HERSCHEL SCIENCE CENTRE

SOVT-2

Science Ground Segment

Simulations Activity Plan & Timeline

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Prepared by:
Mark Kidger
HSC Test Manager

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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 (and simulations) to be performed during the System Operational Validation Test #2.

SOVT-2 will involve the Spacecraft & Ground Segment being operated during a 6 day period – 5 full ODs of spacecraft operations + 6 associated DTCPs + a further day for data propagation after spacecraft operations have ended) in a Performance Verification Phase 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-2 test i.e. validation of the end-to-end configuration specific to the Performance Verification Phase of the Herschel mission. This will have two specific components: testing all aspects of the Science Ground Segment that were not tested, or that could not be tested in SOVT-1 and re-testing parts of the Science Ground Segment for which the SOVT-1 tests were inadequate, or showed inadequate performance.

The second correspond to additional "simulated" activities to be performed in all centres which, although not required for the success of SOVT-2, allow the validation of interactions and procedures which are PV Phase specific, or for which the rapid turnaround required in PV Phase will present particular challenges to the Science Ground Segment Team e.g. HSC MPS planning, DP Pipeline, calibration table update etc.

1.2 Test duration

1.2.1 MOC perspective

The formal duration of the test from the MOC perspective will be 5 days (5 full ODs with 6 associated DTCPs). The test shall begin at the start of DTCP-60 and end at the end of DTCP-65, when spacecraft operations are completed.

1.2.2 Data propagation perspective

From the perspective of data transfer, the duration of the test will be 5 days, but delayed one day with respect to spacecraft operations. Although all data will be received at MOC by the end of DTCP-65, propagation to the HSC and onward to the ICCs and NHSC will continue for as much as 10 hours after the end of DTCP-65, thus occupying a significant fraction of the nominal OD-65 (Day 6 of SOVT-2).

Operations aimed at the recovery of missing telemetry operations and its propagation will continue through Day 6 and may stretch into Day 7 of SOVT-2, depending on the amount of data to be recovered and the reasons for its initial non-propagation.

1.2.3 Data Processing perspective

Data Processing (DP) operations lag the spacecraft activities by typically two days. In other words, when the observations of OD-62 are being carried out, the observations of OD-60 are going through the DP pipeline. DP activities will thus continue through OD-66 and possibly into the nominal OD-67.

1.2.4 Overall perspective

Overall, although the spacecraft element of the SOVT-2 test is 5 full ODs + 1 additional DTCP (start of DTCP-60 to end of DTCP-65), the Science Ground Segment will be active for a full week and some residual activity may continue for even longer than that. Thus, overall, the duration of SOVT-2 should be considered to be a minimum of 7 days from the start of the first DTCP to the end of formal test activities at the HSC and ICCs. At different moments of the 7 days, different elements of the SGS will be active.

1.3 Acronyms

ACMS Attitude Control and Measurement Sub-system
AGN Active Galactic Nucleus
AHF Attitude History File
AOR Astronomical Observing Request
AOT Astronomical Observing Template
APF
AR Anomaly Report

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
LSS Large Space Simulator

MIB Mission Information Base
MIRD Mission Implementation Requirements Document
MOC Mission Operations Centre
MPS Mission Planning System
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
OTF On The Fly

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
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
TBD To Be Decided
TBC To Be Confirmed
TC Telecommand
TCH Telecommand History
TM Telemetry
ToO Target of Opportunity

UT Universal Time

Z Zulu (= GMT = UT)

1.4 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, organised 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.

1.5 Requirements & Important Points to Note

1.5.1 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. 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.

1.5.2 Important Points to Note

The following considerations, extracted from the corresponding document with the Test Plan for SOVT-1 (HERSCHEL-HSC-DOC-1173) remain equally valid for SOVT-2. Indeed, given that SOVT-2 represents the final opportunity to test systems before launch, they are more valid than ever. Any system or procedure that has not been previously verified must be verified and any system that has been patched after SOVT-1 must demonstrate that it functions correctly and is ready for operations.

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. Great efforts have been made to optimise helium use to reduced wastage and maximise the lifetime of Herschel; these need to be backed-up by reliable spacecraft and ground system performance.

Point #2 - The running of System Overall Validation tests are a mandatory step in validating that the spacecraft & ground segment can support the various phases of the mission.

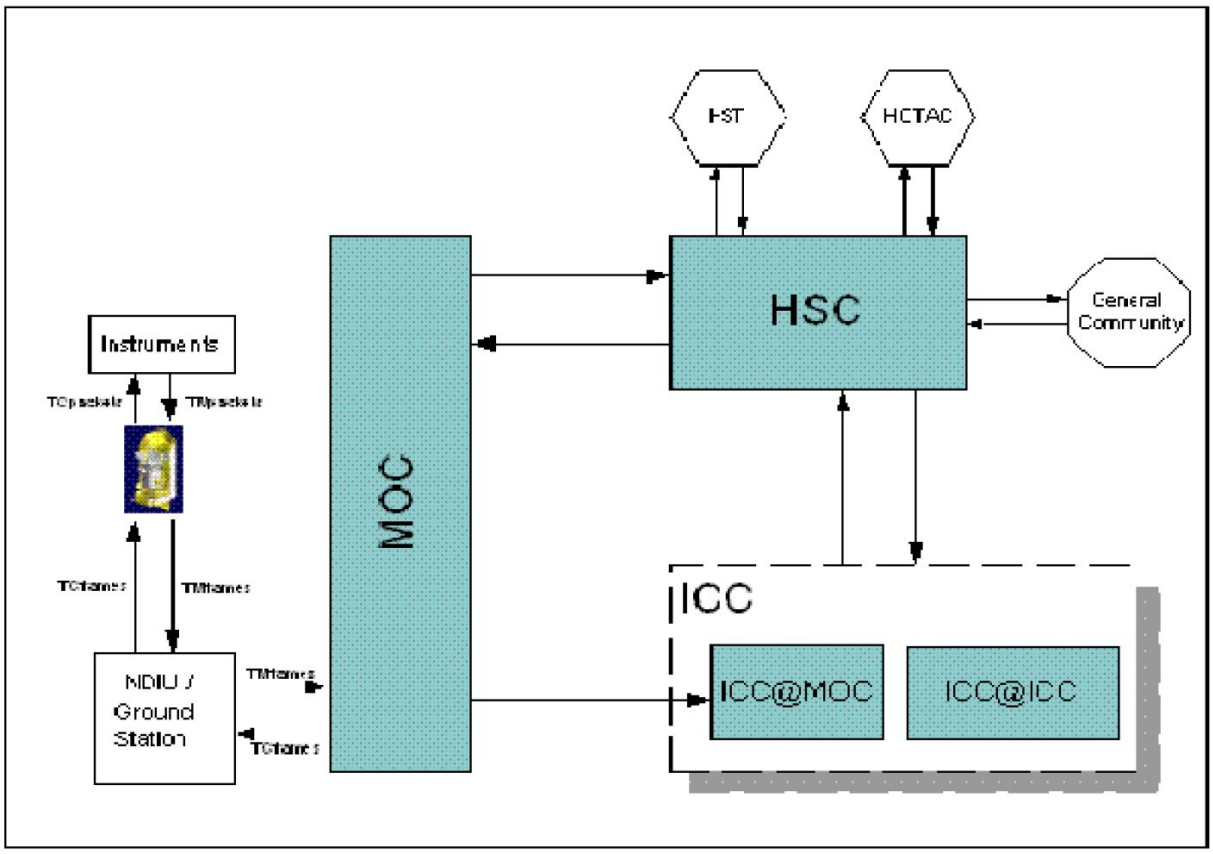
Point #3 - The running of parallel simulations to these SOVTs is a necessary step to ensure that procedures applicable to the various phases of the mission are tested in the most realistic manner possible and that SGS personnel are trained to react efficiently in any circumstances.

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 the rarefied and demanding conditions of PV Phase operations and how to resolve them.

1.6 Configuration of the Interfaces between Herschel Operational Centres

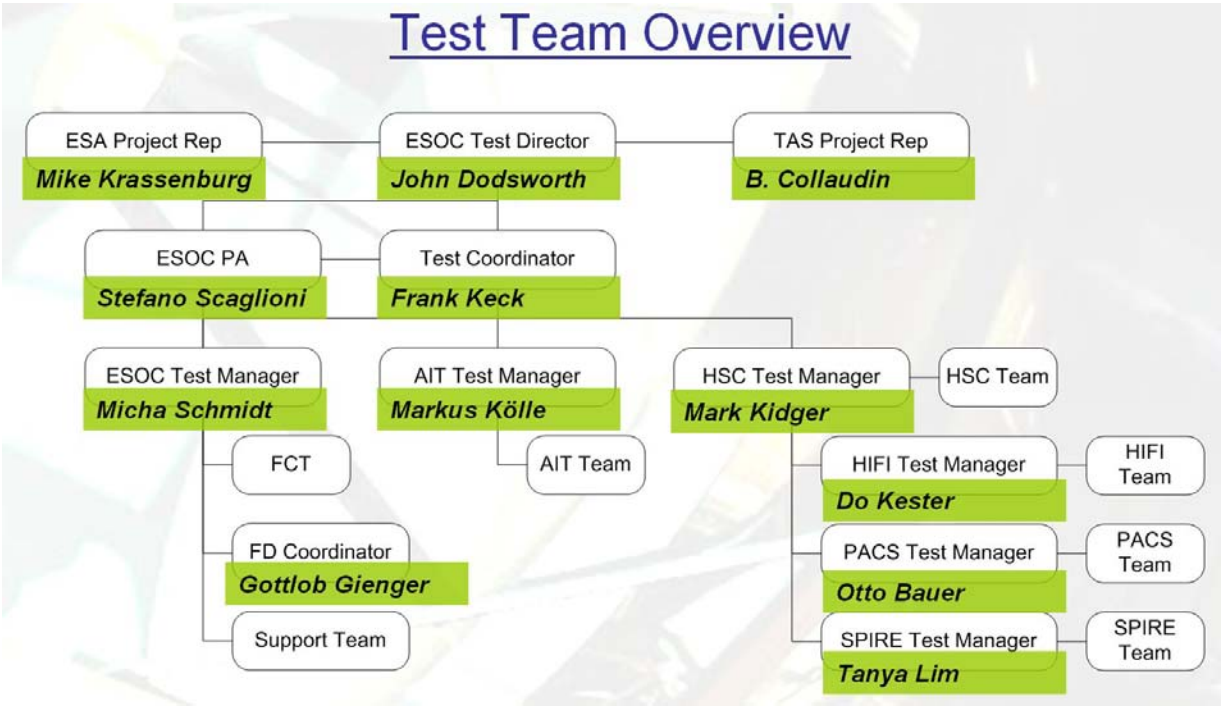
The structure of the Herschel Ground Segment interfaces, which will be operational for SOVT-2. This is the operational structure of the Herschel Ground Segment and defines how data is passed between centres and how data reaches the end user from the satellite. An essential difference between SOVT-1 and SOVT-2 is that the final link in the SGS chain – MOC → ICC@MOC – will be exercised for the first (and only) time before launch.



The structure of the Herschel Ground Segment and the data flow between centres as it will be both during SOVT-2 and in normal operations. Note that SOVT-2 will test the ICC@MOC segment, which has not previously been tested in any campaign: testing this branch of the SGS is a critical element of SOVT-2.

1.7 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.



The organigram of the Herschel branch of the Herschel-Planck test team for SOVT-2.

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

2.1 SOVT-2: 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 SOVT-2 are these system tests, while two, long simulation campaigns of two weeks duration each will hone the SGS personnel's knowledge of and efficiency in carrying out operational procedures in realistic conditions that approximate closely to a flight situation, although, unlike in SOVT-2, without the spacecraft in the circuit and with reduced interactions with MOC.

SOVT-2 is thus one link in a chain of tests and operational campaigns that exercise all elements of the SGS and ensure that all the elements of the SGS are properly tested and flight-ready before launch.

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

The major difference between SOVT-1 and SOVT-2 is that we tested routine operations in SOVT-1, while we will test PV Phase operations in SOVT-2. The activities from the Spacecraft perspective and from the ground segment perspective are completely different between these two phases. In particular, the PV Phase is far more challenging and demanding and places more stringent requirements on the ground segment than the routine phase does. For this reason, a successful conclusion of SOVT-1 has been an essential prerequisite for running SOVT-2.

The PV Phase of the Herschel mission lasts for 6 months in total – i.e. a significant fraction of the entire mission lifetime – and includes the check-out, commissioning and science demonstration phases. During this phase of the mission, the performance of each of the instruments must be checked and verified and each of the sub-modes commissioned successfully and released for use by the astronomical community. PV Phase is an essential part of the mission allowing the in-flight performance of the instruments to be characterised, observing strategies to be optimised to in-flight reality and a first, reliable in-flight calibration to be performed. As such, it is a vital part of ensuring optimal science returns to the community from routine operations.

A second essential difference lies in the test conditions for SOVT-2. SOVT-1 was run in He-2 conditions, but without the dewar completely full and at a relatively high temperature. SOVT-2 will be run in vacuum in the LSS, in He 2 conditions, with a dewar that is more than 85% full for the entire test: i.e. cold conditions that are much closer to those in space than can be achieved outside the LSS. This will provide a far more stable and realistic thermal environment for the spacecraft than was possible in SOVT-1. In particular, it will allow the tests to be run with HIFI's Local Oscillators switched on, allowing a much better characterisation of HIFI

than has been possible to date. Similarly, the thermal conditions will be more optimal to repeat some of the PACS spectroscopy observations that suffered from very marginal thermal conditions in SOVT-1.

2.1.3 Prerequisite for the start of SOVT-2

SOVT-2 is the final major test activity in the Mission Timeline before Herschel is prepared for shipping to Kourou for the launch campaign. As such, it will be run with Herschel in an essentially flight-ready configuration. As a prerequisite for SOVT-2, all the issues that were raised in SOVT-1 should have been fixed or, at very least, suitable workarounds must have been devised and the software should be in a stable, flight-ready state.

2.1.4 Where does SOVT-2 fit into the overall timeline to launch?

The following is the time line of key events to launch as of the SciOpsWG meeting of 06/11/2008 (SciOpsWG #14):

SciOpsWG Schedule Review

Issue 1.0 of SGS SOVT-2 Test & Sims. Plan from HSC	11 Nov. 2008
CUS scripts and AORs for SOVT-2 from ICCs to HSC	14 Nov. 2008
Delivery of POS files for SOVT-2 from HSC to MOC	21 Nov. 2008
SOVT-2 TRR	27 Nov. 2008
Herschel pre-launch Data Processing Workshop	04-05 Dec. 2008
SOVT-2 (He II) execution	05-12 Dec. 2008
SciOpsWG#15(telecon) @10:30	15 Dec. 2008
SOVT-2 TRB @14:30	15 Dec. 2008
AOR content of 2+2 ODs per instrument for use in SGS Pre-flt. Sims	18 Dec. 2008
Simulations Plan Draft 1.0	18 Dec. 2008
CUS scripts and AORs for SOVT-2 from ICCs to HSC	16 Jan. 2009
AORs and POS for Model PV Phase from ICCs to HSC	16 Jan. 2009
PV Phase validation	mid-Jan. to launch
SciOpsWG#16 (meeting)	28 Jan. 2009
1st. 14 day pre-flight Simulations across the SGS	mid-Feb. 2009
2nd. 14 day pre-flight Simulations across the SGS	mid-Mar. 2009
Launch of Herschel	12 Apr. 2009

2.2 SOVT-2 – 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 Performance Verification Phase configuration.

2.2.2 Detailed Objectives:

2.2.2.1. Demonstration of PV Phase E2E integration of sub-systems and their system-level interfaces

Integration and validation activities, which were already performed during SOVT-1 for the routine phase, shall be performed for the PV Phase at a system level during SOVT-2.

2.2.2.2. Identification of timing constraints and data product processing issues

Estimated transfer and process times shall be confirmed that are specific to the PV Phase. 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.

2.2.2.3. Validation of Ground Segment stability for 24/6

The complete ground segment hardware, software and communication lines are used in an operational context for 24 hours on 6 days. No forced contingencies are planned, but unexpected outages shall be covered by redundancy. In this case the PV Phase requirements are more stringent than the routine phase

2.2.2.4. Validation of Space Segment stability for 24/6 while operating PV Phase activities

The S/C shall operate for 24 hours on 5 days, based upon planned instrument & S/C PV Phase activities. 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.

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

Complex systems conceal unexpected behaviour when exercised to their full capability. This unexpected behaviour will differ between the Routine & the PV Phase scenario. System wide tests reduce the risk of such behaviour manifesting itself and impacting significantly on the success of operations. As SOVT-1 demonstrated, the stress of intensive system-wide interactions can make apparently reliable systems fail unexpectedly for reasons that are only clear with the benefit of 20-20 hindsight. The only way to find and fix these unpredictable problems is by running intensive testing in circumstances that are as realistic as possible.

2.2.3 Ancillary Objectives:

The ancillary objectives, additional to the previous list are:

2.2.3.1 Validation of Operations Procedures

While most Flight Operations Procedures are validated in SVTs, Ground Operations Procedures shall be validated during SOVTs as well. SOVT-2 is the opportunity to validate PV Phase activities.

2.2.3.2 Operational Network under realistic load

The measured data transfer times shall confirm the choice of communication lines bandwidths. These times are more stringent during the PV Phase.

2.3 SOVT-2 – Practical Objectives

2.3.1 How the objectives were defined

The practical objectives for SOVT-2 are fourfold and have been determined by asking the following questions in this order of priority:

(i) What activities are planned for SOVT-2 according to the SOVT-2 Objectives & Contents document (HERSCHEL-HSC-DOC-1215)?

(ii) What time should be assigned to allow manual commanding to be performed during DTCPs to validate Commissioning phase activities?

(iii) What activities were envisaged in SOVT-1 that did not take place and that should thus be carried out in SOVT-2?

(iv) What activities from SOVT-1 require re-testing in SOVT-2?

2.3.2 Activities envisaged in SOVT-1 that did not take place

The realities of SOVT-1 meant that not every test that was initially envisaged could be carried-out in the available time. A small number of instrument sub-modes were not tested at all in SOVT-1 and must be tested in SOVT-2 as a matter of urgency. Not all DTCP science activities could be carried out either and are thus priorities for testing in SOVT-2. The list of activities to be carried out in SOVT-2 because they were not completed in SOVT-1 is (not in order of priority):

- Real Time Science Window
- Burst Mode
- Validation of all instrument sub-modes: some still remain to be tested.
  - Dithered PSpecR and PSpecL maps
  - HMap + position switching HMap + load switching

2.3.3 The activities planned for SOVT-2, according to the SOVT-2 Objectives and Contents document

There is a long list of objectives for the SOVT-2 test that may be found in the "SOVT-2: Objectives & Contents – Science Ground Segment Specific" document (HERSCHEL-HSC-DOC-1215). The following are simply a sample:

- Execution of specific Instrument PV Phase activities.
- Validation of the Ground to Spacecraft Feedback mechanism i.e. execution of observations, analysis of data, feedback into MTL, uplink & execution of that MTL
- Pointing Calibration Plan Activities for SOVT-2, including a test of on-ground gyro propagation.
- Peak-up tests of HIFI & SPIRE.
- Testing of new HIFI modes: OTFLoadChop & DBSRasterHalfThrow Modes.

2.3.4 Commissioning Phase procedure validation - Manual commanding + link with downlink processing

One part of the SGS has so far not been tested at all in Herschel: ICC@MOC. The testing of this mode is a key aim of SOVT-2 as it allows the ICCs to carry out real time manual commanding of their instruments rather than simply executing a pre-uplinked MTL. The aims in this area for SOVT-2 are:

- Assign time to allow manual commanding to be performed during DTCPs to validate Commissioning phase activities[2].
- Use of the ICC@MOC during SOVT-2 - Testing of the manual commanding versus timeline execution with regards to data ingestion & processing in the SGS.
    - All instruments have confirmed that they will send dedicated away teams to MOC for these activities and, where possible, including extra personnel in the away team for training purposes.
    - The day of the SOVT-2 TRR will be used by MOC and instruments to test ICC@MOC readiness (workstation testing, etc.)

2.3.5 Activities from SOVT-1 that require retesting in SOVT-2

While SOVT-1 was a successful test, a few aspects of the test were less than optimal.

- TM ingest was shown to be less robust than was desirable. Changes have been made to the system to improve its performance and to make it more robust: these patches need to be verified operationally, under conditions that are as close to in-flight reality as possible.

2 This does not prevent the ICCs from using time also from outside the DTCP to validate Commissioning phase activities. They have defined a significant quantity of PV Phase activities in the SOVT-2 document however which should be taken into account if such time is decided to be used differently.

- PACS-Spec red bolometer was in saturation during most of the SOVT and at ~90% of saturation even on the first day of the tests (when the PACS Spectroscopy observations were carried out), thus further observations should be scheduled in SOVT-2.

- SPIRE Jiggle Map observations - no data was provided during SOVT-1, due to a known SPIRE software problem.

- Scan Map & OTF maps ACMS data had errors in SOVT-1 and thus should be repeated now that the problem has been identified and will be resolved.

- Parallel Mode: It is clear that further data is required to validate the pipelines for this mode.

- Address issues of PACS observations being incorrectly linked to SPIRE pipelines during pipeline processing, due to uplink issues.

2.4 What we test on the S/C and in the Ground Segment?

2.4.1 SOVT-2 Pointing and Instrument Focal Plane Geometry Measurements

2.4.1.1 Introduction

As part of the pointing tests and accurate assessment of aperture positions in the focal plane for Herschel, there are a number of activities planned for the early Commissioning & Performance Verification phase. The goal of these activities is to:

1) Verify the performance of the Herschel pointing system (Absolute Pointing Error [APE], Spatial Relative Pointing Error [SRPE] etc.).

2) To determine accurately (to better than 1") each of the apertures associated with the three science instruments and their sub-instruments.

Since, following launch, we may expect misalignments of up to 0.47 degrees, the latter can not be assumed from on-ground measurements only, and without the initial set of pointing activities the science instruments will essentially be blind. The pointing calibration plan is currently being placed in the Herschel Pointing Calibration Plan document (HERSCHEL-HSC-DOC-1139).

2.4.1.2 Pointing Calibration Plan Activities for SOVT-2.

The following represent activities that are completely different from the standard AOT modes of the science instruments. These will be done as "engineering" modes during the early phases of the mission using CUS that scripting that has been adapted for the specific purpose. [NB: There have been two, apparently mutually contradictory inputs for this activity – I believe that the one described in Section 2.5.3.3.1 is the current baseline (TBC)]

1) Assessment of relative pointing accuracies:

Need: To determine the accuracy to which raster steps across a several arc minutes field of view are made. Determination of SRPE.

Method: Raster maps to be made with and without the use of gyro propagation (reconstruction). Uses mode that provides calibration holds for gyros – 15 second position holds on a nominated reference position every 600 seconds in addition to the standard science raster map. Uses PACS.

Objective: Determine the spacecraft SRPE. Also determines the pointing improvement due to the use of gyro information. In the case of poor pointing performance several instrument observing modes will need to employ this mode of observing (with associated observing efficiency loss) to meet the SRPE requirement.

Time estimate: ~2 hours

Pass criteria: Startracker AHF able to be updated with data produced (by Flight Dynamics) using gyro information and added into pointing product by HSC. Anything other than this should be considered a failure.

Spacecraft need: Requires ACMS and gyro information.

NOTE: This mode was not exercised in SOVT-1.

2) Focal plane geometry of the SPIRE photometer:

Need: To determine the accurate positions of fiducial pixels of the SPIRE photometer.

Method: This particular case requires the use of the CP mode (gyro propagation – providing in-flight position improvements using gyro information) of the ACMS. This is employed in the basic raster pointing scheme available in the pointing modes for the instruments. At present this is only specifically being used for the assessment of the SPIRE instrument apertures.

Objective: To determine accurately the positions in the focal plane of the telescope of 5 fiducial pixels of the SPIRE photometer to allow accurate positioning of science targets on the SPIRE photometer array. This will be used to update SIAM for SPIRE.

Time estimate: ~2 hours + ~2 hours (for SIAM update check)

Pass criteria: AHF produced directly from gyro information using ACMS CP mode and placed into pointing product by HSC. Anything other than this should be considered a failure.

Spacecraft need: Requires gyro information and use of special CP mode of ACMS.

NOTE: The use of the CP mode was not tested in SOVT-1, since it is not included in standard instrument AOTs, but is essential for the calibration needs of the science instruments (in this case, the SPIRE photometer).

Further instrument focal plane geometry measurements are specific to the commissioning/PV Phase. I would expect a number of items to come from the ICCs on this (e.g. assessment of one of the HIFI apertures/peak-up, taking just over 1 hour of test time).

Test	Reason for doing it during SOVT-2	Repeats	Time (mins)	Total
Phot Multi-Level Noise	Verification of ICC internal interfaces to NHSC and specific processing of this data	1	75	75
Spec Multi-level Noise	Verification of ICC internal interfaces to NHSC and specific processing of this data	1	75	75
Phot Thermal Stability	Long duration Noise test, interface/processing/performance test with NHSC	1	300	300
Phot PCAL Level Check	Use data to determine levels to use and feed results into uplink table (to be analysed at Cardiff)	1	30	30
Spec PCAL Level Check	Use data to determine level to use and feed results into uplink table (to be analysed at Cardiff)	1	30	30
Regular PCAL flashes	Checks updated uplink table, allows verification of part of trend analysis processing	10	1	10
Phot Point Source Observation	Validate processing of multiple Nod and Jiggle cycles through pipeline	1	30	30
	Do again with one wrong BSM position, checks ability of pipeline QC to detect this and trigger helpdesk	1	10	10
Phot Small Map Observation	Validate processing of multiple maps	1	30	30
Phot Scan Map Observation	Max length duration to verify performance of pipeline	1	1080	1080
Parallel Mode Observation	Checks PACS and SPIRE produce compatible scientific results (flux values)	1	100	100
Spec Sparse Map (full res)	Simulation of telescope cooling phase, and verification of Lethbrige analysis	1	600	600
	Do again but don't scan SMEC full range, checks ability of pipeline QC to detect this and trigger helpdesk	1	600	600
Spec Map	Simulate largest possible to verify performance of pipeline	1	1080	1080
			Total	**4050** (67.5 hrs)

All observations will also be used to verify the operational day processing - we would require at least 2 complete ODs to complete all the observations listed in the above table.

2.4.2 HIFI inputs for tests required to be run in SOVT-2 on the S/C

The proposal HIFI observations during SOVT-2 (COP and PV-phase oriented) are as follows.

2.4.2.1 6-day cycle validation

During the commissioning phase, HIFI will run dedicated instrument characterisation measurements aiming at updating some of the settings needed to optimally (i.e. with the best sensitivity) configure the instrument. Once the measurements are performed, it is mandatory to have the data analysed and fed back into the uplink before to proceed with instrument check-out as otherwise subsequent tests will have little sense. The fasted turn-around possible is thus of upmost importance, and SOVT-2 is the first and only place to test the effectiveness of the 6-day turn around cycle prior to launch, and thus prior to the real.

The tests proposed to be used for this validation in SOVT-2 correspond to the tuning of the HIFI diplexer mechanics. It shall have been performed well before during the IST1 @ He1, so that reference data for this test have even been collected on a representative configuration, allowing to state on the correctness of the measurement and of the outcomes when taken in the framework of a MTL-operated S/C.

This test exists in 4 blocks (for HIFI bands 3, 4, 6, 7) which take each 20 minutes. So performing all 4 bands would take 1h20m.

The tests taking place after the up-date in the up-link (and thus checking the effectiveness of the implemented optimisation) have a duration of 10min per band, so performing the check (on Day-6) for all bands takes 40min.

All the above times do not take into account the time needed to set the instrument to prime and back to standby, but this is supposed to occur during the DTCP so should not be charged to the effective OD slot.

The above tests are of course not the only ones which will imply the need for a quick turn-around over the commissioning phase, so that additional engineering/observing modes could be added in order to fill a full HIFI OD.

2.4.2.2 PV-phase activity validation

1) New AOT modes for use in PV calibrations:

HIFI has defined specific implementations of DBSRaster and OTFLoadChop Observing Modes that are required for calibration measurements in PV (Focal Plane Alignment and Beam Efficiency/Pattern characterisation).

Note the FP Geometry measurements will be the first light of HIFI and therefore will strongly rely on a robust end-to-end chain. The DBSRaster AORs will be set with full and half chopped position, so in the standard fashion (in its astronomical implementation for HSpot) and as a special engineering mode (devised in CUS editor/XHSpot) that sets half positions of HIFI's Focal Plane Chopper.

The OTFLoadChop mode is also implemented for astronomical purposes to provide an alternative to the OTF FrequencySwitch mode in HIFI's two highest frequency bands 6 and 7, where frequency switching will not cope well with the instabilities measured during FM-ILTs (SCR 1441). [A SScanLoadChop mode is being implemented for the same reason (SCR 1513) but this mode is not expected to be needed for PV calibrations.] The OTFLoadChop mode for calibration purposes in PV will be generated as engineering requests in XHSpot/CUS editor during ground-tests.

The setups of these modes and the configuration of the standard DBSRaster maps (matched to the HIFI beams at samplings suited to the "course" and "fine" mapping activities for example are unique to the PV calibrations.

2) Testing in SOVT-2

The importance of the AOT tests, focused on PV, in SOVT-2 is as follows:

1. The OTFLoadChop and DBSRasterHalfThrow modes will not have been tested on the HIFI FM by SOVT-2. They could in principle be tested from a purely functional standpoint in an SFT opportunity, or during TV/TB.

2. The ground system is essential. For validating the Observing Mode command sequence the dispatching of commands in the Mission Time Line avoids the timing jitter inherent to the SCOS system. Non-flight workarounds are invoked in certain HIFI observing mode procedures to prevent command timing errors when the SCOS system is used during ILT/IST-level tests with AOTs, but these are avoided in SOVT-1 and -2 with the MPS. The MTL also contains the necessary S/C pointing commands that should be validated in conjunction with the instrument commands.

