Herschel/Planck Mission Implementation Plan

esa

TOS-OGH

10th April 2003

The Mission Implementation Plan

- Response to the MIRD
- Defines the boundaries of ESOC responsibilities
- Presents ESOC's understanding of:
  - What has to be done
    - Mission description
    - Operations Concept
  - What facilities are needed to do it
  - What resources are required
- Provides the basis for the CaC
- Defines the organisation
- Presents the assumptions, cost, schedule, and work packages
- Presents the compliace to the MIRD requirements

GS Lifecycle

Phase	O/A	B	C	D			E		F
Objective	Mission Analysis and Feasibility	Ground Segment Preliminary Design	Ground Segment Detailed Design	Ground Segment Production and Validation			Operations Execution		Disposal
				Production	Technical Validation	Operational Validation	LEOP & Commissioning	Routine Operations	
Activities	Identify Characteristics Constraints Concepts, Assess Feasibility (G/S perspective)	Define requirements on G/S and G/S Baseline	Complete G/S Design to Element level and start implementation	**Procure G/S facilities and elements**	**Integrate & Validate G/S/Systems** (Incl. Preliminary validation of mission data)	**Train people & Validate full G/S/** (Incl. People and mission data)	Acquire Mission orbit/config. & accept Space Segment	Operate & exploit mission in orbit	Space & Ground Segment Disposal
Reviews	Cust RQR	GSRQR	GSDR	GSIR	Ops Validation Campaign Briefing	GSRR, ORR	MCRR		
Focus	SYSTEM DEFINITION		GS IMPLEMENTATION				OPERATIONS		

Symbols:

XXX Optional review

XXX Mandatory review

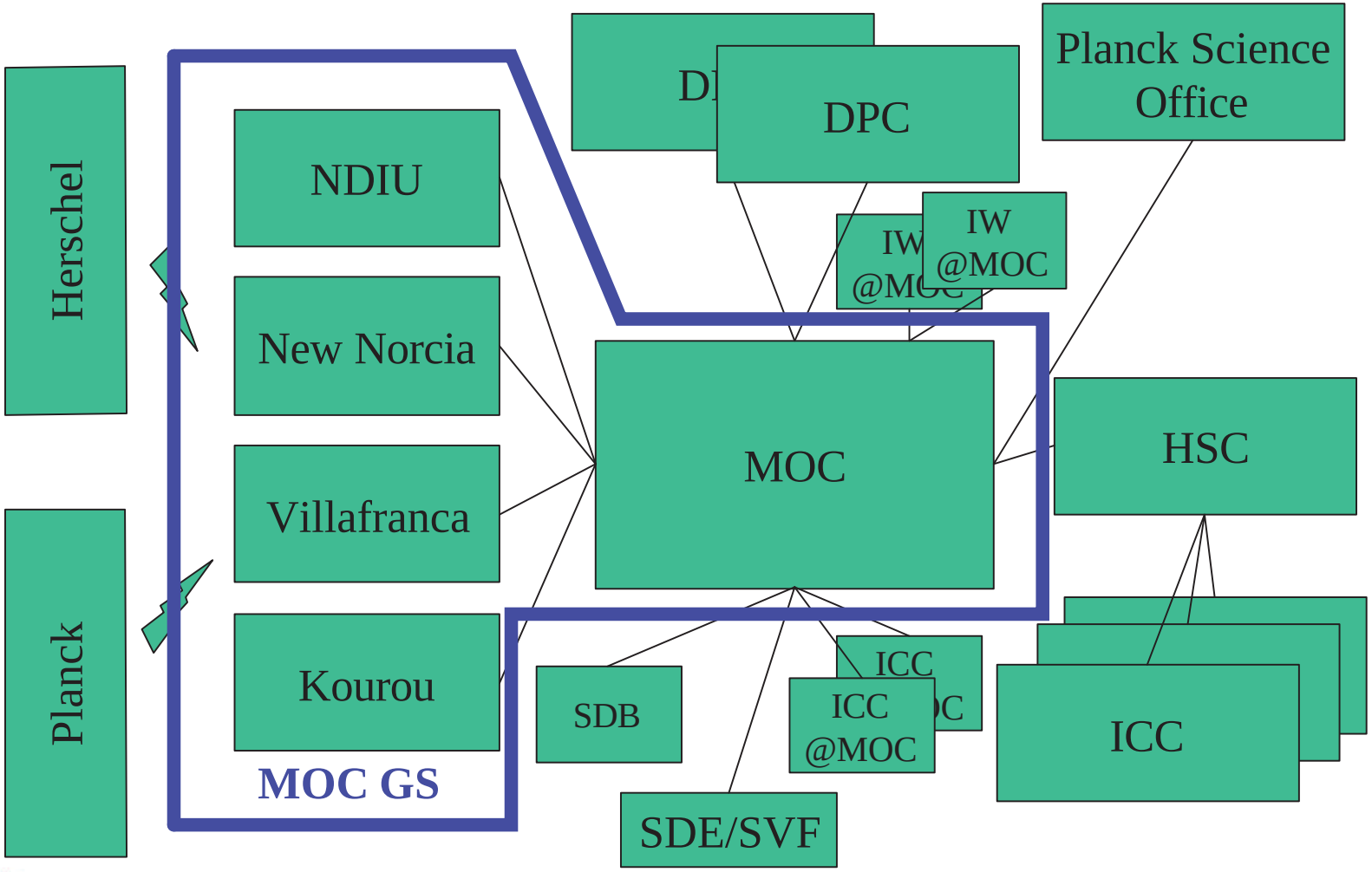
Responsibilities

- The overall definition and programme implementation for the Herschel/Planck mission is vested with the Herschel/Planck Project ("the Project").
- The responsibility for assuring the definition, design and implementation of the MOC Ground Segment, and the accomplishment of the activities identified in the MIP is vested with the Mission Operations Department (TOS-O) at the European Space Operations Centre (ESOC).
- ESOC shall coordinate the overall ground segment integration and test activities.

What is the MOC Ground Segment?

- LEOP and routine phase Ground Station Network and communications;
- Mission Control Centre;
- Mission Control Centre to HSC and DPC communications;
- Mission Control Centre to System Validation Test (SVT) site communications;
- Mission Control Centre to Centre Spatial Guyanais (CSG) communications.
- Backup control centre in Redu and communications to NNO

MOC Ground Segment



Responsibilities

- Herschel:
  - Providing a basis for the planning process to the HSC.
  - Planning the mission on the basis of the observation programme provided by the HSC.
  - Executing the observation plan.
  - Provision of the recovered data and pointing and auxiliary data to the HSC.
  - Operation and maintenance of the spacecraft and MOC related ground segment.
  - First line intervention in the event of payload anomalies according to pre-planned procedures.
  - Storing the data for 10 years.

Responsibilities

- Planck
  - Planning the mission on the basis of the observation programme and strategy provided by the PSO .
  - Executing the observation plan
  - Transmission of the recovered data and pointing and auxiliary data to the DPCs
  - Operation and maintenance of the spacecraft and ground segment
  - First line intervention in the event of payload anomalies according to pre-planned procedures.
  - Archiving the data for 10 years.

Operations Concept

- Assumptions
  - The spacecraft and instruments are designed for autonomous operations and compliant with the operations interface requirements document
  - In general science operations will be on-board schedule driven except in special cases for commissioning/ performance verification and trouble shooting.
  - Real time operations will be restricted to 3 hour periods per spacecraft during the DTCP, and will be principally directed towards spacecraft maintenance (MTL loading etc.)
  - No Real Time science data will be required except in special cases: Commissioning / Performance Verification, trouble shooting
  - Data dumped from the on-board SSMM during the DTCP will be stored at the ground station and transferred to ESOC at lower than received rate.
  - The on-board schedule shall cover at least 48 hours of operations

Ops Concept Drivers

- The nature of the Herschel and Planck missions:
- The ground operations and support requirements.
- The degree of commonality between Herschel and Planck and the success of the "smooth transition between phases" concept.

