esa

MEETING

meeting date *date de la réunion*	06/10/04	ref./*réf.*	HERSCHEL-HSC-MOM-0457	page/*page*	1 / 49
meeting place *lieu de la réunion*	ESOC, Darmstadt	chairman *président*	K. Galloway		
minute's date *dates de minute*	28/10/04	participants *participants*	See Appendix 1		
subject/objet	**HGSSE #27 MoM : Issue 1.0**	copy/*copie*	See Appendix 1		

description/description	ction/action	lue date/date limite

KG welcomedeveryone to HGSSE meeting #27. KG explained that Ralph Biggins had taken over from David Patterson and thanked David for his efforts on behalf of the HGSSE group.

Apologies had been received from Sunil Sidher for not being able to attend HGSSE meeting #27. This was because of the ongoing SPIRE CQM testing campaign.

1. Comments on HGSSE#26 MoM and HGSSE#27 Agenda

There were no comments on the minutes of meeting #26.

See Appendix 2 for the HGSSE meeting #27 agenda. AH requested that the radiation monitor be discussed under AOB. It is recorded under agenda item 8 (iv) in these minutes.

The agenda was re-ordered to ensure that the more urgent issues were addressed first. However these minutes maintain the order of the original agenda.

2. Review of Actions

See Appendix 3 for the status of the HGSSE actions prior to the meeting.

See Appendix 4 for KG's action status presentation. The categories listed below correspond to the categories shown in this presentation.

See Appendix 5 for CW's presentation closing action item 090604/17 (category 3 below).

Category 1: SCOS/ MIB/ spacecraft database

AI#110304/12: ICCs to supply latest SCOS-2000 hardware. **Action CLOSED**. All ICC input received.

AI#110304/20: History of OOL/TCH interface. **Action CLOSED**.

KG repeated what he had said in the previous meeting, namely: it was essential that the telecommand id was included in the TCH information supplied to the HSC by MOC as this allowed the association of the downlink data ingested into the Herschel common science system (HCSS) with the uplink data created in the HCSS.

*****NEW ACTION ITEM: AI#061004/1:** KG to raise a RID on the MCS at the H/P ground segment review to ensure that the SCOS patches being used by the science ground segment (especially the OOL/ TCH patch) find their way into the standard SCOS system. Due date: 29/10/04.

AI#090604/10: HIFI timing error problem. **Action REDUNDANT**. This is no longer an issue.

Category 2: Solid state mass memory

AI#041203/13: Packet types not to be stored in SSMM. **Action CLOSED**.

AI#090604/1: FCT to flag any problems in the ICC's AI#041203/13 responses. Action remains **OPEN**.

Category 3: Sub-schedules/ mission timeline

AI#110304/30: HSGS system engineers to review MS's sub-schedules TN. HIFI, HSCDT and PACS have provided comments. SPIRE comments not yet received. Action remains **OPEN**.

There was discussion regarding whether the observations should be handled using permanent or transient sub-schedules. Eventually it was agreed that this was a MOC internal issues.

AI#090604/17: CW to investigate how often the mission timeline had to be suspended on other satellites (eg. Integral), and the causes. **Action CLOSED**. See Appendix 5 for CW's presentation addressing this issue. As no-one from the Herschel science ground segment (HSGS) had seen CWs input prior to the meeting it was decided that the HSGS would review the presentation and comment upon it

NEW ACTION ITEM: AI#061004/2: HSGS system engineers (BV, KG, PR, SS) to review CW's AI#090604/17 closure and provide comments. Due date: 03/02/05.

Category 4: Telemetry services to ICC@MOC

AI#090604/2: DP to flag any problems in the ICC AI#110304/1 responses. Action remains **OPEN**. David Patterson has been replaced by Ralph Biggins and he was not aware of this action. KG will forward the ICC AI#110304/1 closures to RB in order to allow him to close this action.

NEW ACTION ITEM: AI#061004/3: KG to provide RB with AI#110304/1 closures to enable him to address AI#090604/2. Due date: 08/10/04.

AI#010704/2 : PR/SS to supply their understanding of the analysis that was performed regarding the availability of consolidated telemetry. CLOSED.
AI#010704/3 : KG to reconstruct the history of the HGSSE discussions on the availablilty of consolidated telemetry. CLOSED.
AI#010704/4 : BV to distribute an e-mail to the HSGSSEs stating his concerns regarding the availability of consolidated telemetry. CLOSED
AI#010704/5 : KG, if necessary, to (1) include consolidated telemetry availablilty on the agenda of the next HGSSE meeting and (2) raise a RID at the MOC GSDR. REDUNDANT.

KG explained that as a result of MS's presentation at HGSSE meeting #26 the HSGS system engineers had discussed the availablity of consolidated telemetry to the HSGS in their last teleconference and had put the above 4 actions in place. The issue had been resolved following clarification by MS. KG thanked MS for the time he had spent on this.

The full issue was presented (for the record) under agenda item 6 (iii).

Category 5: Mission planning/ scheduling

AI#090604/3: AH to update the scheduling schemes document. **Action CLOSED**. AH released draft 0.4 of the document on 01/10/04.

AH: The document has been placed under Livelink and a link should be made to it from the HGSSE area of Livelink.

KG will do this as part of normal work.

The members of the HGSSE group can look at the document and provide comments as part of normal work. No actions necessary.

AH clarified that the document would go to issued status when the section of the document addressing the instrument scheduling schemes that best accommodate all constraints has been produced.

Category 6: Derived parameters

AI#110304/17: Which type of derived parameters will be used by the ICCs. **Action CLOSED**.

Category 7: Attitude/ star tracker/ instrument alignment

AI#110304/24: PACS to supply instrument alignment data. **Action CLOSED**.

GG asked BV if he could summarize the outcome of the action. This he did. There is no great urgency for the instrument alignment matrices and it was agreed to revisit this issue at the next HGSSE meeting in order to discuss the current status.

AI#090604/4: CW to report on the analysis of the reaction wheel power consumption and its impact on performing rasters. Action remains **OPEN**. KG mentioned that CW had requested more time to close this action. **New due date: 03/02/05.**

Category 8: HCSS

AI#090604/15: KG to raise an SCR on the CUS to allow delays of less than 1 second. **Action CLOSED**. It was not necessary to raise the SCR as a result of the solution proposed in AI#010704/1 (see category 11).

Category 9: Simulator/ IUM

AI#090604/12: BV agreed to send the 4 PACS documents which will be combined into the single PACS IUM to David Verrier. **Action CLOSED**.

BV mentioned that there were currently no advances in putting this docs into one.

Category 10: SPIRE core dumps

AI#090604/11: SS to reply to CW's questions on SPIRE core dumps. Action remains **OPEN**.

KG explained that he had spoken to SS about this. SS had said that they had discussed this within the SPIRE team but had not managed to reach a decision. KG will get SS to contact CW.

Category 11: Interfaces

AI#110304/16: Time correlation during the IST phase. **Action CLOSED**. There are no time correlation activities performed during the IST mission phase which correspond to the MOC time correlation activities during the in-orbit phases.

AI#090604/7 : KG to assess the Flight Dynamics proposal to simplify the POS/ SIAM interfaces. **Action CLOSED**. The simplified interface is accepted.

AI#090604/8 : AH/ LA to determine if there are Herschel pointing constraints for Jupiter and report to the next meeting. AH explained that she had spoken with Timo Prusti and stated that any constraints for Jupiter would be handled by the HSC. **Action CLOSED**.

LA explained that if it was a safety issue then it would need to be detailed in the system requirements specification document (SRS).

GG, who had originally raised the issue, expressed some concerns but agreed to contact Timo Prusti to discuss them further. Normal work.

AH agreed to check with the instrument teams to determine the impact of Jupiter on their instruments.

LA agreed to take bring the subject to Project if there was a need to update the SRS after AH findings [normal work].

*****NEW ACTION ITEM: AI#061004/4:** AH to check with the instrument teams to determine the impact of Jupiter on their instruments. Due date: 03/02/05.

AI#090604/13: KG to inform Jon Brumfitt that the POS needs to include a marker indicating where the timeline can be rejoined. **Action CLOSED**. There will be a marker in the POS.

AI#010704/1 : JBr/ KG to resolve the issue of preserving the order of command execution (either through finer time granularity or the order of the commands as specified in the POS being maintained). **Action CLOSED**. It was agreed that MOC would maintain the order of the telecommands in the POS.

AI#010704/6 : ICC system engineers (BV, PR, SS) to determine the required position and velocity for the predicted and reconstructed orbit data. Action remains **OPEN**. Only PACS had responded before the meeting.

Category 12: Documentation

AI#041203/12: Consistency of HGS documents with mission planning concepts document. **Action CLOSED**. David Patterson had provided inputs and these had been included in the design description document.

AI#110304/2: Clarify telemetry consolidation in HGS documentation. **Action OPEN**.

AI#110304/9: Clarify orbit determination performance requirements. **Action CLOSED**.

AI#110304/18: Clarify TBDs in the List of ICDs document. **Action OPEN**.

AI#110304/19: Update List of ICDs based on **AI#110304/18**. **Action OPEN**.

AI#110304/26: Update HGS documents to reflect use of FTS. **Action CLOSED**.

AI#090604/5: KG to update the HGS documentation regarding the status of the RTA events and TM parameters interface. **Action CLOSED**

AI#090604/6: KG to introduce the new interface to the HGS documentation: derived parameter definitions/ algorithms from the science ground segment to the MOC. **Action CLOSED.**

AI#090604/14: LA and GG to discuss Herschel PMIS limitations and to report back at the next meeting. **Action CLOSED**.

GG: New data package arrives, ACMS CDR [Gottlob to provide his comments]

AH: Having very limited access to Project and Industry documentation impacts the work of the HGSSE group, as has been already seen in various occasions.

Statement: Awaiting Gottlob's comments. *******

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3. HGSSE general

(i) SCOS 2000 issues

See Appendix 6 for KG's overview regarding SCOS 2000 issues

(a) MIB/ S/C database related issues

KG explained how the situation had deteriorated regarding the HPSDB and specifically bridge file deliveries to the HSGS but also stated it was a management issue, and not a system engineering issue, to resolve these schedule difficulties. These issues are being handled via the EGSE working group.

MS mentioned that there had been a specific splinter session addressing HPSDB issues during the H/P system level review so the problems were being recognised at the highest level.

(b) HPMCS deliveries and SCOS-versions

It has been agreed by the system engineers that all components of the Herschel ground system should attempt to use the same version of SCOS.

KG mentioned that the list showed that the MCS version would include the CCS patches but did not mention the HSGS patches and specifically the telecommand history patch. KG will raise the necessary RIDs. See also agenda item 2 category 1.

(c) Installing SCOS-2000 on new machines

KG explained how the HSGS had encountered difficulties installing the SCOS-2000 recommended Susie 7.3 on new PCs. The problems arose because the very old Suse 7.3 operating system does not recognise new hardware components.

EC said he had compiled a list of hardware components which work with Susie 7.3 and Susie 8 and agreed to distribute this list.

Action 061004/5: EC to distribute list of hardware components which work with Susie 7.3 and Susie 8. Due date: 15/10/04.

GdiG stated that he should be considered a SCOS user in the same way as the HSGS and that Serge Valera was the SCOS contact point for the HSGS. KG agreed to talk to Serge. Normal work.

(d) Telecommand id in the TCH records/ Logica patch

Already covered in part (b) discussion above. See also agenda item 2 category 1.

(ii) HGS interfaces

See appendix 7 for KG's HGS interface status presentation.

The following list details the discussion on each of the HGS interfaces. Note that only those relating to the in-orbit mission phase were discussed as the ILT/ IST mission phase interfaces are well documented.

1. **MIB format**: It was agreed that the interface is well defined but that it currently does not work. This statement relates to the problems industry are having (a) ingesting the instrument team MIB files into the HPSDB and (b) producing instrument bridge files. The responsibility is on Industry to resolve the difficulties.

2. **Telemetry**: No problems. However the documents defining the interface should be extended to include spacecraft subsystem documents.

Action 061004/6: KG to include relevant spacecraft subsystem telemetry description documents in the telemetry interface description. Due date: 03/02/05.

3. **OOL data**: Interface well defined for the ILT/ IST mission and will be the same for the in-orbit phase. The interface is described in a SCOS document. ESOC will provide the details with the closure of action item 110304/18.

4. **NRT telemetry interface**: Interface understood with presentations having been given on the ICC@MOC setup by ESOC at previous HGSSE meetings. The details of the relevant interface document(s) will be provided by ESOC with the closure of action item 110304/18.

5. **TC history**: Interface well defined for the ILT/ IST mission phases and should be the same for the in-orbit phase. The interface is described in a SCOS document. ESOC will provide the details with the closure of action item 110304/18. A major note is that the HSGS requires the necessary SCOS patch to be present in the MCS to allow the contents of the telecommand history files for the in-orbit phase to be the same as those in the ILT/ IST mission phases. KG stated he would raise a RID at the ground segment review on this issue.

Action 061004/7: KG to raise a RID on the MCS at the GS review to include relevant SCOS-2000 science ground segment patches (specifically those relating to telecommand history). Due date: 25/10/04.

6. **Instrument OBSW interchange format**: No discussion.

7. **HCSS – RTA telemetry interface** : Interface internal to the science ground segment. Interface will be the same as that used in ILT/ IST mission phases.

8. **RTA – HCSS interface** : Interface relates only to the ILT mission phase. KG needs to make this clearer in the List of ICDs document.

Action 061004/8: KG to clarify in the list of ICDs document that interface 8 (RTA – HCSS) applies only to the ILT mission phase. Due date: 03/02/05.

9. **HCSS OBSW interface** : It is unlikely that the OBSW will be stored as a BLOB in the HCSS but the interface remains until the details of the OBSM system (specifically relating to version control) are finalised.

10. **HCSS MIB interface** : This interface needs to be removed as MIBs/ bridge files will not be stored as BLOBs in the HCSS. This had been agreed in CSDT meeting #19:

http://www.rssd.esa.int/llink/livelink?func=ll&objId=354701&objAction=browse

Action 061004/9: KG to remove interface 10: MIB interface (MIB stored in HCSS as a BLOB) from the list of ICDs document. Due date: 03/02/05.

11. **EGSE-ILT to HCSS test control interface** : ILT/ IST interface.

12. **RTA events and TM parameters** : ILT/ IST interface.

13. **NRT TM interface (CCS – EGSE-IST)**: IST interface.

14. **EGSE-IST – CCS uplink interfaces**: IST interface.

15. **Time correlation**: The interface is well understood and there is an ESOC TN on the issue. The details of the relevant interface document(s) will be provided by ESOC with the closure of action item 110304/18.

16. **Derived parameters**: Transfer of derived parameters, generated at MOC, to the HCSS. The details of the relevant interface document(s) will be provided by ESOC with the closure of action item 110304/18.

17. **Planning skeleton**: Well defined. No discussion necessary.

18. **Schedule status information**: Procedural interface which will be captured via the MOC-HSC operational interactions interface.

19. **Commanding timeline summary**: The details of the relevant interface document(s) will be provided by ESOC with the closure of action item 110304/18.

20. **Spacecraft orbit data reconstituded**: Well defined. No discussion necessary.

21. **Spacecraft attitude history**: The overdue actions on Industry are preventing the definition of this interface.

22. **SSO databases**: Interface is well understood but the interface documents are still to be written. GG agreed that the HSC would be the single point distributor of ephemerides files, retrieved from the NASA Horizons system, for the Herschel ground segment. It was noted that it has additionally been agreed that the HSC will be responsible for retrieving ephemerides files for the PSO.

Action 061004/10: KG to update the HGS documentation to show that the HSC distribute ephemerides files to the other Herschel ground segment elements (specifically ESOC/FD). Due date: 03/02/05.

23. **DDS interface** : Interface understood with a presentation having been given at a previous HGSSE meetings. The details of the relevant interface document(s) will be provided by ESOC with the closure of action item 110304/18.

24. **Planned observation sequence** : Well defined. No discussion necessary.

25. Interface removed.

26. **Instrument apertures and pointing misalignment**: Well defined interface. GG explained that the ICD addresses 2 sets of matrices corresponding to the prime and redundant star tracker. KG mentioned that custodianship and requirements deriving from the handling of SSOs are still being discussed between the HSC and ESOC/FD.

27. **Spacecraft orbit predictor algorithm and data**: Well defined. No discussion necessary.

28. **Spacecraft attitude constraints algorithm and data**: Well defined. No discussion necessary.

29. **Spacecraft slew time and path predictor algorithm and data**: Well defined. No discussion necessary.

30. Interface removed:

31. **Attitude utilities**: Well defined. No discussion necessary.

32. **FTS interface** : Interface understood with a presentation having been given at a previous HGSSE meeting. The details of the relevant interface document(s) will be provided by ESOC with the closure of action item 110304/18.