   The ground system will also provide the interfaces that should be tested as part of the PV calibration activities. Pointing products associated with the calibration AORs are a critical component in the analysis of the FPG and Beam characterisations. Analysis scripts cannot be well prepared and later rehearsed without seeing the interfaces at work.

   Note also that the SIAM begin held at MOC is also in the loop. This involves verification of generating a SIAM (update procedure), data interfaces and delivery process SRON-HSC-FDS/MOC, and final verification whether the aperture selected by the ACMS is indeed the right one with the right

coordinates as expected from the FPU delivered data as can be verified from the telemetry of the spacecraft. The optional repeat of the FPG could then be used to check whether we are able to get an updated SIAM in the ground system applicable for the next observing day applicable to a given instrument (see point 1 above).

3. Gyro-based pointing reconstruction is foreseen to be implemented in AOT CUS and in FDS attitude reconstruction software in time for SOVT-2. The availability of the gyro-based attitude history is ultimately essential for the calibration maps, but it is not absolutely required in all modes by the time of SOVT-2 in case development or FDS readiness issues occur.

Note that telemetry obtained from the instrument and ACMS during SOVT-2 can always be re-processed to create products and test analysis scripts if all downlink components are not ready before test execution.

Since the modes for PV calibrations are currently in implementation, the overall duration of the HIFI testing is not precisely known yet, but we estimate that it can be achieved in ~1/2 OD. The AORs must be set to the "safe" frequencies in all 14 LO sub-bands (for the warm LOU), and AOR sequencing will be tuned for verifying the logic rather than noise performance (by reducing the number of map and calibration reference cycles).

2.4.2.3 Planning guidelines for MPS re-planning of OD-64

These are the guidelines to be aware of for the re-planning of OD64 with the mission planning system.

Note: If the only thing being changed and delivered is the mission configuration i.e. no AOR change, then ignore these guidelines.

(a) If you wish to change/edit/insert/update any AORs in OD64 then you must redeliver us the full set of AORs for OD64 for your instrument.

(b) Please respect the start & end times of the period assigned to your instrument in the OD64 SSF. The SSF to be delivered on Monday December 15th must contain the same start times but can of course end earlier i.e. if some of your AORs are shorter. The point here is that merging should be straightforward of all instruments if these times are maintained.

(c) If you wish to replace an AOR in your OD64 schedule for a new one then you should ensure that you use the Ra/Dec of the AOR file you have removed. In addition, the duration of the new AOR shall be less than the one you have removed.

(d) Updating an AOR's contents will of course mean that the Ra/Dec is kept however again you must ensure that the duration does not change or is less. We do not want to have to reduce your observations & try to get things to fit. There is no time on Monday December 15th for this.

(e) You must respect the Ra/Dec in use for the start observation and the end observation of your instrument period. This avoids that we end up with long slews between instrument activities.

2.4.3 PACS inputs for tests required to be run in SOVT-2 on the S/C

For SOVT-2 it is mandatory that the connection between up-link and down-link is preserved. This is the basis of the HSC data model and this is also the reason why we need the satellite in the loop.

The total duration of the SOVT-2 is required to be 6 days. This is the turn-around time between measurement and repetition of an updated measurement.

PACS will execute these observations during SOVT-2:

(1) Mechanism control loop optimisation	4 h
(2) Spectrometer set-up	6 h
(3) Photometer set-up	6 h
(4) FOV characterisation	2 h
(5) Spectrometer calibration	6 h
(6) Photometer Calibration	6 h
(7) Spectrometer AOTs tests	8 h
(8) Photometer AOTs tests	8 h
(9) SPIRE PACS Parallel mode	2 h
Total	48 h

2.4.4 Turnaround time for re-planning the Mission Time Line

In PV phase instruments will be scheduled in 2-day blocks, that is, with a 6-day planning cycle. This allows instruments 4 days to analyse each set of 2-day data that is obtained before

An essential part of the SOVT-2 activities is to test the turnaround time in the MTL, uploading a revised MTL with new observations parameters derived from previous ones

Day 1 – OD-60
Start 13:00 local. Execution of OD-60 observations through remainder of Monday & up to 13:00 local Day 2.

Day 2 – OD-61
Start 13:00 local - Data starts becoming available to the HSC and on to the ICCs approximately 15:00 local (if not earlier). As data arrives at the HSC throughout this period it is propagated to the ICCs within seconds.

Day 3 – OD-62
01:00 local: Final science packets from OD60 arrive at about 01:00 local on morning of Day 3.

05:00 local: HSC runs the HIFI TM proc to generate the HIFI Data Frames.

08:00 local: ICCs start analysing their observations from OD-60 (see Note 1 below also).

13:00 local : (OD-62 starts) + ICCs deliver to the HSC the updated cus/cal backend for OD-64.

16:00 local: HSC delivers to the MOC the new POS file for OD-64.

Day 3/Day 4
16:00 local Day 3 to 13:00 local Day 4: MOC FDS Generate EPOS File, MOC Flight Control Team generate updated MTL for OD64.

Day 4
13:00 local: OD-63 starts - Uplink of MTL UU for OD64 (this covers End DTCP-64 to End DTCP-65) performed here.

Day 5
13:00 local : OD-64 starts.

Day 6
13:00 local: final DTCP.

16:00 local - TEST ENDS

==========

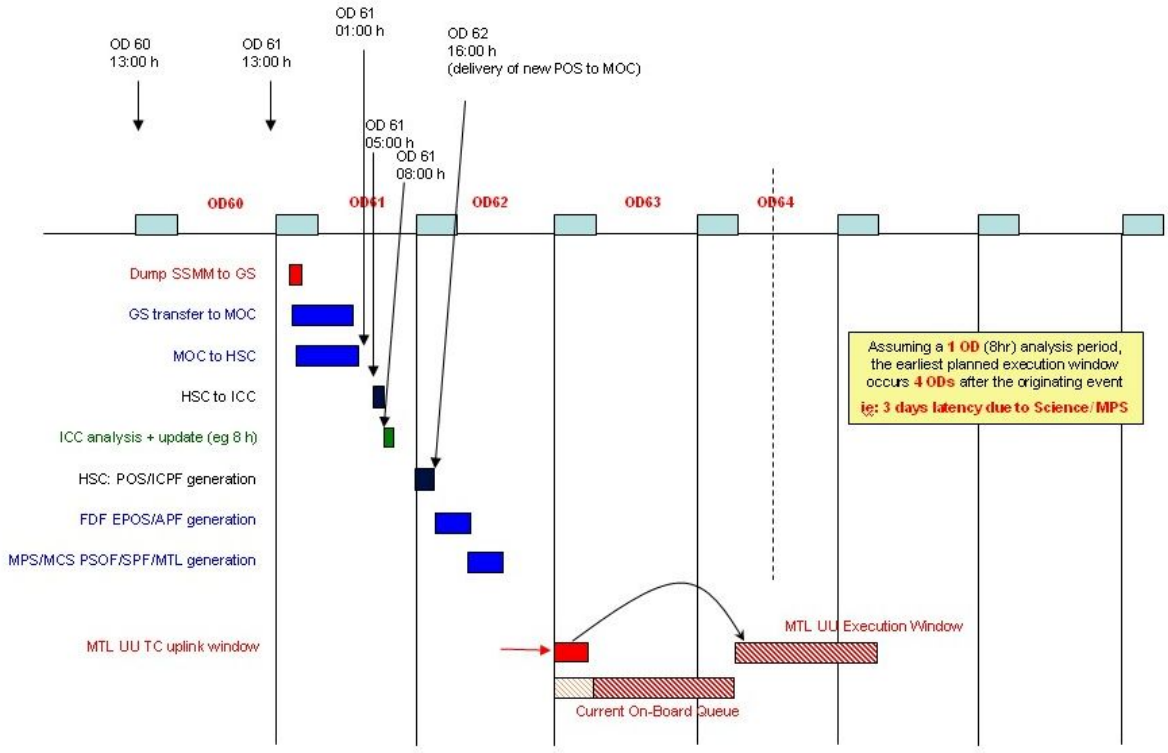
There are four important points to mention here:

Note 1
Some ICCs e.g. PACS & SPIRE will have their data already in the evening of Tuesday because the science dumped data will be passing through the system all evening. HIFI will be the ICC which will receive its final data on the Wednesday morning.

Note 2
If something goes wrong with the preparation of the MTL from Day 3 till Day 4 then we will proceed with the MTL planned for OD-64. This must be the case as we cannot waste Spacecraft time whereby we find the new MTL is not ready. This is a worst case situation because everyone involved in this will be working hard to ensure we do make it.

Note 3
It is appreciated that this turn around time for data analysis is extremely short for the ICCs so they should have the cus/cal backend already prepared at the ICCs to be sent for 13:00. ICC data analysis can be a confirmation that your updates are correct. If the ICCs cannot do this preparation beforehand then they should take into account that they have little turnaround time.

Note 4
ICCs should not not change any parameters for their activities during the DTCP of OD-64. This is because, when we reach OD-62 to upload the MTL for OD-64 (or rather the MTL UU covering end DTCP-64 to end DTCP-65), MOC will already have uplinked the first 3 hours i.e. DTCP of OD-64, the previous day (MTL UU covering end DTCP-63 to end DTCP-64). Our update will be therefore affect the MTL commands from 16:00 local on Day 5 onwards.



A diagrammatic view of Mission Time Line update during SOVT-2.

2.4 Milestones in the Timeline of SOVT-2 preparations

Timeline to SOVT-2 -- Major milestones		
Updated: 2008/12/10 18:35 CET		
All times are CET (GMT+1h, UT+1h, z+1h)		
Blue items are completed		
Red items are late		
Black items are highlights to come		
Activity	Start	End
XHSpot delivery 4.1.1 to ICCs	**10/10/2008**	
ICCs given basic information on ODs and available time for SOVT-2	**17/10/2008**	
Draft 0.1 of SOVT-2 Test Plan and Timeline document distributed	**21/10/2008**	
PSFs and orbit file delivered to HSC by MOC	**28/10/2008**	
Draft 0.2 of SOVT-2 Test Plan and Timeline document distributed with compressed timeline	**30/10/2008**	
Final SOVT-1 report delivered	**30/10/2008**	**Inputs missing!**
Draft 0.3 of SOVT-2 Test Plan and Timeline document distributed.	**04/11/2008**	
Discussion of SOVT-2 preparations with ICCs at SciOpsWG meeting #14	**06/11/2008 09:00**	

Issue 1 of SOVT-2 Test Plan and Timeline document distributed	**11/11/2008**	
First Videocon between HSC & ICCs to discuss SOVT-2 preparations	**12/11/2008 15:00**	
HCSS 0.6.6 build for SOVT-2 made	**14/11/2008**	
ICCs to deliver CUS scripts and AORs for SOVT-2 to HSC	**14/11/2008**	**19/11/2008**
LSS tank doors sealed for TB/TV and SOVT-2 tests	**19/11/2008**	
Second Videocon between HSC & ICCs to discuss SOVT-2 preparations	**19/11/2008 15:00**	
HSC to deliver SOVT-2 POS files to MOC for OD-60 & OD-61	**21/11/2008**	
HSC to deliver SOVT-2 POS file to MOC for OD-62	**21/11/2008**	
HSC to deliver SOVT-2 POS file to MOC for OD-64	**24/11/2008**	
HSC to deliver SOVT-2 POS file to MOC for OD-63	**25/11/2008**	
Replay of SOVT-1 to test TM ingest, data propagation and bulk transfer	**25/11/2008**	**26/11/2008**
SOVT-2 kick-off meeting at HSC	**26/11/2008 13:45**	
Third Videocon between HSC & ICCs to discuss SOVT-2 preparations	**26/11/2008 15:00**	
SOVT-2 Test S/C Readiness Review	**27/11/2008 09:30**	**27/11/2008 12:30**
SOVT-2 Test Readiness Review	**03/12/2008 10:00**	**03/12/2008 16:00**
SOVT-2 Preparation Readiness Telecon with ICCs	**03/12/2008 15:00**	
SOVT-2 Test Delta S/C Readiness Review	**08/12/2008 15:00**	**08/12/2008 16:30**
Final (issue 2.0) of SOVT-2 Test Plan and Timeline document distributed	10/12/2008	
SOVT-2 Final Readiness Telecon with ICCs	11/12/2008 15:00	
SOVT-2 Test Final Readiness Review	12/12/2008 14:00	12/12/2008 15:00
SOVT-2 readiness meeting with HSC	12/12/2008 15:30	
SOVT-2	**13/12/2008**	**18/12/2008**
1st DTCP of SOVT-2	13/12/2008 13:00	11/12/2008 16:00
Final DTCP of SOVT-2	18/12/2008 13:00	16/12/2008 16:00
SOVT-2 Spacecraft activities end	18/12/2008 16:00	
SOVT-2 data reception ends	19/12/2008 01:00	
SOVT-2 pipeline processing ends	20/12/2008	

The SOVT-2 preparation time line status, as of 2008 December 10th

2.5 High Level Event Timeline of SOVT-2

2.5.1 SOVT-2 – Launch Date, Epochs & Operational Day numbering

The SOVT-2 scenario is based upon a launch date of 12/04/2009. The epochs shall be from 10/06/2009 = 161/2009 (SOVT Day 1 – Operational Day 60 – OD-60) to 14/06/2009 = 165/2009 (SOVT Day 5 – Operational Day 65 – OD-65). At these epochs the satellite has passed the low Earth orbit and is in the transfer phase. 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	10/06/2009	161/2009	60
Day 2	11/06/2009	162/2009	61
Day 3	12/06/2009	163/2009	62
Day 4	13/06/2009	164/2009	63
Day 5	14/06/2009	165/2009	64

In other words, SOVT-2 is based in the future and as such all systems receiving and processing the data must take this into account and the software must be made compliant with running in future time.

Note that these dates are fixed. A change of the real launch date during test preparations shall not result in any re-planning of the SOVT-2 simulated dates.

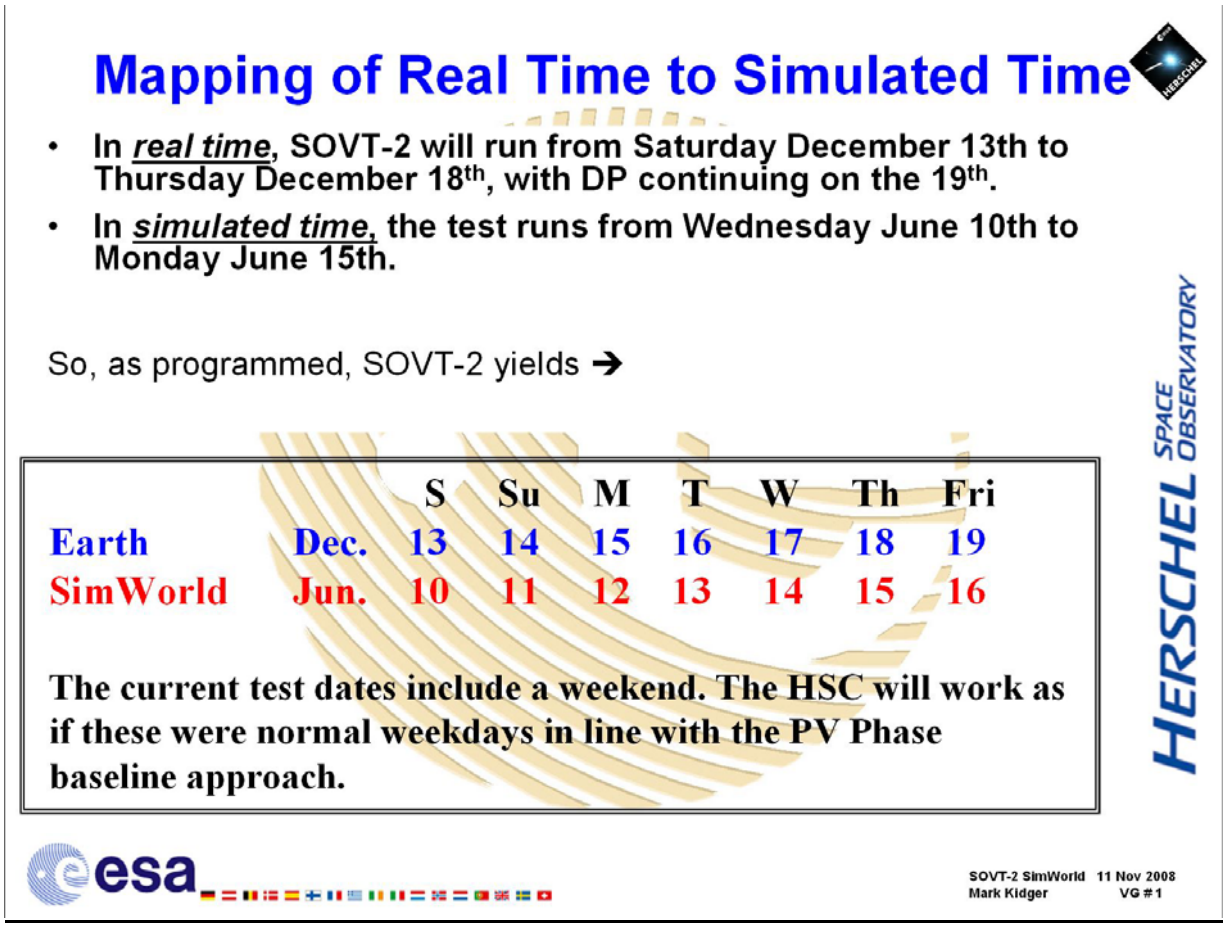
The Operational Day Numbering (60 → 64) is what is used by Flight Dynamics in the generation of the mission planning input products (Planning Skeleton Files – PSFs).

The correlation for the start of OD-1 of SOVT-2 is thus:

Real Day	2008 December 13th
Real UTC	12:00:00
Scenario Day	2009 June 10th
Scenario UTC	12:00:00
Scenario TAI	12:00:34

2.5.2 Real World – SimWorld mapping for SOVT-2

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.



The Real World – SimWorld mapping for SOVT-2 for the SOVT-2 timeline defined at the SOVT-2 TRR on December 3rd. It is intended that these are hard 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 SOVT-2 that 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:

- 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, save for DTCP-61, DTCP-62 and DTCP-63 when it shall be from 12:00z-17:00z. 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 what is normally a 24h time frame for each MTL. The time frame from 15:00z to 17:00z for OD-60, from 17:00z-17:00z for OD-61 and OD-62, from 17:00z-15:00z for OD-63 and from 15:00z-15:00z for OD-64. The differences are caused by the switch between 3h and 5h ODs. Note that were manual commanding is involved during the DTCP this will be outside the MTL.
- 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 Activity timeline definition

The result of the above analysis described in Section 2.3 led to the creation of the activity timeline that is shown in the attachment. This has been produced taking into account:

- The points described in Section 2.3.

- Looking at the constraints which we faced in SOVT-1 e.g. cooler re-cycling hold time, fill levels etc.

- Maximising the turn-around cycle required for some activities.

- Placing possibly problematic tests at the end, e.g. HIFI peak-up.

- Taking into account the fact that SPIRE Spectrometer will not be used in SOVT-2, to maximise the overall time to satisfy all instruments in use.

2.5.3.3.1 Activities in OD-60 and OD-64

OD-60 and OD-64 will be a combination of all 3 (4 if SPIRE PACS Parallel Mode is considered an instrument) instruments. The data from OD-60 shall be analysed with an updated backend provided to HSC to allow regeneration and transfer to MOC of the POS file for OD-64. The resulting MTL will then be uplinked by MOC and executed in OD-64 whereby the feedback/data analysis link to the uplink will have been validated - this is an extremely important interaction which will be exercised continuously during the

Commissioning and PV Phases. On this basis, it would be foreseen that at least 2 observations per instrument executed in OD-60 shall be repeated in OD-64 which will validate this downlink/uplink feedback interaction.

Note that OD-60 and OD-64 shall include, for the case of the PACS Photometer, the execution of the pointing working groups activity to determine the SRPE & APE. This would normally correspond to tracking of about 20 stars i.e. 20 AORs but, in this case, a smaller set of stars is being used. The result of this will be update of the SIAM matrix during SOVT-2 and execution of the changes in OD-64 with a repeat of these activities.

2.5.3.3.1 Activities in OD-61

OD-63 shall be a HIFI OD.

2.5.3.3.3 Activities in OD-62

OD-62 shall be a SPIRE OD. During the DTCP of this OD a real time science window shall be executed and a SPIRE observation shall be viewed real time in the ICC@MOC after a SPIRE cooler recycling. This leaves approximately 2.5 hours at the end of the 5 hour DTCP for the real time science activities. At the end of the SPIRE OD, a 2.5 hour custom map AOR shall be executed to validate the pointing group inputs to SOVT-2.

2.5.3.3.4 Activities in OD-61

OD-63 shall be a PACS OD – a PACS Burst Mode AOR shall be executed towards the end of this OD.

2.5.3.4 Activities during DTCP

There are 3 DTCPs (corresponding to the dedicated instrument ODs) which have a duration of 5 hours. These are defined to satisfy the MOC and ICC request to be able to validate commissioning phase procedures. It also satisfies my request to allow combination of manual commanding and timeline commanded downlink data into the SGS to simulate what will be the real case in Commissioning and PV Phase.

What is most important to stress here is that all manual commanding activites shall ensure that the instrument is in standby at the end of DTCP to support the timeline activities that shall then be performed.

2.5.3.5 Activities outside of DTCP

It is of course up to each instrument team to decide how they wish to use their time in their dedicated ODs. If they wish to validate commissioning phase procedures outside of the DTCP they can of course do so.

Please take into account however the PV inputs provided by each ICC defining what they wished to validate in SOVT-2 i.e Sections 3.2.2, 3.2.3 and 3.2.4 of the SOVT-2 Objectives & Contents document (HERSCHEL-HSC-DOC-1215).

2.5.3.6 AORs to be delivered by the ICCs

2.5.3.6.1 Engineering AORs

Note that all Engineering Observations shall be generated with Expert HSpot and shall be provided by the

ICCs.

2.5.3.6.2 OD-60 AORs - PACS, Parallel, SPIRE & HIFI

3 hours PACS Photometer AORs: These shall be 20 Observations to be provided by the Pointing Working Group & PACS

2 hours SPIRE/PACS Parallel mode AORs: These shall be delivered by SPIRE

5 hours SPIRE Photometer AORs: These shall be delivered by SPIRE

4 hours PACS Spectrometer AORs: These shall be delivered by PACS

7 hours HIFI AORs: These shall be delivered by HIFI

2.5.3.6.3 OD-61 AORs – HIFI

As there are 5 hours DTCP then HIFI should deliver AORs corresponding to 19 hours of timeline activities.

Note that some AORs should be provided that test HMap + position switching and HMap + load switching. We believe that these were not tested in SOVT-1 - please confirm.

Some AORs shall be provided to test OTFLoadChop and DBSRasterHalfThrow Modes. Some new PV Calibration Modes are envisaged to be tested here so AORs should be provided.

If there are activities in the DTCP that are required to be performed by the MTL and which are not MOC manual commanding procedures then AORs shall be provided.

2.5.3.6.4 OD-62 AORs - SPIRE

There are 5 hours DTCP in this OD.

SPIRE should deliver AORs corresponding to

- 1 AOR to be executed during DTCP to test the real time science window.

- 2.5 hour AOR covering SPIRE custom map test: to be provided by SPIRE in line with requirements of Pointing working group

- 16.5 hours of SPIRE AORs: These shall include SPIRE Jiggle map observations.

If there are activities in the DTCP that are required to be performed by the MTL and which are not MOC manual commanding procedures then AORs shall be provided.

2.5.3.6.5 OD-63 AORs – PACS

As there are 5 hours DTCP then PACS should deliver AORs corresponding to at least 19 hours of timeline activities. At least one observation shall produce Burst Mode TM.

Note that some AORs should be provided that test Dithered PSpecR and PSpecL maps. We believe that these were not tested in SOVT-1 - please confirm.

If there are activities in the DTCP that are required to be performed by the MTL and which are not MOC manual commanding procedures then AORs shall be provided.

2.5.3.6.6 OD-64 AORs - PACS, Parallel, SPIRE & HIFI

- 3 hours PACS Photometer AORs: These shall be a repeat of the 20 Observations to be provided by the Pointing Working Group & PACS in OD-60.

- 2 hours SPIRE/PACS Parallel mode AORs :These shall be delivered by SPIRE. At least one AOR shall be a repeat of that tested in OD-60 but that has had its backend updated to allow this change to be visible in the TM generated.

- 5 hours SPIRE Photometer AORs: These shall be delivered by SPIRE - At least one AOR shall be a repeat of that tested in OD-60 but that has had its backend updated to allow this change to be visible in the TM generated.

- 4 hours PACS Spectrometer AORs: These shall be delivered by PACS - At least one AOR shall be a repeat of that tested in OD-60 but that has had its backend updated to allow this change to be visible in the TM generated.

- 7 hours HIFI AORs: These shall be delivered by HIFI - At least one AOR shall be a repeat of that tested in OD-60 but that has had its backend updated to allow this change to be visible in the TM generated.

2.5.3.7 Top-level summary of instrument and support activities during SOVT-2

The table below gives a top-level overview of the planned contents of each OD during SOVT-2, 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-2 with the corresponding shift of Real World date and day of the week.

	Science	**Engineering**	**DP**
December13th (Saturday)	**PACS Photo., SPParallel, SPIRE Photo., PACS Spec., HIFI**	**PACS, SPIRE, HIFI**	**None**
December 14th (Sunday)	**HIFI**	**None**	**None**
December15th	**SPIRE Photo.**	**SPIRE, HIFI**	**PACS Photo., SPParallel, SPIRE Photo., PACS Spec.,**

			HIFI
December 16th	**PACS Photo., PACS Spec.**	**PACS**	**HIFI**
December 17th	**HIFI, PACS Photo., SPParallel, SPIRE Photo., PACS Spec.,**	**PACS, SPIRE, HIFI**	**SPIRE Photo.**
December 18th		**PACS, SPIRE, HIFI**	**PACS Photo., PACS Spec.**
December 19th			**HIFI, PACS Photo., SPParallel, SPIRE Photo., PACS Spec.,**

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-2. An "X" means that this instrument requires support on that day of the test. Note that MTL-60, 64 and 66 – Days 1, 5 and 7 of SOVT-2 – have activities with all the instruments and with the SPIRE PACS Parallel Mode.

	PACS	**SPIRE**	**HIFI**	**SPParallel**	**Mission Planning**
December 04th					**X**
December 05th					**X**
December 09th					**Stand-by**
December10th					**Stand-by**
December13th (Saturday)	**X**	**X**	**X**	**X**	
December 14th (Sunday)			**X**		
December15th	**X**	**X**	**X**	**X**	**X**

December 16th	**X**		**X**		**Stand-by**
December 17th	**X**	**X**	**X**	**X**	
December 18th	**X**	**X**	**X**		
December 19th	**X**	**X**	**X**	**X**	

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

2.5.3.8 DTCP durations and science activities during DTCP

During SOVT-2 not all of the DTCPs will be of 3 hours duration, unlike in SOVT-1 and in routine operations. SOVT-2 will include a mix of 3 and 5 hour DTCPs to permit Real Time science activities to be carried out during the DTCP on ODs that will be dedicated to a single instrument.

The following table defines the DTCP length for each OD and whether or not Real Time science is to be carried out in each one.

DTCP	DURATION	SCIENCE ACTIVITIES
60	3h	None
61	5h	HIFI
62	5h	SPIRE
63	5h	PACS
64	3h	None
65	3h	None

2.5.3.9 The Mission Timeline contents and when they are to be uplinked

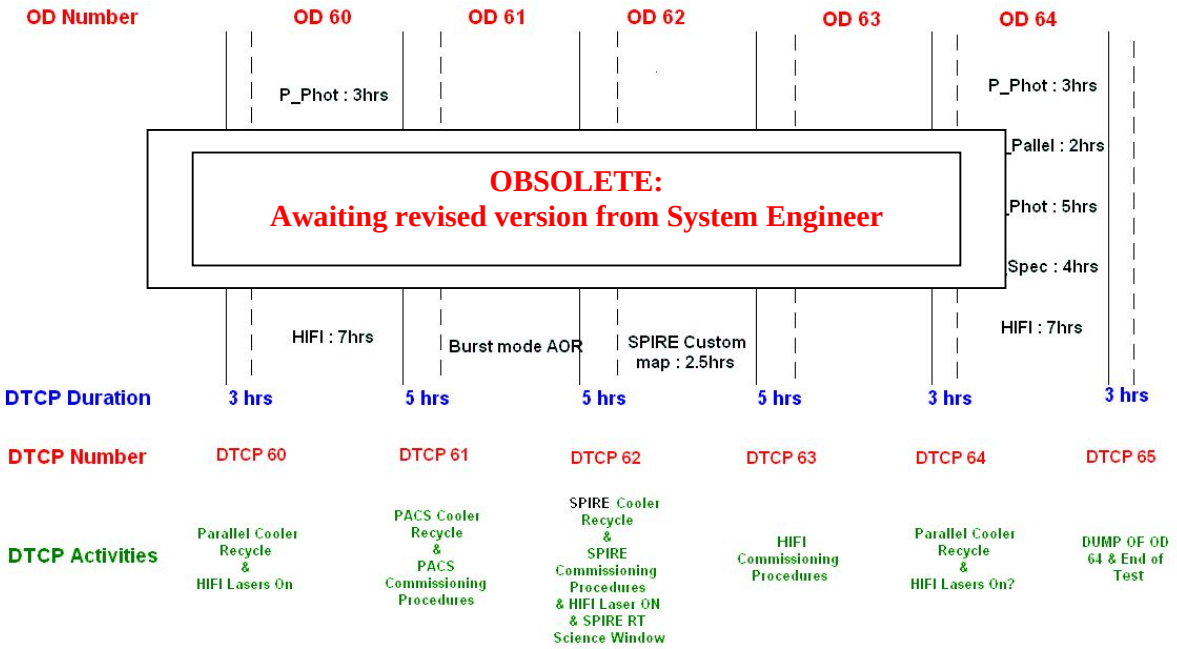
The table below gives an overview of the planned contents of each MTL, in summary form and, in the second table, with additional timing information. **Please Note** that MTL-59 is a reduced MTL as it just covers the activities from the S/C being ready to the end of the first "real" DTCP. The first "real" DTCP occurs in OD-60. **Note also** that an MTL covers the period "end of DTCP to end of DTCP+1"

MTL-OD	*Validity (UT)*	*Upload during DTCP-XYZ*	*Contents of MTL*
MTL-59	D1/11:45 – D1/15:00	DTCP-59 (D1/06:00)	**Activities by TAS leading to DTCP-60;** TBC. **DTCP-60 Science activities**: Parallel Cooler Re-cycling in DTCP-60. HIFI Lasers On in DTCP-60.
MTL-60	D1/15:00 – D2/17:00	DTCP-60 (D1/12:00)	**OD-60 main Science Activities (21h):** PACS Photometer 3h (14%) SPParallel 2h (10%) SPIRE Photometer 5h (24%) PACS Spectrometer 4h (19%) HIFI 7h (33%) **DTCP-61 Science activities:** HIFI set into primary in DTCP-61. HIFI R/T science.

