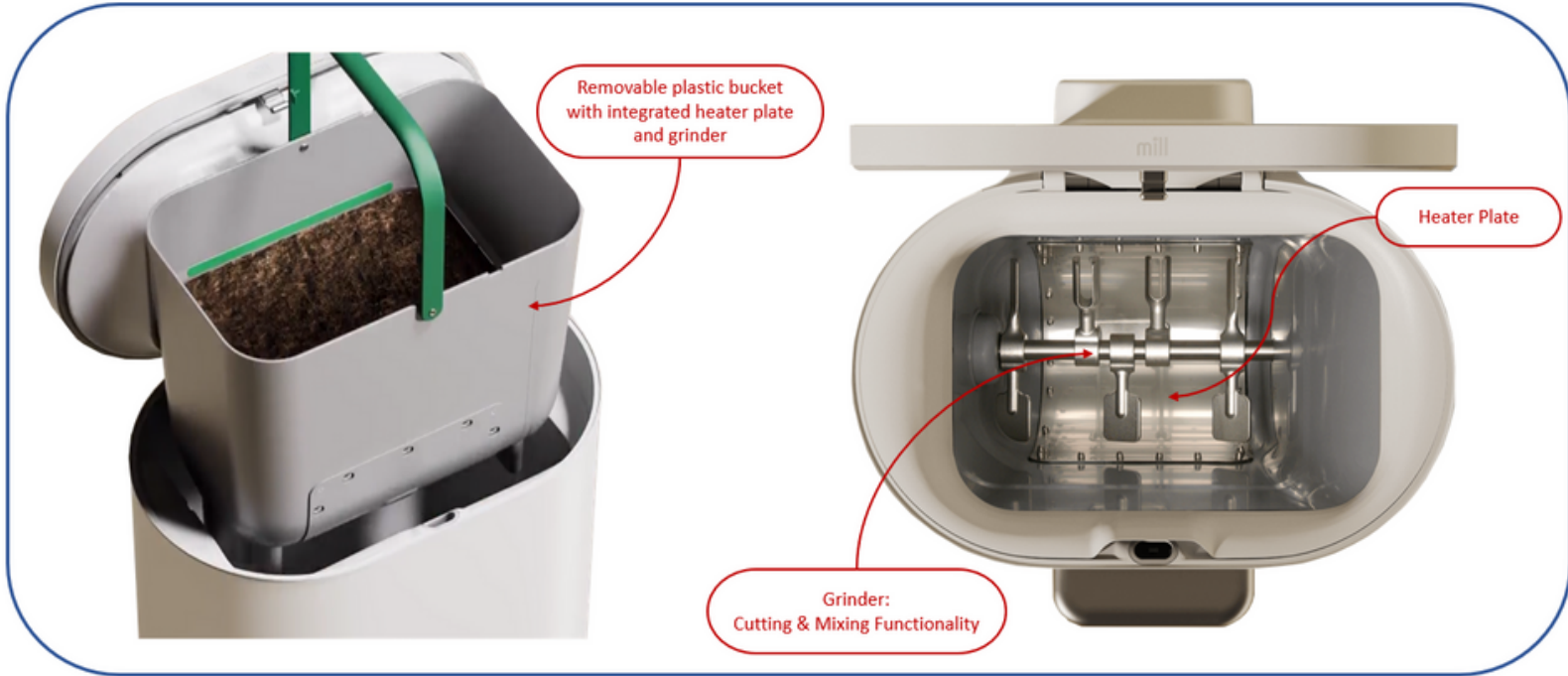


## GRINDING SYSTEM ARCHITECTURE AND DESIGN - MILL INDUSTRIES



\*Designs shown here are of the first generation Mill Kitchen Bin. My work was focused on the second generation bin, which has not been released yet. The photos here are all taken from the company website and are for illustration purposes only!

