

Ground Systems Standardization and Commonality: Benefits, Risks and Obstacles

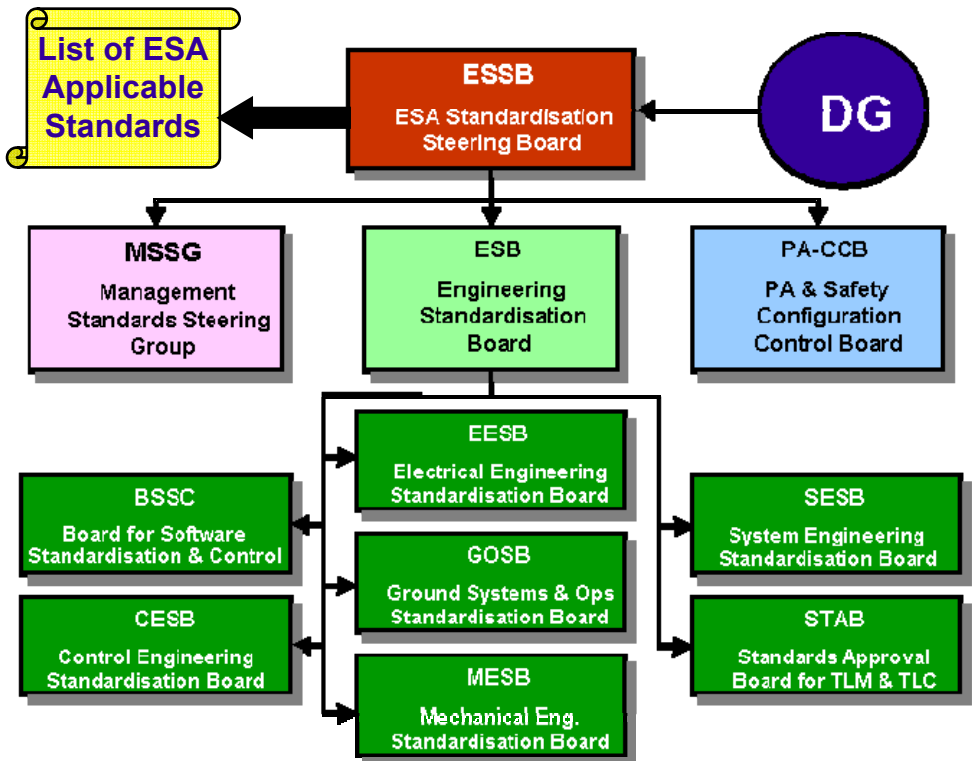
Dr. Mario Merri
European Space Agency

GSAW, Manhattan Beach, 27 Mar 2007

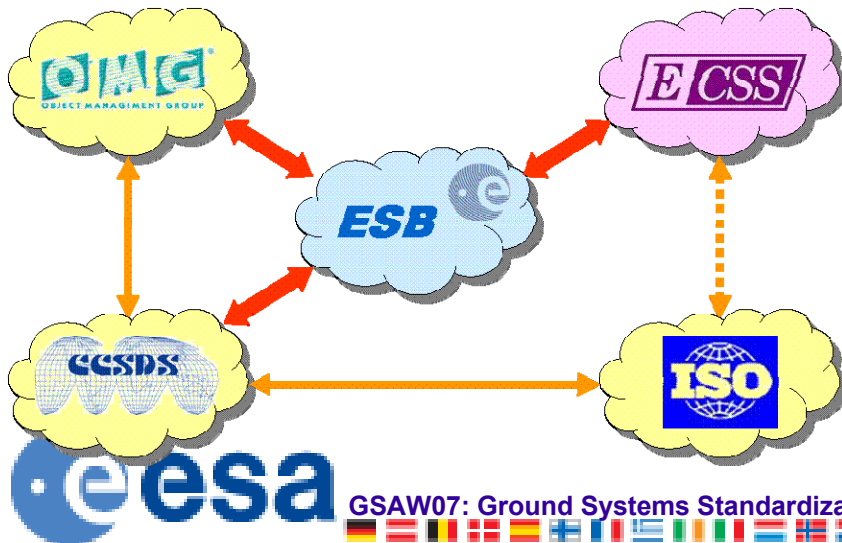


Ground Segment Standardisation at ESA

- Organisation in place to manage ESA effort in standardization
- No ESA internal standard
 - Only via participation in international standardization bodies



- ESA commitment to use standards in projects
 - Mandatory “List of ESA Applicable Standards”



