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M E E T I N G

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meeting place <i>lieu de la réunion</i>	ESTEC	chairman <i>président</i>	SV
minute's date <i>dates de minute</i>	28/06/02	participants <i>participants</i>	See appendix
<i>subject/objet</i>	<b>HGSSE #19 MoM</b>	<i>copy/copie</i>	
<i>description/description</i>		<i>action/action</i>	<i>due date/date limite</i>

SV officially welcomed KG.

## Comments on HGSSE#18 MoM and HGSSE#19 Agenda

There were no changes requested to HGSSE#18 MoM.

See SV's slides in Appendix 1 for the agenda.

The following items were requested to be added to AOB

- HIFI: issues associated with scheduling observations
- HIFI: packets for data frames
- PACS: MIB mnemonic
- SPIRE: Report on the SPIRE ICC review

It was also noted that a teleconference with ESOC had been arranged for 14:30 in order to discuss the simulator software requirements document.

## Review of Actions

See SV's slides in Appendix 1 for the list of actions.

**AI#171001/8:** 3 ICCs to clarify their plan for having High Fidelity HW and EGSE-ILT like set-up after the delivery of the flight model to be used for SPG/QCP & IA test purpose and Ops support purpose . Due date: 07/11.

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**Action closed.**

The intent of the action, to determine if there was a need for a Mini-MOC, was met. There will be no Mini-MOC. The problem now lies with the ICCs.

HIFI system engineering team agree there should be some sort of breadboard but the discussion is ongoing. SPIRE (SS) said that there would be a flight spare which at present is unfunded. PACS (BV) said they will have the necessary hardware.

**AI#291101/3:** ICCs to describe their proposed ILT set-up and HCSS ODMS replication requirements. Due date 17/12. Open for SPIRE and PACS

For PACS, see email from Ekhard Sturm dated 27/05/02

**Action closed.**

For HIFI see "HGSSE #17 MoM", HERSCHEL-HSC-MOM-0234, 08/03/02.

For SPIRE see "SPIRE ICC Scenarios", SPIRE-RAL-DOC-001195, Issue 1.0, 03-May-2002

**AI#280202/3:** RH to clarify usage of the S2K OBSM by PACS in ILT and consequent customization of the OBSM. Due date 08/03.

**Action closed.**

PACS will not use SCOS 2000 OBSM facility for AVM.

They have put a request to project to customize it for the DSP. Subsequently depends on a reply from project management.

**AI#280202/7:** ICCs to surface requirements on orbit data and pointing history vis-à-vis MOC. Due date 28/03

**Action closed.**

HIFI: E-mail from Peter Roelfsema, "AI #280202/7: ICCs to surface requirements on orbit data and pointing history", 16/06/02.

PACS: "PACS requirements on pointing information", H. Feuchtgruber, PACS-ME-TN-030, Issue 1.0, 26-Feb-02.

SPIRE: E-mail from Sunil Sidher, "AI #280202/7: ICCs to surface requirements on orbit data and pointing history", 18/06/02.

**AI#230402/1:** NP to confirm or otherwise the compatibility of the LOGICA patch with the TC id additional TC history field. Due date: 15/05.

See NP's email dated 26/04/02

**Action closed.**

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**AI#230402/2:** PR to produce and distribute to HSC and other ICCs draft UCs driving replication of data between development and test areas in ILT. Due date: 10/05

**Action closed.**

**AI#230402/3:** SPIRE, PACS and HSC to comment on a.m. HIFI draft UCs. Due date: 24/05

**Action closed.**

**AI#230402/4:** JD and SF to re-issue H/P instrument simulator MOC requirements. Due date: in time for next HGSSE meeting on 20/06/02.

**Action closed.**

## ILT System design

### Logica TC and OOL history server testing status (SPIRE)

SPIRE (SS) reported that the LOGICA patch to fetch TC history and OOL data had been successfully installed and tested by LOGICA in RAL on S2K v2.1.1e.

There is a test MIB and they can send commands via manual stack to the router and onto the simulator Downlink from instrument simulator to router to HCSS

The tests so far have been ad-hoc – there has been no formal testing. However, SS foresees no problems

### TERMA TC Id development status (SV & SPIRE)

Test control interface.

