

HERSCHEL/ PLANCK INSTRUMENTS**ESA PA 3rd QUARTERLY MEETING**

MPE Garching
03/07/02

1. INTRODUCTION:

By Mr. Katterloher, MPE

Actions

Due date

2. INSTRUMENT STATUSA **PACS****CRITICAL ITEMS LIST**

MPE / AI-1

1/10/02

ESA request special problems to be added to CIL
MPE to do this in future. Update of CIL.

SAVETY SUBMISSION

Document due for release

MPE / A1-2

15/07/02

MPE to send electronic version in // to ESA and ALCATEL

CLEANLINESS

Update of plan in signature cycle. Discussion of molecular
contamination 4×10^{-6} . Are there margins?

MPE/A1-3

15/07/02

DERATING

New IFSI doc available.

VCD

Document to be delivered to ESA

MPE / AI-4

15/07/02

CIDL

Latest document to be delivered to ESA

MPE / AI-5

15/07/02

MIP PLANNING

Available at ESA

BLACK PAINT DISCUSSION (KT)

Statement KT outgassing within specification (RML)
per ECSS-Q-02A. Sent to ESA by e-mail.

ESA requests complete report on outgassing

KT/AI-6

B. HIFI

No participation

C. SPIRE

CIL Not issued by spire	SPIRE/AI-7	19/07/02
FMECA: ESA question on thermal straps to be answered by e-mail.		
HSIA : SPIRE to check status of this.	SPIRE/AI-8	19/07/02

PROBLEMS & SOLUTIONS

ESA statement option 2 (prioritise deliveries not acceptable / discussion needed) see annex

SAFETY

Why do ALCATEL need description? Spire to check critical materials.	SPIRE/AI-9
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D. HFI

ESA request copy of action plan	HFI/AI-10	10/07/02
ESA insists on comprehensive derating analysis to be discussed at PI level	ESA/HFI PI / AI-11	

E. LFI

No actions

3. IHDR PREPARATIONS

ESA presentation on procedures
PA should check procedures against Annex.
KIP Report example - Annex
Document requested by PA - Annex

New: SAFETY
LOG BOOK
EIDP
and submittal dates.

PA requirement: Document will not be updated. ESA to update with responsibility LOG books and EIDP - Annex	ESA/AI-12	closed
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Is electronic form acceptable?

ESA answer: 1 paper copy + 5 CDROM
for delivery or 5 paper copies. TBC

ESA / AI-15

next quarter.

4. ALCATEL

Documents - as last meeting.
Discussion on safety submission.

5. ACTIONS ON SAFETY SUBMISSION - Annex 11

AI-2 Status
HFI - see attached

Position statements

For HFI, SCE is not managed by HFI.
P. Stassi manages SCE with IPL indirect, not with IAS.
PA LFI point out that direct I/F with SCE is HFI so
documentation have to be reviewed at least in //
with HFI/LFI.

ESA will require HFI and LFI PI to clarify the
management line for the SCE.

ESA / AI-13

To AI-5 Transferred to ALCATEL
Copy of radiation analysis to all Instruments.

6. AOB

Next meeting in IAS 15/10/02 TBC.

ALL/AI-14

Common problems
Contractuara / Issues / Institutes - Manpower
Documentation

QUARTERLY MEETING

Annex 1

03/07/02

PARTICIPANTS:

Igl, Georg	MPE
Jenkins, Ian	ASTRIUM
Katterloher, Reinhard	MPE
Gradmann, Norbert	MPE
Rautakoski, Jan	ESA
Olivier, Pierre	ESA
Heurtel, Alavi	IAS
Dragoni, Antonio	PST-Laben
Masse, Christian	ALCATEL
Clark, Eric	R.A.L.
Kanpe, Dirk	KT (part time)

9:15 - 9:30 1. Arrival/Introduction MPE/ESA
 2. Instrument PA status and outlook
including problems/solutions and help needed * :

9.30 - 10:00 PACS

10:00 - 10:30 HIFI

10:30- 11:00 Coffee Break

11:00- 11:30 Spire

11:30-12:00 HFI

12:00-12:45 Lunch

12:45-13:15 LFI

3. IHDR Preparation (ESA?)

13:15 - 13:45

4. Presentation by Alcatel on PA document
schedule, documents required from Instruments

13:45-14:15

14:15-14:30 Coffee Break

14:30- 15:15 AOB

* Instrument status covering:

CIL

NCR

System FMECA and effect on S/C (propagation of failures)/HSIA

Cleanliness (materials)

Results on derating

Status on VCD

Configuration status

MIP planning

AIT procedure preparation

Meeting reference	Date	Meeting	Action Item Description	Action No.	Actionee	Due Date	Status	Reference
SCI-PT-10698	14.12.2001	1st PA quarterly meeting	Clarification of EEE parts approval	AI 1	ESA		Closed	e-mail 4.1.2002 MvH
SCI-PT-10698	14.12.2001	1st PA quarterly meeting	Alcatel to provide CA/SO/ISO 246/90 info to instruments	AI 2	Alcatel		Closed	e-mail 19.12.2001 CM
LA-GE-DQ-MN-0006-02	18.4.2002	2nd PA quarterly meeting	Safety submissions to Alcatel from all instruments, draft from JPL	AI 1	All	end May 2002	Partly Open	PACS missing, HIFI partly delivered ref. Missing
LA-GE-DQ-MN-0006-02	18.4.2002	2nd PA quarterly meeting	Deliver SW PA plan from ISN to ESA. Clarify if it is applicable to LFI too.	AI 2	HFI	26.4.2002	Partly Open	SPMP delivered 19.2.2002. Not confirmed it applicable to LFI
LA-GE-DQ-MN-0006-02	18.4.2002	2nd PA quarterly meeting	ESA to provide 6 samples for molecular contamination measurements of cleanrooms	AI 3	ESA	Mid May 2002	Closed	sent by G van Papendrecht, confirmed received 14.5.2002 HJ
LA-GE-DQ-MN-0006-02	18.4.2002	2nd PA quarterly meeting	ESA to provide Alcatel with the safety statement from HIFI delivered to ESA before the HIFI IBDR	AI 4	ESA	26.4.2002	Closed	e-mail to C. Masse 1.5.2002
LA-GE-DQ-MN-0006-02	18.4.2002	2nd PA quarterly meeting	SRON requests a radiation sector analysis wrt. Service module	AI 5	ESA	date to be provided	Open	Asked for clarification 10.6 from HIFI on which components need it
LA-GE-DQ-MN-0006-02	18.4.2002	2nd PA quarterly meeting	SRON provide the impact of air that can enter the CVV through sealings	AI 6	SRON	2nd half of May 2002	Closed	e-mail to JR, PO, 14.5.2002 (Fwd: contamination due to leakage through Herschel cryostat seals)
LA-GE-DQ-MN-0006-02	18.4.2002	2nd PA quarterly meeting	Next qtl. PA meeting 4 July 2002 at MPE to be confirmed	AI 7	MPE	ASAP	Closed	Closed by event

Documents requested by PA for reviews

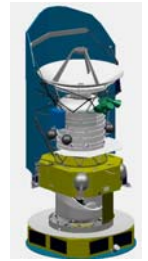
A = for approval

R = for review

I = for information

	Title	Class	Responsible	Submittal
1	PA plan	A	PA	
2	SW PA plan (can be part of PA plan)	A	PA	
3	CM plan	A	CM, PA	
4	CIL	R	PA, PM, ENG, AIT	IBDR, IHDR, ICDR, As part of progress report
5	FMECA	R	PA, ENG	IIDR, IBDR, IHDR
6	Worst Case Analysis, Derating analysis	R	ENG	IIDR, IBDR, IHDR, ICDR
7	HSIA (Hardware/software interaction analysis)	R	ENG (SW)	IIDR, IBDR, IHDR, ICDR
8	Summary FDIR	R	ENG (SW)	IIDR, IBDR, IHDR, ICDR
9	Cleanliness control plan	R	PA	IBDR
10	Manufacturing flow chart with MIP/KIP identified	R	ENG, AIT, PA	IBDR, IHDR
11	EEE parts list, PAD sheets	R/A	ENG, PA	IIDR, IBDR, IHDR, ICDR, EIDP (PAD sheets for self procured components)
12	Material, process (consolidated) and mechanical parts list, RFA	R/A	ENG, AIT, PA	IIDR, IBDR, IHDR, ICDR, EIDP. (as they occur for RFA)
13	Verification control document	R	ENG, AIT, PA	IBDR, IHDR, ICDR, EIDP
14	CIDL	R	CM, PA	IBDR, IHDR, ICDR, Before tests, EIDP
15	MIP/KIP reports	R	AIT, PA	As produced, EIDP
16	ABCL	R	CM, PA	Before tests, EIDP
17	Test Procedures	R	AIT	ICDR, 1 month before tests
18	Test reports	R	AIT	After tests, EIDP
19	Qualification matrix (can be part of Verification Control Document, VCD)	R	AIT, ENG, PA	IBDR, IHDR, ICDR, EIDP
20	NCR, NCR status list	R/A	PA	Major NCR as they occur, List as part of progress report, List as part of EIDP
21	RFW, RFW status list	A	PA, PM	RFW as needed List as part of progress report, List and RFW as part of EIDP
22	Certificate of conformity	R	PA, PM	EIDP
23	Progress report	I	PM, PA	Monthly
24	Audit reports	I	PA	As requested
25	Safety submission	A	PA, ENG	For S/C PDR In time for each safety submission as required 6 months before due date.

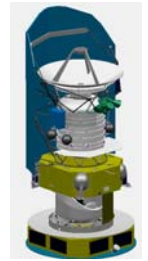
26	Manufacturing logbook	I	AIT, PA	As part of EIDP
27	EIDP, End Item Data Package	R	All	IHDR (CQM model)



Logbooks & EIDP

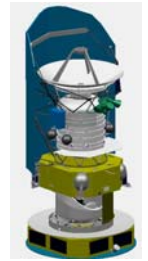
ESA-ESTEC

J. Rautakoski



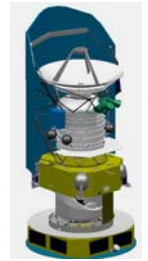
Logbook – Manufacturing/History Logbook

- Document in which the data related to manufacturing, integration and testing of a configuration item are recorded in chronological order
- Providing traceability of all events at any time during the life cycle
- Beginning with manufacturing, continuing through assembly, integration and qualification or acceptance test, can be one or separate logbooks
- Included in the EIDP to allow full visibility of the product history during acceptance and use of the deliverable hardware by the customer



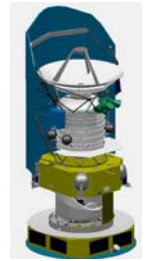
Logbook contents

- **Cover page containing**
 - General information
 - Contents
 - Approvals of the relevant authorities (QA, PA, PM)
 - Customer acceptance (if required by the contract)
- **Section 1: HW configuration & traceability**
 - Contains the hardware configuration and traceability table, which reports all the identification references of single elements composing the CI
- **Section 2: HW configuration change status**
 - Contains the hardware configuration change and status table, which reports for each single element of the CI all the events relevant to integration, removal and replacement on the higher level



Logbook contents cont.

