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| meeting date <i>date de la réunion</i> | 16/11/00 | ref./réf. | FIRST/FSC/MOM/0165 | page/page | 1 / 12 |
| meeting place <i>lieu de la réunion</i> | SRON | chairman <i>président</i> | SV | | |
| minute's date <i>dates de minute</i> | 24/11/00 | participants <i>participants</i> | See appendix | | |
| subject/objet | FGSSE #10 MoM | copy/ <i>copie</i> | | | |
| description/description | | action/action | | due date/date limite | |

Objective & Agenda

See SV's VG#1

There were no comments on the proposed agenda

Comments on the FGSSE#9 MoM: none

New issues of FGSDD and FGSIRD

SV recalled that FGSDD 1.0 and FGSIRD 1.3 have been issued on 03/11/00. These issues include changes on the ILT part of the documents as agreed at the FGSSE-EGSE meeting on the 09-10 October as well as changes related to other phases triggered by comments from project and ESOC.

SV stressed in particular that:

- 1) requirements FGS-IR-3.1-40/50/60/70 related to the content of TM have been deleted from the IRD on the ground that these requirements are not on the MOC-FSC interface.
- 2) Requirements in 3.2.2 related to the ICC@MOC ICC I/F are deleted as they are requirements internal to the ICCs

Wrt to 1):

ICCs agreed that these requirements are not relevant to this I/F. However, PR stressed that they are relevant requirements, that should therefore be captured in other relevant documents. Requirement 3.1.50 (OBSID in science TM) is captured in the OIRD, see PACK-15. The other requirements are not captured in any documents; they are all in effect requirements on the instrument teams and/or ICCs.

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It was agreed that FGS-IR 3.1.40 should actually be split in two requirements (1) the ability to detect missing TM that is lost during ground contact at the link between the satellite and the ground station and (2) the ability to detect problems in the link between FSC and MOC when retrieving consolidated TM from the MOC. It was agreed that the second part of the requirement is relevant to the FGS IRD and should be introduced in the next issue.

It was discussed that FGS-IR 3.1.70 will be implemented as part of the instrument procedures that the instrument teams will write for the MOC .

The exact handling of these requirements was left TBD. It was proposed that at least for the time being these requirements be captured in the FCSS open issue document, so that they do not get forgotten. SV will follow it up.

Wrt to 2), ICCs wants more time to think about it.

SV pointed that any short term changes to the IRD will have to be done in the frame of the FCSS SRR/PDR.

Overall ICCs were not really pleased with the fact that requirements were taken out of the IRD (by SV) without the whole group being involved.

Discussion on the FGSSE role/responsibility wrt to ILT FGS integration and system tests.

The FGSSE does not see itself as having an active role in the integration and system testing of the ILT set-up (i.e. FCSS+EGSE-ILT+RTA). This is understood to be the role of the different instruments EGSE managers, co-ordination between the different instruments being done in the frame of the EGSE-WG.

In the context of the ILT set-up testing, the FGSSE will be interested in monitoring the I/F and system tests which are relevant for the next phases of the mission (i.e. IST, routine) in order to assess what can be actually re-used in these next phases. However, it is not clear at present whether there will be any formal testing done on the ILT set-up, this should be clarified by the different instruments or by the EGSE-WG.

In addition, the FGSSE should look at any additional tests or activities which should be done in the frame of ILT in order to prepare for the next phases (e.g. collect science TM data for play back in SVT or EE to test the downlink from TM generation to QLA processing of TM).

⇒ **AI#161100/1 FSC and all three ICCs to investigate potential additional tests or activities in ILT to support SVT or end-to-end system testing. Due date next FGSSE meeting.**

It was also re-stated that the main activity of the FGSSE in the coming months will be to guide and review the ILT development and in particular the ICDs for ILT to ensure that they are consistent with the concept of smooth transition as currently defined in the FGSDD and take corrective actions if not.

Regarding the FGSSE ToR, the active involvement of the FGSSE in the planning of the FGS integration and system tests is to be understood for the operational FGS (FSC+ ICCs+ MOC), not for the testing phases.

System design monitoring

The discussion was triggered by a number of comments on the two TNs resulting from the FCSS UCs splinter groups: "Analysis of ILT UCs" issue 0.15 dated 27/10/00 and "Data processing from TM ingestion onward" issue 1.0 dated 13/11/00.

Compression/de-compression

The data processing TN stresses the fact that compression for PACS will lead to PUS TM packets non-correlated with BBID and OBSID. This is going against the initial idea of being able to correlate TM data with observation and BB at the level of PUS TM packets.

