

Syed Aabis Akhtar

Aerospace Engineering

Propulsion hardware, flight systems, CAD, autonomy and engineering software.

Email

aabisa2@illinois.edu

Website

aab.is

GitHub

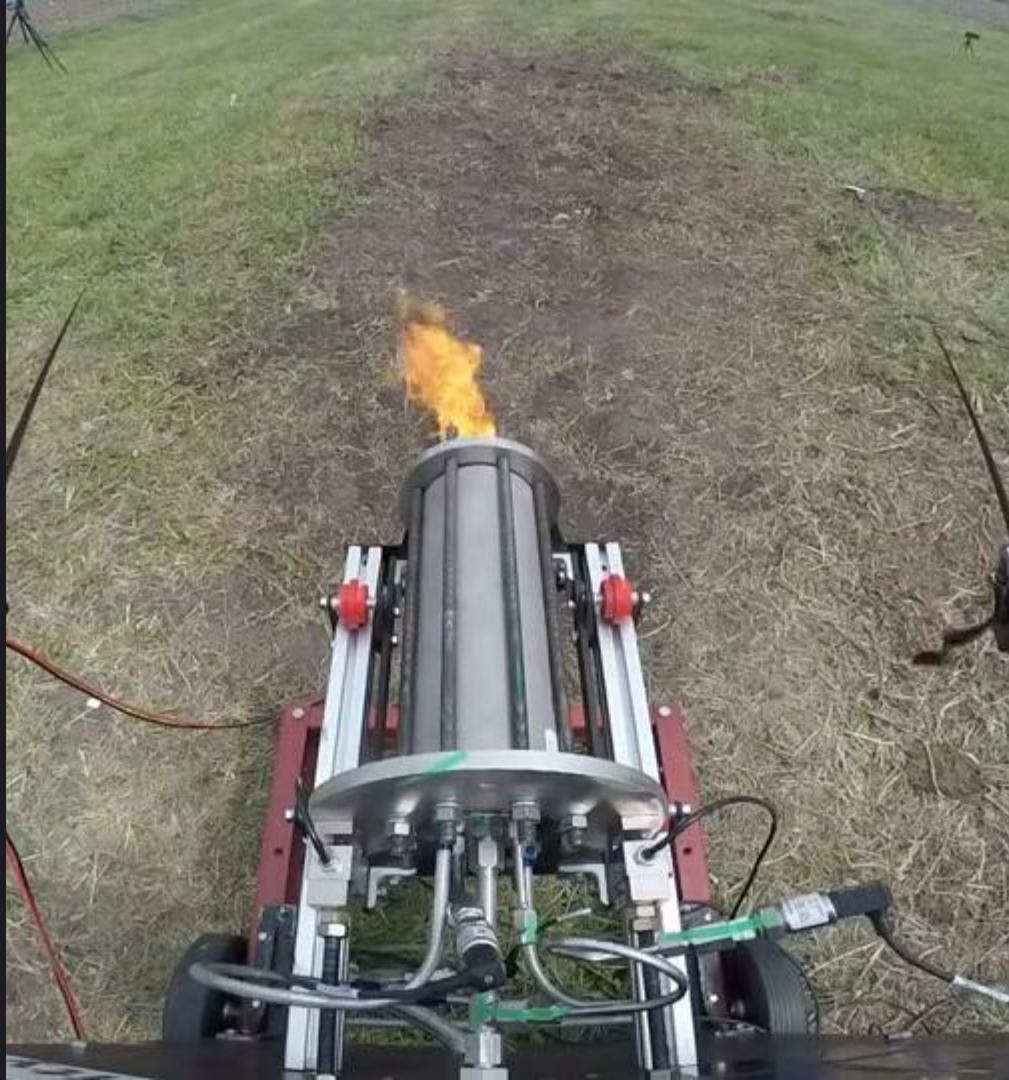
github.com/GitBolt

LinkedIn

linkedin.com/in/saabisa

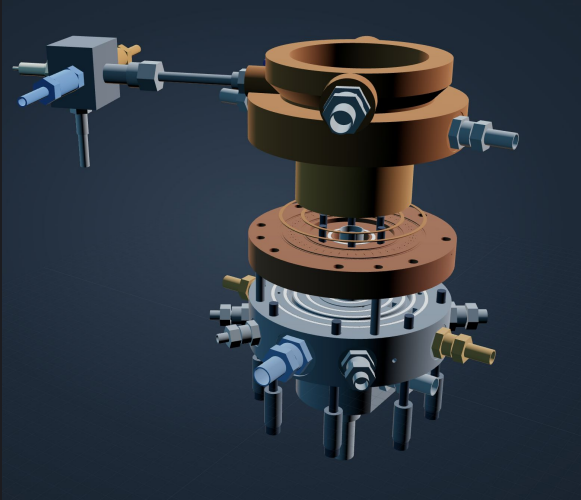


University of Illinois Urbana-Champaign
B.S. Aerospace Engineering

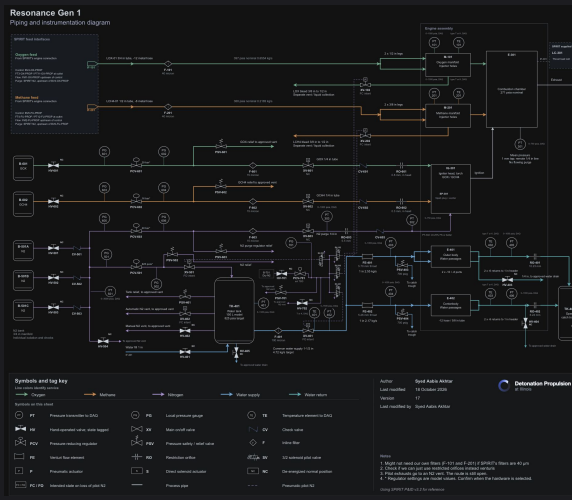


Rotating Detonation Rocket Engine

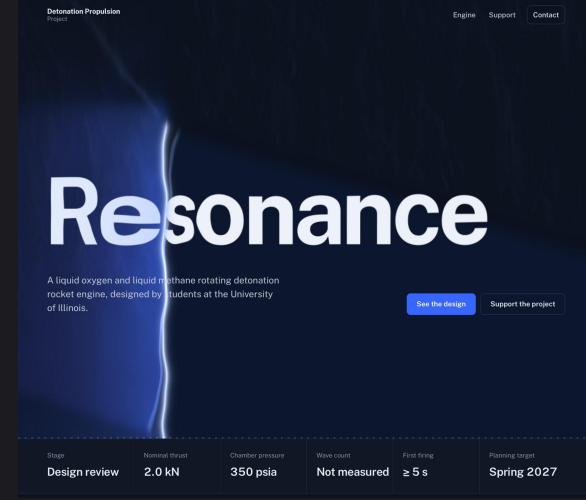