33. **Derived parameter definitions** : Well defined. No discussion necessary.

Possible new interfaces:

- **Orbit file from MOC(FD) to NASA** : Orbit file to be available from the Horizons system. GG agreed that Flight Dynamics would support this interface.

Action 061004/11 : KG to update the HGS documentation to show the orbit file interface between Flight Dynamics and NASA. Due date: 03/02/05.

- **Herschel pointing properties file** : GG explained that this was a placeholder in the FD implementation analysis document. No action necessary.

- **TPF interface** : MS re-introduced (it had previously been presented at HGSSE#25:

http://www.rssd.esa.int/llink/livelink/Minutes_of_HGSSE_Meeting__25.pdf?func=doc.Fetch&nodeId=347302&docTitle=Minutes+of+HGSSE+Meeting+%2325)

the telecommand parameter file interface. It was accepted that this interface was necessary/ useful and it was clarified that in fact there were 2 interfaces:

- There is a generic TPF ICD specifying the format.
- There will have to be specific ICDs on specific uses of the command sequences.

Action 061004/12: KG to update the HGS documentation to show the TPF interfaces. Due date: 03/02/05.

(iii) DMWG report

See appendix 8 for MS's presentation on behalf on the DMWG chairman.

MS highlighted that the key issue was that instrument boot software is currently unacceptable from an operational perspective.

MS stated that the next DMWG meeting will be on the 20/21 October and an HGSSE status presentation is required.

Action 061004/13: KG to produce HGSSE report to the DMWG. Due date: 15/10/04.

(iv) HSGSSG report

See appendix 9 for KG's presentation on HSGSSG meeting #2.

KG stated that he had raised the AHF interface problem (overdue industry actions preventing the interface definition) to the attention of the steering group and that they in turn had drawn this to the attention of the project manager and principle investigators in the subsequent PM/PI meeting.

KG stated that it had also been emphasized that everything else was being handled as normal work.

4. ILT System design

(i) Current status of science ground segment

(a) HCSS [KG]

See Appendix 10 for KG's presentation on the HCSS status. The presentation is the presentation that Johannes Riedinger had presented to the Herschel science team on the previous day (05/10/04).

KG quickly ran through the slides. There was no discussion.

(b) HIFI ICC [PR]

PR presented the following summary:

Currently we are trying to get the HIFI Qualification Model integrated with the instrument EGSE at SRON. Various problems both in the instrument interfaces and in the EGSE interfaces lead to delays; firstly diagnosing such problems in an environment in which many components are integrated for the first time is not easy, and secondly correcting the problems is also not always straight forward. As a result we are now some two weeks behind schedule for the QM tests, which in a total period of about 7 week is quite significant. At the time of the HGSSE meeting the instrument had just been cooled to its operating temperature such that real testing could commence.

In the test setup HIFI has from the very start used all available Hershel ground segment functionalities; the HCSS archive function, the CUS to construct test procedures which are translated using the MIB and SCOS into TC packets for commanding, IA/QLA for data analysis etc. As such we are continuously exercising the HSGS components to be used in operations.

The hard deadline at the end of the QM test period is the QM delivery to Alcatel by mid November.
HIFI FM delivery is currently forseen for April 2006.

(c) PACS ICC [BV]

BV presented the following summary:

PACS CQM instrument level tests progressing well.
EGSE setup performing well.
All instrument commanding routinely done from S2K, most data analysis performed within the IA system.
CUS/ HCSS database population are not routinely in the loop.
Most prominent problems are a filter wheel which cannot be moved and ongoing problem identification/ solving on the warm electronics level (photoconductor readout control).

(d) SPIRE ICC

No input. The SPIRE system engineer was unable to attend the meeting.

5. IST

(i) CCS-EGSE interface status

See Appendix 11 for KG's status report on the CCS to EGSE/ HCSS interface.

The issues raised in these slides have all been addressed elsewhere in these minutes.

6. OPS

(i) MOC comms set-up

See Appendix 12 for MB's MOC communications set-up presentation.

MB desribed how ESOC were now starting to address the network communications issues between ESOC and the other ground segment components.

Action 061004/14: KG to provide name of the person addressing network/ communication issues for the HSC. Due date: 15/10/04.

(ii) H/P ground segment end-to-end (SOVT) test concept

See Appendix 13 for EC's end-to-end test concepts presentation.

EC stated he would like the names of points of contact for the HSGS. There was some discussion whether this should be just for the HSC (as the MOC only communicates operationally with the HSC) or should include ICC representatives.

This led to a lot of discussion regarding the scope of the end to end testing/ SOVT and who the contact people should be (operations people or system developers).

Key points from the discussion:

- GG: The tests are run in future time. It is necessary for the ground segment components to be able to deal with this.
- GdiG: The availability of the spacecraft is always the key issue. Many of the tests will have to be performed using simulators.
- MS: The capabilities of the instrument simulators are limited. They will generate instrument telemetry at the coorect time and frequency but they will not generate science telemetry packets containing realistic science data.
- GdiG: The HGSSE should strongly support long term tests. Typically short tests are performed which demonstrate that information/ data can be correctly passed across the interfaces but they do not demonstrate the the systems can cope with reallistic amounts of data. There was general support from all the system engineers.

GdiG provided the following additional clarification of the above point after the meeting:
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[There is a] need to ammend the SOVT Test Plan to add a final GS E2E Test away from last SVT, namely at L-4 month.

The duration of such test is tbd from 1 to 2 weeks and in this scenario the typical Routine Operation shall be validate d.

The reason why this as currently is in the plan is not sufficient (in my humble opinion) is the following:
- it is too close to SVT.
- it is strongly affected affected by S/C availability (and we know by experience that the S/C also during SVT is required to be taken away from MOC control for various activity to be done at end of each daily session).
- tendency to condense Routine Scenario during Simulation program.

The test I strongly envisage is a final Routine Validation to be executed (with S/C or Simulator) over a sufficiently long duration in a Routine Phase configuration 100% representative of the Operation scenario.

Proper place in the schedule for such a test shall in my opinion be accomodated.
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- GG/ MS: It is always necessary to be aware of the constraints on the end-to-end tests. To be aware of what is not being tested.
- GdiG and EC will discuss on-line tracking tools offline.
- It was agreed that the contents of the current end-to-end test plan would find their way into other documents and that the document would eventually become redundant.

http://www.rssd.esa.int/llink/livelink/fetch/-29587/29334/Heschel_Ground_Segment_End-to-End_test_plan.pdf?nodeid=58765&vernum=0

Action 061004/15: HSGS to provide names of the contact persons in the science ground segment addressing end-to-end testing issues. Due date: 03/02/05

Action 061004/16: EC/ MS/ KG to have teleconference to discuss scope and handling of end to end testing and to report back at the next HGSSE meeting. Due date: 03/02/05

(iii) Consolidated telemetry

See Appendix 14 for KG's consolidated telemetry presentation.

(a) Consolidated telemetry availability
KG thanked MS for his support in clarifying the availability of consolidated telemetry to the HSGS.

(b) HIFI science packets having the same time
KG explained the scenario where it was possible that the consolidation process could fail due to the HIFI science telemetry packets having the same time key.

It was clarified that the source sequence counter was different for these packets.

GdiG did not think it would be a problem as the primary key for sorting could be selected to resolve the issue. Ground received time or source sequence count were stated as possibilities.

KG said he would raisse a RID at the ground segment review to ensure this issue was formally recorded.

Action 061004/17: KG to raise a RID at the ground segment review addressing the issue of HIFI science packets having the same time key. Due date: 22/10/04.

(iv) Mission planning issues/ scheduling schemes

See Appendix 15 for KG's mission planning and scheduling schemes presentation.

(a) Scheduling schemes document
AH has updated the document. It is considered normal work to review this document. No formal actions

(b) Commissioning and PV phase activities
It was clarified that the information need to be in place in time for the end-to-end tests/ SOVTs.

AH: The commissioning phase is the responsibility of the Project, but not the PV phase, which is the HSC responsibility. Already reported by e-mail which information on the PV phase is currently available. The Herschel Calibration Steering Group will be the responsible to coordinate the instrument and cross-calibration PV plans in order to define the PV timeline but this will not happen until end 2005.

LA agreed to take an action to check within Project to see what plans/ information there currently were as commissioning phase activities were the responsibility of Project.

Action 061004/18: LA to check within Project to see what plans/ information there currently were for commissioning activities. Due date: 03/02/05.

(v) Sub-schedules

See agenda item 2 category 3. MS's sub-schedules TN has been commented upon by everyone except SPIRE.

(vi) Time correlation

Nothing to discuss.

(vii) Instrument simulators/ user manuals: status report

It was clarified that David Verrier is still the contact person and that GdiG should be copied on all correspondence.

(viii) Herschel orbit and attitude

Nothing to discuss.

(ix) Real time science window

See Appendix 16 for KG's real time science window presentation.

It was clarified after much discussion that the necessary structures are in place within the PSF and POS to satisfy the FCT concerns. The real-time science window HSGS will be indicated in the PSF and the POS will indicate whether the HSGS want to use this window.

(x) Reference mission scenario

MS had outstanding questions regarding HIFIs comments on the reference mission scenario documentation. The HIFI comments can be found in the minutes of the reference mission scenario teleconference #2:

http://www.rssd.esa.int/llink/livelink/fetch/-29587/314072/Reference_Mission_Scenario_Teleconference_MoM__2.pdf?nodeid=394471&vernum=0

Clarification was provided by PR however this clarification is not recorded here. MS and PR agreed to discuss any other points offline as part of normal work.

Key additional points arising out of the discussion were:

- As more information is now available AH will provide updated POSs for the reference mission scenario
- There are no mission planning performance requirements for the PV phase. The HSGS may need faster turnaround times the the 3 weeks for routine phase operations. The HSGS system engineers will discuss this in their teleconference and report back.
- The details of the SPIRE serendipity mode (expecially telemetry bandwidth) should be confirmed.

Action 061004/19: AH to provide updated POSs to the reference mission scenario group (MS). Due date: 29/10/04.

Action 061004/20: HSGS to address the mission planning lifecycle requirements and to report back at the next meeting. Due date: 03/02/05.

Action 061004/21: AH/ KG to check the details of the SPIRE serendipity mode and communicate these to MS. Due date: 03/02/05.

7. Other System activities

(i) HGSSE documentation status

See appendix 17 for KG's documentation status presentation.

KG quickly ran through the status of the various documents. There was no discussion.

8. AOB

(i) Date of next meeting

03/02/05 at ESOC.

(ii) ICC@MOC facilities

Covered by agenda item 6 (i). Internet access etc. is clarified in this presentation.

(iii) SGS specific items

See appendix 18 for KGs overview of the items under discussion.

(a) Time

Will be discussed in the next HSGS teleconference.

(b) SPIRE's use of the BbId.

Will be discussed in the next HSGS teleconference.

(iv) Radiation monitor

AH raised the issue of how to handle the radiation monitor data/ information. There was a great deal of discussion but it was finally agreed that the HSGS system engineers would discuss the subject in the next HSGS system engineers teleconference and report any possible impacts on operations to the FCT. In particular, the HSGS system engineers should specifically check whether the allocation of the telemetry

assigned to the radiation monitor in the current documents is enough for the data accumulation time that is advisable for operations (around 1 minute).

Action 061004/22: HSGS system engineers to discuss the radiation monitor and to report findings to the FCT. Due date: 03/02/05.

9. Actions open at the end of the meeting

Action Id.	Action text	Resp.	Due date
110304/2	KG/ MS to clarify the relevant parts of the HGSSE documentation (specifically the IRD) regarding telemetry consolidation	KG MS	09/06/04
110304/18	GdiG/ MS to supply names and current versions for the TBD in-orbit interface documents listed in the "HGS list of ICDs" document	GdiG MS	29/04/04
110304/19	KG to update "HGS list of ICDs" document with the results of AI#110304/18	KG	09/06/04
110304/30	HSGS (BV, KG, PR, SS) system engineers to review MS's sub-schedules TN	BV KG PR SS	06/10/04
090604/1	FCT to flag any problems in the ICC AI#041203/13 responses	CW DP MS	06/10/04
090604/2	DP to flag any problems in the ICC AI#110304/1 responses	RB	06/10/04
090604/4	CW to report on the analysis of the reaction wheel power consumption and its impact on performing rasters	CW	03/02/05
090604/11	SS to reply to CW's questions on SPIRE core dumps	SS	18/06/04
010704/6	ICC system engineers (BV, PR, SS) to determine the required position and velocity for the predicted and reconstructed orbit data.	BV PR SS	31/08/04
061004/1	KG to raise a RID on the MCS at the H/P ground segment review to ensure that the SCOS patc hes being used by the science ground segment (especially the OOL/TCH patch) find their way into the standard SCOS system.	KG	29/10/04
061004/2	HSGS system engineers (BV, KG, PR, SS) to review CW's AI#090604/17 closure and provide comments	BV KG PR SS	03/02/05
061004/3	KG to provide RB with AI#110304/1 closures to enable him to address AI#090604/2.	KG	08/10/04

061004/4	AH to check with the instrument teams to determine the impact of Jupiter on their instruments	AH	03/02/05
061004/5	EC to distribute list of hardware components which work with Suse 7.3 and Suse 8.	EC	15/10/04
061004/6	KG to include relevant spacecraft subsystem telemetry description documents in the telemetry interface description.	KG	03/02/05
061004/7	KG to raise a RID on the MCS at the GS review to include relevant SCOS-2000 science ground patches (specifically those relating to telecommand history).	KG	25/10/04
061004/8	KG to clarify in the list of ICDs document that interface 8 (RTA – HCSS) applies only in the ILT mission phase.	KG	03/02/05
061004/9	KG to remove interface 10: MIB interface (MIB stored in HCSS as a BLOB) from the list of ICDs document.	KG	03/02/05
061004/10	KG to update the HGS documentation to show that the HSC distribute ephemerides files to the other Herschel ground segment elements (specifically ESOC/FD).	KG	03/02/05
061004/11	KG to update the HGS documentation to show the orbit file interface between Flight Dynamics and NASA.	KG	03/02/05
061004/12	KG to update the HGS documentation to show the TPF interface.	KG	03/02/05
061004/13	KG to produce HGSSE report to the DMWG.	KG	15/10/04
061004/14	KG to provide name of the person addressing network/ communication issues for the HSC.	KG	15/10/04
061004/15	HSGS (AMH, KG, BV, PR, SS) to provide names of the contact persons in the science ground segment addressing end-to-end testing issues.	HSGS	03/02/05
061004/16	EC/ MS/ KG to have a teleconference to discuss scope and handling of end to end testing and to report back at the next HGSSE meeting.	EC MS KG	03/02/05
061004/17	KG to raise a RID at the ground segment review addressing the issue of HIFI science packets having the same time key.	KG	22/10/04
061004/18	LA to check within Project to see what plans/ information there currently were for commissioning activities.	LA	03/02/05
061004/19	AH to provide updated POSs to the reference mission scenario group (MS).	AH	29/10/04
061004/20	HSGS (AMH, KG, BV, PR, SS) to address the mission planning lifecycle requirements and to report back at the next meeting.	HSGS	03/02/05
061004/21	AH/ KG to check the details of the SPIRE serendipity mode and communicate these to MS.	AH KG	03/02/05
061004/22	HSGS system engineers (AMH, KG, BV, PR, SS) to discuss the radiation monitor and to report findings to the FCT.	HSGS	03/02/05

Appendix 1: Attendees and Distribution List

Attendees:

Luis Aloy (ESTEC-Project)
Ralph Biggins (ESOC- Flight Control Team)
Marco Butkovic (ESOC-Comms) [part-time]
Ed Chester (ESOC-Integration and Test) [part-time]
Kevin Galloway (ESTEC-HSCDT)
Gottlob Gienger (ESOC-Flight Dynamics)
Gianpiero Di Girolamo (ESOC-MCS-Data Processing) [part-time]
Ana Heras (ESTEC-HSC-PST)
Claudio Mevi (ESOC-MCS-Data Processing)
Peter Roelfsema (SRON-HIFI)
Micha Schmidt (ESOC-Flight Control Team)
Bart Vandenbussche (KUL-PACS)

Cc:

Absent HGSSE group members :
Sunil Sidher (RAL-SPIRE)
Chris Watson (ESOC-Flight Control Team)

Simulator responsible:
David Verrier (ESA-ESOC)

Herschel pointing/ orbit and attitude issues
Stephan Ott (ESA-HSC)
Timo Prusti (ESA-HSC)
Ian Rasmussen (ESA-Project)

Others:
Otto Bauer (MPE)
John Dodsworth (ESA-ESOC)
Pierre Estaria (ESA-Project)
Ken Ganga (IPAC-NHSC)
Ken King (RAL)
Rene Laureijs (ESA-Planck)
Steve Lord (IPAC-NHSC)
Alastair McDonald (ESOC- Flight Dynamics)
Mike McKinnell (ESA-Planck)
Roberta Mugellesi Dow (ESOC- Flight Dynamics)

Bryan Melton (ESA – TOS-EMG)
Goran Pilbratt (ESA – HSC)
John Rector (IPAC-NHSC)
Johannes Riedinger (ESA - HSC)
Mark Tuttlebee (ESOC-Flight Dynamics)
Serge Valera (ESA – TOS-EMG)
Frederick Wechlser (ESA – H/P project)

Herschel common system development team

Appendix 2: Agenda

HGSSE Meeting #27: Agenda
==========
Date: 06 October 2004
Location: ESOC (Room: H III)
Start Time: 09:00
Latest End Time: 17:00
[If necessary please travel the night before to ensure a 09:00 start]
Contact person at ESOC: Micha Schmidt

Agenda
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1. Comments on HGSSE#26 MoM and HGSSE#27 Agenda

2. HGSSE action status

3. HGSSE general

(i) SCOS 2000 issues [KG]
(a) telecommand id in the TCH records
(b) MIB/ spacraft database related issues

(ii) HGS interfaces [KG]
(a) Status of the ground segment interfaces.
(b) Possible new interface from HP FD Implementation Analysis: Herschel pointing properties file

(iii) DMWG report [MS]
Report on the 20th DMWG meeting

(iv) HSGSSG report [KG]
Report on the 3rd steering group meeting

4. ILT
(i) Current status of science ground segment
Brief status reports/ current issues:
(a) HCSS [KG]
(b) HIFI ICC [PR]
(c) PACS ICC [BV]
(d) SPIRE ICC [SS]

5. IST

(i) CCS - I-EGSE interface status [KG]

6. OPS
(i) MOC comms set-up [MB]
discussion about the communications set-up in MOC (i.e. data transfer to DPC's, PSO, HSC, IW@MOC, connectivity in PISA, etc)

(ii) HERSCHEL/PLANCK Ground Segment End-To-End (SOVT) test concept [EC]

(iii) Consolidated telemetry [KG]
(a) Availability of consolidated tm to the science ground segment.
This issue has been closed offline but it is worth presenting the issue and the outcome to those not involved.

