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The ESTRACK Management & Scheduling System

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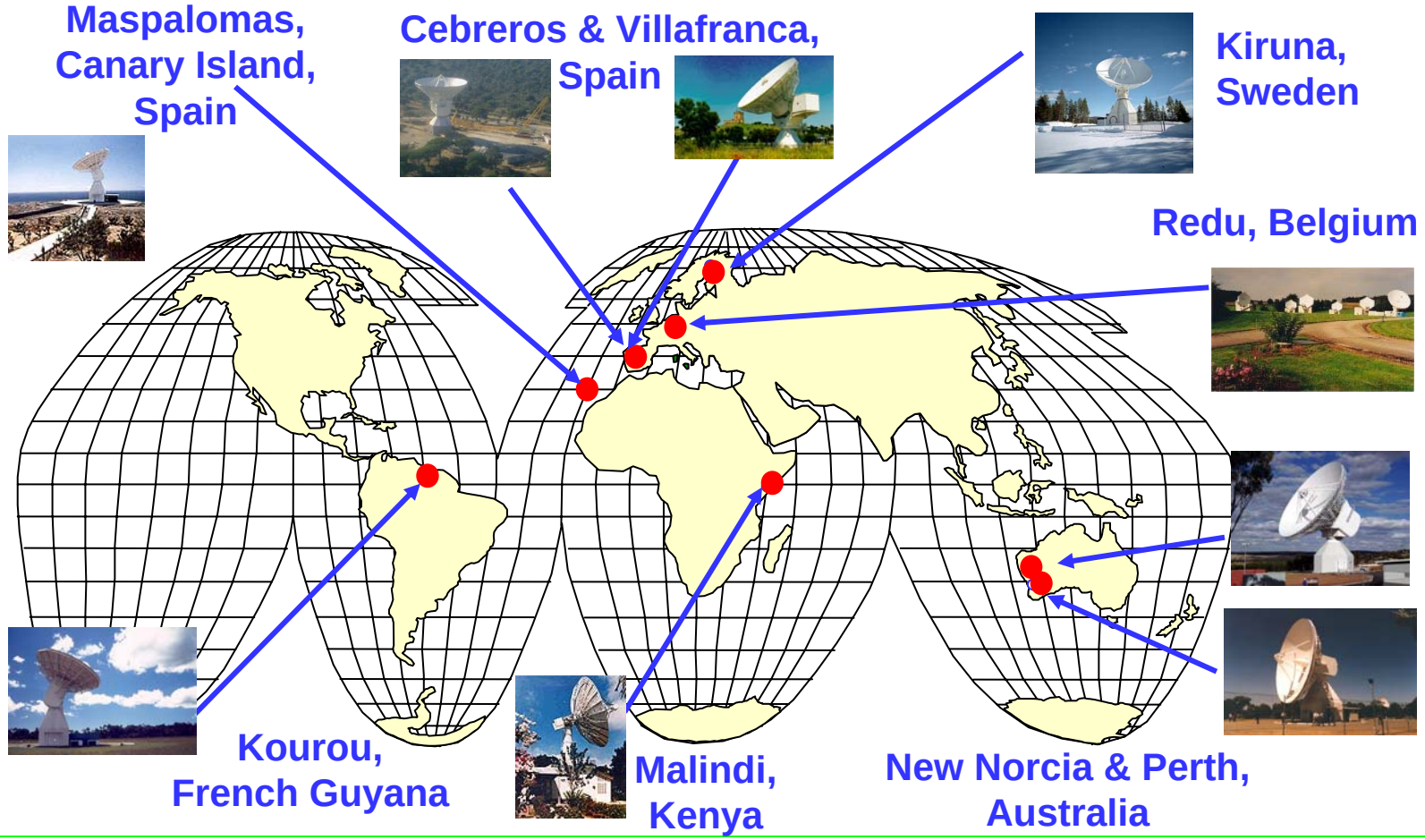
Presentation Content

