ALCATEL SPACE

HERSCHEL/PLANCK

REF. : H-P-ASP-MN-3513

SPIRE Progress & Interface

DATE : 04-05/09/03 | PAGE : 1/15

COMPTE RENDU DE REUNION / *MINUTES OF MEETING*

LIEU / *PLACE : RAL Chilton*

OBJET / *PURPOSE :*

CLASSIFICATION :

SPIRE Progress & Interface Meeting & IIDB meeting

PARTICIPANTS *ATTENDEES*	SOCIETE *FIRM*	SIGNATURE *SIGNATURE*	PARTICIPANTS *ATTENDEES*	SOCIETE *FIRM*	SIGNATURE *SIGNATURE*
Guy Doubrovik	ASP		Bruce Swinyard	RAL	
Carsten Scharmberg	ESA		Ken King	RAL	
Jan.Rautakoski	ESA		John Delderfield	RAL	5/9/03
Horst Faas	ASED		Eric Sawyer	RAL	
Bernard Collaudin	ASP		Chris Bockley-Blatt	MSSL	
			Anne Sophie Goizel	RAL	
			Eric Clark	RAL	

REDACTEUR / *WRITTEN BY* :

Bernard Collaudin

CONCLUSION :

DISTRIBUTION :

PARTICIPANTS / *ATTENDEES*

POUR ACTION :
FOR FURTHER ACTION

POUR INFORMATION :
FOR INFORMATION

APPROUVE PAR / *APPROVED BY*

NOM / *NAME*				
SIGNATURE / *SIGNATURE*				

ACTION

Agenda : see Annex 1

Open Actions status (see annex 2):

- **HP-ASPI-MN-3310 (26/06/03)**

1: Open: New date: End sept 03
3: data on Evaporator & pump strap available (from QPM action)
Remaining data end Sept

- **HP-ASPI-MN-3081 (06/05/03)**

2: Alignment: No comments. Considered as agreed. Closed.
Astrium should add Bruce Swinyard in copy of further mail about alignment
5: Superseded by procurement Samples received. Test will be performed by ESA on matching connectors. Action closed.
X: all action related to Comments on IID-B are considered as closed & will be updated on iid6b session on 5/9

- **ASPI-MN-2748 (27/2/03)**

9: Integration procedure: difficult to start with one party only.: Leave open, due date moved to end October 2003
Proposition to add and integration working session (FPU JFET & cryoharness) on OBA, during next AIV meeting.
Mechanical IF meeting (ASED-SPIRE)
8a: Closed/ Dimensions to be included in next version.
3: deleted.
HP-2-ASED-MN-0387. AIV meeting.
5 Thermal environment during IST-IMT
Answer of SPIRE is that Instrument cannot be tested with proposed temperature environment (7K on level 1). No Cooler recycling possible.. SPIRE will run the model and provide a feed-back.
Action remains open.
8: most sensitive noises mode. Will be Identified in test sheet.
11: Still open.

IID-B Update.

CR Status (Annex 3) . Accepted by all parties.
Last CR's on Electrical insulation got positive feedback from Astrium, & will be accepted.
Detailed discussion on IID-B transferred to dedicated session.

SPIRE general Status.

SPIRE progress (see annex 4 presentation from E.Sawyer)
Alignment Model (AM) activities finished, reconfiguration into CQM on going
FM manufacturing in progress. DPU (funding) , DRCU (QM-FM philosophy)on hold.
Schedule: complete CQM delivery shifted to August., but FPU could be delivered any time after cold vibration (Feb 2004)

Thermal IF Issues:
SPIRE Level 0 (evaporator & pump) Thermal strap data sent to industry (early August)
Test done on Industry thermal straps show reduction of performance of about 30% wrt prediction, mainly due to contact conductance. Tests are continuing, but decision has been taken to implement open tank solution. (on FM only, as it is not foreseen to open the ISO QM tank). Interface should remain unchanged with instruments.

Drop in the sorption cooler performances (SPIRE & PACS) apparently due to heat switch

Status of SPIRE thermal analysis (see presentation from Anne-Sophie Goizel (annex 5)
When new version of the FM SPIRE model will be needed by Astrium.?
New version issued for CDR. Instrument model needed end December 2003
Do Astrium need SPIRE CQM version of SPIRE Model.
Nothing foreseen for detailed CQM instrument analysis at Astrium.
Instruments will get the data for in-house analysis.

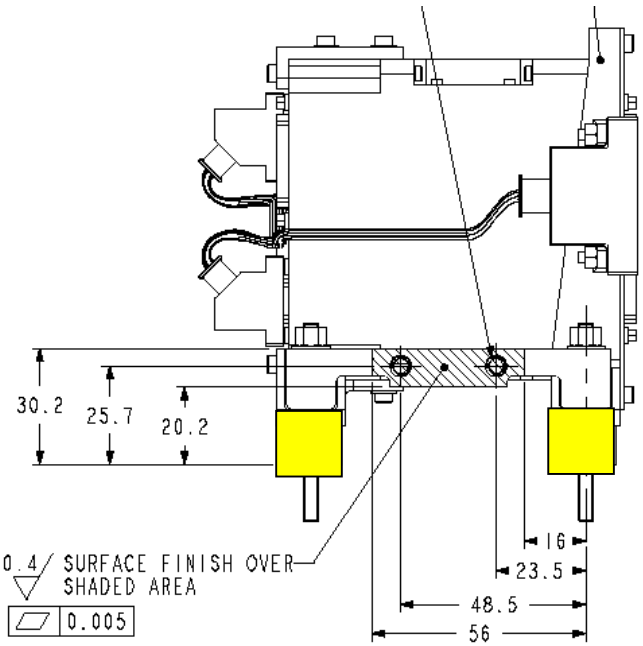
CR 9
Annex 6 show the agreement reached on the Thermal requirement
from draft 5 of IID-B 2.3
Table split Orbit / ground requirements
Evaporator strap heat flow reduced from 30 to 15mW
Temperature requirement reduced from 2K to I.85K, + Goal at 1.75K
Ground test level 1 reduced from 7K to 6K (TBC by RAL to Analyse)
Astrium stated that it cannot be achieved according the current thermal analysis.
Foot Notes updated
Explanatory text goes in a technical note in annex of IID-B

FCU Thermal interfaces
RFD seems acceptable (although not readable sizes). FRD to be kept at SPIRE level,
But SPIRE has to to issue an update of the FCU ICD (CR's) with readable sizes — AI 1 SPIRE JD End Sept

Mechanical IF Issues:

JFET Interfaces (Photometer & spectrometer). The thermal insulation of the JFET is not sufficient. The height of the carbon fibres support increase by 7.35 mm

All altitudes increased by +7.35mm



THERMAL STRAP INTERFACE

All changes have been taken into account in an update of the OBA end July for both JFET units.

Astrium will check if the change of altitude of the SPIRE JFET boxes can be taken into account (OBA, L3 interface position, and cryoharness (position of connectors). — AI 2. Astrium HF 20/9

In case the change can be implemented, SPIRE will issue a CR — AI 3. SPIRE JD End 09

L0 interfaces

Air Liquide document HP-2-AIRL-TN-002 (Multi foil flexible straps) handed over to SPIRE.

+/- 6mm flexibility (all 3 directions) at the bottom of level 0 strap is accepted by SPIRE

Warm units

AVM when different from FM) ICD's should be implemented in IID-B
(where sent by Eric Sawyer by mail on 12/2 & 18/3: FCU. DCU

SPIRE to add AVM ICD's (in case they are different from FM's) in the next IID annex pack — AI 4 SPIRE JD End 09

FPU interface

Issue 17 is the baseline, issue 18 draft is circulating for comments.
Issue 18 (includes all comments from Astrium on previous issue) will be issued now. To be implemented in IID-B

Electrical IF Issues:

Cryoharness.

Pin out verification
Comments received from SPIRE on ASED electrical ICD version 2.3 (DG) & have been included.
Next version is 2.6.

Exchanges SPIRE ←→ Astrium on implementation of over shielding.
SPIRE agrees to the new Astrium overshield proposal (option 3 of QPM meeting (H-P-ASP-MN-3421), described in fax HP-2-ASED-FX-0596).
Answer by SPIRE to the 3 questions asked by Astrium are YES (few details to be finalised.
Astrium & RAL will agree on a suitable descriptive text to be implemented in IID-B (red line modification, no CR required)

AI 5 SPIRE JD
To be ready in a few days 10/09.

CQM harness reduction

Reply from SPIRE of used CQM harness
Proposed reduction from ASED to ASP & ESA.
In case of implementation (most probable) an iteration will be needed with instrument to verify the QM harness definition.

Loan of LCL

SPIRE request a spare LCL for verification purposed (as proposed in EMC working group) (mail from J.Delderfield to K.R.Hibbert from ~April-May 03)
Alcatel will check that this spare LCL can be made available to SPIRE

AI 6 Alcatel 10/9

AIT

Verification of electrical insulation during AIT (only in warm conditions)
Insulation will be monitored when warm at each interconnection is assembled.
When SPIRE is cold, it will only be possible to make an overall verification.
Criteria for insulation (resistance) is missing & should be supplied (20Mohms each I/F)

AOB

Presentation of Level 0 tests #2 presented in Air Liquide Sassenage on 19/9.
Thermal meeting will follow in October (to conclude on thermal straps design).

