

	<b>HERSCHEL/PLANCK</b>	REF. : HP-ASPI-MN-390	
		DATE : 25/09/01	PAGE : 1/10
<b>MINUTES OF MEETING</b>		PLACE : RAL / UK	

PURPOSE :	CLASSIFICATION :
<b>SPIRE – Technical Meeting n° 2</b>	

PARTICIPANTS	FIRM	SIGNATURE	PARTICIPANTS	FIRM	SIGNATURE
Glenn Lund	Alcatel		Berend Winter	RAL	
Bernard Collaudin	Alcatel		Horst Faas	ASED	
Matt Griffin	QMW		Armin Hauser	ASED	
Ken King	RAL		Jean Bruston	ESTEC	
Eric Sawyer	RAL		Jan Rautakoski	ESTEC	
Bruce Swinyard	RAL				
John Delderfield	RAL				
Written by : G. Lund					

CONCLUSIONS :

DISTRIBUTION : PARTICIPANTS	FOR FURTHER ACTION
	FOR INFORMATION

APPROVED BY				
NAME				
SIGNATURE				

## Discussion of Agenda

### • Brief overview by Bruce

Subsystems complete detailed design reviews by Oct. 2001

Coolers OK

Filters OK

BDA "

JFET

/ Agreement on vibration levels, with JPE

/ Discussion on proposed implementation enabling some of the FETs to be selectively switched off.

Proposed implementation of a strap between JFET box and 1<sup>st</sup> shield.

BS points out that wording is ambiguous in BDA wrt thermal dissipation allocations.

#### FPU on OB

- SPIRE / ESA agreement for industry to provide electrical isolation of cold straps.

- Discussion of means of simplification of cryoharness connections

BDA { - Increase in size of kevlar wire capstans to prevent movement in vibration.  
- QM + FM procurement has begun.  
EM,  
- Long wavelength end has been pushed up to 670  $\mu\text{m}$  for spectrometer.

#### Thermal modeling

SPIRE states that if they don't have thermal model (including cryostat) feedback in  $\leq 2$  months, it will be too late to be useful. Otherwise their instrument would be delayed.

Main objectives on SPIRE's side:

- Refine detailed design

- Understand/adapt behaviour wrt observation strategies/operations.

Agreed that when SPIRE is not observing, the sorption cooler will be switched off.

SPIRE requests "simplified" interface thermal model.

Astrium needs cryoharness model detailed (~2 weeks) to consolidate thermal model.

Agreement that Astrium (Armin Hausw) and SPIRE (Sam Hayes) discuss configuration / No nodes of model, etc.

Overshield <sup>(outside cvv only)</sup> for cryoharness: not included in first iteration, but should be foreseen. Need for this shield has not yet been clarified - EMC WG established. This can only be determined by test.

Astrium expect to converge on preliminary cryoharness design around mid October 2001.

ASPI / Astrium to foresee design of cryoharness overshield / characteristics, and include (option) its impact on thermal model.

AI1

Astrum / HF to foresee / organise technical meeting(s) with Herschel instruments (approx. 2nd half of October) to discuss impacts / refine harness.

AI2

Goals (TBC): harness - 3rd week of October  
(d) Thermal model - 4th week of October.

SPIRE states that its <sup>test</sup> cryoharness procurement ~~risks delays~~ is delayed by waiting for preliminary design from Astrium. Associated risks for instrument schedule, and test harness representativity.

ESA is to provide the 3 reduce instrument TMM's by 03/10/01

AI3

### 300 mK Strap.

Critical issue: 2  $\mu$ W budget for heat leak through supports.

Breadboarding appears necessary.

A thermal short at this level would be a S/F.

### Microvibrations

Main area of concern now appears to be transverse vibrations of FTS mechanism.

Upper acceleration limit now estimated to be 0.1 mg. ESA (Thijs Vandulaan) is currently analysing the SPIRE report.

Sensitivity of detectors is now re-evaluated at 1 mg.

SPIRE suggests that wheel speed housekeeping should be available on ground for data reduction.

Expected microvibrations induced by reaction wheels are more like 1 or 10 mg - at resonance frequencies.

