SPIRE-ALC-MOM-001453

ALCATEL SPACE

REF. : HP-ASPI-MN. 2254

DATE : 5/11/2002 | PAGE : 1/8

COMPTE RENDU DE REUNION / *MINUTES OF MEETING* | LIEU / *PLACE* : CANNES

OBJET / *PURPOSE* : DATA HANDLING WORKING GROUP #13 | CLASSIFICATION :

PARTICIPANTS *ATTENDEES*	SOCIETE *FIRM*	SIGNATURE *SIGNATURE*	PARTICIPANTS *ATTENDEES*	SOCIETE *FIRM*	SIGNATURE *SIGNATURE*
P. COUZIN	ASP		GP. DRAGAN	ASP	
B. HIBBERD	ASP		F. de Bruin	ESA	
M. Feuchtgruber	MPE		P. Estaria	ESA	
dL Bèmey	LAL		J. Dodsworth	ESA	
J. CHARRA	IAS/HFI		S. Thürey	ESA	
L. DUBBELDAM	SRON/HIFI				
REDACTEUR / *WRITTEN BY* :					

CONCLUSION :

DISTRIBUTION :
PARTICIPANTS / *ATTENDEES*

POUR ACTION :
FOR FURTHER ACTION

POUR INFORMATION :
FOR INFORMATION

APPROUVE PAR / *APPROVED BY*

NOM / *NAME*	COUZIN			
SIGNATURE / *SIGNATURE*				

ACTION

AGENDA.

SEE ANNEX

ACTION ITEM REVIEW

FROM WG MEETING # 12.

AI 1, ASSES IMPACT OF LOSING 1 PACKET. - CAN BE COVERED BY THE RETRY MECHANISM REQUIREMENTS (AI 2 WAS TO UPDATE THE PSICD TO DESCRIBE THIS).

AI 3 EVENT TM COUNTER LOCATION - AI CLOSED.
PSICD WILL BE UPDATED TO MAKE THE LOCATION OF THE EVENT COUNTER (AS ALREADY IMPLEMENTED BY THE INSTRUMENTS) APPLICABLE TO ALL USERS.

AI 4 BASELINE BUS PROFILES - WILL BE CLOSED DURING THIS MEETING BY ASP PRESENTATION.

AI 5. RESOLVE TBDs IN PSICD. - STILL OPEN.

AI 6. START OF SLOW TIMING # COMMANDS - STILL OPEN.

AI 7 - CLOSED.

AI 8 - TO BE CLOSED DURING THIS MEETING

AI 10 - PACS CLOSED, ALL OTHER INSTRUMENTS OPEN.
HFI WILL ANSWER BY 15/1/2003
HIFI WILL ANSWER BY 15/11/2002.

AI 9 - CLOSED.

AI 11 - CLOSED FOR LFI, SPIRE HAVE NOT RESPONDED.

ACTION

ASP WILL REQUEST FROM INSTRUMENTS THAT DO NOT ATTEND THE WG MEETINGS A CONFIRMATION THAT THEY HAVE RECEIVED THE MOM.
Emails showing AI closure are attached in appendix ...

BUS PROFILE

SEE ANNEX, THE EXCEL SOURCE FILES WILL BE SENT BY EMAIL TO ALL PARTIES FOR COMMENTS.

ASP REMIND THE INSTRUMENTS THAT THE TM ALLOCATION AS GIVEN IN THE HP-1-ASPI-TN-204 IS INCLUSIVE OF ALL TMS.

IMPLEMENTATION PROGRESS & FINDINGS

PACS: ONBOARD S/W RUNNING, SOME PROBLEMS WITH INTERNAL PACS COMMUNICATIONS.
INTERFACE WITH 1553 & NOMINAL BUS LIST WORKS CORRECTLY
DATA RATES HAVE BEEN TESTED 70 to 80kb/s
SCIENCE (COMPRESSED & NONCOMPRESSED) TM HAS BEEN TESTED.
CDMS SIMULATOR STOPS OCCASIONALY FOR NO KNOWN REASON.
ALL SERVICES USED HAVE BEEN TESTED
Bus A - Bus B switch has been very preliminarily simulated.

ACTION

HFI - SEE PRESENTATION IN ANNEX.

HIFI - SINCE THE HIFI DPU IS THE SAME AS FOR PACS SO THE PACS TESTING IS ALSO APPLICABLE FOR HIFI.

INTRODUCTION TO PS ICD ISSUE 3.0. See Annex

Maximum useable length for MTL TC's is 228 bytes

TC Context report TM (1,9) are mandatory for CDMU and ACC, and optional for instruments.

TM packets limitations to 64 bytes are removed.

Memory Management:

Change of "start address" from 16 to 32 bits is rejected by instruments. Previous definition is kept; it is a workable solution for all on board memories but the SSMM. A specific TC for SSMM management shall be properly defined in the CDMU BSW specification.

OBCP service:

Segmentation for OBCP load shall only be

ACTION

made applicable to CDMU/ACC, not instruments, i.e. optional for instruments.

Service 22:
Deleted

Service 20: A11
Instruments to confirm that it can be deleted, or describe utilisation. INSTRUMENTS.

App. 1 :-
The RT shall copy the time message to SAST after reception. This requirement applies to the RT. The BC is not required to acquire the SAST content on a frame basis, only in conjunction with FDIR-activity.

Burst Mode:
PACS state that all types of TM can be transferred via the burst mode mechanism, when in burst mode. In that case no retry is possible, even for events, and this is accepted.

Instruments and industry will provide comments to issue 3 draft of the PS-ICD (which will be distributed before 12-11-02) before 25-11-02. A12 INSTRUMENTS ASP ESOC.

Time Synchronization:
see Annex

ACTION

CRITICAL / ESSENTIAL HK

- SEE ANNEX.

THE SUBSAMPLING OF THE SKPS IS ACCEPTED BY THE INSTRUMENTS (THE CDMU WILL ACQUIRE ALL DATA AND WILL DISCARD 9/10 PACKETS FOR INSTRUMENTS).

S/C INSTRUMENT FUNCTIONS

SEE ANNEX WHICH RAISES THE AI:

DEFINE THE ACTION SEQUENCE (ALGORITHMIC FORM) OR COMMIT UPON WHEN THIS DATA IS AVAILABLE IN ORDER THAT ASP CAN CODE THE SOFTWARE,

AI 3
31/12/2002
INSTRUMENTS

THE INSTRUMENTS ARE REQUESTED TO PROVIDE THE DETAIL SEQUENCE FOR TURNING THE INSTRUMENT OFF, AND FOR PUTTING THE INSTRUMENT IN STANDBY MODE, i.e. the sequences for which the CDMS needs to access the instruments.

AI 4
31/12/2002
INSTRUMENTS

ESA WILL DEFINE THE T.O.C. / TEMPLATE FOR A DOCUMENT WHERE THE INSTRUMENT SEQUENCES CAN BE DEFINED BY INSTRUMENTS. The intention is to have these documents annexed to each instrument IIDB's and managed by ASP.

AI 5.
26/11/2002

ACTION

A.O.B. : ESA CONFIRM THAT THE ON BOARD TRANSMITTER WILL BE TURNED OFF WHEN THERE IS NO DATA TRANSFER TO GROUND (DTCP)
(16:45:ST leaving)

THE NEXT MEETING IS PLANNED FOR THURSDAY 13TH FEBRUARY 2003 IN CANNES.

ALCATEL SPACE

ACTION ITEM LIST

REF. : H.P.DSP1.MN0054

MEETING TITLE: DATA HANDLING WORKING GROUP

DATE : 5/11/2002

HERSCHEL/PLANCK

PAGE : 8/8

INITIATOR Firm / person	ACTION N°	ACTION DESCRIPTION	ACTIONEE Firm / person	DATE DUE
ESA	1	INSTRUMENTS TO CONFIRM THAT SERVICE 20 CAN BE DELETED	INSTRUMENTS	
ESA	2	INSTRUMENTS / ESOC / ASP TO PROVIDE COMMENTS TO ISSUE 3	INSTRUMENT / ASP / ESOC	25-11-02.
		DRAFT OF THE PS-ICD		
ASP	3	DEFINE ACTION SEQUENCE OR DATE WHEN THIS IS AVAILABLE	INSTRUMENTS	31-12-02.
ASP	4	DEFINE ACTION SEQUENCE FOR INSTRUMENT SWITCH OFF AND	INSTRUMENTS	31-12-02.
		INSTRUMENT STANDBY		
ESA	5	ESA TO DEFINE A DOCUMENT TOC FOR INSTRUMENT	ESA	26-11-02
		SEQUENCES.		

