DOCUMENT

Delivery Review Procedure for H-P Scientific Instruments

Herschel / Planck Project

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D I S T R I B U T I O N

name	organisation
Herschel/Planck team	ESA/ESTEC
HIFI	SRON
HFI	IAS
LFI	IASF
PACS	MPE
SPIRE	RAL
	Alcatel
	Astrium

C H A N G E L O G

date	issue	revision	pages	reason for change
4.10.2004	1		All	Initial issue

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1 INTRODUCTION

The Instrument Delivery Review (DR), applicable to all models, for the Herschel / Planck instruments, or other ESA furnished equipment, will be held at the time that the instrument level test programmes are successfully finished before delivery of the instruments to ESA, and subsequently to the contractors Astrium, and Alcatel.

The DR shall be conducted at the PI's premises before any formal delivery to ESA/Contractor of hardware and software deliverable items provided by the PI, that are subject to acceptance by ESA.

2 APPLICABLE DOCUMENTS

The following documents, and the documents listed within them as applicable, form the requirements of this document.

[AD1]	SCI-PT-IIDA-04624	issue 3.1	Herschel/Planck Instrument Interface Document IID-A
[AD2]	SCI-PT-IIDB/SPIRE-02124	issue 3.1	SPIRE IID-B
[AD3]	SCI-PT-IIDB/HIFI-02125	issue 3.2	HIFI IID-B
[AD4]	SCI-PT-IIDB/PACS-02126	issue 3.2	PACS IID-B
[AD5]	SCI-PT-IIDB/ HFI-04141	issue 3.2	HFI IID-B
[AD6]	SCI-PT-IIDB/ LFI-04142	issue 3.0	LFI IID-B
[AD7]	PT-RQ-04410	issue 2.0	Product Assurance Requirements for First/Planck Scientific Instruments

3 OBJECTIVES OF THE DR

The objective of the DR is to establish that there is adequate documentary evidence to demonstrate that the instrument has satisfied all requirements and identify any possible open work, and that the item is fit for further utilisation, like integration into the spacecraft or test benches, with the purpose to authorize the shipment of the item under acceptance.

This is achieved by certifying that the item is:

- Conforming to the project requirements, and the certificate of conformity is filled and signed
- Conforming to the agreed configuration
- Free from material and workmanship deficiencies, and clean
- All non-conformances are closed
- Delivered with a complete EIDP

- All RFD/RFW accepted
- The User Manual is available and understood by the receiving parties
- The item has been qualified and/or flight acceptance testing has been performed

The output of the meeting is formal acceptance of the item, for shipment and for further use.

4 ORGANISATION

The DR shall be held together with the Prime Contractor (Alcatel) participation, and his subcontractor (Astrium) as applicable, to avoid multiple handover meetings. For the instruments on the Herschel OB Astrium shall participate as prime's subcontractor.

This acceptance review shall be thoroughly prepared by the PI team and shall be supported by an End Item Data Package (EIDP) also called Acceptance Data Package (ADP) to be provided by the PI team.

Part of the EIDP shall be delivered in advance on CD-ROM, nominally 2 weeks to allow for commenting and updates in good time before the review meeting. Other required documents that shall be delivered in advance are detailed in section 7. The full EIDP shall be available at the DR.

The DR will be held at the PI Institute with the full preliminary EIDP, which will be reviewed on the spot by the review board. During the review of the documentation, points to be clarified and updated will be forwarded by the review board to the instrument team. This will take typically half a day. Thereafter the formal Delivery review Board (DRB) meeting will take place.

The EIDP shall be delivered as two full EIDPs on paper, of which one set shall accompany the HW at all times during the AIT phase, and as a minimum 5 copies of the EIDP on CD-ROM.

In the case that the EIDP requires updates the item can be released for shipment but delivery occurs only when the EIDP is submitted and accepted in a formal way.

5 DELIVERY REVIEW BOARD COMPOSITION

The Delivery Review Board will consist of:

ESA representative for all Herschel Planck units
Product Assurance, Chairman
Instrument System Engineer
Payload Manager or his representative
AIV Manager or his representative

Satellite Prime Contractor representative, Alcatel, for all Herschel Planck units
Product Assurance, Co-chairman for all Planck units
Instrument System Engineer, Secretary for all Warm Units and Planck FPU units

AIV Manager
Specialist(s) (if required)

Astrium
Product Assurance, Co-chairman for all Herschel units
Instrument System Engineer, Secretary for Herschel units
AIV Manager

Instrument representative:
Project Manager
PA Manager
JPL representative for SCS, and in connection with LFI DR when the SCS is concerned

6 STRUCTURE OF THE DELIVERY REVIEW

The DR consists essentially of two parts:

1. Review of the documentation (see data package list below of the EIDP) typically ½ day
2. DRB Meeting, typically 1 day, and Inspection of HW typically ½ day

The PI team shall organise the tour through the facility for the HW inspection, taking into account possible limitations of personnel in the facilities (limited number of personnel at any one time in the cleanrooms).

