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M E E T I N G

meeting date *date de la réunion*	13/07/00	ref./*réf.*	FIRST/FSC/MOM/0142	page/*page*	1 12
meeting place *lieu de la réunion*	ESTEC		chairman *président*	SV	
minute's date *dates de minute*	13/07/00		participants *participants*	See appendix	
subject/objet	**FGSSE #7 MoM**		copy/*copie*		

description/description	action/action	due date/date limite

The meeting was held without ESOC representatives, NP and JD being on leave.

O b j e c t i v e & A g e n d a

See SV's VG#1

There were no comments on the proposed agenda

Comments on the FGSSE#6 MoM:
- CCE should read Central Check-out Equipment
- IAT should read TAI (Temps Atomique International)

Wrt to the usage of the TAI, PE clarifies that this is part of the CCSDS standard. It still has to be clarify how the usage of TAI on board and UTC on ground (UTC is understood to be the reference time for the MOC, e.g. TC history are expected to be time tagged with UTC) can be easily conciliated . This shall be discussed will ESOC at the FGSSE#8.

[PE post-meeting comment:
This is to confirm what I said yesterday during the FGSSE meeting # 7.
*The S/C time -for both FIRST and Planck- will be the "Temps Atomique International" (TAI). This is specified in the F/P System Requirements Specification -SRS- document (ITT-applicable document), and mentioned in the F/P OIRD (req. **TIM-2** chapter 2.14). The corresponding SRS requirements will be recorded in the IID-A.*
Please note also that time correlation and/or time conversion will be performed by the MOC as required.]

F G S S E o b j e c t i v e s c l a r i f i c a t i o n

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SV presented VG#2.

FGSSE role within the overall context of the FIRST GS development, as presented in VG#2, was agreed with the comment that the IPAC will be added as a potential additional center to be covered by the FGGSE in terms of interfaces with other centers/systems (PE).

Other comments on the slide:
- The EGSE WG development responsibilities can be limited to EGSE-ILT, RTA and OBSM, if other systems emerge they will be handle by other groups (PR).
- In the common system, the CCS (Configuration Control System) should be moved within the FINDAS box.

The FGGSE terms of reference will be formalized including the documentation tree for which the FGSSE is responsible.

⇨ **AI#130700/1: SV to formalize the terms of reference of the FGSSE group. Due date: 21/08/00**

Other System activities reporting / monitoring / co-ordination

In order to proceed with the definition and coordination of interfaces between systems through ICDs, the FGSSE group needs to have the visibility on the development process, standard and schedule of the different systems (and most urgently the ones involved in ILT, i.e. the common system, the EGSE-ILT, RTA and OBSM) as well as on the PIs interface related activities.

In this respect, it was noted that there is today (to the knowledge of the FGSSE group) no consolidated development plan/schedule for the different systems of the ILT GS and PIs instrument development against which ICDs need date could be defined.

The FGSSE is therefore asking for the FGSAG to take action to coordinate at management level the different systems/instrument development plans and to give to the FGSSE the visibility on these different development plans. SV will contact JRR and GP on this point.

In parallel, PR as an EGSE WG member will take action for these aspects to be added to the agenda of the next EGSE WG meeting planned early September.

Interface Requirements between FGS systems

SV recalled that the current IRD only covers the I/F requirements between the FGS centers. With the clarification on the definition and scope of the FGS systems, it was agreed that the IRD should/can now be extended to cover the I/F requirements between systems.

SV noted that some of these requirements are already captured in the EGSE URD (see reference to these requirements in ICD draft list). These requirements will have to be moved from the EGSE-URD.

It was agreed that the following sections will be added to the IRD:
- Common System / EGSE-ILT
- Common System / CCE (this section should be compatible with IIDB)
- Common System / RTA (including the instrument database (TBC))
- Common System / OBSM
- Common System /MCS (this section will be a mere reference to existing IRD sections as the interface between these two systems is the same as the I/F between the FSC and MOC and between the MOC and ICC@MOC)
- RTA / EGSE-ILT (including feed-back events with expected performance of feed-back loop).

PR will send a draft of these new sections. SV will consequently update the scope of the IRD and issue a new version of the IRD in time for the next FGSSE meeting.

⇨ **AI#130700/2: PR to send draft of new IRD section . Due date: 21/08/00**
⇨ **AI#130700/3: SV to send new IRD . Due date: 28/08/00**

These IRs shall then be reviewed by the EGSE group. PR will make sure this is addressed at the next EGSE WG meeting planned early September.

