European Space Agency

Directorate of Scientific Programmes
Space Science Department

FIRST COMMON SCIENCE SYSTEM

System Requirements Review &
Preliminary Design Review FCSS v0.1
Procedure

FIRST/FSC/DOC/0155

Issue 1.0

October 2000

Prepared by: _____
Johannes Riedinger (SCI-SAF)
FSC Development Manager

Approved by: _____
Brian G. Taylor
H/SSD (acting)

Concurrence: _____
Göran Pilbratt (SCI-SA)
FIRST Project Scientist

ESTEC European Space Technology and Research Centre

e

FCSS SRR/v0.1 PDR
System Requirements and
Preliminary Design Review
Procedure

Document No.   FIRST/FSC/DOC/0155
Issue/Rev. No.   Issue 1.0
Date   30-Oct-00
Page   ii

CHANGE RECORD SHEET

Date	Issue No.	Rev. No.	Description and Page No.	Approval Authorisation	SCR No.
15-Sep-00	Draft	0.1	All	---	---
09-Oct-00	Draft	0.2	All	---	---
20-Oct-00	Draft	0.3	All	---	---
30-Oct-00	Issue	1.0	New bullet added to section 1.3	---	---

A vertical bar at the outside border indicates revisions.

e

FCSS SRR/v0.1 PDR
System Requirements and
Preliminary Design Review
Procedure

Document No.	FIRST/FSC/DOC/0155
Issue/Rev. No.	Issue 1.0
Date	30-Oct-00
Page	iii

DISTRIBUTION LIST

Recipient	Organisation	Recipient	Organisation
G. Pilbratt	SSD-SA	T. Passvogel	SCI-PT
A. Heras	SSD-SA	P. Estaria	SCI-PT
T. Prusti	SSD-SA		
K. Galloway	SSD-SA/Aurora		
P. Claes	SSD-SAF	O. Bauer	MPE-Garching
J. Riedinger	SSD-SAF	T. Dimbylow	Rutherford Lab.
S. Veillat	MSM-MAA	P. Roelfsema	SRON-Groningen
M. Thomas	SSD-SA/Cara	A. Poglitsch	MPE-Garching
J-J. Mathieu	TOS-EMS	M. Griffin	QMW
J. Carranza	TOS-QQS	K. King	Rutherford Lab.
J. Brumfitt	SSD-SAF/Aurora	T. de Graauw	SRON-Groningen
H. Siddiqui	SSD-SAF/Vega	C. Wafelbakker	SRON-Groningen
M. Kessler	SSD-SAI		
H. Jenkner	STScI		
M. Hernek	TOS-QQS		
J. Dodsworth	TOS-OFC		
B. Melton	TOS-GCE		
N. Peccia	TOS-GCM		
B. Taylor	H/SSD (acting)		

e

FCSS SRR/v0.1 PDR

System Requirements and
Preliminary Design Review
Procedure

Document No.	FIRST/FSC/DOC/0155
Issue/Rev. No.	Issue 1.0
Date	30-Oct-00
Page	iv

TABLE OF CONTENTS

e | FCSS SRR/v0.1 PDR
System Requirements and
Preliminary Design Review
Procedure | Document No. | FIRST/FSC/DOC/0155
| | Issue/Rev. No. | Issue 1.0
| | Date | 30-Oct-00
| | Page | 1

1. INTRODUCTION

1.1 Review Background

Following the standards for Software Engineering (ECSS-E-40A) and Software Product Assurance (ECSS-Q-80A) that apply to the development of systems used to support the operation of scientific satellites, the FIRST Common Science System shall be subject to periodic reviews throughout its development lifecycle.

In this context, ECSS-E-40A foresees a series of reviews at specific milestones during the development: A System Requirements Review (SRR), a Preliminary Design Review (PDR), a Critical Design Review (CDR), a Qualification Review (QR) and an Acceptance Review (AR).

