

Fachbereich Computerwissenschaften

EINLADUNG
zum Gastvortrag am

Dienstag, 28. Oktober 2008,
16:00 Uhr, T03
Institutsgebäude Jakob-Haringer-Str. 2, Itzling

von

Gabriel Hoffmann

Palo Alto Research Center (Intelligent Systems Lab)
Stanford University (Aeronautics and Astronautics Dept)

zum Thema:

**Automatic Control of a Multi-Agent
Quadrotor Helicopter Testbed**

Abstract:

This talk presents theoretical and flight experiment results for the Stanford Testbed of Autonomous Rotorcraft for Multi-Agent Control (STARMAC), a fleet of quadrotor helicopters. This system has been developed as a testbed for novel algorithms that enable autonomous operation of aerial vehicles, with the ability to accomplish abstract tasks without human intervention.

First, I will present the vehicle design and dynamics for the STARMAC II quadrotor helicopters that we developed. Then, I will present the hierarchical approach that we used to control the vehicles, composed of a vehicle control system and an autonomous guidance system. The vehicle control system provides the capability of accurately tracking input commands to control vehicle orientation and position. It has demonstrated accurate control of the aircraft both indoors in small areas, and outdoors at higher speeds with wind disturbances. The guidance system provides the capability of performing more advanced tasks by analyzing the current state of the system to generate input commands for the vehicle control system, specific to the type of task desired. I will present a technique for one such task, to perform automatic search and rescue using the fleet of quadrotor helicopters with avalanche rescue beacon sensors. The vehicles are tasked with acquiring as much information as possible about the location of a victim buried under snow in by an avalanche. The vehicles use particle filters and information theory to compute optimal flight trajectories to localize the rescue beacon.

Univ.-Prof. Dr. Christoph Kirsch (Host)