



# HERSCHEL SCIENCE CENTRE

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SOVT-1

Science Ground Segment

Simulations Activity Plan & Timeline

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**Document Reference: HERSCHEL-HSC-DOC-1173**

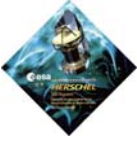
**Final Version: 1.3.1**

**24<sup>th</sup> September 2008**

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HSC Test Manager**



# HERSCHEL

## SOVT-1

### SGS – Simulations Activity Plan & Timeline

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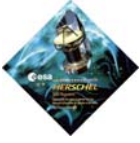
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**HERSCHEL**

**SOVT-1**

***SGS – Simulations plan & Timeline***

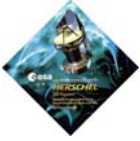
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# **HERSCHEL**

## **SOVT-1**

### ***SGS – Simulations plan & Timeline***

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## **1. Introduction**

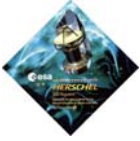
### **1.1 Scope**

The purpose of this document is to provide a detailed description of the Science Ground Segment activities (& simulations) to be performed during the System Operational Validation Test #1.

SOVT-1 will involve the Spacecraft & Ground Segment being operated during a 5 day period in a routine operations configuration, including weekend operations.

The activities to be performed can be divided into two main categories. The first are those activities which would nominally take place in the science ground segment during the SOVT-1 test i.e. validation of the end-to-end configuration.

The second correspond to additional “simulated” activities to be performed in all centres which although not required for the success of SOVT-1 allow the validation of interactions & procedures which are routine phase specific e.g. HSC MPS planning, DP Pipeline calibration table update etc.



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## SOVT-1

### SGS – Simulations plan & Timeline

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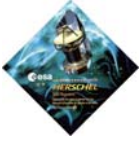
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## 1.2 Acronyms

ACMS	Attitude Control and Measurement Subsystem
AGN	Active Galactic Nucleus
AHF	Attitude History File
AOR	Astronomical Observing Request
AOT	Astronomical Observing Template
APF	
AR	Anomaly Report
CUS	Common Uplink System
CS	
DB	Database
DDS	Data Distribution System
DP	Data Processing
DTCP	Daily Telecommunications Period
E2E	End to end
EE	End to end
EPOS	
ESAC	European Space Astronomy Centre
FD	Flight Dynamics
FTP	File Transfer Program
FTS	File Transfer System
G/S	Ground Segment
GMT	Greenwich Mean Time
H/W	Hardware
HAS	Herschel Science Archive
HK	Housekeeping
HPSDB	
HSC	Herschel Science Centre
IA	Interactive Analysis
ICC	Instrument Control Centre
ICP	
ICS	Instrument and Calibration Scientist
IE	
IST	Instrument System Test
KPGT	Key Programme Guaranteed Time
LO	Local Oscillator
MIB	Mission Information Base
MIRD	Mission Implementation Requirements Document
MOC	Mission Operations Centre
MPS	Mission Planning System



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## SOVT-1

### SGS – Simulations plan & Timeline

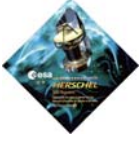
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MTL	Mission Time Line
NOAA	National Oceanic and Atmospheric Administration
OBSM	On-Board Software Monitoring System
OD	Operational Day
OOL	Out of Limits
OT	Open Time
POS	Planned Observation Sequence
PSF	Planning Skeleton File
PV	Performance Verification
R/T	Real Time
S/C	Spacecraft
S/W	Software
SGS	Science Ground Segment
SIAM	Spacecraft Instrument Alignment Matrix
SIP	Science Implementation Plan
SIRD	Science Implementation Requirements Document
SOPS	
SOVT	System Operational Validation Test
SPG	Standard Product Generation
SPT	Special Performance Test
SSMM	
SSO	Solar System Object
SVT	System Validation Test
TA	Technical Assistant
TAS	Thales Alenia Space
TBD	To Be Decided
TC	Telecommand
TCH	Telecommand History
TM	Telemetry
ToO	Target of Opportunity
UT	Universal Time
Z	Zulu (= GMT = UT)



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### **1.3 Definition of Simulations**

The term “simulations” may be understood as follows:

*For any planned test campaign involving the S/C and instruments and exercising procedures or observational templates characteristic of real operational cases, a corresponding set of human interactions, information exchange and deliveries across interfaces can be identified by reference to the Operational Interactions governing the overall Herschel Observatory process and its sub-processes.*

A “Simulation” surrounding a test campaign refers to the exercise of those related elements of the overall process, organized in a realistic timeline and involving the personnel who will run the actual (sub-) processes.

Therefore, a specific test campaign will aim to exercise specific H/W and S/W functionalities, but any attendant simulation will aim to exercise the corresponding components of the overall observatory process, including the human element.

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## 1.4 Requirements & Important Points to Note

### 1.4.1 High Level Requirements in the SIP & SIRD

The SIP defines the following Requirement related to SOVT (or End to End tests)

#### **PAQA-025**

The ICCs and the HSC shall be included in the End-to-End Tests (EEs) which validate proper operations of the entire space- ground segment system

What should be noted in the above text is that “End to End Tests” is plural.

The MIRD defines the following requirement whereby 2 SOVTs are clearly defined:

#### **Requirement MPA-125 ([AD-2])**

Two SOVT's (End-to-End Tests) shall be performed with each spacecraft:

- EE1 (immediately following SVT1)
- EE2 (immediately following SVT2)

The aim of the EE tests shall be:

- Validation of the overall ground and space segment behaviour and performance from end-to-end in its different operational configurations
- Validation of the mission planning process and interfaces
- Validation of the data transfer processes and access mechanisms
- Validation of OBSM interfaces for payload elements
- Validation of the HSC/ICCs capability to receive and process all the data from the MOC

### 1.4.2 Important Points to Note

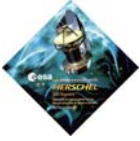
Point #1 - Every day lost when the spacecraft is in orbit due to spacecraft or ground segment problems is one day less of mission lifetime and one day less of scientific results being provided to the community. This is particularly critical for a cryogenic mission. A single day of helium corresponds to approximately 1 million Euros; if you prefer, each SECOND of wasted helium represents approximately 10 Euros.

Point #2 - The running of System Operational Validation Tests (SOVTs) are a mandatory step in validating that the spacecraft & ground segment can support the various phases of the mission.

Point #3 - The running of parallel simulations to these SOVTs is a necessary step to ensure that procedures applicable to the various phases of the mission are tested in the most realistic manner possible.

Point #4 - The simulations campaign is intended to also determine the best methodologies for interacting between the sites during the various phases of the mission. For SOVT-1 this will be the routine phase.

Point #5 - The simulations are going to be run in rigidly realistic conditions. The DTCP timing and the data flow will correspond to the standard mission scenario for in-flight operations. This will be as close to operational reality as is possible and is required to identify possible problems and difficulties that may appear in routine operations and how to resolve them.



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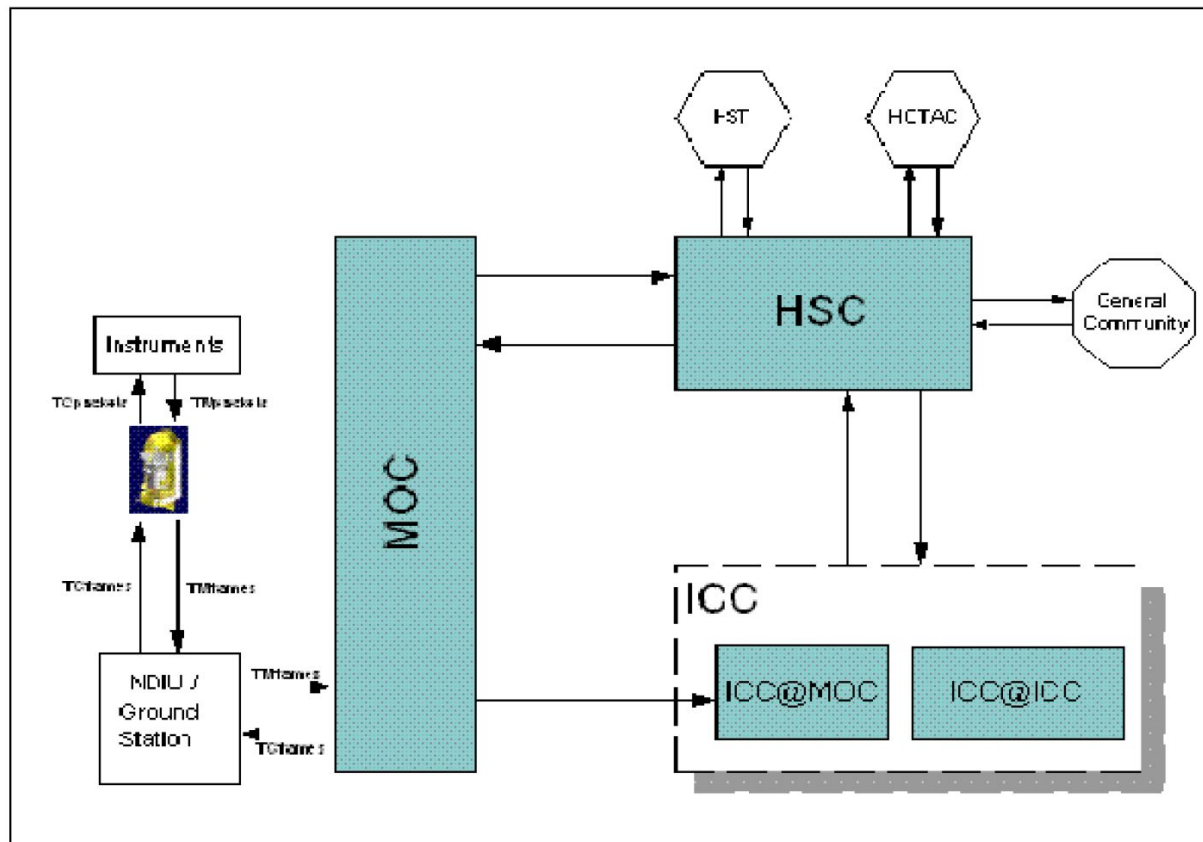
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## 1.5 Configuration of the Interfaces between Herschel Operational Centres

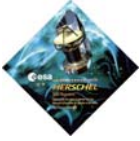
The structure of the Herschel Ground Segment interfaces, which will be operational for SOVT-1. This is the operational structure of the Herschel Ground Segment and defines how data is passed between centres and how data reaches the end user from the satellite.



*The structure of the Herschel Ground Segment and the data flow between centres as it will be both during SOVT-1 and in normal operations.*

## 1.6 Configuration of the Herschel-Planck Test Team

The structure of the Herschel Test team for SOVT-1 and other tests of the SGS is shown in the following flow diagram, which defines the interactions between personnel at different centres during the test campaign.



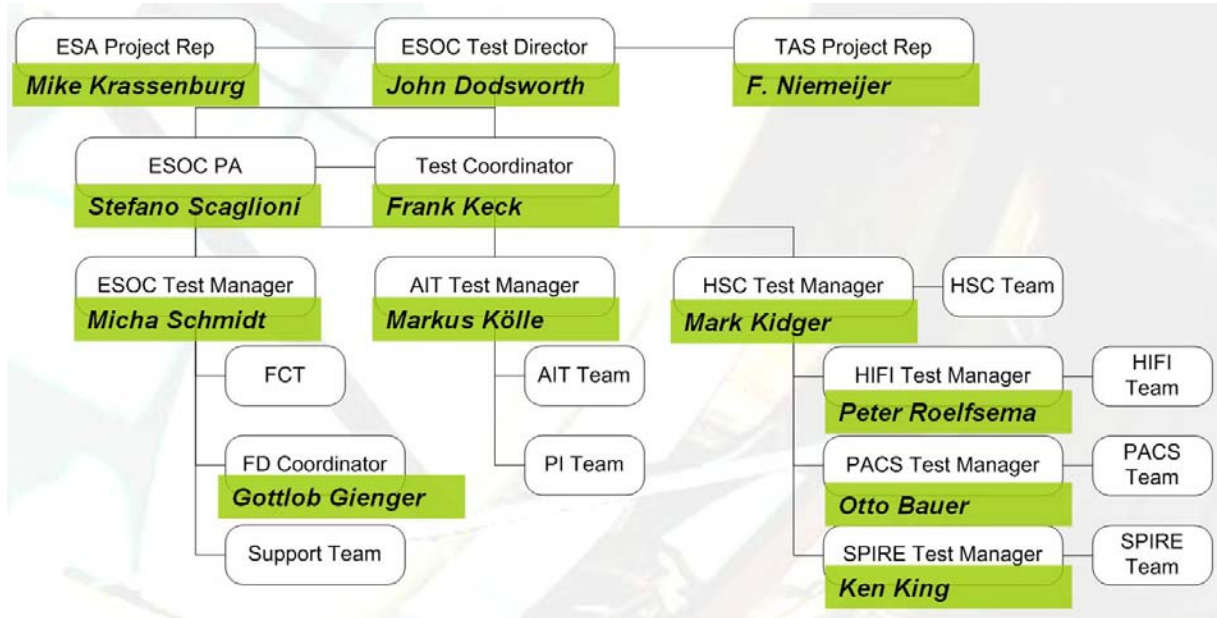
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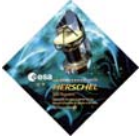
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*The organigram of the Herschel branch of the Herschel-Planck test team.*

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## 2. SOVT-1 – Objectives & High Level Event Timeline

### 2.1 SOVT-1: Some background information

#### 2.1.1 Background to the purpose of SOVTs

Every day lost when the spacecraft is in orbit due to spacecraft or ground segment problems is one day less of mission lifetime and one day less of scientific results being provided to the community. This is particularly critical for a cryogenic mission such as Herschel.

As a result, to avoid helium wastage (1 day of helium lost is equivalent to 1 million Euros = 10 Euros per second), system tests of the S/C and ground segment together must be performed before launch to catch as many problems as possible before in-orbit operations begin and to improve in-flight operational efficiency. Although 100% efficiency is obviously impossible, we have a duty to the scientific community to attain as high an operational efficiency as is reasonably practical.

For the case of Herschel, SOVT-1 and SOVT2 are these system tests, while two, long simulation campaigns of two weeks duration each will hone personnels' knowledge of and efficiency in carrying out operational procedures in realistic conditions that approximate closely to a flight situation. SOVT-1 is thus one link in a chain of tests and operational campaigns that exercise all elements of the SGS.

#### 2.1.2 What is the difference between SOVT-1 and SOVT 2

The major difference between SOVT-1 and SOVT2 is that we test routine operations in SOVT-1, while we test PV phase operations in SOVT2. The activities from the Spacecraft perspective and from the ground segment perspective are completely different between these two phases. In particular, the PV phase places more stringent requirements on the ground segment than the routine phase.

#### 2.1.3 Prerequisite for the start of SOVT

When conducting an SOVT, the Herschel Ground Segment -- in this operational context consisting of MOC, HSC and ICCs -- expects to connect to a satellite which has been validated to function nominally, in particular with respect to basic ground-spacecraft-instrument interactions (validated MIB, fully functional instruments operated in a cryogenic environment that is reasonably close to in-orbit conditions (He-II), debugged Ground Stations communication infrastructure, upload/storage of commands, on-board execution of a typical MTL as well as manual stack commands, acquisition/ storage/ downloading/ reception of TM, on-board failure handling, correct interaction of instruments with the Spacecraft subsystems).

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## 2.2 SOVT-1 – Test Objectives

### 2.2.1 Top level Objective:

The top level objective is validation of the overall ground and space segment behaviour from end-to-end in a routine operational configuration.

### 2.2.2 Detailed Objectives:

Detailed objectives are, as follows:

#### 1. Demonstration of E2E integration of subsystems and their system-level interfaces

Successful integration and validation activities, which were already performed for limited system areas, shall be confirmed in a system wide operational context.

#### 2. Identification of timing constraints and data product processing issues

Estimated transfer and process times shall be confirmed. Especially the impact of transfer times on the expected start of successive processes. Identification of bottlenecks in system processes, where an underperformance in transfer or in a sub-process causes delays.

#### 3. Validation of Ground Segment stability for 24/5

The complete ground segment hardware, software and communication lines are used in an operational context for 24 hours on 5 days. No forced contingencies are planned, but unexpected outages shall be covered by redundancy.

#### 4. Validation of Space Segment stability for 24/5

The S/C shall operate for 24 hours on 5 days. The MTLs shall be executed and the S/C behaviour shall be nominal. This objective shall not authorise MOC to validate the satellite, which remains responsibility of TAS. This objective is a placeholder for TAS to describe their interests in an E2E test following the IST-1.

#### 5. Identification of unexpected problems coming up in an E2E operational environment

Complex systems conceal unexpected behaviour. System wide tests reduce these risks.

### 2.2.3 Ancillary Objectives:

The ancillary objectives, additional to the previous list are:

#### 6. Validation of Operations Procedures

While most Flight Operations Procedures are validated in SVTs, Ground Operations Procedures shall be validated during SOVTs as well.

#### 7. Operational Network under realistic load

The measured data transfer times shall confirm the choice of communication lines bandwidths

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## 2.3 What we test on the S/C and in the Ground Segment

### 2.3.1 What do we test on the S/C

The SOVT-1 objectives primarily reflect the fact that we are testing & validating that the overall ground segment can support the nominal routine operations scenario.