(b) HIFI science tm packets having the same time.
Will the consolidation process ensure the correct order

(iv) Mission planning issues/ scheduling schemes
(a) In the last meeting Ana said she would update the scheduling constraints document.
(b) FCT asked about current ideas about Commissioning and PV of the HERSCHEL and the PLANCK instruments. Ana replied but perhaps we should touch on it in the meeting.

(v) Sub-schedules
Micha released the new version of this note after HGSSE#26.

(vi) Time correlation

(vii) Instrument simulators/ user manuals: status report

(viii) Herschel orbit and attitude [KG]

(ix) RT Science window [KG]
Chris provided a comment on the PSF ICD which may need to be discussed.

(x) Reference mission scenario
Micha want to discuss some of Peters comments on the RMS document.

7. Other system activities

(i) HGSSE documentation [KG]
(a) Design description document

(b) Interface requirements document

(c) List of ICDs

(d) Herschel science ground segment to instruments ICD

(e) End-to-end test plan
Should have been covered in "HERSCHEL/PLANCK Ground Segment End-To-End (SOVT) test concept" agenda item

(f) Project documentation/ documentation tree (KG)
Status report

http://astro.esa.int/SD-general/Projects/Herschel/SystemEngineering/documents/index.html

(g) Documentation consistency (KG)
Status of HGSSE documentation with regard to other ground segment documents.

8. AOB
(i) Date of next meeting

(ii) ICC@MOC facilities [MS]
ESOC said they would report on this issue in the last meeting

(iii) SGS specific items
Always last item allow non-SGS system engineers to leave if they wish.

(a) Time
Using the correct time and the implications if we don't.

(b) SPIRE's use of the BbId.

Appendix 3: Action item status

The action item status prior to the meeting is presented below. See also section 2 of these minutes for additional information regarding actions closed during the meeting:

Action 041203/12: KG to check consistency of HGSSE documents and the Herschel mission planning concept TN and to report back at the next meeting.
Due date: 11/03/04
Status: Closed.

E-mail: "HGSSE: Action item 041203/12: Check HGSSE documents against Herschel mission planning concept TN.", 30/01/04, K.Galloway

E-mail: "HGSSE: Action item 041203/12: Check HGSSE documents against Herschel mission planning concept TN.", 09/08/04, K.Galloway

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Action 110304/2: KG/ MS to clarify the relevant parts of the HGSSE documentation (specifically the IRD) regarding telemetry consolidation.
Due date: 09/06/04
Status: Open

Action 110304/3: MS to distribute the reference scenario and associated documents.
Due date: 19/03/04
Status: Closed.

E-mail: "Reference Mission Scenario - as discussed during HGSSE#25", 18/03/04, Micha Schmidt

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Action 110304/9: KG/ GG to clarify (or remove with suitable comments) the orbit determination performance requirements in the IRD.
Due date: 09/06/04
Status: Closed.

E-mail: "HGSSE: Action item 110304/9: Orbit determination performance requirements", 24/06/04, K.Galloway

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Action 110304/12: ICCs (BV, PR, SS) to obtain latest hardware specifications for their ILT SCOS-2000 systems.

Due date: 09/06/04
Status: Closed.

HIFI: E-mail: "Action 110304/12: ICCs to obtain latest hardware specifications for their ILT SCOS-2000 systems.", 07/06/04, Peter Roelfsema

PACS: E-mail: "HGSSE AI 110304/12 - PACS", 09/06/04, B.Vandenbussche

SPIRE: E-mail: "HGSSE Actions", 08/06/04, Sunil Sidher

Action 110304/16: KG to determine via the EGSE-WG what, if any, time correlation information would be available during the IST mission phase.
Due date: 09/06/04
Status: Closed.

E-mail: "HGSSE: Action item 110304/16: Time correlation information during IST mission phase", 12/08/04, K.Galloway

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Action 110304/17: ICCs (BV, PR, SS) to determine if derived parameters [not synthetic parameters] are (a) to be used and (b) if they need to be stored in the HCSS.
Due date: 09/06/04
Status: Closed

HIFI: E-mail: "Action 110304/17: ICCs to determine if derived parameters are (a) to be used and (b) need to be stored in the HCSS.", 07/06/04, Peter Roelfsema

PACS: E-mail: "HGSSE action 110304/14 - PACS", [NOTE INVALID ACTION ID], 08/06/04, B.Vandenbussche

SPIRE: E-mail: "HGSSE Actions", 08/06/04, Sunil Sidher

Action 110304/18: GdiG/ MS to supply names and current versions for the TBD in-orbit interface documents listed in the "HGS list of ICDs" document.
Due date: 29/04/04
Status: Open

Action 110304/19: KG to update "HGS list of ICDs" with the results of AI#110304/18.
Due date: 09/06/04

Status: Open

Action 110304/24: BV to investigate by when PACS could supply the current PACS alignment data in the format given in the misalignment ICD and to report back at the next meeting.
Due date: 09/06/04
Status: Closed.

Action closed in HGSSE#25. See MoM pg 4:
http://www.rssd.esa.int/llink/livelink/Minutes_of_HGSSE_Meeting__26.pdf?func=doc.Fetch&nodeId=375413&docTitle=Minutes+of+HGSSE+Meeting+%2326

Action 110304/25: KG/GdiG to define the data types to be transferred between HSC and MOC using the H/P FTS.
Due date: 09/06/04
Status: Closed.

E-mail: "HGSSE: Action item 110304/25: Data types using the H/P FTS", 03/06/04, Kevin Galloway

Action closed in HGSSE#25. See MoM pg 3:
http://www.rssd.esa.int/llink/livelink/Minutes_of_HGSSE_Meeting__26.pdf?func=doc.Fetch&nodeId=375413&docTitle=Minutes+of+HGSSE+Meeting+%2326

Action 110304/26: KG to update HGS documentation to replect the use of the H/P FTS.
Due date: 09/06/04
Status: Closed.

E-mail: "HGSSE: Action item 110304/26: Reference H/P FTS in HGS documentation", 12/08/04, Kevin Galloway

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Action 110304/27: KG to check if a table of operational day start times is needed within the HSC.
Due date: 09/06/04
Status: Closed.

HSC weekly meeting: HGSSE action item 110304/27: List of OD start times.

Action closed in HGSSE#25. See MoM pg 3:
http://www.rssd.esa.int/llink/livelink/Minutes_of_HGSSE_Meeting__26.pdf?func=doc.Fetch&nodeId=375413&docTitle=Minutes+of+HGSSE+Meeting+%2326

Action 110304/30: HSGS system engineers to review MS's sub-schedules TN.
Due date: 09/06/04
Status: Open

HIFI: E-mail: “AI 110304/30 HSGS system engineers to comment on the technical not the use of sub-schedule”, 05/10/04, P. Roelfsema

HSC: E-mail: “HGSSE: Action item 110304/30: HSGS system engineers to review MS's sub-schedules TN.”, 05/10/06, K.Galloway

PACS: E-mail: “AI 110304/30 HSGS system engineers to comment on the technical not the use of sub-schedules”, 05/10/06, B. Vandenbussche

SPIRE:

Action 110304/31: FCT and HSGS (BV, KG, PR, SS) to review the updated "instrument scheduling schemes" document.
Due date: 09/06/04
Status: Closed.

FCT: E-mail: "HGSSE Action 110304/31: Herschel Instrument Scheduling Schemes", 08/06/04, David Patterson

KG: E-mail: "HGSSE: Action item 110304/31: Instrument scheduling schemes draft 0.3: KG comments", 04/06/04, Kevin Galloway

HIFI: E-mail: "Action 110304/31: FCT and HSGS (BV, KG, PR, SS) to review the updated "instrument scheduling schemes" document.", 08/06/04, Peter Roelfsema

PACS: Input provided in HGSSE#25

SPIRE: E-mail: "HGSSE AI 110304/3:1 FCT and HSGS (BV, KG, PR, SS) to review the updated "instrument scheduling schemes" document", 08/06/04, Sunil Sidher

Action closed in HGSSE#26. See MoM pg 3:
http://www.rssd.esa.int/llink/livelink/Minutes_of_HGSSE_Meeting__26.pdf?func=doc.Fetch&nodeId=375413&docTitle=Minutes+of+HGSSE+Meeting+%2326

Action 110304/32: AH/ LA/ KG to check if there are any limitations imposed on performing rasters.
Due date: 09/06/04
Status: Closed.

E-mail: "Re: HGSSE: Action item 110304/32: Limitations imposed on performing rasters [Correction]", 03/06/04, Kevin Galloway

Action closed in HGSSE#26. See MoM pg 4:
http://www.rssd.esa.int/llink/livelink/Minutes_of_HGSSE_Meeting__26.pdf?func=doc.Fetch&nodeId=375413&docTitle=Minutes+of+HGSSE+Meeting+%2326

AI#090604/1 FCT to flag any problems in the ICCs AI#041203/13 responses.
Status: Open.
Due date: 06/10/04

AI#090604/2 DP to flag any problems in the ICC s AI#110304/1 responses.
Due date: 06/10/04
Status: Open.

AI#090604/3 AH to update scheduling schemes document.
Due date: 06/10/04
Status: Open.

AI#090604/4 CW to report on the analysis of the reaction wheel power consumption and its impact on performing rasters.
Due date: 06/10/04
Status: Open.

AI#090604/5 KG to update the HGS documentation regarding the status of the RTA events and TM parameters interface.
Due date: 06/10/04
Status: Closed.

E-mail: "HGSSE: Action item 090604/5: RTA events and TM parameters interface status", 08/09/04, K.Galloway

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AI#090604/6 KG to introduce the new interface to the HGS documentation: derived parameter definitions / algorithms from the science ground segment to the MOC.
Due date: 06/10/04
Status: Closed.

E-mail: "HGSSE: Action item 090604/6: New interface - instrument derived parameter definitions", 29/06/04, K.Galloway

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AI#090604/7 KG to assess the Flight Dynamics proposal to simplify the POS/ SIAM interfaces.
Due date: 30/06/04
Status: Closed.

E-mail: "HGSSE: Action item 090604/7: Simplification of POS/ SIAM interfaces", 19/07/04, K.Galloway

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AI#090604/8 AH/ LA to determine if there are Herschel pointing constraints for Jupiter and report at the next meeting.
Due date: 06/10/04
Status: Open.

AI#090604/9 KG to check if the HSC has the Matlab MEX compiler which is required for the orbit software.
Due date: 30/06/04
Status: Closed.

E-mail: "HGSSE: Action item 090604/9: Matlab MEX compiler", 24/06/04, K.Galloway

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AI#090604/10 VO, SS and BV to exchange information on the timing error experienced by HIFI:
Due date: 30/06/04
Status: Open.

AI#090604/11 SS to reply to CW's questions on SPIRE core dumps.
Due date: 18/06/04
Status: Open.

AI#090604/12 BV to send the 4 PACS documents which will be combined into the single PACS IUM to David Verrier.
Due date: 18/06/04
Status: Closed.

E-mail: "AI 090604/12", 21/06/04, K.Galloway

AI#090604/13 KG to inform Jon Brumfitt that the POS needs to include a marker indicating where the timeline can be rejoined.
Due date: 30/06/04
Status: Closed.

E-mail: "HGSSE: Action item 090604/13: New POS marker [Attention JON BRUMFITT]", 25/06/04, K.Galloway

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AI#090604/14 LA and GG to discuss Herschel PMIS limitations at to report back at the next meeting.
Due date: 06/10/04
Status: Closed.

E-mail: "HGSSE: Action item 090604/14: Herschel PMIS limitations", 01/10/04, L.Aloy

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AI#090604/15 KG to raise an SCR on the CUS to allow delays of less than 1 second.
Due date: 30/06/04
Status: Closed.

E-mail: "HGSSE: Action item 090604/15: CUS to allow delays of less than 1 second.", 21/07/04, K.Galloway

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AI#090604/16 KG to distribute to the HSGS system engineers the list of flight dynamics provided attitude algorithms.
Due date: 30/06/04
Status: Closed.

E-mail: "HGSSE: Action item 090604/16: Attitude algorithms", 23/06/04, K.Galloway

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AI#090604/17 CW to investigate how often the mission timeline had to be suspended on other satellites (eg. Integral), and the causes.

Due date: 06/10/04
Status: Closed.

E-mail: "AI#090604/17", 05/10/05, C.Watson

AI#010704/1: JBr/ KG to resolve the issue of preserving the order of command execution (either through finer time granularity or the order of the commands as specified in the POS being maintained).
Due date: 31/08/04
Status: Closed.

E-mail: "HGSSE: Action item 010704/1: Preserving the order of command execution", 21/07/04, K.Galloway

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AI#010704/2: PR/ SS to supply their understanding of the analysis that was performed regarding the availability of consolidated telemetry.
Due date: 31/08/04
Status: Closed.

AI#010704/3: KG to reconstruct the history of the HGSSE discussions on the availability of consolidated telemetry.
Due date: 31/08/04
Status: Closed.

AI#010704/4: BV to distribute an e-mail to the HSGS system engineers stating his concerns regarding the availability of consolidated telemetry.
Due date: 31/08/04
Status: Closed.

AI#010704/5: KG, if necessary, to (1) include consolidated telemetry availability on the agenda of the next HGSSE meeting (06/10/04) and (2) raise a RID at the MOC GSDR (25/10/04).
Due date: 06/10/04
Status: Closed.

All 4 actions closed by:

E-mail: "AI#010704/4:", 06/07/04, B. Vandenbussche

E-mail: "HGSSE: Action item 010704/3: consolidated telemetry availability", 25/08/04, K.Galloway

E-mail: "Re: HGSSE: Action item 010704/3: consolidated telemetry availability", 25/08/04, B.

Vandenbussche

AI#010704/6: ICC system engineers (BV, PR, SS) to determine the required position and velocity for the predicted and reconstructed orbit data.
Due date: 06/10/04
Status: Open.

HIFI:

PACS: E-mail: "PACS closure of HGSSE Action item 010704/6: Orbit position and velocity", 16/09/04, B.Vandenbussche.

SPIRE:

Appendix 4: KG's "HGSSE action status" slides

Agenda item 2:
HGSSE action status

K. Galloway

Action items

1. SCOS/ MIB/ spacecraft database issues

Action 110304/12: ICC system engineers (BV, PR, SS) to obtain latest hardware specifications for their ILT SCOS-2000 systems. CLOSED

Action 110304/20: KG to summarise the history of the OOL/ TCH interface (Logica patch/ telecommand id). CLOSED. [Check with GdeG that MCS will support this].

