

meeting date <i>date de la réunion</i>	04-02-2000	ref./réf.	FIRST/FSC/MOM/104	page/page	1 / 9
meeting place <i>lieu de la réunion</i>	ESTEC	chairman <i>président</i>	SV		
minute's date <i>dates de minute</i>	21 February 2000	participants <i>participants</i>	see attached		
subject/objet	FGSSE Mtg #3 MoM		copy/copie		
description/description		action/action		due date/date limite	

## Objective & Agenda

See SV's VG#1&2 attached

### **IRD review (draft 0.2 dated 21/01/00):**

The review covered from beginning of the document to section 3.1.1 (included). It was agreed that ESOC and the ICCs will send their comment to SV on the rest of the document:

=> **AI#040200#1: ESOC and ICCs to send their comments on the IRD draft 0.2. Comments should include reporting on AI#211291-2 from ICCs. Date: 14/02/00**

Overall:

- SV explained the place of the IRD within the FGS (engineering) documentation tree (see VG # 9). A discussion followed on whether the IRD is an applicable document or not. NP precised that for ESOC, only applicable documents are maintained, reference documents are usually not maintained. The IRD is to be maintained (SV). It was proposed that the IRD be referenced both within the SIRD and within the MIRD as an applicable document.

1.1 objective:

- It was proposed (JD) and agreed that the IRD addresses information flow versus data flow (data being only 'bits' on a telecommunication line). Data will be replaced by information in the whole document.
- The section shall clarify that the SMP is the applicable document to the IRD and that the scenario document is a reference document. No reference will be made to the MIRD and SIRD in this section.

1.2 scope

- It was clarified that the scope of the IRD does not include the ILT and IST test systems, however it was agreed that it shall include the transition (in terms of data transfer) from ILT and IST to operation.
- It was agreed that the scope of the IRD shall also include the SW deliveries between the different centres during operation.

### 1.3 Structure of the document

- No comments

### 1.4 Definitions & acronyms

- Definition of exposure is to be added
- The different states of observations and products shall be defined (PR).

### 1.5 References

- Only the SMP shall be listed as an applicable document
- MIRD shall be added and listed with the SIRD as a reference document

### 2.1. Assumptions

- Assumptions shall reference explicitly the scenario document
- Guaranteed high data rate communication line will be between the MOC and the FSC and the FSC and the ICC@ICC (versus ICC as it reads now).

#### 2.2.1 Data flows related to MOC

No comments

#### 2.2.2 Data flows related to ICC

- In line with new scope, data processing SW delivery to FSC (see above) and PCS delivery to MOC shall be covered by the IRD.

#### 2.2.3 Data flows related to FSC

No comments

#### 2.2.4 TM flow

- NRT TM (see 2<sup>nd</sup> table) can include both live TM and unconsolidated dump TM. Both can be potentially used by ICC@MOC.

#### 2.2.5 Data flow summary

- There should be a line to indicate the information flow between the MOC and the ICC@ICC to support the notification of major events relevant to satellites.
- Information flows are missing from the diagram.

### 3.1.1 Consolidated TM

### 3.1.1.1 data flow

- The 2<sup>nd</sup> requirement is to be modified to “*The FSC shall be able to retrieve the satellite TM data in a format from which the source packets generated on board can be extracted*”. This accounts for the fact that MOC will supply source TM packets with additional header and trailer. This requirement applies to both S/C and instruments TM.
- The 3<sup>rd</sup> requirement (S/C TM data format) can be deleted, it is covered by the 2<sup>nd</sup> one.
- The 4<sup>th</sup>, 5<sup>th</sup> and 6<sup>th</sup> requirements on TM data including means to respectively detect missing TM packets, associate TM packets with observation and associate TM packets with measurements are not requirements on MOC but on the S/C and instruments. As such, there should be moved from the IRD to the IID (for the instruments related ones).
- The 7<sup>th</sup> requirement (inclusion of APID, SID,...) can be deleted as it is implicitly covered by the 2<sup>nd</sup> requirement.

### 3.1.1.2 control flow.

JD stressed the fact MOC will not notify the FSC of new consolidated data being available, the FSC will have to poll the MOC DDS. SV would see notification more appropriate when the FSC will be retrieving data from the MOC only once a day in routine phase.

In any case, it was proposed to rephrase the 2<sup>nd</sup> requirement to: “*The FSC shall be informed of the availability of consolidated TM data corresponding to a given category and period*”

### 3.1.1.3 performance requirements

- No comments

### 3.1.1.4 availability requirements

- No comments

## **EGSE reporting:**

See PR's VGs

In terms of smooth transition between ILT and operation, it was recalled that the ILT (IST) functional I/F as shown in PR's VG #2 (#3) are mostly relevant to operation PR's VG#4 and should be implemented in as much as possible in the same way. In particular:

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Operational functional interfaces	Corresponding ILT (IST) functional interfaces
Scientific scheduling- Satellite scheduling	CUS- Test control
MOC Data archive - FINDAS	Downlink-FINDAS
OBSM-MOC Satellite scheduling	OBSM – Test Control
FINDAS –RTA	FINDAS - RTA
FINDAS – QLA/IA	FINDAS – QLA-IA
FINDAS – CUS	FINDAS - CUS

JD stressed the fact that a change in TM format between the ILT and operation may lead to the rewriting of SW between ILT and operation, e.g. S2K packetizer. SS agrees that this can be a problem and that it shall be watched carefully. PR does not see this as a major problem and believes that instrument TM format will be quite stable over time.

SV points that FINDAS should be largely resilient to changes of TM format. Indeed FINDAS should not need to know about the inner structure of the TM data segment.

With regard to the OBSM related interfaces, JD mentioned that MOC shall receive the complete on board memory image from the ICCs (via FSC). It is then up to MOC to derive the patch to be uploaded by comparing the new on board memory image with the current one.

**System Design discussion of TM flow**

**General (SV'S VG#3)**

- NP mentions that the output of the NCTRS is TM frames. TM frames have to be processed by the S2K packetizer before being stored as TM packets into the MOC DDS.
- ICCs stressed that QLA and IA should be grouped in the same box. QLA shall be seen as a subset of IA.
- There should be a sub-system between the DDS and the FSC TM archiver, interfacing the MOC DDS to the FINDAS TM archiver, in the same way as in the ICC@MOC diagram.

FINDAS node versus no FINDAS node in ICC@MOC (SV's VG#6)

Discussion on SV's VG# 6

- According to PR there is no need to transfer live TM from ICC@MOC to ICC@ICC: commissioning will only last a few days for each instrument. SV is happy to remove it but recalls that this need was put forward by SPIRE (KK) at the scenario meeting on the 16/12/99.