- **Section 3: Shop traveller list or similar**
 - Summary list of integration and test instructions, such as shop travellers
 - For each entry the action start date, action performed date, operator performing the action, and action close-out dates shall be reported
- **Section 4: NC summary list**
 - Summary list of nonconformances with identification references, issue date, closure dates, and status
- **Section 5: Connector mate and demate log**
 - Connector (or other limited life cycle items) mate and demate cycles to ensure conformance with the project requirements
- **Section 6: Operating log**
 - Records of total operating hours for each limited-life element



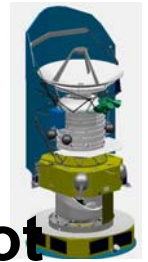
Logbook contents cont.

- **Section 7: Log of actions**

- Containing, in chronological order, events related to integration and test activities performed on the item (i.e. system, subsystem, and equipment), including:
 - Action requested form:
 - Operations performed with references to applicable documents or procedures, start date, operator, completion date and quality inspection stamps.
 - Step by step procedures and results:
 - Including copies of the as-run procedures in a suitable format
 - Procedures variation form:
 - Including copies of approved modified procedures (red marked) identified with a procedure variation number

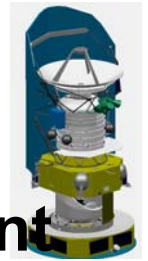
- **Section 8: Open works**

- List of open actions or open tests at product shipment to the customer, test facility or launch pad



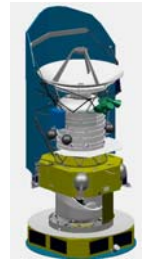
Example of PCB manufacturing logbook contents, not exhaustive

1. Assembly history log
2. Assembly remarks
3. Parts list
4. Assembly instructions, change instructions
5. Temporary installations
6. Parts placement diagrams
7. Mechanical drawings
8. Schematic diagrams
9. Layout diagrams
10. Drilling diagrams
11. History logbook
12. Connector logbook (mate, demate)
13. Control logs, KIP/MIP reports, solder inspection logs
14. Nonconformance reports
15. Test logs
16. Calibration logs
17. etc...



Example of PCB manufacturing logbook contents, cont

- The example shows how a lower level logbook in a larger unit might look like. The lower level log does not necessarily have the same format, it must, however, be complete and contain all relevant information to provide full traceability of parts, materials, processes, manufacturing steps, tests, inspections, operators, etc. in a logical manner.
- In this case the log is for one PCB out of many in a unit. The complete manufacturing log would consist of many logbooks, one for each PCB and one for the integration of all PCBs into the unit.
- This collection of logbooks will form the complete log for the unit and that will contain all the required information.

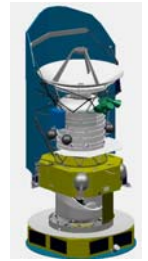


EIDP – End Item Data Package

- Collection of data related to manufacturing, assembly, integration and test of a deliverable configuration item
- Provides the necessary traceability and events record
- The EIDP constitutes the basis to support the acceptance of the product
- Built from the beginning of the activity for all relevant verification levels (i.e. MIP, TRR or TRB)
- Used to perform the TRB or DRB with the customer during the acceptance review of deliverable hardware.

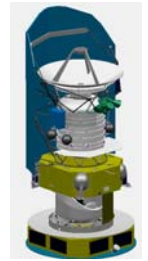
Note. To illustrate the difference between logbooks and EIDP, in the EIDP contents description section, the the text that is in

- **Bold** signifies the actual logbook
- ***Bold Italic*** signifies that the actual information/document is found in the logbook



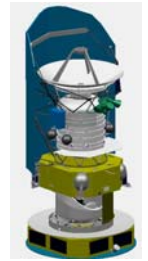
EIDP – Cover page

- With references to clearly identify the product and the relevant documents, for example:
 - Title: End item data package
 - Item description
 - Product specification
 - Serial number
 - Drawing
 - Model
 - CI number
 - Contract number
 - Refer to PT-RQ-04410 and ECSS-Q-20B Annex C, for more details



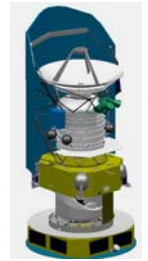
EIDP – Contents

- **Section 1**
 - The customer follow-up sheet to record all events after the product final delivery
 - The customer acceptance certificate
 - The DRB minutes
 - The shipping document even if it is not part of the EIDP shall be available at the time of delivery.
- **Section 2**
 - EIDP front sheet and table of contents
- **Section 3**
 - EIDP change record
- **Section 4**
 - Certificate of conformity, including **NCR** status list



EIDP – Contents cont.

- **Section 5**
 - As-designed ***as-built*** configuration status
- **Section 6**
 - Summary and status of ***RFDs*** and ***RFWs***
- **Section 7**
 - Documents necessary for further integration, testing and operation, including the software used to operate the item, and user or operating manuals
- **Section 8**
 - **Product logbook**, including all data recorded in chronological order for full traceability of manufacturing, assembly, integration and test activities



EIDP – Contents cont.

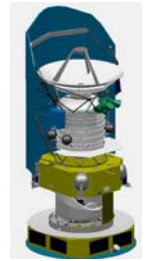
- **Section 9**

- Procedures for handling of the product after final delivery covering:

- packing
 - handling
 - storage
 - transportation
 - safety
 - cleanliness

- **Section 10**

- ***Test reports***, or as a minimum a list of the test reports with identification of their location, and VCD



EIDP – Contents cont.

- **Section 11**
 - List of ***ground support equipment*** (MGSE, EGSE, FGSE, OGSE) with reference to relevant EIDPs and software product
- **Section 12**
 - List of EIDPs or **logbooks** of subunits and subsystems
- **Section 13**
 - List of ***loose items, not installed items, limited life items, temporary installation records, and spares*** supplied with the product
- **Section 14**
 - “Other data and remarks” describing any useful information or relevant data that is not included in the other EIDP sections

	KIP REPORT FOR BOARD	Docref : _____ Issue : - Pages : _____ of _____
Project :		Inspector:
Board :	Ser.no. :	Dwg. num:
KIP 1 date : ____/____/____		KIP 2 date : ____/____/____

Checked items	Checke d at KIP 1	KIP1 OK	Checke d at KIP 2	KIP2 OK	Remarks
Visual inspection: 1. Component mounting 2. Cleanliness 3. Board marking 4. Varnish 5. Wire wrappings 6. Gluing					<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
Documentation: 7. Assembly history 8. Traceability 9. Logbook 10. Soldering inspection 11. Connector logbook 12. Changes docum. 13. Jumpers & settings					<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
Software, PLDs: 14. Marking 15. Version					<hr/> <hr/>
Related NCRs:					<hr/> <hr/> <hr/> <hr/>

Other comments	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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Re-inspections:	<hr/> <hr/> <hr/>
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Board accepted to integration	Date:	QA Stamp:
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INTRODUCTION

Product Assurance

Eric Clark

RAL

SPIRE PA STATUS AND OUTLOOK

❖ CIL & DERATING

❖ NCR & CHANGE CONTROL

❖ CIDL & CONFIGURATION

❖ CLEANLINESS

❖ FMECA & HSIA

❖ VCD

❖ AIT, MIP's & KIP's

❖ PLANNING

❖ PROBLEMS & SOLUTIONS

❖ PA PLAN

❖ AOB

CIL, WCA, & DERATING

❖ CIL List

SPIRE does not have a formal CIL.

Matt Griffin has stated that these issues should be discussed with ESA and Industry at the routine technical meetings rather than PA meetings.

❖ Worst case analysis and Derating analysis

Have been requested from IFSE & CEA/Sap.

Who I believe are the only subsystems required to produce them for SPIRE.

NCR'S & CHANGE CONTROL

❖ Non-Conformance Report

NCR

No Major or Flight NCR's

❖ Engineering / Document Change Request.

ECR

About 50% of the outstanding ECR's will be closed when the IID-B Changes are approved.

There are a number that require actions from subsystems and industry that have not been returned as yet.

I will be checking into these when I get back

CIDL & CONFIGURATION STATUS

❖ CONFIGURATION ITEM DATA LIST CIDL

SPIRE-RAL-PRJ-001134. Still at draft issue 2.

❖ No new subsystems CIDL's added.

Some still require updating and putting into document format.

❖ Configuration Status.

SPIRE still has to many documents not signed, however virtually all the documents that would come under configuration control are being controlled already.

Still require authorisation (by ESA etc) of top level documents before the lower ones can be authorised

CLEANLINESS

(Materials) ????

The Cleanliness Plan has defined the cleanliness for the instrument, this plan has been released for some time and should cover all aspects required.

Is there a Problem or
Am I missing the point?

FMECA - HSIA

- ❖ **System FMECA and effect on short circuit (propagation of failures).**

The System FMECA including interfaces for Launch and Flight, has been supplied, comments raised by Jan on it are being addressed as time allows, however an early response is unlikely at present.

- ❖ **Hardware/Software Interaction Analysis (HSIA).**

This has not been done!

VCD.

❖ Verification Control Document. (VCD)

- The Test Plan is virtually complete the Database is now being worked on.

AIT, MIP's & KIP's

❖ AIT Procedure Preparation.

- AIT Plan for STM and CQM are completed, with all the Test plans, issue, date, etc included.

Awaiting approval signatures.

❖ Mandatory & Inspection Points (MIP's)

❖ Key Inspection Points (KIP's)

- Are detailed in the AIT plan above

ESA will be informed of the place, time and date of a MIP

Typically Four weeks before, by fax or Email, and reminded two days before, by Email or Telephone.

PLANNING

There are Several subsystem deliverables and Qualification testing taking place in the coming months that will require TRR's (Test Readiness Review) and inspection among other things.

Complete the actions I set for myself at the last PA Managers meeting.