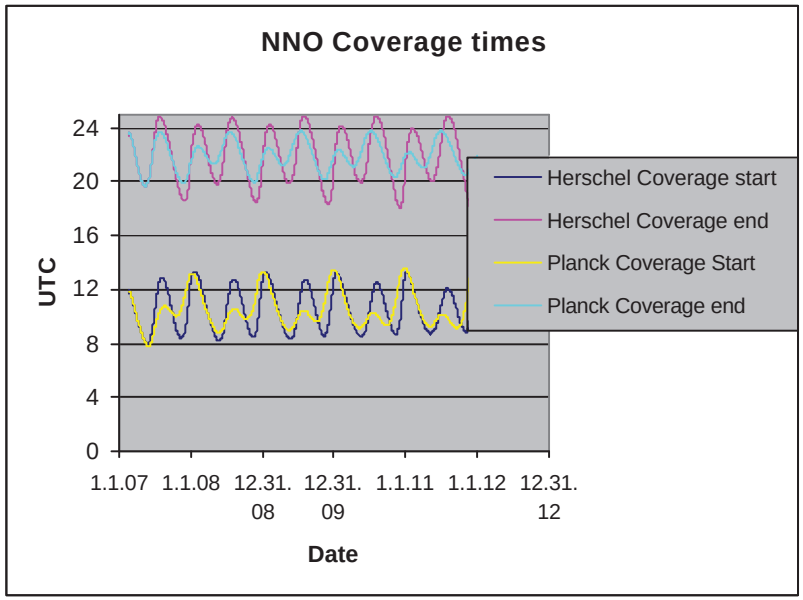
Mission Characteristics

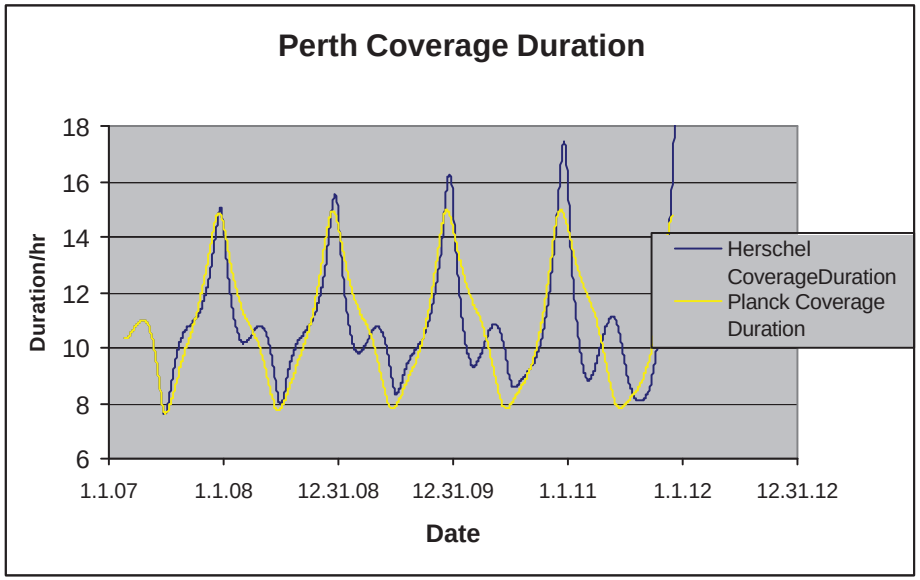
- Mission type:
  - Herschel - Observatory with Science Centre
  - Planck – Survey with PIs
- Limited lifetime
  - On- board consumables
- Orbits and transfer time
  - Coverage
  - Restriction on operations during transfer
- Communications limitations
  - Spacecraft – limited rate, MGA characteristics
  - Ground Segment – requires 34m antenna for 1.5Mbps data capture

Ground Operations and Support Requirements

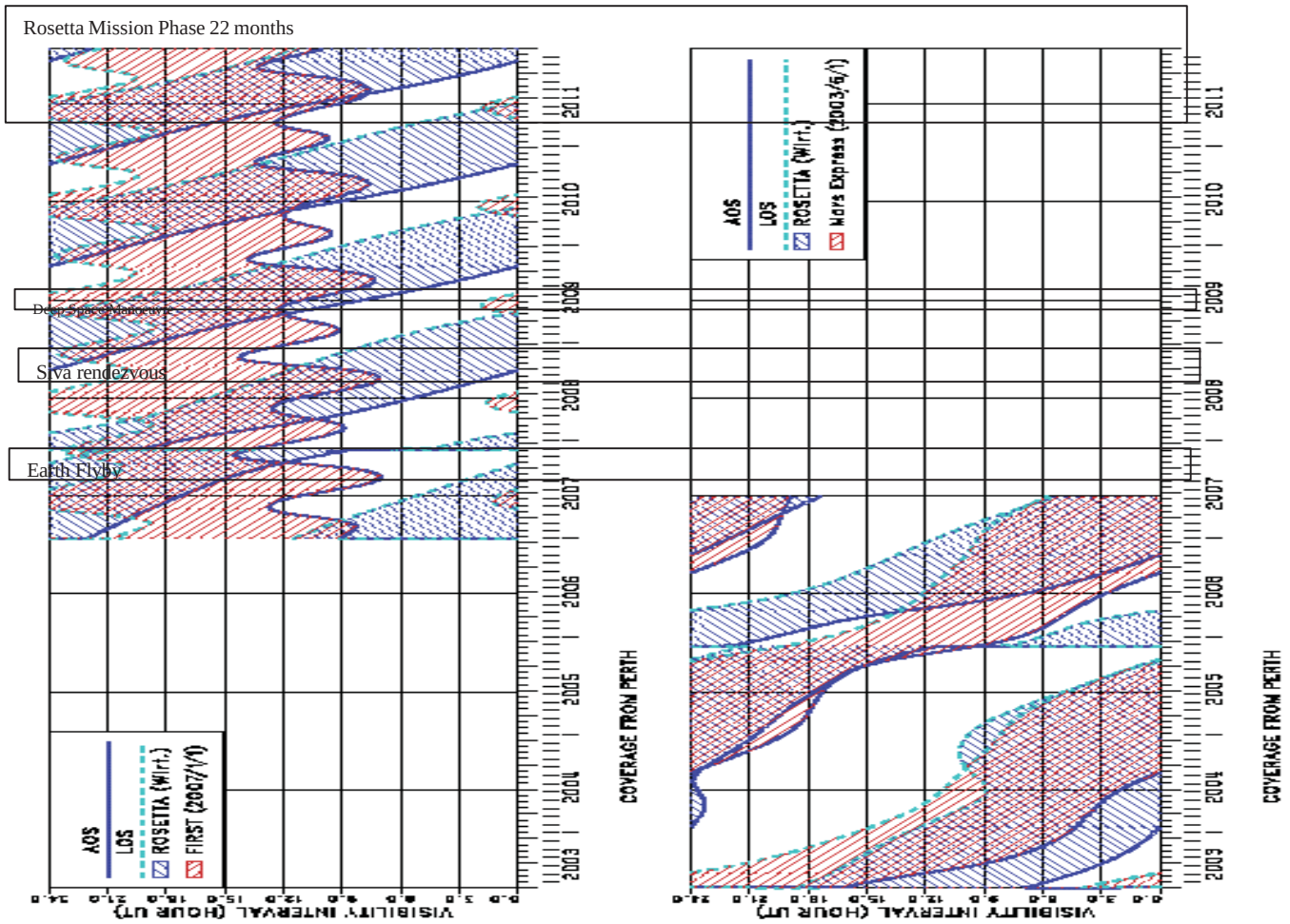
- Mission Planning differences between Herschel and Planck:
  - Principally affecting flight dynamics
- Common spacecraft control approach
- New Norcia scheduled for 3 hours per spacecraft per day
  - Shared with Rosetta – potential conflict details TBD for new mission
  - Coverage generally between 8:00Z±2hrs to 22:00Z ±2hrs with duration varying between ca 8 and 14 hours per day
  - Covered by 1 shift of SPACONS
- Accommodation and facilities for LEOP, Commissioning, PV teams
- Accommodation for PI and ICC work stations at MOC

Coverage in New Norcia





Rosetta Conflicts (old mission)



ROSETTA, MARS EXPRESS AND HERSCHEL/PLANCK AT PERTH

Commonality

- Common Operations and Engineering team for preparation activities
- Separation of Herschel and Planck teams when integration and test activities, SVTs and SOV starts, but shared expertise for common subsystems.
- Common MCS (excluding mission planning) based on CCS development
- Common data base, procedures with AIV reduce preparation and validation effort
- Overall Ground system integration and test effort reduced by the smooth transition concept

LEOP and Transfer phase

- LEOP
  - Objectives:
    - Subsystem checkout
    - Navigation to the correct trajectory
  - Duration 2 weeks
    - Major manoeuvres at L+2 days and L+10days
- Transfer
  - Objectives:
    - Commissioning of spacecraft and payload
    - Initiation of payload operations
    - Injection into L2 orbit (Planck only)
  - Duration up to 6 months (nominal ca 4 months)

Operations

- LEOP (2 weeks)
  - Coverage from Kourou, Vilspa and NNO
  - Operations in real time with 5 or 150kbps TM rate and 4 kbps uplink
  - 24*7 operations
- Commissioning and PV
  - Coverage from Kourou and NNO
  - Operations initially in RT with 5 or 150kbps TM rate, and 4 kbps uplink, then as for routine (MTL driven) depending on sun-earth-satellite geometry
  - 10hr/ day scheduled coverage, operations team work normally.
  - PIs accommodated some of the time at ESOC