=> **AI#040200-2: SPIRE to confirm or not the need to transfer TM acquired live in ICC@MOC to ICC@ICC (TBC).**

- Not having FINDAS in ICC@MOC would not allow having QLA in NRT as QLA in ICC@MOC would then only be based on remote access to ICC@ICC. (assuming QLA is only FINDAS based).
- The issue of data rate between ICC@MOC and ICC raised by SV in case of FINDAS in ICC@MOC is according to PR not an issue, assuming live TM do not have to be transferred back to ICC (see above). The only information flowing between ICC@MOC and ICC or FSC would be uplink data (FSC->ICC@MOC) and calibration data (ICC@MOC -> FSC and ICC) and they could be accommodated on the operational MOC-FSC line. NP mentioned that the back-up FSC-MOC line could also be used.
- Having FINDAS in ICC@MOC would allow importing ancillary data to ICC@MOC. The usage of ancillary data in ICC@MOC at this stage cannot be ruled out (PR).
- ICCs do not see why there should be more than one FINDAS node at ICC@MOC. This will have to be confirmed by further analysis.

#### ICC@MOC connection to DDS versus direct S2K connection (SV's VG#4&5)

- With a direct S2K connection, TM data will be relayed to ICC@MOC in RT versus with 1 to 2 minutes delay with the DDS connection
- PR states that one to two minutes delay is acceptable if some ICC members can sit with the SPACON.
- The main advantage of a DDS connection is the possibility to remote access into RTA or QLA/IA in ICC@MOC from ICC. This is a top requirement for ICC (PR).
- PR and RH do not see the direct connection to S2K as simplifying the MOC- ICC@MOC interface as suggested by SV.
  1. A direct S2K connection would generate differences between the TM archiver in the FSC and the one in ICC@MOC while both should be the same. According to PR, the fact that one is archiving NRT TM and the other one consolidated TM should not make a difference: TM data are in the same format and speed of archiving should be roughly be similar. The consolidated TM should be archived at the same speed as NRT TM to keep up with the amount of TM data to be archived (~twice the speed of on board data generation ~ 200 kbps).
  2. PR and RH consider that the DDS TM server should be the same implementation for both ICC@MOC and for the FSC. This is not clear to SV. For ICC@MOC, we are talking about TM retrieved in NRT on a TM packet basis, while for FSC, we are talking about consolidated TM retrieved by files.
- JD agrees with PR and RH in the sense that the DDS will present the same I/F for NRT TM and consolidated TM. The DDS shall present only one sequence of TM data; a time counter will indicate the time until which these TM data are consolidated. It is not clear to SV that this lead to a unique interface for the NRT and consolidated TM data.
- Another argument for having a DDS connection (PR) is that it leaves open the possibility to import into ICC@MOC ancillary data from the MOC.

#### IA/QLA interfaces to FINDAS versus S2K for raw TM data (see SV's VG #7)

- IA/QLA interface to S2K is not seen as an alternative by PR:

1. IA/QLA needs to interface with FINDAS anyway to store intermediate products and to retrieve ancillary data.
2. FINDAS is needed to implement the TM and auxiliary data queries needed to feed IA/QLA..

#### Instrument and S/C database issue (see SV's VG # 8)

- JD recalls that S2K does not support the editing and maintenance of the instrument and S/C database. This is done outside S2K by an appropriate tool (Microsoft access). The database is then imported within S2K (objectstore) for run time purpose.
- SV raises the two following issues:
  1. Do we need to import the S/C + instrument database into FINDAS?
  2. Do we need a similar database for the interpretation/conversion of science data?
- PR believes the answer to both question is NO. Assuming IA and QLA works only with science data, the S/C + instrument databases which TM wise only cover HK data is not needed into FINDAS. Even if some HK parameters are needed that should not justify to run the S/C + instrument database as part of FINDAS. As for the science TM raw data, their interpretation/conversion shall not justify a run time (FINDAS based) database.

### **System Design discussion of Uplink flow**

Not discussed for lack of time (see SV'S VG#10)

### **Work plan (See SV's VG#12 & 13)**

The responsibilities of the FGSSE as defined in SV's VG#12 were agreed with the precision that check baseline should read control baseline.

It was agreed that the CUS design should be discussed as part for the FSC/ICC common object model.

The discussion on schedule was reported to the FSC KO meeting (23/02/00)

### **AOB & Next Meeting**

Next meeting will in Leeuven (KUL) on the 16 of March 2000.

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*Attendees:*

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

**Cc:**

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)  
G. Pilbratt (ESA – FSC)  
J. Riedinger (ESA - FSC)