1.2 Scope of this Document

This document constitutes the procedure for the combined System Requirements Review (SRR) of the FIRST Common Science System and the first Preliminary Design Review for the initial implementation phase of this System (FCSS v0.1 PDR). It provides the review objectives, organization and participation schedule, and the overall contents of the data packages.

1.3 The System under Review and its Context

The FIRST Common Science System (FCSS) is the joint development of teams at ESA (SSD/SA) and the three nationally-funded Instrument Control Centres, each of which is associated with one of the three FIRST instruments. The FCSS is one of several systems which in various constellations comprise the FIRST Ground Segment at different times during FIRST development and operations. FCSS development is coordinated by the FCSS Management Group (FCSSMG). Fig 1-1 shows the FCSS and FCSSMG in the context of the other elements of the FIRST Ground Segment and their coordinating bodies.

The development of the FCSS differs from predecessor projects such as ISO or XMM-Newton in the following respects:

➢ The FCSS has to support a concept of "smooth transition" between mission phases from Instrument Level Tests onward until the end of the FIRST post-mission archiving phase. This requires that certain interfaces of the system need to be defined early and with a system level approach to ensure that such interfaces remain valid to the maximum extent possible through the various development and operational phases. It also requires that an intial FCSS version, which is capable of generating instrument command sequences and of storing appropriately "tagged" instrument telemetry, is deployed more than 5 years prior to launch.

➢ Because the system is deployed for actual use so early, the development and corresponding maintenance activities are rather extended. This requires strong attention to robustness of both the system and the development/maintenance approach against changing hardware platforms and software environments; similarly, one will have to guard against natural staff turnover, making it necessary to preserve "corporate memory" by strict, comprehensive, and continuously up-to-date documentation.

➢ The FCSS will be entirely developed using the object-oriented paradigm. Although this approach is more and more widely adapted in putting together SW-intensive systems, care

e

FCSS SRR/v0.1 PDR
System Requirements and
Preliminary Design Review
Procedure

Document No.   FIRST/FSC/DOC/0155
Issue/Rev. No.   Issue 1.0
Date   30-Oct-00
Page   2

needs to be taken in such a development to provide adequate tools and adequate training to the development team.

➢ The FCSS development is distributed across different sites and includes active participation in operational software development from Instrument Teams from the start. This approach is not without risk because the contributing teams have different SW development cultures and backgrounds, but is imposed on the development by a high-level ESA decision.

➢ Based on experience with ISO and, to a lesser extent, XMM-Newton, the FCSS is designed to collect all data that may become relevant during the different phases of the mission from development into post-operations into a single, distributed database.

Fig. 1-1: Context of FCSS Development
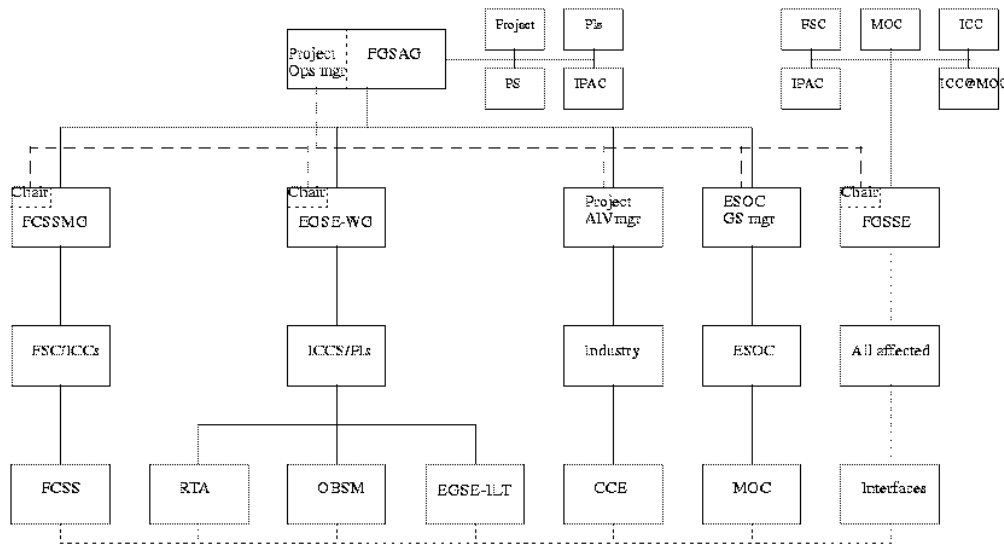
1.4 Justification for a Combined SRR/FCSS v0.1 PDR