FTS cryogenic optical encoders have been tested and work perfectly.

Radiation tests yet to be carried out.

Discussion of tilting of EAM test cryostat. SPIRE requires 90° tilt.

AI4

Astrum to confirm this can be achieved (when the tank is  $\approx$  half full).

### SMEC

increased stiffness of flex-pivots (because of launch vibrations)  $\rightarrow$  higher thermal dissipation (9mW), in case of high resolution FTS observations.

Can be reduced in case of low res. observations.

### CLEANLINESS

specified in PA Plan. at delivery

SPIRE says the 0.1  $\mu$ m molecular contamination is highly overspecified.

Cleanliness W.G. recommendations need to be re-examined / ~~by~~ ESA. checked, to understand whether this stringent reqt. is justified.

SCHEDULE

Delays with FPU structure. 95% of optics has been frozen, however some aspects of mirror mounts, etc. have not yet been finalized. Some fits are very tight (space problems). Expected (internal) delivery delay ~  $\geq 2$  mo for the structure, wrt. previously known schedule. This would then lead to a revised delay of ~ 8 mo for the ~~com.~~

DDR of structure around mid-november.

+ 8-10 weeks for engineering drawings

+ 8-10 weeks for manufacture

few weeks for surface finishing.

RAL black (carbon-impregnated epoxies).

↳ not yet vibration qualified.

Discussion of past action items

- HP-ASPI-MN-164 AI-1 - implemented. IIDB 2.0 § 5.9.64
- " AI-2 - SVM boxes:

IIDB 2.0. § 5.5 FSFCU/FSDCU are 2 separate boxes

Dimensions are

FCU	: 180 x 480 x 250	) including allowance for the feet
DCU	240 x 400 x 250	

Total mass unchanged, i.e. 23 kg, breakdown in mass is unknown.

SPIRE guidelines 1: Shift the DPU over to the <sup>ergo-</sup> S/C electronics side of the panel.

2: connectors on top of the boxes rather than on the sides

AI-3 & 4 remain open (11 mode and serendipitous mode observations).

AI 5 SPIRE close this action, replaced by the following:

"SPIRE to update their spreadsheet mass budget, change terms to bring them in line with ESA terminology, i.e. ... nominal mass + margin = allocation (which shall not be exceeded)."

AI 5

AI 20 discussions complete. Request for notching needs however to be handled by a request for waiver.

SPIRE (which does not have <sup>access</sup> to NASIRAN) needs to know in what form their mechanical model should be delivered to Alcatel (fairly simple model should be adequate for vibration analysis).

21 Thermal heat flux on lid.

SPIRE wants to be able to control the temperature of their shutter during tests. For this reason they need to know the radiative heat flux to be expected from the cover and shields.

See also §7 of 11DA.

This matter needs some thought, wrt. exact test reqts of SPIRE before launch, and could be further discussed during the EAM meeting 1-2 Oct. next.

Discussion of the prior proposal made by SPIRE to implement a system shutter (cold).

22 Normal work. Thermal strap material not yet defined. However Astrium needs further IPRs from SPIRE to design thermal straps. In particular:  
- max. thermal loads (worst-case)

23 (→ SPIRE: provide profile for heat flows during cooler recycling.

A#6

↳ this info. needs to be fed into the 11DB.

From Structure Schedule Splinter (JB + BW)

A#7

SPIRE to provide: (by 15-10-01)

- Updated structure schedule
- List of milestones towards the DDR.

Discussion of requirements on <sup>thermal</sup> Strap IIF. (11DB §5.7.1.2)

See Astrium comments to 11DB-2.0 §5.7.1.2 (not consistent with 11DA), they state that reqts. in " " " are not consistent with the [new] requirement for Ohmic isolation (§5.10.2, p.5-29) requirement. Bc thinks the thermal reqts of §5.7.1.2 are not entirely self-consistent. This needs clarification. Astrium has only just started work on the thermal strap design.

Design/efficiency of strap heat exchange needs more work (see Annex 2).

11DB Comments

- Alcatel will send Word file to SPIRE, including its comments to the v. 2.0 11DB.