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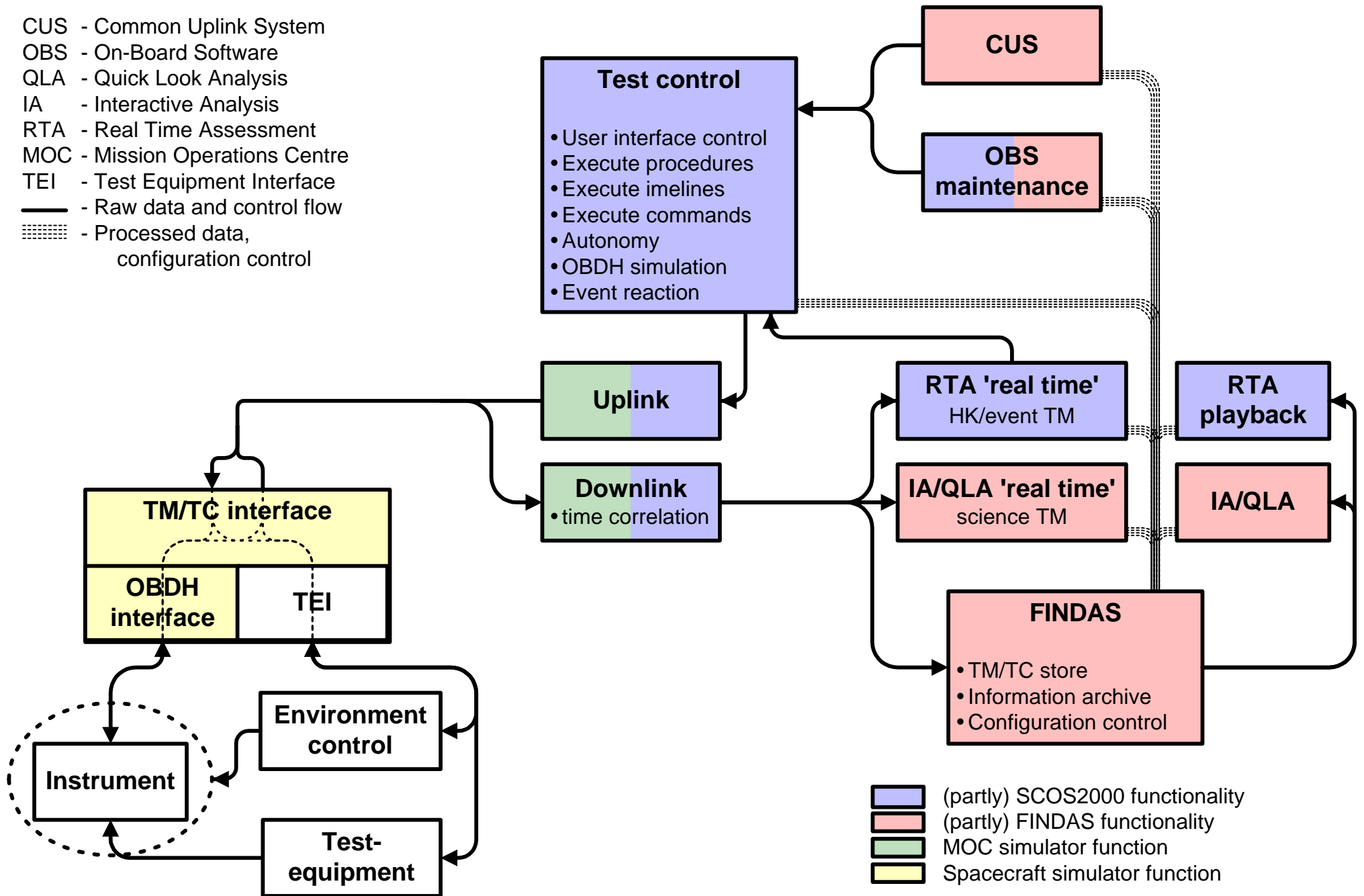
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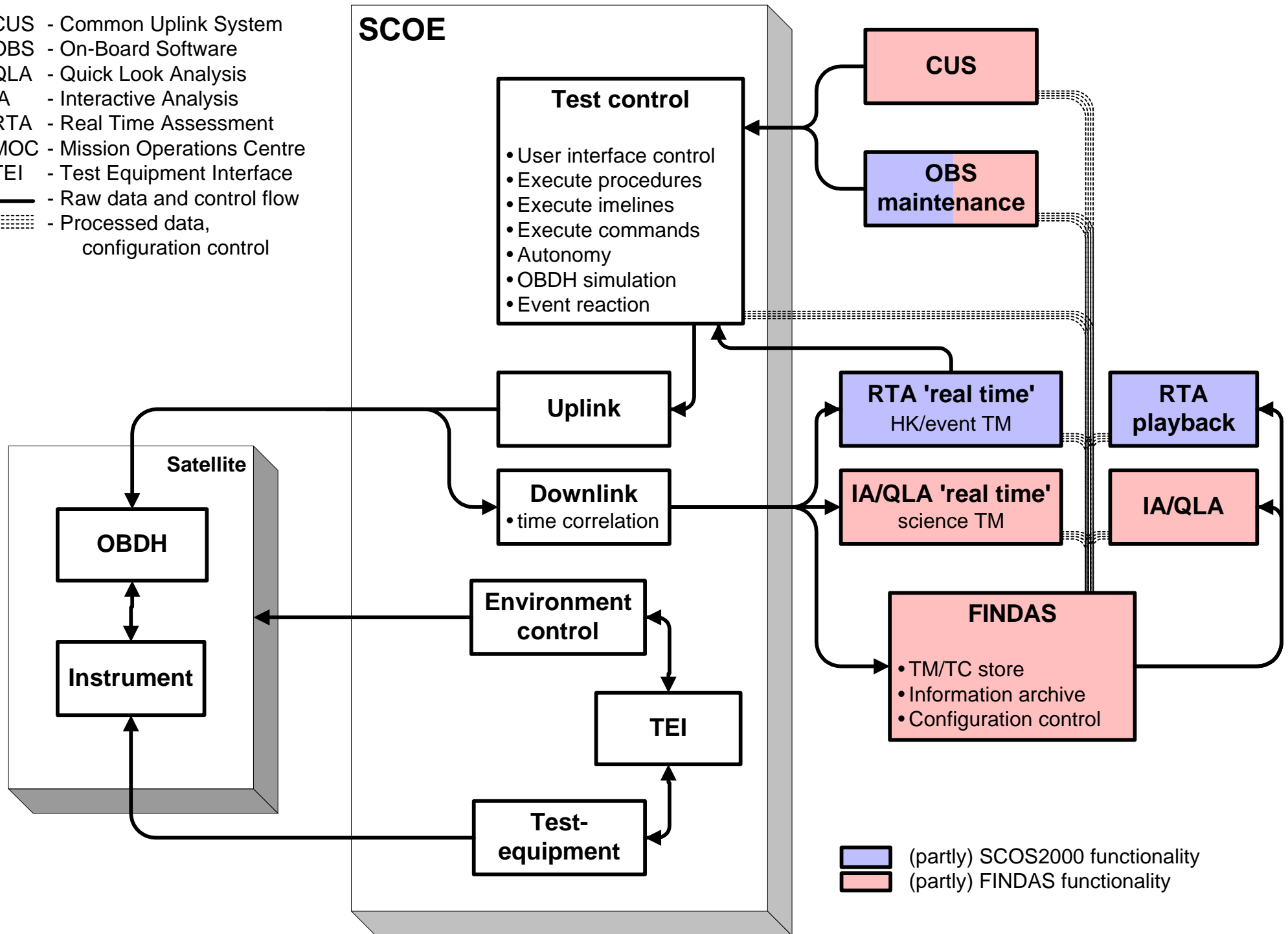
**PR's VGs:**