Uplink system design issue: CUS

The FGSSE reviewed the technical note produced by RH as a reply to **AI#200400/5 .** The note is attached in appendix. The following comments have been made:
- The only relevant references are the FSC/ICC common system URD (current FSCS URD augmented to cover the scope of the FSC/ICC common system) and the FSC/ICC common system UC model (with supplementary spec) . The requirements today captured in the EGSE URD should be transferred when relevant to the FSC/ICC common system URD.
- The CUS should not be seen as a system but as a function or set of functionalities . The CUS covers the following: definition of observation template, definition of observation building block, definition of TC mnemonic, generation of TC mnemonic, observation duration computation. The actual definition of an observation request (based on observation template) is covered by the PHS and the actual scheduling of an observation in an schedule or test schedule is covered by the MPS. The MPS, PHS and CUS constitute the uplink function of the FSC/ICC common system
- The TC mnemonics generated by the CUS are not only instrument related but also include pointing request or test environment commanding.
- There is no difference between the Commands and the TC mnemonic, a building block will be defined in terms of a sequence of TC mnemonic, a TC mnemonic corresponding either to an on-board function or procedure or atomic instrument command.

- The output of the FSC/ICC common system uplink function (sequence of TC mnemonics) can be exported to either MCS, CCE or EGSE-ILT.
- The section on CUS architectural design, object model and case studies can be dropped as they do not further explain the uplink concept and are/will be covered in the FSC/ICC common system development documentation.

The CUS technical note is to be updated by RH to reflect the above comments, it will then be integrated in the FGSDD. This is covered by action AI#130700/4.

Overall system design

The draft of the FGS Design Document resulting from AI#310500/1, AI#310500/2 and AI#310500/3 has been reviewed (see appendix). The following comments have been made:

On the document structure
- The document is to be re-titled FIRST GS Design Document (not FIRST GS System Design Document)
- Section 2.1 is to be renamed operation concepts
- Section 2.1 should include commonality between instrument as an operation concept, CUS should be removed from the list
- Section 2.2.4 CUS should be removed. The section 2.2.3 should include instead a paragraph explaining the uplink concept and its relevance for the different phases of the mission
- For each phase/each system, there should be two sub-sections, one covering interfaces/archiving and another one covering the components of the system.
- Section 3.1 should include a sub-section describing the different components of the FSS in routine phase
  - OBSM (inputs from PR)
  - IA/QLA (inputs from PR)
  - RTA (inputs from SS)
  - CUS (inputs from RH)
  - MPS (inputs from SV)
  - PHS (inputs from SV)
  - FINDAS (inputs from SV)

On the technical content:
- In 3.1.2.2.1 TM archiving:
  - it was confirmed that all TM (originating from either Satellite or test equipment) would follow the ESA standard as defined in the Packet Structure ICD

- Serendipity and parallel TM data archiving should not differ from other observation TM, i.e. each serendipity or parallel observation TM packet is expected to be tagged with 2 unique id relating to respectively observation and observation building block.
- Archiving of (non prime) instrument HK TM. This is still TBD and the requirement should be clarified by the ICC (to be captured in the IRD). PR mentions that it should be possible to easily relate these HK TM to the main observation in order to e.g. study possible interference between instruments.
- Archiving of TM resulting from manual commanding from MCS or EGSE-ILT or CCE while an observation or a test is carried out is still TBD. PR will comment on that for the next draft of the FGSDD.

- In 3.2.4.6 ILT MPS function shall be updated to reflect the role of the MPS in ILT to produce test schedule (PR)

- In 3.2.4.2, the direct RTA interface (events feed-back) with the EGSE-ILT shall be discussed wrt performance aspect. It has first to be clarified what the end-to-end performance requirements between reception of TM by the common system and the sending of events. Is that compatible with TM flowing through FINDAS (see UR FSC-UR-3.2-0200 which specifies a maximum one minute delay for TM flowing through FINDAS)? The performance requirement should eventually be captured in the IRD in the RTA/EGSE-ILT section. PR will address the issue in the next draft of the FGSDD.

⇨ **AI#130700/4: PR, RH, SS, SV to update their sections of the FGSDD (according to above comments). Due date 18/08/00**

The new update will the be sent to ESOC for comments and for filling-in the parts relevant to the MCS in time for the next FGSSE meeting and in accordance with **AI#310500/4: MOC representatives to deliver first inputs to FGSDD in time for FGSSE meeting in August. Due date: 25/0**8.

ICDs identification

The ICD draft list updated following **AI#310500/5 (see appendix)** has been reviewed. The following comments have been made:
- Instrument TC & TM I/F custodian should read PI (ILT), Project/Prime (IST), MOC (In-orbit operation)
- Derived parameter and OOL TM I/F are TBC for ILT (i.e. may not be used at all)
- Time Correlation I/F can be assumed not relevant (in ILT, instrument time will be kept synchronized with test control clock, in operation, MOC will keep the on board time synchronized with ground time +- 20 ms)
- ILT TEI TC&TM I/F custodian is PI. These TC&TM are expected to be defined in the same manner as instrument and S/C TC&TM (i.e. in instrument database)
- IST SCOE TC&TM custodian should read project/prime
- Science TM data segment should read science TM data field. It is needed by ICCs. The custodian is PI.