Action 090604/10: VO, SS and BV to exchange information on the timing error experienced by HIFI. OPEN.

2. Solid state mass memory

Action 041203/13: ICCs (BV, PR, SS) to verify the list of candidate packet types for not storing in the SSMM presented in section 2.8 of the "Packet store usage on H/P" TN and to report back at the next meeting. CLOSED.

Action 090604/1: FCT to flag any problems in the ICCs AI#041203/13 responses. OPEN.

3. Sub-schedules/ mission timeline

Action 110304/30: HSGS system engineers to review MS's sub-schedules TN. OPEN.

Action 090604/17: CW to investigate how often the mission timeline had to be suspended on other satellites (eg. Integral), and the causes. OPEN.

Action items

4. Telemetry services to ICC@MOC

Action 110304/1: ICCs (BV, PR, SS) to check DP's response to AI#041203/2 and to state if the telemetry services provided by the MCS to the ICC@MOC are sufficient. CLOSED

Action 090604/2: DP to flag any problems in the ICCs AI#110304/1 responses. OPEN.

Action 010704/2: PR/SS to supply their understanding of the analysis that was performed regarding the availability of consolidated telemetry. CLOSED.

Action 010704/3: KG to reconstruct the history of the HGSSE discussions on the availablilty of consolidated telemetry. CLOSED.

Action 010704/4: BV to distribute an e-mail to the HSGSSEs stating his concerns regarding the availability of consolidated telemetry. CLOSED

Action 010704/5: KG, if necessary, to (1) include consolidated telemetry availablilty on the agenda of the next HGSSE meeting and (2) raise a RID at the MOC GSDR. REDUNDANT.

5. Mission planning/ scheduling

Action 090604/3: AH to update scheduling schemes document. OPEN.

6. Derived parameters

Action 110304/17: ICCs (BV, PR, SS) to determine if derived parameters [not synthetic parameters] are (a) to be used and (b) if they need to be stored in the HCSS. CLOSED.

Action items

7. Attitude/ star tracker/ instrument alignment

Action 110304/24: BV to investigate by when PACS could supply the current PACS alignment data in the format given in the misalignment ICD and to report back at the next meeting. CLOSED.

Action 110304/32: AH/ LA/ KG to check if there are any limitations imposed on performing rasters. CLOSED.

Action 090604/4: CW to report on the analysis of the reaction wheel power consumption and its impact on performing rasters. OPEN.

Action 090604/16:KG to distribute to the HSGS system engineers the list of flight dynamics provided attitude algorithms. CLOSED.

8. HCSS

Action 090604/15: KG to raise an SCR on the CUS to allow delays of less than 1 second. CLOSED.

9. Simulator/ IUM

Action 090604/12: BV to send the 4 PACS documents which will be combined into the single PACS IUM to David Verrier. CLOSED.

10. SPIRE core dumps

Action 090604/11: SS to reply to CWs questions on SPIRE core dumps. OPEN.

Action items

11. Interfaces

Action 110304/16: KG to determine via the EGSE-WG what, if any, time correlation information would be available during the IST mission phase. CLOSED.

Action 110304/25: KG/ GdeG to define the data types to be transferred between HSC and MOC using the H/P FTS. CLOSED.

Action 110304/27: KG to check if a table of operational day start times is needed within the HSC. CLOSED.

Action 090604/7: KG to assess the FD's proposal to simplify the POS/ SIAM interfaces. CLOSED.

Action 090604/8: AH/ LA to determine if there are Herschel pointing constraints for Jupiter and report at the next meeting. OPEN.

Action 090604/9: KG to check if the HSC has the Matlab MEX compiler which is required for the orbit software. CLOSED.

Action 090604/13: KG to inform Jon Brumfitt that the POS needs to include a marker indicating where the timeline can be rejoined. CLOSED.

Action 010704/1: JBr/ KG to resolve the issue of preserving the order of command execution (either through finer granularity or the order of the commands as specified in the POS being maintained). CLOSED.

Action 010704/6: ICC system engineers (BV, PR, SS) to determine the required position and velocity for the predicted and reconstructed orbit data. OPEN.

Action items

12. Documentation

Action 041203/12: KG to check consistency of HGSSE documents and the Herschel mission planning concept TN and to report back at the next meeting. CLOSED.

Action 110304/2: KG/MS to clarify the relevant parts of the HGSSE documentation (specifically the IRD) regarding telemetry consolidation. OPEN.

Action 110304/9: KG/ GG to clarify (or remove with suitable comments) the orbit determination performance requirement in the IRD. CLOSED.

Action 110304/18: GdeG/ MS to supply names and current versions for the TBD in-orbit interface documents listed in the "HGS list of ICDs" document. OPEN.

Action 110304/19: KG to update "HGS list of ICDs" with the results of AI#110304/18. OPEN.

Action 110304/26: KG to update HGS documentation to reflect the use of the H/P FTS. CLOSED.

Action 090604/5: KG to update the HGS documentation regarding the status of the RTA events and TM parameters interface. CLOSED

Action 090604/6: KG to introduce the new interface to the HGS documentation: derived parameter definitions/ algorithms from the science ground segment to the MOC. CLOSED.

Action 090604/14: LA and GG to discuss Herschel PMIS limitations and to report back at the next meeting. OPEN.

Appendix 5: CW's "Action item 090604/17 closure" slides

HERSCHEL/PLANCK

Timeline suspension and restart on other missions

Chris Watson, ESOC

Integral – Salma Fahmy

- Queue - Ground commanded
- Timeline suspensions (instances due to ground commanding loop are excluded)

  Anomaly –

  SEU in perigee, once

  Instrument safe modes due to background radiation, flare dependent - come in bursts

  Radmon crash, puts all instruments to safe mode – ~14 times

  Maintenance – none, always done within perigee pass

- Techniques for reentry to timeline

  Instruments have very little in the way of mode / configuration changes. What there is can be tracked and commanded manually

  More of an issue for special calibrations observations, but these are rare

MEX – Jonathon Schuster

- Queues

  1 queue on board (subschedules available but not used), typically carrying 80 hours worth of commanding

- Timeline suspensions

  Anomaly – SSMM anomalies / anything leading to safe mode. "3 occurrences in routine phase" (Once due to initiation of a memory dump with default priority)

  Maintenance – none so far

- Techniques for reentry to timeline

  Instruments always OFF outside of their observations – can re-enter at next instrument start

  But can't re-enter in the middle of a sequence of observations for the same instrument

Envisat – Rob Furnell

- Queues

  One queue on board, typically carrying ~36 hours worth of commanding

- Timeline suspensions

  Anomaly – PMC reset, "seven times" in two years

  Maintenance – none

- Techniques for reentry to timeline

  Replan within MOC with MPS, all relevant instrument statuses / configurations are known to MOC and used as an input to the MPS

Cluster – Steve Foley

- Queues

  Single queue on board, typically carrying ~36 hours worth of commanding

- Timeline suspensions

  Anomaly – Spacecraft CDMU, ~5 incidences total

  Instrument anomaly, once a month typically

  Maintenance – none, always pre-planned

- Techniques for reentry to timeline

  Not possible for MOC to re-enter timeline. Replanning by P.I.s required.

ERS – Ian Harrison

- Queues

  Multiple queues on board, typically carrying 36 hours worth of commanding

- Timeline suspensions

  Anomaly – "Once every few weeks"

  Maintenance – "Also once every few weeks". E.g. Power recycling on a unit was due when I spoke to Ian.

- Techniques for reentry to timeline

  Extra commands added at appropriate point to regain correct configuration

  Possible to reenable queues by timetagged command from other queues (equiv. to subschedule functionality). Allows reentry out-of-coverage.

Summary

- All missions questioned experience stops of the timeline but for vastly different reasons and at very different frequencies
- Missions utilise different approaches to re-entering the timeline, ranging from
  - Cluster – replanning by P.Is
  - Envisat – Full instrument config known at MOC
- Impossible to know in advance what circumstances will lead to the need to restart the MTL on Herschel prior to flight. Can expect multiple times per year based on other missions

Appendix 6: KG's "SCOS 2000 issues" slides

Agenda item 3 (i): SCOS 2000 issues

K. Galloway

SCOS 2000 issues

See MoM of HGSSE#26 for last report.

1. MIB/ spacecraft database related issues

1. The original plan was for industry to provide bridge files for HIFI, PACS and SPIRE instruments, which were to be delivered to ESTEC for HCSS-0.2.2 system testing and integration with the (IST mission phase) I-EGSE and then the CCS.
2. A number of iterations have taken place, but with no convergence: there is yet to be a single bridge file set, for any of the instruments, that pass the checks described in the MIB Tailoring and Clarification note, and coded in the HCSS 'mibchecker' tool. The most recent delivery, of an updated HIFI bridge file set, was made on 22nd September.
3. The most recent problems were to do with the way industry compose the bridge files from the constituent MIB files delivered by the ICCs. The recent MIB files delivered by the ICCs pass all mibchecker checks, but the resultant bridge files fail those same checks.
4. HCSS-0.2.2 testing was eventually conducted using the ICC MIB datasets, and not with the industry bridge files as originally intended.

SCOS 2000 issues

2. HPMCS deliveries and SCOS-versions (Any change?)

- D1: April '05: based on S2K v 3.1 + CCS patches
- D2: Dec '05 based on S2K 4.0 (to be delivered in May '05)
- D3: Jun '06 (most probably) based on S2k 4.0 (S2K 5.0 only planned for May '06)
- D4: Nov '06 same S2K version as for D3 (D4 functionality is identical to D3; only bug fixes).

Note: for D3 and D4 decision on which version of S2K to use will be taken in 2006.

3. Installing SCOS-2000 on new machines

The I-EGSE and HCSS integration tests at MPE were delayed due to problems installing Suse 7.3 on new PCs. Various hardware components were not recognised.

Is there an ESOC recommended approach to such issues?

4. Telecommand id in the TCH records/ Logica patch

From HGSSE#26 MoM:

AI#110304/20: History of OOL/TCH interface. **Action CLOSED**.

KG emphasized that it was essential that the telecommand id was included in the TCH information supplied to the HSC by MOC as this allowed the association of the downlink data ingested into the Herschel common science system (HCSS) with the uplink data created in the HCSS. Of secondary importance is that the format of the OOL and TCH records is the same as in the ILT and IST phase. If the format was different this would be additional work for the development team and against the spirit of smooth transition but of primary importance is the telecommand id.

GdeG agreed to raise the issue at the next SCOS-2000 technical meeting.

KG will, if necessary, raise RIDs on the MCS at the H/P ground segment design review.

4. Telecommand id in the TCH records/ Logica patch (cont.)

E-mail from Nestor Peccia in response to questions from Sunil:

1) It is relatively straightforward to make the change to Logica's C++ software BUT ONLY IF we know the exact function call from the S2K 2.3 interface to perform the TCID extraction. We are assuming that the enhancement in S2K is made to the same interface that the patch is currently using. If this is not the case then the patch will need to be largely rewritten.

Response: in the R2.3e,the TC ID is archived as follow:

An additional field has been added at the end of the CMDrqstPktDataDetails structure. The way to extract this field depends on the mechanism used i.e. Direct access of the history files - in this case the return record has to be parsed at low level but the structure is well known.The attached documents show the changes performed to support this additional field.

2) We need to be able to recompile the patch after updates and link it into S2K.Our understanding is that it will be necessary to have the S2K developmentversion available in order to do this. Please confirm whether this is the case.

Response: If they were going to make the change there, they'd need a development environment (which according to Logica wasn't well set-up - Logica didn't build the thing there, Logica built it at ESOC and copied the binaries over there).

I suggest to make the changes at ESOC, and rebuild the binaries - it would be quite straight forward for them to install the binary files there (they'd just need to replace the files).

Appendix 7: KG's "HGS interface status" slides

Agenda item 3 (ii): HGS interfaces

K. Galloway

HGS interfaces: In-orbit phase

- **Interface 1: MIB format [spacecraft database bridge files]**

Interface well defined around the SCOS-2000 database import ICD.

- **Interface 2: Telemetry**

Interface well defined around the PS ICD and the telemetry definition documents for the instruments.

Note: May need to add s/c subsystem (eg. ACMS) telemetry definition documents to List of ICDs document.

- **Interface 3: OOL data**

Interface well defined for ILT and IST mission phases. Should be the same for the in-orbit phase. ICD reference remains TBD.

- **Interface 4: NRT telemetry interface**

ICC@MOC. Interface understood but ICD reference remains TBD.

- **Interface 5: TC History**

Interface well defined for ILT and IST mission phases. Should be the same for the in-orbit phase. ICD reference remains TBD.

HGS interfaces: In-orbit phase

- **Interface 6: Instrument OBS interchange format**

Interface defined around the SCOS-2000 OBSM external interfaces ICD.

- **Interface 7: HCSS - RTA telemetry interface**

Playback of telemetry from HCSS to the instrument RTA. Interface well defined around the EGSE router ICD.

- **Interface 8: RTA - HCSS interface**

N/A. Applies only to ILT mission phase. I need to make this clearer in the List of ICDs document.

- **Interface 9: HCSS OBS interface**

Storage of OBSW as a BLOB in the HCSS. HCSS TN describes how this will be performed. The need for this interface is still TBD.

- **Interface 10: HCSS MIB interface**

Storage of MIB as a BLOB in the HCSS. HCSS TN describes how this will be performed. It has been agreed within the CSDT that this interface is not required. Update documentation.

HGS interfaces: In-orbit phase

- **Interface 11: EGSE-ILT to HCSS test control interface**

N/A. Applies only to ILT and IST mission phases.

- **Interface 12: RTA events and TM parameters**

N/A. Applies only to ILT and IST mission phases.

- **Interface 13: NRT TM interface (CCS - EGSE-IST)**

N/A. Applies only to IST mission phase.

- **Interface 14: EGSE-IST - CCS uplink interface**

N/A. Applies only to IST mission phase.

- **Interface 15: Time correlation**

Transfer of time correlation info between MOC and HSC. Interface is well understood but ICD reference remains TBD.

- **Interface 16: Derived parameters**

Transfer of derived parameters, generated at MOC, to the HCSS. ICD reference remains TBD.

HGS interfaces: In-orbit phase

- **Interface 17: Planning skeleton**

Interface well defined and documented.

- **Interface 18: Schedule status information**

Procedural interface. Will be captured via the MOC-HSC operational interactions interface.

- **Interface 19: Commanding timeline summary**

Discussed at HGSSE meeting #25. GdeG sent around Integral example. This was accepted by the HSGS. ICD reference remains TBD.

- **Interface 20: Spacecraft orbit data reconstituted**

Interface well defined and documented.

- **Interface 21: Spacecraft attitude history**

Interface is TBD pending outcome in actions on Industry.

HGS interfaces: In-orbit phase

- **Interface 22: SSO database**

Interface is now well understood. Need to agree that HSC is the single point of distribution for SSO ephemerides files. ICD (UM) reference remains TBD.

List of ICDs document needs to be updated to show NASA - HSC interface and HSC - MOC(FD) interface (if confirmed).

[Orbit file from MOC(FD) - NASA needs to be introduced - see later]

- **Interface 23: DDS interface**

Interface understood but ICD reference remains TBD.

- **Interface 24: Planned observation sequence**

Interface well defined and documented (ICD to be issued in the near future).

- **Interface 25: Interface removed**
- **Interface 26: Instrument apertures and pointing misalignment**

Interface well defined and documented. List of ICDs to be updated to show interface involving only HSC and ICCs. **Note:** Possible issue remains regarding scheduling of SSOs and their handling by Flight Dynamics

HGS interfaces: In-orbit phase

- **Interface 27: Spacecraft orbit predictor algorithm and data**

Interface well defined and documented.

- **Interface 28: Spacecraft attitude constraints algorithm and data**

Interface defined and documented. Matlab package still to be received by HSCDT.

- **Interface 29: Spacecraft slew time and path predictor algorithm and data**

Interface well defined and documented. Matlab package received by HSCDT.

- **Interface 30: Instrument simulator SW API**

Interface removed after agreement at HGSSE meeting #25.

- **Interface 31: Attitude utilities**

Interface well defined and documented. Matlab package received by HSCDT.

- **Interface 32: FTS interface**

Interface well defined and documented. ICD only at Issue 0.0.

HGS interfaces: In-orbit phase

- **Interface 33: Derived parameter definitions**

New interface introduced as a result of HGSSE meeting #26 discussions. Well defined and documented. Benefits from ICCs using SCOS-2000 during ILT and IST mission phases.

HGS interfaces: In-orbit phase - new interfaces?

- **Interface ?: Orbit file from MOC(FD) to NASA**

For use with Horizons and SPICE.