### What?

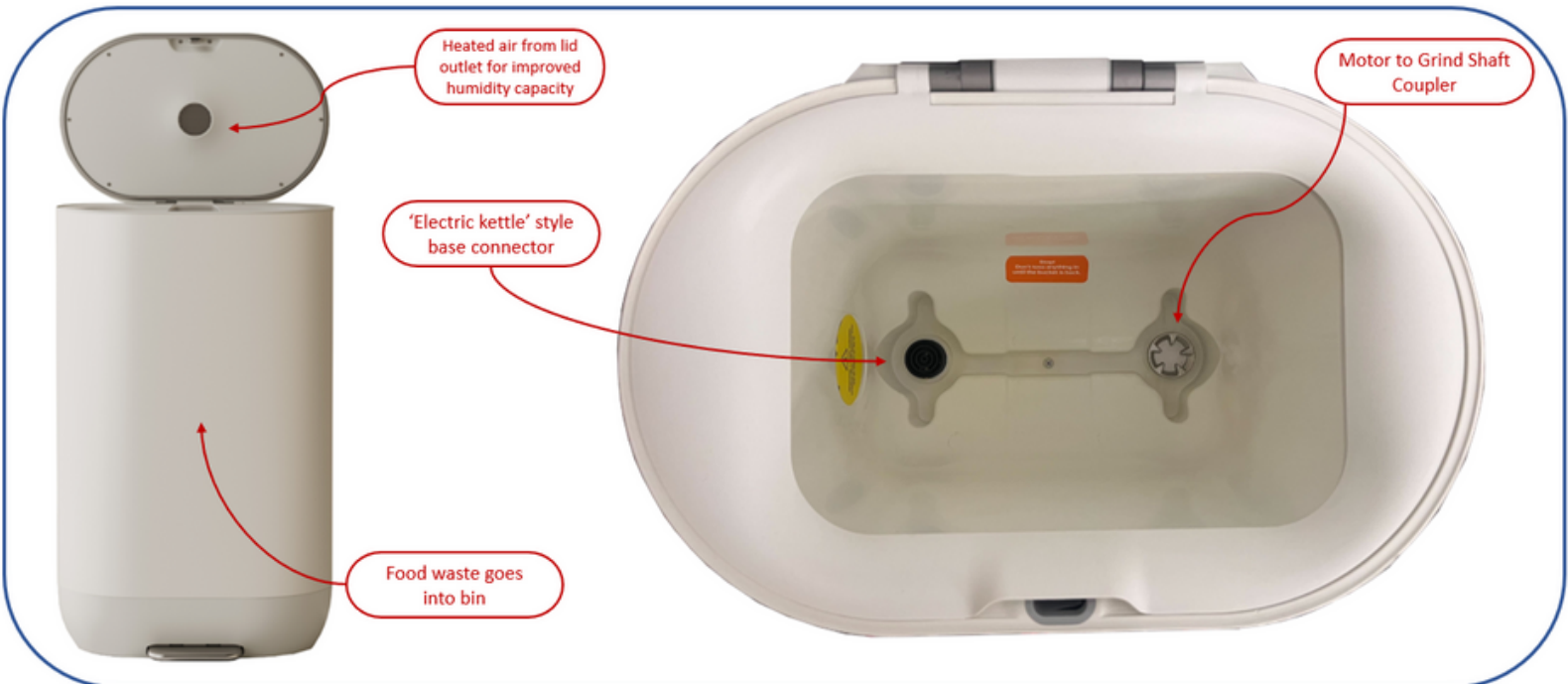
- Led design and down-selection for Grinding architecture, which breaks down and dries food waste
- Validated reliability of grinding architecture through test engineering
- Designed for strong cost reduction and simplification