BV stated that Erich is waiting for the new version of TOPE which is expected by the end of June.

BV wasn't sure if Erich had the new SCOS 2000 command handler ICD (describes the interface between test control and SCOS). KG will forward it.

BV stated that Erich's planned to close his HCSS v0.2 Test control interface WP (WP-560) by the end of September.

**Action 200602/1:** KG to check at the next EGSE-WG for the delivery schedules for SCOS-2000 and TOPE. Due date: 05/07/02

KG noted that Steve Guest (on behalf of Matthew Graham) would present the status of TC history/ OOL ingestion status at the next CSDT.

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SS asked for test control documentation.

PR requested that user documentation for TestControl should be produced (as is normal for a delivered SW package), because HIFI already ran into the problem that there are only a few very simple scripts as example of how to use TestControl. Indeed –as PACS says- its main use is 'scheduling', but specifically scheduling of observations and intermixed user actions (go-nogo steps etc.).

BV stated that the test control manual is to a large extent covered by the TOPE manual (which is available).

BV agreed with PR that the test-control specific procedures are not well documented, except for the example scripts that Erich provided.

BV said that in the PACS ICC there is the opinion that we should move real observation logic as soon as possible to CUS and limit the test control logic to scheduling and controlling test control equipment.

BV said that the first AVM command sequences will probably be short test control scripts.

**Action 200602/2:** KG to check at the next EGSE-WG when there is to be a user manual for writing test procedures. Due date: 05/07/02

#### HSC – Instrument ICD: finalization of v1.2 (SV)

The changes were discussed and the following 4 additional clarifications were requested:

- Observation Identifier: Spare field values - 0110, 0111, 1xxx. Make the syntax consistent with the packet ICD. *[After meeting comment: KG checked and the current syntax is consistent with the packet ICD.]*
- HSC phase: add “(ie. Operations)”.
- Add: Observation execution counter is unique to the location
- Add: Observation Identifier is generated by the HCSS system

SS raised the issue of “essential housekeeping packets”. Do they need to have observation and building block identifiers?

BV stated that these “essential housekeeping packets” will be the nominal HK for PACS, but at a lower rate, so there will be no new format for PACS.

It was agreed to wait until the packet ICD had been updated to include these new telemetry packets. Also:

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**Action 200602/3:** KG to make sure this is an agenda item for the next HGSSE meeting. Due date: Next HGSSE meeting.

## ILT HCSS replication requirements/issues

Jon Brumfitt and Rob Zondag joined the meeting for this discussion.

The use cases produced by PR (see output of AI#230402/2) were displayed and see also PR's slides in Appendix 2.

There was a lot of discussion first on the use cases produced by Pjotr and then on possible technical solutions. The outcome of the discussion was that:

Pjotr would update his use cases to address:

- Disconnected nodes
- Management of conflict
- Node which is disconnected could be inconvenienced
- Global and partial synchronization
- Two phase retrieve/ commit/ rolling back
- Verification of changes

And present them at the next CSDT meeting (CSDT#14, 26/06/02).

**Action 200602/4:** PR to update use cases and present them to the CSDT. Due date: 26/06/02.

JB would then present proposed technical solutions to CSDT#14 and that a proposition would be made to create a splinter group to address this HCSS replication/ synchronization issue.

**Action 200602/5:** KG to propose the HCSS replication/ synchronization issue as a topic for a splinter group. Due date: 26/06/02.

## IST

### CCS – EGSE I/F status after meeting between H/P project on 06/06 (SV):

SV stated that (1) the CCS PDR has taken place and (2) our (HCSS) ICDs had been removed as applicable documents from the CCS documentation. As a result the project scientist had raised this in his project

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scientist report to D/Sci. This then resulted in a meeting with the project manager. The outcome of this meeting was:

- Telemetry: a process to feed telemetry packets to the EGSE router from the CCS (using the PIPE protocol) would be funded by project.
- Test control: No interface recognised.
- The forum for protesting/ putting arguments forward is the EGSE-WG
- It is still not clear if the CCS will have/ use the OBSM for instrument memory patching.