From the Science Ground Segment Perspective, nominal routine operations during SOVT shall involve the following spacecraft activities:

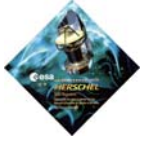
- Testing of the different instrument types as defined in the scheduling scheme document i.e. 7 templates. In other words, we have defined that in routine operations there are 7 different ways in which we will combine the scheduling of the instruments. These are being tested in SOVT-1.
- Running nominal 24 hour ODs resulting in fully representative (size, content) HSC MPS POS files sent to MOC
- Testing of **all** the different complex pointing modes through MPS as part of each Instrument AOT execution. These are tested making use of actual observations to be scheduled when Herschel will be in orbit (submitted by the KPGT/OT Astronomer community)
- Scheduling & execution of SPIRE/PACS Parallel mode\*
- Scheduling & execution of PACS AOTs that use Burst mode
- Testing of the Busconfig i.e. prime & non-prime instrument setting, prior to OD end/begin.
- Testing of Serendipity Mode on SPIRE
- Testing of SPIRE Pcal Flash Observations
- Testing of On-The-Fly Mapping mode. This is part of the on-ground gyro propagation mode testing to be performed by MOC flight dynamics.
- Testing of the Real Time science window via POS scheduling
- Testing of the cooler recycling vs. SOPs window approach
- Testing of the parallel mode cooler recycling cus scripts
- Testing of the 30 minute difference between SPIRE/PACS Cooler recycling initiation
- Testing of cooler recycling efficiency in He-II conditions during a long duration test

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### 2.3.2 What do we test in the Science ground segment

From the Science Ground Segment Perspective, nominal routine operations during SOVT shall involve the following ground segment activities:

- On-line Retrieval over the lease lines from the DDS of HK & Science TM from the MOC archive following its arrival at MOC & its consolidation
- Testing of the DDS on-line transfer interface during “real operations” i.e. continuous data set being made available up to 8 hours after DTCP during a 5 day period
- Testing of the HSC File Management System, i.e. data received from DDS, passed on to the operational DB server and start of TM Ingest/TM proc.
- In parallel, propagation of all data to each of the ICCs via the Lease line within 5 minutes of reception of each bit from the MOC
- Transfer from MOC to HSC of auxiliary Data relevant to the OD in question starting during the DTCP and ending approx 8-10 hours after DTCP ends e.g. Time Correlation, TC History, Out of Limits.
- Transfer from HSC to ICCs via the operational FTP server of all relevant auxiliary data
- Transfer approx 8 hours (latest) after DTCP ends of the Attitude History File by the File Transfer System from MOC to HSC.
- Start of the Auxiliary pipeline process whereby all auxiliary data from the MOC is converted to products and made available to the HSC Pipeline manager
- Start of the Automatic pipelines using the HSC GRID whereby auxiliary products & Science TM are passed through each instrument pipeline to generate Level 0 & Level 1 products (minimum)
- All products generated are placed in the Herschel Science Archive (HSA)
- All ICCs shall connect to the HSA and shall retrieve the products from there via the product transfer mechanism
- All ICCs shall process to a predefined level the propagated TM delivered to them from HSC and shall provide Quality information as well as identify problems with the data which need to be followed up by HSC & by MOC



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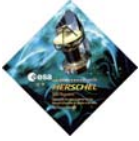
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## 2.4 High Level Event Timeline of SOVT-1 preparations

Timeline to SOVT-1 -- Major milestones		
Updated: 2008/07/29 17:00 CEST		
All times are CEST (BST+1h, UT+2h, z+2h)		
<b>Blue</b> items are completed		
<b>Red</b> items are late		
<b>Black</b> items are highlights to come		
Activity	Start	End
<b>ICC Test team members supplied</b>	06/06/2008	
<b>HOT Core SOVT-1 Readiness meeting</b>	10/06/2008 10:30	
<b>SOVT-1 Preparation telecon with ICCs #1</b>	10/06/2008 15:00	
<b>ITSG meeting</b>	12/06/2008	
<b>SOVT-1 kick-off meeting with HSC &amp; NHSC</b>	13/06/2008	
<b>DP 3.7 End-to-end</b>	15/06/2008	21/06/2008
<b>1st delivery additional HFOM procedures</b>	20/06/2008	
<b>SOVT-1 Preparation telecon with ICCs #2</b>	24/06/2008 15:00	
<b>HSC-NHSC Interactions Document Delivery</b>	27/06/2008	
<b>SGS Readiness Tests (HIFI)</b>	01/07/2008	02/07/2008
<b>SOVT-1 Preparation telecon with ICCs #3</b>	01/07/2008 15:00	
<b>HSC-ICC Interactions Document delivery v1.0C</b>	02/07/2008	
<b>HDPMG readiness review</b>	02/07/2008	
<b>SGS Readiness Tests (SPIRE)</b>	03/07/2008	04/07/2008
<b>SGS-MOC Interactions Document delivery</b>	07/07/2008	
<b>SGS Readiness Tests (PACS)</b>	08/07/2008	09/07/2008
<b>AIV schedule v8.8 released</b>	08/07/2008 14:15	
<b>SOVT-1 Preparation telecon with ICCs #4</b>	08/07/2008 15:00	
<b>Additional SGS Readiness Tests (SPIRE)</b>	10/07/2008	11/07/2008
<b>Comments on additional HFOM procedures returned</b>	28/07/2008	
<b>SOVT-1 Preparation telecon with ICCs #5</b>	29/07/2008 15:00	
<b>SOVT-1 procedures ready</b>	01/08/2008	
<b>Release of Version 1.0 of this document</b>	01/08/2008	
<b>PACS SOVT-1 Test plan meeting</b>	01/08/2008 09:00	
<b>SOVT-1 engineering AOR final delivery</b>	01/08/2008 15:00	
<b>PACS SOVT-1 Test plan delivery</b>	01/08/2008 15:00	
<b>SOVT-1 POS file delivery to MOC</b>	04/08/2008	



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<b>PACS SOVT backend ingestion &amp; OD re-planning</b>	05/08/2008	
<b>SOVT-1 Preparation telecon with ICCs #6</b>	05/08/2008 15:00	
<b>Delivery of PACS OD 126 to MOC</b>	06/08/2008	
<b>HIFI backend delivery for SOVT-1</b>	06/08/2008	
<b>HIFI SOVT backend ingestion &amp; OD re-planning</b>	08/08/2008	
<b>Delivery of HIFI OD 127 to MOC</b>	11/08/2008	
<b>Additional SGS Readiness Tests (HIFI)</b>	18/08/2008	22/08/2008
<b>Installation of test HCSS 0.6.3.1 at HSC</b>	19/08/2008	
<b>SOVT-1 Preparation videocon with ICCs #1 and telecon #7</b>	19/08/2008 15:00	
<b>SOVT-1 Test Readiness Review</b>	20/08/2008 10:00	20/08/2008 15:30
<b>SPIRE SPT ends</b>	21/08/2008	
<b>SPIRE backend delivery for SOVT-1</b>	22/08/2008	
<b>Delivery of ODs 128 &amp; 129 to MOC</b>	26/08/2008	
<b>SOVT-1 Preparation videocon with ICCs #2 and telecon #8</b>	26/08/2008 15:00	
<b>HSC situation briefing on RMS and SOVT-1</b>	29/08/2008 16:00	
<b>Installation of final HCSS 0.6.3.3 at HSC</b>	02/09/2008	
<b>SOVT-1 readiness meeting with HSC</b>	03/09/2008	
<b>Situation briefing and RMS de-briefing videocon with HSC, NHSC &amp; ICCs (#1)</b>	03/09/2008 16:30	
<b>SOVT-1 Delta Test Readiness Review</b>	04/09/2008 15:00	
<b>Situation briefing and RMS de-briefing videocon with HSC, NHSC &amp; ICCs (#2)</b>	04/09/2008 16:30	
<b>SOVT-1 briefing and RMS de-briefing videocon with HSC, NHSC &amp; ICCs (#3)</b>	05/09/2008 15:30	
<b>SOVT-1 Delta Delta Test Readiness Review</b>	05/09/2008 17:00	
<b>1st DTCP of SOVT-1</b>	06/09/2008 14:00	
First telemetry delivery to HSC	07/09/2008 16:10	
First telemetry delivery complete (approximate)	08/09/2008 10:00	

*The SOVT-1 preparation timeline status as of 2008 September 3rd.*

## 2.5 High Level Event Timeline of SOVT-1

### 2.5.1 SOVT-1 – Launch Date, Epochs & Operational Day numbering

The SOVT-1 scenario is based upon a launch date of 31/07/2008. The epochs shall be from 03/12/2008 = 338/2008 (SOVT Day 1 – Operational Day 126 – OD-126) to 07/12/2008 = 342/2008 (SOVT Day 5 – Operational Day 130 – OD-130). At these epochs the satellite has passed the transfer phase and is already in operational orbit. No time-correlation shall be applied (00:00z = 00:00z), so the offset is an integer number of days.

Test Day	Scenario Day	Scenario DOY	Mission OD #
Day 1	03/12/2008	338/2008	126
Day 2	04/12/2008	339/2008	127
Day 3	05/12/2008	340/2008	128
Day 4	06/12/2008	341/2008	129
Day 5	07/12/2008	342/2008	130

In other words, SOVT-1 is based in the future and as such all systems receiving & processing the data must take this into account.

The correlation for the start of OD-1 of SOVT-1 is:

<b>Real Day</b>	2008 September 6 <sup>th</sup>
<b>Real UTC</b>	12:00:00
<b>Scenario Day</b>	2008 December 3 <sup>rd</sup>
<b>Scenario UTC</b>	12:00:00
<b>Scenario TAI</b>	12:00:33

Note that these dates are fixed. A change of the real launch date during test preparations shall not result in any re-planning.

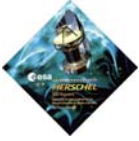
The Operational Day Numbering (126 → 130) is what is used by Flight Dynamics in the generation of the mission planning input products (Planning Skeleton Files – PSFs) .

### 2.5.2 Real World – SimWorld mapping for SOVT-1

Each scenario day represents a simulated future day of operations (SimWorld). These days are mapped onto by a series of dates on which the simulation will actually be run in reality (Real World), thus a Real World Friday may be used to simulate a SimWorld Sunday.

Given that it represents a first opportunity to use precious spacecraft time, for the purposes of SOVT-1 the HSC will work on each day that the spacecraft is connected as if it were a weekday, with the following caveats (note that, due to the complex nature of the RMS and SOVT-1 tests and the large number of interactions involved, it is possible that either test could be delayed at just a few hours notice, thus the actual working scenario that is adopted may need to be decided on-line in real time):

- If SOVT-1 starts on a Tuesday, the last day of spacecraft operations will be a Real World Saturday. SPIRE data will be received at the corresponding ICC over the night of Saturday to Sunday and



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processed on Sunday. In this case all personnel at the HSC who are essential for SPIRE support in normal operations will be available on Sunday as if it were a normal working day in SimWorld.

- If SOVT-1 starts between Wednesday and Saturday, SOVT-1 will run over both Saturday and Sunday. In this case, all personnel will be available both days as if it were a normal working day in SimWorld.
- If the dates for SOVT-1 include a public holiday at the HSC, all personnel will work as if it were a normal working day in SimWorld if the spacecraft is connected. Otherwise, if the public holiday falls the day after SOVT-1 ends, the public holiday will be treated as a normal working day in SimWorld, but only essential support personnel for SPIRE will be available.

- **In real time, SOVT-1 will run from Saturday September 6th to Wednesday September 10th.**
- **In simulated time, the test runs from Wednesday December 3rd to Sunday December 7th and also includes a public holiday.**

So, as programmed, SOVT-1 yields :=>

	S	Su	M	T	W
Earth	Sep. 06	07	08	09	10
SimWorld	Dec. 03	04	05	06	07

But the HSC will work as if Sunday were a weekday.

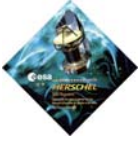
*The Real World – SimWorld mapping for SOVT-1 for AIV v8.9.2 adapted to the reality of the final RMS and SOVT-1 dates.*

### **2.5.3 Mission Timeline Generation, Contents & when it is uploaded**

#### **2.5.3.1 Mission Timeline Generation**

Based on MOC Flight Dynamics orbit products (orbit file, Planning Skeleton Files), 4 consecutive mission timelines must be produced for this SOVT which will include ACMS pointing commanding, instrument commanding for observations and other nominal instrument activities. The resulting MTLs (Mission Timelines) will define the exact test activities with the satellite and shall represent typical routine operations activities.

The generation of the mission timelines is the end of the mission planning process whereby the following steps take place:



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- Delivery of the Flight Dynamics Orbit products – PSF, Orbit file
- Delivery of all cus scripts & calibration tables to the HSC from the ICCs
- Delivery of the HPSDB (merged instrument MIBs) from Alcatel via MOC
- Ingestion of all AORs (observation requests) into the HSC DB
- Ingestion of the Orbit file & PSF from MOC. Ingestion of the horizons, SSO & SIAM files.
- Scheduling of each Operational Day (OD) by the HSC Mission Planning System followed by generation of a POS/ICP file
- Transfer of the POS/ICP files to the MOC (Flight Dynamics)
- Generation by Flight Dynamics of the corresponding EPOS & APF files for each OD
- Generation of the Mission Timeline Uplink Units by the MOC Mission Planning System following ingestion of these files

### 2.5.3.2 Constraints & requirements for MTL generation

The following constraints and requirements must be obeyed during for the MTL generation:

- On each SOVT day the ODs shall start at 12:00z and DTCPs (New Norcia) shall be 12:00z-15:00z. The planning constraints caused by other missions sharing New Norcia ground station (DTCP schedule) shall be ignored.
- The start execution time of all MTLs shall be the end of the DTCP; this results in a 24h time frame for each MTL from 15:00z to 15:00z.
- The PSF for day 2 shall contain a SOPS window for a Delta-V manoeuvre. The manoeuvre shall start close after DTCP-2.
- All MTL commands must obey limitations of the satellite to ensure the satellite will not run into a contingency and/or stop the MTL execution.

### 2.5.3.3 Top-level summary of instrument activities during SOVT-1

The table below gives a top-level overview of the planned contents of each OD during SOVT-1, split between science data being taken, engineering activities and Data Processing activities for each sub-instrument (NB: for the purposes of this table all HIFI bands are considered to be the same sub-instrument). This scheme is valid for any start date for SOVT-1 with the corresponding shift of Real World date and day of the week.

	Science	Engineering	DP
September 6 <sup>th</sup> (Saturday)	PACS Photo, PACS Spec	HIFI	None
September 7 <sup>th</sup> (Sunday)	HIFI	None	None
September 8 <sup>th</sup>	PACS Photo, SPIRE Photo, SPParallel	PACS, SPIRE	PACS Photo, PACS Spec.
September 9 <sup>th</sup>	PACS Photo, SPIRE Photo, SPParallel	None	HIFI

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September 10 <sup>th</sup>	None	None	PACS Photo, SPIRE Photo, SPParallel
September 11 <sup>th</sup>	None	None	PACS Photo, SPIRE Photo, SPParallel

The timeline for DP activities assumes that:

- The data from a particular instrument will be taken on Day “x”.
- The data will be transmitted during the DTCP from the on-board data store and then propagated to MOC & HSC on Day “x + 1”.
- DP activities will be carried out on Day “x + 2”.

The following table shows what instruments have activities of any kind that require support on any particular day of SOVT-1. An “X” means that this instrument requires support on that day of the test. Note that MTL-128 – Day 4 of SOVT-1 – has activities with all the instruments and with the SPIRE PACS Parallel Mode.

	PACS	SPIRE	HIFI	SPParallel
September 6 <sup>th</sup> (Saturday)	X		X	
September 7 <sup>th</sup> (Sunday)			X	
September 8 <sup>th</sup>	X	X		X
September 9 <sup>th</sup>	X	X	X	X
September 10 <sup>th</sup>	X	X		X
September 11 <sup>th</sup>	X	X		X

A far more detailed breakdown of activities is given below and, in particular, in Section 3 of this document.

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### 2.5.3.4 The Mission Timeline contents & when they are to be uplinked

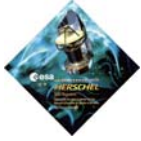
The tables below give an overview of the planned contents of each MTL. **Please Note** that MTL-125 is a reduced MTL as it just covers the activities from the S/C being ready to the end of the first “real” DTCP. The first “real” DTCP occurs in OD126. **Note also** that an MTL covers the period “end of DTCP to end of DTCP+1”.

### Activities per Operational Day – HIGH LEVEL

Operational Day #	Activities during this Operational Day
126	<b>DTCP-126 Science activities:</b> PACS Cooler Recycling in DTCP-126. HIFI Lasers On & LO Off in DTCP-126. <b>OD-126 main Science Activities:</b> PACS Photometer (25%) & Spectrometer (75%).
127	<b>DTCP-127 Science activities:</b> HIFI set into primary in DTCP-127. <b>OD-127 main Science Activities:</b> Delta-V Manoeuvre (SOPS window, starts closely after DTCP-2), HIFI Operations,
128	<b>DTCP-128 Science activities:</b> PACS & SPIRE Parallel Cooler Recycling during DTCP-128. <b>OD-128 main Science Activities :</b> PACS-Photometer 20% (4.2 hr) PARALLEL mode 20% (4.2 hr) SPIRE-Photometer 60% (12.6 hr)
129	<b>DTCP-129 Science activities:</b> PACS & SPIRE Parallel Cooler Recycling during DTCP-129 <b>OD-129 main Science Activities :</b> PACS-Photometer- 50% - One SSO Observation (Titan) PARALLEL Mode SPIRE-Photometer - 30% + 4 PcalFlash engineering Observations
130	<b>DTCP-130 Science activities: None</b>

### ACTIVITIES PER OD – MTL Specific & Upload information

<i>MTL-OD</i>	<i>Validity</i>	<i>Upload during DTCP-XYZ</i>	<i>Contents of MTL</i>
MTL-125	D1/TBD – D1/15:00	DTCP-125 (D1/06:00)	<b>Activities by TAS leading to DTCP-126 ;</b> Burst mode as MTL or manual commanding using Dummy Burst data to fill up SSMM (as done in RMS 48 hr). <b>DTCP-126 Science activities :</b> PACS Cooler Recycling in DTCP-126. HIFI Lasers On & LO Off in DTCP-126.
MTL-126	D1/15:00 – D2/15:00	DTCP-125 (D1/06:00)	<b>OD-126 main Science Activities :</b> PACS Photometer (25%) PACS Spectrometer (75%) Operations. <b>DTCP-127 Science activities :</b> HIFI set into primary in DTCP-127.
MTL-127	D2/15:00 – D3/15:00	DTCP-126 (D1/12:00)	<b>OD-127 main Science Activities :</b> Delta-V Manoeuvre (SOPS window, starts closely after DTCP-2), HIFI Operations, <b>DTCP-128 Science activities :</b> PACS & SPIRE Parallel Cooler Recycling during DTCP-128.
MTL-128	D3/15:00 – D4/15:00	DTCP-127	<b>OD-128 main Science Activities :</b>



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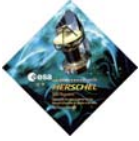
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		(D1/12:00)	PACS-Photometer 20% PARALLEL mode 20% SPIRE-Photometer 60% <b>DTCP-129 Science activities : PACS &amp; SPIRE</b> Parallel Cooler Recycling during DTCP-128
MTL-129	D4/15:00 – D5/15:00	DTCP-128 (D1/12:00)	<b>OD-129 main Science Activities :</b> PACS-Photometer- 50% - One SSO Observation (Titan) PARALLEL Mode SPIRE-Photometer - 30% – 4 pcalflash engineering observations <b>DTCP-130 Science activities : None</b>