MTL-61	D2/17:00 – D3/17:00	DTCP-61 (D1/12:00)	**OD-61 main Science Activities (19h):** HIFI Operations. **DTCP-62 Science activities:** SPIRE Cooler Re-cycling during DTCP-62. HIFI Lasers On. SPIRE manual commissioning procedures.
MTL-62	D3/17:00 – D4/17:00	DTCP-62 (D1/12:00)	**OD-62 main Science Activities (19h):** SPIRE Photometer 16.5h (87%) SPIRE Custom map 2.5h (13%) **DTCP-63 Science activities:** PACS set to prime. PACS cooler recycling. PACS manual commissioning procedures.
MTL-63	D4/17:00 – D5/17:00	DTCP-63 (D1/12:00)	**OD-63 main Science Activities (19h):** PACS operations. Burst mode TM. **DTCP-64 Science activities:** PACS/SPIRE parallel cooler recycling.
MTL-64	D5/17:00-D6/15:00	DTCP-64 (D1/12:00)	**OD-64 main Science Activities:** HIFI 7h (33%) PACS Photometer 5h (24%) SPParallel 2h (10%) SPIRE Photometer 5h (24%) PACS Spectrometer 2h (10%) **DTCP-65 Science activities:** None.
MTL-65	D6/15:00-D6/15:15		**S/C shutdown activities only**

MTL-OD	*Validity*	*Upload DTCP*	*Contents*
MTL-59	D1/11:45 - D1/15:00	DTCP-59	12:00 Start DTCP-60 - Start P/S parallel cooler recycling at 12:37:00z
MTL-60	D1/15:00 - D2/17:00 (26h)	DTCP-59	15:00 End DTCP-60 - End P/S parallel cooler recycling at 15:29:31z - 3 h PACS Photometer - 2 h SPIRE/PACS Parallel mode - 5 h SPIRE Photometer - 4 h PACS Spectrometer - 7 h HIFI 12:00 Start DTCP-61 - HIFI set to prime - HIFI R/T Science (16:23:52z - 16:40:00z)
MTL-61	D2/17:00 - D3/17:00 (24h)	DTCP-60 (3h)	17:00 End DTCP-61 - 19 h HIFI 12:00 Start DTCP-62 - 1st SPIRE Cooler Recycling (12:37:00z - 15:08:11z)
MTL-62	D3/17:00 - D4/17:00 (24h)	DTCP-61 (5h)	17:00 End DTCP-62 - 16.5h SPIRE Photometer - 2nd SPIRE Cooler Recycling at (02:21:34z - 04:52:45z) - 2.5 h SPIRE Custom map 12:00 Start DTCP-63 - PACS set into primary
MTL-63	D4/17:00 - D5/15:00 (22h)	DTCP-62 (5h)	17:00 End DTCP-63 - PACS Cooler Recycling (17:48:58z - 20:21:10z) - 19 h PACS (Burst mode 11:14:14z - 11:26:53z) 12:00 Start DTCP-64
MTL-64	D5/15:00- D6/15:00 (24h)	DTCP-63 (5h)	15:00 EndDTCP-64 - 7 h HIFI (Peak-up at 18:48:45z) - P/S Parallel Cooler recycling (19:29:54z -22:22:25z) - 5 h PACS Photometer - 2 h SPIRE/PACS Parallel mode - 5 h SPIRE Photometer (Peak-up at 07:34:01z) - 2 h PACS Spectrometer 12:00 Start DTCP-65
MTL-65	D6/15:00- D6/15:15	DTCP-64 (3h)	15:00 End DTCP-65

2.5.3.10 A Diagrammatical View of SOVT-2 Activities – Day by Day



2.6 POS File delivery and configuration information

2.6.1 Delivery Information

2.6.1.1 POS Files sent

POS__HSCSDA_D_0060_0001_____00000.HERS

POS__HSCSDA_D_0061_0002_____00000.HERS

POS__HSCSDA_D_0062_0001_____00000.HERS

POS__HSCSDA_D_0063_0002_____00000.HERS

2.6.1.2 PSF, Orbit & SIAM & SSO ephemerides used

These correspond to the following PSFs delivered by Flight Dynamics:

2.6.1.2.1 PSFs

0060_0001

0061_0001

0062_0001

0063_0002

2.6.1.2.2 SIAM

0001_0006.SIAM

2.6.1.2.3 Orbit file

H20081023_0001.LOE(12-04-2009 launch)

2.6.1.3 Initial Attitude

Initial attitude for the start of OD60:

hcss.mps.initial.od = 60

hcss.mps.initial.attitude.x = +0.32914832425832

hcss.mps.initial.attitude.y = +0.52986463522475

hcss.mps.initial.attitude.z = +0.77716323842535

hcss.mps.initial.attitude.w = +0.08319945802812

2.6.1.4 HPSDB information

HPSDB used (delivered on 17th Nov 08): H-P-2-ASP-LI-1420_issue12_signed version.zip

It contains:

- PACS Mib version 9.3
- HIFI Mib version 11.10
- SPIRE Mib version 2.2.H1 PR

2.6.1.5 Name of the HSC DB & Mission Configuration

HSC Database: hsc_ops_sovt_2_a@herdb01.esac.esa.int

Mission configuration: SOVT2_B

2.6.1.6 Cus/Cal backend deliveries used for FMRMS test

2.6.1.6.1 SPIRE

SPIRE_OD0060.tar, SPIRE_OD0062.tar, SPIRE_OD0064.tar delivered 17th & 19th Nov. The 19th Nov included the parallel mode cus scripts.- Corresponding SPIRE MC = SOVT2_mconfig_06

2.6.1.6.2 HIFI

HIFI_OD0060.tar, HIFI_OD0063.tar, HIFI_OD0064.tar- delivered 17th Nov - Corresponding HIFI MC = HIFI_PHS_P_008

2.6.1.6.3 PACS

PACS_OD0060.tar, PACS_OD0061.tar, PACS_OD0064.tar - delivered 14th Nov - Final redelivery of OD64 on 20th Nov: Corresponding PACS MC = SOVT2_2008-11-19B

2.6.1.7 Software used at HSC

The HCSS build number is 0.6.6

The PHS build number is 308 HSpot version - 4.0.1 (2nd release)

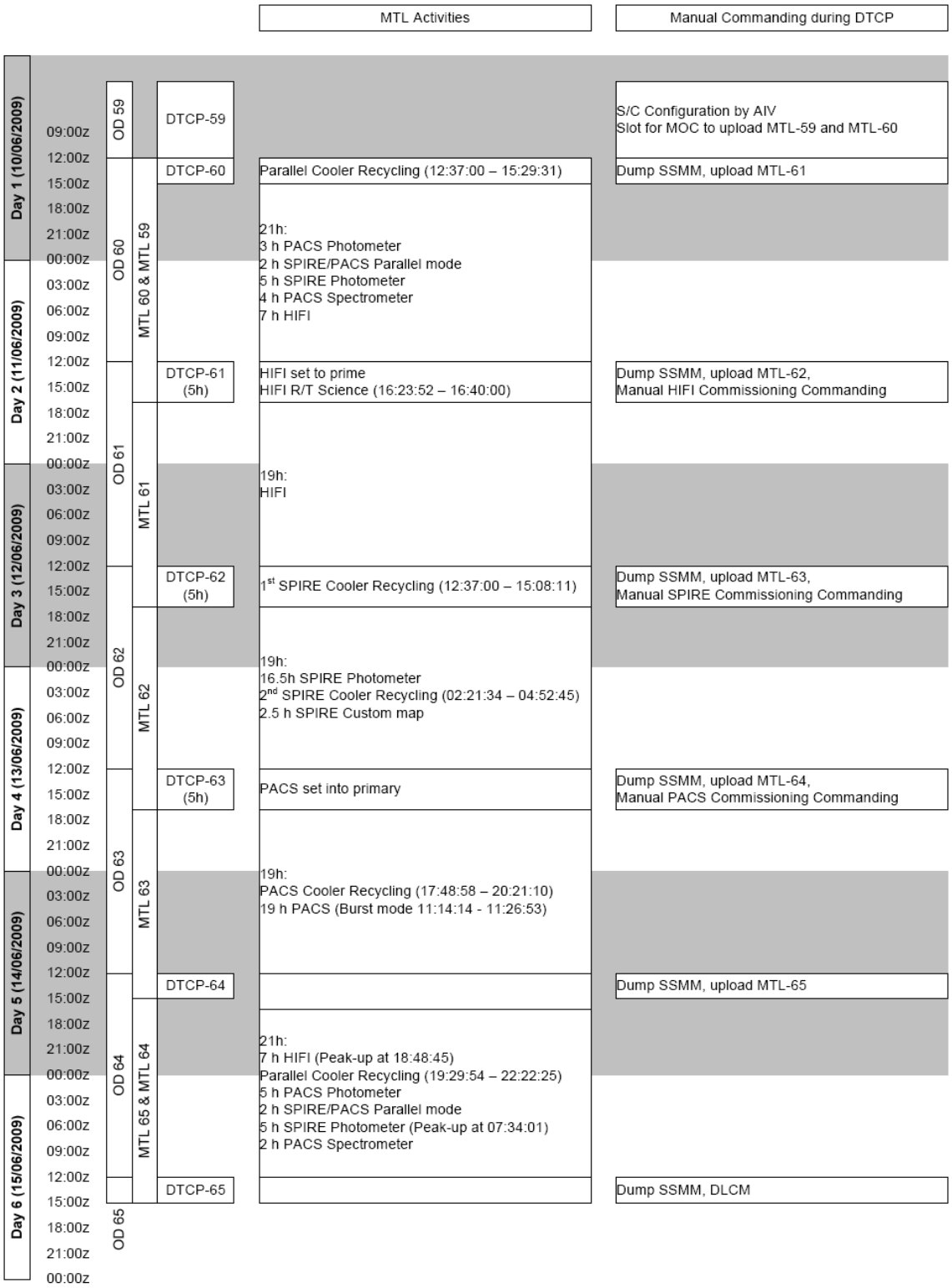
3. SOVT-2 – Instrument Day to Day Activities – In Detail

3.1 Introduction

The Mission Planning performed at the HSC will result in the generation of a Preferred Observation Sequence (POS) File for each Operational Day in question (OD-60 → OD-64).

The planning of each of these Operational Days will be 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, will also be provided. This will allow 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.



A diagrammatic overview of SOVT-2 activities.

3.1.1 A detailed breakdown of activities in the Mission Time Line during SOVT-2

The following breakdown gives detailed timing and other information for activities carried out during SOVT-2. It should be used in conjunction with the tables of AORs and their timings in Sections 3.2-3.6 to give a complete picture of SOVT-2 activities.

3.1.1.1 Operational Day 60

3.1.1.1.1 Highlights of the OD

- All instruments being used (including parallel mode)
- A "light" version of the PACS_APE_measure_STR1 procedure, with approx 10 (rather than 40) targets. This allows us to exercise the procedure to analyse the data, produce updates in the SIAM and feed the planning system back with them.
- Very long slews are planned for SPIRE during this OD (Approx 1334 seconds durations)
- SSO observations being performed = Saturn, Ceres
- # of Telecommands sent in MTL = 8698
- # of observations (eng & normal) scheduled in MTL = 64

3.1.1.1.2 DTCP 60

- Parallel Cooler Recycle starts at 2009-06-10T12:37:00Z & ends at 2009-06-10T15:29:31Z

3.1.1.1.3 Rest of OD60

- HIFI into Standby-II at 2009-06-10T15:29:31Z
- PACS Photo activities start at 2009-06-10T15:29:55Z
- Parallel mode activities start at 2009-06-10T17:24:30Z
- SPIRE Photo activities start at 2009-06-10T19:33:59Z
- Start of first long slew at 2009-06-10T22:06:42
- Pacs Spec activities start at 2009-06-11T00:01:59Z
- HIFI activities start at 2009-06-11T04:49:41Z
- End of OD Instrument activities at 2009-06-11T11:43:07Z with HIFI being set into Standby-II

3.1.1.2 Operational Day 61

3.1.1.2.1 Highlights of the OD

- HIFI Only day
- Real Time Science Window is scheduled during the DTCP
- Execution of HIFI AORs with LO in cold. Something not possible in SOVT-1
- Contrary to all other ODs, the HIFI OD is consistent with the targets they have planned for the PV phase. We did not change them.
- # of Telecommands sent in MTL = 14296
- # of observations (eng & normal) scheduled in MTL = 20

3.1.1.2.2 DTCP 61

- Manual commanding starts at 12:37z. Real Time Science window between 16:23:52 & 16:40:00

3.1.1.2.3 Rest of OD61

- HIFI MTL activities begin at 17:00
- End of HIFI activities at 2009-06-12T11:26:42Z with HIFI being set into Standby-I (Lasers Off)

3.1.1.3 Operational Day 62

3.1.1.3.1 Highlights of the OD

- SPIRE Only Day
- At least one long slew to the north pole and back again
- Serendipity mode
- SSO observations being performed = Saturn, Typhon & Saturn
- Two cooler recyclings are being performed to address cooler holdtime constraints
- SPIRE_Initpoint_PHOT, i.e. the search for the position of five pixels within the SPIRE photometer array. This will allow us to exercise the new custom map mode and the on-ground gyro propagation at FDS. The GCP (aka OFF) is the first pointing in the series.
- # of Telecommands sent in MTL = 12399
- # of observations (eng & normal) scheduled in MTL = 41

3.1.1.3.2 DTCP 62

- 1st SPIRE Cooler Recycling starts at 12:37z & ends at 2009-06-12T15:08:11Z
- Manual commanding between 15:08:11 to 2009-06-12T16:37:27Z.
- Spire have 3 observations planned on the MTL to be viewed during DTCP (starting at 16:37:27Z) i.e. redy-phot stby, EngPCALFlash and Cal_StdLoadCurve.

3.1.1.3.3 Rest of OD62

- 2nd Cooler Recycling starts at 2009-06-13T02:21:34Z
- SPIRE custom map planned towards end of OD
- End of SPIRE Activities at 2009-06-13T10:48:31Z

3.1.1.4 Operational Day 63

3.1.1.4.1 Highlights of the OD

- PACS Only Day
- Burst mode observation planned
- Both Photometer & Spectrometer observations planned
- SSO observations : Ceres & Saturn
- # of Telecommands sent in MTL = 7161
- # of observations (eng & normal) scheduled in MTL = 62

3.1.1.4.2 DTCP 63

- 2h R/T slot considered
- HIFI into Standby_II at 14:37:00
- PACS observations on MTL starting at 14:37:24

3.1.1.4.3 Rest of OD63

- PACS Cooler Recycle starts at 17:48:58Z & ends at 20:21:10
- Photometer observations from then until 2009-06-14T06:19:28Z

- Burst mode observation takes place between 2009-06-14T11:14:14Z and 2009-06-14T11:26:53Z
- Spectrometer observations from then until 11:54:03

3.1.1.5 Operational Day 64

3.1.1.5.1 Highlights of the OD

- All instruments (including parallel mode)
- Peakup observations planned for HIFI & for SPIRE
- HIFI switched off after its activities are completed
- SSO observations : Ceres & Saturn
- Cooler recycling outside of DTCP
- # of Telecommands sent in MTL = 8160
- # of observations (eng & normal) scheduled in MTL = 66

3.1.1.5.2 DTCP64

- Gap to allow manual commanding (if required) between 2009-06-14T12:37z & 2009-06-14T13:41:08
- HIFI observations start at 2009-06-14T13:41:08

3.1.1.5.3 Activities

- HIFI Peak-up Observation : 2009-06-14T18:48:45Z
- Gap at end of HIFI to allow HIFI switch-off : 2009-06-14T18:59:54Z to 2009-06-14T19:29:54Z
- Parallel mode cooler recycle starts at 2009-06-14T19:29:54Z
- PACS Photometer activities start at 2009-06-14T22:22:25Z
- Parallel mode activities start at 2009-06-15T00:56:54Z
- SPIRE Photometer activities start at 2009-06-15T02:58:20Z
- SPIRE Peak-up Observation : 2009-06-15T07:34:01Z
- PACS Spectrometer activities start at 2009-06-15T08:08:38Z
- End of Instrument activities at 2009-06-15T11:44:46Z

3.1.2 Manual commanding activities during SOVT-2

3.1.2.1 DTCP-60 (all instruments)

3.1.2.1.1 Manual Commanding

There is no manual commanding period in this DTCP.

3.1.2.1.2 MTL Activities

Parallel cooler recycle starts on the MTL at 2009-06-10T12:37:00Z & ends at 2009-06-10T15:29:31Z.

3.1.2.2 DTCP-61 (HIFI)

3.1.2.2.1 Manual Commanding Period (approx 3 hours 36 minutes)

- Starts at 2009-06-11T12:37:00Z
- Must end before 2009-06-11T16:23:52Z

3.1.2.2.2 MTL Activities

Real Time Science Test : Starts at 2009-06-11T16:23:52Z & ends at 2009-06-11T16:40:00Z. We have three short HIFI Engineering Observations which will be executed in succession and which will produce RT science Data. Here are the start time & observation name details:

2009-06-11T16:23:52Z HifiEngSetIntoPrimary_RT_Science_OD63
2009-06-11T16:23:58Z HifiEngSwitchonLO_1a_RT_Science_OD63
2009-06-11T16:39:36Z HifiEngSetIntoStandby_II_RT_Science_OD63

3.1.2.3 DTCP-62 (SPIRE)

Note: There are MTL activities before Manual Commanding Activities followed again by MTL activities in this DTCP.

3.1.2.3.1 Manual Commanding Period (approx 1 hour 29 minutes)

Manual Commanding starts at approx 2009-06-12T15:08:11Z & must end before 2009-06-12T16:37:27Z.

3.1.2.3.2 MTL Activities

SPIRE perform a cooler recycling in the DTCP before Manual Commanding starts. This cooler recycling starts at 2009-06-12T12:37:00Z & ends at 2009-06-12T15:08:11Z.

SPIRE have scheduled 3 engineering observations to be viewed during the DTCP starting at 2009-06-12T16:37:27Z and ending at 2009-06-12T16:58:16Z.

3.1.2.4 DTCP-63 (PACS)

3.1.2.4.1 Manual Commanding Period (approx 2 hours)

Manual commanding starts at 2009-06-13T12:37:00Z.

Manual commanding must end before 2009-06-13T14:37:00Z.

3.1.2.4.2 MTL activities

HIFI have their laser switched on by MTL starting at 2009-06-13T14:37:00Z.

PACS have then scheduled calibration observations to be viewed during the DTCP starting at 2009-06-13T14:37:24Z and ending outside of DTCP. After these, then their Cooler recycling is started (outside of the DTCP).

3.1.2.4.3 Details of PACS Manual Commanding activities in OD-63

The following details of PACS Manual Commanding activities have been supplied.

Previously, TSF files were delivered to the HSC containing the following details:

Test Block 1 - 20090613_0063_H_SAVED_0101

Pacs_DMC_SET_OBSID_12_10_2007_01.xls H_COP_PAC_X008
CONF_chopper_ast_OBS_21_11_2007_01.xls H_COP_PAC_X009
PACS_Chopper_EnDis_Test_NoConf_ast1_17_10_2007_01.xls H_COP_PAC_C101
PACS_Chopper_EnDis_Test_NoConf_ast300_17_10_2007_01.xls H_COP_PAC_C102
CONF_chopper_ast_OBS_21_11_2007_01.xls H_COP_PAC_X009
PACS_Chopper_EnDis_Test_NoConf_ast300_17_10_2007_01.xls H_COP_PAC_C102
PACS_Chopper_EnDis_PlateauTest_NoConf_ast_20_11_2007_01.xls H_COP_PAC_C103
Pacs_DMC_SET_OBSID_12_10_2007_01.xls H_COP_PAC_X008

Test Block 2 - 20090613_0063_H_SAVED_0201

PACS_Spec_Gra_IST_Check_1_OBS_13_11_2007_01.xls H_COP_PAC_G201
PACS_Spec_Gra_IST_Check_2_OBS_13_11_2007_01.xls H_COP_PAC_G202

There is a possibility that this will be repeated using new IPF files - should be called test block 4

Test Block 3 - 20090613_0063_H_SAVED_0301

PACS_Spec_Gra_IST_Check_4_OBS_13_11_2007_01.xls H_COP_PAC_X011

The IPF files used to make these stacks are not the ones to be used during SOVT-2. The correct IPFs will be delivered today from the ICC@MOC, and as such, the TSF files will be updated as the information arrives, both before and during the DTCP. As such new TSF files will be delivered in a timely manner before uplink (although this may be a matter of seconds/minutes) as follows:

Test Block 1A - 20090613_0063_H_SAVED_0A01 - after delivery of
HCPX0009_CONFCHOP_0002.IPF
Pacs_DMC_SET_OBSID_12_10_2007_01.xls H_COP_PAC_X008
CONF_chopper_ast_OBS_21_11_2007_01.xls H_COP_PAC_X009
PACS_Chopper_EnDis_Test_NoConf_ast1_17_10_2007_01.xls H_COP_PAC_C101
PACS_Chopper_EnDis_Test_NoConf_ast300_17_10_2007_01.xls H_COP_PAC_C102

Test Block 1B - 20090613_0063_H_SAVED_0B01 - after deilvery of
HCPX0009_CONFCHOP_0003.IPF which is generated after the previous block is
completed
CONF_chopper_ast_OBS_21_11_2007_01.xls H_COP_PAC_X009
PACS_Chopper_EnDis_Test_NoConf_ast300_17_10_2007_01.xls H_COP_PAC_C102
PACS_Chopper_EnDis_PlateauTest_NoConf_ast_20_11_2007_01.xls H_COP_PAC_C103
Pacs_DMC_SET_OBSID_12_10_2007_01.xls H_COP_PAC_X008

Test Block 2 - 20090613_0063_H_SAVED_0202 - after deilvery of
HCPG201Y_GRATING1_0002.IPF and HCPG202Y_GRATING2_0002.IPF
PACS_Spec_Gra_IST_Check_1_OBS_13_11_2007_01.xls H_COP_PAC_G201
PACS_Spec_Gra_IST_Check_2_OBS_13_11_2007_01.xls H_COP_PAC_G202

There is a possibility that this will be repeated using new IPF files -
should be called test block 4 using IPF files HCPG201Y_GRATING1_0003.IPF
and HCPG202Y_GRATING2_0003.IPF

Test Block 3 - 20090613_0063_H_SAVED_0302 - after deilvery of
HCPX0011Y_GRATING3_0002.IPF
PACS_Spec_Gra_IST_Check_4_OBS_13_11_2007_01.xls H_COP_PAC_X011

Please note that in effect, the sequence of procedures and the commands themselves has not changed, only the TC parameters which differ from the original files due to new IPFs..

After iteration with PACS, the following update was applied:

Due to inputs received from PACS, the procedure H_CRP_PAC_CSSF should be executed at the end of PACS Test Block 2 in order to return PACS to a suitable state.

However, in the end, a further modification had to be applied in execution:

As described in the SOVT-2 Test Plan, PACS requested that Test Block 2 was repeated (called Test Block 4). Due to time constraints, it was agreed not to execute Test Block 3.

Test Block 4 contained the following procedures:

H_COP_PAC_G201 (OBSID = 0x1006, IPF version 0003)
H_COP_PAC_G202 (OBSID = 0x1007, IPF version 0003)
H_CRP_PAC_CSSF

This test block was successfully completed.

3.1.2.5 DTCP 64 (All instruments)

3.1.2.5.1 Manual Commanding Period (approx 1 hour 4 minutes)

Manual commanding period starts at 2009-06-14T12:37:00Z and ends at 2009-06-14T13:41:08Z. This period was placed there just in case of issues related to the LOU being warm (which have since been addressed & means that this period will not be used, at least for that activity).

3.1.2.5.2 MTL activities

HIFI MTL commanding starts at 2009-06-14T13:41:08Z.and proceeds outside the DTCP.

3.1.3 Explanation of the main Column headings in the upcoming detailed tables

In the following tables the AORs to be performed are listed, by OD, in order of execution, along with basic target, timing and mode information. Jointly with the previous section these tables give a complete picture of the MTL for SOVT-2.

In the tables, the columns are:

“Obs ID” = the Observation Identifier number

"Date (UT)" = time of start of the observation.

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

“Instrument” is the instrument being used to execute the AOR.

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

“Target name” is the name of the target to be observed. If “Fake” is added to the name it signifies that the target coordinates have been faked to make the observations more efficient (i.e. less time spent in slews), or to enable a valid reaction wheel biasing to be obtained. If the target name is shown as “no pointing”, it means that an engineering observation will be performed that does not require a target.

"Total time" = total # of seconds required for the observation, including overhead

3.2 Operational Day 60

3.2.1 OD-60: Planning Rules

DTCP-60 Science activities:

Parallel Cooler Re-cycling in DTCP-60.
HIFI Lasers On in DTCP-60.

OD-60 main Science Activities (21h):

PACS Photometer 3h (14%)
SPParallel 2h (10%)
SPIRE Photometer 5h (24%)
PACS Spectrometer 4h (19%)
HIFI 7h (33%)

DTCP-61 Science activities:

HIFI set into primary in DTCP-61.
HIFI R/T science.

