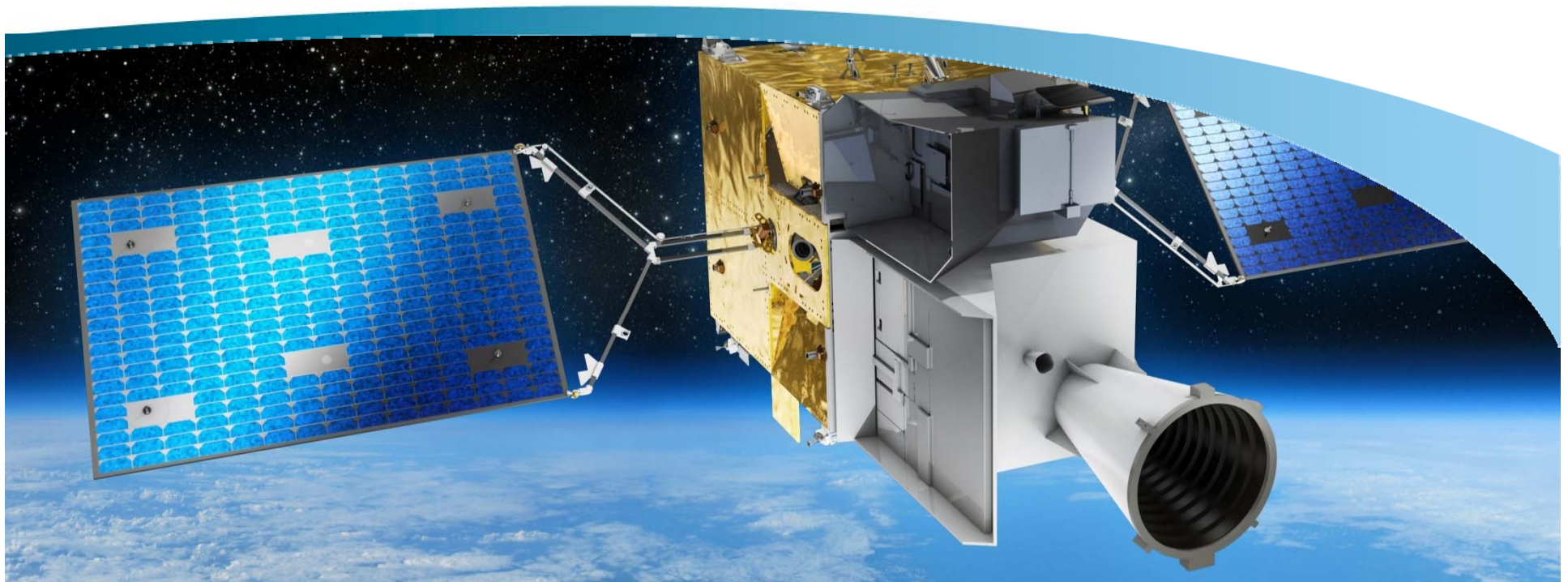


OHB System AG
Andreas Weihusen
28.03.2017, SESP 2017



SPACE SYSTEMS

Efficient Development of Software-based Simulators by Re-use of Generic Components

We. Create. Space.

