



14th March 2002

To: Laurent Trougnou.

SPIRE-RAL-NOT-001194

From: John Delderfield

cc: Bernard Collaudin, Doug Griffin, Bruce Swinyard, Jamie Bock, Colin Cunningham, Jean Bruston, Bernard Jackson, Glenn Lund.

SPIRE CRYOHARNES OVERSHIELDS INTERNAL TO THE CVV.

This relates to your Fax. last week numbered H-P-ASPI-LT-1086.

At the meeting of 13/02 in ESTEC Bernard Collaudin said that it had been decided to instruct Astrium that these shields were not baseline at the Herschel PDR. The meeting did not derive a decision from a technical discussion. SPIRE responded that we cannot determine how sub-contractors are instructed to proceed at any particular time. The position shall remain that SPIRE project team has to be satisfied that this harness (which functionally is within the instrument analogue system) will fulfil instrument requirements.

The implementation of these shields is presently something that the SPIRE project team considers the instrument needs. The shields have been in the design throughout the past two years and have been negotiated with JPL. All the points you list as rationale are part of the picture, indeed the last phrase of the third one is indisputable! However these points omit the following oft-stated ideas:

- that the shield gaps at the rear of the CVV connectors should be r.f. overlapped but not d.c. coupled;
- a preference held by some that they all be reconnected anyway;
- the extremely demanding sensitivity levels;
- the plan agreed within the instrument consortium and confirmed at reviews that SPICE modelling should give initial answers and then early RF testing the definitive steer.

The only changes to H-P-ASPI-LT-1086 that this implies are on page 2, below the diagram, where a form of words might be:

“The following factors will need to be evaluated:



- i. the definition of how the shields could be implemented and an estimate of their resulting HF screening efficiency
- ii. any results from EMC tests or computations, e.g. with the HPLM EQM.

“Astrium should note that these or other factors may indicate that the overshields should be added into the PDR baseline as defined on the first page of this Fax., and no plans should be proceeded with that preclude this from being invocable.”

Best wishes.

John Delderfield

Ken King

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	Date 06/03/02	Référence H-P-ASPI-LT-1086

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SPIRE cryo-harness internal overall shield

[Ref. 1] Evaluation of field level inside the cryostat, H-P-ASPI-LT-512, 28/10/2001

[Ref. 2] Cryostat Shielding Efficiency Assessment Consolidation, H-P-2-ASPI-TN-0177, 30/11/2001

Dear Sirs,

At the meeting held on the 13/02 at ESTEC it was decided that SPIRE **internal** cryo-harness overall shield (the "FPU Faraday shield") was **not** considered as the baseline for the PDR design.

The rationale can be summarised as follows :

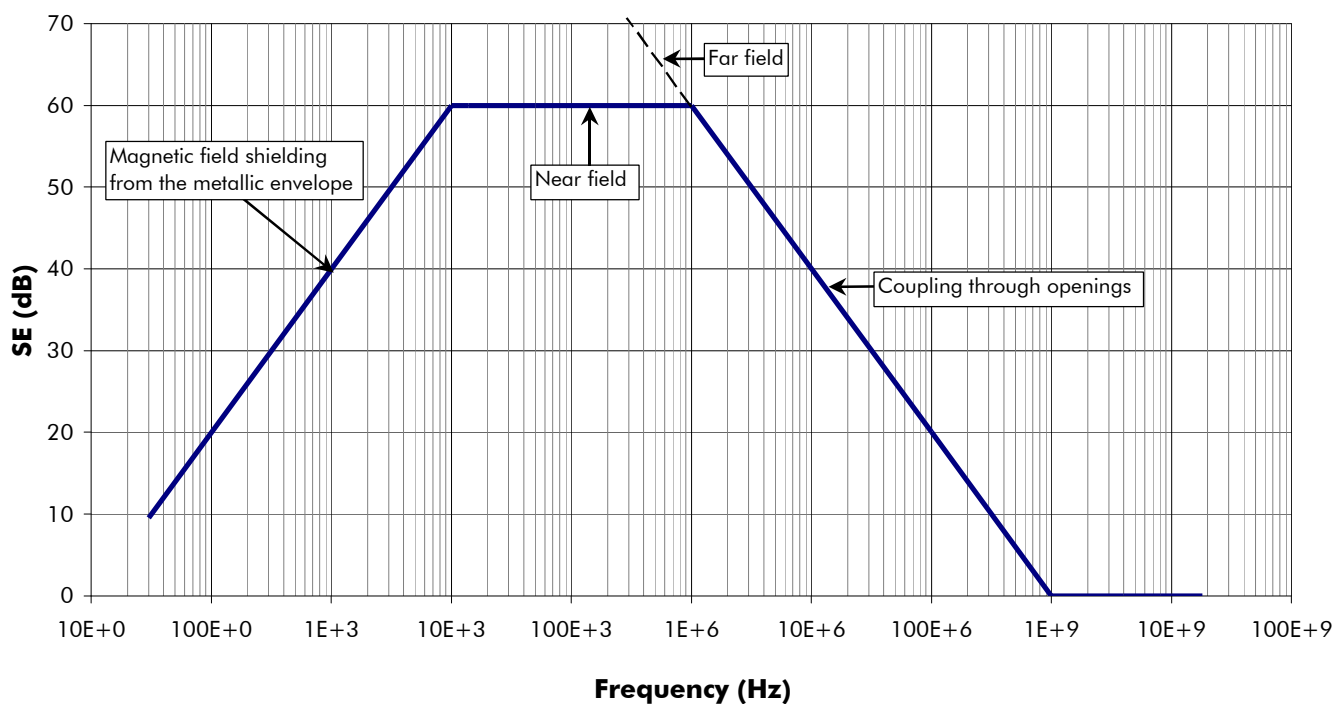
- the sensitive links are already protected against low frequency EMI by other means (balanced differential links, analogue 0V grounded on one side only, individual shields grounded on one side only, etc.) + to some extent by the cryostat shielding efficiency
- this overall shielding, the way it is planned to be connected to SVM through cryo-harness wires cannot a priori be efficient at high frequency (roughly above 1 MHz), that is to say where the cryostat shielding efficiency is expected to decrease (cf. cryostat shielding efficiency mask next page, also cf. [Ref. 1] and [Ref. 2]), so there would be little extra EMC benefit to expect from it
- on the other hand, this overall shielding, the usefulness/implementation of which is doubtful, may have a significant impact on lifetime

FAX

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 06/03/02

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Cryostat shielding efficiency final assumption



However, in case the EMC tests on the HPLM EQM finally lead to the conclusion that an overshielding is actually necessary on SPIRE internal cryo-harness (i.e. high frequency susceptibility is found), one must evaluate this possible option, i.e :

- define what would be the characteristics of an internal overshielding efficient at high frequency (material, process, backshells, etc.)
- estimate its efficiency (ratio of interface noise pick-up with/without in dB)
- assess the impact of such an overshielding (lifetime, mass, etc.), and the feasibility/impacts of introducing it on the FM after the EQM EMC tests completion

In order to be prepared to such eventuality, Astrium is kindly requested to propose an assessment of these last 3 points.

Best regards,

L. Trougnou

P. Couzin