3.2.2 OD-60: Schedule in detail

Obs ID	Date (UT)	AOR title	Instrument	Mode	Target name	Total Time (s)
6138	10/06/2009 12:37	Calibration_sovt2_parallel_1-SpireEngParallelCoolerRecycleGen-0000	SPParallel	Engineering	no pointing	10350
6340	10/06/2009 15:29	Calibration_michael_10-SetIntoStandby_II_start-OD60	HIFI	Engineering	(no pointing)	25
6261	10/06/2009 15:29	Calibration_PVPhotSetup_2-PVPhotSetup_na_nStd_orbitpro_na_0001	PACS	Engineering	None	2272
6257	10/06/2009 16:12	Calibration_CPPhotFPG_1-CPPhotFPG_261E_StdPS_blu_SAA_CSDra_0001	PACS	PacsPhoto	Fake-CS Dra	338
6260	10/06/2009 16:17	Calibration_CPPhotFPG_1-CPPhotFPG_261E_StdPS_blu_SAA_HIP56211_0001	PACS	PacsPhoto	Fake-HIP 56211	338
6278	10/06/2009 16:21	Calibration_CPPhotFPG_1-CPPhotFPG_261E_StdPS_blu_SAA_HIP58225_0001	PACS	PacsPhoto	Fake-HIP 58225	338
6264	10/06/2009 16:26	Calibration_CPPhotFPG_1-CPPhotFPG_261E_StdPS_blu_SAA_HIP57504_0001	PACS	PacsPhoto	Fake-HIP 57504	338
6266	10/06/2009 16:30	Calibration_CPPhotFPG_1-CPPhotFPG_261E_StdPS_blu_SAA_HIP67627_0001	PACS	PacsPhoto	Fake-HIP 67627	338
6277	10/06/2009 16:34	Calibration_CPPhotFPG_1-CPPhotFPG_261E_StdPS_blu_SAA_HIP62223_0001	PACS	PacsPhoto	Fake-HIP 62223	338
6256	10/06/2009 16:37	Calibration_CPPhotFPG_1-CPPhotFPG_261E_StdPS_blu_SAA_HIP56779_0001	PACS	PacsPhoto	Fake-HIP 56779	338
6273	10/06/2009 16:43	Calibration_CPPhotFPG_1-CPPhotFPG_261E_StdPS_blu_SAA_HIP65006_0001	PACS	PacsPhoto	Fake-HIP 65006	338
6270	10/06/2009 16:47	Calibration_CPPhotFPG_1-CPPhotFPG_261E_StdPS_blu_SAA_HIP58854_0001	PACS	PacsPhoto	Fake-HIP 58854	338
6263	10/06/2009 16:51	Calibration_CPPhotFPG_1-CPPhotFPG_261E_StdPS_blu_SAA_PPM102025_0001	PACS	PacsPhoto	Fake-PPM 102025	338
6262	10/06/2009 16:56	PVPhotFPG_262B_nStdScani45_blu_gypro_HIP21479	PACS	Engineering	Fake-HIP 21479-1-1	1044
6294	10/06/2009 17:17	SOVT2_ScanMap-2	PACS	PacsPhoto	target1	626

6144	10/06/2009 17:24	Calibration_sovt2_parallel_1-SpireEngREDYtoPHOT_STBYGen-0000	SPParallel	Engineering	no pointing	162
6145	10/06/2009 17:43	Calibration_sovt2_parallel_1-SpirePacsParallelGen-green_slow_orth	SPParallel	Engineering	ngc 6946	3985
6136	10/06/2009 18:57	Calibration_sovt2_parallel_1-PVParAOTVal_515A_StdParallel_blu_fast_betaUMi_nomin	SPParallel	SPParallel	beta ursae minoris	2387
6275	10/06/2009 19:33	Calibration_PVPhotSetup_2-PVPhotSetup_na_nStd_orbitepi_na_0001	PACS	Engineering	None	14
6132	10/06/2009 19:45	Calibration_sovt2_od60_1-SpirePhotoPointJiggleGen-6arcsecOffset	SPIRE	Engineering	1 Ceres	1181
6139	10/06/2009 20:08	Calibration_sovt2_od60_1-SpirePhoto_Cal_StdLoadCurveGen-0000	SPIRE	Engineering	Saturn	1033
6134	10/06/2009 20:27	Calibration_sovt2_od60_1-SPhoto-0001-2Rep	SPIRE	SpirePhoto	new target2	1238
6137	10/06/2009 20:47	Calibration_sovt2_od60_1-SpirePhoto_Cal_IltPcalFlashGen-0000	SPIRE	Engineering	0,90	169
6133	10/06/2009 20:53	Calibration_sovt2_od60_1-SPhoto-0000-4Rep	SPIRE	SpirePhoto	beta pegx-1	1703
6146	10/06/2009 21:18	Calibration_sovt2_od60_1-SpirePhoto_Cal_PhaseUpGen-0000	SPIRE	Engineering	No pointing	338
6135	10/06/2009 21:24	Calibration_sovt2_od60_1-SpirePhoto_Cal_PhaseUpGen-5mV-130Hz	SPIRE	Engineering	No pointing	457
6147	10/06/2009 21:33	Calibration_sovt2_od60_1-SpirePhotoCalGCOFovMapCrossRaster_CRL2688mo_5pts_20	SPIRE	Engineering	CRL 2688 mod-1	580
6151	10/06/2009 21:43	Calibration_sovt2_od60_1-SpireEngPcalFlashGen-0000	SPIRE	Engineering	No pointing	54
6149	10/06/2009 22:06	Calibration_sovt2_od60_1-SpirePhotoPointJiggleGen-flashPerNod3Rep	SPIRE	Engineering	beta peg	1303
6131	10/06/2009 22:50	Calibration_sovt2_od60_1-SPhoto-0002-AB_60x30_Nom	SPIRE	SpirePhoto	CRL 2688	1242
6141	10/06/2009 23:10	Calibration_sovt2_od60_1-SpirePhotoPointJiggleGen-6arcsecOffset	SPIRE	Engineering	GAMMA DRA	1523
6142	10/06/2009 23:36	Calibration_sovt2_od60_1-SpirePhotoPointJiggleGen-6arcsecOffset	SPIRE	Engineering	GAMMA DRA	907
6143	10/06/2009 23:53	Calibration_sovt2_od60_1-SpirePhoto_Cal_PhaseUpGen-70mV-130Hz	SPIRE	Engineering	near 0,90	446
6148	11/06/2009 00:01	Calibration_sovt2_od60_1-SpireEngPHOT_STBYtoREDYGen-0001	SPIRE	Engineering	No pointing	36
6258	11/06/2009 00:01	Calibration_PVSpecSetup_3-PVSpecSetup_na_nStd_orbitpro_na_0001	PACS	Engineering	None	2459
6268	11/06/2009 00:47	Calibration_PVSpecAotVal_1-PVSpecAotVal_521_StdLineChopDither_A_NGC6543_0001	PACS	PacsLineSpec	Fake-NGC6543	1462
6274	11/06/2009 01:10	Calibration_PVSpecAotVal_1-PVSpecAotVal_521_StdLineWaveSwitch_A_NGC6543_0001	PACS	PacsLineSpec	Fake-NGC 6543	1289
6276	11/06/2009 01:30	Calibration_PVSpecAotVal_1-PVSpecAotVal_521_StdLineWaveSwitch_B_NGC6543_0001	PACS	PacsLineSpec	Fake-NGC 6543	1285
6259	11/06/2009 01:51	Calibration_PVSpecAotVal_1-PVSpecAotVal_522_NStd_WS_no_cal_3_NGC7027_0001	PACS	Engineering	Fake-ngc7027	522
6265	11/06/2009 02:01	Calibration_PVSpecAotVal_1-PVSpecAotVal_523_StdRngAFastFullNyq_NGC7027_0001	PACS	PacsRangeSpec	Fake-ngc7027	1987
6269	11/06/2009 02:32	Calibration_PVSpecAotVal_1-PVSpecAotVal_523_StdRngBFastFullNyq_NGC7027_0001	PACS	PacsRangeSpec	Fake-ngc7027	1141
6272	11/06/2009 02:50	Calibration_PVSpecAotVal_1-PVSpecAotVal_523_HighBlueOverlap3rdOrder_NGC7027_1	PACS	PacsRangeSpec	Fake-ngc7027	2358
6267	11/06/2009 03:28	Calibration_PVSpecAotVal_1-PVSpecAotVal_523_HighRedOverlap2ndOrder_NGC7027_1	PACS	PacsRangeSpec	Fake-ngc7027	799
6311	11/06/2009 03:41	PVSpecAotVal_522_NStd_WS_no_cal_8_atOff_FAKE_0001	PACS	Engineering	Fake target #1	1094
6333	11/06/2009 04:01	PVSpecAotVal_522_NStd_WS_no_cal_7_2linesA_FAKE_0001	PACS	Engineering	Fake target #1	1094
6289	11/06/2009 04:20	PVSpecAotVal_522_NStd_WS_no_cal_11_FAKE_0001	PACS	Engineering	Fake target #1	400
6297	11/06/2009 04:28	PVSpecAotVal_522_NStd_WS_no_cal_9_2linesB_FAKE_0001	PACS	Engineering	Fake target #1	342
6304	11/06/2009 04:36	PVSpecAotVal_522_NStd_WS_no_cal_10_FAKE_0001	PACS	Engineering	Fake target #1	342
6303	11/06/2009 04:44	PVSpecFlux_431A_nStdSlewCal_13_DarkField_0001	PACS	Engineering	Fake-HIP 21479-1	133

6306	11/06/2009 04:47	PVSpecFlux_431A_nStdSlewCal_13_DarkField_0002	PACS	Engineering	Fake-HIP 21479-1	133
6271	11/06/2009 04:49	Calibration_PVSpecSetup_3-PVSpecSetup_na_nStd_orbitepi_na_0001	PACS	Engineering	None	14
6120	11/06/2009 04:49	Calibration_michael_10-SetIntoPrimary-OD60	HIFI	Engineering	(no pointing)	7
6125	11/06/2009 04:49	Calibration_michael_10-TuneLO-1b	HIFI	Engineering	(no pointing)	940
6121	11/06/2009 05:08	Calibration_michael_10-OTFFSwitchNoRef-1b	HIFI	HifiMapping	Fake_Gal 79.29+00.46	626
6124	11/06/2009 05:15	Calibration_michael_10-TuneLO-1a	HIFI	Engineering	(no pointing)	940
6127	11/06/2009 05:34	Calibration_michael_10-DBSRasterNoCont-1a	HIFI	HifiMapping	Fake_Uranus	2459
6119	11/06/2009 06:12	Calibration_michael_10-Dipl_cal_vs_D2-4	HIFI	Engineering	(no pointing)	2480
6118	11/06/2009 06:55	Calibration_michael_10-FPG1-4b-1112GHz	HIFI	Engineering	Fake_Jupiter	9698
6126	11/06/2009 09:41	Calibration_michael_10-DBSRasterNoCont-4b	HIFI	HifiMapping	Fake_CarinaN-map-N	3150
6129	11/06/2009 10:30	Calibration_michael_10-TuneLO-2a	HIFI	Engineering	(no pointing)	940
6122	11/06/2009 10:49	Calibration_michael_10-DBSCrossNoCont-2a	HIFI	HifiMapping	Fake_IRC+10216	698
6123	11/06/2009 10:59	Calibration_michael_10-FastDBSCross-2a	HIFI	HifiMapping	Fake_IRC+10216	965
6128	11/06/2009 11:13	Calibration_michael_10-FastDBSRasterNoCont-2a	HIFI	HifiMapping	Fake_IRC+10216	1922
6130	11/06/2009 11:42	Calibration_michael_10-SetIntoStandby_II-OD60	HIFI	Engineering	(no pointing)	25
slew	11/06/2009 12:00	ra="148.95224",dec="24.16846"				

3.3 Operational Day 61

3.3.1 OD-61: Planning Rules

OD-61 main Science Activities (19h):
HIFI Operations.

DTCP-62 Science activities:
SPIRE Cooler Re-cycling during DTCP-62.
HIFI Lasers On.
SPIRE manual commissioning procedures.

3.3.2 OD-61: Schedule in detail

Obs ID	Date (UT)	AOR title	Instrument	Mode	Target name	Total Time (s)
6342	11/06/2009 16:23	HifiEngSetIntoPrimary_RT_Science_OD63	HIFI	Engineering	(no pointing)	7
6343	11/06/2009 16:23	HifiEngSwitchonLO_1a_RT_Science_OD63	HIFI	Engineering	(no pointing)	940
6344	11/06/2009 16:39	HifiEngSetIntoStandby_II_RT_Science_OD63	HIFI	Engineering	(no pointing)	25
6399	11/06/2009 17:00	Calibration_michael_11-SetIntoPrimary-OD63	HIFI	Engineering	(no pointing)	7
6391	11/06/2009 17:00	Calibration_michael_11-IF_FeedBack_Dip-4a	HIFI	Engineering	(no pointing)	3690
6390	11/06/2009 18:01	Calibration_michael_11-Tsys-3a	HIFI	Engineering	(no pointing)	2426
6397	11/06/2009 18:42	Calibration_michael_11-HEB_Spectra_vs_Imix-6b	HIFI	Engineering	(no pointing)	1800
6401	11/06/2009 19:12	Calibration_michael_11-HEB_Spectra_vs_Imix-7a	HIFI	Engineering	(no pointing)	1800
6402	11/06/2009 19:42	Calibration_michael_11-HEB_Spectra_vs_Imix-7b	HIFI	Engineering	(no pointing)	1800
6395	11/06/2009 20:12	Calibration_michael_11-HEB_Spectra_vs_Imix-6a	HIFI	Engineering	(no pointing)	1800
6388	11/06/2009 20:42	Calibration_michael_11-Stab-6a-SYS1	HIFI	Engineering	(no pointing)	1310
6396	11/06/2009 21:22	Calibration_michael_11-SScanFSwitchNoRef-6a	HIFI	HifiFS	Gal 79.29+00.46	9421
6393	11/06/2009 23:57	Calibration_michael_11-SScanFastDBSNoCont-6a	HIFI	HifiFS	Gal 79.29+00.46	13622
6398	12/06/2009 03:41	Calibration_michael_11-TuneLO-3b	HIFI	Engineering	(no pointing)	940
6394	12/06/2009 04:23	Calibration_michael_11-SScanDBSNoCont-3b	HIFI	HifiFS	eta Car	11819
6387	12/06/2009 07:37	Calibration_michael_12-TuneLO-5b	HIFI	Engineering	(no pointing)	943
6392	12/06/2009 07:55	Calibration_michael_11-SScanFSwitchNoRef-5b	HIFI	HifiFS	eta Car	6804
6389	12/06/2009 09:49	Calibration_michael_11-SScanLoadChopNoRef-5b	HIFI	HifiFS	eta Car	5810
6400	12/06/2009 11:25	Calibration_michael_11-SetIntoStandby_II-OD63	HIFI	Engineering	(no pointing)	25
6526	12/06/2009 11:26	Calibration_michael_10-SetIntoStandby_I-OD60	HIFI	Engineering	(no pointing)	11
slew	12/06/2009 12:00	ra="149.75204",dec="23.28865"				

3.4 Operational Day 62

3.4.1 OD-62: Planning Rules

OD-62 main Science Activities (19h):

SPIRE Photometer 16.5h (87%)
SPIRE Custom map 2.5h (13%)

DTCP-63 Science activities:

PACS set to prime.
PACS cooler recycling.
PACS manual commissioning procedures.

3.4.2 OD-62: Schedule in detail

Obs ID	Date (UT)	AOR title	Instrument	Mode	Target name	Total Time (s)
6537	13/06/2009 01:14	Calibration_sovt2_od62_1-SpirePhoto_CalGCO_FovMapFpgScanGen-30YZ	SPIRE	Engineering	No pointing	9072
6540	12/06/2009 12:37	Calibration_sovt2_od62_1-SpireEngCoolerRecycleGen-0000	SPIRE	Engineering	pole 2	162
6541	13/06/2009 04:58	Calibration_sovt2_od62_1-SpirePhotoLargeScanGen-0000	SPIRE	Engineering	No pointing	54
6542	13/06/2009 10:12	Calibration_sovt2_od62_1-SpirePhotoLargeScanGen-0001	SPIRE	Engineering	No pointing	1033
6543	13/06/2009 06:23	Calibration_sovt2_od62_1-SpirePhotoLargeScanGen-0002	SPIRE	Engineering	No pointing	4550
6544	12/06/2009 22:00	Calibration_sovt2_od62_1-SpirePhotoLargeScanGen-0004	SPIRE	Engineering	No pointing	54
6545	12/06/2009 22:51	Calibration_sovt2_od62_1-SpirePhoto_CalGCO_FovMapFpgScanGen-20s-offpos-rel	SPIRE	Engineering	No pointing	54
6546	13/06/2009 07:38	Calibration_sovt2_od62_1-SpirePhotoLargeScanGen-0005	SPIRE	Engineering	1 Ceres	2466
6547	12/06/2009 23:02	Calibration_sovt2_od62_1-SpirePhoto_CalGCO_FovMapCrossR-Seren-S06-notDefau	SPIRE	Engineering	No pointing	54
6548	13/06/2009 08:14	Calibration_sovt2_od62_1-SpirePhotoSmallGen-0000	SPIRE	Engineering	fake beta peg-1	9497
6549	13/06/2009 08:27	Calibration_sovt2_od62_1-SpirePhoto_CalGCO_PhotTransRespoAndDynBeamProfGen-0000	SPIRE	Engineering	No pointing	54
6550	13/06/2009 00:31	Calibration_sovt2_od62_1-SpirePhoto_Cal_BsmAngleCalGen-chop	SPIRE	Engineering	fake new target 2-1	256
6551	12/06/2009 21:49	Calibration_sovt2_od62_1-SpirePhoto_CalGCO_PhotTransRDynBeamP-rate25	SPIRE	Engineering	0, -90-1	2009
6552	13/06/2009 09:59	Calibration_sovt2_od62_1-SpirePhotoSmallGen-0000	SPIRE	SpirePhoto	42355 Typhon-1	601
6553	13/06/2009 10:47	Calibration_sovt2_od62_1-SpireEngPHOT_STBYtoREDYGen-0000	SPIRE	Engineering	No pointing	54
6554	12/06/2009 19:03	Calibration_sovt2_od62_1-SpireEngPcalFlashGen-0000	SPIRE	Engineering	fake CRL 2688-1	605
6555	12/06/2009 16:40	Calibration_sovt2_od62_1-SpireEngPcalFlashGen-0001	SPIRE	Engineering	fake CRL 2688-1-1	2243
6556	12/06/2009 22:39	Calibration_sovt2_od62_1-SPhoto-0001	SPIRE	Engineering	No pointing	54
6557	12/06/2009 18:16	Calibration_sovt2_od62_1-SpireEngPcalFlashGen-0002	SPIRE	Engineering	fake CRL 2688x-1-1-1	598
6558	13/06/2009	Calibration_sovt2_od62_1-SPhoto-0002	SPIRE	Engineering	fake gamma	1847

	05:42				dra-x-1-1	
6559	12/06/2009 21:46	Calibration_sovt2_od62_1-SpireEngPcalFlashGen-0003	SPIRE	Engineering	fake beta peg-1	2596
6560	13/06/2009 09:41	Calibration_sovt2_od62_1-SPhoto-0003	SPIRE	Engineering	fake beta peg-1	1372
6561	12/06/2009 18:15	Calibration_sovt2_od62_1-SpireEngPcalFlashGen-0004	SPIRE	Engineering	fake beta peg-1	2596
6562	13/06/2009 08:38	Calibration_sovt2_od62_1-SPhoto-0004	SPIRE	Engineering	No pointing	36
6563	12/06/2009 22:46	Calibration_sovt2_od62_1-SpireEngPcalFlashGen-0005	SPIRE	Engineering	No pointing	9072
6564	12/06/2009 23:39	Calibration_sovt2_od62_1-SpireEngPcalFlashGen-0006	SPIRE	Engineering	pole 2	162
6565	12/06/2009 18:22	Calibration_sovt2_od62_1-SpirePhoto_Cal_PcalLoadCurveGen-0000	SPIRE	Engineering	fake CRL 2688x-1-1	2495
6566	13/06/2009 05:55	Calibration_sovt2_od62_1-SpirePhoto_Cal_StdLoadCurveGen-0003	SPIRE	SpirePhoto	fake gamma drax2-1-1	547
6567	12/06/2009 19:08	Calibration_sovt2_od62_1-SpirePhoto_CalGCO_FpgInitialPointingGen-0000	SPIRE	Engineering	new target 5	1022
6568	13/06/2009 10:05	Calibration_sovt2_od62_1-SpirePhoto_Cal_IItPcalFlashGen-0000	SPIRE	Engineering	0,90	3355
6569	13/06/2009 08:35	Calibration_sovt2_od62_1-SpirePhoto_Cal_IItPcalFlashGen-0001	SPIRE	Engineering	pole 2	1022
6570	12/06/2009 16:37	Calibration_sovt2_od62_1-SpireEngREDYtoPHOT_STBYGen-0000	SPIRE	Engineering	0,90	1681
6571	12/06/2009 23:56	Calibration_sovt2_od62_1-SpirePhoto_CalGCO_FovMapCrossRasterGen-Seren	SPIRE	Engineering	fake beta pegx-1-1-1	299
6572	12/06/2009 16:41	Calibration_sovt2_od62_1-SpirePhoto_Cal_StdLoadCurveGen-0000	SPIRE	Engineering	fake new target 4-1-1	238
6573	13/06/2009 07:20	Calibration_sovt2_od62_1-SpirePhoto_Cal_StdLoadCurveGen-0001	SPIRE	Engineering	Saturn-1	176
6574	13/06/2009 01:37	Calibration_sovt2_od62_1-SpirePhoto_Cal_BsmAngleCalGen-jiggle	SPIRE	SpirePhoto	Saturn-1	3870
6575	12/06/2009 23:44	Calibration_sovt2_od62_1-SpirePhoto_CalGCO_FovMapFpgScanGen-offset-abs	SPIRE	SpirePhoto	42355 Typhon-1	1249
6576	12/06/2009 17:00	Calibration_sovt2_od62_1-SpirePhoto_Cal_MultiLevelNoiseGen-100Hz	SPIRE	Engineering	42355 Typhon-1	310
6577	13/06/2009 02:21	Calibration_sovt2_od62_1-SpireEngCoolerRecycleGen-0000	SPIRE	Engineering	42355 Typhon-1	176
6578	13/06/2009 02:20	Calibration_sovt2_od62_1-SpireEngPHOT_STBYtoREDYGen-0000	SPIRE	Engineering	1 Ceres	2135
6579	13/06/2009 04:52	Calibration_sovt2_od62_1-SpireEngREDYtoPHOT_STBYGen-0000	SPIRE	Engineering	No pointing	36

3.5 Operational Day 63

3.5.1 OD-63: Planning Rules

OD-63 main Science Activities (19h):

PACS operations.
Burst mode TM.

DTCP-64 Science activities:

PACS/SPIRE parallel cooler recycling.

3.5.2 OD-63: Schedule in detail

Obs ID	Date (UT)	AOR title	Instrument	Mode	Target name	Total Time (s)
6684	13/06/2009 14:37	Calibration_michael_10-SetIntoStandby_II_start-OD62	HIFI	Engineering	(no pointing)	25
6587	13/06/2009 14:37	Calibration_PVSpecSetup_3-PVSpecSetup_na_nStd_coldCS_na_0001	PACS	Engineering	None	356
6590	13/06/2009 14:43	Calibration_PVSpecFlux_2-PVSpecFlux_4310D_nStdDarkCSSimultWarmUp_eng_na_0001	PACS	Engineering	Fake-ISOPHOT Dark Field	11124
6620	13/06/2009 17:48	Calibration_PVSpecSetup_3-PVSpecSetup_na_nStd_orbitepi_na_0002	PACS	Engineering	None	14
6609	13/06/2009 17:48	Calibration_PVPhotCooler_1-PVPhotCooler_117_nStd_na_na_0001	PACS	Engineering	None	9133
6594	13/06/2009 20:21	Calibration_PVPhotSetup_2-PVPhotSetup_na_nStd_orbitpro_na_0002	PACS	Engineering	None	2272
6610	13/06/2009 21:04	Calibration_PVPhotSpatial_1-PVPhotSpatial_314A_NStd_bluM1_AlfBoo_0001	PACS	Engineering	Fake-* alf boo	500
6598	13/06/2009 21:12	Calibration_PVPhotBol_1-PVPhotBol_110A_nStd_VrlVhBlind_na_0001	PACS	Engineering	None	2826
6630	13/06/2009 22:06	Calibration_CPPhotBol_1-CPPhotBol_721A_nStd_firstBackGrd_DarkField_0001	PACS	Engineering	Fake-North empty region	3053
6591	13/06/2009 22:58	Calibration_PVPhotAOTVal_2-PVPhotAOTVal_512G_nStdSmall_30s_NGC6543_0001	PACS	Engineering	Fake-NGC 6543	896
6586	13/06/2009 23:14	Calibration_PVPhotAOTVal_2-PVPhotAOTVal_512G_nStdSmall_60s_NGC6543_0001	PACS	Engineering	Fake-NGC 6543	803
6589	13/06/2009 23:28	Calibration_PVPhotSpatial_1-PVPhotSpatial_313A_StdScan_bluPA90_V814Her_0001	PACS	PacsPhoto	Fake-V814 Her	2707
6618	14/06/2009 00:12	Calibration_PVPhotSpatial_1-PVPhotSpatial_313A_StdScan_bluPA0_V814Her_0001	PACS	PacsPhoto	Fake-V814 Her	5166
6626	14/06/2009 01:37	Calibration_PVPhotAOTVal_2-PVPhotAOTVal_511H_nStdCalB_16rds_hr7001_003	PACS	Engineering	Fake-hr7001	133
6603	14/06/2009 01:39	Calibration_PVPhotAOTVal_2-PVPhotAOTVal_511H_nStdCalB_20rds_hr7001_001	PACS	Engineering	Fake-hr7001	133
6600	14/06/2009 01:42	Calibration_PVPhotAOTVal_2-PVPhotAOTVal_511H_nStdCalB_8rds_hr7001_002	PACS	Engineering	Fake-hr7001	133
6605	14/06/2009 01:44	Calibration_PVPhotAOTVal_2-PVPhotAOTVal_511H_nStdCalB_20rds_hr7001_003	PACS	Engineering	Fake-hr7001	133
6624	14/06/2009 01:46	Calibration_PVPhotAOTVal_2-PVPhotAOTVal_511H_nStdCalB_16rds_hr7001_001	PACS	Engineering	Fake-hr7001	133
6625	14/06/2009 01:48	Calibration_PVPhotAOTVal_2-PVPhotAOTVal_511H_nStdCalB_16rds_hr7001_002	PACS	Engineering	Fake-hr7001	133
6604	14/06/2009 01:51	Calibration_PVPhotAOTVal_2-PVPhotAOTVal_511H_nStdCalB_20rds_hr7001_002	PACS	Engineering	Fake-hr7001	133
6602	14/06/2009 01:53	Calibration_PVPhotAOTVal_2-PVPhotAOTVal_511H_nStdCalB_8rds_hr7001_003	PACS	Engineering	Fake-hr7001	133
6599	14/06/2009 01:55	Calibration_PVPhotAOTVal_2-PVPhotAOTVal_511H_nStdCalB_8rds_hr7001_001	PACS	Engineering	Fake-hr7001	133
6617	14/06/2009 01:58	Calibration_PVPhotAOTVal_2-PVPhotAOTVal_511H_nStdCalB_12rds_hr7001_002	PACS	Engineering	Fake-hr7001	133
6619	14/06/2009 02:00	Calibration_PVPhotAOTVal_2-PVPhotAOTVal_511H_nStdCalB_12rds_hr7001_003	PACS	Engineering	Fake-hr7001	133

6616	14/06/2009 02:02	Calibration_PVPhotAOTVal_2-PVPhotAOTVal_511H_nStdCalB_12rds_hr7001_001	PACS	Engineering	Fake-hr7001	133
6608	14/06/2009 02:07	Calibration_PVPhotAOTVal_2-PVPhotAOTVal_511G_nStdPS_intcal10_blu_HD15008_0001	PACS	Engineering	Fake-HD 15008	1958
6614	14/06/2009 02:40	Calibration_PVPhotAOTVal_2-PVPhotAOTVal_511G_nStdPS_intcal0_grn_HD15008_0001	PACS	Engineering	Fake-HD 15008	1591
6596	14/06/2009 03:10	Calibration_PVPhotSpatial_1-PVPhotSpatial_312A_NStd_blu_Kbin14_0001	PACS	Engineering	Fake-K-band_binary_14	310
6601	14/06/2009 03:16	Calibration_PVPhotSpatial_1-PVPhotSpatial_312B_NStd_blu_Kbin14_0001	PACS	Engineering	Fake-K-band_binary_14	299
6622	14/06/2009 03:25	Calibration_PVPhotBol_1-PVPhotBol_111bisA_nStdRaster_grnInitDrct_Ceres_0001	PACS	Engineering	1 Ceres	11
6595	14/06/2009 03:28	Calibration_PVPhotBol_1-PVPhotBol_111bisA_nStdRaster_grn26Drct_Ceres_0001	PACS	Engineering	1 Ceres	5328
6611	14/06/2009 05:00	Calibration_PVPhotBol_1-PVPhotBol_111bisA_nStdRaster_FinDrct_Ceres_0001	PACS	Engineering	1 Ceres	11
6597	14/06/2009 05:02	Calibration_PVPhotFlux_1-PVPhotFlux_324A_StdPS_hi200Jy_grn_1Ceres_0001	PACS	PacsPhoto	1 Ceres	349
6649	14/06/2009 05:08	SOVT2_ScanMap-7	PACS	PacsPhoto	target3	2765
6650	14/06/2009 05:53	SOVT2_ScanMap-8	PACS	PacsPhoto	target3	1753
6631	14/06/2009 06:19	Calibration_PVPhotSetup_2-PVPhotSetup_na_nStd_orbitepi_na_0002	PACS	Engineering	None	14
6588	14/06/2009 06:19	Calibration_PVSpecSetup_3-PVSpecSetup_na_nStd_orbitpro_short_0001	PACS	Engineering	None	1256
6623	14/06/2009 06:43	Calibration_PVSpecWave_2-PVSpecWave_421A_nStdRS_nochoporderA_Jupiter_0002	PACS	Engineering	Fake-Jupiter Barycenter-Saturn	706
6627	14/06/2009 06:55	Calibration_PVSpecWave_2-PVSpecWave_421A_nStdRS_nochoporderB_Jupiter_0003	PACS	Engineering	Fake-Jupiter Barycenter-Saturn	1015
6628	14/06/2009 07:13	Calibration_PVSpecWave_2-PVSpecWave_421A_nStdRS_nochoporderB_Jupiter_0004	PACS	Engineering	Fake-Jupiter Barycenter-Saturn	428
6606	14/06/2009 07:24	Calibration_PVSpecFlux_2-PVSpecFlux_4310B_nStdFovScan_60-2_DarkField_0001	PACS	Engineering	Fake-ISOPHOT Dark Field	392
6615	14/06/2009 07:31	Calibration_PVSpecFlux_2-PVSpecFlux_4310B_nStdFovScan_60-3_DarkField_0001	PACS	Engineering	Fake-ISOPHOT Dark Field	392
6607	14/06/2009 07:40	Calibration_PVSpecSpatial_3-PVSpecSpatial_411_nStd_9x9RC_00_w75_IRAS22134_0001	PACS	Engineering	Fake-IRAS22134+5834	2171
6612	14/06/2009 08:18	Calibration_PVSpecSpatial_3-PVSpecSpatial_412_nStd_ScaCh45d_00_IRAS22134_0001	PACS	Engineering	Fake-IRAS22134+5834	2930
6592	14/06/2009 09:08	Calibration_PVSpecSpatial_3-PVSpecSpatial_412_nStd_ScaCh135d_00_IRAS22134_0001	PACS	Engineering	Fake-IRAS22134+5834	2930
6629	14/06/2009 09:57	Calibration_CPMechChop_1-CPMechChop_232A_nStd_PidFinetuningShort_na_0002	PACS	Engineering	none	1566
6593	14/06/2009 10:23	Calibration_CPSpecGeGa_1-CPSpecGeGa_na_nStdCuringExplore_SOVT2_na_0001	PACS	Engineering	Fake-ISOPHOT Dark Field	1199
6585	14/06/2009 10:43	Calibration_CPSpecGeGa_1-CPSpecGeGa_na_nStdRespMonitorLoop_SOVT2_na_0001	PACS	Engineering	Fake-ISOPHOT Dark Field	1843
6613	14/06/2009 11:14	Calibration_CPSpecGeGa_1-CPSpecGeGa_na_nStdBufferTransmission_SOVT2_na_0001	PACS	Engineering	Fake-ISOPHOT Dark Field	760
6642	14/06/2009 11:30	PVSpecFlux_431A_nStdSlewCal_20_DarkField_0002	PACS	Engineering	Fake-HIP 21479-1	76
6643	14/06/2009 11:32	PVSpecFlux_431A_nStdSlewCal_20_DarkField_0003	PACS	Engineering	Fake-NGC 6543	76
6655	14/06/2009 11:33	PVSpecFlux_431A_nStdSlewCal_17_DarkField_0003	PACS	Engineering	Fake-NGC6543	94
6661	14/06/2009 11:35	PVSpecFlux_431A_nStdSlewCal_18_DarkField_0002	PACS	Engineering	Fake-NGC6543	72
6660	14/06/2009 11:36	PVSpecFlux_431A_nStdSlewCal_14_DarkField_0003	PACS	Engineering	Fake-NGC 6543	94
6662	14/06/2009 11:38	PVSpecFlux_431A_nStdSlewCal_18_DarkField_0003	PACS	Engineering	Fake-NGC 6543	72
6664	14/06/2009 11:39	PVSpecFlux_431A_nStdSlewCal_21_DarkField_0002	PACS	Engineering	Fake-NGC6543	97
6668	14/06/2009 11:41	PVSpecFlux_431A_nStdSlewCal_15_DarkField_0001	PACS	Engineering	Fake-NGC6543	173
6670	14/06/2009 11:44	PVSpecFlux_431A_nStdSlewCal_15_DarkField_0002	PACS	Engineering	Fake-NGC 6543	173

6674	14/06/2009 11:48	PVSpecFlux_431A_nStdSlewCal_19_DarkField_0003	PACS	Engineering	Fake-CS Dra	94
6663	14/06/2009 11:50	PVSpecFlux_431A_nStdSlewCal_21_DarkField_0001	PACS	Engineering	Fake-CS Dra	97
6665	14/06/2009 11:52	PVSpecFlux_431A_nStdSlewCal_21_DarkField_0003	PACS	Engineering	Fake-CS Dra	97
6621	14/06/2009 11:53	Calibration_PVSpecSetup_3-PVSpecSetup_na_nStd_orbitepi_na_0003	PACS	Engineering	None	14
slew	14/06/2009 12:00	ra="151.32824",dec="21.53446"				

3.6 Operational Day 64

3.6.1 OD-64: Planning Rules

OD-64 main Science Activities (21h):

HIFI 7h (33%)
PACS Photometer 5h (24%)
SPParallel 2h (10%)
SPIRE Photometer 5h (24%)
PACS Spectrometer 2h (10%)

DTCP-65 Science activities:

None.