OPS

Pointing requirements relevant to HGS IRD:

Not discussed due to a lack of time.

Other System activities reporting/ monitoring/ co-ordination

ICC SW integration with HCSS (BV)

*[This summary was provided by BV after the meeting]*

BV identified the need of an entity that can address issues in the HCSS on the architectural and system design level. Many of those issues will appear when designing the integrated ICC systems, so the ICC responsables for the design of the integrated ICC systems should be there.

The integrated ICC systems encompass the hcsc, additional icc-specific applications [scientific simulator, calibration tools, ..] and the associated more accurate modeling of certain parts of the problem domain. These are under the responsibility and hence configuration control of the ICC.

It was agreed that the HGSSE working group with its current terms of reference was not the correct forum and that we should put this before the CSDT at the next CSDT meeting for further discussion there.

**Action 200602/6:** KG to put the above issues to the CSDT and to propose a splinter/ working group to address these issues. Due date: 26/06/02.

Instrument Simulator discussion

See PR's slides in Appendix 2

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A teleconference was held with David Verrier (TOS-xxx) and Micha Schmidt (TOS-OFC) at ESOC.

Two items were identified for discussion:

- Item 1: The simulator software requirements document
- Item 2: The DSP/ DPU emulator study

#### The simulator software requirements document

A long, not very productive (agreed by all parties involved) discussion ensued. The “highlights” of the discussion were:

- Baseline is for the ICCs to develop instrument simulators.
- ICCs stated that it was not possible to scope the amount of work involved based on the current SRD. DV stated that they should just scope the needed simulator functionality. The thing that drives the cost of the simulator is the complexity of the modelling.
- KG asked what kind of delta was placed on the instrument simulator developer by having to conform to the SIMSAT interface (break-pointing, satellite interfacing, etc). DV responded that the delta was minimal.
- According to DV the simulator SRD should expand to something like 200 pages and will reflect/ capture all (including instruments) requirements on the simulator.
- Requirement INSTR-015: Clarified by DV that the satellite database interface is not supported by SIMSAT and is not part of the simulator infrastructure.
- Requirement INSTR-011: Clarified by DV/ MS that the requirement did not imply that the simulator should run the on-board software. Requirement will be reworded by ESOC to avoid misunderstanding.
- The requirements supplied by the ICCs should be worded with regard to the procedures (contingency) which need to be tested.

The conclusion of the discussion was:

ESOC to add a column to each requirement to identify the instrument (development) relevant requirements

ICCs to send written comments on the Simulator SRD to KG for collation and then sending on to ESOC (DV, MS).

ESOC to release draft 2 of the document, including the additional column and incorporating the changes induced by the ICC comments by mid September.

**Action 200602/7:** ICCs (PR, BV, SS) to send simulator comments to KG for collation. Due date: 31/07/02.

**Action 200602/8:** KG to send collated comments to ESOC (DV, MS). Due date: 30/08/02.

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**Action 200602/9:** ESOC (DV, MS) to reissue simulator SRD (draft 2) to include a column to identify requirements which are applicable to the instruments and to incorporate ICC comments. Due date: 13/09/02 (Mid September).

In addition BV said he would assess the impact of what's been discussed on PACS [Not an action].

SS mentioned that SPIRE have a DRCU simulator URD and would forward it to ESOC (DV, MS). He also stated that he would discuss the SRD with other members of his consortium (any comments should be supplied in the time frame allowed by **Action 200602/7**).

**Action 200602/10:** SS to send DRCU simulator URD to ESOC (DV, MS). Due date: 28/06/02.

#### The DSP/ DPU emulator study

- The study is almost finished.
- The draft report has been produced
- Conclusion is that it is possible but that it will be expensive
- The emulation would need to be performed on a 64 bit processor
- It would take a year to develop the emulator after a decision has been made to go ahead
- There is no time frame for a decision
- The only customer currently identified is Herschel/ Planck

#### HGSSE ToR discussion

Not discussed due to a lack of time.

#### AOB

#### HIFI: Issues associated with scheduling observations

See PR's slides in Appendix 2

PR described how there were "timing penalties" regarding how HIFI observations were scheduled.