AGENDA

1- DM WG12 Actions review/closure

2- Data Management activity status

- 2.1- Bus Profile
- 2.2- Implementation Progress and findings

3- Introduction to PS ICD Issue 3.0

4- Time Synchronization mechanisms

- 4.1- System Requirements
- 4.2- Current Implementation and Timing Budgets
- 4.3- Instruments Req. and detailed implementation/performance

5- Critical essential Instrument HK

6- Specification of S/C functions for instruments

7- System PDR main outcomes related to DM

8- AOB

DM Activity Status (1)

Bus Profile

- Established for each spacecraft
- proposed to be used as « representative case » for the validation of the data interface
- basic assumptions are
  - each frame is self consistent (a frame doesn ’t depends on the previous frame) except last point
  - in line with subframes allocations in TN H-P-1-ASPI-TN-0204
  - in line with PS ICD services and appendix 9 rules and requirements
  - TC acknowledge TM can be reported from one frame to the next one.

DM Activity Status (2)

Herschel Bus Profile

Subframe 1				Subframe 2				Subframe 3				ACC 1	Subframe
Slot	Activity	RT	Sub address	Slot	Activity	RT	Sub address	Slot	Activity	RT	Sub address		Slot
1	Sync without data word	broadcast	0R	1	Sync with data word	broadcast	0R	1	Sync with data word	broadcast	0R		1
2	RT status acquisition	ACC	1T	2	RT status acquisition	PCDU	1T	2					2
3	RT status acquisition	prime	1T	3	TC message	PCDU	28R	3					3
4	RT status acquisition	non prime 1	1T	4				4					4
5	TC packet 1 ACC MSB	ACC	11R	5	TM Message 1 acq.	PCDU	11T	5					5
6	TC packet 1 ACC	ACC	12R	6	TM Message 2	PCDU	12T	6					6
7	TC packet 1 ACC	ACC	13R	7	TM Message 3	PCDU	13T	7					7
8	TC packet 1 ACC LSB	ACC	14R	8	TM Message 4	PCDU	14T	8					8
9	TC packet 1 prime MSB	prime	11R	9	TM Message 5	PCDU	15T	9					9
10	TC packet 1 prime	prime	12R	10	TM Message 6	PCDU	16T	10					10
11	TC packet 1 prime	prime	13R	11	TM Message 7	PCDU	17T	11					11
12	TC packet 1 prime LSB	prime	14R	12	TM Message 8	PCDU	18T	12					12
13	TC packet 1 non prime 1 MSB	non prime 1	11R	13	TM Message 9	PCDU	19T	13					13
14	TC packet 1 non prime 1	non prime 1	12R	14	TM Message 10	PCDU	20T	14					14
15	TC packet 1 non prime 1	non prime 1	13R	15				15					15
16	TC packet 1 non prime 1 LSB	non prime 1	14R	16				16					16
17				17				17					17
18				18				18					18
19				19				19					19
20				20				20					20
21	TC Packet 1 ACC Transfert Descriptor	ACC	27R	21	TC Packet 1 ACC Transfert Confirmation	ACC	27T	21	ACC TM Packet Transfer Request (poll ACC)	ACC	10T		21
22	TC Packet 1 prime Transfert Descriptor	prime	27R	22	TC Packet 1 prime Transfert Confirmation	prime	27T	22	TM packet transfer confirmation	0	10R		22
23	TC Packet 1 non prime 1 Transfert Descriptor	non prime 1	27R	23	TC Packet 1 non prime 1 Transfert Confirmation	non prime 1	27T	23	TC message transfert Confirmation from PCDU	PCDU	28T		23
24				24				24					24

DM Activity Status (3)

Implementation progress and findings

INSTRUMENTS ...

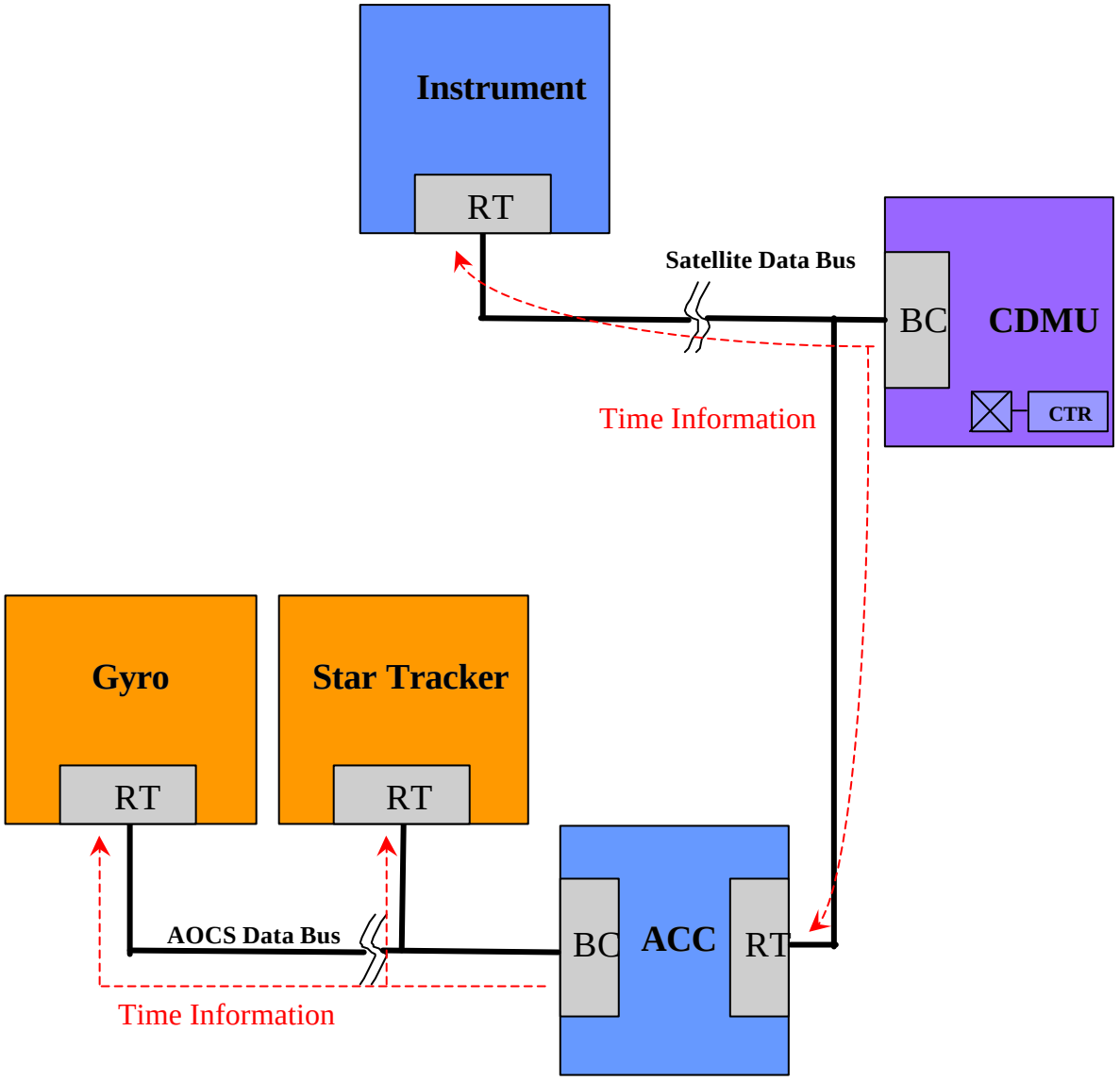
Time Synchronization (1)

BASED ON SYSTEM REQUIREMENTS :

