

ALCATEL
SPACE

HERSCHEL/PLANCK

REF.: H-P-ASP-MN-3961

SPIRE Progress & Interface

DATE: 18/11/03

PAGE: 1/14

COMPTE RENDU DE REUNION / MINUTES OF MEETING

LIEU / PLACE: RAL Chilton

OBJET / PURPOSE:

CLASSIFICATION:

SPIRE Progress & Interface 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 | |
| Horst Faas | ASED | | Eric Sawyer | RAL | |
| Bernard Collaudin | ASP | | Chris Bockley-Blatt | MSSL | |
| Marco Cesa | ALS | | John Coker | MSSL | |
| Christian Schlosser | ASED | | 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 | | | | | |

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Agenda : see Annex 1

Open Actions status (see annex 1):

• **SCI-PT-21435 (Telecon 29/10/03)**

- 1: impact of late test results availability on QM2/FM DRCU: New date End Nov.
- 2: Instrument integration & verification top level document: Still open. Rescheduled 15/12 in SPIRE TN 982 "SPIRE EQM test program definition". Objective is to complete the QM & FM instruments test specification. Emphasis on the test plan & hardware needed.
- 3: Harness definition document. Problem of availability. Patches in IID-B are equivalent (HDD 1.1 + patch v.3 (tech not v3.0 should be replaced in IID-B). Keep open.

• **HP-ASPI-MN-3513 (04/09/03)**

1: FCU ICD: Open -> postponed end Nov. Alenia has been instructed to proceed with M5 screws instead of M4.

Alcatel / Alenia will check that the SVM is designed with M5 screws for FCU/DCU, and if not initiate the change.

2-3: JFET height: Withdrawn. The JFET drawing is included in drawing pack 7.

4: AVM means here "warm electronics for EQM testing"

Drawings exist but are different from hardware (NCR). SPIRE will redline existing drawings & send them. New date end Novembre.

8: EIDP has been reviewed by ESA.

List is accepted by ESA except: CIDL and CR list that have to be added.

In addition, ESA insist on having subsystems EIDP's.

9: IID-B AD/RD. Has been initiated. New date mid dec to complete it.

10: Still Open – New due date =Mid Dec.

11: Conduction dissipation in Harness: Still Open. New harness definition has just been updated in the Thermal model. Results expected by mid decembre

• **HP-ASPI-MN-3310 (26/06/03)**

1: Withdrawn

It is agreed that the activity will focus on Instruments test plans (HP-2-ASED-PL-0021 (QM) and 31 (FM).

3: Closed IID-B annex 4 and Thermal meeting H-P-ASP-MN-3923

• **ASPI-MN-2748 (27/2/03)**

9: Integration procedure: covered by AI 2 of SCI-PT-21435 (Telecon 29/10/03) above, due 15/12.

• **HP-2-ASED-MN-0387. AIV meeting.**

5: Thermal environment during IST-IMT



Answer of SPIRE (at last meeting) 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.

Astrium expressed strong concerns related to the closure of this action and the availability of this information, to be able to state on the instrument testability on

ACTION

AI 1:
ASP/Alenia
30/11

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ground for the CDR.

The table 5.7-2 in IID-B is currently not agreed between SPIRE & Industry.

8 & 11: Will be included in SPIRE TN 982 "SPIRE EQM test program definition" to be updated by 15/12

IID-B issue 3.0 :

SPIRE do not want to sign version 3.0

Annex 5 has to be replaced by version 3 for printing reasons (page 176 does not print)

SPIRE would like to have the agreements of level 0 meeting (H-P-ASP-MN-2923) included. Table 7.5-1

ASED state that they do not accept the ground testing conditions table 7.5.2

It is agreed to update the current document to version 3.1 by changing page 5-19 and page 5-20 according to the meeting and annex 5. Change described in the change notice. Only pages changed will be affected.

+ the ICD pack 8 if confirmed by ASED (see action 5 & 6 below)

Alcatel ask SPIRE to prepare a list of expected changes wrt baseline definition, to be discussed during next interface meetings

AI 2 - SPIRE

- ICD's to be updated (FCU)
- Level 0 interference with cooling loop.
- Power supply interface circuit (information)
- Mode definition
- Data rate (to agree with IID-A)

SPIRE general Status :

See annex 2 Presentation from E.Sawyer.

Launch conditions: (ref H-PLM thermal model & analysis)

OBA will be between 25K (no delay, nominal) and 45K (25h launch delay).

System vibration test: On ground the typical OBA temperature is 15K

DCU FCU are under test. Connector pattern are similar to flight, except on one of the board (MCU) where the order has been reverted.

The redundant part of the units are not fitted with dummy connectors (this is shown on the DCU/FCU QM warm units drawings (minutes of the June meeting).

(on the FPU side the unused cryoharness are connected to the FPU (on filters).

The common understanding is that the unused cryoharness should be properly terminated. Astrium will evaluate how the termination of the cryoharness can be done in compliance with EMC test objectives (for instance terminating the unused cryoharness at the SVM bracket).

AI 3: Astrium
15/12

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Baking: The current bakeout duration (3 days TBC in IID-A) might be modified as the bakeout limit might be adjusted depending of the outgassing rate. SPIRE states that there are no units that are limited to 3 days.

Schedule:

Delivery of FPU QM is still in may 04. DCU/FCU QM 1 is needed to check the integration (with power supply & egse to drive it). And would need to be returned later on for refurbishing.

It will be needed several times: during SPIRE FPU integration (cryostat open), and before pumping down (cryostat closed, about 6 weeks later)

Warm units would be delivered 2 to 3 months later.

SPIRE will make the electronics available as it will be needed.

FM FPU is delivered end of June 05 for a need date of mid-may 05.

No change in the DCU/FCU availability.

Alcatel inform SPIRE that the management of Instrument Delivery dates is now managed directly by ESA.

Mechanical IF Issues :

DCU/FCU Update of the QM unit drawings will be delivered with indication of the changes & non conformances (position of connectors, ...)

AI 4 – SPIRE
25/11

FCU FM: Only change is the diameter of the screws M4->M5, and the web between feet. Ref AI 1. Drawing not available.

The mass will not change.

JFET: Latest version of the Cad drawings are used at Astrium.

The Drawings in IID-B are not in line with that (the 7.3mm not in)

The drawing pack issue 7 has the JFET height change, and the update of the FPU drawing Issue 18 (including mainly comments from Astrium).

Version 18 does not include the material of the FPU support, nor the latest Thermal strap interface. It does not include the MGSE drawing.

AI 5 - SPIRE
25/11

SPIRE will issue formally Drawing pack 7 (becoming then 8) with and updated front sheet, and AVM units (see AI 4)

In parallel, Astrium will check that the FPU ICD version 18 is acceptable, and if yes, this pack will be included in IID-B 3.1

AI 6 - Astrium
25/11

SPIRE FPU Supports:

SPIRE ask if the SPIRE feet could be qualified on the Herschel STM with instruments MTD's (as no warm vibration are allowed for SPIRE BDA). 3 sets of feet will be manufactured and should be available by March 04.

This approach is interesting from a technical point of view (representation of the FPU feet thermally & mechanically), but add some complications (schedule links, modification of delivered hardware, ...)

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MTD's will be warm vibrated in April/May 04
Herschel STM will undergo Thermal testing end 2004 and mechanical test before the FM program (spring 2005)

Astrium will check if the use of these SPIRE FPU feet can be undertaken.

AI 7: Astrium,
15/12

Level 0 (see Annex 3 MSSL presentation)

Thermal straps have been modified between Level 0 interface and SPIRE FPU to improve the conductance

Open issues: Clearance between level 0 and vent line is now solved (MSSL working with the latest CAD model).

Closed Pod: 4 tapped holes for strap + 2 for T sensor (see annex 4)

Design of the "Open pods" in not fully frozen. (Square + 1 central hole)

Design of the Open Pod bolt pattern should be frozen in the next 2 weeks, by agreement with SPIRE/MSSL.

AI 8 Astrium
8/12

One of the 4 screws of the Pump strap interface appears to be difficult to install because of the SPIRE strap support frame. MSSL states that there is no time / money to update this, and proposes that this should be handled by dismantling the A frame.

The effective suspended mass of the SPIRE strap which is attached to the cooler heat switch is currently estimated to 140g.

MGSE drawing is not available yet (being finalised).

SPIRE/MSSL will provide MGSE ICD by mid 01/04

AI 9
SPIRE/MSSL
15/1/04

Thermal IF Issues :

Current activities are prediction for CQM testing

Updated SPIRE FPU reduced thermal Model (to version 2.5) is needed by industry mid 01/04 to update the analysis for system CDR

SPIRE states that this will be difficult due to the activity of the SPIRE CQM testing. SPIRE proposes end Jan 04 which is agreed by industry.

SPIRE will deliver updated Reduced Thermal Mathematical model by end Jan 2004.

AI 10 SPIRE
30/01/04

No Conductance test data will be available before end 01/2004.

AIT Issues :

3 Warm units will be integrated on the SVM simulator: DPU, FCU, DCU.

The DCU/FCU have an external power supply which needs to be at less than 3m (TBC) from the warm units.

There is no Acceptance test of the FPU/warm units feasible at reception because there is no dedicated harness for that. (SPIRE has a cryo-harness included in their test facility, and similar for ASED).

Instrument testing on ground (cooler recycling). SPIRE has not more information. The statement that 7K is not good enough to recycle the cooler is still valid. More to come from the EQM testing early 2004.

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Electrical IF Issues :

Cryoharness: Harness CDR is currently on going at CASA
Issue 2.8 of the H-PLM Electrical ICD is in line with Harness definition document 1.1 + Patched of IID-B.
A CD is handed over to SPIRE with the SPIRE specific ICD & Interface drawings for the routing.
There is an agreement on the Pin to pin allocation, the shielding, and routing, resistance, capacitance. Only open point is the heat dissipation in the cables (on going for thermal modelling, see above).
L1 electrical insulation on the vent line. This will be integrated in Jan. 04 at Air Liquide.