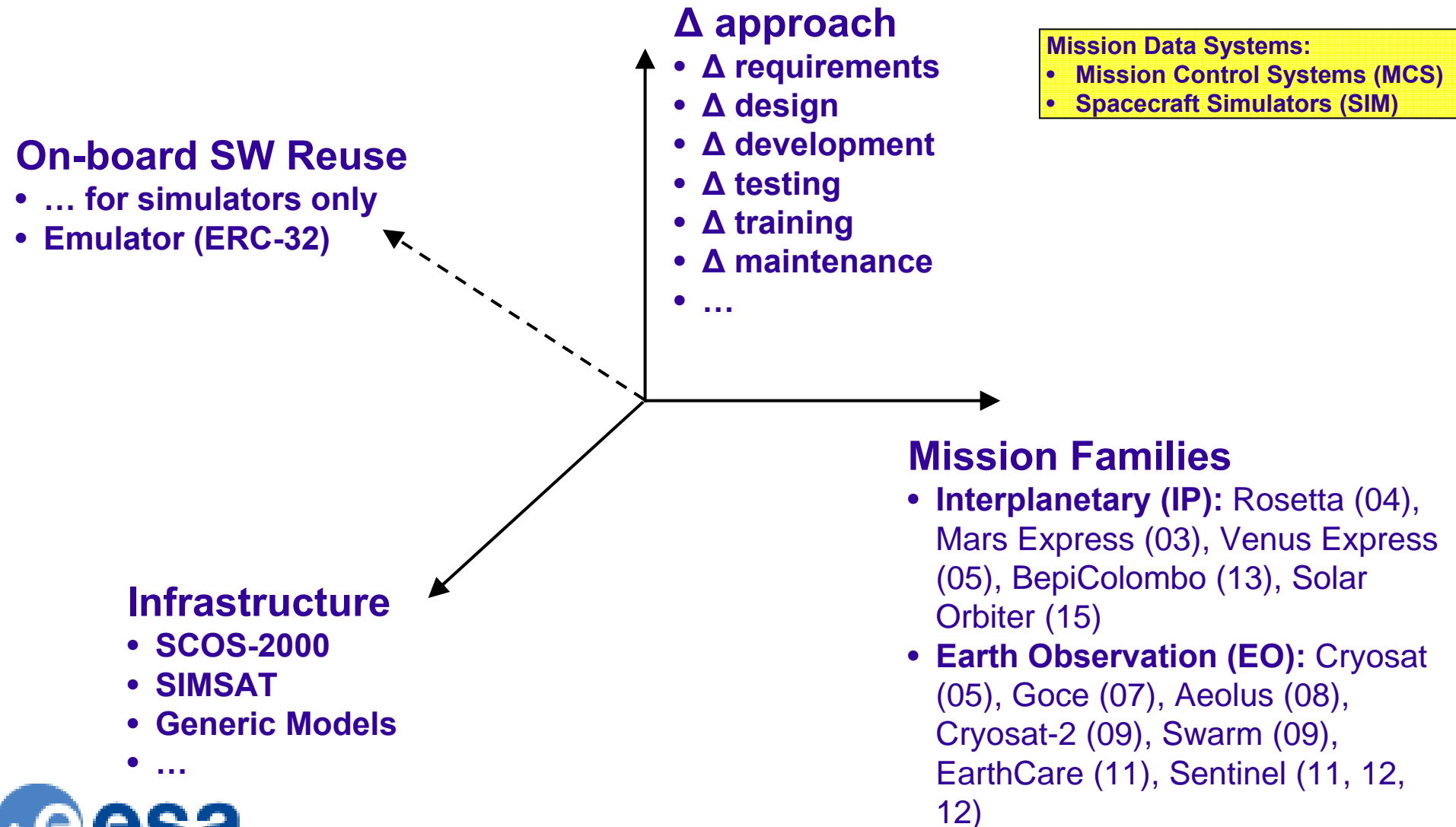
Use of Standards

- Technical Standards
 - ECSS, CCSDS, internal coding standards and best practices
 - Software Engineering Standard
 - Do not overdo, but have discipline!
 - SETG: tailored version for Ground Segment software of ECSS-E-40 and Q-80
 - About 16 deliverables documents
 - Light version of SETG in preparation for small projects