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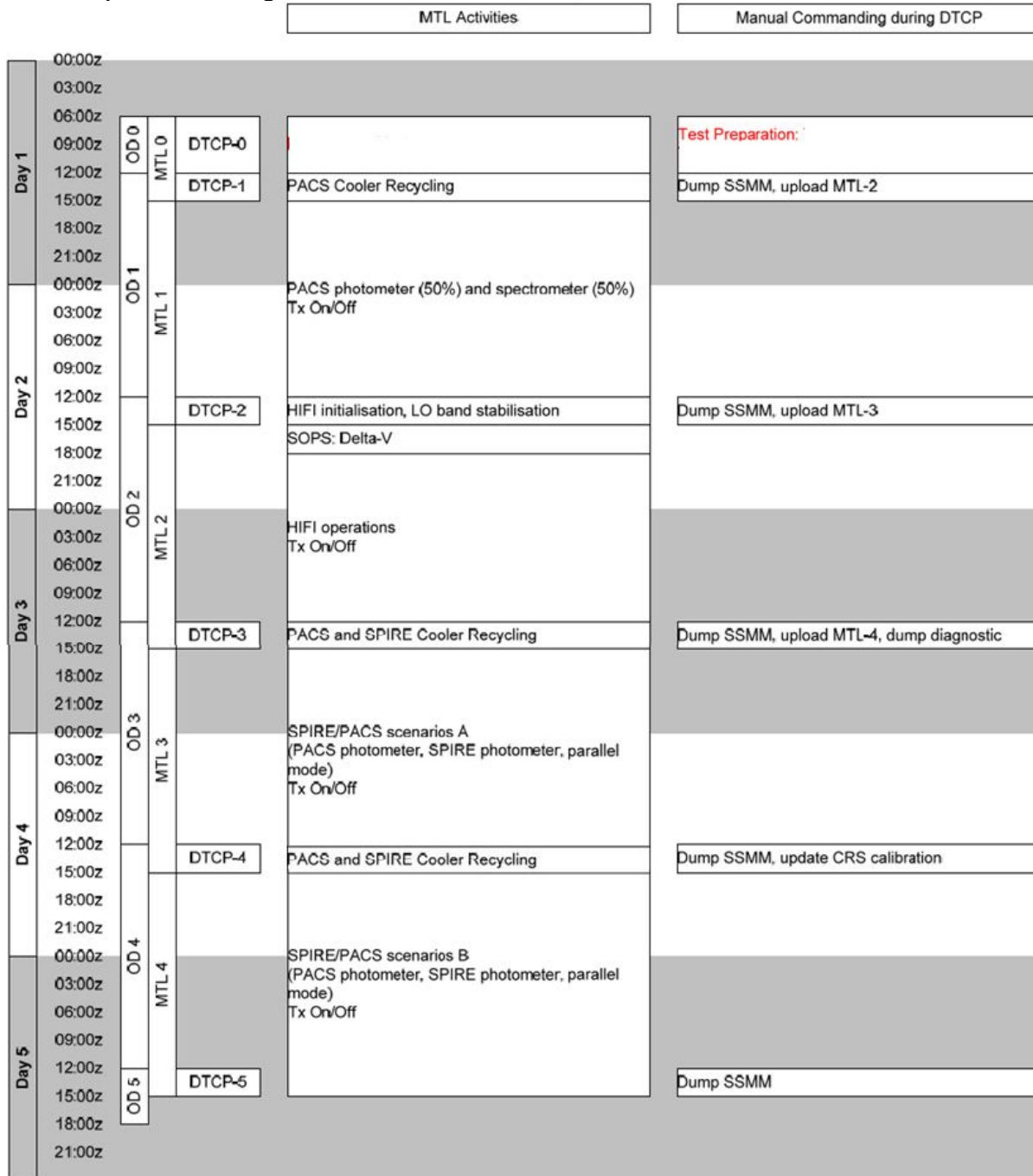
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#### 2.5.4 Diagrammatical View of the SOVT-1 activities – Day by Day

**Note:** The OD & DTCP numbering in this drawing refer to the sequence in SOVT-1. The reader should map the numbering as follows – OD-0 = OD125, OD-5 = OD130



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### 3. SOVT-1 – Instrument Day to Day Activities – In Detail

#### 3.1 Introduction

The Mission Planning performed at the HSC has resulted in the generation of a Preferred Observation Sequence (POS) File for each Operational Day in question (OD126 → OD130).

The planning of each of these Operational Days has been performed based upon certain input planning rules being followed. These rules are such that we can maximise validation of different observation types & different instrument configurations during the 5 days of the SOVT. Further details of the planning rules for each Operational Day is provided below.

In addition, the detailed timing of observations i.e. second by second, is also provided. This allows the reader to know at what time a specific observation type is being executed on board the spacecraft such that e.g. for DP, the pipeline operator will know which pipeline is to be used when the data is downlinked and sent to the HSC.

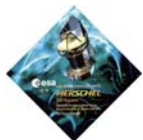
#### 3.1.1 Explanation of the main Column headings in the upcoming tables

"Slew" = # of seconds performed in slewing the s/c during the observation

"Sec" = time when it reaches the target that it performs the observation.

"Title" is the name of the AOR contained in the DB that was used by Mission Planning.

"Mode" corresponds to the observation mode being performed by the instrument starting from the "start time" in question.



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## 3.2 Operational Day 126

### 3.2.1 OD-126: Planning Rules

#### DTCP-126 Science activities:

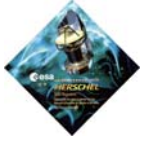
- PACS Cooler Recycling
- HIFI Lasers On & LO Off in DTCP-126.

#### OD-126 Science Activities

- PACS Photometer AORs (25% of the 21 hours)
- PACS Spectrometer AORs (75% of the 21 hours).

### 3.2.2 OD-126: Schedule in detail

ID	Start date	Start time	Sec	Title	Mode	AOT	Sub Mode
1199	03/12/2008	12:37:00Z	28	HifiEngSetIntoStandby_II_0002-SOVT1	HifiEngSetIntoStandby_II	HIFI Eng.	
1206	03/12/2008	12:37:24Z	8531	PacsEng_BOLO_cool_recycleGen-0000	PacsEng_BOLO_cool_recycl	PACS Eng.	
1207	03/12/2008	15:00:00Z	14	PacsEng_PHOT_orbit_prologueGen-0000	PacsEng_orbit_prologue	PACS Eng.	
738	03/12/2008	15:38:32Z	1970	GOODS-N_d+0+0_forward_r1_shortaxis	PacsPhoto	PPhoto	Scan map
719	03/12/2008	16:41:35Z	3418	GOODS-N_d+0+0_forward_r1_longaxis	PacsPhoto	PPhoto	Scan map
734	03/12/2008	17:41:23Z	3720	Groth_d+0+0_forward_r1_NE-SW	PacsPhoto	PPhoto	Scan map
739	03/12/2008	19:15:22Z	5576	Groth_d+0+0_forward_r1_NW-SE	PacsPhoto	PPhoto	Scan map
1221	03/12/2008	21:13:56Z	7114	PacsEng_orbit_epilogueGen-0000 - copy	PacsEng_orbit_epilogue	PACS Eng.	
1209	03/12/2008	21:14:10Z	14	PacsEng_SPEC_orbit_prologueGen-0000	PacsEng_orbit_epilogue	PACS Eng.	
782	03/12/2008	21:54:10Z	2098	SOVT NearGalPACS-lowmet-ngc6822HubbleVI-6linesfs	PacsEng_SPEC_orbitprolo	PACS Eng.	
776	03/12/2008	22:51:57Z	1834	SOVT PACS set 1 Class I - Ced110 IRS 4	PacsRangeSpec	PSpecR	Map with off
773	03/12/2008	23:37:55Z	1290	SOVT PACS set 2 - Class I - Ced110 IRS 4	PacsRangeSpec	PSpecR	Map with off
783	04/12/2008	00:02:14Z	3170	SOVT PSpecR HD 168625 SED_R	PacsLineSpec	PSpecL	Pointed with chop/nod
780	04/12/2008	00:50:40Z	1035	SOVT PSpecR HD 168625 SED_B	PacsLineSpec	PSpecL	Pointed with chop/nod
767	04/12/2008	01:40:27Z	558	SOVT full scan SED Blue high sens - L483 - L483	PacsLineSpec	PSpecL	Pointed with chop/nod
779	04/12/2008	01:55:25Z	3289	SOVT sbs1533+574-PACSSpectro2+1	PacsLineSpec	PSpecL	Map with wavelength switch
768	04/12/2008	02:12:16Z	1341	SOVT m16finger2-PSpecR-r1	PacsLineSpec	PSpecL	Pointed with chop/nod
769	04/12/2008	02:35:35Z	2612	SOVT m16finger2-PSpecR-r2	PacsLineSpec	PSpecL	Pointed with chop/nod
766	04/12/2008	03:08:37Z	2829	SOVT NearGalPACS-Sy2-01-red	PacsRangeSpec	PSpecR	Map with off
770	04/12/2008	04:03:00Z	2817	SOVT NearGalPACS-Sy2-01-blue	PacsRangeSpec	PSpecR	Map with off
774	04/12/2008	04:22:54Z	722	SOVT PSpecL-M81-OIII	PacsRangeSpec	PSpecR	Pointed with chop/nod
1208	04/12/2008	04:32:12Z	766	PacsEng_SPEC_curingGen-0000	PacsLineSpec	PSpecL	Pointed with chop/nod
777	04/12/2008	04:58:58Z	1409	SOVT NearGalPACS-lowmet-ng2366	PacsEng_SPEC_curi	PACS Eng.	



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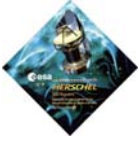
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772	04/12/2008	06:33:29Z	2612	SOVT hs1304+3529-PACsSpectro3+1	PacsLineSpec	PSpecL	Pointed with chop/nod
781	04/12/2008	08:01:35Z	2208	SOVT PACS setting 1 H2O 212-101 - AFGL490	PacsLineSpec	PSpecL	Map with chop/nod
775	04/12/2008	08:47:39Z	2096	SOVT NearGalPACS-lowmet-ngc4449-CIIfast	PacsLineSpec	PSpecL	Pointed with chop/nod
765	04/12/2008	09:26:52Z	287	SOVT PACS L1448 - 1 r2	PacsLineSpec	PSpecL	Pointed with chop/nod
771	04/12/2008	10:05:26Z	1764	SOVT PSpecR-red-NGC6302	PacsRangeSpec	PSpecR	Pointed with chop/nod
763	04/12/2008	10:39:50Z	5036	SOVT IRAS13120-5453-RS-short	PacsLineSpec	PSpecL	Pointed with chop/nod
764	04/12/2008	11:12:30Z	5524	SOVT PSpecR-blue-NGC6302	PacsLineSpec	PSpecL	Map with chop/nod
778	04/12/2008	11:38:12Z	1868	SOVT PACS L1448 - OI r2	PacsRangeSpec	PSpecR	Pointed with chop/nod
1210	04/12/2008	11:42:59Z	1324	PacsEng_orbit_epilogueGen-0000	PacsEng_orbit_epilogue	PACS Eng.	
SLEW	04/12/2008	12:00:00Z	298				



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### 3.3 Operational Day 127

#### 3.3.1 OD-127: Planning Rules

##### DTCP-127 Science activities:

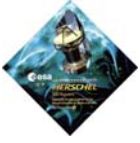
- HIFI set into primary

##### OD-127 Science Activities

- Delta-V Manoeuvre (SOPS window, starts closely after DTCP-127 ends)
- HIFI Operations

#### 3.3.2 OD-127: Schedule in detail

ID	Start date	Start time	Sec	Title	Mode	AOT	Mode
1189	04/12/2008	12:37:00Z	10	HifiEngSetIntoPrimary-SOVT1	HifiEngSetIntoPrimary	HIFI Eng.	
1191	04/12/2008	12:37:10Z	1004	HifiEngSwitchonLO_2b-SOVT1	HifiEngSwitchonLO	HIFI Eng.	
624	04/12/2008	14:37:08Z	1471	PointFSwitch-Band2bWarm-SOVT1	HifiPointModeFSwitch	HPoint	Point with Frequency switch
631	04/12/2008	15:04:45Z	417	PointFastDBS-Band2bWarm-SOVT1	HifiPointModeFastDBS	HPoint	Point with Dual Beam Switch
621	04/12/2008	16:48:43Z	44	PointFSwitchNoRef-Band2bWarm-SOVT1 - 0001	HifiPointModeFSwitch NoRe	HPoint	Point with Frequency switch
1194	04/12/2008	16:49:31Z	1005	HifiEngSwitchonLO_1a-SOVT1	HifiEngSwitchonLO	HIFI Eng.	
625	04/12/2008	17:09:07Z	2063	PointDBS-Band1aWarm-SOVT1	HifiPointModeDBS	HPoint	Point with Dual Beam Switch
638	04/12/2008	17:47:36Z	1359	PointFSwitch-Band1aWarm-SOVT1	HifiPointModeFSwitch	HPoint	Point with Frequency switch
1196	04/12/2008	18:10:15Z	1005	HifiEngSwitchonLO_1b-SOVT1	HifiEngSwitchonLO	HIFI Eng.	
635	04/12/2008	18:30:33Z	2728	MappingFSwitchOTF-Band1bWarm-SOVT1	HifiMappingModeFSwitchOT	HMap	Map with Frequency switch
636	04/12/2008	19:19:27Z	2004	PointFastDBS-Band1bWarm-SOVT1	HifiPointModeFastDBS	HPoint	Point with Dual Beam Switch
639	04/12/2008	19:56:52Z	8891	MappingDBSRasterNoCont-Band1bWarm-SOVT1	HifiMappingModeDBS Raster	HMap	DBS raster map
1192	04/12/2008	23:26:19Z	1005	HifiEngSwitchonLO_2a-SOVT1	HifiEngSwitchonLO	HIFI Eng.	
619	04/12/2008	23:46:22Z	538	PointDBS-Band2aWarm-SOVT1	HifiPointModeDBS	HPoint	Point with Dual Beam Switch
629	04/12/2008	23:59:18Z	5574	MappingDBSRaster-Band2aWarm-SOVT1	HifiMappingModeDBS Raster	HMap	DBS raster map
1195	05/12/2008	01:02:25Z	1005	HifiEngSwitchonLO_3b-	HifiEngSwitchonLO	HIFI Eng.	



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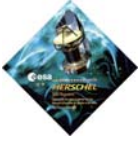
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				SOVT1			
617	05/12/2008	01:22:23Z	1883	PointLoadChopNoRef-Band3bWarm-SOVT1	HifiPointModeLoadChopNoR	HPoint	Point with load chop
622	05/12/2008	01:57:36Z	1991	PointLoadChop-Band3bWarm-SOVT1	HifiPointModeLoadChop	HPoint	Point with load chop
1197	05/12/2008	02:30:47Z	1005	HifiEngSwitchonLO_4a-SOVT1	HifiEngSwitchonLO	HIFI Eng.	
623	05/12/2008	02:50:05Z	369	SScanFastDBS-R3-Band4aWarm-SOVT1	HifiSScanModeFastDBS	HScan	DBS spectral scan
618	05/12/2008	03:00:36Z	399	SScanFastDBS-R6-Band4aWarm-SOVT1	HifiSScanModeFastDBS	HScan	DBS spectral scan
627	05/12/2008	03:15:48Z	1989	MappingFastDBSCross-Band4aWarm-SOVT1	HifiMappingModeFastDBSCr	HMap	DBS raster map
630	05/12/2008	03:53:45Z	259	SScanFSwitchNoRef-Band4aWarm-SOVT1	HifiSScanModeFSwitchNoRe	HScan	DBS spectral scan
633	05/12/2008	04:02:07Z	2207	MappingOTF-Band4aWarm-SOVT1	HifiMappingModeOTF	HMap	On the fly map
637	05/12/2008	04:42:58Z	628	SScanFastDBS-R12-Band4aWarm-SOVT1	HifiSScanModeFastDBS	HScan	DBS spectral scan
615	05/12/2008	05:06:38Z	930	SScanFSwitch-Band4aWarm-SOVT1	HifiSScanModeFSwitch	HScan	Frequency switch spectral scan
1198	05/12/2008	05:18:20Z	1005	HifiEngSwitchonLO_4b-SOVT1	HifiEngSwitchonLO	HIFI Eng.	
628	05/12/2008	05:38:39Z	363	SScanDBS-R8-Band4bWarm-SOVT1	HifiSScanModeDBS	HScan	DBS spectral scan
634	05/12/2008	05:52:28Z	642	SScanFSwitch-Band4bWarm-SOVT1	HifiSScanModeFSwitch	HScan	Frequency switch spectral scan
641	05/12/2008	06:06:20Z	4728	MappingOTF-Band4bWarm-SOVT1	HifiMappingModeOTF	HMap	On the fly map
626	05/12/2008	06:57:31Z	348	SScanDBSNoCont-R4-Band4bWarm-SOVT1	HifiSScanModeDBS	HScan	DBS spectral scan
1203	05/12/2008	07:03:11Z	1175	HifiEngSwitchonLO_6a-SOVT1	HifiEngSwitchonLO	HIFI Eng.	
632	05/12/2008	07:21:57Z	4071	MappingFastDBSRasterNoCont-Band6aWarm-SOVT1 - 0001	HifiMappingModeFastDBSRa	HMap	DBS raster map
1193	05/12/2008	08:31:00Z	1030	HifiEngSwitchonLO_5a-SOVT1	HifiEngSwitchonLO	HIFI Eng.	
620	05/12/2008	08:50:15Z	1437	PointFSwitchNoRef-Band5aWarm-SOVT1	HifiPointModeFSwitchNoRe	HPoint	Point with Frequency switch
1204	05/12/2008	09:14:12Z	1176	HifiEngSwitchonLO_6b-SOVT1	HifiEngSwitchonLO	HIFI Eng.	
614	05/12/2008	09:34:04Z	1993	MappingDBSCross-Band6bWarm-SOVT1	HifiMappingModeDBSCross	HMap	DBS raster map
1190	05/12/2008	10:05:43Z	1174	HifiEngSwitchonLO_7a-SOVT1	HifiEngSwitchonLO	HIFI Eng.	
640	05/12/2008	10:26:35Z	1715	PointFSwitch-Band7aWarm-SOVT1	HifiPointModeFSwitch	HPoint	Point with Frequency switch
1205	05/12/2008	10:57:06Z	1174	HifiEngSwitchonLO_7b-SOVT1	HifiEngSwitchonLO	HIFI Eng.	
616	05/12/2008	11:17:00Z	2178	MappingFastDBSCross-Band7bWarm-SOVT1	HifiMappingModeFastDBSCr	HMap	DBS raster map



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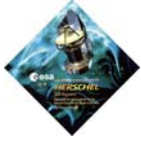
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1188	05/12/2008	11:53:18Z	28	HifiEngSetIntoStandby_II_00 01-SOVT1	HifiEngSetIntoStandby II	HIFI Eng.	
1200	05/12/2008	11:54:06Z	11	HifiEngSetIntoStandby_1- SOVT1	HifiEngSetIntoStandby I	HIFI Eng.	
SLE W	12/5/2008 12:00	343	0				



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## 3.4 Operational Day 128

### 3.4.1 OD-128: Planning Rules

#### DTCP-128 Science activities:

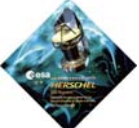
- PACS & SPIRE Parallel Cooler Recycling

#### OD-128 Science Activities

- SPIRE-Photometer 60% (12.6 hr)
- PARALLEL mode 20% (4.2 hr)
- PACS-Photometer 20% (4.2 hr)