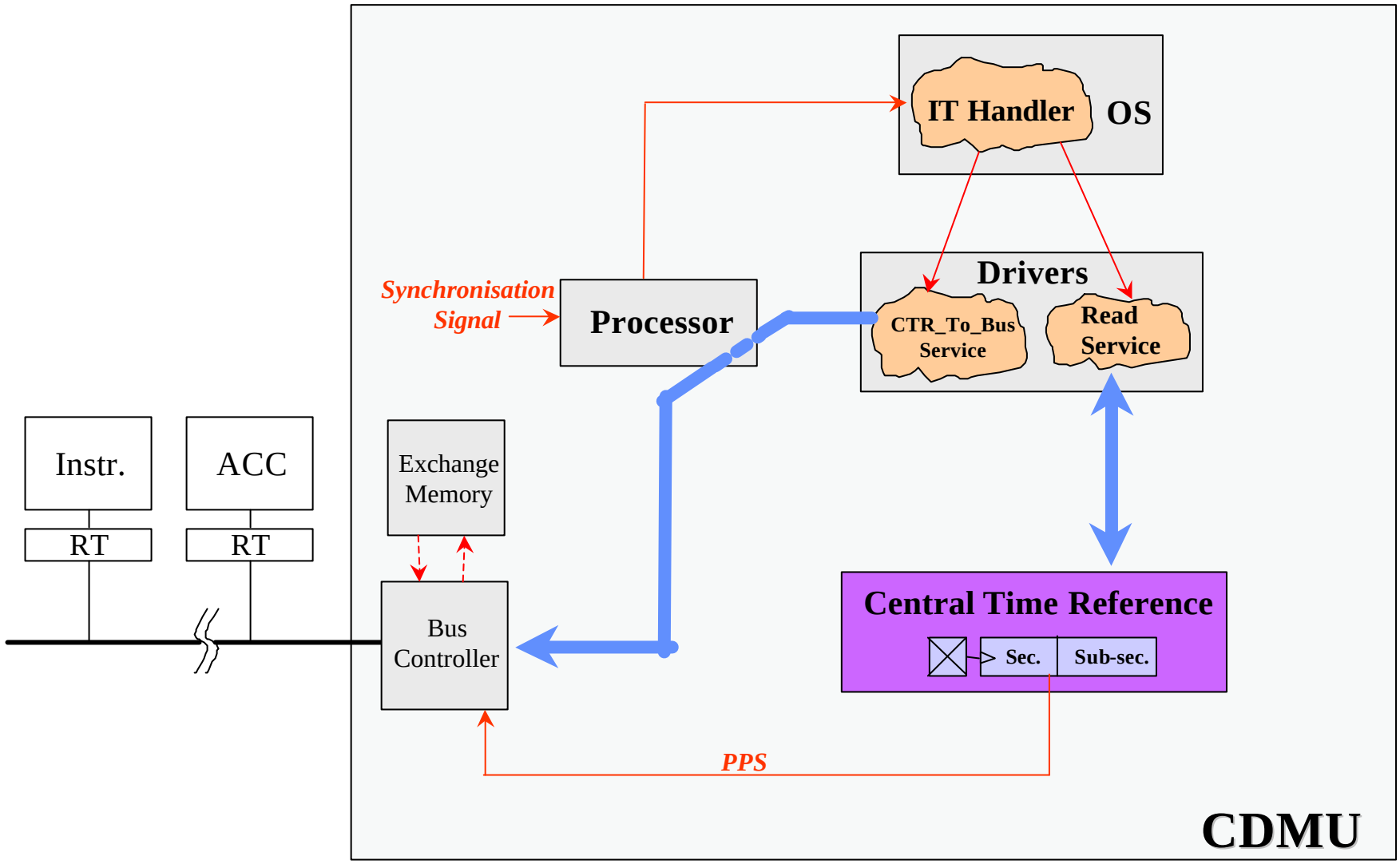
↳**SINT-075 H/P** : The time correlation between the attitude information and science data shall be better than 0.5 ms.

↳**SMCD-225 H/P** : The spacecraft shall deliver the timing information (time in TAI [Temps Atomique International] format) including synchronisation signals and clock to the instruments for datation of their information with an accuracy of 0.1 ms.

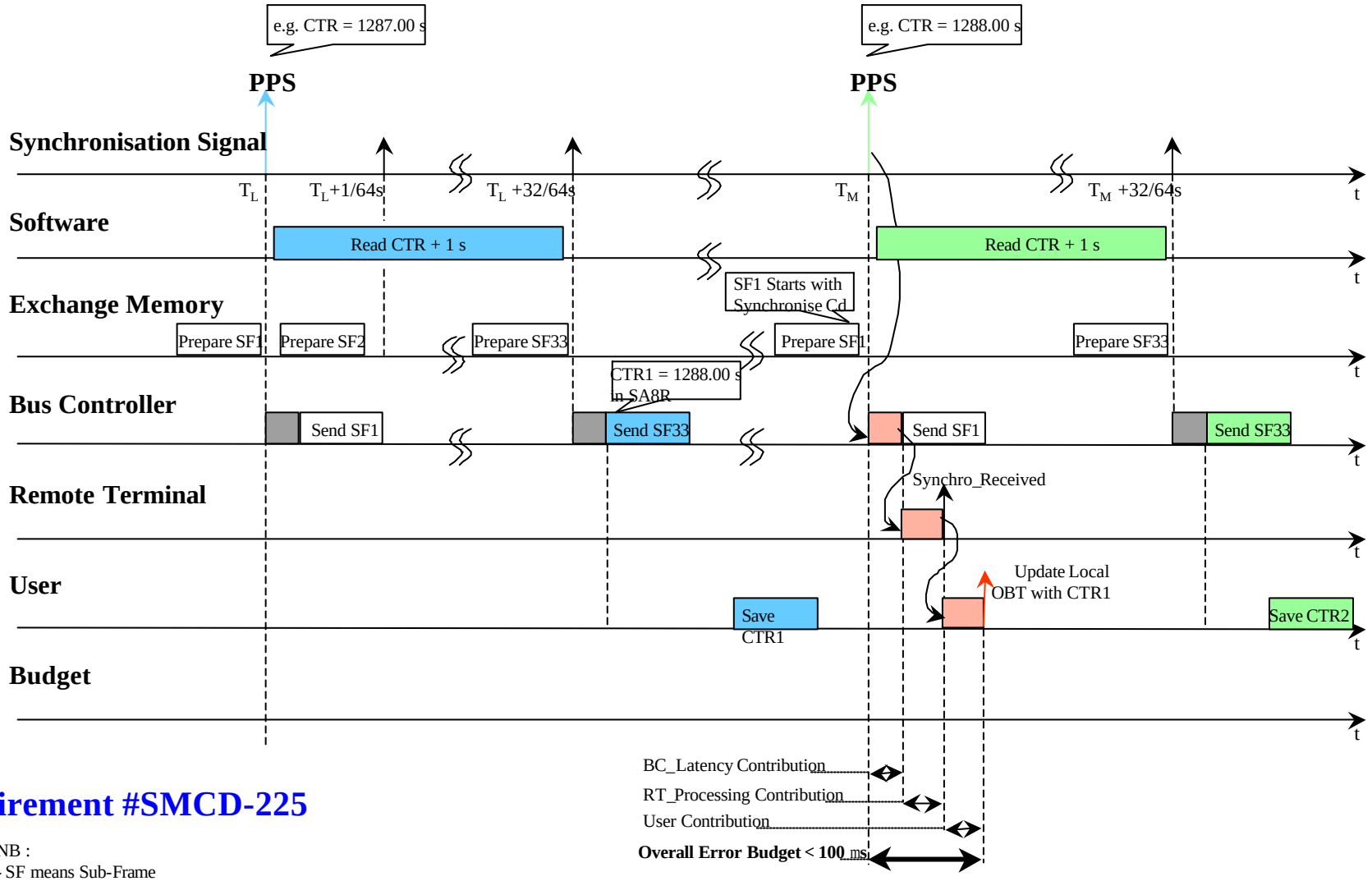
Time Synchronization (2)



Time Synchronization (3)