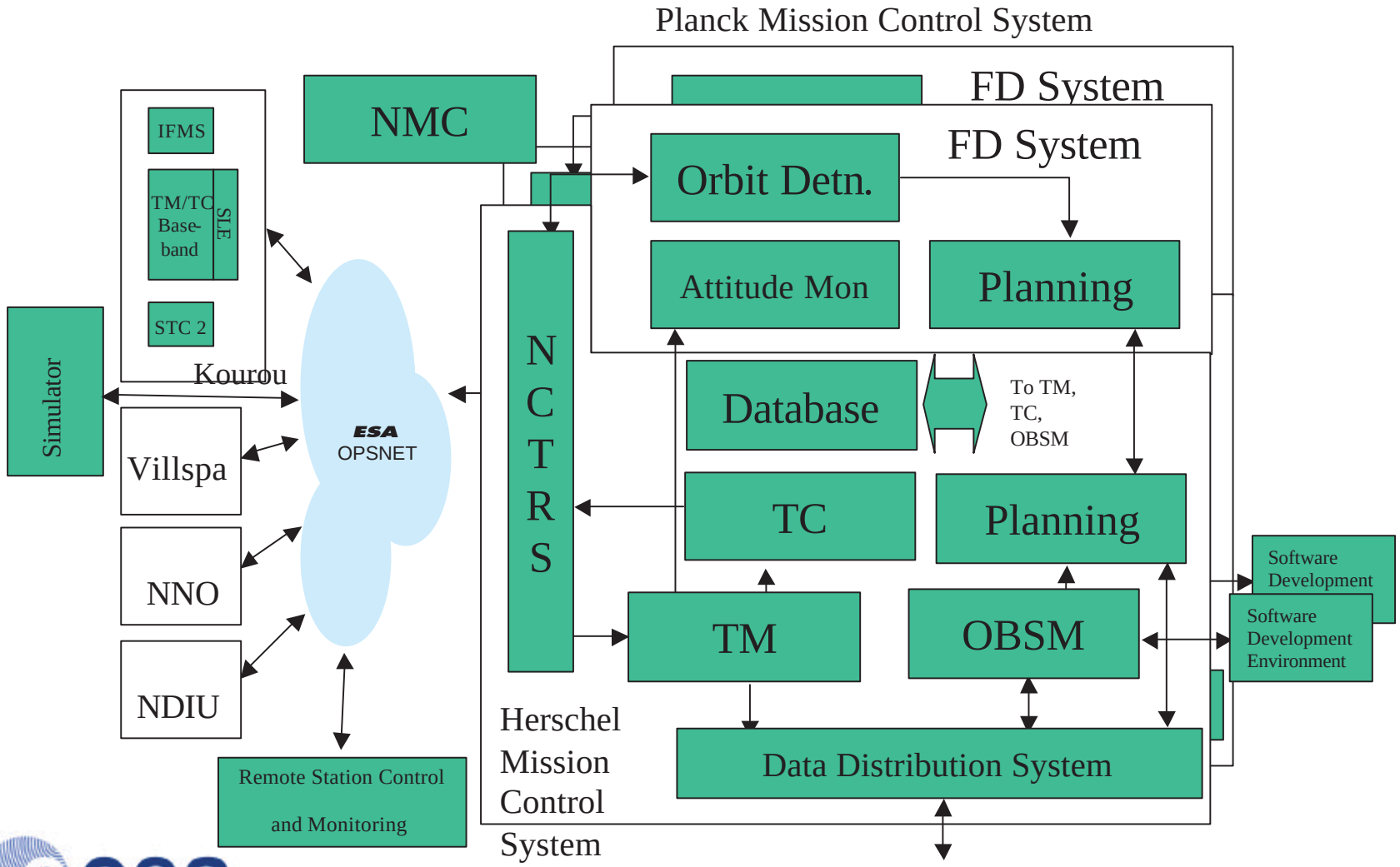
Operations

- Routine
  - Coverage from NNO only, 3hours/satellite/day
  - Operations mostly MTL driven, RT operations for maintenance and timeline upload, data recovery at 150kbps and 1.5Mbps
  - Recovered high rate data stored at the station and "played back"to the MOC in the following 16hours.
  - Data made available to the science community:
    - Via the Data Distribution System (all data)
    - Via the Frame Decommutator (RT data) and instrument workstations

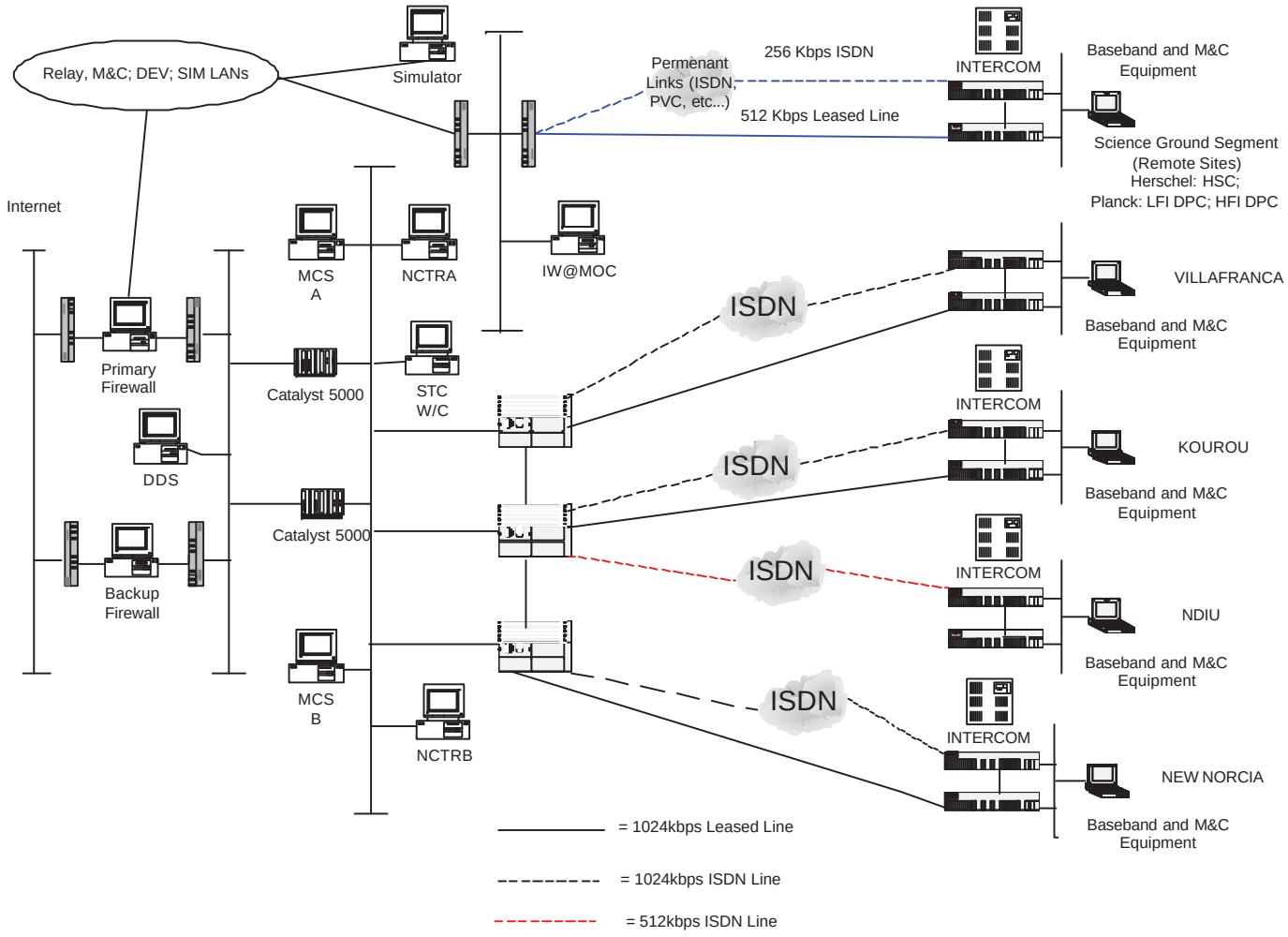
A typical pass

1. Configure station for Herschel
2. Slew to data acquisition attitude (scheduled on-board for Herschel only)
3. Start telemetry transmission in medium rate (scheduled on-board)
4. Start Ranging
5. Configure station and switch to high rate
6. Enable dump of events and stored HK
7. Enable RT science (if required)
8. Enable dump of stored science
9. Load schedule for the next 48 hours
10. Terminate dump
11. Configure station and switch to medium rate
12. Start Ranging
13. End of pass
14. Configure station for next spacecraft