### How?

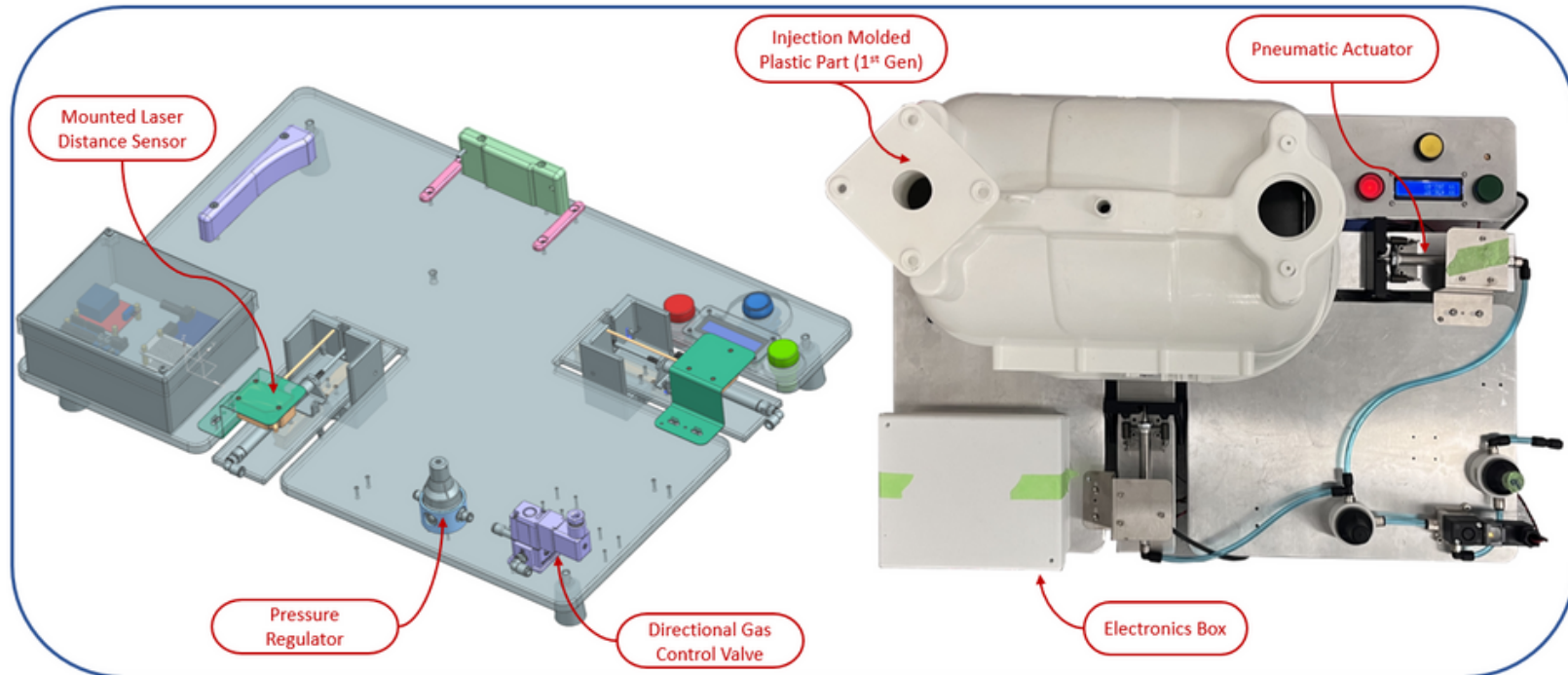
- Collaborated with multiple teams on **PD, systems architecture and test reliability from concept to production** (Proto through DVT & PVT)
- Used Siemens NX for design of **novel grinding shaft design and geartrain design** (2 patents pending)

### Results

- **Improved grinder system** with effective cutting, mixing and drying
- **Significant Cost reduction** through DFM and part simplification
- Designs implemented into final production unit!



## PNEUMATICALLY-ACTUATED PLASTIC PART INSPECTION FIXTURE - MILL



### What?

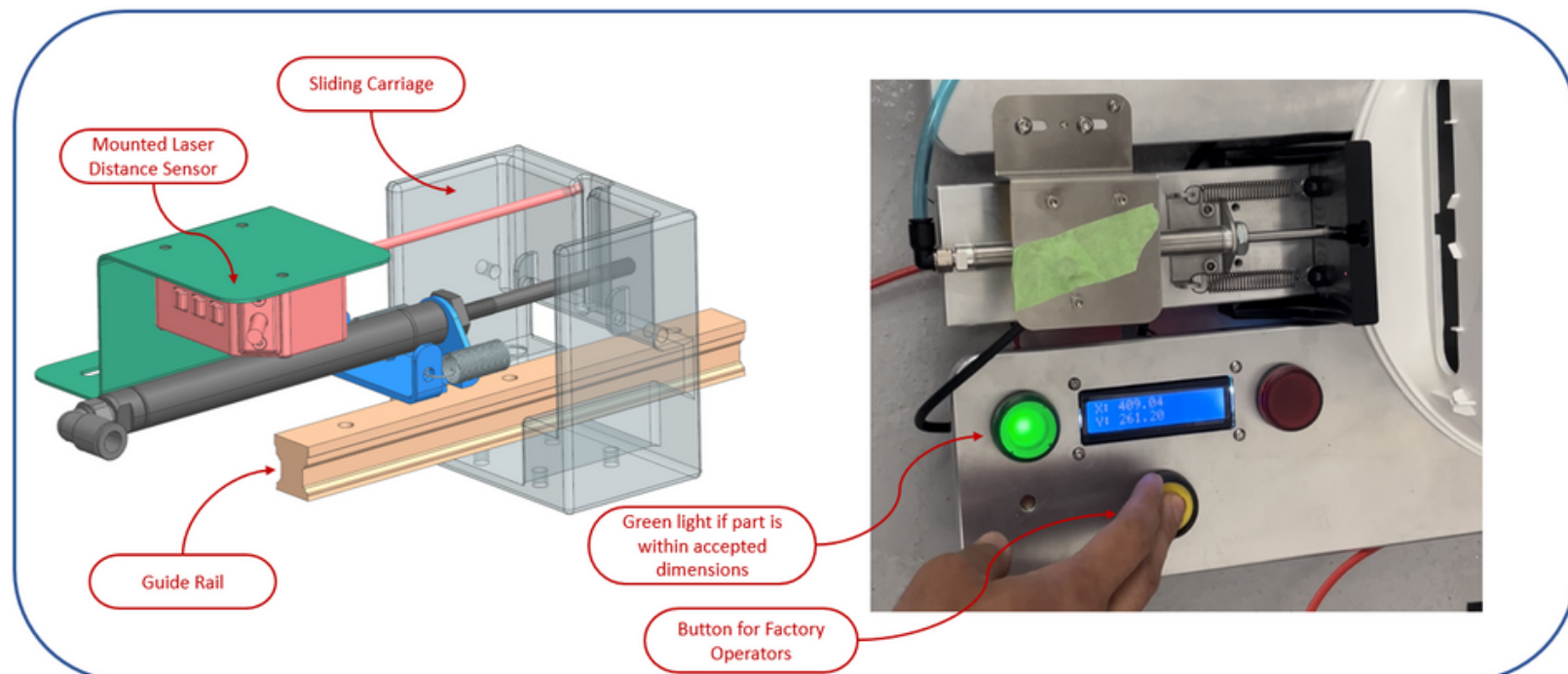
- **Design** and **fabricate** the inspection fixture for injection-molded factory parts
- **Design** the pneumatic actuation system through use of control valves and pressure regulators