Agenda

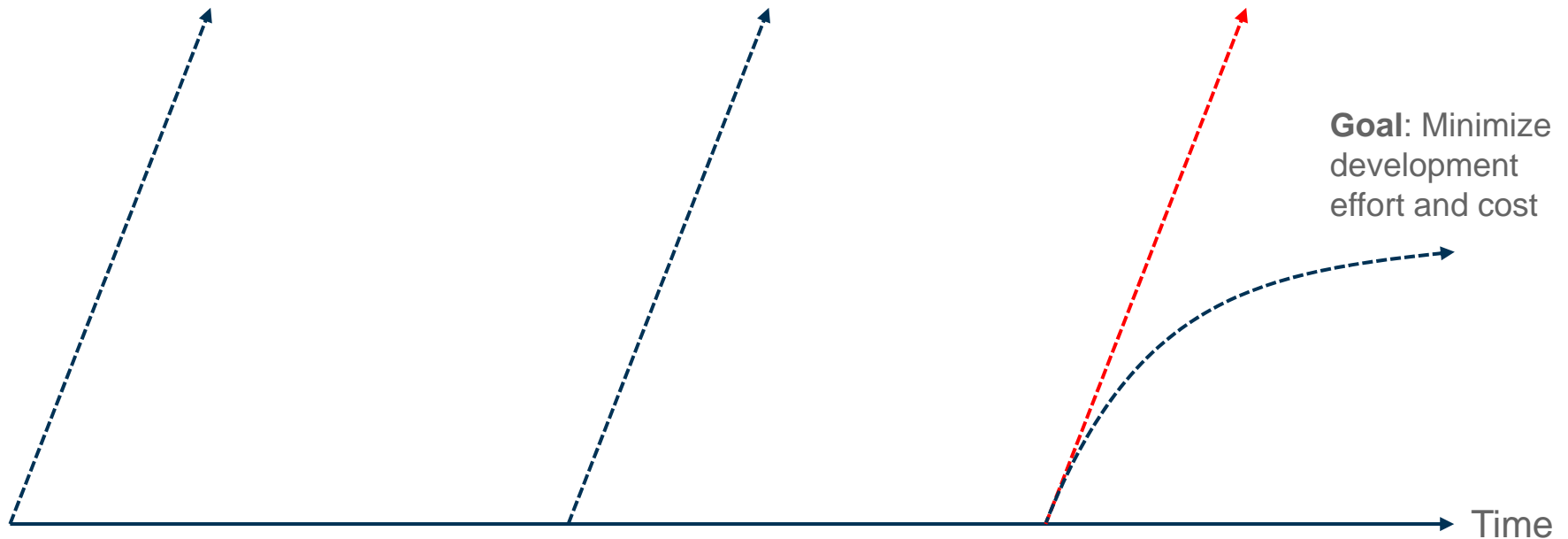
- Objectives
- Re-use
- Base Simulator Components
- Requirements
- Configuration Control and Build Process
- Conclusion and Outlook

Increasing role of S/C simulations:
- Various different use cases
- Variety of Simulator Facilities

Increasing functionality and complexity of S/C systems and corresponding simulators

Development time,
cost and risk?