WIH and SVM harness

2 connectors are swapped on the FCU (MCU) (see action Item 4). This is between DCU/FCU (made by CEA, based on Routing proposed by industry).
Cad Models have been distributed 2 weeks ago on ftp server.
WIH QM cable is already available and should be long enough for Herschel EQM PLM test.

The swap will be corrected on QM2 & FM

SPIRE will confirm that this available harness is compliant with the Herschel testing configuration (dummy SVM)

AI 11 SPIRE
30/11

For AVM testing, only the DPU is used together with a DRCU simulator.

Alcatel will check the type of EMC testing will be performed on the AVM.

AI 12 ASP
30/11

A SPIRE FCU load simulator is available and could be used to properly simulate the FCU DCU. Load on the PCDU.

Other :

Thermal reference point: SPIRE accepts to use the Mechanical reference point, and state that any item attached to this point (glued or screwed) should be known soon.

Next SPIRE IF Meeting :

Teleconf: 1st December 03
Meeting : 11/02/04.

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|  | ACTION ITEM LIST | REF. : H-P-ASP-MN-3961 |
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| ACTION | | | DATE |
|---------------|--|-----------------------------|-------------|
| N° | DESCRIPTION | ACTION Firm / person | DUE |
| 1 | Alcatel / Alenia will check that the SVM is designed with M5 screws for FCU interface, and if not will initiate the change. | ASP/Alenia | 30/11 |
| 2 | Alcatel ask SPIRE to prepare a list of expected interface changes wrt current IID-B 3.0 baseline definition, to be discussed during next interface meetings | SPIRE | 30/11 |
| 3 | Astrium will evaluate how the termination of the cryoharness can be done in compliance with EMC test objectives (for instance terminating the unused cryoharness at the SVM bracket. | ASED | 15/12 |
| 4 | DCU/FCU Update of the QM unit drawings will be delivered with indication of the changes & non conformances (position of connectors, ...) | SPIRE | 30/11 |
| 5 | SPIRE will issue formally Drawing pack 7 with and updated front sheet | SPIRE | 25/11 |
| 6 | In parallel, Astrium will check that the FPU ICD version 18 is acceptable, and if yes, this pack will be included in IID-B 3.1 | ASED | 25/11 |
| 7 | Astrium will check if the use of these SPIRE FPU feet can be undertaken. | | |
| 8 | Design of the Open Pod bolt patter should be frozen in the next 2 weeks, by agreement with SPIRE/MSSL. | ASED | 8/12 |
| 8 | SPIRE/MSSL will provide MGSE ICD by mid 01/04 | SPIRE/MSSL | 15/01/04 |
| 10 | SPIRE will deliver updated Thermal Mathematical model by end Jan 2004. | SPIRE | 30/01/04 |
| 11 | SPIRE will confirm that this available harness is compliant with the SVM (AVM) configuration. | SPIRE | 30/11 |
| 12 | Alcatel will check the type of EMC testing the AVM. | ASP | 30/11 |
| | | | |

ANNEXES OF THE MINUTES

Annex 1: Agenda and Actions Status

Annex 2: SPIRE Status (E.Sawyer)

Annex 3: MSSL Presentation SPIRE Level 0 straps(Chris Bockley-Blatt)

Annex 4: PODS Bolt pattern.(Astrium)

Annex 1

SPIRE IF Meeting Agenda, 18 November 2003 From 09:00 to 17:30

Actions status:

See attached tables (4 pages)

IID-B issue 3.0 status

- Signature: SPIRE and ESA status
- Page 21 of Annex 5 “ HDD_1.1_Deltas Issue 2.pdf”

SPIRE general (or particular) technical status (TBD by SPIRE) :

- SPIRE schedule (if new inputs)
- Technical status (if new inputs)

Mechanical IF Issues:

- DRCU/QM & PSU/QM ICD's, RFW 02
- SPIRE WU new ICD (issue 7) status
- JFET ICD status
- SPIRE Level-0 thermal strap IF:
- Status of new design
- Design of pump strap and integration issues
- Open pod evaporator IF
- Agreement of interfaces
- Status of FPU Support re-design
- Status of new design
- Availability of new FPU supports for MTD
- MGSE status:
- Design change of FPU MGSE: status

Thermal IF Issues:

- Agreement on thermal interfaces – Status after Instrument Thermal IF Mtg on 30/10/03
- Update of SPIRE Thermal Model: Next Release ?? (latest delivery date to ASSED: 15 Jan. 2004)
- When are thermal conductance test data available from new supports?

Electrical IF Issues:

- Approval of SPIRE Cryo-Harness Data Package
- S/C SPIRE Scientific Harness design including pin-to-pin allocation
- Routing of SPIRE Scientific Harness

AIT Issues:

- AVM mechanical/electrical interfaces to be considered for the SVM simulator design (clarification of some specific points regarding the external power units)
- FPU testing during/after integration (which kind of EGSE will be used, what is the function of the warm units during these tests)
- (Thermal) background conditions for on-ground tests

Other:

- SPIRE CEA FM warm units (DCU & FCU) delivery date : answer to mail from BC ref H-P-ASP-LT-3868
- Procurement of JFET mounting hardware for MTDs (integration)

Minutes and actions, End of IF Meeting

SPIRE Actions Status

From last SPIRE Progress Telecon 29-10-03 , SCI-PT-21435

| N° | ACTION DESCRIPTION SCI-PT-21435 SPIRE Progress Telecon 29-10-03 | DUE DATE | Firm / person | ACTION STATUS |
|----|--|----------|---------------|---------------|
| 1 | SPIRE will assess the impact of late test results availability on the QM2/FM DRCU | 12/11 | SPIRE | Open |
| 2 | SPIRE will assess the scenario of the availability of warm units for FPU checkout after delivery to Astrium prior to cryostat enclosure. In addition SPIRE will issue a top-level document: - FPU/JFET integration procedure on the optical bench - Description of EGSE and/or WU needed for checkout. - Warm functional Tests to be performed prior cryostat enclosure. - Cold functional tests. | 30/11 | SPIRE | Open |
| 3 | SPIRE to issue the Harness Definition Document version 1.2, which will reflect HDD1.1 plus update according annex 5 of SPIRE IID-B version 3.0 "SPIRE HDD 1.1 Deltas" | 30/11 | SPIRE | Open |

SPIRE Actions Status
From last SPIRE IF&IIDB Meeting 4-09-03 , H-P-ASP-MN-3513

| N° | ACTION DESCRIPTION H-P-ASP-MN-3513 SPIRE IF&IIDB Meeting_4-09-03 | DUE DATE | Firm / person | ACTION STATUS |
|----|--|----------|------------------|--|
| 1 | SPIRE to issue an update of the FCU ICD, according to latest RFD (CR's) with readable sizes | 30/9 | SPIRE J.D. | Open |
| 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). | 20/9 | Astrium. H.F. | Closed ? (Nearly closed by fax HP-ASED-FX-0749-03 dated 19/09/03, and HPLM PM17 minutes HP-ASP-MN-3704 29/09/03) |
| 3 | In case the change can be implemented (AI 2 output), SPIRE will issue a CR | 30/9 | SPIRE J.D. | Open |
| 4 | SPIRE to add AVM ICD's (in case they are different from FM's) in the next IID annex pack | 30/9 | SPIRE J.D. | Open |
| 5 | Astrium & RAL will agree on a suitable descriptive text to be implemented in IID-B ch 5.10 for harness-overshield (red line modification, no CR required) | 10/9 | SPIRE JD | Closed (by IIDB v 3.0) |
| 6 | Alcatel will check that this spare LCL can be made available to SPIRE | 10/9 | Alcatel GD | Closed - Mail Keithrobert Hibberd « LCL Loan » 15/09/03. Waiting for SPIRE answer |
| 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 | 15/9 | SPIRE/MSSL | Closed – Mail E.Sawyer 29/10 with "Instrument Vibration Test Report 1.0.pdf" |
| 8 | ESA to check and comment the SPIRE EIDP content list | 15/9 | ESA J.R. | Closed during this meeting |
| 9 | SPIRE to check that all AD/RD documents are on livelink. | 15/9 | SPIRE JD | Open New date mid december |
| 10 | SPIRE to provide TN with definition of safing plugs that are needed | 30/9 | SPIRE JD | Open New date mid December |
| 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). | 19/9 | Astrium A.H | Open New date mid December |
| 12 | Annex 4 describing the thermal behaviour of the sorption cooler will be sent by SPIRE | 10/9 | SPIRE JD | Closed – Annex 4 is in IIDB v3.0 draft 1 |

From Previous Meetings ACTION ITEM LIST STATUS 1/2

| N° | ACTION DESCRIPTION | DUE date | Resp | 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 | 26/09/03 | SPIRE | 1: Withdrawn It is agreed that the activity will focus on Instruments test plans (HP-2-ASED-PL-0021 (QM) and 31 (FM)). |
| 02 | ASED to provide SPIRE the Step files of relevant OB assembly | 15/07/03 | ASED | Closed: HP-ASED-EM-0443-03 |
| 03 | SPIRE to provide inputs: <ul style="list-style-type: none"> ➤ 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, ... | 26/09/03 | SPIRE | Closed ? by Thermal meeting H-P-ASP-MN-3923 |
| | 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) | 30/05/03 | SPIRE | Closed – No comments |
| 05 | SPIRE to provide Courage and Cristek connectors data | 30/05/03 | SPIRE | Closed - Obsolete |
| 08 | ASED to verify the 50 mA capability of harness | 16/05/03 | ASED | 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) | 16/05/03 | SPIRE | Closed - Obsolete |
| X | ASED Inputs & comments on IIDB 2.3 draft 2 to 4 (see AI 3 MN-2748) | 16/05/03 | ASED | Closed - Obsolete |
| X | ALS Inputs & comments on IIDB 2.3 draft 2 to 4 | 16/05/03 | ALS | Closed - Obsolete |
| | | | | |