### How?

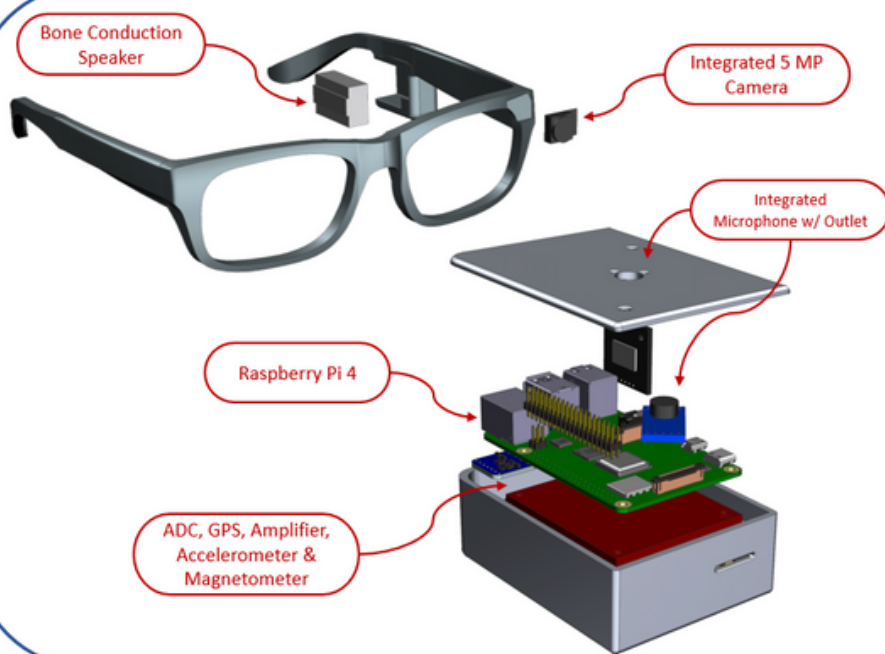
- Used **Siemens NX** to design all parts
- Applied **DFA principles** for the component location and pressure regulator mounts
- **Calibration of input air pressure** to minimize deflection in plastic part

### Results

- The design fulfilled its purpose well with **accurate and consistent measurements**, with mitigation for deviation in part placement and tolerances
- **User-friendly design** for factory operators
- Deployed for long term use in factory!



