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Minutes of Meeting

Herschel

Date: 05.02.2003	
Doc.-No.: HP-2-ASED-MN-0290	
Meeting place: Ottobrunn	Chairman: O. Bauer
Date/Time: 05.02.2003 / 9^{00}	Secretary C. Schlosser
Agenda dated: 30.01.2003	Close of Meeting:

Subject:

Participants: See attached sheet	Additional Distribution:

Page: 1 of 6 Page(s)

☐ Brief-Minutes (except following sheets)

☐ Summary of Results of Sheets 2 till

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Reference	Results	Remarks
	1. Agenda Specific point to discuss added 2 Test Definition & Objectives the presentation from S. Idler (annex 1) IMT (Integrated Module Test) is an IST, but with power and data IF from EGSE (PLM EGSE) instead of the satellite IF. In the beginning of IST, instruments needs several break points to have a quick look analysis of science and HK data. Goal is to have an automated sequence running w/o breaks at the end. Not all modes of the instruments could be checked in an IST. For some of the modes an SPT is needed.	

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Reference	Results	Remarks
	3. Herschel Overall EGSE Configuration The overall Herschel EGSE configuration has been presented by ASP (see annex 2). Herschel PLM configuration is valid during all tests w/o SVM: all EGSE tests and on PFM until end of IMT and EMC on PLM level (CCE, as only 4. Approach of IST's see ESA presentation (annex 3) - Operation phase (via MOC) - System test phase (via CCS) Possibility to have a direct outside access to the instrument EGSE has to be discussed. The instrument test cannot be continued in case of a problem w/o going back to a certain break point, setting the instrument in a defined configuration	

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Reference	Results	Remarks
	5. Role of Instrument EGSE See annex 4 (Bryan Melton presentation) TOPE in Instrument EGSE is not used on system level test. TOPE in instrument EGSE is different from CCS TOPE. Therefore procedures running on instrument EGSE cannot directly re-used on CCS level. 6. Instrument EGSE for AIT See annex 5 (Otto Bauer presentation) 2 complete IEGSE will be provided for each model. One for real time operations the other one for analysis and as back-up. Open questions: - How to seperate the CCS LAN from „IEGSE LAN" (via switch?) - Is it possible to have a high speed access to the „back-up" IEGSE? - How to test IEGSE ⇔ CCS I/F? (via CCS simulator?)	

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Reference	Results	Remarks
	7. EGSE Conceptual Architecture See annex 2 Instead of 3 specific EGSE (one for each instrument) a common EGSE will be provided as explained above. 8. IEGSE ↔ CCS I/F Discussion • PUS protocols will be used (EGSE WG) • OBSID, parameter (agreed) ↳ CUS: (1) instant, rel. timing (2) Generic (3) Parameter set • Generic + param. ↳ SCOS TOPE on CCS side ↳ def. of format • Test control TOPE to be modified CUS to be modified (Instrument task) • Definition of other messages • ICD: CCS-EGSE needed from ASP • Scenario document (defining boundary cond.) • IEGSE test • Integration & test plan • Generation of test sequences	

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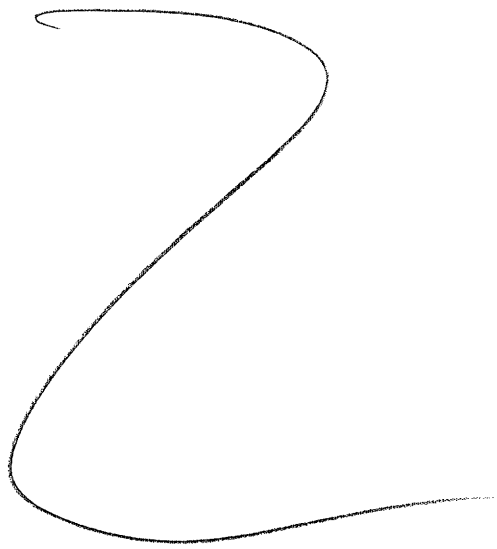
Reference	Results	Remarks
	Compatibility of test sequences between I-EGSE and CCS environm. (implementation / validation) will be discussed / clarified in the EGSE WG. 9. A.O.B Delivery of I-EGSE could be ~1 month before delivery of the instruments. A I/F test between I-EGSE and CCJ (Light) shall be done well in advance. 	

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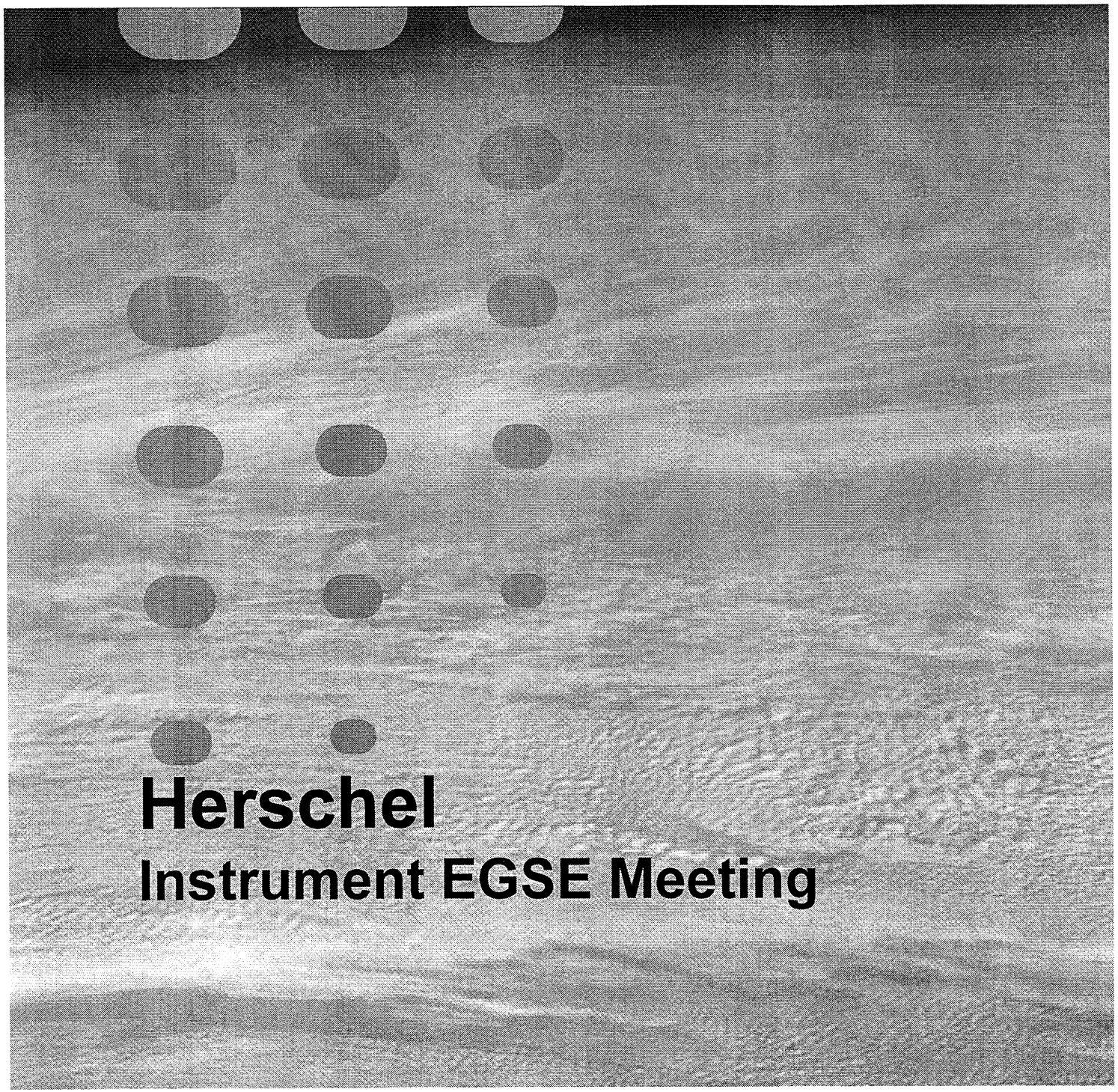
Reference	Participants ~~Results~~		Remarks
	C. Schlosser	ASED	
	M. Koelle	ASED	
	S. Idler	ASED	
	G. DOUBROVIK	Alcatel	
	B. DUBOIS	Alcatel.	
	D. MONTET	Alcatel.	
	E. Wiezorrek	PACS / MPE	
	K. KING	SPIRE / RAL	
	B. MELTON	ESA/ESTEC	
	L. DUBBELDAM	HIFI / SRON	
	O. PIERSANTI	ESA/ESTEC	
	J. RIEDINGER	ESA/ESTEC	
	K. Galloway	ESA/ESTEC	
	O.H. Bauer	PACS / MPE	



Herschel
Instrument EGSE Meeting

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Siegmund Idler
05.02.2003

Instrument Tests on PLM/Spacecraft Level

Test Definitions and Objectives

Test	Test Objektives	Conditions	Scheduling
Short Functional Test (SFT)	Confidence test to check electrical integrity and operability of the EPLM or satellite. As regards the instruments: Switch on and functional verification of instrument interfaces. Evaluation should preferably be based on housekeeping data. Automated test executed from CCS using a combination of ILT sequences (subset of IST sequences). Three different types of instrument SFT's to be defined: warm, He1 and He2.	SFT warm: Ambient SFT He1: Tank temperature 4.2 K SFT He2: Tank temperature 1.7 K	SFT warm: Before cool down of the cryostat. SFT He1: After cool down (He1) and between environmental tests. SFT He2: After He2 production..
Specific Performance Test (SPT)	Instrument stand-alone test: Verification of dedicated aspects of the performance of the integrated instrument. Tests may require a specific spacecraft configuration different from the IST. Automated test executed from CCS using a combination of ILT sequences.	Tank temperature 1.7 K	Scheduling depending on test set-up requirements.

Instrument Tests on PLM/Spacecraft Level

Test Definitions and Objectives

Test	Test Objektives	Conditions	Scheduling
Integrated System Test (IST)	Verification of the correct operation of the fully integrated satellite in a series of representative mission modes. As regards the instruments: Verification of the functional performance of the integrated instrument in all modes. Check of the instrument performance (no degradation with respect to instrument level test results) as far as possible with satellite configuration. Automated test executed from CCS using a combination of ILT sequences. Specific IST to be defined for EMC and TB/TV test.	Tank temperature 1.7 K	Before and/or after full environmental tests. Specific IST during EMC and TB/TV test.

- Instrument tests shall run on EPLM and satellite level.
- EPLM level IST is called IMT.
- EPLM level instrument tests are executed from CCS lite via CDMU DFE

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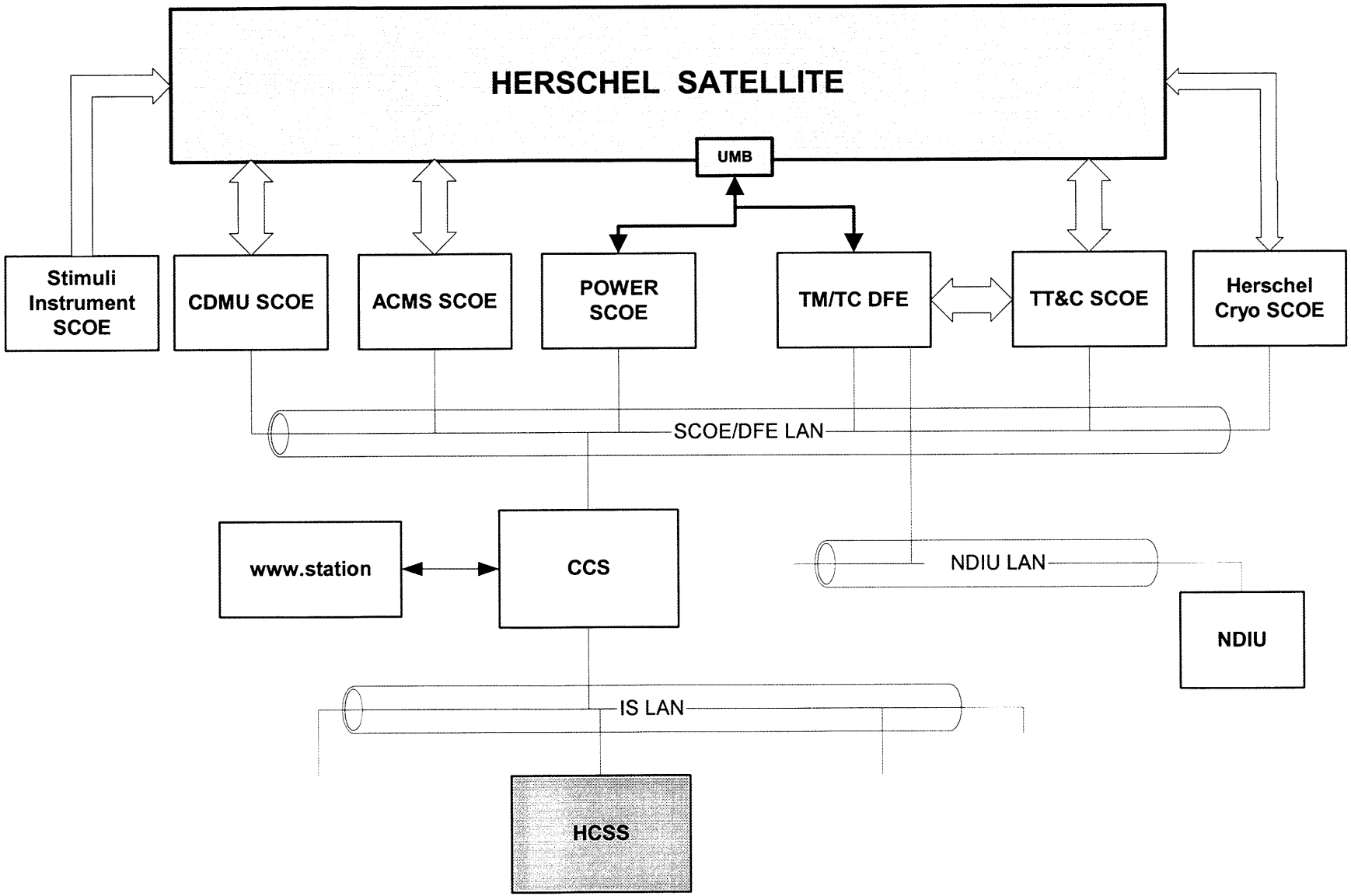
OVERALL HERSCHEL S/C
Test Configuration

