Notes in SPIRE Technical Meeting at ESTEC, November 17 1998

Matt Griffin 24 Nov. 98

Present:	SPIRE:	Matt Griffin	PI
		Colin Cunningham	FPU Systems Engineer
		Ken King	Project Manager
		Bruce Swinyard	Instrument Scientist
	ESA:	Thomas Passvogel	Payload Manager
		Harm Schaap	Responsible for IID-B
		Bernard Collaudin	Thermal engineer
		Pierre Estaria	Responsible for Ground Segment

ESA's minutes of the meeting (written by Harm Schaap) will be distributed soon. This document is a based on my own notes. It is more SPIRE-centric and contains additional important information and comments. Many of the issues must be addressed at our December Consortium meeting on Dec. 1 and 2.

1. Next meeting date

The next meeting will be on 15 March 1999 (TBC).

2. Actions from July 29 technical meeting, telescope meeting, AO activities:

Most are closed. Outstanding ones are summarised below.

Information on dichroics: (performance, materials, space qualification status, etc.) MJG to do this within one week.

Cleanliness requirements: Class 100 for ESA handling of our instrument box is probably unnecessary. The figure in the PA plan is therefore changed to TBD for now. TP will raise the general issue for all three instruments in CWG7 .

Cold cryostat cover: ESA need to receive and assess input from the other instruments. The option of retroreflectors on inside of cover is worth looking at – SPIRE will provide more information on the requirements.

Cooler orientation: ESA have no problem with "Option 2" – i.e., we are free to install the cooler in either the horizontal or vertical orientation, whichever is more convenient for us.

Cold vibration facility: TP will raise the general issue in the CWG. CSL (Liege) are possibly interested. Who would pay is TBD. The requirements need to be specified.

Flight Spare philosophy: ESA still strongly prefer having a full FS ready for installation rather than our proposed repair scheme. They need to consult with the other instrument teams. They note that the amount of money we need to build and calibrate the FS is not large compared to the cost to them of even a short delay at that stage of the project. Delivering a fully calibrated FS must still be our baseline.

3. Instrument Development Plan

SPIRE will review our IDP at the Dec. Consortium meeting, after which a high level draft IDP will be provided to ESA. Detailed schedules will be available from SPIRE institute managers by the end of

the year, and SPIRE will provide an updated plan in early January, in time for ESA's writing of the SPC papers. ESA have provided KJK with the LFI IDP as an example of the required format

4. Funding and schedule

SPIRE will provide clear answers to the two questions raised at the Payload Funding meeting. In particular, ESA want to assess

(i) the level of additional resources that would be needed to meet the current schedule;

(ii) what schedule is consistent with existing funding commitments from the agencies is already being addressed by SPIRE.

The "alternative schedule" proposed by the French SPIRE groups was shown and discussed. ESA noted that the interval between PFM delivery and launch is reduced by one year, to which they do not agree. ESA also noted the PI's comment that the existing schedule has no margin, and also will become increasingly less workable unless ramp-up to the necessary funding level begins very soon. In effect, delays in clarification of the funding may soon make the existing schedule impossible. ESA need to assess the inputs from all five FIRST/PLANCK instruments.

5. SPIRE management issues

SPIRE Management Plan: ESA are satisfied with it generally, but have made a number of specific comments. SPIRE (especially the SPIRE Steering Group) will review the Management Plan at the Dec. Consortium Meeting, and produce a revised version incorporating internal and ESA comments. This will then be reviewed at the SPIRE/ESA management meeting planned for Dec. 16. ESA wish to use the current draft as an example for the other instrument teams (to which we have no objection).

SPIRE Document Tree: ESA would like to see it broken down at the next level also, and the need/delivery dates for the documents need to be specified.

SPIRE WBS: ESA are generally happy with the draft/template provided. They need to see what the other instrument swill provide before commenting further.

