

Piper Jacobs

Portfolio

Disclaimer:

Material contained in this portfolio is limited and does not contain material prohibited by any NDA.

Table of Contents

<u>Professional Experience</u>	4
• Boston Engineering	5
• Space Exploration Technologies	7
• Sonos	9
• Tesla	14
<u>Project Experience</u>	20
• NU Baja	21
• ME Capstone Project	26
<u>Contact Information</u>	30

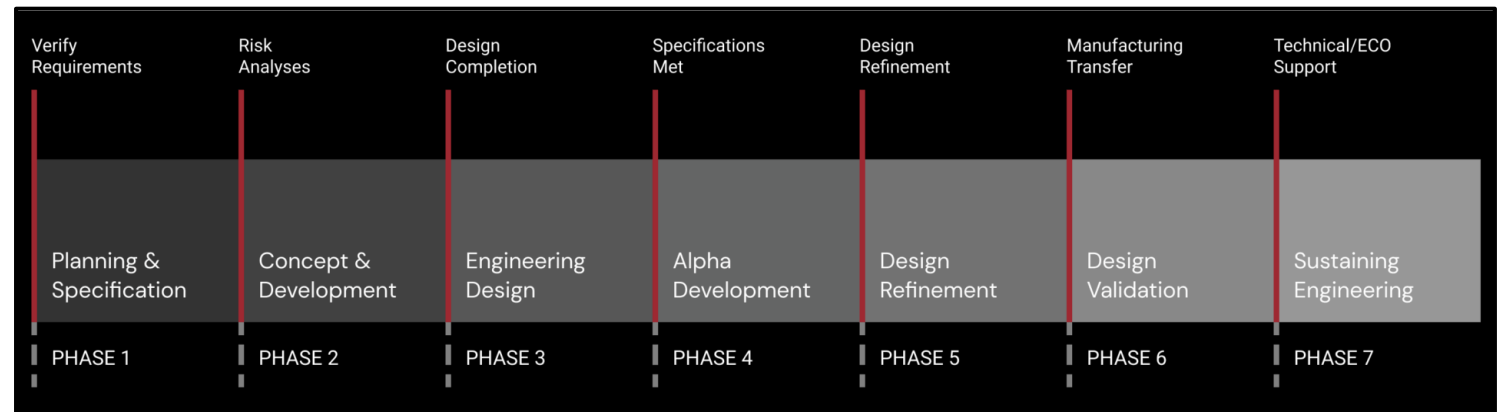
Professional Experience

Boston Engineering

July 2022 - Present

Consulting

While at Boston Engineering, I consulted for a wide variety of industries. I am unable to share any samples of work from this time period due to confidentiality. Please refer to my resume for details about my work there.



Space Exploration Technologies

January 2021 - June 2021

Starlink User Terminal

While at Space Exploration Technologies, I worked on the Starlink User Terminal team. I am unable to share any samples of work from this time period due to confidentiality. Please refer to my resume for details about my work there.

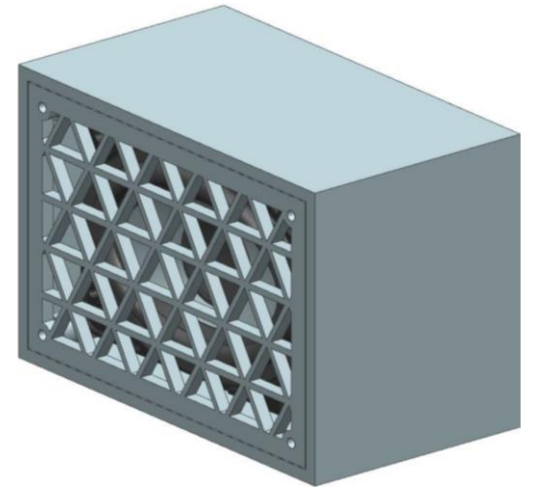
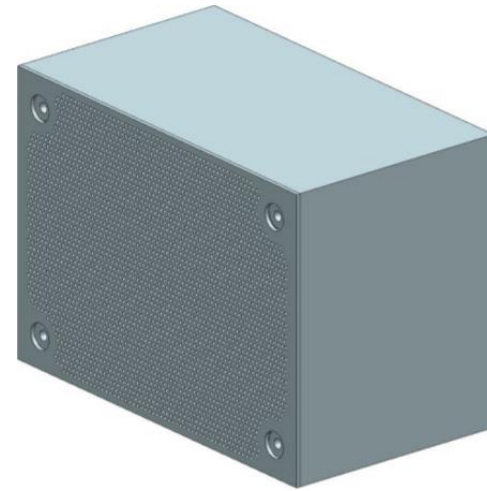