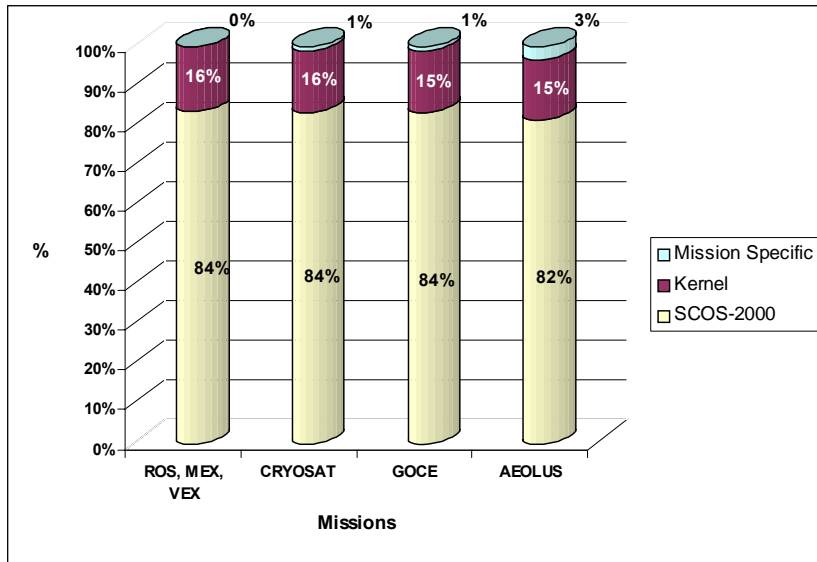
- Needed to facilitate the procurement (acquisition) process
 - Standards are made applicable in the Request for Proposal
 - Result in comparable offers
 - Standardise ways in which projects are run