From Previous Meetings ACTION ITEM LIST STATUS 2/2

| N° | ACTION DESCRIPTION | DUE date | Resp | Status |
|--------------|--|----------|----------|--|
| | 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 | Closed - Obsolete |
| | | | | |
| | From HP-ASPI-MN-2748 (27/2/03) | | | |
| AI 9 | Integration procedure of FPU on Optical bench | SPIRE | 30/10/03 | Withdrawn - covered by AI 2 of SCI-PT-21435 (Telecon 29/10/03) above, due 15/12. |
| | | | | |
| | From ASED | | | |
| | From HP-2-ASED-MN-0182 | | | |
| AI 8a | HP-2-ASED-MN-0182 MSSL / BW should clarify how the SPIRE red tagged cover should be represented in the IF drawings | MSSL | 30/06/03 | Closed |
| AI 3 | RAL/JD to evaluate the LO interface and its implications on LO instrument side design | SPIRE | 10/07/03 | Closed - Deleted |
| | From HP-2-ASED-MN-0387. AIV meeting. | | | |
| 5 | Thermal environment during IST-IMT | SPIRE | | Still Open |
| 8 | most sensitive noises mode. Will be Identified in test sheet. | SPIRE | | TN 982 to be updated 15/12 |
| 11 | Define power lines to be tested | SPIRE | | TN 982 to be updated 15/12 |
| | | | | |



Annex 2 _ H-P-ASP-MN-3961 SPIRE IF Meeting 18-11-03

Instrument Progress/Status

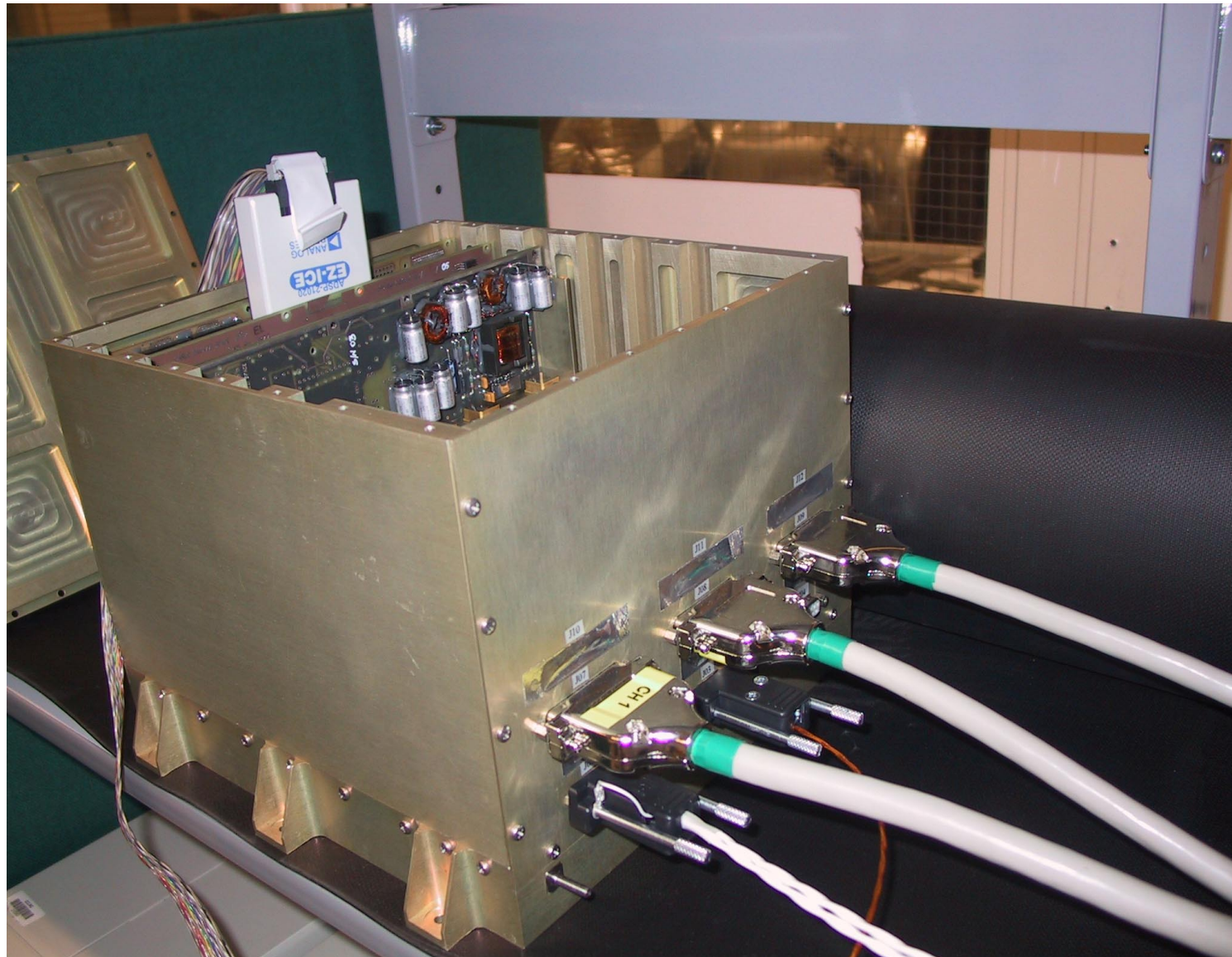
Eric Sawyer

SPIRE

AVM

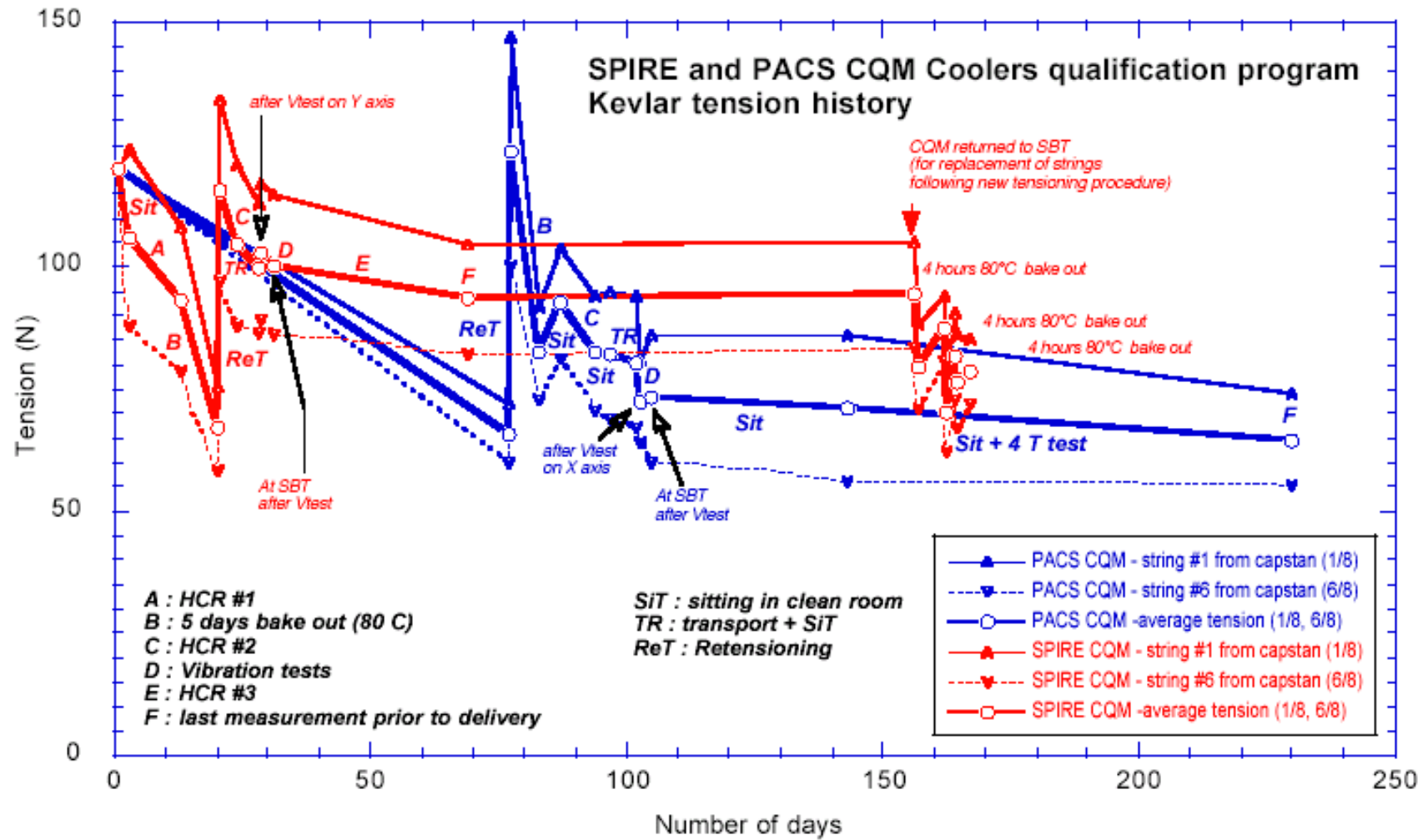
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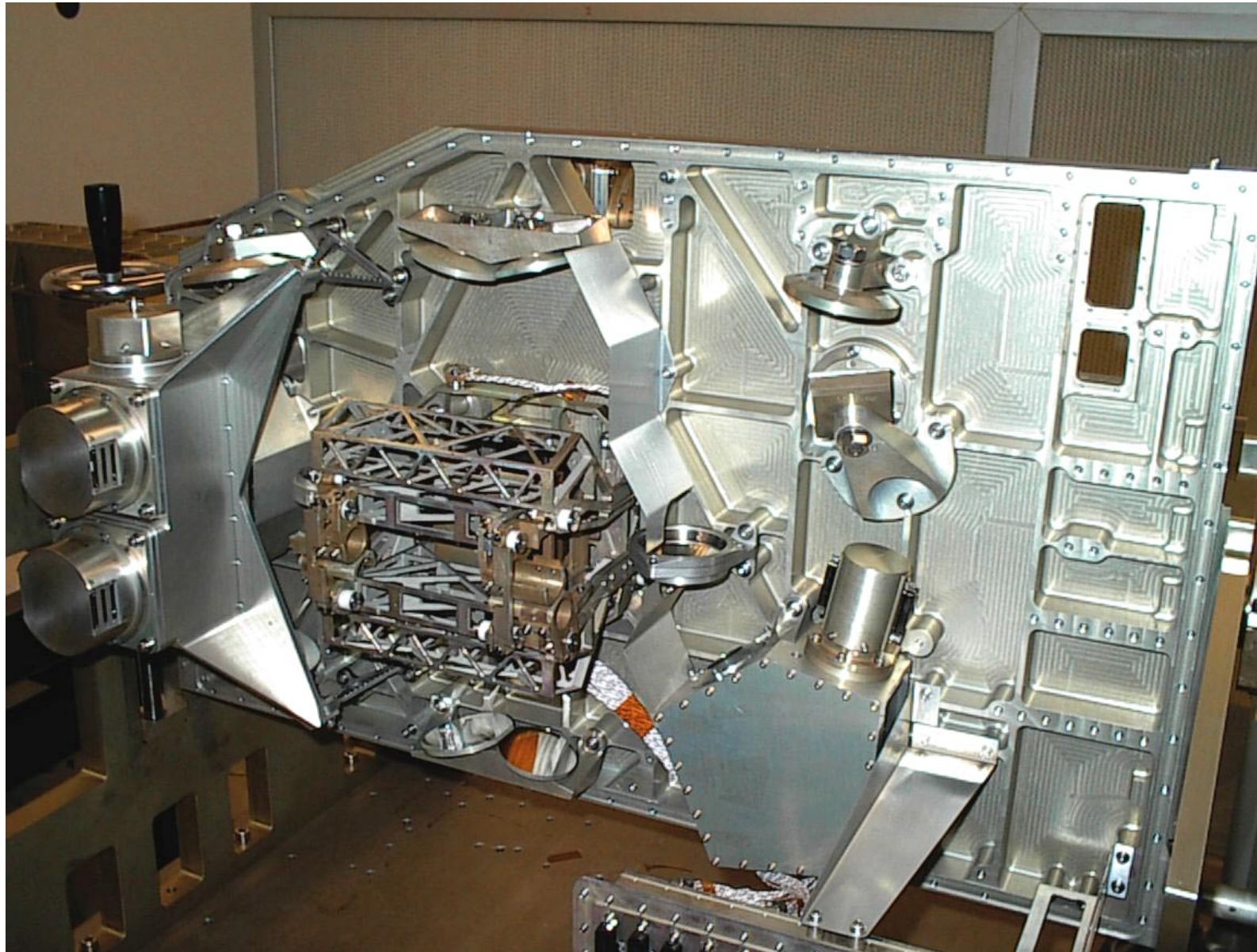
- AVM DPU
- DRCU simulator (simulates DRCU and FPU)
- Delivered April 03
- Preliminary testing complete.
- Simulator software is being updated
- DPU software will be updated, Version 1.2 received
- Formal acceptance planned during cold vibration.
- Testing of OBS and EGSE software continuing