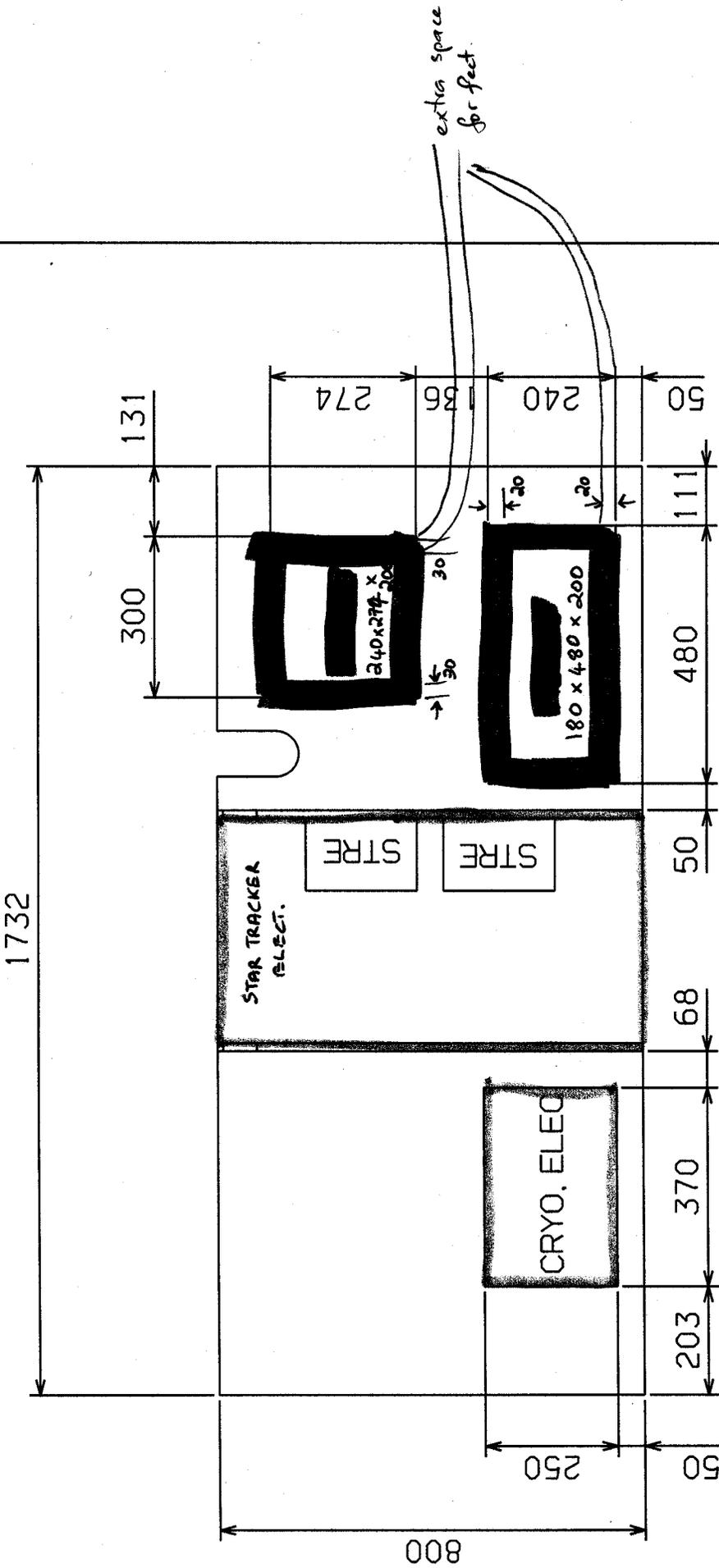
## Status on 28/09/2001 of actions from SPIRE Tech. Meeting n° 2 (25\_09\_01)

