

Carl De Vries

4329 Lincoln Swing #36 Ames, IA 50014 | (641) 780-9473 | carldevries@gmail.com

EDUCATION

Bachelor of Science, Aerospace Engineering

Iowa State University College of Engineering | Ames, IA

GPA: 3.85

Expected: May 2020

Associate of Arts, Liberal Arts, Pre-engineering w/ Honors

Des Moines Area Community College | Boone, IA

GPA: 3.76

December 2014

EXPERIENCE

Research Intern

MIT Lincoln Laboratory | Lexington, MA

May 2019 - August 2019

- Implemented a 3 degree of freedom missile model and integrated it into an aircraft engagement simulation
- Updated the engagement simulation from a 2D flat Earth model to a 3D spherical Earth model
- Validated the simulation using proportional navigation, gravity bias, and lofting guidance schemes

Engineering Co-op

The Charles Stark Draper Laboratory, Inc. | Cambridge, MA

January 2018 - July 2018

- Implemented guidance computer simulation software in MATLAB and Simulink
- Verified performance characteristics between system level models and standalone sensor models
- Integrated a new sensor model into a system simulation and generated data for performance verification
- Automated data analysis and unit tests to verify a sensor model's scale factor and bias implementation

Software Engineering Co-op

Collins Aerospace (formerly Rockwell Collins) | Cedar Rapids, IA

January 2017 - August 2017

- Verified functional and DO-178B Level A compliance for 75 upgraded Simulink models (2007a - 2016b)
- Developed graphical and functional flight display software using Simulink and Simulink Coder
- Decreased build times via script enhancements which omitted unchanged models from the build process

SKILLS

MATLAB, Simulink, Python, C/C++, Linux, Git, SVN

PROJECTS

Guidance and Navigation of Aerospace Vehicles

- 3DOF Mars entry simulation using two-phase Zero-Effort-Miss/Zero-Effort-Velocity (ZEM/ZEV) guidance
- Ballistic missile intercept simulation using true, pulsed proportional navigation and ZEM guidance
- Orbital rendezvous using Clohessy-Wiltshire equations, linearized perturbed guidance, and ZEM/ZEV
- Strapdown inertial navigation IMU simulation verified using 3DOF Mars entry flight dynamics

Random Signals Analysis and Kalman Filtering

- Kalman Filter estimation of four aircraft longitudinal states from two measurements using elevator input
- Extended Kalman Filter estimation of two-dimensional motion model

Automatic Control of Flight Vehicles

- PID and LQR controller design for longitudinal and lateral modes of a Cessna T-37 (Simulink)

Astroynamics II

- Orbital insertion simulation and trajectory design for a two stage, solid-fuel gravity turn rocket
- Lunar free return trajectory simulation using circular, restricted three body (CR3BP) dynamics

Spacecraft Dynamics and Control

- 3DOF quaternion feedback controller simulation for satellite rest-to-rest and pointing maneuvers

Additional Projects

- Black Brant sounding rocket simulations to analyze single and multi-stage motor performance (C++)
- Runge-Kutta-Fehlberg (RK45) adaptive step-size integrator verified using CR3BP (C++)
- Developed an autonomous vehicle to navigate around a 12 foot track 5 times in 60 seconds (C++)

ORGANIZATIONS

ISU Spaceflight Operations Workshop

August 2018

Vermeer International Leadership Program

August 2018 - May 2019

NASA National Community College Aerospace Scholars

September 2013 - February 2014