Goal: Minimize
development
effort and cost

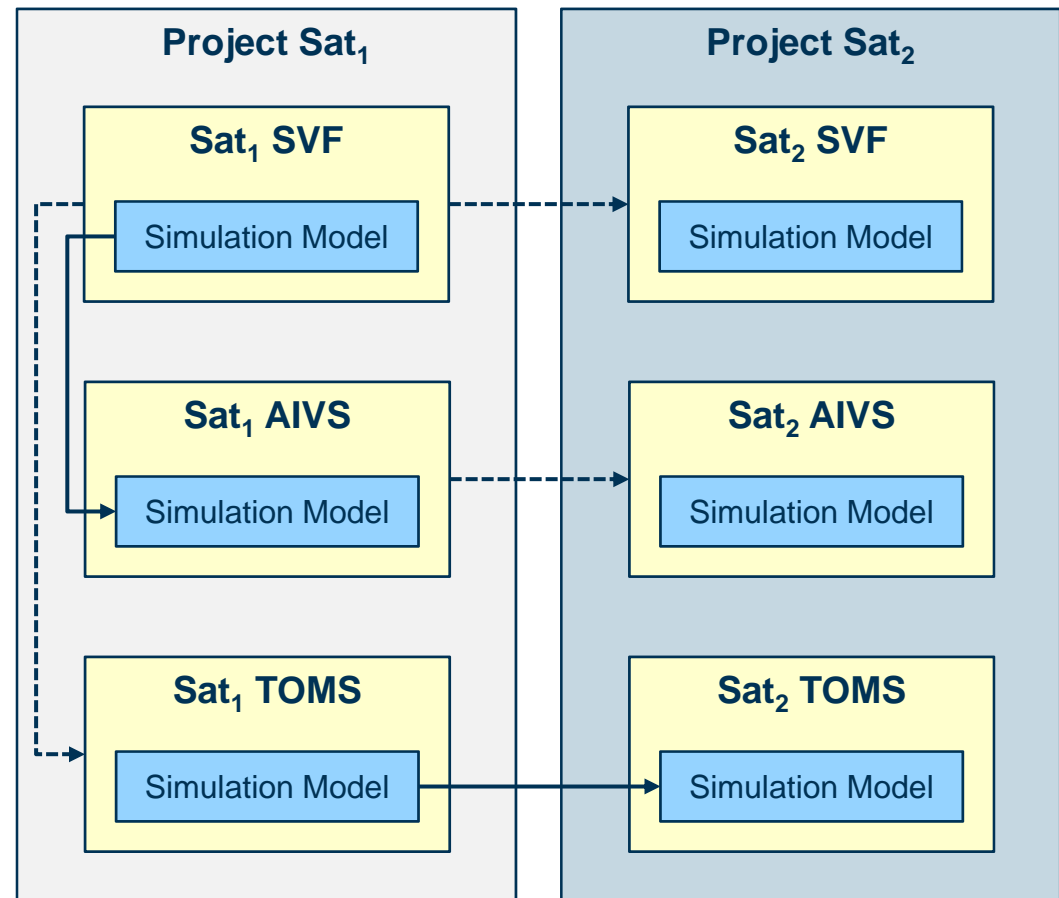


Approach

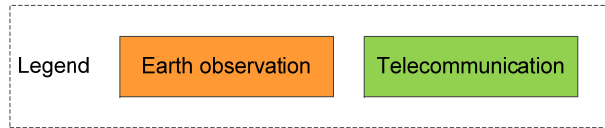
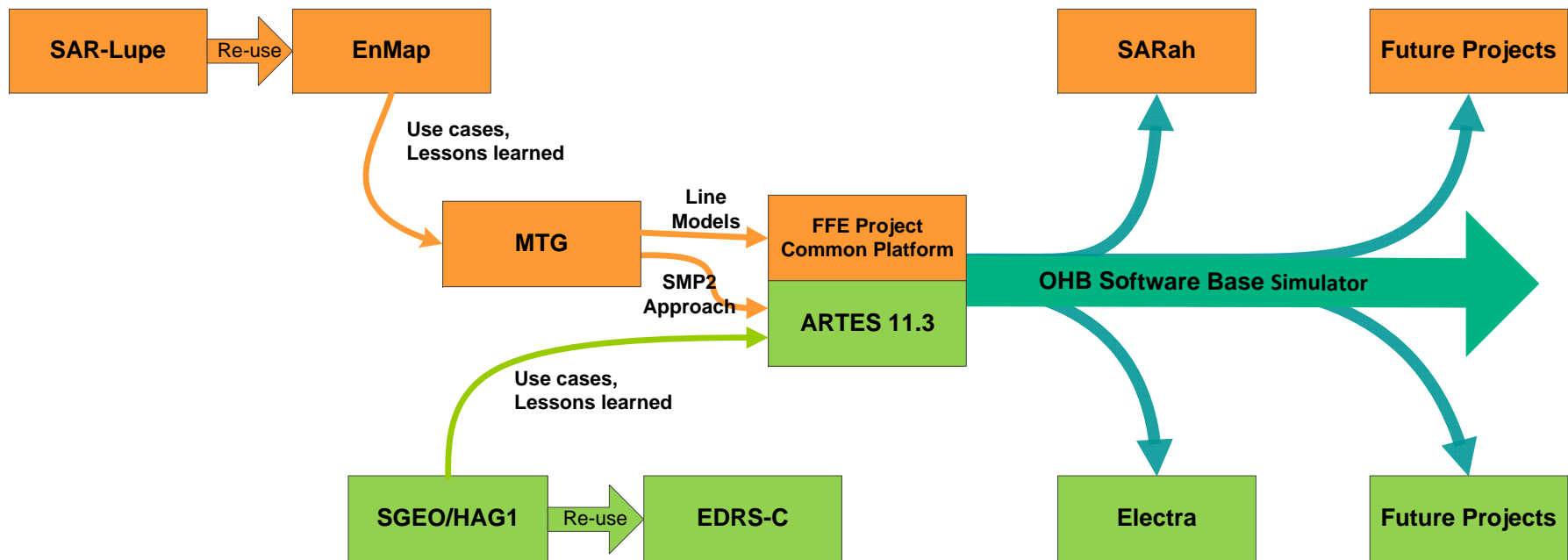
- Re-use of qualified simulator software components
- Usage of development standards → SMP2