## VIDI: TRAVEL COMPANION GLASSES FOR THE VISUALLY IMPAIRED - UC BERKELEY AI HACKATHON



### What?

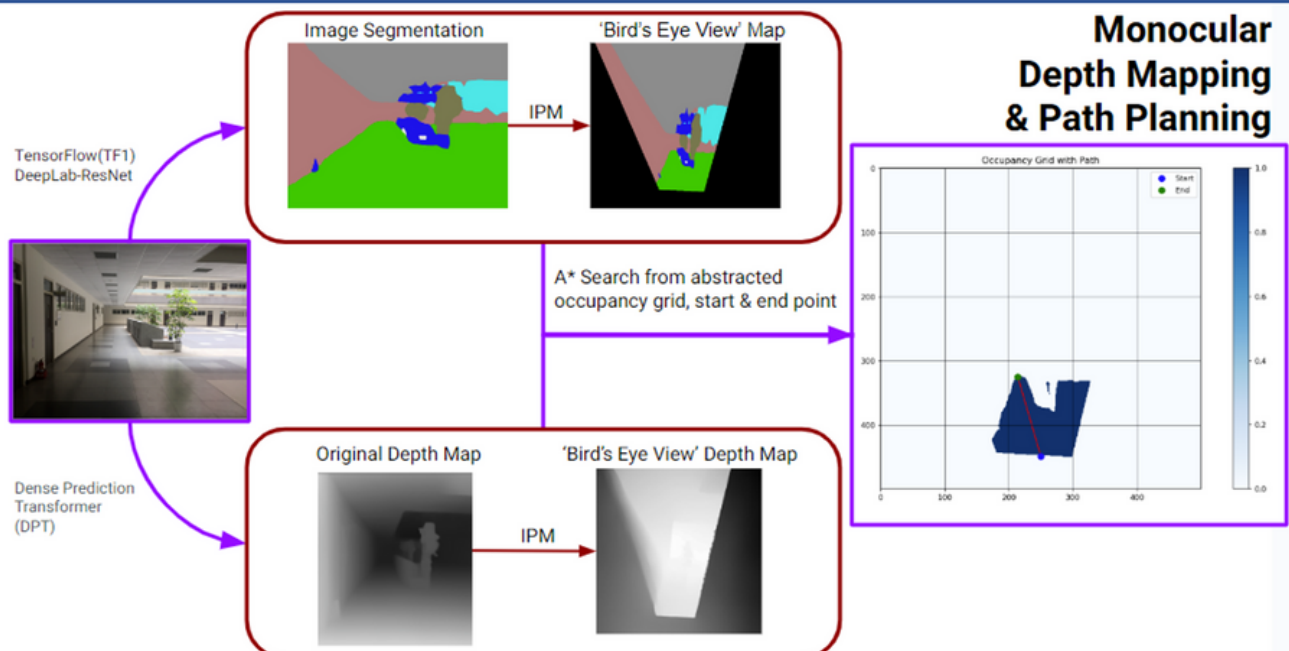
- Vidi is a pair of smart glasses that utilizes the power of **LLMs and sensor technologies** to help guide and support the visually impaired
- It can do **path planning**, along with **object detection & identification** for the user.

### How?

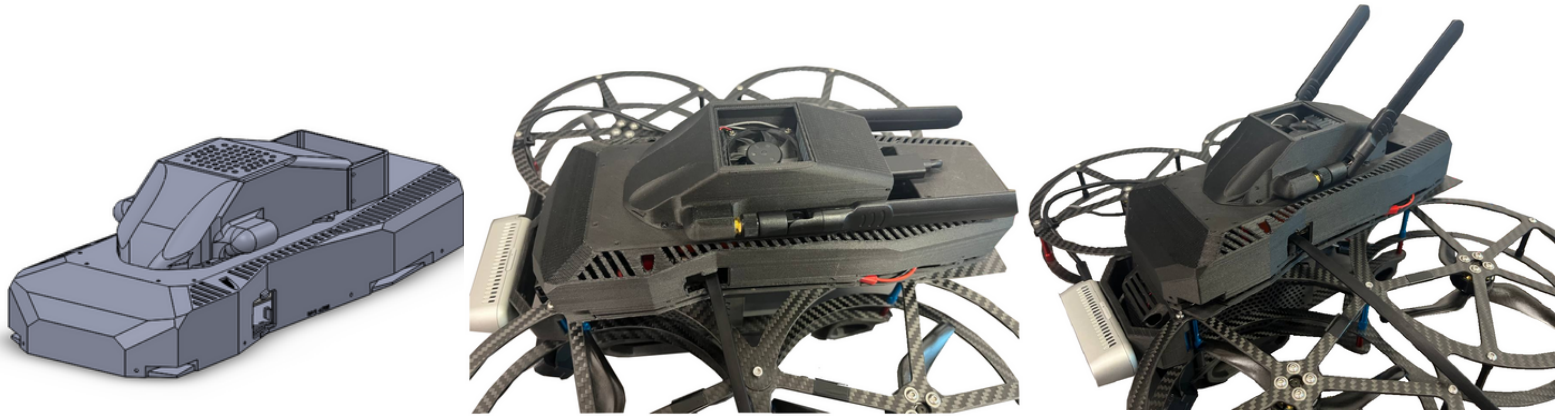
- Designed 3D CAD models for glasses and electronics case, with **integrated sensors and connectors**
- Designed **customized path planning method involving monocular camera**, via Inverse Projection Mapping and TF1 Image Segmentation model
- Used YoloV8 for object identification