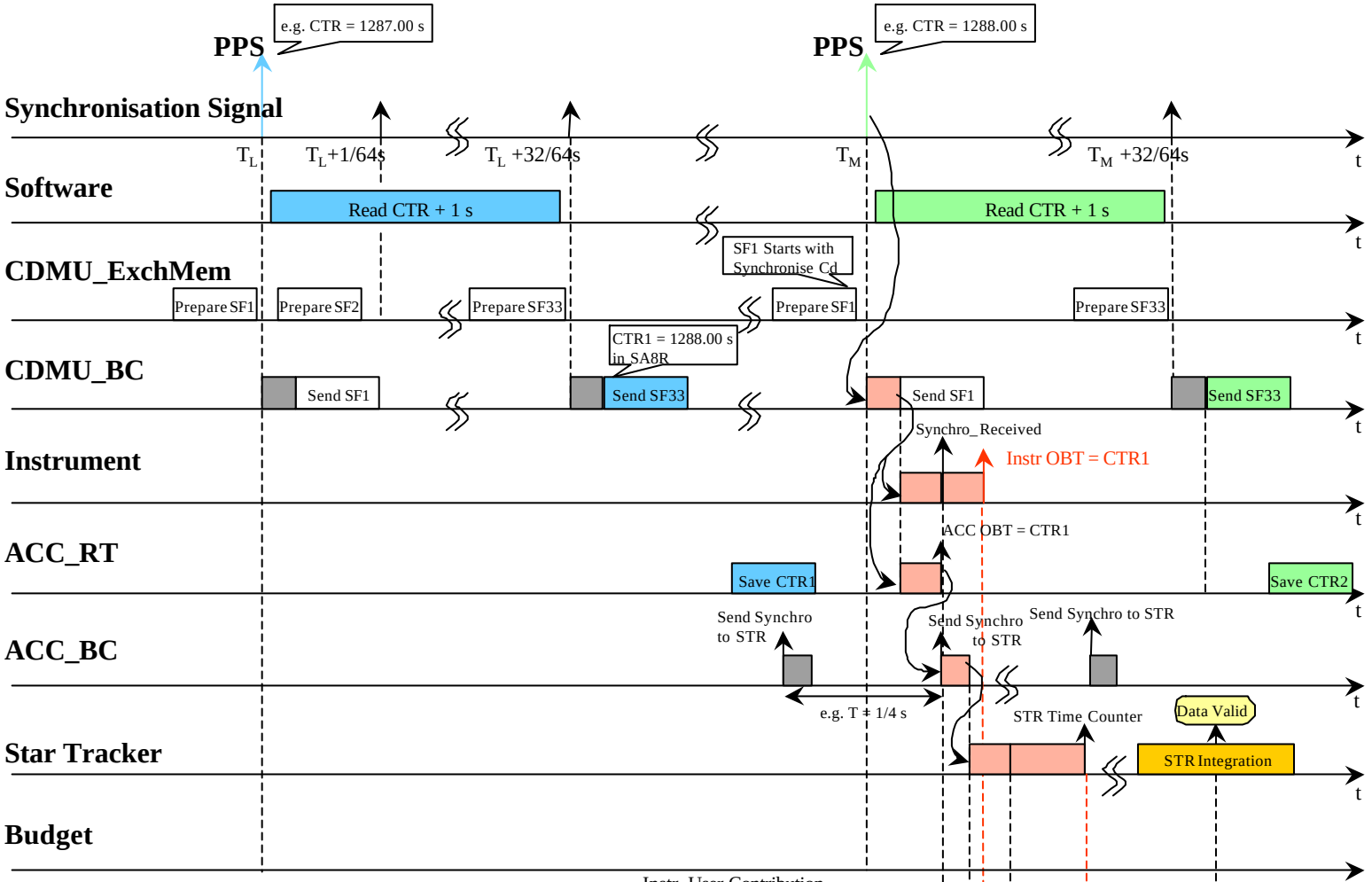
Time Synchronization (4)



Requirement #SMCD-225

NB :
- SF means Sub-Frame
- SA means Sub-Address
- Req. #SMCD-225 H/P : The spacecraft shall deliver the timing information (time in TAI [Temps Atomique International] format) including synchronisation signals and clock to the instruments for datation of their information with an accuracy of 0.1 ms.

Time Synchronization (5)



Requirement #SINT-075

NB :
- SF means Sub-Frame
- SA means Sub-Address
- Req. #SINT-075 H/P : The time correlation between the attitude information and science data shall be better than 0.5 ms.

Time Synchronization (6)

Location	Contribution	Timing error contribution		Remark
		Requirement (µs)	Performance (µs)	
CDMU	(1) **BC_Latency**	20	10 (TBC)	
Data Handling Bus	**Transmission**	-	-	Negligible
Instrument	(2) **RT_Processing**	40	30 (TBC)	
	(3) **User_Contribution**	20	10 (TBC)	Includes error contribution up to the Local OBT sync with the CTR
(4) **Margin**		20		
Time Error Budget vs #SMCD-225 (1)+(2)+(3)+(4)		**100**	**50 (TBC)**	

Requirement #SMCD-225 budget

Time Synchronization (7)

Location	Contribution	Timing error contribution		Remark
		Requirement (µs)	Performance (µs)	
ACC	(1) **BC_Latency**	20	10	
Star Tracker	(2) **RT_Processing**	40	30	
	(3) **User_Contribution**	100	TBD	
Instrument	(4) **User_Contribution**	400	TBD	The requirement value takes into account the worst case where (1), (2) & (3) would be null. It includes errors contributions up to the Science Data datation process.
	(5) **Margin**	100		
Time Error Budget vs #SINT-075 (|(1)+(2)+(3)-(4)-(5)|)		**340**	**TBD**	

Requirement #SINT-075 budget

Instruments detailed requirements and implementation

Critical/essential HK (1)

Context

- Only 5kbps downlink rate is available when on LGA (in survival mode) with New Norcia (500bps with Kourou)
- 5kbps are sufficient to download the real time spacecraft HK. The virtual Channel 0 is designated for that purpose.
- A need is expressed to have available a minimum of HK to assess the status of the instruments => 1kbps (among 5) is left available for this specific instrument HK.
- The allocation of the real time packets to a given virtual channel is done on a packet ID basis => to be routed to VC0, the specific instrument packets (« essential HK ») MUST have a specific ID.

Critical/essential HK (2)

➔Note that routine real time HK (instrument+S/C) is associated to VC4 with *priority_VC0 > priority_VC4 > priority_VC1*

- When on LGA with Kourou (500bps), the essential packets are transmitted at an average rate of 1 over 10 (if acceptable …)

Conclusion

- Instruments must define essential HK packets with a specific ID corresponding to an average rate of 330bps
- the content and size of this HK packet shall be defined by the instruments
- the instruments don't have to have the knowledge of the ground station under use.

beney <beney@lal.in2p3.fr> on 12/09/2002 21:30:59

Pour : Stefan.Thuerey@esa.int
Patrice.Couzin@space.alcatel.fr
Keithrobert Hibberd/ALCATEL-SPACE@ALCATEL-SPACE
cc : Luc Dubbeldam <L.Dubbeldam@sron.nl>
Astrid.Heske@esa.int
Frank.de.Bruin@esa.int
Frederick.Wechsler@esa.int
John.Dodsworth@esa.int
Pierre.Estaria@esa.int
fgr@iac.es
jhl@iac.es
charra@ias.u-psud.fr
stassi@isn.in2p3.fr
fgb@mpe.mpg.de
ohb@mpe.mpg.de
k.j.king@rl.ac.uk
butler@tesre.bo.cnr.it
eciancet@to.alespazio.it
FRAME@to.alespazio.it
cponzoni@webmail.laben.it
mmiccolis@webmail.laben.it
mansoux <mansoux@lal.in2p3.fr>
couchot <couchot@lal.in2p3.fr> (ccc : Patrice Couzin/ALCATEL-SPACE)
Objet : Data Management Working Group 12, AI close-out

```
Message reference: HFI/LAL/JLBy 02 - 001

Dear colleagues,

Please find the result of actions 1,3,6,8 and 9.

AI-1:
Losing one periodic TMP is not a big problem for HFI since the packets
are self-contained. It becomes tricky if it is an event packet TM(5,2)
which requires
spacecraft action (as FDIR).
In a first approach, one retry should be sufficient to solve the
problem. In all case, if
a FDIR is not activated due to the lost of the 2 TM(5,2). The HFI will
lost time but
will stay safe.
Conclusion: agree for the Alcatel's proposal.

AI-3:
TM(5,x) is not still well defined for HFI:
      Packet header     : 6 bytes
      Data field header : 10 bytes
      Event ID          : 2 bytes
      SID               : 2 bytes
      User code      : x bytes
      Counter           : 1 bytes

      In order to follow POIRD-TM18,  the counter could be defined as
PACS one:
      The two MSBit define the severity of the event according to the
```

following scheme:
01 = event (5,1)
10 = event (5,2)
11 = event (5,4)
The other bits are used as a sequential 14 bit counter. It means that 3 counters are
managed in the OBSW.

