

HERSCHEL TN
***Science Ground Segment Data
Flow Technical Note***

Doc. No: HSCDT-TN052
Issue: Issue 1.2
Date: 18th May 2007
Page: i



HERSCHEL SCIENCE GROUND SEGMENT

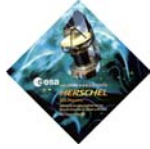
DATA FLOW

HSC TECHNICAL NOTE – HSCDT-TN052

Issue 1.2

18th May 2007

Laurence O'Rourke



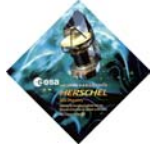
HERSCHEL TN
***Science Ground Segment Data
 Flow Technical Note***

Doc. No: HSCDT-TN052
Issue: Issue 1.2
Date: 18th May 2007
Page: ii

TN STATUS SHEET

1. TN TITLE: Science Ground Segment Data Flow

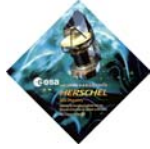
| Current Issue no.. | Date | Change Description |
|--------------------|---------------------------|---|
| 0.5 draft | 25 th July | Inputs received from K.Galloway - Include data delays within the tables Input from T.Lock - Improved readability of the drawings Input from S.Ott - Email 2 nd September Other updates - Inserted SIAM file transfer to the MOC - Changed columns such that ICDs are defined in a single column, Delivery period & Delay are in a single column and file size is in a single column. - Updated Open points section inserting SIAM s/w location at HSC as TBD and defined new open point related to TBC delay times for Auxiliary files - Updated Open points section removing the paragraph concerning the necessity to define the pointing file information. This has been done by M.Sanchez. - Moved all ICC related data transfers to the HSC Internal file generation table - Updated TM packet & TM frame data size values - Moved HSC Internal file generation table to the end - Included SREM data file - Included Space Weather data |
| 1.0 draft C | 8 th September | - Updated taking into account inputs from H.Siddiqui & J.Bakker – email 29 th September - Changed “AUX “subsystem to “TBD” Subsystem to make it clear that this is still an unknown rather than suggesting that there is an already existing subsystem covering it. - Renamed titles of the 4 drawings in the TN - Merged DP software boxes into a single box in the Drawing “Downlink – 1” - Added comments concerning data format which shall be |



HERSCHEL TN
***Science Ground Segment Data
Flow Technical Note***

Doc. No: HSCDT-TN052
Issue: Issue 1.2
Date: 18th May 2007
Page: iii

| | | |
|-----------|----------------------------|---|
| | | <p style="text-align: center;">made available to the astronomer community</p> <p>Other changes</p> <ul style="list-style-type: none"> - SIAM Software has been assigned to within the TBD subsystem, as it is still to be defined where it shall be located. Both text & drawings have been updated with this - Rewrite of the Open issues section to make it clearer - The open issue concerning the mechanism for provision of DP code updates has been removed, as although it will pass through the CCB process, the provision of the updates will follow a process being put into place before launch. - Addition of new file – Quick Look Product – whose definition still remains open |
| 1.0 | 30 th Sept 2005 | <p>Major updates made to the TN based upon the following inputs :</p> <ul style="list-style-type: none"> - Archive RRF & Comms RRF reports clarifying the interface mechanisms - Wishlist Meeting held in ESTEC to discuss major open points from this TN <p>Updates to this issue of TN include therefore :</p> <ul style="list-style-type: none"> - Inclusion of a table of contents - Update of Reference Document list to take into account new interfaces from RD 38 through to RD 43. - Inclusion of an acronym list - Addition of a new subsection defining clarifications to open points from previous issue of TN - Addition of new open issue concerning transfer mechanism of QCR (manual) “xml” files - New drawings showing data flow between SGS - Updates to frequency for time correlation, TC history, TSF & OOL files - Update to data size for time correlation & AHF - |
| 1.1 draft | 23 rd June 06 | <ul style="list-style-type: none"> - Updated drawings to ensure that HCSS contained within ICCs is visible |
| 1.1 issue | 7 th July 06 | <ul style="list-style-type: none"> - Included delivery of Calibration observations from ICCs to the HSC via the HSPOT interface |



HERSCHEL TN
Science Ground Segment Data
Flow Technical Note

Doc. No: HSCDT-TN052
Issue: Issue 1.2
Date: 18th May 2007
Page: iv

| | | |
|-----------|-------------------------|--|
| 1.2 issue | 18 th May 07 | <ul style="list-style-type: none">- Updated the open issues section to reflect status as at issue 1.2- Updated the list of ICDs to reflect changes in interfaces e.g. new SSO file interface with JPL, TSF vs EPOS, FTP & CVS ICDs with ICCs- Updated the MOC & ICC uplink data flow drawings to reflect (a) missing files between HSC & MOC e.g. TPF, EPOS and (b) use of FTP for HSC-ICC data transfer- Updated the data transfer tables as follows:<ul style="list-style-type: none">- FTP instead of FTS interface between HSC & ICCs- Missing TPF file transfer from the ICC to HSC- Missing TSF, EPOS, OEF in MOC-HSC transfer table- Updated CUS Script transfer mechanism to be via CVS- Inserted Calibration observation AORs- Defined data size for SSO Ephem, HSPOT client, EPOS, TSF, Calibration AORs & OEF |
|-----------|-------------------------|--|

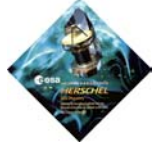
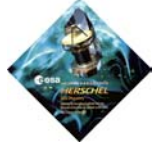
| | | |
|---|---|--|
|  | <p><i>HERSCHEL TN</i></p> <p><i>Science Ground Segment Data Flow Technical Note</i></p> | <p>Doc. No: HSCDT-TN052</p> <p>Issue: Issue 1.2</p> <p>Date: 18th May 2007</p> <p>Page: v</p> |
|---|---|--|

Table of Contents

| | | |
|-----------|---|----|
| 1. | Scope & Contents of This Technical Note | 1 |
| 2. | Applicable & Reference Documentation & Acronym List | 2 |
| 2.1 | Applicable Documents | 2 |
| 2.2 | Reference Documents | 2 |
| 2.3 | Acronym List | 4 |
| 3. | Status of Open Issues & TBDs identified within this document | 6 |
| 3.1 | Open Issues & TBDs in this issue (1.2) of the TN | 6 |
| 3.2 | Open Issues & TBDs from issue 1.0 & 1.1 that are now closed | 8 |
| 4. | Science Ground Segment Uplink & Downlink Drawings | 10 |
| 4.1 | System Drawing A - Uplink Chain (Highlighted part = HSC interactions with MOC) | 11 |
| 4.2 | System Drawing B - Uplink Chain (Highlighted part = HSC interactions with ICCs & Other sites) | 12 |
| 4.3 | System Drawing C - Downlink Chain 1 (Highlighted part = Inputs to Data Processing) | 13 |
| 4.4 | System Drawing D – Downlink Chain 2 (Highlighted part = Output from Data Processing) | 14 |
| 5. | Science Ground Segment Data Flow Tables | 15 |
| Table (A) | : Herschel Ground Segment (MOC, JPL, ICCs, Astronomers & KP) => HSC | 16 |
| Table (B) | – File Transfers: HSC => Herschel Ground Segment (MOC, KP & Astro Community) & PSO.22 | 22 |
| Table (C) | – HSC Internal File Generation & also data transfers to the SGS (ICCs) | 25 |

| | | |
|---|--|--|
|  | <p><i>HERSCHEL TN</i></p> <p><i>Science Ground Segment Data Flow Technical Note</i></p> | <p>Doc. No: HSCDT-TN052</p> <p>Issue: Issue 1.2</p> <p>Date: 18th May 2007</p> <p>Page: 1</p> |
|---|--|--|