Detonation Propulsion at Illinois | Founder & Chief Engineer | LOX/LCH₄ space propulsion



Resonance Gen-1 engine exploded CAD



Fluid system piping and instrumentation diagram



Public website at [RDRELab.com](https://rdreilab.com)

~2 kN

design thrust class

O/F 3.0

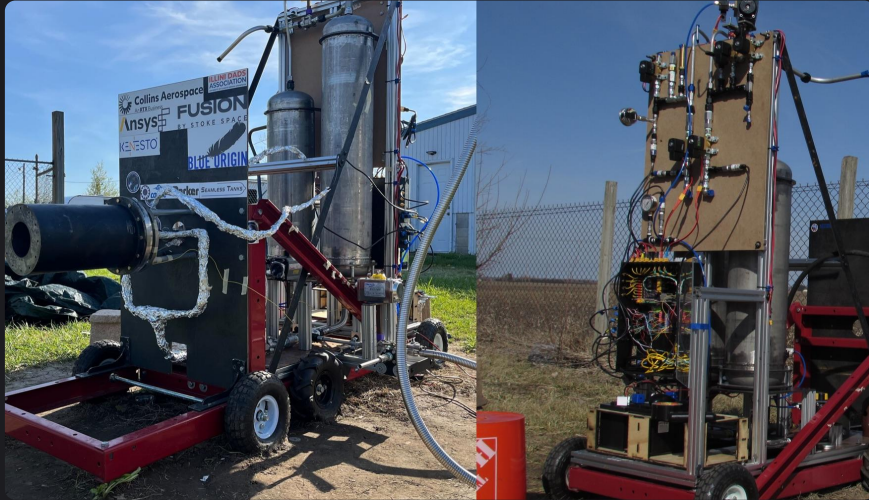
271 psia design point

Founded a 15+ member student team to build Resonance, a 2 kN LOX/methane rotating detonation rocket engine for space propulsion.

