Vincent W. Hill

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EDUCATION

The University of Alabama *Tuscaloosa, AL*

- Doctor of Philosophy *Expected August 2022*
- Master of Science in Aerospace Engineering and Mechanics *May 2020*
- Bachelor of Science in Mechanical Engineering *December 2017*

EXPERIENCE

Guidance, Navigation, and Control Engineer *August 2021—Present*
Raytheon Technologies *Tucson, AZ*

- Developed and tested GNC algorithms for classified missile programs

Guidance, Navigation, and Control Engineer *May 2020—July 2021*
AeroVironment, Inc. *Simi Valley, CA*

- Developed and tested GNC algorithms for large high-altitude long-endurance (HALE) UAS
- Conducted Monte Carlo simulations to analyze uncertainty & failure mode effects on control system performance
- Wrote flight test cards to evaluate control law performance
- Designed a control law to govern flexible wing shape through only control surface deflections
- Developed a Kalman Filter data fusion algorithm to improve aircraft height above ground level estimates
- Designed a control law for autonomous landing with minimal instrumentation
- Designed a control law to stabilize a system mode predicted to become unstable in stratospheric flight
- Primary flight test crew member for 13 flight hours to date
- Participated in 60 hours of flight test crew simulator training to date

Dissertation Research *June 2020—Present*

- Implemented a Python simulation testbed for multi-agent, multi-target GNC algorithm development
- Developed a probabilistic, measurement-based autonomous mission planning algorithm for UAS swarm operations using a random finite set multi-object tracking framework
- Developed a particle filter approach for multi-sensor fusion for autonomous robotic swarms

Graduate Coursework Projects *August 2018—May 2021*

- Designed an H_∞ robust control law for active gust rejection of a flexible aircraft
- Developed Python code for UAV navigation with loose INS/GPS integration
- Estimated the position of a mobile rover using differential GNSS
- Designed and tested a coupled guidance-control algorithm for a lateral aircraft model
- Derived the equations of motion and designed a control system for an inverted pendulum with cart

Research Technician *March 2018—July 2018*
The University of Alabama – Remote Sensing Center *Tuscaloosa, AL*

- Technician on climate change research program
- Led a team of undergraduate and graduate students to manufacture a ground-penetrating radar system
- System was completed and deployed to Greenland's EastGRIP research station in July 2018

Co-Op (Four Terms) *January 2015—August 2017*
Delta Air Lines – Operations Support Engineering *Atlanta, GA*

- Served as a first responder for a 24/7 operations support engineering hotline
- Authored over 100 unique aircraft repair technique substantiations which are subject to FAA audit
- Directed Delta maintenance technicians during on-site disposition of severe aircraft damages

LEADERSHIP

Professional Development Committee Chair *August 2019—May 2020*
The University of Alabama – Graduate Student Association

- Organized and moderated two professional development events, a research grant writing experts' panel and a life as a new professor discussion panel

Alumni Mentor *August 2019—May 2020*
MentorUPP
- Partnered with two mechanical engineering upperclassmen to develop concrete plans to achieve realistic goals
- Provided advice on resume building, study habits, grad school admissions, and job searches
- Under my direction, senior mentee received fully funded offer to his first-choice MS program
- Junior mentee received offer from his first-choice company for a summer 2020 internship

TEACHING

Graduate Teaching Assistant *August 2018—May 2020*
The University of Alabama
- Grader for two classes per semester
- Gave a total of 15 lectures on elementary glider design, technical writing, dynamics, and fluid mechanics

AWARDS

Graduate Student of the Year *April 2020*
The University of Alabama – Graduate Student Association

PEER-REVIEWED JOURNAL PUBLICATIONS

1. **Vincent W. Hill**, Ryan W. Thomas, and Jordan D. Larson, "Autonomous Situational Awareness for Robotic Swarms in High-Risk Environments," in *IEEE Transactions on Control of Network Systems*, in review

REFEREED CONFERENCE PROCEEDINGS

1. **Vincent W. Hill**, Ryan W. Thomas, and Jordan D. Larson. "Autonomous Situational Awareness for UAS Swarms", IEEE Aerospace 2021 Forum, IEEE Aerospace Forum, to be published
2. **Vincent W. Hill**, Jason Mukherjee, Derek Lisoski, Oliver Chiang, Brian P. Danowsky, and Stephen Haviland. "In-Flight Stability Analysis and Envelope Clearance of a Solar-Powered HALE UAS with CIFER", AIAA Aviation 2021 Forum, AIAA Aviation Forum, to be published