

Instrument Qualification Review Proceedings

1 Introduction

The Instrument Qualification Review (IQR) for the Herschel / Planck instruments will be held at the time that the instrument teams have completed their instrument qualification and the Instrument Level Tests (ILT) of the AVM/CQM program.

The IQR is of particular importance to confirm the qualification of the entire instrument at the time of the delivery to industry, and to demonstrate that the required scientific performance is achieved. In case the required performance has not been achieved on the Qualification Model, all proposed measures and design improvements to be implemented on the (Proto) Flight Model have to be identified in detail.

In the view of the upcoming integrated tests at payload module and system level the instrument operability – i.e. correct functioning regarding telecommand reception/ interpretation, telemetry generation and operational modes – shall be demonstrated as well as the availability and functionality of the related ground support equipment.

2 Objectives

The objectives of the review shall be :

- Confirmation of instrument hardware and software qualification
- Assessment of scientific performance and compliance with scientific requirements
- Completion of instrument design verification and compliance with requirements
- Identification and confirmation of improvements/modifications for FM
- Completion of OBSW design and demonstration of functionality
- Confirmation of EGSE design and demonstration of functionality
- Confirmation of instrument operability and availability of issue 1 of the User Manual

3 Structure

The single steps of the IQR will be:

1. Kick-off Meeting (with Instrument presentations) and data package delivery.
Location: ESTEC
2. Document review phase with RID generation
3. Co-location meeting (or teleconference) with instrument to clarify/answer all RIDs.
Location: Instrument premises
4. Board Report

In order to ensure a proper review process, the timely availability of the entire document data package is absolutely mandatory. The data package shall be provided in CD-ROM (5 copies) at the kick-off meeting.

NB: The review team will not accept a staggered delivery of the data package. A failure to submit a complete document data package on the due date will result in postponement of the review.

During the kick-off meeting, the instrument teams shall give supporting presentations on the following areas:

- Instrument and instrument subsystems qualification
- Scientific performance achieved during ILT
- Declaration of consistency between system and unit documentation with clear indication of deviations
- Measures and design improvements to be implemented on the (Proto) Flight model
- Budgets
- OBSW status and performance
- Mission Information Base (MIB) status
- Status of Integrated -Payload- Module Test (IMT) & Integrated System Test (IST) plans / procedures
- Ground support equipment and facilities
- Product assurance
- Management and schedule

4 Deliverable Documentation

A data package shall be provided for the IQR. The package shall be delivered to the ESA Project Team in electronic form (PDF-file) on CD-ROM (5 copies) at the day of the kick-off meeting. The data package shall be organized in three classes:

- **Mandatory documentation (MD):** These documents or items have to be submitted and shall be up-to date - and complete - and will be reviewed in detail. These documents must be available by the K.O. meeting. Any of these documents missing will lead to postponing the K.O. meeting and therefore the entire review.
- **Supplementary documentation (SD):** The documents should be submitted and are supporting documents that will only be used by the reviewers as reference for the mandatory documents. In particular, the reviewers will *not* verify consistency between these documents and their consistency with the mandatory documents
- **List of other documents:** List of existing documents; the documents themselves are not deliverables unless, specifically requested. It is not expected that these documents are up-to-date or specifically updated for the IQR.

The contents of the data package are given in Annex 1.

5 Board Composition

The board will consist of:

Chairman (Payload Manager)

Co-Chairman (Project Scientist)

Secretary (Instrument System Engineer)

ESA Board Members (4+) covering the following areas:

- Product Assurance
- AIV - Ground Support Equipment
- Electrical - Thermal/Cryo - Mechanical
- Data Management - On-board software – Operations

Industry Representative(s)

Representative of the national funding agency or other entities (if proposed by the instrument team)

In addition, during the documentation review or for the review meetings, experts may be called upon. After mutual Instrument and ESA agreement, third parties may be invited to the review as observers.

6 Timeline

The timeline for the IQR is last quarter 2004 to beginning of 2005.