Ran NASA CEA to set sizing and operating points and designed the full fluid system. Went from idea to team, final design and sponsors in 3 weeks.

Liquid Rocket Feed System

RAND-E test stand | Liquid Rocketry at Illinois



Student-built engine test stand (RAND-E)



Overture Mark 1 rocket engine

Fuel and oxidizer plumbing

Built the IPA/LOX feed from the team's piping and instrumentation diagram. Cut, bent and flared tubing. Installed valves, fittings and actuators on the RAND-E stand.

Test operations

Ran pressurization, leak checks and water flows that cleared the stand for hotfire. As Admin Director I interviewed test leads after tests and helped with key club decisions.

Liquid Rocket Engine Hotfire

Liquid Rocketry at Illinois | May 2026



Cold-flow test



Hot-fire sequence · May 3, 2026

Operations

Oxygen cleaning, cold-flow, hotfire

IPA / LOX

isopropyl alcohol / liquid oxygen

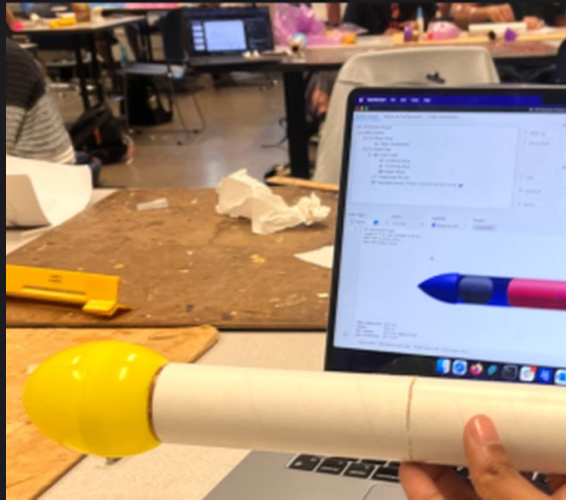
Helped with oxygen cleaning, leak testing and torqued fittings before cold-flow and hotfire. The engine ignited, but a controller fault cut the run early before the 10-second target. A second hot-fire is planned for November 2026.

Model Rocket: Design and Launch

OpenRocket simulation and field launch



October 2025 launch footage



OpenRocket build · model and simulation



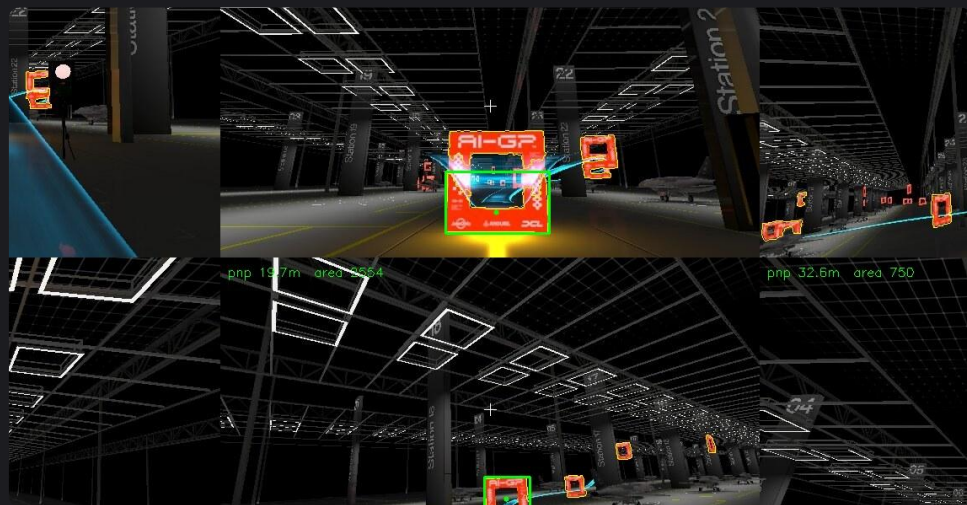
Predicted altitude vs time

381 mm tube · 50.8 mm OD · balsa fins · 56 g egg · D12-3 · 305 mm chute

Designed the rocket in OpenRocket and launched it in the field. The first sim showed large pitch, yaw and angle of attack. After a stability revision, the model predicted 106.4 m apogee and 46.5 m/s peak speed at 179 g launch mass.