1. Scope & Contents of This Technical Note

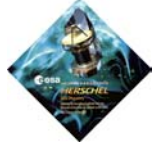
This technical note serves to provide an overview of the following types of Science Ground Segment data flow chains:

- Data being received by the Herschel Science Centre from the rest of the Herschel Ground Segment
- Data being transferred by the Herschel Science Centre to the rest of the Herschel/Planck Ground Segments
- Data being generated internally & distributed internally within the HSC and the Science Ground Segment

A small section relating to Data Flow Open points is provided outlining those issues that are currently TBD in this version of the TN as well as those which have been closed since the last issue of the TN.

Various drawings have been produced to show how the data flow is managed within the Herschel ground segment. It is recommended to print these drawings on a colour printer.

Finally Tables containing a complete list of the files being transferred, their transfer mechanisms, the ICDs linked to those files, their generation rate and their predicted size are provided.

| | | |
|---|---|--|
|  | <i>HERSCHEL TN</i> <i>Science Ground Segment Data</i> <i>Flow Technical Note</i> | Doc. No: HSCDT-TN052 |
| | | Issue: Issue 1.2 |
| | | Date: 18 th May 2007 |
| | | Page: 2 |

2. Applicable & Reference Documentation & Acronym List

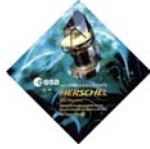
2.1 Applicable Documents

[AD 1] Herschel Ground Segment List of ICDs – FIRST/FSC/DOC/0150

2.2 Reference Documents

AD 1 contains a full list of the applicable ICDs in use by the Herschel Science Ground Segment. To avoid duplication of data & document references, the table below provides only the interface number, how it relates to the ground segment data flow and what the Interface actually covers. These ICD numbers are referred to in the tables that follow.

| [AD 1] reference | Direction | Title |
|------------------|--------------------|--|
| ICD-001 | SGS specific | <i>MIB Format ICDs</i> |
| ICD-002 | SGS Specific | <i>TM Format ICDs</i> |
| ICD-003 | MOC-SGS | Out of Limits Data |
| ICD-004 | MOC-SGS | NRT Telemetry Interface |
| ICD-005 | MOC-SGS | TC History |
| ICD-006 | SGS-MOC MOC-SGS | <i>Instrument OBSM File format</i> |
| ICD-007 | SGS Specific | <i>HCSS-RTA TM Interface</i> |
| ICD-008 | SGS Specific | <i>RTA-HCSS Data Interface</i> |
| ICD-009 | SGS Specific | HPSDB updates |
| ICD-010 | - | HCSS MIB Interface (<i>Interface deleted</i>) |
| ICD-011 | SGS Specific | <i>EGSE ILT – HCSS Test control interface</i> |
| ICD-012 | SGS Specific | <i>RTA Events and TM Parameters</i> |
| ICD-013 | SGS Specific | <i>NRT TM interface (CCS to EGSE IST)</i> |
| ICD-014 | SGS Specific | <i>EGSE IST – CCS uplink interface</i> |
| ICD-015 | MOC-SGS | Time Correlation |
| ICD-016 | - | <i>Interface deleted - Derived Parameters Updates</i> |
| ICD-017 | MOC-SGS | Planning Skeleton |
| ICD-018 | MOC-SGS | Schedule Status Information (<i>Procedural</i>) |
| ICD-019 | MOC-SGS | Mission Timeline Summary – TSF & EPOS files |
| ICD-020 | MOC-SGS | Spacecraft Orbit Data Reconstituted |
| ICD-021 | MOC-SGS | Spacecraft Attitude History |
| ICD-022 | SGS-MOC | Solar System Objects Database |
| ICD-023 | MOC-SGS | DDS Interface |
| ICD-024 | SGS-MOC | Planned Observation Sequence |
| ICD-025 | - | <i>Interface deleted</i> |
| ICD-026 | MOC-SGS SGS-MOC | Spacecraft / Instrument Alignment History File |
| ICD-027 | MOC-SGS | Spacecraft Orbit Predictor Algorithm and Data |
| ICD-028 | MOC-SGS | Spacecraft Attitude Constraints Algorithm and Data |
| ICD-029 | MOC-SGS | Spacecraft Slew Time and Path Predictor Algorithm and Data |
| ICD-030 | MOC-SGS | Herschel MOIS import Data ICD |
| ICD-031 | MOC-SGS | Attitude Utilities |
| ICD-032 | MOC-SGS | FTS Interface |

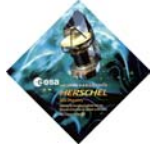


HERSCHEL TN
***Science Ground Segment Data
 Flow Technical Note***

Doc. No: HSCDT-TN052
Issue: Issue 1.2
Date: 18th May 2007
Page: 3

| | | |
|---------|--------------|---|
| ICD-033 | SGS-MOC | Derived Parameter Definitions |
| ICD-034 | MOC-NASA | Orbit File |
| ICD-035 | SGS-MOC | Task Parameter File |
| ICD-036 | SGS Specific | Radiation Monitor data |
| ICD-037 | SGS Specific | Space weather information |
| ICD-038 | SGS-MOC | On-board DB parameters |
| ICD-039 | SGS-MOC | MOC - HSC operational interactions |
| ICD-040 | SGS-MOC | MOC-ICC Operational interactions |
| ICD-041 | SGS Specific | HSC-ICC Operational interactions |
| ICD-042 | SGS Specific | Calibrated Radiation Monitor data |
| ICD-043 | SGS-MOC | Instrument SSO Avoidance Angles |
| ICD-044 | SGS Specific | Horizons SSO Ephemerides file – HSC-NASA horizons data exchange |
| ICD-045 | SGS-MOC | Manual Commanding pointing requests |
| | | |
| | | |

- [RD 46] Herschel Data Product “Description Document”, TBD
- [RD 47] Database Hardware Requirements TN – HSCDT/TN050 – 25th July 2005
- [RD 48] Herschel SGS Communications RRF Report - HERSCHEL/HSC/REP/0695 – 27th Jan 06
- [RD 49] Wishlist Meeting held in ESTEC – Herschel-HSC-MOM-0737
- [RD 50] Herschel science ground segment FTP interface control document, HERSCHEL-HSC-ICD-0968
- [RD 51] Herschel science ground segment CVS interface control document, HERSCHEL-HSC-ICD-0967



