SPIRE Warm Electronics Group Meeting #2.
May 6, 1999
CEN Saclay - SAp

<u>Attendees:</u>

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IFSI: R.Cerulli, R.Orfei
LAS : D.Ferrand, D.Pouliquen
SAp : J-L.Auguères, C.Cara, L.Rodriguez
RAL : K.King
SO  : H.G.Floren
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<u>Distribution list:</u>

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Attendees + C.Cunningham, W.Gear, M.Griffin, B.Swinyard, L.Vigroux
          + F.Loubère, I.Perez, J.Herreros
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<u>0. Agenda of the meeting</u>

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 9.30 Review of the agenda                        JLA     10'
 9.40 Managerial issues
      - Action review                             JLA     15'
      - SPIRE Project info                        KK      15'
      - Institute Progress report:
        . IAC                                     JH       5'
        . IFSI                                    RC       5'
        . LAS                                     DP       5'
        . SAp                                     JLA      5'
        . SO (full status)                        HGF     10'

10.40 SPIRE System status                         LR/BS   20'
11.00 WE Quality Assurance.
      - SPIRE QA Plan                             KK/GD   10'
      - WE QA progress report                     FL(JLA)  5'
11.15 Coffee break
11.30 WE system issues.
      - Review and discussion about the existing  JLA/CC  90'
        and missing WE requirements

14.00 WE functional analysis.                     CC      90'
      - Discussions on the Instrument status diagram.
      - WE functionality to be fulfilled to meet
        the WE requirements.
16.20 Short term planning (building and discussions) JLA/KK 20'
16.40 DPU/SPU option status
      - Outcomes of the last Steering Group meeting  KK   10'
      - Other inputs since the last meeting:
        . IFSI and IAC comments.                  RC      10'
        . MMS CPU board: info collected so far,   CC      15'
          possible impact on the SPIRE WE.

17.15 AOBs
17.30 End of meeting.
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1. Review of the agenda.

- The DPU/SPU option status point has been added to the original proposal.
- No further comments.

2. Action review.

- **WEG meeting #1 - Saclay - March 24-25, 1999**

Action 1	KK		Open	to issue a note stating both objectives and expected inputs for the Sept. 99 PDR.

Not done yet. KK committed himself to produce the note at short notice.

Action 2	KK		Closed	to talk with the other project manager about design synchronisation of the different groups.

KK discussed with H.Bauer: PACS is working on no clear general requirements. The synchronisation of the designs is likely a vain hope. The action is therefore considered as closed.

Action 3	KK		Closed	to contact SO to asses the situation.

Closed. See SO reporting section hereafter.

Action 4	IAC/JH		Closed	to check the Model table figures for the SPU.

No inputs from IAC. Action considered as closed.

Action 5	System team		Open	to perform a risk analysis.

Still Open. A "Risk Analysis" item will be set up in the May 19 System Meeting agenda (LR).

Action 6	KK		Open	to boost the SPIRE QA activity.

KK confirmed that no QA specific activity is planned at this stage. JLA pointed out that the SPIRE QA policy based on "laisser faire" is not suitable and that for the sake of the project, the QA team has to participate from the earliest stage. Groups like SAp are used to deal with QA but it is certainly NOT the case with other groups participating in SPIRE. The present QA document has to be adapted to SPIRE (not simply copied from a former project) and QA activities (like participation in the preparation of the SPIRE reviews) shall exists. Furthermore, QA has to be co-ordinated the same way as it is for the Project Management.
KK agreed to reconsider the QA issue. The action is still considered as Open

Action 7	RAL/GD	asap	Open	Issue the SPIRE Quality Requirements

See comment on previous action. Action still Open.

Action 8	KK	asap	Deleted	Provide the list of documents to be produced for the PDR

Same as action 1. This action is deleted.

Action 9	SAp/FL	04/99	Open	Produce the first issue of the Warm Electronics Product Assurance Plan

```
Started but not completed. Delay due to the present uncertainties on
the WE team organisation.
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Action 10	SAp/FL	05/99	Open	Produce the first issue of the Warm Electronics Quality requirements.