3.6.2 OD-64: Schedule in detail

Obs ID	Date (UT)	AOR title	Instrument	Mode	Target name	Total Time (s)
6735	14/06/2009 13:41	Calibration_michael_12-SetIntoPrimary-OD64	HIFI	Engineering	(no pointing)	7
6736	14/06/2009 13:41	Calibration_michael_12-TuneLO-1b	HIFI	Engineering	(no pointing)	940
6721	14/06/2009 13:59	Calibration_michael_12-OTFFSwitchNoRef-1b	HIFI	HifiMapping	Fake_Gal 79.29+00.46-1	626
6737	14/06/2009 14:08	Calibration_michael_12-OTF-1b	HIFI	HifiMapping	Fake_Gal 79.29+00.46-1	562
6723	14/06/2009 14:16	Calibration_michael_12-OTFLoadChopNoRef-1b	HIFI	HifiMapping	Fake_Gal 79.29+00.46-1	626
6733	14/06/2009 14:25	Calibration_michael_12-OTFFSwitch-1b	HIFI	HifiMapping	Fake_Gal 79.29+00.46-1	731
6720	14/06/2009 14:34	Calibration_michael_12-Dipl_cal_HotCold-4	HIFI	Engineering	(no pointing)	1537
6730	14/06/2009 15:04	Calibration_michael_12-FPG2-4b-1112GHz	HIFI	Engineering	Saturn-1	1476
6727	14/06/2009 15:36	Calibration_michael_12-FPG2-4b-JupiterMode	HIFI	Engineering	Saturn-1	1825
6725	14/06/2009 16:08	Calibration_michael_12-FPG2-4b-HalfThrow	HIFI	Engineering	Saturn-1	1354
6729	14/06/2009 16:34	Calibration_michael_12-Stability-4b-1091GHz	HIFI	Engineering	fake blank sky	2617
6731	14/06/2009 17:18	Calibration_michael_12-TuneLO-7b	HIFI	Engineering	(no pointing)	965
6724	14/06/2009 17:36	Calibration_michael_12-DBSRasterNoCont-7b	HIFI	HifiMapping	Fake CarinaS-point-IF	3542
6722	14/06/2009 18:33	Calibration_michael_11-TuneLO-5b	HIFI	Engineering	(no pointing)	943
6728	14/06/2009 18:52	Calibration_michael_12-Peakup-5b-1200GHz	HIFI	Engineering	Saturn-1	212
6734	14/06/2009 18:58	Calibration_michael_12-PUFollowUp-5b-1200GHz	HIFI	Engineering	Saturn-1	72
6732	14/06/2009 18:59	Calibration_michael_12-SetIntoStandby_II-OD64	HIFI	Engineering	(no pointing)	25
6726	14/06/2009 18:59	Calibration_michael_12-SetIntoStandby_I-OD64	HIFI	Engineering	(no pointing)	11
6701	14/06/2009 19:29	Calibration_sovt2_parallel_1-SpireEngParallelCoolerRecycleGen-0001	SPParallel	Engineering	no pointing	10350
6752	14/06/2009 22:22	Calibration_PVPhotSetup_2-PVPhotSetup_na_nStd_orbitpro_na_0003	PACS	Engineering	None	2272

6745	14/06/2009 23:04	Calibration_CPPhotFPG_1-CPPhotFPG_261E_StdPS_blu_SAA_CSDra_0002	PACS	PacsPhoto	Fake-CS Dra	338
6772	14/06/2009 23:09	Calibration_CPPhotFPG_1-CPPhotFPG_261E_StdPS_blu_SAA_HIP58225_0002	PACS	PacsPhoto	Fake-HIP 58225	338
6759	14/06/2009 23:13	Calibration_CPPhotFPG_1-CPPhotFPG_261E_StdPS_blu_SAA_HIP67627_0002	PACS	PacsPhoto	Fake-HIP 67627	338
6769	14/06/2009 23:18	Calibration_CPPhotFPG_1-CPPhotFPG_261E_StdPS_blu_SAA_HIP62223_0002	PACS	PacsPhoto	Fake-HIP 62223	338
6762	14/06/2009 23:23	Calibration_CPPhotFPG_1-CPPhotFPG_261E_StdPS_blu_SAA_HIP65006_0002	PACS	PacsPhoto	Fake-HIP 65006	338
6754	14/06/2009 23:28	Calibration_CPPhotFPG_1-CPPhotFPG_261E_StdPS_blu_SAA_PPM102025_0002	PACS	PacsPhoto	Fake-PPM 102025	338
6771	14/06/2009 23:33	Calibration_CPPhotFPG_1-CPPhotFPG_262A_nStdRaster_blu_gypro_HIP21479_0001	PACS	Engineering	fake HIP 21479-1	4828
6703	15/06/2009 00:54	Calibration_sovt2_od64_1-SpireEngREDYtoPHOT_STBYGen-0000	SPIRE	Engineering	No pointing	162
6705	15/06/2009 01:08	Calibration_sovt2_parallel_1-PVParAOTVal_515A_StdParallel_green_fast_betaUMi_nom	SPParallel	SPParallel	beta ursae minoris	2387
6697	15/06/2009 01:51	Calibration_sovt2_parallel_1-PVParAOTVal_515B_StdParallel_blu_slow_ngc6946_ortho	SPParallel	SPParallel	ngc 6946-1	4165
6768	15/06/2009 02:58	Calibration_PVPhotSetup_2-PVPhotSetup_na_nStd_orbitepi_na_0003	PACS	Engineering	None	14
6706	15/06/2009 03:06	Calibration_sovt2_od64_1-SpirePhotoPointJiggleGen-6arcsecOffset	SPIRE	Engineering	1 Ceres	1181
6694	15/06/2009 03:29	Calibration_sovt2_od64_1-SpirePhoto_Cal_IltPcalFlashGen-0000	SPIRE	Engineering	0,90	169
6691	15/06/2009 03:35	Calibration_sovt2_od64_1-SpirePhoto_Cal_PhaseUpGen-70mV-130Hz	SPIRE	Engineering	near 0, 90-1	446
6693	15/06/2009 03:50	Calibration_sovt2_od64_1-SpirePhotoPointJiggleGen-flashPerNod3Rep	SPIRE	Engineering	beta peg-2	1303
6700	15/06/2009 04:12	Calibration_sovt2_od64_1-SpireEngPcalFlashGen-0000	SPIRE	Engineering	No pointing	54
6707	15/06/2009 04:13	Calibration_sovt2_od64_1-SpirePhoto_Cal_PhaseUpGen-5mV-130Hz	SPIRE	Engineering	No pointing	457
6696	15/06/2009 04:30	Calibration_sovt2_od64_1-SpirePhoto_Cal_StdLoadCurveGen-0000	SPIRE	Engineering	Saturn	1033
6692	15/06/2009 04:49	Calibration_sovt2_od64_1-SPhoto-0001-2Rep	SPIRE	SpirePhoto	new target 2-1	1238
6690	15/06/2009 05:30	Calibration_sovt2_od64_1-SPhoto-0000-4Rep	SPIRE	SpirePhoto	beta peg	1703
6695	15/06/2009 06:11	Calibration_sovt2_od64_1-SpirePhoto_Cal_MultiLevelNoiseGen-0000	SPIRE	Engineering	CRL 2688-1	1746
6709	15/06/2009 06:49	Calibration_sovt2_od64_1-SPhoto-0002-AB_60x30_Nom	SPIRE	SpirePhoto	CRL 2688-1	2876
6698	15/06/2009 07:36	Calibration_sovt2_od64_1-SpirePhotoPeakupGen-0000	SPIRE	Engineering	gamma dra-1	166
6699	15/06/2009 07:39	Calibration_sovt2_od64_1-SpirePhotoPointJiggleGen-6arcsecOffset	SPIRE	Engineering	GAMMA DRA	1699
6708	15/06/2009 08:08	Calibration_sovt2_od64_1-SpireEngPHOT_STBYtoREDYGen-0000	SPIRE	Engineering	No pointing	36
6747	15/06/2009 08:08	Calibration_PVSpecSetup_3-PVSpecSetup_na_nStd_orbitpro_na_0002	PACS	Engineering	None	2459
6767	15/06/2009 08:53	Calibration_PVSpecAotVal_1-PVSpecAotVal_522_NStd_WS_no_cal_1_NGC7027_0001	PACS	Engineering	fake ngc7027	400
6773	15/06/2009 09:02	Calibration_PVSpecAotVal_1-PVSpecAotVal_522_NStd_WS_no_cal_2_NGC7027_0001	PACS	Engineering	fake ngc7027	400
6748	15/06/2009 09:10	Calibration_PVSpecAotVal_1-PVSpecAotVal_522_NStd_WS_no_cal_3_NGC7027_0002	PACS	Engineering	fake ngc7027	522
6763	15/06/2009 09:21	Calibration_PVSpecFlux_2-PVSpecFlux_438A_nStdSlewCal_A_DarkField_0001	PACS	Engineering	Fake ISOPHOT Dark Field	130
6744	15/06/2009 09:23	Calibration_PVSpecFlux_2-PVSpecFlux_438A_nStdSlewCal_B_DarkField_0001	PACS	Engineering	Fake ISOPHOT Dark Field	126
6758	15/06/2009 09:25	Calibration_PVSpecFlux_2-PVSpecFlux_438A_nStdQuickFull_CS1_DarkField_0001	PACS	Engineering	Fake ISOPHOT Dark Field	3474
6764	15/06/2009 10:23	Calibration_PVSpecFlux_2-PVSpecFlux_438A_nStdSlewCal_A_DarkField_0002	PACS	Engineering	Fake ISOPHOT	130

					Dark Field	
6746	15/06/2009 10:26	Calibration_PVSpecFlux_2-PVSpecFlux_438A_nStdSlewCal_B_DarkField_0002	PACS	Engineering	Fake ISOPHOT Dark Field	126
6770	15/06/2009 10:28	Calibration_PVSpecFlux_2-PVSpecFlux_438A_nStdQuickFull_CS2_DarkField_0001	PACS	Engineering	Fake ISOPHOT Dark Field	3474
6755	15/06/2009 11:26	Calibration_PVSpecFlux_2-PVSpecFlux_431A_nStdSlewCal_01_DarkField_0001	PACS	Engineering	Fake ISOPHOT Dark Field	94
6765	15/06/2009 11:28	Calibration_PVSpecFlux_2-PVSpecFlux_431A_nStdSlewCal_02_DarkField_0001	PACS	Engineering	Fake ISOPHOT Dark Field	112
6749	15/06/2009 11:30	Calibration_PVSpecFlux_2-PVSpecFlux_431A_nStdSlewCal_03_DarkField_0001	PACS	Engineering	Fake ISOPHOT Dark Field	126
6751	15/06/2009 11:32	Calibration_PVSpecFlux_2-PVSpecFlux_431A_nStdSlewCal_04_DarkField_0001	PACS	Engineering	Fake ISOPHOT Dark Field	72
6756	15/06/2009 11:33	Calibration_PVSpecFlux_2-PVSpecFlux_431A_nStdSlewCal_05_DarkField_0001	PACS	Engineering	Fake ISOPHOT Dark Field	79
6766	15/06/2009 11:34	Calibration_PVSpecFlux_2-PVSpecFlux_431A_nStdSlewCal_06_DarkField_0001	PACS	Engineering	Fake ISOPHOT Dark Field	90
6750	15/06/2009 11:36	Calibration_PVSpecFlux_2-PVSpecFlux_431A_nStdSlewCal_07_DarkField_0001	PACS	Engineering	Fake ISOPHOT Dark Field	126
6753	15/06/2009 11:38	Calibration_PVSpecFlux_2-PVSpecFlux_431A_nStdSlewCal_08_DarkField_0001	PACS	Engineering	Fake ISOPHOT Dark Field	90
6757	15/06/2009 11:40	Calibration_PVSpecFlux_2-PVSpecFlux_431A_nStdSlewCal_09_DarkField_0001	PACS	Engineering	Fake ISOPHOT Dark Field	158
6761	15/06/2009 11:42	Calibration_PVSpecFlux_2-PVSpecFlux_431A_nStdSlewCal_10_DarkField_0001	PACS	Engineering	Fake ISOPHOT Dark Field	104
6760	15/06/2009 11:44	Calibration_PVSpecSetup_3-PVSpecSetup_na_nStd_orbitepi_na_0004	PACS	Engineering	None	14
slew	15/06/2009 12:00	ra="152.10463",dec="20.65805"				

3.7 List of Modes used

The following table summarises all the unique observing modes to be used in SOVT-2.

TBD

4. SOVT-2 – 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 60) preparation (MOC perspective)

The sequence of activities to prepare for the first DTCP (DTCP-60, or OD-60) is the following.

Time	Actor	Action/Event
	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, FCT	S/C configuration completed (according to section 3.3.2) Delete SSMM and CEL after MOC confirmed good time-correlation of MCS AIV will run DHS_START script (in one go) after coordination with MOC
	AIV, FCT	Handover of S/C to MOC
	FCT	TC connection test and AD mode configuration
	FCT	Uplink of MTL-59 and MTL-60
	FCT	Starting SREM Accumulation
	FCT	Define/Enable/Disable DTM for FD
	FCT	Dumps to check S/C configuration (e.g. dump of OBDB for FDT)
11:00z	Everyone	H-SOVT-2 Initial Briefing (at MOC, externals join via telecon)
	AIV or FCT	Last chance to correct S/C configuration
11:55z	MTL	Tx ON by MTL-59 (for start of DTCP-60 at 12:00z)

4.1.1.2 DTCP activities (MOC perspective)

The sequence of DTCP activities for each OD of the SOVT-2 campaign is the following.

DTCP	Actor	Action/Event
11:30z	FCT, AIV	Pass Briefing via NDIU voice loop
11:55z	MTL	**Official AOS:** Tx On by MTL TC (medium TM rate)
	AIV	Switch from umbilical to RF via TTC SCOE
12:00z		**Start DTCP**
	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
	FCT, PIs	5h DTCPs only (DTCP-61/62/63): Manual Commissioning Commanding
14:45z / 16:45z	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
15:00z / 17:00z		**End DTCP**
	FCT, AIV	Disconnect NCTRS TC link and handover of S/C from MOC to AIV
	AIV	Switch from RF back to umbilical
15/17:00:15z	MTL	**Official LOS**: Tx Off by MTL TC (medium TM rate)
16:00z / 18:00z	All Test Managers	Daily Test Telecon: All Test Managers provide quick reports about their test sites. Order of reports: AIV, MOC (FCT, FDT and PIs), HSC, ICCs.

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.

DTCP	*Actor*	*Action/Event*
-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		**Start DTCP**
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		**End DTCP**
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

4.1.3 Science Ground Segment data flow – in more detail

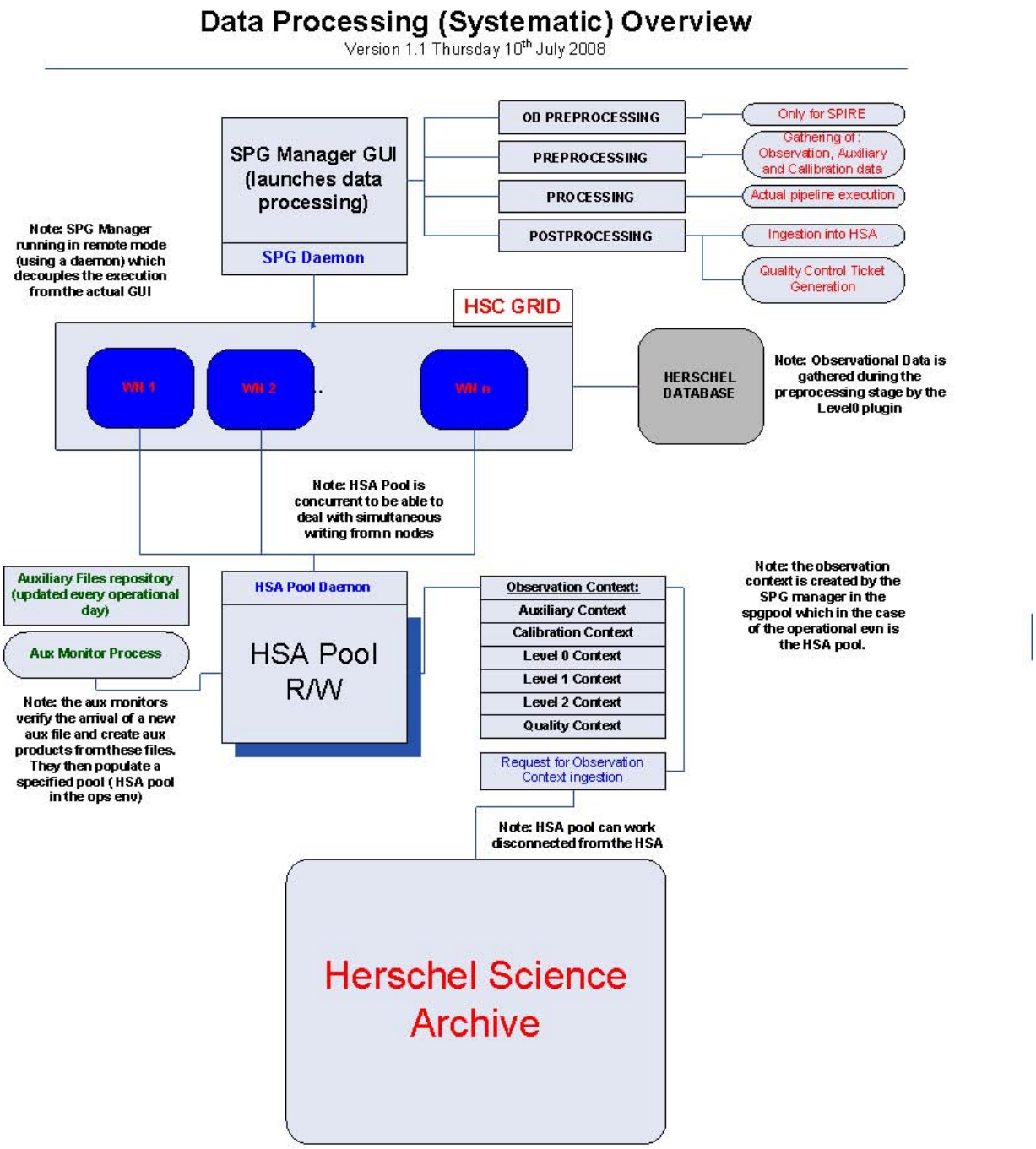
The main "system" data flow from the ground segment perspective is as follows (timings have, in general, been confirmed in SOVT-1):

- 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 TBC (**see Sections 6-8 for a detailed instrument-by-instrument breakdown of plans**).

4.1.4 DP Flow

4.1.4.1 Overview of DP

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



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 was tested successfully in 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.