5 - Feb - 2003

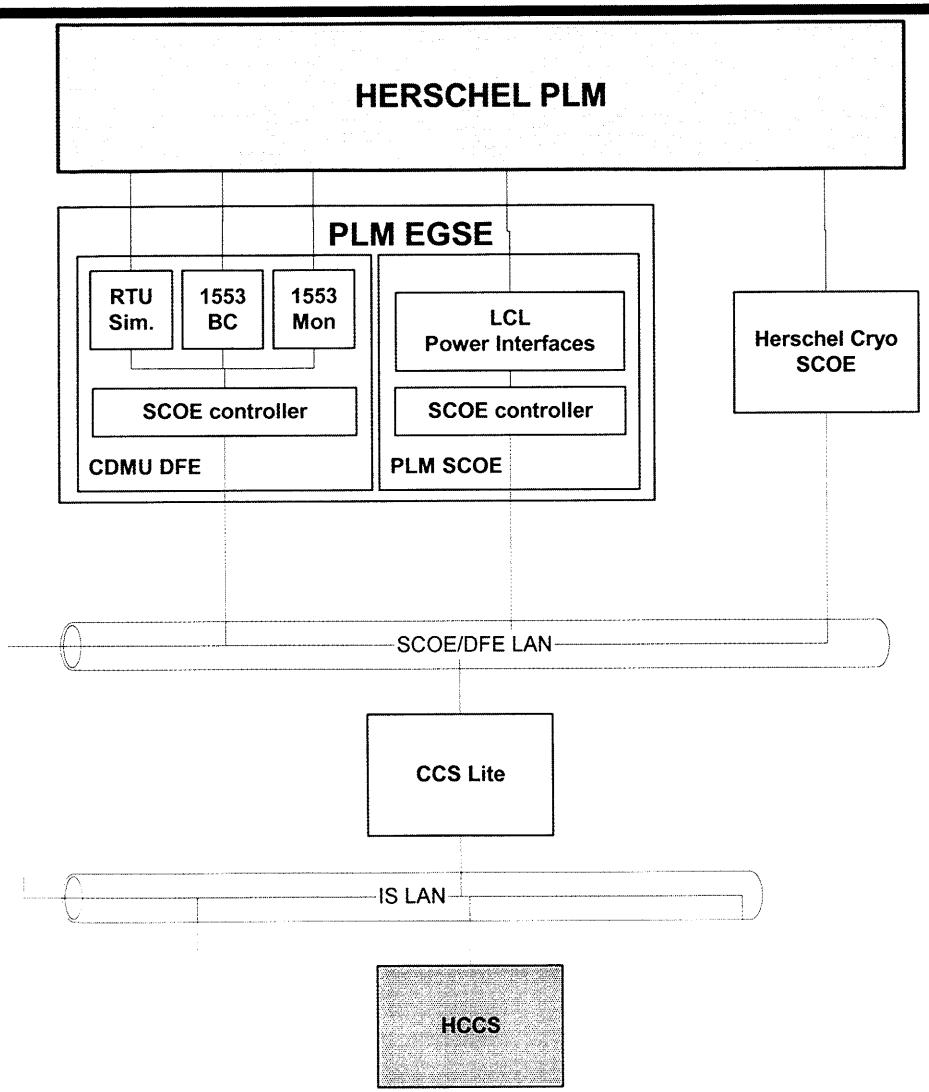


Annex 2 A/9
HP-2-AED-RN-0290 IA025-A

ALCATEL SPACE

HERSCHEL PLM
Test Configuration

5 - Feb - 2003



PLM EGSE : Detail of CDMU DFE

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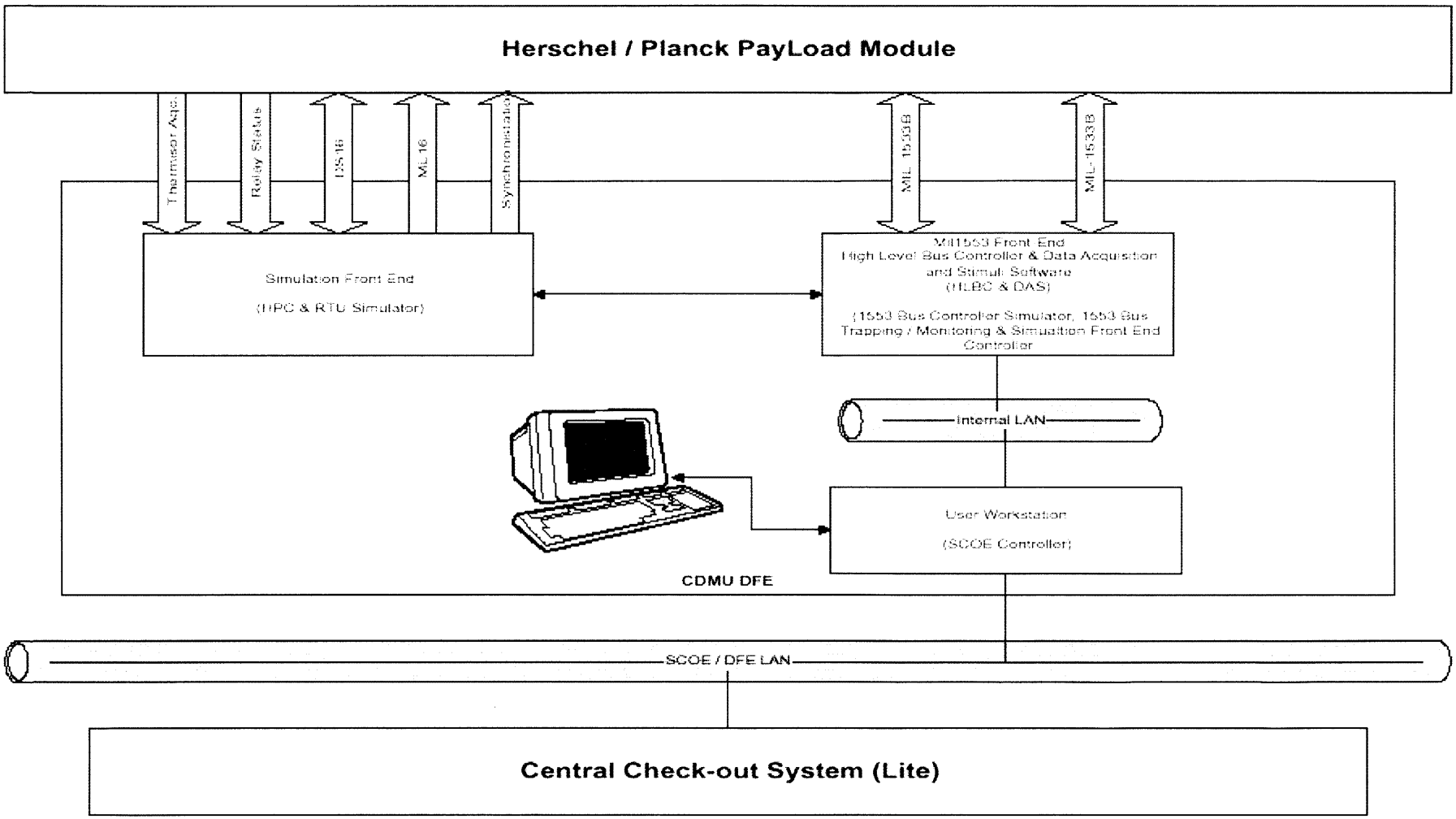
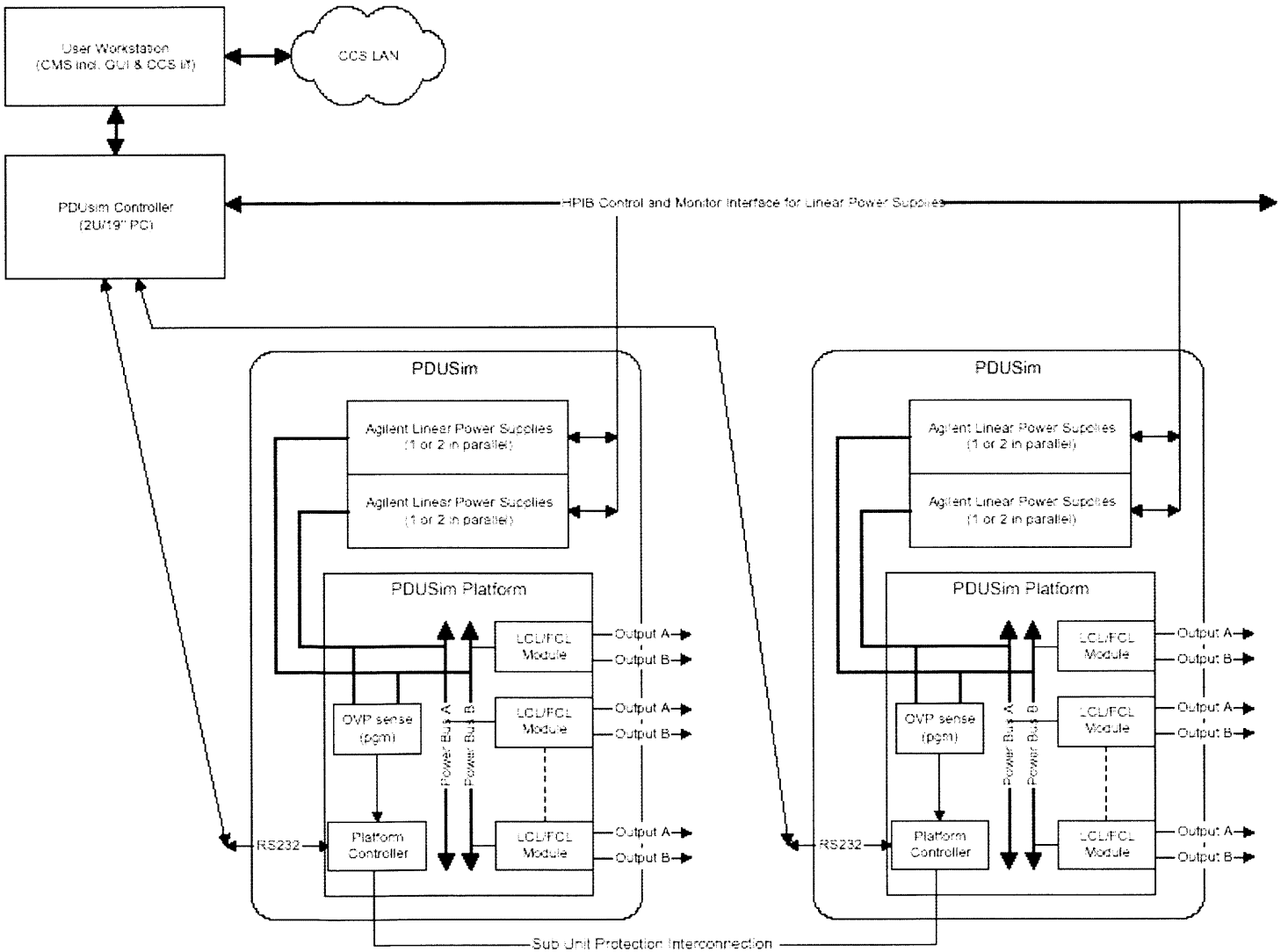
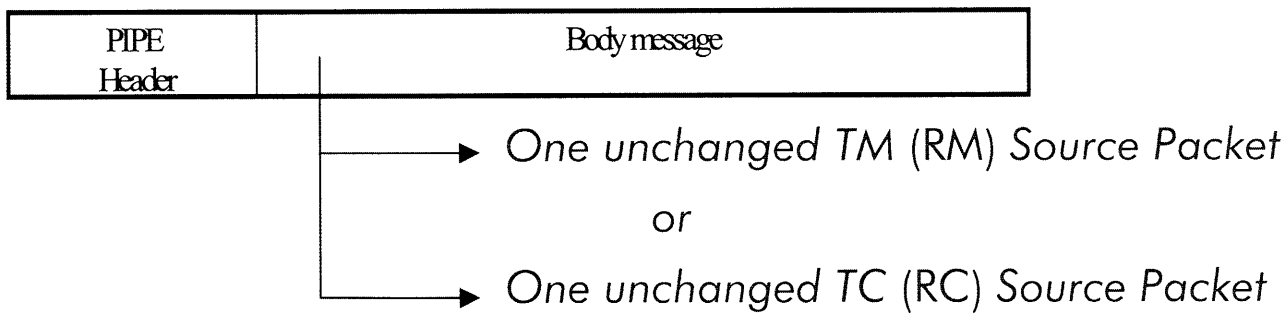


PLM EGSE : Detail of PLM SCOE



PIPE Protocol

- PIPE protocol allows to exchange Packets between CCS and EGSE items connected via LAN. The protocol is structured in such a way that *TM Source Packets* and *TC Source Packets* are transferred without any changes (Body Message). This is achieved by the attachment of an information header (*PIPE header*) containing additional information required for proper routing and processing of the Packets.



- The main principle of PIPE protocol is to consider each SCOE as an Onboard equipment:
  - Each SCOE receive TC packets from CCS (called **RC** - **R**emote **C**ommand)
  - Each SCOE transmit Telemetry Packets to CCS (called **RM** - **R**emote **M**essage)

PIPE Messages for I.EGSE

- CCS shall receive from each I.EGSE at least one RM Packet every 60 seconds.
  The following Remote Messages shall be foreseen :
  - → Periodic RM packets containing vital data measured/acquired by each I.EGSE (if needed)

    AND/OR
  - → Asynchronous RM packets containing special events /errors/warning notification (if needed)

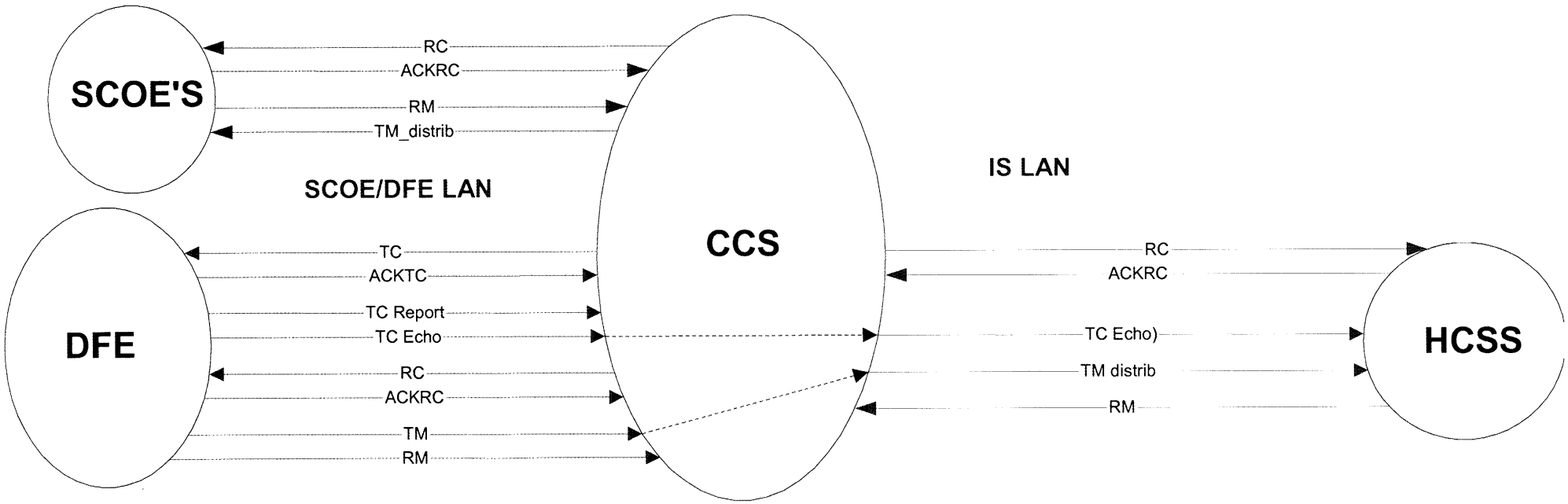
    AND/OR
  - → Alive RM Packets (empty packet used to control the link between CCS and I.EGSE)

- CCS will send to I.EGSE RC commands to be executed locally.

