

NICHOLAS MULKA

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PROFESSIONAL SUMMARY

CTO and co-founder who grew from founding individual contributor to company-wide technical leader, designing an autonomous drone docking station from a blank screen to a product deployed across six continents. Full-stack hardware leader spanning mechanical design, electronics, firmware, and software—personally responsible for taking the product from ideation to a mature industrial platform now used in public safety, critical infrastructure, and enterprise operations. Deep hands-on expertise in structural and thermal design for outdoor environments, materials selection, GD&T, FEA, and cross-functional engineering leadership. Described by colleagues as relentlessly effective—creates forward momentum when others lack direction, drives problems to resolution across every discipline, and synthesizes input from the entire team to make high-quality decisions under pressure.

EXPERIENCE

Chief Technology Officer & Co-Founder | Hex (formerly Hextronics) Jan 2024 – Present

Earned co-founder title upon promotion to CTO; transitioned from hands-on IC to leader of the full engineering organization

- Grew Atlas from \$0 to \$5.5M+ in revenue (**73% of all company revenue**), shipping 126 units at ~\$44K ASP to 67+ customers across 28 countries including Shell, Chevron, Motorola, Union Pacific, Brightline, and Renault
- Achieved **99.86% full-system reliability** across the deployed fleet produced in 2025 through continuous engineering refinement across mechanical, electrical, firmware, and software
- Atlas systems now execute a fully automated drone flight roughly every 7 minutes—over **5,000 flights per month**—responding to 911 calls, enforcing perimeter security, and protecting critical infrastructure
- Reduced duty cycle from 8–10 min to ~2 min for drone-as-first-responder applications through multi-month cross-system optimization
- Directly oversee 15 people in engineering and customer success with responsibility for 10 in production; leader of a ~30-person company with recruiting pipeline from CMU, Northeastern, Georgia Tech, and FIU
- Set technical roadmap and priorities for every product across electrical, software, and hardware teams; manage cross-functional dependencies, conduct hardware design reviews, and approve major design changes before they enter production
- Manage key enterprise accounts including Flock Safety, CSX, and Aerodyne; lead demos for Fortune 500 COOs
- Guide materials selection decisions for structural components, enclosures, and drive systems—advising engineering teams on performance, durability, cost, and manufacturability trade-offs
- Led redesign of the thermal management system for sustained high-temperature operations in environments such as Mesa, AZ; conducted thermal analysis and redesigned battery enclosure
- Driving paradigm shift to vertically integrated drone + dock (Eclipse R&D), including structural architecture for new airframe and dock platform

Lead Product Engineer | Hextronics Aug 2022 – Dec 2023

Promoted from founding engineer to lead product role

- Owned design, production, and implementation of the Atlas system end-to-end—CAD through manufacturing through customer deployment
- Defined specifications for HexTech boards (pin mappings, connectors, power distribution) and evolved product firmware—motor control, StallGuard tuning, and system integration
- Implemented the company's first inventory control and quality assurance systems; defined manufacturing steps for Atlas and Universal, built internal tooling in Google Sheets, and oversaw migration from CIN7 to ThruLine ERP—achieving a production rate of 2 stations/week
- Personally led international field deployments and troubleshooting in Malaysia, UAE, Netherlands, Australia, Chile, and across the US

Electro-Mechanical System Design Engineer | Hextronics Jan 2022 – Aug 2022

Founding engineer and sole IC; recruited by CEO Curt Lary from Georgia Tech

- Brought a novel robotic system from ideation to market in under a year—designed entire CAD model (100+ sheet metal parts, 50+ polymer parts, 16 motors, 2 single-board computers, and HVAC) built around a third-party airframe
- Created detailed engineering drawings and specifications for manufacturing per GD&T (ASME Y14.5); selected materials based on structural strength, environmental durability, cost, and manufacturability
- Designed for extreme serviceability—field-replaceable subassemblies, modular enclosure panels, and accessible wiring routing for maintenance in remote outdoor locations
- Wrote “Dumbledore” firmware (ESP32/embedded C++) with multi-core threading, interrupt service routines, SPI/I2C/GPIO communication, and StallGuard motor monitoring for the product's full control system
- Fabricated, assembled, programmed, and wired the first two drone stations independently