### 3.4.2 OD-128: Schedule in detail

ID	Start date	Start time	Sec	Title	Mode	AOT	Mode
1078	05/12/2008	12:37:00Z	10337	SpireEngParallelCoolerRecycleGen-0000	SpireEngParallelCoolerRe	SPIRE Eng.	
1212	05/12/2008	15:29:17Z	1970	PacsEng_PHOT_orbit_prologueGen-0000 - copy	PacsEng_PHOT_orbit_prolo	PACS Eng.	
1141	05/12/2008	16:07:38Z	1333	ngc1705-PACSScan75	PacsPhoto	PPhoto	Chopped raster
1139	05/12/2008	16:33:47Z	797	PPhoto-arp220	PacsPhoto	PPhoto	Small-source photometry
1145	05/12/2008	16:49:11Z	797	PPhot_HEN 3-519_B	PacsPhoto	PPhoto	Small-source photometry
1147	05/12/2008	17:03:31Z	797	PPhot_HEN 3-519_G	PacsPhoto	PPhoto	Small-source photometry
1128	05/12/2008	17:19:06Z	7590	PPhoto-ngc2403 - copy	PacsPhoto	PPhoto	Scan map
1062	05/12/2008	19:25:36Z	71	SpireEngREDYtoPHOT_STBYGen-0000	SpireEngREDYtoPHOT_STBY	SPIRE Eng.	
1182	05/12/2008	19:30:01Z	5053	SPParallel-SlowB1Orth	SpirePacsParallel	SPParallel	
1184	05/12/2008	20:07:35Z	5513	SPParallel-SlowB1Nom	SpirePacsParallel	SPParallel	
1181	05/12/2008	20:45:45Z	2145	SPParallel-smallFastB1Orth	SpirePacsParallel	SPParallel	
1187	05/12/2008	22:18:51Z	2145	SPParallel-smallFastB1Nom	SpirePacsParallel	SPParallel	
1222	05/12/2008	23:43:06Z	14	PacsEng_orbit_epilogueGen-0000 - copy - 0001	PacsEng_orbit_epilogue	PACS Eng.	
1169	05/12/2008	23:47:57Z	507	Photometer_small_1rep	SpirePhotoSmall	SPhoto	small
1167	05/12/2008	23:59:10Z	209	Photometer_large_angleB_1rep	SpirePhotoLargeScan	SPhoto	large
1164	06/12/2008	00:04:59Z	23771	Photometer_verylarge_fast_2rep	SpirePhotoLargeScan	SPhoto	large
1170	06/12/2008	06:46:18Z	209	Photometer_large_angleA_1rep	SpirePhotoLargeScan	SPhoto	large
1165	06/12/2008	06:52:00Z	1759	Photometer_point_5rep	SpirePhotoPointJiggle	SPhoto	point
1166	06/12/2008	07:25:25Z	13220	Photometer_large_40rep	SpirePhotoLargeScan	SPhoto	large
1163	06/12/2008	11:09:34Z	2299	Photometer_small_5rep	SpirePhotoSmall	SPhoto	small
1092	06/12/2008	11:47:53Z	39	SpireEngPHOT_STBYtoREDYGen-0000	SpireEngPHOT_STBYtoREDY	SPIRE Eng.	
SLEW	12/6/2008	12:00	0				

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### 3.5 Operational Day 129

#### 3.5.1 OD-129: Planning Rules

##### DTCP-128 Science activities:

- PACS & SPIRE Parallel Cooler Recycling

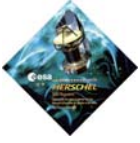
[Note: No real-time dump of PACS science data will now be attempted. This will be postponed to SOVT-2. An additional cooler recycling has been added to this DTCP.]

##### OD-129 Science Activities

- PACS-Photometer- 50% (10.5 hr + 2hr during DTCP) - includes one PACS burst mode + One SSO Observation (Titan)
- PARALLEL Mode (4.2 hr)
- SPIRE-Photometer - 30% (6.3 hr)

#### 3.5.2 OD-129: Schedule in detail

ID	Start date	Start time	Sec	Title	Mode	AOT	Mode
1079	06/12/2008	12:37:00Z		SpireEngParallelCoolerRecycleGen-0000 - copy	SpireEngParallelCoolerRe	SPIRE Eng.	
1063	06/12/2008	15:29:17Z		SpireEngREDYtoPHOT_STBYGen-0000 - copy	SpireEngREDYtoPHOT_STBY	SPIRE Eng.	
1213	06/12/2008	15:31:34Z	1970	PacsEng_PHOT_orbit_prologueGen-0000 - copy - 0001	PacsEng_PHOT_orbit_prolo	PACS Eng.	
1183	06/12/2008	16:11:28Z	4501	SPParallel-largeFastB2Nom	SpirePacsParallel	SPParallel	
1186	06/12/2008	17:30:43Z	4396	SPParallel-FastB1Nom	SpirePacsParallel	SPParallel	
1185	06/12/2008	18:48:24Z	4837	SPParallel-FastB1Orth	SpirePacsParallel	SPParallel	
1084	06/12/2008	20:09:03Z	25	SpireEngPcalFlashGen-0000	SpireEngPcalFlash	SPIRE Eng.	
1093	06/12/2008	20:09:28Z	39	SpireEngPHOT_STBYtoREDYGen-0000 - copy	SpireEngPHOT_STBYtoREDY	SPIRE Eng.	
1143	06/12/2008	20:14:26Z	897	PacsBlue RM - Arp 140	PacsPhoto	PPhoto	Chopped raster
1135	06/12/2008	20:31:27Z	1333	ngc1705-PACSScan110	PacsPhoto	PPhoto	Chopped raster
1140	06/12/2008	20:55:31Z	2544	PacsHzQSO - 4C41.17	PacsPhoto	PPhoto	Point-source photometry
1127	06/12/2008	21:40:01Z	4164	cep_11251_p1	PacsPhoto	PPhoto	Scan map
1136	06/12/2008	22:50:28Z	1343	PPhoto-11721	PacsPhoto	PPhoto	Scan map
1138	06/12/2008	23:15:09Z	159	haro3-PACSp110	PacsPhoto	PPhoto	Point-source photometry
1131	06/12/2008	23:20:04Z	795	PacsMzQSO - SDSSJ221203.88-085739.4	PacsPhoto	PPhoto	Point-source photometry
1150	06/12/2008	23:35:58Z	2157	PPhoto-ic59	PacsPhoto	PPhoto	Chopped raster
1137	07/12/2008	00:16:50Z	328	PPhoto-0002 - Titan - 0000	PacsPhoto	PPhoto	Point-source photometry
1129	07/12/2008	00:28:25Z	927	PPhoto-ngc1068 - copy	PacsPhoto	PPhoto	Scan map
1133	07/12/2008	00:46:46Z	852	PPhoto-ngc4151	PacsPhoto	PPhoto	Scan map
1142	07/12/2008	01:02:59Z	2703	PacsVzQSO - SDSSJ123333.48+062234.2	PacsPhoto	PPhoto	Scan map
1151	07/12/2008	01:51:05Z	851	PacsBlue ScMap7ori135deg - Arp 084	PacsPhoto	PPhoto	Scan map
1146	07/12/2008	02:07:45Z	7654	Abell1689 d+0+0 forward r1 PA45	PacsPhoto	PPhoto	Scan map
1132	07/12/2008	04:16:22Z	7654	Abell1689 d+0+0 forward r1 PA315	PacsPhoto	PPhoto	Scan map
1223	07/12/2008	06:23:56Z	14	PacsEng_orbit_epilogueGen-0000 - copy - 0002	PacsEng_orbit_epilogue	PACS Eng.	



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## SOVT-1

### SGS – Simulations plan & Timeline

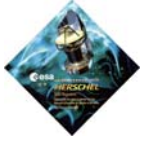
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1064	07/12/2008	06:24:10Z	71	SpireEngREDYtoPHOT_STBYGen-0000 - copy - 0001	SpireEngREDYtoPHOT_STBY	SPIRE Eng.	
1085	07/12/2008	06:26:27Z	25	SpireEngPcalFlashGen-0000 - copy	SpireEngPcalFlash	SPIRE Eng.	
1172	07/12/2008	06:31:22Z	4845	Photometer_medlarge_3rep_offset	SpirePhotoLargeScan	SPhoto	Large
1173	07/12/2008	07:55:19Z	5176	Photometer_point_15rep	SpirePhotoPointJiggle	SPhoto	Point
1086	07/12/2008	09:21:35Z	25	SpireEngPcalFlashGen-0000	SpireEngPcalFlash	SPIRE Eng.	
1168	07/12/2008	09:25:51Z	6813	Photometer_small_15rep	SpirePhotoSmall	SPhoto	small
1087	07/12/2008	11:19:24Z	25	SpireEngPcalFlashGen-0000	SpireEngPcalFlash	SPIRE Eng.	
1094	07/12/2008	11:19:49Z	39	SpireEngPHOT_STBYtoREDYGen-0000 - copy	SpireEngPHOT_STBYtoREDY	SPIRE Eng.	
SLEW	07/12/2008	12:00:00Z	0				



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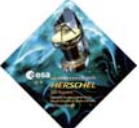
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### 3.6 List of Modes used

The following table summarises all the unique observing modes to be used in SOVT-1.

Mode	AOT	Sub Mode
HifiEngSetIntoPrimary	HIFI Eng.	
HifiEngSetIntoStandby_I	HIFI Eng.	
HifiEngSetIntoStandby_II	HIFI Eng.	
HifiEngSwitchonLO	HIFI Eng.	
HifiMappingModeDBSCross	HMap	DBS raster map
HifiMappingModeDBSRaster	HMap	DBS raster map
HifiMappingModeFastDBSCr	HMap	DBS raster map
HifiMappingModeFastDBSRa	HMap	DBS raster map
HifiMappingModeFSwitchOT	HMap	Map with Frequency switch
HifiMappingModeOTF	HMap	On the fly map
HifiPointModeDBS	HPoint	Point with Dual Beam Switch
HifiPointModeFastDBS	HPoint	Point with Dual Beam Switch
HifiPointModeFSwitch	HPoint	Point with Frequency switch
HifiPointModeFSwitchNoRe	HPoint	Point with Frequency switch
HifiPointModeLoadChop	HPoint	Point with load chop
HifiPointModeLoadChopNoR	HPoint	Point with load chop
HifiSScanModeDBS	HScan	DBS spectral scan
HifiSScanModeFastDBS	HScan	DBS spectral scan
HifiSScanModeFSwitch	HScan	Frequency switch spectral scan
HifiSScanModeFSwitchNoRe	HScan	DBS spectral scan
PacsEng_BOLO_cool_recycl	PACS Eng.	
PacsEng_orbit_epilogue	PACS Eng.	
PacsEng_PHOT_orbit_prolo	PACS Eng.	
PacsEng_SPEC_curing	PACS Eng.	
PacsEng_SPEC_orbit_prolo	PACS Eng.	
PacsPhoto	PPhoto	Chopped raster
PacsPhoto	PPhoto	Point-source photometry
PacsPhoto	PPhoto	Scan map
PacsPhoto	PPhoto	Small-source photometry
PacsLineSpec	PSpecL	Map with chop/nod
PacsLineSpec	PSpecL	Map with wavelength switch
PacsLineSpec	PSpecL	Pointed with chop/nod
PacsRangeSpec	PSpecR	Map with off
PacsRangeSpec	PSpecR	Pointed with chop/nod
SpirePhotoLargeScan	SPhoto	large
SpirePhotoPointJiggle	SPhoto	point
SpirePhotoSmall	SPhoto	small
SpireEngParallelCoolerRe	SPIRE Eng.	
SpireEngPcalFlash	SPIRE Eng.	
SpireEngPHOT_STBYtoREDY	SPIRE Eng.	
SpireEngREDYtoPHOT_STBY	SPIRE Eng.	
SpirePacsParallel	SPParallel	

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## 4. SOVT-1 – Ground Segment Day to Day Activities – In Detail

### 4.1 Introduction & general overview of ground segment activities

This chapter defines the steps to be performed on a day to day basis at each Operational Centre involved in the test.

It covers also the “parallel” simulations being performed e.g. HSC Mission Planning, at each centre.

#### 4.1.1 Spacecraft handover at DTCP (MOC perspective)

##### 4.1.1.1 DTCP-1 (OD 126) preparation (MOC perspective)

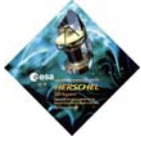
The sequence of activities to prepare for the first DTCP (DTCP-1, or OD 126) is the following.

<i>Time</i>	<i>Actor</i>	<i>Action/Event</i>
	AIV	Configuration of S/C Enable forwarding of TM from EGSE to NDIU
	FCT	Connect NCTRS links VC-0/1/2/3/4/ROCF to NDIU
	FCT	Listen-In, initialisation of time-correlation on both MCS chains
09:00z	AIV	S/C configuration completed Delete SSMM and CEL after MOC confirmed good time-correlation of MCS AIV will run DHS_START script; to be coordinated with MOC
	AIV, FCT	Handover of S/C to MOC
	FCT	TC connection test and AD mode configuration
	FCT	Uplink of MTL-0 and MTL-1
	FCT	Starting SREM Accumulation
	FCT	Dumps to check S/C configuration
10:30z	FCT, AIV	Optional: Back-handover of S/C to AIV until formal start of SOVT-1 with DTCP-1
	AIV or FCT	Last chance to correct S/C configuration
11:55z	MTL	Tx ON by MTL-0 (for start of DTCP-1 at 12:00z)

#### 4.1.1.2 DTCP activities (MOC perspective)

The sequence of DTCP activities for each OD of the SOVT-1 campaign is the following.

<i>DTCP</i>	<i>Actor</i>	<i>Action/Event</i>
		S/C monitoring via umbilical, NDIU receives TM via Ethernet from EGSE
-00:05:00	MTL	<b>Official AOS:</b> Tx On by MTL TC (medium TM rate)
	AIV	Switch from umbilical to RF via TTC SCOE
00:00:00		<b>Start DTCP</b>
	FCT	Connect NCTRS links VC-0/1/2/3/4/ROCF to NDIU
	AIV	Perform TC uplink sweep
	AIV, FCT	Handover of S/C from AIV to MOC and connect NCTRS TC link
	FCT, AIV	MOC to announce TM rate change to high; AIV to operate TTC SCOE and EGSE
02:45:00	FCT, AIV	Switch back to medium TM rate for Ranging. MOC to announce TM rate changes to AIV; AIV to operate TTC SCOE and EGSE
03:00:00		<b>End DTCP</b>



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	FCT	Disconnect NCTRS links VC-0/1/4/ROCF from NDIU, only VC-2/3 remain connected until the transfer of dumped TM is completed
	FCT, AIV	Disconnect NCTRS TC link and handover of S/C from MOC to AIV
	AIV	Switch from RF back to umbilical
03:00:15	MTL	<b>Official LOS:</b> Tx Off by MTL TC (medium TM rate)

#### 4.1.2 Typical Ground Segment data flow (MOC perspective)

The table below (produced by MOC) provides a typical set of ground segment activities to be performed per operational day. The sections in this chapter will address in much greater detail those activities where “HSC” and the Science Ground Segment are listed.

<i>DTCP</i>	<i>Actor</i>	<i>Action/Event</i>
-01:00:00	FCT	DTCP Preparation
-00:10:00	TAS	Switch to RF via TTC SCOE, awaiting AOS
-00:08:00	FCT	Connect NCTRS links VC-0/1/2/3/4/ROCF to NDIU, awaiting AOS
00:00:00		<b>Start DTCP</b>
00:15:00		Start of VC-2 TM transfer from NDIU to MOC
00:35:00		Start of VC-3 TM transfer from NDIU to MOC
03:00:00		<b>End DTCP</b>
03:06:00	FCT	Disconnect NCTRS links VC-0/1/4/ROCF from NDIU, only VC-2/3 remain connected until the transfer of dumped TM is completed
03:30:00	FDT	Injection of simulated ground station tracking and ranging data into FDS (real ground stations are not involved in SOVT-1) to update orbit data
06:30:00		End of VC-2 TM (packet store 1 and 2) transfer from NDIU to MOC (estimation, see section 3.5.1)
	FCT	Start offline consolidation for HK TM
	HSC	While offline HK consolidation is ongoing, HSC automatically retrieves consolidated blocks
	FDT	Start HK TM transfer to FDS
10:00:00		End of VC-3 TM transfer from NDIU to MOC (estimation, see section 3.5.1)
	FCT	Start offline consolidation for SCI TM
	HSC	While offline SCI consolidation is ongoing, HSC automatically retrieves consolidated blocks
11:00:00	FDT	AHF generated and distributed (estimation, requirement FGS-IR-3.1-410)
14:00:00	FDT	Orbit File, Event File, WIMPY, OWLT and STDM generated and distributed (estimation, usually done only once per week)
	HSC	DDS Transfer of consolidated TM and Auxiliary Files from MOC completed
	HSC	Generate Instrument Science TM Data Frames
	HSC	Provide Consolidated TM to ICCs via propagation
	HSC	SPG Pipeline products generation
	HSC	Delivery of SPG Pipeline products from HSC to ICCs
	HSC	Delivery of outputs

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### **4.1.3 Science Ground Segment data flow – in more detail**

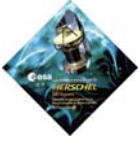
The main “system” data flow from the ground segment perspective is as follows:

- On-line Retrieval over the lease lines from the DDS of HK & Science TM from the MOC archive following its arrival at MOC & its consolidation
- Data received from DDS, passed on to the operational DB server and start of TM Ingest/TM proc.
- In parallel, propagation of all data to each of the ICCs via the Lease line within 5 minutes of reception of each bit from the MOC
- Transfer from MOC to HSC of auxiliary Data relevant to the OD in question starting during the DTCP and ending approx 3.5 hours after DTCP ends e.g. Time Correlation, TC History, Out of Limits.
- Transfer from HSC to ICCs via the operational FTP server of all relevant auxiliary data
- Transfer approx 12 hours (latest) after DTCP ends of the Attitude History File by the File Transfer System from MOC to HSC.
- Start of the Auxiliary pipeline process whereby all auxiliary data from the MOC is converted to products and made available to the HSC Pipeline manager
- Start of the Automatic pipelines using the HSC GRID whereby auxiliary products & Science TM are passed through each instrument pipeline to generate Level 0 & Level 1 products (minimum)
- All products generated are placed in the Herschel Science Archive (HSA)
- All ICCs shall connect to the HSA and shall retrieve the products from there via the product transfer mechanism
- All ICCs shall process to a predefined level the propagated TM delivered to them from HSC and shall provide Quality information as well as identify problems with the data which need to be followed up by HSC & by MOC
- All ICCs shall perform the following tasks:
  - Health Monitoring of their instrument
  - Trend Analysis
  - Generation of quality products
  - Inspection of products
  - Others TBW (see Sections 6-8 for a detailed instrument-by-instrument breakdown of plans).
- HSC shall perform mission planning of ODs 131 onwards using the PSFs delivered by MOC.

### **4.1.4 DP Flow**

#### **4.1.4.1 Overview of DP**

The flowing chart summarises the data flow through the Data Processing (DP) system through to the final dump in the Herschel Mission Archive.