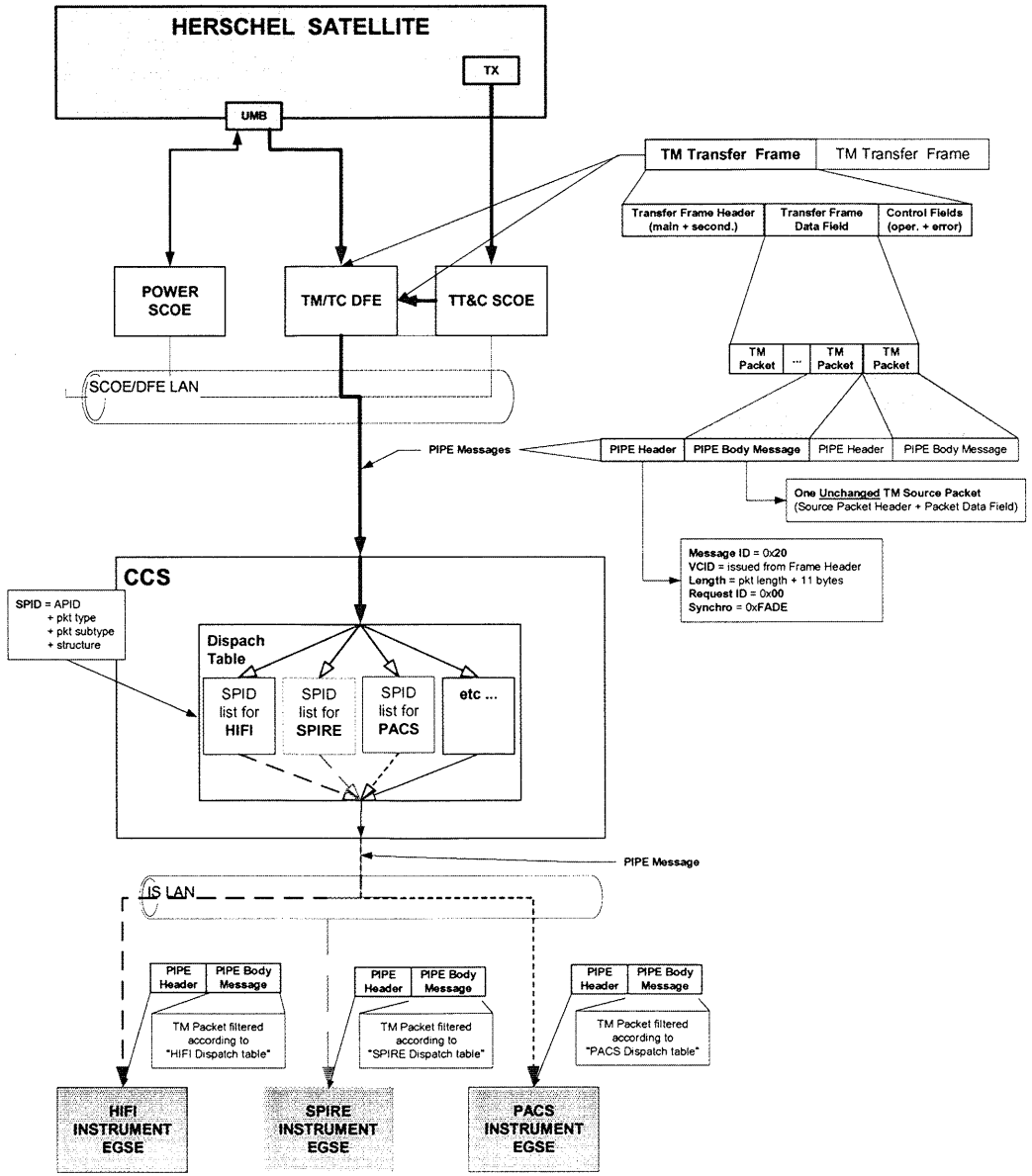
- CCS will distribute to Each I.EGSE TM Source Packets according to the dispatch table.
  (The dispatch table contains the list (combination of APID/type/sub-type/structure) of TM Packet to be send to I.EGSE)

- Each I.EGSE shall receive from CCS TC Echo Packets.
  TC Echo Packets contain the re-constructed TC Source Packet sent by TM/TC to S/C)

PIPE Messages exchange

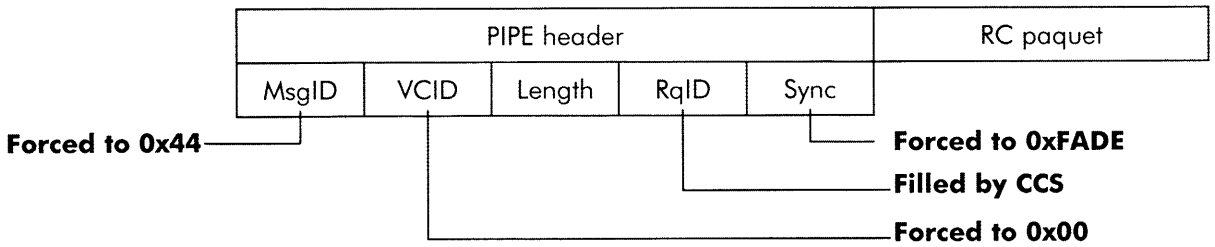


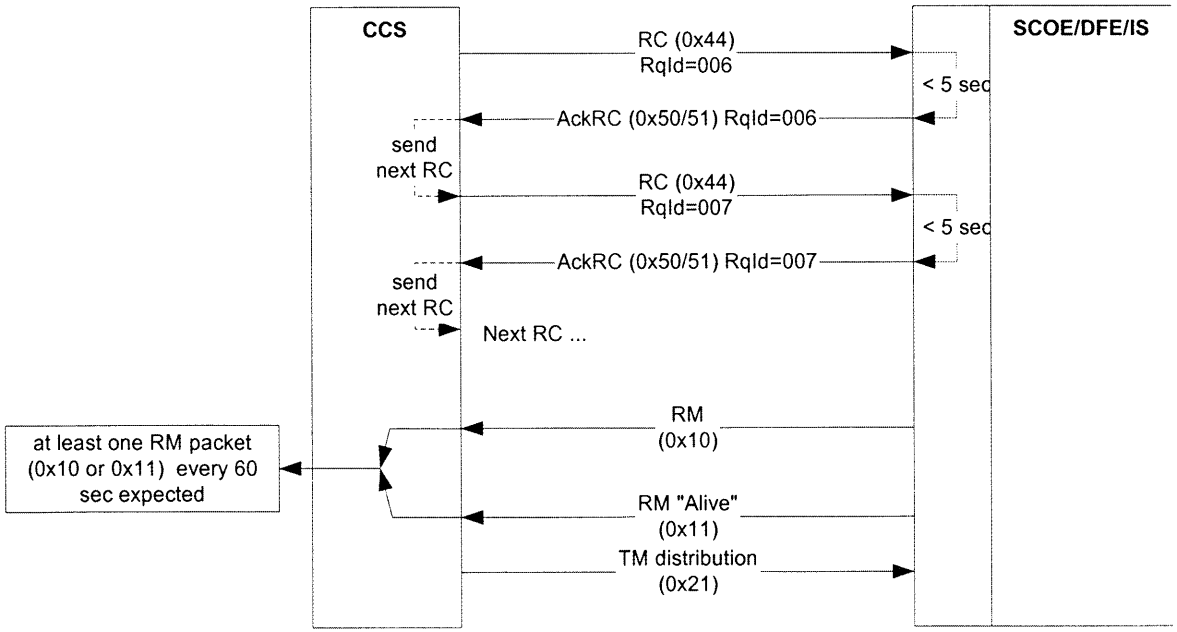
TM Flow Distribution

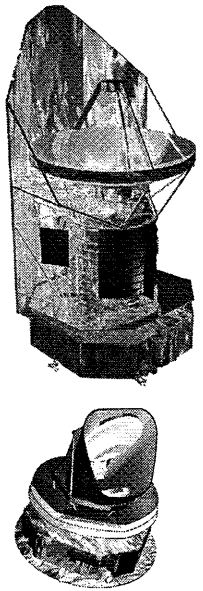


RC/RM Flow Distribution

RC messages

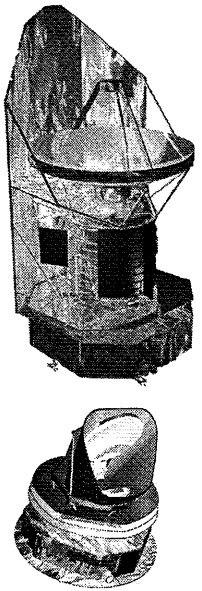


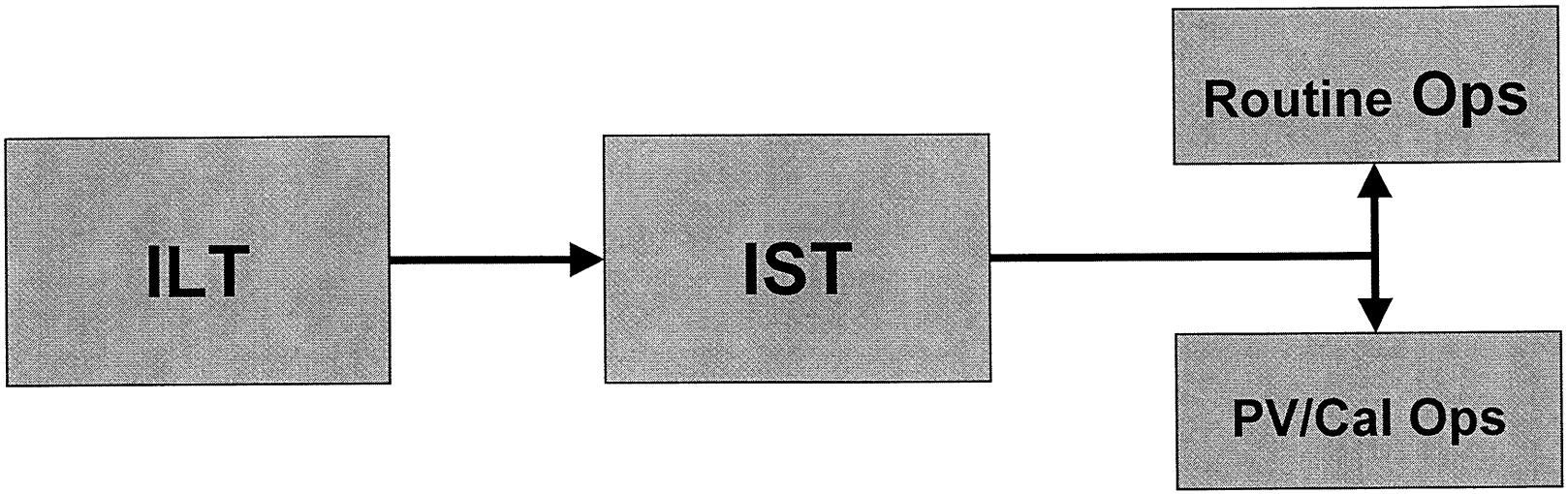




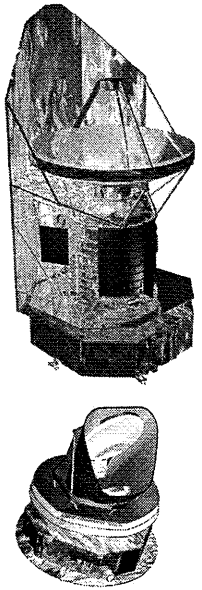
Approach to ISTs

21 January 2003



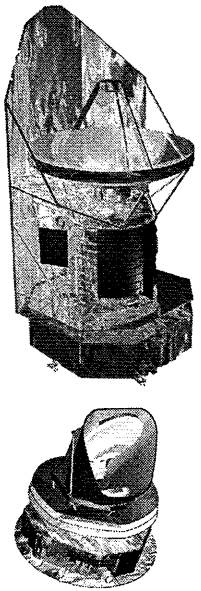


Smooth Transition Requirement



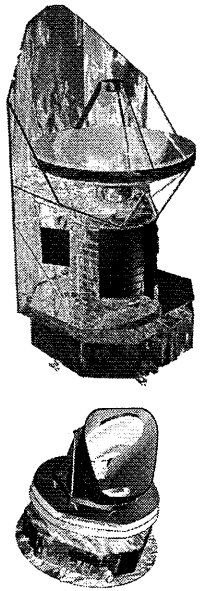
ILTs

- Performed individually at instrument level before delivery
- To include functional, performance and reference tests of instruments
- Make use of HCSS and EGSE-ILT based on SCOS 2000
- During ILT, EGSE-ILT interfaces the HCSS to get the "Observation Plan" and ObsID requested for the test.



ISTs

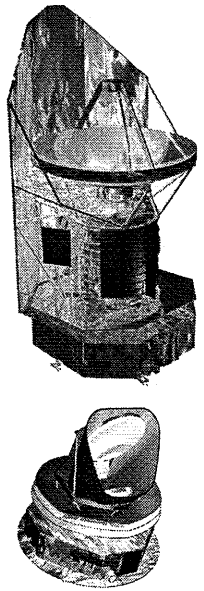
- To verify correct operation of the full integrated spacecraft in a series of representative mission scenarios including failure cases
- To be performed on the AVM (Herschel and Planck), STM/CQM (Planck only) and PFM (Herschel an Planck)
- ISTs to combine procedures developed and debugged at SVM, PLM and Instrument level
- IST to include some Instruments performance tests (Herschel PFM)



Operations(1)

From: Reference Mission Scenario (Herschel)

- Commanding of the satellite (spacecraft and instruments) is carried out exclusively by the Mission Operations Centre (MOC) located at ESOC.
- For Herschel an Operational Day (OD = 24 hours) has been defined as basic planning unit for the operational phase.
- Each OD can be divided into: DTCP (I.e visibility period of about 3 hours) and autonomy period (remaining 21 hours)
- HSC to submit to MOC an Observation Plan covering about 3 weeks
- From the Observation Plan, MOC to derive a detailed Schedule of activities and the related MTL for each OD.

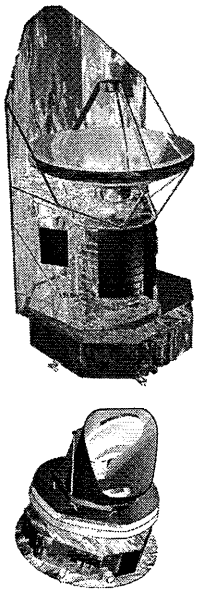


Operations(2)

From: Reference Mission Scenario (Herschel)

Some activities during DTCP

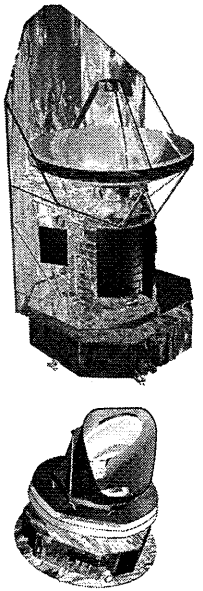
.....	
P + 2 min	**Request downlink of events, recorded HK and recorded Science in this order of priority.**
.....	
P + 10 min	Evaluate recorded HK and events data, start downlink of science data
.....	
P + 1 hour	Update on-board schedule (top-up, normally for 24 h)
.....	