Check the clean room etc, to be used by SPIRE before the deliverables arrive.

PROBLEMS & SOLUTIONS

- ❖ **The problem areas are resource, Money and person power. (*politically correct statement*)**
There is not enough of either available to meet the requirements for Hardware, Software or Documentation.

- ❖ **Spire Have too options:-**
 1. To obtain more money from somewhere. This is being actively pursued.
 2. To Prioritise what SPIRE can deliver and what it can not. *Decisions whether we want Hardware or documentation will have to be made if option 1 is unsuccessful.*

PA PLAN

❖ SPIRE Product Assurance Plan

SPIRE-RAL-PRJ-000017

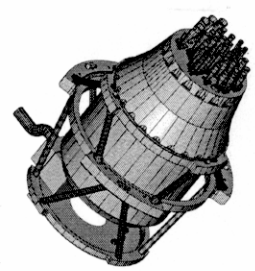
Issue 1

❖ Changes To the Plan Now at Issue 1.1

- **Most of the comments from Pierre have been incorporated however it has sill not been completed.**

AOB

- **Permeation of air through the CVV seals.**
This is not thought to be a problem for SPIRE, However Bruce is looking into it and will issue a statement accordingly .
- **Safety Submission**
The hazard check sheet supplied to Alcatel indicated there were no safety issues, however a technical description was requested to be added to it. WHY?



3rd Quarterly PA meeting
July 3, 2002 Garching

PLANCK
HFI

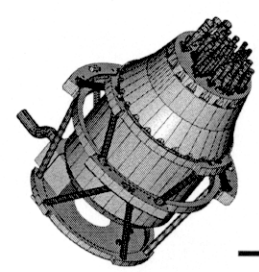
Product Assurance : Status and outlook

Alain Heurtel

HFI PAM

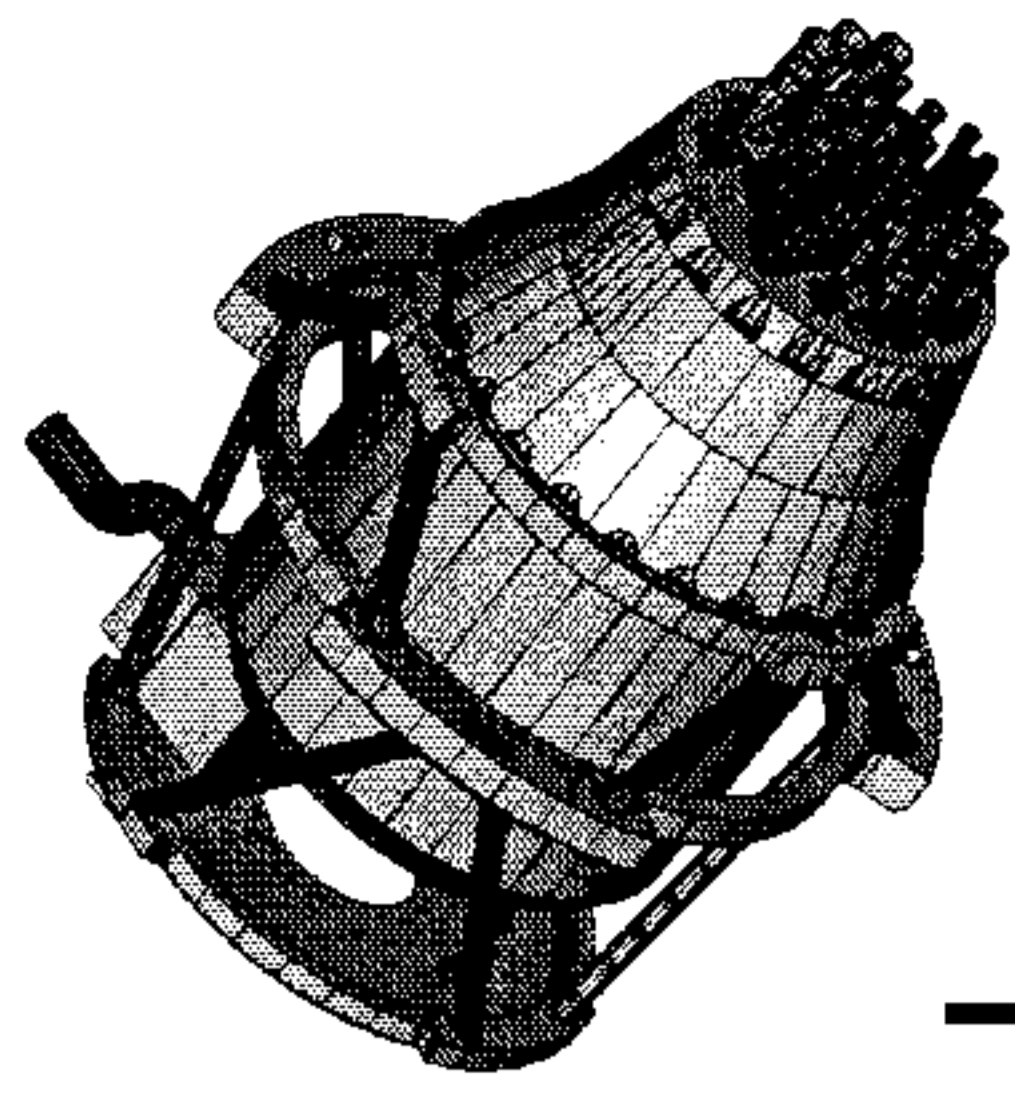
CNRS/IN2P3/LAL and IAS (France)

heurtel@lal.in2p3.fr



Plan

- PA structure management
- PA audit and consequences
- PAP situation
- Review of the list of documents
- Next steps
- Other PA activities



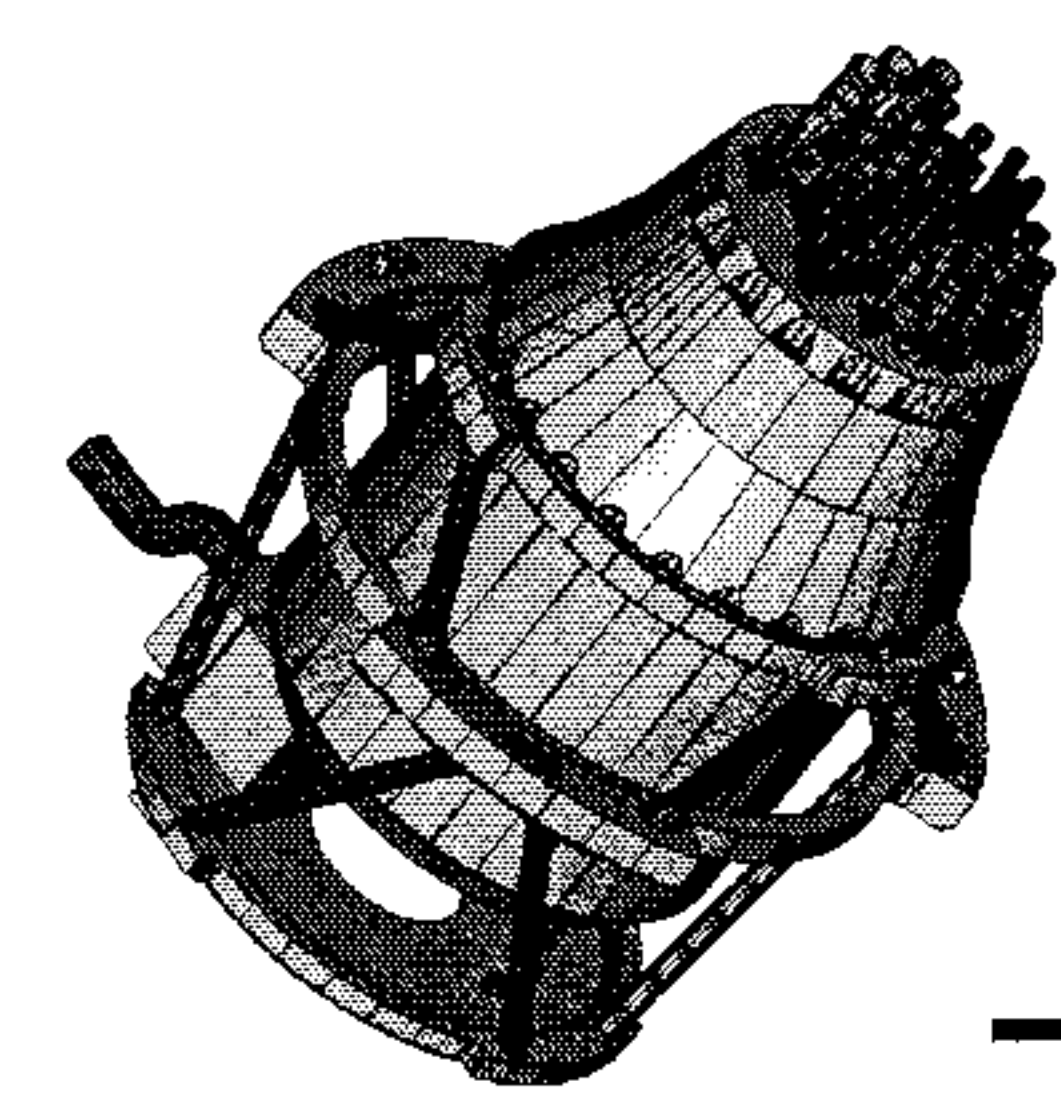
PA Structure Management

- PA support :

Didier Wadel from CNES (coming from Space Department of Bureau Veritas) is arrived the 15 of June as a cognizant support to reinforce the PA structure of HFI at system level. He will work half-time in IAS up to the end of this year.

- Other PA support :

A new PA support is foreseen as soon as possible up to the FM delivery to Alcatel (TBC).



