AEROSPACE ENGINEERING PORTFOLIO · 2026

STERLING PEARSON

DESIGN. BUILD. TEST. SCALE.

Hardware engineer across mechanical design, manufacturing, propulsion, and test.

UCF AEROSPACE ENGINEERING '27 · SPACEX STARSHIP CO-OP · UCF PERL RESEARCHER · FOUNDER · JAS AT UCF · NAR LEVEL 1

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20 mo

In industry across four companies, 2023 to 2026

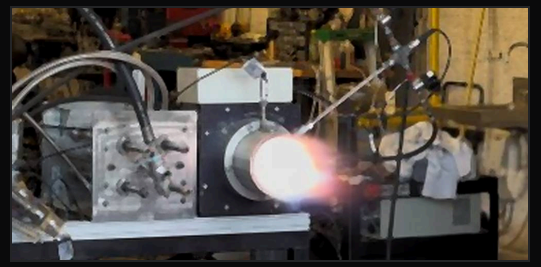
2023	2024	2025	2026
UNEW 4 mo	SRT 4 mo	FIREHAWK 4 mo	SPACEX 8 mo

01 · HOW I WORK

SELECTED PROJECTS

I have a strong bias for hands-on engineering where the data proves the design. The Starship program taught me that humility is part of the engineering: look past your own assumptions, lean on the technicians who run the hardware every day, and care about getting it right for the vehicle, not just your own design. Everything I build runs through the same four steps: design, build, test, and scale.

PROFESSIONAL RECORD FOLLOWS ON P. 03

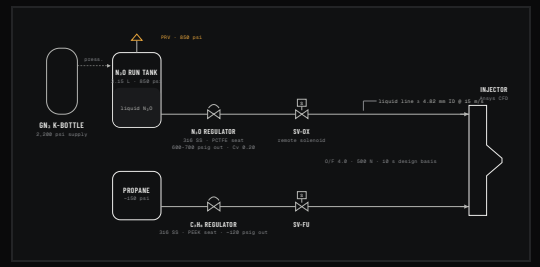


UCF PERL · RESEARCH · 2024 TO NOW

ROTATING DETONATION TEST CELL

Hot fires from 100 to 1,000 psi, detonation verified at the exit plane

SEE P. 07

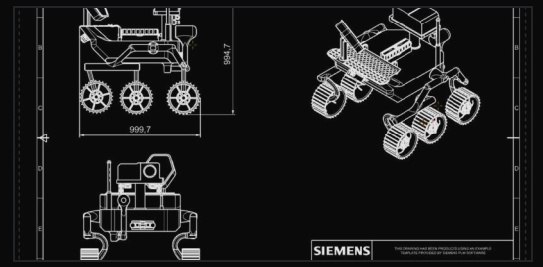


KNIGHTS EXPERIMENTAL ROCKETRY · 2023 TO 2025

KXR PROPULSION

Feed system P&ID and sizing, safety first, down to the regulator seats

SEE P. 08



NASA L'SPACE · 2024

MARTIAN ROVER MECHANICAL SUBSYSTEM

16 kg and 20 W against a 45 kg budget

SEE P. 10

FOUNDER & PRESIDENT · UCF · 2023 TO 2026

JET & AERONAUTICS SOCIETY

500+ members, a 30-engineer technical core

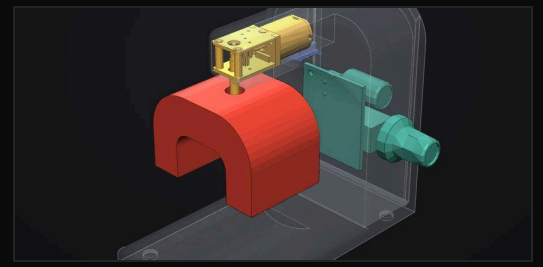
SEE P. 11

NAR LEVEL 1 · 2025

SINGULARITY 26

Flown and certified NAR Level 1, April 2025

SEE P. 12



REDESIGN · PDR DRAFT

CENTRIFUGAL MAGNET SPINNER

Concept and PDR draft, redesigned from an open reference

SEE P. 14

JAN 2026 - AUG 2026 · 8 MO · CAPE CANAVERAL, FL

SPACEX

Starship Thermal Hardware Engineering Intern

DESIGN | BUILD | TEST | SCALE

I worked on the team responsible for Starship's thermal protection hardware at the Cape. Day to day was a balance between development work, meaning research, design, planning, and building out project proposals, and the production floor, where I worked with technicians to integrate equipment or run down root causes when something failed. Much of it was taking requirements that were undefined or still moving and turning them into proposals, engineering models, drawings, and hardware, then validating how they actually held up during integration and testing.

Two areas took most of my time. The first was inspection and test: developing clearer verification methods for heatshield components, from the first step through integration on the vehicle, including physical testing on T1 flight hardware. The second was equipment engineering: running trade studies, specifying cells, and staying with them through procurement, installation, and the first weeks on the floor. My largest project was an automated bonding cell for Starship V3, designed from the start around the rate the program needs. In July, when the thermal protection system, still the most critical system on the vehicle, had flight-blocking needs in Texas, I surged from the Cape to the Starfactory at Starbase to help on site.