Operations (3)

During the Operation (routine) phase:

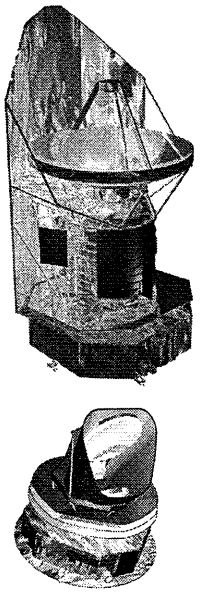
- The HSC shall provide in advance the Observation Plan
- There is no real time involvement of the HSC
- The MOC can transfer science data to the HSC after several hours
- All commanding and recovery actions shall be controlled by the MOC



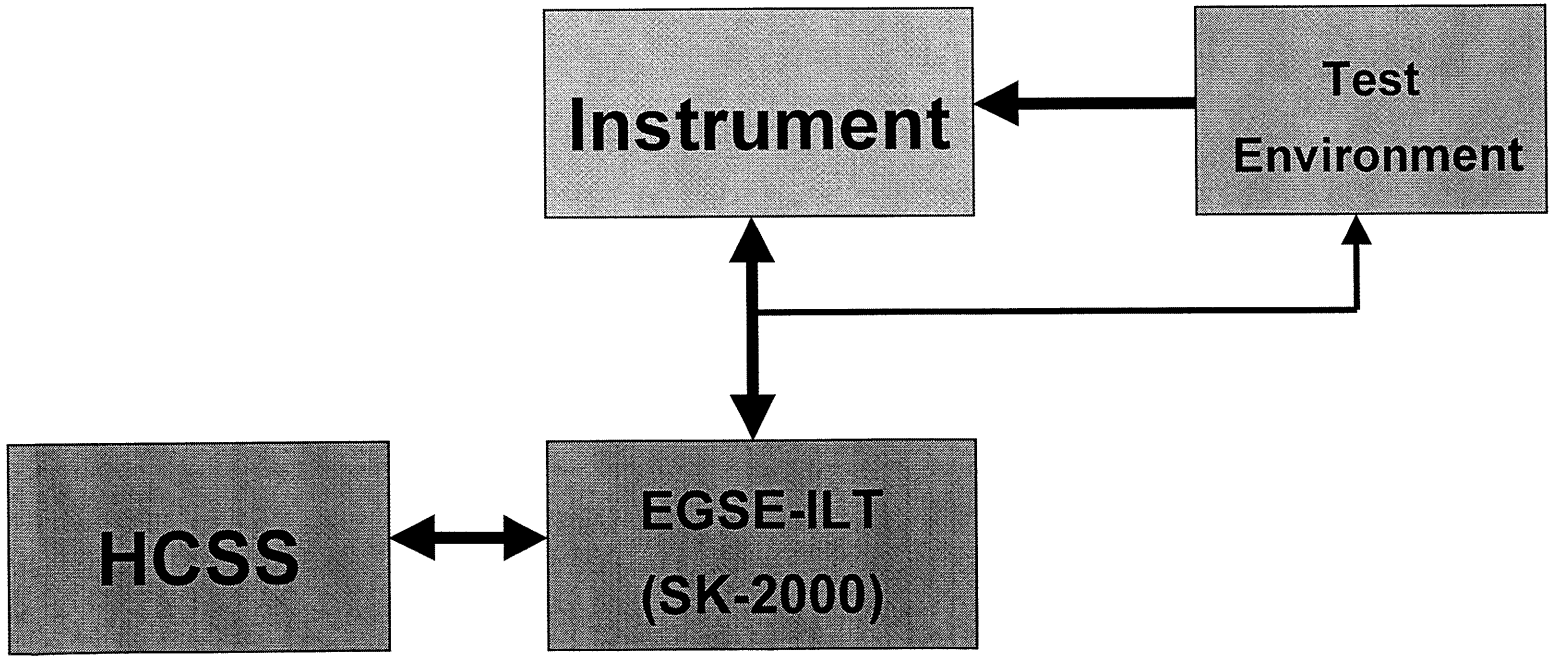
Operations (4)

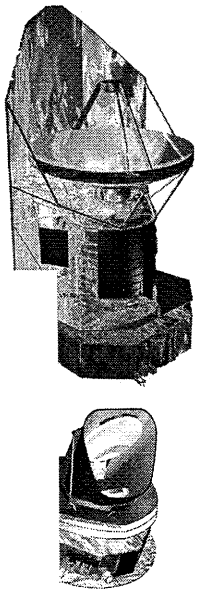
During the Calibration/PV phase (may be in T.O.):

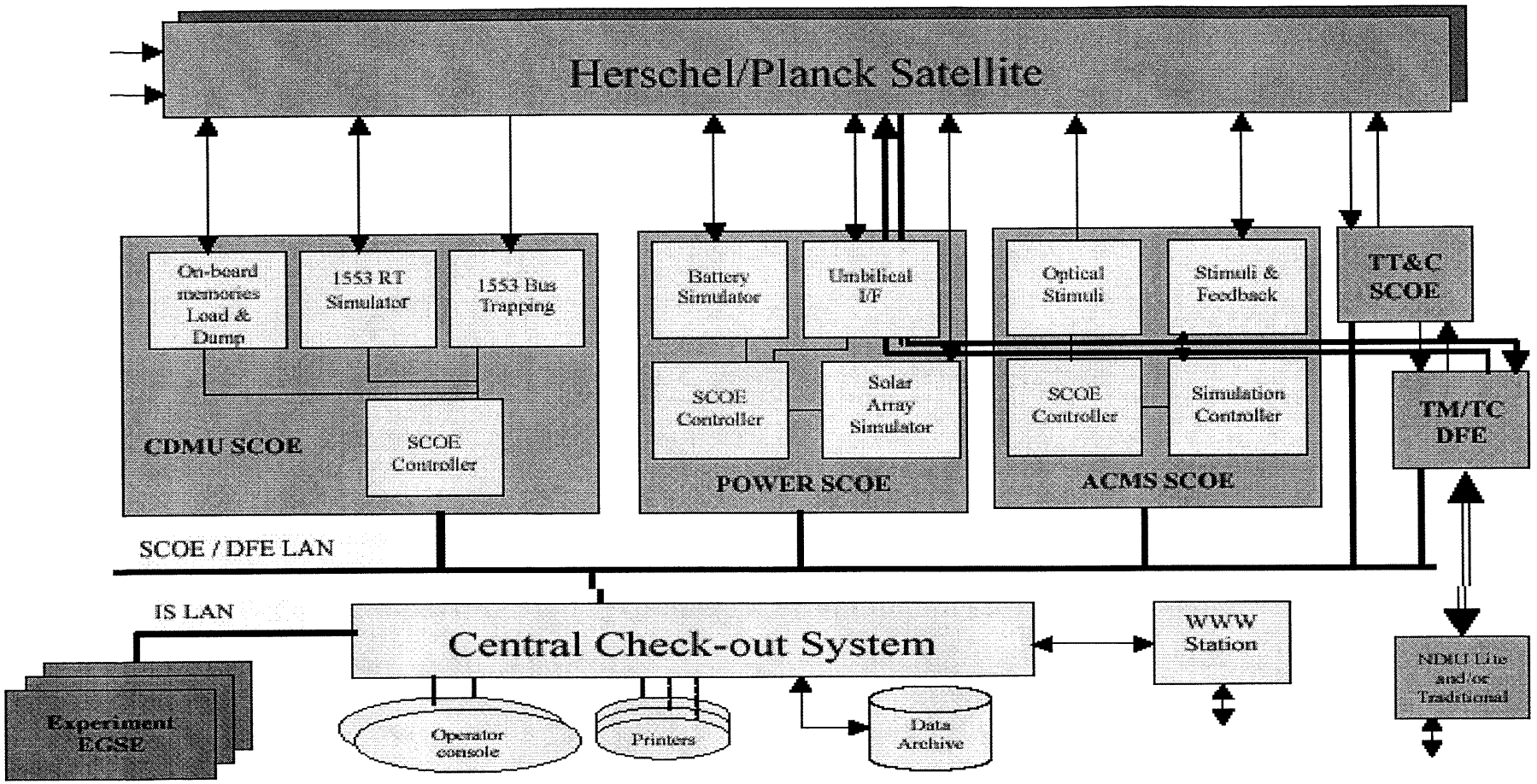
- **An ICC is installed in the MOC**
- **10 hrs visibility per day looks possible**
- **Real time interaction ICC/MOC might be requested (unclear)**



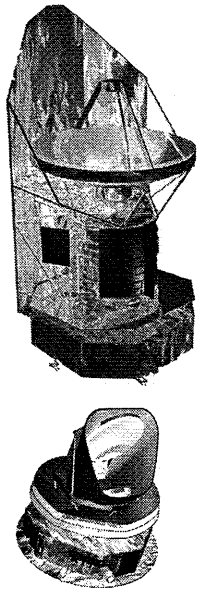
Set-up for ILT (Herschel)





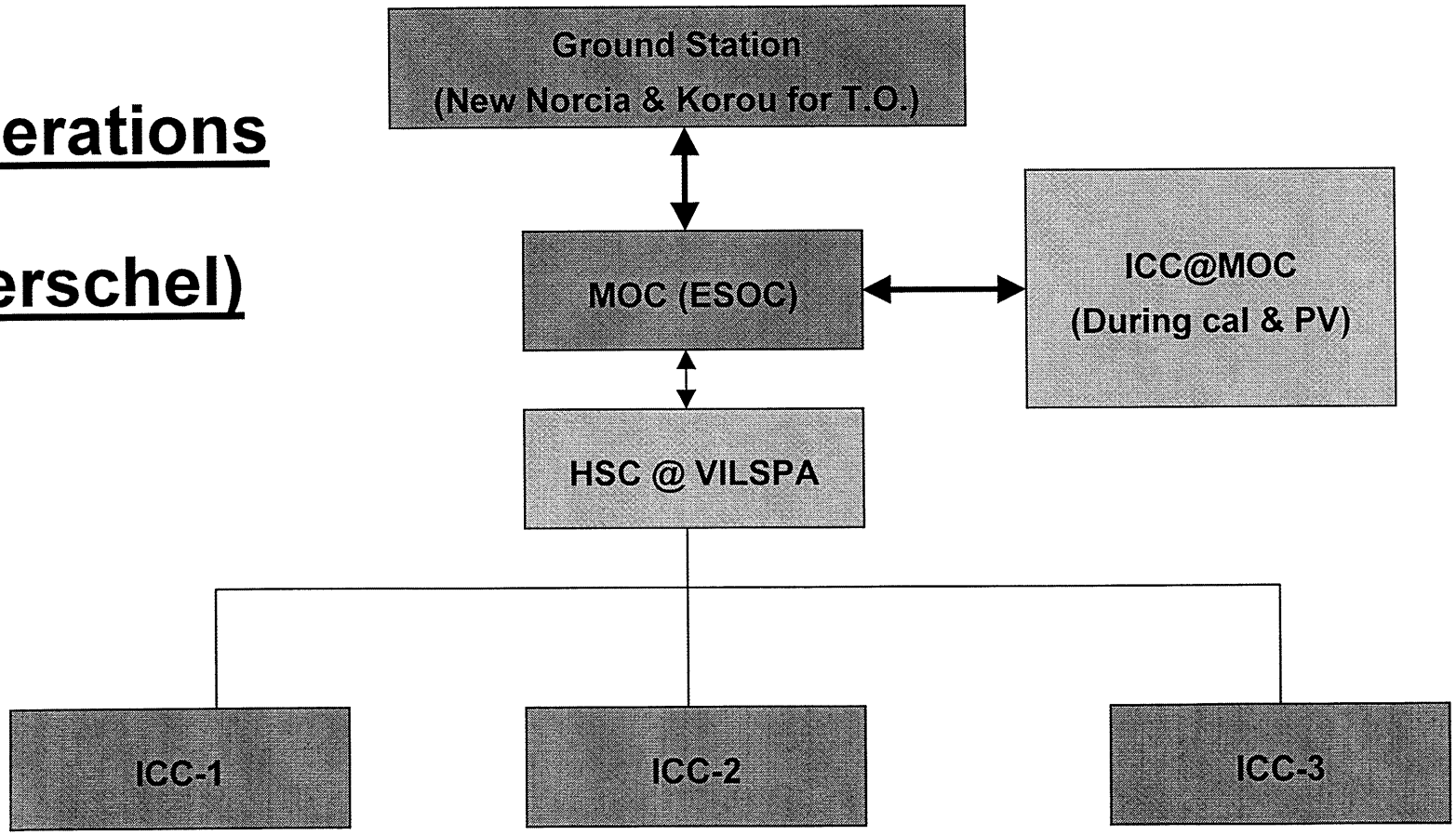


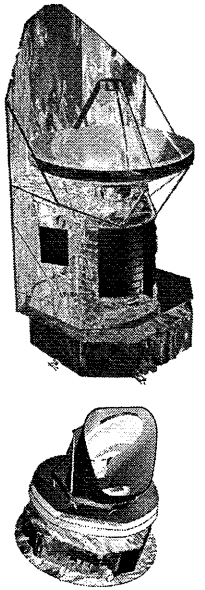
Set-up for ISTs



Operations

(Herschel)



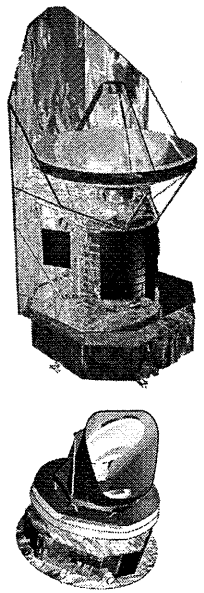


Utilisation of the I-EGSE at System Level

During system level activities, 3 ways of operating the I-EGSE are considered:

- Mode-1: I-EGSE OFF (or unavailable)
- Mode-2: I-EGSE in listening mode i.e. one way communication only from CCS to I-EGSE to dump Instruments HK and Science data
- Mode-3: I-EGSE involved in real time testing under the control of the CCS

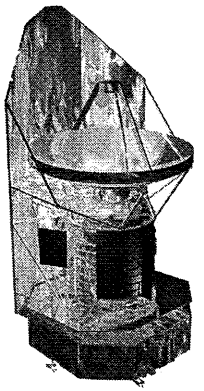
Regardless the selected mode, the CCS retains the control of the test activity. The I-EGSE cannot uplink commands to the spacecraft.



Approach to IST (1)

- Initial running of IST will require debugging of procedures and AIT SW with flexibility to fix quickly minor bugs
- Context saving and re-start may be normal practice (no night shift)
- ISTs to run initially with pre-defined Observation Plan and associated MTL both prepared in advance and available in the CCS.
- Failure cases can also be tested.
- **It might be necessary to re-use several time the same Observation Plan**
- **In this configuration the I-EGSE shall be in listening mode (Mode-2)**

A successful IST in this configuration ensures smooth transition between IST and routine operations phase with the CCS replacing the MOC.