RH (see RH slide 1) explained the concept of the TM data processing as seen by PACS and as reflected in the data processing TN. TM data are to be related to observation and BB at the level of product TM packet. Although different from the initial plan for other instruments, this TM data processing scheme is seen as being compatible with the other instruments (see RH slide 2). In other words, all instruments shall have the concept of Product TM as the basic starting point for scientific data processing. For other instruments, the data processing will be simpler than for PACS, as no compression/decompression is involved (see RH slide 2).

Other comments from RH on slide 1, comments are relevant for PACS only:

- The slide gives a simplified view of PACS data processing from detectors read-out frame on board to the generation of product TM on ground.
- Reduced frame : the reduction (e.g. running average) is irreversible, i.e. read-out frame cannot be recovered . The reduced frame will not cross observation or building block boundaries, i.e. a reduced frame can be associated with one OBSID and one BBID
- Compressed entity: optimal block size for compression is about 30KByte and therefore several reduced frames are gathered without taken into account the OBSID and BBID. A compressed entity is therefore not synchronised with OBSIDs and BBIDs.
- the data processing down to the generation of compressed entity is handled by the SPU
- Compressed TM = compressed entity
- Product TM = Reduced frame

For all three instruments, PUS and product TM packets will be made persistent.

In this concept, PUS TM will only be stored according to their generation time key. Consequently, PUS TM cannot be queried according to OBSID from the FCSS. JD stressed that the same applies for the MOC DDS.

Because, reduced data frame and PUS TM are de-correlated (at least for PACS), the time field in the PUS TM data field header may not be usable to time tag science TM data with enough accuracy. JD pointed out that it would then seem more appropriate that each frame carries its on board read-out time. This is to be further investigated, see action below.

Beyond being needed for science data processing, this time could also be used to exactly time the start and end of any building block. The exact start/end time of a BB is important to be able to then accurately correlate HK data with BB.

It was noted here that

1. the OIRD (MTL-9) allows for a mission timeline to be shifted in time (+- 5 minutes), i.e. the actual start/end time of a BB could be different from the time start/end time of a BB as defined by the FSC MP.
 2. Instruments HK TM packets will not carry OBSID and BBID information as the sampling for the HK data will not be in synch with observation and BB (at least for PACS) and time tag will be the only way to correlate HK and science data.
- ⇒ **AI#161100/2: ICCs to investigate for their instruments the relevance or not of the PUS TM packet timing information for data science processing and the need to have additional timing information attached to the data frame in particular to mark actual start/end time of a BB. Due date: next FGSSE meeting.**
- ⇒ **AI#161100/3: PE to confirm the operational need/capability for shifting instrument commands time wrt time determined by the FSC MPS. Due date: next FGSSE meeting.**

Still wrt HK TM packets ingestion, SV pointed out that it will not be, in general, possible to associate HK TM to Observation and BB, at the time of the reception of these data in the FCSS. In ILT, at the time of reception of HK TM packet, the start/end execution time of an BB may not be known. In routine phase, the actual start/end time can have been slightly shifted with respect to the time of the schedule (see above). The actual time will only be known with certitude once the science TM will have been ingested. Therefore, no relation wrt to OBSID and BBID can be done for HK TM before ingestion of the science TM. In routine phase, for consolidated TM, science TM ingestion may only occur several hours after HK TM reception. This is not seen as an issue for any of the ICCs.

Finally, it was noted that the archiving of HK TM data is not really addressed in the data processing TN.

BB defined outside the CUS

PACS is investigating at least two scenarios where BBIDs would not be defined at the time of the instrument commanding generation:

1. The ILT TN leaves the door open for BB to be defined on board for PACS (see point 21 p 9) to accommodate for high level commanding of the instrument via OBCP.
2. For raster observations, PACS is investigating the possibility to identify BB at the time of the ingestion of TM based on pointing information, i.e. one BB would be identified for each pointing in the raster (RH).

PR&SV noted that point 2) raises particular problems, can you trust the On Target Flag? (you could not on ISO) or would you have to wait for the pointing history (i.e. several days) before being able to ingest Raster TM data into BB data?

Possibly these scenarios could be accommodated in the current TM data ingestion framework as defined in the data processing TN, however, it was stressed at the meeting that this would significantly increase the complexity of the TM data ingestion and make it more likely to have different ingestion principles for the different instruments. This, in turn, would lead to a potentially less reliable, more difficult to maintain, more difficult to operate TM ingestion process.

PR stressed that HIFI, in particular envisage no exception to the principle of having all BBs identified as part of the CUS. The same goes for SPIRE.

For raster observations, the instrument being free-running from start to end, the need for having different BBs could not be clarified at the meeting. In addition, other solutions could be envisaged based on the predictability of the different micro-slews+dwel time duration in the raster (PR).

As a conclusion on this point, it is the position of the FGSSE, that decision by ICCs of implementing observing mode where BB are NOT defined as part of the CUS should be very careful traded-off.