HERSCHEL TN

Science Ground Segment Data Flow Technical Note

Doc. No: HSCDT-TN052

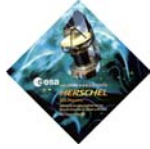
Issue: Issue 1.2

Date: 18th May 2007

Page: 4

2.3 Acronym List

| | |
|---------|---|
| AHF | Attitude History File |
| AUX | Auxiliary Data Ingestion Subsystem |
| CCB | Configuration Control Board |
| CUS | Common Uplink System |
| DB | DataBase |
| DDS | Data Disposition System |
| DP | Data Processing |
| DTCP | Daily TeleCommunication Period |
| ESAC | European Space Astronomy Centre |
| FDS | Flight Dynamics System |
| FTS | File Transfer System |
| GT | Guaranteed Time |
| HAB | Herschel Archive Browser |
| HCSS | Herschel Common Science System |
| HGS | Herschel Ground Segment |
| HIFI | (Herschel) Heterodyne Instrument for the Far Infrared |
| HK | HouseKeeping |
| HOD | Herschel Operational Database |
| HSC | Herschel Science Centre |
| IA | Interactive Analysis |
| ICC | Instrument Control Centre |
| ICD | Interface Control Document |
| ICP | Instrument Command Parameters |
| I/F | InterFace |
| IOD | Instrument Operational Database |
| KP | Key Programme |
| MCS | Mission Control System |
| MIB | Mission Information Base |
| MOC | Mission Operations Centre |
| MPS | Mission Planning System |
| MPS SSF | Mission Planning System Schedule Summary File |
| OBSM | On-Board Software Maintenance |
| OD | Operational Day |
| OOL | Out of Limits |



HERSCHEL TN

Science Ground Segment Data Flow Technical Note

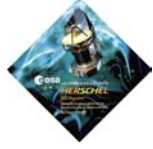
Doc. No: HSCDT-TN052

Issue: Issue 1.2

Date: 18th May 2007

Page: 5

| | |
|-------|--|
| PACS | (Herschel) Photodetector Array Camera and Spectrometer |
| PHS | Proposal Handling System |
| POS | Preferred Observation Sequence |
| PSF | Planning Skeleton File |
| PSO | Planck Science Office |
| QCP | Quality Control Pipeline |
| QCR | Quality Control Report |
| QLA | Quick Look Analysis |
| RTA | Real Time Assessment |
| S/C | SpaceCraft |
| SGS | Science Ground Segment |
| SIAM | Spacecraft Instrument Alignment Matrix |
| SPG | Standard Product Generation |
| SPIRE | (Herschel) Spectral and Photometric Imaging Receiver |
| SPPT | System Planning & Performance Tool |
| SPR | Software Problem Report |
| SSO | Solar System Objects |
| S/W | SoftWare |
| TBC | To Be Confirmed |
| TBD | To Be Determined |
| TC | TeleCommand |
| TCH | Telecommand History |
| TM | TeleMetry |
| TPF | Task Parameter File |
| UM | User Manual |

| | | |
|---|--|--|
|  | <p><i>HERSCHEL TN</i></p> <p><i>Science Ground Segment Data Flow Technical Note</i></p> | <p>Doc. No: HSCDT-TN052</p> <p>Issue: Issue 1.2</p> <p>Date: 18th May 2007</p> <p>Page: 6</p> |
|---|--|--|

3. Status of Open Issues & TBDs identified within this document

3.1 Open Issues & TBDs in this issue (1.2) of the TN

The open issues defined below are being addressed as normal work and it is expected that they shall have been fully addressed by end 2007.

(a) Files that still have many open issues

The following file still has a number of different open interface issues.

ICCs Mission Planning Schedule Summary File - Open issues

- File format needs to be defined
- The delivery rate needs to be established
- The expected file size is unknown

(b) Transfer mechanism between ICCs and the HSC

The transfer mechanism for the ICC Calibration objects from the ICCs to the HSC is TBD.

(c) HCSS Database & Software Temporary Storage Area remains TBD/TBC

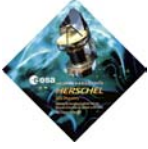
This was discussed in the wishlist meeting [RD 49]. It is understood that a temporary DB repository will need to exist to support the provision of updates to the system and indeed to support the resultant CCB approval process. The definition of this temporary storage area can be considered as normal work and shall be clarified in the scope of the feedback mechanism TN that is currently under review. .

Until final confirmation of the DB repository structure is given, the following assumptions have been made :

- CUS Scripts – these shall be uploaded to the CVS during operations as is occurring during pre-launch phases.
- Calibration objects – any objects delivered shall need to be stored in the CCB Temporary Object DB repository
- OBSM Image files for uplink - any files delivered shall need to be stored in the CCB Temporary File DB repository
- DP Software code updates - these shall be uploaded via the CVS during operations as is occurring during pre-launch phases.

(d) Documentation missing or to be written

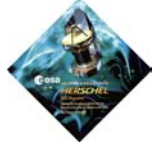
The ICD for the mission planning schedule file needs to be written.

| | | |
|---|---|--|
|  | <p style="text-align: center;"><i>HERSCHEL TN</i></p> <p style="text-align: center;"><i>Science Ground Segment Data Flow Technical Note</i></p> | <p>Doc. No: HSCDT-TN052</p> <p>Issue: Issue 1.2</p> <p>Date: 18th May 2007</p> <p>Page: 7</p> |
|---|---|--|

(e) File sizes of the following data

The expected file sizes for the following files remain to be defined in the table:

-
- TC History File
- OOL file
- Task Parameter File
- Astronomer provided Quality Control Report

| | | |
|---|--|--|
|  | <p><i>HERSCHEL TN</i></p> <p><i>Science Ground Segment Data Flow Technical Note</i></p> | <p>Doc. No: HSCDT-TN052</p> <p>Issue: Issue 1.2</p> <p>Date: 18th May 2007</p> <p>Page: 8</p> |
|---|--|--|

3.2 Open Issues & TBDs from issue 1.0 & 1.1 that are now closed

(a) Transfer mechanism between ICCs and the HSC

The transfer mechanism for the following files have now been resolved :

- SIAM File inputs from the ICCs – It was confirmed that no “file” inputs to the HSC would be provided by the ICCs for the generation of these files. Where an update to the file is required then it shall be discussed with the ICCs and the relevant updates checked by them. More details can be found in [RD 49].

(b) The TBD Subsystem

The definition of a subsystem that will process the following files has now been clarified in [RD 49] to be the Auxiliary Data Ingestion Subsystem:

- Time correlation
- Attitude History File
- Timeline Summary File
- SIAM Files

The definition of a subsystem that will generate the following files can be confirmed to be the Auxiliary Data Ingestion Subsystem

- Pointing files
- Quality Control Report Input Products

(f) The delay from end DTCP to provision to HSC of Auxiliary files

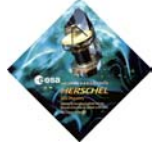
After release of the appropriate ICDs from the MOC, it was possible to clarify the delivery “delay” for the following files :

- Time correlation file
- TC History file
- Timeline Summary File
- Out of Limits File

(g) File sizes of the following data

The expected file size for the following file has now been defined :

- AHF – Defined in the AHF ICD.
- TSF – obtained during HSC-MOC(MCS) integration test
- SSO Ephemerides file – obtained during HSC-MOC(FDS) integration test

| | | |
|---|--|--|
|  | <p><i>HERSCHEL TN</i></p> <p><i>Science Ground Segment Data Flow Technical Note</i></p> | <p>Doc. No: HSCDT-TN052</p> <p>Issue: Issue 1.2</p> <p>Date: 18th May 2007</p> <p>Page: 9</p> |
|---|--|--|

(h) Exchange of Quality Control Report Information

The mechanism by which Quality Control Report (manual) are exchanged within the SGS shall be via the Kayako system. This ensures comments are received from various QC levels.

