Andrew **Torgesen**

Roboticist · Mechanical Engineer · Computer Scientist

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Education

Massachusetts Institute of Technology
Cambridge, MA

M.S. in Aeronautics and Astronautics, Autonomy Emphasis — *September 2019 - Present*

- Research assistant in the Aerospace Controls Lab.

Brigham Young University
Provo, UT

B.S. in Mechanical Engineering — *September 2012 - April 2019*

- Graduated with *Magna Cum Laude* honors.
- Computer Science and Mathematics Minors.

Work Experience

Raytheon
Tucson, AZ

Guidance, Navigation, and Control Engineer — *May 2019 - August 2019*

- Implemented and integrated a new gun drive system model into an autonomous track-and-fire defense simulation written in Ada and C.
- Conducted two in-depth trade studies evaluating the effectiveness of the gun drive compared to a baseline, automating several testing procedures in the process for increased efficiency.
- Used debugging skills and engineering analysis of simulation results to pinpoint several disparities between the track-and-fire simulation and the physical system.

Magicc Lab
Provo, UT

Research Assistant — *April 2017 - April 2019*

- Designed and implemented a factor graph back-end optimizer that calculates the 6-DOF offsets between a camera sensor and an IMU.
- Created a high-fidelity dynamic simulation of an autonomous multirotor in C++ for flying waypoints, taking inertial and visual measurements, and landing on a boat.
- Worked with hardware on a multirotor for field testing of a camera offset optimization routine.
- Modified an Extended Kalman Filter landmark and target estimation model for a ground-based robot to apply it to an air-based platform.

Air Force Research Laboratories
Albuquerque, NM

Robotics Developer — *May 2018 - August 2018*

- Designed and implemented a well-documented real-time simulation of a 7-DOF robot arm to match the behavior of a real robotic arm.
- Researched and implemented an inverse kinematic path planner for the control of a robotic arm.
- Designed and implemented an estimation scheme using an Extended Kalman Filter to visually measure the locations of objects without a motion capture system.

Project Experience

Autonomous UAV Team
Provo, UT

Brigham Young University — *September 2018 - June 2019*

- Captain of team of 12 undergraduate seniors in Mechanical, Electrical, and Computer Engineering for the international AUVSI-SUAS competition.
- Used agile project management tools to coordinate and evaluate efforts of controls, computer vision, unmanned ground vehicle, and airframe sub-teams.
- Designed and built fully-functional ground station GUI for interfacing with an autonomous UAV.
- Led flight testing and tuning of lateral and longitudinal autopilot.
- Implemented algorithms to augment UAV path following and state estimation capabilities.
- Devised and created integrated and systematic documentation system built on LaTeX which all team members used.

Skills & Coursework

Technologies
- Modern C++
- Python
- Matlab
- Git
- Linux & Bash
- ROS & Gazebo
- LaTeX

Concepts
- Autopilot Design
- Linear Systems Theory
- Linear Control Systems Design
- State Estimation
- Modeling and Simulation
- Optimization & Factor Graphs
- Path Planning

Coursework
- Robotics
- Robust Control
- Optimization
- Flight Dynamics and Control
- Control Systems Design
- Dynamic Optimization and Control
- Graduate-Level Dynamics