esa

MINUTES OF MEETING

FIRST/Planck Project

date 17-3-00	reference SCI-PT/ 07543	page 1/3	
meeting date "	meeting place ESTEC (Fresnel 1).		
chairman Bernard Jackson			
participants See below.	copy Attendees + F. Vandenbussche, T. Passvogel, H. Schaap, A. Hoskr.		
subject FIRST/PLANCK EMC WORKING GROUP. Meeting 1			

description	action	due date
(1) Send questionaire to instrument teams	A. Ciccolella	21-3-00
(2) Instrument teams to return completed questionnaire	All.	14-4-00

Attendees.

Name	phone	email	affiliation.
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description	action	due date

Introduction.

See attached view graphs Annex 1.

It was agreed that in addition to emc, power aspects would be covered in this working group. The members were the 'power responsible within the instrument teams, or would ensure that the correct power responsible person was kept informed

Schedule

The aim of the working group is to establish baseline emc requirements prior to the appointment of an industrial prime contractor for the spacecraft ± Jan 2001

The plan for the working group meetings is given in Annex 1 page 7.

ISO emc specification.

For information a copy of the ISO emc specification is attached as Annex 2. FIRST and Planck emc specifications will be developed and this specification can be taken as a starting point.

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A. Ciccolella gave a presentation on basic emc practices for connector grounding. From the points raised by the meeting representatives it was clear that extreme emc environments are present on FIRST/Planck and that some solutions will have to be specially engineered

Questionaire. A. Ciccolella will prepare a questionaire to include.

Frequency plan,
Sensitivities of instruments
emissions item ..
Common Mode Levels acceptable
Requirements on power supply ⇒ max acc. ripple
inverter sync. is baselined
in CDMS working group it was proposed to make the frequency 131.072 kHz.

Verification

The emc performance has to be demonstrated in realistic conditions e.g. does the instrument have to be at very low temperatures to demonstrate the emc performance

Schedule for Questionaire

- Questionaire issued to instruments by 21 March 00.
- Response from Instrument teams to estec by 14/April/00.

FIRST/PLANK - EMC & POWER QUESTIONNAIRE FOR PAYLOADS

PAYLOAD NAME:

REFERENCE PERSON:

1. Power Interface Requirement

Please describe the expected power interface of the experiment with the satellite bus through a table, (see example below) specifying the name and type of power line required and, possibly, the LCL class associated to them.

Example:

Function	Number of main lines required	Number of redundant lines required	LCL class eg 1,2,4,7A
+ 28 V primary power	1	1	(109W/4A Trip-off limit)
+28 V primary power (heaters)	1	1	(28W/1A Trip-off limit)
Keep alive supply 7 – 9V	0	0	1W max per line

Note
The inrush current of the instrument should be limited to <1.5 times the LCL peak value and of duration < 0.5 msec. The rate of change of the inrush current shall not exceed 1A/micro sec

2. Instrument Power Distribution Block Diagram and Redundancy Approach

Please describe the expected instrument internal power distribution block diagram and the redundancy concept within the instrument.

3. Instrument Power Requirements

Please provide the preliminary power requirements for the instrument for each operational mode specifying the power through a table or, if necessary through a current versus time diagram.
Example:

Experiment interface	Operational mode …….. Average Power	Peak Power and duration
+28 Pr. Power		

Furthermore, state whether DC/DC converter synchronisation is required and, in the affirmative case, provide the relevant rationale.

4. Instrument Grounding Diagram

Please describe with suitable drawings the grounding diagram that you expect to implement in your experiment, including the grounding of the harness shielding.

5. Interconnecting Harness Block Diagram

Please describe the interconnecting harness block diagram within the instrument's subsystems, specifying the expected length and the type of the signals.

6. Instrument Susceptibilities

Please specify the frequencies and the levels for which you expect your instrument, or its parts/components, to be susceptible (Voltage and Current ripple, Electric Fields, Magnetic Fields, etc.).

7. Instrument Emissions

Please specify the frequencies and the levels you expect your instrument will emit (Voltage and Current ripple, Electric Fields, Magnetic Fields, etc.).

8. Instrument Frequency Plan

Please establish a frequency plan for your instrument assembly, including switching frequencies of power supplies, clocks, IF amplifiers etc. Information on pulse width, amplitude, rise and fall times of clocks are highly desirable.

9. Detailed questions on EMC

A) Does your instrument require electrostatic or magneto-static cleanliness at spacecraft level?

B) What is the topology of the electronic interfaces you are considering in the instrument design? (E.g. single ended-differential, balanced-differential, etc.). If available, please give an interface circuit diagram.

C) Do you believe your experiment be compliant to the ISO EMC requirements, which are presently assumed as a reference? Please try to establish a compliance matrix with the ISO EMC requirements.

D) Do you expect your experiment be vulnerable to Electrostatic Discharge (say 10 kV, 5.6 mJ)?

E) Do you believe it is mandatory to use a static screen for the converters' transformers in order to minimise the winding capacitance and enhance AC de-coupling between primary and secondary power?

F) Do you expect your experiment be vulnerable to voltage common mode transients? Which peak value and time characteristics?

G) What is the EMC verification concept you plan to implement in the development phases of your instrument?

H) What are the major concerns of your instrument from the EMC discipline point of view?