### Results

- Successful product demo** at hackathon with object detection and voice recognition!
- Comfortable, compact and user-oriented design



## RAVEN DRONE BODY PROJECT - PERFORMANCE ROTORS (PR)



### What?

- **Design** and **fabricate** the housing & mounts for new electrical components for a testing drone
- **Design** antenna receiver mounts to **minimize intrusiveness**

### How?

- Used **SolidWorks** to design my parts
- Applied **DFM principles** for the housing design
- **3D Printed** all components

### Results

- The design fulfilled its purpose well with a **minimal part count**
- Provided **compact** and **aesthetic** housing while allowing abundant **airflow for fan & heatsink**

## NDT RAVEN DRONE BODY PROJECT - PR



### What?

- **Design** and **fabricate** a compact housing for NDT components
- Ensure housing accommodates **easy removal and refilling** of couplant fluid bottle

### How?

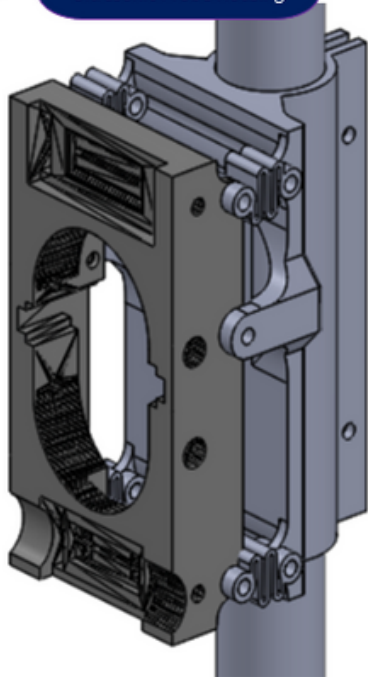
- Used **Solidworks** to design my parts
- Applied **DFM principles** for housing design
- **3D Printed** all components

### Results

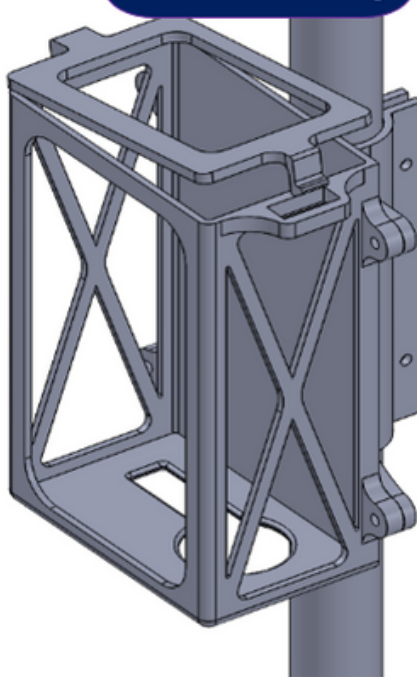
- New design **reduced manufacturing & assembly time by 45%** with its **minimal part count**

## ULTRASONIC TESTING PROBE MOUNTS - PR

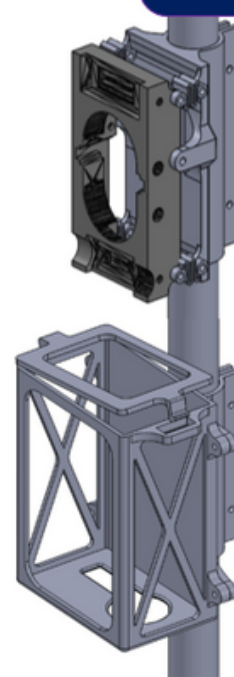
Ultrasonic Probe Housing



Ultrasonic Generator Housing



Full Assembly



### What?

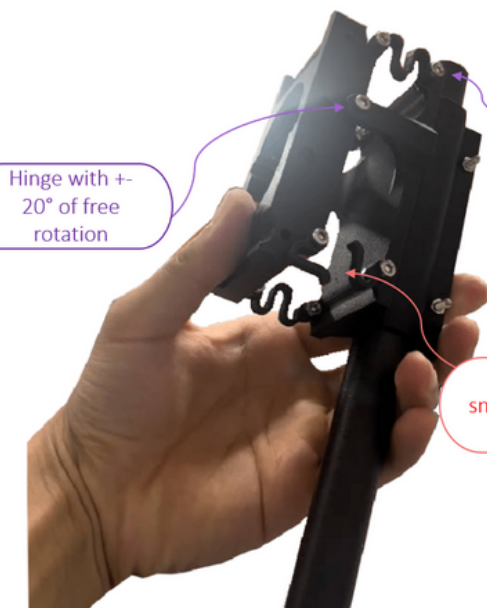
- **Design** and **fabricate** the housing and mounting clamps for Ultrasonic Testing (UT) equipment
- Design a **compliant spring mechanism** to allow for limited rotation of UT Probe head