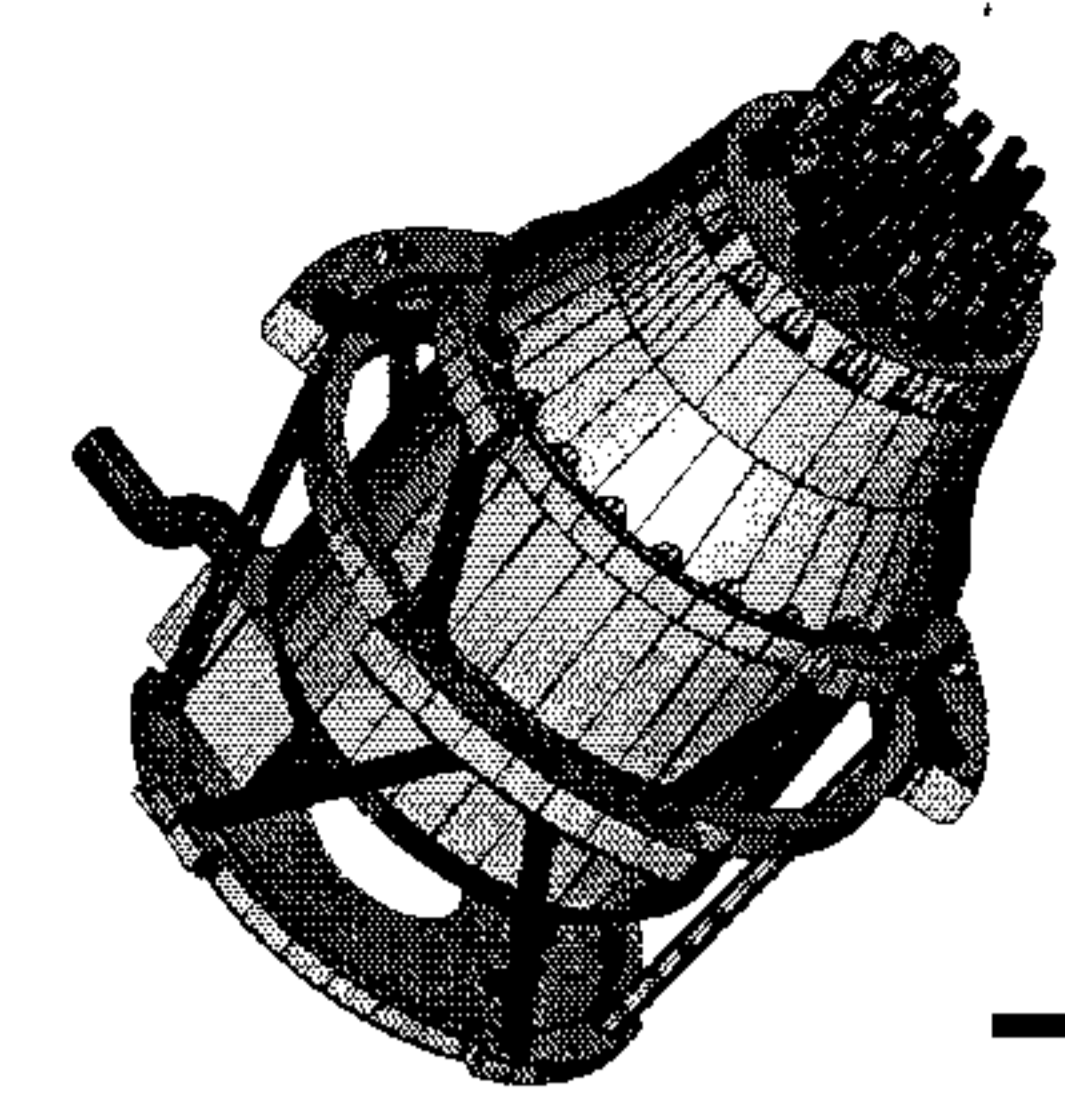
The audit of PA activities

1. Tasks conducted :

- Audit of pending e-mails with no answer,
- Review of PA status and outlook with the Direction of Project.

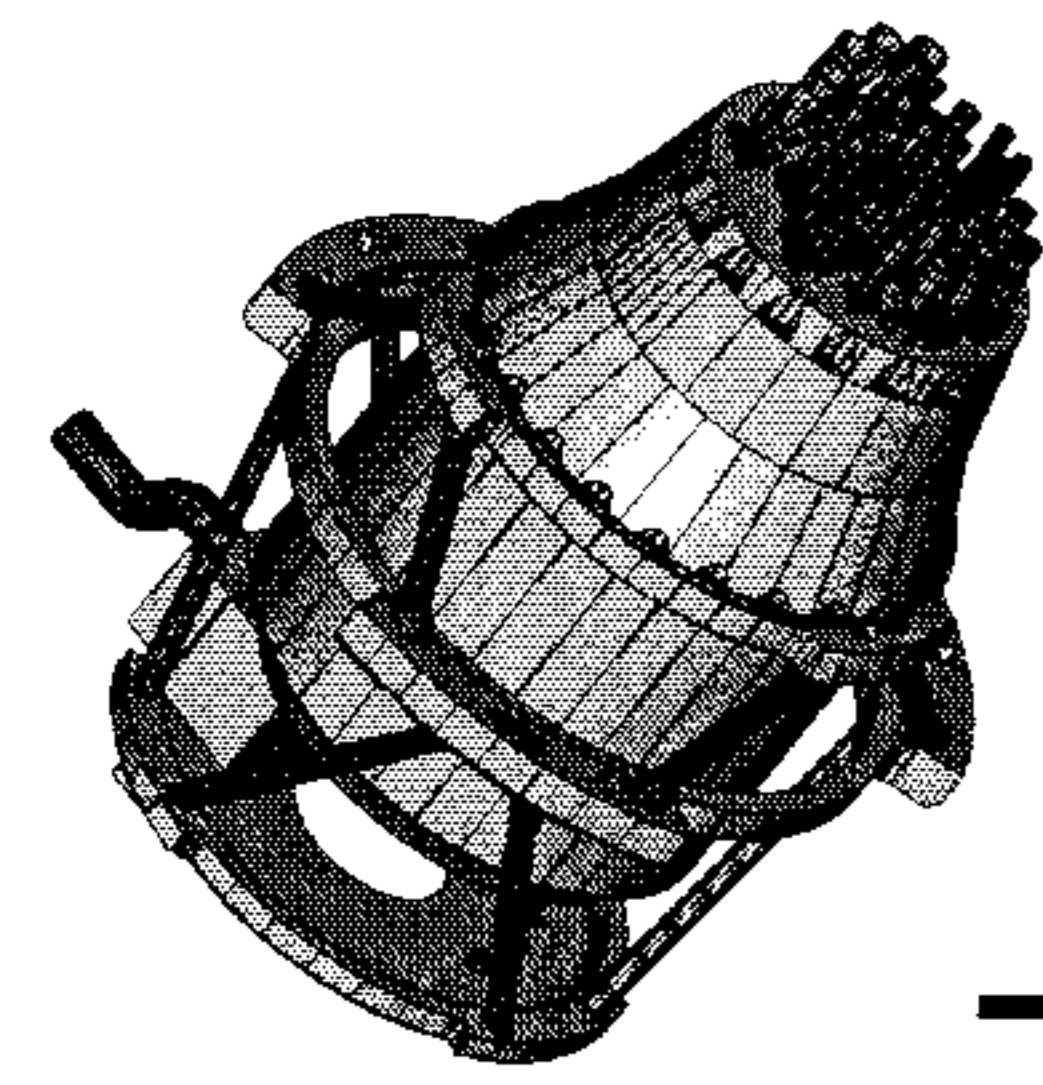
2. Result :

Management of PA will be made according to priorities defined in common with the PI and the PM.



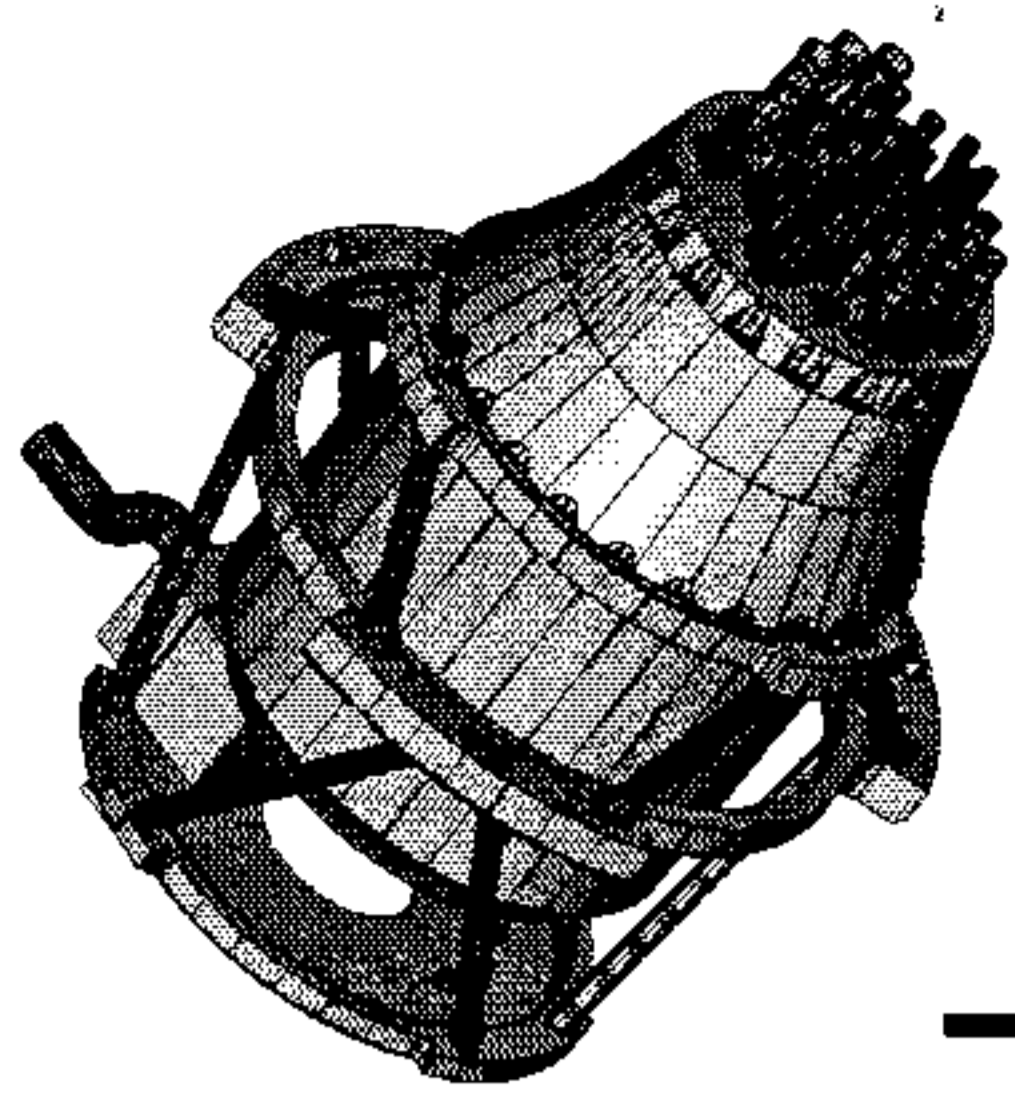
Consequences of PA audit

1. Classification of proposed actions according to 3 different axis :
 - Management of PA at IAS Project level,
 - Management of the existing documentation,
 - Evaluation of PA tasks in comparison with ESA demands.
2. Presentation of one Actions Plan to the head of the Project.
3. Approval of this Actions Plan.