- TC history I/F custodian should read MOC (for all mission phase) (PE).
- Instrument OBSW I/F custodian should read MOC (for all mission phase) (PE).
- Instrument command sequences I/F will be defined as part of the instrument database
- Test procedure should be renamed Test schedule, as only test schedule will flow between the Common System and the EGSE-ILT.
- TM archiver I/F custodian is FSCDT

SV will update current list with above comments.

⇨ **AI#130700/4: SV to update ICD draft list in time for next meeting. Due date 21/08.**

Regarding file interfaces between the EGSE-ILT or the CCE and the common system, it was mentioned that they should be as much as possible compatible with the MCS/DDS – common system file interface. However it is not clear at this stage whether that will put any constraints on the EGSE-ILT or the CCE.

R e v i e w o f a c t i o n s

Past actions:

⇨ AI#200400/5: RH to draft a CUS technical note in time for discussion at the next FGSSE meeting. Due date: 26/05/00 (i.e. in time for FGSSE group to read it before next meeting).
Close

⇨ AI#310500/1 : SV to propose a TOC for the FGSDD, with draft definition of scope and purpose of the document and define responsibilities for the different sections. Due date 09/06.
Close

⇨ AI#310500/2: ICCs and MOC representatives to comment on SV input to FGSDD ToC : Due date 23/06
Close

⇨ AI#310500/3: FSC, ICCs representatives to deliver first inputs to FGSDD in time for the next FGSSE meeting: Due date: 07/07.
Close

⇨ **AI#310500/4: MOC representatives to deliver first inputs to FGSDD in time for FGSSE meeting in August. Due date: 25/08.**
Open

⇨ AI#310500/5: MOC and ICCs representatives to comment on the FSC drafted ICD list. Due date 30/06.

Close

⇨ AI#310500/6 , ICCs representatives to send their comments on the list of required ODBMS features in time for the FSC objectivity/DB training. Due date: 09/06.

Close

New actions:

⇨ **AI#130700/1: SV to formalize the terms of reference of the FGSSE group. Due date: 25/08/00**
⇨ **AI#130700/2: PR to send draft of new IRD section . Due date: 18/08/00**
⇨ **AI#130700/3: SV to send new IRD . Due date: 25/08/00**
⇨ **AI#130700/4: PR, RH, SS, SV to update FGSDD (according to above comments). Due date 18/08/00**
⇨ **AI#130700/5: SV to update ICD draft list. Due date 18/08.**

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

FGSSE#8 meeting will be held in ESOC on 30/08/00.

AOB:

Holidays over summer are as followed:

PR: none
SS: none
RH: 14/07 – 07/08
PE: 09/08 – 28/08
SV: 16/07 – 08/08
JD and NP until end of July

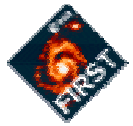
A t t e n d e e s:

Pierre Estaria (ESA - FIRST/PLANCK project)
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)
John Dodsworth (ESA – ESOC)
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)