```
Ditto Action 9.
```

Action 11	WE Inst.	asap	Closed	Appoint a Quality Manager (or correspondent)

```
The QA Managers are:
      IFSI : R.Orfei
      LAS  : D.Pouliquen
      SO   : H.G.Floren
      IAC  : J.Herreros
      SAp  : F.Loubère
```

Action 12	WE Inst.	06/99	Open	to produce their Product Assurance Plans.

Action 13	JLA		Closed	to complete and circulate the note on DPU/SPU vs. DPU options.

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Done.
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Action 14	System Team		Open	to produce redundancy requirements at system level.

```
Still Open. A "Redundancy Analysis" item will be set up in the May 19
System Meeting agenda (LR).
```

- **SAp/IAC meeting - IAC - Nov. 16, 1998**

Action 1	IAC/JH		Open	Draft an SPU Development Plan

```
In a waiting state due to the ongoing discussions on SPU/DPU
architecture.
```

- **Warm electronics & S/W working group splinter meeting (SPIRE Consortium Meeting - RAL - Dec. 1-2, 1998)**

Action 2	BMS	20/01/99	Open	To respond the essential input request list.

```
Open. JLA/CC will re-issue the list to BS and KK.
KK pointed out that a Chopper Specification document exists.
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Action 3	KJK	15/12/99	Open	To provide a Development Plan containing AIV information as well..

```
A new draft of the IDP will be issued by KK by the end of May.
```

Action 4	SAP/LR	15/01/99	Closed	To draft a skeleton of the electronics specifications with the electronics requirements identified so far.

```
Closed. JLA presented a draft (see viewgraphs). This draft will be
circulated for comments at short notice.
```

- **SAp/IFSI meeting - IFSI - Feb. 16, 1999**

Action 1	KJK	asap	Deleted	To provide asap a reasonably stable version of the SPIRE development plan (including schedule and a flow diagram).

```
Deleted. This still Open action is the same as the above Action 3.
```

Action 2	IFSI & SAp	15/03/99	Open	Comment the preliminary draft of the SPIRE Development Plan.

```
Awaiting for the completion of the above Action 3.
```

- **CWG #4 - Feb. 10, 1999**

Action 3	JLA	20/05/99	Open	SPIRE to confirm allocation of responsibilities for SPU h/w & s/w implementation.

```
It is likely that this action cannot be completed on time.
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Action 5	IRC (*)	06/05/99	Open	Generate and Co-ordinate "requirements" on instrument commanding & verification.

```
A draft addressing very general issues has been circulated amid the
WEG (no particular comments received yet).
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Action 7	RC/JLA	06/05/99	Open	Define OBSW related milestones and activities till end 99.

```
It is likely that the OBSW activity will not be started by the end of
the year.
```

Action 8	KK	06/05/99	Open	Provide comments to Appendix 1 of Mission Operation Scenario.

- **CWG #3 - Feb. 3, 1999**

Action 3	KK	19/05/99	Open	Provide plans for ILTs, indicating required deliveries (S/C simulator, CCE,...)

Action 8	KK	30/04/99	Open	Comment on PACS RTA requirements used for SCOS testing.

Action 9	KK	05/03/99	Open	To supply estimates of manpower available for RTA related activities.

- **CWG #1 #2 – March 3, 1999**

Action 1	RO	25/05/99	Open	Submit list of needed common parts.

```
CC will provide a list to ESA (Passvogel).
```

3. SPIRE project info (KK). (see meeting's Viewgraphs)

- Presentation of the short term schedule.
- Fax sent by ESA calling for Instrument Science Verification. For SPIRE, documentation should be handed out by mid August and the Review Board Meeting to take place on Sept. 10.
  Comment expected by May 20th.
- Status:
  - Development plan: Inputs from only 1 group.
  - Inst. requirement document: No comment received so far.
  - Qualification Plan: No comment received so far.

KK expressed concerns on the poor participation of the SPIRE groups in the elaboration of the SPIRE high level documents. He pointed out that these documents are part of the PDR documentation package.
- Presentation of the Meeting list (passed and ahead till the end of the year).
Remark: Peak Up mode issues will be addressed at he FIRST AOCS to Inst. I/F meeting.