But let us note that the counter is usable only if a new event of same severity is
produced after the packet lost (which is not very likely; we will wait for next event
of same severity !).
In fact, i find more interesting to have a global counter for the 3 TM(5,x).
What do you think about it ?

AI-6:
It is well understood that start of slew and end of slew will be indicated respectively to S/C
and HFI with TC within the MTL.
We propose to foresee the following integrated sequence:
- at t1: execution of TC (start of slew for S/C)
- at t2: execution of TC (end of slew for HFI) with the T argument (period before next depointing)
with t2-t1 close to the damping period.
- at t3: execution of TC (start of slew for S/C)
- at t4: execution of TC (end of slew for HFI) with the T argument (period before next depointing)
with t3-t1 = t4-t2 = T
etc...
It means that we are going to define a HFI TC called "end of slew" with the T argument which indicates
the time before the next depointing.
Then, MOC shall ensure the coherence of the T argument with the time tags of "start of slew" and "end of
slew" TCs.

In all cases, HFI limits its own datarate to the allowed amount (75 kbit/s).
If no start of slew has been received, it limits its instantaneous data rate to 75 kbit/s.
If a start of slew has been received, it limits its averaged data rate on T to 75 kbit/s.

Please, make comments.

AI-8: FDIR management
The detailed activities which have to be carried out by the CDMU in case of HFI anomaly are described in HFI OBSW TS document and shall be integrated in IID-B and discussed with ESA/Alcatel.

FDIR over HFI belows to two types:
- autonomous (DPU recoveries the failure alone)
- non autonomous (DPU needs of CDMU help).

The FDIR could be defined thanks to On board Monitoring service if it allowed
to define the action (associated TM(5,2) for example) but it is not the case.
For autonomous FDIR, an action is executed by DPU and a TM(5,1 or 2) is sent

to inform CDMU.
For non-autonomous FDIR, an action is requested by DPU to CDMU through TM(5,2).
Conclusion: we can discuss of HFI FDIR as soon as possible. A fully configurable FDIR
procedure seems to me not possible with service 14. Please, make comments

AI-8bis: "Are you alive" packet with service 17
Instrument data rate and currents monitoring, DPU watch-dog and "Are you alive" packet
can be useful in order to detect if DPU has crashed.
But we cannot demonstrate that these 4 failure detection ways can detect all failures specially
with the use of Virtuoso RTK.
Conclusion: i am not sure that "Are you alive" packet improves significantly the failure detection
of HFI DPU. But since it requests a weak development, it could be interesting to have it as backup
solution.
Let us note that the data rate monitoring for failure detection shall be applied only on HSK packets
(Science packets may be stopped if data rate is too high but HFI is still in good health).

AI-9:
Although, it was planned to implement the "essential" HK packet (HSK3), we have internal
discussion about the LFI's proposition (change the download frequency of the main HSK packet).
Bob, Patrice, could you comment this solution ? Is it possible to download one packet each 10
seconds instead of each 1 seconds in order to reach the 330 bit/s ?

Best regards.
Jean-Luc.

Jean-Luc Béney
LABORATOIRE DE L'ACCÉLÉRATEUR LINÉAIRE
IN2P3-CNRS et Université PARIS-SUD
Centre Scientifique d'Orsay - Bât 200 - B.P. 34
91898 ORSAY Cedex (France)
Tél. : +33 1 64 46 84 53
Fax : +33 1 64 46 89 34
http://www.lal.in2p3.fr

"Luc Dubbeldam" <L.Dubbeldam@sron.nl> on 07/11/2002 09:56:41

Pour : John.Dodsworth@esa.int
bernard.collaudin@space.alcatel.fr
Felix.Chatte@space.alcatel.fr
patrice.couzin@space.alcatel.fr
cc : A.C.M.Snijders@sron.nl
C.J.T.Gunsing@sron.nl
C.K.Wafelbakker@sron.nl
H.Goulooze@sron.nl
H.J.M.Aarts@sron.nl
H.M.Jacobs@sron.nl
J.Veenendaal@sron.nl
M.A.A.Bonenkamp@sron.nl
W.van.Leeuwen@sron.nl
Th.de.Graauw@sron.rug.nl (ccc : Patrice Couzin/ALCATEL-SPACE)
Objet : Action item closeout DMwg 12-10: HIFI database

Dear All,

Attached the HIFI-database ASCII files.

Could someone inform me of the current proposal to solve to
Non-Conformance concerning the Curve numbering (i.e. H-P-ASPI-CR-0199).

Regards,
Luc

Luc Dubbeldam
SRON National Institute for Space Research
Sorbonnelaan 2
3584 CA Utrecht
Phone: 030-253 8582
Fax: 030- 254 0860

- HIFI_MIB_2002_11_07.tar

"Luc Dubbeldam" <L.Dubbeldam@sron.nl> on 11/07/2002 09:21:09

Pour : Patrice.Couzin@space.alcatel.fr
cc : A.C.M.Snijders@sron.nl
A.E.T.Jose@sron.nl
C.J.T.Gunsing@sron.nl
C.K.Wafelbakker@sron.nl
H.J.M.Aarts@sron.nl
J.Veenendaal@sron.nl
M.A.A.Bonenkamp@sron.nl (ccc : Patrice Couzin/ALCATEL-SPACE)
Objet : Data Management Working Group 12, AI 3 close-out

Question: Is the 10th word of a packet available for a Event-counter

The answer follows from PS-ICD and FIRST-FSC-DOC-0200,
(HCSS-instruments ICD)

The structure of an Event TM packet is defined as follows:

Header byte 0-5
datafield header byte 6-15
Event ID, SID, byte 16-19
OBS-ID BB-ID, 20-27

First location available for the counter is byte 28. (word #14)

Regards,
Luc

Luc Dubbeldam
SRON National Institute for Space Research
Sorbonnelaan 2
3584 CA Utrecht
Phone: 030-253 8582
Fax: 030- 254 0860

"Maurizio Miccolis" <mmiccolis@webmail.laben.it> on 10/07/2002 15:13:02

Pour : Patrice.Couzin@space.alcatel.fr
Stefan.Thuerey@esa.int
Keithrobert Hibberd/ALCATEL-SPACE@ALCATEL-SPACE
FRAME@to.alespazio.it
cc : jhl@iac.es
Javier.Marti.Canales@esa.int
Jean-Philippe.Chambelland@space.alcatel.fr
butler@tesre.bo.cnr.it (ccc : Patrice Couzin/ALCATEL-SPACE)
Objet : Re: Minutes of Data Management Working Group 12

Dear all,
first of all I apologize for having missed the meeting.

I'm reading the minute anyway and working on the new actions... but I noticed that all the actions from the previous meeting has been considered close.

Actually I closed LFI part of the action #3 of 11th DMWG concerning the usage of the PS-ICD by the instruments and I was waiting for comments. The closure for that, I suppose, was considered a telecon with only the instruments of Herschel. Could you confirm this?
Notice that in the list of the actions at the end of the minute, this action is addressed only to Herschel instruments whereas in the text it is addressed to both Herschel and Planck.

Concerning the action #4 of 11th DMWG I closed it sending LFI comments to the Alcatel proposal and an alternative one, but I never received any comment until this minute where there is another action (#9) to send other proposals... The proposal that I sent on 23/05/02 by mail is still valid for LFI. Do you (ESA/ASPI) have a due date to evaluate and comment the proposals?