SPIRE vibration tests: Use of "force limited vibration testing" implies automatic notching (random vibration). Input levels actually applied to the instrument should be sent to ESA/Alcatel for agreement — AI 7 SPIRE/MSSL 15/9

IID-A: SPIRE to comment on available sections of IID-A.
(edition finalised & signed end sept 2003)

EIDP (end item data package) List of content should be supplied by SPIRE (2 paper copies (1 ESA, 1 Alcatel that will follow the hardware) + 3 CD's
Hardware, software, MGSE, EGSE lists are available
ESA want all manufacturing logbooks, and the EIDP's of all subsystems.
All manufacturing logbooks down to subsystem level will in any case be available at RAL.
EIDP's will be available at RAL (paper form)
The SPIRE EIDP Table of content is given in annex 7:

ESA to check and comment the SPIRE EIDP content list — AI 8 ESA 15/9

RFW HR-SP-CEA-RFW-001 requesting acceptance of lower quality AD 590 temperature sensor is believed by ESA to be obsolete and should thus be withdrawn if this is the case. The AD 590 is being procured by the CPPA, also for CEA, in the highest quality level. If the RFW is not withdrawn, it will be rejected by ESA with justification.

End of Interface meeting

Continue on IID-B Convergence meeting

Chapter 2: SPIRE to check that all AD/RD documents are on livelink. — AI 9 SPIRE JD 15/9

RD1 & 2 order to be reversed (consistency between IID's)

Chapter 3: Few correction made on names. Missing Telephone nb to be added . Included on 5/9

Chapter 4: No further corrections.

Chapter 5:

5.1, last sentence: Safing plugs would need to be provided by Industry together with cryoharness (for CVV & SVM bracket connectors) to secure the FPU when the SVM warm units are not connected.

SPIRE to provide TN with definition of safing plugs that are needed	AI-10 SPIRE End sept
This will not be in this version of IID-B (TBD will remain)	
5.2: remove paragraph related to CR 39	
5.5: Go back to table as in CR 48 v1. Updates from that to be issued in a new CR if needed (mass of DPU 6.62 to 7.18 kg, height of JFET higher by 7.3mm	
5.6.1.2: Change "SPIRE provided A-Frame" to "support" Remove statement on the max load, which is not applicable at the interface Add a note in 5.10.2 referring to the mechanical implementation of electrical insulation: " The mechanical implementation of thermal straps insulation is described in section 5.6.1.2"	
5.7 Thermal interface SPIRE reduced model TMM diagram goes in annex 2 thermal model (top of annex) figure 75.7.1 (SPIRE system overview), as modified in CR 9 version 10 goes at beginning of section 5.7 Explanatory text (5.7.1.1) goes into a new annex 3 5.7.1 includes only the thermal requirements (table as agreed in this meeting (annex 6) SPIRE wishes to modify the 10K /350J triangular peak requirement on the pump strap to 6.7K/500mW. which is refused by Industry. A note (vi) is added to this box that the pump strap is designed to 0.1W/K.	
Additional requirements in ECR 9 **Temperature of Instrument shield** (eq. Radiative temperature) <16K. OK, included in the table. Note that instrument shield temperature is measurable, but the equivalent radiative temperature not.	
Heat load from SPIRE cryoharness to FPU (J19 to J30) < 0.2mW. Estimation of Astrium of the current situation is between 0.7 & 1mW (including thermal stand-off on the OBA. Estimation by SPIRE is about 3mW (conduction & dissipation)	
Astrium will make a detail evaluation of the conduction / Dissipation (discriminate between both) of the SPIRE cryoharness to the FPU. (this could mean using electrical resistance at operating temperature). It is agreed that the Conduction/dissipation from the cryoharness should not exceed the losses through the FPU feet (currently estimated to about 1.2mW). A placeholder should be included in IID-B.	AI-11 Astrium AH 19/9
Annex 3 describing the thermal behaviour of the sorption cooler will be sent by SPIRE (from unused text in section 5.7.1 and of ECR 9/10	AI-12 SPIRE JD 10/9

5.8: add note from JD comments 1/9., remove note below figure

5.9.1: Keep only the 2 first columns of the table, replace Max by Power, remove mean, and harness columns, and refer to the dissipations from the thermal model in annex 2. Update the values according to ECR 63. Harness dissipation due to SPIRE to be estimated in the TMM, from harness implementation, and estimated typical currents.
Add a note : note these values are updated from thermal model 2.3, and will be included in model version 2.5.

5.10: Remove all text between 5.10 and 5.10.1, and replace by the outcome of AI 5 above

5.10.1: modified as follows:
The Spire harnesses shall be compliant with the requirements specified in annex 3 (summary of SPIRE cryoharness wiring fonctions)
The cryoharness interface pinout shall be compliant with RD19: SPIRE Harness definition document SPIRE-RAL-PRJ-000608 issue 1.1 (+ agreed updates to be issued in 1.2).
Figure below gives an overview of the Spire harness layout.

5.10.2 modified as follows:
To fulfil Spire's grounding requirements, the HSFPU and both of the JFET racks need to be electrically isolated from the Optical Bench, at their mechanical mounting points. The same applies to the bolometer system harness screens.
SPIRE grounding diagram provided in the figure below is for information, as the necessary grounding implementation are specified explicitly elsewhere in this document.
The mechanical implementation of thermal straps insulation is described in section 5.6.1.2

Fig 5.10.2 to be sent in a vectorial format compatible with MS word 97 to Alcatel

5.10.3: Bonding: Annex 2→ annex 1
Remove last section up to Note.

5.10.4.3: Change "Launch confirmation" to "Launch Latch confirmation"
Replace beginning of phrase by "After transportation to Kourou, and the last operation of SPIRE prior to launch"
Remove last phrase

5.12.1. 1st paragraph: Add TM(5, 1) as the ACMS datapacket to be used
2nd paragraph: replace "settling time… less than 10s" by "the transition time between the 2 position shall be less than 32s", which is in agreement with the

Syatem requirement specification (transition time=10s+Root(2xPHI(arcsec)), PHI=4arcmin for SPIRE
Paragraph 3=OK
Paragraph 4 & 5: The reduction of 2arcsec to 1.7 is not accepted by industry (not compliant with SRS): include a caveat in IID-B: (not agreed by industry)

5.12.3: On target flag:
change to:
"For pointed observations, SPIRE requires, an On-Target Flag. It will be provided in the spacecraft telemetry, and will specify the acquisition time to a precision of better than 0.1 second. This is required for the correct processing of the Spire data on the ground; it is not required for Spire operations. "

precision of 0.1s feasibility to be checked
5.15.1.2: Agreed . remove notes

5.16: Note 2 removed as covered y an action from this meeting

Teleconf to terminate the IID-B convergence meeting on 19/9/03, 9:30 CET (8:30 BST) if needed.

Next SPIRE IF Meeting 19-20 Nov 2003

ALCATEL SPACE	**ACTION ITEM LIST**	REF. : H-P-ASP-MN-3513
	MEETING TITLE: SPIRE Progress & Interface Meeting	DATE : 04-05/09/03
	HERSCHEL/PLANCK	PAGE : 10/15

ACTION			**DATE**
N°	DESCRIPTION	ACTION Firm / person	DUE
1	SPIRE to issue an update of the FCU ICD, according to latest RFD (CR's) with readable sizes	SPIRE J.D.	End Sept
2	Astrium will check if the change of altitude of the SPIRE JFET boxes can be taken into account (OBA, L3 interface position, and cryoharness (position of connectors).	Astrium. H.F.	20/9
3	In case the change can be implemented, SPIRE will issue a CR	SPIRE J.D.	End 09
4	SPIRE to add AVM ICD's (in case they are different from FM's) in the next IID annex pack	SPIRE J.D.	End 09
5	Astrium & RAL will agree on a suitable descriptive text to be implemented in IID-B (red line modification, no CR required)	SPIRE JD	10/09
6	Alcatel will check that this spare LCL can be made available to SPIRE	Alcatel GD	10/9
7	Use of "force limited vibration testing" implies automatic notching (random vibration). Input levels actually applied to the instrument should be sent to ESA/Alcatel for agreement	SPIRE/MSSL	15/9
8	ESA to check and comment the SPIRE EIDP content list	ESA J.R.	15/9
9	SPIRE to check that all AD/RD documents are on livelink.	SPIRE JD	15/9
10	SPIRE to provide TN with definition of safing plugs that are needed	SPIRE JD	30/09
11	Astrium will make a detail evaluation of the conduction / Dissipation (discriminate between both) of the SPIRE cryoharness to the FPU. (this could mean using electrical resistance at operating temperature).	Astrium A.H	19/9
12	Annex 2 describing the thermal behaviour of the sorption cooler will be sent by SPIRE	SPIRE JD	10/09