Progress reporting to ESA: SPIRE will not be able to report on workpackages until they have been defined within the consortium and are underway. What ESA want is actually rather high-level information:

- Overview of instrument status (by units)
- Indication of progress wrt development schedule
- Identification of problems and their impacts

A common template for all instruments would be a good idea. TP will devise a template for progress reporting and circulate it to the instrument teams.

Management meeting: To avoid SPIRE (KJK, MJG, LV) having to travel to ESTEC for this, we will try to do it by teleconference or videoconference. Suggested date: Dec. 16, 10.00-12.00 (ESTEC time). MJG will check the availability of LV for this.

6. Instrument design status

A brief verbal report by MJG covered:

- FTS study: decision planned for January; internal accommodation and systems aspects of both designs now very similar.

- Photometer optics optimisation (on hold pending outcome of revision of focal plane sharing)
- Urgent thermal/mechanical modelling work on outline structure design for proof of concept
- Interface definition and systems and subsystems requirements in definition under Systems Team
- Science requirements document being written
- Detector array options: first draft systems designs in January; to be reviewed at January Detector Group meeting
- On-board S/W and electronics group started
- Structure and internal layout group started
- Consortium meeting in early December will review management

Points raised in discussion:

Microprocessor selection: The baseline processor may not be optimum for real-time control, according to some people involved in the ODIN project. GP will follow this up.

DPU/SPU design: The Italian and Spanish groups will be providing these for several instruments. There is a danger of designing too early before the requirements of the individual instruments are all available. CWG 2 should coordinate this.

External DMS access: GP will set up a domain for SPIRE use. SPIRE documentation policy will be finalised at the Dec. Consortium meeting. We may wish to have our own system in addition to DMS for various purposes. ESA will require major/official documents to be deposited in DMS in any case.

FSEC matters: SPIRE have responded (or are responding) to all major technical and scientific issues raised by the FSEC.

Data rate: X-band is increasingly likely, with a potential factor of 4 increase. ESA are still studying this, and the main issue is actually whether it can be accommodated on the ground. We should continue to assume the IID-A data rate for now. PACS wants a maximum instantaneous data bus rate of 0.8 MBS. SPIRE should specify what we want.

Public relations: ESA want us to give them a list of possible PR opportunities in the participating countries for FIRST in the coming year. SPIRE will discuss this at the Dec. Consortium meeting.

ICC status report: ESA are concerned at the slow start-up of ICC definition activities in the FIRST instrument consortia. SPIRE will be dealing with ICC planning, and will establish a working group, at the Dec. Consortium meeting. SPIRE are not proposing to implement the ICC in any way other than as required in the FIRST Science Management Plan.

7. IID-B update

- **General updates:** The revisions sent to HS by CRC prior to the meeting will be implemented
- **Chapter 4:** MJG will provide updated text for Chapter 4 (this chapter is an overview of the instrument and does not contain any "official" information)
- **Names of our units**: These will be changed so as to be more descriptive : e.g., SPIRE 1 now becomes FS FPU etc.
- **Thermal tables:** These will be updated by BMS/CRC by Nov. 25. The thermal model diagram will be made consistent with the tables, and the adopted margins (20%) will be explicitly stated. The IID-B should contain one "worst case" option, but full information on the other options must be provided separately. Cooler recycle will be included as specific SPIRE mode.
- **Power profiles:** The document by BMS shall become a reference document in the IID-B
- **Cryoharness:** For the harness definition and thermal tables, the IID-B should have one version corresponding to the "worst case" of the current options. Detailed descriptions of the alternative options shall be provided to ESA as a separate document. From ESA's point of view it is

shielding requirements that dominate the A/L, so we should be careful what we specify here. The baseline implementation of the cryoharness will be to use the same types of cables as were used for ISO (capacitance = 80 – 100 pF/m – TBC). SPIRE will specify any restrictions on R, L, C separately for both sides of the BAU.

