
EDUCATION


NASA Jet Propulsion Laboratory & Autonomous Systems Lab, ETH Zurich 05/2018
MSc Thesis: Disturbance Estimation and Rejection for High-Precision Multirotor Position Control. Supervision: Dr. Roland Brockers (JPL), Prof. Roland Siegwart (ASL ETH). - 12/2018

- Developed nonlinear Kalman filters to estimate external wrench and disturbance-aware PID and MPC controllers to improve multirotor position control accuracy in the presence of strong external disturbances by up to 80% compared to a baseline PID controller [3];
- Applied the controllers to enable precision landing despite severe wind and ground effect.



ETH Zurich 2012-2018
BSc & MSc Mech. Eng. Focus on control systems, system modeling, state estimation.

WORK EXPERIENCE


Autonomous Systems Lab, ETH Zurich 04/2019
 Research Assistant. - 07/2019

- Responsible for soft- and hardware integration, calibration and benchmarking of GPS and vision-based state estimation / navigation frameworks for fixed-wing UAVs;
- Developed a software tool that automates the benchmarking of visual-inertial odometry algorithms on given open-sourced datasets (Python, C++, ROS);
- Developed a full-stack web application that enables first responders to interface with a ROS-based search-and-rescue UAV from any OS and device (vue.js, node.js).



NASA Jet Propulsion Laboratory, California Institute of Technology 11/2017
 Visiting Researcher. Computer Vision Group. - 04/2018

- Responsible for development, integration and testing of a guidance, navigation and control framework for long-duration fully autonomous operation of a rotorcraft UAS (C++, ROS);
- Enabled the first autonomous outdoor flights by improving the robustness of the flight controllers and of the autonomy logic, resulting in up to 4-hour fully autonomous missions;
- Quantified performance of vision-based pose estimation of recharging platform.



Automatic Control Laboratory, ETH Zurich 02/2017
 Student Researcher. Supervision: Prof. Maryam Kamgarpour. - 07/2017

- Developed a novel stochastic motion planning algorithm to generate safety-optimal aircraft trajectories in the presence of hazardous thunderstorms (MATLAB) [2].

PROJECT EXPERIENCE


AMZ Racing, ETH Formula Student Electric Team 2015-16
 Team Leader.

- Led ETH's world-record-breaking Formula Student team in the development of a state-of-the-art electric racecar, competing in the world's largest engineering competition;
- Team won *Formula Student Austria* and 3 of 4 Engineering Design events against dozens of international teams; AMZ set WR for fastest-accelerating EV (0-100 km/h in 1.513 s).

Battery Engineer. 2014-15

- Responsible for packaging, structural design and thermal management of the high voltage accumulator, using CAD, FEA and CFD software tools;
- Team won 2 out of 4 competitions, becoming Formula Student Electric World Champions.

SKILLS

(*** proficient, ** intermediate, * basic knowledge)
 Languages: C/C++***, Python**, JavaScript**, MATLAB/Simulink***, Bash**.
 Frameworks: ROS***, Vue.js*, Express.js*.
 Libraries: STL***, Eigen**, OpenCV*.
 CAD/CAE: Siemens NX, Ansys, CD Adapco StarCCM+.
 Spoken languages: English, French, German (all high proficiency), Luxembourgish (native).

PUBLICATIONS

JOURNALS

1. D. Malyuta, C. Brommer, **D. Hentzen**, T. Stastny, R. Siegwart, and R. Brockers, “Long-Duration Fully Autonomous Operation of Rotorcraft UAS for Remote-Sensing Data Acquisition,” *Journal of Field Robotics*, 2019
2. **D. Hentzen**, M. Kamgarpour, M. Soler, and D. Gonzalez-Arribas, “On maximizing safety in stochastic aircraft trajectory planning with uncertain thunderstorm development”, *Aerospace Science and Technology*, vol. 79, pp. 543-553, 2018

CONFERENCE PROCEEDINGS

3. **D. Hentzen**, T. Stastny, R. Siegwart, R. Brockers, “Disturbance Estimation and Rejection for High-Precision Multirotor Position Control,” in *IEEE Intelligent Robots and Systems (IROS)*, Macao, China, 2019
4. C. Brommer, D. Malyuta, **D. Hentzen**, and R. Brockers, “Long-Duration Autonomy for Small Rotorcraft UAS including Recharging,” in *IEEE Intelligent Robots and Systems (IROS)*, Madrid, Spain, 2018
5. D. Gonzalez-Arribas, **D. Hentzen**, M. Sanjurjo-Rivo, M. Kamgarpour, and M. Soler, “Optimal Aircraft Trajectory Planning in the Presence of Stochastic Convective Weather Cells,” in *17th AIAA Aviation Technology, Integration, and Operations Conference*, Denver, CO, 2017