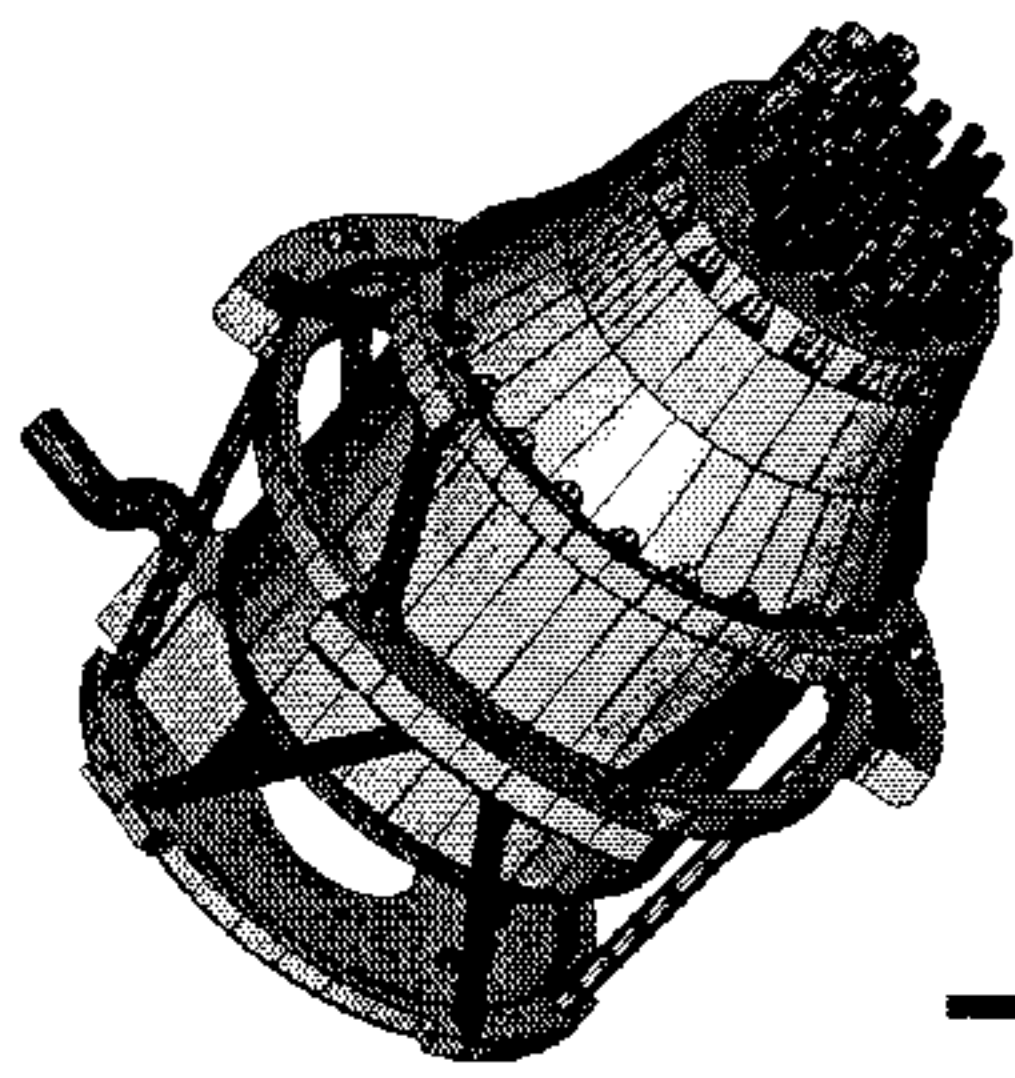
The PAP situation

- After clarifications brought by a Jan's meeting in IAS, corrections have been reported (ex. NCR, management of configuration, etc.),
- An internal evaluation is foreseen in the incoming days in IAS to adjust specified duties mentioned into the PAP with ESA PT-RQ-04410, issue 2, requirements.
- After this internal review, a final edition should be rapidly prepared, signed by the Project and sent to ESA for submission to final approval.



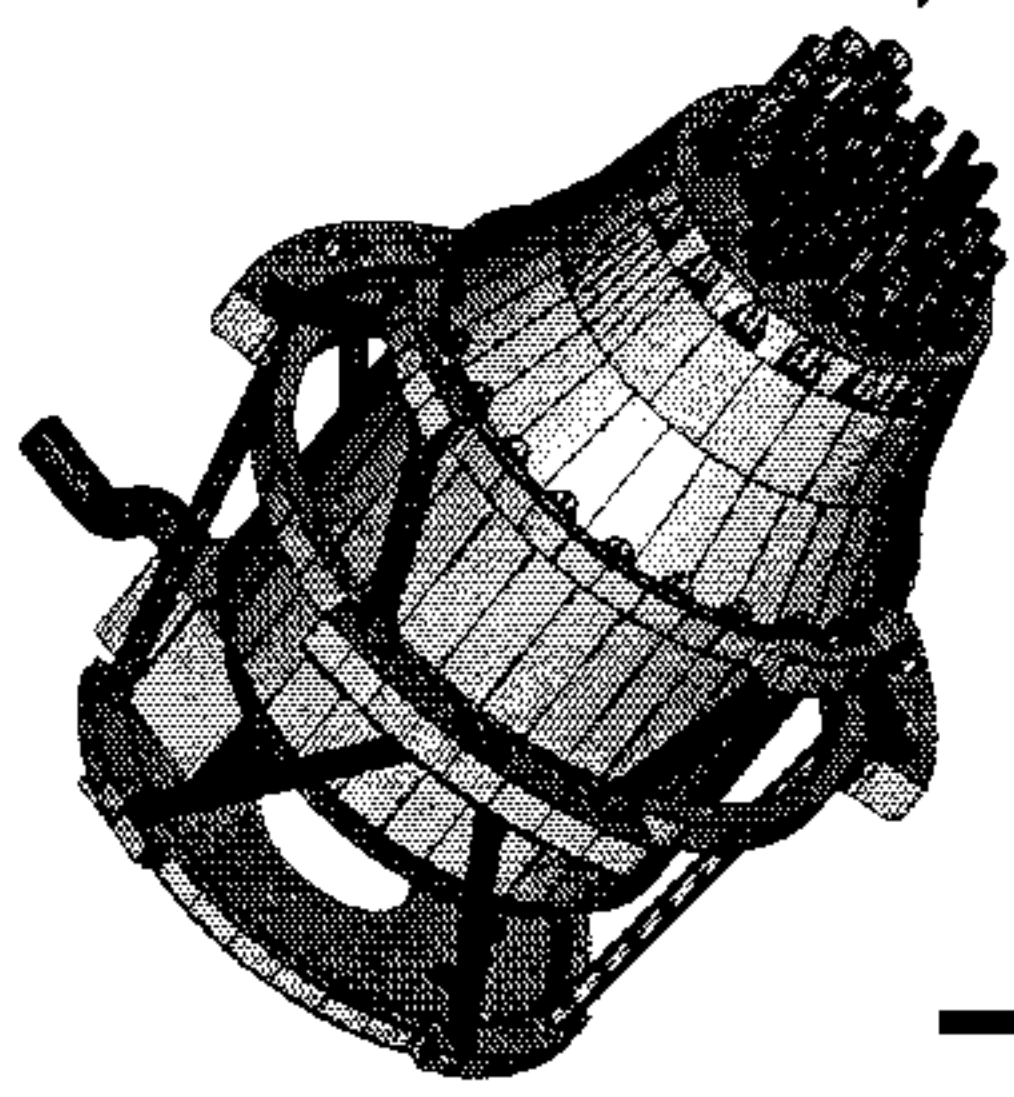
Review of list of documents (1/4)

- CIL :
The existing list is managed in configuration at IAS level. Last issue published for the IBDR.
- NCR :
At this time, the project is still end of B phase. Design of several S/S not frozen yet. NCR should be activated as soon as possible.
- FMECA and HSIA :
 - Missing Air Liquide FMECA will be delivered next September with the mock-up.
 - HSIA is on-going in LAL (writing by new person arrived on April for soft).
- Cleanliness (material) :
 - Tentative done to determine particulate budgets of each S/S based on the master schedule. Waiting for inputs from S/S.
 - Issued document already submitted to ESA as a draft.



