

FIRST/Planck Project

FIRST/Planck Instrument Reviews

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1 FIRST/Planck Instrument Reviews

1.1 Introduction

This document describes the reviews to be held with the FIRST/Planck Instrument Teams in the course of the programme.

Figure 1.1 shows the system event/review schedule for the FIRST/Planck programme. All detailed planning is based on this schedule.

Not included in the figure are the instrument reviews, as defined in the Instrument Interface Document part A, which relate to the following system events/reviews:

- S/C Development
- System Reviews
- Deliveries

1.2 System Events/Reviews

Two key system events in the FIRST/Planck programme are preceding the system reviews that will be held during the satellite development phase. These events, which have a direct bearing on overall instrument development, are:

- ITT release September 2000
- Start of Phase B June 2001

During the satellite development phase, system level reviews will be covering spacecraft, payload and launch vehicle aspects of the FIRST/Planck mission.

The baseline schedule for the system level reviews is:

- System Requirements Review SRR 4th quarter 2001
- Preliminary Design Review PDR 3rd quarter 2002
- Critical Design Review CDR 4th quarter 2003
- Qualification Review QR 4th quarter 2004
- Acceptance Review AR 3rd quarter 2006
- Flight Readiness Review FRR 1st quarter 2007.

To prepare for the system reviews, each satellite subsystem will have its separate review. This will include instrument reviews, for which inputs will comprise data review packages for the individual instruments. A list of the nominal contents of these packages is defined in 1.3.8.