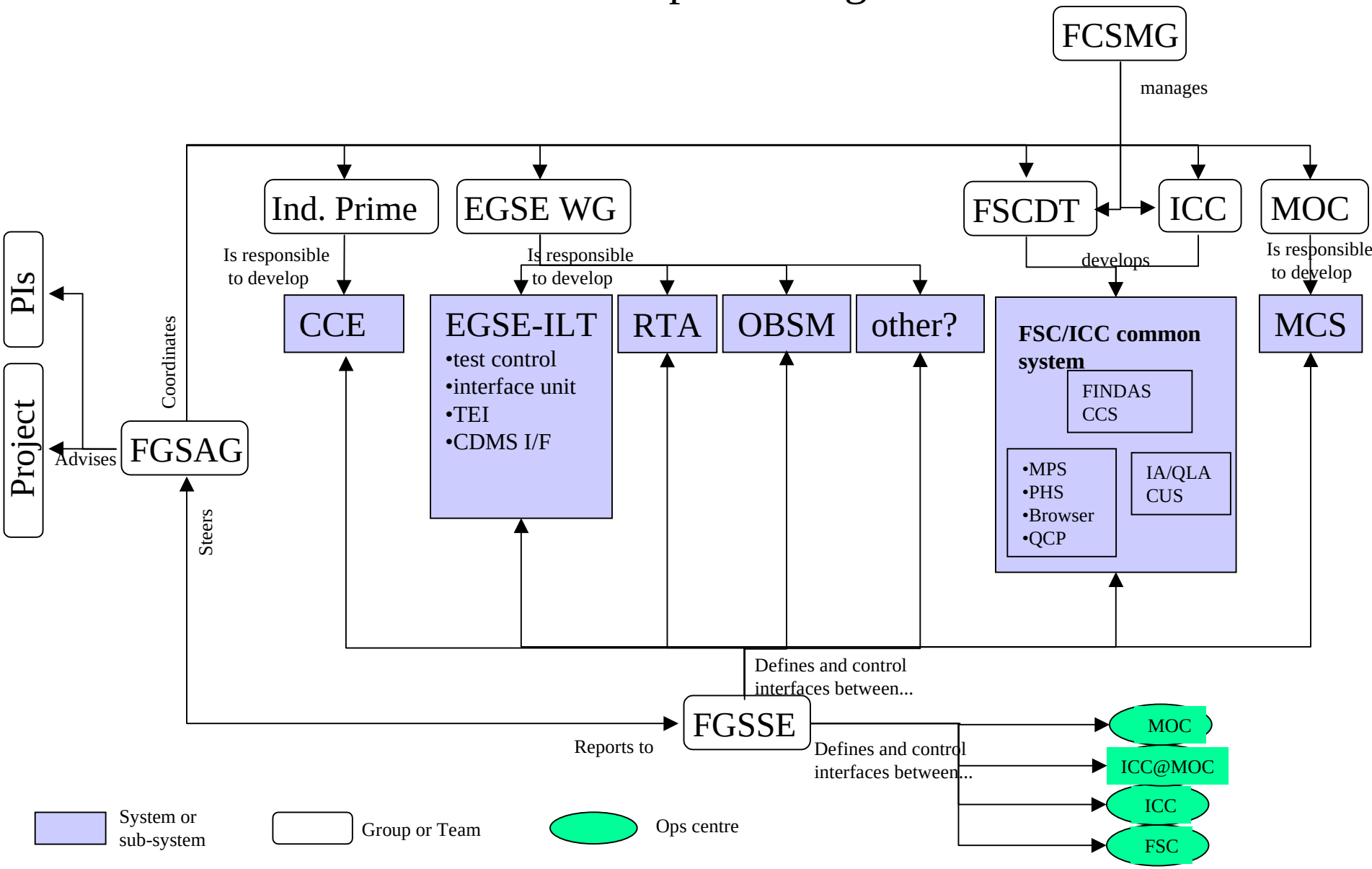
S V ' s V G s :



FGSSE#7, Agenda

- **Comments on FGSSE Mtg#6 MoM, FGSSE#7 agenda**
- **FGSSE objectives clarification after managerial teleconf 03/07/00 (~1/2 hour) (SV)**
  - What the FGSSE is responsible for/what it is not responsible for!
- **Interface Requirements between FGS systems (~1 hour) (All)**
  - How do we go about it?
  - How do we cover them?
  - Extension of IRD scope?
- **CUS (~ 1/2 hour) (RH)**
  - Review of technical note from RH (AI#200400/5**)**
  - Follow-up
- **System Design Document (FGSDD) 1st draft review (~2-3 hours) (All)**
  - Review of outputs of AI#310500/3
  - Define next steps for FGSSE#8
- **ICDs identification, prioritization and schedule (cont'd from FGSSE#6) (~ 1 hour) (All)**
  - Initialization of the ICD definition process
    - identification of ICDs wrt system design
    - prioritization/schedule of ICDs wrt ILT
- **Other System activities reporting/monitoring/co-ordination (~ 1/2 hour) (All)**
  - **EGSE, RTA, FSC/ICC Common System**
- **FGSSE actions (status+recap)**
  - incl.. reporting from SV on past ODBMS actions**.**
- **Next FGSSE meeting (**confirmation**)**
- **AOB**

FIRST GS Development Organization



C U S T N (f r o m R H):

The CUS Concept

Purpose and scope

This technical note describes the current understanding of the FGSSE group on the *Common Uplink System* for FIRST.

The document serves two purposes:

1. To communicate the CUS concept among the different groups and teams interested in the CUS, e.g. FGSSE, EGSE, FSCDT, ICCs, MOC, On-board SW CWG, and hereby help to reach a common understanding among these groups.
2. To be used as additional and/or complementary input to the elaboration of the COM.

Since the CUS concept and user requirements are already well described in several other documents, this note will **not rewrite** what is written elsewhere but instead try to elaborate and clarify.

Reference documents

RD-1. FIRST Common Uplink System (CUS) URD, H. Feuchtgruber and U. Klaas, PICC-ME-RD-001, Draft 1, 11 May 2000.

RD-2. Towards a Common Uplink System for FIRST, U. Klaas, PACS-MA-TN-001, Version 0.2, 28 June 1999.

