by the community will follow the coding standards for the HCSS.

Source	RD-7 SIRD-ICCF-180
Importance	Essential
Frequency	Monthly
Phase	ILT

UR-HSC-230 Provide quality check tools

Provide IA/QCP tools for the HSC to carry out parallel/cooperative assessment (with the ICC instrument specialists) of the status and behaviour of the instrument.

Source	RD-2[5.2.2] SIRD-ICCF-130
Importance	Essential
Frequency	Monthly
Phase	PV

UR-HSC-240 Provide interactive analysis

Provide IA tools for interactive analysis of data by the Astronomer using the HSC environment, and IA tools that can be installed at the Astronomer’s institute subject to (TBD) supported platforms.

These IA tools will most likely be identical to those provided in the previous requirement. The tools for both remote (i.e. at the HSC) and local installation use will be the same, i.e. SPIRE will only support platforms available at the HSC. The requirement that IA tools can be installed locally has implications for remote access of observations from HCSS databases and possible off-line use.

Source	RD-3[UCF-493]
Importance	Essential
Frequency	Monthly
Phase	Operations

UR-HSC-250 Scope of quality check tools

The QCP tools provided to the HSC will allow the systematic and automatic generation of quality control data for each science observation

Source	RD-3[UCF-331]
Importance	Essential
Frequency	Monthly
Phase	Operations

UR-HSC-260 Review Instrument parameters after QCP

As a result of routine QCP carried out by the HSC, the ICC will undertake joint review with the HSC to establish new `nominal' values for instrument/observation parameters if it is thought that current parameters do not produce optimal products.

Source	RD-2[5.2.2] SIRD-ICCO-075
Importance	Essential
Frequency	Monthly
Phase	IST

UR-HSC-270 Calibration reports

The ICC will provide periodic calibration status reports.

Source	RD-2[5.2.2] SIRD-ICCO-075
Importance	Desirable
Frequency	Weekly/Monthly
Phase	ILT

UR-HSC-280 Provide/Update calibration plan

The ICC will provide the long-term calibration plan and strategy, updated as necessary by ongoing calibrations. The HSC informs the community of the calibration status and strategy at regular intervals.

Source	RD-2[5.2.2] SIRD-ICCO-075
Importance	Desirable
Frequency	Monthly/Yearly
Phase	ILT

UR-HSC-300 HCSS database

UR-HSC-310 Support HCSS at ICC

The ICC must provide support for the running and maintenance of the local HCSS node at the ICC.

There needs to be an Actor at the ICC with sufficient knowledge of how the local node runs to be able to fix it if it stops, or know who to contact if the problem is serious.

Source	Here
Importance	Essential
Frequency	Daily
Phase	ILT

UR-HSC-320 Support HCSS development

The ICC shall provide support to the HSC for definition, design, integration, test and validation of the HCSS.

Source	SIRD-ICCF-175 SIRD-ICCF-177
Importance	Essential
Frequency	Daily
Phase	ILT

UR-HSC-400 HCSS Maintenance / Configuration Control System

UR-HSC-410 Updating the OBS

On the raising of an appropriate SPR/SCR the ICC will update code to generate an onboard software memory image and deliver it to the HSC with a software release note describing its implications and updated documentation. This will be more frequent during IST/PV phases.

The OBS URD needs to indicate who is responsible for maintaining code, since IFSI is not around in the operations phase.

Source	RD-2[5.11.1]
Importance	Essential
Frequency	Monthly/Yearly
Phase	IST

UR-HSC-420 Using a common CC system

The ICC shall use the Configuration Control System of the HCSS for all software and documentation of the common system that is jointly supported and maintained by the HSC and ICCs.

CVS (Concurrent Versions System) is currently the implementation of a Configuration Control System

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Source	RD-2[5.11.2]
Importance	Essential
Frequency	Daily
Phase	ILT

UR-HSC-430 Update of calibration/engineering files

ICC submit, under configuration control, updates of calibration/engineering files and AOTS to the HCSS such that the best, verified parameters, procedures, etc are used to perform and reduce observations. More frequent during ILT/IST.