QLA operating outside OBSID/BBID context.

See data processing TN 6.13 p 24. The signification of having QLA operating outside an OBSID/BBID context could not be clarified at the meeting. Does it mean that QLA should be able to analyse TM generated from manual commanding (all other science TM should have an OBSID/BBID context)? In this case, what is the ingestion process for these TM? Would we need a default OBSID and BBID to have these data ingested following the same process as science TM data generated from CUS commanding?

QLA NRT I/F.

See data processing TN 4.1.4 p 11. An external NRT TM I/F is required from the FCSS to serve QLA. To the understanding of the FGSSE, such an external I/F is only required by PACS, the other instruments will develop their QLA as an extension of the FCSS CCM. SV pointed that this seems to go against the instrument commonality concept and again is likely to increase development, maintenance and operation

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effort for the FCSS. In any case, the concept of the external NRT I/F for QLA should be clarified by PACS, the TN is referring to access of SW artefacts?? How does this fit with the TM ingestion and TM product generation as defined in the TN? SV will also raise the issue at the next FCSSMG meeting.

RH as the PACS representative will attempt to clarify the above three PACS related issues and feedback to the FGSSE:

- BB defined outside the CUS
- QLA operating outside OBSID/BBID context
- QLA NRT I/F

Email from NP on FFRD dated 15/09:

Not discussed

I / F monitoring / presentation

SCOS-2000 CORBA based I/F see slides from NP presented by JD.

It was concluded that the CORBA supported I/F are only of interest for the SCOS-2000/Test Control I/F. No usage is foreseen of CORBA for the FCSS-SCOS-2000 I/F.

NCTRS emulation

JD clarified that NCTRS emulators have been developed for both Rosetta and Integral. They feed TM frames to SCOS-2000 via TCP/IP in the same way as the NCTRS does. TM frames are input to the NCTRS emulator as files. These emulators have been developed by ANITE. It is still to be clarified by NP whether they can be re-used in one way or another to support the FCSS-RTA TM I/F. In particular the FCSS-RTA TM I/F is to be TM packet based, not TM frame based.

They are also some restriction on the delivery of these emulators; in fact, only the Integral one is an ESOC deliverable.

JD also mentions that a SCOS-2000 TM packet generic I/F is planned to be developed for SCOS-2000 v2.3 or 2.4 (TBC). This would support the reception of all TM packets conforming to the PUS standard. This could be relevant to the FCSS-RTA I/F but the development schedule may not be compatible with ILT (TBD).

⇒ **AI#161100/4: JD to send the specification for the SCOS-2000 TM packet generic I/F together with development schedule. Due date: next FGSSE meeting.**

Other ICD issues:

TC history:

The issue of relating TC history entry with command generated by the FCSS was put forward by JD. Following discussion, the following ways forward were proposed for further investigation.

- 1) The CUS would associate the OBSID and BBID to each command mnemonic statement; these ids would be then carried over to SCOS-2000. SCOS-2000 would then append it to the relevant TC history record.

A command mnemonic statement from the CUS would look like:

<Time> <OBSID> <BBID> <command mnemonic> <para1> <paraN>

The OBSID and BBID as listed above are not to be uplinked and would only be for SCOS-2000 consumption. The OBSID and BBID information for the instrument itself are part of the commanding, e.g. special command.

- 2) SV proposed an alternative (discussed with S. Valera) whereby the SCOS-2000 TC id (TC sequence count) would be returned to the FCSS in association with the corresponding command mnemonic (SV).

Both solutions seem applicable in principle to all phases. It was however recognised that proposal 1) could represent a significant modification to SCOS-2000 and in ILT to Test Control.

⇒ **AI#161100/5: JD to investigate feasibility/effort associated with proposed solutions for relating TC history record and FCSS command mnemonics. Due date: next FGSSE meeting.**

RH asked for a clarification of the packet size limitation for memory dumps. The PUS recommends to use large packets for memory dumps, however the PS-ICD doesn't allow for this.

JD explained that a strict limitation on packet size is needed as FIRST does not implement the concept of segmentation of source TM packets but that the actual size limit of 1024 Bytes could be subject to modification in phase B. RH pointed that a change in the size limit from 1K to 2K may be of interest to PACS since between SPU and DPU packets are 2048 octets. RH will check this with the PACS instrument team.

Other System activities reporting/monitoring/co-ordination

Not addressed beyond discussion on FGSSE responsibility, see above.

Review of actions

Past actions:

- ⇒ AI#300800/4: JD to investigate the possibility to provide a first draft TC history ICD by end October. Due date: 09/10 (next meeting).