Sonos

January 2020 - June 2020

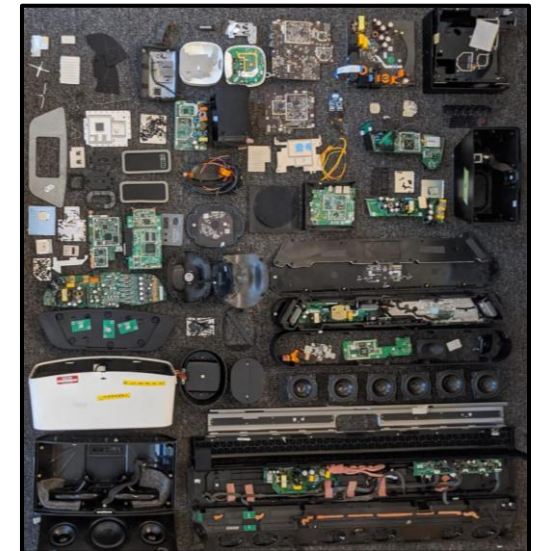
Industrial Design Prototypes

- Designed and 3D printed prototypes of transducer, substrate, and grill assembly.
- Allowed for the Industrial Design team to visually inspect mock-ups.
- Enabled team to quickly test design options by swapping pieces in and out.