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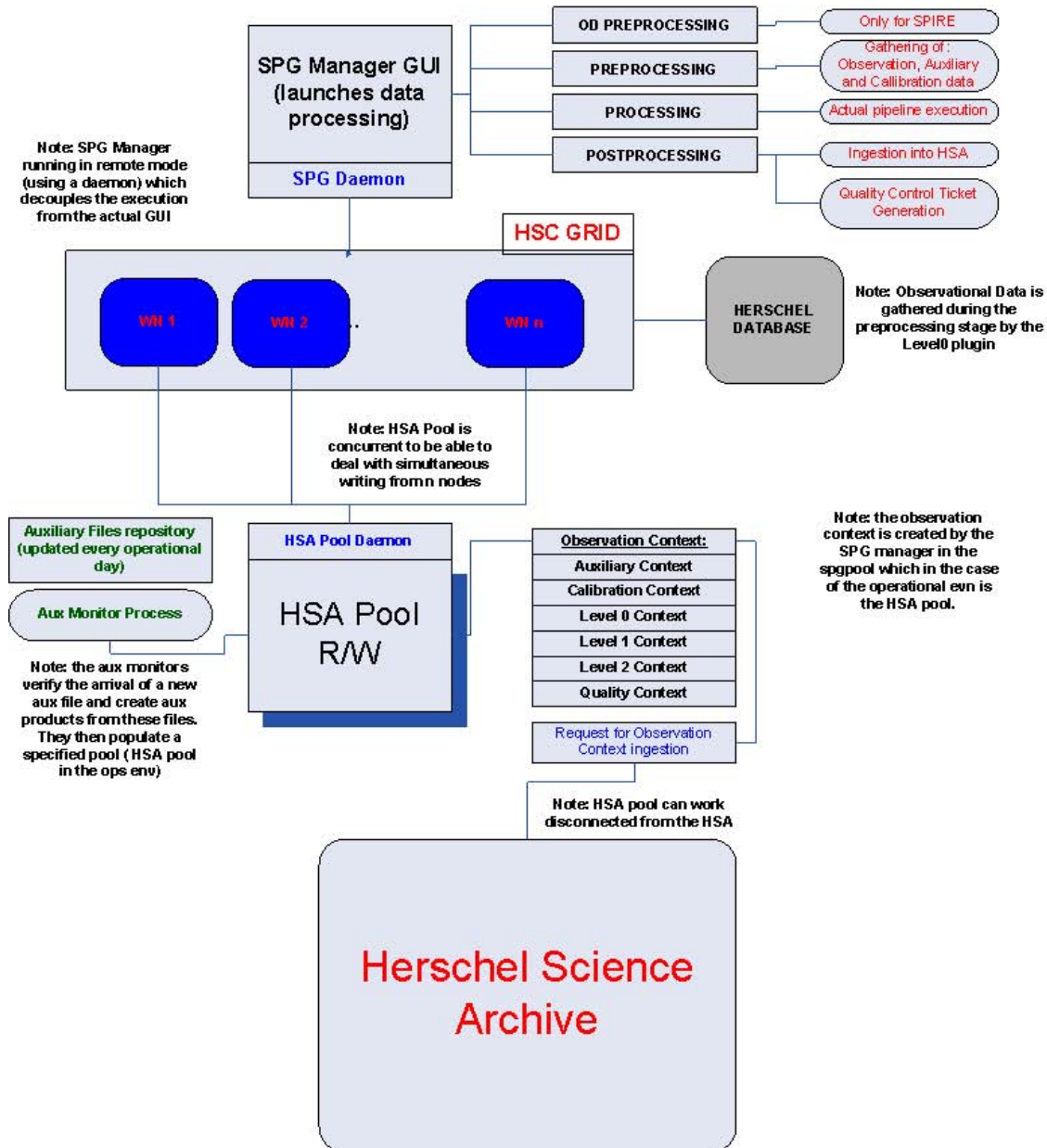
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## Data Processing (Systematic) Overview

Version 1.1 Thursday 10<sup>th</sup> July 2008



### 4.1.4.2 Automatic pipeline processing

An automated pipeline processing system has been developed and will be released as part of the patch to HCSS 0.6.3 that has been prepared specifically for RMS and SOVT-1. The automated pipeline processing will start after the last data packet has been received at ESAC during the night and will complete running before HSC personnel arrive the following morning.

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The pipeline parameters are configurable. This is required because the time of arrival of the last data packet will vary from day-to-day according to the instrument and observing mode that is in operation and thus the quantity of data to be transferred. Thus the process will be launched at 00:00UT and will check for completion of data transfer at half hour intervals until it detects that the transfer is complete and that all the necessary data and products are available.

The sequence of pipeline processing events is the following:

1. Check that a given required file (set by the Configuration property: "hcss.ia.spg.cron.ddsfile") exists on the file system.

2. This file contains a start/end time of the data retrieved for that operational day, for example:

```
#Thu Jul 17 21:30:08 MEST 2008
startTime=2008-10-28T13\.:27\.:28.000000 TAI (1603891648000000)
endTime=2008-10-29T13\.:30\.:26.000000 TAI (1603978226000000)
```

3. Retrieve the Operational Day corresponding to this start/end times from the Versant database.

4. Get the scheduled observations listed under that Operational Day

5. Check that the following products from the AUX process have been created for that Operational Day:

```
herchel.ia.obs.auxiliary.pointing.PointingProduct
herchel.ia.obs.auxiliary.oob.OolProduct
herchel.ia.obs.auxiliary.timecorr.TimeCorrProduct
```

This file list is configurable. The Pointing Product file should be the last one to be received at the end of data transfer.

6. If all of these file are present on the system → start the corresponding Operational Day processes and pipelines.

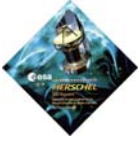
7. If the files are not present, wait and start the checks again in 30 minutes.

The automated pipeline process will run autonomously and complete the data reduction process overnight to a level consistent with the state of development of the pipeline. In all three instruments all processes generate at least Level 1 products and some processes develop Level 2 products; some processes also generate Quality information, but this is still not fully implemented for all pipelines.

#### **4.1.4.3 Manual pipeline operation**

At the start of each working day the Data Processing Technical Assistants (DPTA) will arrive between 08:30 and 09:30 each morning and will check the state of the automated pipeline reduction. If the pipeline has run correctly during the night the DPTA will concentrate on checking the products that have been generated and, if necessary, recovery operations for any missing packets.

If the pipeline has failed, the various logs that are generated will be examined to locate the cause of the error. In some cases it may be due to a simple glitch in the grid, in which case the pipeline will be re-run manually. Failures due to errors in processes or to problems with the input data will be examined to establish the remedial action that is required in the process to permit recovery and to allow it to function correctly.



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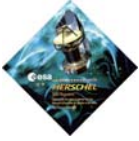
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#### **4.1.4.4 RMS-SOVT synergies**

The RMS test can consider itself in many respects to be equivalent to an SOVT-0, although the methodology is different and the test is run by industry. This means that there are important synergies between RMS and SOVT-1. In particular, the pipeline processing of the data is identical in both cases. This means that RMS can be used for advanced testing of the DP pipeline and product generation, allowing the automatic pipeline process to be tested in operational conditions before SOVT-1. Effectively RMS will be used as an error-trapping exercise, with the two working days between the end of RMS and the start of SOVT-1 used to patch any automatic pipeline process errors that have relatively simple solutions.



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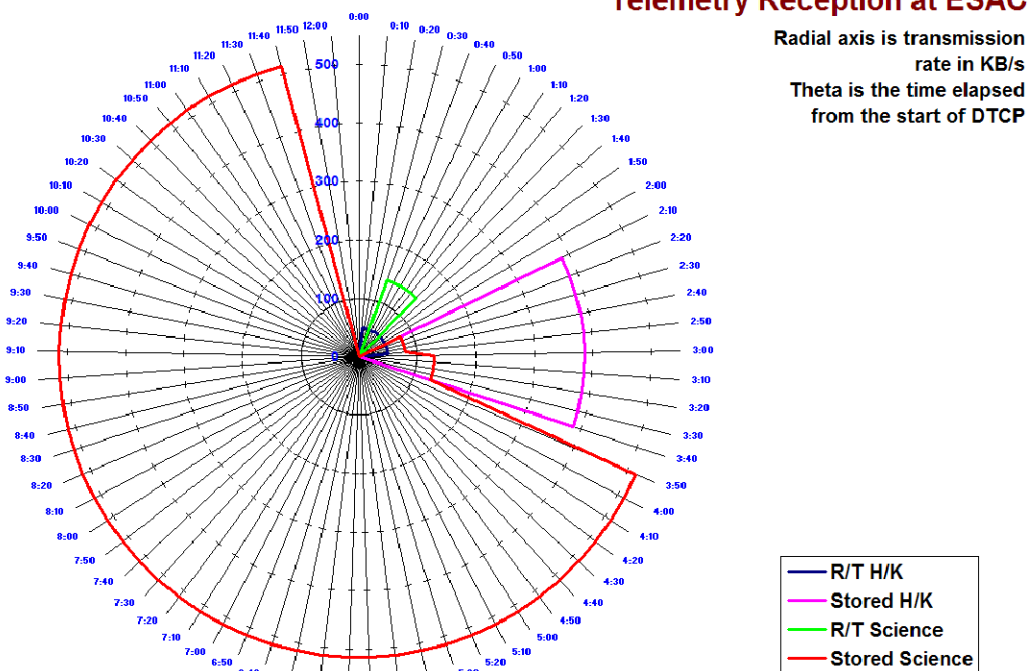
## 4.2 Ground Segment Data Generation & Transfer – A timing perspective

This section will list all data types to be exchanged/distributed during SOVT-1 and shall define the time of generation & distribution of this data with respect to the DTCP start time of each Operational Day.

For those who cannot wait, please look at the HSC System Data Flow Technical Note or look at the two pictures below, which show the dataflow schematically.

The first shows the approximate flow rate of different types of data into ESAC from the start of DTCP. A total bandwidth of 512KB/s is available to Herschel. The first data start to arrive at ESAC 10 minutes after the start of DTCP. Initially priority is given to Real-Time (R/T) Science and House-Keeping (H/K) data and then to the stored House-Keeping data. Finally, when all the Stored H/K has been delivered, the entire bandwidth is given over to the stored science data, the bulk of which arrives in the period starting 4-hours after the start of DTCP. The delivery of stored science data should finish approximately 12 hours after the start of DTCP.

### Telemetry Reception at ESAC



*A schematic view of telemetry reception over a 12-hour period from the start of DTCP, showing the approximate data flow rate, based on experience from the Planck SOVT-1. Data starts to arrive at ESAC from MOC 10 minutes after the start of DTCP. A total bandwidth of 512Kb/s is available. Initially priority is given to real-time (R/T) information and then to Housekeeping (H/K) data. Finally, the bulk of the stored science data is transmitted using the full bandwidth. By giving priority to House-Keeping data the house-keeping is received at ESAC just after the DTCP ends, at the cost of slightly delaying the receipt of science data.*

As DTCP will start at 12:00z (z = ZULU = UT), add the number of hours delay to this start time to get the real time of data delivery. Local Time at ESAC is ZULU+2h. Note that in winter the difference will be ZULU+1h. All science data should thus be delivered by approximately 2am local time at ESAC and will be ready when HSC personal arrive in the morning.



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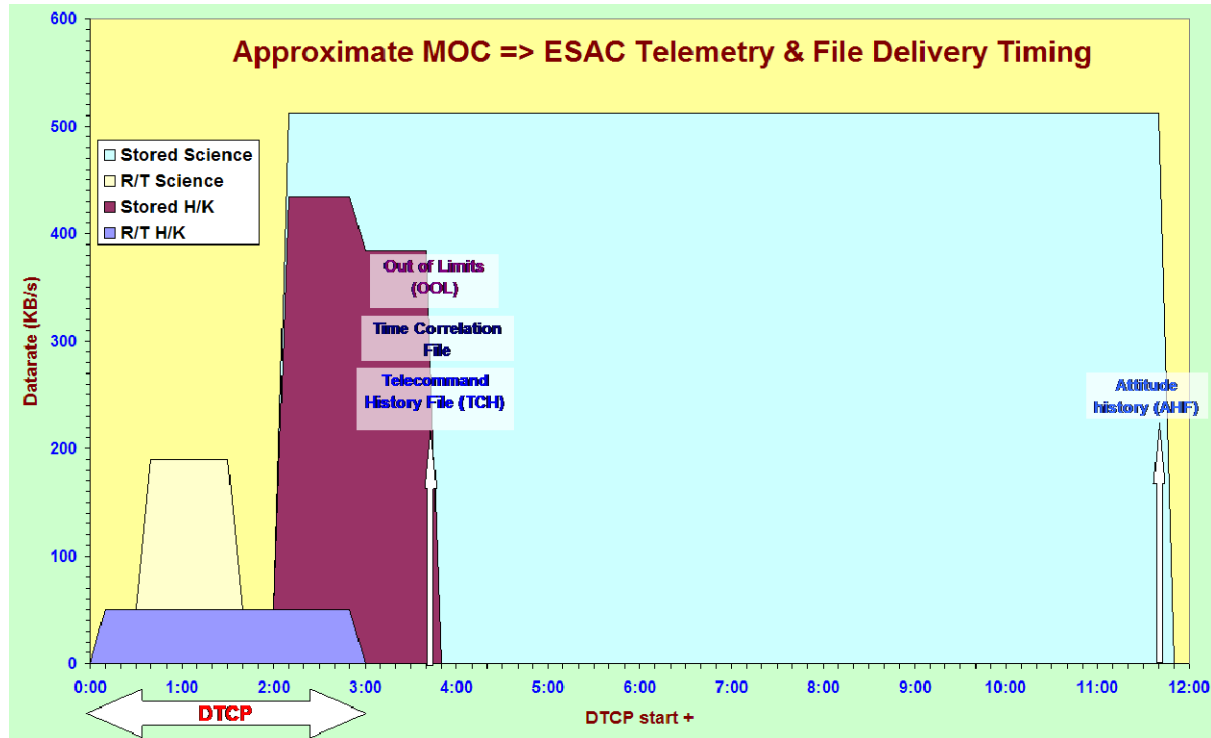
Doc. No: HERSCHEL-HSC-DOC-1173

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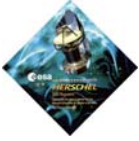
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Auxiliary files will arrive with the data delivery. The second plot shows the approximate arrival times of the various auxiliary products in relation to the data deliveries.



The approximate file and data delivery timeline. Vertical lines indicate file deliveries.



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### 4.3 Preparation for the SOVT-1 - Setting up the system at the HSC & ICCs

Please refer to the test plan prepared by each individual ICC and presented in Sections 6-8.

### 4.4 HCSS configuration for RMS & SOVT-1 at the HSC

A final HCSS build for RMS and SOVT-1 was made on 2008 September 2<sup>nd</sup>, containing additional patches. The release note defines this build, as follows:

This new release, HCSS v0.6.3.3, can be found as Old Style and New Style builds as:

HCSS: 1719  
HCSS-CORE: 245  
HCSS-APPS: 18  
DP-CORE: 302

And contains fixes for:

HCSS-SPR 4835

Please, do not expect these builds to hold any functionalities released after HCSS v0.6.3.2 except for the mentioned changes.

This build will be used for RMS or SOVT unless otherwise notified.

Please, note that any required fixes to the instruments software required during RMS or SOVT will be built against the new HCSS release or its successors.

Currently builds for the ICCs software on the 0.6.3.x track has been built for:

HIFI: 1084  
DP-HIFI: 164  
SPIRE: 923  
DP-SPIRE: 168

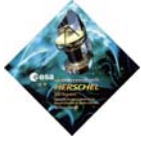
#### **4.4.1 HCSS additional patch configuration (September 5<sup>th</sup>)**

The following release note was issued on 2008 September 5<sup>th</sup>

Yesterday the cCCB approved some changes to the latest 0.6.3.x release and according to that we have created a new 0.6.3.4 candidate.

This new release, HCSS v0.6.3.4 candidate, can be found as Old Style and New Style builds as:

HCSS: 1725  
HCSS-CORE: 250  
HCSS-APPS: 24  
DP-CORE: 306



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And is supposed to contain fixes for:

SCR-4870  
SCR-4871  
SCR-4874  
SCR-4863  
PACS-SPR 1015  
PACS-SPR 1014  
PACS-SPR 991

Please, do not expect these builds to hold any functionalities released after HCSS v0.6.3.3 except for the mentioned changes.

This build will be used for SOVT unless otherwise notified.

Please, note that any required fixes to the instruments software required during SOVT will be built against the new HCSS release or its successors.

Currently builds for the ICCs software on the 0.6.3.4 track have been built for:

HIFI: 1088  
DP-HIFI: 169  
SPIRE: 929  
DP-SPIRE: 172  
DP-PACS 190

#### **4.4.2 HCSS additional patch configuration (September 7<sup>th</sup>)**

A further additional patch to the HCSS software for SOVT-1 has been made to address further issues detected in RMS data. The following release note was issued on 2008 September 7<sup>th</sup>:

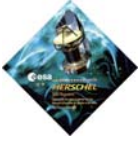
Yesterday cCCB approved some changes to the latest 0.6.3.x release and according to that we have created a new 0.6.3.6 candidate.

This new release, HCSS v0.6.3.5 candidate, can be found as Old Style and New Style builds as:

HCSS: 1728  
HCSS-CORE: 250  
HCSS-APPS: 27  
DP-CORE: 306

And is supposed to contain fixes for:

SCR-4880  
PACS SPR 1015  
PACS SPR 1014  
PACS SPR 991  
PACS SPR 1020  
PACS SPR 1018  
PACS SPR 1016



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PACS SPR 1013

PACS SPR 1017

Please, do not expect these builds to hold any functionalities released after HCSS v0.6.3.5 except for the mentioned changes.

This build will be used for SOVT unless otherwise notified.

Please, note that any required fixes to the instruments software required during SOVT will be built against the new HCSS release or its successors.

Currently builds for the ICCs software on the 0.6.3.6 track have been built for:

DP-HIFI: 169

DP-SPIRE: 172

DP-PACS 191

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## 5. SOVT-1 – Ground Segment Procedures required for SOVT-1

### 5.1 Introduction

This chapter defines the list of procedures required to exist at each centre to allow the personnel working at that centre to be able to perform the activities expected of them during SOVT-1

### 5.2 Procedures at HSC

Page numbers, where given, refer to the relevant page in the Herschel Facilities Operations Manual (HFOM). This information will be updated as the HFOM gets closer to its final operational version.