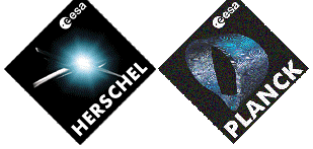
Complies with the CCSDS standard for orbit files.

Timo Prusti (PST) comment in support of this interface: “Yes, orbit file at Horizon is needed for community (to allow them playing games like 'when is Titan at maximum elongation from Saturn when observed from Herschel'). Community includes in this case HSC astronomers when they are supporting SSO observers and possibly instrument calibration scientists will use it as well in some special cases (PSF/beam measurements).”

- **Interface ?: Herschel pointing properties file**

Listed in the HP FD Implementation Analysis. Gottlob?

Appendix 8: MS's "DMWG" slides



Boot Software

- Herschel Instruments boot software operation has been found barely acceptable from the point of view of operations because of a very pour observability :
  - it supports a very limited set of PS ICD Services
  - it is used for Memory management tasks (service 6) and generates only ONE TM packets

Instruments FDIR/ Planck

- It has been identified that :
  - NO 4K and dilution coolers anomaly requests a spacecraft reaction towards any of the instrument
  - there is NO instrument safety issue resulting from a 4K or dilution cooler failure
  - there is NO instrument safety issue resulting from a sorption cooler failure

- The possibility, and interest, of the use of the 2 SCE in parallel is still under investigation
  - ➔ Note that the current command/control design does not permit it

The principles for all instruments standby modes in elationship with the S/C modes has been defined. Exception HIFI.

The procedures to be run by the S/C as response to struments FDIR events have been identified in details for PIRE, HFI, LFI.

- The final specifications of these FDIR procedures are planned to be finalized in end 12/04. Coding will be in early 05 by ALCATEL

LFI, HFI and SCE have confirmed availability of User 's anual in September.

Appendix 9: KG's "HSGSSG" slides

Agenda item 3 (iv): HSGSSG report

K. Galloway

Reminder: Impact on the HGSSE group:

- The HGSSE group reports to the HSGSSG through the HGSSE chairman.
- Unresolved issues within the HGSSE group go to the HSGSSG.

Summary of HSGSSG meeting#3:

The key items discussed were:

- **EGSE-WG**: No single Industry coordinator hampers the work of the group.
- **Spacecraft database/ bridge files**: Still not available from Industry. Affects HCSS/ I-EGSE integration tests and subsequent I-EGSE/ CCS integration tests.
- **Attitude history file**: Non closure of actions by Industry delaying the specification of this interface.
- **Instrument inputs to support key programs AO**: Concerns raised but issues were addressed and resolved at a subsequent “time estimator” meeting.

Summary of HSGSSG meeting#3 (continued):

- **Schedule**: Currently no credible schedule
- **IA**: Obtaining additional funds for interactive analysis.
- **Herschel science ground segment review**: Timeline agreed:
  - **13-Oct-04**: Detailed discussion of the document list & agenda
  - **23-Dec-04**: Key review documents available
  - **14-Jan-05**: Full documentation package available
  - **19/20-Jan-05**: Kick-off presentation to Review Board
  - **7-Feb-05**: Review Board requests for clarification
  - **18-Feb-05**: Clarification Session
  - **28-Feb-05**: Review Board Report – Draft
  - **4-Mar-05**: Comments due on draft Review Board Report
  - **11-Mar-05**: Review Board Report – Final

Follow up of HGSSE issues from HSGSSG#2:

- **Boresight/ star tracker alignment**

Resolution of data/ information flow between sites/ systems.
Resolved. Science ground segment is responsible for the SIAM files and converts pointing requests to spacecraft coordinates (ACA reference frame) before delivery to MOC/ Flight Dynamics.

- **Attitude reconstruction.**

FD waiting on final definition by Project of ACMS telemetry before producing the AHF ICD/ detailing what on-ground processing they can perform.
Still an issue. System level CDR action on Industry remains open. H/P Flight Dynamics Manager is pursuing this with Project. This is still not critical but has been on-going for a long time. The science ground segment design for attitude data processing is awaiting the outcome of this issue.

- **Solid state mass memory**

SSMM dumps work at the byte level therefore start and end of dumps will send down incomplete telemetry packets which will be rejected by the HGS/ ground station.
Non-issue/ misunderstanding

- **SSO interfaces**

  Resolution of data/ information flow between HSC, MOC/FD, NHSC and JPL.
  Almost resolved. A few loose ends to tidy up/ formalise.

- **Telemetry rate markers in observation schedule**

  ESOC would like to see an estimation of the amount of tm that will be produced by an observation.
  Resolved. Support for this has been introduced into the common uplink system.
  The POS will contain telemetry rate indicators

HGSSE group report:

I reported for the HGSSE on the following recent/ current issues:

- Consolidated telemetry availability: Turned out to be a false alarm.
- Handling tm packets from the same source with the same time: New issue which is addressed elsewhere in the agenda.
- Telecommand history/ out of limits; Support for smooth transition
- Orbit accuracy requirements: ICCs to supply numbers.

I emphasized that everything was **normal work**.

Appendix 10: KG's "HCSS status report" slides

HCSS and HSC Development
(copy of report to the Herschel science team)

K. Galloway

for

Johannes R. Riedinger

Herschel Science Center Development Manager

Science Operations and Data Systems Division

Research and Scientific Support Department

A Reminder: What the HCSS Is All About

- HCSS = "Herschel Common Science System"
- Developed jointly by ESA/HSCDT + 3 ICCs + NHSC
- Ensemble of services in a single, coherent, mostly platform-independent system (as opposed to "a lose assortment of tools")
  - Proposal Submission & Editing
  - Support to Proposal Handling and Time Allocation Committee decisions
  - Scientific Mission Planning / observation sequence "optimisation"
  - Generation of instrument commands
  - Reception and archiving of HK & Science Telemetry
  - Community helpdesk
  - Generation of standard observation products & quality information
  - Product Archive for automatically generated and "optimised" products
  - Source of documentation & software to reduce Herschel data

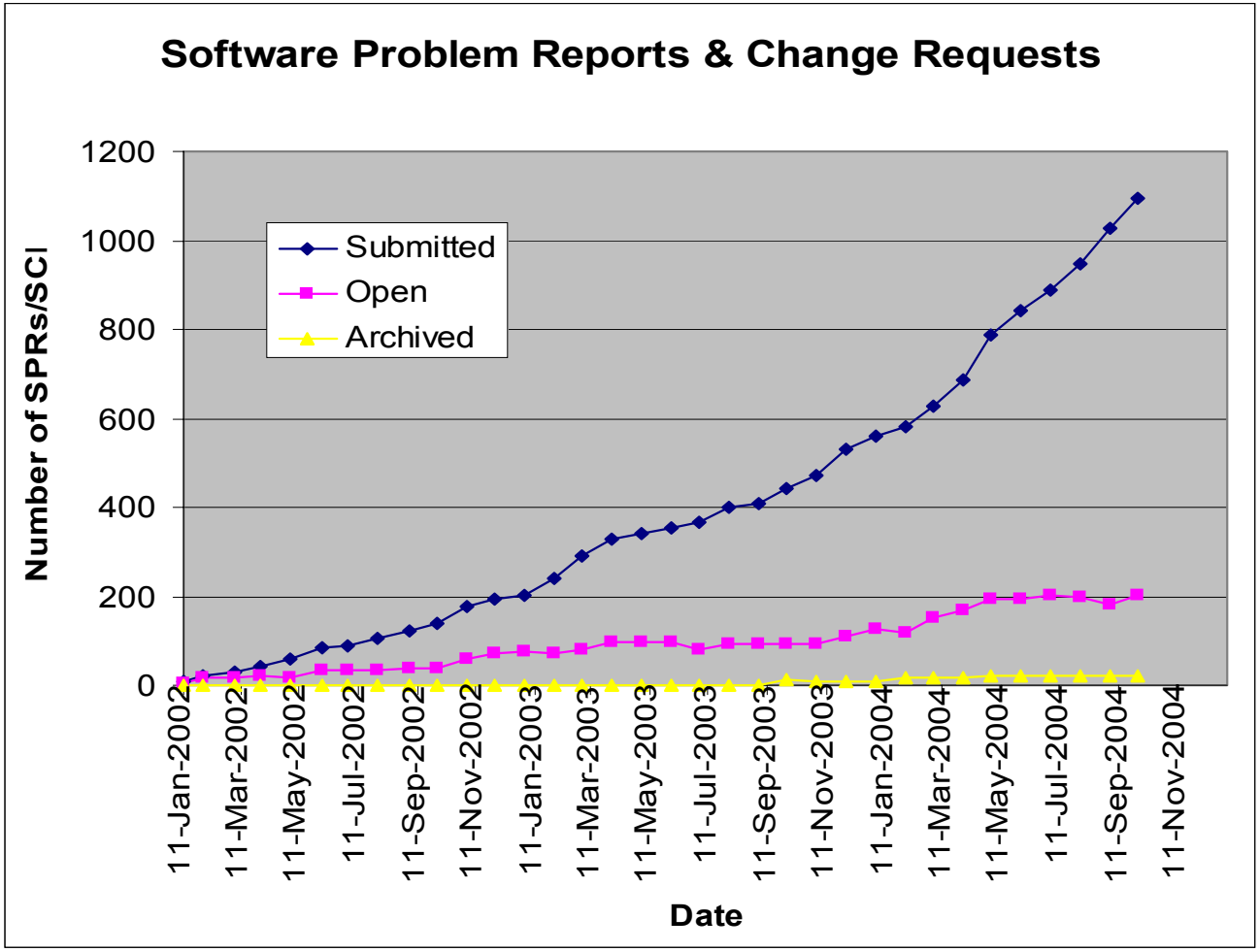
Herschel Common Science System - Progress

- **HCSS user releases**
  - HCSS v0.2.1 was released 6-Aug-04 including IA #5/3
  - HCSS v0.2.2 was released 19-Sep-04 including IA #5/4 (final iteration #5)
  - HCSS v0.2.3 agreed to be released ~mid November 04
- **HCSS v0.2.2 integrated into I-EGSE at MPE 20-22 September**
  - Representatives of all instruments and HSCDT working together
  - Some problems setting up I-EGSE due to SCOS 2000 requiring SuSE 7.3 (3 years old) which does not support state-of-the-art hardware
  - "Apparently successful": Systems appear to work but no systematic testing performed due to lack of time
- **Work Packages for HCSS v0.3 development issued June 2004**
- **Work Packages for IA iteration #6 issued September 2004**
- **Herschel Science Ground Segment Status Review delayed to timeframe Jan-Mar 2005 due to AVM/CQM activities**

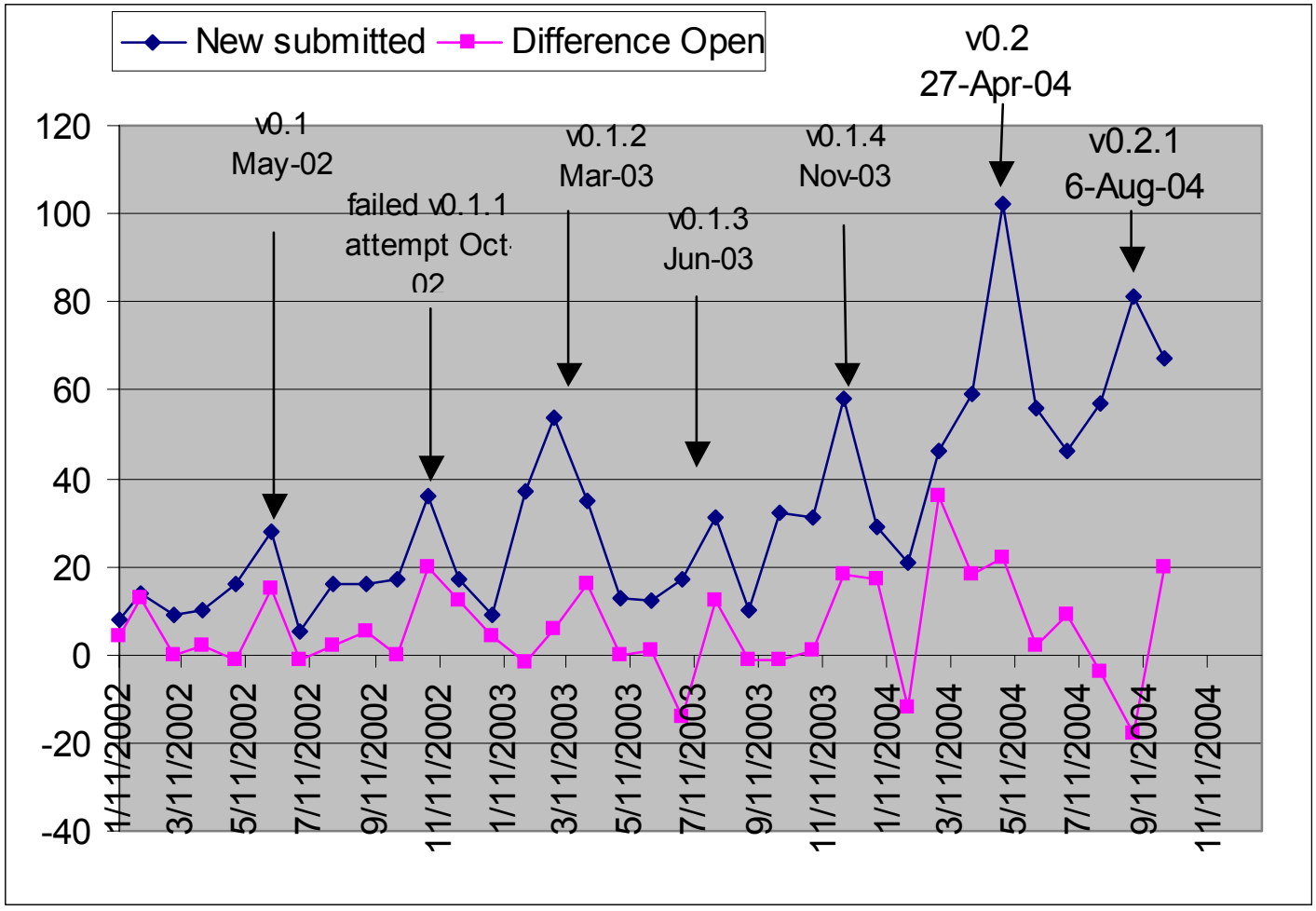
Herschel Common Science System – Progress (Cont'd)

- Routine "developer" builds of HCSS, PCSS and the HIFI system are linked and automated; "getting there" for building SPIRE system
- Settling more and more into routine interactions
  - Herschel Science Ground Segment Steering Group: 3 meetings
  - HCSS Management Group: Telecon #69 on 7-Oct-04
  - HSGSSE Group: Meeting #27 on 6-Oct-04
  - HCSS CCB: Telecon #22 on 4-Nov-04
  - Herschel IA CCB: Telecon #4 on 5-Oct-04
  - CSDT: 19 meetings
- Still a few glitches occasionally
  - SPIRE lost 31 hours worth of AVM/CQM test data in September; nailing down the cause is difficult as screen messages were not logged to file
  - HSCDT accidentally broke the HIFI system when a change in API was not adequately communicated
- 1000 SPRs/SCRs exceeded during August 2004

Development of SPR/SCRs - 1



Development of SPR/SCRs - 2



Herschel Common Science System – Progress (Cont'd)

- Definition of helpdesk functionality completed, URD impact on HCSS analysed, procurement of a COTS tool under way; on track for use in combination with HCSS v0.3
- NASA software licensing issues resolved (e.g. SPOT)
- Implementation of Herschel SPOT well under way
- Implementation of Scientific Mission Planning started
- Interface discussions with ESOC Flight Dynamics are going well
- Initial delivery of Flight Dynamics code received and ported to Java
- Interface with the Project Scientist Team going well including the areas of Proposal Submission & Handling System and the Interactive Analysis
- Progress in database schema evolution & database replication

Herschel IA - Progress

- Printable, basic User's Manual (133 pages).
- Starter's kit to help new IA users get accustomed to the system.
- On-line help provides a unified help system.
- Significant improvements in the display and plot packages.
- Numerics has been refactored, fulfilling the user request to improve and make consistent function syntax and usage.
- Dataset inspector provides a user-friendly way to inspect the contents of datasets.
- Software Problem Reports and Change Requests

	Total	IA
SPRs/SCRs (all priorities) May 04	205	83 (40%)
SPRs/SCRs (all priorities) Sep 04	183	80 (44%)
SPRs/SCRs (high priority) May 04	17	14 (82%)
SPRs/SCRs (high priority) Sep 04	10	5 (50%)

Herschel Common Science System - Concerns

- HPSDB & "bridge" file issues still not completely resolved.
  - I-EGSE/CCS integration and I-EGSE acceptance delayed 2-3 months.
  - 3 user releases of the HCSS for IST had to be made without being able to system-test it against a central IST I/F.
- So far ICCs have used core HCSS functionality to a widely different degree (HIFI "full", SPIRE "partial", PACS "hardly"). Fortunately, SPIRE and PACS have started to catch up.
- Overall, the Herschel/Planck project has no credible schedule.
- ICC schedules are floating. Commitments (e.g. to support the HSGS status review or proposal submission phase 1 as agreed only a few months ago) are postponed unilaterally by some ICCs with potentially detrimental effects on the HCSS schedule.
- In general, WP planning/ tracking does not work/ is invisible on the ICC side; fortunately most ICC-owned core-HCSS packages are now under maintenance so the impact is reduced.