MOC Ground Segment



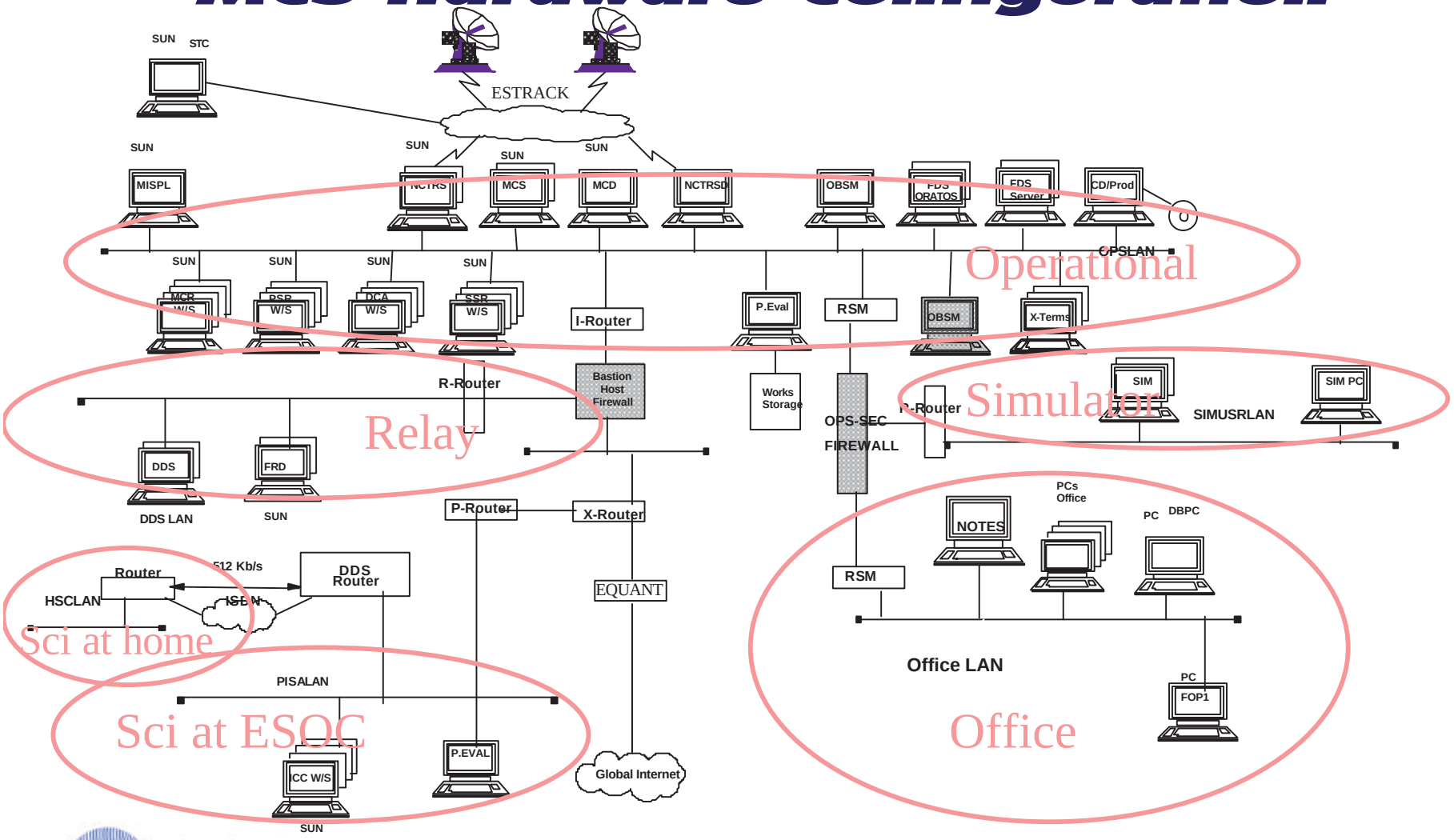
Communications



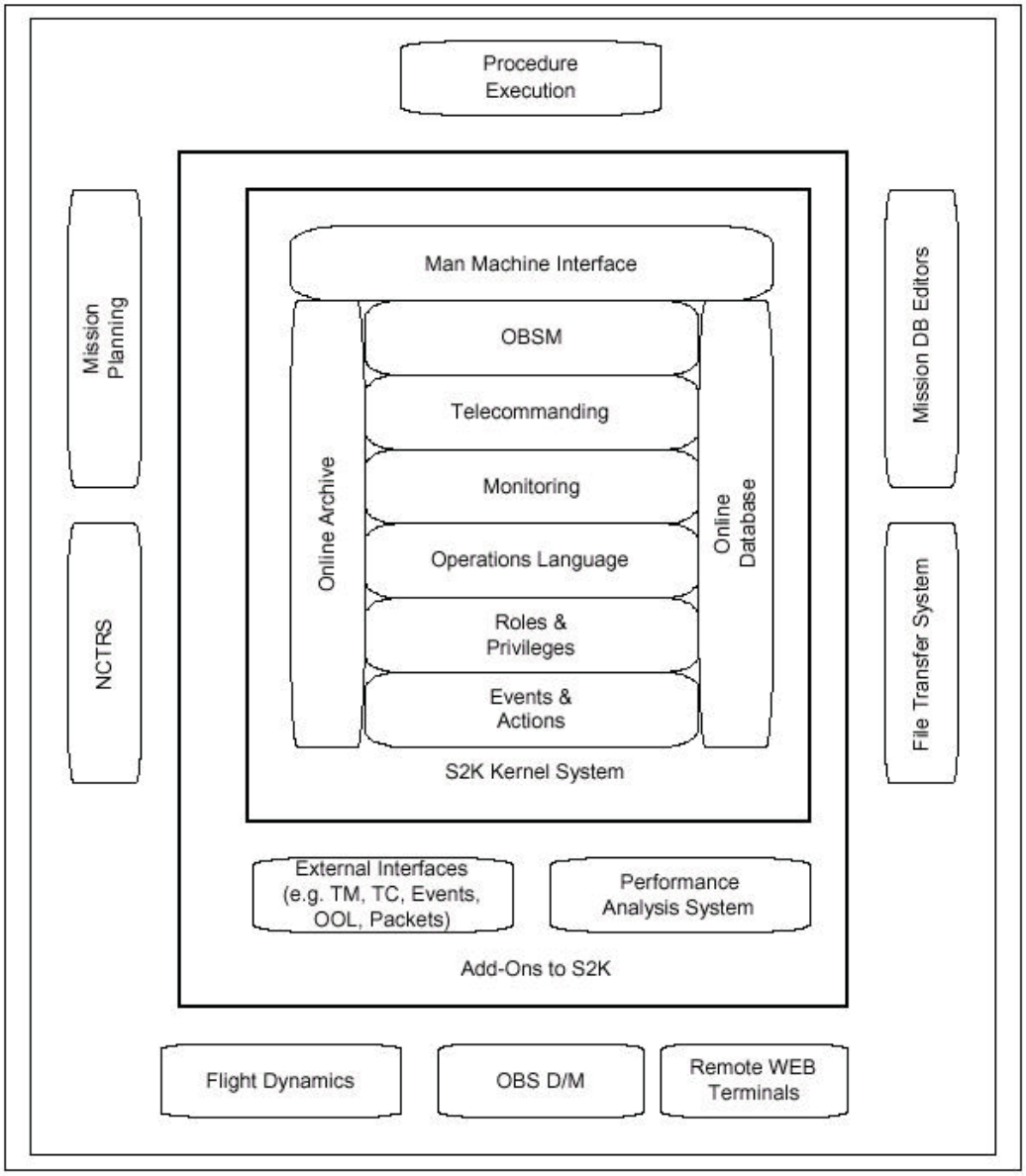
MCS Major Elements

- Facilities — MCR, GFCC, DCA, FDR, PSR, PISA
- Interface to the Network — NCTRS
- Mission Control System — SCOS 2000
- On-board Software Management — OBSM
- Flight Dynamics Services
- The simulator — SIMSAT
- Mission Planning
- Data distribution and file transfer services — DDS, FRD
- On-board Software development and maintenance

MCS Hardware Configuration



Mission Control System



MCS upgrades for H/P

- System management and configuration components
- Monitoring components, covering both spacecraft and non-spacecraft data monitoring
- Commanding components
- Spacecraft systems modelling
- Data storage components
- External interfaces to Flight Dynamics, Mission Planning, the DDS, the ICC@MOC and the ground segment
- On-board memory management
- The mission archive