### How?

- Used **SolidWorks** to design fixture
- **Prototyping** of various spring designs to achieve target flexure
- Prototyping & **extensive testing** of **snap fit lock** and **friction clamps**

### Results

- The UT set has been **successfully deployed** for On-Site NDT **operations**, with **good reviews** from the operations team



Hinge with +/- 20° of free rotation

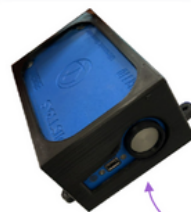
3D Printed Springs (Prototype)



Prototype spring snapped during stress test

Snap Fit Lock

Slide-In Mount for UT Generator



Cut-Outs with tolerances for connection ports

Friction Clamp



## DRONE POWDER RELEASE MECHANISM & MOUNT - PR



### What?

- **Design, Fabricate & Test** a **powder dispensing mechanism** which mounts onto a powder payload
- **Minimize** number of **electrical components** required
- Ensure payload and dispensing mechanism can be **quick-released**

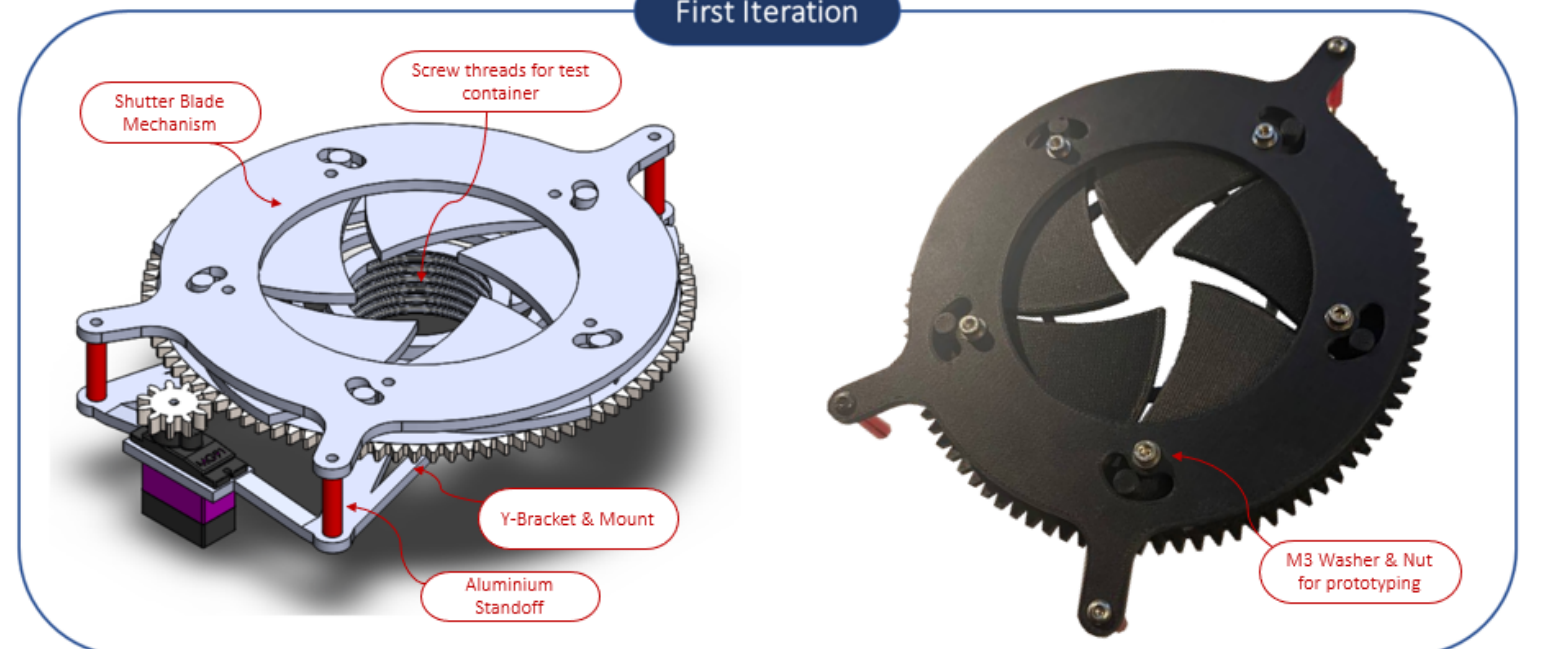
### How?