Herschel Common Science System – Concerns (Cont'd)

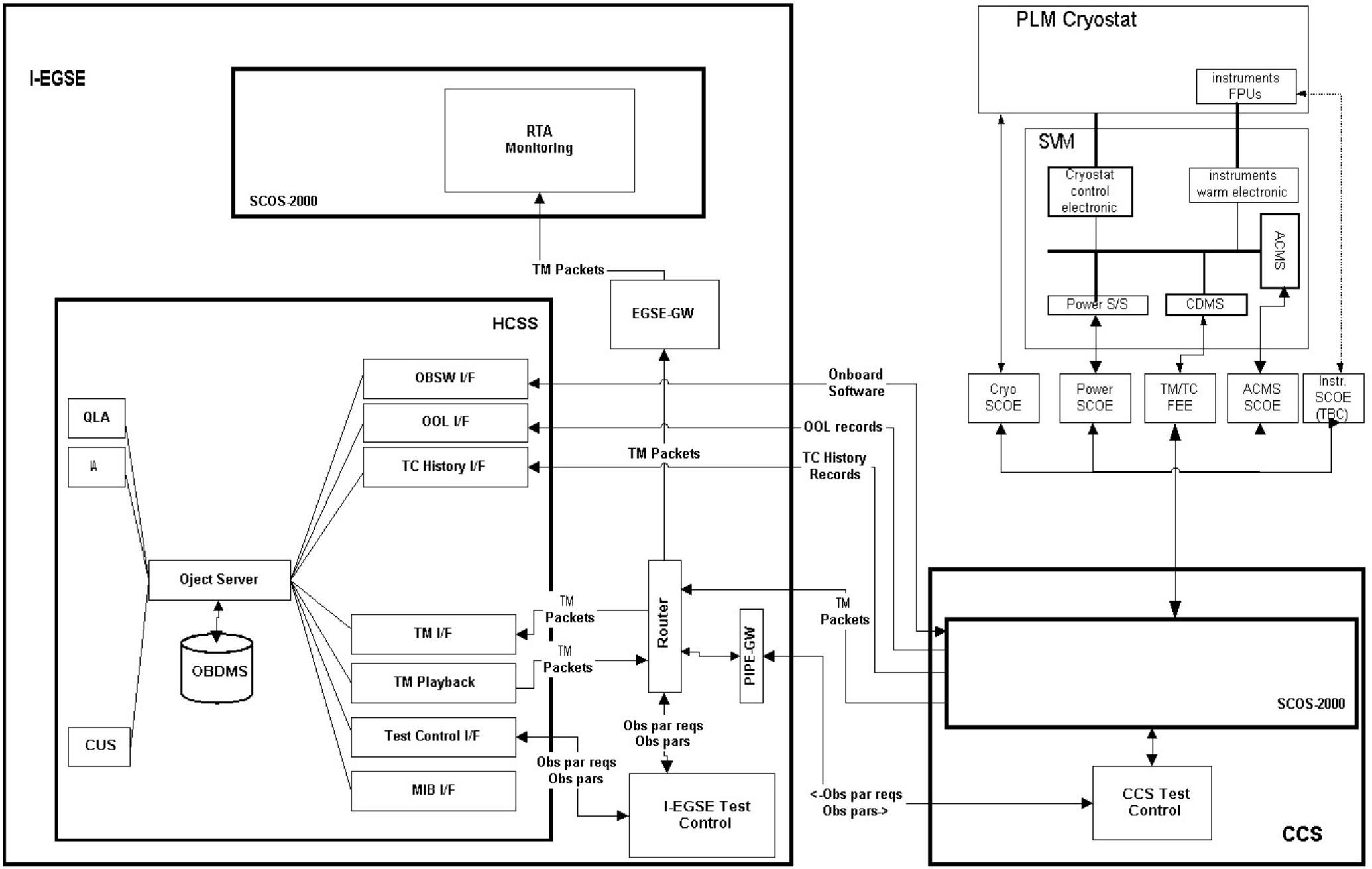
- Acceptance testing of HCSS user releases by end users is lacking formality, depth (e.g. testing robustness by artificially introducing error cases) and, very likely, reproducibility. On the other hand, the customers themselves seem not to be too worried about this, so perhaps ESA shouldn't be either.
- Is the definition of AOTs and "observing time calculators" on track to support entry of phase 1 Key and Guaranteed Time Programmes ~mid 2005 in HCSS v0.3 ?
- At the level of the Herschel Science Ground Segment Steering Group it is agreed that we should push ahead and accelerate development of a "Herschel IA". However, much convincing still needs to be done at the different levels (users in some instruments, PIs, Science Team, ESA hierarchy) to obtain the necessary funding.

Appendix 11: KG's "CCS to HCSS/ EGSE interface status" slides

Agenda item 5 (i):
CCS - EGSE/ HCSS interface status

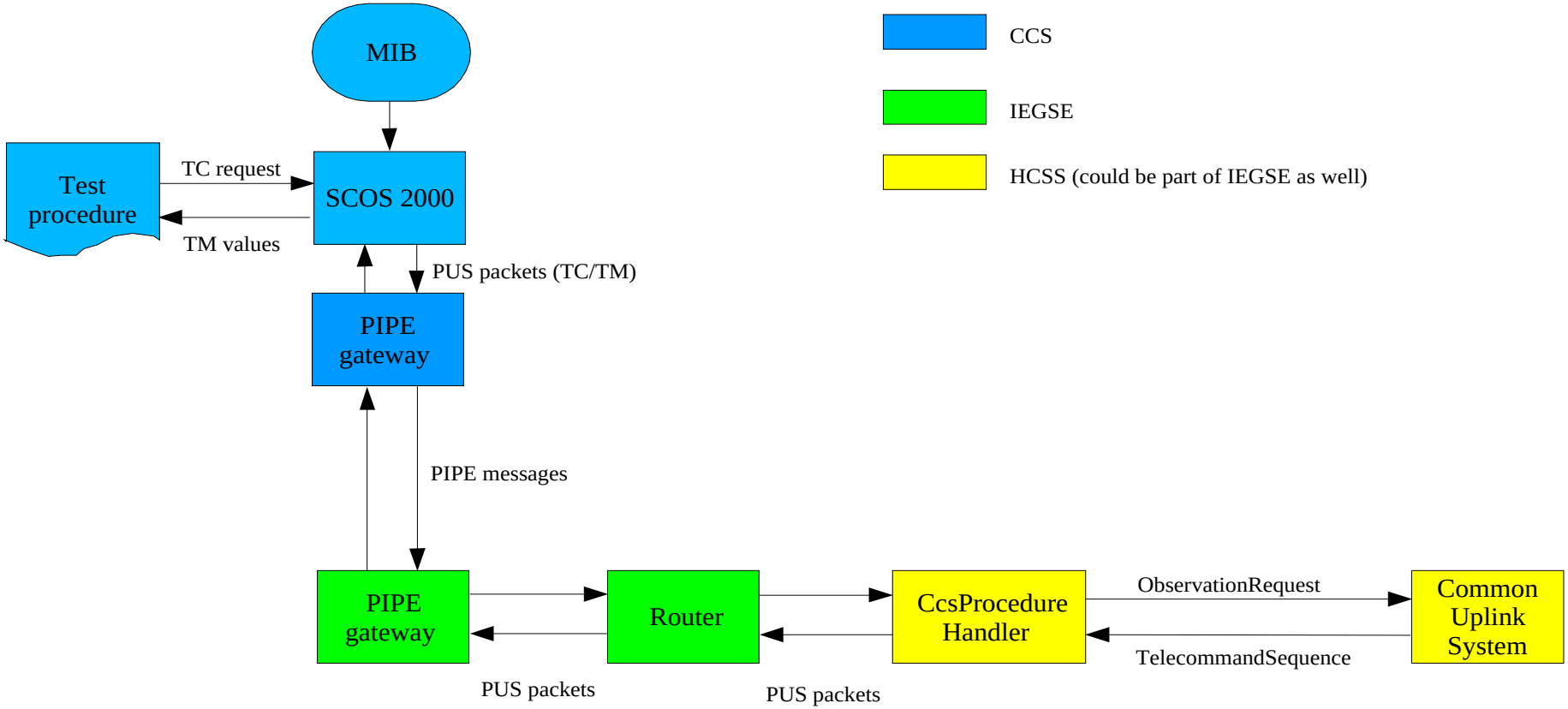
K. Galloway

IEGSE/ CCS for IST



EGSE meeting #32

CCS-IEGSE: TC Sequence Interface



CCS - EGSE/ HCSS interface: status

See last HGSSE group MoM for last status report.

Changes since last meeting:

- **HCSS/ I-EGSE integration tests performed at MPE in week 38 using instrument team provided MIB files [My opinion: partial integration].**
- **CCS/ I-EGSE integration tests at MPE in week TBD**
- **CCS/ I-EGSE tests at Astrium in week TBD**
- **Spacecraft database files (bridge files)**: Still not received by HSCDT.
- In the HSGSSG the chairman of the EGSE-WG complained that there was no central coordinator of EGSE activities for industry.

For HGSSE to monitor

Issues identified at last meeting:

- OBSW interface/ OBSM - this issue remains valid.

New issues:

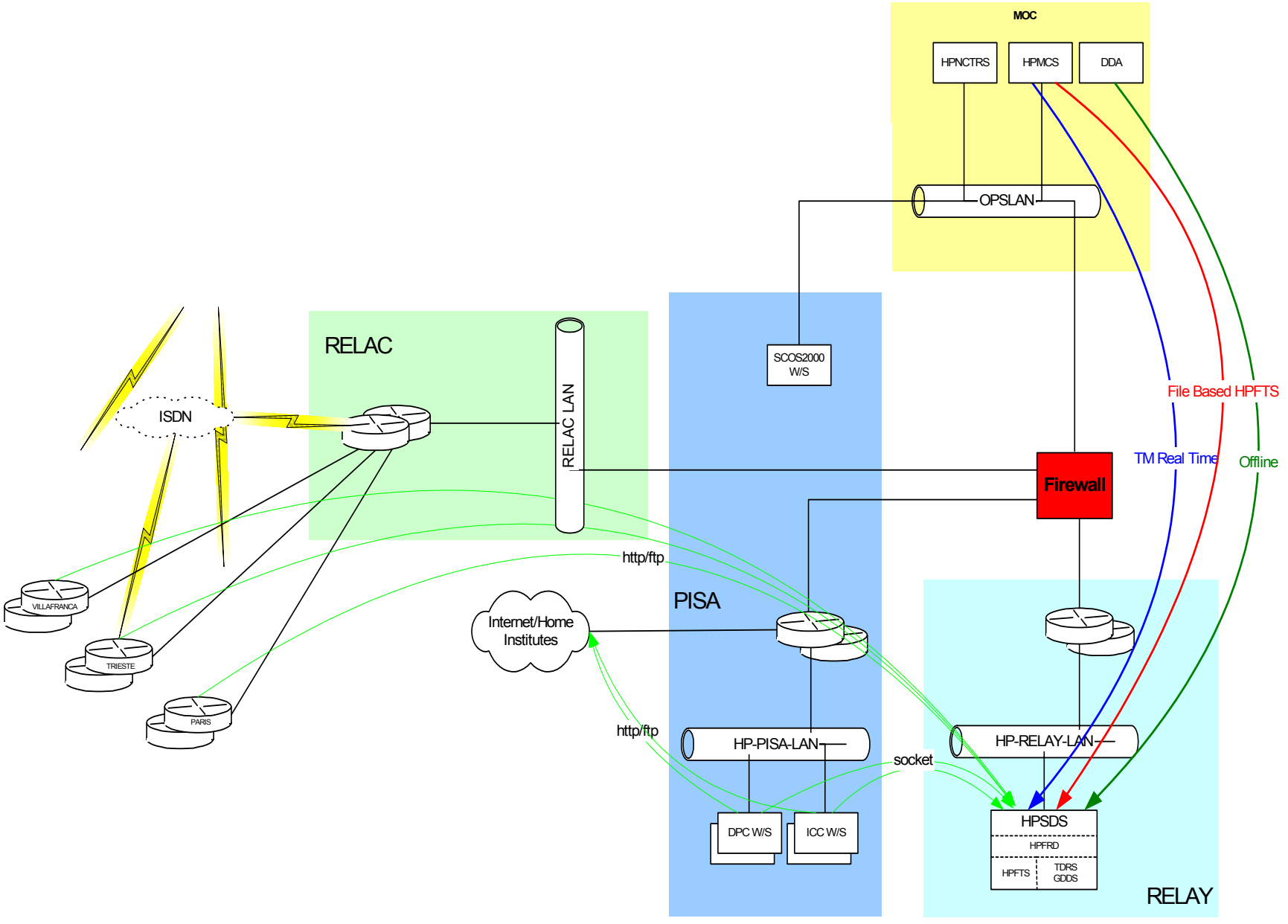
- None. (Late delivery of IST components is the specific concern of the management groups not the HGSSE group).

Appendix 12: MB's "MOC communications set-up" slides

H/P PI Interface

Marko Butkovic OPS-ONC

H/P Ground Communications Coordinator


MOC
HPNCTRS
HPMCS
DDA
OPSLAN
RELAC
RELAC LAN
ISDN
SCOS2000
W/S
File Based HPFTS
TM Real Time
Offline
Firewall
http/ftp
PISA
Internet/Home
Institutes
VILLAFRANCA
TRIESTE
PARIS
http/ftp
HP-PISA-LAN
HP-RELAY-LAN
socket
DPC W/S
ICC W/S
HPSDS
HPFRD
HPFTS
TDRS
GDDS
RELAY

Connectivity requirements

1. **Socket** communication between HPSDS and PI W/S attached to the PI LAN this needed to support the **RT Delivery of TM to** IWS @ MOC (Chapter 10 HP MCS SRS)

2. ftp and http (via Internet) between PI LAN and home institutes

3. **ftp** (via dedicated lines) between SGS sites (Villafranca (Herschel), Paris (Planck), Trieste (Planck) + any other home institutes) and HPSDS. This is to allow on-line data file exchange (via **HPFTS** or native FTP) between SGS and MOC (Chapter 7 of HP MCS SRS)

4. **http** (via dedicated lines) between SGS sites (Villafranca (Herschel), Paris (Planck), Trieste (Planck) + any other home institutes) and HPSDS. This is to provide remote access to
   1. to the archived TM via **GDDS** (packets) and **TDRS** (parameters)
   2. and to the auxiliary file archive via **GDDS** (namely those files distributed on-line via interface in bullet 3) (Chapter 8 and Chapter 9 of the HP MCS SRS)

Security aspects in general

1. High Availability Bastion host at ESOC (FW + routers)
2. Firewalls at Villafranca, Paris and Trieste?
3. IP addresses for far ends provided by MOC?

Number of machines and their distribution at MOC

1. PISA LAN (DPC W/S , ICC W/S), no wireless access (Internet) for the time being

2. Visitor LAN (wireless access to the Internet)

3. ESOC expects that all machines have a personal firewall and an up-to-date-version of antivirus software

Throughput requirements

1. MOC assumes that under no circumstances we will need more than 512k for data transfer between MOC and Villafranca, Paris and Trieste.

2. This should be sufficient for all data types.

Maintenance/Management/Availability (Lines, Routers etc.)