BV and SS said that there were similar scenarios for PACS and SPIRE.



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**Action 200602/11:** KG to draw the action of Jon Brumfit (mission planning responsible) and the project scientist team to PR's slides and to report back at the next HGSSE meeting. Due date: xx/09/02.

HIFI: Packets for data frames

See PR's slides in Appendix 2

PR informed the group that HIFI were introducing a "start of data frame" packet in order to simplify the on-ground processing of the science telemetry.

BV mentioned that PACS uses the PUS sequence counter services to indicate that science packets belong to one compressed buffer instead of sending a meta-packet first.

PACS: MIB mnemonic

BV asked if SPIRE and HIFI could confirm that the proposal to have an extra MIB table is acceptable, so I think the action is not on PACS [SCR-070: "gencusscript should generate command and variables names which are the MNEMONICS"].

SV noted that ESOC should be consulted as they have the most experience with MIBs

**Action 200602/12:** HIFI (PR) and SPIRE (SS) to look at the SCR and to identify their need for such functionality. Due date: None given.

**Action 200602/13:** KG to draw the Hassan Siddiqui's attention to this high priority action. Due date: 28/06/02.

SPIRE: Report on the SPIRE ICC review

Not discussed due to lack of time.

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*Attendees:*

Jon Brumfit (Aurora-HSC) (synchronization discussion only)  
Kevin Galloway (Aurora-HSC)  
Peter Roelfsema (SRON)  
Micha Schmidt (ESA-ESOC) (simulator teleconference only)  
Sunil Sidher (RAL)  
Bart Vandenbussche (KUL)  
Stephane Veillat (ESA – HSC)  
David Verrier (ESA – ESOC) (simulator teleconference only)  
Rob Zondag (AlbaSpace-HSC) ) (synchronization discussion only)

Cc :

O. Bauer (MPE)  
J. Brumfit (Aurora – HSC)  
K. Galloway (Aurora – HSC)  
M. Graham (Imperial College)  
A. Heras (ESA-HSC)  
S. Lord (IPAC)  
J.J. Mathieu (ESA – TOS-EMS)  
Brian Melton (ESA – TOS-EMG)  
G. Pilbratt (ESA – HSC)  
J. Rector (IPAC)  
J. Riedinger (ESA - HSC)  
Serge Valera (ESA – TOS-EMG)  
Frederick Wechlser (ESA – H/P project)  
E. Wiezorrek (MPE)

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Appendix 1: SV slides



## HGSSE#19, Agenda (draft)

- **Comments on HGSSE#18 MoM and HGSSE#19 agenda**
- **HGSSE pending actions**
  - see slides #2 & #3
- **ILT System design**
  - LOGICA TC and OOL history server testing status (SPIRE)
  - TERMA TC Id development status (SV & SPIRE)
    - Roadmap to implementation:
      - CUS+TestControl I/F + TOPE + S2K v2.3e(LOGICA patch)
  - HSC – Instrument ICD: finalization of v1.2
- **ILT HCSS replication requirements/issues**
  - Discussion on replication requirements following PACS input and UCs (TBC, depends on outcome of AI#230402/2&3)
- **IST**
  - CCS – EGSE I/F status after meeting between H/P project on 06/06 (SV)
- **OPS**
  - Pointing requirements relevant to HGS IRD (TBC, depends on outcome of action AI#280202/7)
- **Other System activities reporting/ monitoring/ co-ordination**
  - ICC SW integration with HCSS (BV) “At the next meeting I would like to discuss how we see the integration of software under configuration control of the icc (in the case of pacs: all de.mpg.mpe.herschel packages) and the hcsc (n.esa.herschel). To start the discussion I can present the architecture of the PACS ICC software system and the hcsc from the PACS point of view”
- **Instrument simulator requirements/issues**
  - Finalization of ESOC requirements on instrument simulators following last ESOC update. In line with HGSSE#18, ESOC will update current requirements (current planning is we will get an update by 12/06). ICCs should review these requirements BEFORE the meeting for discussion with ESOC at the meeting (teleconf with ESOC (SF + JD?) will be organized.
- **HGSSE ToR discussion**
  - With over half of the group members being renewed, it makes to revisit the HGSSE ToR . The discussion cannot be concluded at this meeting as some new members on ESOC and H/P project side will only start to attend at HGSSE#20, but it can be started with focus on HSC/ICC. Current HGSSE ToR can be found under livelink.
- **Next HGSSE meeting & AOB**