- **Mass:** ESA are very concerned about the overall mass of the focal plane. They want to have a reliable mass estimate from us by early next year. SPIRE must therefore verify the envisaged structure concept and get a good mass estimate by the end of 99. Our number in the IID-B is 33 kg + 20% margin, and ESA would not like it to get any higher.
- **FET box:** The option of dumping all the heat at 15K (no strap to 30 K) is favoured by ESA as the baseline.
- **BAU:** The Saclay document on the BAU design has been given to ESA for information As the BAU has to be thermally isolated from the CVV, a length of harness of around 0.5 m will be needed between the BAU and the CVV connector ESA prefer that other signals do NOT go through the BAU, so this is adopted as the baseline. In the absence of any details on the requirements of the other options, the CEA BAU design is adopted as the baseline for all options. The size and shape of the box are not seen as critical by ESA. Perhaps the sky-side of the box can have a radiator to get rid of some of the heat. ESA will study the BAU accommodation and report at the next technical meeting.
- **Warm electronics power:** This is not seen as a major driver by ESA (but that doesn't give us *carte blanche*).
- **Parts:** SPIRE options may involve parts not on the approved list. ESA recommend that we continue to study options based on "sensible" (e.g., NASA-approved) parts and provide them with the relevant information/wish-list for their consideration (the earlier the better).

8. Summary of actions

The formal action list is given in Harm Schaap's minutes. In addition, a number of other actions were agreed at the meeting which Harm decided not to include in the formal list:

1.	Include cleanliness requirements as topic for CWG7 (to be considered for all three instruments)	TP
2.	Provide "worst case" harness and thermal numbers for the IID-B with technical note describing the details of the different options (after Cons. Mtg.)	SPIRE
3.	Provide figures on thermal loads due to the other instruments when in standby mode	TP
4.	Send BAU note as baseline for SPIRE to Caltech/GSFC	MJG
5.	Update Detector Selection Plan after Jan. mtg. and include a higher level overview	KJK
6.	Provide requirements for cryostat cover retroreflectors	SPIRE
7.	Confirm feasibility of videoconferece on SPIRE management issues on Dec. 16 (availability of LV)	MJG
8.	Update Chap. 4 of the IID-B	MJG
9.	Produce next formal update of the IID-B (mid. Jan.)	HS
10.	Include PFM replacement criteria on agenda of FST meeting.	GP
11.	Define SPIRE requirement on maximum instantaneous data rate between SPIRE and OBDH	BMS
12.	Set up SPIRE domain in DMS	GP
13.	Send updated list of ICC milestones to KJK	PE

Ordinal Action Number	Title and Description	Due Date	Originator		Actionee		Completion	
			Firm	Person	Firm	Person	Date	By Document No.
AI-SPIRE-18	Respond to SPIRE-STP-2 (dichroics)	24.11.98	ESTEC	Schaap	QMWC	Griffin		
AI-SPIRE-19	Contact ODIN on their choice of microprocessor i.e. SPARC	31.12.98	ESTEC	Schaap	ESTEC	Pilbratt		
AI-SPIRE-20	Provide a template for Progress reporting by Instrument Teams	31.12.98	QMWC	Griffin	ESTEC	Passvogel		
AI-SPIRE-21	Provide numbers on the FPU structure and harness for the Optical Bench also considering observation modes of other instruments	29.1.99	QMWC	Griffin	ESTEC	Collaudin		
AI-SPIRE-22	SPIRE to deliver their Development Plan (First draft)	16.12.98	ESTEC	Passvogel	QMWC	Griffin		
AI-SPIRE-23	Complete Schedule versus Funding v.v. AI's from Paris meeting	7.12.98	ESTEC	Passvogel	QMWC	Griffin		
AI-SPIRE-24	Send updated Documentation Tree to ESTEC	25.12.98	ESTEC	Schaap	QMWC	Griffin		
AI-SPIRE-25	Send IID-B updates	25.12.98	ESTEC	Schaap	QMWC	Griffin		
AI-SPIRE-26	Provide PR relevant info	7.12.98	ESTEC	Pilbratt	QMWC	Griffin		
AI-SPIRE-27	Provide a design for mounting the BAU to the cryostat wall	15.3.99	QMWC	Griffin	ESTEC	Collaudin		