I split my time close to evenly between the desk and the floor. I mentored technicians and other interns on the work I owned, and learned that a big part of being an efficient engineer is teaching others how they can help instead of doing everything yourself. Late in my term I presented my work to Starship program leadership, and my review package became a reference for the rest of the team.

Operating at the speed of a flight program was my biggest learning curve. Early on, work I had put real effort into was set aside as requirements shifted, which taught me not to take pivots personally and to refocus where the team needed me. Later I was trusted with sole ownership of several systems that are still operational today, and I learned that acting quickly and with intent, then learning from the result, beats waiting for the perfect decision.

~10x	~90%	80%+	12
RATE SCALE-UP MY BONDING CELL WAS ADOPTED FOR AT CDR	COST CUT FROM A DOE I RAN	LESS MARKING TIME PER PART WITH MY LASER CELL	PROJECTS OWNED OR LED, CONCEPT TO HAND-OFF

HOW SPACEX CHANGED HOW I WORK

FIRST PRINCIPLES
Question every requirement and delete steps before optimizing them.

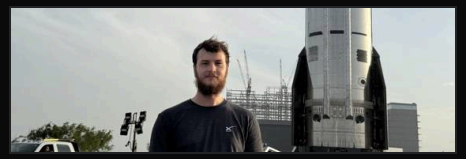
STAY PARANOID
Assume every failure mode can happen and design it out.

FAIL FAST
A fast test that fails teaches more than a slow one that's perfect.

ROOT CAUSE
5 Whys, fault trees, and FMEA before any fix.

THE FULL STACK AT STARBASE

A SUPER HEAVY BOOSTER ROLLING OUT



WITH A SHIP AT STARBASE DURING THE JULY SURGE

LAUNCH DAY AT STARBASE, BEFORE THE SCRUB

A LAUNCH LIGHTING UP THE SKY ON AN EARLY DRIVE INTO WORK

MAY 2025 - AUG 2025 · 4 MO · ADDISON, TX

FIREHAWK AEROSPACE

Propulsion Design Engineering Intern

DESIGN | BUILD | TEST | SCALE

I was a propulsion design engineering intern at a hybrid rocket startup in Addison, Texas. Day to day was a balance between design work in Creo Parametric 9, structural analysis, and tooling development, and hands-on work on the floor.

My main project was FDM tooling for fuel grain production: one-time-use molds with O-ring glands and vacuum-capable iterations. Testing validated seal integrity, bond-layer uniformity, and cure, for a projected 360% gain in production capacity. I also spent real time in the lab formulating adhesives and iterating fuel grain geometry, which fed straight back into the same bottleneck my tooling was built to fix.

360%	50,000+ lbf	3,500 lbf	3
PROJECTED FUEL GRAIN CAPACITY GAIN FROM MY TOOLING	HORIZONTAL STATIC FIRE STAND	HYBRID CAMPAIGN, RECOVERY GROUND TESTS	U.S. ARMY PROGRAMS SUPPORTED

THE FIREHAWK TEAM, SUMMER 2025

A FLIGHT TEST OFF THE FIREHAWK TOWER

MAY 2024 - AUG 2024 · 4 MO · ORLANDO, FL

SPACE RESOURCE TECHNOLOGIES

Manufacturing Engineering Intern

DESIGN | BUILD | TEST | SCALE

I'd call this my first real engineering job. SRT made regolith simulant for aerospace customers, and the process ran almost entirely on tribal knowledge.

I spent my days watching where waste was produced, working out how to fix it, and then working entire shifts on the line myself with the operators to make sure the fix actually held. I tracked units per day, batch time, labor, faults, and downtime across hundreds of runs before changing anything.

Then I reorganized the production cells around Lean Six Sigma, integrated the equipment, and wrote the SOPs. Same-batch processing went from four weeks to six hours, and the lead manufacturing engineer adopted the flow.

4 wk ⟶ 6 h	~600%	100s
SAME-BATCH PROCESSING	ESTIMATED THROUGHPUT	RUNS TRACKED

THE SRT PRODUCTION TEAM

THE CRUSHING AND SCREENING LINE

REGOLITH SIMULANT IN THE MIXER

JAN 2023 - APR 2023 · 4 MO · PORT SALERNO, FL

UNEW

Engineering Intern

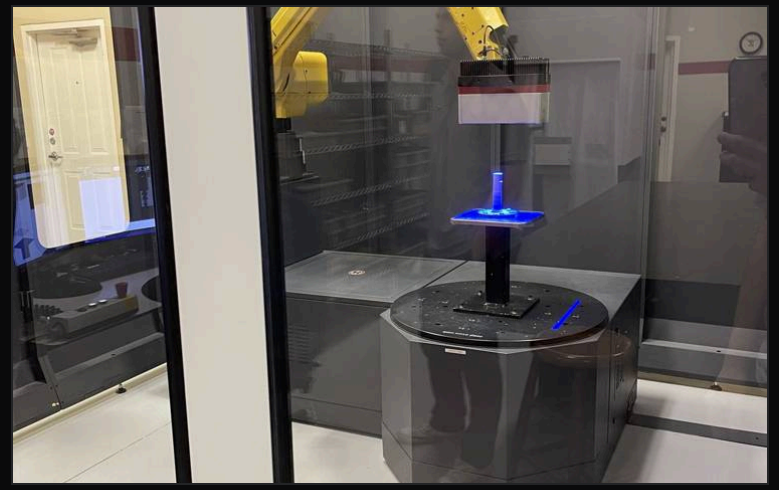
DESIGN | BUILD | TEST | SCALE

My first internship, at a company that reverse engineers and manufactures replacement parts for industrial gas turbines.