1. MOC will provide and manage routers for both ends

2. There will be one prime line to each of the far sites (512k) and one backup line (ISDN)

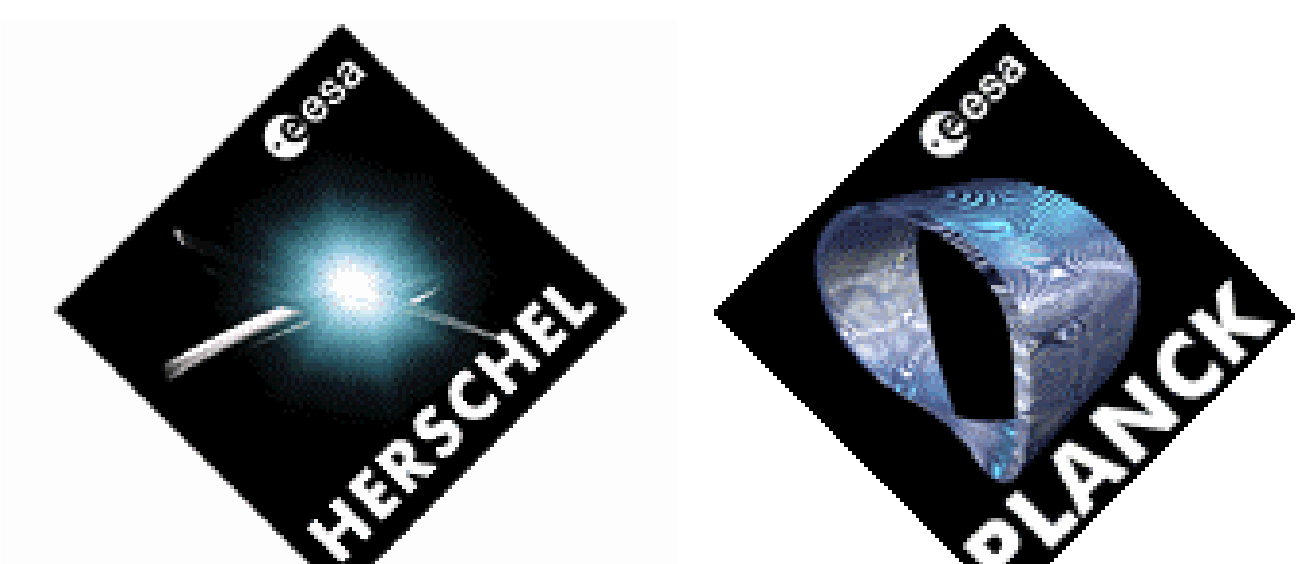
3. MOC will need to carry our site surveys at all far sites in order to collect all necessary details for installation

4. MOC will also provide training covering all important aspects of equipment maintenance and operations.

Appendix 13: EC's "End-to-end test concepts" slides

HERSCHEL/PLANCK
PGSSG#15 & HGSSE#27

Ground Segment End-to-End Test Overview and Concepts



E. Chester, OPS-ONV/ESO
Sept. 200

Contents

- End-to-End Testing – Where are the ends?
- Points of Contact
- Dates and Schedule
- Assumptions
- Planning and Concepts
- Test Interfaces and Objectives
- Test Data Sources
- Operational Realism
- Discussion

End-to-End test = SOVT (System Operational Verification Test)

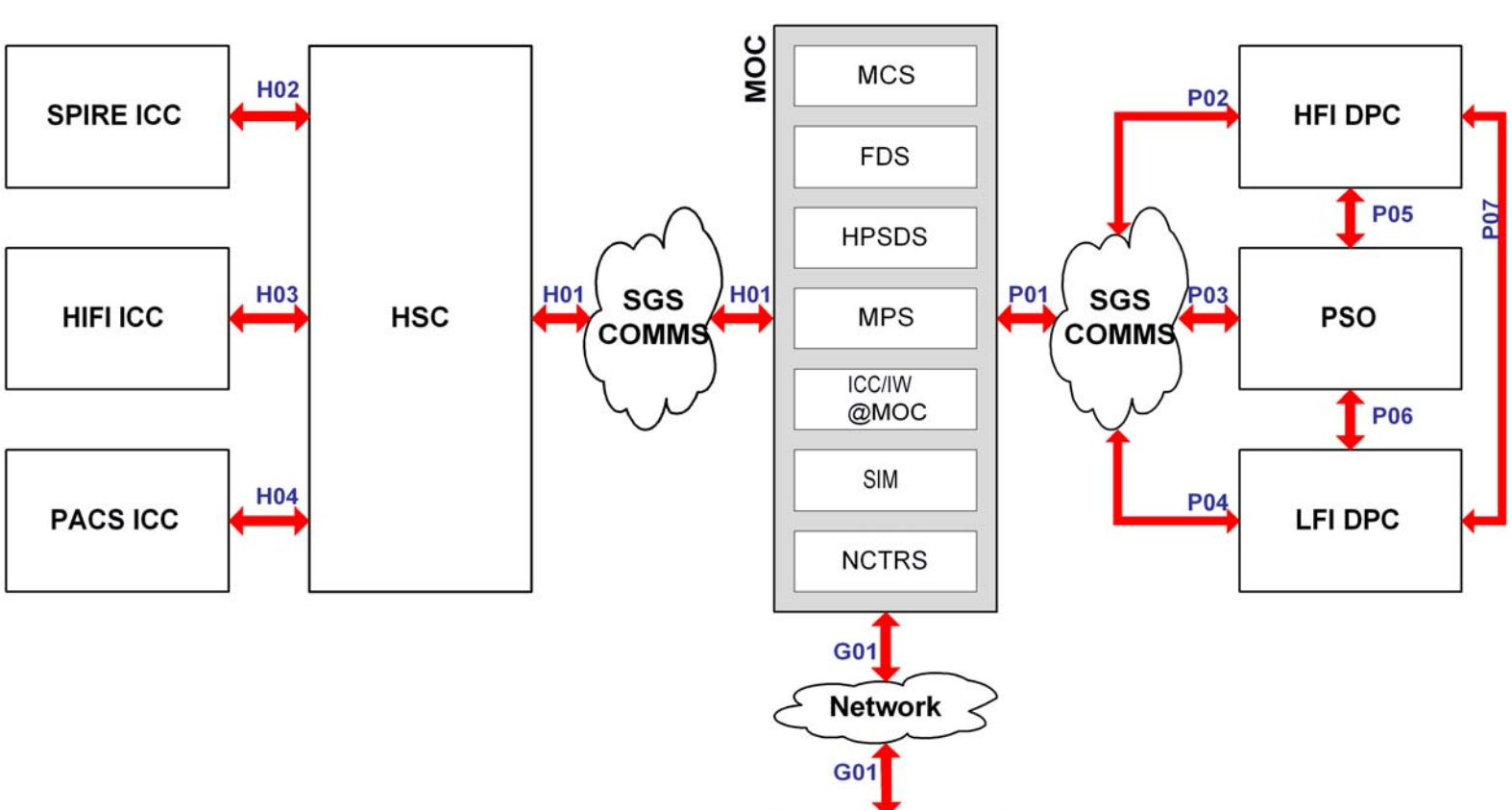
Objective:

To test the complete mission operations chain, from science team planning inputs, through despatched commands, to correctly received telemetry, archiving and distribution, science team TM requesting, and finally processing and interpretation of payload TM in science centres.
A complete mission planning cycle will be simulated/modelled.

The Ends:

- One end is at the science teams (and engineers);
- payload (and platform) are at the other end;
- everything in between falls into the scope of the SOVT.

End-to-End Testing (2)



Points of Contact

Component	*Point of Contact **
Mission Control System (HPMCS)	Gianpiero di Girolamo
Mission Operations Centre (MOC)	Ed Chester
Mission Planning System (HPMPS)	Ralph Biggins
Flight Dynamics (FDS)	Gottlob Gienger
Communications	Marko Budkovich
Planck Science Office	?
LFI Data Processing Centre	?
HFI Data Processing Centre	?
Herschel Science Centre	?
Industry / Prime (per s/c)	?

* for test purposes

Would like to complete this list as soon as possible, to initiate coordination of master test plan generation.

SOVT Roles/Scope

Component	*Scope/Role in SOVT*
Mission Control System	Receipt and processing of planning products, normal TM and TC roles
Mission Planning System	Consolidation of planning inputs and validation of planning cycle
Flight Dynamics	Receipt of FD HK TM, provision of FD planning products
Communications	Frame/Packet/File exchange between the AIT site and MOC, and between MOC and the Science centres as required.
Planck Science Office	Provision of planning files
Data Processing Centres	TM request and receipt, transfer of auxiliary files, interaction with HPSDS, validation of instrument commands, sequences and procedures.
Herschel Science Centre	TM receipt, provision of planning files, transfer of auxiliary files, validation of instrument commands, sequences and procedures.
Industry / Prime	CCS/EGSE operations, technical support, procedure approval…

Dates and Schedule

time

HERSCHEL	PLANCK	*Test/Activity*	*Notes*
L		**LAUNCH (3/8/07)**	(By this point, <u>everything</u> should work!)
L-5	L-6	SOVT-2	Payload interfaces verified; RT TM at PISA systems, simulated environmental + AOCS HK TM.
L-5	L-6	SVT-2	Every service type-subtype exercised.
L-11	L-12	SOVT-1	Payload interfaces verified.
L-11	L-12	SVT-1	Additional functionality of MCS D2 tested, re-tests as required from SVT-0. Some sequences tested with MIB closer to operational status.
L-18	L-18	SVT-0	No payload operations, basic database, telecommand and telemetry functional validation.
before all that…		Integration & unit/centre testing	ILTs, ISTs, MOC integration, GSITs, *etc.*

Assumptions

- MCS (and other MOC components) is integrated and unit-tested
- All Science centres will have performed their own “end-to-end” testing
- Instrument workstations at MOC:
  - Not (necessarily) available for SOVT-1
  - Available for interface testing by SOVT-2 preparation period (full functionality not required, and remains responsibility of science teams – but need to validate *at least* interfaces)
- Every component will provide representative ‘dummy’ or template files during the test preparation period
- SOVT (and SVT) dates will continue to be set relative to launch
- Data sets collected during previous tests will be available to subsequent tests (including TM, auxiliary files, command loads *etc.*)
- NCTRS, NDIU and network(s) are tested during SOVTs, but are already tested during integration tests and SVTs.
- Science centres will have provided instrument procedures during the test preparation period.

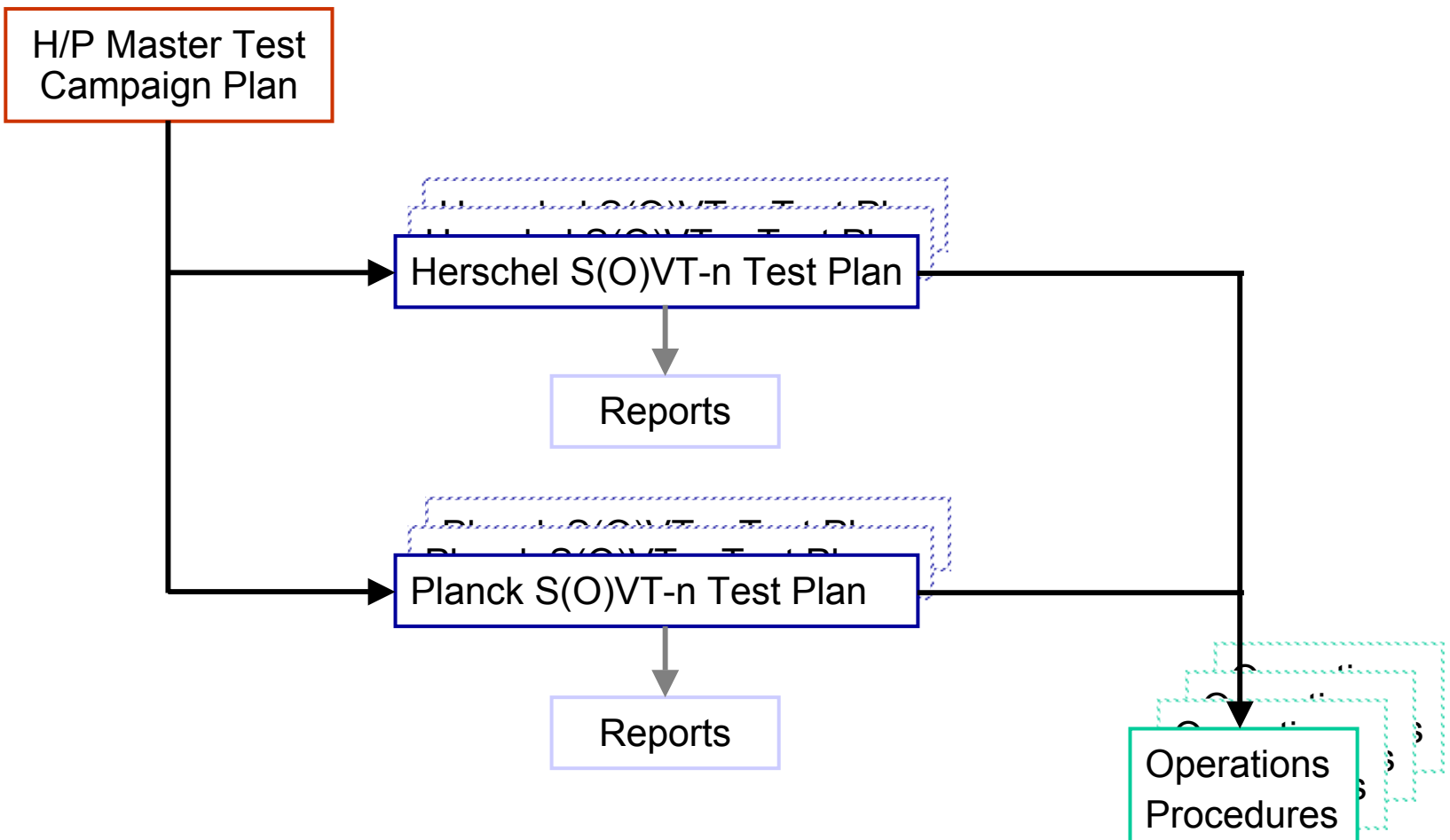
Coordination

- Test coordination is performed by the named Point of Contact people for each component, and they are responsible for communicating information around their teams as required.

Test Plans

- The overall S(O)VT test campaign shall be presented in an H/P Master Test Plan (which requires inputs from most teams).
- The Master Test Plan contains only top-level information, and refers to individual Test Plans/Test Procedures for each test (i.e. there shall be a detailed test plan for SVT-0, for SVT-1, and so on). The Master Test Plan retains a system-level perspective.
- Each Test Plan contains procedures provided by both science teams and MOC teams.
- Test Plans are agreed by all teams before the start of the Test Preparation Period (*see next slide*)
- Full test reports are required from each component/site for the actual test, within a reasonable TBD timeframe.

Planning and Concepts (2)



Planning and Concepts (3)

Test Preparation Period

- Each test is preceded by a Test Preparation Period during which required data are collected or generated as required, distributed to relevant teams, and basic connectivity checks are conducted.

- A plan, procedure or technical note will be issued with the specific requirements and basic activities for the test preparation periods. Completion of the preparation steps shall be confirmed in a brief informal test report, provided as a 'tick-box' proforma in the plan, e.g.