Source	RD-2[5.2]
Importance	Essential
Frequency	Monthly
Phase	ILT

UR-HSC-440 Changing a system artifact

Changes to any system artefact upon which the HSC has a dependency must be preceded by the submission of a SCR.

Source	RD-3[UCF-421]
Importance	Essential
Frequency	Daily
Phase	ILT

UR-HSC-450 Responding to an SCR

Following submission of a SCR the relevant artefacts must be checked out of the HCSS and a test plan and test environment created. Updated artefacts must be verified with the CC and CCB prior to checking into the HCSS.

Source	RD-3[UCF-395]
Importance	Essential
Frequency	Daily
Phase	ILT

UR-HSC-460 Traceability of configuration and inputs

Persistent processing results have to be reproducible, implying traceability of the configuration and input products used to produce new or updated artefacts.

Source	Here
Importance	Essential
Frequency	Daily
Phase	ILT

UR-HSC-470 Updating software delivered to HSC

The ICC will produce updates to software it delivers to the HSC, for integration into the HCSS.

To update software we only need submit new versions to the configuration control system. The HSC rebuild the development release of the HCSS each night. The HSC makes development releases `live' on a six weekly cycle.

Source	FSC
Importance	Desirable
Frequency	6 weekly
Phase	ILT

UR-HSC-500 HSC Collaboration

UR-HSC-510 Interface with FSC

ICC interfaces directly with the HSC Helpdesk (community support) for questions and answers.

During office hours

Source	RD-2[5.1.4] RD-3[UCF-605] SIRD-ICCO-025
Importance	Desirable
Frequency	Daily
Phase	Call for proposals #1

UR-HSC-520 Responding to FSC PR requests

The ICC shall participate as required in pre-launch ground segment integration tests, validation tests and simulations.

Source	SIRD-ICCF-200
Importance	Essential
Frequency	Daily
Phase	Definition

UR-HSC-530 Information for PR

ICC provides information, material and staff appearances requested by the HSC for PR purposes.

Source	Here RD-3[UCF-92]
Importance	Desirable
Frequency	Daily/Weekly
Phase	Operations

UR-HSC-540 Joint Information Provision

The ICC shall provide, jointly with the HSC:

- Instrument Observers Manual
- Definition of instrument data to be stored in the science archive and their relationship with HSC & MOC provided items.
- Data and operational interface between ICC and HSC.

Source	SIRD-ICCF-102 SIRD-ICCF-120 SIRD-ICCF-125 SIRD-ICCF-165
Importance	Essential
Frequency	Daily/Weekly
Phase	Operations

UR-HSC-550 Instrument Information Provision

The ICC shall provide to the HSC:

- Instrument calibration, engineering, diagnostic etc requests to the HSC for the upcoming mission planning period.
- Proposed changes to instrument operations scenario and coordinate with MOC and HSC.

Source	SIRD-ICCO-030
	SIRD-ICCO-055
Importance	Essential
Frequency	Daily/Weekly
Phase	Operations

UR-HSC-600 Training

UR-HSC-610 Development Staff Training

The ICC shall ensure development staff are adequately trained.

Source	Here
Importance	Essential
Frequency	Daily/Weekly
Phase	ILT

UR-HSC-620 Operations Staff Training

The ICC shall set up and train the ICC operations team.

Source	SIRD-ICCO-05
Importance	Essential
Frequency	Daily/Weekly
Phase	Operations

UR-HSC-630 HSC/MOC Staff Training

The ICC shall provide instrument training, as required, to selected HSC and MOC staff.

Source	SIRD-ICCO-010
Importance	Essential
Frequency	Daily/Weekly
Phase	Operations

UR-HSC-700 Archive Phase

UR-HSC-710 Archive Support

The ICC shall, jointly with the HSC:

- Monitor the run-down activities in order to ensure that all required spacecraft data are secured.
- Define the type of data and products to store in the archive.
- Support users in data reduction.
- Define processing and archive access tools.

Source	SIRD-ICCA-005
	SIRD-ICCA-010
	SIRD-ICCA-015
	SIRD-ICCA-020
Importance	Essential
Frequency	Daily/Weekly
Phase	Operations