- ESTRACK Network and its evolution
- ESTRACK Management System (EMS)
- EMS Planning Component (EPS)
- EMS Scheduling Component (ESS)
- EMS Coordination Component (ECS)
- Conclusion

ESTRACK - ESA Tracking Network Overview

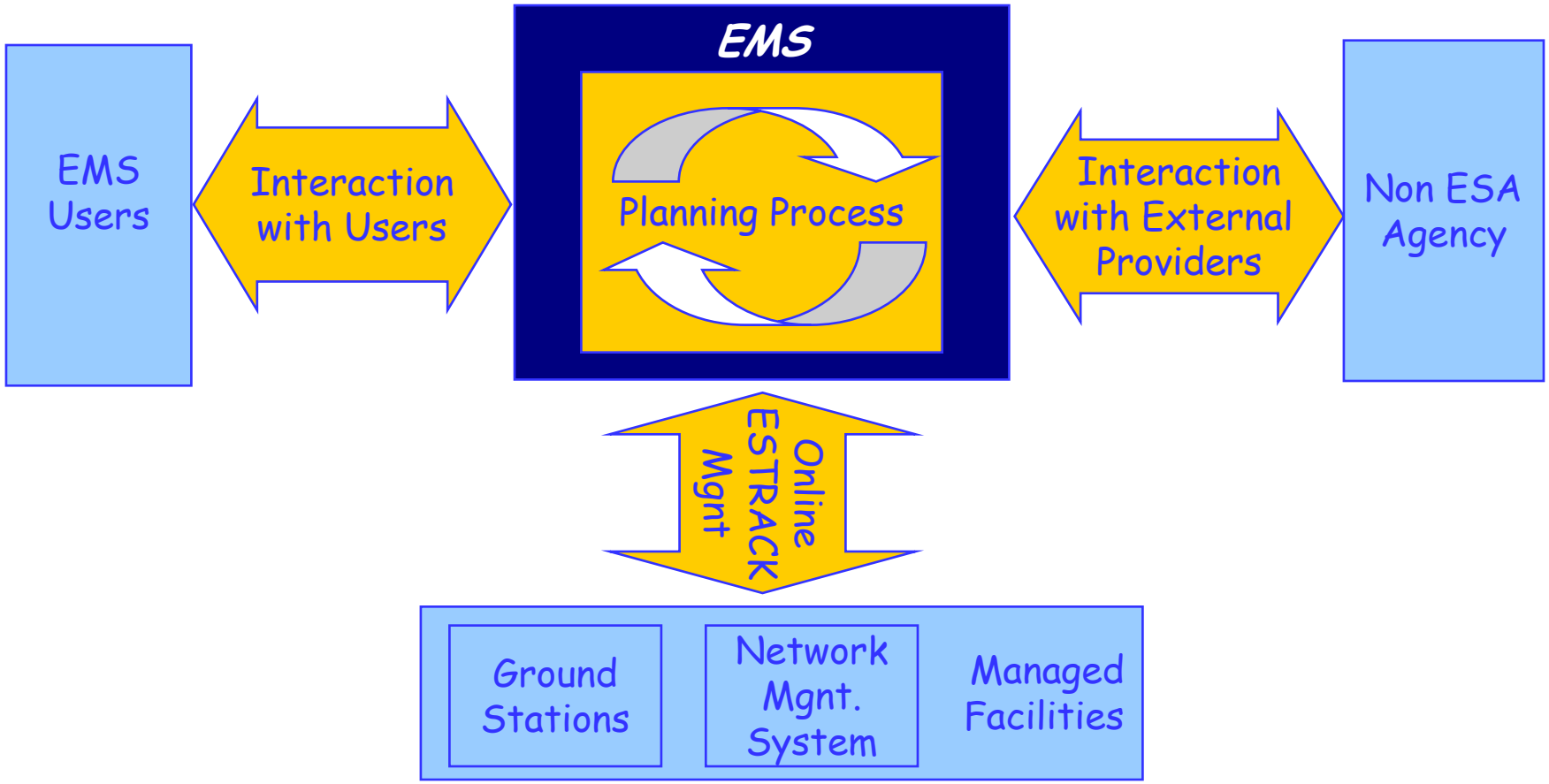


ESTRACK Evolution

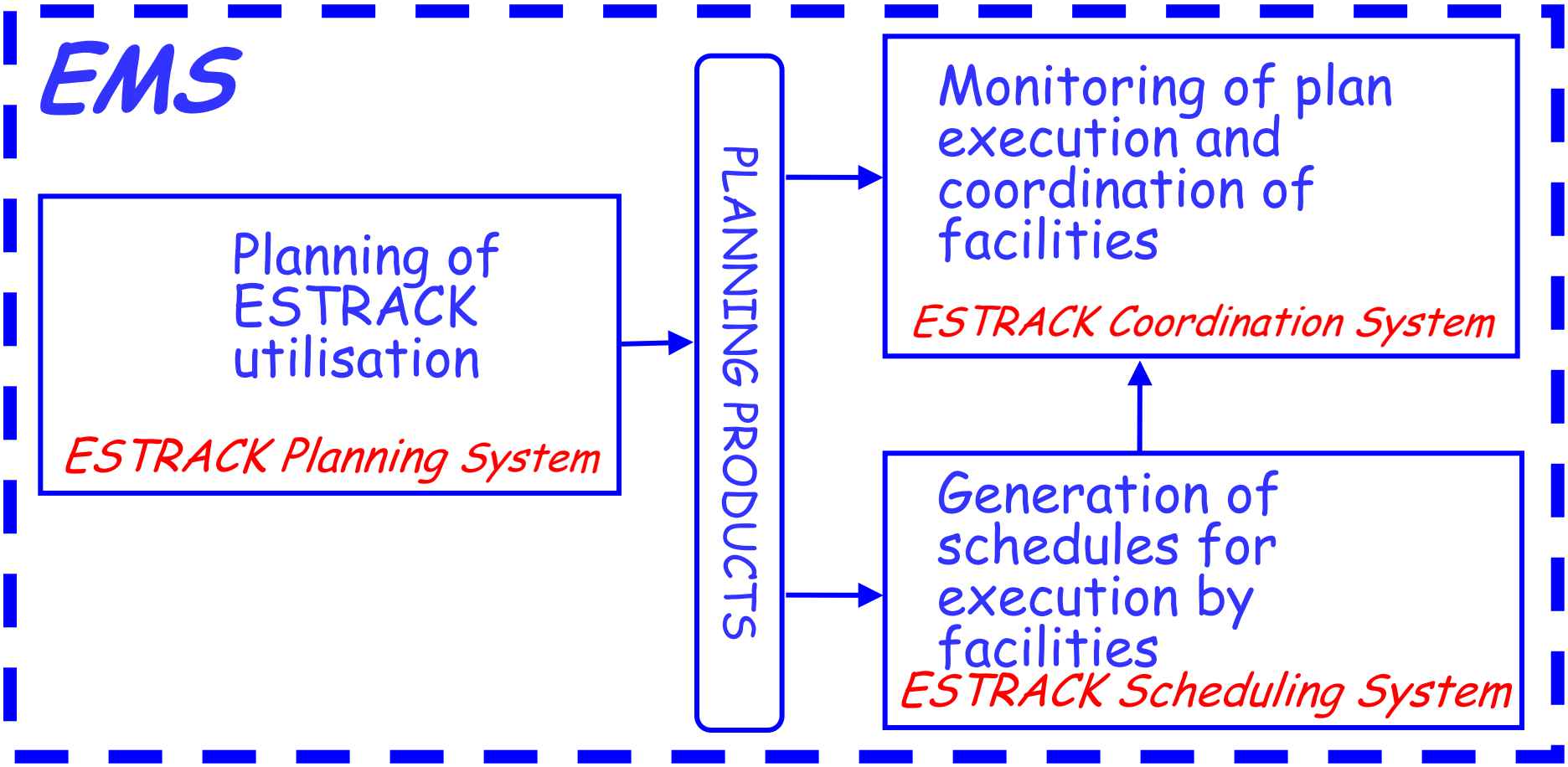
- Yesterday
  - Ground stations almost exclusively dedicated to a given ESA mission
  - Ground stations operated locally
- Today
  - ESTRACK constantly growing in size, capability and complexity
  - Ground stations remotely operated on a routine basis
  - Ground stations supporting multiple missions, within and outside ESA
  - Users requests evolving from direct request of specific facilities to more generic tracking service requirements
- Tomorrow
  - Increasing level of cross-support
  - Increasing network load