#### 5.2.1 HFOM version

The version of the HFOM that has been used to generate the list of procedures is:

HFOM v1.1 (formal release, August 8<sup>th</sup>)

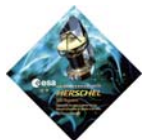
HERSCHEL-HSC-DOC-0742

#### 5.2.2 Mission Planning System Procedures

Procedure Reference	Procedure Description	Page #
HSC-PROC-MPS-0001	Logging onto the HSC Operational workstations as MPS user	108
HSC-PROC-MPS-0002	Long-term mission planning procedures	109
HSC-PROC-MPS-0003	Advance mission planning procedures	110
HSC-PROC-MPS-0004	Short-term mission planning procedures	116
HSC-PROC-MPS-0005	Rescheduling of of scheduled ODs at advanced planning level	120
HSC-PROC-MPS-0006	Re-planning of scheduled ODs at operational mission planning level	123
HSC-PROC-MPS-0007	Mission planning procedures following a ToO or other exceptional circumstances	126
HSC-PROC-MPS-0008	Notification to users of failed observations and re-scheduling approval	127

#### 5.2.3 Proposal Handling System Procedures

Procedure Reference	Procedure Description	Page #
HSC-PROC-PHS-0001	Logging onto the HSC Proposal Handling System	43
HSC-PROC-PHS-0002	Initial database and database server set-up procedures	45
HSC-PROC-PHS-0003	Opening the PHS application	47
HSC-PROC-PHS-0004	Pre-Phase 1 activities	52
HSC-PROC-PHS-0005	Setting the AO Programme in the DB	54
HSC-PROC-PHS-0006	Setting up the HOTAC panels	56
HSC-PROC-PHS-0007	Setting the Observation Programme to OPEN	60
HSC-PROC-PHS-0008	Monitoring the Proposal Submission to the HSC	61



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HSC-PROC-PHS-0009	Setting the Observation Programme to CLOSED	61
HSC-PROC-PHS-0010	Assigning proposals to HOTAC panels and referees to proposals	62
HSC-PROC-PHS-0011	Phase 1 technical checkout procedures (of received proposals)	66
HSC-PROC-PHS-0012	The HOTAC Proposal Web Review	73
HSC-PROC-PHS-0013	The HOTAC meeting	77
HSC-PROC-PHS-0014	Post HOTAC meeting activities	82
HSC-PROC-PHS-0015	HOTAC results made public on the web	84
HSC-PROC-PHS-0016	Declaring Phase 2 of the AO open and initial Phase 2 activities	86
HSC-PROC-PHS-0017	Phase 2 technical check-out (of accepted proposals)	89
HSC-PROC-PHS-0017	Post Phase-2 activities	89
HSC-PROC-PHS-0019	Processing of proposal change requests at the HSC Helpdesk	91
HSC-PROC-PHS-0020	Handling of routine proposal changes	92
HSC-PROC-PHS-0021	Handling of late proposal changes	94
HSC-PROC-PHS-0022	Handling of exceptional proposal changes	96
HSC-PROC-PHS-0023	Handling of mission configuration changes	97
HSC-PROC-PHS-0024	Ingestion of routine calibration proposals	97
HSC-PROC-PHS-0025	Handling of DDT proposals	98
HSC-PROC-PHS-0026	Handling of ToOs	98
HSC-PROC-PHS-0027	Handling of abnormal space weather conditions	101
HSC-PROC-PHS-0028	Ingestion of PV Phase calibration proposals	102
HSC-PROC-PHS-0029	Notifications to users of AOR scheduling	102
HSC-PROC-PHS-0030	Generation and update of Herschel observing log	103
HSC-PROC-PHS-0031	Transfer of downlink information to the operation and staging databases	103

#### 5.2.4 Data Processing System Procedures

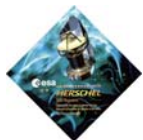
Procedure Reference	Procedure Description	Page #
HSC-PROC-DP-0001	Systematic Data Processing Procedure	134
HSC-PROC-DP-0002	DP Installation Procedure	
HSC-PROC-DP-0003	Herschel Aux Product Generation Procedure	
HSC-PROC-DP-0004	Herschel Cal Product Ingestion Procedure	
HSC-PROC-DP-0005	Quality Control Analysis Procedure	

#### 5.2.5 Helpdesk Procedures

Procedure Reference	Procedure Description	Page #
HSC-PROC-HPDSK-0001	Access to the Helpdesk System	125
HSC-PROC-HPDSK-0002	Management of Helpdesk Questions	127
HSC-PROC-HPDSK-0003	Management of Newsletters	128
HSC-PROC-HPDSK-0004	Management of Mass-Mailing	128

#### 5.2.6 HSC-ICC Interface Procedures

Procedure Reference	Procedure Description	Page #
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HSC-PROC-SGSINT-0001	Propagation of Data	130
HSC-PROC-SGSINT-0002	Provision of data to the Ops FTP Server	130
HSC-PROC-SGSINT-0003	Provision of Data via the HSA (summary only)	130
HSC-PROC-SGSINT-0004	Reception of Data on the FTP Server	131
HSC-PROC-SGSINT-0005	Helpdesk Interactions	132
HSC-PROC-SGSINT-0006	Quality Control Interactions	132
HSC-PROC-SGSINT-0007	OBSM Interactions	132
HSC-PROC-SGSINT-0008	HPSDB Interactions	132
HSC-PROC-SGSINT-0009	Instrument Malfunction Interactions	132
HSC-PROC-SGSINT-0010	Reception of PV Phase OD deliveries	133
HSC-PROC-SGSINT-0011	Processing of PV Phase OD Deliveries by ICS Group	133
HSC-PROC-SGSINT-0012	Processing of PV Phase OD Deliveries by HCSG Group	133
HSC-PROC-SGSINT-0013	Reception of Routine Phase OD deliveries	133
HSC-PROC-SGSINT-0014	Processing of Routine Phase OD Deliveries by ICS Group	133
HSC-PROC-SGSINT-0015	Processing of Routine Phase OD Deliveries by HCSG Group	133

### 5.2.7 System Data Flow Procedures

TBW

### 5.2.8 Quality Control Procedures

TBW

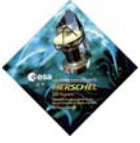
## 5.3 Procedures at each ICC

### 5.3.1 PACS Procedures

Procedure Reference	Procedure Description
PICC-ME-GP-002	Instrument Health Monitoring
PICC-ME-GP-003	Database propagation (HSC to ICC@ICC)
PICC-ME-GP-004	Product transfer (HSC to ICC@ICC)
PICC-ME-GP-005	Routine data processing
PICC-ME-GP-006	Database propagation (ICC@ICC to external ICC sites)
PICC-ME-GP-007	Trend Analysis on instrument and S/C data

### 5.3.2 SPIRE Procedures

Procedure Reference	Procedure Description
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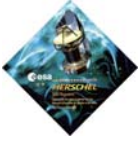
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Draft in TWIKI page	Instrument health monitoring
Draft in TWIKI page	Generation of observing logs
Draft in TWIKI page	Trend analysis processing
Draft in TWIKI page	Transfer files from HSC
Draft in TWIKI page	Operate Helpdesk
Draft in TWIKI page	Data processing
Draft in TWIKI page	Make TA queries
Draft in TWIKI page	Data access from external ICC sites

### 5.3.1 HIFI Procedures

Procedure Reference	Procedure Description
Draft	Database propagation from HSC to HIFI
Draft	Generation of quality products
Draft	Inspection of products



## 6. SOVT-1 – PACS daily activities during SOVT-1

### 6.1 Introduction

This chapter defines the test plan and activities to be carried out by the PACS ICC during SOVT-1, as received from PACS. More details of the PACS test plan can be found in the Twiki page at the url:

<http://www.herschel.be/twiki/bin/view/Pacs/Iom>

#### 6.1.1 PACS software configuration for SOVT-1

##### 6.1.1.1 Software version

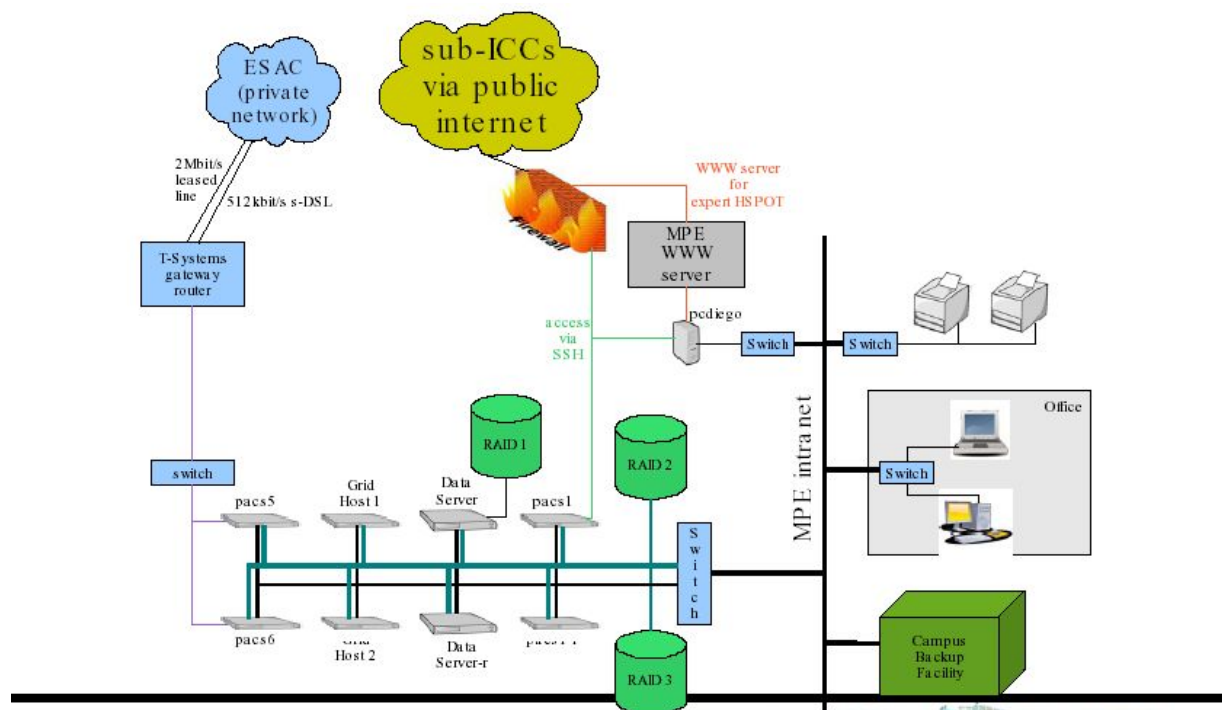
HCSS 0.6.3.6 + PACS SOVT build

##### 6.1.1.2 Database

PACS MIB 9.2

#### 6.1.2 PACS hardware configuration for SOVT-1

The PACS Hardware configuration for the SOVT-1 test is shown in the following flow diagram.



*The PACS hardware configuration for the SOVT-1 test.*

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## 6.2 Data Processing Scenarios for SOVT-1

**General : H/W and account details need to be added**

### 6.2.1 Scenario 1 : Database propagation ESAC -> MPE

Actor : Operator

- Start propagation mechanism
- Monitor progress

### 6.2.2 Scenario 2 : Pool propagation (Auxiliary data/Pointing) ESAC -> MPE

Actor : Operator

- Start client application listening for available Auxiliary Products
- Client application receive a notification of new Auxiliary Product
- Automatic pool propagation Auxiliary Products ESAC -> MPE

### 6.2.3 Scenario 3 : Run Pipeline @ MPE

Actor : Operator

- After an operational day the operator receive a list of executed observations
  - **The mechanism is still TBD**
- The Operator schedule the observations with the local pipeline tool
- Start pipeline application connected to Versant DB and operational Pool
- If an observation is completed and Auxiliary Products are available, start processing
- Populate the Operational Pool @ MPE with Level 0/1/2 Products
- Operator monitor this process
- In case of problems contact E.Wieprecht [ewieprec@mpe.mpg.de](mailto:ewieprec@mpe.mpg.de) - 3845

### 6.2.4 Scenario 4 : Local interaction with raw data

Actor : Instrument Engineer /Calibration Specialist @ MPE

- Start JIDE
- Select Versant Database or MPE Operational Data Pool (see [Scenario 3](#))
- Browse on available Observations, Instrument, ObservingMode<sup>2</sup>, Uplink information, etc.
  - Use PoolBrowser<sup>2</sup> for Pool, readHkDb() and readTmDb() for Database
- Browse (with GUI Menus organized in PacketTypes<sup>2</sup> etc. ) possible HK parameter
  - Use PacsTrendAnalysis<sup>2</sup>
  - Extract selected HK parameter selected by time range (as raw or converted values)
  - Extract selected HK parameter selected by OBSID (as raw or converted values)
  - Extract selected HK parameter selected by queries
- Plot HK parameter in various combinations
  - Save as JPEGs

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- Send to printer
- Select a range in the Plot and apply mathematical operations (fitting, statistics,...)
- Save private products in a local data pool

### **6.2.5 Scenario 5 : Access Products from ESAC**

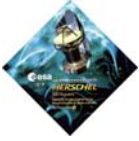
Actor : Instrument Engineer /Calibration Specialist @ ICC

- Using HSA Browser \*Start HSA Browser (from within JIDE or stand alone)
  - Authentication as User, PACS calibration specialist or other profiles (access rights)
  - Select Products in the HSA
  - Retrieve data from HSA into a local pool or as Fits files with reasonable names
  - If stand alone application was used
    - Start JIDE
    - Browse HSA files
    - Import Products (keeping links to [ObservationContext](#) ?)
- Using HAIO
  - **Already tested - not usable for operation**
  - start JIDE
  - start ProductBrowser<sup>2</sup>
  - select connect to ESAC
  - start ProductBrowser<sup>2</sup>

### **6.2.6 Scenario 6 : Local interaction with Products**

Actor : Instrument Engineer /Calibration Specialist @ ICC

- Start JIDE
- **Scenario 6.1 : Browse and Access Products**
  - Select available Pools
  - Start Product Browser with a reasonable view [SCR-3294 Configurable Views of PAL Browser](#)
  - Extract Products into JIDE session
  - Browse available Tasks for Spectroscopy and Photometry in the pipeline scripts or User Manual
  - Lookup documentation (starting overview view with one liners and API description, click and getting more detailed information)
  - Browse for selected Tasks on Photometer/Spectrometer (e.g. only Pipeline Tasks)
  - Inspect the History of a Product
  - Browse Products in a Session by DatasetInspector<sup>2</sup>
    - get overview about Product sizes (in allocated memory)
- **Scenario 6.2 : Access Documentation**
  - - Access User Manual
    - Print a Chapter of a User Manual
    - Click on a Product : get view/possible pipeline applications/product description
    - Get pipeline scripts (code) related to a certain Product



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### SGS – Simulations plan & Timeline

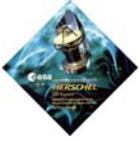
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- Get synopsis of a certain Task
- **Scenario 6.3 : Browse and Access Calibration Products**
  - Get a convenient overview about available PACS calibration data (table which version , at what time , etc.)
  - Access certain calibration data
  - Modify calibration Products
  - Save modified calibration Products in private pool
  - Put calibration Product into test environment (MPE user access)
  - Deliver new calibration Product (another Scenario to write)
- **Scenario 6.4 : Process Products**
  - Stepwise execution of the pipeline standard processing steps
  - Visualization of temporary results
  - Modify input parameter for a pipeline step
    - optional : GUI support
    - optional : store parameter setting
    - get GUI command into command line history
  - Compare results
  - Load private calibration Product
  - Use private calibration Product for a pipeline step
  - Compare results (Display and Plot)
  - Plug in of private Jython and Java Tasks without restarting JIDE
  - Reloading of Jython and Java Tasks without restarting JIDE
  - Execute private or modified Jython/Java Task
- **Scenario 6.5 : Workspace handling**
  - Optional for controlled exit or within session (even configurable by time) : Save Workspace (command history, parameter settings, Products,...)
  - Restore crash : Restore last saved Workspace



## 7. SOVT-1 – SPIRE daily activities during SOVT-1

### 7.1 Introduction

This chapter defines the activities to be carried out by the SPIRE ICC during SOVT-1. More details of the SPIRE test plan can be found in the Twiki page at the url:

<http://www.herschel.be/twiki/bin/view/Spire/DPTTestPlanSOVT1>

#### 7.1.1 SPIRE software configuration for SOVT-1

##### 7.1.1.1 Software version

HCSS 0.6.3.6 + SPIRE SOVT build

##### 7.1.1.2 Database

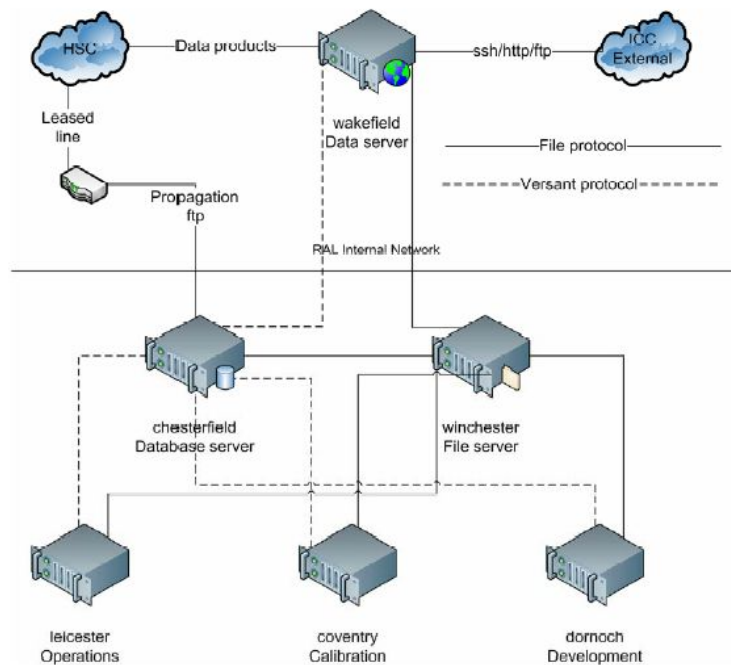
SPIRE MIB 2.2H1 PR

#### 7.1.2 SPIRE hardware configuration for SOVT-1

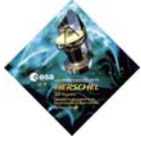
The SPIRE Hardware configuration for the SOVT-1 test is shown in the following flow diagram.

### Operations Computers

- Computer hardware in place
- Leased line has been tested and is now operational
- Links from Wakefield to external sites tested and operational
- Will be used for SOVT1



*The SPIRE hardware configuration for the SOVT-1 test.*



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## 7.2 Planned daily activities

The following is the Day to Day Timeline for SOVT-1 for the SPIRE ICC.  
All times are given in UTC

### 7.2.1 Day1

06:00 start OD (satellite setup)  
12:00 start OD126  
15:30 Daily Briefing with HSC  
16:30 Daily Wash-up with MOC

### 7.2.2 Day2

08:30 Status Telecon (30 mins)  
12:00 Start OD127  
12:00 Deliver Calibration Observation to HSC  
15:30 Daily Briefing with HSC  
16:30 Daily Wash-up with MOC

### 7.2.3 Day3

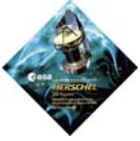
08:30 Status Telecon (30 mins)  
09:00 Instrument Health Monitoring OD126  
09:00 Generation of Observation Logs OD126  
09:00 Trend Analysis Processing of TM OD126  
09:00 Transfer files from HSC OD126  
12:00 Start OD128  
15:30 Daily Briefing with HSC  
16:30 Daily Wash-up with MOC

### 7.2.4 Day4

08:30 Status Telecon (30 mins)  
09:00 Instrument Health Monitoring OD127  
09:00 Generation of Observation Logs OD127  
09:00 Trend Analysis Processing of TM OD127  
09:00 Transfer files from HSC OD127  
12:00 Start OD129  
15:30 Daily Briefing with HSC  
16:30 Daily Wash-up with MOC

### 7.2.5 Day5

08:30 Status Telecon (30 mins)  
09:00 Instrument Health Monitoring OD128  
09:00 Generation of Observation Logs OD128  
09:00 Trend Analysis Processing of TM OD128  
09:00 Transfer files from HSC OD128  
12:00 Start OD (test completion)  
18:00 End OD (test completion)



## **HERSCHEL**

### **SOVT-1**

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12:00 Start Copy of SPG products OD128  
12:00 Trend Analysis Processing of Products OD128  
14:00 Trend Analysis Queries (Eur)  
15:30 Daily Briefing with HSC  
16:00 Data Access from External Sites OD128 (US)  
16:00 Data Processing (US)  
16:30 Daily Wash-up with MOC

#### **7.2.6 Day6**

09:00 Data Access from External Sites OD128 (Eur)  
09:00 Data Processing (Eur)  
09:00 Instrument Health Monitoring OD129  
09:00 Generation of Observation Logs OD129  
09:00 Trend Analysis Processing of TM OD129  
09:00 Transfer files from HSC OD129  
12:00 Start Copy of SPG products OD129  
12:00 Trend Analysis Processing of Products OD129  
15:30 Daily Briefing with HSC  
16:00 Trend Analysis Queries (US)

#### **7.2.7 Day7**

Write Test Report

### **7.3 Planned tests for Day 6**

We intend the following tests to be executed on Day 6 (Tuesday in the current SOVT-1 schedule – however, see note below).

