



HERSCHEL/PLANCK

REF. : H-P-ASP-MN-5107

DATE : 17 &amp; 18/6/2004 PAGE : 1 /11

## COMpte RENDU DE REUNION / MINUTES OF MEETING

LIEU / PLACE : ASP Cannes

OBJET / PURPOSE :

CLASSIFICATION :

## Data Management Working Group Meeting #20

PARTICIPANTS ATTENDEES	SOCIETE FIRM	SIGNATURE SIGNATURE	PARTICIPANTS ATTENDEES	SOCIETE FIRM	SIGNATURE SIGNATURE
K.King	RAL		JL.Beney	IAS	
O.Bauer	MPE		M.Miccolis	LABEN	
L.Dubbeldam	SRON		F.Pancher	IAS	
S.Thürey	ESTEC		J.Charra	IAS	
P.Estaria	ESTEC		F.Chatte (part.)	ASP	
M.Schmidt	ESOC		M.Koelle	ASTRIUM	
F.Sauvage (part.)	ASP				
REDACTEUR / WRITTEN BY :	P.Couzin				

CONCLUSION :

DISTRIBUTION :

PARTICIPANTS /  
ATTENDEESPOUR ACTION :  
FOR FURTHER ACTIONPOUR INFORMATION :  
FOR INFORMATION

APPROUVE PAR / APPROVED BY

NOM / NAME	P.Couzin			
SIGNATURE / SIGNATURE				

ACTION

**Herschel Session**

Agenda is in Annex 1

**1- Action Items from DMWG 19**

**AI #1** : 1553 test by instruments

AI remains open. H instruments state that the 1<sup>st</sup> fully representative model, as far as far as 1553 interface is concerned, will be the "Confidence Model", to be ready for the end of the year. ASP/ESA consider that the testing of the I/F on this model, regarding both the delivery schedule, and the schedule of the tests on the SVM AVM, remains valuable from a technical point of view. The generation of the test plan and testing of the instrument DPU will be performed by Carlo Gavazzi.

The AI closure is consequently postponed until the end of the year.

AI#1Herschel  
20/12/04

**AI#2** : Input for Device tables

Closed for Herschel.

**AI#5** : Definition of standby modes and FDIR modes

PACS and SPIRE have answered in a detailed way (see Annex 2). SPIRE have provided a document which expresses the various FDIR procedures in a clear way. PACS stated that they will use this document as a model for the next update of their existing FDIR document. HIFI state that similar information will be available for the end of summer. AI reopened for HIFI.

As far as the implementation of the instruments FDIR procedures are concerned, ASP current schedule is the following : Spec for FDIR procedures implemented via OBCP (baseline) to be written for the end /04. Then coding in beginning 05.

AI#2 HIFI  
20/9/04

**AI#12** : S/C actions in case of commanding anomaly

SPIRE and PACS have answered (see Annex 2). PACS state that the re action they expect from the spacecraft when no commanding is possible may depend on the mode the instrument is in. ASP point out that this would imply an analysis of the instrument HK to test the mode before reacting. This issue needs to be clarified.

PACS shall clarify the procedure to run in case no TC can be sent to PACS.

AI#3 PACS  
20/9/04

Action 12 is open for HIFI.

AI#4 HIFI  
20/9/04

**2- Instrument OBSW audits**

Activity, run by CAPTEC is nearly completed. No final report has been distributed yet.

The instruments expect that the H/P project will derive specific recommendations for each instrument from the CAPTEC reports. This will have to be discussed when specific recovery plans are elaborated.

**3- 1553 test debrief**

PACS test has been successfully run, however, 2 NCR's have been raised :  
 1- Rejection of the 1<sup>st</sup> TC sent after switch on of CDMU DFE + Inst DPU :  
 ASP propose to resolve this issue via the TC re-send mechanism (see answer to DMWG #19 AI 13).

2- missing TM packets in PACS burst mode :

An anomaly has been found in PACS DPU S/W (1553 part), and corrected; PACS have requested a 3<sup>d</sup> test campaign to be run, exercising a complete TOPE procedure during which the Burst Mode is used. The NCR should be closed after successful completion of this test campaign.

**4- Boot SW functionalities**

IFSI have provided a brief description of the boot SW functionality (see annex 3). No further reference to a SW specification or design document has been provided, which is considered insufficient.

Discussion happens on the sub type of the event raised by the boot SW after successful start. A TM(5,2) is currently generated, apparently not following the requirements 5350-EVRP/ 5360-EVRP of the PS-ICD, which ask for an event Tm(5,1) in case of information/warning and for an event TM(5,2) in non-nominal case when unsynchronous **on-board** action is required. This may not be consistent with the need to stay in boot SW in the case where SW management has to be performed or when manual verification or acknowledgement is wanted/required.

ESOC stresses the fact that the observability of the operations from boot SW, considering that the SW management activities could last long, is far from being sufficient from an operation point of view.

ASP & ESA shall formally comment Herschel boot SW description (also possibly addressing the low level protocol implementation). These comments will be relayed to IFSI by PACS on behalf of the Herschel instruments.

AI#5  
ESA/ASP

**5- IEGSE integration**

Depending of the way HCSS supports the interface with HPSDB there could be naming convention conflicts for the three following items :

- Curve identifiers,
- Command Verification Stage,
- Parameter range set.

This risk is due to the fact that the identifiers format are different between CCS/SCOS and SCOS used by instruments :

- Curve Id are number(4) in SCOS and char(10) in CCS/SCOS – In order to allow instrument bridge file loading inside HPSDB, the instruments were required to code their curve identifiers as number(3),

- Command verification stage Id are number(5) in SCOS and are number(9) in CCS/SCOS – In order to allow instrument bridge file loading inside HPSDB, the instruments were required to code their command verification stage Id as number(4)
- Parameter range set Id are number(4) in SCOS and are char(8) in CCS/SCOS – In order to allow instrument bridge files loading inside HPSDB, the instruments have been required to code their parameter range set id as number(3)

Naming convention conflicts may occur between the 3 instruments on these identifiers.

In order to identify potential conflicts it is agreed that ASP will continue:

- the loading of the three Herschel instruments MIB files
- the re-generation of SCOS bridge files from HPSDB,
- the check between the input and output bridge files,

Conclusion :

ASP will deliver the three sets of bridge files to ESA (J. Riedinger) by the end of June and ESA will check if HCSS can cope with potential inconsistencies.

If this is not the case then solutions will be investigated jointly by ASP and the instruments (normal work) e.g.:

- Allocation of range per instrument (warning if other subsystem are concerned),
- Others ?

## Common Session

Agenda is in annex 4.

### 1- terms of reference for DMWG

Document distributed by ESA (S.Thuerey) has been reviewed and is approved

### 2- Action Items from DMWG #19

**AI#3** : merging of function ID and activity ID

See answer in Annex 5.

A footnote shall be added in PS ICD to mention that as implementation in the database, the activity ID and function ID shall be merged.

**AI#4** : identification of the source of TM packet (nominal/redundant)

ESA/ASP proposal is in Annex 6. It basically consists, from a database point of view, to duplicate the nominal database, change the APID to the redundant ones, and change the relevant calibration data.

