

Ground Systems Standardization and Commonality: Continuing the Dialogue

Dr. Mario Merri
European Space Agency

GSAW, Redondo Beach, 2 Apr 2008



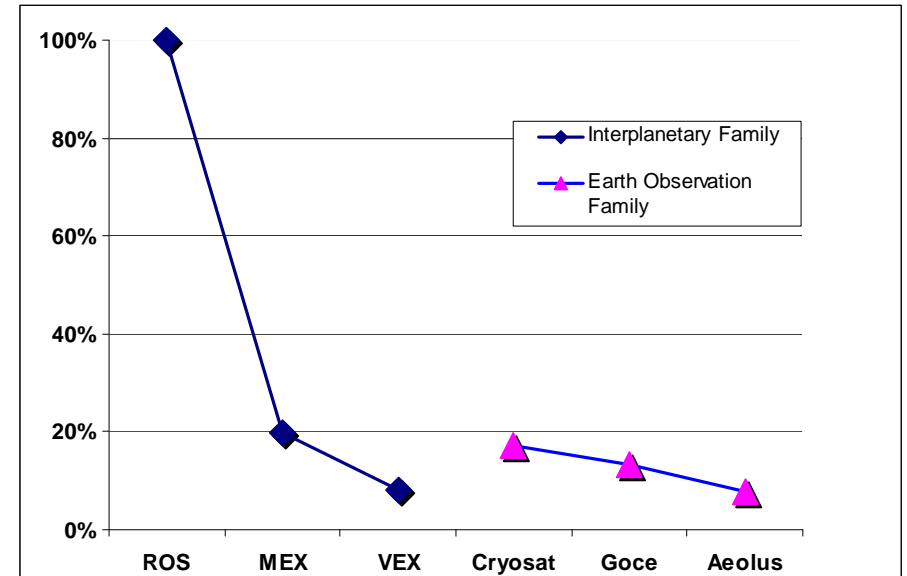
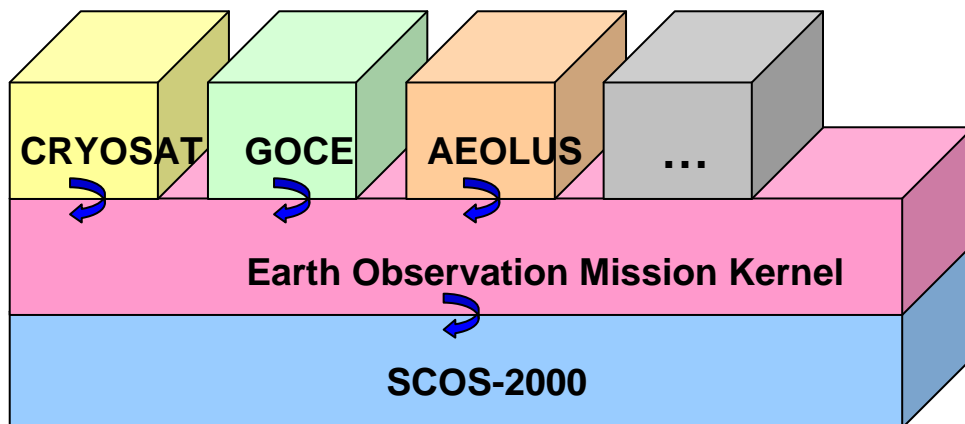
The Questions

1. What efforts have you used to identify other programs or systems to seek commonality with? How have you addressed cost-sharing with those programs or systems?
2. Have you experienced there regulatory or policy obstacles towards achieving greater commonality and, if so, how have you addressed those obstacles? Are there policy changes that could help enable standardization and reuse?
3. How have you obtained buy-in on use of standards and overcome resistance and skepticism?
4. What are the implications of trying to achieve commonality at different stages of development maturity? Does commonality always have to be planned for in the initial development or are there ways to leverage reuse for systems that are further along?
5. Does planning for commonality and reuse require different systems engineering processes?
6. How can costs and schedules for projects involving commonality and reuse be estimated accurately?
7. Are there management best practices that allow for successful use of commonality, standardization, and reuse in ground system projects? Are there specific pitfalls associated with management of vendors and subcontractors?



System Commonality Identification Effort and Cost-sharing Issues

- Standards and infrastructure do offer cost saving
 - ... but first user syndrome: maturity, first development costs, ...
 - difficult to estimate upfront
- => identify family of missions
 - Sell standardisation/infrastructure to entire family and not to individual missions
 - New development cost/risk for standard/infrastructure can be shared



Regulatory or Policy Obstacles Towards Achieving Greater Commonality

- Project Management independence
 - “ Why should I spend extra money to have what I could already have cheaper with older technology?”
 - => group missions into families and implement commonality at mission family level
 - => have list of mandatory standards

- Industry resistance
 - Often monopolistic solutions are preferred to global ones
 - => Requesting agency must have a long-sited view

- National export regulation (e.g. ITAR)
 - Protection of technology ... but international standardisation is everyone's technology
 - => Standardisation organisations should provide not only documents, but also products (e.g. software libraries implementing standards)

Buy-in on Use of Standards and Overcome of Resistance And Skepticism

- Closer connection between standard and mission organisations
 - Standard needs should be driven by missions
 - Standard developers should also have mission responsibility (not just standardisation theoreticians)
 - More thrust in the standard fulfilling the mission needs
 - Leverage in adoption of new standards