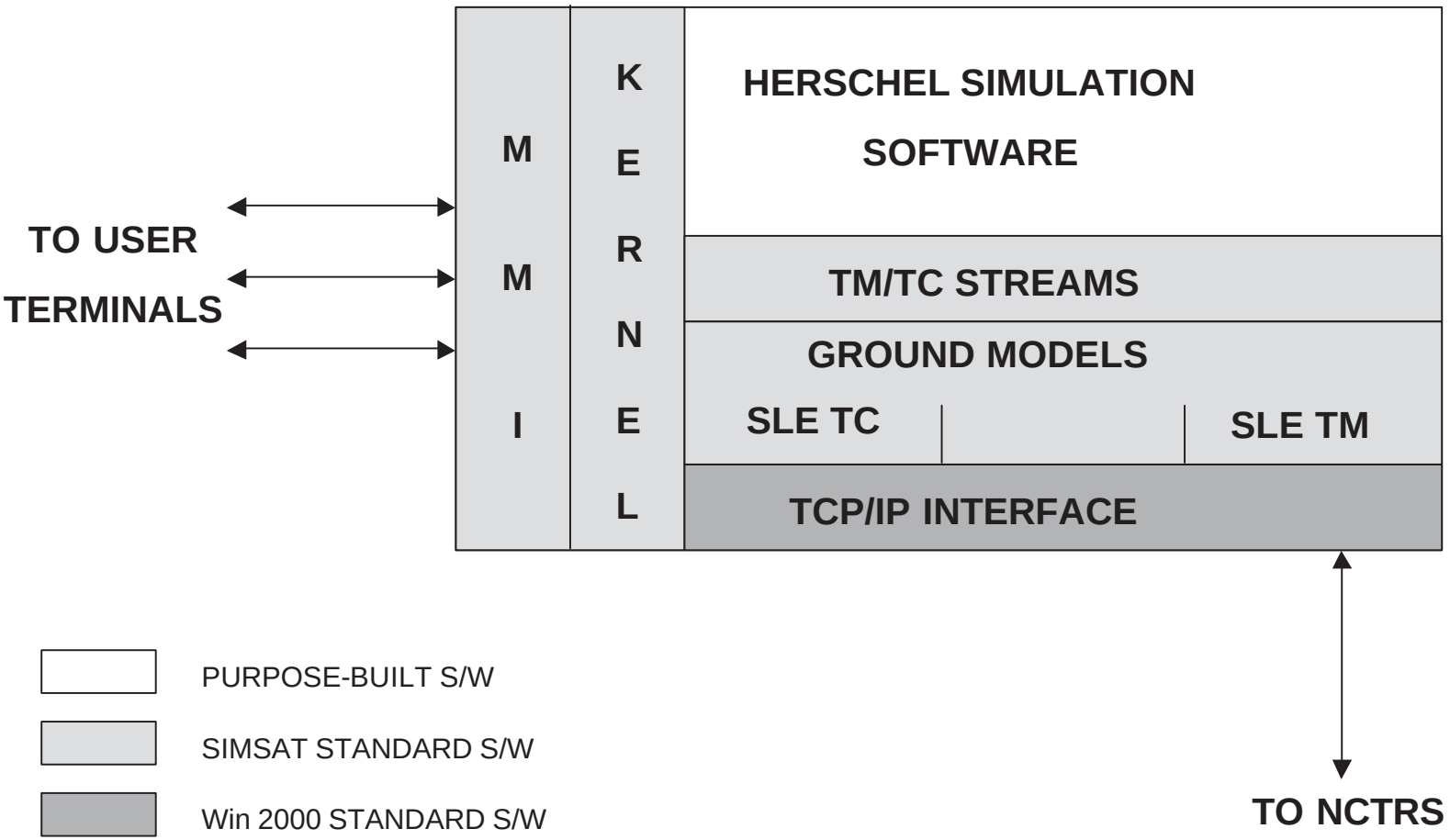
Flight Dynamics Services- Herschel

- Orbit determination and prediction and control for the transfer to L2 and for the Lissajous orbit at L2
- Mission Planning Support:
  - Planning tool algorithms to the HSC (attitude constraint checker, slew time predictor etc.)
  - Preparation of mission planning products
    - Enhanced Preferred Observation Sequence and Attitude Parameter File generation
    - Reaction wheel profile planning
- Immediate parameter files for LEOP operations
- Attitude determination and Control
- Attitude determination and attitude history
- ACMS monitoring, ACMS units calibration, ACMS command parameter generation
- Product Quality checking
- 3D animation during LEOP

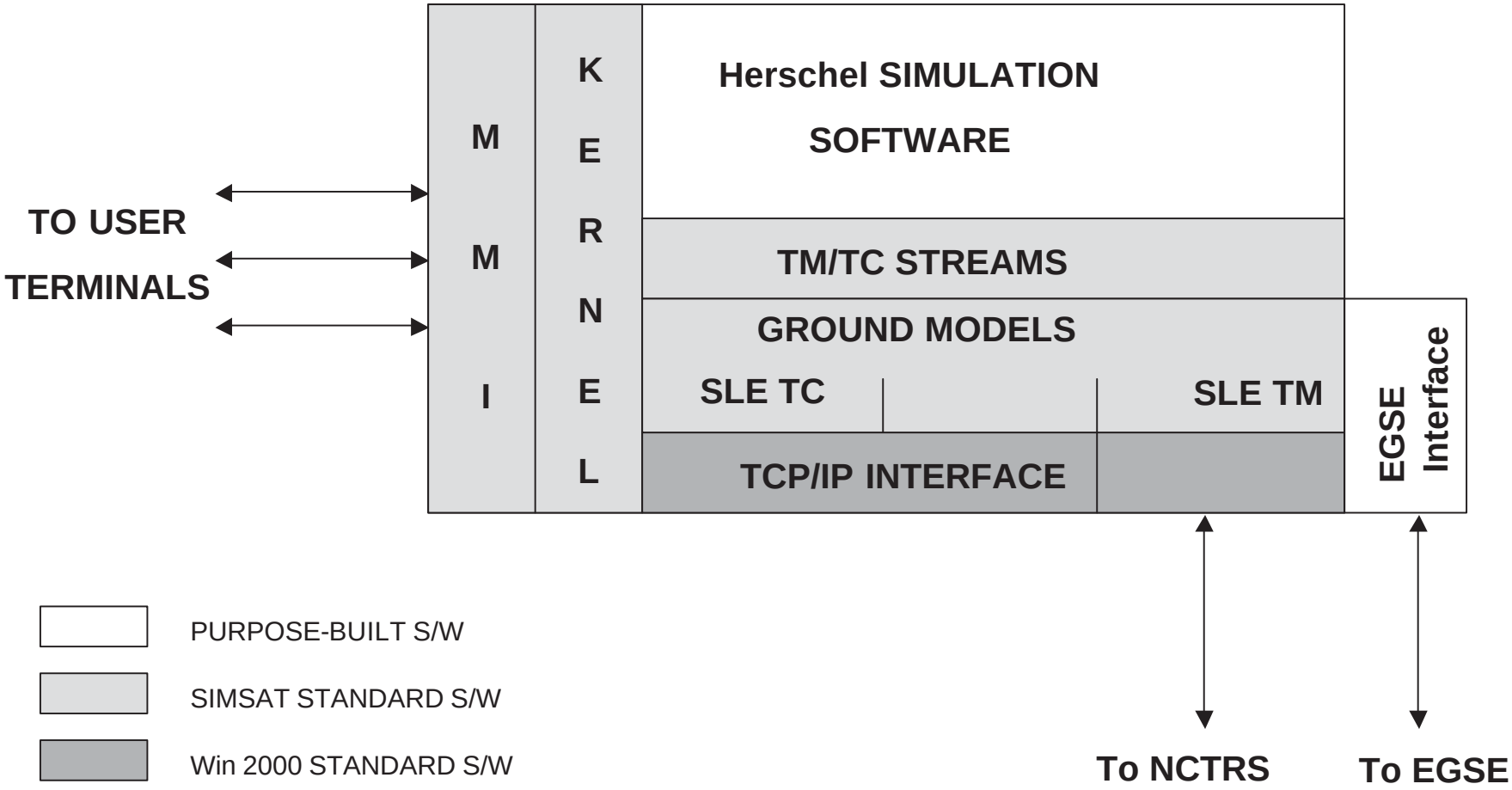
Flight Dynamics Services- Planck

- Orbit determination and prediction, orbit control for the transfer to L2 and for the Lissajous orbit at L2
- Scanning and orbit maintenance Strategy Support:
  - Preparation of scan/orbit manoeuvre plan
- Attitude determination and Control
  - Attitude determination and attitude history
  - ACMS monitoring
  - ACMS units calibration
  - Attitude manoeuvre command generation
  - ACMS command parameter generation
- Product Quality checking
- 3D animation during LEOP