RD-3. PACS ICC S/W URD, Bart Vandenbussche, PACS-KL-RD-001, Version 0.12, 01 July 1999.

RD-4. PACS ICC S/W URD, Bart Vandenbussche, et al., PACS-KL-RD-001, Version 0.13, 24 April 2000.

RD-5. The Ground Segment Actor descriptions and Use Cases.

Assumptions

Introduction

The Common Uplink System is a software system that processes various types of input and generates a sequence of relative time-tagged instrument commands. The CUS will be identical for all three instruments on FIRST.

The input to the CUS is a type of observation associated with specific parameters. The observation can be a general user observation (AOT), a calibration observation or an engineering observation.

The CUS is expected to handle all these types of instrument measurements in a uniform way. It will be used during instrument testing (ILT) for the generation of instrument test sequences and calibration and instrument characterisation measurements as input for the EGSE Test Control system. The same CUS will be used by the general FIRST user

(astronomer) to process standard astronomical observations into instrument command sequences.

The output of the CUS is a sequence of instrument commands that make up an instrument measurement or observation. The instrument commands will be time-tagged relative to the start of the observation. The sequence will be incorporated into a schedule by the FSC and further processed by the MOC for uplink.

Calibration scientists and instrument engineers will be able to define observations and underlying building blocks in a scripting language especially tuned for the CUS.

Additionally, the CUS should be able to calculate the total duration (observing time) of the requested observation and will be used as a time estimator during proposal handling and during scheduling/mission planning.

The CUS abstraction levels

The CUS concept is based on four levels of abstraction, which are described in Figure #. All instrument uplink procedures should be defined using this stack of abstraction levels.

The **observation** level defines the scientific, calibration or engineering observation and its associated parameters. This level represents the common entry point for the CUS. For general users who use the proposal handling system where an observation type can be selected and parameters specified in a user-friendly environment. For instrument specialist and calibration scientists a more complex interface will be provided according to requirements specified in [RD-1]. This abstraction level will typically also define scheduling constraints or instructions.

The **observation type definition** contains the definition of the observation defined in a typical scripting language as specified in [RD-1]. The definition defines how the observation type and parameters should be translated into a sequence of observation building blocks. During this translation all input is checked for correct syntax and parameter range and validity. In ISO terms, the type definition corresponds to the AOT logic, the COBs and TPFs.

The **observation building blocks** are the next level of abstraction and defines how the measurement is functionally structured by a sequence of measurement building blocks. It corresponds to a high level description of the observation in the user domain, typical building blocks are e.g. `do_dark_measurement` or `perform_scan (start, stop)`.

The building blocks are defined in the **building block definitions**, which are written using the same scripting language as for the observation type definition. The definition defines how the building blocks should be translated into a sequence of commands. Since observation building blocks can also take parameters, the translation step performs parameter validity and range/limit checks next to syntax checking.

The next abstraction level is then a sequence of **instrument commands** where each command can be an on-board command procedure (OBCP) or a more fundamental instrument command that need not be expanded by the DPU/ICU.

The difference between this abstraction level and the observation building blocks (OBBs) is somewhat artificial since OBBs could also be defined as OBCPs. From the user or developer point of view this difference is nevertheless important since (1) observation building blocks are defined in the user domain where on-board command procedures are defined in the instrument domain, and (2) data reduction algorithms may benefit if the downlink (telemetry) organisation (data model) is based on observation building blocks.

On-board command procedures are normally expanded on-board by the DPU/ICU and provide a way to optimise or minimise the uplink telecommand stream and thereby cope with the limited uplink data rate. It is nevertheless necessary that the CUS can expand these OBCPs

on the ground into a sequence of fundamental or atomic instrument commands for testing