Normally, one would expect a System Requirements Review to precede a Preliminary Design Review by several months and, indeed, the first formal Issues 1.0 of a User Requirements Document, containing requirements on the post-launch *operational* system, and an Interface Requirements Document for the FIRST Ground Segment were already available in May 2000. However, additional requirements on functionality, interfaces and development schedule arising from the early operational use of the system in Instrument Level Tests have required a significant amount of interface definition and FIRST Ground Segment architectural investigation to be carried out before the joint development team could establish the full requirements baseline with some confidence.

As the requirements baseline for *operational* and *pre-launch* uses of the system was only consolidated less than one year before the planned delivery of FCSS v0.1, it has become necessary to review the requirements baseline and a preliminary design for the first release of the FCSS during the same review period. However, the scopes of the two reviews remain different and should not be confused (cf. sections 2.1 and 2.2).

e

FCSS SRR/v0.1 PDR

System Requirements and
Preliminary Design Review
Procedure

Document No.	FIRST/FSC/DOC/0155
Issue/Rev. No.	Issue 1.0
Date	30-Oct-00
Page	3

2. REVIEW OBJECTIVES/TASKS

2.1 Review Objectives of the System Requirements Review

The top-level objective of the System Requirements Review,

> to verify that the FIRST Common Science System is well-defined in terms of its scope and the interface it has with other systems of the FIRST Ground Segment, of which it forms part

can be broken down into the following review components:

a) To verify that the requirements baseline for the FIRST Common Science System is compliant with the programmatic constraints under which the FIRST Ground Segment has to be developed;

b) To verify that the requirements baseline for the FIRST Common Science System is internally consistent;

c) To verify that the requirements baseline for the FIRST Common Science System is complete with respect to the functions this system provides as part of the FIRST Ground Segment;

d) To verify that all interfaces between the FIRST Common Science System and the other systems within the FIRST Ground Segment have been identified;

e) To verify that the resources and programmatic assumptions are consistent with the scope of the requirements (within the tolerances permitted at this phase);

f) To verify that the management scheme is appropriate for the joint development;

g) To verify that a risk assessment has been completed and the risk reduction measures proposed are appropriate.

Upon satisfactory conclusion, the results of the SRR shall provide for approval of the FIRST Common Science System requirements baseline and further go-ahead for the next phase of implementation (Elaboration Phase, Part 2).

2.2 Review Objectives of the Preliminary Design Review for FCSS v0.1

The top-level objective of the initial Preliminary Design Review,

> to verify that the first formal release of the FIRST Common Science System (FCSS v0.1) will provide adequate support to its users during Instrument Level Tests

can be broken down into the following components:

a) To verify that the FIRST Common Science System top level design is consistent with the requirements and adequate for this stage of development;

b) To verify that the plans for the development of the system in the next phase are complete, consistent and sufficient, and the associated resources are adequate and available.

c) To verify that the development environment is adequate;

d) To verify that the scope and functionality of this first formal release is properly understood and that the requirements pertaining to this functionality have been analysed to a depth sufficient to start implementation of FCSS v0.1;

e) To verify that the specific risks for this phase have been addressed.

Upon satisfactory conclusion, the results of the FCSS v0.1 PDR shall provide for approval of the FIRST Common Science System development plans for this phase and further go-ahead for the next phase of implementation (Construction Phase for FCSS v0.1, which in time overlaps with Elaboration Phase Part 2). Because these two development phases overlap, the corresponding reviews also overlap but they still have their separate objectives.