➡ This demonstrated that a new network management & scheduling operational concept is required

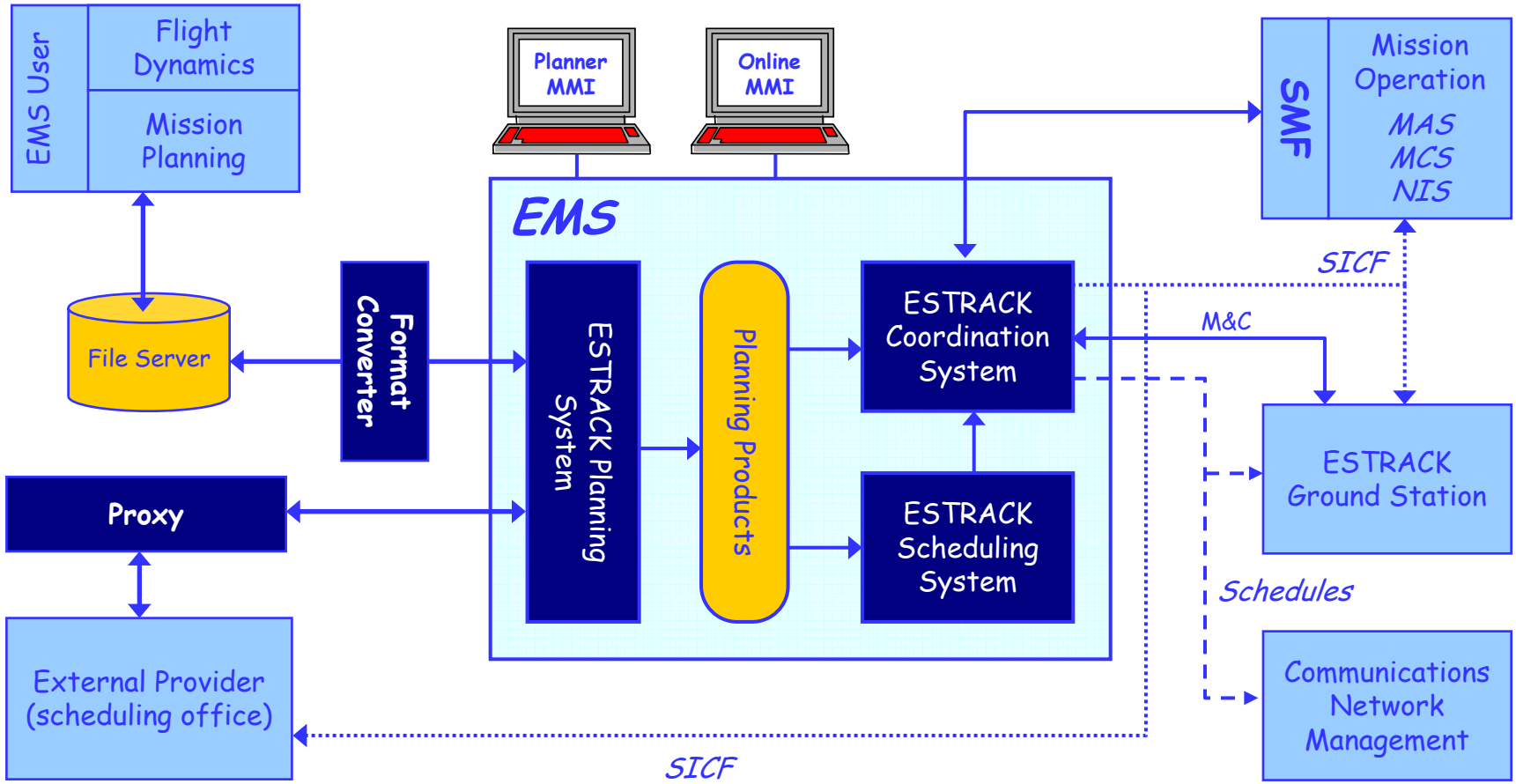
ESTRACK Management & Scheduling System



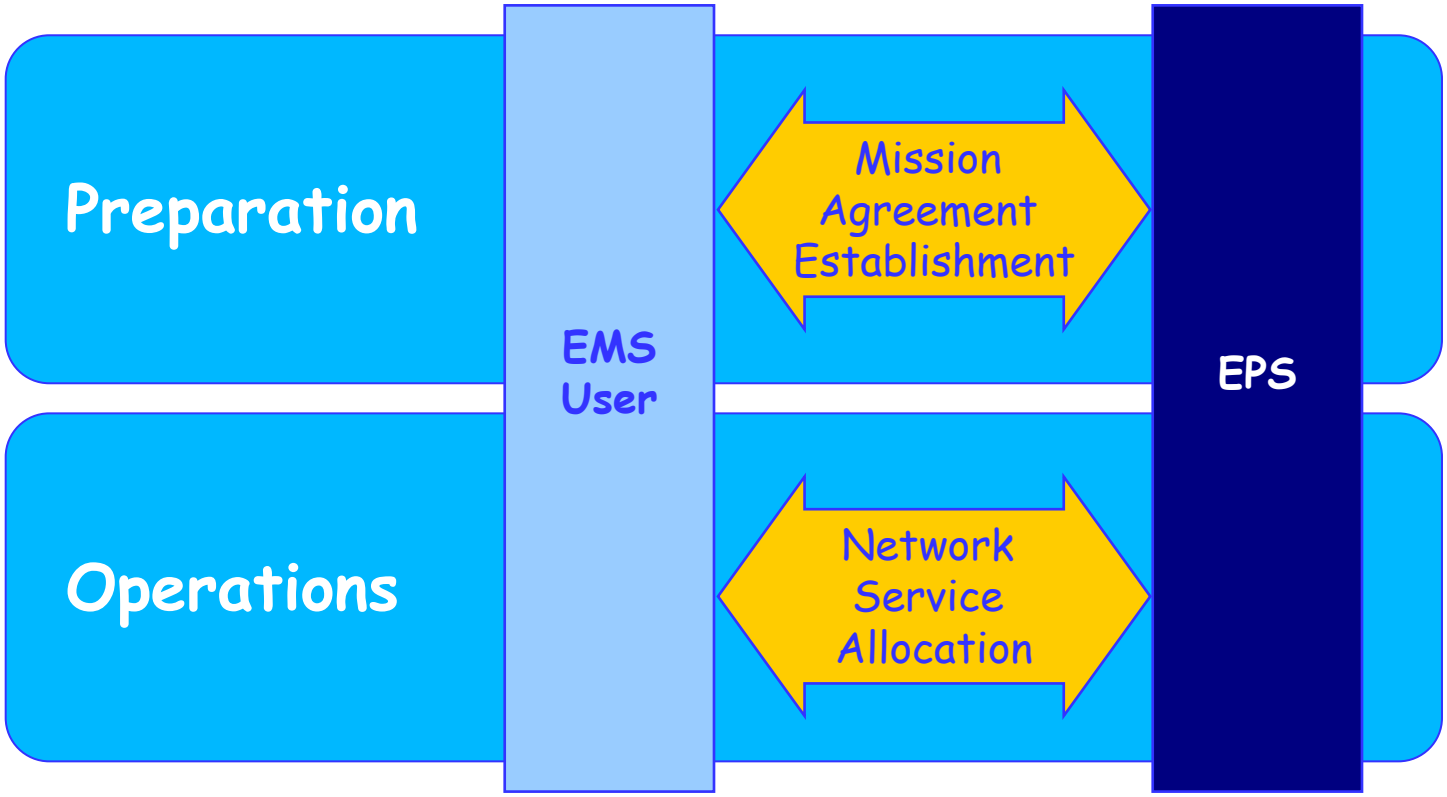
