EVAN LIN

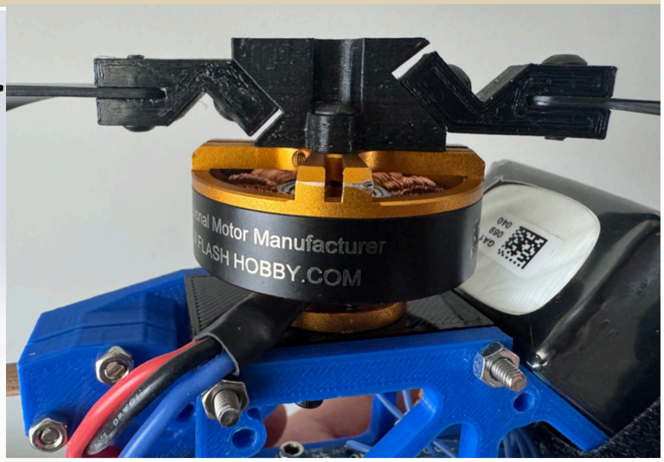
MECHANICAL ENGINEERING AT PURDUE UNIVERSITY

evanlin987@gmail.com

linkedin.com/in/evanll

(615) 968 - 4350

CYCLIC THRUST MODULATED HELICOPTER



What?

- Designed and built a model helicopter with hinged blades and **specialized control loops** instead of a traditional swashplate mechanism

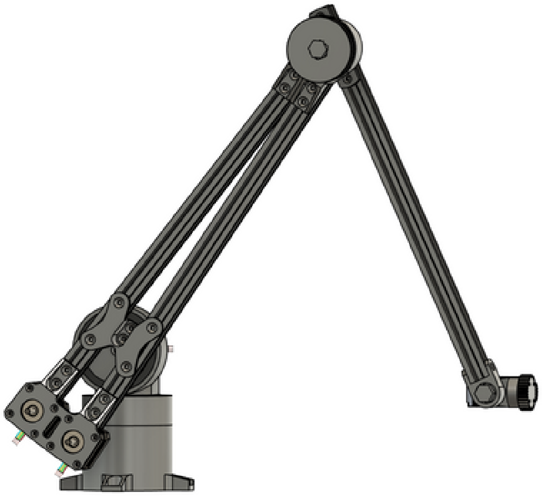
How?

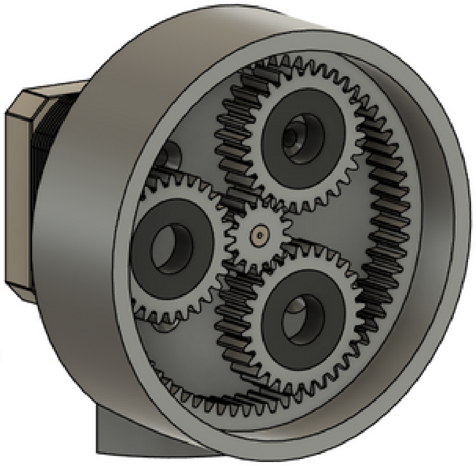
- Modeled using **SolidWorks**
- Simulated PID loops using **MATLAB Simulink**
- Wired a custom flight controller with inertial measurement unit, rotary encoder, RC receiver, and motors

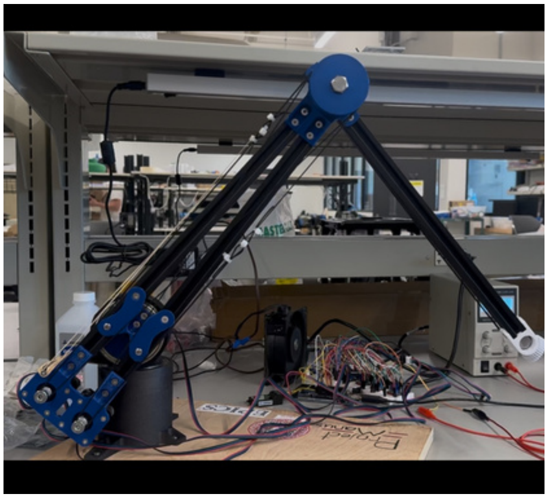
Results

- Full control over yaw, pitch, and roll while requiring **75% less moving parts** compared to swashplate rotors

ROBOTIC ARM WITH 5 DEGREES OF FREEDOM







What?