ESOC shall detail the consequences of the proposed solution (where each TM redundancy has its own APIDs) on the database.

LFI state that they do not need to identify separately the parameters belonging

AI#6 ESOC

to each chain, because LFI is non-redundant, except the cold-redundant data-bus I/F electronics. It is commonly recognised that in that case, the proposed duplication of APID's is not necessary; the system could cope with that situation.

LFI state that they do not need to identify separately each chain. It is commonly recognised that in that case, the proposed duplication of APID's is not necessary; the system could cope with that situation.

SPIRE points out that ESA/ASP proposal implies more APID's. These additional APID's shall have to be defined within end June 04.

**AI#6** : routing of nom/red TC's

See answer in Annex 5. It is pointed out that this answer is at a proposal stage, not yet agreed/confirmed by ESA. Action is reopened

AI#7 ASP

AI#8  
ASP/ESA

**AI#7** : SSMM pointers management.

See ESA answer in Annex 2. Action is closed. Topic is to be addressed within operations WG.

**AI#8** : Checks to be applied on TC PTD and TM PTC

ASP proposal is in Annex 5. LFI consider that the check of the reserved bits is useless from RT point of view. ASP position is that the check of reserved bits for TM PTC does not, indeed, bring much robustness to the protocol because the evaluation of the packet count field alone is deterministic (test is "equal to"). However, this check is confirmed to be important for TC PTD check because the evaluation of the TC PTD packet count field alone is not deterministic (check is "different from").

HFI confirm the proposal can be implemented.

Herschel instruments + SCE +ESA shall comment ASP proposal on TC PTD/TM PTC checks

AI#9  
Herschel+  
SCE + ESA

**AI#11** : OBSM HFI tool usage by all instruments

See Annex 2 answers. HIFI and LFI confirm they will use the tool. Action is closed.

**AI#13** : TC packet transmission FDIR (TFL)

ASP proposal is in Annex 5. It is based on a retry of the same TC packet, but with an updated packet count field in the TC PTD. Recognised drawback, although considered of a very low probability, is that the same TC could be executed twice.

All instruments state (and have already stated in the past ...) that they are robust to the execution 2 consecutive identical TC packets.

Action is closed.

**AI#14** : Solution to resolve conflict of commanding via OBCP's for instruments FDIR, and from other sources.

See answer in Annex 5. ASP position is that the available functionalities permit the OBCP's triggered by a failed instrument via Event Action Table (EAT) to first

disable the MTL commanding for the failed instrument. This permits to free bus bandwidth for the OBCP's commanding.  
Action is closed.

**AI#15** : ESA Comments on HFI 1553 testing  
See ESA answer in Annex 6. Action is closed

### 3- OBSM development environment

ESOC present the current design and development status. See Annex 13.  
The instrument teams have agreed on the principles of OBSM development infrastructure (i.e. selfstanding system, PC to be purchased by instrument teams). To be clarified: is a system with mixed OS (sun solaris for I-EGSE server/ linux for OBSM tool) possible to cover the situation for PACS.  
First delivery will be done to HFI within the coming weeks  
ESOC present the current design and development status. See Annex 7.

### 4- HGSSE and PGSSG WG reports

See Annex 8.  
SSMM management issue has been addressed. Trade off cyclic vs linear packet stores is still to be finalized based upon instruments preference and present SSMM design (see answer to AI #7).  
Instruments User's Manual : delivery time frames for Herschel are in Annex 14.  
For Planck : LFI + HFI + SCS confirm date of delivery of the 1<sup>st</sup> version is end-September 2004.

### 5- 1553 I/F test

Item moved to Planck dedicated session.

### 6- HPSDB Development status

HFI state that they absolutely need feedback on their database input before delivery of the QM units (September 2004).  
ASP confirm PACS MIB files have been successfully loaded; objective is to load all Herschel instruments MIB files by end of June. Planck will follow.  
SCE MIB files are planned to be available by mid July.

## Planck Session

Agenda is in Annex 9

### 1- Action Items from DMWG 19

**AI #1** : 1553 test by instruments

See Annex 2. HFI have provided a Test Plan/Procedure (ref doc. Phba-DPU-dpu1553if-testplan-i1r0). The test will be carried out on the CQM (either in July

or September. An offer from Astrium-Velizy is pending). ASP/ESA point out that only the electrical part of the procedure need to be run on the PFM; the protocol part is believed to be not model dependent (TBC).

ESA/ASP shall comment HFI test plan and compliance matrix

AI#10 ESA /ASP

LFI refer to REBA CRISA Test Plan. A compliance matrix to AS4112 test plan will be provided.

SCE refer to SCE DPU CRISA Test Plan.

A compliance matrix to AS4112 test plan shall be provided by LFI and SCE

AI#11 LFI & SCE 15/7/04

**AI #2 :**

Answer has been provided directly to ESOC by LFI and HFI. For SCE, see Annex 2. Action Closed

**AI #5 :** Definition of Standby modes (see TN ASP "Instruments standby Modes and Boundary Conditions")

HFI have provided a dedicated TN ref TS-PHBC-100006-LAL. As far as the 1<sup>st</sup> case Standby mode is concerned, HFI prefer not to change its current mode of operation.

ASP shall comment HFI TN ref TS-PHBC-100006-LAL.

AI#12 : ASP 31/8/04

ASP propose this document to be called by the IID B in the relevant section.

LFI : for the case 1, as for HFI, LFI request to be maintained in the same mode (i.e. no action). If no Telecommanding is possible LFI request to be maintained in the same configuration (i.e.. no action). If the data rate allocated to LFI needs to be reduced, LFI request that a single commands (details TBD) is sent to the instrument by the CDMS.

SCE : Answer is provided in Annex 2. However, the following comments are made by LFI & HFI : in the case 1, they prefer the SCE to be maintained in the same mode (rather than to go to the Ready mode as proposed by LPSC). In the case 2 LPSC proposal (switch-off of the two power lines) is not acceptable. A dedicated meeting will be organised between LFI/HFI/Sorption Cooler to assess the consequence of a communication anomaly with the SCE, and the preferred action. ASP request to be involved to avoid further loops due to constraints on the spacecraft side.

As mentioned in Herschel session, as far as the implementation of the instruments FDIR procedures are concerned, ASP current schedule is the following : Spec for FDIR procedures implemented via OBCP (baseline) to be written for the end /04. Then coding in beginning 05.

ASP indicate that the OBCP's will be pre compiled on ground with the HPSDB; any TC and TM (including events) which is present in the HPSDB will then be accessible to any OBCP.

**AI#12 :**communication anomalies

HFI : see TN TS-PHBC-100006-LAL..

LFI : see DMWG 19 MOM's

Sorption Cooler : As for AI#5, a dedicated meeting with LFI & HFI will take

place to commonly agree on the best and safest approach.

**2- Status report from CAPTEC Audit**

HFI : report has just been received. Most of the problems identified were already known.

LFI : report not yet received.

In a second step, as for Herschel, the Planck instruments state that specific recommendation should be made.