- ESOC Quality Management System

Software Reuse in Mission Data Systems

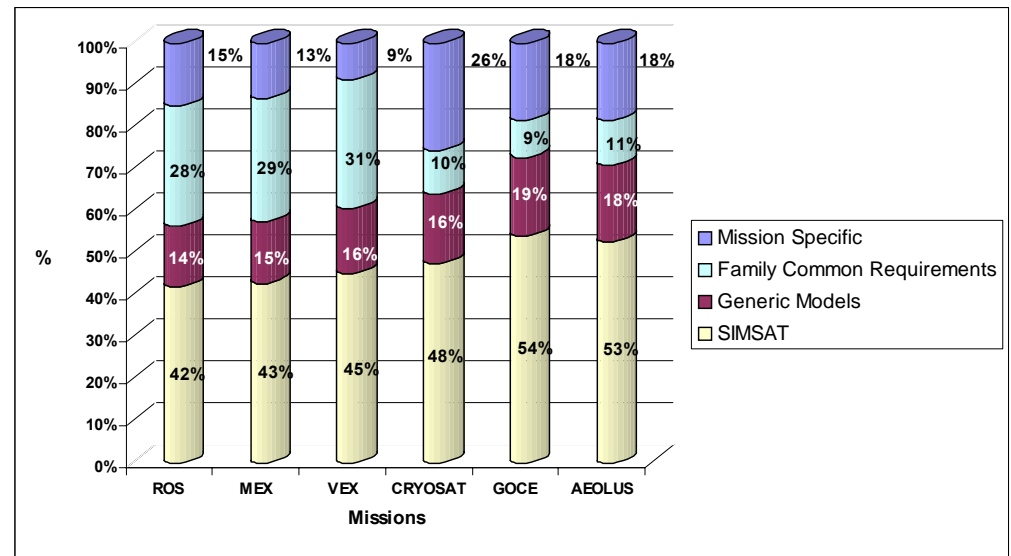


Requirement Reuse in Mission Data Systems

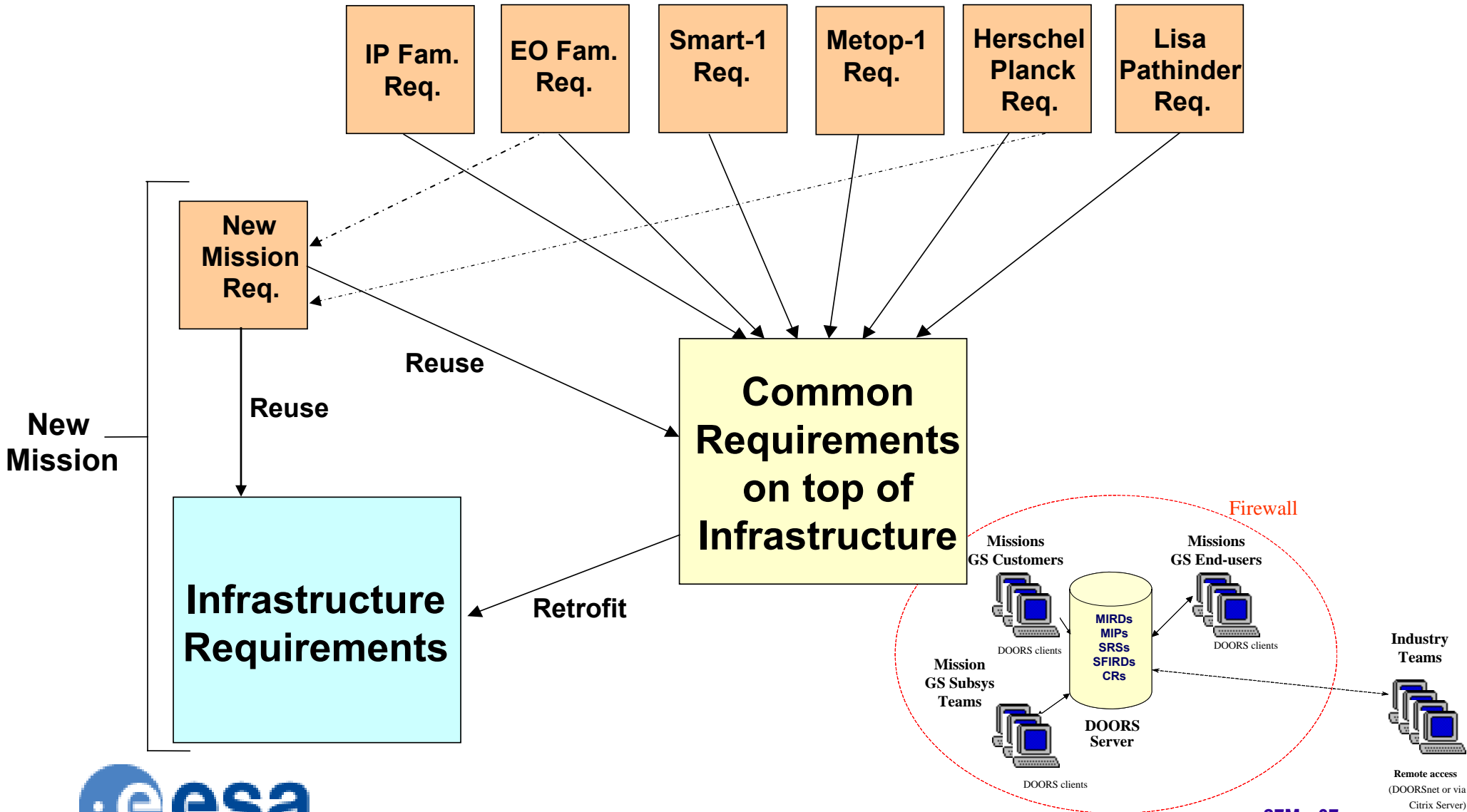


◀ MCS

SIM ▶

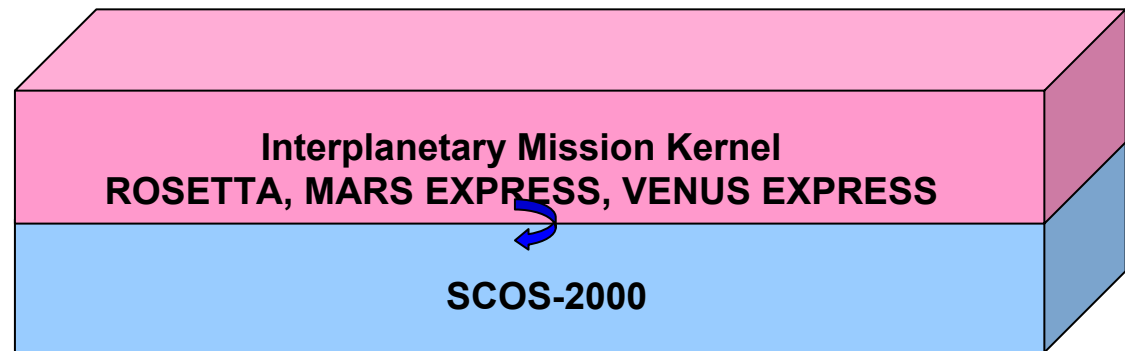


Requirements Management Process

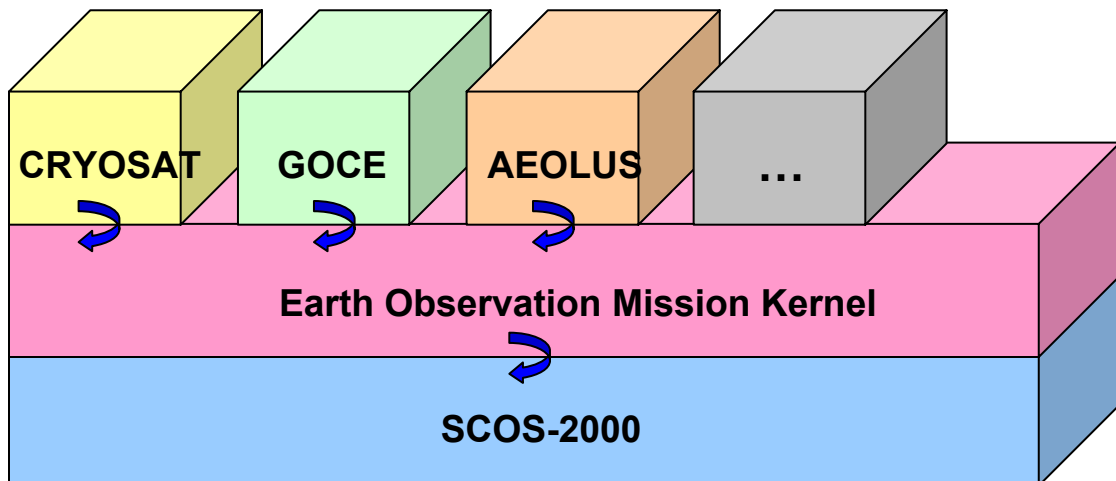


Software Reuse in Mission Control Systems

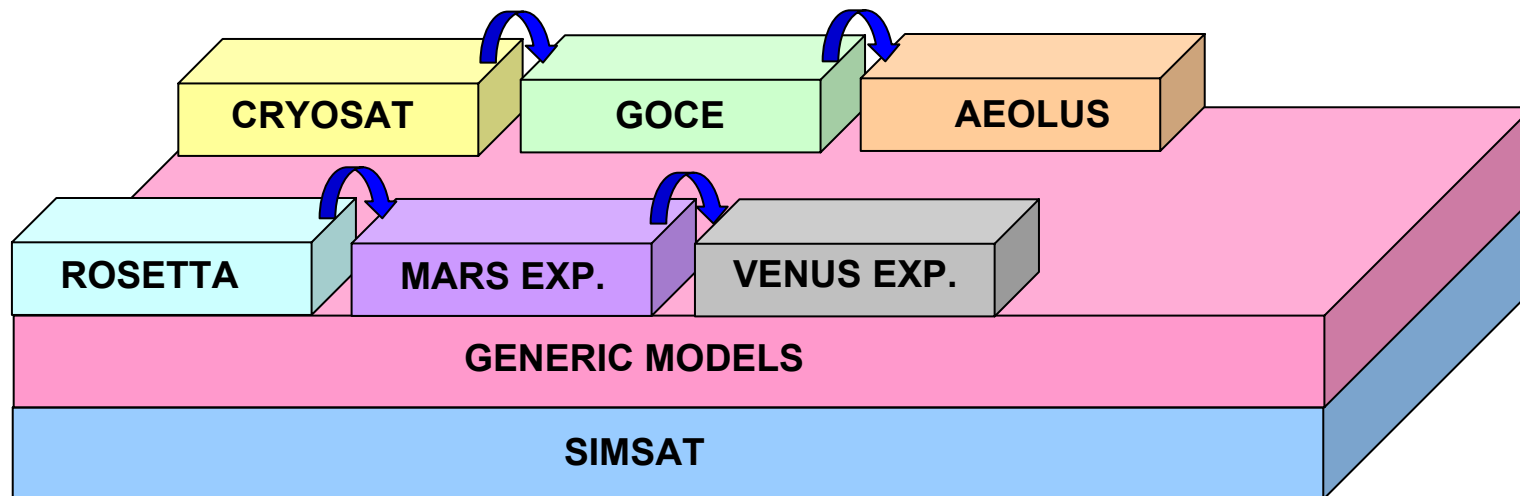
Interplanetary Family



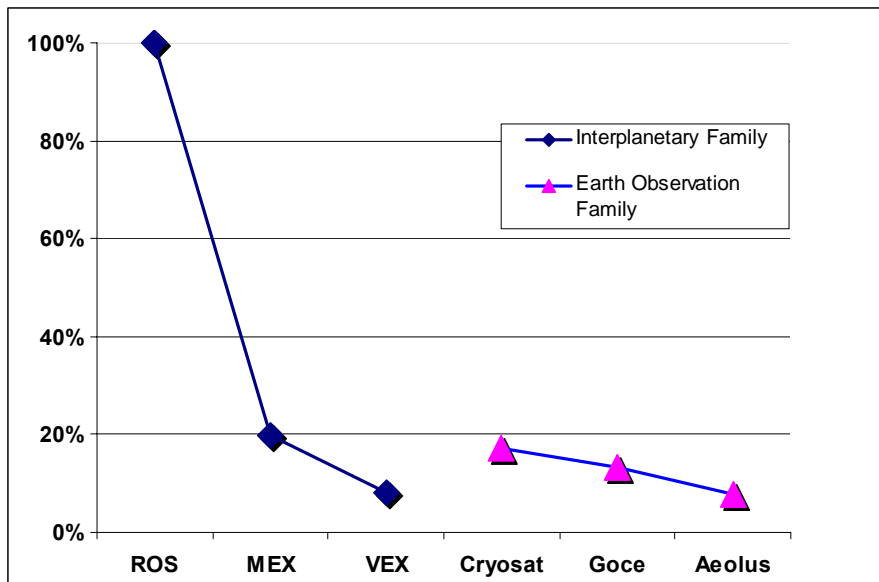
Earth Observation Family



Software Reuse in Simulators

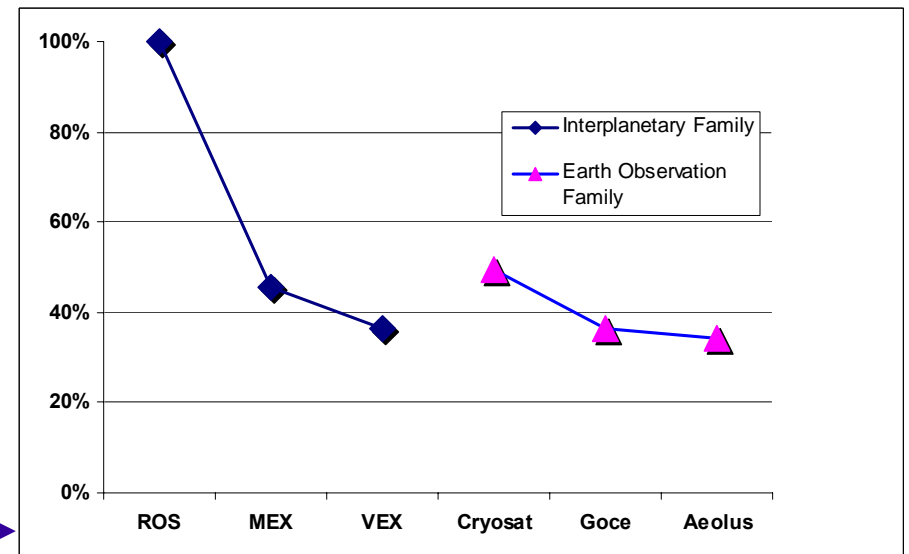


Impact of Reuse in Development Price



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Prices wrt to the most expensive development