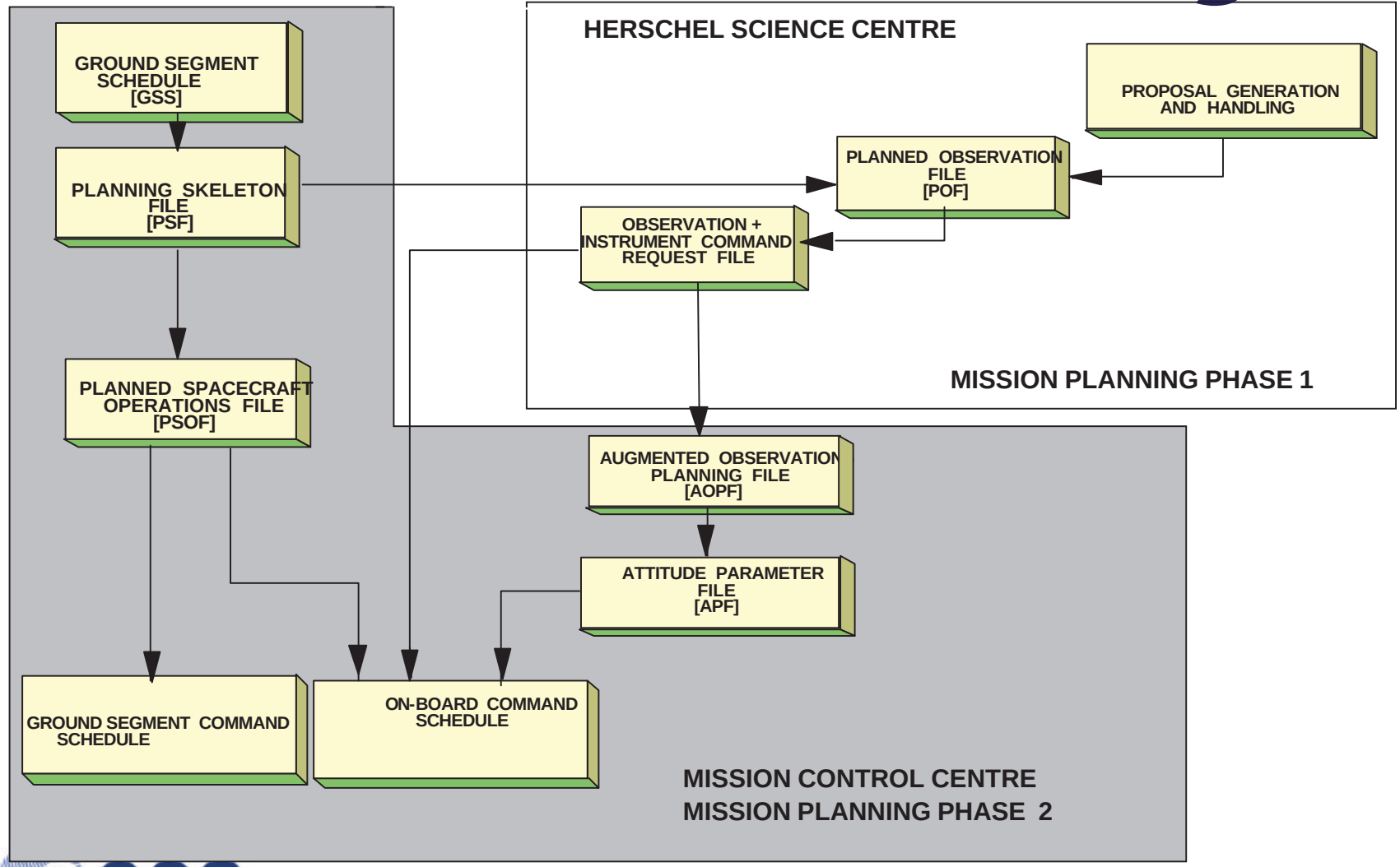
Simulator


MMI
KERNEL
HERSCHEL SIMULATION SOFTWARE
TM/TC STREAMS
GROUND MODELS
SLE TC
SLE TM
TCP/IP INTERFACE
TO USER TERMINALS
TO NCTRS
PURPOSE-BUILT S/W
SIMSAT STANDARD S/W
Win 2000 STANDARD S/W

NDIU lite


TO USER
TERMINALS
M
M
I
K
E
R
N
E
L
Herschel SIMULATION
SOFTWARE
TM/TC STREAMS
GROUND MODELS
SLE TC
SLE TM
TCP/IP INTERFACE
EGSE Interface
PURPOSE-BUILT S/W
SIMSAT STANDARD S/W
Win 2000 STANDARD S/W
To NCTRS
To EGSE

Herschel Mission Planning



Planck Mission Planning

- Is in the process of definition.
- MIRD requirements are:
  - PSO provides a scanning strategy input (form TBD)
  - MOC prepares manoeuvre schedule according to strategy within 10 days(TBC)
  - MOC able to make modifications to the strategy within 3 days (TBC) on the basis of PSO inputs.
  - Requests from DPC s for operations shall arrive 3 days before uplink (min 4 days before execution from the MTL)
- MIP is compliant but the requirements (and therefore the implementation) are TBC.

Data Distribution System

- Based on the Generic DDS:
- Access is configurable
  - general via public lines
  - authorised users via public and / or leased lines
  - both
- Three data types are covered:
  - Requests for on-line data sent by the users to the DDS (via Web I/F)
  - The on-line data sent by the DDS to the users according to their requests (via FTP to a specified user node using public / leased lines)
  - Off-line full data sets on Raw Data Media (RDM) (i.e. CD-ROM or DVD) sent to the users.
- Data is packaged using the CCSDS Panel 2 Standard Formatted Data Unit (SFDU) Concept.
- Two full data sets on RDM will be made for the archive.

Back-up Control Centre

- Located in Redu
- Comprises a FD system and MCS
- Communications via dial-up 256Kbps ISDN to NNO

Assumptions

- CFI
  - Docs defined in the OIRD – User's Manual, Data Base, FD data base..
    - According to schedule
    - Data base and User manual validated during AIV
  - RF suitcase
    - L – 24 for initial tests of new transponder
    - L – 12 to L – 6 for 4 weeks each for Herschel and Planck
  - Industrial support to simulator development
  - Mirror data base site mid 2003
  - SVF + supporting tools. Docs at L-12m
  - Provision for review of FOP by Industry
  - Science Ground segment ready for agreed integration activities
  - Project Support Team for LEOP and commissioning
  - Post launch Industrial support to S/W maintenance, anomaly investigation etc.

Assumptions

- Mission Control System
  - No science TM processing will be made by ESOC.
  - CCS deliveries 1 and 2 will be used as the basis for the HPMCS development
  - CCS design documentation is available to ESOC
  - All required functionality provided by appropriate configuration of SCOS 2000 evolution version, and ESOC infrastructure developments
  - The spacecraft design is compliant with the SGICD and OIRD.
  - The interface with ground station will be compliant to CCSDS SLE standard
  - No near RT TM distributed via DDS.
  - LEOP lasts 14 days and 24h support is required
  - SSD will be a high level requirements document.
  - SSR will be a delta to SCOS-2000 SRD, and the input for the ITT (+ reference docs)
  - No facilities are required for Database preparation activity except for those importation of pre-formatted ASCII files

Assumptions

- Simulator
  - Instruments are functional models
  - SIMSAT upgrades funded by infrastructure:
    - Ground model performance for higher data rates — Probably ok
    - Environment model upgraded for L2 transfer — ok
    - ERC-32 emulator ported to WIN–200x possibly 64bit version — Probably not ok
- Ground Stations
  - 3 Dedicated Telemetry processors (1 Herschel, 1 Planck, 1 shared) will be procured
  - Contribution to station upgrade for higher data rates necessary
  - 2 PSS required
  - NDIU based on infrastructure

Assumptions

- Communications
  - NNO – ESOC 1 Mbps link shared between Herschel and Planck for the duration of the Planck mission then reduced to 512Kbps
  - Herschel
    - ESOC to Villafranca 512 kbps to end of run down
  - Planck
    - ESOC to Trieste 512 kbps to end of run down
    - ESOC to Paris 512 kbps to end of run down
    - No dedicated link to the PSO

What you get for your money!

- An MOC GS for Herschel and Planck
- An operations and maintenance service for GS and spacecraft based on science inputs
- Data delivered to the Science Ground Segment
- Support to the design and development of the spacecraft and payload and supporting facilities (SDE, SVF, Data base,reviews..)
- Support to the development, integration and testing of the Science GS
- Mission Analysis support

Deliverable Items

No.	ITEM	Project Approval/ Review	DUE DATE
	Documents		
1	Mission Implementation Plan	Approval	Feb 2003
2	Ground Segment Product Assurance Plan	Approval	June 2003
3	Configuration Management Plan		June 2003
4	Risk Management Plan		June 2003
5	GS FMECA		April 2004
6	Contingency Support Activity Plan		Dec 2005
7	Management Information reports		Quarterly
8	Flight Operations Plan	Approval	Final L – 1 month
9	Network Operations Procedures		L- 6months
10	Flight Dynamics Mission Operations Document		L-2 days

Deliverable Items

	Review Packages		
1.	Ground Segment Requirements	Review	June 2003
2.	Ground Segment Design	Review	April 2004
3.	Ground Segment Implementation	Review	Feb. 2006
4.	Ground Segment Readiness	Review	L – 20 weeks
5.	Operational Readiness	Review	L – 4 weeks
6.	Commissioning Review	Review	L + 3 months

Deliverable Items

	Deliverable Items		
1.	SCOS 2000 TC History/OOL interface		May 2002
2.	SCOS 2000 TC History identifier S/W patch		May 2002
3.	SCOS 2000 Training		May 2002
4.	Slew Time calculation Algorithms		TBD
5.	Slew Time Test and Results data set		TBD
6.	Inertia Properties history/model		Mission end + 3mnths
7.	Post Mission Evaluation Report		Mission end + 3mnths

Major Milestones

- Project Reviews
  - PDR — January 2003
  - GSRQR — June 2003
  - CDR — February 2004
  - GSDR — April 2004
  - QR — November 2004
  - GSIR — October 2005
  - AR — September 2006
  - GSRR — September 2006
  - FRR — October 2006
  - ORR — January 2007
  - LRR — February 2007