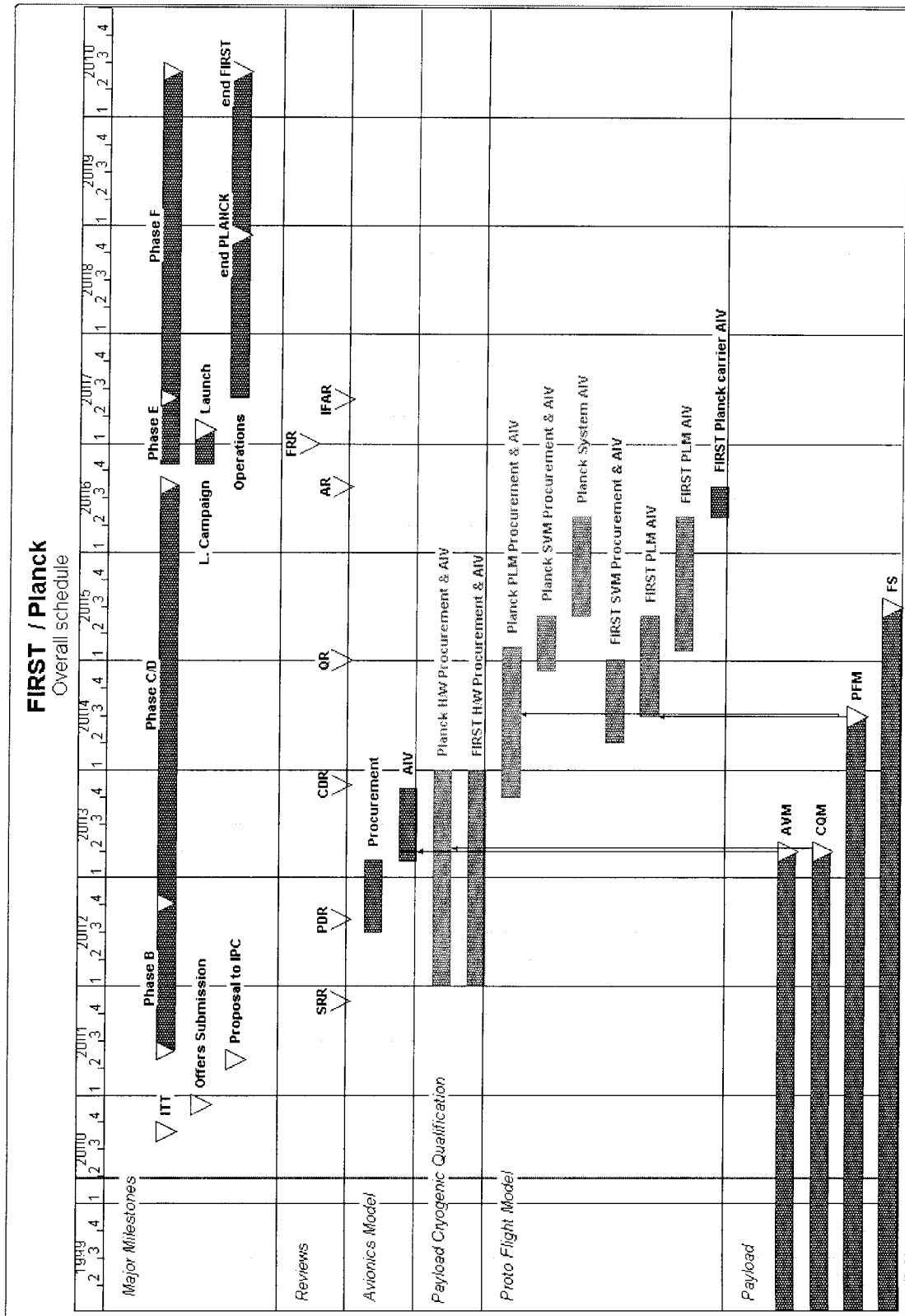


Figure 1.1: FIRST/Planck schedule overview

1.3 Instrument Reviews

1.3.1 General

There shall be six major reviews for each instrument selected for the FIRST/Planck mission. The reviews form part of the overall FIRST/Planck review programme as outlined above.

For each of the reviews, a review board will be set-up. The board will consist of ESA personnel and will be chaired by the FIRST/Planck Payload Manager together with the Project Scientist or their designated representatives.

The reviews shall be conducted by ESA, nominally at ESA premises. The objectives will be to ensure that:

- the instrument design will be compatible for achieving the instrument performance.
- the instrument design complies with the interface requirements of the Instrument Interface Documents (IID's)
- the scheduled delivery dates are compliant with the system level programme.

The data package to be reviewed shall cover both the instrument hardware and software together with details of any other deliverables such as MGSE, EGSE, OGSE and documentation and shall be delivered to the ESA Project Team as a minimum twenty working days prior to the scheduled review date.

The output of the review shall provide recommendations for consideration by the ESA Project Manager or the Principal Investigator in technical or programmatic areas. Either party shall provide a formal response to such recommendations within one month of review completion.

Non-compliance with other system elements will be brought forward to the following system level review for resolution.

Following the system level reviews the IID's will be formally reissued to reflect the results of the review.

It is realised that, aside the formal ESA reviews defined in this paper, instruments might want to conduct further instrument reviews, e.g. for internal monitoring of progress, request from funding agencies. In order to avoid duplication of effort combination of instrument internal and formal ESA reviews can be envisaged, as long as the objectives of both reviews match. For that reason it is planned to handle the below given dates for reviews in a flexible way, i.e. allowing a bandwidth of several months.

The following Instrument Reviews shall be held:

- the Instrument Science Verification Review (ISVR, end 1999 / early 2000)

- the Instrument Intermediate Design Review (IIDR, end 2000 / early 2001)
- the Instrument Baseline Design Review (IBDR, mid/end 2001)
- the Instrument Hardware Design Review (IHDR, mid/end 2002)
- the Instrument Critical Design Review (ICDR, mid/end 2003)
- the Instrument Flight Acceptance Review (IFAR, date 3rd quarter 2006)

In addition, Instrument Acceptance Reviews (IAR's) will be held at delivery of each of the instrument models. The dates are 1st quarter 2003 for the AVM and CQM, 3rd quarter 2004 for the PFM and 3rd quarter 2005 for the FS and/or FS components.

1.3.2 Instrument Science Verification Review (ISVR)

It shall be conducted after instrument selection, in preparation for the release of the ITT for S/C development.