Kind regards.
Maurizio

"Maurizio Miccolis" <mmiccolis@webmail.laben.it> on 30/07/2002 12:00:11

Pour : "Patrice Couzin" <patrice.couzin@space.alcatel.fr>
Stefan.Thuerey@esa.int
Keithrobert Hibberd/ALCATEL-SPACE@ALCATEL-SPACE
FRAME@to.alespazio.it
cc : butler@tesre.bo.cnr.it
jhl@iac.es
fgr@iac.es
eciancet@to.alespazio.it
"Javier Marti Canales" <javier.marti.canales@esa.int> (ccc : Patrice Couzin/ALCATEL-SPACE)
Objet : Re: AI from DMWG meeting #12

Dear all,
please find a contribution of LFI to the closure of the actions of the 12th DMWG.

AI #1:
Please find in annex a list of the TC (the same reported in the Communication ICD) foreseen for LFI with a proposed method for the verification of the execution of the command. The last column states whether the operations of the instrument can be recovered without damages in case the related command is lost.
Concerning the TM packets in principle there are no essential TM packets except those reporting an exception that requires a CDMS intervention.
It would be anyway fundamental to know what will be the failure rate of the communications. This in order to understand how many packets will be lost during the mission and whether a failure into an instrument, that generates an event packet, togheter with a failure on the bus, can be considered a very rare case of double failure.

AI #8:
Automatic actions required from LFI to the S/C will be a few.
One of them (signalled with a suitable TM(5,2)) will be the request for switching the RAA off
The possibility of asking a switch off also of the REBA by means of a LFI generated request is still under discussion.
The list of the conditions in which the CDMS should switch off the entire instrument will contain the absence of any TM packets for TBD seconds. Other conditions are still under discussion.

AI #9:
LFI proposal remains that contained in the mail that I've sent on 23/05/02 and here annexed.

The other actions in charge to LFI are still under internal discussion for the closure.

Kind regards.
Maurizio

 - Command verification.doc

---

From: "Maurizio Miccolis" <mmiccolis@webmail.laben.it>
To: <Keithrobert_Hibberd@vzmta01.netfr.alcatel.fr>, "Patrice Couzin" <Patrice.Couzin@space.alcatel.fr>
Cc: "Chris Butler" <butler@tesre.bo.cnr.it>, "Jose M. Herreros" <jhl@ll.iac.es>
Subject: Proposal for HK selection in case of use of LGA
Date: Thu, 23 May 2002 10:23:38 +0200
Content-Type: multipart/alternative;
boundary="----=_NextPart_000_005A_01C20243.E704C8B0"
MIME-Version: 1.0

Dear Patrice and Bob,

I try to close the relevant action (4) of last DMWG with a description of my understanding about the problem and a proposal that seems to make sense at least to me.

The use of the LGA is foreseen only in particular non-nominal cases during the mission. Some of these cases imply the switching off of the instruments because there could be a danger for the satellite. These cases are not interesting.
The relevant cases are those where the LGA is used but the instruments are still functioning nominally. This the situation should be completely transparent to the instruments otherwise they should be able to manage a satellite issue. In those particular cases the scientific data will be cumulated into the 48-hours-wide mass memory.
Some real time telemetry is anyway expected to check the health of the satellite during the ground contact, even if this RT telemetry amount is far less than that of nominal contact.
In order to mantain the transparency of the situation from the instrument point of view, the choice of the HK packets to be sent to ground as real time telemetry should be done by the S/C; the other packets are stored as usual.
The solution proposed by ASPI is that the instruments define one most important HK packet to be delivered to ground anyway that will be selected (only in those emergency cases) among the nominal stream of HK packets to be transmitted to ground.
Of course the emergency situation implys a strong limitation in the available bandwidth for these packets, in fact two scenarios are envisaged: one with an overall available TM rate of 5 kbps and another with only 0.5 kbps.
In the first case the proposed solution is to limit the bandwidth available for each instrument to about 330 bits per second that means that the selected packet alone shouldn't deliver more than 330 bps. In the second case the available bandwidth should be ten times lower that is 33 bps! In order to avoid the generation of such little packets ASPI proposes to sample the stream of selected packets once every 10 packets.

Now let's come to the LFI situation. We have already defined the HK packets and the selected one, the one that carries the most important information, delivers 1236 bits per second!
Since we don't want to redefine the packets (also because theirs implementation is already on going) why cannot we use the same mechanism proposed for the lowest telemetry rate case?
I mean that we can keep the HK stream as it is and simply ask to the CDMS to sample 1 out of 4 of those selected packets (that means once every 16 seconds) when the LGA is used with an overall bandwidth of 5 kbps. Of course this means also to sample only 1 out of 40 packets when the LGA works with only 500 bps available.
The reason for my request is that in my understanding the CDMS SW is still be to written and you have anyway to implement this function for the case where the LGA is used with an overall bandwidth of 0.5 kbps. From what I can see this would minimise the effort to achieve the compliance to the emergency situation.

Of course I remain available for further discussions.

Kind regards.
Maurizio

 - att2.htm

"Helmut Feuchtgruber HERSCHEL-PACS @ MPE" <fgb on 22/07/2002 10:22:31

Veuillez répondre à fgb@mpe.mpg.de

Pour : Patrice Couzin <patrice.couzin@space.alcatel.fr>
a.p.naber@sron.nl
Luc Dubbeldam <L.Dubbeldam@sron.nl>
charra@ias.u-psud.fr
butler@tesre.bo.cnr.it
beney@lal.in2p3.fr
Otto Bauer <OHB@mpe.mpg.de>
Renato Orfei <Renato.Orfei@ifsi.rm.cnr.it>
Ken King <k.j.king@rl.ac.uk>
jhl@iac.es
cponzoni@webmail.laben.it
Pierre.Estaria@esa.int
Astrid.Heske@esa.int
Frederick.Wechsler@esa.int
John.Dodsworth@esa.int
Stefan.Thuerey@esa.int
fgr@iac.es
D.J.Parker@rl.ac.uk
mmiccolis@webmail.laben.it
stassi@isn.in2p3.fr
Keithrobert Hibberd/ALCATEL-SPACE@ALCATEL-SPACE
FRAME@to.alespazio.it
eciancet@to.alespazio.it
Frank.de.Bruin@esa.int

cc : PACS PO <PACS@mpe.mpg.de>
Stefano Pezzuto <pezzuto@ifsi.rm.cnr.it>
Erich Wiezorrek <erw@mpe.mpg.de>
Milena Benedettini <Milena.Benedettini@ifsi.rm.cnr.it> (ccc : Patrice Couzin/ALCATEL-SPACE)

Objet : AI from DMWG meeting #12

Dear colleagues,

Please find attached the response of PACS to the action items of last
DMWG meeting and
one request for clarification.

AI -10 will be resolved in due time.

Best regards,
Helmut Feuchtgruber

PACS response to action items from DMWG meeting #12
==========

Before the response to the action items from last DMWG meeting, there is
the following question related to the PS-ICD which need clarification for
a proper implementation in the instrument OBSW:

- After the common and agreed decision to use the time synchronization
  according to PS-ICD Appendix 9, sec. 4.3, only TC(9,7) and TM(9,9)
  are implemented in the PACS OBSW out of the whole time management service.
  The question is now, which "time" the OBSW should report in TM(9,9) once

it receives a TC(9,7), the last received time value from CDMU or the next upcoming one?

We strongly suggest to choose between the following two options:

- Option a) to transmit the currently valid central reference time stamp as used by the instrument in TM(9,9)
- Option b) to transmit the current absolute time as calculated by the instrument from the received and stored central reference time stamp and the instrument internal clock.

Note, that due to the granularity of the MTL and other possible command jitter, it may not be possible to accurately predict the arrival time of TM(9,7) at the instrument, therefore the time reported in TM(9,9) may not be that useful after all (= option (b)). If option (a) is chosen, one can at least verify that the frame by frame synchonization between BC and RT works correctly. On top of this, we have in addition the time in the data field header of TM(9,9), which is by definition identical to option(b).

AI-1: The probability of loosing 1 TM packet appears rather low, but this assumption still needs confirmation in real operations. In general there will be no big impact on PACS if 1 TM packet is lost. The only case is if it is an event packet which requires on-board reactions TM(5,2). In case of an anomaly (ex. HK parameter OOL) such a transition would be reported only once and would not be visible to the CDMU if the packet is lost. There is no way in the PACS OBSW design that this case could be detected.
Since the problem is considered to have a very low probability one may consider a switch-off and switch-on of PACS in that case. Then such an event (if its cause still persists) would be reissued.

