Douglas Kaiser

GNC Simulation & Controls Engineer | Real-Time C++ Systems | Flight Test & Hardware Validation

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SUMMARY

Controls, flight software, and real-time systems engineer with hands-on ownership from simulation to HIL/SIL, bench testing, flight test, and hardware commissioning. Strong match for high-fidelity GNC simulation, C/C++ flight software, deterministic real-time architectures, control-law tuning, nonlinear closed-loop analysis, flight-performance data review, and artificial-gravity attitude dynamics.

TECHNICAL SKILLS

Programming	C/C++, Python, MATLAB, Simulink, Bash, Java, VBA
Real-Time Software	Deterministic C++ systems, cycle-time management, UDP/IPC/TCP communications, algorithm optimization, safe C++ practices, module/unit test frameworks
GNC / Controls	Flight controls, attitude dynamics, ADCS, CMGs, control-law tuning, nonlinear simulation, model validation, flight-data analysis
Test / Simulation	HIL test stands, SIL/software-only test systems, real-time controls, V&V, regression testing, hardware commissioning
Tools	ROS, Linux, Simscape, STK, Goddard cFS, ANSYS, SolidWorks, Python Dash, Git; DoD Secret Clearance

EXPERIENCE

Commonwealth Fusion Systems | *Senior Real-Time Controls & Simulation Engineer* — *Devens, MA | Sep 2022 - Present*

- Designed core components of *Neutrino*, a greenfield real-time controls framework emphasizing determinism, cycle-time reliability, safety, and hardware integration for SPARC subsystem commissioning
- Developed UDP/IPC/TCP communications and C++ real-time software patterns for high-consequence control systems, with emphasis on cycle-time management, algorithm optimization, and safe C++ practices
- Built and supported HIL test stands, software-only test systems, testing infrastructure, and module unit-test frameworks for rapid control-software development and validation
- Developed control and test software for the tritium injector system and supported the quench-detection/protection system through poloidal-field magnet test campaigns

Merlin Labs | *Flight Test / Controls / Flight Software Engineer* — *Boston, MA | Nov 2020 - Aug 2022*

- Served as onboard flight-test engineer in the backseat of a LongEZ, actively tuning flight-control parameters mid-flight and accumulating the most flight hours of anyone at the company
- Flew and supported flight-test campaigns across three aircraft types: CozE, LongEZ, and King Air; analyzed flight data to iterate control behavior and flight-software performance
- Designed and implemented C/C++ and Python flight-software features for autonomous aircraft in a ROS-based flight software environment
- Developed a flight-control tuning pipeline and online model-fit tool used during flight test to validate control-model behavior and guide rapid tuning decisions

Draper | *Systems / Flight Software Engineer* — *Cambridge, MA | Jun 2019 - Nov 2020*

- Developed test and simulation code for quality control and certification of the Sierra Nevada Dream Chaser flight software computer simulator
- Built a Python Dash dashboard for customer-facing trade-space exploration, connecting tunable design parameters to system-level performance outcomes
- Researched and implemented an optimality scoring metric to compare candidate designs across changing mission sets and acceptable non-optimality levels

Pivotal Aero / Opener | *Controls / Flight Test Engineer* — *Palo Alto, CA | Mar 2017 - May 2019*

- Designed, implemented, and tested control algorithms for autonomous and pilot-controlled eVTOL flight on deployed flight hardware
- Wrote firmware for sensor-data processing and communication routing; debugged controls, electrical, and mechanical issues during field test campaigns
- Performed flight-control tuning, in-field code modifications, and verification/validation for multiple hardware projects from proposal through test completion

Cornell Artificial Gravity CubeSat / CUGravity | *Project Manager & ACS Lead* — *Ithaca, NY | Aug 2016 - Dec 2016*

- Conceived and led an artificial-gravity CubeSat using a deployable spinning architecture; managed 8 M.Eng. students and 1 undergraduate through initial design, funding, and approvals
- Led ACS/CMG trade studies and built 2-D/3-D dynamics models plus flight-code simulation for attitude control and spin-up/spin-maintenance analysis
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Additional Relavent Experience: Violet Nanosat ACS Team Lead / I&T Engineer; CUSat ADCNS member; Technion Aerospace guidance and navigation lab researcher; ASML engineering analysis intern

EDUCATION & SPACECRAFT PROJECTS

Cornell University — *Ithaca, NY*

B.S. Mechanical Engineering — *May 2016*

M.Eng. Aerospace Engineering, Aerospace Controls — *Dec 2016*