The planned dates are given in Annex 2.

For each review the timing is as follows:

1. T0 K.O. Meeting and Data Pack
 - 1a. T0 + 3 days Preliminary feedback from the Board to Instrument Team
2. T0 + 2-3 weeks RIDs to Instrument Team (one week prior to co-location)
3. T0 + 3-4 weeks Co-location
4. T0 + 6-7 weeks Issue of Board Report

Between these steps board meetings will be held as considered necessary by the chairman.

Annex 1 – IQR Data Package

The data package shall contain the following documents, or documents providing equal level of information as agreed between the Instrument and ESA.

Document Title	Mandatory Document	Supplementary Document	Required for Delivery Review
<i>Hardware Design / Development / Interfaces</i>			
IID-B	X		
Instrument Master Schedule	X		
Instrument Budgets	X		
Design Description		X	
<i>Qualification</i>			
Instrument AIV Plan	X		
Instrument Calibration Plan	X		
Instrument Verification Control Document (incl. Verification Control Matrix)	X		X
Scientific Performance Test Specification		X	
Scientific Performance Test Report	X		X
ILT Summary Test Report	X		
FPU Vibration Test Report	X		X
Vibration Test Specification for all units		X	
Vibration Test 'as-run' Procedures for all units		X	X
Vibration Test Reports for warm electronic units incl. HIFI LOU	X		X
Thermal Test Specification for all units		X	
Thermal Test 'as-run' Procedures for all units		X	X
Thermal Test Reports for all units	X		X
EMC Test Specification for all units		X	
EMC Test 'as-run' Procedures for all units		X	X
EMC Test Reports for all units	X		X
<i>On-Board Software</i>			
URD		X	
SSD		X	
Software Installation Guide	X		X
HSIA	X		X
FDIR	X		X
SVVP	X		
Software Acceptance Plan		X	X
Software Acceptance Test Report	X		X
Software User Manual (if not included in the Instrument UM)	X		X
SPR/SCR List	X		
SCIDL Software Config. Item Data List	X		X
MIB Mission Information Base		X	

<i>Operations and EGSE</i>			
Instrument User Manual	X		X
EGSE User Manual	X		X
EGSE Requirement Document		X	
EGSE Specification		X	
Transport and Handling Procedures	X		X
Integration Procedures		X	X
GSE Safety Analysis (if applicable)	X		X
<i>PA</i>			
PA Plan		X	
Software PA Plan		X	
Software Configuration Management Plan		X	
Cleanliness Plan		X	
CIDL/ABCL (As Built) Config. Item Data List	X		X
CIL Critical Items List	X		X
Safety Analysis	X		X
FMECA	X		X
PSA Parts Stress Analysis	X		X
WCA Worst Case Analysis	X		X
DML Declared Materials List	X		X
DPL Declared Parts List	X		X
EEE Parts List	X		X
PAD Status Report Parts Approval Doc.	X		X
ECR Status Report	X		X
NCR Status Report	X		X
RfD/ RfW Status Report	X		X
Manufacturing flowchart with MIPs included and agreed by ESA	X		

It should be noted that the majority of the mandatory documents are also required for the delivery review of the CQM/AVMs which will be delivered in the same timeframe as the IQR. It should further be noted that the last column is for information only and the list of mandatory documents for the Delivery Review is not exhaustive in this procedure. The complete list of documents (EIDP) is described in the Delivery Review Procedure for ESA Furnished Items (SCI-PT/27760).

Annex 2 – Planned IQR Dates

Instrument	K.O. & Data Pack	RIDs to Instrument	Co-Location	Board Report
<i>Herschel</i>				
HIFI	07/12/04	17/12/04	11-12/01/05	01/02/05
PACS	26/11/04	13/12/04	20-21/12/04	19/01/05
SPIRE	16/11/04	26/11/04	09-10/12/04	11/01/05
<i>Planck</i>				
HFI				
LFI				
SCS	28/10/04	22/11/04	02-03/12/04	17/12/04