Most of my time went into learning Siemens NX and redesigning several turbine fixtures and parts, then blue-light scanning the real parts on an ATOS ScanBox and comparing them to my models in GOM Inspect. That comparison is where tolerances, manufacturing defects, and what machining actually does to a design first made sense to me.

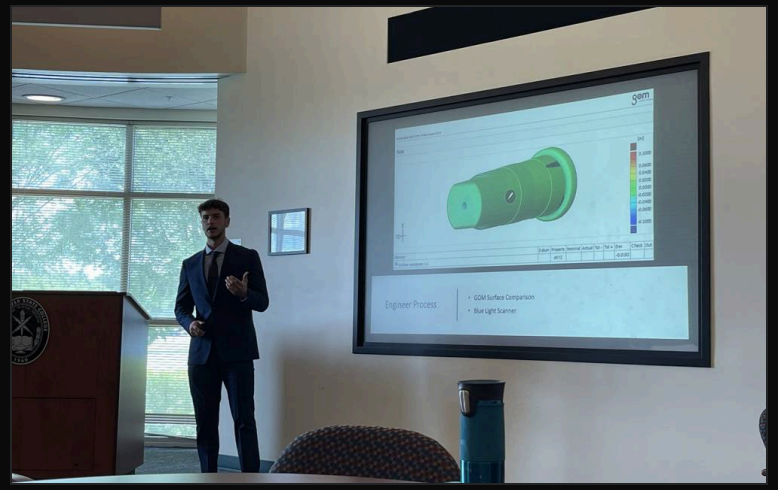
I worked through my assignments quickly enough to ask for more, so I researched hydrogen as a fuel for gas turbines, what it takes to produce, store, and use it responsibly, and presented what I found to the engineering team. It was the first time I saw how engineering actually gets done, and it's a large part of why I chose aerospace.

1st	NX	ATOS
INTERNSHIP, SENIOR YEAR OF HIGH SCHOOL	CAD SOFTWARE USED	BLUE-LIGHT SCANNING



THE AUTOMATED SCAN CELL

BLUE-LIGHT SCANNING ON THE ATOS SCANBOX



PRESENTING MY WORK AND HYDROGEN RESEARCH TO THE ENGINEERING TEAM

FLYING · JAPAN · SEDS AT BLUE ORIGIN · STARBASE

THE STORY SO FAR

I'm an aerospace engineering student at the University of Central Florida, finishing my degree in December 2027. In Florida, launches have always been part of the view. Chasing that feeling pulled me into a cockpit first, and then onto test stands and factory floors.

2022 to 2023	**LEARNING TO FLY** Trained toward my private pilot license in Cessna 172s out of Stuart, Florida, and logged about 70 hours, including my first solo landings.
Jan 2023	**FIRST INTERNSHIP · UNEW** Learned Siemens NX and blue-light scanning at a gas turbine parts company during my senior year of high school.
Spring 2023	**GRADUATED FROM CLARK ADVANCED LEARNING CENTER** Finished high school with my diploma and my AA degree at the same time.
Jun 2023	**FOUR WEEKS IN JAPAN** A trip my friend and I planned and made on our own, from Tokyo to Hiroshima and back, ending with a climb up Mount Fuji.
Fall 2023	**STARTED AT UCF** Began my B.S. in Aerospace Engineering at the University of Central Florida.
Fall 2023	**JOINED KNIGHTS EXPERIMENTAL ROCKETRY** IREC hybrid combustion first, then the Hall effect thruster propellant trade, and later the bi-propellant feed system.
Oct 2023	**FOUNDED JAS** Founded the Jet and Aeronautics Society at UCF, starting as Outreach and Marketing Officer and Turbocharger Jet Engine lead, then ran for president and won. It grew past 500 members.
Feb 2024	**BLUE ORIGIN TOUR WITH SEDS** Toured Blue Origin with SEDS at UCF. Seeing the real work being done so close by pushed me to pursue my dreams.
Apr 2024	**NASA L'SPACE ROVER PDR** Presented our Mars rover at PDR with the mechanical subsystem at 16 kg against a 45 kg budget.
May 2024	**SPACE RESOURCE TECHNOLOGIES** Worked full shifts on the line and cut same-batch regolith simulant processing from 4 weeks to 6 hours.
Aug 2024	**SHADOWING NASA** A day at Kennedy Space Center with NASA scientists and engineers through the Knights Shadow Program.
Sep 2024	**UCF PERL · ROTATING DETONATION** The day I remember most was an RDE hot fire. Hours of plumbing, then run after run of deflagration, until it finally detonated and I watched the Mach diamonds form in real time.
Apr 2025	**SINGULARITY 26 · NAR LEVEL 1** Designed, built, and flew my first high-power rocket, and earned my Level 1 certification with it.
May 2025	**FIREHAWK AEROSPACE** Propulsion design intern on fuel grain tooling, test stands, and recovery ground tests.
Sep 2025	**KXR BI-PROPELLANT FEED SYSTEM** Designed and sized the P&ID for an N_2O / propane feed system, safety first, down to the regulator seats.
Dec 2025	**PARK CITY** Closed out the year skiing in Park City, Utah, and unwound before starting at SpaceX.
Jan 2026	**SPACEX · STARSHIP** Eight months on Starship Thermal Hardware Engineering at Cape Canaveral, with 12 projects owned or led.
Since Aug 2026	**L1 ACTIVE-FIN GNC** A stage-gated path from an instrument-only flight to bounded roll damping, with recovery kept independent of the experiment.
Since Sep 2026	**CENTRIFUGAL MAGNET SPINNER** A desktop electromechanical build with a worm gearmotor, PWM speed control, and a guarded magnet rotor.