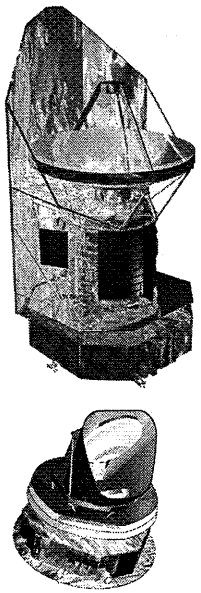


Approach to IST (2)

- IST also requires (Herschel) Instruments verification and consideration of the activities of the ICC@MOC during calibration and PV phase (T.O.)
- ISTs to run initially with pre-defined Observation Plan and associated MTL both prepared in advanced and available in the CCS.
- Real time involvement of the I-EGSE is requested in order to:
  - Evaluate science data
  - Provide updated Observation Plan as needed
  - Validate ground SW (HCSS), QLA, RTA .....
- **In this configuration the I-EGSE shall be involved in real time testing (Mode-3)**

A successful IST in this configuration ensures smooth transition between:

- **IST and PV/ calibration phase with the CCS replacing the MOC and**
- **ILT and IST for all Instrument data processing**



Approach to IST (3)

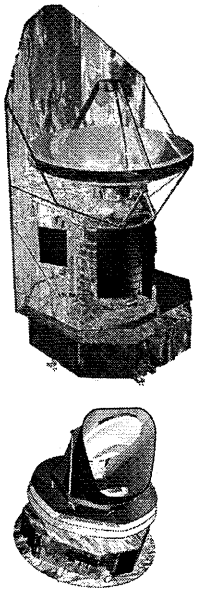
Interfaces required to support IST:

- EGSE I/F Requirements Spec H-P-1-ASPI-IS-0121 to be completed with RC/RM for I-EGSE and Observation Plan

  → normal work to be completed by end February (TBC)

- TC history files

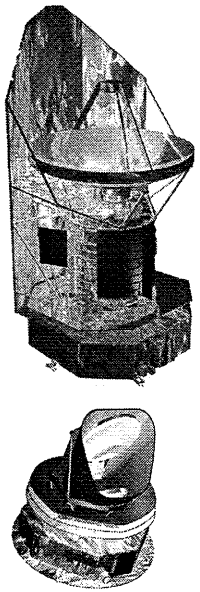
  → already implemented in the CCS and I-EGSE



Approach to IST (4)

On the whole smooth transition is supported by:

- Overall approach to IST as mentioned above
- Established EGSE functionalities and ICDs
- Common SDB
- EGSE (CCS and I-EGSE) and MOC based on SK 2000



Approach to IST (5)

What's next:

Detailed implementation of the IST to be defined in:

- **Herschel IST Specification**
- **Planck IST Specification**

both documents to be issued by Prime

Role of Instrument EGSE at Payload and Satellite level

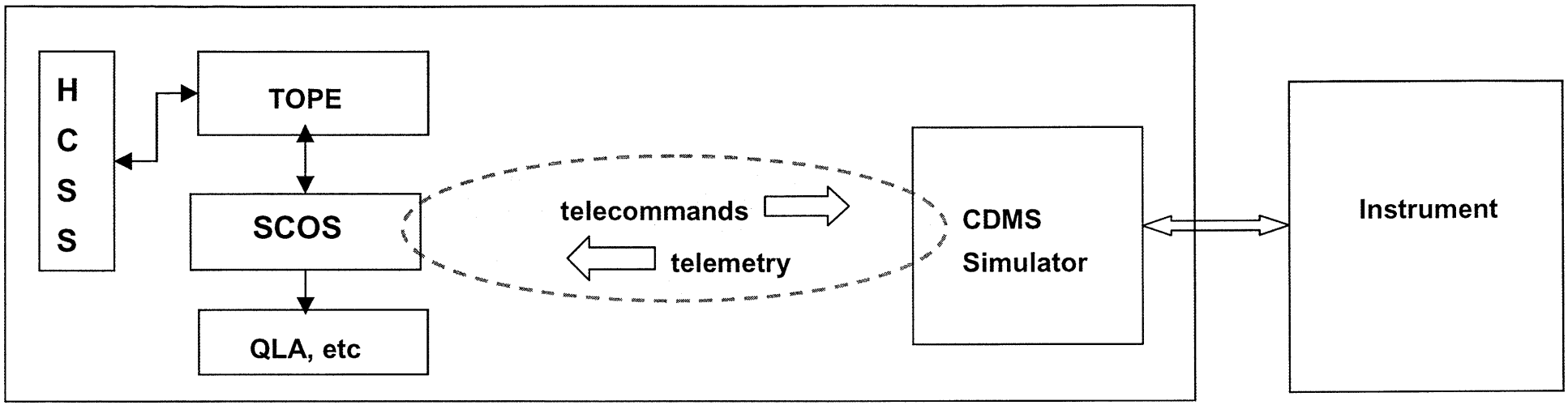
Instrument EGSE modes

- Instruments will be tested with Instrument teams being present and absent
- 3 modes of operation for the I-EGSE are foreseen.
  - Mode 1: I-EGSE OFF (i.e. not required)
  - Mode 2: I-EGSE in listening mode i.e. one way communication only from CCS to I-EGSE to dump Instruments HK and Science data, OOL data, command history.
  - Mode 3: I-EGSE involved in real time testing under the control of the CCS
- For mode 1 and mode 2 a predefined set of Observation characteristics can be used (i.e. fixed set of test sequences), executed by CCS.
- For mode 3 the Instrument EGSE needs to be “in the loop”.

Mode 3 operations

- The necessary telecommand data to command an instrument for a specific "observation" is known only to the instrument EGSE and is created and stored in the HCSS database.
- Software to determine correct operation of the instrument for each observation is resident in the Instrument EGSE.
- Test philosophy at system level demands that the CCS is the only source of telecommands, using a configuration controlled set of test sequences.
- A fixed set of commands with no variability in command data will not support correct operation of the I-EGSE data processing.
- "Smooth transition" requires that a high level of commonality is required between Instrument level (ILT) and higher levels of test (e.g. IST).

ILT configuration



Instrument EGSE

Start a TOPE (TCL/TK code) test sequence

Call HCSS to get observation telecommand sequence(TOPE TCL/TK code)

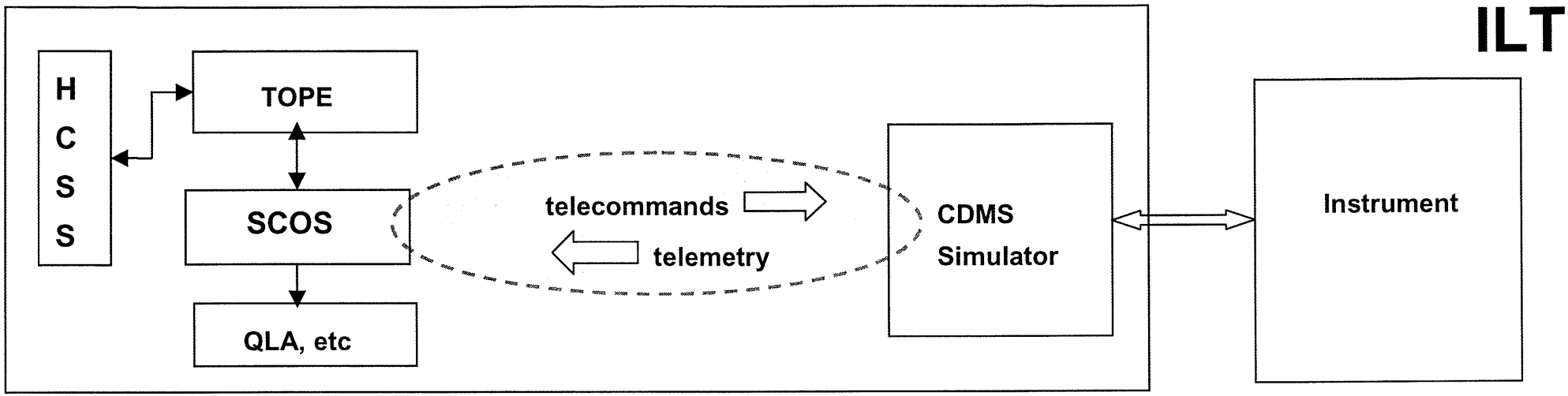
Load & execute the command sequence

Receive telemetry and perform processing

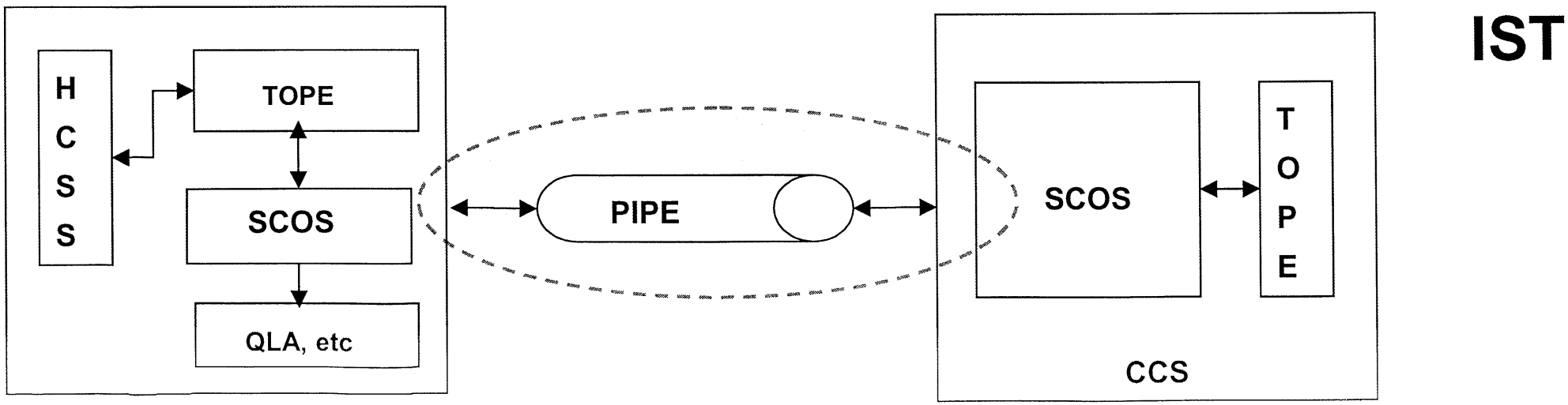
Confirm pass/fail and proceed to next step of test

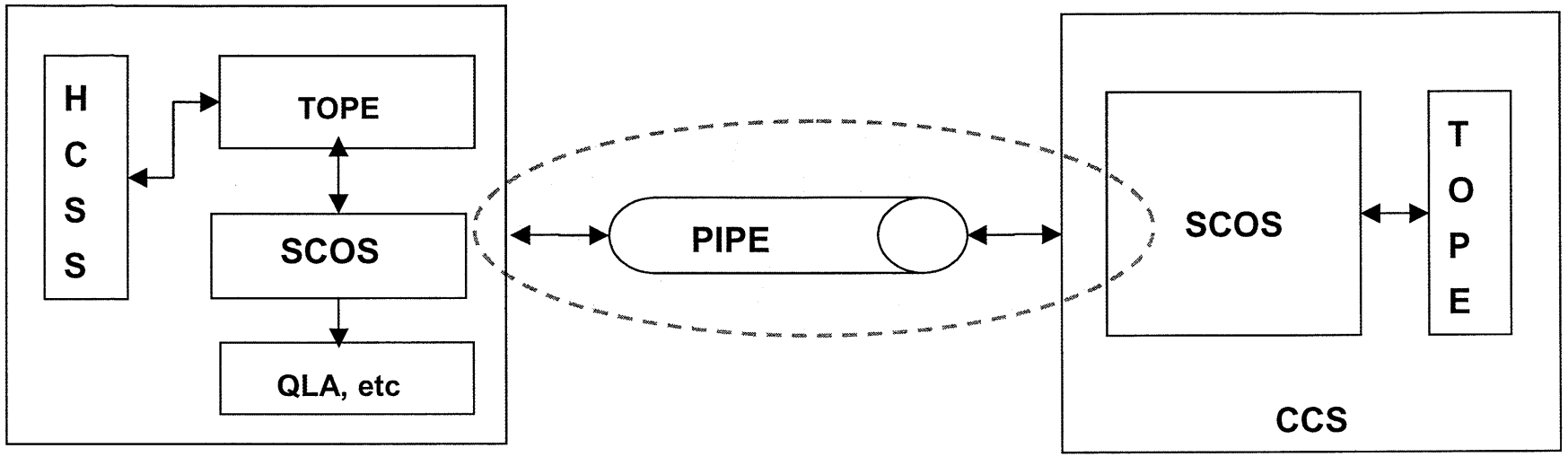
comparison Herschel/Planck

ILT

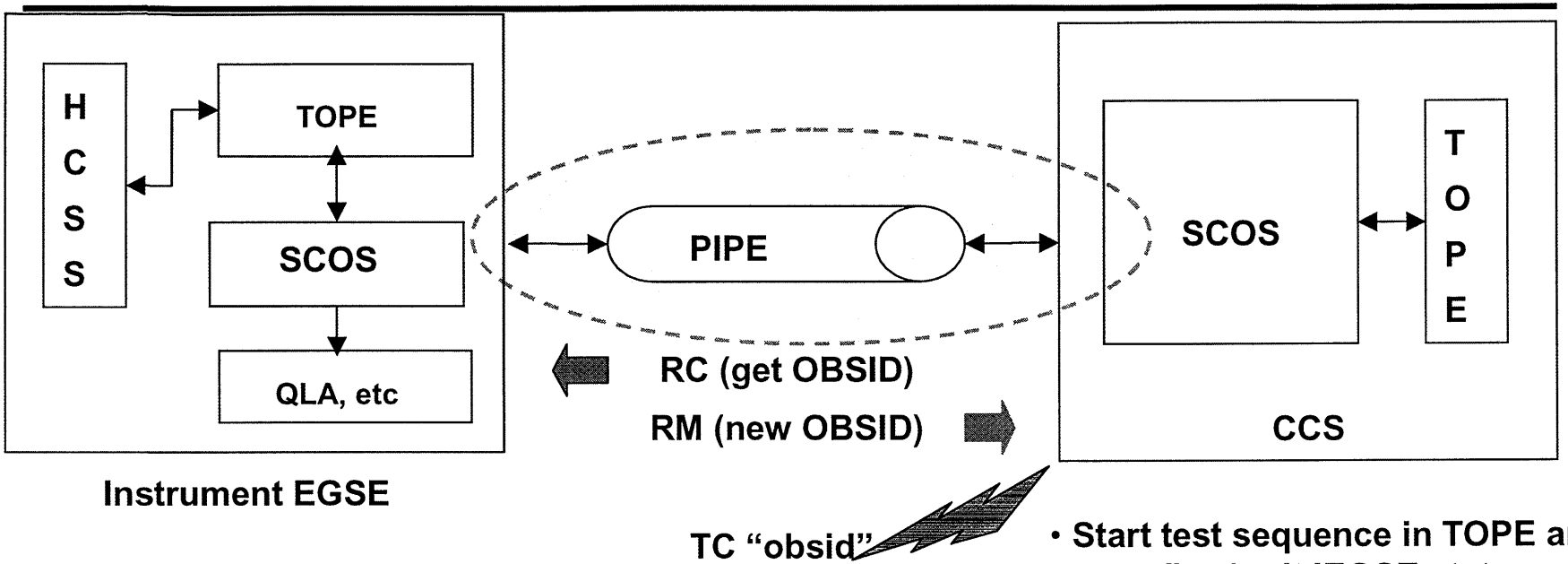


IST





- CCS to request I-EGSE to initiate generation of observation data (using RC command of PIPE protocol).
- I-EGSE to send observation parameter sets to CCS for use by CCS test sequences (RM packets of PIPE protocol).
- Use these to construct “parameters” for a set of generic Instrument operational telecommands.
- CCS then retains commanding responsibility with predefined telecommands, whilst I-EGSE provides dynamic data and all instrument data processing.