AI-3: The event counter in PACS event TM is located at the earliest possible word in the TM(5,x) packets

The begin of every TM(5,x) packet looks like:

```
Packet header     : 6 octets
Data field header : 10 octets
Event ID          : 2 octets
SID               : 2 octets
OBSID             : 4 octets
BBID              : 4 octets
Counter           : 16 bits
.....
.....
```

The counter is defined as follows:
The two MSb define the severity of the event according to the following scheme:
01 = event (5,1)
10 = event (5,2)
11 = event (5,4)
The other bits are used as a sequential 14 bit counter.

AI-8: The detailed activities which have to be carried out by the CDMU in case of PACS DPU detecting an anomaly are not yet known at this point in the development of the instrument, however the mechanisms for the interaction between PACS and CDMU can already be established:

- PACS will provide a list of TM(5,2) events and the related required

CDMU activities
- The number of such events will be <50
- There is no need for CDMU to look into other TM packets generated by PACS than TM(5,2).
- The type of activities which will be requested by CDMU as reaction to such events will be one or a combination of the following actions (a combination of these actions obviously can form OBCPs running in the CDMU):

  + disable and enable commanding PACS from the MTL (enabling TC to PACS from the MTL should be done only at observation boundaries, which means actually subschedule boundaries according to the last DMWG minutes)
  + send TCs to PACS (service 8 and service 18)
  + raise event for logging the activities (usually TM(5,1))
  + switch power on/off for DPU
  + switch power on/off for SPU
  + switch power on/off for DMC
  + switch power on/off for BOLC
  + wait for a certain amount of seconds

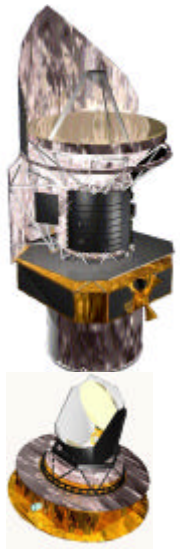
- Disabling the MTL and after some time, enabling it again is usually a non-critical operation for PACS, since the observations will be self-contained in terms of commanding. However in case PACS is to be switched from spectroscopy to photometry or the other way around while the MTL is in disabled state, PACS will not work until the right section of the instrument is activated, because the detector activation sequences are not part of the observations due to their long stabilization times.

  A possible solution could be, that the CDMU is capable of reading from the subschedule ID in the MTL which part of the PACS instrument is to be operated within that subschedule (either photometry or spectroscopy mode).
  So once the CDMU is about to re-activate PACS after a recovery exercise, it could look up first the earliest possible subschedule by when the activation would be finished, identify from that subschedule ID which mode is required and then activate PACS in the right mode.
  Of course this is just a suggestion, any other solution to this problem is welcome.

AI-9: PACS has implemented the "essential" HK packet in the following way:

- The packet contents is identical to the non-prime HK packet
- APID is 1155
- Type and subtype are: TM(3,26) (Note: all nominal HK packets have type and subtype TM(3,25))
- The generation frequency is once every 10 seconds

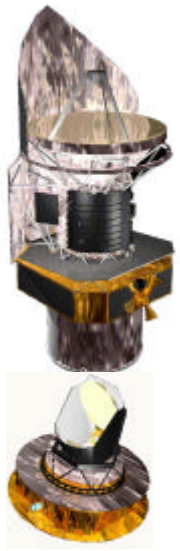
The present size of our non-prime HK packet is 374 bytes (=2992 bits), therefore the PACS data rate for essential HK packets is less than 300 bps. The knowledge on the required content for non-prime HK may still improve during the further development of the instrument, which may cause slight changes to the packet content, however we will make sure that 330 bps as upper limit for the data rate of essential HK packets will not be violated.



Herschel / Planck
Data Management Working Group

Meeting 13, 5-11-2002, ASP, Cannes

Stefan Thürey SCI-PTS



Packet Structure ICD, Issue 3: Modifications w.r.t. issue 2

- **Issue 3 of the PS-ICD will reflect the agreed changes and additions, which have accumulated since release of issue 2.**
- **In this presentation only the modifications with potential impact to instruments will be discussed.**
- **Changes related to function and performance of the CDMS and ACMS, and editorial modifications can be found in the draft of issue 3, which will be circulated for review and comments.**

Changes to PS-CD (1)

1. **Para.3.1.1.3, Packet Length for MTL-Telecommands:**

Encapsulated TC-packet within a TC(11,4) will be carried as 'Variable OctetString'. As the length of this field is always provided in a fixed position of its packet-header, no additional length-field is necessary, and therefore the useable maximum size is 228 octets.

2. **Para. 5.1.2.1, TC Failure report, TM(1,2):**

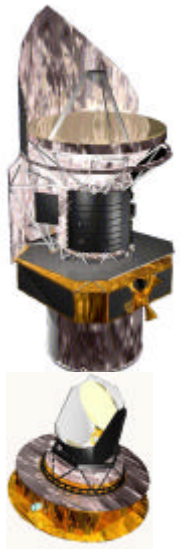
a) Error codes and parameters, layout of parameter-field:

The parameter-field shall be multiple of 16-bit-words, with a minimum of 4 octets. At least the parameter causing the rejection shall be reported in its original position in one of these octets. In case of header-error the complete header, in case of CRC the complete CRC shall be reported. (Already defined: the error code determines layout of the parameter-field).

b) Limitation to 64 octets is deleted.

3. **Para. 5.1.2.6, Telecommand Context Reports:**

The generation of Telecommand Context Reports is a mandatory service for CDMU and ACC. It is considered optional for commands generated or formatted and handled within instruments.



Changes to PS-CD (2)

4. Para. 5.3.1.1, HK Service: Definition of HK/Diagnostic-Packet Report, (3,1) and (3,2):

The parameter N will be split into two 1-octet-fields, which determine

a) the position of a Segment of parameters within the TM-packet,

b) the number of parameters within that Segment,

c) a specific Segment Count indicates the end/completeness of the Parameter-field.

d) After a completed (Re-)Definition a Confirmation of Execution (1,7) should be generated, or a TM(1,8) in case of a failure / timeout (TBC).

5. Para. 5.5, Event-Service:

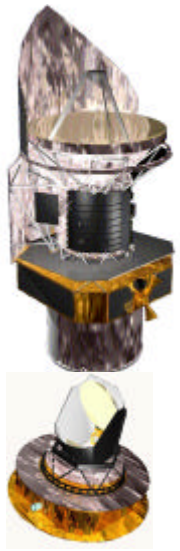
a) An Event-Counter will be introduced in data fields of TM(5,1)……(5,4), in order to be able to distinguish different instances of the same Event. The exact position is TBD, proposed is to place the Event-Counter directly behind the Event-ID.

b) Limitation to 64 octets is deleted.

6. Para. 5.6, Memory Management:

a) The definition of 'Start Address' is changed from Unsigned Integer, 16 bits, to Unsigned Integer, 32 bits.

b) In order to retain compatibility with the PUS the requirements on CRC-calculation for Dumps etc. remain unchanged.



Changes to PS-CD (3)

Para. 5.18, OBCP Service: Loading of OBCPs, (18,1):

The parameter N will be split into two 1-octet-fields, which determine:

a) the position of a Segment of the OBCP-code,

b) the number of octets within that Segment.

c) A specific Segment Count indicates the end/completeness of the OBCP.

d) After a completed (Re-)Load a Confirmation of Execution (1,7) should be generated, or a TM(1,8) in case of failure / timeout (TBC).

e) Loaded OBCPs can be dumped.

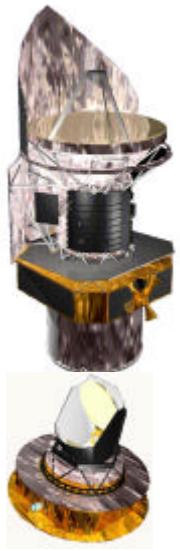
- **The Context-Saving Service 22 is deleted.**

- **Appendix 3, APID Assignment:**

  APIDs for Essential HK-packets are defined for all users, equal to 'Base-APID + 0'.