Engineering Design Consultant | *Blue Box Air LLC*

Dec 2020 – Jun 2021

- Designed an automated belt-driven HVAC cleaning system with PLC-controlled compressor, pumps, stepper motors, and sensors; engineered for multi-year autonomous reliability

Graduate Teaching Assistant | *Georgia Tech Capstone Design*

Aug 2020 – Dec 2021

- Guided student teams in DFM, DFA, and GD&T for project prototyping; co-authored 2 ASEE papers on course infrastructure serving 1,000+ students/semester

Engineering Intern (2 rotations) | *Gulfstream Aerospace*

Jan 2018 – Aug 2019

Tool Design Engineering (Spring 2018) • *Industrial/Operational Engineering (Summer 2019)*

- Designed manufacturing tooling and fixtures for aircraft production under strict GD&T; created holding fixtures and dollies for aft bulkhead and baggage door assemblies
- Presented cost-benefit analysis to leadership projecting \$7.5M+ in savings over 15 years by automating aircraft skin drilling
- Reduced per-aircraft build time by 6 hours through creation of 3D-printed manufacturing tools

EDUCATION

M.S. Mechanical Engineering | *Georgia Institute of Technology*

Dec 2021

- Concentration: Robotics & Additive Manufacturing Design • GPA: 3.84/4.0
- Thesis: “Fluid Interface Supported Printing for Three-Dimensional Object Fabrication”—materials characterization (interfacial surface tension, UV curing kinetics, resin chemistry), optical system design, and custom control systems (230+ pages)

B.S. Mechanical Engineering | *Georgia Institute of Technology*

Aug 2020

- Concentration: Design • Major GPA: 3.69/4.0 • Study Abroad: Georgia Tech Lorraine, Metz, France (Spring 2019)

AWARDS

Dean’s Impact Award, Georgia Institute of Technology

March 2026

PATENTS & PUBLICATIONS

- **Patent (WIPO):** PCT/US2022/038368—“Three-Dimensional Additive Fabrication with Support Fluid” (Georgia Tech Research Corporation, 2022)
- **Patent (pending):** HEX2501NP—“Aerial Drone Station Systems and Methods” (Hex)—covers housing, environmental control (HVAC), landing platform, robotic assemblies, and sensor systems
- **3 peer-reviewed publications:** SFF Symposium 2021 (SLA support structures), 2× ASEE Annual Conference 2021 (course infrastructure & hybrid-virtual engineering design)

RESEARCH & LEADERSHIP

Lead Researcher | *Advanced Additive Manufacturing, Georgia Tech*

2020 – 2021

- Led multi-disciplinary team of 10 designing a novel SLA 3D printing system; developed simulations for curing kinetics, force dynamics, heat transfer, and fluid statics; co-inventor of patent-pending system

Sub-team Lead | *Experimental Flights VIP — Drone Delivery Station*

2019 – 2020

- Led team of 6 developing an autonomous drone package delivery station; designed internal mechanisms in SolidWorks and built functional prototype

Sub-team Lead | *HyperJackets (Hyperloop Competition Team)*

2018 – 2019

- Led vehicle dynamics sub-team; created MATLAB suspension simulations and **performed structural FEA in ANSYS** to optimize component weight under dynamic loading conditions

TECHNICAL SKILLS

CAD & Analysis: Fusion 360, SolidWorks, CATIA V5, Siemens NX, AutoCAD, ANSYS FEA, MATLAB (optimization, control systems, signal processing, Simulink)**Design & Manufacturing:** Structural design, sheet metal (DXF), 3D printing/rapid prototyping, GD&T, DFM/DFA, BOM management, materials selection, thermal management/HVAC integration**Electronics & Firmware:** PCB design, embedded C/C++ (ESP32, Arduino), motor drivers (TMC2160A), SPI/I2C/UART, BLDC control, power distribution