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:

```
herschel.ia.obs.auxiliary.pointing.PointingProduct
herschel.ia.obs.auxiliary.ool.OolProduct
herschel.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 nigh,t the DPTA will concentrate on checking the products that have been generated and, if necessary, recovery operations for any missing packets.

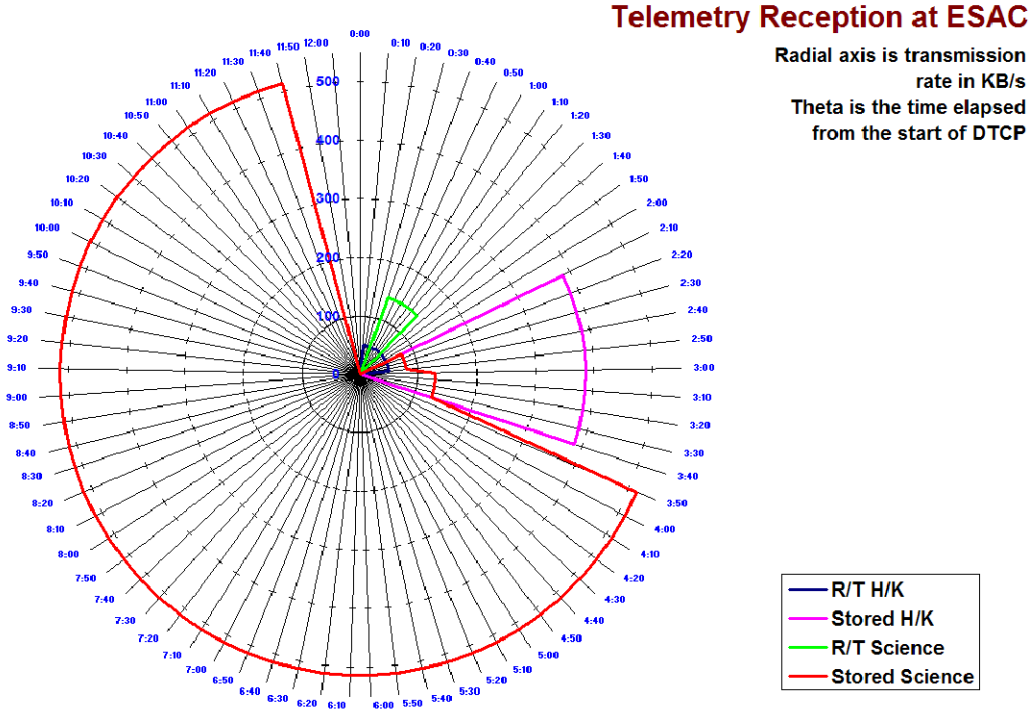
If the pipeline has failed, the various logs that are generated will be examined to locate the cause of the error. In some cases it may be due to a simple glitch in the grid, in which case the pipeline will be re-run manually.

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.

4.2 Ground Segment Data Generation & Transfer – A timing perspective

This section will list all data types to be exchanged/distributed during SOVT-2 and shall define the time of generation & distribution of this data with respect to the DTCP start time of each Operational Day.

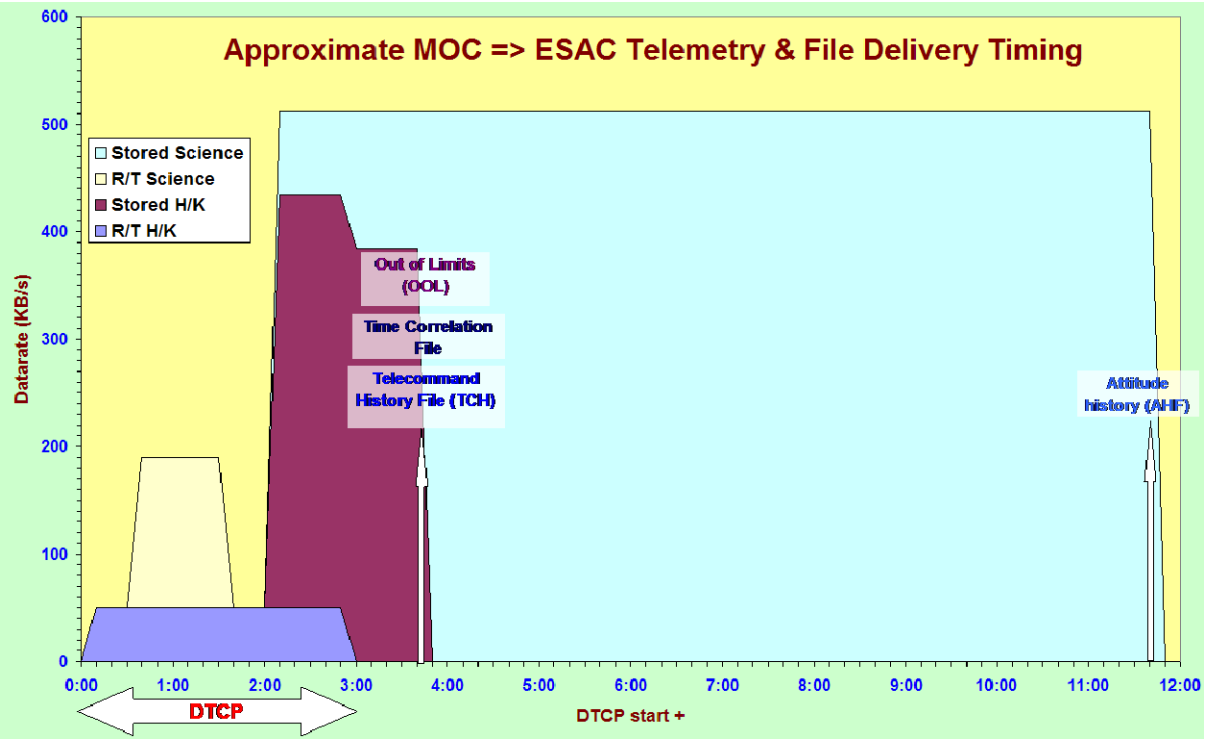
The first shows the approximate flow rate of different types of data into ESAC from the start of DTCP: this was broadly confirmed in SOVT-1, although it was noted that for the HIFI OD in SOVT-1, TM ingest was completed several hours earlier than for PACS. A total bandwidth of 512KB/s is available to 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.



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 and Herschel SOVT-1. Data starts to arrive at ESAC from MOC approximately 40 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 the 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+1h (note that in the future time being used for SOVT-2 local time would be CEST = z + 2h). All science data should thus be delivered by approximately 1am local time at ESAC and will be ready for processing when HSC personal arrive in the morning.

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.

4.3 Preparation for the SOVT-2 - 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 SOVT-2 at the HSC

A final HCSS build for SOVT-2 was made on 14/11/2008. From then on the HCSS was branched with the 0.6.6 branch for SOVT-2 containing additional patches and released as 0.6.6.1, 0.6.6.2 and so on, successively, under close cCCB control. The release note that defines this build and the following builds are, as follows:

This is the current status of the HCSS 0.6.6 user release and the different updates requested on it.

4.4.1 HCSS 0.6.6

This release is conformed by the following builds:

New Style:

HCSS-CORE	308
HCSS-APPS	48
DP-CORE	399
DP-HIFI	226
DP-SPIRE	238
DP-PACS	254

Old Style

HCSS	1805
HIFI	1142
SPIRE	991

4.4.2 HCSS 0.6.6.1 (updates approved on cCCB held on 2008-11-19)

This release is based on 0.6.6 and contains updates for the following SPRS:

- PACS-SPR 1163: Spectro and Photo PPL NameError. Fixed in D_PACS_TOOLBOXES_1_23_2

- HCSS-SPR 5315: ObservationContext should include compulsory metadata. Fixed in D_IA_SPG_2_54_1

- HCSS-SPR 4902: Observation executed flag not set to true. Fixed in D_TCHOOL_1_28_2

This release is conformed by the following builds:

New Style:

HCSS-CORE	308
HCSS-APPS	52
DP-CORE	401
DP-HIFI	231
DP-SPIRE	242
DP-PACS	256

Old Style

HCSS	1809
HIFI	1145
SPIRE	994

4.4.3 HCSS 0.6.6.2 (updates approved at the cCCB held on 2008/11/21 and 2008/11/25)

This release contains the following updates to HCSS 0.6.6.1:

- HCSS-SPR 5014: Context size wrong in ProductRef descriptor. Accepted for implementation. Fix pending implementation.

- HIFI-SPR 1991: Level2pipeline: NameError String. Implemented on D_HIFI_PIPELINE_GENERIC_0_80_1

- HIFI-SPR 1992: AT66 hardcoded dbase setting in FTsuite_new. Fix pending delivery.

- HIFI-SPR 1994: AT66 DiplexerScan fails to run. Fix pending delivery.

- HIFI-SPR 1998: AT66: UnboundLocalError in LO_IV_Analysis(). Fix pending delivery.

- HIFI-SPR 2001: HIFI1toClass. Fix pending delivery.

- HIFI-SPR 2005: wrong BBID in Ivcurve_FT.py. Fix pending delivery.

- HIFI-SPR 2006: HIFI AT: TsysSurveyTask breaks on obsids without hot-cold. Fix pending delivery.

- HIFI-SPR 2007: Chopper Functional Test missing import statement. Fix pending delivery.

- HIFI-SPR 2008: WbsCheckFT.py import problem. Fix pending delivery.

- HIFI-SPR 2009: LO_tuning_tyssurvey acceptance test (0.6.6) fails. Fix pending delivery.

- HIFI-SPR 2012: missing pool definition for accessing HSA products from ICC dbpool. Fix pending delivery.

- HIFI-SPR 2014: WBS export to ASCII fails on 0.6.6. Fix pending delivery.

- HIFI-SPR 2016:. Fix pending delivery.

- HIFI AT066: CompositeStabilityPlot fails with an error. Fix pending delivery.

- HIFI-SPR 2018: import missing in TmRate ?. Fix pending delivery.

- HIFI-SPR 2020: Level 0 plugin fails on fm-ilt data. Fix pending delivery.

The release note for this release, made on November 27th 2008 states:

This update contains the changes approved at the cCCBs held on 2008-11-21 and 2008-11-25:

HIFI-SPR 1738:
- D_HIFI_PIPELINE_WBS_0_115_1
HIFI-SPR 1986:
- D_HIFI_SCRIPTS_USERS_SHARE_0_37_1
HIFI-SPR 1991:
- D_HIFI_PIPELINE_GENERIC_0_80_1
HIFI-SPR 1992:
- D_HIFI_SCRIPTS_USERS_TONY_0_37_1
- D_HIFI_SCRIPTS_USERS_ENGINEERING_0_32_1
HIFI-SPR 1994:
- D_HIFI_SCRIPTS_USERS_ENGINEERING_0_32_1
HIFI-SPR 1998:
- D_HIFI_SCRIPTS_USERS_TONY_0_37_1
- D_HIFI_SCRIPTS_USERS_ENGINEERING_0_32_1
HIFI-SPR 2000:
- D_HIFI_SCRIPTS_USERS_ENGINEERING_0_32_1
HIFI-SPR 2005:
- D_HIFI_SCRIPTS_USERS_ENGINEERING_0_32_1
HIFI-SPR 2006:
- D_HIFI_SCRIPTS_USERS_ENGINEERING_0_32_1
HIFI-SPR 2007:
- D_HIFI_SCRIPTS_USERS_ENGINEERING_0_32_1
HIFI-SPR 2008:
- D_HIFI_SCRIPTS_USERS_ENGINEERING_0_32_1
HIFI-SPR 2009:
- D_HIFI_SCRIPTS_USERS_ENGINEERING_0_32_1
HIFI-SPR 2010:
- D_HIFI_PIPELINE_WBS_0_115_1
HIFI-SPR 2012:
- D_HIFI_RELEASE_ 0_180_1
HIFI-SPR 2014:
- D_HIFI_SCRIPTS_USERS_TONY_0_37_1
HIFI-SPR 2016:
- D_HIFI_SCRIPTS_USERS_VOLKER_0_58_1
HIFI-SPR 2017:
- D_HIFI_SCRIPTS_USERS_SHARE_0_37_1
HIFI-SPR 2018:
- D_HIFI_SCRIPTS_USERS_SHARE_0_37_1
HIFI-SPR 2020:
- D_HIFI_PIPELINE_PRODUCT_0_94_1
HIFI-SPR 2023:
- D_HIFI_PIPELINE_0_89_1
HIFI-SPR 2024:

- D_HIFI_SCRIPTS_USERS_ENGINEERING_0_32_1

HIFI-SPR 2025:
- D_HIFI_PIPELINE_0_89_1

HIFI-SPR 2030:
- D_HIFI_PIPELINE_0_89_1

HIFI-SPR 2031:
- D_HIFI_PIPELINE_0_89_1

HIFI-SPR 2034:
- D_HIFI_SCRIPTS_USERS_ENGINEERING_0_32_1

PACS-SPR 1174
- D_PACS_SPG_200_103_1

PACS-SPR 1175
- D_PACS_TOOLBOXES_1_23_3

PACS-SPR 1184
- D_PACS_SPG_200_103_1

The release consists of:

HCSS-CORE	308
HCSS-APPS	52
DP-CORE	401
DP-HIFI	236
DP-SPIRE	242
DP-PACS	259
HCSS	1809
HIFI	1149
SPIRE	994

4.4.4 HCSS 0.6.6.3 (updates approved at the cCCB held on 2008/11/21 and 2008/11/27)

This release contains the following updates to HCSS 0.6.6.3:

HIFI-SPR 1738:
- D_HIFI_PIPELINE_WBS_0_115_2

HIFI-SPR 1969:
- D_HIFI_PIPELINE_0_89_3

HIFI-SPR 1988:
- D_HIFI_PIPELINE_0_89_3

HIFI-SPR 2026:
- D_HIFI_PIPELINE_PRODUCT_0_94_2

HIFI-SPR 2032:
- D_HIFI_PIPELINE_PRODUCT_0_94_2

HIFI-SPR 2042:
- D_HIFI_PIPELINE_PRODUCT_0_94_2

PACS-SPR 1173:
- D_PACS_SPG_200_103_2

PACS-SPR 1182:
- D_PACS_TOOLBOXES_1_23_5

PACS-SPR 1183:
- D_PACS_SPG_200_103_2

PACS-SPR 1089:

D_PACS_SPG_200_103_2
D_PACS_TOOLBOXES_1_23_4

The release consists of:

HCSS-CORE	308
HCSS-APPS	52
DP-CORE	401
DP-HIFI	239
DP-SPIRE	242
DP-PACS	262
HCSS	1809
HIFI	1152
SPIRE	994

4.4.5 HCSS 0.6.6.4 (updates approved at the cCCB held on 2008/12/02)

The release note for the 0.6.6.4 update for the HCSS software is as follows.

This update contains the changes approved at the cCCBs held on 2008-12-02:

HIFI-SPR 2061:
D_HIFI_PIPELINE_PRODUCT_0_94_3
D_HIFI_SCRIPTS_USERS_VOLKER_0_48_2
HCSS-SCR 4987:
D_TMINGEST_1_122_1
HCSS-SCR 5591:
D_IA_MANUALS_WNEW_0_11_1
HCSS-SPR 5517:
D_IA_GUI_APPS_1_60_1
HCSS-SPR 5487:
D_IA_GUI_APPS_1_60_1
PACS-SPR 1194:
D_PACS_SPG_200_103_4
D_PACS_TOOLBOXES_1_23_6
PACS-SPR 1197:
D_PACS_TOOLBOXES_1_23_6

The release consists of:

HCSS-CORE	308
HCSS-APPS	55
DP-CORE	420
DP-HIFI	245
DP-SPIRE	249
DP-PACS	268
HCSS	1819
HIFI	1157
SPIRE	999

4.4.6 HCSS 0.6.6.5 (updates approved at the cCCB held on 2008/12/05 and 2008/12/07)

The release note for the HCSS 0.6.6.5 release states:

The 0.6.6.5 update for the HCSS software has been released.

This update contains the changes approved at the cCCBs held on 2008-12-05 and 2008-12-07:

PACS-SPR 1200:
D_PACS_SPG_200_103_7

PACS-SPR 1208:
D_PACS_TOOLBOXES_1_23_8

PACS-SPR 1213:
D_PACS_SPG_200_103_7

HCSS-SPR 5614:
D_IA_SPG_2_54_2

HCSS-SPR 5624:
D_IA_DOCUMENT_1_144_1

HCSS-SPR 4955:
D_AUXPROCESSORS_0_40_1

PACS-SPR 1177:
D_PACS_SPG_200_103_7

PACS-SPR 1215:
D_PACS_TOOLBOXES_1_23_8

PACS-SPR 1216:
D_PACS_SPG_200_103_7

HIFI-SPR 2071:
D_HIFI_PIPELINE_GENERIC_0_80_2
D_HIFI_DP_OTF_0_10_1

The release consists of:
HCSS-CORE 308
HCSS-APPS 55
DP-CORE 429
DP-HIFI 250
DP-SPIRE 254
DP-PACS 276
HCSS 1830
HIFI 1164
SPIRE 1006

Please note that the correction of SPR 4955 implies some problems with the storage of the pointing products. In order to avoid the uncertainty on the impact for this problems it was agreed to generate a 0.6.6.6 release

which will effectively be equivalent to 0.6.6.5 without the 4955 patch.

4.4.6 HCSS 0.6.6.6 (updates approved at the cCCB held on 2008/12/11)

4.4.6.1 Overall HCSS Release Note

The 0.6.6.6 update for the HCSS software has been released on Friday December 12th. The release note is as follows:

This update contains the changes approved at the cCCB held on 2008-12-11:

HCSS-SPR 4955:
Rolled back from D_AUXPROCESSORS_0_40_1 to D_AUXPROCESSORS_0_40

The release is consist of:
HCSS-CORE 308
HCSS-APPS 55
DP-CORE 432
DP-HIFI 253
DP-SPIRE 257
DP-PACS 278
HCSS 1831
HIFI 1165
SPIRE 1007

Please note that unless otherwise specified, this will be the baseline to be used during SOVT-2.

4.4.6.2 DP Release Note

In the following web page you can find an installer created for the user release candidate 0.6.6.6 that will be used as baseline for SOVT-2:

http://www.rssd.esa.int/SD-general/Projects/Herschel/hscdt/docsDpInstallInfo.shtml

The builds used for this installer are:

HCSS-CORE 308
HCSS-APPS 55
DP-CORE 432
DP-HIFI 253
DP-SPIRE 257
DP-PACS 278

4.4.7 HCSS 0.6.6.7 and 0.6.6.8 (updates approved at the cCCB held on 2008/12/13 and 2008/12/16)

4.4.7.1 HCSS Release Note (18/12/2008)

The release note for these two versions, issued on 2008/12/18 is, as follows:

The 0.6.6.7 and 0.6.6.8 updates for the HCSS software have been released.

These updates contain the changes approved on cCCBs held on 2008-12-13 and 2008-12-16 respectively:

HCSS - 0.6.6.7:
- PACS-SPR 1239
  D_PACS_SPG_200_103_8

The release consists of:
HCSS-CORE 308
HCSS-APPS 55
DP-CORE 432
DP-HIFI 253
DP-SPIRE 257
DP-PACS 282
HCSS 1831
HIFI 1165
SPIRE 1007

HCSS - 0.6.6.8
- HIFI-SPR 2047
  D_HIFI_PIPELINE_GENERIC_0_80_3
- HIFI-SPR 2066
  D_HIFI_PIPELINE_GENERIC_0_80_3
- HCSS-SPR 5676
  D_AUXPROCESSORS_0_40_2

The release consists of:
HCSS-CORE 308
HCSS-APPS 55
DP-CORE 437
DP-HIFI 257
DP-SPIRE 260
DP-PACS 284
HCSS 1835
HIFI 1169
SPIRE 1011

Please note that, unless otherwise specified, HCSS 0.6.6.8 will be the baseline to be used during SOVT-II from now on.

4.4.7.2 DP disclaimer about 0.6.6.8 release

Following the implementation of SPR-5119 DPAT0: Installer does not include source code HIPE is hitting 1.5 GB, e.g. 0.5 GB more than before. This too big size is basically due to

* HCSS SCR-4402 Builds downloads are holding many duplicates.

* PACS SCR-1117 pacs_spg test-harness data is too massive.

* the size of the PACS calibration products

and maybe

* SPIRE SCR-0799 SPIRE build illegally checks out additional data as part of build.

There are reports that 0.6.6.8 build can't be used for windows 32 bit users. All other operating systems should be OK.

Following the reports that the 0.6.6.8 installer can't be used for windows 32 bit, the urgent SPR-5719 was raised “HIPE hitting 1.5 GB as source code is included: Win 32 bit users can't install”. A decision will be made on December 19th as to whether or not to downgrade this to normal, or to withdraw it against an entry in the FaQ.

5. Ground Segment Procedures required for SOVT-2

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-2.

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 8th) – to be updated with new HFOM release

HERSCHEL-HSC-DOC-0742

[**To be updated with the SOVT-2 release of the HFOM, when available**]

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

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 #
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
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. PACS daily activities during SOVT-2

6.1 Introduction

This chapter defines the test plan and activities to by carried out by the PACS ICC during SOVT-2, 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 (TBC)

6.1.1 PACS software configuration for SOVT-2

6.1.1.1 Software version

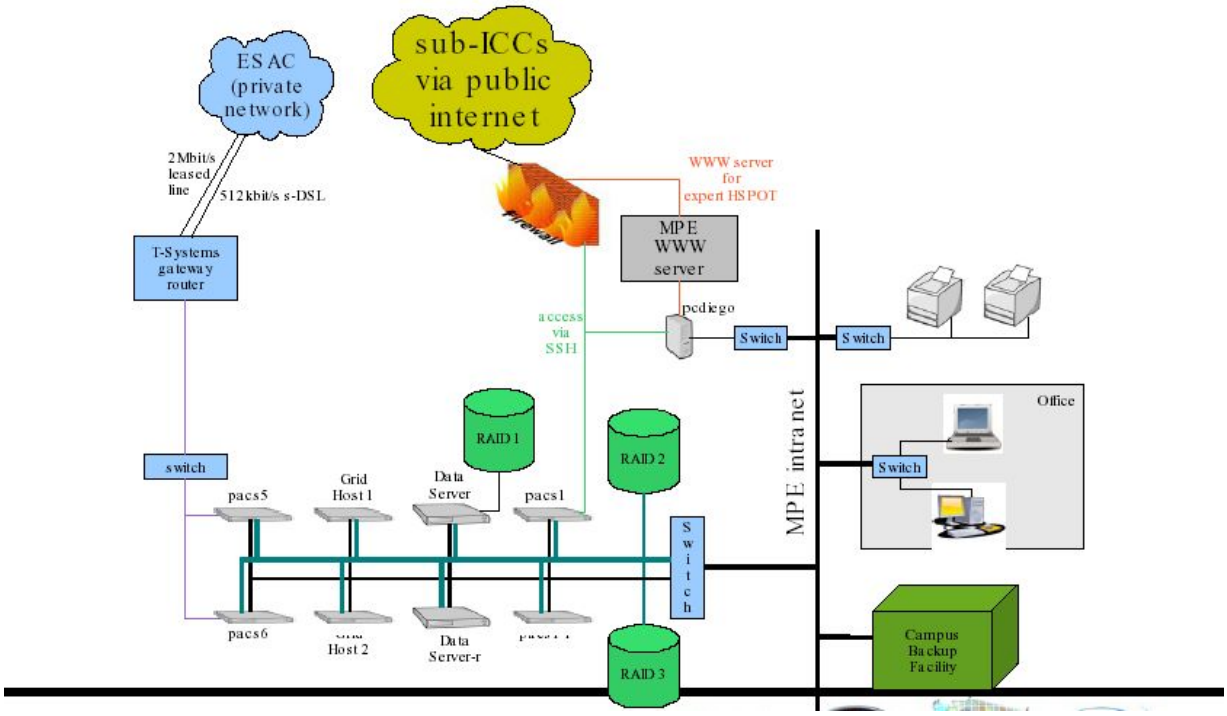
TBW

6.1.1.2 Database

MIB 9.3

6.1.2 PACS hardware configuration for SOVT-2

The PACS Hardware configuration for the SOVT-2 test is shown in the following flow diagram.



The PACS hardware configuration for the SOVT-1 test.

6.2 PACS proposal for SOVT-2 contents

6.2.1 Initial PACS Objectives & Contents plans

The proposed split of time is as follows:

(1) Mechanism control loop optimisation	4h
(2) Spectrometer set-up	6h
(3) Photometer set-up	6h
(4) FOV characterisation	2h
(5) Spectrometer calibration	6h
(6) Photometer calibration	6h
(7) Spectrometer AOT tests	8h
(8) Photometer AOT tests	8h
(9) SPIRE/PACS parallel mode	2h
Total	48h

6.2.2 Allocation of SOVT-2 time to PACS in Activity timeline proposal

6.2.2.1 OD-60

- P_Phot (AOTs) 3h (reserved for pointing calibration)
- SP_Parallel (AOTs) 2h (SPIRE responsibility)
- P_Spec (AOTs) 4h (include line and range dither observations)

6.2.2.2 OD-63

All day PACS

- DTCP with R/T connection: 5h
  - ➔ remaining time with Mission Time Line commanding: 19h
- include PACS burst mode
- Commissioning and Performance Verification Phase observations, i.e.
  - non-standard engineering and calibration observations,
  - calibration observations with standard AOTs
  - non-standard AOT validation
- to test the implementation and the interfaces and
- to get test cases for CP and PV CAP implementation

6.2.2.3 OD-64

- P_Phot (AOTs) 3h (reserved for pointing calibration)
- SP_Parallel (AOTs) 2h (SPIRE responsibility)
- P_Spec (AOTs) 4h (include line and range dither observations)

In essence a repetition of the OD-60 activities, but with some updates achieved by fast re-planning

6.2.3 Proposal for filling the allocated PACS SOVT-2 slots

6.2.3.1 OD-60

6.3.3.1.1 Pointing calibration

- Proposal CPPhotFPG

- Responsibility of B. Altieri and M. Sanchez to define the detailed observations, like initial scan map and refined pointing trim by point source photometry AOTs. ~3.0 h

6.3.3.1.2 Spectrometer set-up with internal CalSources on

- Proposal: PVSpecSetup

- spectrometer set-up with heating internal CalSources
  PVSpecSetup_na_nStd_orbitpro_na_0001 0.5994 h
  status: existing from PV iteration 1, may be modified to
  shorter CS stabilisation time, if spectrometer block follows (0.2511 h)
  immediately the PACS photometer block and they were switched
  off just before and have not yet cooled down much
  responsible: H.Dannerbauer

6.3.3.1.3 Spectrometer AORs:

- Proposal PVSpecAotVal

- standard line scan AOT, dithering, range A
  PVSpecAotVal_521_StdLineChopDither_A_IC4997_0001 0.3822 h
  status: existing from PV iteration 1, but target IC4997 has
  to be replaced by another one
  responsible: C.Jean

- standard line scan AOT, dithering, range B
  PVSpecAotVal_521_StdLineChopDither_B_IC4997_0001 0.3819 h
  status: existing from PV iteration 1, but target IC4997 has
  to be replaced by another one
  responsible: C.Jean

- standard wave switch AOT, range A
  PVSpecAotVal_522_StdLineWaveSwitch_A_NGC6543_0001 0.3578 h
  status: existing from PV iteration 1 (rename 522)
  responsible: C.Jean

- standard wave switch AOT, range B
  PVSpecAotVal_522_StdLineWaveSwitch_B_NGC6543_0001 0.3575 h
  status: existing from PV iteration 1 (rename 522)
  responsible: C.Jean

- non-standard wave switch with cal tables, range A, 2x2 raster

PVSpecAotVal_522_nStdLineWaveSwit_A2x2_NGC6543_0001 0.5378 h
status: new (2x2 raster)
responsible: R.Vavrek

- standard range scan fast full range A Nyquist sampling
PVSpecAotVal_523_StdRngAFastFullNyq_NGC7027_0001 0.5486 h
status: new
responsible: R.Vavrek

- standard range scan fast full range B Nyquist sampling
PVSpecAotVal_523_StdRngBFastFullNyq_NGC7027_0001 0.3131 h
status: new
responsible: R.Vavrek

- standard range scan high sampling overlap 3rd order
PVSpecAotVal_523_StdRngHighBlueOverl3O_NGC7027_0001 0.6550 h
status: existing from PV iteration 1 (rename)
responsible: C.Jean

- standard range scan high sampling overlap 2nd order
PVSpecAotVal_523_StdRngHighRedOverl2O_NGC7027_0001 0.2217 h
status: existing from PV iteration 1 (rename)
responsible: C.Jean

6.3.3.1.4 Spectrometer switch-off

Proposal: PVSpecSetup

- spectrometer switch to safe mode
PVSpecSetup_na_nStd_orbitepi_na_0002 0.0036 h
status: existing from PV iteration 1
responsible: H.Dannerbauer

Total time 4.3586 h
(4.0103 h)

6.3.3.2 OD 64

6.3.3.2.1 Pointing calibration

Proposal CPPhotFPG

- responsibility of B. Altieri and M. Sanchez to define the detailed observations, like initial scan map and refined ponting trim by point source photometry AOTs. ~3.0 h

6.3.3.2.2 Spectrometer set-up with internal CalSources on

Proposal: PVSpecSetup

- spectrometer set-up with heating internal CalSources
  PVSpecSetup_na_nStd_orbitpro_na_0003 0.5994 h
  status: existing from PV iteration 1, may be modified to
  shorter CS stabilisation time, if spectrometer block follows (0.2511 h)
  immediatley the PACS photometer block and they were switched
  off just before and have not yet cooled down much
  responsible: H.Dannerbauer

6.3.3.2.3 Spectrometer AORs

Proposal PVSpecAotVal

- standard line scan AOT, dithering, range A
  PVSpecAotVal_521_StdLineChopDither_A_IC4997_0004 0.3822 h
  status: copy existing 0001 from PV iteration 1,
  target IC4997 has to be replaced by another one
  responsible: C.Jean

- standard line scan AOT, dithering, range B
  PVSpecAotVal_521_StdLineChopDither_B_IC4997_0004 0.3819 h
  status: copy existing 0001 from PV iteration 1,
  target IC4997 has to be replaced by another one
  responsible: C.Jean

- standard wave switch AOT, range A
  PVSpecAotVal_522_StdLineWaveSwitch_A_NGC6543_0004 0.3578 h
  status: copy existing 0001 from PV iteration 1 (rename 522)
  responsible: C.Jean

- standard wave switch AOT, range B
  PVSpecAotVal_522_StdLineWaveSwitch_B_NGC6543_0004 0.3575 h
  status: copy existing 0001 from PV iteration 1 (rename 522)
  responsible: C.Jean

- non-standard wave switch with cal tables, range A, 2x2 raster
  PVSpecAotVal_522_nStdLineWaveSwit_A2x2_NGC6543_0002 0.5378 h
  status: new (2x2 raster)
  will change cal file with the capacitor setting
  for blue detector for re-delivery
  responsible: R.Vavrek

- standard range scan fast full range A Nyquist sampling
  PVSpecAotVal_523_StdRngAFastFullNyq_NGC7027_0002 0.5486 h
  status: new
  responsible: R.Vavrek

- standard range scan fast full range B Nyquist sampling
  PVSpecAotVal_523_StdRngBFastFullNyq_NGC7027_0002 0.3131 h
  status: new
  responsible: R.Vavrek

- standard range scan high sampling overlap 3rd order
  PVSpecAotVal_523_StdRngHighBlueOverl3O_NGC7027_0002 0.6550 h
  status: copy existing 0001 from PV iteration 1 (rename)
  responsible: C.Jean

- standard range scan high sampling overlap 2nd order
  PVSpecAotVal_523_StdRngHighRedOverl2O_NGC7027_0002 0.2217 h
  status: copy existing 0001 from PV iteration 1 (rename)
  responsible: C.Jean

6.3.3.2.4 Spectrometer switch-off

Proposal: PVSpecSetup

- spectrometer switch to safe mode
  PVSpecSetup_na_nStd_orbitepi_na_0003 0.0036 h
  status: existing from PV iteration 1
  responsible: H.Dannerbauer

  total time 4.3586 h
  (4.0103 h)

6.3.3.3 OD 63

6.3.3.3.1 DTCP period

- Manual commanding, parameter update for

  - chopper and grating mechanism tuning 2.3 h
    to be coordinated with MOC activities

- Photometer cooler re-cycling

Proposal: PVPhotCooler

- standard cooler re-cycling (elongated by 15min)
  PVPhotCooler_117_nStd_na_na_0001 2.6194 h
  status: update of PV iteration 1
  responsible: K.Okumura
  data dump from OD60 in parallel?

  total time 5.0 h

6.3.3.3.2 Non-DTCP period

- Spectrometer set-up with internal CalSources off!

Proposal: PVSpecSetup

- spectrometer set-up without heating internal CalSources
  for subsequent dark measurement
  PVSpecSetup_na_nStd_orbitproCSoff_na_0001 0.0994 h
  status: existing from PV iteration 1
  responsible: H.Dannerbauer

- Spectrometer dark and straylight assessment

Proposal: PVSpecFlux

- spectrometer dark configurations including blank position
  of filter wheel and including heat up phase of CSs
  PVSpecFlux_..... 3.0 h
  design as engineering observation, so that it can be
  moved into the DTCP period to exchange with cooler re-cycling
  if this should become necessary
  status: new
  responsible: P.Royer

- Spectrometer switch-off

Proposal: PVSpecSetup

- spectrometer switch to safe mode
  PVSpecSetup_na_nStd_orbitepi_na_0001 0.0036 h
  status: existing from PV iteration 1
  responsible: H.Dannerbauer

Total time spent for spectrometer operations I 3.1030 h
(without slew times)

- Photometer set-up

Proposal: PVPhotSetup

- photometer set-up with heating internal CalSources
  PVPhotSetup_na_nStd_orbitpro_na_0001 (0.5472 h)
  status: existing from PV iteration 1, may be modified to
  shorter CS stabilisation time, since they were switched off 0.2511 h
  responsible: K.Okumura

- PV Phase VRL-VH_Blind exploration

Proposal: PVPhotBol

- VRL-VH_BLIND exploration
