Kyle Carbon

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EXECUTIVE SUMMARY

Senior engineering leader in robotics and autonomy, known for scaling teams and delivering mission-critical systems from concept to deployment. Experienced in shaping platform strategy, aligning product and engineering, and building durable execution rhythms across complex, cross-functional organisations. Looking to build and deploy real-world systems that make measurable impact for customers and operators.

PROFESSIONAL EXPERIENCE

Director of Strategic Projects, Hivemind | Shield AI | San Diego, CA 2026/01 – Present

- Partner with Product to identify priority customer needs and deliver on high-impact, cross-functional initiatives
- Set architectures, roadmaps, and execution plans for platform reference implementations, polyglot deployment tooling, and foundation-model integration
- Mentor engineering managers and ICs across multiple teams on technical depth, leadership, and career development

Director of Aircraft Software & Autonomy | Shield AI | Dallas, TX 2024/04 – 2025/01

- Owned all software and autonomy for the Aircraft Engineering business unit: firmware, OS, networks, middleware, planning & controls, state estimation, DevOps, simulation, GCS applications, and aero/performance
- Scaled the organisation from 22 to 60+ engineers; managed and mentored 6 engineering managers and 2 architects
- Supported domestic and international V-BAT customer operations (deployments, demonstrations, certification, etc.)
- Led design and development of core V-BAT features: autonomous landing, Starlink, GNSS-denied navigation, VIDAR
- Built operator training simulation tools with Customer Success, reducing training time from 6 weeks to 2 weeks
- Delivered software update capabilities that improved production throughput by ~2.5X and enabled OTA field updates
- Designed X-BAT autonomy architecture and triplex flight control system according to DO-178C and MIL-HDBK-516C

Senior Manager & Hivemind Architect | Shield AI | San Diego, CA 2022/01 – 2024/04

- Owned architecture and roadmaps for task planning, behaviour planning, motion planning, and controls
- Grew the Planning & Controls team from 8 to 16 engineers; mentored 2 new managers into leadership roles
- Led design and development of a unified testing & simulation framework across middleware, cloud, and autonomy teams
- Built foundational autonomy libraries (e.g., Lie algebra, trajectories); integrated with DSL and units libraries
- Ported the V-BAT autonomy stack from Simulink to C++, reducing licensing cost and improving developer velocity; integrated test & simulation into CI to reduce regressions and manual testing time
- Established design reviews, trainings, and other team processes to improve algorithm rigor, software engineering standards, and engineering outcomes

Chief Engineer & Hivemind Technical Lead | Shield AI | San Diego, CA 2019/09 – 2021/12

- As Chief Engineer for Nova 2, owned architecture and execution across software, autonomy & AI, hardware, and test operations (~80 engineers)
- As Technical Lead for Hivemind Pilot, delivered 3D exploration, 3D object detection/localisation, autonomous building entry, AI-assisted manual flight with obstacle avoidance, and mapping/floorplan streaming
- Designed and executed the Nova 2 release plan, including system verification/validation and release-to-manufacturing
- Partnered with Product to build roadmaps, financial models, training/maintenance plans, and customer feedback loops
- Led multiple Nova 1 software releases that fixed critical bugs and contained new features (e.g. improved no/low-light robustness)

Manager, Planning & Controls | Shield AI | San Diego, CA 2018/05 – 2019/09

- Led and mentored a team of 6 engineers; set technical direction and managed execution
- Served as scrum master for urgent deliveries (bugs, demos) while advancing long-term roadmap
- Architected key autonomy capabilities: 2D-to-3D planning migration, motion-primitive library, optimisation-based local planning, and viewpoint-based exploration
- Led a cross-functional team to ship the first Unreal Engine-based simulation tool for engineers, UX, and Product

Senior Autonomy Engineer | Shield AI | San Diego, CA 2017/01 – 2018/05

- Implemented L1 adaptive and nonlinear controllers for quadrotors in PX4 firmware
- Built an optimisation-based local planner in ROS to avoid dynamic obstacles while minimising snap
- Implemented frontier and information-theoretic strategies for exploration and global path planning
- Led modelling and analysis tooling for quadrotor and motor dynamics in Simulink

GNC Engineer II | Boeing Research & Technology | St. Louis, MO 2015/08 – 2017/01

- Developed shape-memory-alloy remote-controlled actuation system for wind tunnel tests using MATLAB & Simulink code-generation
- Refactored a 16-bit microcontroller codebase: sensor sampling, UART comms, and new control-law integration
- Developed a LIDAR model to measure airspeed/temperature/pressure for optical air data trade studies; partnered with suppliers on requirements and integration
- Supported wind tunnel tests and flight demonstrations across USA, England, and Brasil

</> SKILLS

Leadership	organisational scaling, team mentorship, roadmap development, cross-functional initiatives, establish & optimise processes (e.g. budgeting, risk management, change management)
Autonomy	planning & controls, state estimation, mission-critical robotics and aviation (group 1-5 UAS), flight test
Languages	C++ (11/14/17), Python, Matlab/Simulink, Julia, Bash, C, TypeScript, CUDA
Frameworks	Eigen, Abseil, OpenCV, ROS, Boost, PX4, OMPL, PyTorch, Ray
Build/tooling	Git, Bazel, CMake, Conan, GCC/G++, LLVM, Docker, Kubernetes
Platforms	Linux, macOS, Windows, NuttX RTOS, VxWorks
Collaboration	GitHub, GitLab, Azure DevOps, Jira, Confluence, M365, Linear

EDUCATION

Stanford University, 2013 – 2015
M.S., Aeronautics & Astronautics, GPA: 3.96

Harvey Mudd College (HMC), 2009 – 2013
B.S. with High Distinction, General Engineering, GPA: 3.81

Fellowships & Awards

- National Science Foundation GRFP, Stanford
- De Pietro Fellowship, HMC
- Harry E. Williams Mechanics Prize, HMC
- Tau Beta Pi Engineering Honor Society, HMC
- Phillips Award for Experimental Technique & Engineering Judgment, HMC
- Dean's List, HMC, 2009-2013

PUBLICATIONS

[1] Cha, P. D., Carbon, K. C., and Hsieh, R., 2014, "Eigenvalues and Eigenvalue Sensitivities of a Beam Supported by Viscoelastic Solids," *Journal of Vibration and Acoustics*, Vol. 136, pp.021017-1 to 021017-16.
[2] Cha, P. D., and Carbon, K. C., 2013, "An Efficient Approach to Approximate the Deflection Curve of an Arbitrarily Supported Beam Subject to External Loads," *International Journal of Mechanical Engineering Education*, Vol. 41-2, pp. 146-168.

HOBBIES & INTERESTS

Mentoring & Tutoring
I enjoy helping people grow their skills and confidence. Today, I mentor new hires and interns. Previously, I supported K–12 science outreach programs, tutored undergraduates at Stanford and HMC, and mentored students in the Asian Pacific-Islander Sponsor Program at Harvey Mudd College.

Hobbies
I like learning new programming languages (most recently Julia) and tinkering with technology (e.g. tinkering with VR, configuring the `i3` window manager). Outside of technology, I'm into snow sports, surfing, coffee, weightlifting, and food. I also enjoy travel, especially by bike.