ANNEXES OF THE MINUTES

Annex 1: Agenda

Annex 2: Compilation of last meetings actions

Annex 3: SPIRE CR Status

Annex 4: SPIRE Status (E.Sawyer)

Annex 5: Thermal analysis status (A.S.Goizel)

Annex 6: Agreement on thermal requirement (CR9)

Annex 7: SPIRE EIDP content list (E.Clark)

Annex 1: SPIRE IF Meeting Agenda, 4-5 September 2003

(in red: modification versus draft agenda)

1. IF Meeting, 4 September, From 09:00 to17:30

Actions status:
See attached ASP table (page 2)

IID-B Update v2.3 draft status and comments:
- CRs status
- Inputs required, missing inputs, answer to notes status
- IIDB convergence: according to spare time, continue 5 September (see here after)

SPIRE general (or particular) technical status (TBD by SPIRE) **:**
- SPIRE schedule (if new inputs)
- Technical status (if new inputs)

Mechanical IF Issues:
- L0 to L3 Thermal Strap IF agreement
- HP-ASED-EM-0455-03: L0 thermal links enveloping load cases for design
- FPU IF
- JFET IF: Change of height above HOB by 7mm
- WU IF
- FCU IF (CEA RFD # 9 & # 10)

Thermal IF Issues:
- Agreement on thermal interfaces – Status (i.e. Status of re-release of ECR-009 v7/v8…v10)

Electrical IF Issues:
- SPIRE Cryo-Harness Data Package - Status
- SPIRE Cryo-Harness internal overshield:HP-ASED-FX-0596-03 (28/07/03) and HP-ASED-EM-0481-03 (6/08/03) proposal (dated): SPIRE answer and IIDB/ SPIRE Harness specification implementation
- CQM Harness Reduction, HP-ASED-FX-0602-03: SPIRE response

AIT Issues:
- Verification of electrical insulation during AIT (only in warm conditions)

Other:

Minutes and actions, End of IF Meeting

2. IIDB Convergence Meeting, (4 and) 5 September, From 08:30 to 12:30

- **SPIRE IIDB basis:**
- sections 2, 5 and 7 v2.3 draft 5
- sections 1, 3, 4, 6 and 8 to 10 v2.3 draft 4
- **exhaustive check and update of sections 2, 5 and 7**
  Inputs required, missing inputs, answer to notes
- **quick check of sections 1, 3, 4, 6 and 8 to 10**

Objective: keep the minimum open points (objective 0) in order to edit and sign the IIDB final version 3.0

Annex 2: Compilation of last meetings actions

Since SPIRE Progress & Interface Telecon Meeting 26/06/03 , H-P-ASP-MN-3310

ASP: SPIRE ACTION ITEM LIST STATUS dated 08/08/03 (including previous meeting actions)

(in red: modification versus draft agenda)

	ACTION			
N°	**DESCRIPTION**	**Resp**	**DUE date**	**Status**
	From HP-ASPI-MN-3310 (26/06/03)			
01	SPIRE to issue a CR providing text/inputs for all sections & sub-sections of IIDB concerned by AIV, Testing, Verification, Hardware matrix and model philosophy	SPIRE	15/07/03	Open
02	ASED to provide SPIRE the Step files of relevant OB assembly	ASED	15/07/03	Closed: HP-ASED-EM-0443-03
03	SPIRE to provide inputs: ➢ Performance of Sorption Cooler with shunt strap connected to the pump heat switch ➢ Detailed heat loss budget on 300mK strap ➢ Visibility of SPIRE level 0 strap (between thermal I/F and FPU) including margins, materials, …	SPIRE	31/07/03	Open ?
	From HP-ASPI-MN-3081 (06/05/03)			
02	SPIRE comments on doc: HP-2-ASED-TN-0002 Alignment Plan-Concept / Herschel (AD 7 of IIDB)	SPIRE	30/05/03	Open ?
05	SPIRE to provide Courage and Cristek connectors data	SPIRE	30/05/03	Open ?
08	ASED to verify the 50 mA capability of harness	ASED	16/05/03	Closed (mail H.Fass 03/07/03) Ref. HP-ASED-EM-0365-03
X	SPIRE Inputs & comments on IIDB 2.3 draft 2 to 4 (see AI 3 MN-2748)	SPIRE	16/05/03	Still open: lot of inputs missing.
X	ASED Inputs & comments on IIDB 2.3 draft 2 to 4 (see AI 3 MN-2748)	ASED	16/05/03	Nearly closed
X	ALS Inputs & comments on IIDB 2.3 draft 2 to 4	ALS	16/05/03	Open: no comment or inputs received

	From HP-ASPI-MN-2298 (26-27/11/02)			
AI 2	Update IID-B: §5.16: Add hardware matrix (deliverable items) ; §9: to provide input wrt testing & verification ; § 5: details of all points of electrical isolation on SPIRE FPU & JFETs (by new ECR 53)	SPIRE	30/05/03	Open, only ECR53 received
	From HP-ASPI-MN-2748 (27/2/03)			
AI 9	Integration procedure of FPU on Optical bench	SPIRE	30/03/03	Open
	From ASED			
AI 8a	HP-2-ASED-MN-0182 MSSL / BW should clarify how the SPIRE red tagged cover should be respresented in the IF drawings	MSSL	30/06/03	Covered in IF drawings, Issue 18, but no dimensions given
AI 3	RAL/JD to evaluate the L0 interface and its implications on L0 instrument side design	SPIRE	10/07/03	Open, but covered by L0 dedicated L0 thermal strap activities, Proposed to be deleted.

Annex 3 : SPIRE CR Status

SPIRE CR	Status (*)	Resp.	IIDB Issue	ASPI CR Ref.	FAX ASP ref & date	Subject of instrument CR (s)	Industry Response Ref. & Comments	OTCmt
HR-SP-RAL-ECR 007, 012, 014	**C**	ASP	2.0				Covered by IIDB 2.2	
2/1 -> 2/2	**C**	ASED	2.1	**H-P-ASPI-CR-0174**	H-P-ASPI-LT-1821 26/07/02	Update of SPIRE IIDB 2.1 to 2.2	CR CONDITIONALLY ACCEPTED (fax HP-ASED-FX-0586-02)	
2/1 -> 2/2	**C**	ALS	2.1	**H-P-ASPI-CR-0178**	H-P-ASPI-LT-1822 26/07/02	Update of SPIRE IIDB 2.1 to 2.2	CCN H-P-AC-AI-0016 : certain objections were raised. These discussed by Telecon on 13/01/03. Awaiting agreement by Alenia of HP-ASPI-MN-2542 sent 14/01/03.	
HR-SP-RAL-ECR-0009 v6-v7-v8 to v10 ?	**S, W**	ASED	2.2	**H-P-ASP-CR-0468 for v?**		Required SPIRE detailed temperatures and heatflows at I/F	Waiting for new and agreed version of ECR 0009 (last one from SPIRE: v10 dated 01/09/2003) - Proposed IIDB §5.7 as CR009v7 send by BC mail 02/07/03, included in in IIDB 2.3 draft 5	
HR-SP-RAL-ECR-0029 v2	**N**	ASED	2.2	**H-P-ASPI-CR-0291**	H-P-ASPI-LT-2635 30/01/03	Harness update	ASED: FAX HP-ASED-FX-0157-03 dated 25/02/03, ECR029v2 is superseded by new SPIRE Harness Definition Doc. Issue 1.1 - ECR SPIRE to be updated to ECR29v3 (see below), as H-P-ASP-MN-2748 27/02/03	CCB # 19
HR-SP-RAL-ECR-0029 v3	**A,W**	ASED	2.2	**H-P-ASPI-CR-0291 v2.0**	H-P-ASPI-LT-3046 24/04/03	New SPIRE Harness Definition Doc. Issue 1.1 -	ECR 29 SPIRE updated to v3 (made by ASP), as H-P-ASP-MN-2748 27/02/03, and officially sent to ASED - Overshield to be not taken into account (until final decision on CR39) - Harness Def Doc to be put in annex of IIDB v2.3 - ASED fax HP-ASED-FX-0639-03 dated 31/07/03: will be covered by new overshield (HP-2-ASED-CP-0054) and new Harness Def Doc issue	CCB # 19
HR-SP-RAL-ECR-0030 v2	**R**	ASED	2.2	**H-P-ASPI-CR-0292**	H-P-ASPI-LT-2635 30/01/03	Temperature sensors	ASED: ECR update required; HP-EM-0013-02, dated 18.11.02- ECR SPIRE to be updated to ECR30v3 - See ECR-30 v3 below for S/C sensors table § 5.7.5.3 - Only Internal instrument sensors table § 5.7.5.1 applied to IIDB 2.3 draft 2	CCB # 19
HR-SP-RAL-ECR-0030 v3	**C**	ASED	2.2	**H-P-ASPI-CR-0292 (for v2)**	H-P-ASPI-LT-2635 30/01/03 (for v2)	Temperature sensors	ECR 30 v2 SPIRE updated to ECR30v3(inputs ASED) and closed, as H-P-ASP-MN-2748 27/02/03 - CR 30 "v3" from ASED proposal applied to table § 5.7.5.3 in IIDB 2.3 draft 2 - More reduced table from ASP BC proposal mail H-P-LT-3035 dated 23/04 not applied	CCB # 19
HR-SP-RAL-ECR-0032	**C**	ASED	2.2	**H-P-ASPI-CR-0293**	H-P-ASPI-LT-2635 30/01/03	Removal of shutter	Accepteed by ASED,fax 158	CCB # 19
HR-SP-RAL-ECR-0033	**C**	ASP	2.2	**NA**		Update of IIDB with 3D views.	OK for ASPI and ASED (mail dated 11.09.02), to be included in v. 2.3 - draft	CCB # 19
HR-SP-RAL-ECR-0039 v.1	**S**	ASED	2.2	**H-P-ASPI-CR-0265**	H-P-ASPI-LT-2267 18/11/02	Cryoharness update including overshield.	HP-ASED-FX-0777-02 Initial analysis provided, ASP: waiting for ESA decision on ECP - CR 39V1 will be covered by new overshield (HP-2-ASED-CP-0054) - Considered as not accepted yet	CCB # 19
HR-SP-RAL-ECR-0040 v1	**N**	ASED	2.2	**H-P-ASPI-CR-0294**	H-P-ASPI-LT-2635 30/01/03	Updated FPU & SVM unit drawings	ASED: Conditionally accepted, detailed IF definition ongoing- Waiting for updated drawings: ECR 40 v2 (see below) to be issued	CCB # 19
HR-SP-RAL-ECR-0040 v1	**N**	ALS	2.2	**H-P-ASPI-CR0320**	H-P-ASPI-LT-2634 30/01/03	Updated FPU & SVM unit drawings - ICD Annex of IIDB	Waiting for updated drawings: new version v2 to be issued will include ECR 47 content - Waiting for updated drawings: ECR 40 v2 (see below) to be issued	CCB # 19