  ☑ *"Yes: we can login to the account on the SDS"*

  ☑ *"Yes: we have a PPL/POS here ready for the test"*

Test Interfaces & Objectives

The SOVT will exercise and validate the following interfaces:

HPFTS – file transfer
- MOC – SGS
- FDS – MCS
- FDS – SGS

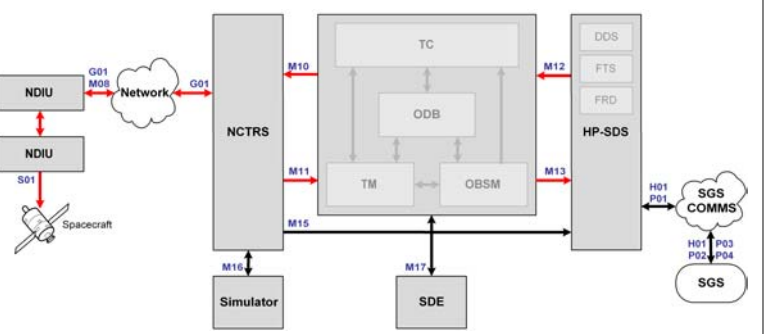
HPDDS – (Consolidated VC2,3) TM data distribution
- MCS – DDS
- DDS – SGS (remote access from external world, incl. IW@MOC)

External RT-TM (VC0,1,4) Service
- NCTRS – PISA Systems data

SODA
- MCS – FDS

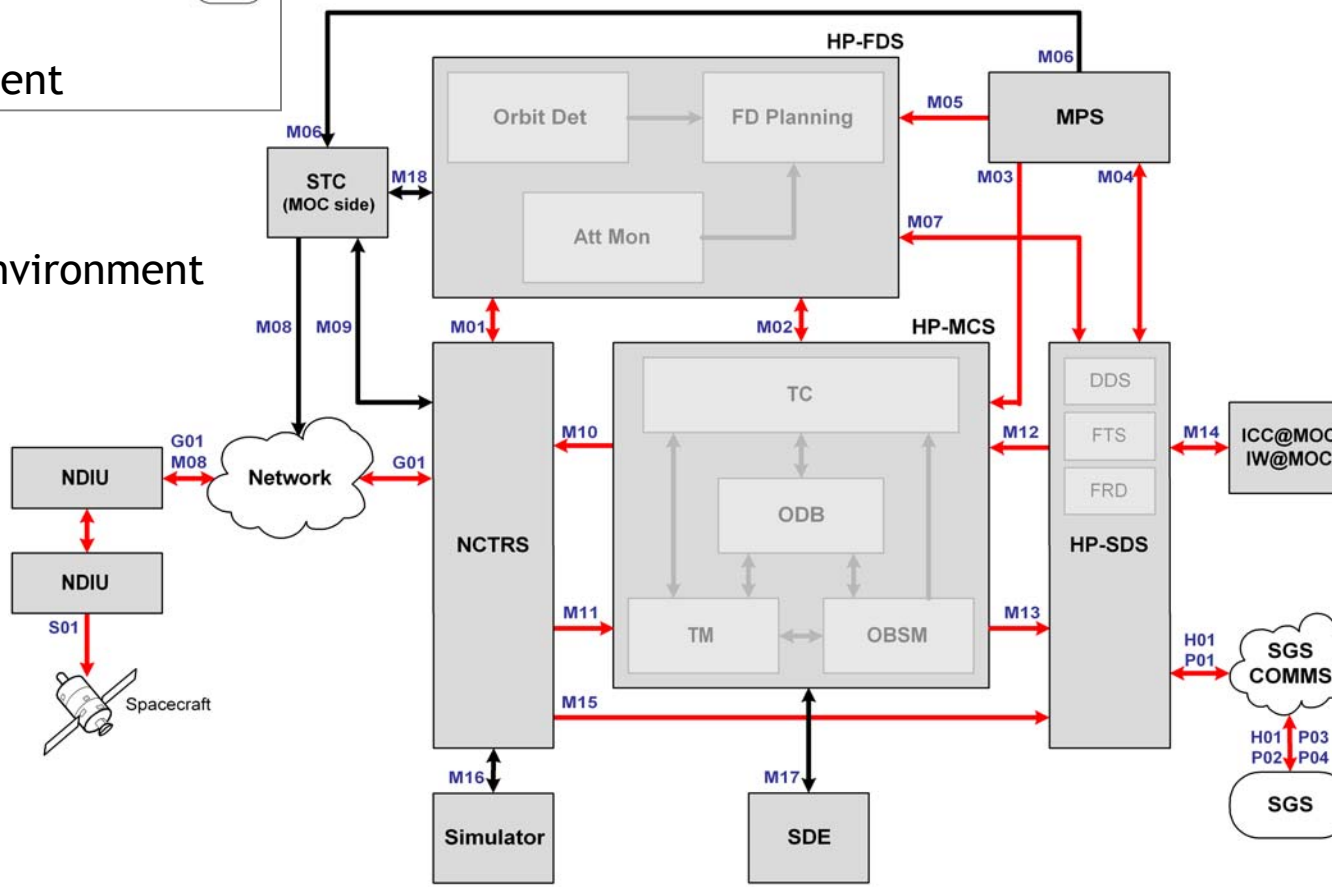
NDIU, NCTRS
- MOC – AIT site (already tested during SVTs)

Test Interfaces (2)



SVT-0 interface environment

SOVT-2 interface environment



Test Data Sources

In order to perform specific activities within a test plan, data must be exchanged between components:

- Operational interfaces MUST be used
- Data files SHOULD be as close to operational size and format as possible, i.e. compliant with the relevant ICD, and filled with appropriate information as required by the test (this may be nonsense for some files, others will need to be 'correct' (but 'fake')

The following data files are probably required for SOVT – individual test plans will have definitive lists to be consulted during the test preparation period.

PSF – POS/EPOS – PPL/APPL – SSODB – APF – AHF – TPF – ILT/IST TM files stacks – platform procedures – SVT HK datasets – OBSW images – OWLT - MIB configuration files – orbits/events file – payload procedures – *etc.*

Operational Realism

SOVTs will be conducted with the real FM spacecraft connected to the ground segment.

SOVT operations must be conducted as thoroughly as in-flight operations, to ensure both spacecraft safety, and that the objective of the test can be achieved with a high degree of realism.Data sources used should be prepared to represent operational data as closely as possible.

While a mission planning cycle will be executed during the SOVTs, these will be the first full exercises of the planning systems. Therefore they are not expected in 'real time' – an extended period of plan preparation, consolidation and validation is expected to ensure correctness of process and products, and complete understanding by all teams.

Many possible operations of the spacecraft will not be possible in the test environment, e.g. attitude manoeuvres, some payload operations. Where possible, environment telemetry and other unavailable data types will be simulated.

Large sets of dummy telemetry should be made available in order to test throughput and loading of communications links, packetisers, archiving and any other real-time processing component.

Discussion

- Is there anything in here that surprised anyone?
- Any problems/issues arising from the assumptions that relate to Science centres?
- Anything else

Appendix 14: KG's "Consolidated telemetry" slides

Agenda item 6 (iii): Consolidated telemetry

K. Galloway

(a) Availability of consolidated tm in the science ground segment

In the HSGS teleconference#3 concern was expressed by PACS regarding the availabliity of consolidated telemetry in the science ground segment.

A summary of the timeslots of TM transfer to the MOC for the different virtual channels during and after start of ground contact time as presented by Micha during the last HGSSE meeting:
Live HK at moc : T0 -> T0+3
Live Sc at moc : T0+40m -> T0+100m (+/-)
Dump HK at moc : T0+30m -> T0+2h
Dump Sc at moc : T0+50m -> T0+11h

For Live HK and Sc at ICC@MOC, the first telemetry packet is available to the ICCs almost instantaneously after its arrival at MOC.

For VC3 (science dump) the situation is drastically different: processing only starts after the complete dataset is available at MOC (T0+11h). This means the first telemetry packet is available 11 hours after its arrival at MOC.

For routine phase and most of PV this is fine. However, for checkout and early PV this will often mean an extra day in the downlink - analysis - planning - uplink cycle.

In some cases the first science dump data will be necessary input for last-minute changes to the uplink. Focal plane geometry is a typical example that cannot be done during ground contact time since a suiteable source is not necessarily compatible with the required attitude for ground contact.

If the dump data became available in chunks of e.g. one hour, the analysis of the first observations could be done already and fed back in the planning cycle.

(a) Availability of consolidated tm in the science ground segment

Micha responded:

… we have chosen a design where (most likely) VC3 (and VC2) data are going to be transferred via an FTP interface from the ground station to the MOC. This comprises the following advantages and disadvantages (excerpt from MCS SRS):

"[...] The usage of the FTP transfer approach would provide following advantages:

- The possibility to compress the data files before the transfer, with a potential reduction of the load on the network thus optimising the usage of the available bandwidth
- Simplification of the consolidation processes, reducing substantially the overhead necessary to guarantee the data completeness and fill the potential gaps.

The FTP transfer approach introduces instead the following disadvantage:

- An extra processing layer within the HPMCS.
- The necessity to wait for the closure of a file in order to start the delivery.
  The necessity for the complete transfers of the data (via FTP) prior to starting the replay and thus the processing. [...]

we added some more explanatory text in the MCS SRS:

"[...]Note: The approach of using a replayer functionality capable to inject a set of TM frames into the system at a defined rate, has been already implemented for the Cryosat Mission, and it will became part of the SCOS 2000 infrastructure in the version 4.0[Rid 189]. The difference in case of HPMCS is that also the scientific data are playback into the system although not processed. This implies a

(a) Availability of consolidated tm in the science ground segment

particular attention to be taken on the size of the files stored in the ground station and then transferred in the HPMCS. The best approach is the possibility to store the data of a pass (one every 24 hours) in more than one file per VC (may be one file every 15 minutes) so that while a file is transferred, potentially compressed, via FTP one already downloaded can be processed from the system. The proposed approach has the scope of minimize the latency time due tothe FTP usage. [...]

That means:

We meet the requirements against performance (i.e. we will make available data within the specified time after all data have arrived at MOC). Bart's concerns about the _first_ telemetry packet only available after ~11 hours are not real; we will have to find a good compromise for the size of data files that are transferred via that FTP service, but the order will be "some minutes" plus 10 minutes (as per requirement) after the dump has started.

Figures in that order of magnitude should be acceptable for the HSC (and consequently by the instrument teams); I don't think an in depth analysis of the optimal settings to be applied to the FTP interface to the ground station in order to gain half a minute or so is justified at this stage of the development of the MCS.

(b) HIFI science tm packets have the same time

Question: Why do HIFI science tm packets (from the same source) have the same time?

Answer (from Albrecht de Jonge of HIFI):

The question is, why don't we use the timestamp tick (about 16 microsec) to sort HIFI telemetry?

The decision not to do so was based on these considerations:

a) HIFI science packets carrying the same time stamp actually refer to data taken at the same time, but distributed over several packets because of the limited packet size.

b) The time stamp field relies on proper clock synchronization, which can only be achieved after communication with the instrument is established.

c) Quote from the PS-ICD :

"Time : This field represents the local on-board reference time of the packet, expressed in CUC format. Details of the time field are given in appendix 6. The relationship of the time information to packet data generation or packet completion shall be fixed and defined per packet type/subtype of each application."

d) Quote from the PS-ICD:

"Source Sequence Count : A separate source sequence count shall be maintained for each Application Process ID and shall be incremented by 1 whenever the source (APID) releases a packet. Therefore the counter corresponds to the order of release of packets by the source and enables the ground to detect missing packets."

(b) HIFI science tm packets have the same time

Answer continued:

We concluded that the timestamp is application layer data, and that the sequence counter is transmission layer data designed to maintain the proper order in the communication. It would be a bad design to rely on the timestamp, if necessary increasing it artificially by a 'negligible amount', to restore the packet sequence. It would shift the responsibility of the transmission layer to the application layer, and abuse a field that was not intended for the purpose of transmission order restoration..

Consider this scenario:

A housekeeping task in the ICU collects data samples over 4 seconds, and writes them in a housekeeping packet timestamped with the time of the first sample. During data collection, a limit monitor task discovers a out-of-limit condition and writes it in an event packet timestamped with the time of discovery of the condition. The event packet will be sent before the housekeeping packet, and hence have a lower sequence count. The housekeeping packet will have the earlier timestamp

The ground segment should maintain the order of transmission.

(b) HIFI science tm packets have the same time

Problem: The design of the HSGS systems depends upon the correct ordering of the telemetry packets upon ingestion into the archive.

- **The correct order is guaranteed in the ILT and IST mission phases as these are real time operations.**
- **The correct order of the consolidated telemetry is maintained in the in-orbit phase in the event of nominal operations (TBC with ESOC - does the ground station maintain the order of reception from the s/c when sending to the MOC)**
- **However, there is a possible scenario where the correct order of the consolidated telemetry might not be maintained (TBC with ESOC):**
  - **There are n+m HIFI science packets with the same time (coming from the same source). These have been received at the GS and are being transferred to the MOC.**
  - **There is a drop in the link between the GS and the MOC. The first n packets which have the same time are lost and will have to be resent as part of the consolidation process.**
  - **In the meantime the next m packets are sent and successfully received at the MOC.**
  - **The n packets are resent from the GS and are stored after the m packets because they have the same time but arrived after them.**

(b) HIFI science tm packets have the same time

Is this a viable scenario?

Does the MOC consolidation process guarantee the correct order of the HIFI science telemetry packets?

Appendix 15: KG's "Mission Planning/ scheduling schemes" slides

Agenda item 6 (iv):
Mission planning issues/ scheduling schemes

K. Galloway

Mission planning issues and scheduling schemes

(a) Herschel instrument scheduling schemes

Now at draft 0.4. Is it necessary to review it?

(b) Commissioning and PV phase activities

Micha asked the HSC:

"Could you please help us by hinting towards documents to consult, if we would like to find out about current ideas about Commissioning and PV of the HERSCHEL and the PLANCK instruments?"

Ana (as chair of the calibration steering group) replied:

According to the Herschel Operations Scenario Document, the Herschel Commissioning and PV phases will be carried out sequentially after LEOP, and will last 1 and 2 months, respectively.

The concrete plans and timelines of the PV phase activities are under discussion and will not be available until late next year (except for HIFI, which may have a PV plan by beginning 2005). There is a possibility that the durations given above are modified when more details are known. In

the Herschel Calibration Document draft, and references therein, you can find and overview of the Herschel calibration activities, but no timeline or detailed explanations about PV are given yet.

As you know, the Commissioning phase is responsibility of Project and, although we are discussing some of the tests, I am not aware of any document where a plan is given. Only the Reference Mission Scenario provides a first summary of the Commissioning operations and of some PV activities. Maybe Luis has more information.

Do we need to follow up on this in any way?

Appendix 16: KG's "Real-time science window" slides

Agenda item 6 (ix):
Real-time science window

K. Galloway

Instrument usage of the real-time science window

The FCT made the following comment when reviewing the PSF ICD produced by Flight Dynamics:

As the timing of the RT-Science window is heavily dependant on the timing of the Packet Store dumps the FCT would like it to be defined as starting at a configurable offset time from AOS and ending when the high-rate TM ends.

A configurable offset is useful when recovering from a missed pass for example.

It needs to be discussed during the next HGSSE how the HSC and instrument teams actually want to use their 1 hour of real-time science per DTCP so that this 1 hour allowance can be translated into constraint checks.

The current baseline is that the constraints will be applied by the MPS and, therefore, remain transparent to FD.

What needs to happen next?

Appendix 17: KG's "Documentation" slides

Agenda item 7 (i): HGSSE documentation

K. Galloway

HGSSE Documentation

(a) Design description document

Now at Issue 1.4

The updates since Issue 1.3 are:

- Mission planning section has been brought into line with Mission Planning concept document (AI#041203/12).
- The use of the H/P FTS has been addressed (AI#110304/26).

(b) Interface requirements document

Now at Issue 2.3. The main updates are:

- Orbit prediction performance requirement FGS-IR-3.1-145 updated as a result of HGSSE#25 AI#110309/9.
- Orbit reconstitution performance requirement FGS-IR-3.1-375 added as a result of HGSSE#25 AI#110309/9.
- New interface: Derived parameter definitions added as a result of HGSSE#26 AI#090604/6
- Introduced mission planning concepts document as a reference document (HGSSE AI#041203/12).

HGSSE Documentation (cont.)

(c) List of ICDs:

Now at Issue 1.6. The main updates for Issue 1.5 were:

- Added IST ICDs and set-up diagram
- IST phase: “RTA-HCSS data interface” becomes a simple file copy interface with exact details TBD.
- Interface 24. Renamed to Planned Observation Sequence
- New interface 31: Attitude utilitiesOOL/ TCH interfaces for IST updated.

The main updates for Issue 1.6 were:

- New interface 32: FTS Interface. From HGSSE#25 (AI#110304/26)- FTS to transfer files.
- The schedule status information interface is procedural (HGSSE#25 AI#110304/11).
- New interface: Derived parameter definitions (HGSSE#26 action 090604/6)
- Interface 25: Instrument command sequences. Interface removed as instrument command sequences for manual commanding are defined in the MIB/ spacecraft database (HGSSE#24)
- Time correlation during IST mission phase. TBC reference removed (HGSSE#25 AI#110304/16)

The following updates have been made in (the as yet unissued) Issue 1.7

- Introduced diagrams for in-orbit and post-operations mission phases.
- Updated applicable and reference documents
- Removed interface 30 Instrument simulator SW API (as agreed at HGSSE#25, see MoM page 12).

HGSSE Documentation (cont.)

(d) Herschel science ground segment to instruments ICD.

Now at Issue 2.2. The main updates were:

- There is now a building block execution counter associated with each building block type.

(e) End-to-end test plan

See agenda item 6 (ii).

(f) Project documentation/ access/ documentation tree

There are updated Project documents. Luis to update?

Luis/ Gottlob action 090604/14 is addressed under agenda item 2.

(g) Documentation consistency

I need to check HGS documentation against the updated documents available for the ground segment review.

Appendix 18: KG's "Science ground segment specific" slides

Agenda item 8 (iv): SGS specific items

K. Galloway

(a) Hardware time synchronisation

The issue: Are the ICCs ensuring the correct system times on their machines during their ILT testing?

Impact:

- Different times on different machines: Associating OOL records etc. will not work as the association as the association is performed based on time key.
- Using wrong dates: Possible problems if for example the system clocks are set to 1970.

(b) Building block Id

From CCB#21

SPR-0939: Confusing variable/field names for BuildingBlock.

Analysis provided 16-Sep-04. Implementation appears to be straight forward but requires schema evolution.

There was a bit of an argument with SPIRE, which uses 16 bits for BBID instead of the 14 bits allocated in the ICD.

Changing to ICD compliance will require an update to SPIRE MIBs, to Access, and to SPIRE software.

Action 210904/2: KG to bring this issue to the HGSSE meeting on 6-Oct-04 and to describe how it is resolved in the MoM of this meeting. Due: 15-Oct-04.