21 July 2000

To: Gary Parks
From: F. T. Barath
Subject: Review Board Report for the FIRST/Planck Confirmation Readiness Review (CRR) and Preliminary Design Review (PDR).

Key Findings and Recommendations

- The FIRST/Planck Standing Review Board was convened on 18-19-20 July 2000 to perform the combined Confirmation Readiness Review (CRR) and Project Preliminary Design Review (PDR) for the project.

- Based on the extensive material presented by the Project Team and the discussions during the Review, the Board unanimously concluded that the Project is ready for confirmation and Phase C/D implementation contingent upon completion of the following actions:

    1. Restoration of the Planck funding to the originally agreed-upon level.

    2. Confirmation of firm funding profiles to allow JPL to deliver the contributions for both FIRST and Planck, compatible with ESA need dates, in particular for the Planck Cryocooler.

    These actions must be completed with the concurrence of all the involved parties as soon as possible and not later than the end of FY 2000, as lack of resolution by that time would put the project into an unacceptable risk situation.

    2. Approval of the Letters of Agreement (Business Agreements) by the European partners by the end of August 2000.

- The Board acknowledges that technology demonstrations are underway in the Cryocooler and the Heterodyne Instrument for FIRST (HIFI), and that until these are successfully completed, project technical and programmatic risks remain. The Board feels, however, that the plans to complete these demonstrations, including delta PDRs, are sound, and should lead to retirement of the risks in a timely manner.

- It is understood that the current unencumbered reserves for Planck and FIRST are 20% and 25% respectively. These overall levels are commensurate with the Faster-Better-Cheaper tenets and groundrules at the time the proposals were submitted. The Board strongly feels, should higher levels of reserves be desired in view of the current climate of lower risk tolerance, that any additional reserves be provided by NASA and not taken out of the current project baseline.

- Sixty Requests For Action (RFAs) were written during the review to document detailed technical and programmatic concerns and recommendations.

General Comments

The combined Confirmation Readiness Review (CRR) and Project Preliminary Design Review (PDR) for the FIRST/Planck Project took place at the Embassy Suites in Arcadia, CA on 18-19-20 July 2000. The Standing Review Board was chaired by Frank Barath (JPL ret.), with the following members in attendance:

Mel Montemerlo, NASA
Carroll Winn, JPL
Norm Jarosik, Princeton
Norm Haynes, JPL
Peter Kittel, ARC
Peg Frerking, JPL
Frank Carr, JPL ret.
Earl Cherniack, JPL
Mike Krim, PE, ret.
Michel Anderegg, ESTEC
Doug Stetson, JPL
George Rieke, UA
Paul Harvey, UT
Gary Coyle, JPL ret.

Also Present were:
Gary Parks, Project Mgr., JPL
Tom Phillips, Caltech
Charles Lawrence, JPL
Bill Langer, JPL
Matt Malkan, UCLA
John Wellman, JPL
Fred O'Callaghan, JPL
Numerous Project Personnel

Detailed presentations were made by the Project on each Project Element and extensive discussions between Project and Board members took place. The Board was Impressed by the in-depth knowledge and candid responses of the Project as well as the enthusiasm of all involved.

Of key importance to the Review was the fact that all the Project Elements had prior technical in-depth Peer Reviews, the results of which were presented. The Project indicated that the actions resulting from the Peer Reviews are documented and are being formally tracked and dispositioned.

The Board feels that the detailed objectives of the Review were achieved, and, subject to the items listed in the Key Findings and Recommendations, confirms that:

- Project objectives are documented and consistent with program plan.
- Requirements and interfaces are adequately specified to define the technical scope and plan.

- Technology has been adequately demonstrated (PDR level elements), or there is an adequate plan to do so.
- Implementation approach is reasonable and justifiable with adequate margins.
- Plans for resolving open items/problems are consistent with resources and risk policy.
- Preliminary designs are sufficiently defined and controlled to proceed with detailed design (PDR level elements), or there is an adequate plan to do so.
- Risk is adequately understood and controlled.
- Interfaces are being defined at the right rate.
- Requirements and approach are verifiable by test, analysis or inspection.
- A firm cost, schedule and content commitment can be made.