Note: All times are UTC

08:30 Status Telecon (30 mins)  
09:00 Data Access from External Sites OD128 (Eur)  
09:00 Data Processing (Eur)  
09:00 Instrument Health Monitoring OD129  
09:00 Generation of Observation Logs OD129  
09:00 Trend Analysis Processing of TM OD129  
09:00 Transfer files from HSC OD129 \*\*  
12:00 Start Copy of SPG products OD129 \*\*  
12:00 Trend Analysis Processing of Products OD129  
16:00 Trend Analysis Queries (US) \*\*  
16:00 Daily Briefing with HSC

These tasks assume that

1. The TM from OD129 has been propagated from HSC to ICC before 09:00
2. That the auxilliary files for OD129 (OOL, TC History, AHF, etc.) are available by 09:00
3. That the SPG pipeline has been run on OD129 by 12:00

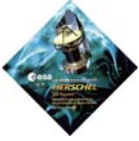
	<p><b>HERSCHEL</b></p> <p><b>SOVT-1</b></p> <p><b>SGS – Simulations plan &amp; Timeline</b></p>	<p><b>Doc. No:</b> HERSCHEL-HSC-DOC-1173</p> <p><b>Issue:</b> Final Version 1.3.1</p> <p><b>Date:</b> 24<sup>th</sup> September 2008</p> <p><b>Page:</b> 56</p>
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In the case that any of these is not completed we will need support from HSC to complete them.

The tasks marked with a \*\* indicate interactions with the HSC which should not require any direct action by the HSC. However, if there are problems in performing these tasks we need to be able to call on someone to help.

### **7.3.1 Day 6 test dependence on SOVT-1 start date**

A Monday or Tuesday start for SOVT-1 (i.e. September 1<sup>st</sup>, 2<sup>nd</sup>, September 9<sup>th</sup>, 10<sup>th</sup>) would see Day 6 of SOVT-1 fall on a weekend – Saturday for a Monday start, Sunday for a Tuesday start. In this case the schedule of activities for Day 6 of SOVT-1 will be maintained and the HSC will provide support, as required as if it were a normal working day (see below).



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## 8. SOVT-1 – HIFI daily activities during SOVT-1

### 8.1 Introduction

This chapter defines the activities to be carried out by the HIFI ICC during SOVT-1

#### 8.1.1 HIFI software configuration for SOVT-1

##### 8.1.1.1 Software version

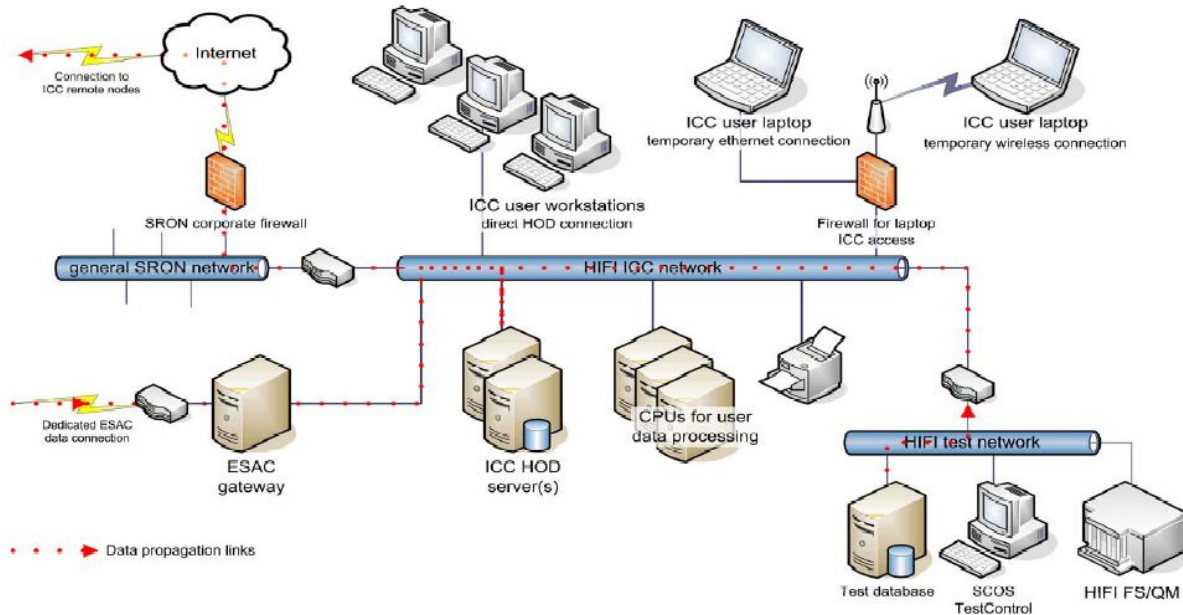
HCSS 0.6.3.6 + HIFI SOVT build

##### 8.1.1.2 Database

HIFI MIB 11.8

#### 8.1.2 HIFI hardware configuration for SOVT-1

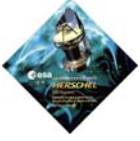
The HIFI Hardware configuration for the SOVT-1 test is shown in the following flow diagram.



*The HIFI hardware configuration for the SOVT-1 test.*

## 8.2 Planned activities

### 8.2.1 Overall test aims



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- 1) telemetry propagation HSC→ICC and ICC→ICC sub-node
- 2) product propagation HSC→ICC
- 3) data analysis at the ICC (in principle)
- 4) product transfer ICC→HSC
- 5) helpdesk follow up

#### **8.2.2 SOVT-1 activities for the HIFI ICC**

The SOVT-1 activities are;

Test set-up activities;

Test preparation

- ICC initializes SOVT-1 database
- ICC starts propagation for SOVT-1 database
- ICC sub-node initializes SOVT-1 database
- ICC sub-node starts propagation for SOVT-1 database
- ICC starts propagation for SOVT-1 database to ICC sub-node
- HSC starts propagation from HSC side

Test closure

- at end of test propagation is stopped on both sides

Telemetry propagation HSC→ICC

- integrity of ingestion process is monitored

Success criterion; all intended telemetry packets and dataframes are being ingested

Pipeline product propagation HSC→ICC

- automatic ICC process connects to FTS
- automatic ICC process requests list of new pipeline products
- automatic ICC process retrieves pipeline products
- automatic ICC process stores product locally

Auxiliary product propagation HSC→ICC

- automatic ICC process connects to FTS
- automatic ICC process requests list of new auxiliary products
- automatic ICC process retrieves auxiliary products
- automatic ICC process stores product locally

Verification of product propagation HSC→ICC

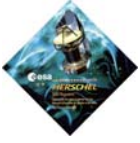
- IE/CS starts IA
- IE/CS verifies that products can be processed

Success criterion; products can be processed (e.g. display, print to screen etc.)

Data analysis at the ICC

- CS/IE starts IA
- CS/IE retrieves TM/dataframes/products
- CS/IE does any kind of processing (e.g. display telemetry, run pipeline partially or all steps, do post processing)

Success criterion; one (simple) processing step can be applied to product



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Product transfer ICC→HSC

- IE/CS connects to FTS
- IE/CS puts product in HSC repository
- IE/CS notifies HSC of delivery by delivery note

Success criterion; HSC can process delivered product

Helpdesk follow up

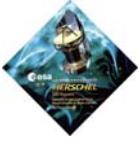
- HSC notifies HIFI of a problem to be investigated by HIFI ICC
- ICC does relevant analysis (where necessary retrieving relevant data)
- ICC sends reply to HSC

Test configuration

- HCSS - HIFI user build 0.6.3 (patched, acceptance tested)
- MIB; TBD
- test database: HSC SOVT-1
  - data for propagation; all SOVT HIFI TM/dataframes and all satellite TM
- products for propagation HSC→ICC;
  - SPG products - all HIFI product from SOVT database
  - auxiliary product - all SOVT-1 auxiliary products
- products for ICC→HSC transfer; HIFI pipeline calibration products TBD

Notes.

- for IA in principle we should be using the HIPE interface, but due to its immature state of implementation likely most work will be done using the JIDE interface
- the subnode for chained propagation is likely to be IPAC
- HIFI does not have Kayako installed, therefore we cannot (yet) use this as a mechanism for helpdesk follow up



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## 9. HSC daily activities during SOVT-1

### 9.1 Introduction

The following figure gives a top-level overview of HSC daily activities during SOVT-1. This time line will be followed for each of the five days of SOVT-1 when there is spacecraft activity. On Day 6 there will be no DTCP, but DP activity will still be on-going, so the 17:30 wash-up telecon with MOC will be suppressed, but the status and debriefing videocons will go ahead, as shown in the second time line figure.

## Typical Daily Timeline (SOVT-1, Days 2-5)

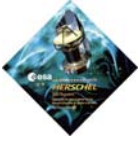
CEST = UTC + 2h

Time (ESAC)	Activity
10:00	Daily internal briefing (All, B3/B4)
10:30	Daily delta briefing with ICCs (Team leaders)
14:00 (12:00UT)	DTCP starts
16:00	Daily internal debriefing & briefing (All, B3/B4)
16:10	First data packet arrives at ESAC
16:30	Daily debriefing & briefing with ICCs (Team leaders)
17:00 (15:00UT)	DTCP ends
17:30	Daily wash-up telecon with MOC (Team leaders)
20:00 (approx)	Stored housekeeping data reception ends
00:00 (approx)	Last science data packet arrives
02:00	Automatic DP pipeline processing starts
06:00	Automatic DP pipeline processing ends
09:00	DP runs pipeline manually on received/recovered data
	ICCs start to analyse data products and housekeeping
	MPS TAs plan schedule for next delivery to MOC.



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Approximate time line of HSC activities on Days 1-5 of SOVT-1.



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## Activities: Thursday September 11<sup>th</sup>



Time (ESAC)	Activity
01:00	Last PACS/SPIRE/SPP parallel science data packet arrives
02:00	Automatic DP pipeline processing starts <i>(if applicable)</i>
06:00	Automatic DP pipeline processing ends <i>(if applicable)</i>
09:00	DP runs pipeline manually on received/recovered data
	ICCs start to analyse data products and housekeeping
	MPS TAs plan schedule for next delivery to MOC.
10:00	Delta internal briefing (B3/B4)
10:30	Delta management briefing telecon (HSC + ICCs)
16:00	Daily internal debriefing & briefing (B3/B4)
16:30	Daily management debriefing & briefing (videocon: HSC & ICCs)

HERSCHEL SPACE OBSERVATORY



*Approximate daily time line for HSC activities on Day 6 of the SOVT-1 test.*

## 9.2 Community Support daily activities during SOVT-1

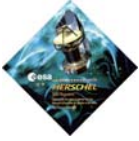
### 9.2.1 Introduction

The aim of SOVT-1 is, as nearly as is reasonable, to simulate normal operations. Community Support will carry out some activities that are reactive and related to the day-to-day activities of the SOVT-1 tests, others, such as Mission Planning, are of operational necessity, de-phased by as much as four weeks with respect to other SOVT-1 activities in normal operations (note, it will not be possible to reproduce this situation exactly in SOVT-1 as other inputs are required from the ICCs first and databases must be created that can only be created when the final POS files to generate the MTL are available – this can only be done a few days before SOVT-1 begins). During SOVT-1 The Herschel Community Support Group will thus, of necessity, have to follow an approximation to standard operational procedures exactly as they would be followed in operations.

### 9.2.2 Planned activities

#### 9.2.2.1 Overall test aims

The aims of SOVT-1 are:



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- 1.) To simulate operational activities and to identify potential problems with support for routine operations.
- 2.) To test the operation of the standard 20-day Mission Planning cycle.
- 3.) To test and refine the procedures for ToO observation, including urgent re-planning in the case of time-critical observations.
- 4.) To test and refine the procedures for Space Weather alerts in the case that the space weather would impact on operational activities.
- 5.) To give the Community Support Team rigorous and realistic training in routine operations activities for a full Mission Planning cycle.

#### **9.2.2.2 Differences with other SOVT-1 activities**

A fundamental difference between Community Support and instrumental activities during SOVT-1 is the long lead-up time. While Mission Planning activities will form the core of routine operations activities, these are performed on a 28-21-14-7 basis, which is described below.

The regular mission planning cycle is 42 days. This allows the percentages of time assigned by HOTAC for the different instruments to be reproduced reasonably accurately in the schedule. This basic cycle is composed of 2 instrument rotations occupying 21 days. Due to the low percentage of SPIRE spectroscopy, only alternate rotations include a SPIRE spectroscopy day. This cycle is arranged to minimise the need for engineering activities that are expensive in helium consumption (e.g. each switch-on of the PACS calibration source uses the equivalent of a full day of helium). Similarly, PACS photometry and SPIRE must always be scheduled as an even number of days to take full advantage of each cooler recycling. This gives the following Mission Planning cycle order of execution.

<b>Rotation 1</b>	4 days PSpec	6 days PPhoto	4 days SPParallel	1 day SPhoto	1 day SPhoto	5 days HIFI
<b>Rotation 2</b>	4 days PSpec	6 days PPhoto	4 days SPParallel	1 day SPhoto	1 day SSpec	5 days HIFI

The sequence of instruments is conserved from cycle to cycle, although there is some fine tuning at the end of each rotation to approximate more closely the percentage of time awarded to each instrument. This cycle will be conserved as is for at least the first year of the mission. Note that on this system there is a slight surfeit of PACS photometry and of HIFI observations and a slight deficit of PACS spectroscopy observations compared to the current HOTAC allocations for Key Programmes. However, contingencies, such as re-planning caused by ToOs or by Space Weather alerts may cause the exact proportions of time programmed to change anyway over those of the cycle given above.

On the 28-21-14-7 system, planning of Mission Planning, each week of telescope time is planned initially 21 days in advance, based on inputs received a 28 days in advance and the schedule is submitted to MOC 14 days in advance of the execution of the first observation in the schedule.

The theoretical schedule of activities involved in SOVT-1 if the exact operations cycle is followed is thus the following:

- T-28d – Community Support Team receives PSF files from MOC for a period of 7 days. This delivery date is a fixed requirement.
- From T-28d to T-21d – Advanced draft Mission Planning schedule prepared in staging database. Initial interaction with users on scheduling preferences.
- T-21d – Deadline for receiving calibration proposals from ICCs for the 7 day period under planning.

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- T-21d – Users informed that their observations are in the provisional schedule.
- From T-21d to T-14d – ToOs included in schedule as required. Schedule fine-tuned in consultation with users.
- T-14d – Final schedule prepared and POS files sent to MOC. Observations passed to operational database. This delivery date is a fixed requirement.
- T<14d – Any changes to the schedule (e.g. urgent ToOs, space weather alerts) can only be taken into account by re-planning one or more days. In principal there is a minimum reaction time of 3 days, but the hard limit on reaction time is 27 hours; it is not currently regarded as being possible to change the schedule on a time scale shorter than this hard limit.

In reality, the database of observations will not be available until August 8<sup>th</sup>, thus the final schedule can only be prepared approximately one week in advance.

During routine operations the POS files will, by definition, be delivered to MOC on a Thursday and all the dates above will be calculated from a Thursday. This allows one full working day for recovery and regeneration of the POS files if MOC finds a problem with the delivery. However, as detailed below, this procedure will not be followed in SOVT-1 due to the unique necessities of the simulation.

### **9.2.2.3 Routine activities during SOVT-1**

A fundamental difference between Community Support and instrumental activities during SOVT-1 is the long lead-up time. While Mission Planning activities will form the core of routine operations activities, these are performed on a 28-21-14-7 basis. Thus Community Support activities for SOVT-1 start nominally 4 weeks in advance of SOVT-1 and would, in a real world situation, end 3 weeks after SOVT-1, with the execution of the observations planned during SOVT-1.

Community Support will carry out a full Mission Planning cycle, from reception of the PSF files to submission of the final POS files to MOC. At the same time the Technical Assistant (TA) Group will maintain a weekly rotation, with each group member cycling through one-week stints as Prime for Mission Planning, Prime for Proposal Handling and, finally, as Back-Up Operator (i.e. available to cover either post at short notice in case of unavailability of the Prime).

#### *9.2.2.3.1 Start of the scheduling cycle*

For routine operations the schedule will be based around a Thursday delivery of POS files to MOC at T-7 days. However, for the purposes of SOVT-1, the 7-day scheduling period for Mission Planning will be defined to start on the first day of SOVT-1, whatever day of the week that may be. The scheduling period will start with Day 1 of Rotation 1 of the Mission Planning cycle (i.e. with PACS Spectroscopy observations) and will follow the 21-day instrument rotation.

#### *9.2.2.3.2 Reception of Calibration Observations*

For the purposes of SOVT-1 calibration observations previously submitted by the ICCs for the PV Test will be used. The calibration proposals will be deemed to have been received by the ICS Team at the HSC. The ICS will extract 3 hours of AORs from the received proposals and will submit them to the HSC through Expert HSpot for each OD that is to be scheduled. The Proposal Handling Technical Assistant will receive these proposals and process them, passing them to the staging database for scheduling. This process of

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submission should start 21 days before the start of SOVT-1. For simplicity, it is acceptable for the same AORs to be submitted for each day that a sub-instrument is active in the Mission Planning cycle.

#### 9.2.2.3.3 POS delivery

POS delivery will always be made on a Thursday to ensure that if there are problems with a delivery they can be corrected before the weekend. During SOVT-1, POS file delivery to MOC will follow this practice and a delivery will be made to MOC either during the test (if a Thursday falls within the test), or on the Thursday immediately prior to the start of SOVT-1.

MOC will not process the delivered POS files.