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Closed by email from NP dated 26/10.e The SCOS 2000 Command Source Handler ICD specifies the TC history record structure

⇒ AI#300800/6: ESOC (NP) to check that the SCOS-2000 instrument TC&TM database can accommodate TM packet of variable length. Due date: (09/10: next meeting)

Closed by email from NP dated 28/09

New actions:

- ⇒ **AI#161100/1 FSC and all 3 ICCs to investigate potential additional tests or activities in ILT to support SVT or end-to-end system testing. Due date next FGSSE meeting.**
- ⇒ **AI#161100/2: ICCs to investigate for their instruments the relevance or not of the PUS TM packet timing information for data science processing and the need to have additional timing information attached to the data frame in particular to mark actual start/end time of a BB. Due date: next FGSSE meeting.**
- ⇒ **AI#161100/3: PE to confirm the operational need/capability for shifting instrument commands time wrt time determined by the FSC MPS. Due date: next FGSSE meeting.**
- ⇒ **AI#161100/4: JD to send the specification for the SCOS-2000 TM packet generic I/F together with development schedule. Due date: next FGSSE meeting.**
- ⇒ **AI#161100/5: JD to investigate feasibility/effort associated with proposed solutions for relating TC history record and FCSS command mnemonics. Due date: next FGSSE meeting.**

A O B & N e x t M e e t i n g

FGSSE#11 meeting will be held on 24th January 2001 in MPE (Garching). No meeting could be scheduled earlier due to the FIRST science Toledo meeting and the FIRST ITT evaluation exercise.

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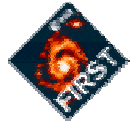
John Dodsworth (ESA – ESOC)
Rik Huygen (KUL)
Peter Roelfsema (SRON)
Sunil Sidher (RAL)
Stephane Veillat (ESA – FSC)

C c :

O. Bauer (MPE)
J. Brumfit (Aurora – FSC)
P. Claes (ESA – FSC)
T.G. Dimbylow (RAL)
Pierre Estaria (ESA - FIRST/PLANCK project)
K. Galloway (Aurora – FSC)
A. Heras (ESA-FSC)
S. Lord (IPAC)
J.J. Mathieu (ESA)
Nestor Peccia (ESA-ESOC)
G. Pilbratt (ESA – FSC)
J. Riedinger (ESA - FSC)
E. Wiezorrek (MPE)

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Agenda:



FGSSE#10, Agenda (draft)

- **Comments on FGSSE#9 MoM and FGSSE#10 agenda**
- **Comments on new issues of FGSDD, FGS IRD:** (1/2 hour) (SV, all)
 - new issues include a few changes which have not yet been discussed at FGSSE level. See change record.
- **Discussion on the FGSSE role/responsibility wrt FGS integration and system tests:** (~ 2 hours) (SV, all)
 - responsibility and reporting line
 - tasks to be carried out? how to perform them?
 - resources
 - time frame/schedule
- **System design monitoring** (~1 +1/2 hour)
 - clarification on PACS On board SW development (RH):
 - compression/decompression
 - BB identification on board
 - other?
 - discussion of above wrt impact (if any) with the FGS system design baseline (FGS DD v1.0) (all)
 - any other points we should address (all)
 - coming out of ILT and/or Products UCs WG TNs
 - email from NP on FFRD dated 15/09
- **I/F monitoring/presentation** (~1 +1/2 hour)
 - Inputs from ESOC (JD)
 - NCTRS emulation for Rosetta
 - SCOS-2000 CORBA I/F
 - Discussion on relevance of above development to the FGS and next steps (all)
 - any other (ILT) ICDs issues to be addressed
- **Other System activities reporting/monitoring/co-ordination** (~ 1/2 hour) (all)
 - co-ordination with EGSE-WG and/or with ESA-TOS(EGSE) activities
- **FGSSE actions (status+recap)**
 - AI#300800/4: TC history email from NP dated 26/10
 - AI#300800/6:TM variable length from NP dated 28/09
- **Next FGSSE meeting**
- **AOB**

