Specification of Generic Software Requirements for Operational Simulators, The First Step towards the Simulation Reference Architecture

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Big picture of Simulator projects

In maintenance:	Under development:	Coming soon:
• Envisat	• GOCE	• SWARM
• ERS-2	• HP (2 S/C)	• GAIA
• Cluster II	• Cryosat-II	• Sentinel-1 (2 S/C)
• Integral	• Aeolus	• Sentinel-2 (2 S/C)
• XMM	• Lisa Pathfinder	• Sentinel-3 (2 S/C)
• MSG		• EarthCare
• Rosetta		• Bepi Colombo
• Mars Express		• ExoMars
• Venus Express		• Seosat

Why a Generic Sim SRS?

Current situation:

- Several projects running in parallel.
- Mission SRS developed by different teams for each mission.

Goals of the Generic Sim SRS:

- Capture common features.
- Avoid unnecessary divergence between missions.
  - Harmonization of user commands, log messages etc...
- Common place to implement Lessons Learned.
- Increase the reuse and quality of software between simulators.
- Reducing the effort for creating a mission specific SRS.
- Help to identify improvements to infrastructure components.

Content of Generic SRS.

- General high-level requirements and modelling principles.

The Power subsystem shall be modelled.
The separation switches shall be modelled.

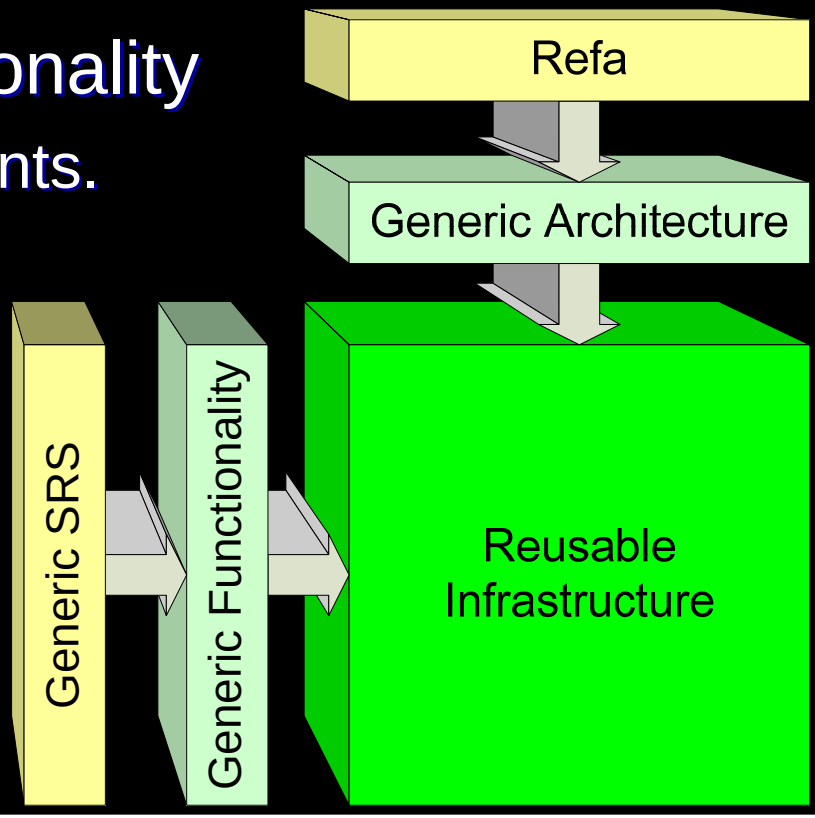
- Some detailed requirements:

It shall be a user command to trigger the separation.

- Covers all S/C subsystems (ie. commonly standard functionalities)
- Simulator elements not S/C related:
  - Configuration.
  - S/C Database handling.
  - Ground Station handling.
  - Requirement related to the ESOC/ESA environment.