**3- Debrief from LFI 1553 test**

As far as the synchronisation of LFI is concerned the present CCS-PLM EGSE design imposes some 4s in between the 2 TC's needed while LFI implementation expects the commands to be received in sequence.

(note that in order to perform the synchronisation test on LFI the TC(9,4) and TC(9,5) have been sent "manually" in a sequence).

This inconsistency is under investigation.

IEGSE was connected to the CCS, the communication from the CCS to the EGSE went OK, however the line dropped after 1 mn because the I-EGSE did not respond to the connection request from the CCS. Problem to be fixed (normal work)

HFI request that an integration test between IEGSE and CCS including the HPSDB is performed before HFI instrument is delivered.

ASP to gives its position on the IEGSE – CCS test, possibly propose a date and agree on the configuration to be used.

SCE : a delay of ~2 months in the 1553 I/F testing activities has been announced; the new planned dates for this I/F test shall be confirmed as soon as possible by SCE.

ASP synthesis from the 1553 I/F tests performed up to now is presented in Annex 10.

**4- Instruments Boot SW**

All Planck instruments boot SW support a significant subset of the PS ICD services; contrarily to Herschel, periodic TM is generated. It was agreed that LFI, HFI and SCE will send to ASP a summary table listing the services supported by the Boot SW as well as the sub-addresses.

**5- Planck operations and FDIR status**

HFI (J.Charra) state that NO 4K+dilution cooler anomaly has been identified so far which requests a spacecraft reaction towards any of the instrument. Also it is underlined that there is no safety issue resulting from a 4K or dilution cooler failure.

It is also stated that there is NO safety issue resulting from a sorption cooler failure, the problem being only at the level of the science return. In order to minimise the occurrence of failures which can affect the control of the SCC, it is strongly recommended to pay careful attention to the SCE FMECA and

AI #13 ASP  
10/7/04





HERSCHEL/PLANCK

REF. : H-P-ASP-MN-5107

DATE : 17 & 18/6/2004 PAGE : 1 /11

**COMPTE RENDU DE REUNION / MINUTES OF MEETING**

LIEU / PLACE : *ASP Cannes*

associated internal FDIR. It is confirmed that in case of failure of one of the instruments (LFI, HFI or SCE) the CDMS is not required to inform the others.  
Nota : The possibility, and interest, of the use of the 2 SCE in parallel is still under investigation.

**AOB :**

Proposed date for next meeting : 20-21/10/04 :

Planck session : 20 morning

Common Session : 20 afternoon

Herschel session : 21 Morning



**ACTION ITEM LIST**

REF. : H-P-ASP-MN-5107


MEETING TITLE: DMWG 20

DATE : 17 & 18/6/2004

**HERSCHEL/PLANCK**

PAGE :

INITIATOR Firm / person	ACTION			DATE
	N°	DESCRIPTION	ACTIONEE Firm / person	DUE
ASP	1	Instruments shall state compliance with 1553 Bus test requirements and provide with associated test plan (AI from DMWG#17)	Herschel Instruments	20/12/04
ASP	2	Instruments shall define a Standby Mode and FDIR mode according to ASP note "Instruments Standby modes boundary conditions"	HIFI	20/9/04
ASP	3	To clarify the procedure to run in case no TC can be sent to PACS.	PACS	20/9/04
ASP	4	Instruments shall establish in details the expected spacecraft actions in case of communication anomalies	HIFI	20/9/04
All	5	ASP & ESA shall formally comment Herschel boot SW description (also possibly addressing the low level protocol implementation).	ESA + ASP	1/9/04
All	6	ESOC to detail the consequences of the proposed TM APID duplication on the database.	ESOC	1/9/04
SPIRE	7	To define the new APID's corresponding to the duplication of TM APID's	ASP	30/6/04
All	8	To propose a concept for routing TC to nominal/redundant unit including management at HPSDB level	ESA / ASP	20/9/04
ASP	9	Herschel instruments + SCE +ESA shall comment ASP proposal on TC PTD/TM PTC checks	ESA + PACS + SCE + SPIRE + HIFI	20/09/04
HFI	10	ESA/ASP to comment HFI test plan and compliance matrix	ESA /ASP	15/7/04
ASP	11	To provide a compliance matrix to AS4112 test plan	LFI + SCE	20/9/04
HFI	12	To comment HFI TN ref TS-PHBC-100006-LAL.	ASP	31/8/04

		<b>ACTION ITEM LIST</b>		REF. : H-P-ASP-MN-5107
		MEETING TITLE: DMWG 20		DATE : 17 & 18/6/2004
		<b>HERSCHEL/PLANCK</b>		PAGE :
HFI	13	To gives its position on the IEGSE – CCS test, possibly propose a date and agree on the configuration to be used.	ASP	16/7/04

---

## Annex 1

### **AGENDA DMWG #20 - Herschel Session (17/6 morning)**

- 1- DMWG19 Actions items 1, 2, 5, 12 review/closure**
- 2- Instruments status report from CAPTEC OBSW audit**
- 3- PACS 1553 I/F test debrief**
- 4- H Instruments boot SW characteristics**
- 5- IEGSE Integration**
- 6- AOB**

## ANNEX 2

AI 1 : Instruments shall state compliance with 1553 Bus test requirements and provide with associated test plan (AI from DMWG#17)

### PACS :

ASI/CGS/IFSI should be responsible for testing the 1553 Bus and provide a test plan.

--> No confirmation received yet.

### SPIRE :

ASI/CGS/IFSI should be responsible for testing the 1553 Bus and provide a test plan.

--> No confirmation received yet.

### LFI :

### SCE :

1553 bus compliance will be tested by subcontractors. We will ask them the tests plans and next provide them to Alcatel.

### HFI :

Refer to phba-dpu1553if-testplan-11r0.

**AI 2 : Instruments shall confirm their inputs for the On-Board device table have been properly reported..**

**PACS :**

DPU: Please note that DPU rejects any TC (6,2) which refers to PROM and EEPROM.

SPU: We checked the excel files and filled

- The memory IDs,
- The data/address bus size for PROM and EEPROM.
- Updated the size for SPU data RAM.

Concerning, the address and data bus sizes for the memory types, they are as follows according to the CRISA documents HW-SW ICD (FPL-IC-1214-01-CRS issue 8 page 12 and page 13):

- PM (PROM, EEPROM and PRAM): address bus is 24 bits wide, data bus is 48 bits wide
- DM (DRAM, Ext DRAM, DPRAM): address bus is 32 bits wide, data bus is 32 bits wide

I agree with Alain, such that the data memory are physically 40 bits wide (according to ADSP manual), but I would suggest to stick to the CRISA documents in the data memory size, such that we are only able to Most significant 32 bits for the data words. For the SPU the data memory size is 2 X 512 X 32 bits according to the CRISA document HW-SW ICD (FPL-IC-1214-01-CRS issue 14)

**DECMEC:**

First remark, this table is not compatible with what I wrote in the questionnaire (but I also made one mistake in the questionnaire).