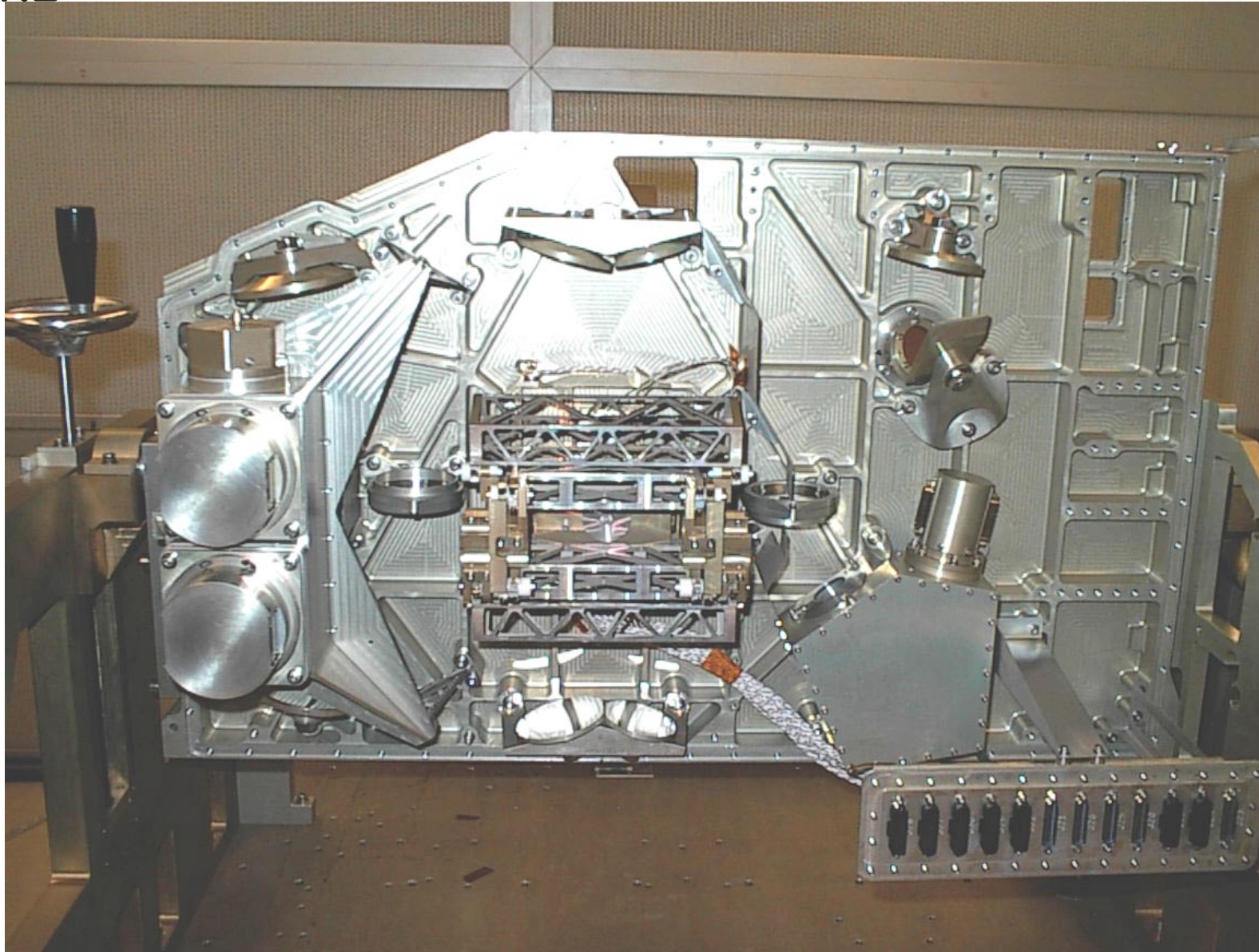


CQM

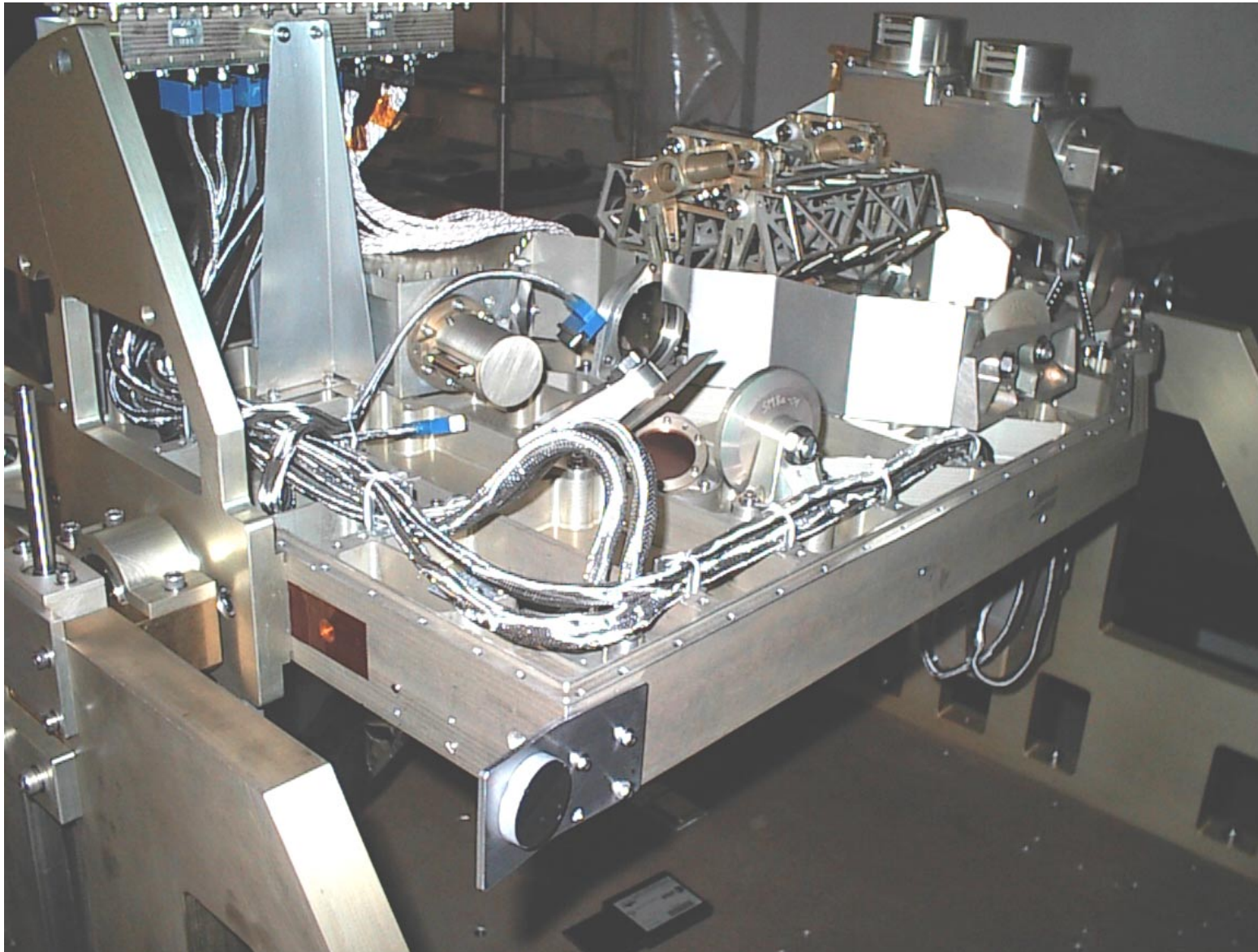
- Following cold alignment. AM reconfigure to CQM
- CQM cooler fitted, subsequently removed and returned to SAP for re-tensioning.
- Detector delivered and installed
- SMEC (STM) delivered and installed.
- CQM BSM modified to include dummy coils for self compatibility test.
- Improved 300mK supports fitted.
- All filters fitted.
- Calibrators fitted.
- Harness has caused some delay, internal harness received, baked and is being fitted.
- Detector harness due this week.
- JFETs assembled.
- CQM assembly proceeding.

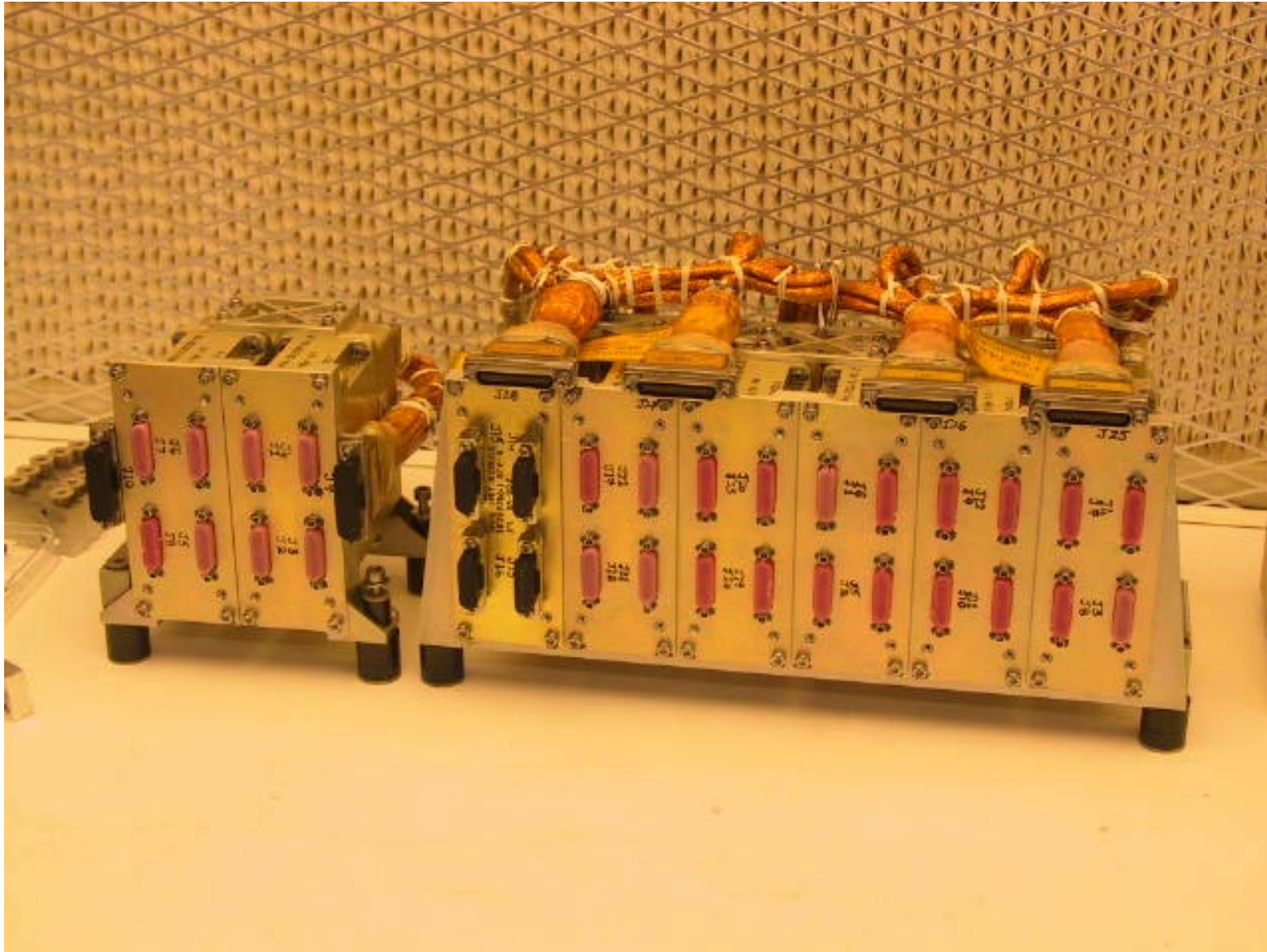












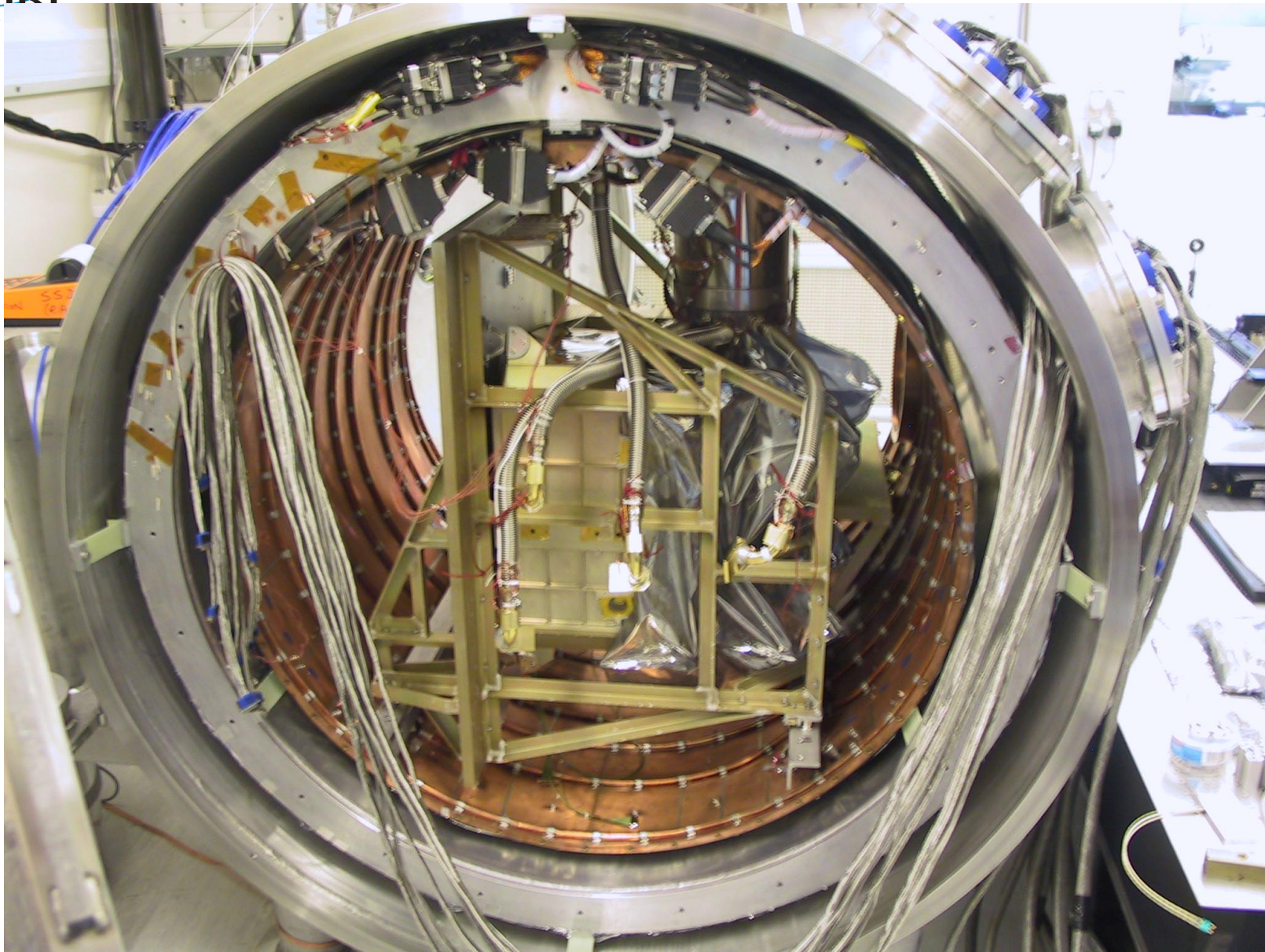
Warm electronics

- QM1 DRCU delivered 15/9/03
- Acceptance tests completed
- Initial integration tests completed with DPU and EGSE + FPU simulator
- No problems identified



AIV

- Improvements made to test facility
- Harness heat-sinking
- Cold black body trial fit
- Stray light rejection
- De-icing heaters
- FTS delivery and checkout



PFM

- Structure mostly manufactured
- Cooler - Review held, release for parts manufacture given.
- DRCU waiting for PFM release, following ILT in Jan.
- SMEC - CQM in manufacture, delivery in February
- Mirrors -manufactured, due for delivery 12/12/03
- BDA - SSW and SLW in assembly
- DPU funding issues, Discussions on reduced testing. Meeting next week.
- Calibrators, filters - in manufacture
- BSM - Built, in test
- PFM FPU Preparation/integration to start on receipt of structure.
- First activities are bakeout and metrology.
- Realistic start is Jan due to staff availability.