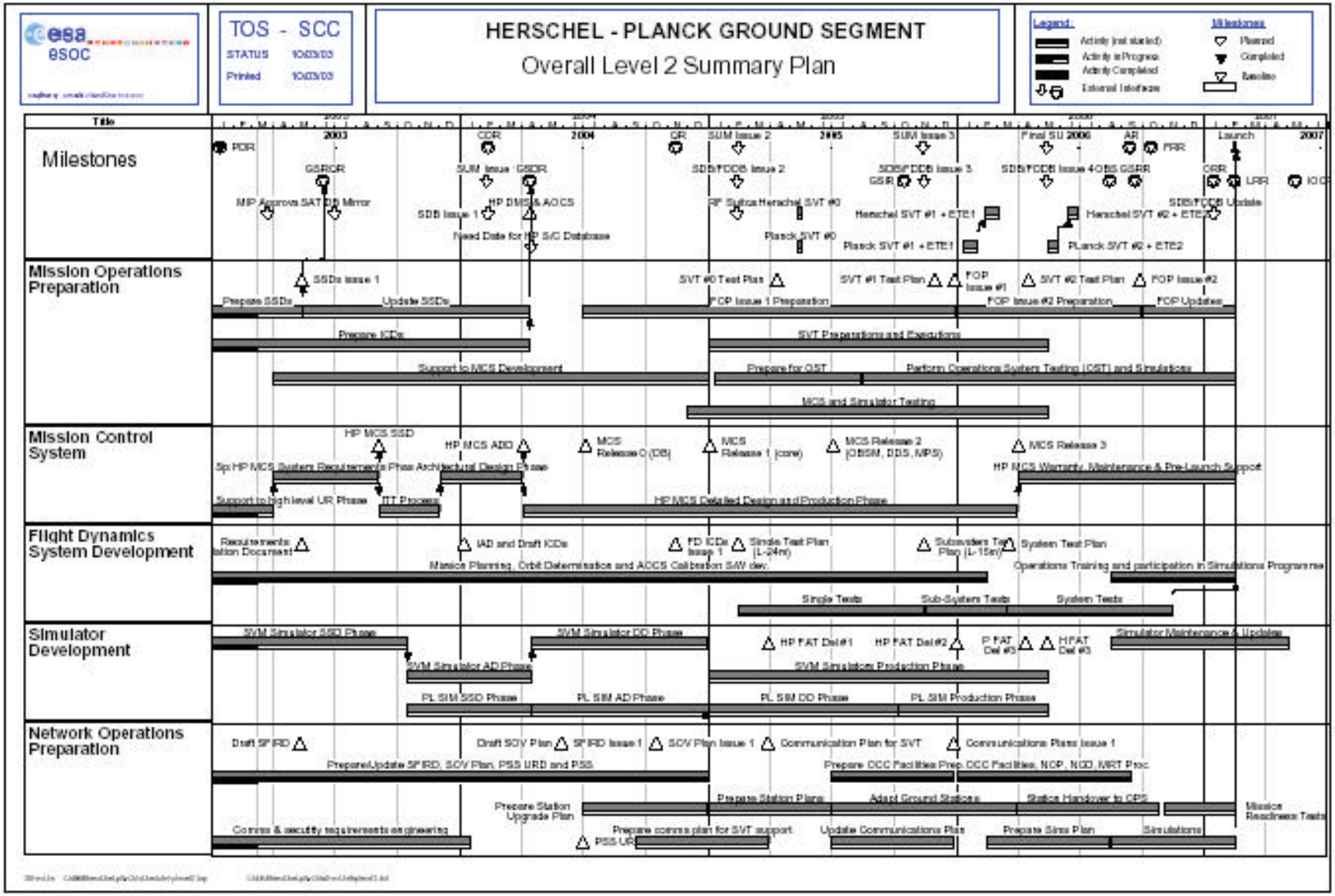
Major Milestones

- Project Deliverables

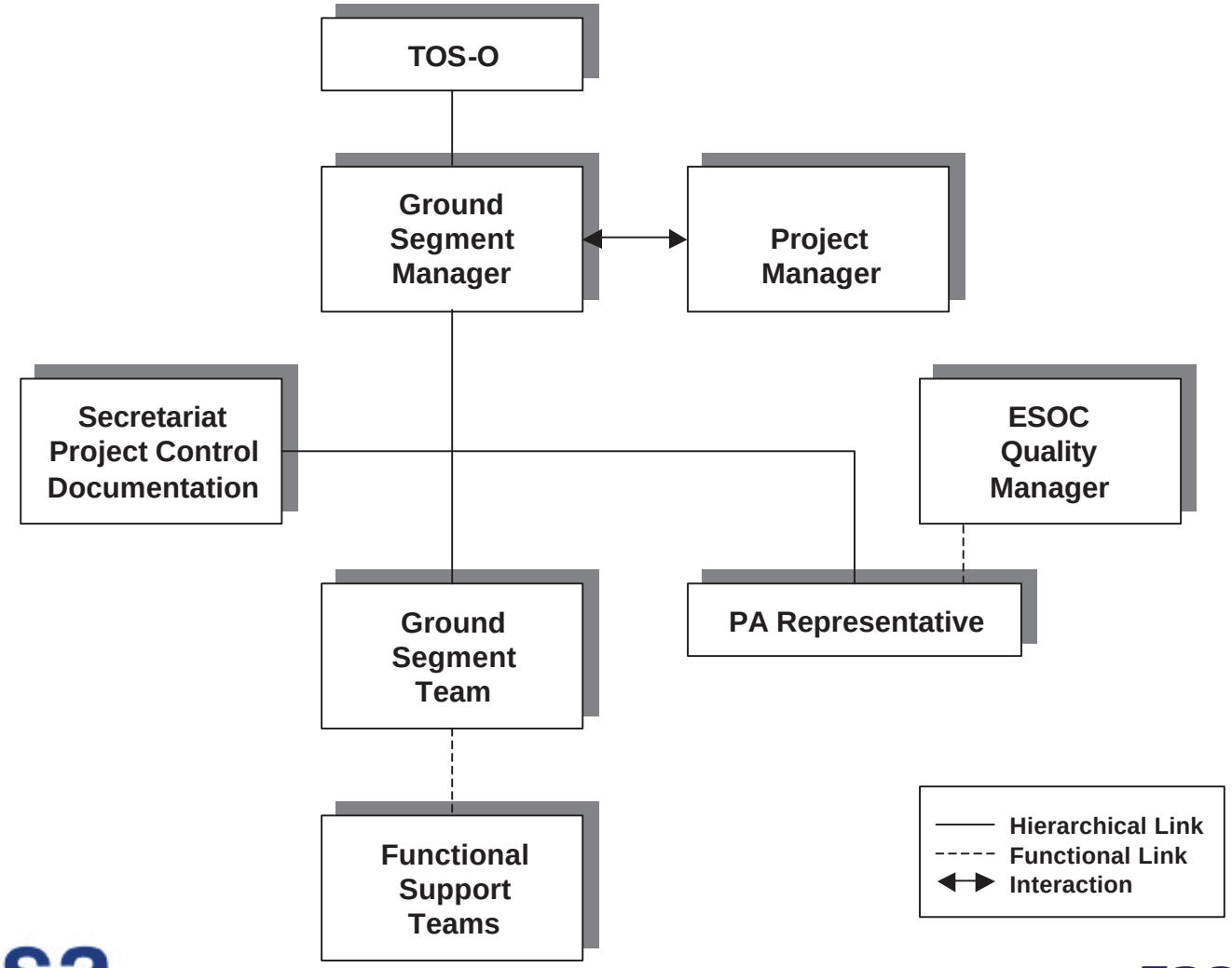
SDB Mirror	June 2003
SUM Issue # 1	February 2004
SUM Issue # 2	February 2005
SUM Issue # 3	November 2005
SUM Final Issue	March 2006
SDB/FDDB Issue # 1	February 2004
SDB/FDDB Issue # 2	February 2005
SDB/FDDB Issue # 3	November 2005
SDB/FDDB Issue # 4	May 2006
SDB/FDDB Final Issue	January 2007
RF Suitcase	February 2005
OBSM	August 2006
SVF	February 2008