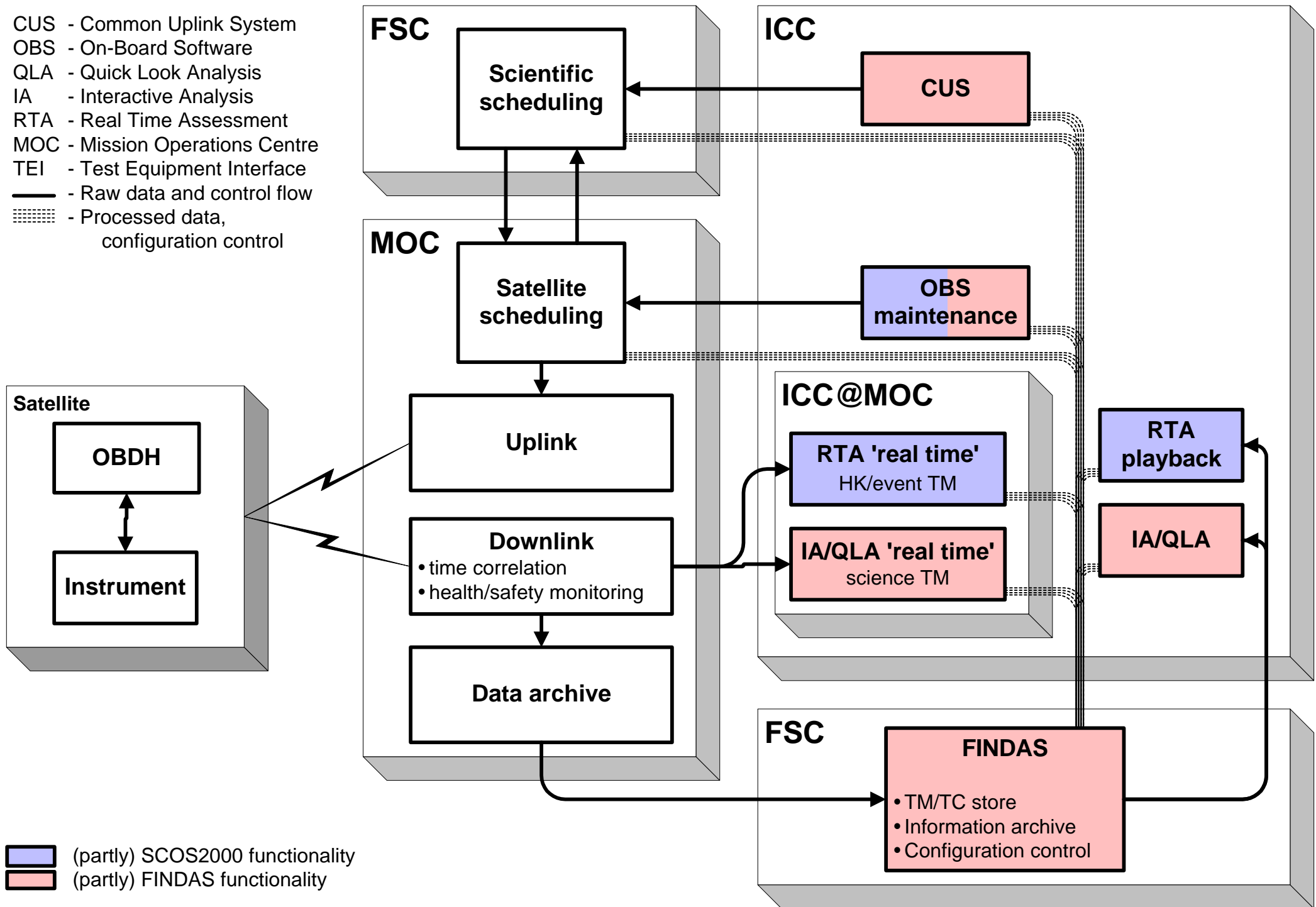
- CUS - Common Uplink System
- OBS - On-Board Software
- QLA - Quick Look Analysis
- IA - Interactive Analysis
- RTA - Real Time Assessment
- MOC - Mission Operations Centre
- TEI - Test Equipment Interface
- - Raw data and control flow
- ⋯ - Processed data, configuration control



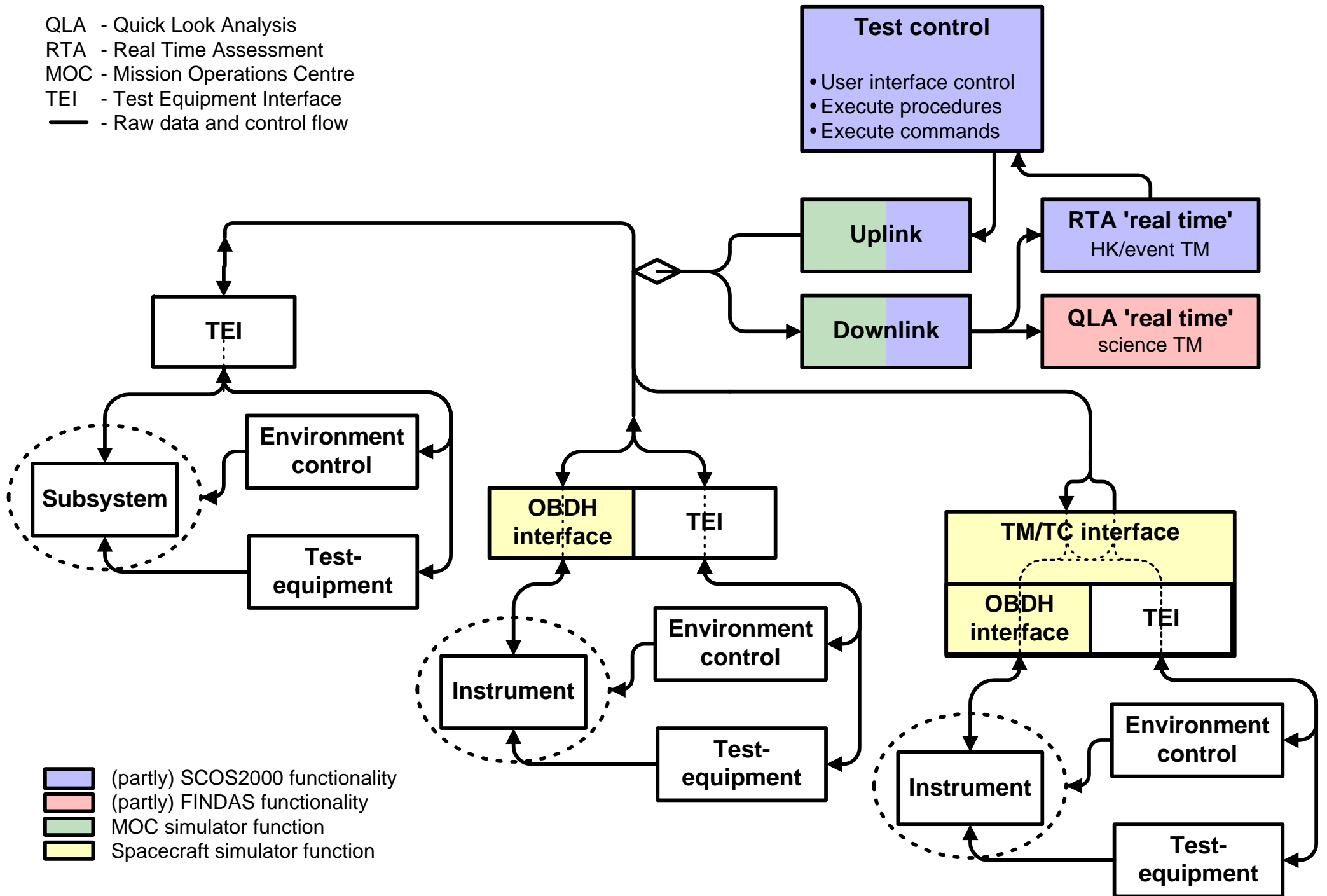
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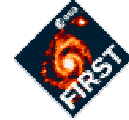
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**SV's VGs:**