  PVPhotBol_110A_nStd_VrlVhBlind_na_0001 0.7911 h
  status: existing from PV iteration 1
  responsible: K.Okumura

- CP telescope background check

Proposal: CPPhotBol

- telescope background check
  CPPhotBol_721A_nStd_firstBackGrd_DarkField_0001 0.6658 h
  status: prepared
  responsible: K.Okumura

- PV Phase bias optimisation high gain

Proposal: PVPhotBol

- optimum detector bias settings in direct mode
  PVPhotBol_111bisA_nStdRaster_grnInitDrct_Palla_0001 0.0364 h
  PVPhotBol_111bisA_nStdRaster_grnNNDrct_Palla_0001 1.4817 h
  PVPhotBol_111bisA_nStdRaster_FinDrct_Palla_0001 0.0364 h
  status: existing from PV iteration 1, but target Pallas has to be replaced by another one
  select for NN nominal bias for ground observations
  responsible: K.Okumura

- PV Phase FOV calibration photometer

Proposal: PVPhotSpatial

- FOV scan with Calibration Source on nominal temperature
  PVPhotSpatial_317B_nStdFOV_CSnom_DarkField_0001 0.5214 h
  status: existing from PV iteration 1
  responsible: T.Müller

- PV Phase photometer FOV distortion calibration

Proposal: PVPhotSpatial

- orthogonal scan maps, chopper on optical zero
  PVPhotSpatial_313A_StdScan_bluPA0_AlfHer_0001 1.4353 h
  PVPhotSpatial_313A_StdScan_bluPA90_AlfHer_0001 0.7519 h
  status: existing from PV iteration 1, but target Alf Her has to be replaced by another one
  responsible: D.Lutz

- PV Phase photometer linearity calibration

Proposal: PVPhotFlux

- point source AOT on flux grid standard
  PVPhotFlux_324A_StdPS_hi10Jy_red_Mrk231_0001 0.0942 h
  status: existing from PV iteration 1
  responsible: M.Nielbock

- PV Phase photometer AOT validation

Proposal: PVPhotAOTVal

- non-standard point source photometry, variation of chopper frequency

PVPhotAOTVal_511D_nStdPS_hiHz_blu_delDra_0001	0.1308 h
PVPhotAOTVal_511D_nStdPS_lowHz_blu_delDra_0001	0.1375 h
PVPhotAOTVal_511D_nStdPS_normHz_blu_delDra_0001	0.1325 h

status: existing from PV iteration 1, but target eps Lep has been replaced by target del Dra
responsible: M.Nielbock

- non-standard point source photometry, internal hold time concept

PVPhotAOTVal_511G_nStdPS_intcal0_grn_HD15008_0001	0.4417 h
PVPhotAOTVal_511G_nStdPS_intcal10_blu_HD15008_0001	0.5444 h

status: existing from PV iteration 1
responsible: M.Nielbock

- non-standard small source photometry, variation of nodding frequency

PVPhotAOTVal_512G_nStdSmall_10s_NGC6543_0001	0.4444 h
PVPhotAOTVal_512G_nStdSmall_30s_NGC6543_0001	0.2489 h
PVPhotAOTVal_512G_nStdSmall_60s_NGC6543_0001	0.2225 h

- Photometer switch-off

Proposal: PVPhotSetup

- photometer switch to safe mode

PVSpecSetup_na_nStd_orbitepi_na_0001	0.0036 h

status: existing from PV iteration 1
responsible: K.Okumura

total time spent for photometer operation (without slew times and cooler re-cycling)	8.3716 h

- Spectrometer set-up with internal CalSources on

Proposal: PVSpecSetup

- spectrometer set-up with heating internal CalSources

PVSpecSetup_na_nStd_orbitpro_na_0002	(0.5994 h)
status: existing from PV iteration 1, may be modified to shorter CS stabilisation time, since they were switched off just before and have not yet cooled down much	0.2511 h

responsible: H.Dannerbauer

- CP curing scenarios

Proposal: CPSpecGeGa

- soft stimulator flashes
  CPSpecGeGa_.... 0.33 h
  status: new (existing)
  responsible: P.Royer

- CP Ge:Ga responsivity monitoring

Proposal: CPSpecGeGa

- responsivitity monitoring for optimum
  (U_bias, t_int, C_int) setting
  CPSpecGeGa_.... 0.5 h
  status: new (existing)
  responsible: P.Royer

- PV Phase Spectrometer wavelength calibration

Proposal: PVSpecWave

- check-out of Jupiter wavecal procedure, including
  re-setting of bias voltage
  PVSpecWave_421A_nStdRS_nochoporderA_Jupiter_0001 0.1956 h
  PVSpecWave_421A_nStdRS_nochoporderB_Jupiter_0001 0.2808 h
  PVSpecWave_421A_nStdRS_nochoporderB_Jupiter_0002 0.1183 h
  PVSpecWave_421B_nStdCRE_setup_Dummy_0001 0.0025 h
  status: existing from PV iteration 1
  responsible: H.Feuchtgruber

- PV Phase FOV calibration spectrometer

Proposal: PVSpecSpatial

- FOV scan with Calibration Source on nominal temperature
  for two grating positions
  PVSpecSpatial_416B_nStdFovScan_CS50K_DarkField_0001 0.1094 h
  PVSpecSpatial_416B_nStdFovScan_CS50K_DarkField_0005 0.1094 h
  status: existing from PV iteration 1 (rename)
  responsible: J.Blommaert

- PV Phase spectrometer PSF calibration

Proposal: PVSpecSpatial

- chopped 9x9 rasters, 1 chopper position, 1 wavelength
  PVSpecSpatial_413A_nStd9x9RC_00_w55_IRAS22134_0001 0.7106 h
  PVSpecSpatial_413A_nStd9x9RC_00_w90_IRAS22134_0001 0.5978 h
  status: existing from PV iteration 1 (rename),
  but Neptune may be used for SOVT-2 OD!
  responsible: A.Contursi/H.Dannerbauer

- PV Phase spectrometer FOV distortion calibration

Proposal: PVSpecSpatial

- chopped scan maps, 2 orthogonal directions,
  1 chopper position
  PVSpecSpatial_412B_nStdScaCh45d_00_IRAS22134_0001 0.4108 h
  PVSpecSpatial_412B_nStdScaCh135d_00_IRAS22134_0001 0.4108 h
  status: existing from PV iteration 1 (rename)
  responsible: A.Contursi/H.Dannerbauer

- PV Phase spectrometer RSRF calibration

Proposal: PVSpecFlux

- non-standard range scans, highest spectral sampling
  on both calibration sources
  PVSpecFlux_.... 1.0h
  status: new
  responsible: B.Vandenbussche

Total time spent for spectrometer operations II 5.1807 h
(without slew times)

- CP chopper PID fine tuning

Proposal: CPMechChop

- fine tuning of PID parameters (reduced set of full CP routine)
  CPMechChop_232A_nStd_PidFinetuningShort1_na_0001 1.94 h
  status: modification of original measurement
  PidFinetuning_na_0001
  or
  CPMechChop_232A_nStd_PidFinetuningShort1_na_0002 0.43 h
  CPMechChop_231A_nStd_OpenLoopFullRange_na_0001 0.3283 h

  responsible: M.Nielbock

- CP raw data transmission

Proposal: CPSpecGeGa

- staring measurement in buffer transmission mode
  (PACS burst mode)
  CPSpecGeGa_.... 0.15 h
  status: new
  responsible: P.Royer

- Spectrometer switch-off

Proposal: PVSpecSetup

- spectrometer switch to safe mode
  PVSpecSetup_na_nStd_orbitepi_na_0002 0.0036 h

status: existing from PV iteration 1
responsible: H.Dannerbauer

6.3.3.4 Total times SOVT-2 (no slew times included)

OD 63:
Manual commanding: ~2.3h
Cooler re-cycling: 2.6194 h
Mechanisms: ~1.94h
Photometer: 8.3716 h
Spectrometer: 8.2837 h

Total 23.4747 h

OD 60/64:
Photometer AOTs: ~3.0 h + delta(OD64)
Spectrometer AOTs: 3.7556 h + delta(OD64)

(1) Mechanism control loop optimisation	1.9h + 2.3h (manual comm.) = 4.2h
(2) Spectrometer set-up	1.85h
(3) Photometer set-up	4.37h
(4) FOV characterisation	0.74h
(5) Spectrometer calibration	6.73h
(6) Photometer calibration	2.28h
(7) Spectrometer AOT tests	3.76h + delta(OD-64)
(8) Photometer AOT tests	7.58h + delta(OD-64)

Some observations have been multiply counted (e.g. fulfilling calibration and AOT test aspects)

6.4 PACS OD-60 scenario

6.4.1 Introduction

OD60: RT start DTCP at 13:00 CET on Thu, Dec 11, 2008
RT end DTCP at 16:00 CET on Thu, Dec 11, 2008
RT end of OD at 13:00 CET on Fri, Dec 12, 2008
start data dump at 14:00 CET on Fri, Dec 12, 2008 (OD 61)
first data available at HSC and ICCs at 15:00 CET on Fri, Dec 12, 2008
data transfer finished at 01:00 CET on Sat, Dec 13, 2008
start of data analysis by ICCs at 8:00 CET on Sat, Dec 13, 2008 (OD 61)
re-delivery of OD64 data base due at 13:00 CET on Sat, Dec 13, 2008
(OD 62 start)

6.4.2 Task Scenario: Database propagation ESAC --> MPE

Procedure PICC-ME-GP-003
Verification of Data Propagation, PACS IOM 11.3

Team: E. Wieprecht, E. Wiezorrek, S. Osterhage

6.4.3 Task Scenario: Pool propagation (auxiliary data/pointing) ESAC --> MPE

Procedure PICC-ME-GP-004
Team: E. Wieprecht, E. Wiezorrek, S. Osterhage

6.4.4 Task Scenario: Run Pipeline @ICC

Procedure PICC-ME-GP-005 (PACS IOM 4.1, 5.1, 5.2)
Team: E. Wieprecht, J. de Jong, J. Schreiber (at MPIA?)

6.4.5 Task Scenario: Instrument Health Monitoring

Procedure PICC-ME-GP-002 (PACS IOM 4.2, 4.3, 4.5)
Team: H. Feuchtgruber, T. Müller

6.4.6 Task Scenario: Trend analysis on instrument and S/C data

Procedure PICC-ME-GP-007 (PACS IOM 4.4)
Team: T. Müller, S. Osterhage, V. Doublier

6.4.7 Task Scenario: Quality Control of Pipeline Products (standard AOTs)

Procedure ?
IOM ?
Team: P. Popesso, A. Contursi

photometer:
point source AORs
CPPhotFPG_261E_StdPS_blu_SAA_CSDra_0001
CPPhotFPG_261E_StdPS_blu_SAA_HIP56211_0001
CPPhotFPG_261E_StdPS_blu_SAA_HIP58225_0001
CPPhotFPG_261E_StdPS_blu_SAA_HIP57504_0001
CPPhotFPG_261E_StdPS_blu_SAA_HIP67627_0001
CPPhotFPG_261E_StdPS_blu_SAA_HIP62223_0001
CPPhotFPG_261E_StdPS_blu_SAA_HIP56779_0001
CPPhotFPG_261E_StdPS_blu_SAA_HIP65006_0001
CPPhotFPG_261E_StdPS_blu_SAA_HIP58854_0001
CPPhotFPG_261E_StdPS_blu_SAA_PPM102025_0001

spectrometer:
standard line scan AOT, dithering, range A:
PVSpecAotVal_521_StdLineChopDither_A_NGC6302_0001
standard wave switch AOT, range A:
PVSpecAotVal_521_StdLineWaveSwitch_A_NGC6543_0001
standard wave switch AOT, range B:

PVSpecAotVal_521_StdLineWaveSwitch_B_NGC6543_0001
standard range scan fast full range A Nyquist sampling:
PVSpecAotVal_523_StdRngAFastFullNyq_NGC7027_0001
standard range scan fast full range B Nyquist sampling:
PVSpecAotVal_523_StdRngBFastFullNyq_NGC7027_0001
standard range scan high sampling overlap 3rd order:
PVSpecAotVal_523_HighBlueOverlap3rdOrder_NGC7027_1
standard range scan high sampling overlap 2nd order:
PVSpecAotVal_523_HighRedOverlap2ndOrder_NGC7027_1

6.4.8 Task Scenario: Interactive Analysis of Parallel Cooler Recycling for PACS photometer

CAP ? TBW (IOM 5.3)

SpireEngParallelCoolerRecycleGen

1) Verify auxiliary products:
   - check OOL product
   - check missing TM product
   - check mission timeline summary
   - check satellite HK product
2) Verify correct timing of recycler steps
3) Check temperature curves and final achieved cooler temperature

Team: M. Sauvage

6.4.9 Task Scenario: Interactive Analysis of Photometer Pointing Calibration

Spacecraft APE Measurements:
CAP ? TBW (IOM 5.3)

CPPhotFPG_261E_StdPS_blu_SAA_CSDra_0001
CPPhotFPG_261E_StdPS_blu_SAA_HIP56211_0001
CPPhotFPG_261E_StdPS_blu_SAA_HIP58225_0001
CPPhotFPG_261E_StdPS_blu_SAA_HIP57504_0001
CPPhotFPG_261E_StdPS_blu_SAA_HIP67627_0001
CPPhotFPG_261E_StdPS_blu_SAA_HIP62223_0001
CPPhotFPG_261E_StdPS_blu_SAA_HIP56779_0001
CPPhotFPG_261E_StdPS_blu_SAA_HIP65006_0001
CPPhotFPG_261E_StdPS_blu_SAA_HIP58854_0001
CPPhotFPG_261E_StdPS_blu_SAA_PPM102025_0001

1) Verify auxiliary products:
   - check OOL product
   - check missing TM product
   - check mission timeline summary
   - check satellite HK product
   - check pointing product
2) Compare pointing with expected position
3) Calculate sigma of pointing deviation from expected position

4) Prepare input for SIAM update according to HSC procedure ?
(check whether absolute offsets are needed
or delta offsets
check convention: is offset subtracted or added)
5) Test prototype pointing calibration CAP
Team: B. Altieri, M. Sanchez-Portal (at HSC), D. Lutz

SRPE measurement scan mode:
CAP ? TBW (IOM 5.3)

CPPhotFPG_262B_nStdScani45_blu_gypro_HIP21479_0001

1) Verify auxiliary products:
- check OOL product
- check missing TM product
- check mission timeline summary
- check satellite HK product
- check pointing product

2) Compare pointing with expected position
3) Extract information relevant for on-ground gyro propagation
4) Deliver information for on-ground gyro propagation
Team: B. Altieri, M. Sanchez-Portal (at HSC), D. Lutz

6.4.10 Task Scenario: Deliver SIAM Update

Procedure: HSC-PROC-?:
Team: B. Altieri, M. Sanchez-Portal (at HSC)

6.4.11 Task Scenario: Deliver information for on-ground gyro propagation

Procedure: HSC-PROC-?:
Team: B. Altieri, M. Sanchez-Portal (at HSC)

6.4.12 Task Scenario: Interactive Analysis of SPIRE/PACS Parallel Mode

CAP ? TBW (IOM 5.3)

PVParAOTVal_515A_StdParallel_blu_fast_betaUMi_nomin
1) Verify auxiliary products:
- check OOL product
- check missing TM product
- check mission timeline summary
- check satellite HK product
- check pointing product

2) Check scan pattern is as expected
3) Check read-out mode
Team: S. Pezzuto

6.4.13 Task Scenario: Interactive Analysis of Spectrometer AOT Validation

Line Scan AOT
CAP ? TBW (IOM 5.3)

PVSpecAotVal_521_StdLineChopDither_A_NGC6302_0001

1) Verify auxiliary products:
- check OOL product
- check missing TM product
- check mission timeline summary
- check satellite HK product
- check pointing product

2) Check dither pattern is as expected
3) Check grating positions are consistent with line range
Team: C. Jean, J. Blommaert

Wave Switch AOTs
CAP ? TBW (IOM 5.3)

PVSpecAotVal_521_StdLineWaveSwitch_A_NGC6543_0001
PVSpecAotVal_521_StdLineWaveSwitch_B_NGC6543_0001
PVSpecAotVal_522_NStd_WS_no_cal_3_NGC7027_0001

1) Verify auxiliary products:
- check OOL product
- check missing TM product
- check mission timeline summary
- check satellite HK product
- check pointing product

2) Check raster pointings are as expected
3) Check grating positions are as expected
Team: R. Vavrek, D. Fadda et al. (at NHSC)

Range Scan AOTs
CAP ? TBW (IOM 5.3)

PVSpecAotVal_523_StdRngAFastFullNyq_NGC7027_0001
PVSpecAotVal_523_StdRngBFastFullNyq_NGC7027_0001
PVSpecAotVal_523_HighBlueOverlap3rdOrder_NGC7027_1
PVSpecAotVal_523_HighRedOverlap2ndOrder_NGC7027_1

1) Verify auxiliary products:
- check OOL product
- check missing TM product
- check mission timeline summary
- check satellite HK product
- check pointing product

2) Check grating ranges are as expected
Team: R. Vavrek, C. Jean, J. Blommaert, B. Vandenbussche

6.4.14 Task Scenario: Re-delivery of PACS OD64 observations with modified mission configuration

PACS IOM procedures 8.2, 8.4, 8.5, 8.6

identified observation:
PVSpecAotVal_522_NStd_WS_no_cal_3_NGC7027_0002
to be replaced by
PVSpecAotVal_522_NStd_WS_no_cal_3_NGC7027_0003
with changed capacitor setting in CAL file

Team: R. Vavrek, B. Vandenbussche, V. Doublier-Pritchard,
U. Klaas
(actually the delivery will be prepared before start of SOVT-2
on 10/11 Dec because of the short ICC reaction time on
Dec. 13, but the delivery and notification of the delivery
will take place on Dec. 13 before 13:00 CET)

6.5 PACS Manning plan for SOVT-2

The following is the provisional plan for SOVT-2 manning. Please note that names may potentially change as a function of changes to SOVT-2 dates.

6.5.1 1st December 2008

Interface test MOC/ICC@MOC: E. Wiezorrek: ongoing.

6.5.2 OD-60

Remote support only

6.5.3 OD-61

PACS not required operationally.

6.5.4 OD-62

PACS not required operationally.

6.5.5 OD-63

DTCP 63: H. Feuchtgruber, E. Wiezorrek, P. Royer, M. Nielbock, ...

OD 63: remote.

6.5.6 OD-64

DTCP 64: H. Feuchtgruber, E.Wiezorrek

OD 64: remote.

6.5.7 DTCP-65

Remote.

7. SPIRE daily activities during SOVT-2

7.1 Introduction

This chapter defines the activities to be carried out by the SPIRE ICC during SOVT-2. 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/DPTestPlanSOVT-2 (TBC)

7.1.1 SPIRE software configuration for SOVT-2

7.1.1.1 Software version

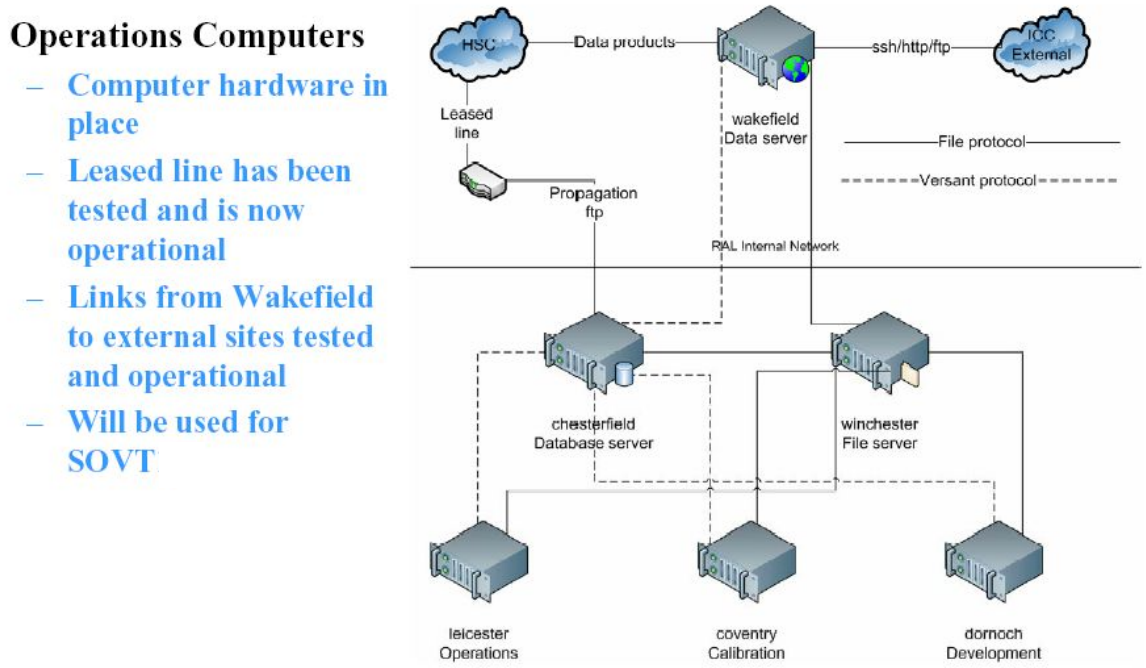
TBC

7.1.1.2 Database

MIB 2.2.H1 PR

7.1.2 SPIRE hardware configuration for SOVT-2

The SPIRE Hardware configuration for the SOVT-2 test is shown in the following flow diagram.



The SPIRE hardware configuration for the SOVT-2 test.

7.2 Planned activities

From a SPIRE perspective SOVT-2 test would like to meet the following test objectives plus some TBD others, in no particular order:

1.) Test the following observation types (this may not be the comprehensive list)

- Practice using MOIS procedures
- Validate CUS scripts to be used in PV phase, in particular those using spacecraft pointing sequences not used in AOTs.
- Test a no-pointing observation
- A real time observation after a cooler recycle.
- Repeat a jiggle map (now with working OBS)
- Parallel mode (now with correct data rate)
- AOTs in expert mode.

2) Feedback of observations done in first day to last day (TBC).

3) FDIR validation

7.3 SPIRE Manning plan for SOVT-2

The following is the provisional plan for SOVT-2 manning. Please note that names may potentially change as a function of changes to SOVT-2 dates.

7.3.1 OD-60

Sunil will travel to ESOC one day before OD 60 to setup the SPIRE PISA.

Sunil will be present to monitor the cooler recycle.

7.3.2 OD-61

Sunil will remain at ESOC but is not required operationally.

7.3.3 OD-62

SPIRE will be present for the whole DTCP and this will be staffed by two SPIRE ICC members, one of which will be Sunil and the other is TBC.

Sunil and the other person will leave following DTCP.

7.3.4 OD-63

SPIRE will not be present at ESOC.

7.3.5 OD-64

SPIRE will not be present at ESOC.

8. HIFI daily activities during SOVT-2

8.1 Introduction

This chapter defines the activities to be carried out by the HIFI ICC during SOVT-2.

8.1.1 HIFI software configuration for SOVT-2

8.1.1.1 Software version

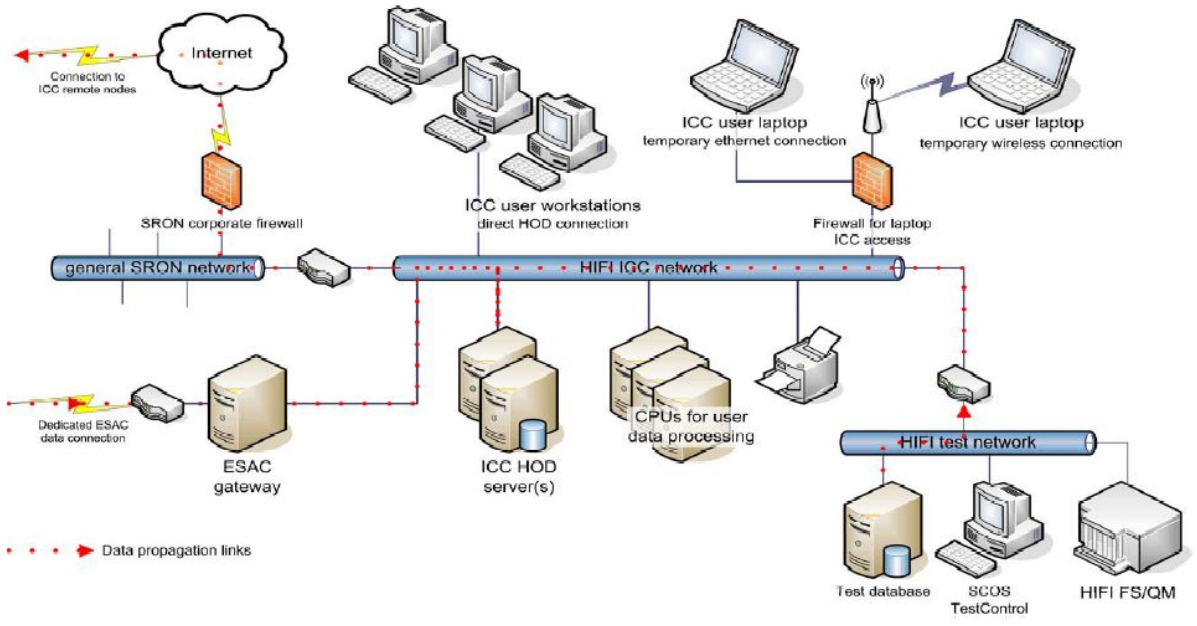
TBC

8.1.1.2 Database

MIB 11.10

8.1.2 HIFI hardware configuration for SOVT-2

The HIFI Hardware configuration for the SOVT-2 test is shown in the following flow diagram.



The HIFI hardware configuration for the SOVT-2 test.

8.2 Planned activities

Below is the list of procedures that HIFI would like to execute during the 5h DTCP of SOVT-2 (for HIFI this

corresponds to OD-63). The following assumptions were made:

- Only the nominal side is tested.
- This list is given in priority order, in other words, it is the preferred order for execution.
- HIFI is found in its standby2 mode when the previous OD ends.

1. Switch HIFI from standby-2 to Primary: H_FCP_HIF_CS2P

2. Chopper response time (1min)

   - H_COP_HIF_NCRT

3. LO functional tests (1h15min)

   - H_COP_HIF_NFL1 (FT LO band 1a)
   - H_COP_HIF_NFL2 (FT LO band 1b)
   - H_COP_HIF_NFL3 (FT LO band 2a)
   - H_COP_HIF_NFL4 (FT LO band 2b)
   - H_COP_HIF_NFL5 (FT LO band 3a)
   - H_COP_HIF_NFL6 (FT LO band 3b)
   - H_COP_HIF_NFL7 (FT LO band 4a)
   - H_COP_HIF_NFL8 (FT LO band 4b)
   - H_COP_HIF_NFL9 (FT LO band 5a)
   - H_COP_HIF_NFLA (FT LO band 5b)
   - H_COP_HIF_NFLB (FT LO band 6a)
   - H_COP_HIF_NFLC (FT LO band 6b)
   - H_COP_HIF_NFLD (FT LO band 7a)
   - H_COP_HIF_NFLE (FT LO band 7b)

4. WBS functional tests (23min)

   - H_COP_HIF_CFWB

5. HRS functional tests (19min)

   - H_COP_HIF_CFHR

6. FPU functional tests (6 min)

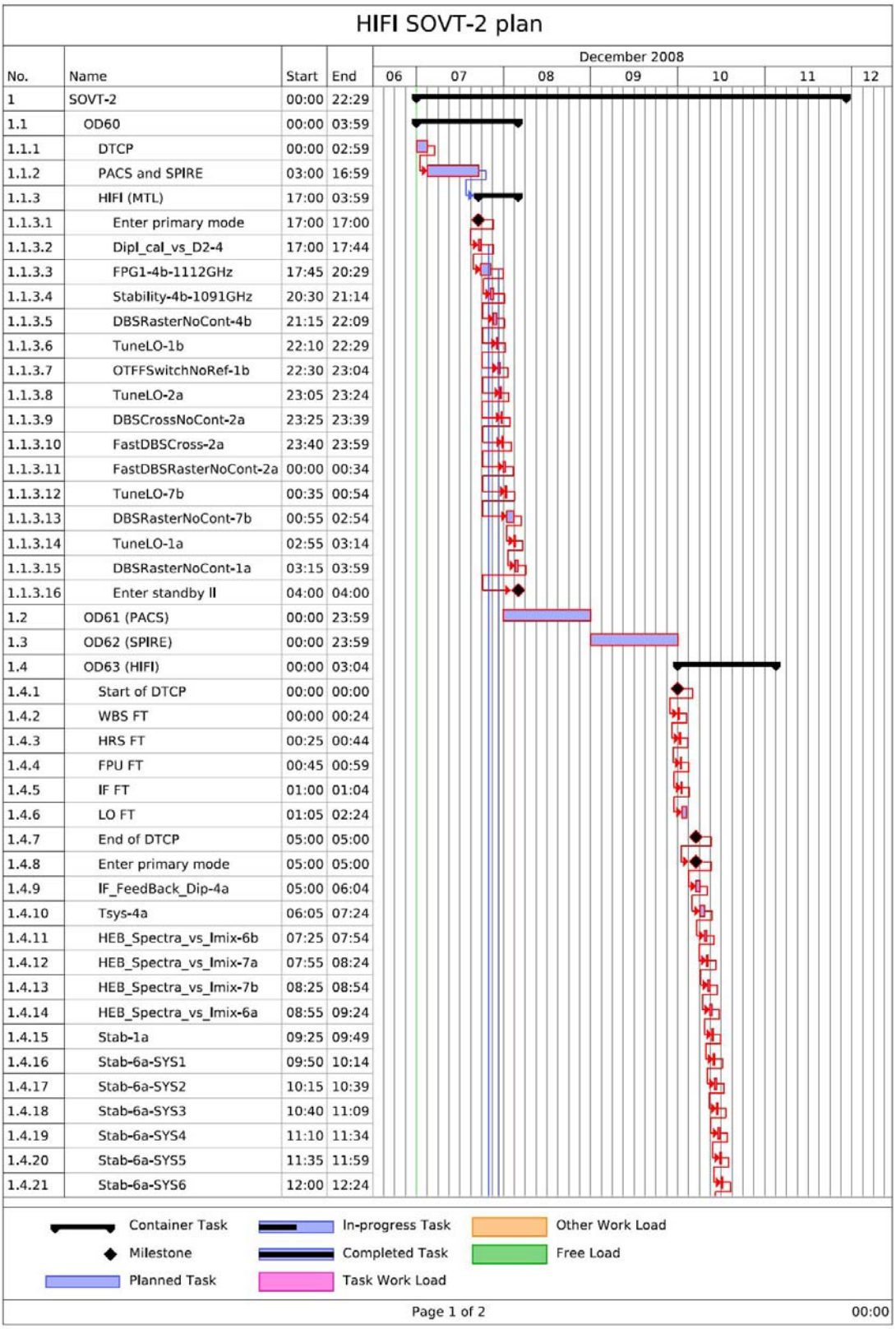
   - H_COP_HIF_NFF8 (FT FPU band 8)
   - H_COP_HIF_NFF1 (FT FPU band 1)
   - H_COP_HIF_NFF2 (FT FPU band 2)
   - H_COP_HIF_NFF3 (FT FPU band 3)
   - H_COP_HIF_NFF4 (FT FPU band 4)
   - H_COP_HIF_NFF5 (FT FPU band 5)
   - H_COP_HIF_NFF6 (FT FPU band 6)
   - H_COP_HIF_NFF7 (FT FPU band 7)

7. IF functional tests (4 min)

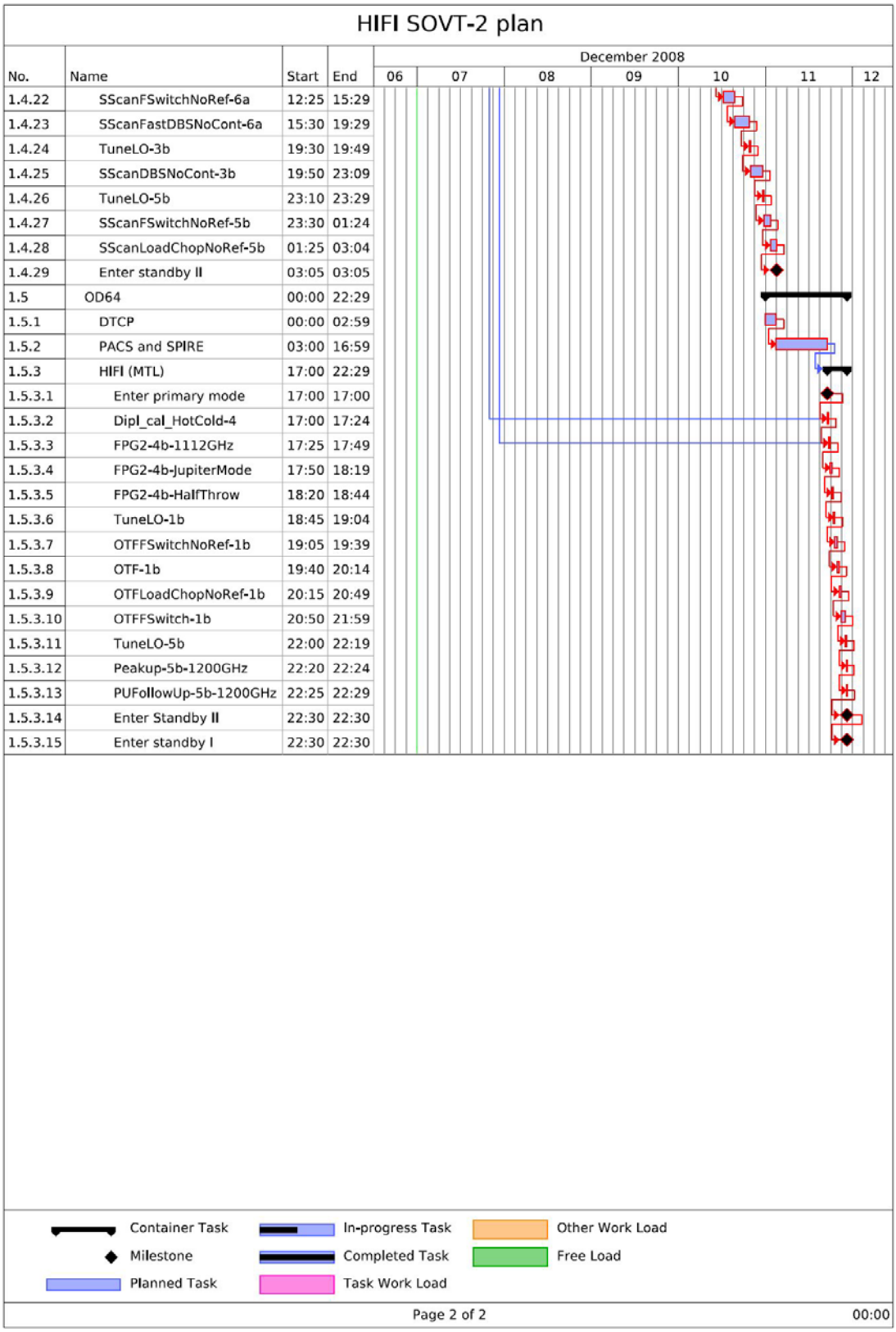
   - H_COP_HIF_IF1 (FT IF band 1)
   - H_COP_HIF_IF2 (FT IF band 2)

- H_COP_HIF_IF3 (FT IF band 3)
- H_COP_HIF_IF4 (FT IF band 4)
- H_COP_HIF_IF5 (FT IF band 5)
- H_COP_HIF_IF6 (FT IF band 6)
- H_COP_HIF_IF7 (FT IF band 7)

8. Switch HIFI from Primary to standby2 (at end of above list, or before DTCP ends): H_FCP_HIF_NPS2



No.	Name	Start	End
1	SOVT-2	00:00	22:29
1.1	OD60	00:00	03:59
1.1.1	DTCP	00:00	02:59
1.1.2	PACS and SPIRE	03:00	16:59
1.1.3	HIFI (MTL)	17:00	03:59
1.1.3.1	Enter primary mode	17:00	17:00
1.1.3.2	DipI_cal_vs_D2-4	17:00	17:44
1.1.3.3	FPG1-4b-1112GHz	17:45	20:29
1.1.3.4	Stability-4b-1091GHz	20:30	21:14
1.1.3.5	DBSRasterNoCont-4b	21:15	22:09
1.1.3.6	TuneLO-1b	22:10	22:29
1.1.3.7	OTFFSwitchNoRef-1b	22:30	23:04
1.1.3.8	TuneLO-2a	23:05	23:24
1.1.3.9	DBSCrossNoCont-2a	23:25	23:39
1.1.3.10	FastDBSCross-2a	23:40	23:59
1.1.3.11	FastDBSRasterNoCont-2a	00:00	00:34
1.1.3.12	TuneLO-7b	00:35	00:54
1.1.3.13	DBSRasterNoCont-7b	00:55	02:54
1.1.3.14	TuneLO-1a	02:55	03:14
1.1.3.15	DBSRasterNoCont-1a	03:15	03:59
1.1.3.16	Enter standby II	04:00	04:00
1.2	OD61 (PACS)	00:00	23:59
1.3	OD62 (SPIRE)	00:00	23:59
1.4	OD63 (HIFI)	00:00	03:04
1.4.1	Start of DTCP	00:00	00:00
1.4.2	WBS FT	00:00	00:24
1.4.3	HRS FT	00:25	00:44
1.4.4	FPU FT	00:45	00:59
1.4.5	IF FT	01:00	01:04
1.4.6	LO FT	01:05	02:24
1.4.7	End of DTCP	05:00	05:00
1.4.8	Enter primary mode	05:00	05:00
1.4.9	IF_FeedBack_Dip-4a	05:00	06:04
1.4.10	Tsys-4a	06:05	07:24
1.4.11	HEB_Spectra_vs_Imix-6b	07:25	07:54
1.4.12	HEB_Spectra_vs_Imix-7a	07:55	08:24
1.4.13	HEB_Spectra_vs_Imix-7b	08:25	08:54
1.4.14	HEB_Spectra_vs_Imix-6a	08:55	09:24
1.4.15	Stab-1a	09:25	09:49
1.4.16	Stab-6a-SYS1	09:50	10:14
1.4.17	Stab-6a-SYS2	10:15	10:39
1.4.18	Stab-6a-SYS3	10:40	11:09
1.4.19	Stab-6a-SYS4	11:10	11:34
1.4.20	Stab-6a-SYS5	11:35	11:59
1.4.21	Stab-6a-SYS6	12:00	12:24



No.	Name	Start	End
1.4.22	SScanFSwitchNoRef-6a	12:25	15:29
1.4.23	SScanFastDBSNoCont-6a	15:30	19:29
1.4.24	TuneLO-3b	19:30	19:49
1.4.25	SScanDBSNoCont-3b	19:50	23:09
1.4.26	TuneLO-5b	23:10	23:29
1.4.27	SScanFSwitchNoRef-5b	23:30	01:24
1.4.28	SScanLoadChopNoRef-5b	01:25	03:04
1.4.29	Enter standby II	03:05	03:05
1.5	OD64	00:00	22:29
1.5.1	DTCP	00:00	02:59
1.5.2	PACS and SPIRE	03:00	16:59
1.5.3	HIFI (MTL)	17:00	22:29
1.5.3.1	Enter primary mode	17:00	17:00
1.5.3.2	DipI_cal_HotCold-4	17:00	17:24
1.5.3.3	FPG2-4b-1112GHz	17:25	17:49
1.5.3.4	FPG2-4b-JupiterMode	17:50	18:19
1.5.3.5	FPG2-4b-HalfThrow	18:20	18:44
1.5.3.6	TuneLO-1b	18:45	19:04
1.5.3.7	OTFFSwitchNoRef-1b	19:05	19:39
1.5.3.8	OTF-1b	19:40	20:14
1.5.3.9	OTFLoadChopNoRef-1b	20:15	20:49
1.5.3.10	OTFFSwitch-1b	20:50	21:59
1.5.3.11	TuneLO-5b	22:00	22:19
1.5.3.12	Peakup-5b-1200GHz	22:20	22:24
1.5.3.13	PUFollowUp-5b-1200GHz	22:25	22:29
1.5.3.14	Enter Standby II	22:30	22:30
1.5.3.15	Enter standby I	22:30	22:30

8.3 HIFI Manning plan for SOVT-2

The following is the provisional HIFI plan for SOVT-2 manning. Please note that names may potentially change as a function of changes to SOVT-2 dates.

8.3.1 OD-60 and OD-61

Nobody at ESOC.

D.Teyssier (ESAC) and A.de Jonge (SRON) travel in the evening of OD-61.