- Concrete advantage for “first mission user”
 - Extra support (e.g. specialised manpower, financial)

- Widen potential user community
 - Listen to their needs and criticisms
 - Support by mother standardisation organisation
 - Extensive communication and outreach

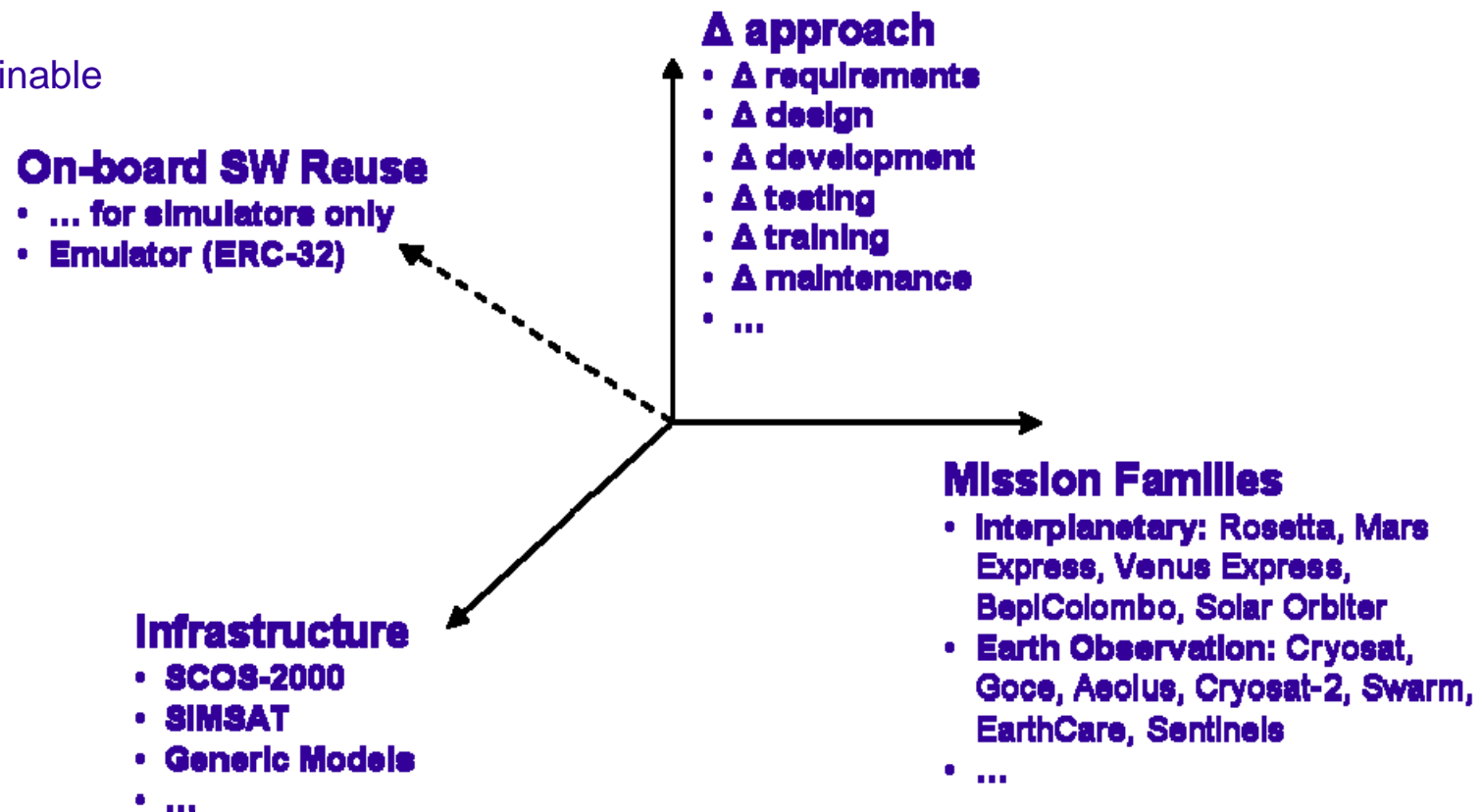


Commonality Planning

- Standards have to be designed with realism
 - Evolution not revolution
 - Backward compatibility
 - Re-use of legacy systems
- Technology independent standards (e.g. SM&C) allows the bridging of different technologies and protection of investment
 - For example, Service Oriented Architecture (SOA)
- However, if possible, better plan in advance the reuse (standard, software from other missions)

Different Systems Engineering Processes for Reuse?

- Yes, of course!
 - Delta approach
 - New software must be written for reuse
 - Documented
 - Tested
 - maintainable



Costs and schedules

- Cost and schedule estimations is still an “art”
 - Mostly based on previous experience
- Commonality and reuse offer most accurate environment for best estimates
 - Statistics on reused items must be collected maintained
 - Time/cost of configuration
 - Time/cost of regression testing and integration

Useful Management Best Practices

- Define and maintain list of mandatory standards to be used by missions
 - Waiver process to justify non compliance

- Keep control of your own re-usable infrastructure
 - Own it (Intellectual Property Rights)
 - Maintain it (... but limit upgrade frequency)
 - Impose infrastructure and standard in invitation to tenders
 - Result also in comparable offers

- Reduce proliferation of different systems
 - ESA strategy: to move to PC/Linux and multi-mission systems

- Keep high level of competition across vendors
 - Minimise use of vendor-specific solutions
 - Favour build up of infrastructure to be shared by missions

Questions?