## Objectives

- Consolidate the IRD in view of baselining it for system design and FSC/ICC elaboration phase
- Progress on the system design downlink and initiate uplink issues
- Common understanding of the FGSSE responsibilities and tasks



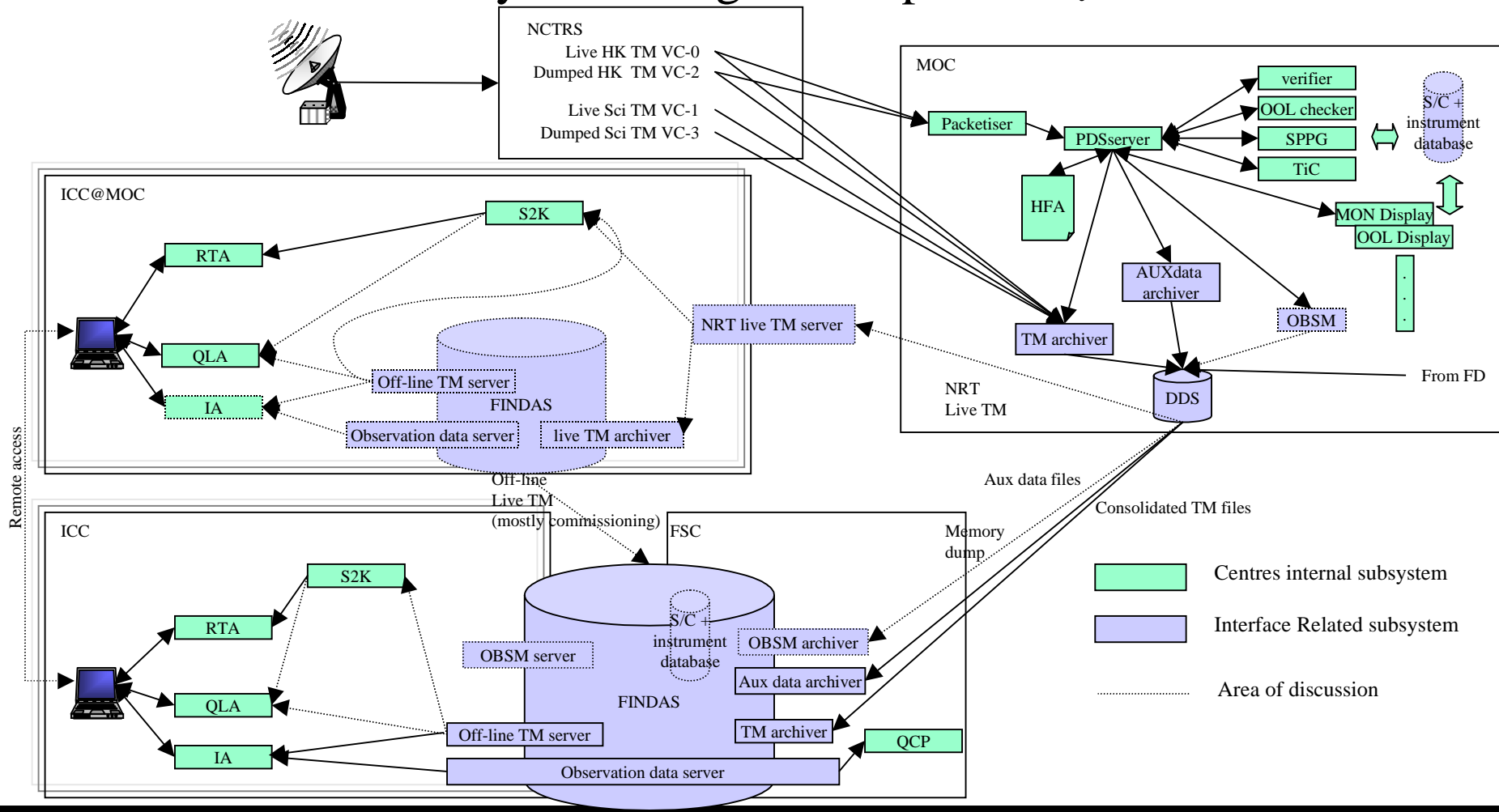
## Agenda

- **IRD internal review:** (10h00-11h45) (all)
  - The review should lead to
    - an internal agreement on the objective, scope, structure of this document
    - a consolidation of the current technical content of the document
    - the identification of important missing information for FSC/ICC elaboration phase , short terms MOC activities (if any) and system design.
  - It is proposed to have a page by page review of the document.
  - As part of this review, the following pending action will be discussed:
    - .AI#211299-2 FRD & other ICC queries of FSC data (IRD 3.3.3)
    - AI#151199-2: Observation & observation commanding request levels of abstraction (see IRD 3.3.2 & 3.4.3)
- **EGSE development status report** (11h45-12h15)

PR and RH will report on the status on the instrument EGSE functional analysis and design following 25/01/00 meeting in Utrecht
- **System design** (13h15-15h15)
  - At the previous meeting, we started to discuss the system design for the TM flow. The discussion led to the identification of two design scenarios. An action on ICC and FSC was set (AI#211299-1) to further assess these scenarios in terms of benefits/drawbacks. It is expected that FSC and ICCs will report on the action on the TM flow design scenarios.
  - A similar exercise should also be started for the uplink data flow (SV + ICC?)
  - Take stock of what we have achieved at the end of the discussion and plan for the next FGSSE system design activities (all)
- **Work plan issues** (15h30-16h45)
  - Work plan was discussed at the FGSSE #1 teleconf. The meeting shall be the opportunity to make a wrap-up of the last teleconf and discuss following issues:
    - FGSSE responsibilities/tasks versus FSC/ICC core development teams (SV + ICCs?)
    - specific issue of the data model, CUS and FINDAS development (all)
    - specific issue of the FGSSE system design activities: objective/scope (SV + ICCs?)
    - FGSSE schedule wrt FSC/ICCs/MOC schedules (all)
- **AOB + Next teleconf/meeting**