SPIRE CR	Status (*)	Resp.	IIDB Issue	ASPI CR Ref.	FAX ASP ref & date	Subject of instrument CR (s)	Industry Response Ref. & Comments	OTCmt
HR-SP-RAL-ECR-0040 v2	**C**	ASED	2.2	**H-P-ASPI-CR-0424**	H-P-ASP-LT-3198 05/06/03	Updated FPU & SVM unit drawings - ICD Annex of IIDB	CR 40 v2 received mail JL dated 23/05: new drawing pack SPIRE-RAL-DWG-001409 (issue 6 dated 21 may) - fax HP-ASED-FX-0677-03 dated 13/08/03: ASED OK with reserve on JFET connectors	
HR-SP-RAL-ECR-0040 v2	**C**	ALS	2.2	**H-P-ASPI-CR-0425**	H-P-ASP-LT-3197 05/06/03	Updated FPU & SVM unit drawings - ICD Annex of IIDB	CR 40 v2 received mail JL dated 23/05: new drawing pack SPIRE-RAL-DWG-001409 (issue 6 dated 21 may) - ALS CCB#53 (fax HP-ALS 03-0341 & minutes H-P-MI-AI-0279): will be covered by IIDB 3,0 review	
HR-SP-RAL-ECR-0041 v1	**C**	ASP	2.2	**NA**		Section 7.2.1 change Clarification of requirements for Cryocooler re-cycling, during on-ground testing. Clarification w. r. t. orientation for cooler recycling on ground	ASED: Conditionally accepted - Updated version of text proposed by ASPI (included in v. 2.3-draft), mail GL dated 21/11/02, New text to be proposed by SPIRE+ASED to close the ECR 41 , as H-P-MN-2748 27/02/03 - Status closed as ASP CCB#19 - Text in IIDB still to be clarified,	CCB # 19
HR-SP-RAL-ECR-0044 v1	**C**	ASED	2.2	**H-P-ASPI-CR-0376**	H-P-ASPI-LT-3046 24/04/03	JFET rack foot mounting details on OB	ASED OK: fax HP-ASED-FX-0645-03 dated 31/07/03 - Text of SPIRE CR44 added in IIDB 2.3 draft 5 in section 5.6.1	
HR-SP-RAL-ECR-0045 v1	**N**	ASP	2.2			Updated DCRU drawings. Completed by ECR 40 ?	ECR 45 deleted - Not transmited	CCB # 19
HR-SP-RAL-ECR-0046 v1	**C**	ALS	2.2	**H-P-ASP-CR-0377 (not used)**		Include HSPDU interface circuit	Accepted by ASP CCB 19, included in IIDB 2.3 draft	CCB # 19
HR-SP-RAL-ECR-0047 v1	**N**	ASP	2.2			IID-B Spire Unit ICD Annex Reissue….Doc. # SPIRE-RAL-DWG-001409 to version 4	ECR 47 deleted, will be included in new ECR 40 v2, as H-P-MN-2748 27/02/03 - Not transmited	CCB # 19
HR-SP-RAL-ECR-0048 v1	**C**	ALS	2.2	**H-P-ASP-CR-0378**	H-P-ASP-LT-3197 05/06/03	Update table in section 5.5 Masses and sizes reflect ECR 47	Accepted by ASP CCB 19, Transmited to ALS for info	CCB # 19
HR-SP-RAL-ECR-0048 v1	**C**	ASED	2.2	**H-P-ASP-CR-0426**	H-P-ASP-LT-3198 05/06/03	Update table in section 5.5 Masses and sizes reflect ECR 47	Accepted by ASP CCB 19, ASED OK: fax HP-ASED-FX-0656-03 dated 08/08/03	CCB # 19
HR-SP-RAL-ECR-0049 v1	**C**	ASP	2.2			Update JFET 3D views to match ICDs: cosmetics of IIDB	Accepted by ASP and applied to IIDB 2.3 draft 2 -Not transmited	CCB # 19
HR-SP-RAL-ECR-005 -006 -009 -010 -011	**C**	ASED	2.0	**H-P-ASPI-CR-0030**	H-P-ASPI-LT-1835 31/07/02	Various.	CR covered by CR 0174. Closed by IIDB 2.2, ECR 009 and 010 not accepted, ECR 009 to be reissued- See ECR-09 vn? Below	CCB # 4
HR-SP-RAL-ECR-005 -006 -012	**C**	ALS	2.0	**H-P-ASPI-CR-0029**	H-P-ASPI-LT-1837 01/08/02	Various.	Ref fax : CFMG/RD/01/0441- CCB # 7 . CR covered by ASP CR n° 0178 (fax H-P-ASPI-L-1837). Closed by IIDB 2.2	CCB # 4
HR-SP-RAL-ECR-0050 v1	**C**	ASP	2.2			Update Spire Input beam illustration 5.8.1	Accepted and applied to IIDB 2.3 draft 2 - This CR should be completed with quantitative description of beam	CCB # 19
HR-SP-RAL-ECR-0051 v1	**N**	ASP	2.2			Increase strap interface boltsize of Sorption Cooler	Withdrawn by ASP, not a spacecraft interface, doesn't affect SPIRE FPU to cryostat interface - Not transmitted	CCB # 19

SPIRE CR	Status (*)	Resp.	IIDB Issue	ASPI CR Ref.	FAX ASP ref & date	Subject of instrument CR (s)	Industry Response Ref. & Comments	OTCmt
HR-SP-RAL-ECR-0052 v1	**C**	ALS	2.2	**H-P-ASP-CR-0427**	H-P-ASP-LT-3197 05/06/03	Spire Herschel DPU 28V Power I/F pin-out error	Accepted by ALS CCB#53 (fax HP-ALS-03-0341 & minutes H-P-MI-AI 0279)	
HR-SP-RAL-ECR-0053 v1	**C**	ASED	2.2	**H-P-ASP-CR-0465**	H-P-ASP-LT-3459 23/07/03	Include table of SPIRE ground isolation for L0 to L3, cryoharness and SVM units details in § 5,10,2	ASED OK: fax HP-ASED-FX-0674-03 dated 12/08/03	
HR-SP-RAL-ECR-0057 (v1)-v2	**C**	ASED	2.2	**H-P-ASP-CR-0466**	H-P-ASP-LT-3459 23/07/03	JFET L3 I/Fs, record details negotiated about the configuration. Spire IID-B annex to be updated to show Spire supplied parts (to be done when feet and harness details fixed). Astrium's Detail D and Detail E on 2547-121140-000-09 need small changes : strap hole size, hole positional accuracy and surface finish.	ECR 57 v2 (superseed v1), ASED OK: fax HP-ASED-FX-0676-03 dated 13/08/03	
HR-SP-RAL-ECR-0058 (v1)-v2	**C**	ASED	2.2	**H-P-ASP-CR-0467**	H-P-ASP-LT-3459 23/07/03	Moving of Spire's L1 I/F insulation from one end of straps to the other	ECR 58 v2 (superseed v1), ASED OK: fax HP-ASED-FX-0673-03 dated 11/08/03	