The objectives of the review shall be to demonstrate that:

- the instrument conceptual design has been finalised/ i.e. is compatible for achieving the instrument performance
- the instrument design will achieve the anticipated science objectives
- the overall interface requirements definition has been finalised
- the conceptual design for on-board software has been finalised
- the conceptual design for the necessary MGSE, EGSE and OGSE has been finalised.

1.3.3 Instrument Intermediate Design Review (IIDR)

It shall be conducted at the time of Prime Contractor selection.

The objectives of the review shall be to demonstrate that:

- the instrument detailed system design has been finalised
- the instrument subsystem design has been finalised
- the detailed interface requirements have been finalised
- the design for the on-board software has been finalised (User Requirements Document)
- the design of the necessary MGSE, EGSE and OGSE has been finalised.

1.3.4 Instrument Baseline Design Review (IBDR)

It shall be conducted in preparation for the S/C SRR.

The objectives of the review shall be:

- the freeze of instrument system and subsystem requirements
- the freeze of the on-board software requirements (Software Requirements Documents)
- the release for manufacture of instrument Avionics Model (AVM) and Cold Qualification Model (CQM)
- the freeze of the MGSE, EGSE and OGSE design
- the release for manufacture of the MGSE, EGSE and OGSE.

1.3.5 Instrument Hardware Design Review (IHDR)

It shall be conducted in preparation for the S/C AVM/CQM phase.
The objectives of the review shall be:

- the assessment of the instrument AVM/CQM programme
- acceptance of the AVM/CQM models for spacecraft system level
- the acceptance and freeze of the on-board software (Architectural Design Document)

1.3.6 Instrument Critical Design Review (ICDR)

It shall be conducted towards the end of the industrial phase C, in preparation for the S/C CDR, after release of the AVM/CQM test reports.
The objectives of the review shall be:

- the assessment of the results of the instrument level tests of the AVM/CQM
- the assessment of the results of qualification on instrument unit and subsystem level
- the confirmation of instrument Flight Model Design, its Instrument Users' Manual and the on-board software Detailed Design Document.

1.3.7 Instrument Flight Acceptance Review (IFAR)

This review shall be conducted after completion of the spacecraft system level FM electrical verification including on-line compatibility tests with the respective flight operations centres and shall precede the programme level Acceptance Review.

The objectives of the review shall be:

- the assessment of the results of the system level FM testing with respect to the instrument

- the assessment of the completion of qualification of instrument units and subsystems
- the update of the Instrument Users' Manual as required
- the close out any outstanding issue.

1.3.8 Review Data Packages

A data package shall be provided for each of the scheduled Instrument reviews, detailed above. The package shall be delivered to the ESA Project Team in electronic form (PDF-file).

The packages shall contain the following information to the appropriate level (system, subsystem, unit) as required by the objective of the review and shall be adapted to each specific review. In order to avoid duplication of effort, the project is prepared to discuss and accept on a case by case basis different ways to provide the required information, i.e. either in a selfstanding document package (preferred way) or distributed among instrument generated documents and technical notes with a guide identifying the location of the information.

Instrument Description Document:

- A description of the current instrument design, its expected performance and interfaces

Instrument Interface Document(s):

- The IID-B updated to the current status

Development Plan/AIV:

- A New/critical technologies demonstration plan
- The Instrument Development and Verification plan
- Integration Plan and Procedures

Test reports:

- Test reports of environmental and functional tests, which demonstrate that the objectives of the instrument development, scheduled for the time of the review, have been met

User Manual:

- The User Manual

Product Assurance:

- Product Assurance documentation as required in the Product Assurance Requirements for the FIRST/Planck instruments

Schedule:

- Schedule network and bar-chart together with an assessment of progress and problem areas covering all aspects of the instrument and associated equipment

Management:

- Management Plan

Ground Support Equipment:

- Electrical ground support equipment, design, development and verification status including both hardware and software
- Mechanical ground support equipment, design, development and verification status
- Optical ground support equipment, design, development and verification status.

Software:

- Onboard software (OSW) – URD, SRD, ADD, DDD
- GSE's, e.g. s/c simulator

Notes:

- Technical notes, covering any topic or analysis which is either required by the IID or has been requested by the ESA Project Team