## FIRST TM system design concept (summary of FGSSE#2)



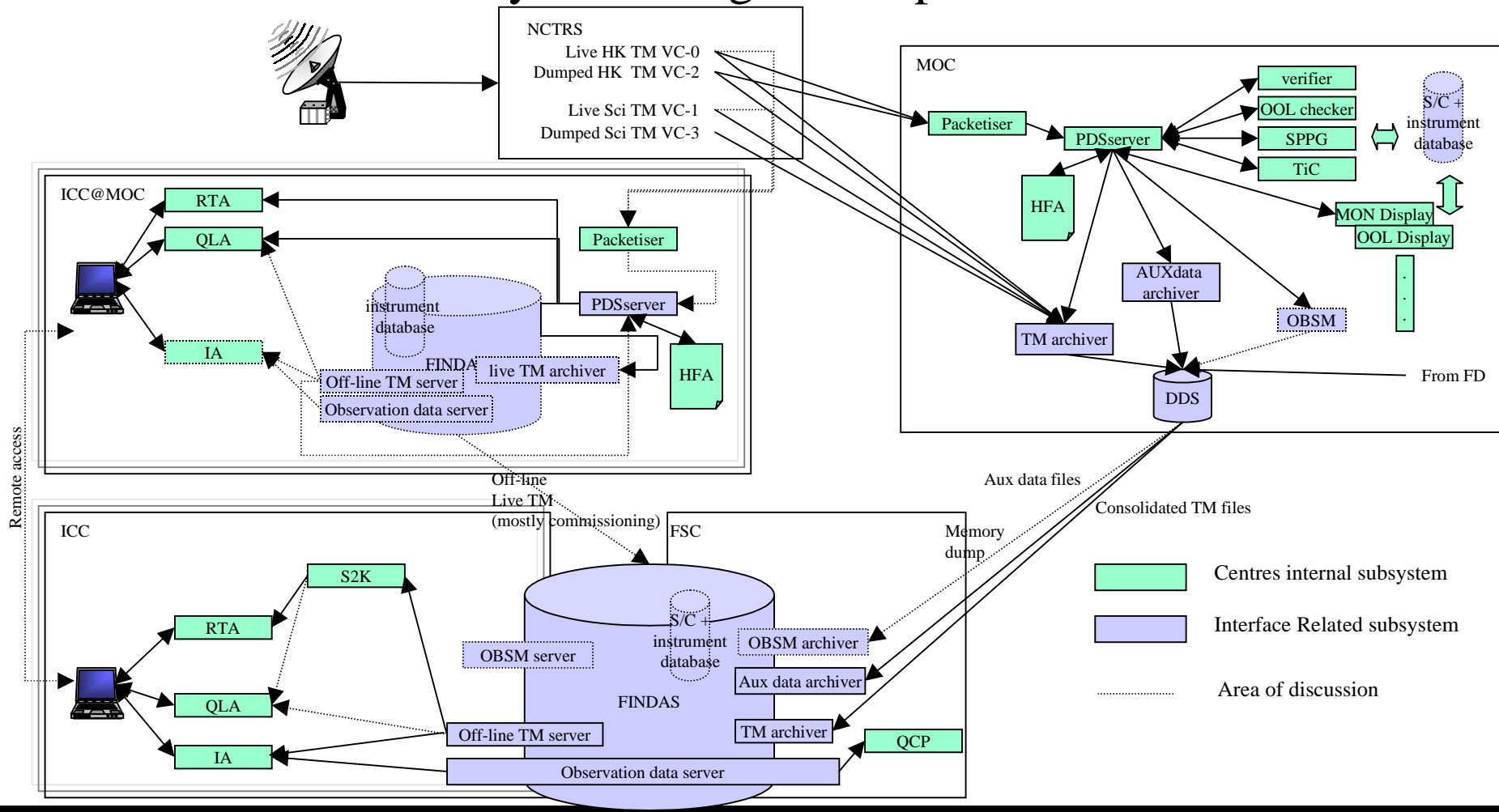


## FIRST TM system design concept (issue 1)

- **ICC@MOC connection to DDS vs S2K direct connection** (see next slide)
  - ICC@MOC is accessible in remote login (not true for alternative: ICC@MOC on Ops LAN)
    - possibility exist to display OPS LAN data outside firewall via dial-in connection (TBC)
  - meet functional + NRT requirements (in fact with great margin, a few seconds delay vs 1 minute)
  - simplify I/F
  - S2K part of the I/F exists already => no need for DDS M/U
  - I/F can be reused as is for ILT
  - in line with PLANCK concept



## FIRST TM system design concept (alternative of issue 1)



## FIRST TM system design concept (issue 2)

- **FINDAS in ICC@MOC vs no FINDAS in ICC@MOC**
  - QLA/IA can be FINDAS based only (vs FINDAS & S2K) (*however see issue 3*)
  - Live TM flow can be transferred to FINDAS
  - Enhance Play-back capabilities?
  - IA(TBC) runs at ICC@MOC
  - Full IA functionalities (versus downgraded for alternative: access to TM raw data only)
  - **functional requirements met (thanks to remote login to ICC@ICC)**
  - **less development (live TM archiver). *however live TM archiver development needed for ILT***
  - **no data interfaces between FINDAS ICC@MOC and FINDAS FSC (e.g for live TM + observations + schedule data).**
  - **less complex FINDAS set-up (additional node)**
  - **lower operational cost (network, maintenance, licence,?). FINDAS in ICC@MOC may lead to additional bandwidth between MOC(ICC@MOC) and FSC to support data flow.**