Different aspects

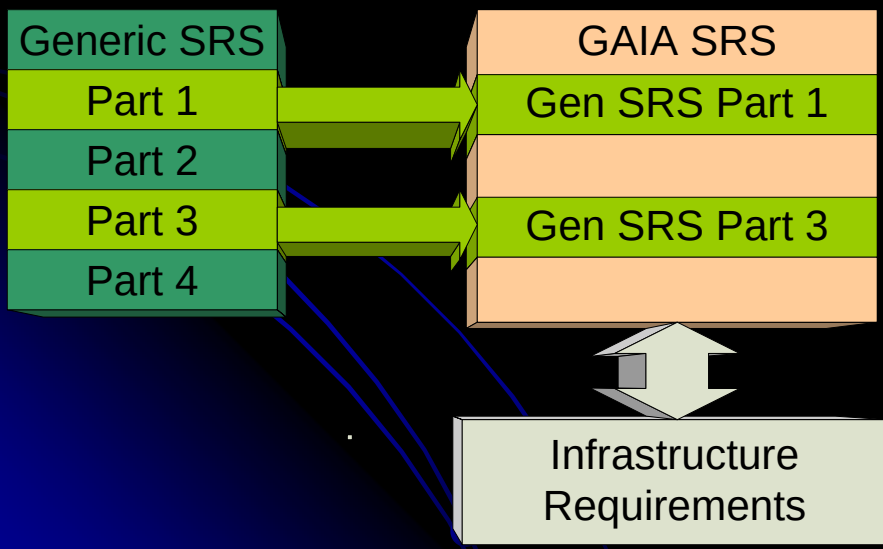
- REFA: Generic Architecture
  - Stable reusable architecture.
- GenSRS: Generic Functionality
  - Stable reusable requirements.
- REFA+GenSRS:
  - Environment for creating reusable components.



How to use?

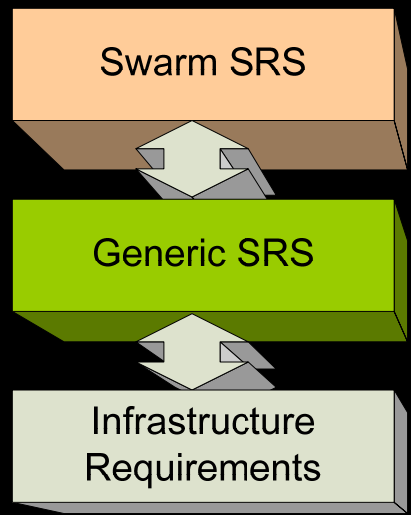
Link Approach:

- Embedded into the mission SRS.
- Easy to read.
- Easy to avoid unneeded parts of the GenSRS.



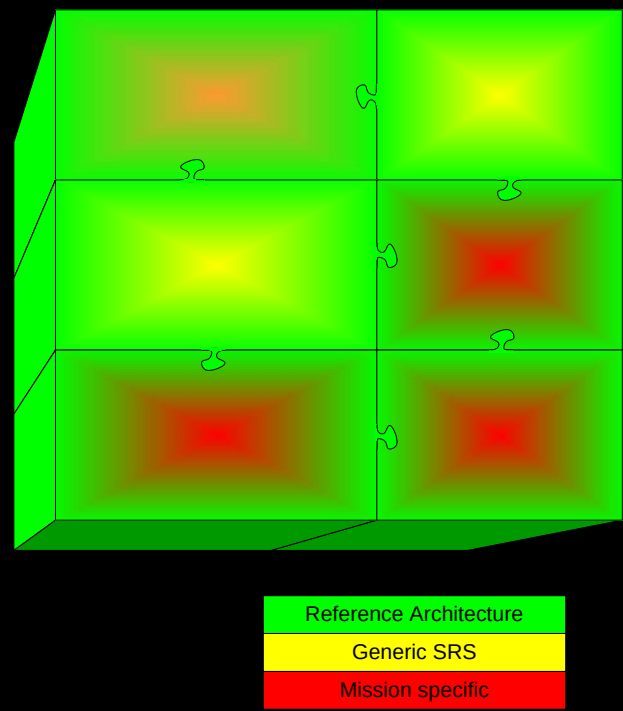
Layer approach:

- Documents in 3 layers.
- High transparency.
- Mission SRS easy to maintain and produce.
- Smaller mission SRS.



Building a Sim like a puzzle

- Goal: Enable exchange of models between projects.
- Key to success is documentation:
  - Need to include also the requirement engineering phase.
  - Encourage reuse from the requirements.



Summary of state today

- A Generic Sim SRS has been developed.
- Used by GAIA and SWARM.
  - Continuous improvement process already started.
- Significantly reduced:
  - The size of mission SRS
  - The effort of writing a mission specific SRS.
- Significant input to the REFA project.
  - Several Generic reusable parts already identified.
- Work in progress on the Generic SRS and REFA SRS:
  - Removal of duplications/inconsistencies between the two SRSes.
  - SRSes will be merged once REFA project is finished.

The future…

- Reference Architecture will be mandated for future projects.
  - Ease flow of models between projects.
  - Shorter and less risky development cycle.
- Drive reuse already from the Requirement engineering phase.
- Increased synergy between projects.
  - Between teams, work environment and project familiarization.