EMS Components



EMS Architecture



User Interaction with EPS



Mission Agreement Establishment

ESTRACK Services are only provided in the framework of a Mission Agreement.

Mission Agreement

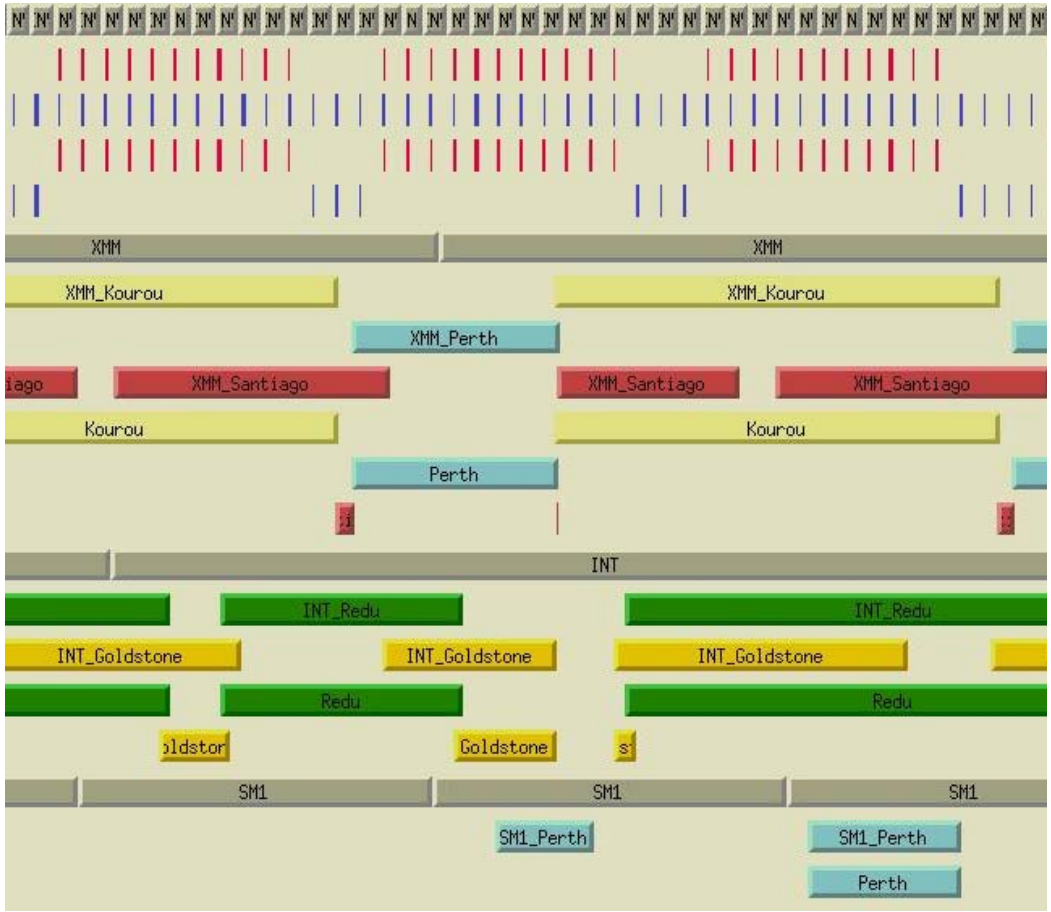
- Mission Identification
- Spacecraft Identification
- Administrative Information
  - Responsibilities …
  - Addresses …
- Validity period
- List of facilities
- ……
- ……
- ……
- Space / Ground ICD