#### **9.2.2.4 Potential non-standard activities during SOVT-1**

A non-standard activity is a scenario that implies potentially rescheduling observations during SOVT-1. Three possible circumstances exist when this might be necessary in routine operations:

- 1.) A ToO alert [**HSC-PROC-MPS-0002**] – By definition, Any ToO Critical (fastest possible reaction) or ToO Hard (maximum required reaction time 1 week) will require re-planning of the schedule. A ToO Soft alert (maximum reaction time 3 weeks) will often be accommodated in the standard Mission Planning cycle without re-planning. ToO Slow alerts will require no re-planning as these imply a reaction time of a minimum of 3 weeks.
- 2.) An instrument problem [**HSC-PROC-MPS-0004**] – The loss or temporary unavailability of an instrument or an observing mode will usually require a partial or a full rescheduling to be carried out.
- 3.) A Space Weather alert [**HSC-PROC-MPS-0003**] – Herschel has a significant vulnerability to high-energy solar proton bombardment in the case of large solar flares, particularly for the PACS GeGa detectors. During epochs of high proton flux the PACS Spectrometer data may become essentially totally unusable. As up to 72 hours warning may be available of such activity it is feasible to change PACS Spectrometer days to PACS Photometer, SPIRE or HIFI days, which would be very much less affected if it is felt that there is a significant risk of operation data being compromised.

##### 9.2.2.4.1 ToO Alerts

ToO alerts are of two types: inherently unpredictable, short-lived phenomena that may appear at any instant with no warning (bright supernovae in nearby galaxies, newly discovered close-pass asteroids, large outbursts of AGNs, etc.), requiring observations within a narrow window of opportunity (days or weeks); and phenomena that may be predicted months and sometimes even years in advance (e.g. high-activity comets discovered far from perihelion). Obviously, only the former are of interest within the scope of SOVT-1.

As the occurrence of ToOs is essentially unpredictable in most cases, to simulate them effectively the alert should be given without warning. However, ToO alerts must be realistic and consonant with the aims and reality of the SOVT-1 test. The number of ToO alerts raised during the period of SOVT-1 may take any integer value in the range from zero to two, but a maximum of one alert will require re-planning of an OD with an already delivered POS file. The ToO alerts, if made, will occur, as in real life, at any time of day or night without prior warning.

If a ToO alert is given during SOVT-1 re-planning of the observing schedule will be carried out if the alert is for a ToO Critical, ToO Hard, or ToO Soft. For a ToO Slow alert, no re-planning will be carried out.

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#### 9.2.2.4.2 Instrument problems

Two scenarios are possible

##### 9.2.2.4.2.1 Instrument problems during the SOVT-1 test

These are not within the scope of SOVT-1. Should an instrument failure occur during SOVT-1, the test will be marked as “failed”. No re-planning will be carried out.

##### 9.2.2.4.2.2 Instrument problems prior to the SOVT-1 test

Should an instrument failure occur during the RMS test that would make an instrument unavailable for SOVT-1 the contingency exists to carry out a partial or full re-planning of SOVT-1 and re-delivery of POS files to MOC. Mission Planning Personnel will be available on call during the RMS test should this contingency arise.

##### 9.2.2.4.3 Space weather alerts

These are within the scope of SOVT-1, although not strictly contemplated within SOVT-1. Each day at 22:03UT a forecast is published by the NOAA that has been prepared jointly by the U.S. Dept. of Commerce, NOAA, Space Weather Prediction Center and the U.S. Air Force. This forecast is made available at <http://www.swpc.noaa.gov/forecast.html>. Predictions are given as percentage probabilities for Class M and Class X (extreme) solar flares and proton storms for the next 24, 48 and 72 hours.

For the purposes of this test, the Space Weather prediction issued the night prior to each DTCP will be used as the forecast for the future time corresponding to SOVT-1. The Group Leader will report the current Space Weather threat each day in the morning briefing.

At present solar activity is at minimum, thus the probability of major flares is stable at a very low level. The current value of the flare/storm probability in Real World time will be used to simulate the probability in SimWorld. Each night, starting 3 days before SOVT-1, the current space weather prediction will be checked and the current probabilities of Class M and Class X solar flares and proton storms will be communicated to the ICCs and HSC Community Support Group. Although no re-planning will be carried out, even in the unlikely case that a significant probability of a major event is predicted.

In the case that there were a warning of a significant and increasing probability of a proton storm (e.g. 24h ahead, 10%; 48 hours ahead, 30%; 72 hours ahead, 60%) the Herschel Science Operations Manager should, in normal operations, make a recommendation to the Project Scientist as to whether or not any observations should be rescheduled as a matter of urgency.

No re-planning will be carried out, but the SOVT-1 test report should include a section on space weather conditions during SOVT-1 and should specifically state if conditions existed that might have required an OD or ODs to be re-planned.



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## **10. Briefing and reporting procedures during SOVT-1**

### **10.1 Introduction**

SOVT-1 is, above all, a large team exercise that tests out all interactions, both human and systems in the SGS. For the first time all the centres in the SGS will be linked. This makes the rapid flow of accurate information between centres of the maximum interest to all for the effective and efficient execution of SOVT-1. Similarly, many individuals are involved in the overall machinery, each adding their own small piece to the overall jigsaw of actions and interactions, very few of whom have an overall view of the entire system. This makes the free flow of information essential so that each person involved in the tests appreciates the importance of their own work to the big picture.

For SOVT-1 the interactions will be facilitated by a series of daily telecon and videocon briefings and debriefings. These will be open to all and attendance will be strongly encouraged.

### **10.1 The daily briefing structure**

The daily briefing structure is determined by the following strictures:

- Seven centres are involved on two continents and three time zones ranging from UT-7h to UT+2h.
  - Timings are a compromise that will generally not be perfect for anyone, but attempt to reduce inconvenience to individual groups as much as possible.
  - They should avoid the core working hours of the middle of the day as much as possible.
- There is a requirement to hold a final wash-up with MOC every day of SOVT-1. This requires inputs from all the actors involved that should be prepared and discussed prior to the wash-up..
- It was felt to be helpful to have a short briefing at the start of each working day so that all ICCs are aware of any developments during the night that might affect their working schedule for the day, but not all ICCs are on the same time zone.

The following structure thus has to be seen as a compromise between various conflicting forces.

#### **10.1.1 Morning briefing**

##### **10.1.1.1 Timing**

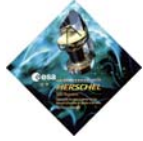
08:30 UT, 10:30 CEST

SPIRE is on BST (UT+1h) while the HSC, PACS and HIFI are on CEST (UT+2h). The timing is a compromise to avoid scheduling a telecon for SPIRE before 9am (local time at RAL) during a time when the ICCs will be working very long days anyway, but making it as early in the working day for all centres as is practical.

##### **10.1.1.2 Expected duration**

15 minutes (maximum)

##### **10.1.1.3 Frequency**



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Daily for Days 1-6 of SOVT-1

#### **10.1.1.4 Format**

Telecon

#### **10.1.1.5 For whom?**

HSC + ICCs

#### **10.1.1.6 Purpose**

A short, “touch base” telecon. The aim is to bring all the participants up to date with any developments that may have happened since the previous wash-up and that might affect their working plans for the day.

### **10.1.2 Afternoon de-briefing**

#### **10.1.2.1 Timing**

14:30 UT, 16:30 CEST

Timing set by the later afternoon wash-up with MOC. As late in the day as is practical.

#### **10.1.2.2 Expected duration**

45 minutes (maximum)

#### **10.1.2.3 Frequency**

Daily for Days 1-6 of SOVT-1

#### **10.1.2.4 Format**

Videocon

#### **10.1.2.5 For whom?**

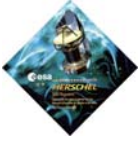
HSC, ESAC, ICCs, NHSC

#### **10.1.2.6 Purpose**

The main daily de-briefing for all personnel involved in SOVT-1 with the exception of MOC. Each team will report on its activities, their status, tests completed successfully, anomalies noted and system status following a set meeting template. The purpose of the Videocon is to give all actors in SOVT-1 the fullest possible picture of what is happening overall and that this information be obtained first-hand from the people carrying out the activities. All personnel at the HSC are expected to attend. Town Hall format, with roving microphone to allow those present to question the speakers.

### **10.1.3 Wash-up with MOC**

#### **10.1.3.1 Timing**



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15:30 UT, 17:30 CEST

Due to the expected length of the meeting, MOC has requested that it be brought forward 30 minutes with respect to the original timing.

#### **10.1.3.2 Expected duration**

60 minutes (maximum)

#### **10.1.3.3 Frequency**

Daily for Days 1-5 of SOVT-1

#### **10.1.3.4 Format**

Telecon

#### **10.1.3.5 For whom?**

HSC + NHSC + ICCs + MOC + Industry

#### **10.1.3.6 Purpose**

Formal wash-up with MOC of the day's activities each day when there is a DTCP. Inputs from the afternoon de-briefing will be used to brief MOC.

### **10.1.4 Local briefings at HSC**

#### **10.1.4.1 Timing**

30 minutes before the morning and afternoon briefings with the ICCs, i.e. at 10:00 and 16:00 each day.

#### **10.1.4.2 Expected duration**

30 minutes (maximum)

#### **10.1.3.3 Frequency**

Daily for Days 1-6 of SOVT-1.

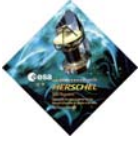
No 10:00 Delta-briefing will be held on Day 1 of SOVT-1.

#### **10.1.3.4 Format**

Live in ESAC room B3/B4

#### **10.1.3.5 For whom?**

All HSC personnel on duty plus supporting groups (computer support, SAT).



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#### **10.1.3.6 Purpose**

To inform all personnel working on SOVT-1 of the status of activities and of any anomalies that will impact on their daily work. Also as a team-building exercise so that each member of the team knows and understands where their own work fits into the big picture.

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## 11. HSC personnel availability during SOVT-1

### 11.1 Introduction

Of necessity the nature of SOVT-1 requires the availability of personnel outside normal core working hours, in particular at weekends but, to a smaller degree, also at night. With the instability in the test schedule, plans have often needed to be changed at short notice. The timing of SOVT-1 is also non-optimal in the sense that has been planned during the summer period when many HSC and ICC personnel would normally be on leave, this special measures have been taken to ensure that key personnel are available at all times, that personnel are available, when necessary, out of core hours and that the needs of rest and family commitments for personnel have been respected.

### 11.2 Core working hours on normal working days during RMS and SOVT-1

Scheduled activities at the HSC, which require the presence of personnel, start with the daily briefing telecon with the ICCs at 10:30 each morning and end with the debriefing telecon with MOC at 17:30. Thus the core working hours for the days of the SOVT-1 test are defined to be:

10:00 – 18:30 CEST

During normal working days, this band of core hours covers all the time that personnel are required to be present, thus no formal overtime working will be required except in exceptional circumstances.

### 11.3 Core working hours at weekends and on Bank Holidays during RMS and SOVT-1

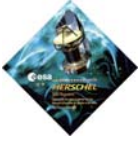
Full details of HSC staffing levels and overtime requirements may be found in the document “HSC Overtime Requirements for RMS & SOVT-1”, submitted to ESA Human Resources. The HSC is committed to ensure adequate staffing to support all activities at all times during campaign.

#### 11.3.1 Core weekend and holiday working hours during the execution of SOVT-1

Scheduled spacecraft activities extend into the weekend for both RMS and SOVT-1. As spacecraft time is precious and extremely limited, special working arrangements will be made to ensure that no spacecraft time is wasted. This means that any day when the satellite is active and data is coming down will, by definition, be regarded as a normal working day for all personnel (although compensated with a special remuneration package equivalent to that for a launch campaign if the activity is carried out outside the Monday to Friday core working hours), regardless of the day of the week during SOVT-1, with the core working hours defined above.

#### 11.3.2 Additional overtime working during RMS and SOVT-1

For RMS and DP activities after the formal end of SOVT-1, essential core personnel will work or be on call out of core hours to support activities as necessary. In SOVT-1 this is the case for SPIRE data processing, which is scheduled for Day 6. Given the status of RMS as SOVT-0, special support will be given to DP



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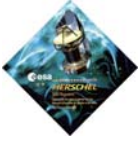
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activities outside core hours that are essential to later success of SOVT-1, especially automatic pipeline processing of data.



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## 12. Appendices

1. Procedure for daily de-briefing
2. Template for daily de-briefing report



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## **APPENDIX 1 – PROCEDURE FOR THE DAILY BRIEFING**

### **HERSCHEL/HSC:**

[Following the “Template for the Daily (de-)Briefing” – see Appendix 2]

The entire process has to be completed in less than an hour.

Say what you have to say. Impart essential facts. If you have nothing to say – say nothing!

- 1. Test coordinator to check briefing room for readiness >15 minutes before start.
0. All entities involved in the preceding shift (being de-briefed) should be represented by a spokesperson who should identify themselves at the start of the briefing, and their name should be recorded in the template. That person will be responsible to report for that entity.

*All entities involved in a shift are responsible to maintain a record of their activities during the shift and to report main events, actions and outcome to the test coordinator, who will keep all reports on record.*

#### **De-Briefing Part:**

1. System Engineer, Test Coordinator or Meeting Chair to report on the status of the Spacecraft. For nominal status it will be sufficient to state that it is nominal.

Report main Spacecraft events of the preceding OD:

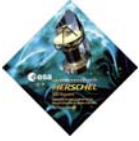
- Spacecraft anomalies
- Failed, erroneous or compromised observations or measurements
- major goals achieved or tasks accomplished
- need for modification of procedures (identify procedures affected)
- need for modification of interfaces (identify interfaces affected)
- other significant observations

2. ICC Representatives or HSC Instrument Calibration to report on the status of the instruments. For nominal status it will be sufficient to state that it is nominal.

Report main instrumental events of the preceding OD:

- instrument anomalies
- failed, erroneous or compromised observations or measurements
- major goals achieved or tasks accomplished
- problems encountered listing SxRs raised by affected sub-system
- need for modification of procedures (identify procedures affected)
- need for modification of interfaces (identify interfaces affected)
- other significant observations

3. ICC Representatives to report on the status of the ICC systems or any of their sub-systems:



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Report main events of the preceding OD:

- major goals achieved or tasks accomplished
- problems encountered listing SxRs raised by affected sub-system
- need for modification of procedures (identify procedures affected)
- need for modification of interfaces (identify interfaces affected)
- other significant observations

4. System Engineer or identified representatives of functional entities, as appropriate, to report on the status of the HSC system or any of its sub-systems:

Report main events of the preceding OD:

- major goals achieved or tasks accomplished
- problems encountered listing SxRs raised by affected sub-system
- need for modification of procedures (identify procedures affected)
- need for modification of interfaces (identify interfaces affected)
- other significant observations

5. NHSC representative to report on the status of the NHSC system or any of its sub-systems:

Report main events of the preceding OD:

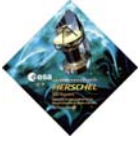
- major goals achieved or tasks accomplished
- problems encountered listing SxRs raised by affected sub-system
- need for modification of procedures (identify procedures affected)
- need for modification of interfaces (identify interfaces affected)
- other significant observations

6. Test Coordinator, System Engineer, Function, ICC or NHSC Representatives, as appropriate, to report, in extreme brevity, on the outcome of the principal activities and/or tests of the OD.

Report main events of the preceding OD:

- major goals achieved or tasks accomplished
- problems encountered listing SxRs raised by affected sub-system
- need for modification of procedures (identify procedures affected)
- need for modification of interfaces (identify interfaces affected)
- other significant observations

7. List declaration of Success/Failure of principal activities and/or tests of the OD.



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## **SOFT-1**

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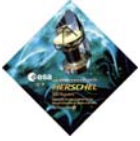
### ***Briefing Part:***

0. All entities involved in the upcoming shift (being briefed) should be represented by a spokesperson who should identify themselves at the start of the briefing, and their name should be recorded in the template. That person will be responsible to speak for that entity.
1. Test Coordinator, System Engineer, ICC, Function or NHSC Representatives, as appropriate, to brief the meeting on the planned events of the coming OD.  
**Only for the first briefing of any campaign, the Test Coordinator or System Engineer should:**
  - o **overview the first 5 ODs of the campaign**
  - o **recap overall scope & goals of whole campaign**

Declare main events of the upcoming OD(s):

- major goals or tasks to be accomplished
- principal (sub-)systems involved
- dominant procedures may be identified
- key interfaces may be identified
- other significant observations

2. Chair to wrap-up.



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## APPENDIX 2 – TEMPLATE FOR THE DAILY DE-BRIEFING

**0. Declare functions represented: ( 2 mins.)**

HSCOM/HSCDM/PS  
SYS.ENG./scoe  
HSC/MPS  
HSC/DP  
HSC/Cal.  
HSC/Software Maint.  
HSC/HSA  
HIFI ICC  
PACS ICC  
SPIRE ICC  
NHSC  
...

***De-briefing part (all cases main discussion offline) :***

PURPOSE is to record major status: Some time slots may be empty with Status NOMINAL.

**1. Status of the Spacecraft ( 3 mins.)**  
(by Sys.Eng. or Test Coord.)

**2. Status of the instruments**  
(by ICC rep. when connected, else HSC/Cal.)

- HIFI ( 3 mins.)
- PACS ( 3 mins.)
- SPIRE ( 3 mins.)

**3. Status of HSC systems ( 5 mins.)**  
(by Sys.Eng. or Function Reps. as appropriate)

**4. Significant events of the previous or ongoing OD**  
(by Sys.Eng., Test.Coord., ICC Reps., Function Reps. as appropriate)

- events as planned ( 5 mins.)
- deviations from the plan ( 5 mins.)

**5. Outcome of principal preceding activities of the OD (10 mins.)**  
(by Test Coord., Sys. Eng., Function Reps. Or ICC Rep. as appropriate. Only major items reported in extreme brevity.)

**6. Declare success/fail previous OD events per Instrument. ( 5 mins.)**  
**Or for the Spacecraft**



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### **Briefing Part:**

**0. Declare primary functions for upcoming OD ( 2 mins.)**

HSCOM/HSCDM/PS  
Sys.Eng/SCOE  
HSC/MPS  
HSC/DP  
HSC/Cal.  
HSC/Software Maint.  
HSC/HSA  
HIFI ICC  
PACS ICC  
SPIRE ICC  
NHSC

**NB: Any of the below timeline sections could simply involve the statement :  
Follows baseline plan Ref.nnn**

**1. Significant events for the next OD**

(by Test Coord., Sys.Eng., ICC Reps. or Function Reps.as appropriate)

- for the first briefing of any campaign only

(by Test Coord.)

o overview the first 5 ODs of the campaign (10 mins.)

o recap overall scope & goals of whole campaign ( 5 mins.)

- nominal detailed timeline for next OD ( 5 mins.)

(by Test Coord., Sys.Eng., Function Reps. or ICC Reps.  
as appropriate)

- deviations from the baseline timeline incorporated since baseline ( 5 mins.)  
definition

(by Test Coord.)

- deviations from baseline timeline proposed at this (de-)briefing (10 mins.)

(by Test Coord., Sys.Eng., Function Reps., Or ICC Reps.  
as appropriate)

**2. Declare readiness status of each function ( 5 mins.)**

HSC functions (GO/NOGO) and each ICC (GO/NOGO)

**Total duration: 1 hour or less.**

**End (de-)briefing:**