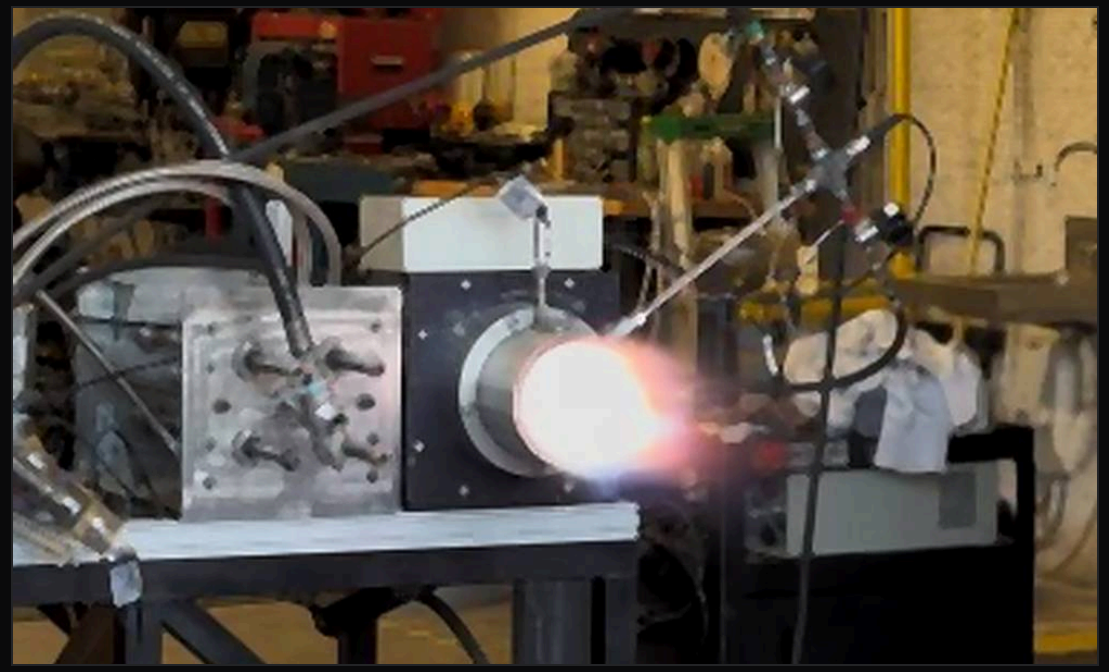
ROTATING DETONATION TEST CELL

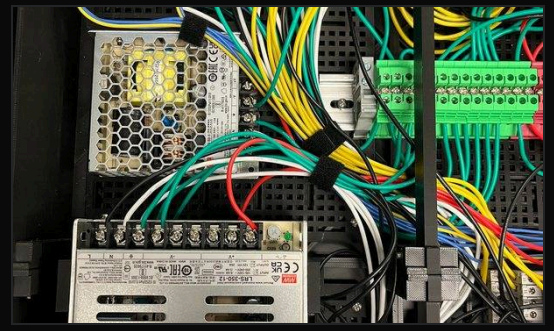
A 6 in dual-mode rotating detonation engine needs a pre-detonator that reliably turns a flame into a detonation, and a test cell that can feed it, time it, and record it safely. I help build and run that cell.

- Plumbed and instrumented the **Swagelok high-pressure fluid system** and DAQ, proof and helium leak checking before every hot-fire series.
- Fabricated the electronics enclosures and designed and soldered custom DAQ wiring harnesses.
- Automated **solenoid valve timing and synchronized capture** in Python and Arduino.
- Ran liquid pre-detonator hot-fires from **100 to 1,000 psi**, characterizing injector spray and verifying DDT at the exit plane.
- Reduced pressure data in MATLAB to estimate wave speed and find stable operating regimes.

> The day I remember most was an RDE hot fire. We cleaned, prepped, fitted, and installed the plumbing, then fired again and again as the engine only deflagrated, until it finally detonated and I watched the Mach diamonds form in real time.