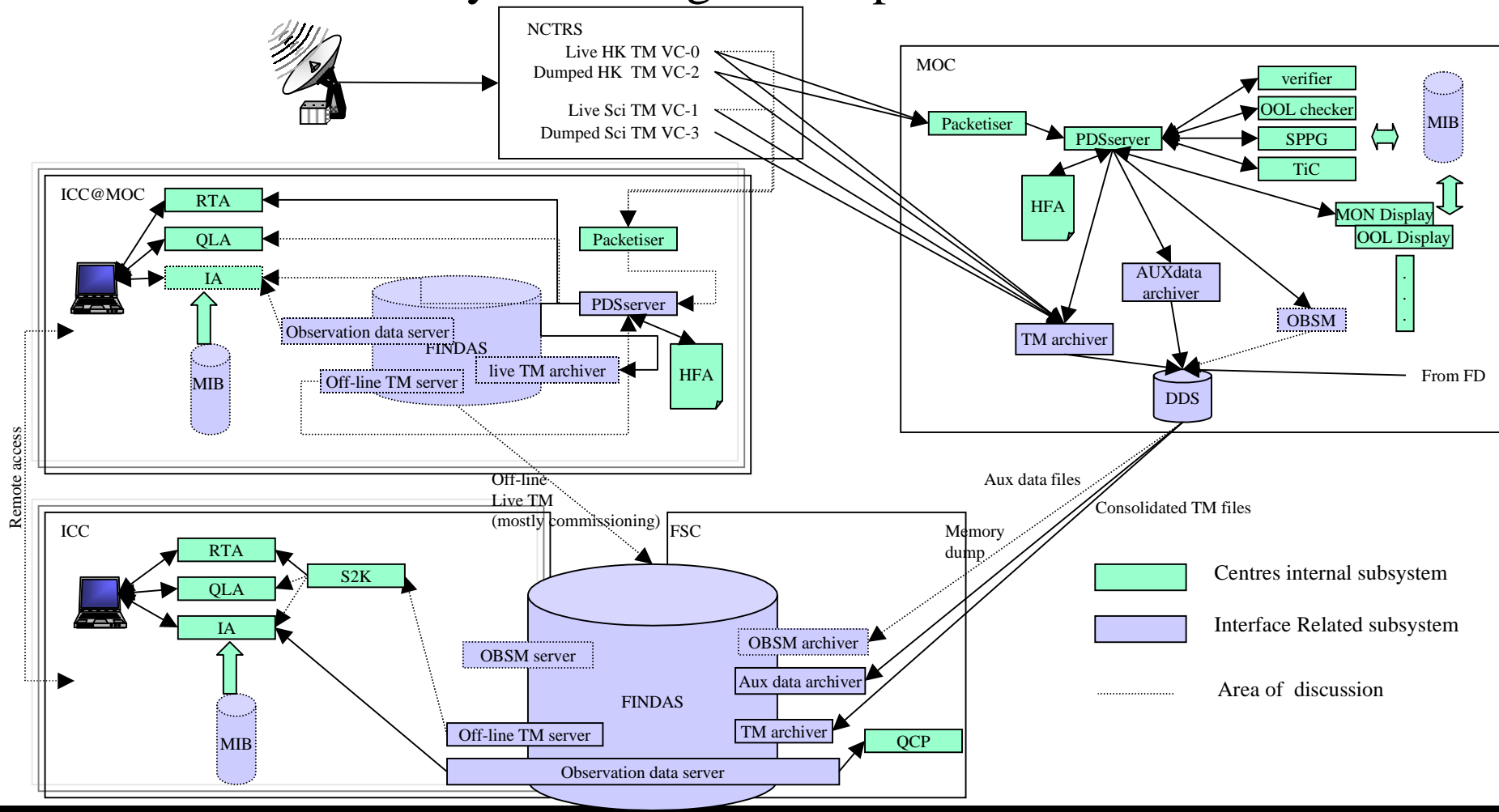
## FIRST TM system design concept (issue 3)

- IA/QLA interface directly to FINDAS vs use S2K as front-end for raw TM packets (wild idea?)
  - simpler interface (S2K is not in the loop)
  - S2K not needed by FSC/QCP (not the case for alternative)
  - do not impose a FINDAS to S2K interface
  - no feasibility issue (feasibility of alternative to be studied)
  - Ensure common IA/QLA interface for raw TM packets
  - FINDAS not needed to run QLA and IA on raw TM packets (interesting for st

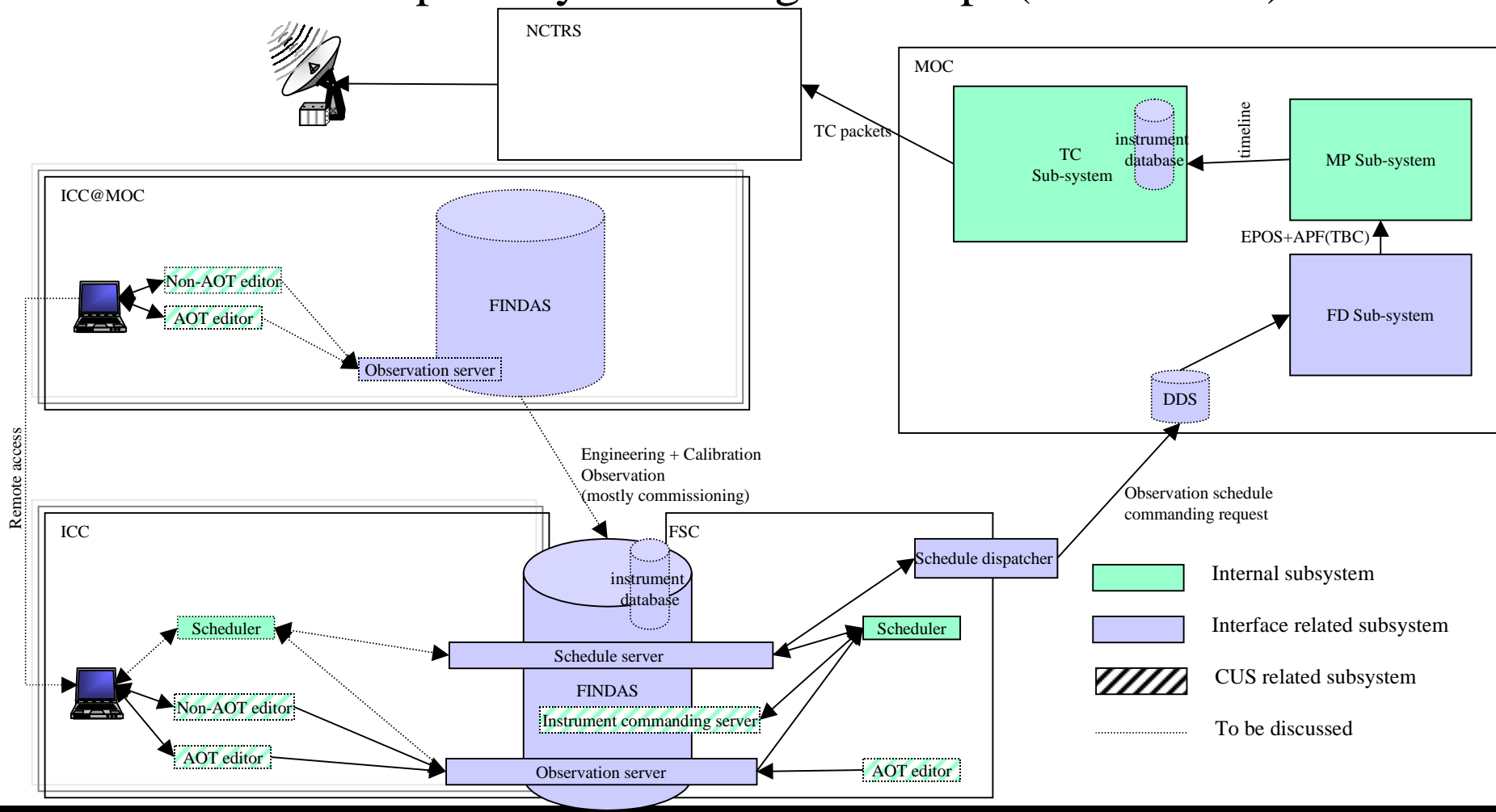
## FIRST TM system design concept (issue 4)