(i) Transfer mechanism between ICCs and the HSC

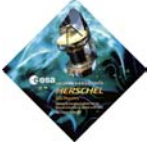
Files shall be exchanged between HSC & ICCs using a HSC located FTP server.

The transfer mechanism for CUS Script files during operations still remains will follow the existing mechanism that is in use pre-launch i.e. upload via the CVS depository.

(j) Documentation missing or to be written

The ICD for the transfer of the SSO Ephemerides files from the JPL Horizons system to the HSC has been written – see ICD-044

Two ICDs defining the transfer mechanism i.e use of CVS or FTP, between the HSC and the ICCs has been identified and shall be produced by mid 2007. See [RD 50] & [RD 51].

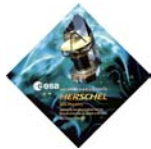
| | | |
|---|--|--|
|  | <p style="text-align: center;"><i>HERSCHEL TN</i> <i>Science Ground Segment Data</i> <i>Flow Technical Note</i></p> | <p>Doc. No: HSCDT-TN052 Issue: Issue 1.2 Date: 18th May 2007 Page: 10</p> |
|---|--|--|

4. Science Ground Segment Uplink & Downlink Drawings

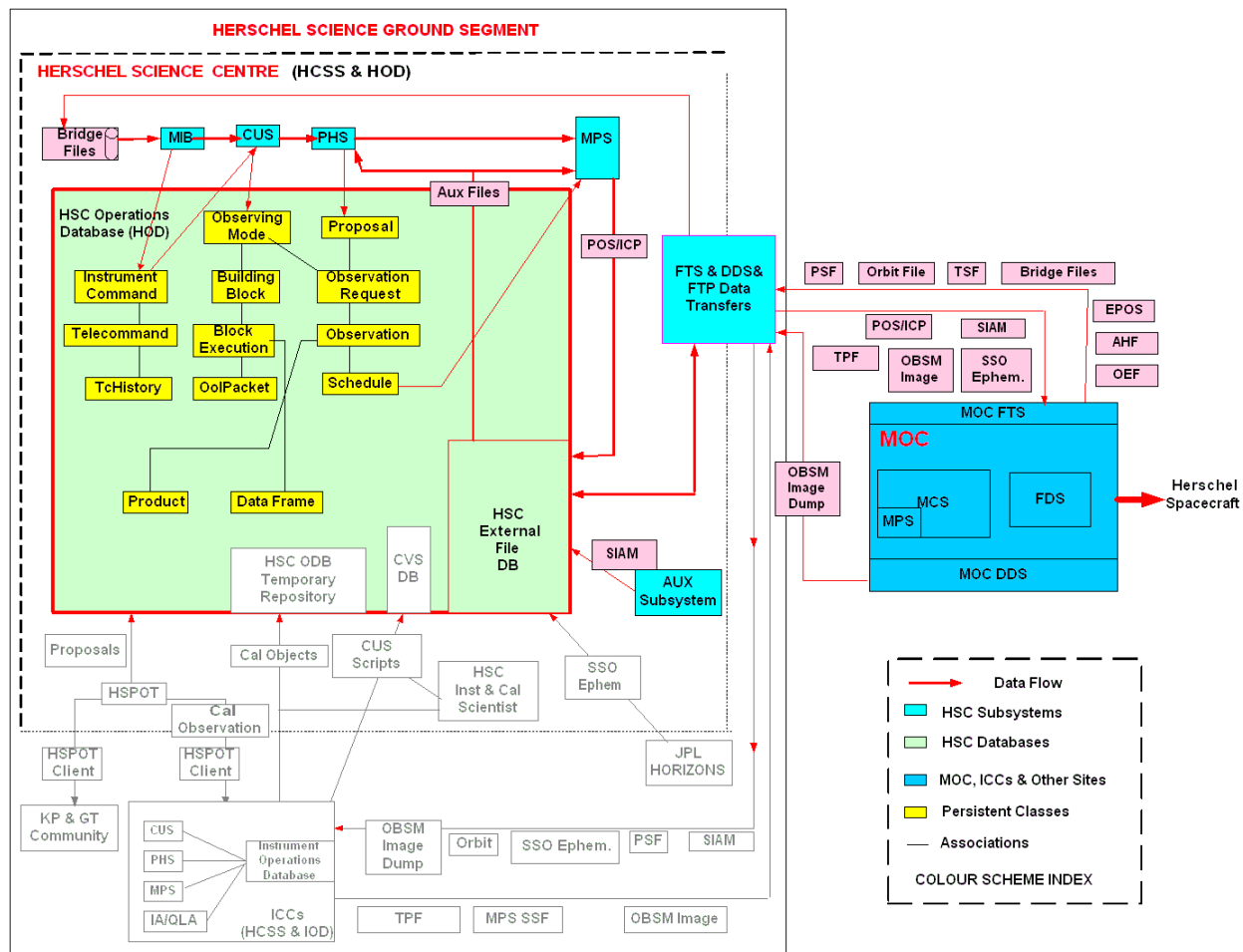
The drawings below show the data flow existing within the HSC and between the HSC and its ground segment interfaces. There are 2 Uplink drawings and two Downlink drawings.

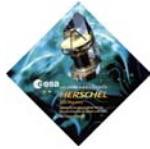
Note: The two uplink drawings correspond to the same drawing except that different parts of the ground segment have been highlighted within each one. The same applies for the case of the two downlink drawings.

The drawings below should be printed out on a colour printer.