Second remark, we should all have the same address/data bus because it is processor dependant and we all use the same processor. So, according to the 21020 manual:

Data memory: 32bits address 40bits data (note, we use only 32bits of data). Program memory: 24bits address 48bits data  
EEPROM = Program memory

For the size of data memory, for DMC, we should have 512k\*40bits instead of 512k\*32bits.

**SCE :**

On-Board device table is ok, except that TC(6,2) (Load Memory) shall not be used for 1553 and FPGA.

**LFI :**

**HIFI :**

**SPIRE :**

I have provided an email to Micha outlining my interpretation of the status of the information in the device table. The response to this indicates that OBSM is possible.

**AI 5 : Instruments shall define a Standby Mode and FDIR mode according to ASP note "Instruments Standby modes boundary conditions"**

**SPIRE**

For case 1 the instrument will be put into the PHOT\_STBY or SPEC\_STBY mode by command from the S/C  
These modes are defined in the attached Mode Configurations

For Case 2 The instrument will be put into the OFF mode

The FDIR procedure for getting to these modes is described in the attached FDIR document

**PACS :**

The modes for the two cases described in the subject document are:

CASE I : PACS SAFE Mode  
CASE II: PACS OFF Mode

**HIFI :**

**LFI :**

**HFI :**

Refer to TS-PHBC-100006-LAL from the 16/5/2004

**SCE :**

Case 1: Ready Mode  
Case 2: Switch off the two power lines.  
See FMECA document "Planck Sorption Cooler Electronics FMECA"  
from 11 march 2003 (ref: PA-PSCB-100006-ISN)



**AI 7 : ESA shall investigate how stop down-link TC impacts SW/HW pointers related to SSMM management.**

The findings presented in DMWG#19 are confirmed.

For completeness, I am repeating here my earlier text.

Note that my findings confirm what I already suspected: the command sequence 'start downlink' - 'abort downlink' - 'start downlink' will not result in a resume of the downlink at the point where it was stopped.

In addition, the BSW has currently no way to tell how much has already been transmitted when it receives an abort and as a result this information can also not be made available to ground in the real time telemetry.

#### The PKS pointers

For a given packet store, the Basic Software maintains the following pointers:

**a write pointer:** this pointer keeps the SSMM address where the next incoming TM packet will be written. It is updated on every write operation (which could contain more than one TM packet)

**a read pointer:** this pointer keeps the SSMM address of the first packet after the last downlink operation. For its behaviour, see below.

**a first valid packet pointer:** this pointer keeps the SSMM address of the first non-deleted packet. This pointer is used to detect whether the a packet store is full. This is the case when the write pointer hits the first valid packet pointer. The first valid packet pointer is moved forward either by command TC[15, 11] "Delete Packet Store Contents up to Specified Time" or automatically in case of circular buffer with over write.

**a end of last packet pointer:** this pointer keeps the SSMM address of the end of the last packet. It is needed because the packets will not completely fill a complete packet store. There is always a little gap at the end of the store which cannot contain a complete packet anymore. This gap will contain invalid data that shall not be downlink. The end of last packet pointer allows the software to skip this when transmitting a packet store to ground.

For the problem at hand, the read pointer is the most relevant.

#### The behaviour of the read pointer

The read pointer comes into play with the execution TC[15,7] "Downlink Packet Store Contents". Upon receipt of this command, the BSW calculates the start address and end address of the part of the packet store that needs to be downlinked.

The start address will be given by the read pointer. It points to the first packet that is not downlinked yet. The stop address will be given by the time that the BSW has received the TC[15, 7]. By means of the PSIT table (see next section) a corresponding end address is found. The start and end addresses are given to the SSMM firmware which will start transmitting the data.

Once the SSMM firmware has completed the transmission, the BSW will store the end address into the read pointer. This way a subsequent downlink request will start where the previous one has left off.

There could be reasons that the SSMM firmware does not complete the transmission, for example a SSMM hiccup, a ground abort command, or a computer reset. In this case, the BSW will not advance the read pointer and a next downlink command will start from old start pointing again.

The read pointer is maintained in software only. It bears no relation to how far the SSMM got in physically transmitting data.

Ground can intervene in this process by specifying the downlink window explicitly via TC[15, 9] "Specify Downlink Time Period". If this command is sent prior to a TC[15,7] "Downlink Packet Store Contents" the BSW will use the start and end address accordingly. Again, once the transmission has completed successfully, the software will update the read pointer.

For this intervention Ground will have to inspect the received packets to see what has been received already. From this, Ground can work out the parameters for the TC[15, 9].

### The PSIT table

The SSMM works based on memory addresses. The operational ground/spacecraft interface works based on time. The BSW maintains a mapping between time and SSMM address in the so-called Packet Store Index Table. Each packet store has such a table. It holds 4096 entries and entries connects a time stamp to an SSMM address.

Because the PSIT entries are ordered in time, the BSW can use this table to find a packet that matches a certain time criterion (a packet earlier than, a packet later than).

The granularity of the time entries varies. It depends on the size of the packet store. A packet store is divided into 4096 segments, and each entry corresponds to the first packet in such a "segment". The amount of packets vary in between segments because packets are not necessarily of same size.

**AI 11 : Instruments shall state whether they intend to use the tool offered by HFI and in case, state compliance w.r.t. the specified interface.**

**PACS :**

SPU comment, also valid for DPU and DECMEC

-----

Actual SPU HLSW could not fulfill the 1st requirement of proposed translator ( In Page 7, item 1).

- The actual SPU HLSW and SUSW are not using the standard Analog device runtime environment. For instance, SPU HLSW is using CRISA-IAC runtime header. This runtime header is not very different from the standard one. This was developed because, months ago, memory waitstates passed from 0 to 1 and again to 0. Therefore, it was mandatory to code a new runtime header for each waitstate configuration.

However, we can provide the runtime header source code and object file with the sources+executable.

- In Page 7, item 3, I do not understand why they do not use the Prom Splitter from Analog device (spl21k) to produce the EEPROM ASCII file.

Is there a reason to use the emulator for that purpose (DUMP from EZ-ICE).

**SPIRE :**

We do intend to use the HFI tool. IFSI have indicated that they can meet the interface.

**HIFI :**

**SCE :**

Yes, we intend to use tool offered by HFI.

**LFI :**

**AI 12 : Instruments shall establish in details the expected spacecraft actions in case of communication anomalies**

**SPIRE :**

The FDIR procedure for getting to these modes is described in the attached FDIR document

<<Mode Configurations.pdf>>  
<<PRJ001978\_SPIRE\_FDIR\_Draft\_2.pdf>>

**PACS :**

In case no TM is received from PACS for a TBD time interval ( $\geq 20$  sec), the PACS switch-off procedure has to be executed. In case no TCs can be sent to PACS, it is safe to leave it on until the next DTCP, however in some particular cases it may be expensive in terms of thermal input by the FPU during such a phase. An alternative is certainly to switch PACS off.

**HIFI :**

**LFI :**

**SCE :**

If no TM is received until a TBD time, our instrument shall be switched off.

If no TC can be sent to our instrument, it shall be switched off after confirmation (TBD procedure).