UNDERGRADUATE RESEARCHER · SEP 2024 TO NOW · SWAGELOK · DAQ · PYTHON · ARDUINO · MATLAB · SOLIDWORKS



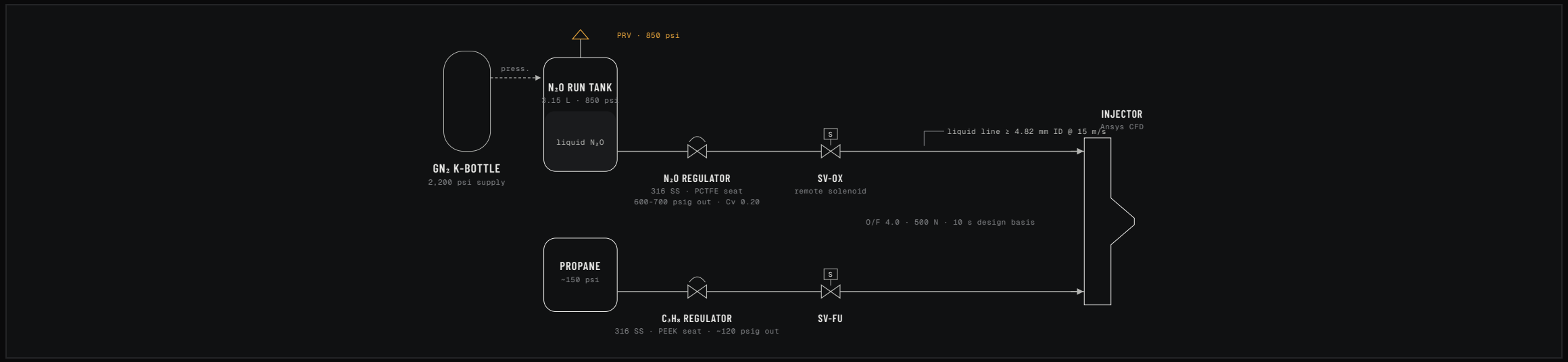


DAQ AND POWER WIRING

DAQ RACK MODEL · SOLIDWORKS

N_2O / PROPANE FEED SYSTEM

On the fluids side, I needed an architecture that was safe first and sized second. I designed the P&ID, sized the system, and specified the regulators down to the seat material.



SIMPLIFIED ARCHITECTURE, REDRAWN FOR THIS PORTFOLIO. NOT THE RELEASED P&ID. DESIGN BASIS 500 N · 10 S · ISP 200 S · O/F 4.0

REGULATOR SELECTION

LINE	IN	OUT	SEAT	CV
N_2O	850 psi	600-700 psig	PCTFE	0.20
Propane	~150 psi	~120 psig	PEEK	0.20

SAFETY FIRST

- **850 psi relief** on the run tank and **remote solenoid** actuation.
- PCTFE vs PEEK seats screened against LOX/GOX oxygen-compatibility and cold data.
- Injector internal flow and spray modeled in **Ansys CFD**.

HYBRID COMBUSTION

KXR's IREC team was building a hybrid rocket for the Spaceport America Cup. I worked the combustion side, from the injector trade to pouring the fuel grain propellant.

- Traded **showerhead, vortex, swirl, and throttle** injector plates on regression rate and efficiency. The **vortex** injector was selected with specific manufacturing angles.
- Authored the **thermal liner CDR** and worked manufacturing of the liner and its mandrel.
- Mixed and poured the **fuel grain propellant** and laid the phenolic liner myself.
- The motor suffered an anomaly and couldn't fly. It became a pivotal point: a failure is the most honest data you get.

POURING THE FUEL GRAIN PROPELLANT

HALL EFFECT THRUSTER

A propellant decision made before any hardware was bought. On the mechanical fluids team I worked the feed trade and drafted the first P&IDs ahead of the design review.

- Ran propellant feed trade studies between **argon, krypton, and xenon** on acquisition, handling, cost, and performance, carried into the design review.
- Helped draw the **P&ID** and select hardware ahead of that review.
- Moved on after the design review. The 10 to 20 person team took it into testing, and it was successful.