Purpose	Meeting	Ref	Date	Origin	Action n°	Description	Responsible	Due	Status	Close date	Document	Closing Reference	Remark	Days to closure	Overdue ?
Herschel	SPIRE Technical Meeting #1	HP-ASPI-MN-390	27-Jun-01	ALCATEL	1	Review/analyse a <b>cryoharness overshield</b> and characteristics thereof, including its possible <b>impact on the thermal</b> (system model) <b>behaviour</b> .	ASTRIUM / AH & HF	26-Oct-01	OPEN					28	
Herschel	SPIRE Technical Meeting #2	HP-ASPI-MN-390	25-Sep-01	ALCATEL	2	<b>Organise Technical Meeting(s)</b> with all 3 Herschel Instruments (+ ESA, Alcatel), to discuss & <b>refine cryoharness requirements</b> & design.	ASTRIUM / AH & HF	5-Oct-01	OPEN					7	
Herschel	SPIRE Technical Meeting #2	HP-ASPI-MN-390	25-Sep-01	ASTRIUM	3	Provide the three <b>reduced instrument Thermal Models</b> to Astrium.	ESA	5-Oct-01	OPEN					7	
Herschel	SPIRE Technical Meeting #2	HP-ASPI-MN-390	25-Sep-01	ALCATEL	4	Confirm <b>whether the EGM test cryostat</b> can be <b>tilted by 90 degrees</b> (as required by the instruments, to perform certain tests) ;	ASTRIUM / AH & HF	19-Oct-01	OPEN					21	
Herschel	SPIRE Technical Meeting #2	HP-ASPI-MN-390	25-Sep-01	ALCATEL	5	<b>Update</b> , and send to ESA, industry, SPIRE's <b>mass-budget spreadsheet</b> . Change terms (such as "contingency", "budget") to ensure <b>consistency with ESA terminology</b> . In particular, nominal mass + margin = allocation (the latter being the value(s) imposed by ESA).	SPIRE	5-Oct-01	OPEN					7	
Herschel	SPIRE Technical Meeting #2	HP-ASPI-MN-390	25-Sep-01	ASTRIUM	6	Provide expected <b>time-line profiles</b> for <b>heat flow</b> behaviour during <b>sorption cooler re-cycling</b> . (this information to be fed into the next update of the IIDB).	SPIRE	19-Oct-01	OPEN					21	
Herschel	SPIRE Technical Meeting #2	HP-ASPI-MN-390	25-Sep-01	ESA	7	Provide : - <b>updated schedule of FPU structure devt.</b> & manufacture, - list of <b>FPU structure devt. Milestones</b> leading up to the DDR.	SPIRE	15-Oct-01	OPEN					17	

Status on 28/09/2001 of actions from SPIRE Tech. Meeting n° 1 (27\_06\_01)