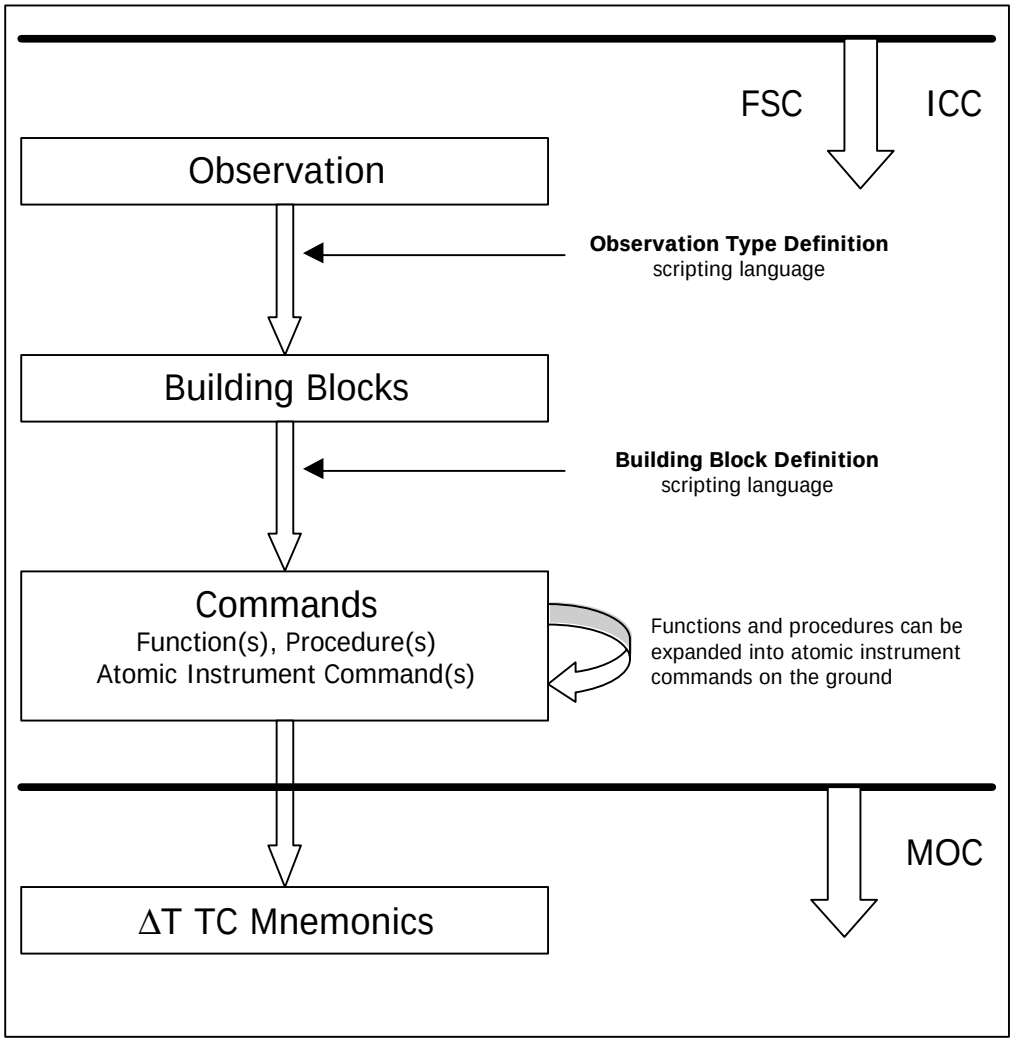


Figure 0: The abstraction levels of the Common Uplink System (CUS).

and engineering purposes.

The last step in this process is the translation of commands into relative time-tagged telecommand mnemonics that can be incorporated into a schedule and further processed by the MOC to be uplinked.

The CUS architectural design

This section could briefly describe where the CUS or CUS components can be found in the Ground Segment Design and clearly identify the interfaces with FSC/ICCs and with MOC.

The CUS reflected in the Common Object Model

The CUS abstraction levels are identified as classes in the Ground Segment Domain Model.

Case studies

This section could briefly describe a few use cases for better understanding the concept.

- An astronomer entering proposal data
- An instrument engineer defining an engineering observation
- A calibration scientist defining a calibration observation
- A developer defining observation type definitions

F G S D D (c o m p i l e d i n p u t s)

The FGSDD inputs are not attached (28 pages…) , they are available from SV

I C D s :

I/F	Reference	Type	Validity	Requested by	Custodian	trace to IRD and EGSE URD draft 1	Comments
I/F = All procedural, data format and protocol interfaces between centers (MOC, FSC, ICC) or SW interface between sub-systems developed by separate teams (e.g. RTA, FINDAS). Note that several related I/F could be documented in one ICD	*Reference to document (ICD) or oter container in which the I/F is described*	*Procedural or data format or protocol*	*Phase at which the interface needs to be operational*	*Date at which the ICD shall be issued*			
operational interactions between centers							
MOC-FSC operational interactions		procedural	In-orbit phase		MOC or FSC?	FGS-IR-3.1-130 FGS-IR-3.1-140 FGS-IR-3.1-160 FGS-IR-3.1-170 FGS-IR-3.1-190 FGS-IR-3.1-200 FGS-IR-3.1-220 FGS-IR-3.1-240 FGS-IR-3.1-250 FGS-IR-3.1-280 FGS-IR-3.1-320 FGS-IR-3.1-360 FGS-IR-3.1-390 FGS-IR-3.1-530 FGS-IR-3.1-540 FGS-IR-3.4-40 FGS-IR-3.4-60 FGS-IR-3.4-70 FGS-IR-3.4-90	MOC-FSC interface procedures
MOC-ICC operational interactions		procedural	In-orbit phase		MOC	FGS-IR-3.2-10	MOC-ICC and ICC@MOC interface procedures