2.3 Review Data Package for the System Requirements Review

The SRR data package, which has to be evaluated, consists of the documents listed in Table 2-1 which can be downloaded from http://… More detailed information can be found in the reference documentation compiled in Table 2-2, which can be downloaded from http://… This reference documentation provides background to and rationale for the requirements baseline contained in the data package but does not form part of the data package.

2.4 Review Data Package for the FCSS v0.1 Preliminary Design Review

The FCSS v0.1 PDR data package, which has to be evaluated, extends the SRR data package by adding

a) analysis and design documents, which form part of the technical specification,
b) interface control documents that need to be elaborated and agreed during this phase,
c) development plans for this phase.

These documents are listed in Table 2-3 and can be downloaded from http://… Ancillary documentation, e.g. Technical Notes explaining the rationale for certain decisions, is listed in Table 2-4 and can be downloaded from http://….

e

FCSS SRR/v0.1 PDR
System Requirements and
Preliminary Design Review
Procedure

Document No.	FIRST/FSC/DOC/0155
Issue/Rev. No.	Issue 1.0
Date	30-Oct-00
Page	5

Table 2-1: SRR Data Package

ID	Document Number	Document Title	Document Version	Date	Review Objective	Doc. lot	Approx. size
SRR. 1	PT-03646	FIRST Science Implementation Requirements Document (SIRD)	Issue 1.0	xx-Nov-00	2.1-a 2.1-c	2	80
SRR. 2	FIRST/FSC/ DOC/0115	FCSS User Requirements Document	Issue 1.1	xx-Oct-00	2.1-b	1	40
SRR. 3	FIRST/FSC/ DOC/0117	FIRST Ground Segment Interface Requirements Document	Issue 1.3	25-Oct-00	2.1-b 2.1-c 2.1-d	1	60
SRR. 4	FIRST/FSC/ DOC/0149	FIRST Ground Segment: List of ICDs	Draft 0.2	12-Oct-00	2.1-d	1	20
SRR. 5	FIRST/FSC/ DOC/0143	FCSS Management Group Terms of Reference	Issue 1.1	15-Oct-00	2.1-f	1	<<10
SRR.6	FIRST/FSC/ DOC/0145	FIRST Ground Segment System Engineering Group: Terms of Reference	Issue 1.0	23-Aug-00	2.1-d 2.1-f	1	<<10
SRR.7a	FIRST/FSC/ DOC/0116	FSC System Software Project Management Plan[a]	Issue 1.0	5-May-00	2.1-f 2.1-g	1	Body: 30 WPs: 20 Tech: 30[d]
SRR. 7b	FIRST/FSC/ DOC/0116	FCSS Software Project Management Plan[b]	Issue 2.0	xx-Nov-00	2.1-e 2.1-f 2.1-g	2	Body: 30 WPs: 50 Tech: 30[d]
SRR.8	FIRST/FSC/ DOC/0127	Software Engineering and Product Assurance Requirements for the FSC/ICC Common System[c]	Issue 1.0	17-Aug-00	2.1-a	1	10
SRR.9	FIRST/FSC/ DOC/0114	FIRST Operations Scenario Document	Issue 1.0		2.1-c	1	70

Notes:

a   Issue 1.0 of the SPMP covers the first development phase, which is to be formally concluded by the SRR as having produced and recorded a consistent requirements baseline and development documents.

b   Issue 2.0 of the SPMP covers the next development phase which will be entered after successful completion of the SRR. This second issue of the document is relevant in verifying that

➢ Elaboration Phase Part 1 has achieved what it set out to achieve (Section 4.1),

➢ the resources and management scheme are adequate for the next development phase (Section 2 and Appendix A),

➢ an appropriate risk assessment has been performed for this effort (Section 4.4.2).

c   The document title may be confusing as this document was issued before the introduction of the accronym FCSS. The FSC/ICC Common System is what is now called the FCSS but this document will not be re-issued just for a change in title.

d   The SPMP consists of a body, describing the managerial aspects of the approach and several annexes. The most important annexes contain