EMS Configuration Database

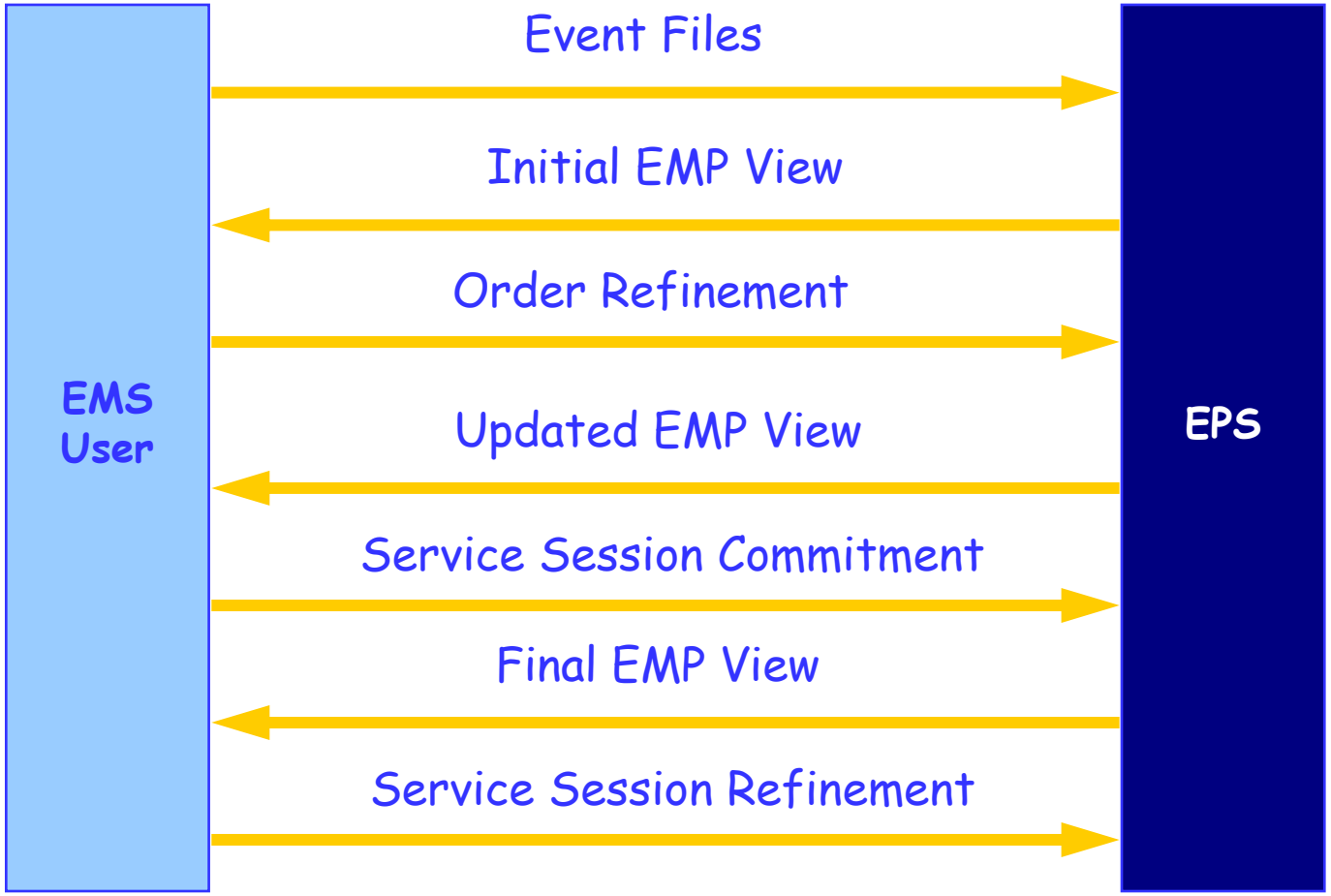
Examples of Network Service Allocation Requirements

- One pass from AOS to LOS of a minimum duration per orbit
  (e.g. Envisat)
- Maximum continuous contact per orbit, with mandatory contact in a time period between two events specified for each orbit, and minimum hand-over duration
  (e.g. XMM, INTG)
- Maximum/Minimum total contact duration and number of passes within a period, with minimum pass duration
  (e.g. SMART-1)
- Etc.

