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Daniel Hentzen

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⌂ Website

EDUCATION

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

- Developed state estimation and model predictive control algorithms to improve multirotor control accuracy in the presence of strong external disturbances by up to 80% [3];

ETH Zurich — 2012-2018
BSc & MSc Mech. Eng. Focus on control systems, motion planning, state estimation.

WORK EXPERIENCE

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

- Improved accuracy and efficiency of evaluating visual-inertial odometry state estimation algorithms by developing an automated benchmarking pipeline and by integrating RTK-GPS state estimation to collect precise ground truth measurements (C++, Python, ROS);
- Enabled Swiss air rescue personnel to monitor live outputs of a deep-learning human detection pipeline running onboard a search-and-rescue UAV by developing a full-stack web UI (front end using vue.js, back end using express/node.js);
- Removed the need for time-intensive in-house labeling of large datasets by developing a crowd-sourced labeling tool using *AWS* APIs (Python).

NASA Jet Propulsion Laboratory, California Institute of Technology — 11/2017 - 04/2018
Visiting Researcher. Mobility and Robotic Systems, Computer Vision (347H).

- Developed and tested guidance, control and autonomy software for long-duration, fully autonomous operation of rotorcraft UAVs (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 - 07/2017
Student Researcher. Supervision: Prof. Maryam Kamgarpour.

- 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 achieved 3 Engineering Design wins in 4 major European competitions; AMZ set WR for fastest-accelerating EV.

Battery Engineer. — 2014-15

- Responsible for packaging, structural analysis 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+.
Natural 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