THE HALL EFFECT THRUSTER TEAM

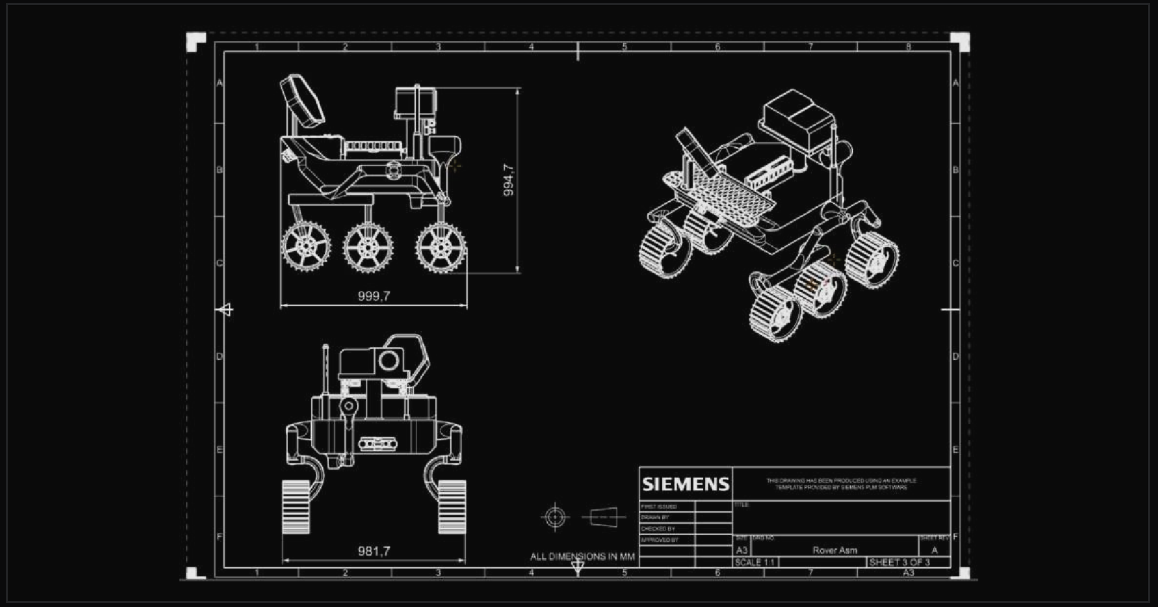
MARTIAN ROVER MECHANICAL SUBSYSTEM

NASA's L'SPACE Mission Concept Academy asked our team for a small, low-cost robotic reconnaissance mission to Mars: find the regions best suited for a future human landing, and characterize the water a crew would depend on. Science drives the design, and the customer's limits were fixed. Break any one of them and the mission is cancelled.

FOUR WEIGHTED TRADE STUDIES

DECISION	SELECTED	SCORE	RUNNER-UP
Robotic arm	Three-axis	71.5%	Five-axis 62.5%
Suspension	Rocker-bogie	80.0%	Independent 62.0%
Landing	Airbags	65.0%	Skycrane 55.0%
Wheels	Aluminum	70.0%	Steel 65.0%

THREE-AXIS ARM CHOSEN ON SCORE AND NASA HERITAGE. FEWER JOINTS, FEWER FAILURE MODES.



ROVER GENERAL ARRANGEMENT · SIEMENS NX

RESULT

- Mechanical subsystem at **16 kg and 20 W** against a 45 kg, 1 m cube, no-RTG limit set.
- All six mechanical requirements closed.
- PDR to NASA reviewers, Apr 15, 2024.

VERIFICATION

- **Regolith bed with a gravity-offload cable** for the wheels.
- Vibration on a 3-axis fixture, acoustic, and vacuum.
- TRL 5 to 7 assessed per component.

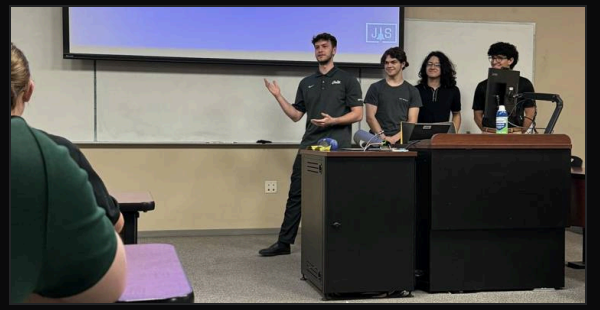
03 · UNIVERSITY OF CENTRAL FLORIDA · STUDENT ORGANIZATION · OCT 2023 TO JAN 2026

JET & AERONAUTICS SOCIETY

I founded JAS in October 2023 to give students a place to build jet and aerospace hardware, not just talk about it. I started as its Outreach and Marketing Officer and Turbocharger Jet Engine lead, then ran for president and won. By the time I handed it off in January 2026 it had grown past 500 members, and it's still active under new leadership.

- Founded JAS as Outreach and Marketing Officer and turbojet lead, then won the presidency. Grew it to **500+ members** with 6 officers and a 30-engineer technical core.
- Weekly engineering reviews and workshops, with members meeting engineers from **Blue Origin, AMD, and Northrop Grumman**.
- Led a **turbocharger-based jet engine** and drove the flame-tube combustor through SolidWorks trades to manufacturable geometry.
- Hosted Blue Origin for a **general body meeting** with JAS members.

BLUE ORIGIN GBM WITH JAS



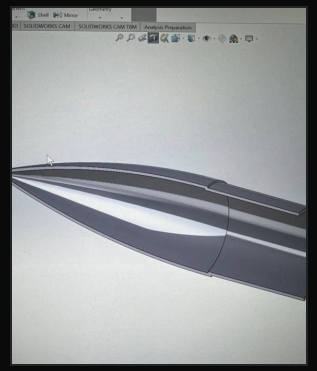
TURBOCHARGER JET ENGINE PDR

03 · PERSONAL BUILD · NAR LEVEL 1 · APRIL 2025

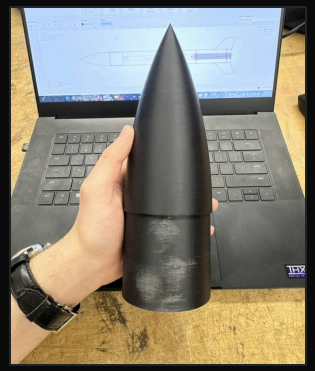
SINGULARITY 26

My first high-power rocket and my NAR Level 1 certification vehicle. I designed it, built it, and flew it. The name comes from my passion for space and for singularities, whose mystery has always fascinated me.