  (Normal HK-packets shall have 'Base-APID + 2'.)

  In App. 3 and para. 5.3 it is described that only HK-packets with these APIDs will be downlinked in all non-nominal modes of the spacecraft, if they stay below 1 kbps, average, for all instruments.



Changes to PS-CD (4)

- **Appendix 6, Parameter Types:**

  a) Introduced: "Enumerated, 32 bits" (PTC=2,PFC=32)

  b) Changed (PTC,PFC)=(5,2) to become (5,3), (5,2): unused.

  c) Introduced: "Variable Bitstring" data (PTC=6, PFC=0), and "Variable Octet String" data (PTC=7, PFC=0),used for example in service 6, 18, and 19 for loading/dumping larger 'blocks' of data.

- **Appendix 9, new requirement 4345-TFL:**

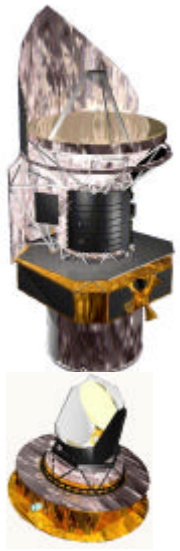
  The RT shall copy the Time Message to SA 8T immediately after reading it.

- **Appendix 9, para. 4.5.1:**

  Relevant definitions on handshake will be described with the same level of detail for TM and TC, for more clarity; among others: word-count=00000bin always means: 32 words.

- **Appendix 9, para's 4.5.2 and 4.6.2:**
  - **Name-change from "Asynchronous TC", "Event-TM-messages" to "High-Priority TM/TC-Messages"**

  b) These services are not used by instruments, and therefore n.a. for them.



Changes to PS-CD (5)

- **Appendix 9, para. 4.6.1.1:**
  Description of 'Flow Control' will be extended to spell out explicitly that the flag-bits and the Packet-Count-field shall be used/changed by the RT according to the status of a transfer.

- **Appendix 9, para. 4.6.1.3:**
  More detailed explanations are added for more clarity:

  Normal Data Bus Mode:

  a) one TM-transfer every other / second Subframe, maximum, for a specific RT,

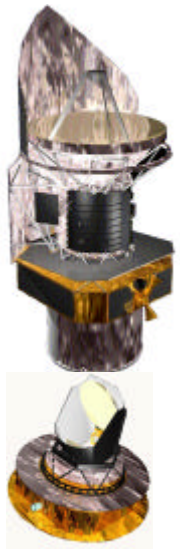
  b) full handshake for BC and RT,

  c) one retry in case the BC detects a transmission error.

  d) The TM-packet belonging to the failed transfer will be discarded (and reported as part of CDMU-FDIR).

  Burst DB Mode:

  - **Setup/initialisation by BC by changing the Data Bus Profile, no direct action needed by the RT. The RT waits for a TC to change its operational/data mode.**
  - **A TM-transfer may happen each subsequent Subframe,**
  - **The BC considers each transfer to be 'successful', i.e. no retry,**
  - **A RT can send interleaved non-burst-data by setting the Burst-flag to 0 for a certain TM-packet.**
  - **If the Burst-flag =0, the RT must wait for a positive TM-PTC before a buffer-update with new TM-data, because the BC acquires at least one TM-packet in Normal Data Bus Mode.**



Changes to PS-CD: Next Steps

- **Issue 3 draft x will be made available to instrument groups and industry for review and comments. Changes w.r.t. issue 2 will be highlighted.**
- **In parallel, the PS-ICD will be re-formatted in order to identify all requirements by individual requirement-numbers (this is already the case for Appendix 9).**
- **This document, with all final modifications incorporated, will be released before end-November.**

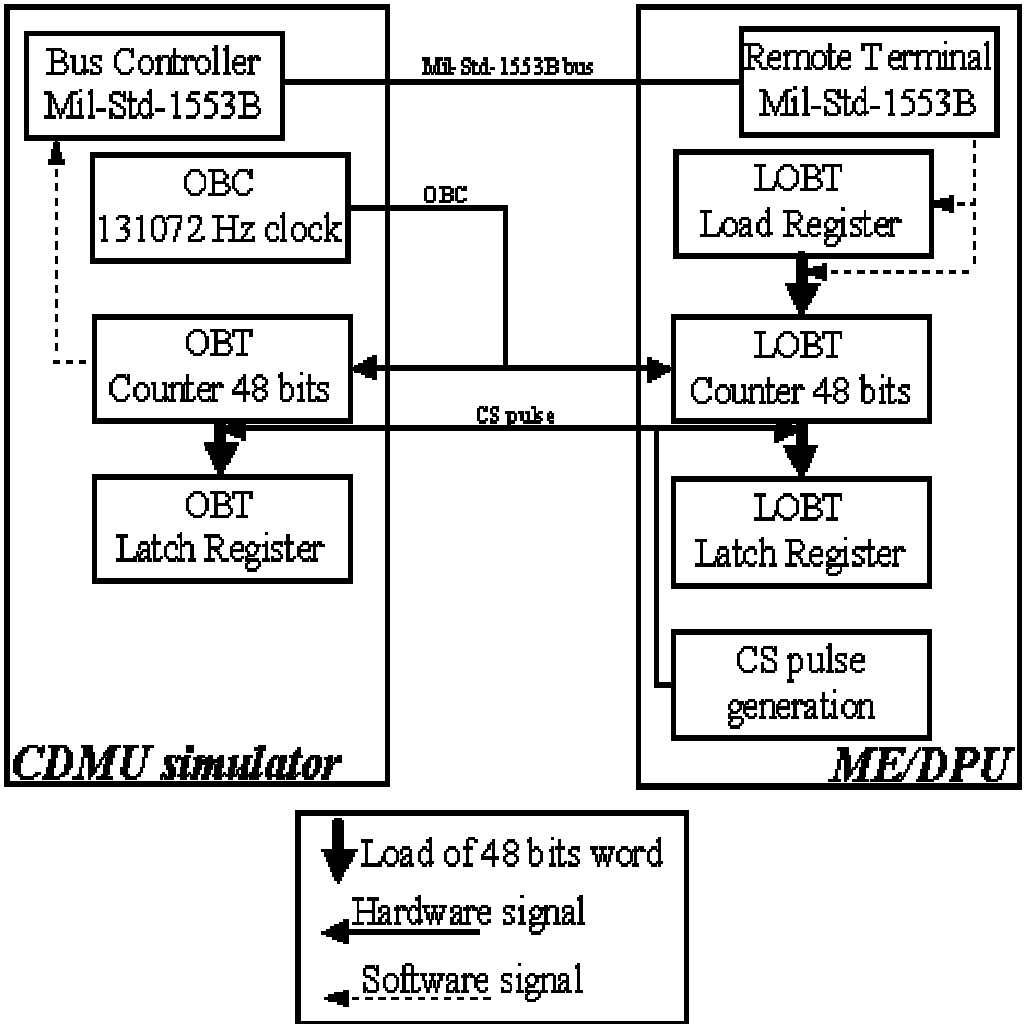
I/F implementation progress

- Tfl1553 v4
  - BC new features:
    - Subframe triggered by software timer before hardware timer implementation.
    - Make of the subframe n°i at the end of the subframe n°i-1: Maximum datarate between the BC and only one RT equal to 30 x 1024 octets.
    - Use of the TM request in slot 21 and TM confirmation in slot 22.
  - RT new features:
    - Time setting procedure implementation using the SDBP OBT sent in subframe 32 (direct action on LOBT registers).
    - Virtuoso semaphore integration (TC_SEM & TM_SEM).

I/F implementation progress

  - Status: tested
- OBSW v1r1 (use of Tfl1553 v4 (RT))
  - Status: fully tested
  - Next update: optimization of buffer management
- S/C simulator v3 (use of Tfl1553 v4 (BC))
  - New features: TC and TM storage
  - Status: fully tested
  - Next update: Subframe triggering by hardware timer and OBT-LOBT setting accuracy measurement.

Time management



- Time synchronisation
  - By software
  - With SDBP OBT in SF32
- Time verification
  - Thanks to Compression Slice pulse and OBT latch register
- Status: to be tested.