Set status "ready" & Wait for PIPE messages

- Receive RC (get obsid)
- Request new observation from HCSS
- Construct & send RM (obsid)
- Wait for new observation data
- Process and set status (by RM)

- Start test sequence in TOPE and confirm/wait IEGSE status = ready
- Request new observation data by sending RC command
- Wait for update of parameter "obsid"
- On arrival SENDTC with parameter "obsid"
- Wait for confirmation status
- Repeat for more observations.....

Impact

- CCS able to exchange RC/RM packets with I-EGSE
- I-EGSE able to exchange RC/RM packets with CCS
- I-EGSE able to request new “observations” from HCSS in terms of parameter sets.
- I-EGSE able to construct RM packets for:
  - cyclic “keep alive” packets
  - Observation parameter sets
- I-EGSE to contain logic to handle mode transitions for each instrument test procedure (using TOPE ?)
- I-EGSE transition from ILT to IST needs careful consideration to make it smooth for users AND for I-EGSE developers.
- COMPLEX and driven by need to include HCSS “in the loop”

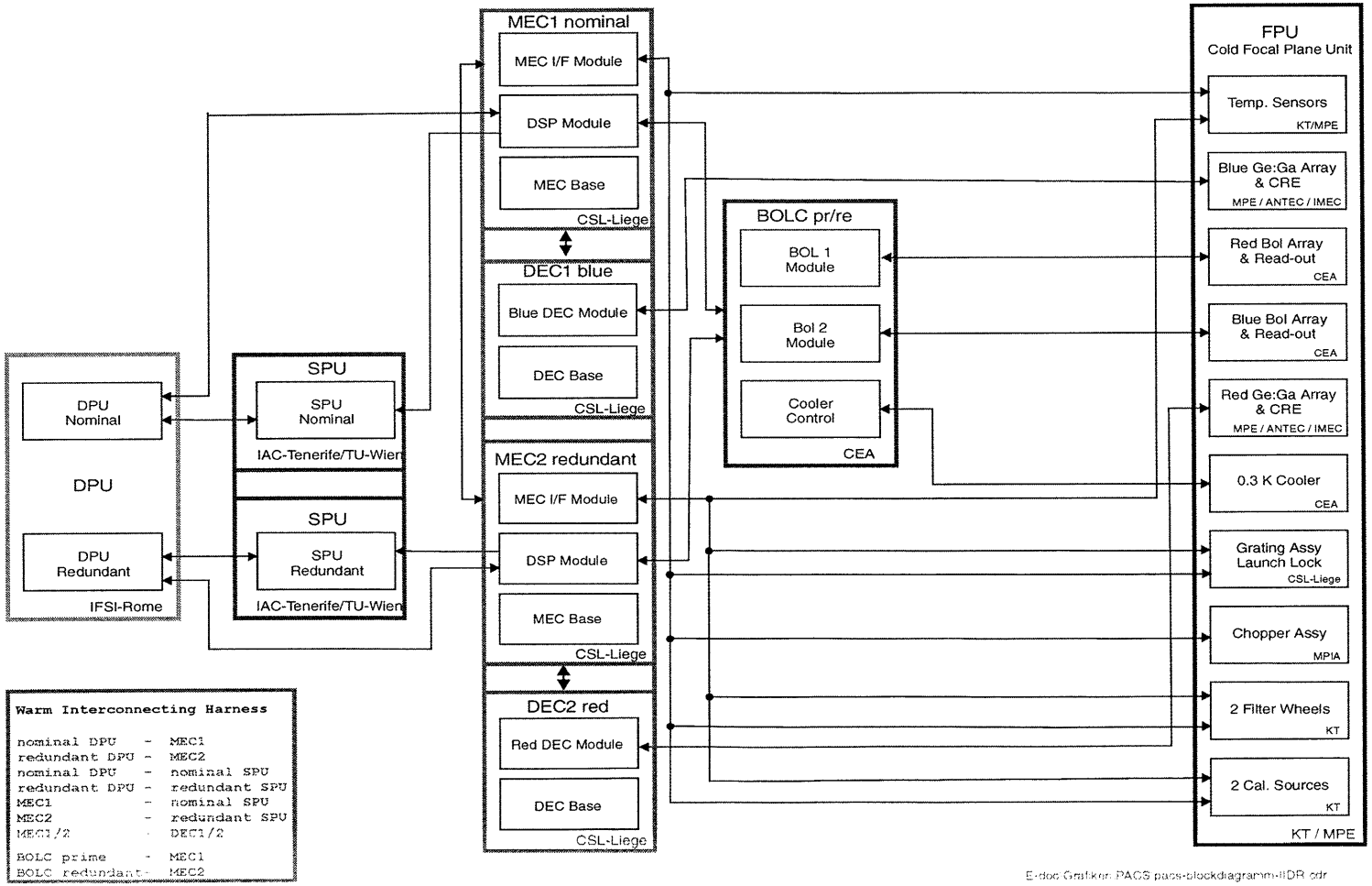
Alternative

- Always use pre-defined test sequences (those already used in ILT) i.e mode 2.
- Requires less dynamic interchange between CCS & I-EGSE (stop, go, wait etc)
- Take duplicate observations into account in the logic of HCSS (e.g. source attribute of measurements)

Instrument EGSE for AIT and its Interfaces to CCS

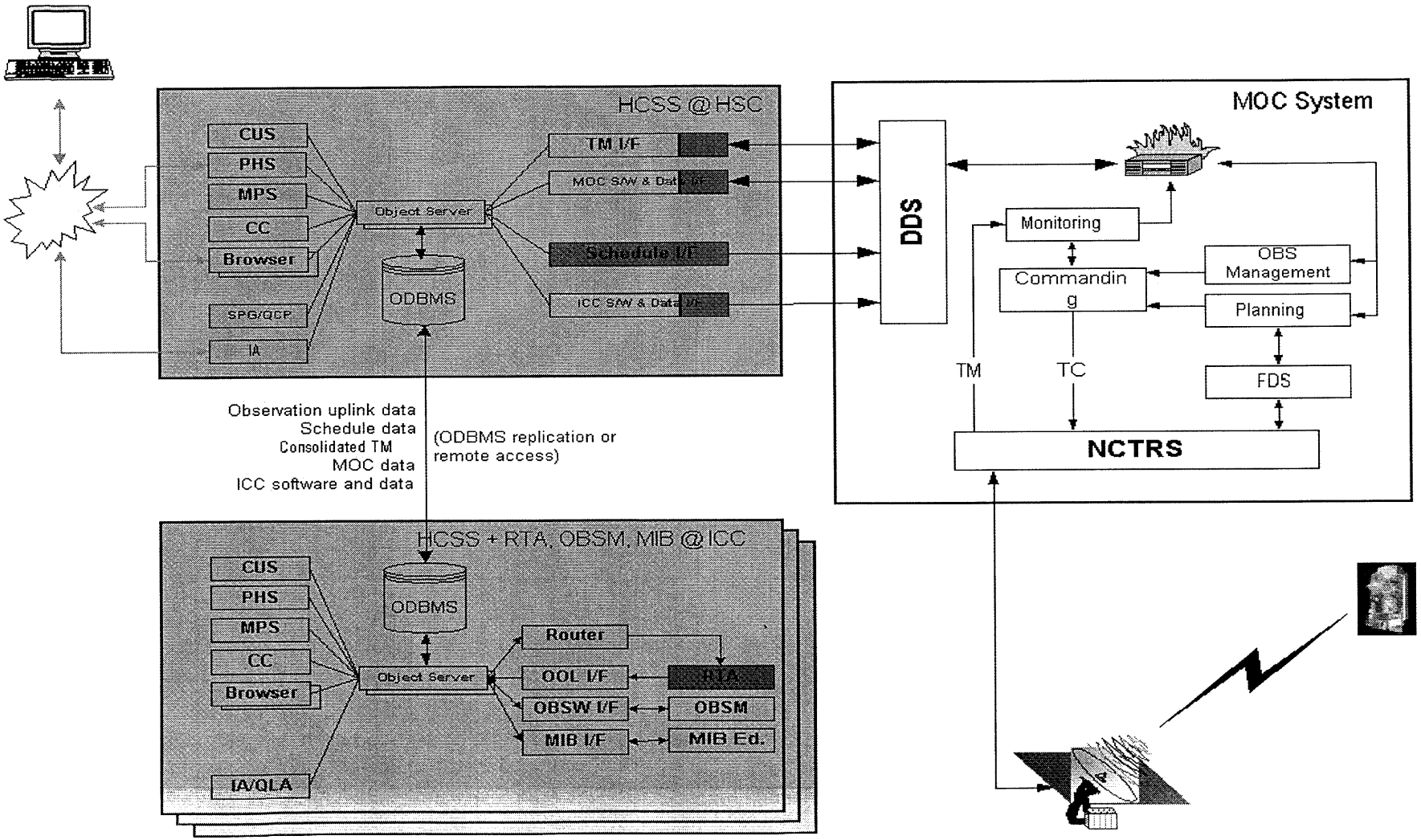
Otto H. Bauer, MPE Garching
Ken J. King, RAL
Kevin Galloway, ESTEC