4. PACS and SPIRE science co-ord. meeting. report (LR)

- It has been required that the Surveys could be performed as fast as possible. As a consequence, it is envisaged to increase the FOV size from 4x4 to 8×4 arc min.
- FTS FOV should not be modified.
- Extending the FTS range to shorter wavelength not accepted. However, strong pressures are remaining to extend the FTS capabilities toward 150 microns. This new feature will have heavy consequences on position accuracy and data rates. As a consequence: LVDT cannot be used any longer. Other solutions have to be investigated (0.1 micron needed). Further studies will be carried out in the coming months.

5. Institute Progress reports.

5.1 IFSI (RC). (see meeting's Viewgraphs)

- The main IFSI activity is the preparation for the ITT. Specification have to be discussed and then issued. The ITT bears on the S/C interface and CPU + Memory whereas the Instrument I/Fs are likely to be developed by IFSI.
- Description of the Low and high rate interfaces to the SPU (or DRCU):
  KK : What happens if SPIRE don't agree with the interface presented.
  RC : IFSI is prepared to design dedicated interfaces if necessary.
  JLA: Questioned about the internal communication reliability. The presented protocols do not include any error detection and/or recovery. Error consequences have to be analysed in any case.
  CC : Low speed link could be OK but the problem is not so clear with the High Speed link.
- A diagram showing the DPU board memory organisation has been presented as well.

5.2 LAS (DP).

- The preparation of the ITT is the main goal. DF worked out on various sketches but a lot of questions are still pending on the FTS mirror moving system requirements. As a consequence a lot of technical solutions are still thinkable.
- DF pointed out that FTS requirement could have impacts on AOCS requirements in turn.
- LAS/SAp discussions on FTS Electronics interface took place at the end of the meeting and are reported in a dedicated section hereafter.

5.3 SAp (JLA,CC).

The SAp activities regarding the WE are the following:
- Development of Test electronics for the detector evaluation (CEA).
- Review of incoming documents.
- Possible DRCU configuration against detector types.

5.4 SO (HGF).

- Presentation of SO s/w development experiences.
- **Funding issue:** depends on other projects. The simulator S/W will be developed by HGF.
- **SO involvement:** HGF stressed that SO cannot be involved in h/w development (even PC interfaces) and that SO participation will be limited to simulator s/w development.
  It has been considered whether IFSI could provide the necessary h/w interface as they are likely needed for DPU interface testing.
- JLA : questioned about the reasons of the relative discretion of SO on the project so far.
  HGF : replied that SO was waiting from inputs from SPIRE to know what SO are required to deal with.
  JLA : pointed out that at this definition stage (as well as in the further ones) an active participation of all the WE group members is highly desirable.

5.5 IAC

IAC was not represented at this meeting.

6. QA Activity (FL) (see meeting's Viewgraphs)

- JLA reported on QA activity in lieu of FL who was not available.
- The SAp expressed concerns on SPIRE QA activity (see the comments on the Action #6 of the previous meeting).

7. WE requirements (JLA) (see meeting's Viewgraphs)

- JLA presented the preliminary draft of the WE Requirement documents. These requirements are stemming from various existing high level documents but mainly from the draft of the Instrument Requirement Document recently issued by B.Swinyard.
- The WE preliminary draft will be circulated for comment.

Action #1 - JLA - asap.
   Circulate the preliminary draft of the WE Requirement Document.

- Main comments:

  Switch on requirements: several possibilities are thinkable. For instance: the OBDH switch on the DPU (cold DPU redundancy to be considered), the DPU start the switching on of the various Instrument subsystems (ESA is providing several 28V independent lines).

  Operation mode shall include all the observation modes plus some of the technological modes.

  Some of the modes (like peaking up) could have to interact with the S/C. In this case, they could belong to a different category.

  The "Real-Time" commanding mode has to be dropped but a "SAFE" mode is to be considered.

  "Time Tagged" commands have no longer to be considered (directly

handled at S/C level).

8. Products & Tests vs. Models (JLA)

- The table has been slightly updated. See attachment hereafter.

9. WE functional analysis (CC) (see meeting's Viewgraphs)

Due to Time shortage, not all the Viewgraphs prepared by CC could be presented. They all have been however bundled in the Viewgraph bunch.
- Presentation of an overall WE electronics functional diagrams.
- Presentation of an overall WE interface diagram.