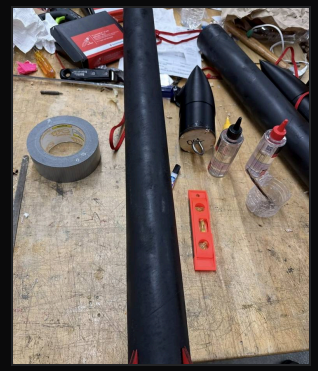
- Modeled stability in **OpenRocket** and designed the structures in SolidWorks.
- Printed the nose cone and built the rest with additive manufacturing and machining.
- Successful launch and recovery to NAR standards for **NAR Level 1**.



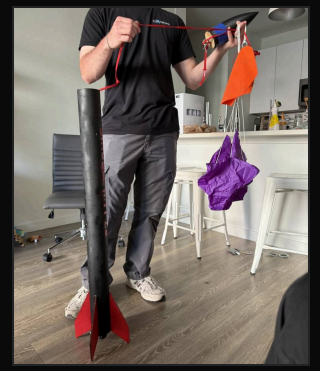
CAD



PRINTED NOSE CONE



AIRFRAME



RECOVERY CHECK

FINISHED

ON THE RAIL

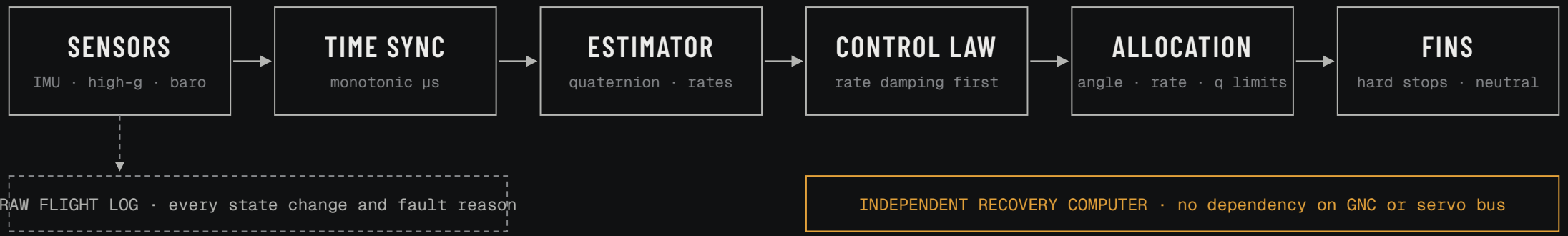
CERTIFICATION FLIGHT, APR 2025

PAD

04 · IN PROGRESS · PLANNING, STAGE 0 AND 1

L1 ACTIVE-FIN GNC

A passively stable hobby rocket still rolls, cones, and weathercocks. I want measured flight dynamics and a controlled path to reducing that motion, without the rocket ever depending on the experiment to fly safely.



STAGE GATES · each closes on evidence before the next opens

STAGE 0	STAGE 1	STAGE 2	STAGE 3	STAGE 4	STAGE 5
L1 FIXED-FIN	INSTRUMENT ONLY	SIL / HIL / GROUND	ROLL DAMPING	LIMITED PITCH/YAW	RESEARCH DECISION

KEY DECISION

A **passively stable rocket with an experimental overlay**, not a guided rocket. First objective is **roll-rate damping**, measured directly by the axial gyro.

SAFETY BOUNDARY

- Recovery independent of GNC and servo bus.
- Control inhibited on pad, rail, low q, and descent.
- Hard stops, neutral on any fault, no uplink.

FIRST LOOP

- Instrument-only logger on a fixed-fin L1, 100 Hz.
- Guarded one-fin bench rig: ±20° steps settle within ±3° in ≤0.75 s.
- $300 target, $400 cap. Nothing built or flown yet.

