



High-Fidelity Simulation Services

Explore our dedicated simulation services.

- ✓ Extensive Heritage & Expertise
- ✓ Cross-Domain Capabilities
- ✓ Deep Adaptability & Compliance

Operational Simulators (OPSIM)

Providing realistic spacecraft and ground segment behavior, including telemetry, telecommand, and onboard procedures.

Software Validation Facilities (SVF)

Enabling OBSW verification through debugging, fault injection, and FDIR testing in controlled environments.

End-to-End Mission Simulation

Full mission flow from scene generation to L1/L2 data product validation with focus on Earth Observation (SAR/optical) and optical communications (laser payloads).

Multi-domain simulation support

Design and develop multiple simulation environments in a single context. MBSE-driven Integration, Co-simulation and digital twin.

Hardware in-the-Loop Environments

The Complete chain, enabling the transition from pure simulation to system-level validation with real hardware under controlled, representative conditions.

Scalable and reusable architectures

Direct knowledge of internal mechanisms with ESA's SIMULUS ecosystem allowing for efficient extension or tailoring of simulator capabilities when required.



Key Project Heritage & Emtech Roles

- **RCCSIM** | Advanced, reusable operational simulators | **Sub-contractor**
- **SPACE RIDER** | Operational Simulator and Mass Memory Unit | **Sub-contractor**
- **HSD** | Complete Mission Management including Product selection, AIT/AIV Simulation and Mission Control | **Prime contractor**
- **SIMROB** | Simulation of Human – Robotic Simulations | **Sub-contractor**
- **ACOSIM** | Application of co-simulation to support test and operations | **Prime contractor**
- **SIMULUS-NG** | SIMSAT support for additional protocols & multi-threading | **Sub-contractor**
- **SimBridge** | Bridge various tools with SMP Compliant Environments | **Prime contractor**

Specifications*



Experience in SIMULUS infrastructure

- **SIMSAT** development environment optimization & extensions
- **SIMSAT's** Graphical User Interface and Script Engine (JavaScript, Groovy)
- **Configuration and utilization** of environmental simulation Generic Models (TNET, SIMPACK, SIMDYN, PEM, Godot, SENSE)
- **Configurations and Interfacing** between Spacecraft models and Ground System Models (Ground, SGM, MCS, NIS, Ground Stations)
- **Spacecraft Simulator Design** based on Reference Architecture (REFA & REFA-TA)



Architecture Design using UML Tools

- Design of spacecraft simulation models for different engineering phases (OpSim, SVF, FVB)
- UMF & EGOS-MF design platforms
- UML Design (MagicDraw)
- SMP2 / ECSS - SMP standard utilization & compliance



Development Languages & Environment

- C++ for model development
- ANSI C for On-Board software
- Java for User Interfaces
- JavaScript for OpSim utilization
- Eclipse platform
- Make, AutoMake, CMake systems
- Continuous integration with Jenkins CI
- Git for version control
- Sonar-Qube for code analysis

High-Assurance Software and Modeling Standards

ECSS-E-ST-40C

Space Engineering - Software

ECSS-Q-ST-80C

Software Product Assurance

ECSS-E-TM / ST -40-07

SMP2 Simulation Modelling Platform

ECSS-E-TM-10-21A

System modelling & simulation

MISRA and BSSC

C/C++, Java, XML coding

Proven Capability

Technical Depth

Native SIMULUS/SMP2 mastery, extending and adapting mission environments with seamless, non-breaking compliance.

Standards & Compliance

Full ECSS compliance and native compatibility with the ESA SIMULUS ecosystem.

Extensive Expertise

Proven partner for Institutional missions and cutting edge studies, delivering high-quality projects within ESOC and ESTEC.

*Contents are subject to change without prior notice.