**HFI :**

Refer to TS-PHBC-100006-LAL from the 16/5/2004

# ANNEX 3

Subject: DPU-ICU Boot Software Services  
Date: Tue, 15 Jun 2004 16:19:49 +0200  
From: "Renato Orfei" <orfei@ifsi.rm.cnr.it>  
To: "PACS-PPO" <pac@mpg.de>, "Bauer, Otto" <OHB@mpg.de>  
CC: "Alessandro Ricciu" <aricciu@cgspace.it>,  
"Bertoli, Andrea" <abertoli@cgspace.it>,  
"Pizzi, Erina" <erina@ifsi.rm.cnr.it>,  
"Di\_Giorgio, Anna" <annadg@ifsi.rm.cnr.it>,  
"Molinari, Sergio" <molinari@ifsi.rm.cnr.it>,  
"Pezzuto, Stefano" <pezzuto@ifsi.rm.cnr.it>,  
"Dubbeldam, Luc" <L.Dubbeldam@sron.nl>,  
"Wafelbakker, Kees" <C.K.Wafelbakker@sron.nl>,  
"Feuchtgruber, Helmut" <fgb@mpg.de>,  
"Sidher, Sunil" <s.d.sidher@rl.ac.uk>, "King, Ken" <k.j.king@rl.ac.uk>,  
"Cerulli\_Irelli, Riccardo" <Riccardo.Cerulli@ifsi.rm.cnr.it>

Dear Otto,

following our phone conversation, I am sending you the requested information.

The Boot SW uses the following services:

1. Event Reporting

- (5,2) Test O.K.
- (5,4) Problem Found

2. Memory Management

- (6,2) Memory Load

3. Function Service

- (8,4) 3 Commands according to the Activity ID:
  - TC Load and Wait
  - TC Load and Boot
  - Force Boot

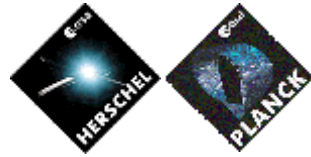
4. NOT IMPLEMENTED is Service 1 of PS-ICD for up-loading of the new SW image: TC Verification Service is as follows:

- If the received TC is O.K.: there is no acknowledge (1,1);
- If the received TC is rejected: the answer is Event (5,4).

Ciao,

-----

Renato Orfei  
Tel. +39 06 4993 4393  
Fax: +39 06 4993 4242  
<http://www.ifsi.rm.cnr.it>



---

## Annex 4

### AGENDA DMWG #20 - Common Session (17/6 afternoon)

- 1- Discussion and approval of DMWG terms of reference
- 2- DMWG19 Actions items 3, 4, 6, 7, 8, 10, 11, 13, 14 review/closure
- 3- OBSM environment development status
- 4- HGSSE and PGSSG working groups progress reports
- 5-1553 I/F tests
  - 5.1- Synthesis & lessons learnt
  - 5.2- next steps
- 6- AOB (HPSDB development status)

# ANNEX 5

**AI #3 : ASP shall reflect in HPSDB/SW ICD that function ID and Activity ID are to be merged in TC(8,4) and TM(8,6) (AI from DMWG#18).**

A Technical note « Generic Data Collection » H-P-1-ASP-TN-0543 has been produced and proposes a common frame to be used by all HPSDB users for generic TM data. In this document Function ID and Activity ID are merged, especially for TM(8,6). As far as TC are concerned (eg. TC(8,6)), a similar TN will be written. Note this does not concern instruments, which interface with the HPSDB with SCOS compatible MIB files.

**AI #6 : ASP shall propose a concept for routing TC to nominal/redundant unit including management at HPSDB level**

We propose as for TM (refer to ESA answer to AI#04) to define nominal and redundant TC differentiated by their APID.

By this way there is no more routing issue.

However this implementation could result in some on board duplication :

- MTL (but it is proposed not to switch automatically from nominal to redundant),
- Event table,
- OBCP (as far as they do not support management of redundant APID as SCOS does),
- other ?

On ground side, there is no need of duplication as far as SCOS allows selection of nominal or redundant APID, and HPSDB supports the definition of the redundant APID (CCF\_RAPID) except in case of different calibration. In this last case the TC shall be duplicated and either both nominal and redundant are sent or a selection is done by the user.

However some points have still to be clarified :

- How SCOS manage the APID selection (it is not via MIB files, is it via configuration file, is it manual, ...)
- How CCS / TOPE manage the APID selection, via SCOS kernel or via dedicated facility ?
- How will the instrument bridge files be delivered :
  - Will they contain both nominal and redundant TC definition or only one definition (according to MIB ICD) ?
  - If only one definition is delivered how are delivered the different calibrations if any ?

It is pointed out that there are similar open points for the TM case (see answer to AI#4) :

- How will the instrument bridge files be delivered :
  - different packets and parameters for nominal and redundant chains ?
  - different packets for nominal and redundant chains but containing the same parameters (curve selection on APID : supported by HPSDB CCS not by SCOS : manual input to be performed ?),
  - only one definition (according to MIB ICD),
- If only one definition is delivered how are delivered the different calibrations if any ?



- Some manual manual modification shall be performed inside HPSDB to generate redundant packet and calibrations.

**AI #8 : Propose a definition for all checks to be involved in TFL on RT side (TM PTC, TC PTD)**

According to PS ICD, TM PTC and TC PTD have to be « evaluated » by the RT :

1-TC PTD  
Requirement :

4425-TFL- T

*The RT shall evaluate the TC Packet Transfer Descriptor after receiving of the next Subframe Sync, within one Subframe.*

TC PTD layout is :

1. Data word (Packet size)				2. Data word (Packet Control)		
( 3 Bit)	( 5 Bit)	( 3 Bit)	( 5 Bit)	( 6 Bit)	( 2 Bit)	( 8 Bit)
Reserved `000`	No. of messages for TC-next packet	Reserved `000`	No. of Data Words in the last message of the TC-packet	Reserved, set to `00 0000`	set to `01`	Packet Count

ASP proposal is to have the TC PTD « accepted » if :

- forced bits are correctly set ; TC PTD shall be « 000x xxxx 000x xxxx 0000 0001 xxxx xxxx »  
AND
- TC packet count field is different from previous TC packet count field (as specified in PS ICD)

As per PS ICD, in case the TC PTD is not accepted, the TC PTC shall not be set.

2- TM PTC  
Requirement :

4625-TFL- D

*The RT, which has requested a TM packet transfer, must be able to determine, if the packet transfer was performed and the next packet data can be loaded to the message buffers. After a successful packet transfer the BC sends a handshake signal to the sending RT (TM Packet Confirmation). This handshake informs the RT which packet was the last one transmitted, by returning a modification of the Packet Transfer Request including the last Packet Count value and a transfer status.*

TM PTC layout is :

1. Data word (Packet size)				2. Data word (Packet Control)					
( 3 Bit)	( 5 Bit)	( 3 Bit)	( 5 Bit)	( 1 Bit)	( 1 Bit)	( 1 Bit)	( 2 Bit)	( 3 Bit)	( 8 Bit)
Re-served `000`	No. of messages of the last TM packet	Re-served `000`	No. of Data Words in the last message of the last packet	Re-served `0`	Re-served `0`	Burst Mode	Flow control	Re-served `000`	Packet Count

ASP proposal is to have the TM PTC « accepted » if :

- reserved bits and flow control bits are correctly set ; TC PTD shall be « 000x xxxx 000x xxxx 00x1 1000 xxxx xxxx » AND
- packet count is consistent with a TM PTR packet count (as specified in PS ICD)

As per PS ICD, in case the TM PTC is not accepted, the TM PTR shall not be updated.