The DRB meeting shall cover the subjects below, which shall also be adequately addressed by the EIDP in the form of documents:

1. Confirm list of deliverable items.
2. Review the Configuration Item Data List, CIDL (as-designed).
3. Review the actual build status for hardware and software ABCL (as-built).
    a. Review of relevant change proposals status and reconciliation of changes
    b. Establish potential deviations to the design qualification baseline or to different models.
4. Review the status of non-conformance (major + minor).
5. Review the status of waivers/deviations.
6. Evaluate inspection results including cleanliness status.
    a. Verify witness samples
    b. MIP/KIP reports
7. Review the status of the test programme/test flow and test reports.
    a. Review the verification status of requirements, VCD
    b. Qualification/Acceptance test successfully run
8. Establish acceptability of Residual Hazards, and verify that all safety issues were covered and well understood, including the dangerous goods declaration, when applicable.
9. Review all interfaces and critical items.

10. Evaluate Historical Records, Mate/demate log, Limited Life Item Records, Open Work Records, Temporary Installation Records, Red Flag Items, and other sections of ADP for content and completeness.
11. Evaluate Operational constraints, Operating and Maintenance Manuals.
12. Review the hardware status and procedure of packaging, handling shipping, and storage operations.
13. Visual inspection of HW
14. Authorise shipment.

The output of the DR is the conditional or unconditional authorisation for shipment and for further use.

7 DELIVERABLE DOCUMENTATION

The preliminary End Item Data Package EIDP is a prerequisite for a DR. The purpose of the EIDP is to provide all necessary information on an item for further integration, testing and operation in higher-level assemblies.

There are, however, a number of required documents that are not formally part of the EIDP that have to be delivered in good time before the DR can be held. These documents shall be finalised and approved no later than in connection with the IQR/CDR, and they are:

- FMECA
- HSIA
- FDIR
- Safety analysis
- DML and DPL
- PSA or derating analysis
- WCA
- Critical Items List

The EIDP itself consists of the following documents as required by [AD7], PT-RQ-04410 Product Assurance Requirements for First/Planck Scientific Instruments.

- List of deliverable items
- Certificate of Conformance, CoC
- Configuration Item Data List, CIDL
- As-Built Configuration List, ABCL, including reconciliation of changes
- Change proposal list
- NCR status list (NCRs), and copies of NCRs
- RFW/RFD status list (RFWs), and copies of RFWs
- Inspection reports, Cleanliness status report, MIP/KIP reports, mass properties
- Verification Control Document (VCD)
- Test reports and test data
- Residual hazard sheets

- ICDs, Interface drawings, Engineering drawings, manufacturing drawings
- EEE parts list including PADs
- DML/DPL
- Critical items list
- Manufacturing logbook, History log
- GSE list
- S/S EIDP list
- Procedures for handling the HW: Packaging, handling, shipping, storage, cleanliness and cleaning
- Documents necessary for further work (input for procedures for Integration, testing, cleanliness, operations)
- List of open items covering, loose items, not installed items, limited life items, (mate/demate log), temporary installation records, red flag items, open work records, missing items, spares supplied with the product

The documents shall be delivered to the following parties:

- ESA – All documents
- Alcatel – All documents
- Astrium – All FPU and LOU documentation

8 GSE

Particular to GSE is that the interfaces to the flight equipment are submitted to the same requirements as flight equipment itself. This implies that the interfaces shall be free of SPFs, i.e. single failure protection is needed for HW, SW and operational errors, as no single failure of the GSE is allowed to propagate to the flight equipment.

What checked in particular for GSE at the delivery review is:

- Interfaces are free of Single Point Failures, SPFs, or they are protected for non propagation (verified for example by I/F FMECA)
- GSE NCRs
- Proof load certificate for handling / lifting equipment is valid for the planed period of AIT campaign or procedure for re-certification is needed.
- Safety / hazardous procedures is following the GSE

ANNEX 1. SW (IF APPLICABLE)

This annex gives a description of items particular to the delivery of SW.

An EIDP is also required for SW deliveries and the contents and structure of the EIDP is similar as for HW. This applies to both flight SW and GSE SW.

Software deliverables on CDROM

- A binary image in an identified and agreed format
- A map file
- A set of list files

Software supporting files on CDROM

- The software in source code format
- Test Reports, Test Logs and Test Results
- Tools and libraries needed to regenerate the software (compile, link, test and validate) or use the software

Release notes

- Identifying the version of the software
- Identifying the version of the sources it has been built with
- Identifying the version of the databases, if any, the software has been built against
- Identifying version of tools and libraries that were used to build the software
- Listing of changes (bug fixes, improvements) with respect to previous software release
- Listing of known open issues (software problem reports) or a statement that are none

User Manual, containing at least

- Procedure to install/load/patch the software
- Procedure to regenerate the software (compile, link, test and validate)
- TM/TC definitions
- Operational constraints if any
- Operational procedures to use or trouble shoot the software

CIDL

- Listing of documents and their versions applicable to this build of the software

Acceptance Review data

- Validation testing report with respect to the requirements baseline
- Traceability of the requirements baseline to the validation tests

Complete set of software documentation as per agreed engineering standard, including

- Specifications
- Design Documents
- Test Documentation
- PA Documentation, including software problem report database

Proof of readiness to enter software maintenance phase

- Test environments like software validation facilities are up to date and delivered or available
- Test suites are up to date and available
- Procedures for problem reporting and solving are available

Miscellaneous

- Licenses for any tools used to generate the software (compile, link, test and validate)
- Software margins and budget report(s)
- Independent Software Verification and Validation reports, if any

ANNEX 2. EIDP STRUCTURE AND CONTENTS GUIDELINES

This annex provides an example of the contents and structure of the EIDP for information.