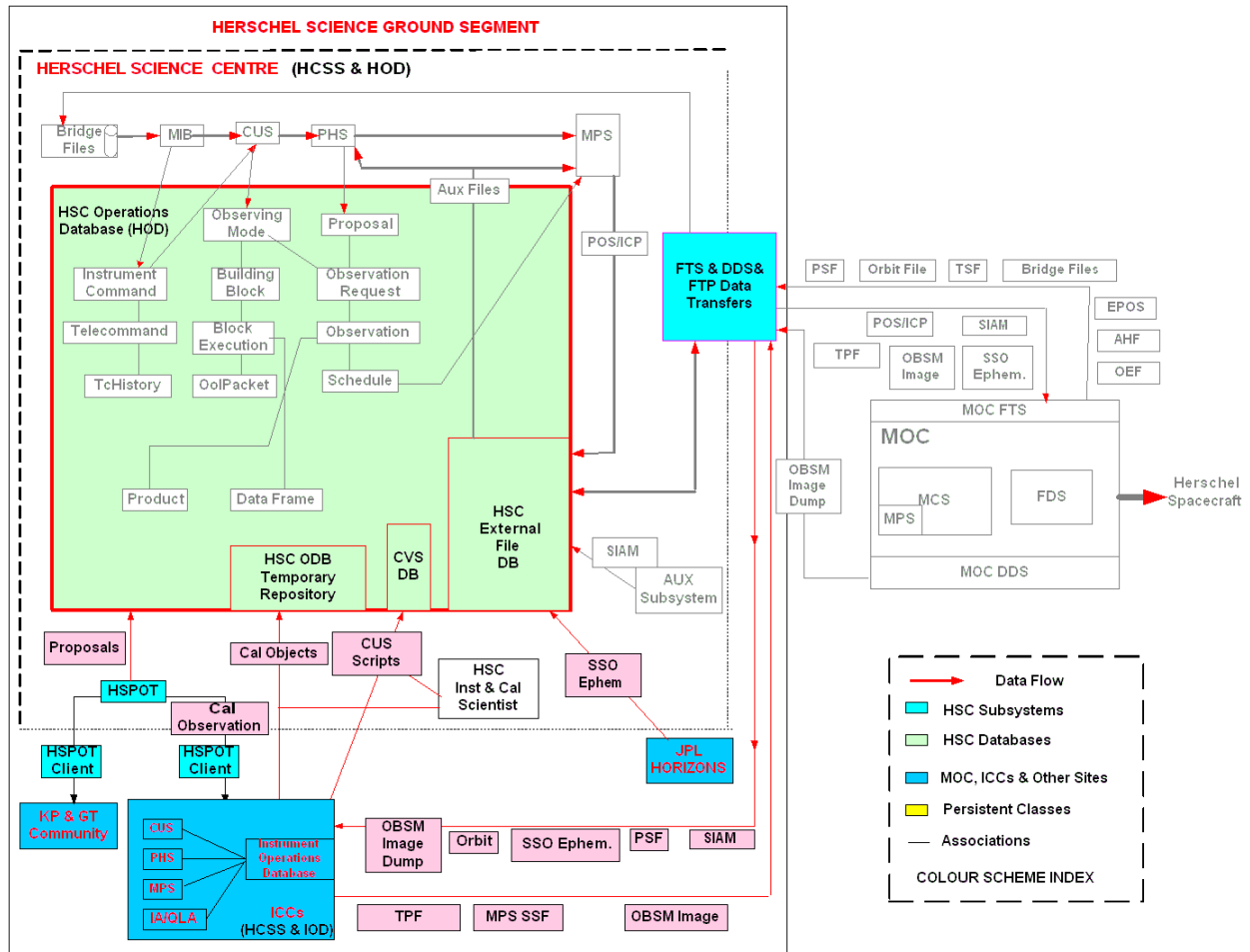


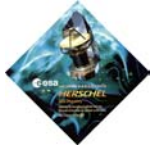
4.1 System Data Flow Drawing A - Uplink Chain (Highlighted part = HSC interactions with MOC)



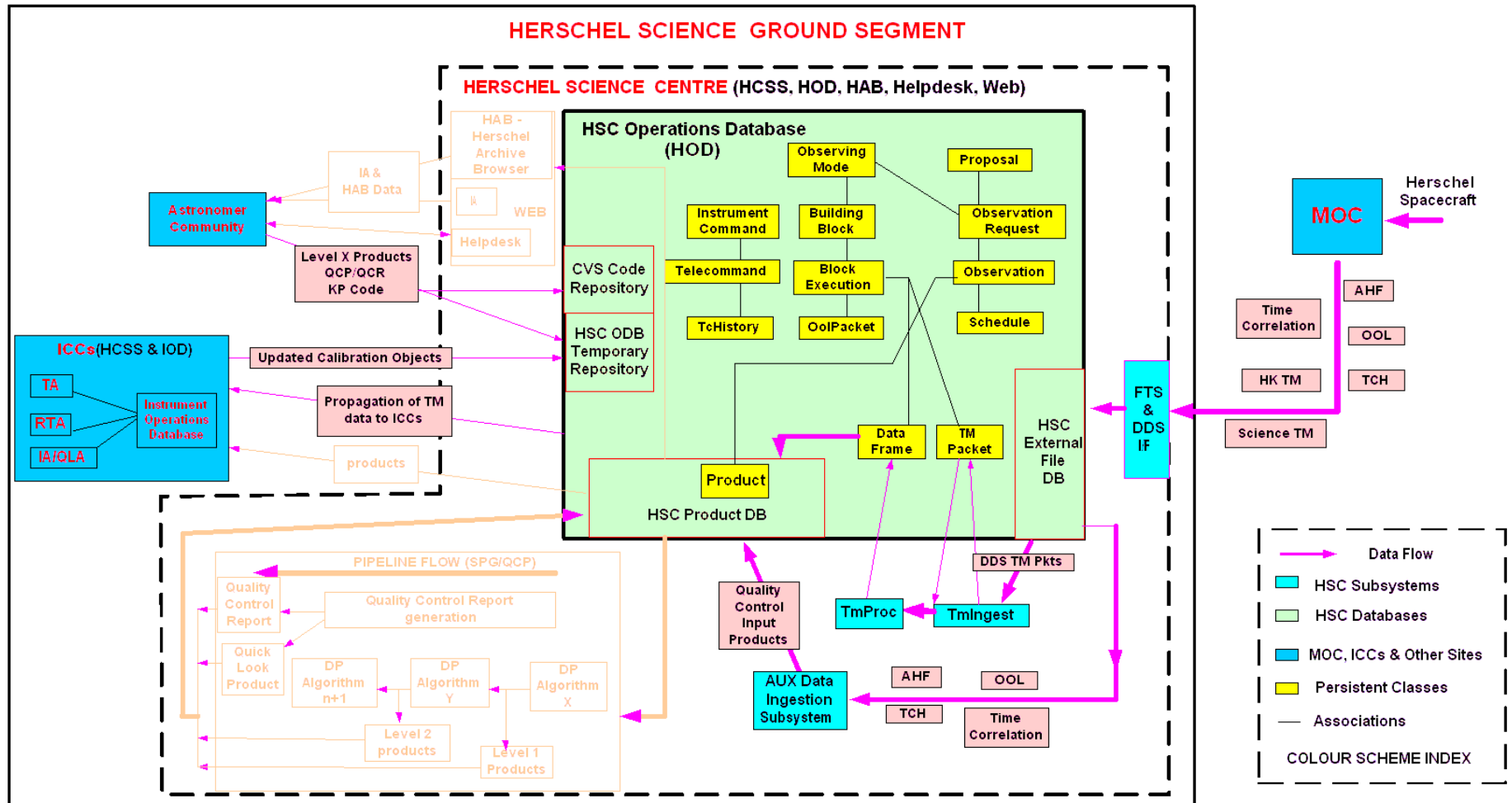


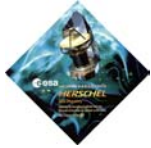
4.2 System Data Flow Drawing B - Uplink Chain (Highlighted part = HSC interactions with ICCs & Other sites)