- Designed a 5 degree of freedom robotic arm based on **Arduino** and NEMA 17 **stepper motors**
- Optimized for ease of assembly and reproducibility with **3D printed** parts to encourage STEM education within high schools

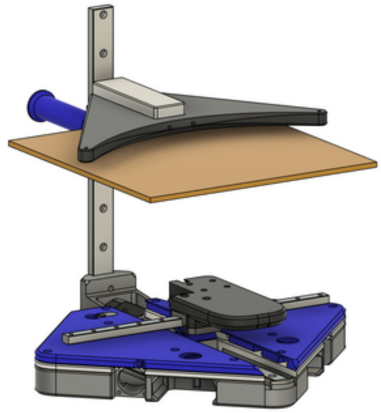
How?

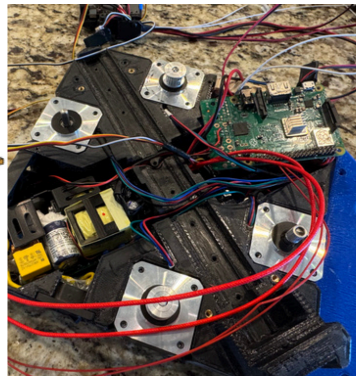
- Modeled all components using **Fusion 360**
- Incorporated interference and screw joints for simplicity
- Used geometry tools to generate gear tooth profiles suitable for 3D printing

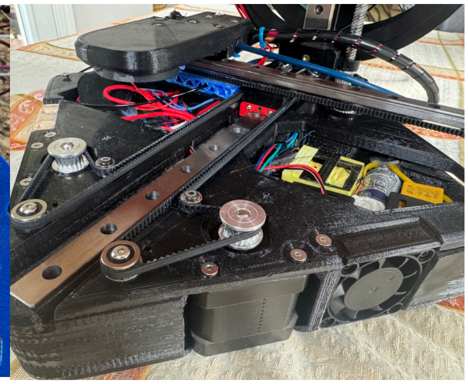
Results

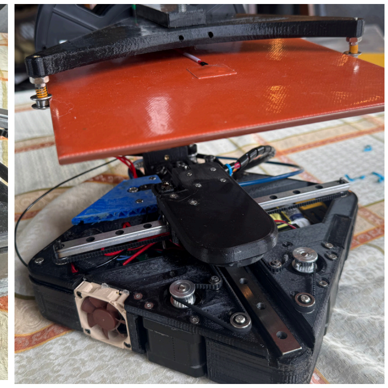
- A final prototype has been assembled and plans have been made available for high schools
- **RC controlled** for accessibility
- Interchangeable end effectors
- **Belt-driven** to reduce moving weight

INVERTED COREXY 3D PRINTER









What?

- Designed a 3D printer with an **upside-down Core-XY** motion system to concentrate moving mass at the base
- Prioritized **space efficiency** with a high build volume to footprint ratio
- Developed a **robust and lightweight** toolend and bed holder

How?

- Used **SolidWorks** to fit all components around a 3D printed chassis
- Integrated fan ducts and wire channels for proper **heat dissipation**
- Implemented **DFA principles** to reduce parts required and assembly cost
- Build using 3D printing and machining

Results

- **400%** higher build area to footprint ratio compared to traditional printers (Prusa Mk4)
- Achieves print speeds of **220 mm/s**, reducing print time by **30%** on average
- Removable bed allows for quick turnaround time