Re-use cases

- Common case: re-use of the simulation models in different simulator facilities of one project
- Advanced case: re-use of a simulator facility in a project (with adaptations)
- Best case: re-use of simulator items between different projects (with adaptations)



OH B's simulator experience



OHB's "Software Base Simulator" denotes a collection of re-usable software components:

- Project-independent functionality
- SMP2-compliant
- Qualified within the projects, in which they have been applied first

Rufos

Runtime for simulations:

- hosts simulation models
- provides all necessary SMP2 services
- User Interfaces:
 - Scripting
 - MMI
- Compiled on Cent OS 7 and QNX

Platform Models

Generic functionalities that recur within different simulator facilities:

- GenericModel
- Line Models:
 - MilBus
 - SpW
 - CAN
 - discrete signal lines
- M&C Interface
- Calibration Service
- Debug Interface

Common Models

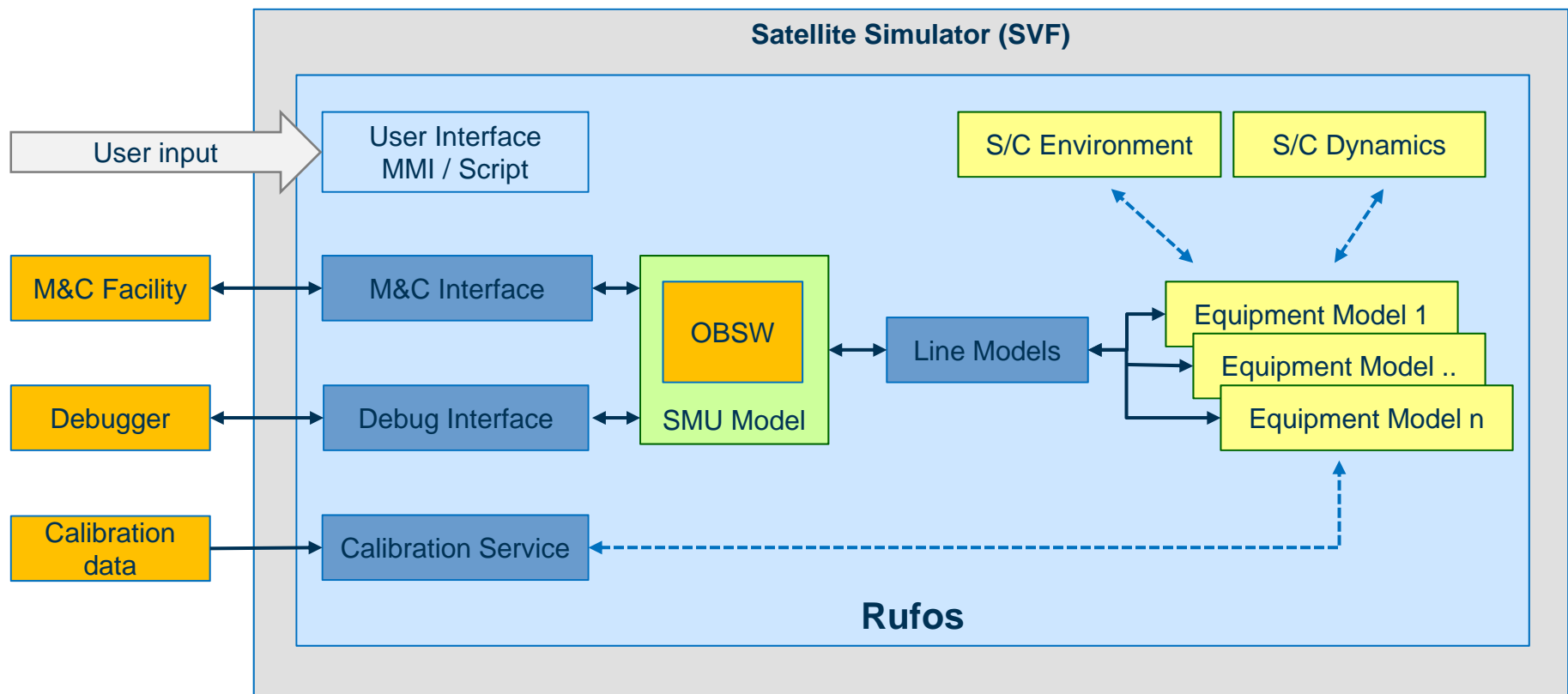
Models of standardized S/C hardware used in various missions