8.3.2 OD-62

D.Teyssier and A.deJonge at ESOC for

1) IA to SRON-G DB for turn-around cycle,

2) CUS update,

3) I-EGSE final check,

4) Briefing

5) To observe the SPIRE manual commanding exercise (as training and preparation for the HIFI manual commanding).

W.Jellema (SRON), W.Laauwen (SRON), HRS rep. (CESR), WBS rep. (KOSMA), LOU rep. (MPIfR), to travel to ESOC that evening.

8.3.3 OD-63

D.Teyssier, A.deJonge, W.Jellema, W.Laauwen, HRS rep., WBS rep., LOU rep. at ESOC

8.3.4 OD-64

Nobody at ESOC.

Personnel travel back (if unable to travel the previous evening). Following the scheme above, The TM from OD-63 is not expected at the ICC before the morning of OD-65.

8.3.5 Rationale and overview

In the above we have assumed that the TM from OD-60 is only available at the ICC on the morning of Day 3 (if Day 1 is when OD-60 starts): this has been concluded in consultation with the System Engineer. The exact names of the HRS, WBS and LOU representative may vary depending on the final dates, but persons have already been identified for the dates as of today's schedule. We'll let you know the names as soon as the schedule stabilises.

On top of this, as previously indicated, there will be no HIFI personnel based at ESTEC during SOVT-2. HIFI instrument health monitoring will be done remotely, as in the SOVT-1, by a team of experts organised on a shift basis.

9. HSC daily activities during SOVT-2

9.1 Introduction

The following figure gives a top-level overview of HSC daily activities during SOVT-2. This time line will be followed for each of the six days of SOVT-2 when there is spacecraft activity. On Day 7 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.

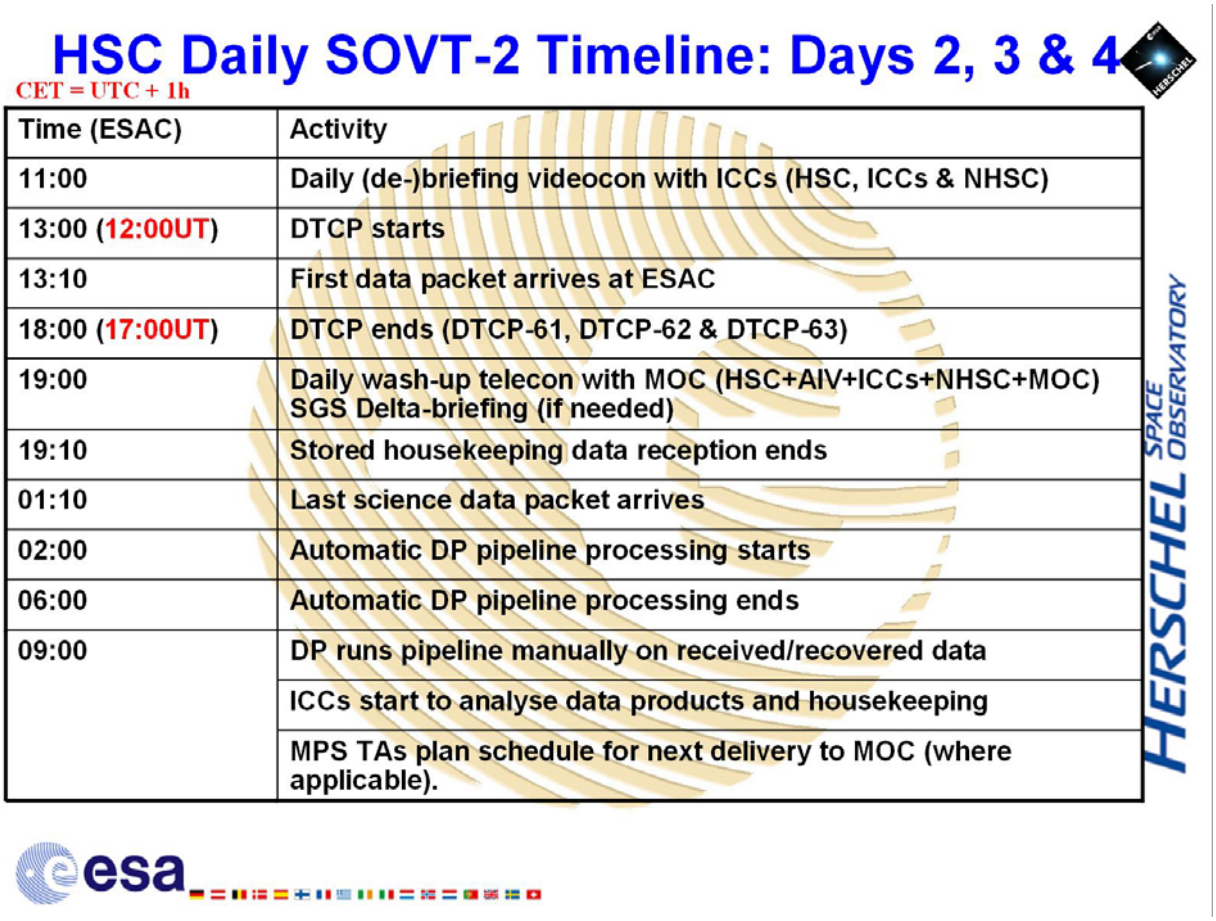
HSC Daily SOVT-2 Timeline: Days 1, 5 & 6

CET = UTC + 1h

Time (ESAC)	Activity
11:00	Daily (de-)briefing videocon with ICCs (HSC, ICCs & NHSC)
13:00 (12:00UT)	DTCP starts
13:10	First data packet arrives at ESAC
16:00 (15:00UT)	DTCP ends (DTCP-60, DTCP-64 & DTCP-65)
17:00	Daily wash-up telecon with MOC (HSC+AIV+ICCs+NHSC+MOC) SGS Delta-briefing (if needed)
19:10	Stored housekeeping data reception ends
01:10	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 (where applicable).

HERSCHEL SPACE OBSERVATORY

esa



Time (ESAC)	Activity
11:00	Daily (de-)briefing videocon with ICCs (HSC, ICCs & NHSC)
13:00 (12:00UT)	DTCP starts
13:10	First data packet arrives at ESAC
18:00 (17:00UT)	DTCP ends (DTCP-61, DTCP-62 & DTCP-63)
19:00	Daily wash-up telecon with MOC (HSC+AIV+ICCs+NHSC+MOC) SGS Delta-briefing (if needed)
19:10	Stored housekeeping data reception ends
01:10	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 (where applicable).

Approximate time lines of HSC activities on Days 1-6 of SOVT-2.

9.2 Critical event timeline in SOVT-2 – HSC Perspective

Relevant timing information for critical events during SOVT-2, is (times are local at HSC):

Spacecraft preparations start:	04:00, December 13th (Saturday)
First DTCP starts:	13:00, December 13th
First data arrives at HSC:	13:40, December 14th (Sunday)
First complete OD data:	01:00, December 15th (Monday)
First DP processing:	02:00, December 15th
Re-plan OD-64	Pm, December 15th (Monday)
HIFI switch-off	23:00, December 17th (Wednesday)
Last DTCP starts	13:00, December 18th
Last DTCP ends	16:00, December 18th
Final MOC wash-up	17:00, December 18th (Thursday)
Final data arrives at HSC	01:00, December 19th
DP "complete"	Pm, December 19th (Friday)

9.3 TM ingest and data propagation activities

The HSC acts as the hub for TM ingest and data propagation to the ICCs. See Section 4 for details.

9.4 Data Processing activities

All science data will go through both automatic and manual pipeline processing and posterior archiving. See Section 4.1.4 for details.

9.5 Coordination activities

The HSC will coordinate SOVT-2 preparations through a series of weekly Videocons with the ICCs. See Section 2.5 for more details

During the execution of SOVT-2 the HSC will organise daily briefings and de-briefings with all the interested parties in the SGS. It will also participate in the wider wash-up telecons organised by MOC. See Section 10 for more details and also the daily timeline of activities at the HSC (above).

9.6 Computer and network Support activities during SOVT-2

9.6.1 Introduction

Given the criticality of the stability of the HSC's computer and network links, the ESAC Computer Support Group will provide full support for the SOVT-2 test, by having personnel on site 24/7 during SOVT-2 and by having further personnel on-call 24/7 outside normal working hours.

9.6.2 Computer Support Group cover

The following Computer Support Group people will be supporting the tests:

- Jose Manuel Blanco (8x7 on-site + 16x7 on-call)

- Daniel Tapiador (8x7 on-site + 16x7 on-call)

- Computer Operators providing 24x7 on-site support.

9.6.3 Additional notes on Computer Support Group cover

- Ruben Álvarez (Computer Support Group Leader) will be coordinating the CSG support (8x7 on-site + 16x7 on-call)

- Currently Daniel Tapiador is in sick-leave. If by the time when SOVT-2 starts he is still in sick-leave

another CSG person will replace him.

9.7 Archive Support activities during SOVT-2

9.7.1 Introduction

Although end-to-end data processing and its subsequent archiving is not a primary objective of SOVT-2, having been tested in SOVT-1, data archiving will occur as a natural part of the DP process and previously untested observing modes will be processed by DP. These activities will start on OD-62 and require support from the ESAC Satellite Archive Team (SAT).

9.7.2 Satellite Archive Team weekend cover

The Satellite Archive Team will be supporting the tests in the following manner, having consulted the needs from DP team and plan to give the following weekend support:

- One person on-site for Saturday December 13th

- One person on-call for Sunday December 14th

The person coming on Saturday could shift it to Sunday in case that Data Processing gets delayed by one day. Otherwise, normal weekday support will be given.

9.8 Community Support daily activities during SOVT-2

9.8.1 Introduction

The aim of SOVT-2 is to simulate, as nearly as possible, daily activities during PV Phase operations. For the HSC Community Support Group this involves:

i) Advanced handling of SOVT-2 deliveries and schedule of the observations contained in these deliveries some time in advance to the SOVT-2 execution;

ii) Re-scheduling of one or more operational days during SOVT-2 execution;

and

iii) a posteriori verification of product ingestion in the Herschel Science Archive and data retrieval.

During the execution of the test, the Community Support Group will exercise all operational procedures as they would be followed in operations.

9.8.2 Planned activities

The aims of SOVT-2 for the Community Support Group are:

1) To plan 5 days of PV Phase operations (ODs 60 to 64), with inputs delivered in advance by all ICCs (calibration observations to be executed) and by MOC (PSFs and orbit files), to simulate and validate uplink activities at the HSC, in preparation for the actual PV Phase operations, including this time some real time science windows in the schedule, and the actual delivery of the generated POS files to MOC.

2) To validate the turn-around times and ground-to-spacecraft feedback mechanisms proposed for PV Phase, in particular those aspects related to the uplink of replanned observations. For this an updated backend will be provided to HSC to allow regeneration & transfer to MOC of the POS file for OD 64, simulating the nominal 6-day PV Phase cycle (shortened to 4-days in the test).

3) To verify the correct ingestion of all products generated during SOVT-2 in the Herschel Science Archive and their accessibility by external users.

4) To validate operational procedures, paying special attention to those which are PV Phase specific (i.e. reception and handling of calibration proposals from ICCs containing detailed timeline of observations corresponding to a given OD).

5) To give the Community Support Group members rigorous and realistic training in PV Phase operations activities.

9.8.3 Community Support weekend cover for emergency MTL re-planning activities

Saturday (December 13th):

Rosario Lorente: on call
TA on call: Álvaro Llorente
TA 1st backup: Fernando Rodríguez
TA 2nd backup: Mar Sierra

Sunday (December 14th):

Rosario Llorente: on call
TA on call: Mar Sierra
TA 1st backup: Fernando Rodríguez
TA 2nd backup: Álvaro Llorente

10. NHSC activities during SOVT-2

10.1 Introduction

The NASA Herschel Science Center (NHSC) has been established by NASA to support to astronomical community based in the USA in its use of the Herschel Space Observatory. As part of its charge to NASA, the NHSC must provide a detailed understanding of the Herschel science instruments, data processing, and the general ground and flight systems. To fulfill, in part, this charge, the NHSC has made close ties with the three Instrument Control Centres and the Herschel Science Centre that includes general support of testing. The test support includes all phases of Herschel ground and flight testing. During SOVT-2, these activities are done in concert with the ICCs and results are reported as part of the ICC support for SOVT-2.

NHSC team members will participate in all SOVT-2 video conferences with HSC and the ICCs.

10.2 NHSC Science Liaison to the HSC

To maintain a direct link with HSC during the Herschel mission, NHSC is providing a full time NHSC HSC Liaison Scientist who will reside in Spain for the extent of the cryogenic mission. At least half the Liaison Scientist's time will be spent on HSC activities under direction of the PS and the HSCOM. SOVT-2 provides an important opportunity for this relatively new member of the Herschel Team to assume his liaison role at HSC and to participate in active testing in an operations-like way.

10.3 NHSC PACS SOVT-2 Activities

The NHSC/PACS group will be on standby during the SOVT-2 to rapidly respond to SxRs. The NHSC/PACS group also has plans to exercise the SOVT-2 data for further pipeline validation, and as an exercise for preparing suitable test data for community Key Program data processing workshops planned in Dec 08/Jan 09 by the HSC and NHSC. The NHSC/PACS group is expected to be responsible for ensuring that SOVT-2 data can be handled by NHSC/PACS developed modules: cubeBuilder and MADmap mapping.

Other activities will depend on need.

10.3.1 NHSC SPIRE SOVT-2 Activities

The NHSC/SPIRE group had the task to look specifically into SPIRE/PACS parallel mode data, PCAL data, and attempt pipeline processing thereof.

Other activities will depend on need.

10.3.2 NHSC HIFI SOVT-1 Activities

For SOVT-2, the NHSC/HIFI group will work on validation of the data produced
from various tests and AORs. This involves inspection of HK, Level 0 product generation, and offline DP with the HIFI pipelines.

Other activities will depend on need.

11. Briefing and reporting procedures during SOVT-2

11.1 Introduction

SOVT-2 is, above all, a large team exercise that tests out all interactions, both human and systems in the SGS. SOVT-2 will test the fast turn-around times and demanding feedback interactions of the PV Phase of spacecraft activities. This makes the rapid flow of accurate information between centres of the maximum interest to all for the effective and efficient execution of SOVT-2. 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-2 the interactions will be facilitated by a series of daily telecon and Videocon briefings and de-briefings. These will be open to all and attendance will be strongly encouraged.

11.1 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-2. 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 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, so this morning briefing cannot be too early in the morning. However this constraint also gives a fundamental incompatibility between the requirements of SPIRE and for NHSC for which a later time slot becomes a start time well after midnight.
- There were too many briefings during SOVT-1. The pressure on groups is reduced by limiting them to as small a number as possible each day.

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

11.1.1 Morning briefing

11.1.1.1 Timing

10:00 UT, 11:00 CET

SPIRE is on GMT (= UT) while the HSC, PACS and HIFI are on CET (UT+1h). Timed to allow the HSC and ICCs to react to overnight events and, in the case of detecting problems, to analyse and resolve them, if possible, but making it as early in the working day for all centres as is practical.

Note that the timing is very bad for the NHSC (UT−7h) as it implies a 03:00am start. It is important that co-location will be possible of NHSC personnel who will then brief personnel at the NHSC.

11.1.1.2 Expected duration

45 minutes (maximum)

11.1.1.3 Frequency

Daily for Days 1-7 of SOVT-2

11.1.1.4 Format

Videocon

11.1.1.5 For whom?

HSC + NHSC + ICCs

11.1.1.6 Purpose

The main daily de-briefing and briefing of planned activities for the new day for all personnel involved in SOVT-2 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-2 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.

This morning briefing will replace the afternoon briefing held in SOVT-1 as the main daily briefing activity and will set-up all participants for the day's activities.

11.1.2 Wash-up with MOC

11.1.2.1 Timing

18:00 UT, 19:00 CET on days with a 5-hour DTCP
16:00 UT, 17:00 CET on days with a 3-hour DTCP

11.1.2.2 Expected duration

60 minutes (maximum)

11.1.2.3 Frequency

Daily for Days 1-6 of SOVT-2

11.1.2.4 Format

Telecon

11.1.2.5 For whom?

HSC + NHSC + ICCs + MOC + Industry

11.1.2.6 Purpose

Formal wash-up with MOC of the day's activities each day when there is a DTCP. Inputs from local de-briefings will be used to brief MOC. It may be necessary to include provision in this telecon for a Delta-Briefing element for HSC, NHSC and ICCs at the end.

Industry will leave the telecon after their segment has finished. MOC will leave the telecon if a Delta-briefing is required.

11.1.3 Local briefings at HSC

11.1.3.1 Timing

To be combined with the main Morning briefing and, in an emergency, the afternoon MOC de-briefing. Where necessary, the HSC team (HSC + SAT + ECSG) may meet 15 minutes ahead of the start of the morning Videocon for local notices.

11.1.3.2 Expected duration

15 minutes (maximum)

11.1.3.3 Frequency

Daily for Days 1-7 of SOVT-1.

No 11:00 briefing will be held on Day 1 of SOVT-2 if the test starts on a weekend.

11.1.3.4 Format

Live in ESAC. Room A-23A (TBC).

11.1.3.5 For whom?

All HSC personnel on duty, plus local supporting groups (ESAC Computer Support, SAT).

11.1.3.6 Purpose

- To inform all personnel working on SOVT-2 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 his or her own work fits into the Big Picture.

12. HSC personnel availability during SOVT-2

12.1 Introduction

Of necessity the nature of SOVT-2 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 may need to be changed at short notice.

12.2 Core working hours on normal working days during SOVT-2

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 de-briefing telecon with MOC at 19:00 on Days 2, 3 and 4 (on Days 1, 5 and 6 the MOC de-briefing will start at 17:00); however, the MOC briefing will normally only be attended by a small sub-set of HSC personnel and will not be a core activity for all HSC personnel.

Thus the core working hours for Contractors for the days of the SOVT-2 test are defined to be:

10:00 – 18:30 CET

For Staff, working under launch campaign rules, the core working hours are

10:00 – 18:30 CET

During normal working days, this band of core hours covers all the time that personnel are required to be present. During the days of the SOVT-2 it is anticipated that the HSC will work on 10/7 principle and that the core hours will be supplemented with up to 2 hours of overtime spread around these times.

12.3 Core working hours at weekends and on Public Holidays during SOVT-2

Full details of HSC staffing levels and overtime requirements may be found in the document "HSC Overtime Requirements for SOVT-2", which will be submitted to ESA Human Resources. The HSC is committed to ensure adequate staffing to support all activities at all times during campaign however, requests for leave from personnel over the Bank Holiday weekend will be respected at the discretion of Team Leaders, provided that all departments remain adequately staffed.

12.3.1 Core weekend and holiday working hours during the execution of SOVT-2

Scheduled spacecraft activities extend into the weekend for SOVT-2. As spacecraft time is precious and extremely limited, special working arrangements will be made to ensure than 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 HSC 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-2. HSC personnel will work the core working hours defined above on these days.

12.3.2 Additional overtime working during SOVT-2

For preparation and also for DP activities after the formal end of SOVT-2, essential core personnel will work or be on call out of core hours to support activities as necessary. Such activities will be approved in advance and compensated with a special remuneration package equivalent to that of a Launch Campaign.

Additional working hours, remunerated as overtime, may be added before or after the core working hours for the SOVT-2 campaign, or may be combined both before and after, up to the limit of approved overtime hours found in the document "HSC Overtime Requirements for SOVT-2"; save in wholly exceptional circumstances this will not amount to more than 2 hours per person per day of the SOVT-2 campaign.

Appendix 1:

Herschel SOVT-2 Meeting Rooms Allocation

(December 09 – December 19 2008)

Issue 4

Day	Room	Time Window	Usage
Wed. Dec.03 to Thu. Dec.18	C74	All day	NHSC David Ardila
Tue. Dec.09	C31	0915 - 1845	Leo SOVT-2
	C74	All day	NHSC David Ardila
	C82	0930 - 1700	Gaia
		1700 - 1930	Leo SOVT-2
	E18	0930 - 1645	Leo SOVT-2
		1645 - 1915	Nienke (Spanish Course - OK)
Wed. Dec.10	C31	0930 - 1030	Leo SOVT-2
		1030 - 1130	Ralf Kholey (Gaia Seminar - OK)
		1130 - 1930	Leo SOVT-2
	C74	All day	NHSC David Ardila
	C82	0930 - 1930	Leo SOVT-2
Thu. Dec.11	C31	1330 - 2000	Leo SOVT-2
	C74	All day	NHSC David Ardila
	C82	0930 - 1930	Leo SOVT-2
	E18	0930 - 1930	Leo SOVT-2
Fri. Dec.12	C31	0930 - 1900	Leo SOVT-2
	C74	All day	NHSC David Ardila
	C82	0930 - 1930	Leo SOVT-2
Sat. Dec.13	C31	0930 - 1900	Leo SOVT-2
	C74	All day	NHSC David Ardila
	C82	0930 - 1930	Leo SOVT-2
Sun. Dec.14	C31	0930 - 1900	Leo SOVT-2
	C74	All day	NHSC David Ardila
	C82	0930 - 1930	Leo SOVT-2

Mon. Dec.15	C31	0930 - 1500	Leo SOVT-2
		1500 - 1800	Pedro GL (OK)
		1800 - 1930	Leo SOVT-2
	C74	All day	NHSC David Ardila
		(traded back 1.5 hrs from Gaia)	
	C82	0930-1030	Julio (DP OK)
		1030-1930	Leo SOVT-2
Tue. Dec.16	B83	0930 - 1300	Leo SOVT-2
	C74	All day	NHSC David Ardila
	C82	1300 - 1930	Leo SOVT-2
	E18	0930 - 1645	Leo SOVT-2
		1645 - 1915	Nienke (Spanish Course - OK)
Wed. Dec.17	B83	0930 - 1930	Leo SOVT-2
	C82	0930 - 1930	Leo SOVT-2
	C74	All day	NHSC David Ardila
Thu. Dec.18	C31	0930 - 1030	Leo SOVT-2
		1030 - 1330	Ruben (OK)
		1330 - 20:00	Ana W. SOVT-2
	C74	All day	NHSC David Ardila
	C82	0930 - 1930	Leo SOVT-2
Fri. Dec.19	C31	0930 - 1930	Leo SOVT-2
	C74	All day	NHSC David Ardila

Appendix 2:

SOVT-2 Activities of the Instrument and Calibration Scientists Team + Contacts.

A.P.Marston, 10 December 2008.

During SOVT-2 the ICS team can be found at the following places doing the following activities.
The group email address is
hscics@sciops.esa.int

Roland Vavrek (rvavrek@sciops.esa.int): PACS instrument and calibration scientist

- Sat. 13/12 – Mon. 15/12 @ MPE, Garching (includes OD64 planning)
- Tues/Wed. 16-17/12 @ MOC (at ICC@MOC)
- Assessment of PACS spectroscopy activities.

Bruno Altieri (baltieri@sciops.esa.int): PACS instrument and calibration scientist

- Mon.-Tues 15-16/12 @MPE, Garching
- Assessment of PACS photometry activities.
- Pointing:
  - Assessment and setup of gyro-propagation observations (including in OD64).
  - PACS SIAM update coordinator and checker (goes to MPS on Mon 15/12 for upload in DTCP of OD63/4).
- Available for PACS photometry issues locally. Quality Control.

Ivan Valtcahanov (ivaltchanov@sciops.esa.int): SPIRE instrument and calibration scientist

- At ESAC throughout
- Assessment of SPIRE photometry and spectroscopy activities.
- Available for SPIRE and SPIRE/PACS (w/Luca) issues locally. Quality Control.

David Teyssier (dteyssier@sciops.esa.int): HIFI instrument and calibration scientist

- At MOC (ICC@MOC – including real time science commanding) Sat 13/12 to Mon. 15/12. Then at ESAC.
- HIFI CUS updates for OD64
- Only available in latter part of the week for HIFI issues. Quality Control.

Luca Conversi (lconversi@sciops.esa.int): SPIRE instrument and calibration scientist

- At RAL for whole week starting Monday 15/12.
- Analysis of SOVT-2 data:
  - PCAL flashes, monitoring/assessment
  - Focal Plane Geometry observations

- Assessment of SPIRE/PACS parallel mode processing.

Bruno Merin (bmerin@sciops.esa.int): DP scientist

- Assessment of Auxiliary Products
- Auxiliary Products report for SOVT-2

Miguel Sanchez Portal (msanchez@sciops.esa.int): Spacecraft scientist

- Assessment of the Herschel Pointing Products – including the use of gyro propagation.
- Oversight of PACS and HIFI SIAM in uplink.
- Pointing products report for SOVT-2.

Anthony Marston (tmarston@sciops.esa.int): Team Lead

- At ESAC all week.
- Coordinator/group rep at reporting sessions.
- Main contact for HIFI issues during SOVT-2. Quality control.