➢ the Work Breakdown Structure and Work Package Descriptions

➢ the development schedule

➢ a description of the development methodology. This section was added as an annex because the FCSS development departs from a traditional waterfall approach

e

FCSS SRR/v0.1 PDR
System Requirements and
Preliminary Design Review
Procedure

Document No.   FIRST/FSC/DOC/0155
Issue/Rev. No. Issue 1.0
Date   30-Oct-00
Page   6

Table 2-2:   SRR Additional Documentation

ID	Document Number	Document Title	Document Version	Date	Doc Lot	Approx. Size
SRR.i		FSC Science Implementation Plan	TBD	TBD	2	Body: 60 Annex: 10
SRR.ii		HIFI Science Implementation Plan	TBD	TBD	2	
SRR.iii		PACS Science Implementation Plan	TBD	TBD	2	
SRR.iv		SPIRE Science Implementation Plan	TBD	TBD	2	
SRR.v	FIRST/FSC/DOC/0146	FIRST Ground Segment Design Description	1.0	3-Nov-00	1	70

e

FCSS **SRR/v0.1 PDR**
System Requirements and
Preliminary Design Review
Procedure

Document No.	FIRST/FSC/DOC/0155
Issue/Rev. No.	Issue 1.0
Date	30-Oct-00
Page	7

Table 2-3:   FCSS v0.1 PDR Data Package

ID	Document Number	Document Title	Document Version	Date	Review Objective	Doc. Lot	Approx. Size
All documents contained in the SRR Data Package are applicable documents						
PDR.1	FIRST/FSC/ DOC/0157	FCSS Actor Descriptions		17-Aug-00	2.2-b	1	60
PDR.2	FIRST/FSC/ DOC/0158	FCSS Use-Cases[a]			2.2-b	1	220
PDR.3	FIRST/FSC/ DOC/0159	FCSS Supplementary Specifications			2.2-b	2	30?
PDR.4	FIRST/FSC/ DOC/0120	FCSS Glossary			2.2-b	1	30
PDR.5	FIRST/FSC/ DOC/TBD	Analysis of a minimum end-to-end chain of use-cases for operations			2.2-c	2	60
PDR.6		Analysis of a minimum end-to-end chain of use-cases for Instrument Level Tests			2.2-c	2	
PDR.7		Traceability Matrix for User Requirements to Use-cases			2.2-a	2	
PDR.8		FCSS Domain Model			2.2-c	2	
PDR.9		FCSS Design Model/Core Class Model for ILT[b]			2.2-c	2	
PDR.10	FIRST/FSC/ DOC/0161	FCSS Product Assurance Plan			2.2-a	2	
PDR.11	FIRST/FSC/ DOC/0162	FCSS Software Verification and Validation Plan			2.2-a	2	
PDR.12	FSCDT/TN-009	Technical Note on Coding Standards for the FIRST Common Science System Development				2	10

Notes:

a   For FCSS v0.1, which will support Instrument Level
Tests, only the following, small fraction of the use-cases
are relevant:

- ➢ UCF-701 Test the instrument during ILT
- ➢ UCF-756 Ingest MIB
- ➢ UCF-753 Define Building Block
- ➢ UCF-752 Define Observing Mode
- ➢ UCF-758 Ingest real-time telemetry
- ➢ UCF-601 Run RTA

- ➢ UCF-747 Run QLA
- ➢ UCF-711 Run test procedure
- ➢ UCF-759 Ingest TC history
- ➢ UCF-748 Run Automatic test analysis
- ➢ UCF-746 RUN IA
- ➢ UCF-IAP Define IA algorithm/product

b   To implement the concept of "smooth transition", it is necessary that the core class model is carefully checked against and compliant with a minimum end-to-end chain of operational use-cases as well as a minimum end-to-end chain of ILT use-cases. As the ILT use-cases have to be implemented during the next development phase, the emphasis at this stage of the development has to be on having sufficient detail available for ILT.