Purpose	Meeting	Ref	Date	Origin	Action n°	Description	Responsible	Due	Status	Close date	Document	Closing Reference	Remark	Days to closure	Overtime ?
Herschel	SPIRE Technical meeting #1	HP-ASPI-MNI-164	27-Jun-01	ALCATEL	1	Include the text resulting from HP-ASPI-MNI-42 / Action Item n°1 (concerning <b>IP Lines sensitive to LCL failure</b> ) into § 5.10.1.4. of the SPIRE IDB-B.	SPIRE	13-Jul-01	Closed	31-Jul-01	<a href="#">SPIRE IDB-B_2_0_310701.pdf</a>		See § 5.9.6.4	0	
Herschel	SPIRE Technical meeting #1	HP-ASPI-MNI-164	27-Jun-01	ALCATEL	2	Provide ALCATEL with details of <b>SVM warm electronics boxes - mass &amp; dimensions</b> .	SPIRE	13-Jul-01	Closed	02-Jul-01	<a href="#">SPIRE IDB5(D).2_3.pdf</a>		Doc = Proposed IDB-B update, sent by mail by JD.	0	
Herschel	SPIRE Technical meeting #1	HP-ASPI-MNI-164	27-Jun-01	ALCATEL	3	Provide a <b>Technical Report on Parallel Mode Observations</b> and requirements.	SPIRE	20-Jul-01	OPEN				Ongoing	-70	Overdue
Herschel	SPIRE Technical meeting #1	HP-ASPI-MNI-164	27-Jun-01	ALCATEL	4	Provide a <b>Technical Report</b> on objectives, constraints & requirements of <b>Serendipitous mode observations</b> .	SPIRE	20-Jul-01	OPEN				Ongoing	-70	Overdue
Herschel	SPIRE Technical meeting #1	HP-ASPI-MNI-164	27-Jun-01	ALCATEL	5	<b>IDB - §5.5.1.2 (20.06.01) : Mass reduction exercise</b> needed to bring the "stimulate + contingency" total mass down to the ESA allocation of <b>90 kg</b> .	SPIRE	20-Jul-01	OPEN				Ongoing	-70	Overdue
Herschel	SPIRE Technical meeting #1	HP-ASPI-MNI-164	27-Jun-01	ALCATEL	6	<b>IDB - §5.6.1.1 (20.06.01) : Random vibration acceleration</b> req. of <b>10 µg</b> to be checked, and justified with a technical note.	SPIRE	20-Jul-01	Closed	02-Jul-01	<a href="#">SPIRE IDB5(D).2_3.pdf</a>			0	
Herschel	SPIRE Technical meeting #1	HP-ASPI-MNI-164	27-Jun-01	SPIRE	7	<b>IDB - §5.7.1.1 (20.06.01) : Confirm details of cryostat strap cross-sections.</b>	ASTRIUM	6-Jul-01	OPEN				Ongoing	-84	Overdue
Herschel	SPIRE Technical meeting #1	HP-ASPI-MNI-164	27-Jun-01	ASTRIUM	8	<b>IDB - §5.7.1.1 (20.06.01) : Define, in accordance with Astrium, details of stress-relief brackets for the cryostats.</b>	SPIRE	6-Jul-01	Closed	25-Sep-01			Principle described in Meeting / 25_09_01	0	
Herschel	SPIRE Technical meeting #1	HP-ASPI-MNI-164	27-Jun-01	ALCATEL	9	<b>IDB - §5.7.1.2 (20.06.01) : Table (interface temp. Reqts.)</b> needs clarification, or replacement by <b>thermal conductance</b> of each strap.	SPIRE	6-Jul-01	Closed	02-Jul-01	<a href="#">SPIRE IDB5(D).2_3.pdf</a>			0	
Herschel	SPIRE Technical meeting #1	HP-ASPI-MNI-164	27-Jun-01	ALCATEL	10	<b>IDB - §5.7.5.1 - 2 (20.06.01) : Temperature sensors</b> - include specification of resolution & accuracy requirements.	SPIRE	6-Jul-01	Closed	02-Jul-01	<a href="#">SPIRE IDB5(D).2_3.pdf</a>			0	
Herschel	SPIRE Technical meeting #1	HP-ASPI-MNI-164	27-Jun-01	ALCATEL	11	<b>IDB - §5.10.1.4 (20.06.01) : LCL fault conds.</b> : clarify phrasing.	SPIRE	6-Jul-01	Closed	02-Jul-01	<a href="#">SPIRE IDB5(D).2_3.pdf</a>			0	
Herschel	SPIRE Technical meeting #1	HP-ASPI-MNI-164	27-Jun-01	ALCATEL	12	<b>IDB - §5.10.2 (20.06.01) : KAL</b> : remove requirement.	SPIRE	6-Jul-01	Closed	02-Jul-01	<a href="#">SPIRE IDB5(D).2_3.pdf</a>			0	