10. DPU/SPU options.

- KK summarised the outcomes of the last steering group meeting on that subject (see the minutes issued by M.Griffin as well).
- Three Options are still considered:

  A- the current baseline.
  B- IFSI provide boards to IAC who is in charge to incorporate the DPU functionality into the SPU (Comment (JLA): this option suppose (among others) that the IFSI boards can handle enough RAM). In this option the DPU disappears.
  C- The SPU functionality are integrated in the DRCU by SAp. In this case, the DPU remains as defined in the Baseline and IAC no more contribute to the WE.

- CC provided information on an MMS board which has been developed in the framework of the "Columbus" project (among else) and which could be suitable for the DPU and/or the SPU (integrated or not to the DRCU).

  This board is based on a SPARC chipset and is commercially available in a Mil-B version.

  A meeting with MMS has been planned on May 7 at Saclay. Outcomes will be circulated within the WE group asap.

11. FTS Electronics interface.

- Discussions on FTS electronics interface between LAS (DP, DF) and SAp (CC, JLA) took place at the end of the meeting.
- The definition criteria are the following:
  - The I/F shall be as simple as possible whereas being capable to cope with most of the still open possibilities.
  - Shall permit as far as possible to the LAS to carry out the development almost without interaction with the rest of the WE (the realisation of this subsystem will be subcontracted).
- Considered solution:
  Considering that the FTS moving system will be in any case driven by a set of values (i.e. a 40.000 point table) we came to the conclusion that:

  - The values (16 bits TBC) will be provided by the DRCU (one by one on request (interrupt every ms. or so) or as a whole set.
  - The values will be calculated onboard (or preloaded). The LAS

will provide either the computation algorithm or the tables (or set of tables or whatever combination of the both).

This solution allows the LAS to develop and test independently the FTS mirror moving system using a DRCU simulator (a PC with a dedicated I/F board). Once the FTS moving subsystem tuned, the LAS will pass the information necessary to develop the driving s/w to the SAp. I/F testing should be simplified.

12. Next WEG meeting.

Given the already planned meeting schedule, the present workload and the uncertainties bearing on the WE architecture, a date could not be chosen for the next meeting.

Action List:

- **WEG meeting #2 - Saclay - May 6, 1999**

Action 1	JLA	asap	Open	Circulate the preliminary draft of the WE Requirement Document.

- **WEG meeting #1 - Saclay - March 24-25, 1999**

Action 1	KK		Open	to issue a note stating both objectives and expected inputs for the Sept. 99 PDR.
Action 5	System team		Open	to perform a risk analysis.
Action 6	KK		Open	to boost the SPIRE QA activity.
Action 7	RAL/GD	asap	Open	Issue the SPIRE Quality Requirements
Action 9	SAp/FL	04/99	Open	Produce the first issue of the Warm Electronics Product Assurance Plan
Action 10	SAp/FL	05/99	Open	Produce the first issue of the Warm Electronics Quality requirements.
Action 12	WE Inst.	06/99	Open	to produce their Product Assurance Plans.
Action 14	System Team		Open	to produce redundancy requirements at system level.

- **SAp/IAC meeting - IAC - Nov. 16, 1998**

Action 1	IAC/JH		Open	Draft an SPU Development Plan

- **Warm electronics & S/W working group splinter meeting (SPIRE Consortium Meeting - RAL - Dec. 1-2, 1998)**

Action 2	BMS	20/01/99	Open	To respond the essential input request list.
Action 3	KJK	15/12/99	Open	To provide a Development Plan containing AIV information as well..

- **SAp/IFSI meeting - IFSI - Feb. 16, 1999**

Action 2	IFSI & SAp	15/03/99	Open	Comment the preliminary draft of the SPIRE Development Plan.

- **CWG #4 - Feb. 10, 1999**

Action 3	JLA	20/05/99	Open	SPIRE to confirm allocation of responsibilities for SPU h/w & s/w implementation.
Action 5	IRC (*)	06/05/99	Open	Generate and Co-ordinate "requirements" on instrument commanding & verification.
Action 7	RC/JLA	06/05/99	Open	Define OBSW related milestones and activities till end 99.
Action 8	KK	06/05/99	Open	Provide comments to Appendix 1 of Mission Operation Scenario.