FCSS SRR/v0.1 PDR

System Requirements and
Preliminary Design Review
Procedure

Document No.	FIRST/FSC/DOC/0155
Issue/Rev. No.	Issue 1.0
Date	30-Oct-00
Page	8

Table 2-4: FCSS v0.1 PDR Reference Documentation

ID	Document Number	Document Title	Document Version	Date
PDR.i	FSCDT/TN-002	Technical Note on Selection of a UML Modelling Tool for the FIRST Common Science System development	1.0	22-Aug-00
PDR.ii	FSCDT/TN-004	Selection of an Object Data Base for the FCSS		

3. COURSE OF REVIEW ACTIVITIES

The review will be conducted according to the activities outlined in the subsequent paragraphs.

3.1 Review Panels

It has been agreed with the authority calling for this review that the nature and scope of the FCSS SRR and v0.1 PDR is such that no Review Panels need to be convened. The highest instance for resolving conflicts at the Review Board level is the Review Board chair, who is responsible for the contents of the SRR/PDR v0.1 Final Board Report(s).

3.2 Preparation / Availability of Data Package

With the support of the FIRST Common Science System development team, the chair of the FCSS Management Group (FCSSMG) will prepare the Review Data Packages given in section 2. The review data packages will be made accessible in electronic form to each Review Team member. Note that it is not foreseen to distribute paper versions of the documentation to Review Team members.

Based on a proposal from the Board Chairman to decompress the time scale for the review, which is driven by the need date for an initial release of FCSS v0.1 in October 2001, the data packages will be distributed in two lots, at the beginning and at the end of November 2000. Which document is available with which lot is indicated in the tables in Section 2, the distribution dates for the lots are given in Figure 5-1.

3.3 Introductory Presentation to the Review Board and Initial Review Period

The first lot of documents to be reviewed will be accompanied by an introductory presentation in electronic form. Following receipt, the reviewers (cf. Distribution List) should start to review this initial set of documents and prepare sets of questions and comments for a clarification session with the joint FCSS development team.

3.4 Clarification Session between Reviewers and Development Team

At the end of November 2000, the reviewers will be invited for a one-day clarification meeting at ESTEC (30-Nov-2000 pm and 1-Dec-2000 am) to discuss their initial findings with the development team. A detailed agenda will be provided a few days in advance of the meeting in consultation with the Review Board Chairman, but the following list of topics will be covered (TBC):

➢ Recapitulation of the review objective by the convening authority,
➢ Introduction of Board Members and conduct of the review (Review Board Chairman),
➢ The FCSS from the user perspective (Project Scientist Team plus one representative of the Instrument Teams),
➢ Introduction to Documentation Packages lot 1 and 2 (FCSSMG Chairman),
➢ Development status (FSC Development Manager),
➢ Specific problem areas,

e

FCSS SRR/v0.1 PDR

System Requirements and
Preliminary Design Review
Procedure

Document No.	FIRST/FSC/DOC/0155
Issue/Rev. No.	Issue 1.0
Date	30-Oct-00
Page	10

> ➢ First impressions from Board Members,
> ➢ Closed Board Meeting.

For documents that had already been distibuted in lot 1, the ratio between presentations and discussion should be 1 to 2, for documents in lot 2, which will be made available at this clarification meeting, this ratio should be 2 to 1.

3.5 Board Meeting Adjacent to Clarification Meeting

1-Dec-2000 pm will be used by the Board in closed session to

> ➢ Collect preliminary concerns from Board members arising from reviewed lot 1 documentation and the presentation of lot 2 documentation,
> ➢ Assign specific review tasks to Board Members.

3.6 Review and RID Submission Period

Following the clarification meeting, RIDs can be raised by any member of the Review Team while the Board members perform their review tasks on the documentation packages. To be acceptable, RIDs must provide a clear description of the discrepancy with detailed references to one or more documents, stating which requirement is violated by the problem observed. The RIDs shall be raised using the World Wide Web URL:

http://…

or, should this prototype turn out to be deficient, in paper form.