Schedule

| ID | Task Name | Duration | Start | 2004 | | | | | | | | | | | | 2005 | | | | | | | | | | | | 20 | |
|-----|--|------------------|---------------------|------|---|---|---|---|---|---|---|---|---|---|---|------|---|---|---|---|---|---|---|---|---|---|---|----|---|
| | | | | O | N | D | J | F | M | A | M | J | J | A | S | O | N | D | J | F | M | A | M | J | J | A | S | | O |
| 1 | SM AIV programme | 166 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 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 95 | CQM programme | 326 days | Tue 24/06/03 | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| 96 | ✓ STM/CQM FTB Subsystem Deliveries | 76 days | Tue 24/06/03 | ■ | | | | | | | | | | | | | | | | | | | | | | | | | |
| 102 | Preparation of CQM | 91.5 days | Mon 04/08/03 | ■ | ■ | ■ | | | | | | | | | | | | | | | | | | | | | | | |
| 138 | CQM Cold Verification 1 | 37 days | Tue 09/12/03 | | ■ | ■ | ■ | ■ | | | | | | | | | | | | | | | | | | | | | |
| 153 | CQM Cold Vibration | 45 days | Thu 29/01/04 | | | | ■ | ■ | ■ | ■ | | | | | | | | | | | | | | | | | | | |
| 161 | CQM Cold Verification 2 | 19 days | Thu 01/04/04 | | | | | ■ | ■ | ■ | | | | | | | | | | | | | | | | | | | |
| 168 | Update QM1 DRCU | 30 days | Mon 26/04/04 | | | | | | ■ | ■ | ■ | | | | | | | | | | | | | | | | | | |
| 170 | CQM modifications before delivery | 13 days | Wed 28/04/04 | | | | | | | ■ | ■ | | | | | | | | | | | | | | | | | | |
| 174 | Possible delivery to ESA FPU only | 0 days | Fri 07/05/04 | | | | | | | | ■ | | | | | | | | | | | | | | | | | | |
| 176 | CQM Delivery Preparation | 9 days | Thu 09/09/04 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 181 | Delivery of full CQM to ESA | 0 days | Tue 21/09/04 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 182 | PFM AIV programme | 412 days | Sun 30/11/03 | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| 183 | CQM/PFM FPU Subsystem Deliveries | 102 days | Sun 30/11/03 | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| 204 | PFM FTB Subsystem Deliveries | 3 days | Mon 15/12/03 | | ■ | ■ | | | | | | | | | | | | | | | | | | | | | | | |
| 209 | PFM FTB Integration | 8 days | Thu 18/12/03 | | ■ | ■ | ■ | | | | | | | | | | | | | | | | | | | | | | |
| 213 | FPU integration phase 1 | 97 days | Wed 17/12/03 | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| 226 | Warm electronics Deliveries | 15 days | Mon 24/05/04 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 231 | QM1 Warm Electronics re Integration | 15 days | Mon 14/06/04 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 234 | Instrument integration and test phase 1 | 94 days | Fri 30/04/04 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 250 | QM1 DRCU available for CQM delivery | 0 days | Wed 08/09/04 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 252 | FPUintegration phase 2 | 48 days | Thu 09/09/04 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 260 | Delivery of DRCU QM2 | 0 days | Mon 01/11/04 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 262 | Delivery of FM DPU | 5 days | Mon 01/11/04 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 264 | Instrument integration and test phase 2 | 20 days | Tue 16/11/04 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 267 | PFM Verification | 141 days | Tue 14/12/04 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 302 | ☰ Delivery of PFM to ESA | 0 days | Tue 28/06/05 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 303 | ☰ Delivery of warm electronics to ESA | 0 days | Wed 30/11/05 | | | | | | | | | | | | | | | | | | | | | | | | | | |



Annex 3 _ H-P-ASP-MN-3961 (SPIRE IF Meeting 18-11-03)