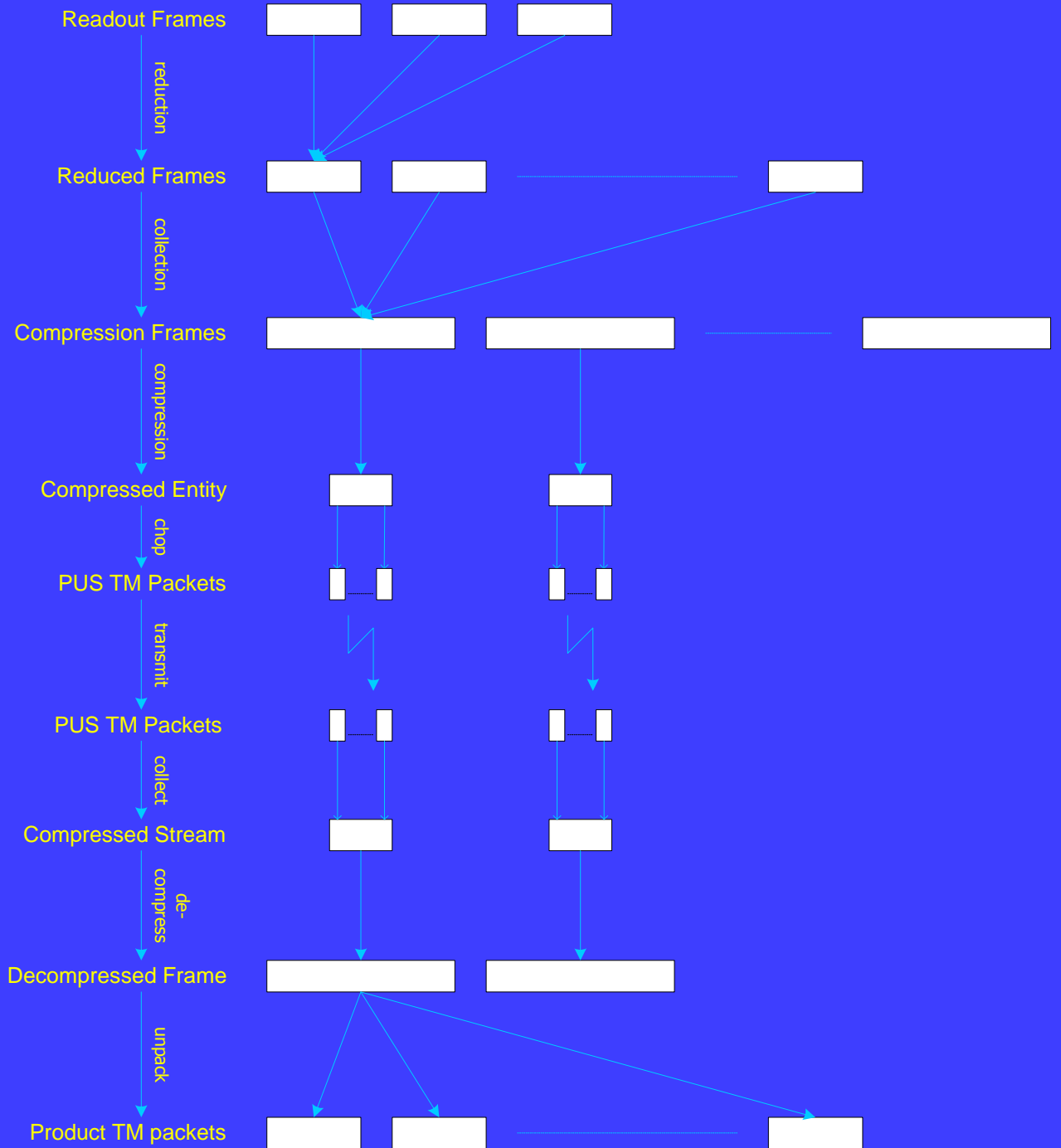
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