**AI #13 : ASP shall assess the present baseline TC packet transmission FDIR (TFL) suitability (sufficient failure cases coverage).**

Reminders : the present FDIR, as far as TC distribution is concerned, aims to ensure the nominal execution of the Mission Timeline in case of a single failure in the TC distribution protocol.

2 1553 layers are involved in the TC packets distribution, and for each of them, a FDIR procedure is applied, based on a « retry » :

- **DLL** : the cases for which a DLL FDIR is started are when the RT transmission error bit or the RT no response timeout bit or the BC loop back test flag are set. f a DLL anomaly occurs. After the recovery is performed, the last TC is resent if not confirmed. In that case the TC PTD packet count is currently specified to be the same than for the first TC. Considering the level of the failure, this baseline is confirmed.
- **TFL** : the case for which a TFL FDIR for TC is started is when the check of the TC PTC by the BC after the specified time following the transmission of the TC packet to the RT, has failed. The failure criterion is TC PTC < > TC PTD. This can happen essentially if the TC PTD check by the RT has failed ; as a consequence the TC PTC is not set by the RT. The failure criteria are proposed hereabove as responses to AI#8 ; they are based on the analysis of the TC PTD « forced bits » and on the analysis of the TC PTD TC packet count field, which must be different from the packet count field of the TC PTD previously received. As part of the recovery procedure by the BC, the TC packet which has not been confirmed is resent once. The present specification states that the corresponding TC PTD packet count field shall be identical to the TC PTD of the first sending of the TC packet. It is recognized that this approach is NOT consistent, considering that it does not act on one of the rejection criteria recalled before, the packet count field value. As a consequence, the SOFDIR Appendix 1 requirement

**# Reference HP-SOFDIR-1553-REQ-0200**

*The packet count field in the TC PTD message word for the second attempt (retry) shall be the same than the packet count field of the TC PTD at the first attempt.*

is proposed to be changed into

# Reference **HP-SOFDIR-1553-REQ-0200**

The packet count field in the TC PTD message word for the second attempt (retry) shall be different from the packet count field of the TC PTD at the first attempt.

**AI#14 : ASP shall investigate and propose a solution to resolve the conflict in between instruments commanding from different sources (ground, MTL, ...) and recovery activities when based on OBCP's**

As specified, in SOFDIR, there is a priority mechanism between the different sources of telecommand on H/P. This priority order is :

High Priority Ground > FDIR > MTL > Low priority ground TC > SW functions > OBCP's ;

The OBCP's have thus the lowest priority level. The current baseline, matching the development constraints of the On Board SW and of the instruments, is to have the instruments FDIR implemented via OBCP. Consequently the distribution of these FDIR TC's by the OBCP could be significantly delayed until after commands from other sources have been executed. To overcome this situation, the instrument APID cannot be simply disabled because then the OBCP would not be capable to send command to the failed instrument too. This feature is known and agreed, and ASP position is NOT to change this baseline for the following reasons :

- the fact that the OBCP mechanism has to be reserved for non time critical activities has been presented, acknowledged and should be accounted for in the definition of the FDIR OBCP's
- current sizing cases show that in typical configuration, bandwidth for OBCP's execution and TC's distribution is guaranteed
- it is possible to have a start of the instrument FDIR OBCP with a FDIR priority ;
- it should be possible to construct the MTL and to operate the spacecraft in such a way that slots for commanding are periodically left free in the Bus profile.
- the OBCP has the capability eg. to first disable the subschedule in which the failed instrument is commanded.

Should these rationales be demonstrated to be not sufficient in some particular cases, the possibility to implement some instrument FDIR procedures via SW functions exists, and would be treated as a CDMU ASW Change.

# ANNEX 6

## Identification of Redundant Functional Units on-board the Herschel/ Planck Satellites, AI #4, DM WG #19

### Context

In the recent months it became apparent through the Data Management Working Group meetings that there is a problem identifying telemetry from the prime or redundant instrument chains and related individual TM/TC-parameters. Because there may be significant differences between the A- and the B-chains for the instruments (any on-board unit), it is mandatory to signal, from which chain a certain set of telemetry originated. The current design of the instrument SW and data-base seems not to take this into account and some adaptation is required.

In DMWG #19, ESA/ASP took the action item to make a proposal. This document contains our plan that is in line with the HFI suggestion to have different APIDs for the prime and the redundant unit.

### Using even and odd APIDs

The APID range, which is already allocated to an instrument, is further subdivided: the even APIDs are assigned to the main chain and the odd APIDs are used for the redundant chain. Requirement 1140-A3 in Appendix 3 of the PS-ICD will be modified. The resulting table is presented at the end of this document.

The change of APIDs only applies for TM. Telecommands towards an instrument will always carry an even APID.

The PS-ICD requirement 5020-TCV will be modified too. This requirement will state that *'the APID in the Packet Header of the TC Verification Report shall be the APID of the Application Process which generates the report for the Telecommand packet being acknowledged'*. Therefore, a TC towards a redundant chain will still carry the even APID but its resulting verification reports (TM[1, x]) will have the odd APID.

Note, that this is only valid for the APID of the header of the verification report packet itself. It also accounts for the fact that the CDMU can generate verification reports for TCs of other on-board units. As the verification report carries the header of the original TC inside the packet data field, this header will have to be an exact copy of the TC that triggered the report, including its APID. Only this way Ground can associate TM[1, x] packets with the correct TC packet.

### Rationale

The above-mentioned approach is our preferred solution because the following two important reasons:

1. It allows a clear identification of the source of all telemetry packets.

The identification problem extends beyond the scope of just applying the proper calibration curve to parameters in housekeeping packets. For all investigations on function, performance, or failure, of a certain unit, it must be possible to identify the involved HW and SW unambiguously, without referring back to a configuration history of that unit. In certain cases also the science data processing may need to know the originating unit.

In addition, it allows easy identification in real-time as well as in retrievals from the archive.

The option of identifying the currently active chain via a parameter, which appears only in a periodic HK packet, has a drawback: Because data streams are handled separately (HK versus science, recorded data versus real time), one would not be able to uniquely determine the telemetry based on a single stream.

2. It allows for a consistent and uniform approach with the least risks on side effects.

The APID is per definition the mechanism to discriminate between entities within the system. All components involved, ranging from on-board software to ground post processing systems, are aware of the field and its usage.

This is the decisive advantage compared to solutions that violate standardisation requirements by modifying existing header fields, for example by using a spare bit in the header. With the proposed solution, there is no risk that an intermediate/ external/ commercial/ re-used component handles a TM packet incorrectly. Furthermore, because the APID is a standard field, all the tools available in the ground systems are designed to handle it for displaying, filtering etc. This will not be the case for other workarounds that would necessitate changes to those tools.