MK2 Level 0 Thermal Straps

Chris Brockley-Blatt

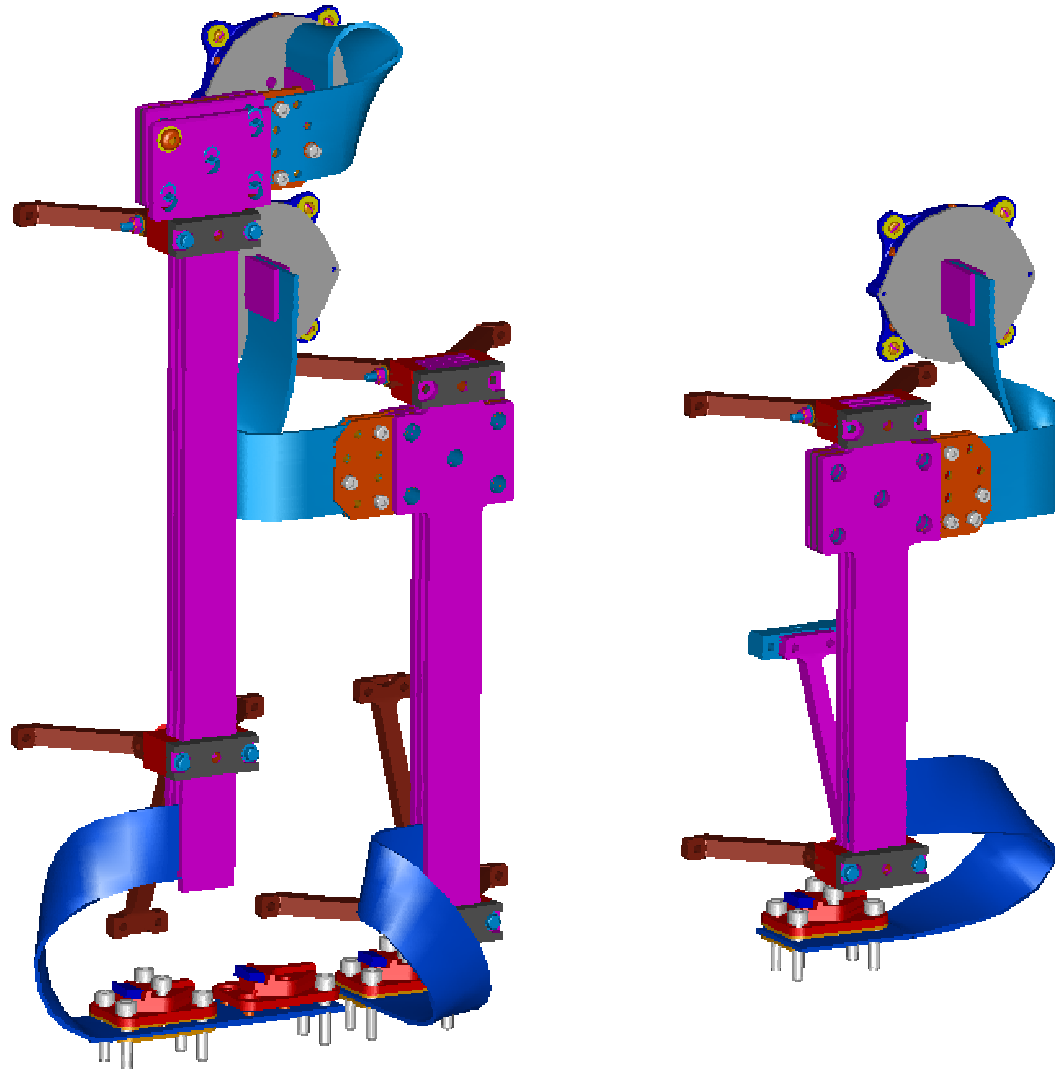




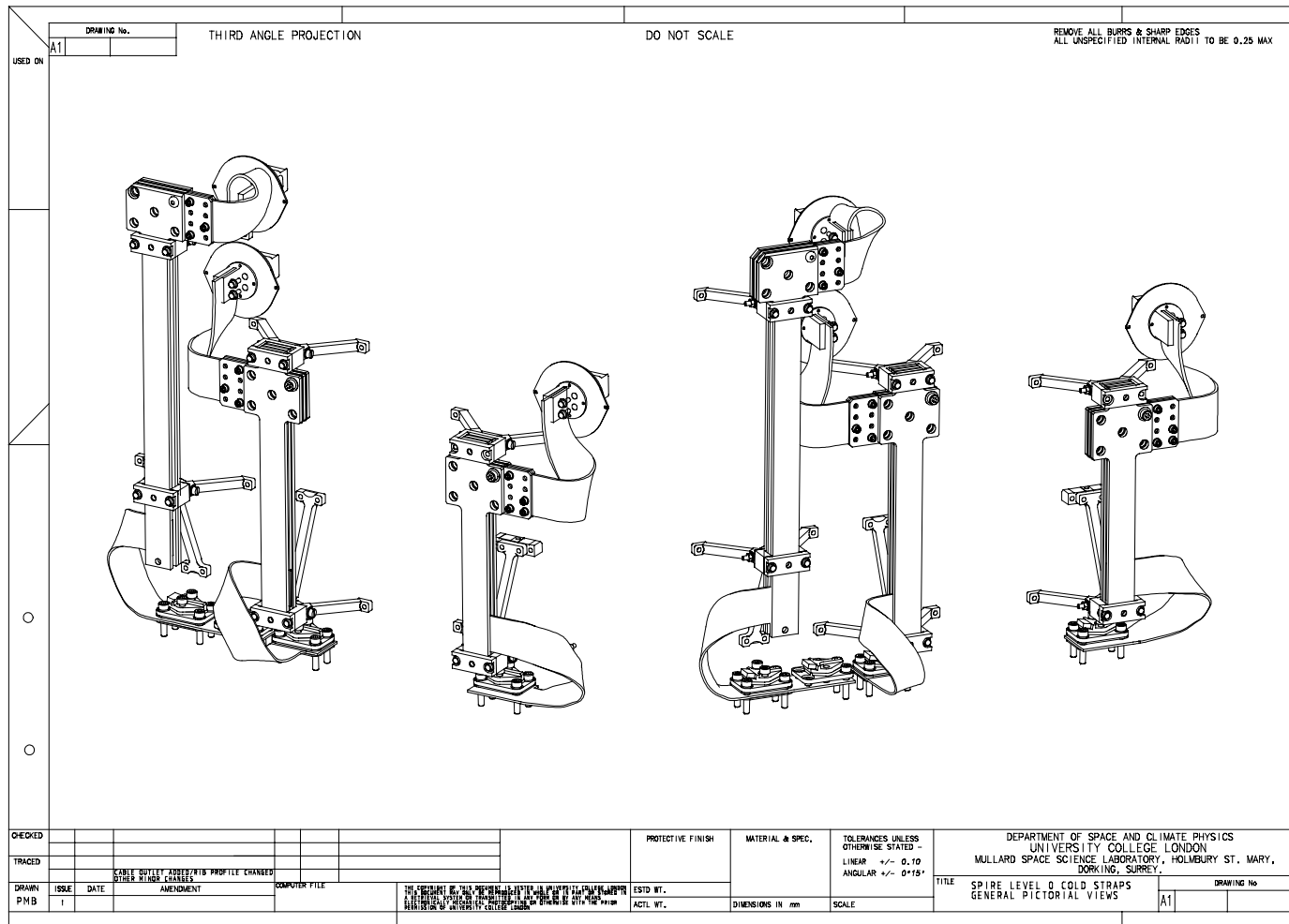
Contents

- **Level 0 Thermal Straps**
 - **Design**
 - **Manufacture**
 - **Schedule**

Level 0 Thermal Straps



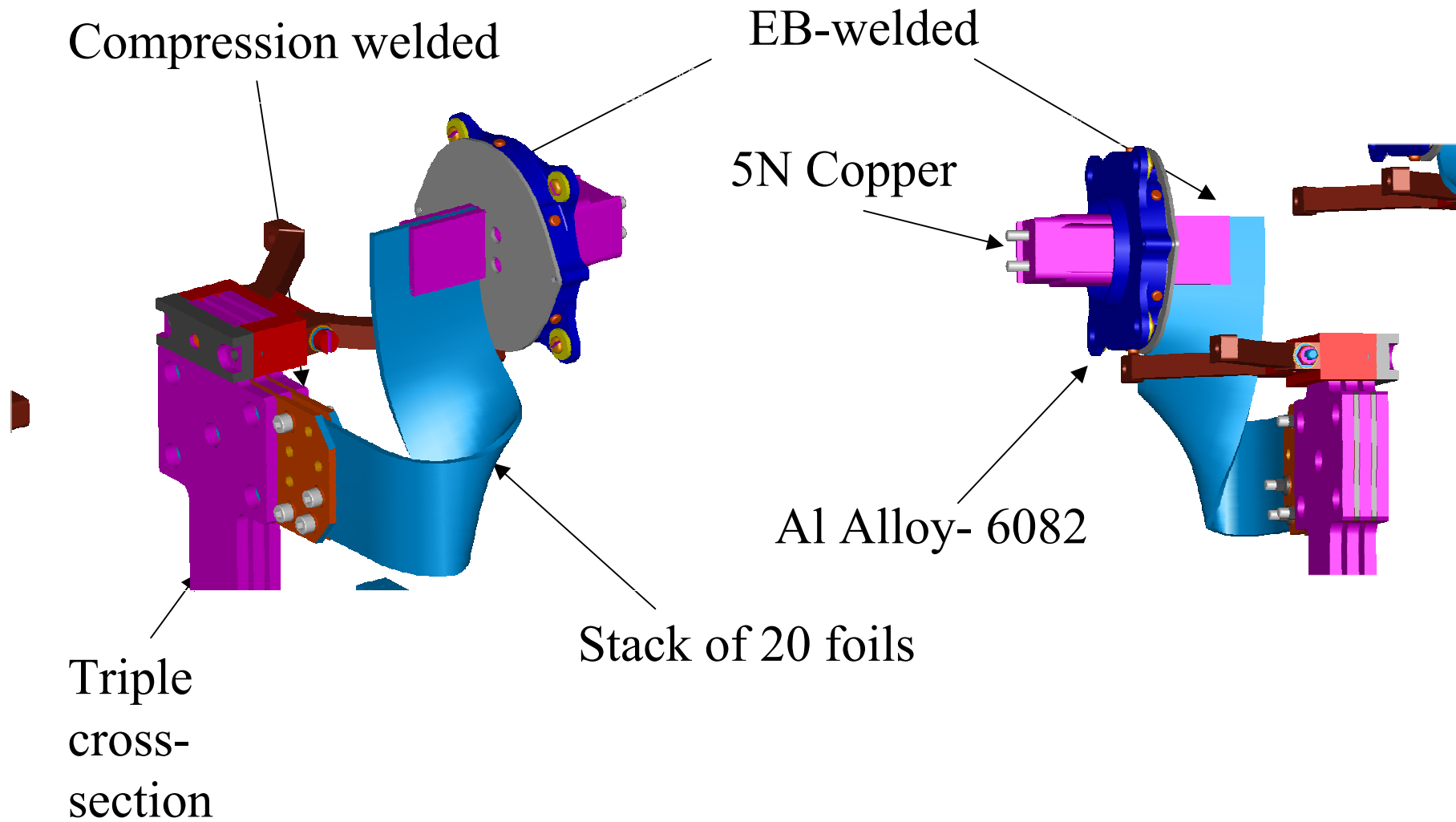
Level 0 Thermal Straps – Drawing

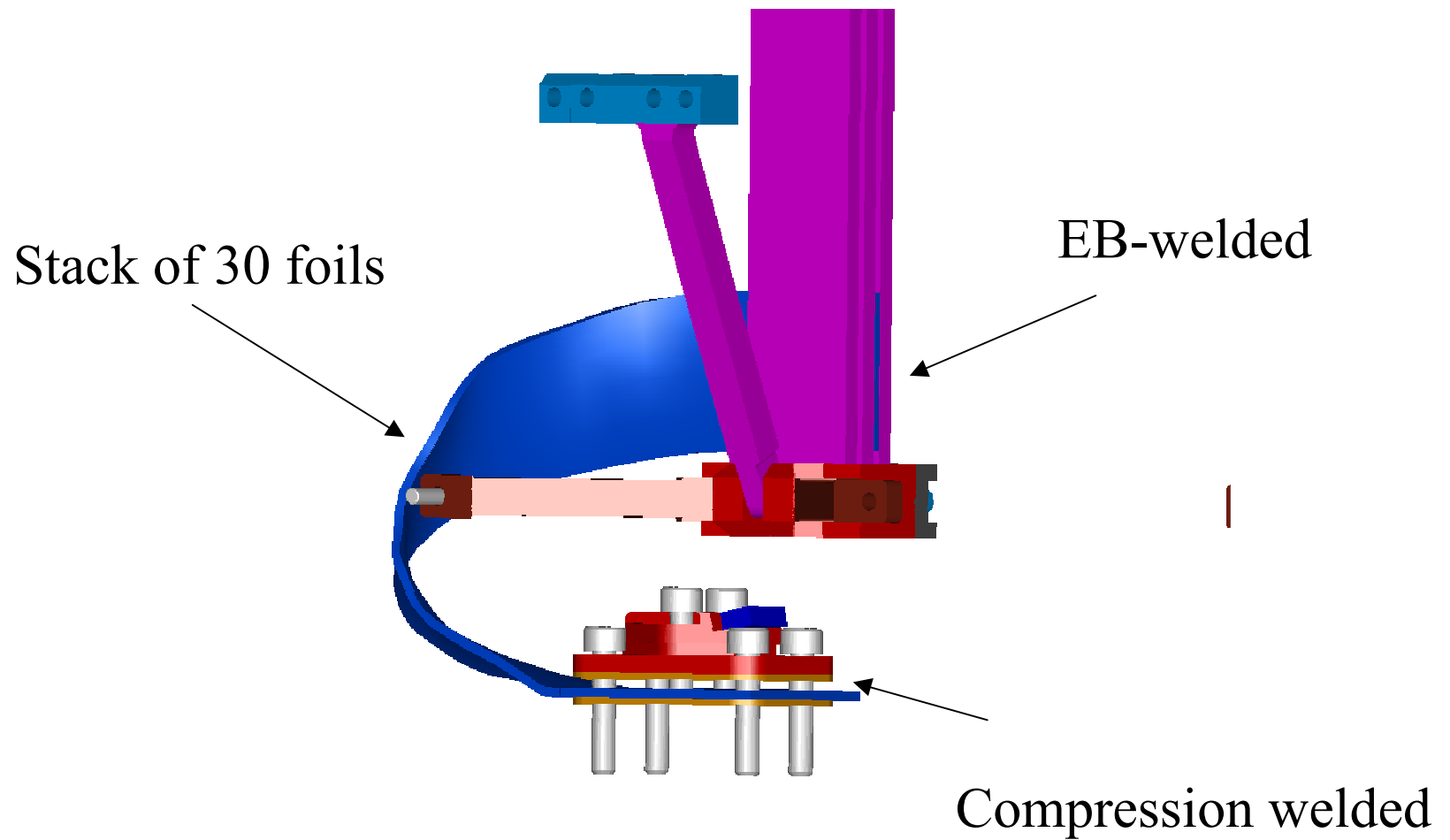


Level 0 Thermal Straps

- The lower straps are made up of 30 shims that are compression welded to form the space craft interface
- Then EB welded at the other end into a sandwich with 3mm thick 5N copper straps.
- The upper straps are compression welded and then bolted between two plates which are then interleaved between the 3mm thick solid straps at the electrical isolation joint.
- The shims are then EB welded into the cooler interface block at their other ends.
- The support legs are made form Torlon and the clamps to hold the straps are made form Al Alloy.