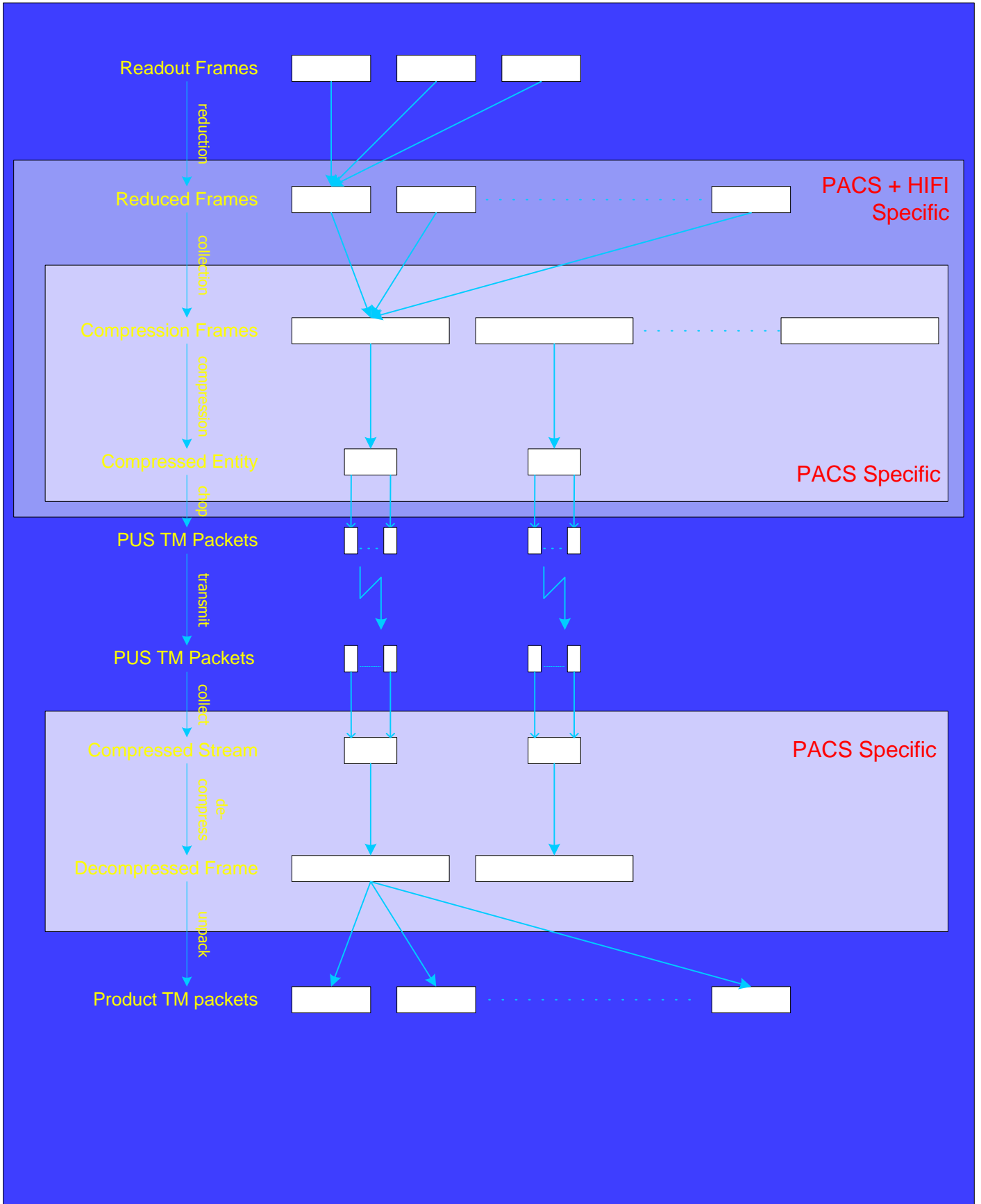
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RH' s V G s:

On-board Reduction-compression on-ground de-compression



On-board Reduction-compression on-ground de-compression



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NP/JD VGS:

SCOS 2000

CORBA based External Interface Services

N. Peccia (TOS-GCM)

9th October 2000



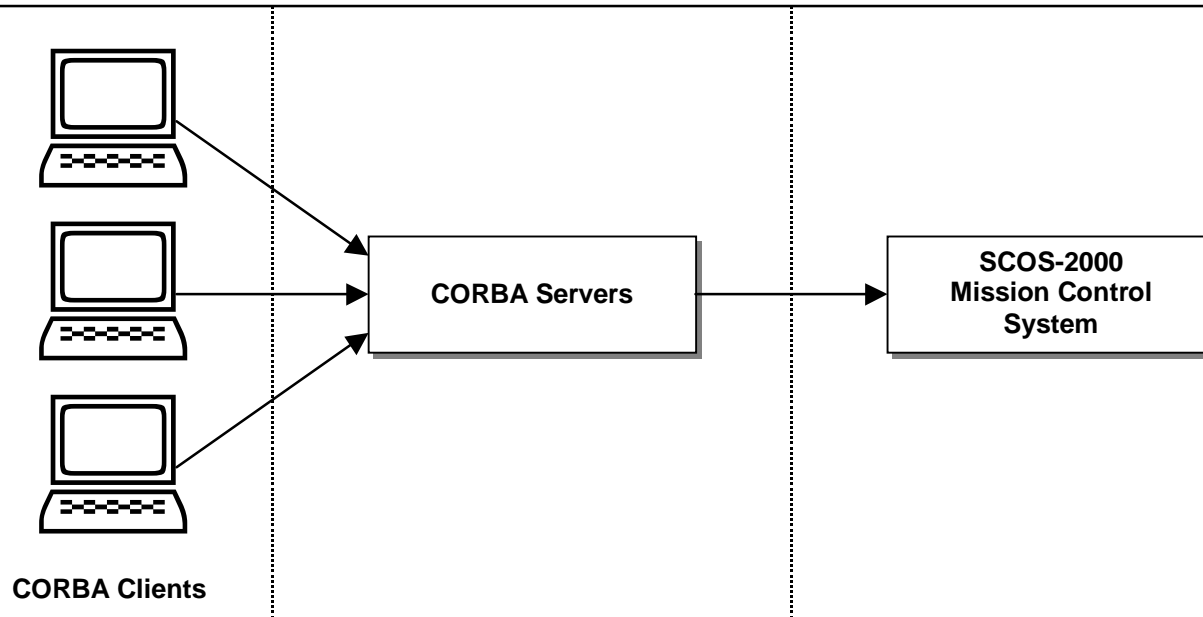
TOS-GCM

Presentation to GC
FIRST / PLANCK

Introduction

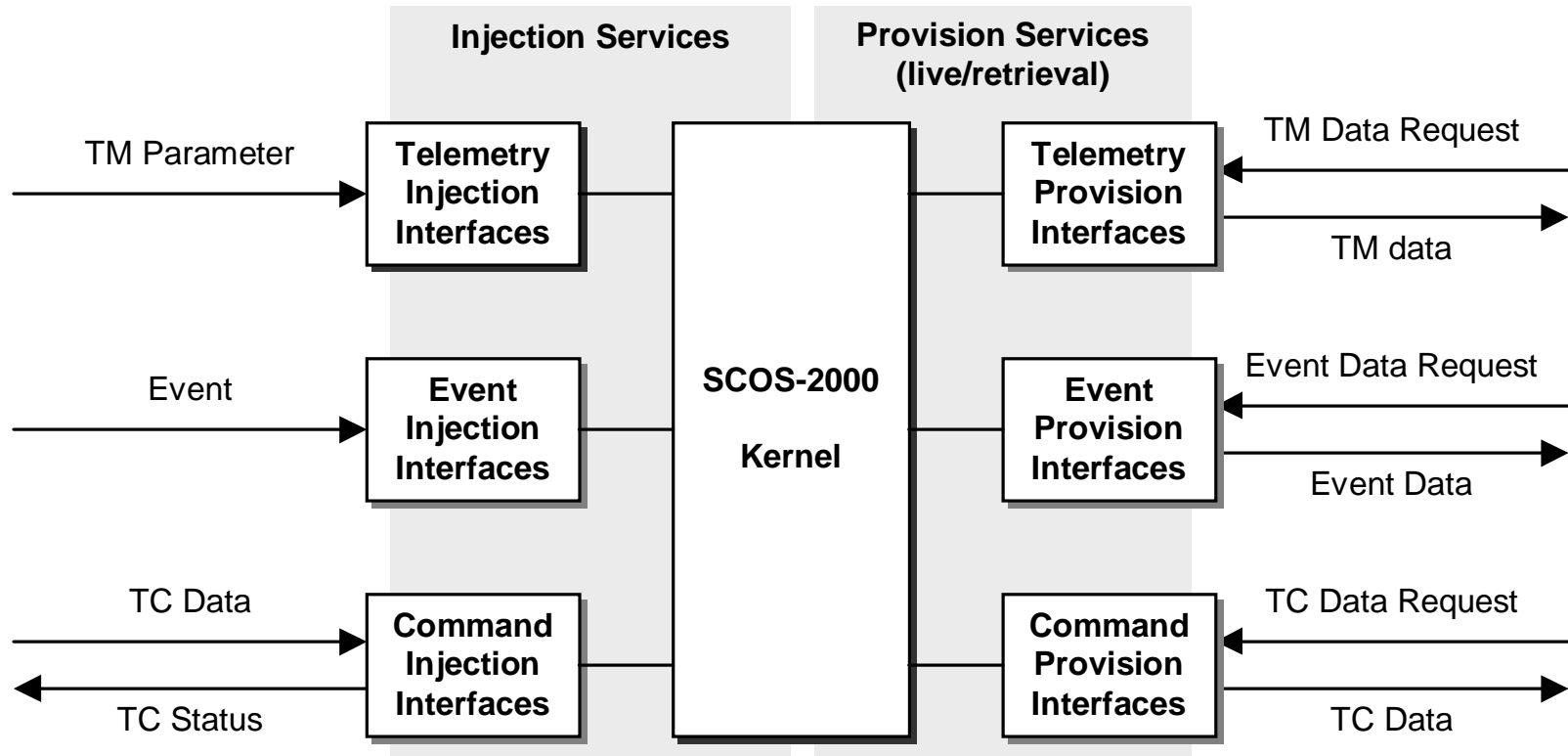
- **It supports different generic CORBA based services to accommodate the needs of external applications for interfacing with SCOS/2000**
- **It is implemented using the CORBA standard**
 - applications running on SUN Solaris, Windows NT or LINUX and using different programming languages are able to use these interfaces.
- **SCOS-2000 also provides other types of external interfaces based on ASCII files or on TCP/IP**
- **The services are based on a client / server architecture. The external application is the client and the server is a CORBA server process running on a SCOS-2000 W/S.**
- **External applications register to the running services server, which shall connect it to the appropriate CORBA objects , responsible for the services required. Access to the different services is done through a service key.**

OVERALL ARCHITECTURE



The SCOS-2000 External Interfaces based on CORBA for the provision of data are an extension to the SCOS-2000 core Mission Control System. They allow different types of clients an access to MCS information. The only technical requirement for this purpose is the availability of CORBA on the client side.