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Appendix 2: PR slides

# HGSSE 19 – HIFI inputs

Peter Roelfsema – ICC manager/system engineer



HGSSE 19, ESTEC,  
19/6/02

HIFI inputs



## HIFI S/W tests in operations

**AI#171001/8:** 3 ICCs to clarify their plan for having High Fidelity HW and EGSE-ILT like set-up after the delivery of the flight model to be used for SPG/QCP & IA test purpose and Ops support purpose.

Item is still under discussion within the consortium:

- Serious discussion to solve this with a simulator (arghh...!) to save money (sure...!)
- Again system engineering team has stated there must be a 'bread board' HIFI put together from AVM/DM/QM and FS parts coupled to the ILT EGSE systems.

Final decision.....??

HGSSE 19, ESTEC, 19/6/02

HIFI inputs





## HIFI pointing requirements

**AI#280202/7:** spelled out by Douwe Beintema (email 16 June):

- IID-A and pointing related appendix is expected to be met
- Pointing information for (at least) 14 instrument bore sights
- Attitude information sampled at at least 1Hz
- Attitude information at a frequency at least double the AOCS bandwidth
- The attitude information must contain:
  - time
  - Intended R.A. and Dec
  - estimated errors on R.A. and Dec
  - roll angle
  - raster point or raster line number
  - on-target flag
  - flag for out-of field reference measurement
- Errors must be filtered to contain no frequencies beyond half the sampling frequency.
- Absolute clarity required on phase shifts between reported times, positions and position errors.



## Replication use cases

**AI#230402/2:** first draft by PRR (email 16 June):

- Discussion items from Sunil included in update:
  - Synchronization during LEOP
    - Should be no problem → yes
  - Synchronization during commissioning?
    - In principle there should be NO change during commissioning → yes
  - Only (configurable) 'partial' synchronization?
  - Roll-back in UPD1.0 → No, but it should be in UPD0.1!
  - Frequency → I was presuming a daily synchronize... but this should obviously be configurable





## Instrument simulator

- Requirements discussed by HIFI system engineering team
  - not all requirements acceptable/doable in a reasonable manner
  - how and when can we implement it
- Initial questions directed to ESOC at last meeting!
  - seems like a mix of requirements for simulators in S/W *and* in H/W
  - dualistic approach; do we need to have the real OBSW (including RAM patching etc.) or a functional emulation of its behavior
  - for some requirements it is not clear why they are needed, i.e. what do you use the simulator for (e.g. simulating power consumption, real time accuracy, simulating memory upload?)
  - are there any priorities
  - what about DSP/Virtuoso emulators (PACS Virtuoso emulators)

**NONE** were answered in updated simulator requirements document!!!



## HIFI scheduling issues

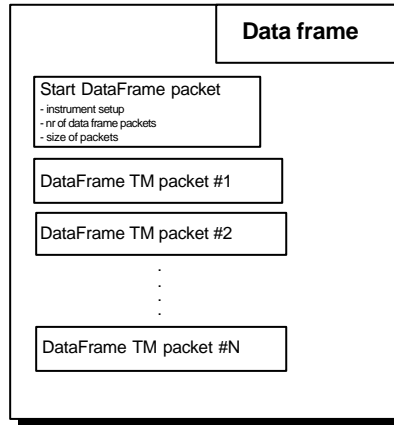
Currently actively analyzing possible HIFI observing modes:

- Users (sometimes) need influence on chop direction
  - Directly impact on scheduling
- HIFI can have significant overheads
  - Switching frequency bands ~ 1 hour
  - Switching frequency within a band ~ 20 seconds
  - Internal calibration ~ few seconds
  - ...basic integration is **a few seconds**,  
and **many** observations will use this minimum time!
- Possibilities for schedule optimization
  - Use one band per OD
  - Allow re-tuning during slews
    - or more general: allow instrument operations during slew
  - Add frequency change penalty in scheduling cost function
    - or more general: add instrument overhead penalty to cost function