History log for use after delivery

This part of the EIDP will be filled out by the customer starting from the DR and will be completed during the subsequent phases. The contents are:

- The customer follow-up sheet to record all events after the product final delivery
- The customer acceptance certificate, sign off sheet
- The DRB minutes
- The shipping document

EIDP front sheet and table of contents

- The front sheet shall contain as a minimum the following information
    - Title: End item data package
    - Item description
    - Product specification
    - Serial number
    - Drawing
    - Model
    - CI number
    - Contract number
- Table of contents

EIDP change record

Section 1 Certificate of conformity (detailing the applicable NCRs if the product is not fully conforming to the requirements)

Section 2 As-designed as-built configuration status lists

- **CIDL** of a certain issue and revision detailing the As-designed baseline configuration agreed at reviews with the following contents (requirements, design, planned verification)
    - **Requirements**
        - List of applicable specifications and/or requirement documents
        - Interface control drawing(s)
    - **Design**
        - Design description
        - Interface connector, pin allocation
        - List of applicable drawings
        - List of declared material (DML)

- List of process (DPL)
- List of component (DCL)
- Analysis performed to confirm parts of the design
- Manufacturing flow chart
- RFWs
- Procedures – handling, cleaning, etc.

o **Verification**

- List of test specifications and facilities planned
- List of manufacturing, inspection and test procedures
- List of test software

- **ABCL** with reconciliation of changes towards the CIDL. Of a later issue and revision than the CIDL, detailing the actual As-built status of the finished product. The contents of the ABCL are the following (requirements, design, verification, refer to NCRs, Waivers/Deviations and reconciliation of changes)

o **Requirements**

- List of applicable specifications and ICDs

o **Design**

- Interface connector, pin allocation
- List of used components, with PADs annexed
- List of applicable drawings
- List of Inspection reports

o **Verification**

- Interface connector, pin allocation
- Test results files and test reports
- VCD

o **Reconciliation of changes through**

- Interface connector, pin allocation
- NCR status list
- Copies of all Major NCRs with a “use as is” or “repair” decision
- RFW/RFD
- Change Notices

Section 3 Summary and status of RFWs and NCRs

- RFW status list
- Including all applicable RFWs
- NCR status list
- Copies of all Major NCRs

Section 4 Test data, reports and VCD

These documents shall be delivered in advance as available

- Functional and environmental test data and reports
- Interface measurement report
- Electrical test data and report
- Vibration test data and report
- Thermal test data and report
- Optical test report
- EMC test data and report
- Cleanliness status report
- Verification control document, VCD

Section 5 Product logbook

- History log of events, listing in chronological order all major events and activities carried out on the item starting at the latest from the final inspection of the hardware after the manufacturing/assembly phase. The list shall contain:
    - Start/end date of the activity or event
    - Activity or Event (e.g. vibration test, transport from A to B, repair per NCR-xxx, removal/temporary replacement of a subassembly)
    - Reference Document identifying the procedure and/or the test- or activity-report established for the particular activity or event
    - Name and signature of the person responsible for the activity
- MIPs and KIPs reports
- Cleanliness status record

Section 6 List of ground support equipment (MGSE, EGSE, FGSE, OGSE)

- With reference to relevant EIDPs and software product
- Samples for monitoring of molecular and particulate cleanliness/contamination

Section 7 List of EIDPs or logbooks of subunits and subsystems

- Complete EIDPs of subsystems shall also be provided for the FM

Section 8 Procedures for handling of the product after final delivery covering

- Packing procedure
- Handling procedure
- Storage procedure
- Transportation procedure
- Periodic check/calibration/recertification procedure if applicable
- Safety procedure, Residual Hazard Sheets
- Cleanliness and cleaning procedure
- Grounding concept/procedure

Section 9 Documents necessary for further work

- Integration procedure
- Testing procedure

- Operating procedure
- SW procedures
- User Manual

Section 10 List of open items and items requiring additional work or attention

- List of loose items
- Not installed items
- Limited life items, i.e. connector mating/demating, operating cycles for mechanism, etc.
- Temporary installation records, red tag item list
- Open work (i.e. work to be finish later)
- Missing items
- Spares supplied with the product

Section 11 "Other data and remarks"

Describing any useful information or relevant data that is not included in the other EIDP sections.