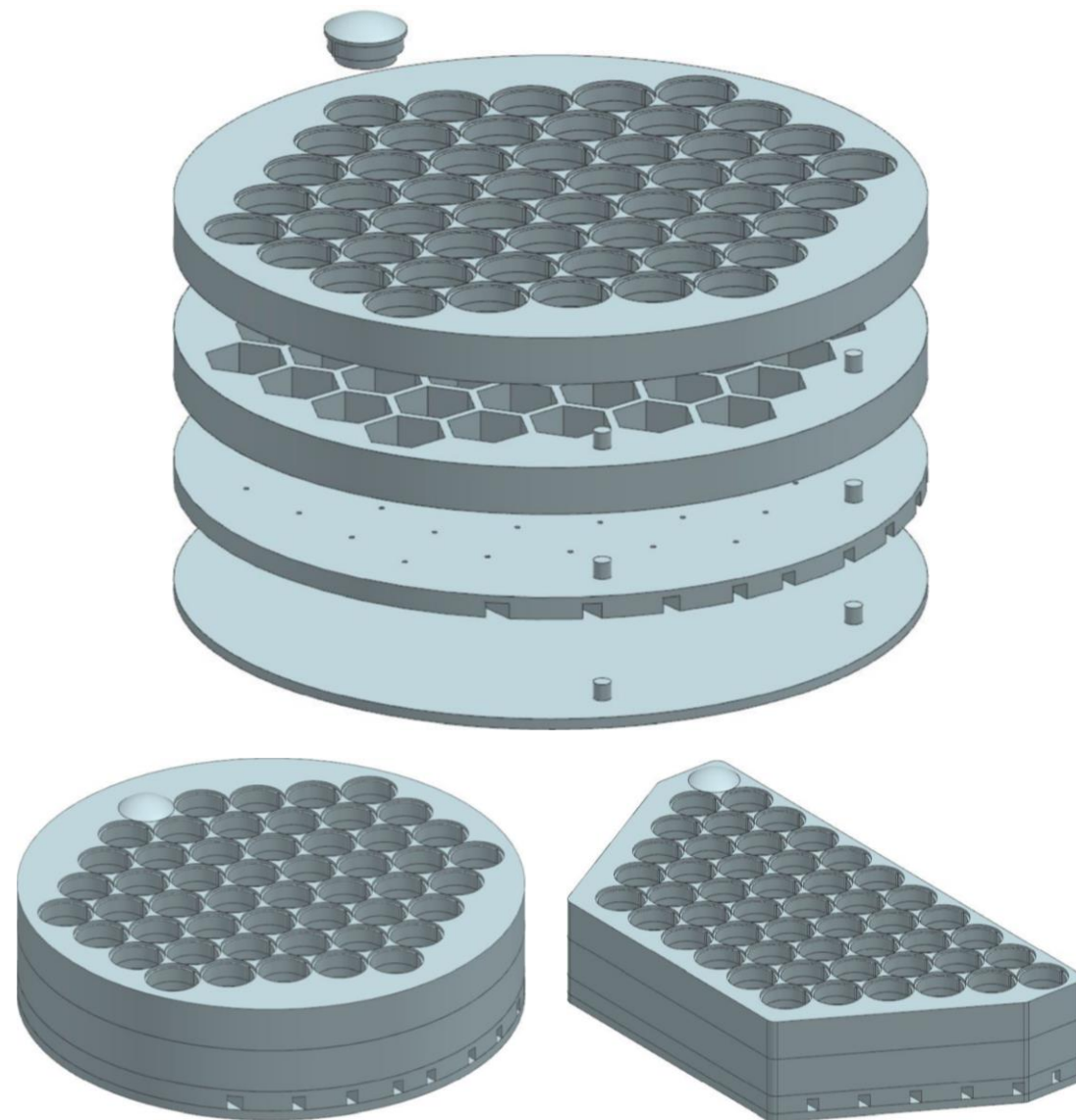
Consumer Privacy Initiative Support

- Supported initiative to destroy memory modules before electronic waste recycling.
- Generated CAD to instruct 3rd party labor service providers where to drill into product memory modules.
- Provided detailed documentation for every product and generation.



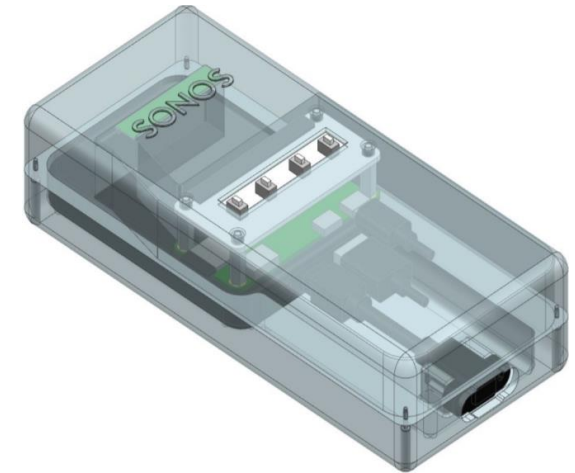
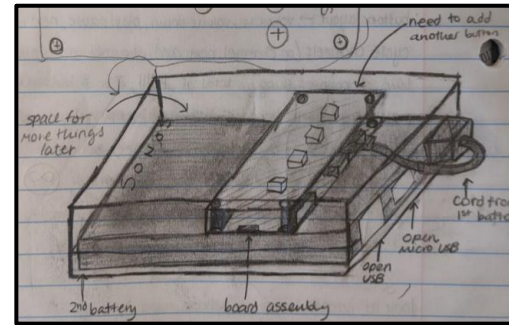
Transducer Arrays

- Designed housings for arrays of 50+ audio transducers.
- Optimized assembly for easy 3D printing, modular layers, and wire routing.
- Integrated requirements of adjustable acoustic volume and surfaces compatible with acoustics.



Hack Week Project

- Partnered with an electrical engineer and a computer engineer to develop a prototype remote.
- Demonstrated concept of operations using works-like prototype.
- Pitched idea to company during hack week.