## AOB; Start DataFrame packet

- HIFI plans to use a 'start\_data\_frame' packet -> commonality?
  - Different number of packets per dataframe depending on observation mode
  - All packets will have OBSID/BBID
- If start packet is lost then dataframe is (most likely) lost



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Appendix 3: BV slides

# ICC Software integration with HCSS

Bart Vandenbussche  
HGSSE#19  
ESTEC, 20/06/2002

Instituut voor Sterrenkunde



## *Background*

- Recent activities @ PACS ICC :
  - System design of the PACS ICC SW System
    - HCSS components
    - Scientific simulator
    - Interactive analysis
    - ...
  - Deployment of operational and development environment at different ICC sites : out of the box requirement
  - Accelerated development in various fields
- Proper integration ICC SW and HCSS should be an HGSSE concern, cfr HGS IRD 2.2.3

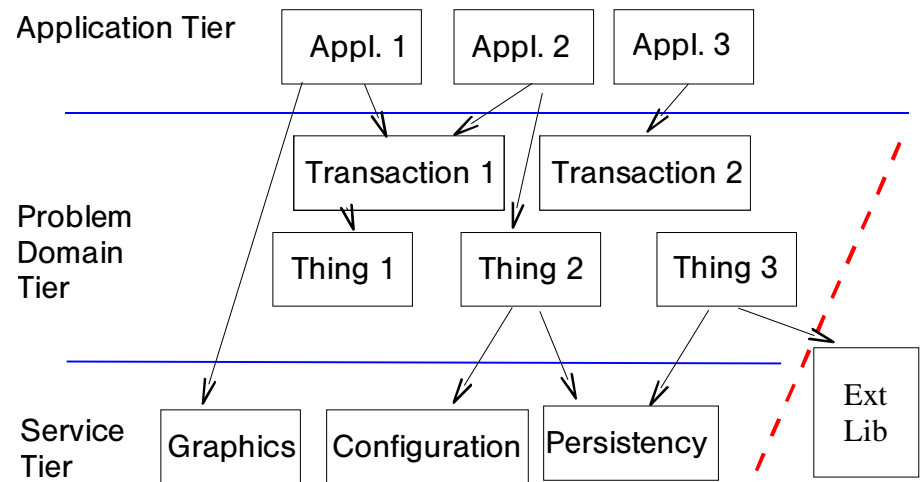
Bart Vandenbussche  
HGSSE#19  
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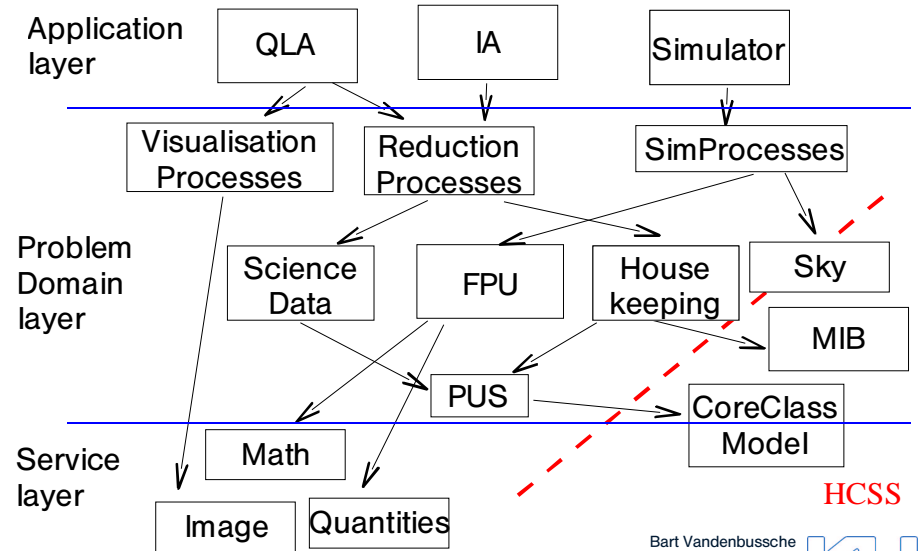
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## Multi-tier architectural principle for PACS