FSC-ICC operational interactions		procedural	In-orbit phase, post mission		ICC or FSC?	FGS-IR-3.5-30 FGS-IR-3.5-150 FGS-IR-3.5-160 FGS-IR-3.7-20 FGS-IR-3.7-40 FGS-IR-3.7-70 FGS-IR-3.7-130 FGS-IR-3.7-140 FGS-IR-3.7-150	FSC-ICC interface procedures
TC & TM data							
S/C TM		data format	IST, In-orbit phase post-mission		Project?, MOC?	TC-CMD-01 FGS-IR-3.1-30 FGS-IR-3.1-40 FGS-IR-3.1-50 FGS-IR-3.1-60 FGS-IR-3.1-70 FGS-IR-3.2-30 FGS-IR-3.3-20 FGS-IR-3.1-500	Includes format definition of the S/C TM packet (header + data segment)
Instrument TC & TM		data format	ILT, IST, In-orbit phase, post-mission	??	Project?, MOC?	FGS-IR-3.1-30 FGS-IR-3.1-40 FGS-IR-3.1-50 FGS-IR-3.1-60 FGS-IR-3.1-70 FGS-IR-3.2-30 FGS-IR-3.3-20 FGS-IR-3.1-500 FGS-IR-3.4-120 FGS-IR-3.7-160	Includes ICS?, TC mnemonic and TC packets formats. Includes format definition of the instrument HK TM packet (header + data segment) as well as the science TM packet header (not science TM data segment). Includes OOL values. Variable TM packets may require a particular ICD (TBC).
Time Correlation TM ICD			ILT, IST, In-orbit phase post-mission	??	MOC, Whom in ILT?	FGS-IR-3.1-420 FGS-IR-3.1-430	TiC TM is created by downlink during ILT, SCOE during IST and MOC during in-orbit phase
Derived parameter TM.		data format	ILT, IST, In-orbit phase	??	MOC, Whom in ILT?	FGS-IR-3.1-450	Derived parameter TM created by MOC
OOL TM.		data format	In-orbit phase		MOC	FGS-IR-3.1-470	OOL TM created by MOC
ILT TEI TC & TM		data format	ILT		PIs	TC-CMD-04	same format as satellite TC & TM database?
IST SCOE TC & TM		data format	IST		Project		same format as satellite TC & TM database?

Science TM data segment (one per instrument). Needed?		data format	ILT, IST, In-orbit phase post-mission		PIs		
MOC data							
Planning Skeleton		data format	In-orbit phase		MOC	FGS-IR-3.1-210	
Schedule status information		data format	In-orbit phase		MOC	FGS-IR-3.1-260	
Commanding timeline summary		data format	In-orbit phase		MOC	FGS-IR-3.1-270	
TC history		data format	ILT, IST, In-orbit phase	??	MOC Whom in ILT?	FGS-IR-3.1-300 FGS-IR-3.1-310	In ILT and IST(TBC), TC history will used to correlate Test procedures and actual execution time
S/C orbit data reconstituted		data format	In-orbit phase		MOC	FGS-IR-3.1-350	
S/C attitude history		data format	In-orbit phase		MOC	FGS-IR-3.1-380	
SSO database		data format	in-orbit phase		MOC	FGS-IR-3.1-520 FGS-IR-3.4-110	
FSC data							
Schedule		data format	In-orbit phase		FSC	FGS-IR-3.4-10 FGS-IR-3.4-20 FGS-IR-3.4-30	Format of schedule as output of FSCS/MPS, Includes S/C commanding request definition
ICC data							
Instrument OBSW interchange format		data format	ILT, IST, In-orbit phase	??	MOC, Whom in ILT?	TC-CMD-18 FGS-IR-3.1-490 FGS-IR-3.4-80 FGS-IR-3.7-10	We assume that the instrument memory as returned by MOC and the instrument memory update from ICC to MOC will be exchanged in the same format.
Instrument procedures and command sequences		data format	In-orbit phase		MOC	FGS-IR-3.4-130 FGS-IR-3.7-170	Needed? Or can be considered included in instrument database
Instrument apertures and pointing misalignement		data format	In-orbit phase		MOC	FGS-IR-3.1-510 FGS-IR-3.4-140	
Scheduling contraints (TBC)		data format	In-orbit phase		FSC	FGS-IR-3.7-60	Only needed if MPS is not used by ICCs to define scheduling constraints on calibration and engineering observations
Observation quality (TBC)		data format	In-orbit phase, post-mission			FGS-IR-3.7-80	internal to FSCS class model?
ILT or IST specific data							

