

scisys

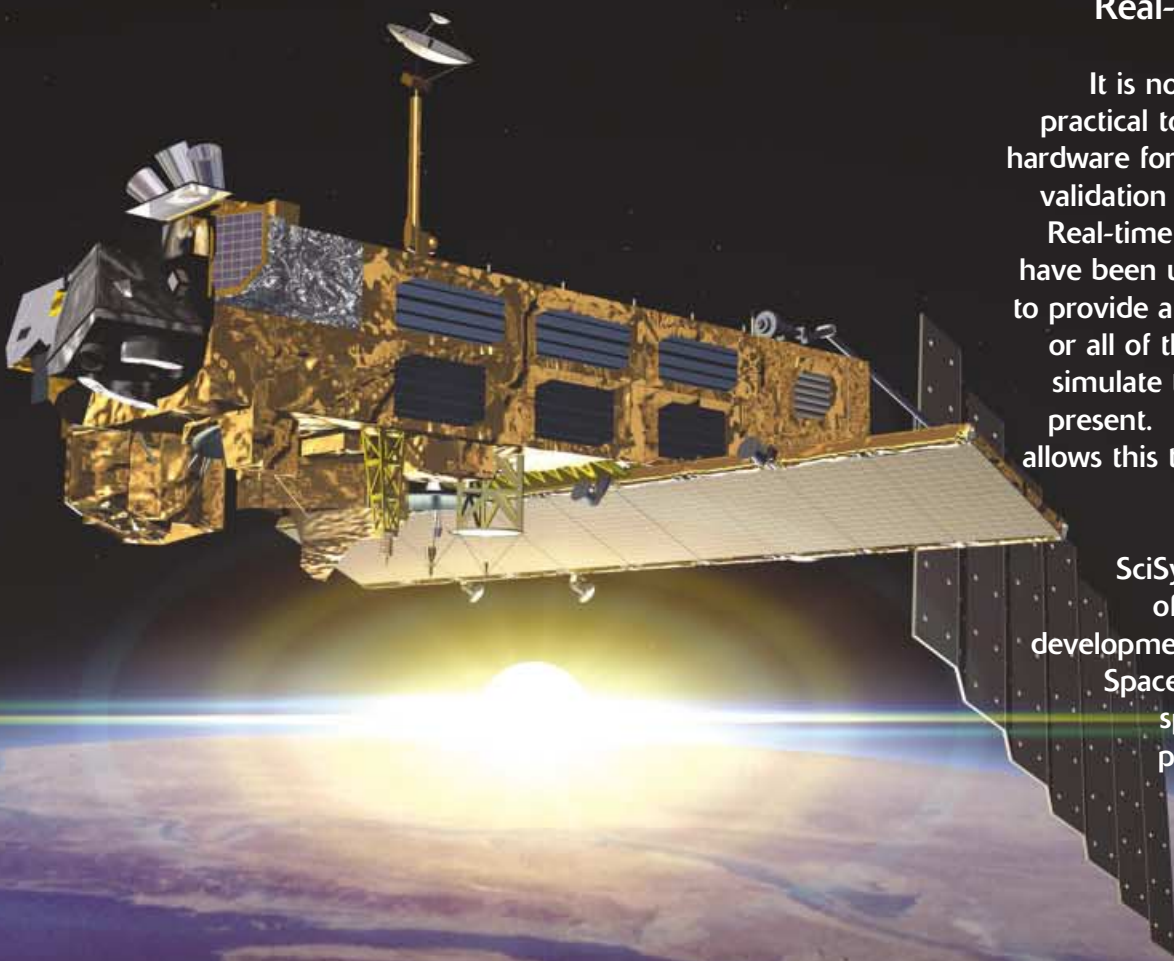
Simulation and Modelling

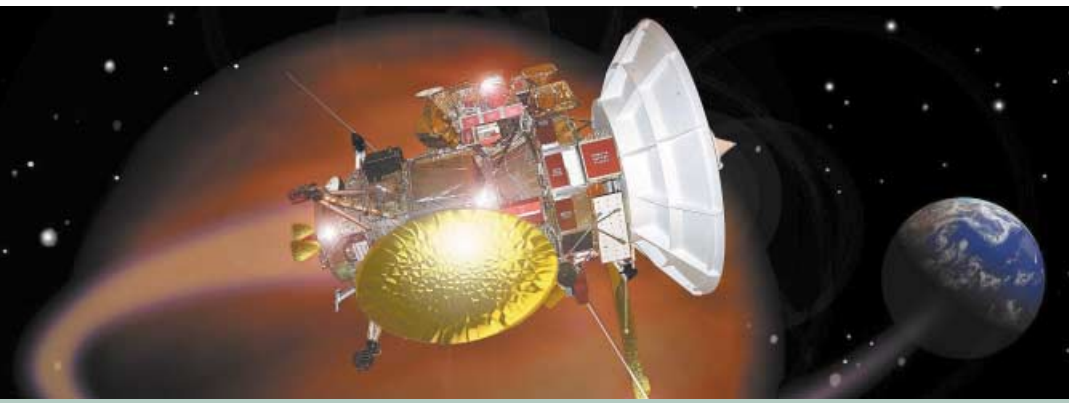
Real-Time Simulators

It is not always possible or practical to use real spacecraft hardware for training, procedure validation or testing purposes.