(*) : I	Created by Instrument, received by ASP
(*) : E	Corresponding ASP CR sent to Sub-Contractor
(*) : S	Waiting for inputs, suspended
(*) : A	Accepted by Sub-Contractor
(*) : C	Closed, Accepted, Applied
(*) : R	Rejected by Sub-Contractor
(*) : N	Obsolete, Suppressed
(*) : W	Waiting for ECR (not yet received by ASP)

Annex 4: SPIRE Status

AVM/STM/CQM Progress/Status

Eric Sawyer

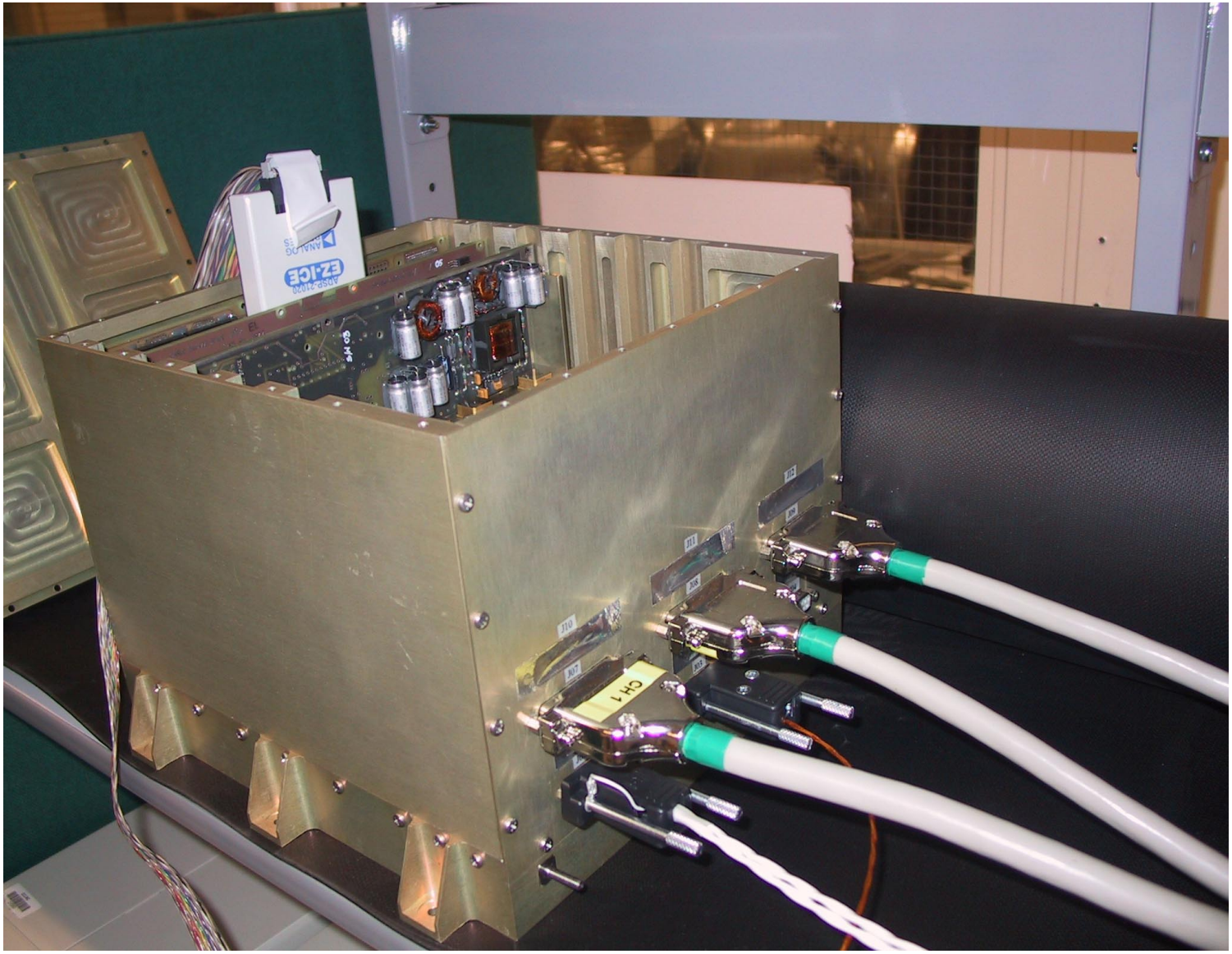
SPIRE

AVM

Consists of:

- AVM DPU
- DRCU simulator (simulates DRCU and FPU)

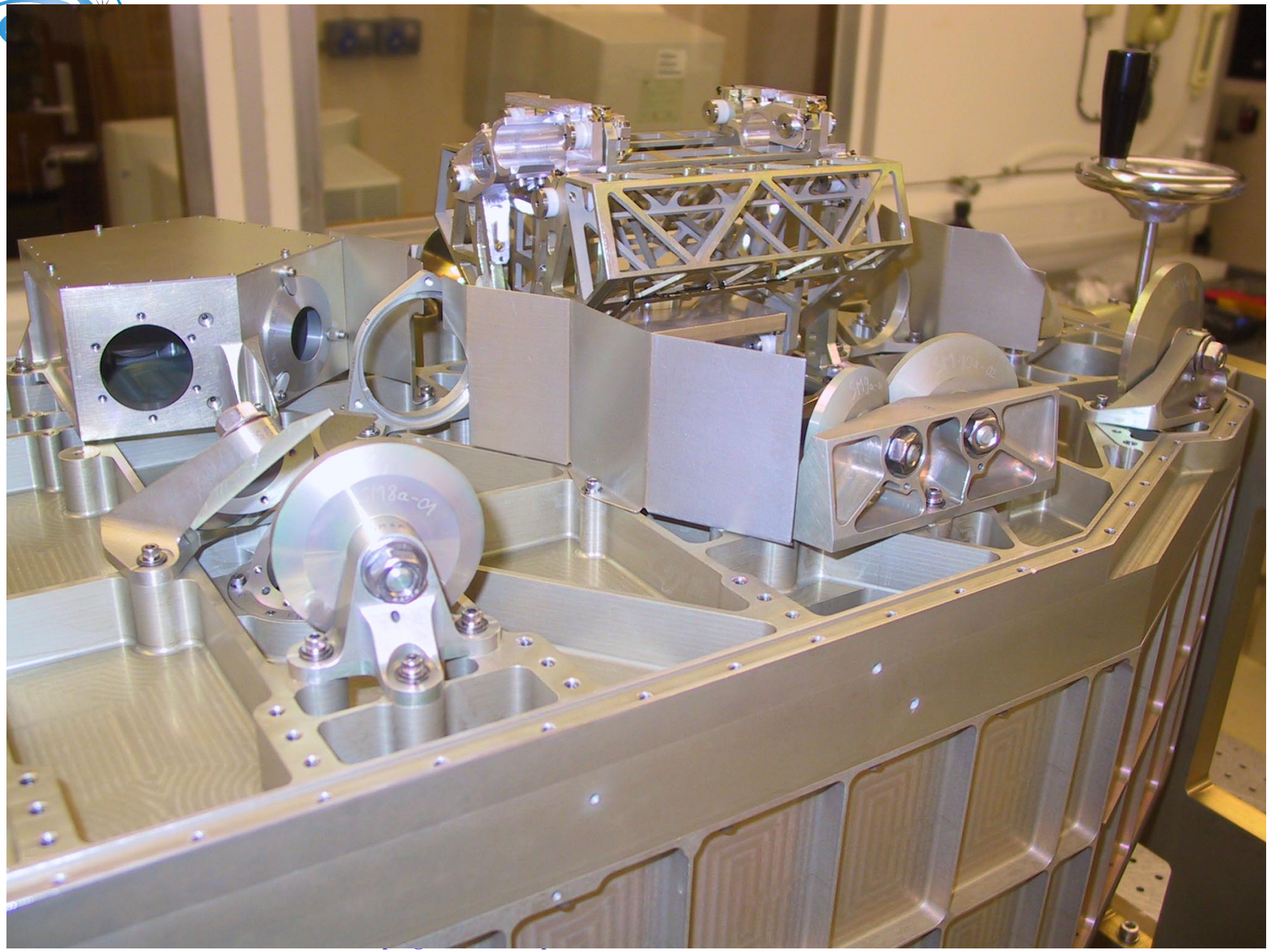
- Delivered April 03
- Preliminary testing complete.
- Simulator software needs updating
- DPU software will be updated
- Formal acceptance planned for October.
- Preliminary testing of OBS and EGSE software continuing