Closing date for RID submission by non-Board members of the Review Team is 11-Dec-2000.

3.7 Board Teleconference

On 12-Dec-2000 the Review Board members will convene via teleconference to report on their findings. Based on these findings and the RIDs submitted by non-Board members of the Review Team, the Board will outline the major elements of the Board Report and allocate responsibilities to individual Board members for raising additional RIDs against the documentation packages should any major concerns not already be adequately covered by existing RIDs.

At the end of this teleconference, the Board Chairman will give a preliminary indication of the outcome of the review to the development team.

3.8 Preliminary Board Report

A Preliminary Board Report will be available by 17-Dec-2000. It will contain

> ➢ A short overview of the main issues,
> ➢ Comments against each of the agreed review objectives, including pass/fail criteria,
> ➢ A set of numbered "findings" and associated "recommendations".

e | **FCSS SRR/v0.1 PDR**
System Requirements and
Preliminary Design Review
Procedure

Document No.	FIRST/FSC/DOC/0155
Issue/Rev. No.	Issue 1.0
Date	30-Oct-00
Page	11

The Board "findings" will be based on discrepancies or shortcomings of the documentation contained in the review data packages, which have been entered into Review Item Discrepancy (RID) forms.

3.9 RID Review by the Development Team

The preliminary Board Report and all RIDs will be available on 17-Dec-2000 to the development team to prepare written answers to all RIDs and associated concerns raised in the Preliminary Board Report. The development team's answer will be available to the Review Board by the end of week 2/2001.

3.10 Final Board Teleconference

During week 3/2001, the Board will convene for another teleconference to review the responses from the development team and to discuss to what extent the preliminary Board Report should be modified based on this response.

3.11 Final Board Report

The final Board Report will be made available during week 4/2001. The decision of providing one combined or two separate reports for the SRR and FCSS v0.1 PDR aspects of the combined review is left to the Review Board.

Table 3-1:   *Preliminary Agenda for the Clarification Meeting*

        TO BE PROVIDED

e

FCSS SRR/v0.1 PDR
System Requirements and
Preliminary Design Review
Procedure

Document No.	FIRST/FSC/DOC/0155
Issue/Rev. No.	Issue 1.0
Date	30-Oct-00
Page	12

4. Review Board Composition

M. Kessler	SCI-SAI	Review Board Chair
P. Estaria	SCI-PT	Review Board Co-Chair
C. Arviset	SCI-SAI	
O. Bauer	MPE	
J. Carranza	TOS-QQS	Secretary
A. Heras	SCI-SA	
H. Jenkner	STScI	
B. Melton	TOS-GCE	
N. Peccia	TOS-GCM	

e **FCSS SRR/v0.1 PDR**
System Requirements and
Preliminary Design Review
Procedure

Document No. FIRST/FSC/DOC/0155
Issue/Rev. No. Issue 1.0
Date 30-Oct-00
Page 13

5. SCHEDULE

The overall review schedule and milestones are given in Figure 5-1.

Figure 5-1: Review Schedule / Milestones

	October 2000					November 2000			
	40	41	42	43	44	45	46	47	48
Document Preparation	====	====	====	====	====	====	====	====	=
Release lot 1 documentation						▼ 7.11			
Full Data Package Available									▼ 29.11
Review lot 1 documenation						===	====	====	▼ 29.11

	Nov	December 2000				January 2001			
	48	49	50	51	52	1	2	3	4
Full Data Package Availability	▼ 29.11								
Clarification meeting with Review Board	▼▼ 30.11 1.12								
Evaluation Period / RID submission	==	====	=▼ 11.12						
RID submission deadline for non-Board reviewers									
Board teleconference			▼ 12.12						
Generation of additional RIDs by Board Members			===	=▼ 16.12					
Draft Board Report from Board Chairman				▼ 17.12					
RID processing by development team				▼== 18.12			===▼ 13.1		
Board teleconference								▼ TBD	
Final Board Report									▼ TBD