SIM ▶



Impact of Platforms

- **Problem: “the jungle”**
 - Current OPS-GD responsibility:
 - 14 Mission Control Systems (on site @ ESOC)
 - 18 Simulators/NDIU Lights
 - The 32 (14+18) MDSs use:
 - ~4 different HW platforms
 - ~13 different OSs
 - ~25 different versions of infrastructure
 - ~270 different Workstations
- **Solution: Reduce proliferation of different systems**
 - PC
 - Linux
 - Reduce frequency of Infrastructure upgrade
 - Multimission systems

Adopt “Combined” Maintenance Scheme

- **Reduce cost and increase efficiency**
 - Combine projects with sufficient critical mass of commonalities
 - Allows the Contractor to pool resources in a larger team
 - Reduces contractual administrative overhead
 - Better adjust to workload conditions on different mission data systems
 - Use ITIL: same approach, tools and procedures
- **Improve Customer satisfaction**
 - Reduce cost to customer (see above)
 - Provide a clear “price versus service” scheme for full cost visibility
 - Maintain strong mission-specific expertise
 - Share knowledge across missions and infrastructure via common tools
 - Allow possibility to flexibly modify dynamically the quality of the service provided (e.g. for support of eclipse season, comet encounter,...)
- **Improve Quality of Service**
 - Put in place continuous service improvement programme
 - Collect Key Performance Indicators to measure the services provided

Questions?