



Bachelor-, Master- und Doktorandenseminar  
des Instituts für Informatik

## Modeling and Simulation Based Development of Autonomy Features for Drone

Shihui Chen, TU Clausthal

In the last decade, more and more aerial robotics researchers show interests in developing autonomy features for drones to solve problems in different areas. But the development of autonomy features is complex and labor intensive. Accordingly, model-based design and simulation-based verification is becoming an industry standard in development of autonomous airborne systems. This we call modeling and simulation based development. However, commercial model-based design and simulation tools and supporting testing environments require a considerable investment. In order to provide a more economic and accessible environment, this paper investigates an open source pipeline for modeling and simulation based development of autonomy features for drones using open source software and hardware stack. In this context, a generic drone architecture is being designed based on open source hardware platforms, namely CC3D and Raspberry Pi. In software stack, LibrePilot, an open source software suite to control multicopters is extended to support the designed architecture. The design of the autonomy features are developed using the open source model-based design in Scilab/Xcos. Accordingly, Xcos Re-useable and Customizable Code Generator is utilized for automatic code generation. The software stack will also include a generic plant model. The workflow starts from autonomy feature modeling, Model-in-the-Loop (MiL) testing, Software-in-the-Loop (SiL) testing, target deployment, Hardware-in-the-Loop (HiL) testing and flight testing. The approach is demonstrated with a case study about an autonomous landing system.

**Freitag, den 06.04.2018, 12:00 Uhr in Raum 106, Ifl  
(D 3), Julius-Albert-Str. 4.**