CH 1

SM

Structural model

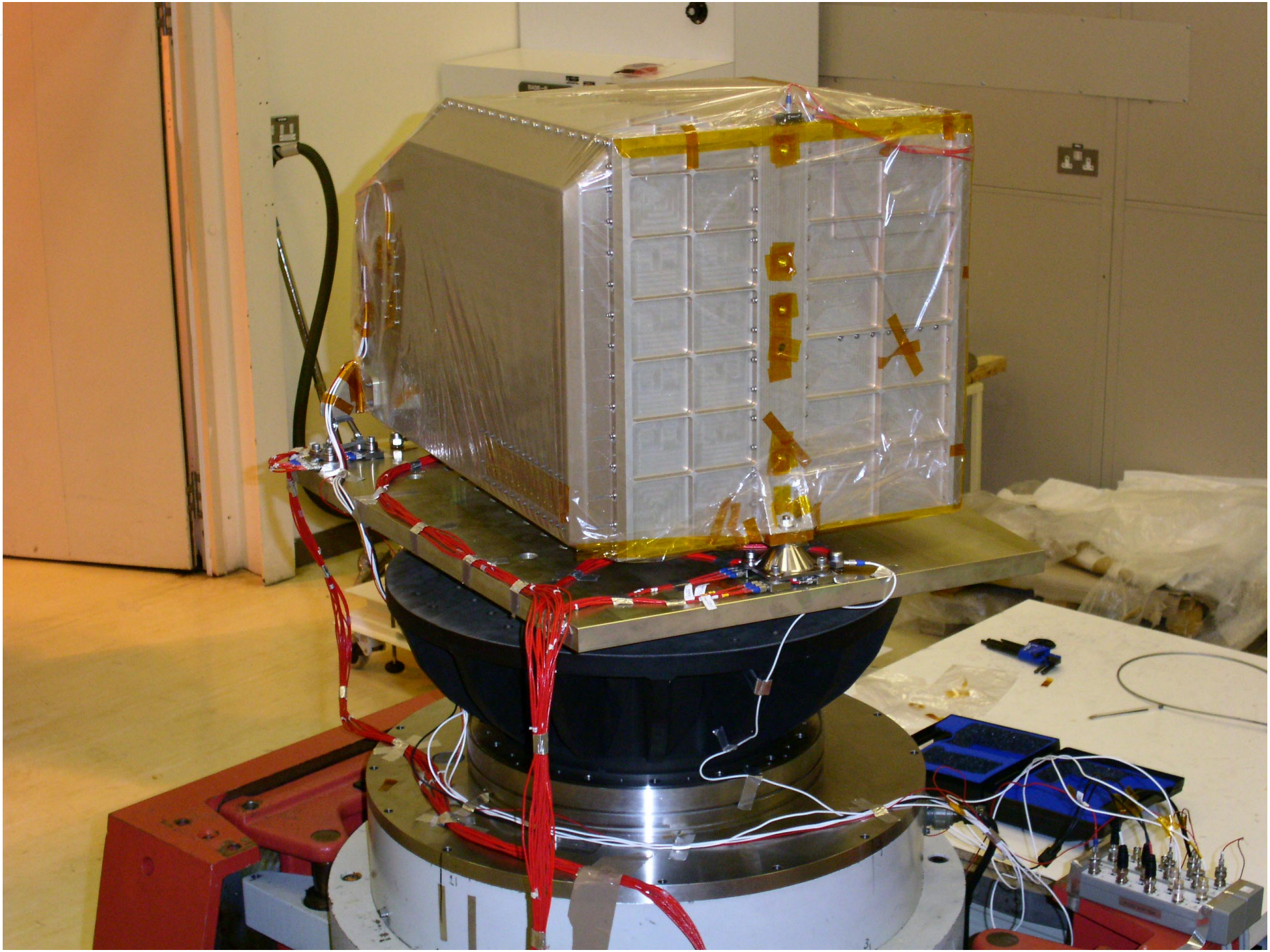
- Assembled March/April 03
- All mirrors fitted
- STM subsystems, BDAs, Cooler, BSM, SMEC, SCAL, 300 mK bus bar
- Warm vibration test, main objective to quantify sub system levels, Full qual levels used.
- Issue with movement of 300mK strap support.
- Subsystem levels available



SM

Structural model

- Assembled March/April 03
- All mirrors fitted
- STM subsystems, BDAs, Cooler, BSM, SMEC, SCAL, 300 mK bus bar
- Warm vibration test, main objective to quantify sub system levels, Full qual levels used.
- Issue with movement of 300mK strap support.
- Sub system levels available



AM

Alignment model

- Fit OGSE in place of SMEC and BDAs – May 03
- Warm alignment check.
- Instrument into cryostat
- Warm alignment recheck.
- Cool down – 6K, heat leak due to window
- Cold alignment check
- Warm alignment check.
- CM3 replaced and alignment re-verified.

CQM

Cold Qualification model

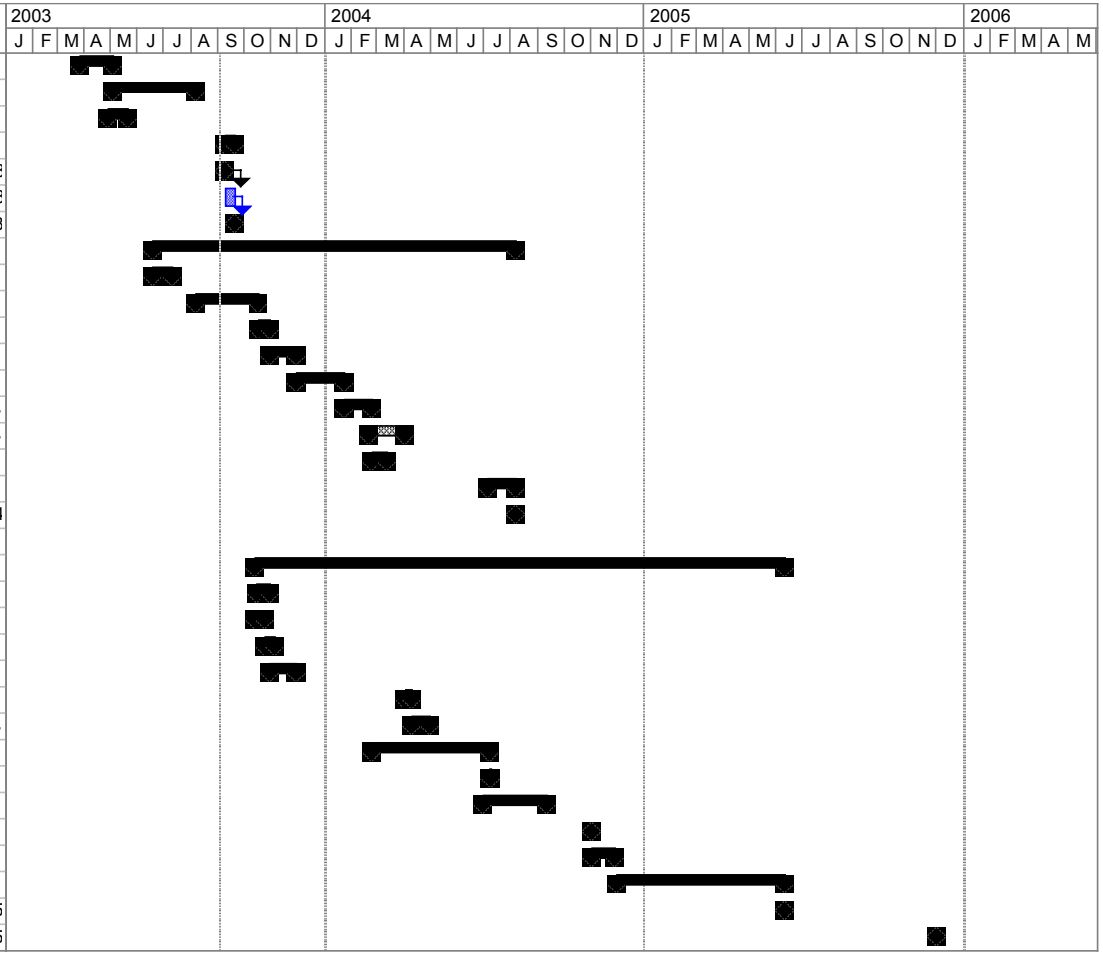
- Following cold alignment
- Reconfigure to CQM
- CQM cooler fitted.
- Detector delivered
- SMEC (STM) delivered.
- Improved 300mK supports due next week
- CQM assembly can proceed.
- Harness will cause some delay