ESTRACK Management Plan (EMP)



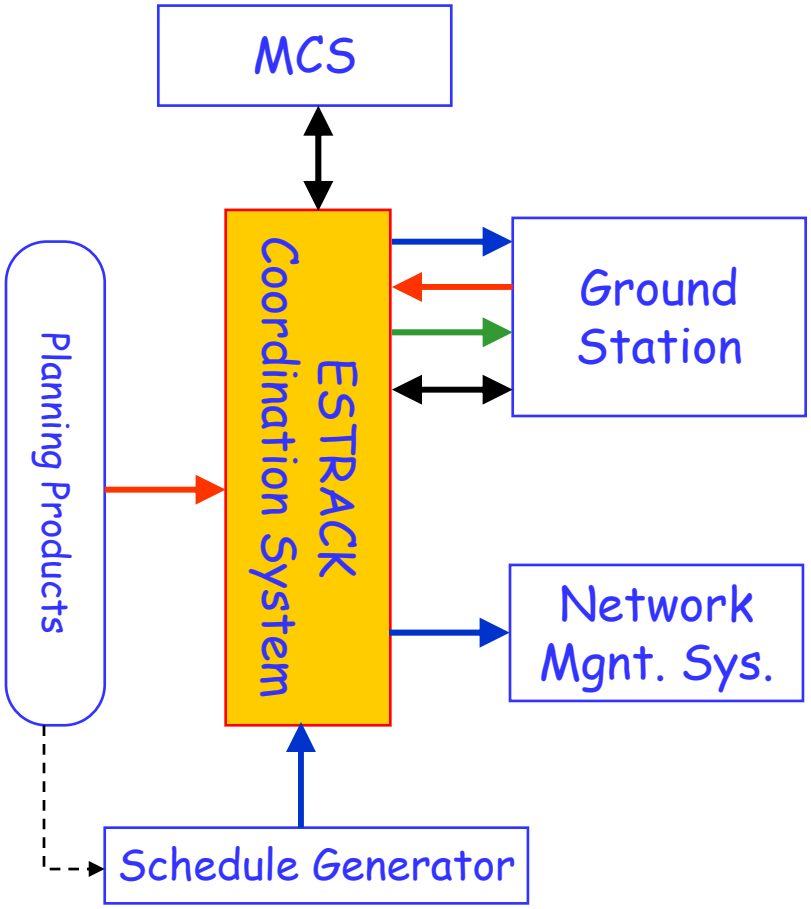
Network Service Allocation



Scheduling Approach Summary

- Generation driven by the ESTRACK Management Plan
- All required variable information taken from EMP
- Static information contained in Schedule Templates
- Generation of SICF from Transfer Service Instances
- Single master schedule controlling load and execution of individual schedules and running on EMS
- Additional readable schedule overview (Timeline for Operations)
- No schedules generated for External Providers

ESTRACK Coordination System



FEATURES

Downloading of schedules

Monitoring of plan execution

Routine control of schedules

Coordination of facilities and the MCS for special events (e.g. station hand over)

Conclusion

- A new ESTRACK network management and scheduling concept has been proposed
- The new concept introduces the ESTRACK Management & Scheduling System (EMS) as part of EGOS
- EMS leads to better usage of the ESTRACK resources through increased flexibility and automation
- EMS is decomposed into three functional blocks: Planning, Schedule Generation, and Coordination
- The concept requires a formalisation of the mission requirements for each mission in mission agreements
- The planning and scheduling components of EMS are under development at ESOC (releases in spring and summer 2007)