- Produced **3D CAD** models with **Solidworks**
- Used **Solidworks Gear Toolkit** to design gear system
- **3D Printed** all components

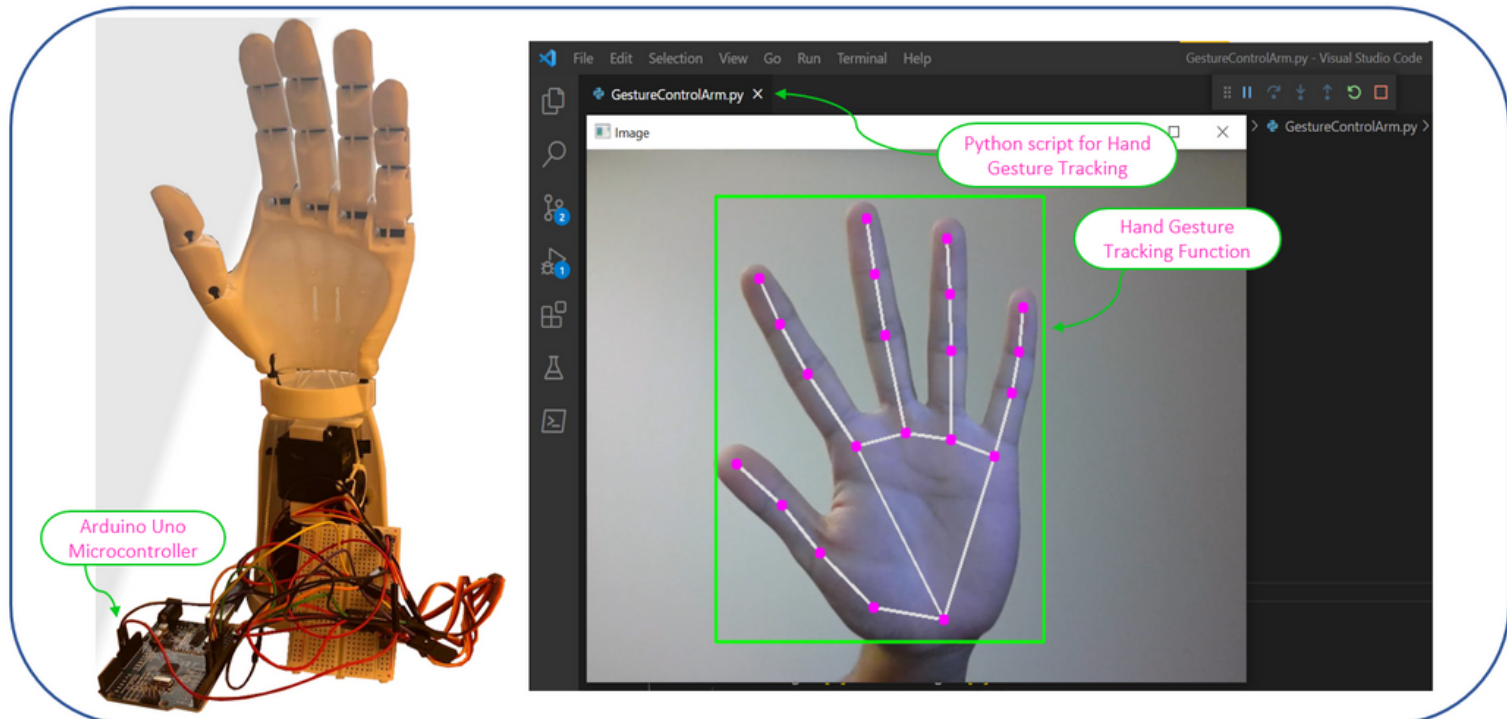
### Results

- The design fulfilled its task well while **minimizing weight** and **part count**
- Design will be further iterated and **presented to the private client for sale**

### First Iteration



## 3D-PRINTED GESTURE TRACKING ROBOT HAND



### What?

- **Design, Fabricate & Assemble** a 3D-Printed Robot Hand
- Implement **hand gesture tracking** ability via **computer vision**

### How?

- **Improved** upon open source 3D Robot Hand design to **fix wrist joint design issues**
- Used **Arduino Uno** for robot finger controls
- Implemented **CV2 & CVZone python packages** for computer vision capability

### Results

- Robot Hand can track and mimic user hand gesture **successfully and quickly (scale of 0.1 seconds)**