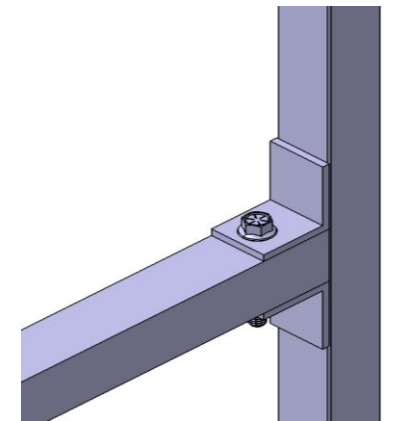
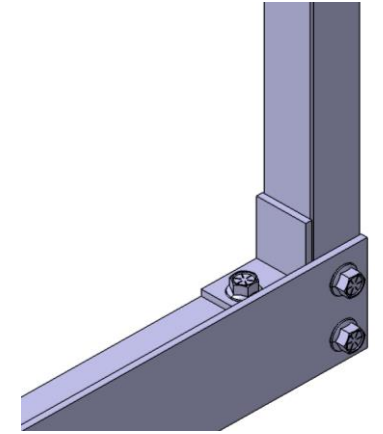
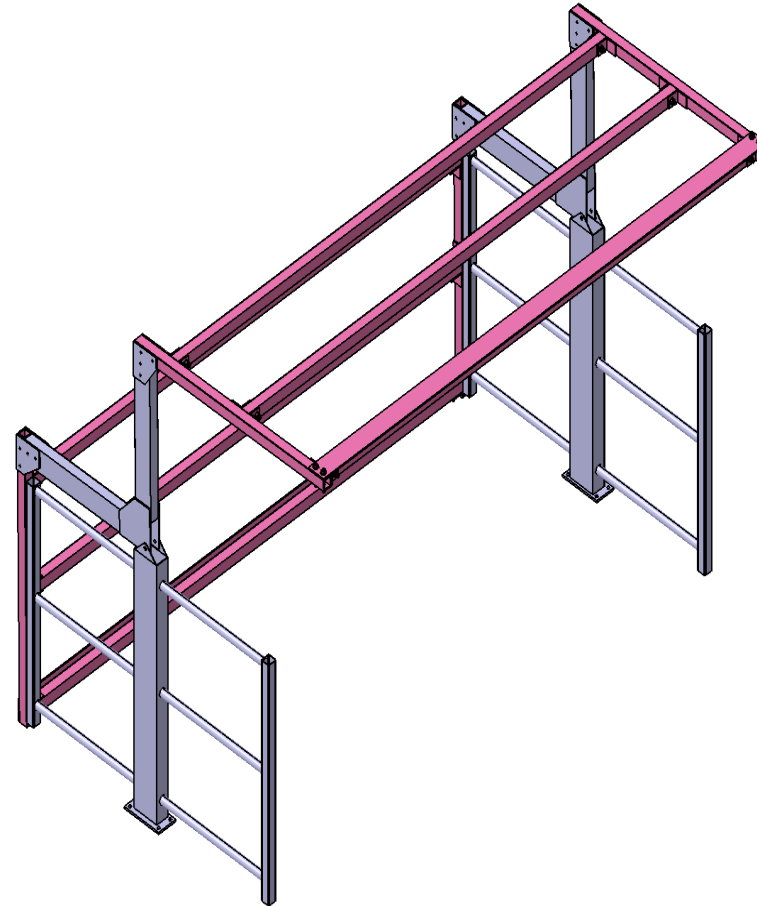