### New APID allocation

The table in appendix 3 of the PSICD becomes as follows (note that only the instrument APIDs are shown):

APID		Assigned to:	
Decimal	Hex	TC packets	TM packets
1024	400h	All HIFI Telecommands	<b>For HIFI Prime</b> All TM packets <b>except</b> : - Non-Essential HK Parameter Report, - Diagnostic Parameter Report - Science Data Transfer TM-Packets
1025	401h		<b>For HIFI Redundant</b> All TM packets <b>except</b> : - Non-Essential HK Parameter Report, - Diagnostic Parameter Report - Science Data Transfer TM-Packets
1026	402h		<b>For HIFI Prime</b> - Non-Essential HK Parameter Report, - Diagnostic Parameter Report
1027	403h		<b>For HIFI Redundant</b> - Non-Essential HK Parameter Report, - Diagnostic Parameter Report
1028 and 1030	404h and 406h		<b>For HIFI Prime</b> - Science Data Transfer TM-Packets
1029 and 1031	405h and 407h		<b>For HIFI Redundant</b> - Science Data Transfer TM-Packets
1152	480h	All PACS Telecommands	<b>For PACS Prime</b> All TM packets <b>except</b> : - Non-Essential HK Parameter Report, - Diagnostic Parameter Report - Science Data Transfer TM-Packets
1153	481h		<b>For PACS Redundant</b>

			All TM packets <b>except</b> : - Non-Essential HK Parameter Report, - Diagnostic Parameter Report - Science Data Transfer TM-Packets
1154	482h		<b>For PACS Prime</b> - Non-Essential HK Parameter Report, - Diagnostic Parameter Report
1155	483h		<b>For PACS Redundant</b> - Non-Essential HK Parameter Report, - Diagnostic Parameter Report
1156 and 1158	484h and 486h		<b>For PACS Prime</b> - Science Data Transfer TM-Packets
1157 and 1159	485h and 487h		<b>For PACS Redundant</b> - Science Data Transfer TM-Packets
1280	500h	All SPIRE Telecommands	<b>For SPIRE Prime</b> All TM packets <b>except</b> : - Non-Essential HK Parameter Report, - Diagnostic Parameter Report - Science Data Transfer TM-Packets
1281	501h		<b>For SPIRE Redundant</b> All TM packets <b>except</b> : - Non-Essential HK Parameter Report, - Diagnostic Parameter Report - Science Data Transfer TM-Packets
1282	502h		<b>For SPIRE Prime</b> - Non-Essential HK Parameter Report, - Diagnostic Parameter Report
1283	503h		<b>For SPIRE Redundant</b> - Non-Essential HK Parameter Report, - Diagnostic Parameter Report
1284 and 1286	504h and 506h		<b>For SPIRE Prime</b> - Science Data Transfer TM-Packets
1285 and 1287	505h and 507h		<b>For SPIRE Redundant</b> - Science Data Transfer TM-Packets
1498	580h	All HFI Telecommands	<b>For HFI Prime</b> All TM packets <b>except</b> : - Non-Essential HK Parameter Report, - Diagnostic Parameter Report - Science Data Transfer TM-Packets
1409	581h		<b>For HFI Redundant</b> All TM packets <b>except</b> : - Non-Essential HK Parameter Report,

			- Diagnostic Parameter Report - Science Data Transfer TM-Packets
1410	582h		<b>For HFI Prime</b> - Non-Essential HK Parameter Report, - Diagnostic Parameter Report
1411	583h		<b>For HFI Redundant</b> - Non-Essential HK Parameter Report, - Diagnostic Parameter Report
1412 and 1414	584h and 586h		<b>For HFI Prime</b> - Science Data Transfer TM-Packets
1413 and 1415	585h and 587h		<b>For HFI Redundant</b> - Science Data Transfer TM-Packets
1536	600h	All LFI Telecommands	<b>For LFI Prime</b> All TM packets <b>except</b> : - Non-Essential HK Parameter Report, - Diagnostic Parameter Report - Science Data Transfer TM-Packets
1537	601h		<b>For LFI Redundant</b> All TM packets <b>except</b> : - Non-Essential HK Parameter Report, - Diagnostic Parameter Report - Science Data Transfer TM-Packets
1538	602h		<b>For LFI Prime</b> - Non-Essential HK Parameter Report, - Diagnostic Parameter Report
1539	603h		<b>For LFI Redundant</b> - Non-Essential HK Parameter Report, - Diagnostic Parameter Report
1540 and 1542	604h and 606h		<b>For LFI Prime</b> - Science Data Transfer TM-Packets
1541 and 1543	605h and 607h		<b>For LFI Redundant</b> - Science Data Transfer TM-Packets
1664	680h	All SCS Telecommands	<b>For SCS Prime</b> All TM packets <b>except</b> : - Non-Essential HK Parameter Report, - Diagnostic Parameter Report - Science Data Transfer TM-Packets
1665	681h		<b>For SCS Redundant</b> All TM packets <b>except</b> : - Non-Essential HK Parameter Report, - Diagnostic Parameter Report - Science Data Transfer TM-Packets

1666	682h		<b>For SCS Prime</b> – Non-Essential HK Parameter Report, - Diagnostic Parameter Report
1667	683h		<b>For SCS Redundant</b> – Non-Essential HK Parameter Report, - Diagnostic Parameter Report



# ANNEX 7

## HERSCHEL/PLANCK

### OBSM\_PI Infrastructure



G.Di Girolamo OPS-GDS HP MCS Data  
System Manager

R.Furnell OPS-OFM HP OBSM Manager

R.Furnell/G.Di Girolamo ESOC



15<sup>th</sup> Jun 2004

Issue 1 / Slide 1



# OBSM Infrastructure

Proposed OBSM infrastructure for remote PI Site installation

## ■ Pro's

- Removes problems of most platform dependencies.
- Leaves existing MCS S2K nominal to avoid interference with ongoing operations.
- Allows different database/MIB to be used as required I.e OBSM local DB only has to support required TC/TM services (6,18).