PFM

- Structure mostly manufactured
- Cooler/DRCU waiting for PFM release.
- SMEC – CQM delivered in November
- Mirrors – in manufacture
- BDA - SSW and SLW in assembly
- DPU funding issues
- Calibrators,filters – in manufacture
- BSM – Built, in test
- PFM FPU integration to start Oct

schedule

ID	Task Name	Duration	Start
1	**SM AIV programme**	**25 days**	**Wed 26/03/03**
53	**AM programme**	**64.5 days**	**Fri 02/05/03**
89	**AVM programme**	**15 days**	**Mon 28/04/03**
91	**Warm electronics programme**	**10 days**	**Mon 08/09/03**
92	DRCU QM1 delivery	0 days	Mon 08/09/03
93	DRCU QM1 integration and test	10 days	Mon 08/09/03
94	DRCU QM1 available for CQM	0 days	Fri 19/09/03
95	**CQM programme**	**287 days**	**Wed 18/06/03**
96	STM/CQM FTB Subsystem Deliveries	**15 days**	**Wed 18/06/03**
102	Preparation of CQM	**53.5 days**	**Mon 04/08/03**
117	CQM Warm Environmental Test	**9 days**	**Fri 17/10/03**
124	CQM Cold Verification 1	**21 days**	**Thu 30/10/03**
134	CQM Cold Vibration	**30 days**	**Fri 28/11/03**
142	CQM Cold Verification 2	**22 days**	**Fri 23/01/04**
149	**Update QM1 DRCU**	**30 days**	**Fri 20/02/04**
151	CQM modifications before delivery	**13 days**	**Tue 24/02/04**
155	CQM Delivery Preparation	**24 days**	**Mon 05/07/04**
161	**Delivery of CQM to ESA**	0 days	Thu 05/08/04
162			
163	**PFM AIV programme**	**423 days**	**Mon 13/10/03**
164	CQM/PFM FPU Subsystem Deliveries	**10 days**	**Wed 15/10/03**
179	CQM/PFM FTB Subsystem Deliveries	**8 days**	**Mon 13/10/03**
184	CQM/PFM FTB Integration	**8 days**	**Thu 23/10/03**
188	FPU integration phase 1	**22 days**	**Wed 29/10/03**
197	**Warm electronics Re Deliveries**	**5 days**	**Thu 01/04/04**
200	**QM1 Warm Electronics re Integration**	**15 days**	**Fri 09/04/04**
203	FPU test phase 1	**96 days**	**Tue 24/02/04**
219	**QM1 DRCU available for CQM delivery**	**1 day**	**Wed 07/07/04**
221	FPU integration phase 2	**53 days**	**Wed 30/06/04**
227	**Delivery of DRCU QM2**	**0 days**	**Mon 01/11/04**
229	FPU test phase 2	**20 days**	**Mon 01/11/04**
232	PFM Verification	**138 days**	**Mon 29/11/04**
267	**Delivery of PFM to ESA**	0 days	Wed 08/06/05
268	**Delivery of warm electronics to ESA**	0 days	Wed 30/11/05



Annex 5: Thermal analysis status

Thermal Analysis Update

Anne-Sophie Goizel

RAL

HERSCHEL DTMM Integration with SPIRE DTMM [1/2]

- Initial runs with Herschel DTMM and SPIRE ITMM have been performed for steady-state and transient cases,

- Results correlate well with those given in the Thermal Report provided by Astrium (no problem with Esatan running on different platforms),

- Integration of Spire DTMM with Herschel DTMM : works well in steady-state but problems have been encountered initially for transient analysis (run time > 1 week).

HERSCHEL DTMM Integration with SPIRE DTMM [2/2]

- The SPIRE DTMM had to be adapted to allow the solver to use a bigger time steps when running the model:
  - Power dissipation of SCAL now applied to FPU (does not have any impact on heat loads),
  - Items of very small masses (ie: busbar) have their masses set to zero (worst case when temperature stability is considered),
- Time control constants relaxed.

SPIRE DTMM – Work in Progress

- Few minor updates still required in the SPIRE DTMM (+ CQM testing starting soon),
- Control Configuration Document to be updated,
- ITMM v2.5 delivery :
  - When would Astrium be able to use it?
  - Do we want the SPIRE ITMM to be delivered before or after the correlation with the CQM test results?

Annex 6: Agreement on thermal requirement (CR9)

5.1.1.1 Thermal requirements

Two major thermal requirements for SPIRE are its sorption minimum cooler cycle time of 48h, and its cold tip temperature of < 290mK.
The table below shows the required operating temperatures and design heat flows at the thermal interfaces of the instrument unit with the cryostat or parts thereof :

SPIRE FPU thermal I/F		**in-Orbit (cycle 48h assumed)**			
		Operation		Recycling Cooler	
		46h		2h	
		Max I/F Temp.	Max Heat load	Max I/F Temp.	Max. Heat load
L0	SPIRE SM Detector enclosure [node 814]	**2.0 K** (i)	**4 mW**	N/A	N/A
	SPIRE Cooler Pump strap [node 815]	2.0 K	1.0 mW (ii)	**10.0 K** (VI)	**350J /1560s (triangular profile |\, giving a peak of about 0.5W)**
	SPIRE Cooler Evaporator strap [node 816]	2.0 K	0.004 mW	~~**2.0**~~**1.85 K 1.75 K as a goal** (iii)	~~**30mW**~~ **15mW for strap design** (iv)
L1	SPIRE L1 (two straps) [node 800]	**5.5 K** (v)	**15 mW**	5.5 K	~~15~~ 20 mW
L2	SPIRE L2 (Optical bench / FPU legs)	12.0 K	-	12.0 K	-
L3	SPIRE L3 HSJFP, HSJFS	15.0 K	50 mW 25 mW	12.0 K	0.0 mW
	Instrument shield (eg. Radiative temperature)	16K		16K	

notes Sorption Cooler Recycling phase is composed of 2 phases in sequence
- 3He condensation (duration 3600s TBC), evaporator switch closed, pump switch open
- Pump cooling phase & evaporator cooling (duration 1560s TBC) evaporator switch open, pump switch closed

(i) According to the current HPLM requirements the temperature of the Helium in the tank should be <1.7K, the conductance of the detector strap (helium to thermal interface) is > 0.~~05W~~1W/K (updated at the meeting HP-2-ASED-MN-0343 (4/4/03)), therefore with 4mW, the thermal interface should be < 1.~~78K~~74K.

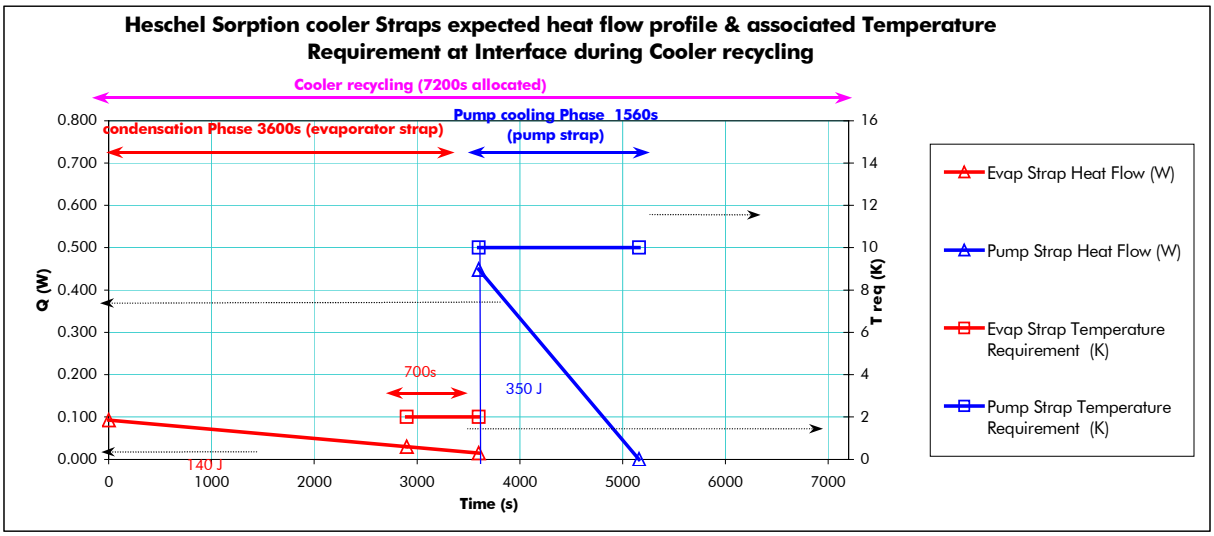
(ii) T~~t~~he maximum average dissipation during operation includes the heat peaks during recycling
These peaks constitutes most of the average dissipation on 48h, therefore, during operation there should remain almost nothing (condensation heat on pump strap (heat switch closed), 1mW allocated, TBC)

(iii) SPIRE requires 1.~~85K~~ 75K at the evaporator interface, to guarantee a low enough temperature at the sorption cooler evaporator, and good efficiency of the 3He condensation, to get 48h cycle time.
The requirement applies at the thermal interface during 200s at the end of condensation phase.

(iv) the evaporator strap heat profile comes from 3He condensation in the evaporator, and on the shunt located on the pumping line (140J/3600s triangular profile) + 15mW constant conduction from pump to shunt. The ~~2 K~~temperature requirement for cooler recycling applies only for 700s (TBC) at the end of condensation phase.~~, which lead to an evaporator strap design for 30mW/<2K.~~ With 1.70K at the tank, the strap conductance should be ~~about~~ greater than 100mW/K
Goal means that the design shall show that the goals are achievable under given conditions.

