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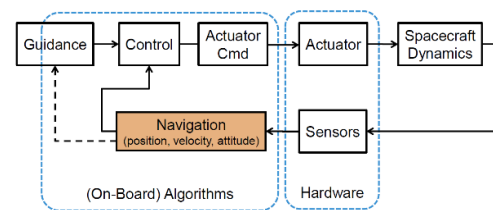
Entwicklung und Implementierung eines Lagereglers für die EIVE On-Board Software

Development and Implementation of an Attitude Controller for the EIVE On-Board Software

Motivation:

The Institute of Space System (IRS) is currently working on the small satellite project EIVE in cooperation with scientific and industrial partners. The 6-unit nanosatellite aims to demonstrate E-band communication technology in orbit. Equivalent to the structure of other satellite projects, the EIVE project is structured into several subsystems. One of these subsystems is the attitude control (ACS) subsystem, which ensures the correct orientation of the satellite during all mission phases. The central part of the ACS system is a control loop which consists of different sensors like sun sensors or magnetometers, actuators like reaction wheels and magnetorquers, and the attitude controller running on the on-board computer of the satellite.

This controller calculates the necessary actuator output based on the current orientation of the satellite and the desired attitude. This controller usually also has different modes like a Safe Mode or Target Pointing mode which are based on other control loops and try to achieve different pointing. The primary goal of this work is to develop and implement the attitude controller in the On-Board Software (C++) based on existing MATLAB code and the current ACS implementations running the satellite mission Flying Laptop (FLP). The work is completed with a presentation and documentation of the work.



Task:

- Basic familiarization of the MATLAB ACS code. The C++ code will be based on the MATLAB code
- Familiarization with the development environment for the EIVE On-Board Software
- Analysis of the existing ACS implementation on the satellite mission Flying Laptop and existing MATLAB control loops.
- Implementation and testing of the attitude controller
- Documentation of the work

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Starting date: As soon as possible
Submission until: [Click for date](#)

Acknowledgement of receipt:

I hereby confirm that I read and understood the task of the bachelor thesis, the juridical regulations as well as the study- and exam regulations.

Prof. Dr.-Ing. Sabine Klinkner
(Responsible Professor)

Signature of the student

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