Test procedure		data format	ILT, IST	??	ICC	TC-CMD-07 TC-CMD-11 TC-CMD-23 TC-CMD-02 TC-AUT-06	Relative time tagged sequence of instrument TC mnemonics and/or TEI/SCOE commands menmonics. Is expected to be a subset of the schedule I/F
Logging information		data format	ILT, IST	??	ICC		
I/F protocol							
MOC/DDS to FSC consolidated TM ICD		protocol	In-orbit phase		MOC	FGS-IR-3.1-20 FGS-IR-3.1-80 FGS-IR-3.1-90 FGS-IR-3.1-100 FGS-IR-3.1-110 FGS-IR-3.1-340 FGS-IR-3.1-440 FGS-IR-3.1-460 FGS-IR-3.1-480	DDS services and protocol to retrieve consolidated TM. (TM format is described in project document)
MOC/DDS to ICC@MOC NRT TM ICD		protocol	In-orbit phase		MOC	FGS-IR-3.3-10 FGS-IR-3.3-30 FGS-IR-3.3-40	DDS services and protocol to retrieve TM in NRT from MOC
EGSE-ILT to FSCS TM ICD		protocol	ILT	??	ICC	??	
CCE to FSCS TM ICD		protocol	IST		Project?		
TM archiver ICD		protocol	ILT, IST, In-orbit phase		ICC or FSC?	FGS-IR-3.2-20 FGS-IR-3.2-40	Protocol interface to the TM archiver from either the consolidated TM /F or the NRT TM I/F..
MOC/DDS to FSC file I/F		protocol	In-orbit phase		MOC	FGS-IR-3.1-230 FGS-IR-3.1-290 FGS-IR-3.1-330 FGS-IR-3.1-370 FGS-IR-3.1-400	DDS services and protocol to retrieve MOC data files. It is assumed that MOC/DDS provides a unique protocol for all MOC data exported to FSC as a file.
FSC to MOC/DDS file I/F		protocol	In-orbit phase		MOC	FGS-IR-3.4-50 FGS-IR-3.4-100	DDS services and protocol to export files from FSC to MOC. All data from FSC to MOC are transferred as files.
Test Control import/export ICD		protocol	ILT	??	ICC	TC-CMD-07 TC-CMD-16	protocol to export (e.g. test procedure) and import (e.g. looging info) between ILT Test control and the FSCS/FINDAS. To be the same as the DDS I/F?
CCE import/export		protocol	IST		Project		protocol to export (e.g. test procedure) and import (e.g. looging info) between CCE Test control and the FSCS. To be the same as the DDS I/F?

MOC SW							
S/C orbit predictor SW API		SW	In-orbit phase		MOC	FGS-IR-3.1-120	
S/C atitude constraints SW API		SW	In-orbit phase		MOC	FGS-IR-3.1-150	
S/C slew time and path predictor SW API		SW	In-orbit phase		MOC	FGS-IR-3.1-180	
ICC SW							
Instrument simulator SW API		SW	EE, In-orbit phase		PI	FGS-IR-3.7-90	
Instrument time estimator SW API		SW	AOs, EE, In-orbit phase		ICC	FGS-IR-3.7-100	FSCS interna'I/F, to be defined in the FSCS class model?
Instrument commanding SW API		SW	ILT, IST, In-orbit		ICC	FGS-IR-3.7-110	FSCS internal I/F, to be included in the FSCS class model?
Instrument data processing SW API		SW	ILT, iST, In-orbit phase		ICC	FGS-IR-3.7-120	FSCS internal I/F, to be included in the FSCS calss model?
FSCS SW							
FSCS class model		SW	ILT, IST, In-orbit phase, post-mission		FSC	FGS-IR-3.5-10 FGS-IR-3.5-40 FGS-IR-3.5-50 FGS-IR-3.5-60 FGS-IR-3.5-70 FGS-IR-3.5-80 FGS-IR-3.5-90 FGS-IR-3.5-100 FGS-IR-3.5-110 FGS-IR-3.5-130 FGS-IR-3.5-140 FGS-IR-3.7-10 FGS-IR-3.7-50	defined all the data (including their relationships) and relationships shared by FSC and ICC
TM servers API		SW	ILT, IST, In-orbit phase, post-mission		FSC		to be defined in the FSCS class model. Will serve RTA, IA/QLA
Observation servers API		SW	ILT, IST, In-orbit phase, post-mission		FSC		to be defined in the FSCS class model. Will serve IA/QLA
On Board SW servers API		SW	ILT, IST, In-orbit phase, post-mission		FSC		to be defined in the FCSC class model, will serve OBSM
other objects servers API		SW			FSC		to be defined in the FSCS class model
ODBMS							

ODBMS replication and/or remote access set-up		database	In-orbit phase		FSC	FGS-IR-3.5-20 FGS-IR-3.7-30	definition of the set-up of the ODBMS in terms of replication, remote acess between the different databases over the different FSC and ICC sites.