- Instrument + S/C data base outside S2K (e.g. in FINDAS) vs **in S2K only**
  - QLA, IA, FSC/QCP & CUS? do not need to I/F S2K for S/C and instrument data (would be the case for alternative)
  - less of a feasibility issue? What is requested for a non S2K client to access the MIB?
  - **less development, no need to develop import process into FINDAS**
  - **lower operational cost (yet another instance/implementation of the instrument +S/C data base to be maintained)**

# FIRST TM system design concept (alternatives of issue 1,3&4)



# FIRST uplink system design concept (exl. OBSM)



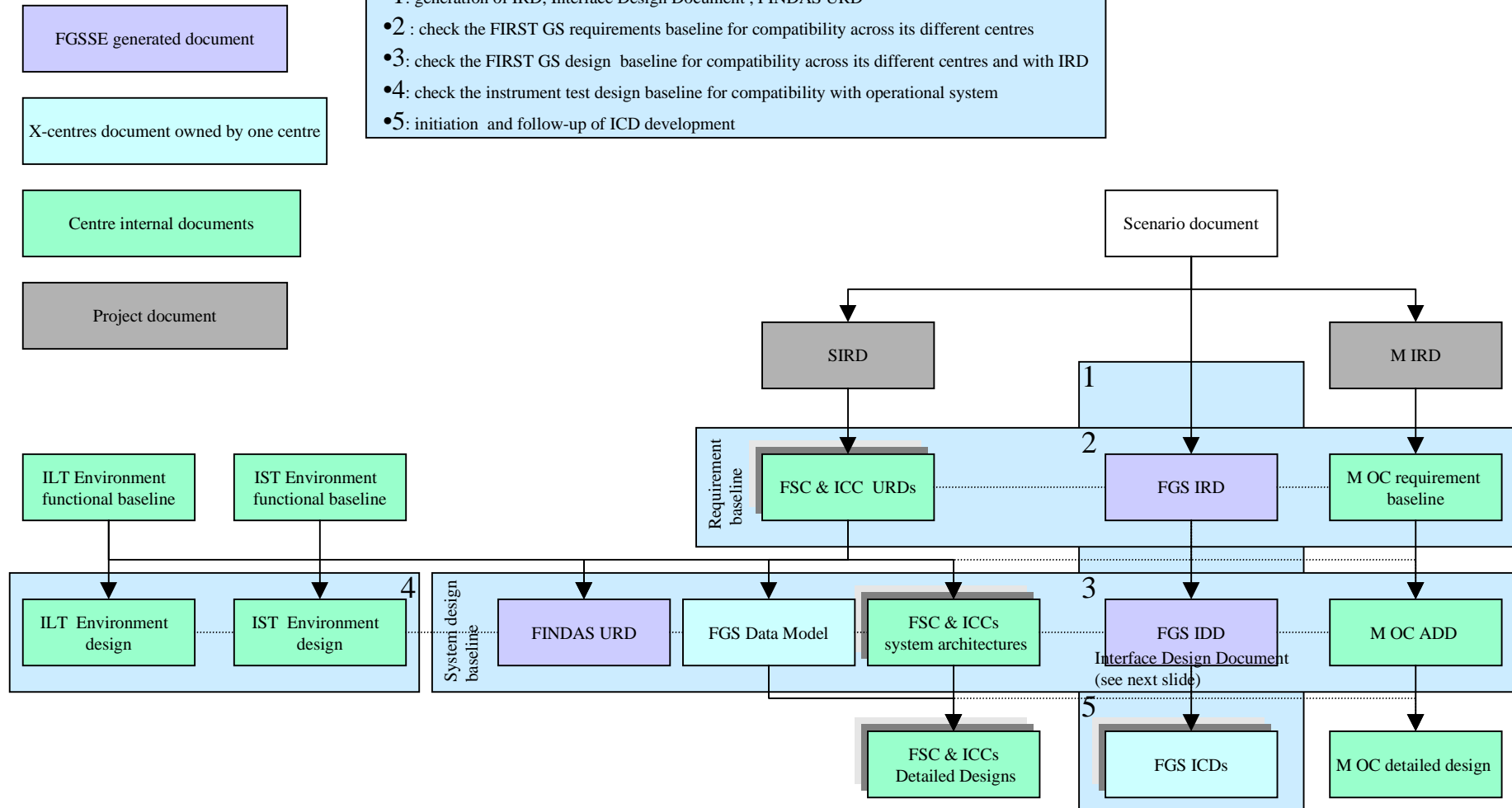
## FIRST Uplink system design concept (issues)

- FINDAS needed in ICC@MOC or can we rely completely on remote access to ICC@ICC
  - submitting an observation in remote access is nominally supported by the FSC/PHS system
- CUS concept?
- CUS needs the instrument database? Same as MIB? another one?
- Issues related to compatibility with ILT/IST set-up?
- Other issues?



## FGSSE responsibilities (To Be Discussed):

- 1: generation of IRD, Interface Design Document , FINDAS URD
- 2 : check the FIRST GS requirements baseline for compatibility across its different centres
- 3: check the FIRST GS design baseline for compatibility across its different centres and with IRD
- 4: check the instrument test design baseline for compatibility with operational system
- 5: initiation and follow-up of ICD development



## Interface Design Document (proposal)

- Objectives:
  - Define the design of the interfaces between MOC/FSC & ICCs :
    - to meet the IRD requirements
    - to be compatible with individual centres system architecture
    - to be compatible with test environment architecture (concept of smooth transition between phases)
    - to be affordable cost and schedule wise
  - Identify and define MOC/FSC and ICCs subsystems which are supporting the interfaces
  - Identify and define the different interfaces between the FSC/MOC and ICCs sub-systems
- Scope:
  - This document will focus on the design of the interfaces between MOC/FSC and ICCs
  - Together with the FSC, ICCs system architectures and MOC ADD, it will constitute the system design baseline of the FIRST GS.
  - The level of details of the definition of both the interface and the sub-systems shall be such that individual ICDs between sub-system can be identified and functional requirements and performance constraints on the different subsystems can be derived.