Anduril Autonomous Drone Racing

Cleared Round 1 on Anduril's simulator | GPS-denied OpenCV/IMU



Gate racing view in Anduril simulator

Perception → control

30 Hz

FPV camera + MAVLink telemetry

**OpenCV /
PnP**

gate detection and pose

400 Hz

gate-relative state estimate

50–60 Hz

control loop with gated PPO policy

100%

easy-course completion

88%

medium-course completion

62%

hard-course completion

Around 7 m/s
Zero crashes

Carbon-fiber Quadcopter

Personal UAV | ArduPilot / MAVLink | hardware and flight testing



Workshop build



Assembled airframe showcase at a conference



Outdoor night flight

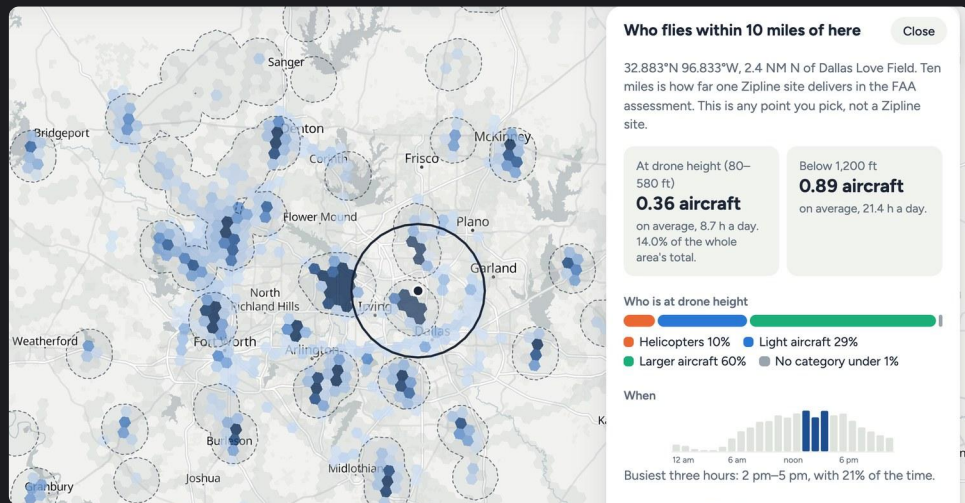
~2 kg

assembled total weight

Built a ~2 kg carbon-fiber airframe and integrated motors, power, radio and flight-control hardware. Used ArduPilot and MAVLink to configure and control the aircraft. Bench-tested and flew outdoors.