Instrument Overview and Subsystem Responsibilities

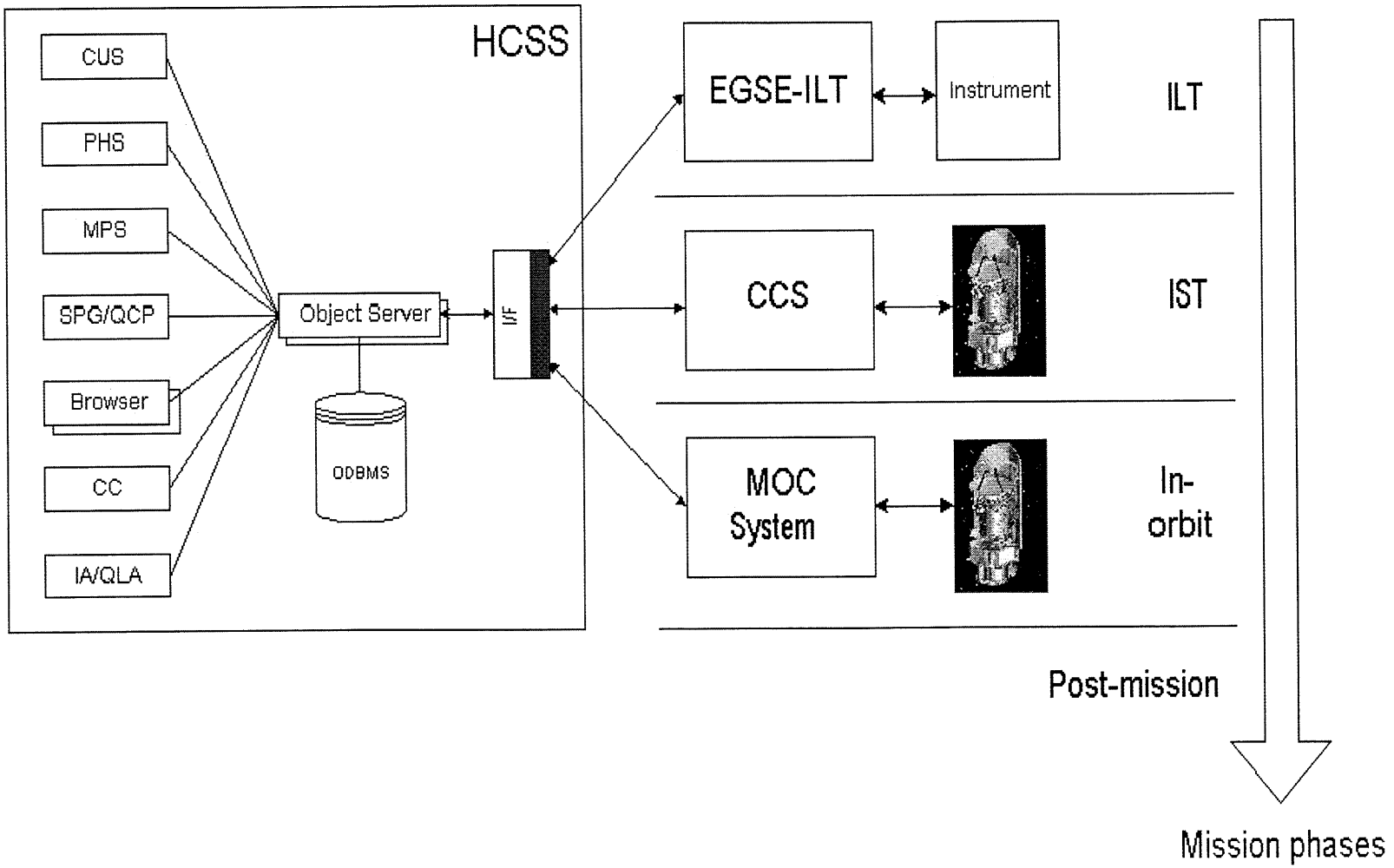


E-doc Grafiken PACS pacs-blockdiagramm-IIDR.cdr

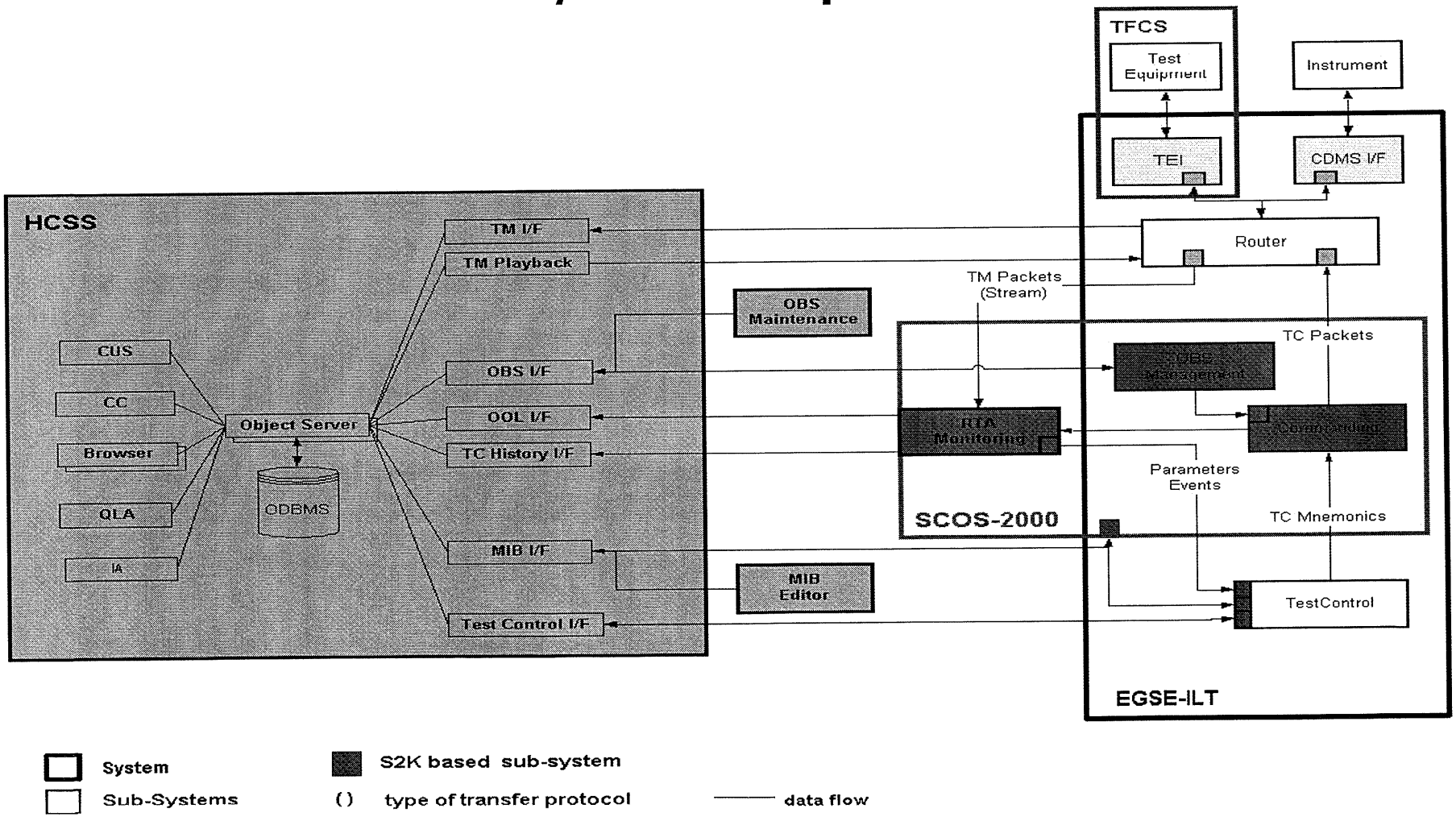
Starting Point: Routine Phase

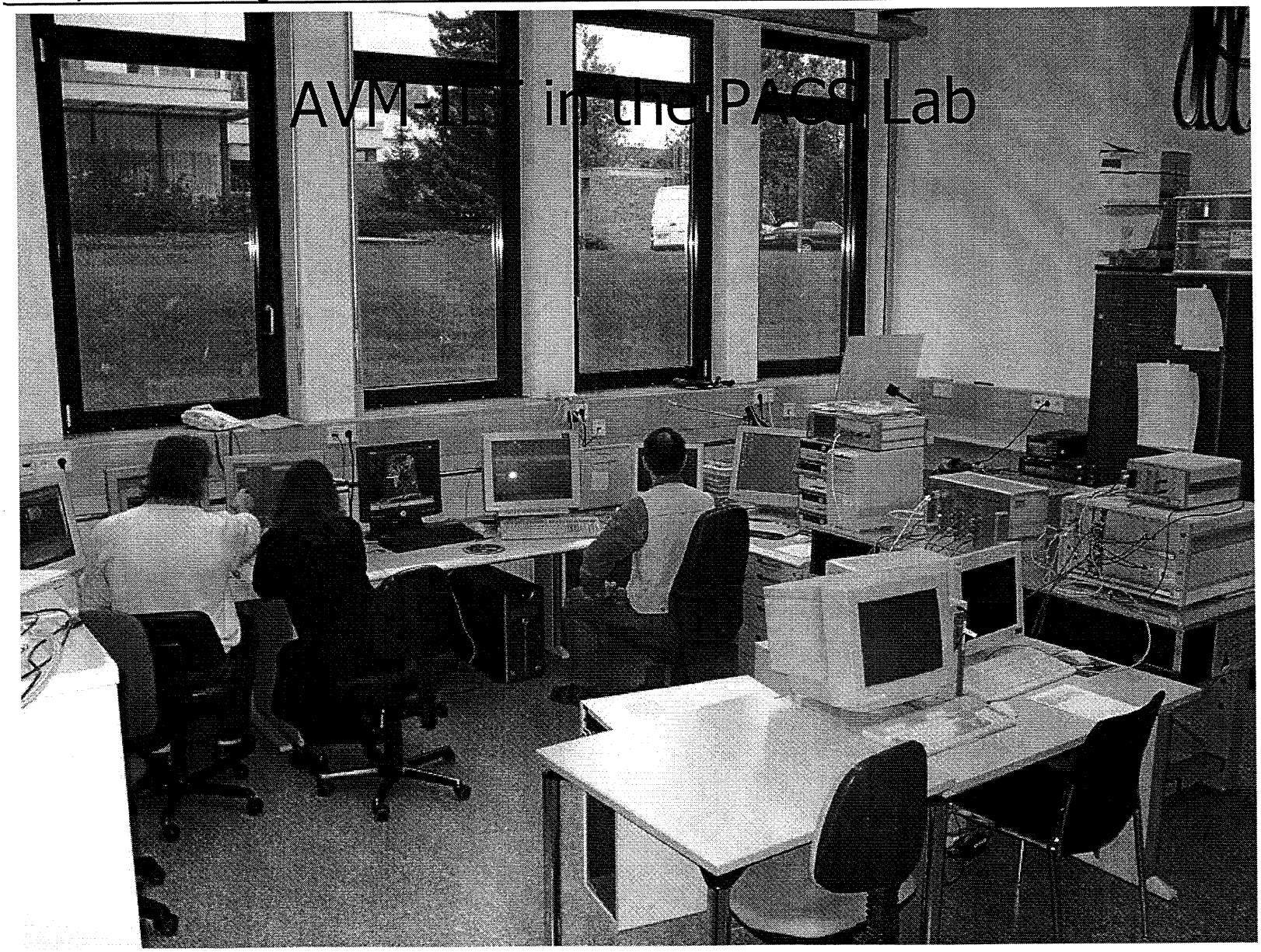


Major Goal: Smooth Transition between Mission Phases

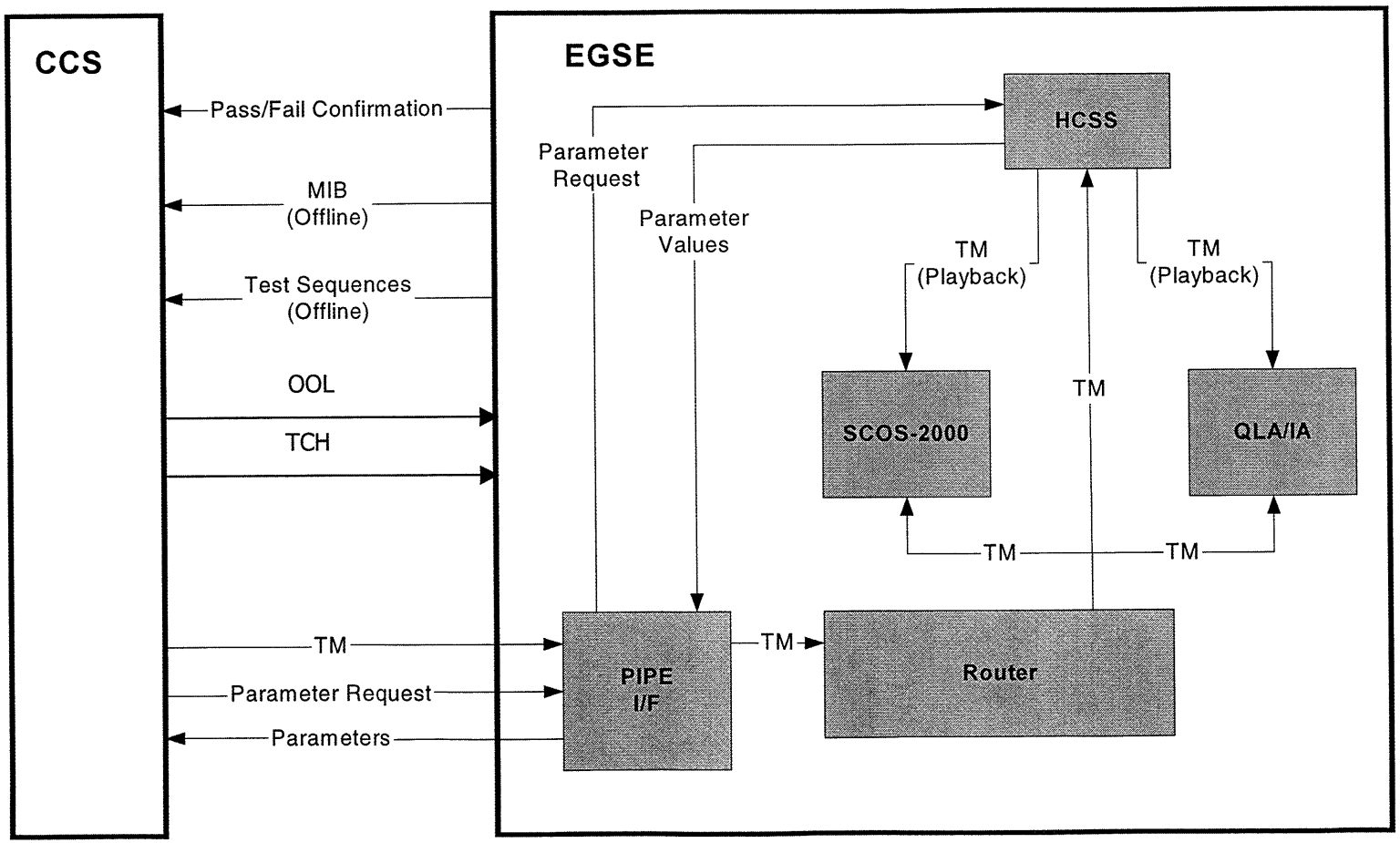


EGSE/HCSS Set-up for ILT

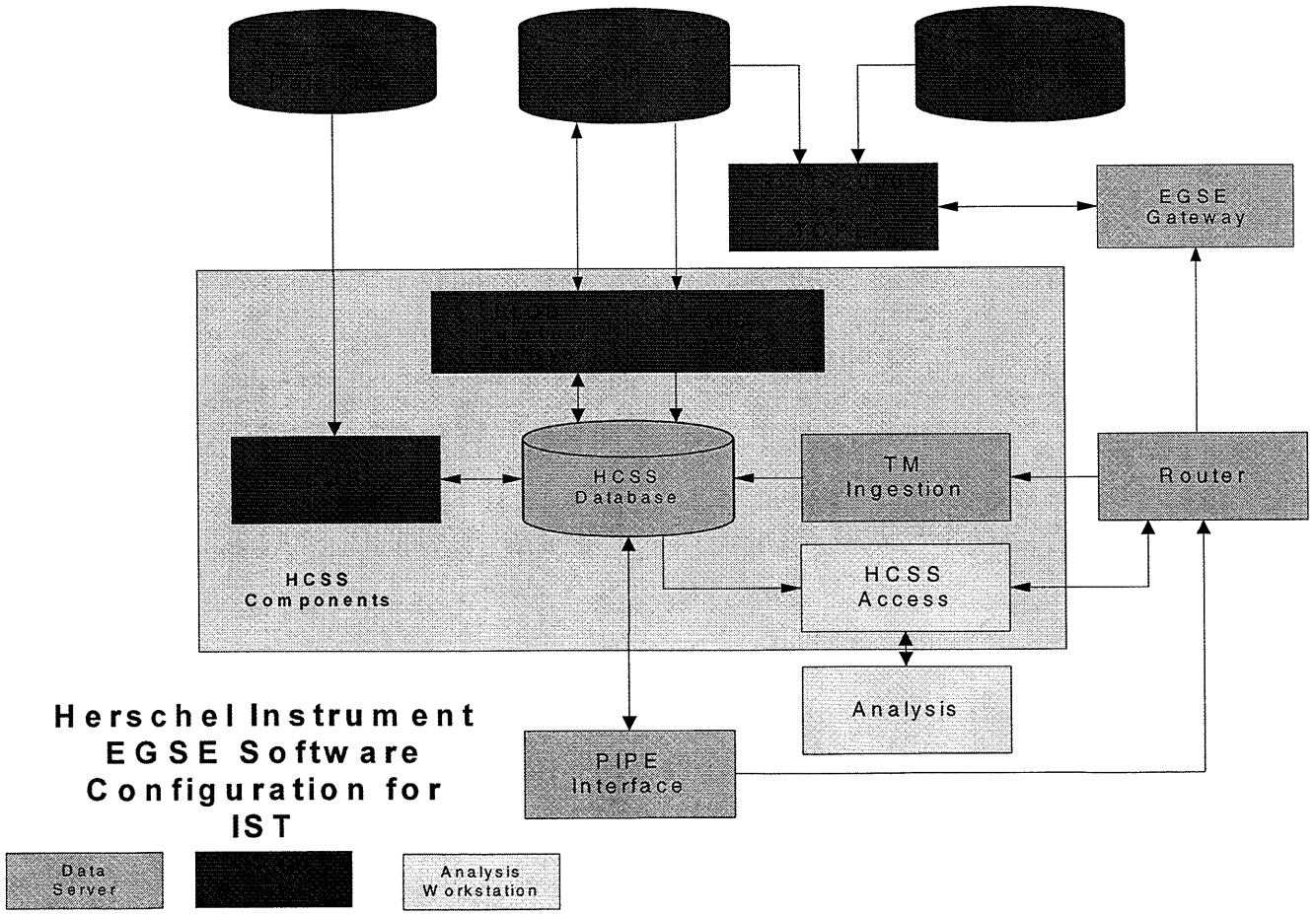



AVM-ILT in the PACS Lab

IEGSE for IST



IEGSE Software Configuration



PIPE Interface

- This component interfaces to the CCS using the PIPE protocol (RD02). It handles three types of interaction:
  - Connection and setup of the interface.
  - Reception of telemetry packets from the CCS and their transport to the IEGSE Router, which distributes them to the rest of the IEGSE.
  - Reception of requests from the CCS for the values of parameters to be inserted into the command sequences, which are sent to the instrument. These requests are passed to the HCSS (CUS), which returns the values required and these are passed on to the CCS.

Definition of an Observation (Test Step)

The starting point is that TestControl sends a request for a certain observation (ObsMode, parameters) to CUS (HCSS) and CUS generates a TC sequence with relative timing. It also calculates the whole duration of this observation. CUS also adds the TCId.