Tesla

January 2019 - August 2019

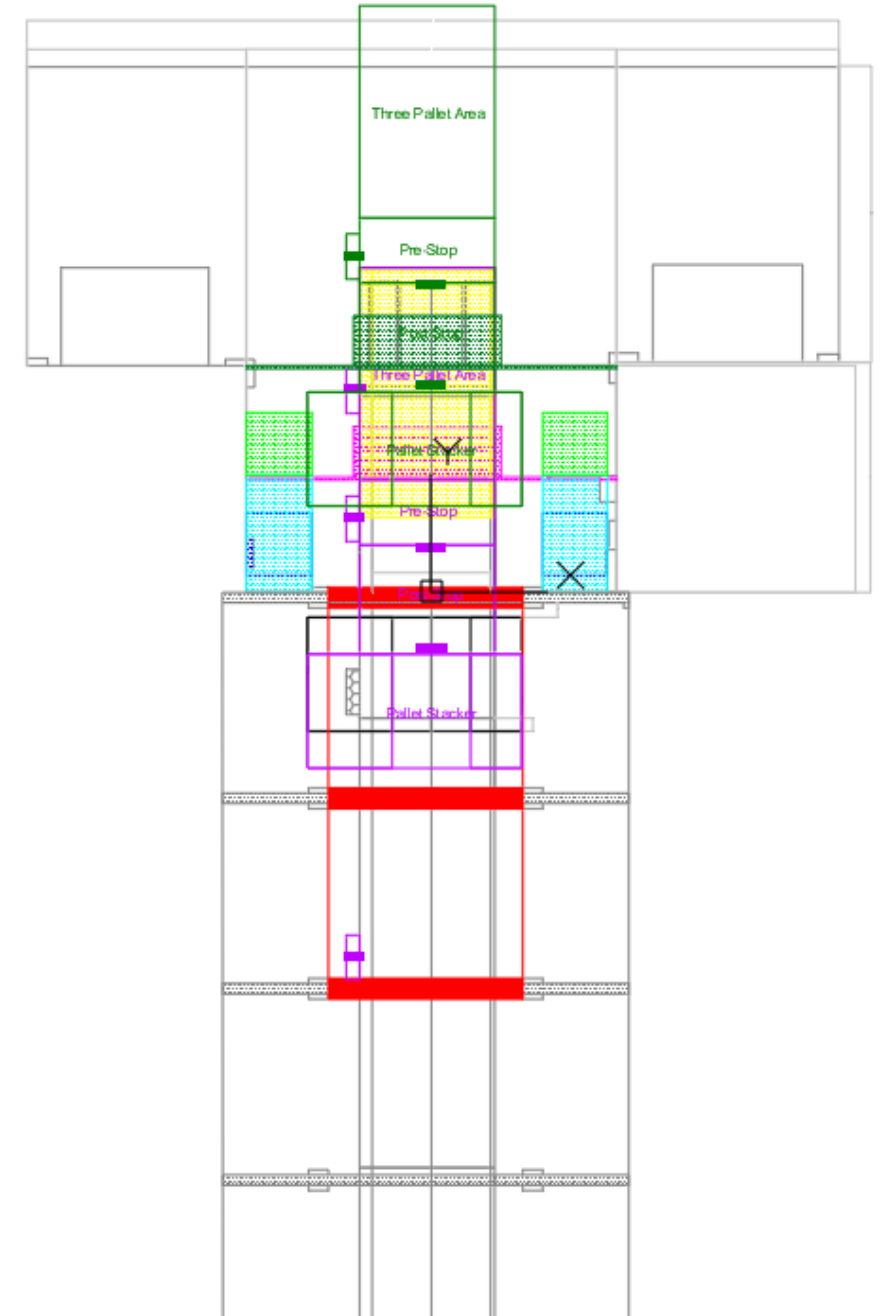
Material Handling Safety Gate

- Created modular replacement parts for an off-the-shelf material handling mezzanine safety gate.
- Designed system to be manufactured in-house to reduce cost and lead time.
- Increased operator safety and technician efficiency.