Level 0 Thermal Straps Mk2



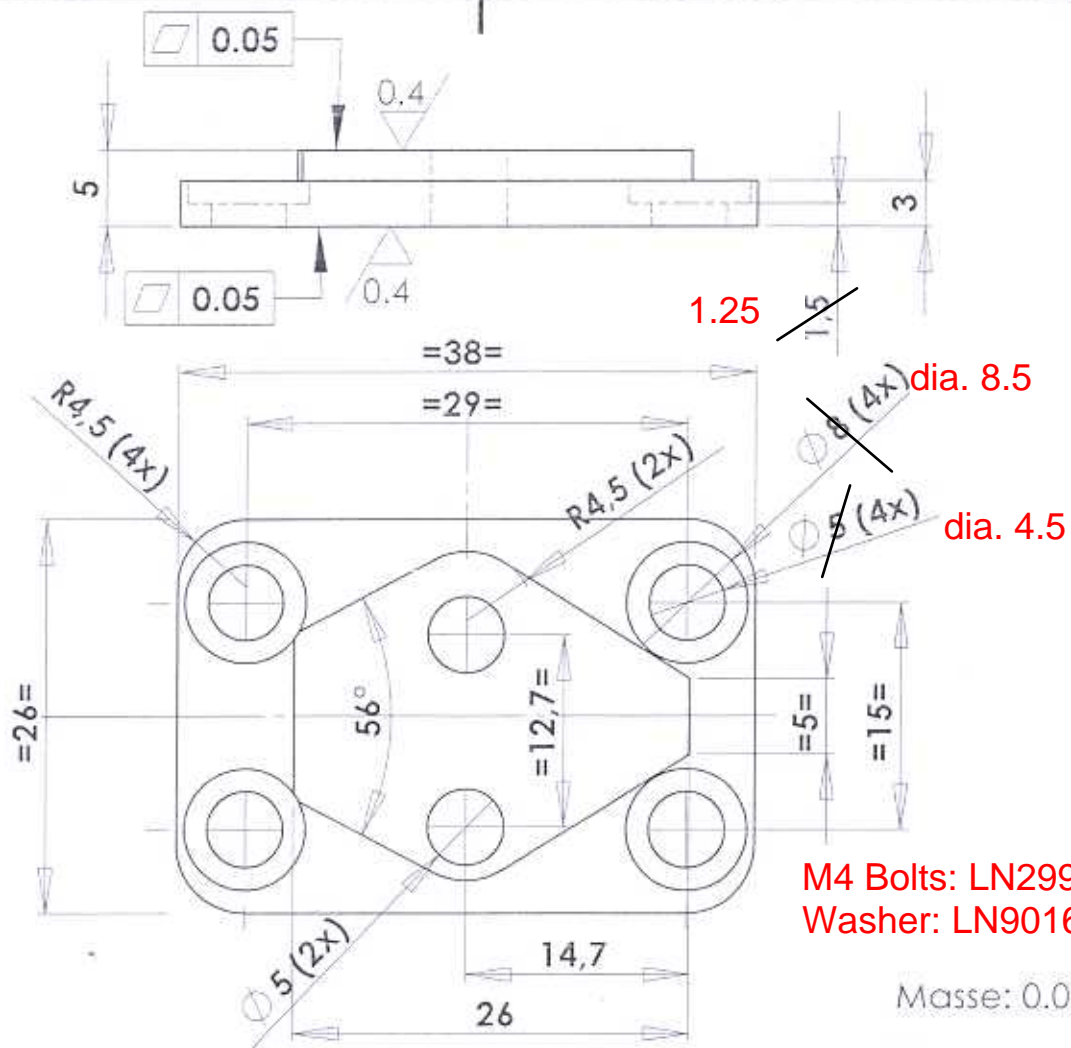


MK2 Thermal Straps Schedule

- **Detail Design/ Manufacturing Drawings**
 - **To be completed this week**
- **Welding Jigs**
 - **To be completed 21 November 2003**
- **Manufacture of parts**
 - **Inner Baffles and Supports completed**
 - **Outer baffles to be modified**
 - **Shims to be cut – 2 weeks (Material is in)**
 - **Compression Welding –2 weeks**
 - **Thick straps – Edwards Brothers**
 - **1 week gold plating – Interfaces only**
- **CQM Delivery 2 Feb 2003**
- **PFM Delivery End of April**

Annex 4 _ H-P-ASP-MN-3961 SPIRE IF Meeting 18-11-03

**PODS Bolt pattern (Astrium)
(2 sheets)**



Masse: 0.024 Kg

Matière : INVAR

Normes :

Tolérances générales
d'usinages sauf
indications

ISO 2768 mK

Etat de surface : Ra = 3.2



| | | | |
|-------------------|----------------|-------------------|---|
| A1 | 10-2003 | CLARIS | Edition originale- (First Issue) |
| Indice (Issue) | Date (Date) | Auteur (Drawn) | Evolution du plan (Drawing evolutions) |



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Vérification
(Checking) Approbation
(Approval)

SPIRE

SUPPORT SONDE TEMPERATURE

Initiales :
(Initials) Initiales :
(Initials)
Date : Date :

ECHELLE
2:1
(SCALE)

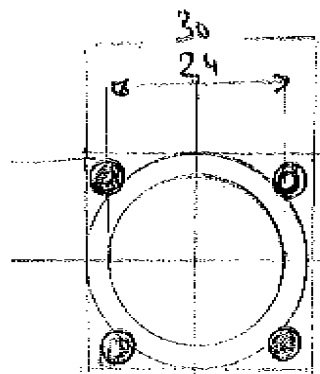
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CORRECTION
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1



SOLIDWORKS

PLANCHE
1/1
(SHEET)

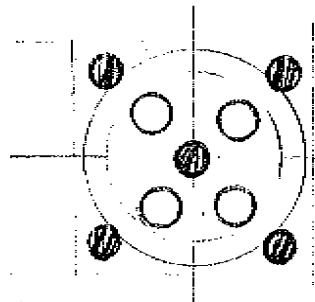


Current

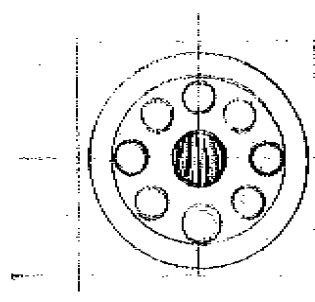
• 4x M4 though holes



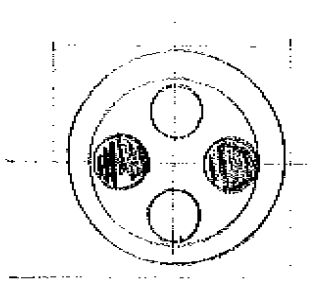
Open pod O/F to flexlink



• 4x M4 + 1x M5 (1D)
 Ø6; 4x Inner holes



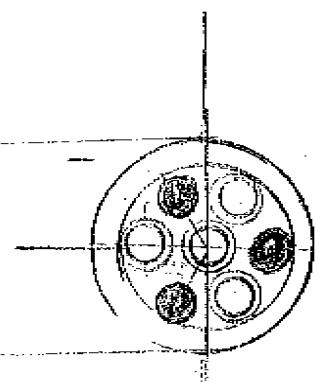
• 1x M8
 Ø5; 6x Inner holes



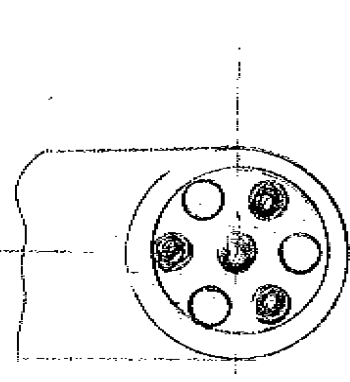
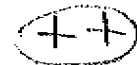
• 2x M8
 Ø8; 2x Inner holes



Pump



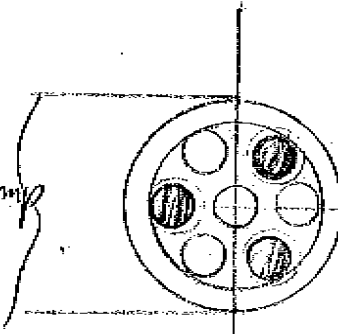
• 3x M6
 Ø6; 4x Inner holes



• 4x M6
 Ø6; 3x Inner holes



Pump



• 3x M6
 Ø6; 4x Inner holes



B. Retten
 12.11.03