## PCSS packages



## **ICC-SW setup: questions and issues**

- Scope HCSS versus scope Pacs iCc Software System (PCSS) ?
  - HCSS:
    - User interfaces : Mission Planning, CUS, Telemetry ingestion, ...
    - Problem domain : Observations, schedules, commanding, telemetry,
    - Service packages : MIB, Formatter (external formats), IA framework, .
  - PCSS:
    - User interfaces : Interactive Analysis (IA) Obs simulator, QLA
    - Problem domain : PACS telemetry, (De)compression, PACS detectorarrays, PACS housekeeping, FPU optical elements, FPU mechanical elements, telescope, spacecraft...
    - Service : math, quantities,...

Bart Vandenbussche  
HGSSE#19  
ESTEC, 20/06/2002



## **ICC-SW setup: questions and issues (ctd)**

- Drawing the integrated architectural view of PCSS and HCSS not always straightforward:
  - HCSS packages not always clearly scoped in terms of vertical tiers in the architecture
  - HCSS packages not always clearly scoped in terms of domain partition
  - Modelling of domain concepts not always optimal
    - Modelling often oriented towards application-level of the packages, not complete enough for general ICC re-use; extension often difficult.
    - Duplication of modeling should be avoided, e.g. SPU buffer compression in TM processor and PACS Warm Electronics domain

Bart Vandenbussche  
HGSSE#19  
ESTEC, 20/06/2002



## PCSS CVS tree & package structure

system/  
extlib/jsky  
extlib/colt  
de/mpg/mpe/herschel/pus  
de/mpg/mpe/herschel/quantities  
de/mpg/mpe/herschel/math  
de/mpg/mpe/herschel/....  
de/mpg/mpe/herschel/pacs  
de/mpg/mpe/herschel/pacs/housekeeping  
de/mpg/mpe/herschel/pacs/spubuffer  
de/mpg/mpe/herschel/pacs/commands  
de/mpe/mpe/herschel/pacs/.....

- Aimed at easily moving packages to HCSS when useful
- External libraries
  - Ad-hoc choices now
  - Hidden behind our own service classes (math...)
  - Plan to follow HCSS selection
- Currently focusing on problem domain

Bart Vandenbussche  
HGSSE#19  
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## PCSS out of the box

\$pcssroot/bin/sunos	\$pcssroot/src/pcss
\$pcssroot/bin/linux	\$pcssroot/src/hcss
\$pcssroot/bin/windoze	\$pcssroot/doc/
\$pcssroot/lib/pcss.jar	\$pcssroot/doc/pubapi/
\$pcssroot/lib/hcss.jar	\$pcssroot/doc/protapi/
\$pcssroot/lib/jsky.jar	\$pcssroot/doc/...
\$pcssroot/lib/colt.jar	\$pcssroot/copyrights/
\$pcssroot/lib/i18n/	
\$pcssroot/lib/sunos/jre/	
\$pcssroot/lib/sunos/jai/	
\$pcssroot/lib/linux/....	
\$pcssroot/lib/windoze/....	
\$pcssroot/config/	

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## ***PCSS configuration control***

- A PCSS configuration consists of
  - Tagged versions of PCSS SW components
  - A stable HCSS build
  - Stable external library builds
- Automatic PCSS builds :
  - Compiling configuration according to tags of PCSS source file versions in CVS
  - Copying selected HCSS builds
  - Copying selected external library builds
  - Building integrated javadoc for PCSS, HCSS and external libraries. Both public apis and protected apis

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## ***Things to think about***

- Common approach ICC SW - HCSS integration
- ICC-specific problem domain modeling in HCSS
  - Instrument domain software components inside HCSS?
  - or use apis of ICC SW builds and avoid 'ISO pipeline phenomenon' ?
- Architecture of ICC SW and HCSS allowing to move ICC-controlled SW to HCSS control.
- Clean architectures for both ICC SW and HCSS: tiers and domain partition

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