- **CWG #3 - Feb. 3, 1999**

Action 3	KK	19/05/99	Open	Provide plans for ILTs, indicating required deliveries (S/C simulator, CCE,...)
Action 8	KK	30/04/99	Open	Comment on PACS RTA requirements used for SCOS testing.
Action 9	KK	05/03/99	Open	To supply estimates of manpower available for RTA related activities.

- **CWG #1 #2 - March 3, 1999**

Action 1	RO	25/05/99	Open	Submit list of needed common parts.

Products & Tests vs. Models (1)

		Resp.	EM	AVM	CQM	PFM	FS	Comments
WE UNITs								
DPU								
	Electronics							
	CPU Board	IFSI	1	1	2	2	(2/3)	FS shared with other Inst.
	Memory	IFSI	1	1	2	2	(2/3)	
	Power Supply	IFSI	1	1	2	2	(2/3)	
	Component Grade		Std	Std	Ext	Qual	Qual	
	Mechanics							
	DPU Box	IFSI	1	1	1	1	(1/2)	FS shared with other Inst.
	Connectors	IFSI	X	X	X	X	X	
	S/W							
	LL s/w	IFSI	V0	V1	V2	V flight	V flight	
	HL s/w	IFSI	V0	V1	V2	V flight	V flight	
SPU								
	H/W							
	CPU Board	IAC	1	1	2	2	1	
	Memory	IAC	xMo	xMo	2*(xMo)	2*(xMo)	xMo	
	Power Supply	IAC	1	1	2	2	1	
	Component Grade		Std	Std	Ext	Qual	Qual	
	Mechanics							
	SPU Box	IAC	1?	1	1	1	(1/2)	FS shared with other Inst.
	Connectors	IAC	X	X	X	X	X	
	S/W							
	LL s/w	IAC	V0?	V1?	V2?	V flight	V flight	
	HL s/w	SAp	V0?	V1?	V2?	V flight	V flight	
DRCU								
	Electronics							
	Detector Readout	SAp	1	-	1	1	1	
	FTS Control	LAS	1	-	2	2	1?	
	Cryo Control	SAp	1	-	2	2	1?	
	Chopper Control	SAp	1	-	2	2	1?	
	Calib. Source Control	SAp	1	-	2	2	1?	
	H/K readout	SAp	1	-	2	2	1?	
	Component Grade		Std	-	Mil	Qual	Qual	
	Mechanics							
	DRCU Box	SAp	1	-	1	1	1	
	Connectors	SAp	X	X	X	X	X	
BAU								
	Electronics							
	Buffers	SAp	1		1	1	1	
	Temp. Regulation	SAp	1		1	1	1	
	Component Grade		Std		Mil	Qual	Qual	
	Mechanics							
	BAU Box	SAp	1	2	2	2	1	
	Connectors	SAp	X	X	X	X	X	
Harness								
	DPU to SPU	SAp	1	1	2	2	1	
	SPU to DRCU	SAp	1	1	2	2	1	
	DRCU to BAU	SAp	1	-	2	2	1	

Products & Tests vs. Models (2)

		Resp.	EM	AVM	CQM	PFM	FS	Comments
Simulators								
FPU Simulator								Developed by CEA/SIG
	Electronics	SAp	1			1		
	Mechanics	SAp	1			1		
DRCU Simulator								
	H/W							
	Station	SO	2	1				
	Elect. Interface	SO	2	1				
	S/W							
	Simulation S/W	SO	V0	V1	V2			
Test Facilities								
EGSE								
	Station	Can.	4					
	Elect. Interface	Can.	4					
Local Test Unit								Developed by CEA/SIG
	Station		2					
	Elect. Interface		2					
Test Facility S/W								
	OBDH Interface Emulation	SIG	1					Local Test Unit
	RTA Common	RAL	1					
	RTA Specific	RAL	1					
	QLA	RAL	1					
	Telecom. Generation Tool	RAL	1					
Tests								
	EMC							
	Thermal Vacuum							
	Vibration							