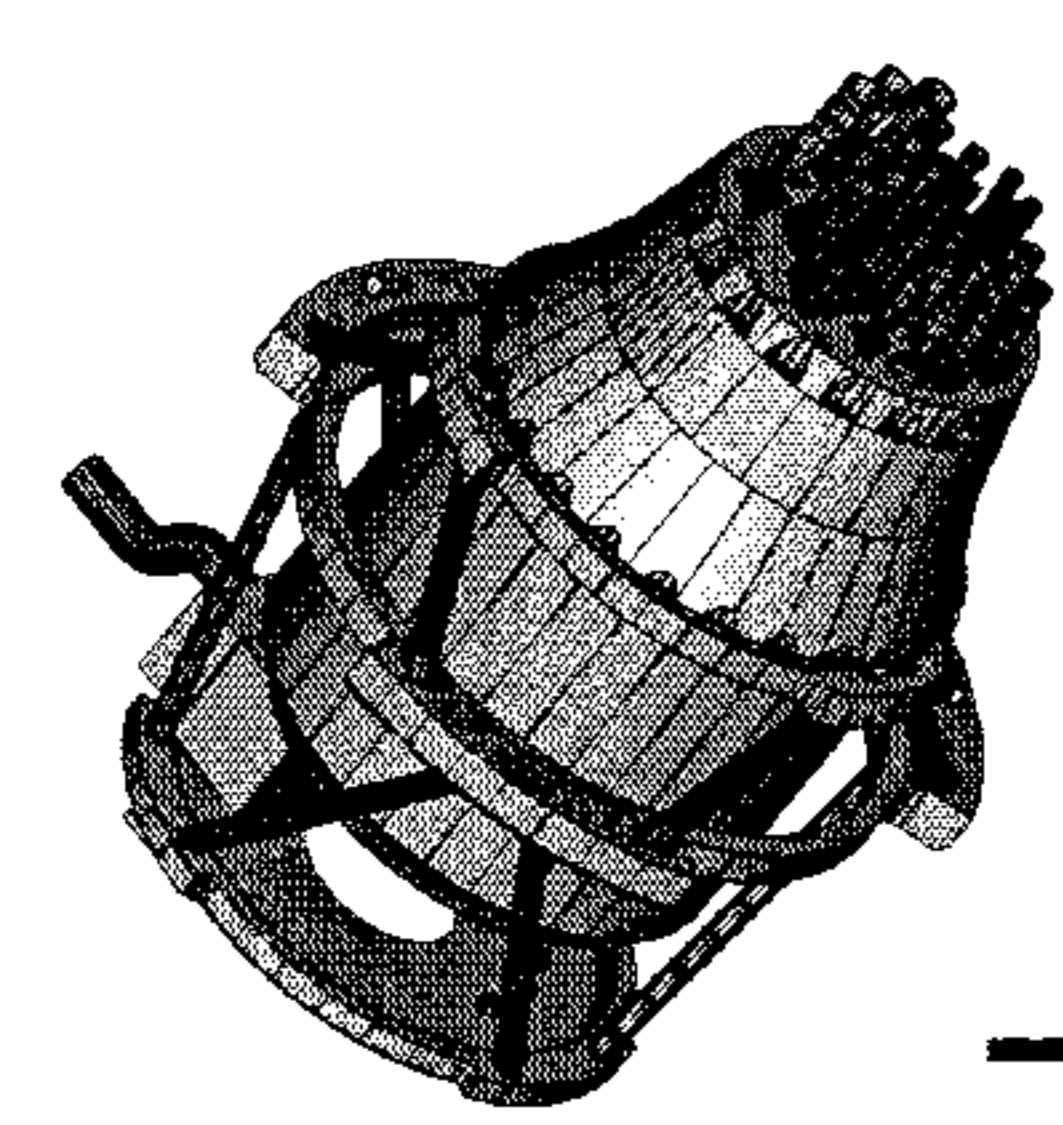
Review of the list of documents (2/4)

- Derating :
 - Elements of discussion :
 - Not done in due-time, this coming from a late request.
 - Electronics parts have often been imposed by CCPA for costs reasons.
 - Impossibility to perform now the derating of the all electronics parts of the instrument according to in-situ cross-actions of components.
 - Note : As usually practised in the culture of IN2P3 Labs., cross verification of circuits have been performed several time last year, but no data have been recorded into logbook.
 - Derating will be done for sensitive parts and interface components only, the aim being to reassure on the design of electronics.
 - Person in charge : N. Briand in IAS. Release date to be determined.



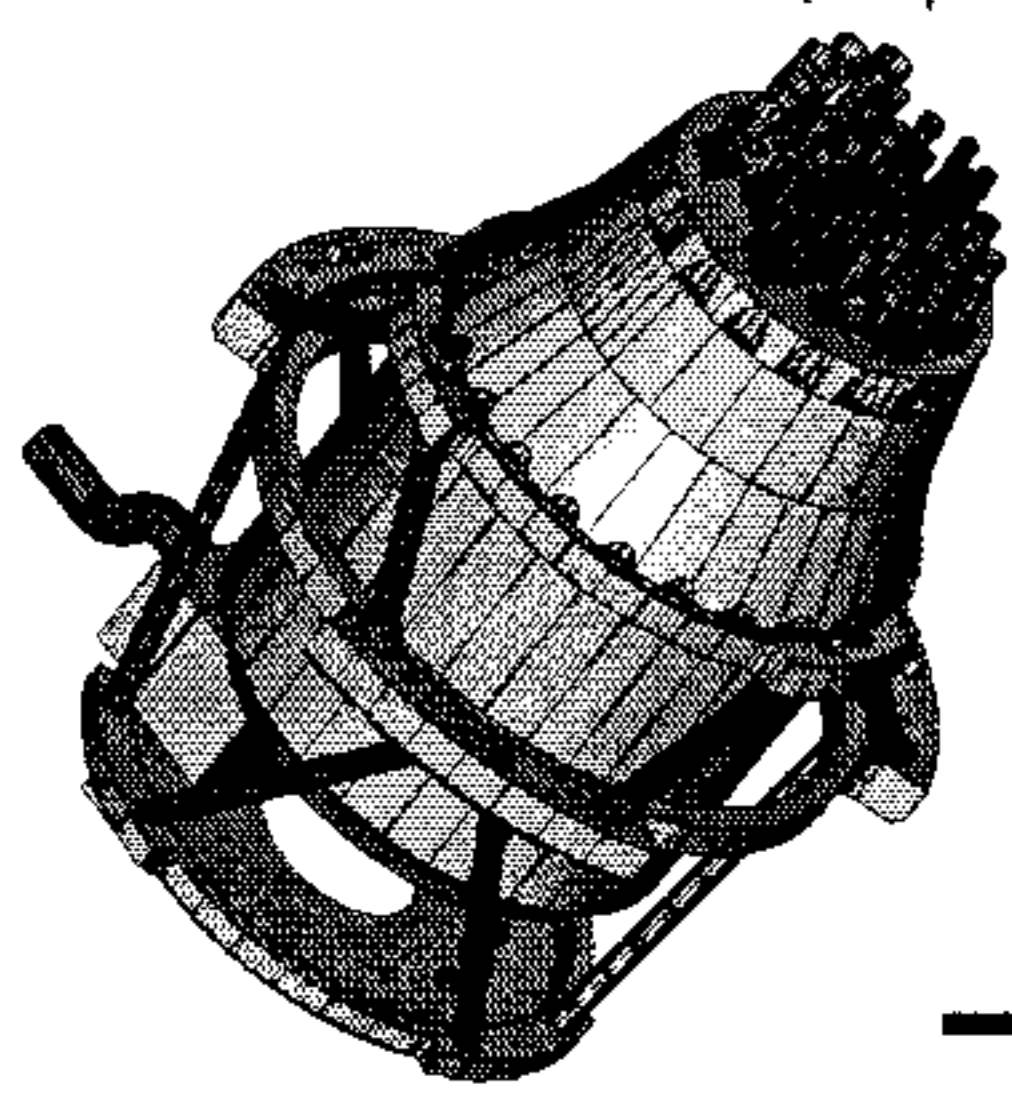
Review of the list of documents (3/4)

- VCD :
 - Waiting for receipt of results of the *Design Verification Matrix*. Template sent to each S/S last March.
 - Note that : The product reference configuration will be frozen by the Project itself, not by PA.
- Configuration status :
 - For HFI, CIDL is managed by the PC (B. Cougrand).
 - Baghera DMS (documentation) is connected to Agile (configuration) via to the Product Tree. A bug in a new release of Agile found, not solved yet. Nevertheless, all documents sent to IAS are under control.



Review of the list of documents (4/4)

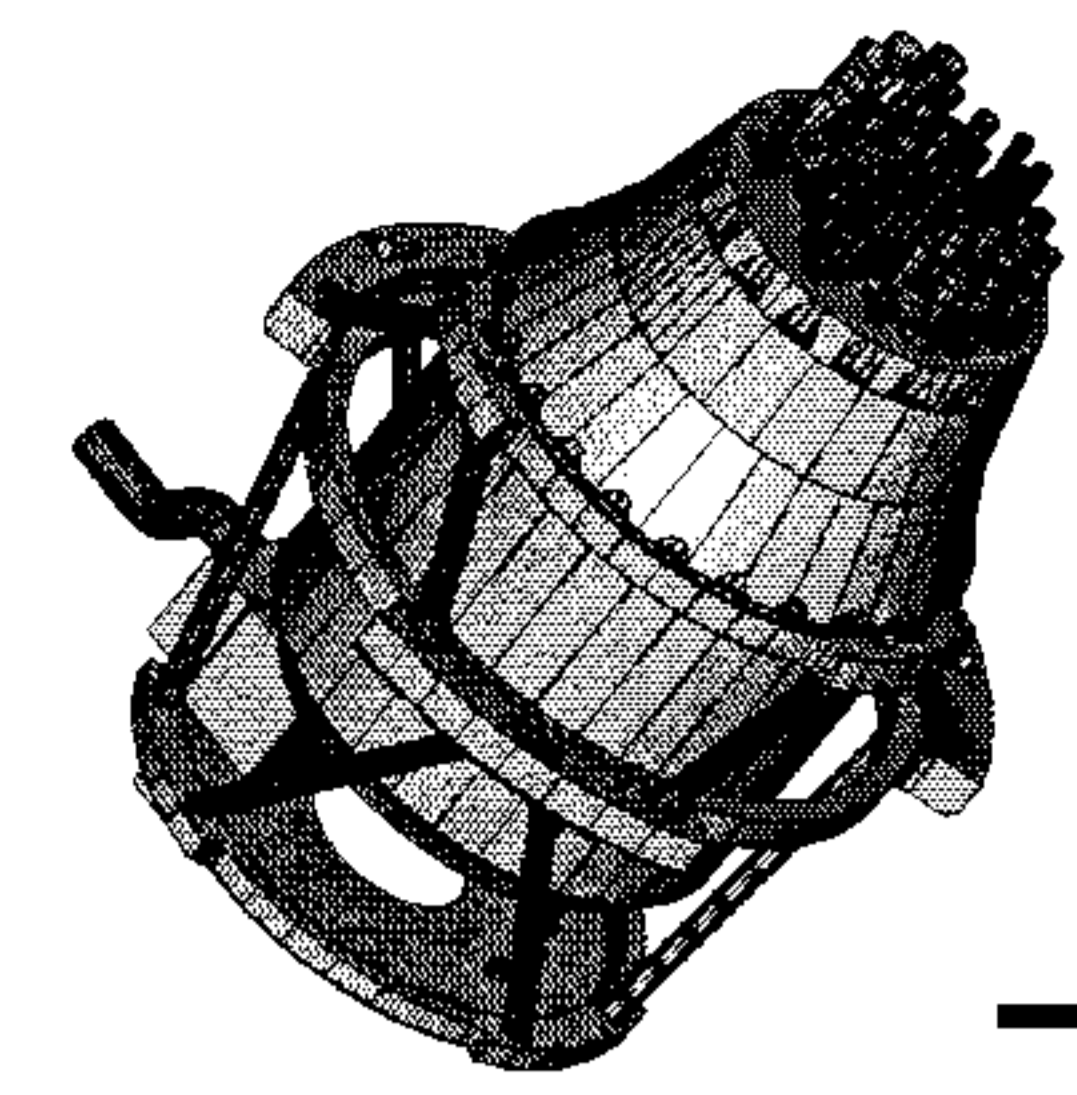
- MIP planning :
 - Pending on selected technologies,
 - Under discussion in each institute with selected sub-contractors.
(For example, done for DPU with LAL).
- AIT planning :
 - Integration tasks defined and planned,
 - Procedures should be written by the IAS group under the responsibility of the AIT Manager (A. Chardin).
 - Procedures of control will be established as soon as possible after.