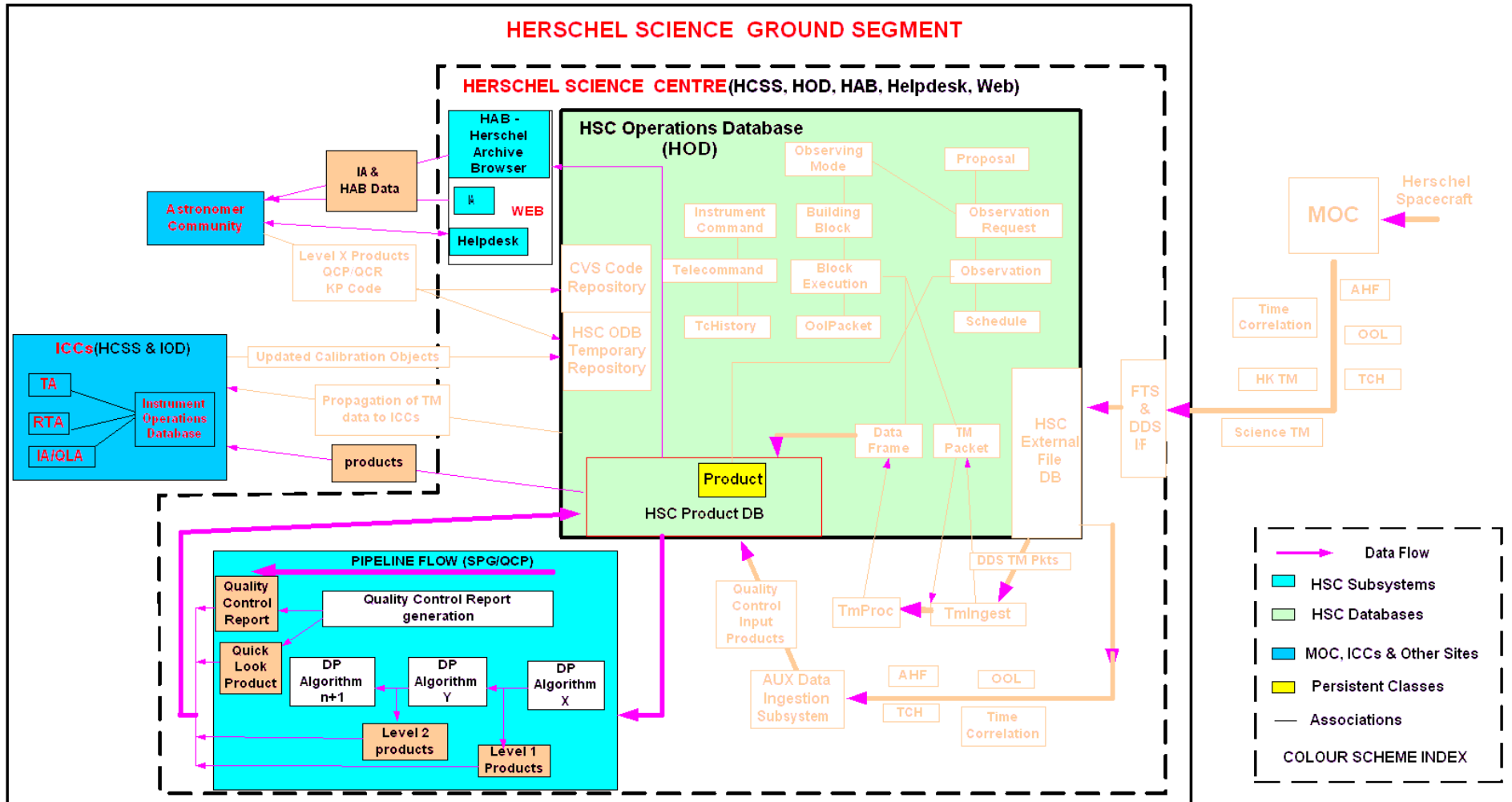


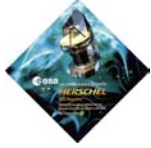
4.3 System Data Flow Drawing C - Downlink Chain 1 (Highlighted part = Inputs to Data Processing)





4.4 System Data Flow Drawing D – Downlink Chain 2 (Highlighted part = Output from Data Processing)





HERSCHEL TN

Science Ground Segment Data Flow Technical Note

Doc. No: HSCDT-TN052

Issue: Issue 1.2

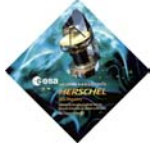
Date: 18th May 2007

Page: 15

5. Science Ground Segment Data Flow Tables

Three tables are presented in the following pages:

- (a) File transfers - Herschel Ground Segment (ICCs included) => HSC
- (b) File transfers - HSC => Herschel Ground Segment (ICCs not included)
- (c) HSC Internal File generation & Transfer to the ICCs



HERSCHEL TN

***Science Ground Segment Data
Flow Technical Note***

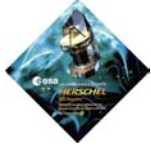
Doc. No: HSCDT-TN052

Issue: Issue 1.2

Date: 18th May 2007

Page: 16

Table (A) : Herschel Ground Segment (MOC, JPL, ICCs, Astronomers & KP) => HSC



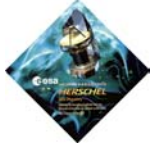
HERSCHEL TN
Science Ground Segment Data
Flow Technical Note

Doc. No: HSCDT-TN052
Issue: Issue 1.2
Date: 18th May 2007
Page: 17

| Name of File | Generated by | | Transfer Mechanism | Storage | HCSS Subsystem processing | Result of Processing | ICD # ¹ | Delivery period & Delay ² | File size (bytes) |
|--|-----------------------|--------------------|--------------------|--------------------------------------|---------------------------|---|----------------------------|--------------------------------------|-------------------|
| | Site | Sub System | | | | | | | |
| Mission Planning Specific Files | | | | | | | | | |
| Planning Skeleton File (PSF) | MOC | FDS | FTS | External File Repository. | MPS | File accessed by MPS but no resultant output file generated | ICD-017 ICD-032 | 1/week (7 PSFs) Delay N/A | 5KB |
| ICCs Mission Planning Schedule Summary File | PACS HIFI SPIRE | MPS | FTP | External File Repository | MPS | Update of the Mission Plan | TBW ICD-050 | Asynchronous Delay N/A | TBD |
| ICCs Calibration Observations (AORs) | PACS HIFI SPIRE | Expert HSPOT | TBD | External File Repository (HOD - TBC) | PHS/MPS | Update of the Mission Plan | HCSS HSPOT interface | Asynchronous Delay N/A | 500KB |
| Proposal Handling Files | | | | | | | | | |
| Proposals for KP & GT phases | Astronomer | HSPOT Client | Internet | HOD | PHS HOTAC | Proposal database | HCSS HSPOT Interface | Delay N/A | 500KB |
| OBSM Files | | | | | | | | | |
| OBSM Image File | PACS HIFI SPIRE | OBSM Image tool | FTP | External File Repository | None | No processing - Transfer from External File Repository to MOC after PS Approval | ICD-006 ICD-050 | Asynchronous Delay N/A | 8MB |

¹ The first ICD # defines the file format. The second ICD # defines the file transfer method. A single ICD # means that it contains both.

