SUPER – Stuttgart University Program for Experiencing Research
Project Information

Institute’s Information

Name of Institute: Institute of Space Systems
Contact Person: Kai Leidig
Phone: +49 (0) 711 / 685 65862
E-mail: leidig@irs.uni-stuttgart.de

Duration of Project/Number of Students
June/July
June/July/August: x
Number of Students: 1

Name of Project: Software for Initialization of a Satellite System Simulator

Beneficial Skills & Knowledge: advanced programming skills (C++/Qt, java), experience with MySQL
very good abstract thinking, profound knowledge about satellite systems

Description of Work

Background

For more than two years, the Institute of Space System successfully operates its first satellite Flying Laptop. Benefitting from the gained experience, follow-up missions are now on the horizon. A major aspect that is supposed to be transferred into a new mission is the operations concept. In train of this, the Flying Laptop Mission Operations System is now converted into a system capable of multi-mission operations.

A mission operations system generally consists of these major elements:

- a real-time telemetry and tele-commanding software
- a mission planning tool
- a flight dynamics tool
- several databases (e.g. for telemetry)
- network and routing tools
- the antenna system
In the scope of its new mission endeavours the Institute of Space System is currently reworking all of these elements and combining them into one closed multi-mission operations system.

**This Work Scope**

For verification of the new developed multi-mission operations system, the Institute of Space System utilizes a spacecraft simulator which can be connected to the system and then be operated as a real satellite. This is a powerful means of testing the operations system, as it supports e.g. the training of staff or the testing of satellite procedures.

The spacecraft simulator itself consists of several models, simulating the spacecraft behaviour in space. This covers the simulation of technical devices, such as computers, sensors, or actuators, and also the simulation of physical phenomena like the orbital dynamics. Over the past years such a simulator has been developed and verified. Now, in the scope of this work, a software which allows a simulation engineer to configure the satellite simulation shall be written. Thus, it shall be easily possible to set-up scenarios in the satellite simulator, which are specifically tailored to a certain testing procedure.

The software shall feature the following elements.

- MySQL backend to the simulator model databases
- User interface for
  - Model selection
  - Model initialization (scenario generation)