Next step

- Detailed PA documents review:
 - Aim is to implement an in-depth look at each PA document to be provided by each sub-system (or each sub-contractor) according to ESA PT-RQ-04410 issue 2 document only.
 - A PA status matrix will be presented to the PI.
- PA actions:

Actions at project level will be lead to provide by S/S all missing documents, or to actualise existing documents.
All this should be done for the next review.



Other PA activities

- The Laboratoire de l'Accélérateur Linéaire (LAL) in Orsay is deeply involved in HFI through the DPU, the on-board software and the EGSE.
- Key point : The HFI Quality PA activities presented to its staff i.e. Direction, community of searchers, responsible engineers. (Lab. meeting at Seillac June 26, 2002).
- Clear message on the necessity of an important effort to provide towards this direction was proved and hopefully received.

Product Assurance Topics

- ➔ *Status on PA documentation***
- ➔ *Reliability and Safety***
- ➔ *EEE Parts, Materials and Processes***
- ➔ *Cleanliness and Contamination***
- ➔ *Quality Assurance***
- ➔ *Configuration Management***
- ➔ *Critical issues***

Status on PA documentation

	LFI →							SCS →	
Suppliers	JBO	SAN (Mer)	MilliLab (Yilinen)	Laben (TRW)	Laben	IAC (CRISA)	PST	JPL (TMU)	ISN (SCE)
PA Documents									
Compl. Matrix to LFI PA Plan	February 2002	February 2002	-	-	July 2001	June 2001	July 2001	April 2002	-
Declared Components List	April 2002	February 2002	June 2002	July 2001	March 2002	February 2002	March 2002	-	February 2002
Declared Materials List	Dec. 2001	February 2002	-	July 2001	October 2001	July 2001	February 2002	May 2001	February 2002
Declared Processes List	Dec. 2001	February 2002	-	-	October 2001	July 2001	February 2002	May 2001	February 2002
FMECA	February 2002	February 2002	-	-	January 2001	July 2001	January 2001	Nov. 2000	February 2002
Critical Items List	February 2002	February 2002	-	-	June 2002	July 2001	June 2002	Nov. 2000	-
Manufacturing Flow Chart	February 2002	March 2002	-	-	February 2001	November 2001	June 2002	-	-
Safety Data Package	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	May 2002	May 2002	-

Reliability

- **The LFI System FMECA issue 1 shall be completely reviewed at the light of the new configuration approach.**

In particular the next issue of the document will take into account: the new redundancy approach, the reduction on the DC/DC converters numbers and the relevant power switching philosophy.

The System FMECA issue 2 is foreseen for the end of September.

- **Up to know the FMECAs at supplier level have not pointed out any single point failure (No input from MilliLab, JPL foreseen an updating end of June 2002).**

Safety

- **JPL MTU and PST LFI Safety Data Package were issued for the Safety Review: no remarks up to now.**
- **From JPL MTU is envisaged a document updating after the internal review.**
- **It is agreed for the 2nd half of July a working meeting between JPL and ISN for the HW / SW Interaction Analysis, expected output foreseen end of September.**

EEE Parts, Materials and Processes

- **An internal review on the available data about the LFI EEE, Materials and Processes was held at PST level during January and February.**
- **Following the above and after clarifications provided by the LFI Suppliers (Laben, SAN/MIER, JBO, IAC/CRISA) it is decided to update the LFI:**
 - **Declared Component List**
 - **Materials and Mechanical Parts List**
 - **Processes List**
- **More details with respect to the first issue are provided inside the lists following the design status of art and ESA comments.**
- **Cryo Harness: reviewed of the Tayco Eng. Proposal and visit to Tayco facilities at Cypress (CA).**
- **MilliLab have not yet provided input for the Materials/Mechanical Parts, and Processes: it is foreseen documentation in June 2002.**

Cleanliness and Contamination

- **Requirements settled during the Cleanliness and Contamination Working Group and inserted in the last issue of the LFI PA Plan**
- **Molecular contamination parameters frozen at LFI level and consequently updated IIDB.**
- **Still open the purging issue: we are not in the position to remove it. Action at LFI Suppliers level (HEMTs) to verify the real need.**

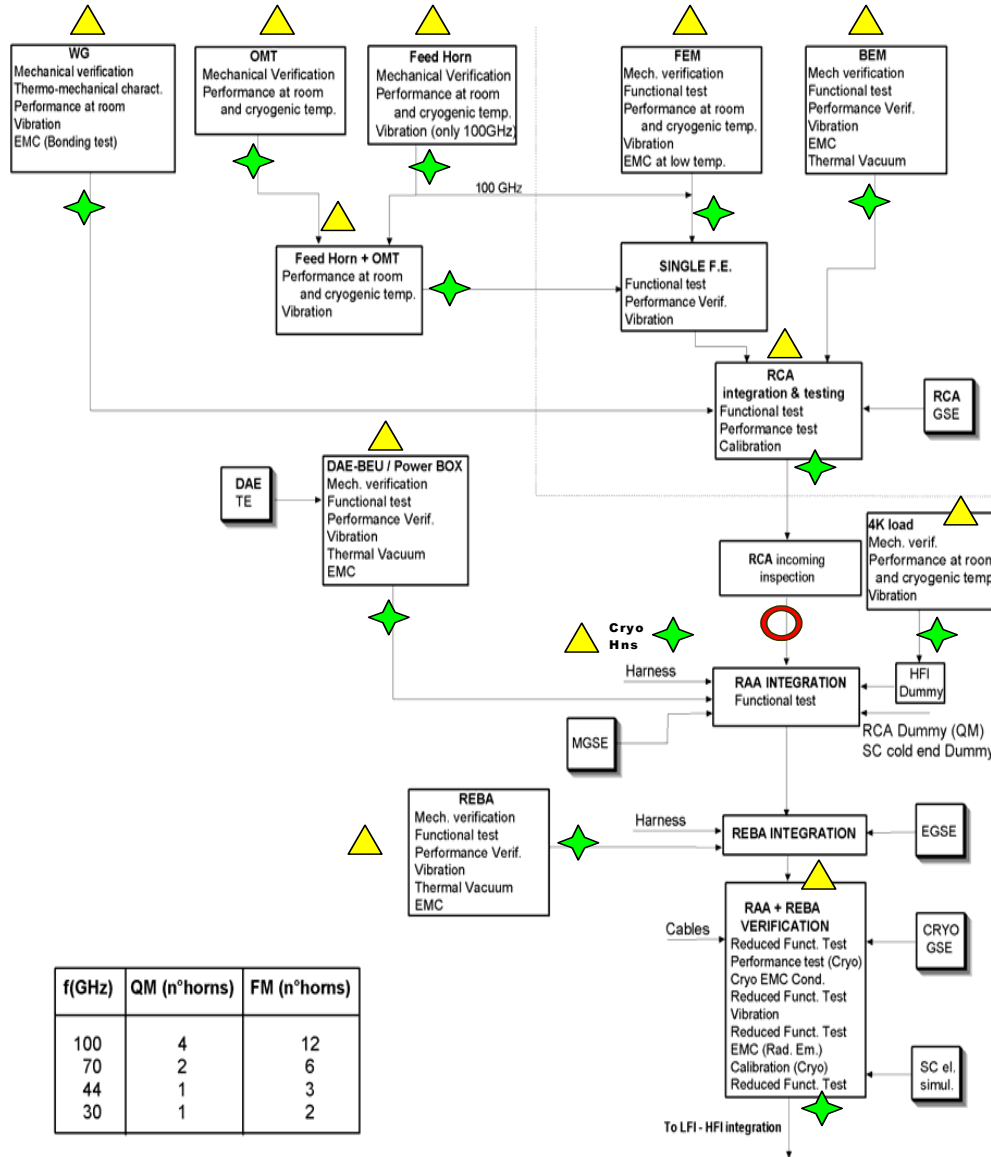
Quality Assurance

The foreseen dates of the Test Reviews (TRR, TRB/DRB) and MIPs at System Instrument level shall be identified in the LFI Progress Report periodically issued.

After LFI system integration, the steps will be:

- LFI + HFI integration and verification
- Integration in the PPLM, with the sorption cooler, and verification

MIP (Mandatory Inspection Point)	⇒	○
TRR (Test Readness Review)	⇒	▲
TRB / DRB (Test Review Board / Delivery Review Board)	⇒	★



Quality Assurance

<i>Annex</i>	<i>Sub System</i>	<i>LFI Supplier</i>	<i>Items</i>	<i>Flow issue</i>	<i>Flow Date</i>	<i>Remarks</i>
A	RAA - RCA	JBO	<u>30 GHz FEMs</u> <u>44 GHz FEMs</u>	-	18/02/02	One flow for both kind of FEMs.
B	RAA - RCA	SAN/Mier	30 GHz BEMs 44 GHz BEMs	-	19/03/02	One flow for both kind of BEMs.
C	RAA - RCA	MilliLab/ Ylinen	<u>70 GHz FEMs</u> 70 GHz BEMs	-	-	No flow provided.
D	RAA - RCA	LABEN (TRW)	<u>100 GHz FEMs</u> 100 GHz BEMs	-	-	No flow available. Foreseen for the next phase.
E	RAA	IASF	<u>4°K REFERENCE LOADS</u>	A	26/04/02	Issued as document: FC101, annexed to procedure STP 317 Rev.B. Not here included because process covered by Manuf. Property.
F	DAE	LABEN	DAE	M	20/02/01	Issued as document: TLC 0093.
G	REBA	IAC/ CRISA	REBA	0/dr	21/11/01	Issued as document: FPL-CHT-1214-01-CRS.

Reference table among LFI Suppliers and Flow Charts annexes to the Planck LFI Manufacturing and Inspection Plan. It is worthwhile to point out that after internal review of the status of art of the system integration no other manufacturing and inspection flow are foreseen at subsystem level.