(v) SPIRE requires L1 temperature below 4.5K to guarantee ~~recycle~~ hold time of the sorption cooler.~~.~~ Transient evaluation with typical dissipations of all instruments (operation & standby mode) gives L1 temperatures between 4 K and 5.6K, depending of the detail of the sequence of the observation. A requirement of 5.5K is kept here

(vi) The Level 0 pump strap from He to thermal interface is specified to be greater than 0.1W/K, including thermal contact conductance at the instrument interface.


Heschel Sorption cooler Straps expected heat flow profile & associated Temperature Requirement at Interface during Cooler recycling
Cooler recycling (7200s allocated)
Pump cooling Phase 1560s (pump strap)
condensation Phase 3600s (evaporator strap)
700s
350 J
140 J
Q (W)
T req (K)
Time (s)
0.800
0.700
0.600
0.500
0.400
0.300
0.200
0.100
0.000
16
14
12
10
8
6
4
2
0
0
1000
2000
3000
4000
5000
6000
7000
Evap Strap Heat Flow (W)
Pump Strap Heat Flow (W)
Evap Strap Temperature Requirement (K)
Pump Strap Temperature Requirement (K)

SPIRE FPU thermal I/F		Ground							
		Operations FM (IMT/IST)		Operations EQM		Cooler recycling		non operating	
		Max I/F Temp.	Max. Heat load	Max I/F Temp.	Max. Heat load	Max I/F Temp.	Max. Heat load	max continuous temperature	Bake out temperature (72h max)
L0	SPIRE SM Detector enclosure [814]	Same as in orbit						60.0 °C	80 °C
	SPIRE Cooler Pump strap [node 815]							60.0 °C	80 °C
	SPIRE Cooler Evaporator strap [node 816]							60.0 °C	80 °C
L1	SPIRE L1 (two straps) [node 800]	~~7~~6.0 K TBC	15 mW TBC (vi)	~~7~~6.0 K TBC	15 mW TBC (vi)	~~7~~6.0 K TBC	15 mW TBC (vi)	60.0 °C	80 °C
L2	SPIRE L2 (Optical bench / FPU legs)	12.0 K	-	12.0 K	-	12.0 K	-		80 °C
L3	SPIRE L3 HSJFP, HSJFS	12.0 K	50 mW 25 mW	12.0 K	50 mW 25 mW	12.0 K	-		80 °C

(vi) During instrument ground test (IST/IMT), the cryostat vent line is flushed with 100mg/s from the auxiliary tank (He II tank closed), and the cover is flushed with LN2 or He. The heat flow on L1 is dominated by the radiation trapped from the cover environment (gaps). Only the SPIRE expected flow are indicated here.
The 6K have still to be confirmed by SPIRE to be compatible with cooler recycling.
The 15mW come from instrument internal behaviour (dissipation, conduction), on top of which the radiated heat flow from cover area, and absorbed by SPIRE FPU shall be added.
These environments are still under investigation, and it should be made clear that the cooler can be recycled.

ANNEX 7: SPIRE EIDP CONTENT LIST

(HARDWARE) TABLE OF CONTENTS

Section	Contents	Req	Comments
1	Shipping Documents		
2	Transportation, Packing, Handling & Integration Procedures		
3	Certificate of Conformance / Delivery Review Board MoM		
4	As Built Configuration Status List		
5	List of Waivers		
6	Copies of Waivers		
7	List of Non-Conformance Reports		
8	Copies of Non-Conformance Reports		
9	Cleanliness Statement		
10	Operational Manual		
11	Top Level Drawings (inc. Family Tree)		
12	Interface Drawings		
13	Functional, Block & Mechanical Drawings		
14	Electrical Circuit Drawings		
15	Serialised Components List		
16	Mass Properties / Power Budget		
17	Qualification Status List / Test Matrix		
18	Test Reports		
19	Open Work / Deferred Work / Open Tests		
20	Calibration Data Record		
21	Historical Record (Part of Assembly Log)		
22	Manufacturing Logbook(s)		Not a deliverable item (Available to view @ RAL)
23	Operating Time / Cycle Record		
24	Connector Mating Record		
25	Age Sensitive Items Record		
26	Pressure Vessel(s) - (History / Test Record)		
27	Temporary Installation Record		
28	Reference List of EIDP's (Associated / Lower Level)		
29	Other Useful Information		
	Indicates documentation supplied		*All sections should be accounted for.*
	Indicates documentation Not supplied		
	Indicates section Not Applicable.	**N/A**	

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END ITEM DATA PACKAGE		PRODUCT ASSURANCE Space Science and Technology Department			
Spacecraft/Projec	**HERSCHEL**	**Document No**			
Instrument/Model	**SPIRE / XXX**	**Issue No**		**REV**	
Subsystem		**Date**			

(SOFTWARE) TABLE OF CONTENTS

Section	Contents	Req.	Comments
1	Shipping Documents		
2	Transportation, Packing, Handling & Integration Procedures		
3	Certificate of Conformance / Delivery Review Board MoM		
4	List of Waivers		
5	Copies of Waivers		
6	List of Non-Conformance Reports		
7	Copies of Non-Conformance Reports		
8	Open Work, Deferred Work, Open Tests		
9	Hardware / Software Interface		
10	Software Requirements Document (SRD) & Architectural Design Document (ADD)		
11	Software Development Plan (containing Test, Verification and Validation Planning)		
12	Software Configuration Status List		
13	Software Manuals (inc. User Manual)		
14	Software Test Procedures and Reports		
15	Historical Records and Software Inspection		
16	Temporary Modification (Patches)		
17	Source Listings		
18	Index of Directories and Files		
19	TCTM Definitions		
20	Algorithms (Tech Note)		
21	Software Budget (Memory Budget)		
22	Timing Budget		
23	Reference List of EIDP's (Associated / Lower Level)		
24	Other Useful Information		
	Indicates documentation supplied		*All sections should be accounted for.*
	Indicates documentation Not supplied		
	Indicates section Not Applicable.	**N/A**	

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END ITEM DATA PACKAGE		PRODUCT ASSURANCE Space Science and Technology Department			
Spacecraft/Project	**HERSCHEL**	**Document No**			
Instrument/Model	**SPIRE / XXX**	**Issue No**		**REV**	
Subsystem		**Date**			

(EGSE) TABLE OF CONTENTS

Section		Contents	Req	Comments
Product Assurance	1	Shipping Documents		
	2	Transportation, Packing, Handling & Integration Procedures		
	3	Certificate of Conformance / Delivery Review Board MoM		
	4	List of Waivers		
	5	Copies of Waivers		
	6	List of Non-Conformance Reports		
	7	Copies of Non-Conformance Reports		
	8	Open Work, Deferred Work, Open Tests		
Hardware	9	As Built Configuration Status List		
	10	Operational Manual		
	11	Top Level Drawings (inc. Family Tree)		
	12	Interface Drawings		
	13	Functional, Block & Mechanical Drawings		
	14	Electrical Circuit Drawings		
	15	Test Reports		
Software	16	Historical Records and Software Inspection		
	17	Identification and Handling Procedures for Software Carriers		
	18	Software Configuration Status List		
	19	Software User Manual		
	20	Software Development Plan (containing Test, Verification and Validation Planning)		
	21	Software Test Procedures and Reports		
	22	Source Listings		
	23	Index of Directories and Files		
	24	Software Requirements Document (SRD) & Architectural Design Document (ADD)		
	25	Calibration Data		
	26	Algorithms (Tech Note)		
	27	Timing Budget		
PA	28	Reference List of EIDP's (Associated / Lower Level)		
	29	Other Useful Information		
		Indicates documentation supplied		*All sections should be accounted for.*
		Indicates documentation Not supplied		
		Indicates section Not Applicable.	**N/A**	

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END ITEM DATA PACKAGE		PRODUCT ASSURANCE Space Science and Technology Department			
Spacecraft/Project	**HERSCHEL**	**Document No**			
Instrument/Model	**SPIRE / XXX**	**Issue No**		**REV**	
Subsystem		**Date**			

(MGSE) TABLE OF CONTENTS

Section	Contents	Req	Comments
1	Shipping Documents		
2	Transportation, Packing, Handling & Integration Procedures		
3	Design Specification		
4	Certificate of Conformance / Delivery Review Board MoM		
5	List of Waivers		
6	Copies of Waivers		
7	List of Non-Conformance Reports		
8	Copies of Non-Conformance Reports		
9	Cleanliness Statement		
10	Interface Information		
11	Operational Manual		
12	Top Level Drawings (inc. Family Tree)		
13	Functional, Block & Mechanical Diagrams		
14	Proof Load Certificates		
15	Test Reports		
16	Open Work / Deferred Work / Open Tests		
17	Historical Record (Part of Assembly Log)		
18	Manufacturing Logbook(s)		Not a deliverable item (Available to view @ RAL)
19	Reference List of EIDP's (Associated / Lower Level)		
20	Other Useful Information		
	Indicates documentation supplied		*All sections should be accounted for.*
	Indicates documentation Not supplied		
	Indicates section Not Applicable.	**N/A**	