

SPACE SYSTEMS SYMPOSIUM (D1)  
Space Systems Architectures (4)

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CONCEPT OF A GENERIC SPACECRAFT SYSTEM TEST ENVIRONMENT FOR ADVANCED  
SPACECRAFT SYSTEMS

**Abstract**

Advanced spacecraft systems show increasing requirements concerning time critical operations, high reliability, hard real-time and determinism. Typical missions with highest requirements in these fields are On-Orbit Servicing (OOS) and Space Robotic applications. As the real-time behavior often strongly depends on the whole spacecraft system and data handling architecture, the Institute of Astronautics (LRT) at Technische Universität München (TUM) is in process of developing a Generic Spacecraft System test stand for rapid system tests and as test environment for advanced space architectures and redundancy concepts.

In difference to classical electrical ground support environments, the Generic Spacecraft System test stand will not only provide support for one clearly specified spacecraft system, but will provide generic subsystem testbeds. Thereby it will act as platform for spacecraft architecture research and allow a rapid deployment and test of different spacecraft architecture concepts. This approach allows measurements and the performance of system level tests of spacecraft architectures in a very early development phase to acquire profound data and to verify software models and simulation results.

The test stand will enclose a Spacewire test environment and interfaces for Hardware-in-the-Loop (HIL) and environmental simulations. It will also offer up- and downlink capabilities to a geostationary relay satellite for the evaluation of roundtrip time and other communication effects on the tested system under realistic conditions. This paper describes the conception, set-up and science potentials of the Generic Spacecraft System test environment.