Software QA

- **The SWs belong to the SCE and REBA subsystems**
- **The Suppliers' declared approach follow the ESA BSSC (96)2**
- **Difficulties to obtain visibility on SW QA activities from IAC (REBA) and ISN (SCE) up to now**
- **HW / SW Interaction analysis foreseen from JPL (MTU) and ISN (SCE). No input from for IAC (REBA).**

Configuration Management

1/4

- **LFI CADM Plan, issue 3 emitted in final version after ESA Review**
- **LFI System CIDL finalised and issued at the end June 2002.**
- **LFI Product Tree, already aware by the Suppliers, updated taking into account definition of LFI part numbers down to subsystems and per model philosophy.**
- **Each LFI Supplier shall issue a Configuration Item Data List pointing out in particular the documents and drawings relevant to the Electrical / Mechanical / Thermal Interfaces with the higher level (sub)system.**

Configuration Management

2/4

LFI SYSTEM CIDL TABLE OF CONTENTS:

- **CONFIGURATION ITEM DATA LIST VERSUS PRODUCT TREE**
- **SECTION I - APPLICABLE AND REFERENCED DOCUMENTS**
- **SECTION II - PRODUCT TREE**
- **SECTION III - DRAWINGS**
- **SECTION IV - SOFTWARE**
- **SECTION V - CONFIGURATION CHANGES**
- **SECTION VI - COMMERCIAL ITEMS**

Configuration Management

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(LFI SYSTEM CIDL TABLE OF CONTENTS)

- SECTION II - PRODUCT TREE

LFI FM PRODUCT TREE

SUPPLIER	MODEL	LEVEL	LFI PROJECT REFERENCE CODE (P/ N)	TITLE / DESCRIPTION	Qty x Assy	REMARKS
LFI PST	FM	0	PL000-P	LOW FREQUENCY INSTRUMENT	1	
LFI PST	FM	*1	PLA00-P	RADIOMETER ARRAY ASSEMBLY	1	
LABEN	FM	**2	PLAA0/01-P	30GHz RCA	1	FPU Ref.: #27
LABEN	FM	***3	PLAAA-P	30GHz FEED HORN	1	
LABEN	FM	***3	PLAAB-P	30GHz OMT	1	
JBO	FM	***3	PLAAC-P	30GHz FRONT END MODULE (FEM)	1	
SAN	FM	***3	PLAAD-P	30GHz BACK END MODULE (BEM)	1	
....						

Configuration Management

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(LFI SYSTEM CIDL TABLE OF CONTENTS)

• SECTION V - CONFIGURATION CHANGES

ID	TITLE OF CHANGE	CHANGE NUMBER	DRWG AFFECTED	FROM REV	TO REV	MODEL	REMARKS
-----------	------------------------	----------------------	----------------------	-----------------	---------------	--------------	----------------

Critical issues

1/3

LFI SUPPLIER	CRITICAL CATEGORY	ITEM IDENTIFICATION	RISK	ACTIVITY FORESEEN OR IMPLEMENTED	STATUS
TES	A	4K Reference Load, see (1)	No data on the behaviour of the 4K Ref. Load materials at 4 Kelvin	Evaluation/Qualification Program to be finalised. Collaboration TESRE-ESA for a test campaign started.	Open
JBO	A	30 & 44 GHz FEMs	No data on the behaviour of the FEMs at 20 Kelvin.	Evaluation/Qualification Program to be finalised, see (5). Review as per Annex 12 of (8). Updated (6).	Open
JBO	A	30 & 44 GHz FEMs: <ul style="list-style-type: none"> InP LNA HEMTs, see (2) 	<ul style="list-style-type: none"> No data available on the space qualification of the InP LNAs and their behaviour at 20 Kelvin. ESD. 	<ul style="list-style-type: none"> Evaluation/Qualification Program to be finalised, see (5). Review as per Annex 12 of (8). Updated (6). Handling procedure to be finalised. 	Open
YLI	A	70 GHz FEMs	No data on the behaviour of the FEMs at 20 Kelvin.	Evaluation/Qualification Program to be finalised, see (5) and (9).	Open
YLI	A	70 GHz FEMs: <ul style="list-style-type: none"> InP LNA HEMTs, see (2) 	<ul style="list-style-type: none"> No data available on the space qualification of the InP LNAs and their behaviour at 20 Kelvin. ESD. 	<ul style="list-style-type: none"> Evaluation/Qualification Program to be finalised, see (5). Handling procedure to be proposed. 	Open
YLI	A	70 GHz FEMs: BZX284, Zener diode series	Commercial parts.	Under evaluation alternative space qualified part. Identified alternative parts.	Closed, see (2)

Critical issues

2/3

LFI SUPPLIER	CRITICAL CATEGORY	ITEM IDENTIFICATION	RISK	ACTIVITY FORESEEN OR IMPLEMENTED	STATUS
YLI	A	70 GHz BEMs: <ul style="list-style-type: none"> AD8131, high speed differential driver SN7504, hex inverter 	Commercial parts.	Researching alternative space qualified parts for AD 8131; under evaluation alternative space qualified part for SN 7504. Identified alternative parts for both.	Closed, see (2)
LAB (TRW)	A	100 GHz FEMs	No data on the behaviour of the FEMs at 20 Kelvin.	Evaluation/Qualification Program to be proposed, see (5).	Open
LAB (TRW)	A	100 GHz FEMs: <ul style="list-style-type: none"> InP LNA HEMTs, see Instrument Science Verification Review (10-11/11/1999) 	<ul style="list-style-type: none"> Not sufficient but partial data exist on the space qualification of the InP LNAs and their behaviour at 20 Kelvin (data distribution restricted). ESD. 	<ul style="list-style-type: none"> Evaluation/Qualification Program to be finalised, see (5). Handling procedure to be finalised. 	Open
LAB	A	DAE unit: <ul style="list-style-type: none"> Multichip Modules (MCM) 	Manufacturing processes.	Qualification program in progress, completion foreseen within 2002.	Open
LAB	A	DAE unit: <ul style="list-style-type: none"> RT54SX32S, FPGA, 208/256 pins 	Extension of the mounting process on PCBs of the parts with more than 196 pins.	Qualification program in progress, completion foreseen within 2002.	Open
JPL	B	Sorption Cooler System: Mechanical Thermal Unit (MTU)	<ul style="list-style-type: none"> Pressurised vessels and cryogenic subsystems Internal surface of the unit are very susceptible to both molecular and particulate contamination. 	Safety and Hazard Analyses under way following current design baseline: draft issued, see (12). Safety Data Packages as per (10). Contamination Control Plan: see (11).	Open

Critical issues

3/3

- | | |
|--|------------------------------------|
| (1): Planck LFI Declared Materials & Mechanical Parts List | PL-LFI-PST-LI-011, issue 2.0 |
| (2): Planck LFI Declared Components List | PL-LFI-PST-LI-012, issue 2.0 |
| (3): Planck LFI Declared Processes List | PL-LFI-PST-LI-013, issue 2.0 |
| (4): Planck LFI FMECA | PL-LFI-PST-AN-001, issue 1.0 |
| (5): InP LNA Evaluation Proposal | PL-LFI-PST-TN-008, issue draft 0.1 |
| (6): 30 & 44 GHz LNA Qualification Plan | PL-LFI-JOD-PL-002, issue draft 0.3 |
| (7): A proposal for mechanical test on adhesive for 4KRL | PL-LFI-TES-TN-006, issue draft 0.1 |
| (8): LFI System Interface Meeting | PL-LFI-PST-MM/01-016 |
| (9): MilliLab / Ylilin Response to InP LNA Evaluation Proposal | PLA-lfi-YLIN-PR-0278-01 |
| (10): JPL FIRST / Planck Project Safety Plan | D-16875, Revision A |
| (11): JPL Herschel / Planck Contamination Control Plan | JPL D-19156 (April 13, 2001) |
| (12): Sorption CryoCooler TMU Draft Safety Data Package | D-22671, Draft, May 2002 |
| (13): LFI Safety Data Package | PL-LFI-PST-RP-004, issue 1 |

PA/QA-STATUS

PACS PA Report

- CIL
- NCR
- System FMECA and effect on S/C (propagation of failure)/HSIA
- Cleanliness (materials)
- Results on derating
- Status on VCD
- Configuration Status
- MIP Planning
- AIT procedure preparation

CIL

- [PACS Critical Item List](#)
PACS-ME-LI-007 (1) 07 Feb 2002

NCR

- Nonconformances
 - Black Paint
 - FEE – Substrates (oversized)
 - FEE – Substrates (bonding)
 - FEE – Substrates (select lead)

- NO Answers by CEA, IAC, MPIA

System FMECA and safety

- [FMECA: Failure Modes, Effects and Criticality Analysis Report](#)

PACS-ME-GR-004 draft (2) 07 Feb 2002

- Despite requests to consortium members, no further information.

- [SPU Functional FMECA](#)

FPL-AN-1214-03-CRS (1) 25 Jul 2001

Safety

- ESA request of 27.05.02 responded to on 06.06.02 (email)
- ESA request for formal safety submission received on 07.06.02.
- Document in preparation
- Only potential safety item is the sorption cooler (common with SPIRE)
 - Specified MOP 100 bar absolute (at 80 ° C), = 80 bar at RT & none when cold.
 - Specified proof 1,5 times MOP.
 - Specified burst 2 times MOP.
 - Leak before burst design.
 - Does this meet safety requirements?

Cleanliness (materials)

- [Contamination Risk Analysis for PACS](#)
PACS-ME-TN-020 (1) 08 Feb 2002
- [PACS FPU Cleanliness and Contamination Control Plan](#)
PACS-KT-PL-005 (1) Sep 2001
- [PACS Cleanliness and Contamination Control Plan](#)
PACS-ME-PL-017 (1) 26.04. 2002

Results on Derating

- [DPU Derating and Worst Case Analysis](#)
CNR.IFSI.2002TR06 (1) 31 Jan 2002
 - Is a template at this stage.

Status on VCD

- [PACS Instrument Verification Control Document](#)
PACS-ME-PL-019 (1) 07 Feb 2002

Configuration Status

- PACS-ME-LI-011 status 27.06.02

MIP Planning

- KIPs (Key Inspection Points) are included in:-
 - [PACS Instrument Test Plan](#)
PACS-ME-PL-012 (1)24 Jan 2002
 - [PACS Instrument AIV Plan](#)
PACS-ME-PL-018 draft 26 Feb 2002
- No request for MIP (Mandatory inspection points) from ESA.

AIT procedure preparation

- (Not a PA task – inputs from engineering available up to now :AIV Plans of Subunits
- Detector Array
- DPU, FPU, SPU
- Chopper
- Grating
- PACS Instrument
- Sorption Cooler