AirWatch: Low-Altitude Air Traffic Survey

Zipline DFW & Austin operating areas | Python, H3, MapLibre / deck.gl | Oct 2026



Live map with the 10-mile brief for any point at zipline-airspace.vercel.app

Data pipeline

7 days

public ADS-B archives, about 4 GB a day

Height AGL

GEOID18 + USGS terrain, checked at runway ends

H3 cells

traffic by height band, aircraft type and hour

pytest

unit tests on synthetic tracks

82%

of low traffic within 3 NM of a public runway

2.6

crewed aircraft at drone height at a typical moment

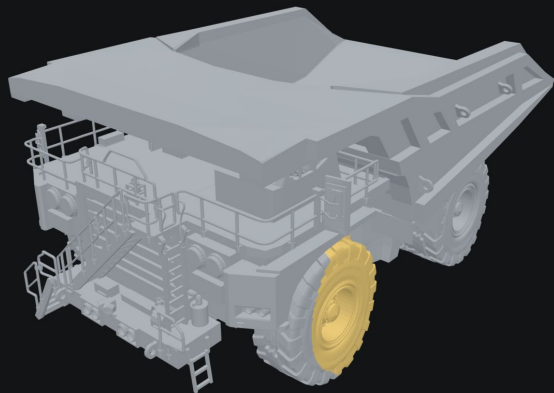
1,275 h

crewed aircraft time below 1,200 ft in one week

One week, public data
DFW and Austin

CatWatch: Inspection Software

HackIllinois 2026 | Caterpillar heavy-vehicle inspection



CAT 797F model in 3D defect viewer

Findings

1R 1Y 1G

- R** Hydraulic line seepage near right-side fitting
- Y** Visible sidewall wear on front tire
- G** Cab glazing and access clear

Checklist

3 · 23%

CAT 797F

- Tires Rims

Sample findings inspection checklist

Python SDK

WebSocket camera stream

Modal CV

Cloud inference and API-key portal

Built a Python SDK that streams camera frames over WebSocket into Modal cloud CV with an API-key portal. Detections map to a 3D defect viewer for Caterpillar at HackIllinois 2026.

Syntactic Foam Impact Analyzer

NMCAD Lab research internship | Indian Institute of Science

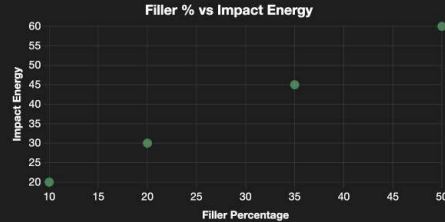
Results

Anomaly Data Point

Filler %: 10.00
Impact Energy: 20.00
Absorbed Energy: 1.40
COR: 1.00
ELP: 4.87
Reasons: Coefficient of restitution must be between 0 and 1

Normal Data Point

Filler %: 20.00
Impact Energy: 30.00
Absorbed Energy: 2.18
COR: 0.96



kNN model for foam impact data

Key capabilities & workflow:

- Groups samples by filler fraction percentage
- Evaluates absorbed energy & restitution (COR)
- Flags nonphysical predictions (COR > 1)

Built the kNN analysis pipeline and a review interface

Sample checks & anomaly detection

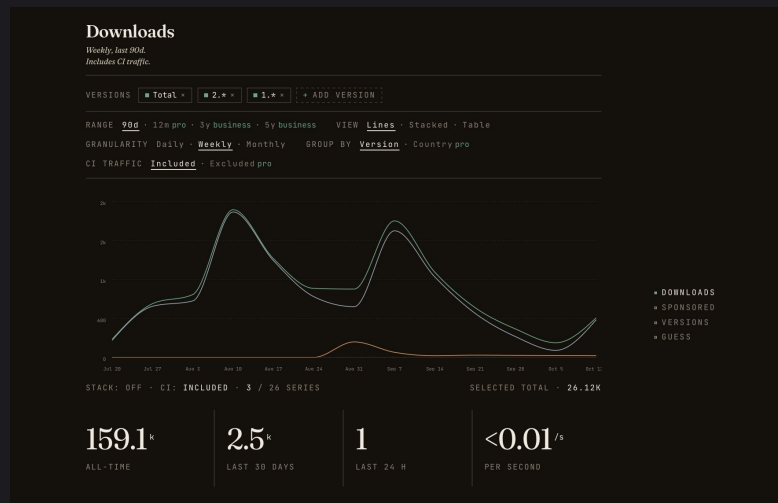
At IISc NMCAD Lab under Prof. Dineshkumar Harursampath, I built a Python kNN model for syntactic-foam energy absorption. It groups samples by filler fraction and flags nonphysical predictions. Sample checks can flag cases where predicted restitution exceeds 1. I also helped redesign the lab site.

Selected Software Projects

~160,000 downloads | Swift Student Challenge



Winning prizes sent by Apple from Menlo Park



Python Solana SDK with downloads statistics

AsymmED

Built an iOS app that explains asymmetric encryption. Won Apple's 2023 Swift Student Challenge after finishing in four days while learning Swift.

Solathon

Published a typed Python SDK for Solana RPC and transactions with sync and async clients. Crossed 159,000+ downloads and received a \$3,000 grant for development.