Major Milestones

- SVTs
  - Herschel SVT # 0 — May 2005
  - Planck SVT # 0 — May 2005
  - Herschel SVT # 1 — January 2006
  - Planck SVT # 1 — February 2006
  - Herschel SVT # 2 — May 2006
  - Planck SVT # 2 — June 2006


esa
eSOC
TOS - SCC
STATUS
Printed
HERSCHEL - PLANCK GROUND SEGMENT
Overall Level 2 Summary Plan
Legend:
Activity (not started)
Activity in Progress
Activity Completed
External Interface
Milestones
Planned
Completed
Baseline
Title
Milestones
PDR
GSRCR
MIP Approval SAT DB Mirror
CDR
SUM Issue 1
GSDR
SDB Issue 1
HP DMS & AOCS
Need Date for HP S/C Database
QR
SUM Issue 2
SDB/FDDB Issue 2
RF Optical Herschel SVT #0
Planck SVT #0
SUM Issue 3
SDB/FDDB Issue 3
GSR
Herschel SVT #1 + ETE1
Planck SVT #1 + ETE1
Final SU
AR
FRR
SDB/FDDB Issue 4
OBS GSRR
Herschel SVT #2 + ETE2
Planck SVT #2 + ETE2
ORR
LRR
SDB/FDDB Update
Launch
Mission Operations Preparation
SSDs Issue 1
Prepare SSDs
Update SSDs
Prepare ICDs
Support to MCS Development
SVT #0 Test Plan
FOP Issue 1 Preparation
SVT #1 Test Plan
FOP Issue #1
Prepare for OST
MCS and Simulator Testing
SVT #2 Test Plan
FOP Issue #2
FOP Issue #2 Preparation
FOP Updates
SVT Preparations and Executions
Perform Operations System Testing (OST) and Simulations
Mission Control System
HP MCS SSD
Spc HP MCS System Requirements Phase
Support to high level UR Phase
ITT Process
HP MCS ADD
Architectural Design Phase
MCS Release 0 (DB)
MCS Release 1 (core)
MCS Release 2 (OBSM, DDS, MPS)
HP MCS Detailed Design and Production Phase
MCS Release 3
HP MCS Warranty, Maintenance & Pre-Launch Support
Flight Dynamics System Development
Requirements
IAD and Draft ICDs
FD ICDs Issue 1
Simple Test Plan (L-24m)
Manoeuvre Planning, Orbit Determination and AOCS Calibration S/W dev.
Subsystem Test Plan (L-15m)
System Test Plan
Operations Training and participation in Simulations Programme
Single Tests
Sub-System Tests
System Tests
Simulator Development
SVM Simulator SSD Phase
SVM Simulator AD Phase
SVM Simulator DD Phase
HP FAT Del #1
HP FAT Del #2
P FAT Del #3
H FAT Del #3
SVM Simulators Production Phase
Simulator Maintenance & Updates
PL SIM SSD Phase
PL SIM AD Phase
PL SIM DD Phase
PL SIM Production Phase
Network Operations Preparation
Draft SFIRD
Prepare/Update SFIRD, SOV Plan, PSS URD and PSS
Draft SOV Plan
SFIRD Issue 1
SOV Plan Issue 1
Communication Plan for SVT
Communications Plans Issue 1
Prepare OCC Facilities Prep. OCC Facilities, NOP, NCD, MRT Proc.
Prepare Station Upgrade Plan
Prepare Station Plans
Adapt Ground Stations
Station Handover to OPS
Mission Readiness Tests
Comms & security requirements engineering
PSS UR
Prepare comms plan for SVT support
Update Communications Plan
Prepare Sims Plan
Simulations

Management


TOS-O
Ground Segment Manager
Project Manager
Secretariat Project Control Documentation
ESOC Quality Manager
Ground Segment Team
PA Representative
Functional Support Teams
Hierarchical Link
Functional Link
Interaction

Key Personnel

Area of Responsibility	Nominee
Ground Segment Manager	John Dodsworth
Spacecraft Operations	Micha Schmidt
Simulators	David Verrier
Mission Control System	Gianpiero Di Girolamo
Flight Dynamics Service	Gottlob Gienger
Station and Facilities Manager	Angela Head
Mission Analysis	Martin Hechler
Project Control	Ian Bayliss
Product Assurance	Emmanuel Vicari

Reporting

- Implementation Phase
  - Quarterly Management Information Reports
  - Quarterly Financial Reports
- Operations Phase
  - LEOP reports
  - Weekly reports :
    - The major events and anomalies raised
    - The subsystem and ground segment performance
    - The status of consumables
    - The achieved amount of data recovered vs. that planned and that required (95% data captured by the ground station).
  - Anomaly Reports

Product Assurance

- The ESOC QMS is generally applicable to the Project
  - How the Project shall be managed
  - The processes to be applied for the development of the ground segment
  - The processes for integration, test and operational validation
  - The way the operations shall be conducted
  - Problem reporting and management
  - Configuration management
- Exactly how it is applied is defined in the PA Plan

Compliance to Requirements

- MIP is almost 100% compliant to the MIRD – no NC
- Some TBC due to TBC requirements which will need analysis
- Some PC

MFUN-020	H/P	Contact with the spacecraft (Herschel and Planck) will take place nominally once per day (DTCP or daily "pass"). The ground segment design shall however allow access to either spacecraft at any time (provided ground station visibility is ensured) in case of emergency. The ground segment design shall also ensure that a "pass" can be missed without detrimental effect on spacecraft and data recovery (48- hour autonomy).	The declaration of "spacecraft emergency" gives priority access to station resources, according to the ESA priority scheme. It is not possible to miss a pass without affecting data recovery, inasmuch as it takes more than 1 day to recover the data and consolidation is affected.	PC
MFUN-225	H/P	The MOC shall maintain at all times on ground a complete model of the on-board status of the spacecraft	Models will be maintained for the purposes of command verification. Relevant status parameters will be status consistency checked, other parameters will be mode dependent status checked. All status parameters will not be modelled or checked.	PC
MFUN-235	H/P	Throughout the mission ESOC shall verify RF- and TT&C compatibility between spacecraft and ground stations (maintenance of the detailed link budgets provided by the Prime Contractor). This compatibility is verified prior to launch via a series of tests carried out with the Project-provided RF suitcase.	ESOC will confirm the link margin and compatibility. Detailed link budgets will not be maintained.	PC
MFUN-310	H/P	The MOC shall ensure that no command / set of commands generated via the MTL or through manual commanding, at any time during the mission, may result in an attitude constraint or attitude restriction violation.	FD/Mission Planning will ensure that commands for the MTL generated in the normal planning cycle do not violate constraints. For manual inputs, the level of protection is dependent on the format of the command and how checks on the command parameters can be applied. Procedural protection will be applied, and commands generated by Flight Dynamics shall be quality checked.	PC

Partial Compliances

MFUN-310	H/P	The MOC shall ensure that no command / set of commands generated via the MTL or through manual commanding, at any time during the mission, may result in an attitude constraint or attitude restriction violation.	FD/Mission Planning will ensure that commands for the MTL generated in the normal planning cycle do not violate constraints. For manual inputs, the level of protection is dependent on the format of the command and how checks on the command parameters can be applied. Procedural protection will be applied, and commands generated by Flight Dynamics shall be quality checked.	PC
MPER-060	H/P	The MOC shall uplink the Master Timeline approved by the Project Scientist one day before it is required, i.e. there will always be between 24 and 48 hours of commands stored on board.	Except in the case of a lost DTCP.	PC
MPER-245	H/P	The MOC shall make available to the HSC (Herschel) and to the PSO and/or DPCs (Planck) any sequence of any category of consolidated TM data from dump TM (i.e. TM dumped from the SSMM during the DTCP) not later than 10 minutes after the last "bit" of this sequence has been received by the MOC (TBC)	The last bit in this case is assumed to be the last bit of data which has been recovered from the ground station belonging to this sequence. Normally consolidation will be declared automatically before the next DTCP (this assumes any recovery actions will have been completed by then). In exceptional cases the consolidation can be declared complete manually, in which case the data will be available earlier.	PC
MPER-260	H/P	The MOC operations team shall be deployed and staffed in such a way that a single team of SPACONs is able to support both the Herschel and Planck mission within a single shift	Section 5. TBC for commissioning and PV, when 10 hour continuous operation may be required.	PC
MOPS-165	H/P	The MOC shall report anomalous satellite behaviour within 8 hours of occurrence to agreed parties. Anomalies which threaten the mission shall be reported as soon as possible (goal < 30 mins) to designated persons (subject to the limitations of communications possibilities, e.g. cellular phone).	Report shall be made within 8 hours of detection, since some anomalies may only be detected from SSMM telemetry. Anomalies which threaten the mission will be apparent from real time data. Notification lists will be kept in the DCA.	PC
MPA-105	H/P	Subsystem, system and overall ground segment tests shall be conducted according to approved test plans and test reports shall be issued. ESOC shall define in agreement with the H/P Project the (detailed) objectives, schedule and duration of these tests. The major tests are listed in the following requirements.	The H/P Project will be involved in the definition of tests with spacecraft hardware, and external to ESOC facilities. Tests internal to ESOC will not require Project involvement. Test will be conducted according to the overall test plan.	PC

Partial Compliances

MMAN-095	H/P	Quarterly Management Information Reports shall be provided. These reports should be brief and include the following information: - brief summary of the progress achieved since the previous reporting period; - concise description of the main problem areas, their criticality and anticipated impacts (e.g. delays in the schedule or non conformance with the requirements); - status of the technical design and operations preparation, of proposed solutions to the problem areas and of engineering, Product Assurance and testing activities; - risk status - per Work Package the manpower usage showing actual versus planned and estimation at completion; - overall manpower usage chart; - update of the overall schedule with latest prediction of the completion dates of the identified milestones; - a list of relevant action items and their status.	Section 6.8. The reporting will be at the MRF level, and not per work package, in accordance with the ESOC manpower reporting system.	PC

Are there problems?

- We need a consolidated Space Segment Schedule
  - especially SVT dates, currently set according to the schedule proposed initially by ALCATEL and drivers for the development.
- Simulator schedule very demanding, complexity high, current infrastructure not adequate in some respects.
- Planck operations are potentially much more complex than originally anticipated owing to concerns about data losses and replanning for data recovery, and more demanding instrument control requirements – situation under analysis