The output could be (TCId= n):

!ObsMode (parameters)!
TC-1, n1, ObsId-x
TC-2, n2, BbId-y
wait t1
TC-3, n3, p1
wait t2
TC-4, n4, p2, p3, p4
wait p5
TC-5, n5, p6
TC-5, n6, p7
wait t3
TC-6, n7
wait t4

The corresponding parameter set: (n1, ObsId-x, n2, n3, p1, n2, p2, p3, p4, p5, n5, p6, n6, p7, n7)

Variables and Execution

- n1,..., n6 are TCId´s (normally n2=n1+1 ....). ObsId-x will change in case of repetition. p1,..., p7 would be variables which could change of repetition. t1,..., t4 are fixed waiting times.
- The total duration would be T= t1+t2+ p5 +t3+t4 , e.g. T depends on p5 and this depends on either p2, p3 or p4.
- It also can be that we have the same TC with different parameters (TC-5 with param. p6 and p7) or commands without parameters (TC-6).
- During ILT CUS would delivery back to TestControl the instantiated TC sequence including duration T and TestControl would send it via TOPE to SCOS for execution.

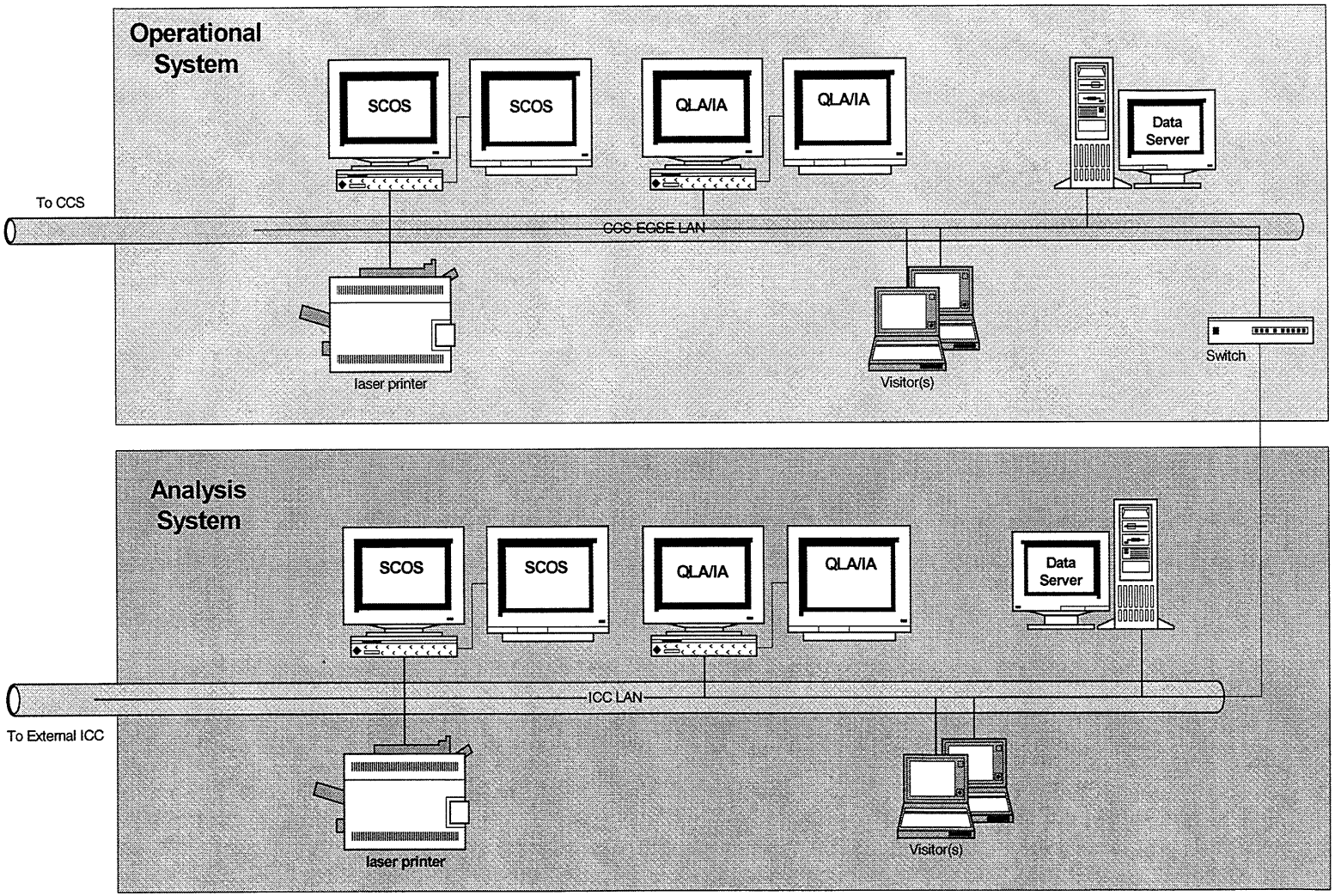
- Such an instantiated TC sequence could be given to CCS for execution during short functional tests without instrument participation. In case of repetition of such a sequence ObsID-x could be increment by 1 in a predifined range. Also n1,..., n6 have to be incremented.
- For the IST, and this could be implemented and tested during ILT, CUS has to be modified in such a way that it generates three outputs:
  (1) The instantiated TC sequence.
  (2) The parameterized TC sequence as shown above.
  (3) The corresponding parameter set
  (n1, ObsId-x, n2, n3, p1, n2, p2, p3, p4, p5, n5, p6, n6, p7, n7)
- The parameterized TC sequence could be given to CCS and stored in SCOS. At the time of execution CCS/SCOS sends a request: ObsMode(parameters) to I-EGSE TestControl which starts CUS.
- TestControl will then send the complete parameter set to CSS/SCOS. CCS/SCOS parses the parameters and sends the TC sequence to the instrument.

IEGSE H/W Configuration

- Two complete IEGSE systems will be provided. One is operated in real time during the testing, while the other may be used for analysis of previous test results and acts as a backup for the operational system.

- 6 different items are identified:
  - SCOS workstation – used primarily to run the SCOS-2000 software. This will be a PC running Linux with a dual display card driving two displays.
  - Analysis workstation – used to run the instrument analysis software (QLA/IA/PCSS). This will be a PC running Linux with a dual display card driving two displays.
  - Data Server – used primarily to run the HCSS software. This will be a PC running Linux with a single display and large disk drives with backup facility (to tape/CD TBD)
  - Colour laser printer
  - LAN switch - protects the Operational System from the Analysis System allowing access to the external internet from the Analysis System
  6. Laptops – used to run instrument specific analysis tools. These are not provided as part of the EGSE but may be used by instrument experts as necessary during testing.

Herschel Instrument EGSE Hardware Configuration for IST



H/W Delivery to Industry

Item	Title	Description
IE-DS-01	Data Server 1	PC running Linux, one Display, keyboard, mouse
IE-DS-02	Data Server 2	PC running Linux, one Display, keyboard, mouse
IE-AN-01	Analysis 1	PC running Linux, two Displays, keyboard, mouse
IE-AN-02	Analysis 2	PC running Linux, two Displays, keyboard, mouse
IE-SC-01	SCOS 1	PC running Linux, two Displays, keyboard, mouse
IE-SC-02	SCOS 2	PC running Linux, two Displays, keyboard, mouse
IE-PR-01	Printer 1	Colour Laser Printer, Type TBD
IE-PR-02	Printer2	Colour Laser Printer, Type TBD
IE-SW-01	Switch	LAN Switch

Support from Industry

- Industry will be responsible for providing consumables (printer paper, ink, tapes, CD´s) used by the IEGSE.
- Industry will be responsible for relocation of IEGSE.
- Industry will be responsible for providing a high speed access point to the Internet.
- Industry will provide a simulator of the CCS to enable testing of the interface between the CCS and IEGSE. This simulator should:
  - Simulate the connection to the CCS
  - Simulate the protocol necessary to connect and set up the IEGSE interface
  - Provide telemetry packets corresponding to an instrument executing a command sequence in a test procedure
  - Provide parameter requests corresponding to a command sequence in a test procedure
  - Accept parameter values corresponding to the request made to the IEGSE

ALCATEL SPACE

Test definitions

EGSE Working Group
Ottobrunn 05/02/03

The test definitions (*AIAI XXXX*) recalled here-after are extracted from

▼H-EPLM AIV & Herschel Satellite AIT
Requirements Specification
↳H-P-1-ASPI-SP-0008 Issue 3

Derived from

▼Herschel/Planck Project
System AIV Requirements Specification
↳SCI-PT-RS-07430 Issue 2

and, for IMT, from

▼Instrument Interface Document
IID Part A
↳SCI-PT-IIDA-04624 Issue 3

Annex 6 AIS
HP-2-ASED-AN-0290

ALCATEL SPACE

Integrated System Test (IST)

EGSE Working Group
Ottobrunn 05/02/03

▼***AIAI-70*** *The purpose of the Integrated System Test (IST) shall be to verify correct operation of the fully integrated satellite in a series of representative mission modes including autonomous (**Mission Timeline** and On-Board Control Procedures) and backup modes.*

▼***AIAI-80*** *The IST shall be an automated test, run from the Central Checkout System using a combination of test procedures and control files developed from lower level electrical test sequences.*

▼***AIAI-85*** *A full IST shall be performed at major milestone during the overall AIV programme, i.e.*

- *following the successful completion of satellite integration **(IST1)***
- *as completion of the full satellite level verification programme **(IST2)***
- *during spacecraft checkout, at the launch site.*

▼***AIAI-95 The payload shall be operational within the constraints defined by the environmental conditions and the instruments operational modes exercised during the Operational Phases of the IST.***

▼***AIAI-100*** *The IST sequences shall be structured such that certain operational modes may be deleted or enhanced according to the test or the conditions under which it is run,*

- *Partial IST during the hot and cold soak phases of the satellite thermal cycling test*
- *Partial IST during system EMC tests (spacecraft **and payload** in their highest emission mode and most sensitive susceptibility mode)*

ALCATEL SPACE

Short Functional Test (SFT)

EGSE Working Group
Ottobrunn 05/02/03

▼***AIAI-110*** *The Short Functional Test shall be a subset of the IST sequences and shall be run to verify system electrical integrity following local movement of the spacecraft or between environmental tests.* ***The payload part of this test should normally be limited to a switch on and a functional verification of interfaces.***

ALCATEL SPACE

Specific Performance Test (SPF)

EGSE Working Group
Ottobrunn 05/02/03

Verification of instrument performances (as well as specific subsystem performances) may require a spacecraft configuration or test set-up different from that required for a standard IST.

SPT may be performed at a particular time in the S/C integration & test process depending on the instrument set-up requirements.

▼***AIAI-115*** *The SPT shall preferably be a stand-alone test, and easily adaptable in such a way that it may form an add-on module to the main IST.*

ALCATEL SPACE

Integrated Module Test (IMT)

EGSE Working Group
Ottobrunn 05/02/03

▼ The Integrated Module Test (IMT) is the functional test of the instruments - instrument by instrument and together - integrated inside the PLM (EQM and PFM)

▼ *As for the IST, the IMT shall be an automated test, run from the Central Checkout System using a combination of test procedures and control files* ***developed from instruments test sequences.***

It is assumed that the procedures are validated within the CQM test sequences <u>at instrument level</u>, so the PLM test sequence is for instrument validation and not for procedure development.

▼ The instruments shall be operational within the constraints defined by the environmental conditions

▼ During this test some information will be obtained on the performance of the cryostat (temperature and lifetime)

	Name	Dep./Comp.
	Alberti von Mathias Dr.	SM 34
	Alo Hakan	OTN/IP 35
	Barlage Bernhard	ED 11
	Bayer Thomas	ED 541
X	Faas Horst	EA 65
	Fehringer Alexander	SM 33
	Frey Albrecht	ED 422
	Gerner Willi	ED 13
	Grasl Andreas	OTN/EN 64
	Grasshoff Brigitte	ED 521
	Hartmann Hans Dr.	ED 422
	Hauser Armin	SM 31
	Hinger Jürgen	SM 31
X	Hohn Rüdiger	ED 541
X	Hölzle Edgar	ED 421
	Huber Johann	ED 543
	Hund Walter	SE 76
X	Idler Siegmund	ED 432
X	Ivády von András	ACE 32
	Jahn Gerd Dr.	SM 31
	Kalde Clemens	ED 532
	Kameter Rudolf	OTN/EN 64
	Kersting Stefan	OTN/EN 63
	Kettner Bernhard	SM 34
X	Knoblauch August	ED 531
X	Koelle Markus	ED 533
X	Kroeker Jürgen	ED 542
	Kunz Oliver	SM 31
	Lamprecht Ernst	OTN/SM 222
	Lang Jürgen	SE 76
	Langfermann Michael	ED 541
	Mack Paul	OTN/EN 64
	Moritz Konrad Dr.	ED 65
	Müller Lutz	OTN/EN 64
	Muhl Eckhard	OTN/EN 64
X	Pastorino Michel	ASPI Resid.
	Peitzker Helmut	ED 65
	Peltz Heinz-Willi	SM 33
	Peters, Gerhard	ED 531
	Pietroboni Karin	ED 65
	Puttlitz Joachim	OTN/EN 64
	Rebholz Reinhold	ED 541
	Reuß Friedhelm	ED 62
X	Rühe Wolfgang	ED 6
	Runge Axel	OTN/EN 64

	Name	Dep./Comp.
	Sachsse Bernt	ED 21
	Schäffler Johannes	OTN/EN 64
X	Schink Dietmar	ED 422
X	Schlosser Christian	OTN/EN 64
	Schweickert Gunn	SM 34
	Stauss Oliver	SM 33
	Steininger Eric	ED 422
X	Stritter Rene	ED 11
	Suttner Klaus	SM 32
	Tenhaeff Dieter	SM 34
	Thörmer Klaus-Horst Dr.	OTN/ED 65
	Wagner Adalbert	OTN/IP 35
	Wagner Klaus	SM 31
X	Wietbrock, Walter	ED 521
	Wöhler Hans	SM 34
	Zipf Ludwig	ACE 32
X	Alcatel	ASPI
X	ESA/ESTEC	ESA
	Instruments:	
X	MPE (PACS)	MPE
X	RAL (SPIRE)	RAL
X	SRON (HIFI)	SRON
	Subcontractors:	
	Air Liquide, Space Department	AIR
	Air Liquide, Orbital System	AIRT
	Alcatel Bell Space	ABSP
	Astrium Sub-Subsyst. & Equipment	ASSE
	Austrian Aerospace	AAE
	APCO Technologies S. A.	APCO
	Astrium GmbH Space Infrastr.	ASIP
	BOC Edwards	BOCE
	Dutch Space Solar Arrays	DSSA
	EADS CASA Espacio	CASA
	EADS CASA Espacio	ECAS
	Eurocopter	ECDE
	HTS AG Zürich	HTSZ
	Linde	LIND
	Patria New Technologies Oy	PANT
	Phoenix, Volkmarsen	PHOE
	Rembe, Brilon	REMB
	SENER Ingenieria SA	SEN
	Stöhr, Königsbrunn	STOE