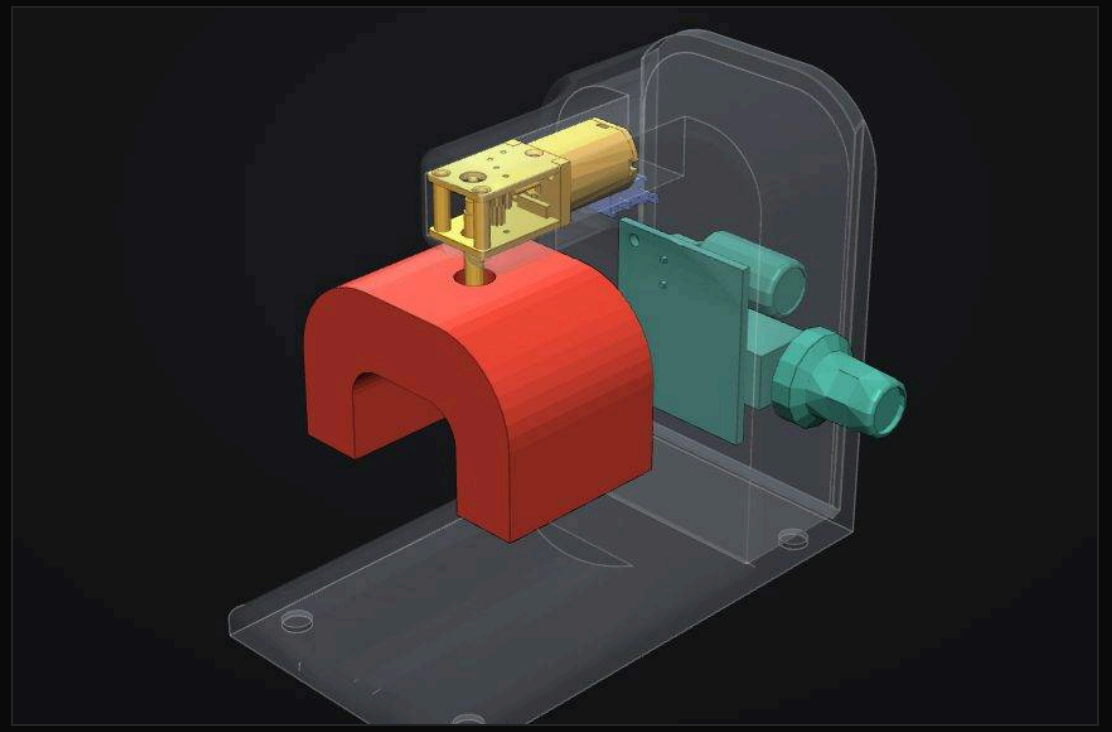
04 · IN PROGRESS · REDESIGN, PDR DRAFT

CENTRIFUGAL MAGNET SPINNER

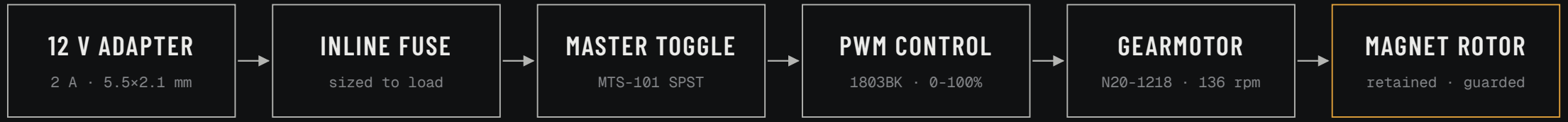
Magnetic nail polish sets its pattern under a spinning magnet. An open reference build proved the idea with a 6 V motor and AA cells, but it left the finger guard, dimensions, and magnet retention unresolved. I'm redesigning it as a safe, instrumented prototype.

DECISIONS SO FAR

- Kept a **right-angle worm gearmotor** to match the mechanism.
- **Positive magnet retention**. Press fit or glue alone isn't accepted near a finger.
- Heavy magnet gets a separate, **bearing-supported** spindle.
- Operating speed will come from a DOE: 40 to max rpm, 2 to 5 mm gap, 3 reps, with current, temperature, and runout logged.



HOUSING, DOOR, AND MAGNET · SIEMENS NX EXPORT



TOOLS AND METHODS

NX
SIEMENS NX
CERTIFIED

L1
NAR
LEVEL 1

LSS
LEAN SIX SIGMA
WHITE BELT

01 · DESIGN

CAD AND DRAWINGS

Siemens NX | Teamcenter | Creo Parametric 9 | SolidWorks | OpenRocket | GD&T · ASME Y14.5 | Tolerance stack-ups | Model-based definition | Drawing release | DFM / DFA

SHOWN IN · SPACEX · UNEW · ROVER · SINGULARITY 26

02 · ANALYZE

ANALYSIS AND SIZING

Ansys FEA | Ansys CFD | MATLAB | Python | Weighted trade studies | P&IDs | Line, tank, and relief sizing | First-principles trades | Nominal hazard zone · ANSI Z136.1

SHOWN IN · KXR · ROVER · PERL · SPACEX

03 · TEST

TEST AND DATA

DAQ and instrumentation | LabVIEW | Arduino | C | Epsilon3 | Grafana | DOE | 5-Why | FMEA | Fault trees | NDE · CT / X-ray | Blue-light scanning · ATOS | Proof and leak testing | Cryogenic testing

SHOWN IN · PERL · FIREHAWK · SPACEX · UNEW

04 · BUILD

HANDS-ON AND MANUFACTURING

Swagelok high-pressure plumbing | Regulators, solenoids, relief valves | Torque tooling | Soldering and harnesses | CNC and manual machining | Additive / FDM | Laser cutting | Fixtures and tooling | SOPs | Lean Six Sigma | 3P

SHOWN IN · PERL · FIREHAWK · SRT · SPACEX

STARBASE, TEXAS

LET'S TALK

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