## ■ Con's

- Limits Event Log (EVT) generation, such that OBSM Events are only recorded on local EVT, not global MCS EVT.
- Requires a new machine to be sourced (e.g. P4 Intel, 2GHz+, 20Gb HD+, Network Card, 256MB Ram+, 1 to 3 Displays/Driver Card – Similar to MCS Machine)



R. Furnell / G. Di Girolamo / ESA

15<sup>th</sup> Jun 2004

Issue 1 / Slide 3

## Installation Detail

### ■ Tested/Supported Configurations

	<i>OBSM S2K Type</i>	<i>MCS Server S2K Type</i>	<i>To be Tested</i>
1	3.1 (SUN/Solaris 8)	2.3e (SUN/Solaris 2.6)	Yes
2	3.1 (SUN/Solaris 8)	3.1 (SUN/Solaris 8)	Yes
3	3.1 (Linux SUSE 8.2)	2.3e (Linux SUSE 7.3)	Yes (expected configuration)
4	3.1 (Linux SUSE 8.2)	3.1 (Linux SUSE 8.2)	Yes

(No mixed OS I.e. Linux OBSM <> Solaris MCS)

- In addition to HW requirements, remote users are expected to know relevant User/Root account details.
- ESOC will configure the new machine + Supply SW



15<sup>th</sup> Jun 2004

## Schedule

Version	Due Date	Contents	SPR submission turn-time
D0	9 <sup>th</sup> July	TM Processing TM Service 6 (including Checksum Reports) Image Import&Comparison	around 3 weeks time
D1	13 <sup>th</sup> August	SPR fix on D0 TC for Patch, Dump and Checksum	3 weeks
D2	5 <sup>th</sup> November	Tune-up of configuration files SPR fix on D1 (Device specs) OBCP support CDMU/ACC/STR Device configuration	7 weeks



*Science*



# *HCSS Development*



## **ANNEX 8**

### **HGSSE Report to DMWG#20**

**Micha Schmidt**

**for**

**Kevin Galloway**

**(Chairman of the HGSSE group)**



## Attitude Reconstruction

- **The HGSSE group has been actively pursuing the issue of star tracker performance verification.**
- **Gottlob Gienger (ESOC Flight Dynamics) was actioned to identify which information would be required in order to verify the star tracker performance.**
- **Based on this input the Herschel system engineers make the following recommendations:**
  1. Project to ensure that ACMS telemetry packets containing the information identified in AI#110304/11 can be generated, **upon request**, at the required frequency.
  2. The Herschel Flight Dynamics manager to allocate the necessary resources to allow verification of the star tracker during the commissioning/ performance verification phases.
  3. Flight Dynamics to perform a verification of the star tracker during the commissioning/ performance verification phases with the aim of informing the project scientist (PS) and the Herschel science team (HST) of the attitude reconstruction gains to be obtained by including the ACMS telemetry in the information downlinked during their scientific observations.
  4. Based on the Flight Dynamics analysis the PS and the HST to decide if they are willing to sacrifice instrument bandwidth to allow the ACMS information to be downlinked during observations



## Packet stores: cyclic versus linear

- The HGSSE group picked up on a discussion within the DMWG regarding the use of the SSMM in either cyclic or linear mode.
- It was thought by the system engineers that 2 unlikely events had to occur in order for the cyclic mode to be inadequate: a very long OD and a DTCP being missed.
- Based on this the Herschel system engineers make the following recommendations:
  1. Based on currently available information the loss of a DTCP will occur very infrequently. ESOC FCT should be allowed to proceed with the use of the packet store in cyclic mode.
  2. The scientific mission planning process (SMPS) should not have additional constraints placed on it in order to handle the unlikely event of a missed DTCP and a long OD. If the combination of a long OD and a missed DTCP happens often then there is a much larger operational problem; we are missing too many DTCPs. The combination of the two is a double fault where one of the two single faults is a very serious one. It is noted that the SMPS will have the necessary design to allow, if operational experience dictates, the incorporation of additional constraints.





## Instrument user manuals: delivery dates

The ICC members of the HGSSE group have provided the following delivery dates for their IUMs:

- HIFI will deliver a first draft of their IUM in the summer.
- PACS have to combine 4 documents into 1. This will be completed by September .  
Note: In HGSSE meeting#26 the PACS system engineer agreed to send the 4 separate documents to the ESOC simulator responsible (David Verrier).
- SPIRE will deliver a first draft of their IUM in September.



## HGSSE group activities over the next 12 months

- Finalising in-orbit phase interfaces in time for HSGS review (autumn 2004).
- Monitoring ILT and IST activities.
- Monitoring OBSM/ OBSW issues.
- HGS end-to-end test plan.
- Maintaining HGS documentation (DD, IRD, List of ICDs, ...).
- Continuing to address issues as they arise.

The HGSSE group is fully supportive of this way of reporting our activities.

# Summary of PGSSG Activity (1/4)

- Major issues from the previous PGSSG (#13) include:
  - ICD Status/Discussion
  - Establishment of ICWG
  - Splitting Dwell Times Over DTCP issue
  - SSO Data from JPL
  - Preparation for SGS Design Review

## PGSSG Activity (2/4)

- Required ICDs have undergone some modification during last PGSSG
  - some new ICDs identified (APPL Summary), some ICDs no longer required (PSF)
  - All ICDs needed as draft for SGS Review data package (draft means not just a template)
- Establishment of ICWG
  - 1st Meeting at ESTEC (23 June) to table issues, establish priorities, agree TORs, and finalise organisation (chair, etc.)

# PGSSG Activity (3/4)

- Splitting Dwell Times Over DTCP
  - PSO TN presented 4 options
    - (1) Random placement of DTCP within dwell; (2) Extend last pointing to continue after DTCP; (3) Distribute adjustment over whole schedule; (4) Reschedule DTCP for end of dwell
  - MOC preferred Option 3, and PGSSG concurred
    - Option 3 - Distribute adjustment over whole OD schedule to accommodate DTCP
- SSO Database
  - PSO liaised with Herschel regarding delivery of orbit data to JPL and receipt of SSO data for onforwarding to PSO:
    - HSC will provide SSO data to PSO for a predefined list of targets
    - DPCs can pull SSO information from JPL Horizons for (moving) target identification in science data
  - PSO TN being drafted to explain final details of this

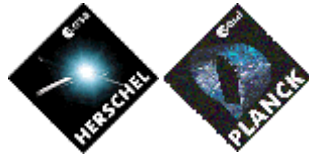
# PGSSG Activity (4/4)

- Preparation for SGS Design Review
  - Next PGSSG (#14, 24 June 2004) theme will be preparation for SGS Review (Nov 2004)
  - Major documents to be prepared/reviewed by group for inclusion in data package:
    - Interface Requirements Document (IRD)
    - Design Description (DD)
    - Mission Planning Concept (MCP)
    - Low-Level ICDs (approx. 50)

## Annex 9

### AGENDA DMWG #20 - Planck Session (18/6 morning)

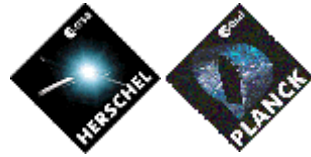
- 1- DMWG19 Actions items 1, 2, 5, 12 review/closure
- 2- Instruments status report from CAPTEC OBSW audit
- 3- LFI 1553 I/F test debrief/outcomes
- 4- P Instruments boot SW characteristics
- 5- Planck level operations and FDIR status
- 6- AOB



## ▼ Synthesis & lessons learnt

- communication has been established with all instruments without major issues
- test has been useful to evidence mistakes and specification flaws
- boot SW specificity has become clear
- overall, test environment (PLM EGSE + CCS) have been proved to be suitable for PLM testing offering in line/off line analysis capabilities
- However, some restrictions apply :
  - test set up was not fully representative from the PLM test conditions :
    - ★ No IEGSE in the loop for PACS and HFI tests
    - ★ tests have not been run with HPSDB
  - only one instrument was present





- ▼ Next planned test is with SCE in early september
- ▼ Further test sessions for the other instruments are not considered necessary by ASP (TBC for PACS)