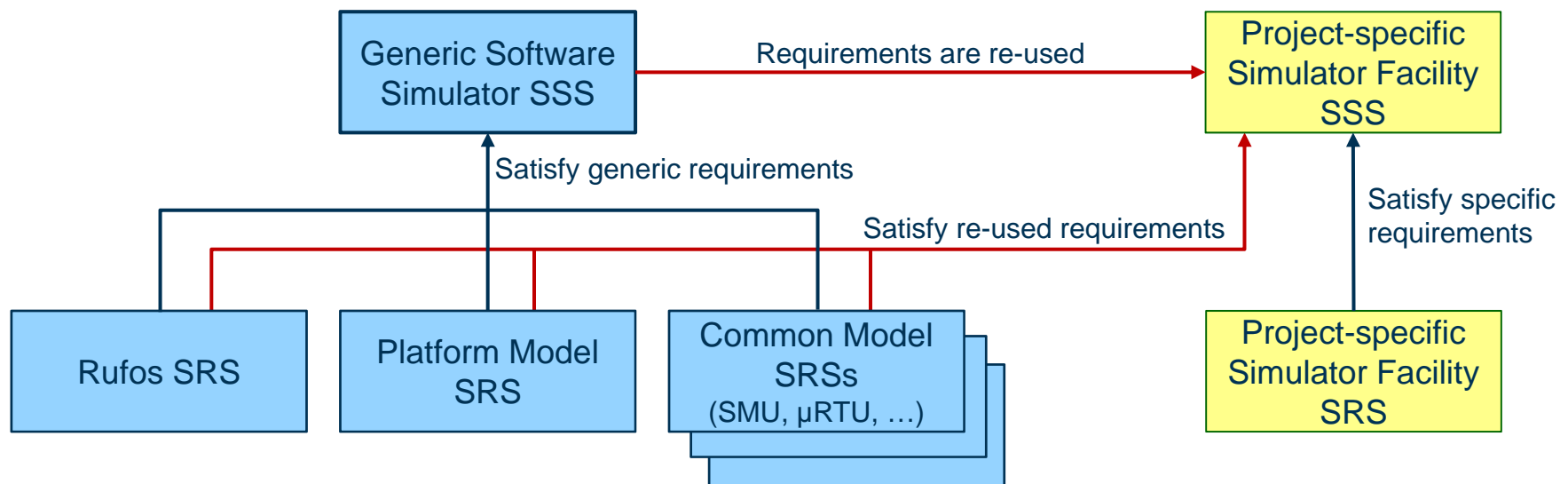
SMU / OBC

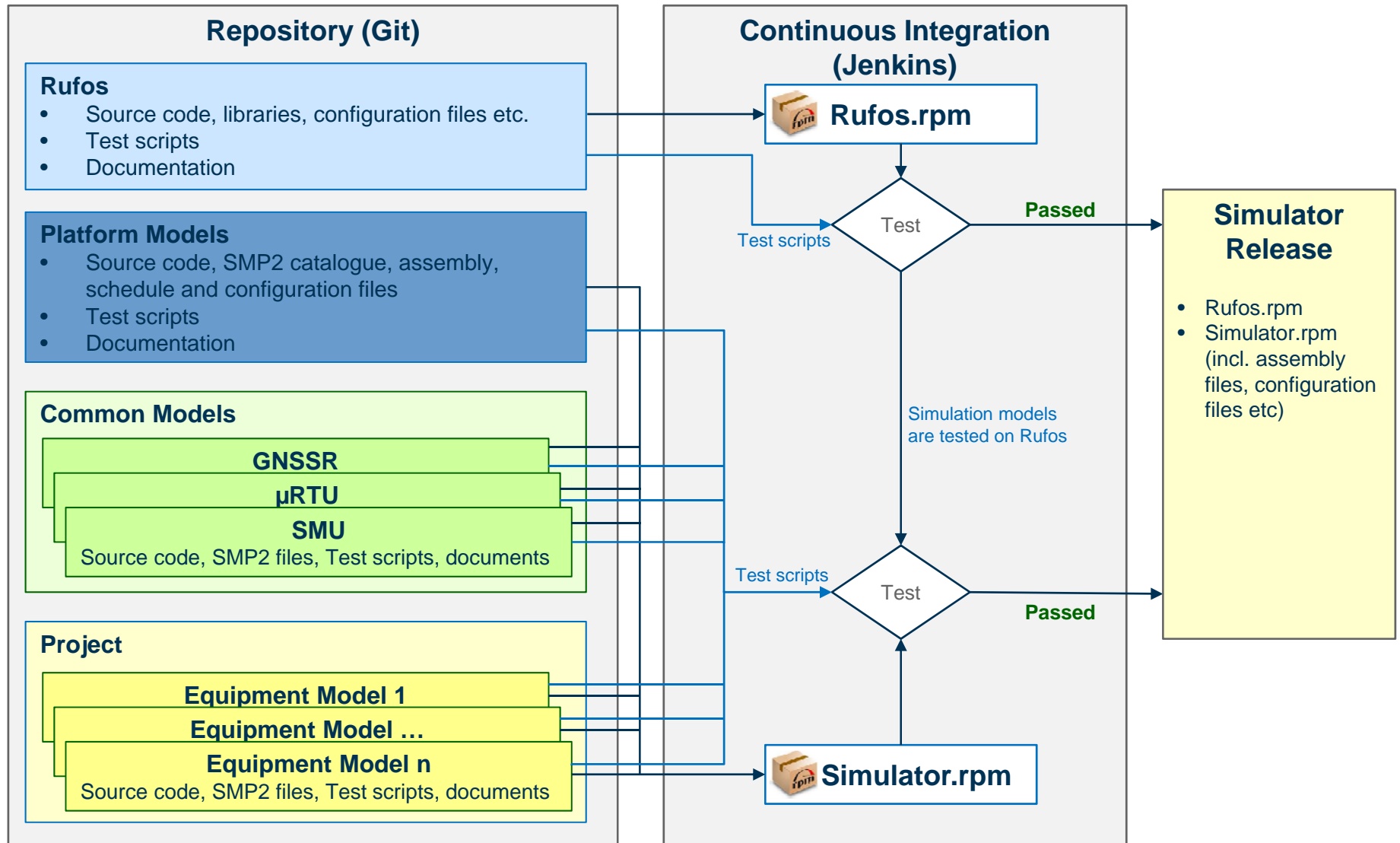
μRTU

GNSSR

Generic Simulator Architecture







Current Status

- The Software Base Simulator is already used in the following simulator facilities:
 - SARah SVF*
 - SARah AIVS*
 - Electra SVF*
 - E-Sail SVF (LuxSpace)

* *First simulator versions with partial functionality*

Conclusion

- Accelerated development life cycles: Quick availability of simulators allows starting related activities already early within the projects (OBSW development, AIV).
- SMP2 standard allows integrating simulation models from suppliers as well as the re-use of existing models from previous projects.
- Re-use reduces the effort for validation, documentation and configuration management.
- The efficiency of the simulator development at OH B could be increased remarkably.

Outlook / Next Steps

- Creation of an executable Software Base Simulator, incorporating
 - a minimum simulator configuration
 - a generic OBSW
- Provision of Software Base Simulator components to other members of the OH B group.
 - This topic is currently analysed.

Thank you.