Specific Comments

1. Cryocooler

Peter Kittel:
- Performance is highly dependent on early definition of the S/C interfaces; project needs to pay extra attention.
- Funding profile is a potential show-stopper , does not permit to achieve delivery compatible with ESA need dates and needs to be resolved by NASA HQ.

Carroll Winn:
- 10% DC power margin is small and "graceful degradation" needs to be understood if power becomes an issue.

Earl Cherniak:
- Is a delta Confirmation Review needed after the delta PDR?
- Exchange of hardware between US and Europe could enhance quality; should be covered in our agreements.

Doug Stetson:
- Requirements are generally loose—need performance floor, requirements, goals clearly defined.

Frank Carr:
- Problems/issues should be resolved at the partnership level and not propagated to the AA.

2. HIFI

Peg Frerking:
- Tech demos are not trivial and should have fallback positions, especially Bands 1-5
- Items for Bands 1-4 are on other's critical paths and need management process to assure timely deliveries.

Paul Harvey:
- Band 6 is scientifically important but only gets lip service. Band 6 is very important scientifically, but the sound of the development plan makes it seem like it may be dropped quite readily.

Earl Cherniack:
- Do not let the Band 6 decision fester.

Norm Jarosik:
- Do not jeopardize Band 5 by resources spent on Band 6 - Have a hard cutoff.

Mel Montemerlo:
- Do not ask for more $! Go with backoffs (General comment).

Frank Carr:
- Band 5 LO is tech driver and needs special attention.

3. HFI

Gary Coyle: - HFI is in good shape.

Carroll Winn: - A decision is needed soon on the dual-polarization approach.

Frank Carr: - "Improvements" such as dual-polarization need to be pinched off.

4. Telescope

Mike Krim: - Two years ago, the feasibility of the FIRST telescope was in doubt. Now we have two designs that have the potential for meeting the program's technical and cost/schedule requirements. COI and Matra are both to be congratulated for their outstanding work.

- The COI design should use some of its available mass margin to reduce quilting and improve design predictability, possibly by decreasing rib spacing and making them thicker.
- The structural adequacy of the COI design needs to be demonstrated by acoustic and proof-load testing on a full scale petal prototype and we understand this is planned, pending NASA funding.
- The produceability of the Matra design needs to be demonstrated by fabricating and proof-testing a full-scale, flight-weight petal. We understand that this is in progress now.
- Confirmation that the Matra design has a 20% weight margin is necessary

Michel Aderegg - Since there is a proposed development without a Qual Model, a plan is needed with intermediate verification points to ensure getting there with confidence and to allow acceptance from ESA mission point of view.

- Actuators need characterization to absolutely ensure no movement.
- A spares philosophy is needed together with a risk mitigation tie-in.

Doug Stetson: - Stick with baseline and do not bring alternates into the Confirmation Review.

Gary Coyle: - The COI key personnel lack of financial support between phases B and C/D needs solution.

Frank Carr: - The baseline needs to be very apparent at the Confirmation Review.

Peg Frerking: - How does on-orbit performance relate to cold-soak testing (assymmetric temperatures)?

5. LFI

Norm Jarosik: - The European effort might not be well coordinated with the US – need to look into end-to-end implementation approach to ensure no gaps.

George Rieke: - Needs attention to solve complex I/F issues.

6. FIRST Science

Matt Malkan: - Need 1-2 FTE at IPAC in 2001 to be involved in the end-to-end data system from the beginning.

Paul Harvey: - Concur with above concern.
- Look at grants as a mechanism for funding Phase E work during Phase D.

Frank Carr - Make solid Phase E plans.

7. Planck Science

George Rieke: - The IPAC involvement is worse than for FIRST and needs solution.

8. SPIRE George Rieke: - Cryo testing/qualification is very important and should be in the program. LN2 shake would be sufficient.
- The Project is crying out for electronic/video teleconferencing.
- The US PI issue/lines of authority must be solved soonest.

Distribution:
-Board Members
-Gary Parks
-John Wellman
-Fred O'Callaghan
-Larry Simmons
-Charles Elachi

Attachment: 60 RFAs