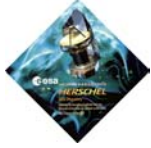
² Delay refers to the time delay from provision of TM data to delivery of a consistent auxiliary file to the HSC (covering same time period)



HERSCHEL TN
Science Ground Segment Data
Flow Technical Note

Doc. No: HSCDT-TN052
Issue: Issue 1.2
Date: 18th May 2007
Page: 18

| Name of File | Generated by | | Transfer Mechanism | Storage | HCSS Subsystem processing | Result of Processing | ICD # ¹ | Delivery period & Delay ² | File size (bytes) |
|--|--------------|------------|--------------------|---------------------------------|---|---|--------------------|--|-------------------|
| | Site | Sub System | | | | | | | |
| OBSM Image DUMP File | MOC | OBSM | FTP | External File Repository | None | No processing - Transfer from External File Repository to ICCs | ICD-006 ICD-050 | Asynchronous Delay N/A | 8MB |
| Consolidated Telemetry Files | | | | | | | | | |
| TM 1 – Consolidated S/C HK Telemetry | MOC | TM | DDS | External File Repository HOD | TM Ingest TM Proc DP | TM Frames stored in the HOD and available for DP at HSC and ICCs. | ICD-023 | 10 min after last bit received at MOC (Earliest provision of last cons. bit by MOC approx 3-4 hours after DTCP end) | 21.6 MB/day |
| TM 2 – Consolidated Instrument HK Telemetry | MOC | TM | DDS | External File Repository HOD | TM Ingest TM Proc SPG/QCP IA HAB ICC QLA | TM Frames stored in the HOD and available for DP at HSC and ICCs | ICD-023 | | 21.6 MB/day |
| TM 3 – Consolidated Science Telemetry | MOC | TM | DDS | External File Repository HOD | TM Ingest TM Proc SPG/QCP HAB IA | TM Frames stored in the HOD and available for DP at HSC and ICCs | ICD-023 | | 1.38 GB/day |
| Auxiliary Data Files | | | | | | | | | |



HERSCHEL TN

Science Ground Segment Data Flow Technical Note

Doc. No: HSCDT-TN052

Issue: Issue 1.2

Date: 18th May 2007

Page: 19

| Name of File | Generated by | | Transfer Mechanism | Storage | HCSS Subsystem processing | Result of Processing | ICD # ¹ | Delivery period & Delay ² | File size (bytes) |
|-------------------------------|--------------|------------|--------------------|---------------------------|---|---|-------------------------------|--|-------------------------|
| | Site | Sub System | | | | | | | |
| Orbit File (ORBI) | MOC | FDS | FTS | External File Repository. | MPS PHS SPG/QCP | File accessed by MPS & PHS but no resultant output file generated | ICD-020 ICD-032 ICD-023 | Short term file (1/week) Long term file (asynchronous) Orbit determination performed on previous "7" days of tracking data. File is generated as a result. | ST = 50KB LT = 500KB |
| Timeline Summary File | MOC | MPS | FTS/DDS | External File Repository | No processing required (Manual Stack printout file) | N/A | ICD-019 ICD-032 ICD-023 | Asynchronous | >10MB |
| EPOS file | MOC | FDS | FTS/DDS | External File Repository | Aux Data Ingestion subsystem | Comparison between POS & EPOS (TBC) | ICD-019 ICD-032 ICD-023 | Follows Mission Planning cycle | < 1MB |
| Attitude History File | MOC | FDS | FTS/DDS | External File Repository | Aux Data Ingestion subsystem SGP/QCP | File ingested by AUX subsystem and Pointing Files generated. Files are provided to SPG/QCP. | ICD-021 ICD-032 ICD-023 | 1/OD Latest delivery approx 8 hours after last bit received by MOC | 82.6MB |
| Orbit Event File (OEF) | MOC | FDS | FTS/DDS | External File Repository | No processing required | N/A | | | 4MB |



HERSCHEL TN

Science Ground Segment Data Flow Technical Note

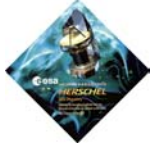
Doc. No: HSCDT-TN052

Issue: Issue 1.2

Date: 18th May 2007

Page: 20

| Name of File | Generated by | | Transfer Mechanism | Storage | HCSS Subsystem processing | Result of Processing | ICD # ¹ | Delivery period & Delay ² | File size (bytes) |
|--|--------------|---------------------------|---|-----------------------------------|---|---|--|--|-------------------|
| | Site | Sub System | | | | | | | |
| Time Correlation File | MOC | TC | DDS | External File Repository | Aux Data Ingestion subsystem | File ingested by AUX subsystem. | ICD-015 ICD-023 | 1/OD Made available at same time as S/C cons. HK | 13.6KB |
| TC History File | MOC | TC | DDS | External File Repository HOD | TchOol AUX Subsystem | File ingested by TchOol subsystem and AUX subsystem | ICD-005 ICD-032 | 1/OD Made available at same time as S/C consolidated HK TM | Size is TBD |
| Out of Limits file | MOC | TM | DDS | External File Repository HOD | TchOol Aux Subsystem | File ingested by TchOol subsystem and Aux Subsystem | ICD-003 ICD-032 | 1/OD Made available at same time as instrument cons. HK TM | Size is TBD |
| SSO Ephemerides File | JPL | Horizons | Internet transfer | External File Repository | MPS PHS | Update of the list of the SSO Ephemerides | ICD-022 UM to be written | Asynchronous | < 0.5 MB |
| Space Weather Forecast Data (TBC) | TBD | Daily info visible on web | Internet transfer or just visible on internet (TBC) | External File Repository | SPG/QCP (TBC) | TBD | ICD-037 | TBD | TBD |
| Database Files | | | | | | | | | |
| Bridge Files | MOC | HPSDB | FTS | CCB DB Repository MIB database | N/A – is just inserted into the DB directly | Passes through CCB process before being imported | ICD-001 ICD-001a (SCOS import ICD) | Asynchronous | Size - TBD |



HERSCHEL TN

Science Ground Segment Data Flow Technical Note

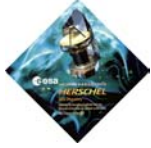
Doc. No: HSCDT-TN052

Issue: Issue 1.2

Date: 18th May 2007

Page: 21

| Name of File | Generated by | | Transfer Mechanism | Storage | HCSS Subsystem processing | Result of Processing | ICD # ¹ | Delivery period & Delay ² | File size (bytes) |
|--------------------------------------|-----------------------|------------|--------------------|---------------------------------|--|--|---------------------------|--------------------------------------|-------------------|
| | Site | Sub System | | | | | | | |
| Calibration objects | PACS HIFI SPIRE | IA S/W | Propagation (TBC) | CCB DB Repository HOD | IA SPG/QCP | Passes through CCB process before being imported | HCSS ADD TBD | Asynchronous | Variable |
| CUS Script files | PACS HIFI SPIRE | CUS S/W | CVS | CCB DB Repository HOD | CUS | Passes through CCB process before being imported | HCSS ADD ICD-51 | Asynchronous | Variable |
| Product Files | | | | | | | | | |
| Level X Products from Key Programmes | Astronomer | IA | TBD | CCB DB Repository HOD | HAB SPG/QCP IA | Passes through CCB process before being imported | ICD-TBD (HAB?) ICD-TBD | Asynchronous | Size – TBD |
| QCProduct & QCR | Astronomer | IA | TBD | CCB DB Repository HOD | HAB SPG/QCP IA | Passes through CCB process before being imported | ICD-TBD (HAB?) ICD-TBD | Asynchronous | Size – TBD |
| Manual Commanding Files | | | | | | | | | |
| Task Parameter File | ICC | CUS | FTP | CCB DB External file repository | HSC SCOS 2000 system to check contents (TBC) | N/A | ICD-035 ICD-050 | Asynchronous | Size - TBD |