SCOS-2000 CORBA based External Interface Services



SCOS-2000 provides different types of CORBA servers for accessing MCS information

INJECTION SERVICES

- **Telemetry Parameter Injection Services**
 - to inject a TM parameter value into SCOS-2000 (e.g. similar to the use of constants in SCOS-2000 TMSPACON task + set of dynamic variables)
- **Event Injection Services**
 - to inject events to be logged and filed into SCOS-2000 (e.g. event messages but external OOL is not covered)
- **Command Injection Services**
 - to inject command execution requests and to receive information on the verification status of those requests. (e.g. a TC with its editable parameters, a TC sequence and its formal parameters, a group of TCs, a block of TCs, a saved stack file or a task parameter file.)

PROVISION SERVICES

- **Telemetry Parameter Data Provision Services**
 - to receive TM parameters in live or retrieval mode (e.g. synthetic parameters calculated outside SCOS 2000, pass of global information to other external applications, single or group of parameters). Different filtering mechanism are supported.
- **Event Data Provision Services**
 - to receive SCOS-2000 events in live or retrieval mode (e.g. all events, or only events of severity alarm, or OOL events)
- **Command History Data Provision Services**
 - to receive command history data in live or retrieval mode.

Examples of external client applications

- An automatic procedure execution environment running on (e.g. a PC) needs to use the *Telemetry Parameter Data provision Services* to access the data for the telemetry parameters which it monitors. It also needs to inject commands, groups of commands, blocks of commands, command sequences, Saved Stack File, Task Parameter Files (TPF) into SCOS-2000 using the *Command Injection Services*.
- A WEB based remote monitoring application showing telemetry parameter displays needs to use *the Telemetry Parameter Data Provision Services*. In order to provide a command history on the Web, the application needs to use the *Command History Data Provisions Services*. In order to provide an event logger application on the Web, it will use the *Event Data Provision Services*. Out of Limit Displays can be implemented on the Web using the *Event Data Provision Services*, as Out of Limits information are specific SCOS-2000 events.
- A mission planning system could use the same mechanism as an automatic procedure execution environment, injecting commands and monitoring telemetry parameters and event. It could also generate an ASCII files containing a list a command or sequences to be executed by the SCOS-2000 automatic stack

GENERAL CONSTRAINTS

- **CORBA**

- SCOS-2000 uses ORBIX 3.0, which is not compatible with CORBA 2.2
 - ORBIX 3.0 uses the non standard Basic Object Adaptor (BOA), while CORBA uses the Portable Object Adaptor (POA)
 - This only impacts the C++ server code implementation and not the communication protocol
 - It is required to implement the CORBA based external interface services with the same version of ORBIX as for SCOS-2000. CORBA shall be available on the client side.
 - CORBA naming services shall be used for the connection of the external applications to the CORBA objects.
 - To avoid performance problems the data provision services can be installed on a separate SCOS 2000 client and the data distribution can be optimised by using filtering and grouping.
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Schedule

| Service | Status | Next Delivery |
|---|--|-----------------------------|
| SCOS-2000 TM Parameter Data Provision Service | Available with WEB-RM release 2.01 2000-08-25 under SCOS-2000 Rel 2.0 | March 2001 with S2K rel 2.1 |
| SCOS-2000 Event Data Provision Service | Available with WEB-RM release 2.01 2000-08-25 under SCOS-2000 Rel 2.0 | March 2001 with S2K rel 2.1 |
| SCOS-2000 Command History Data Provision Service | Available with WEB-RM release 2.01 2000-08-25 under SCOS-2000 Rel 2.0 | March 2001 with S2K rel 2.1 |
| SCOS-2000 Command Injection Service (Phase 1) (Simple command injection, as required by EMOC) | EMOC: "simple command injection" . Available with ECH release 2.0 November under SCOS-2000 Rel 2.0 | March 2001 with S2K rel 2.1 |
| SCOS-2000 Command Injection Services (Phase 2) (all SRs) | WEB-RM extension: can start now with ECH release 2.0 | March 2001 with S2K rel 2.1 |
| SCOS-2000 Event Data Injection Service | EMOC: Under development | March 2001 with S2K rel 2.1 |
| SCOS-2000 Parameter Injection Service | WEB-RM extension: under Development | March 2001 with S2K rel 2.1 |