Herschel	SPIRE Technical meeting #1	HP-ASPI-MNI-164	27-Jun-01	ALCATEL	13	<b>IDB - §5.13.1.1 (20.06.01) : Data rate</b> : replace "science data rate" by "Total data rate".	SPIRE	6-Jul-01	Closed	31-Jul-01	<a href="#">SPIRE IDB v.2.0</a>			0	
Herschel	SPIRE Technical meeting #1	HP-ASPI-MNI-164	27-Jun-01	ALCATEL	14	<b>IDB - §5.13.1.2 (20.06.01) : Data rate</b> : Qualify exact meaning of "short duration", and provide "Maximum average" reqt. Over this period.	SPIRE	6-Jul-01	Closed	02-Jul-01	<a href="#">SPIRE IDB5(D).2_3.pdf</a>			0	
Herschel	SPIRE Technical meeting #1	HP-ASPI-MNI-164	27-Jun-01	ALCATEL	15	<b>IDB - §5.13.1.3 (20.06.01) : Data packets</b> : Qualify exact requirement.	SPIRE	6-Jul-01	Closed	02-Jul-01	<a href="#">SPIRE IDB5(D).2_3.pdf</a>			0	
Herschel	SPIRE Technical meeting #1	HP-ASPI-MNI-164	27-Jun-01	ALCATEL	16	<b>IDB - §5.7.13.2 (20.06.01) : Modify phrasing</b> , such that it is clear that the housekeeping data is provided to ground (only).	SPIRE	6-Jul-01	Closed	02-Jul-01	<a href="#">SPIRE IDB5(D).2_3.pdf</a>			0	
Herschel	SPIRE Technical meeting #1	HP-ASPI-MNI-164	27-Jun-01	ALCATEL	17	<b>IDB - §5.13.3 (20.06.01) : Scan synchronisation</b> : clarify exact requirements.	SPIRE	6-Jul-01	Closed	02-Jul-01	<a href="#">SPIRE IDB5(D).2_3.pdf</a>			0	
Herschel	SPIRE Technical meeting #1	HP-ASPI-MNI-164	27-Jun-01	ALCATEL	18	<b>IDB - §5.14.1 (20.06.01) : Raster Mode</b> : S/C System reqt. = <b>2.0 arcsec</b> steps, not 1.7 arcsec. Clarify.	SPIRE	6-Jul-01	Closed	02-Jul-01	<a href="#">SPIRE IDB5(D).2_3.pdf</a>			0	
Herschel	SPIRE Technical meeting #1	HP-ASPI-MNI-164	27-Jun-01	ALCATEL	19	<b>IDB - §5.17.3.1 (20.06.01) : Transport Container</b> : Replace "Class 10 000" by <b>Class 100 000</b> .	SPIRE	6-Jul-01	Closed	02-Jul-01	<a href="#">SPIRE IDB5(D).2_3.pdf</a>			0	
Herschel	SPIRE Technical meeting #1	HP-ASPI-MNI-164	27-Jun-01	SPIRE	20	<b>Random vibrations</b> spec. for the <b>FPU</b> : Current reqt. appears dangerously high. Produce 1st run of mechanical model, to check on random levels really expected.	ALCATEL / ASTRIUM	20-Jul-01	Closed	25-Sep-01	<a href="#">HP-ASPI-MNI-390 SPIRE Tech Meeting n°2.pdf</a>		Nothing between 100 ~ 200 Hz recommended. RPW to be filed.	0	
Herschel	SPIRE Technical meeting #1	HP-ASPI-MNI-164	27-Jun-01	SPIRE	21	<b>Cryostat shields &amp; shutter</b> : Provide expected thermal heat flux on the shutter during tests.	ASTRIUM	20-Jul-01	Closed	25-Sep-01	<a href="#">HP-ASPI-MNI-390 SPIRE Tech Meeting n°2.pdf</a>		Min. need = functionality checks before launch.	0	
Herschel	SPIRE Technical meeting #1	HP-ASPI-MNI-164	27-Jun-01	SPIRE	22	<b>Thermal Straps</b> : Define material used to make these straps (copper or Al), and thermal characteristics of the <b>sapphire insulating spacer</b> .	ASTRIUM	20-Jul-01	Closed	25-Sep-01	<a href="#">HP-ASPI-MNI-390 SPIRE Tech Meeting n°2.pdf</a>		Ongoing / normal work.	0	
Herschel	SPIRE Technical meeting #1	HP-ASPI-MNI-164	27-Jun-01	SPIRE	23	Check out the <b>impacts on the cryostat thermal model</b> of : up to <b>600 mW</b> thermal load from SPIRE - during up to 10 minutes.	ASTRIUM	20-Jul-01	Closed	25-Sep-01	<a href="#">HP-ASPI-MNI-390 SPIRE Tech Meeting n°2.pdf</a>		See new AI-7, from SPIR Tech. Meeting n° 2.	0	

# HERSCHEL SVM - PANEL - Z LAYOUT - STUDY N+1



- Confirm box dimensions
- Need connector locations & characteristics
- Design assuming HSFCL = HSFCL + HSDCL = 760x

NOT OFFICIAL.