HERSCHEL TN

***Science Ground Segment Data
Flow Technical Note***

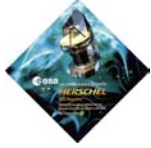
Doc. No: HSCDT-TN052

Issue: Issue 1.2

Date: 18th May 2007

Page: 22

Table (B) – File Transfers: HSC => Herschel Ground Segment (MOC, KP & Astro Community) & PSO



HERSCHEL TN

Science Ground Segment Data Flow Technical Note

Doc. No: HSCDT-TN052

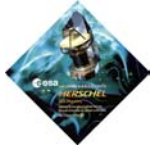
Issue: Issue 1.2

Date: 18th May 2007

Page: 23

| Name of File | HCSS Subsystem generating the file | HSC File location | Transferred to | | Transfer Mechanism | ICD # ³ | Delivery period & Delay | File Size |
|--|-------------------------------------|--------------------------|-----------------------|--------------|--------------------|--|-------------------------|-----------|
| | | | Site | Subsystem | | | | |
| Mission Planning Specific Files | | | | | | | | |
| Preferred Observation Sequence (POS) | MPS | External File Repository | MOC | FDS | FTS | ICD-024 ICD-032 | 1/week - 7 POS files | < 500 KB |
| Instrument Command Parameter File (ICP) | MPS | External File Repository | MOC | FDS | FTS | ICD-024 ICD-032 | 1/week - 7 ICP files | < 3 MB |
| Task Parameter File | ICC CUS | External File Repository | MOC | MCS | FTS | ICD-035 ICD-032 | Asynchronous | TBD |
| Auxiliary Data Files | | | | | | | | |
| SSO Ephemerides File | N/A – received from JPL Horizons | External File Repository | MOC | FDS | FTS | ICD-022 ICD-032 | Asynchronous | <0.5MB |
| | | | PSO | SPPT | FTP | ICD-022 ICD = Procedural interface | Asynchronous | <0.5MB |
| Instrument Alignment File (SIAM) | SIAM File generator (AUX Subsystem) | External File Repository | MOC | FDS | FTS | ICD-026 ICD-032 | Asynchronous | < 10KB |
| Radiation Monitor Data Product | AUX subsystem | External File Repository | ESTEC Radiation Group | Radiation DB | TBD | ICD-036 ICD-TBD | TBD | TBD |
| | | | Astronomer | IA | HAB (TBC) | HAB | TBD | TBD |

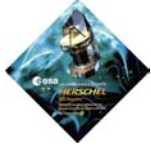
³ The first ICD # defines the file format. The second ICD # defines the file transfer method. A single ICD # means that it contains both.



HERSCHEL TN
***Science Ground Segment Data
Flow Technical Note***

Doc. No: HSCDT-TN052
Issue: Issue 1.2
Date: 18th May 2007
Page: 24

| Name of File | HCSS Subsystem generating the file | HSC File location | Transferred to | | Transfer Mechanism | ICD # ³ | Delivery period & Delay | File Size |
|----------------------------------|------------------------------------|--------------------------|-------------------------|-----------|--------------------|------------------------|-------------------------------|---------------|
| | | | Site | Subsystem | | | | |
| OBSM Files | | | | | | | | |
| OBSM Image File | N/A – Received from ICCs | External File Repository | MOC | OBSM | FTS | ICD-006 ICD-032 | Asynchronous | < 8 MB |
| Products | | | | | | | | |
| LEVEL X Products | SPG, QCP and KP Inputs | HOD | Astronomers KP sites | IA | HAB | HAB User Manual | Asynchronous | Variable size |
| Quality Control Products | SPG, QCP and AC Inputs | HOD | Astronomers | IA | HAB | HAB User Manual | Asynchronous | Variable size |
| Software Files | | | | | | | | |
| IA File Download from Web | HSC IA | HSC Website | Astronomer | IA | Internet | DP ADD N/A | | TBD |
| HSPOT Client | HSPOT | HSC Website | Astronomer | HSPOT | Internet | HSPOT S/W TN N/A | KP & GT Call for proposals | Variable size |



HERSCHEL TN

***Science Ground Segment Data
Flow Technical Note***

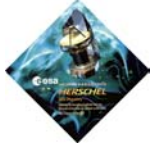
Doc. No: HSCDT-TN052

Issue: Issue 1.2

Date: 18th May 2007

Page: 25

Table (C) – HSC Internal File Generation & also data transfers to the SGS (ICCs)



HERSCHEL TN

Science Ground Segment Data Flow Technical Note

Doc. No: HSCDT-TN052

Issue: Issue 1.2

Date: 18th May 2007

Page: 26

| Name of File | HCSS Subsystem generating the file | HSC File location | Transferred to | | Transfer Mechanism | ICD # | Delivery period & Delay | File Size |
|---|------------------------------------|-------------------|------------------------|---------------|------------------------------------|------------------------|------------------------------------|---|
| | | | Site | Subsystem | | | | |
| TM Packets | | | | | | | | |
| Spacecraft HK TM Packets | Tm Ingest | HOD | ICC | IA | DB propagation | DB TN | Daily | 21.6MB |
| Instrument HK TM Packets | Tm Ingest | HOD | ICCs | IA | DB propagation | DB TN | Daily or Every 3 days ⁶ | 21.6MB |
| Science TM Packets | Tm Ingest | HOD | ICCs | IA | DB propagation | DB TN | | 1.4GB ⁴ |
| TM Frames⁵ | | | | | | | | |
| TM Data Frames | TM Ingest TM PROC | HOD | SPIRE & HIFI ICCs only | IA | DB Propagation | DB TN | Daily or Every 3 days ⁶ | HIFI- 1.3GB SPIRE - 0.8GB |
| Products | | | | | | | | |
| Level X & Quality Control Products | SPG/QCP | HOD | ICCs | SPG/QCP IA | Product Cache & transfer mechanism | HDPD [RD 46] DB TNs | Asynchronous | 0.3 GB per ICC ⁷ HIFI 8.8 GB/OD SPIRE 22 GB/OD PACS 2.1 GB/OD |

⁴ Footnote deleted

⁵ File Sizes calculated using latest estimates in Table 4 of [RD 48]

⁶ Footnote deleted

⁷ Metadata only