Real-time software simulators have been used for many years to provide a substitute for some or all of the hardware, and to simulate the real hardware, if present. Today's technology allows this to be done on a low cost PC platform.

SciSys is at the forefront of real-time simulator development for the European Space Agency to support spacecraft operations preparation activities.





Simulation and Modelling

Operational Simulators

High-fidelity spacecraft operational simulators are used to: train the spacecraft operations team prior to any mission; validate operational procedures; validate onboard software patches; and to test the mission control system and network interfaces.

SciSys has developed simulators for some of the largest and most complex spacecraft ever flown – including ENVISAT; and for medium sized spacecraft such as the INTEGRAL gamma ray telescope. We are currently developing the Galileo System Test Bed V2 simulator for Galileo Industries and the GOCE Simulator for the European Space Operations Centre in Germany.

The simulators use software emulation technology to allow the real flight software image to be run within the simulator.

Test Tools

Simulators are powerful test tools that provide a realistic data source and sink for testing ground networks, mission control systems and the spacecraft hardware itself.



Image courtesy of ESA

SciSys has developed the Mission Control System Test and Validation Tool (MCSTVT) that can ingest a spacecraft database (e.g. SCOS-2000) and be used to generate a CCSDS telemetry stream (at packet or frame level) containing representative data or test data.

SciSys is a leading member of a multi-national team developing the Galileo System Simulation Facility (GSSF). GSSF simulates the complete Galileo navigation satellite system including the space and ground segments, users and the signal propagation environment. It supports Service Volume and Real-Time End-To-End simulation to allow users to evaluate the overall Galileo system performance and behaviour, and generate RINEX data that can be used to test various parts of the Galileo system.

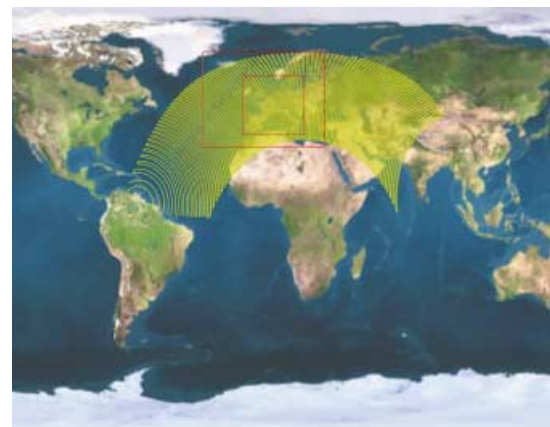
Modelling and Visualisation

Modelling is used extensively to support space system definition and design activities. As one of the leading developers of embedded onboard software in Europe, SciSys offers a unique capability to use modelling to support the software development process from inception to implementation. Models developed during the design phase are used to automatically generate code to run on the onboard computer, reducing cost and risk in the onboard software development.

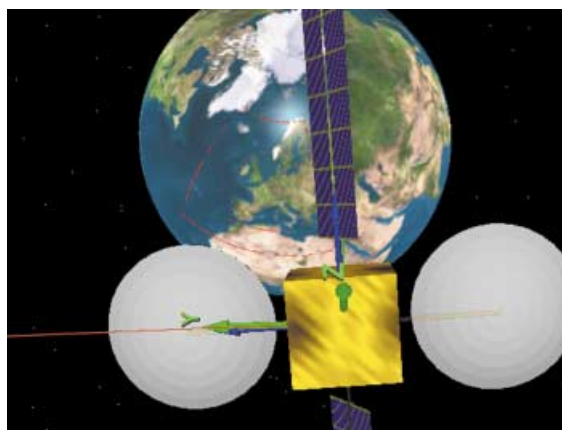
SciSys has modelled:

- n The Bepi-Colombo lander in the Mercury Environment
- n Interferometer Constellation Mission Deployment and Control
- n Elliptical Medium Earth Orbiting spacecraft
- n Distributed Aperture Technologies using formation flying
- n The Mars Ascent Vehicle.

Visualisation is a powerful complement to simulators and models, allowing their outputs to be visualised and easily understood by specialists and non-specialists alike. SciSys uses its ViSat simulation engine to visualise mission simulations. It is readily adaptable for each mission and has been used for SMART-2 and DARWIN.



The above image shows a satellite instrument ground trace, using the EMEO simulator output, in real time.



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