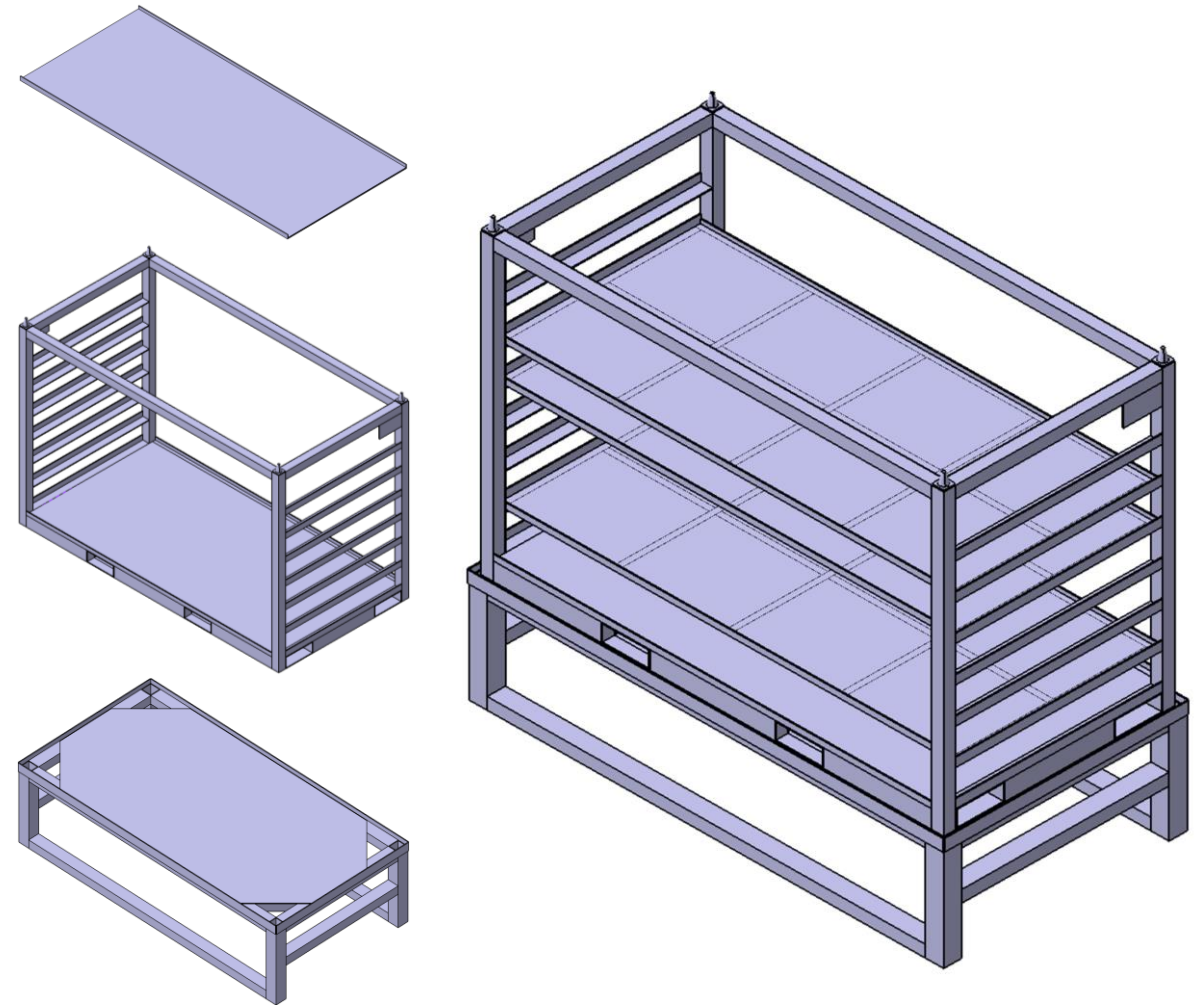
Pallet Stacker Installation

- Served as the mechanical lead of the installation of a pallet stacker.
- Planned installation steps, established budget, and pitched project to relevant departments.
- Reduced safety incidents and station headcount.



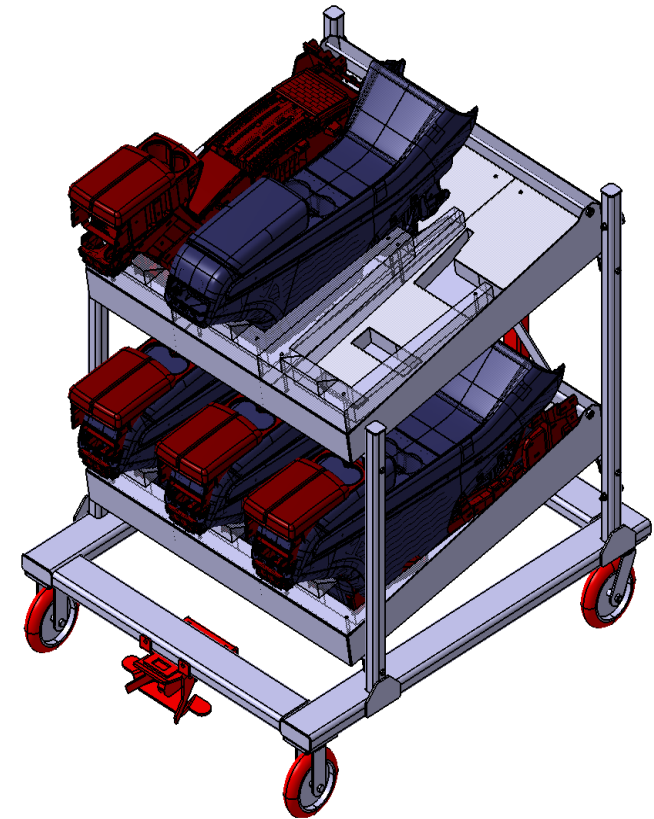
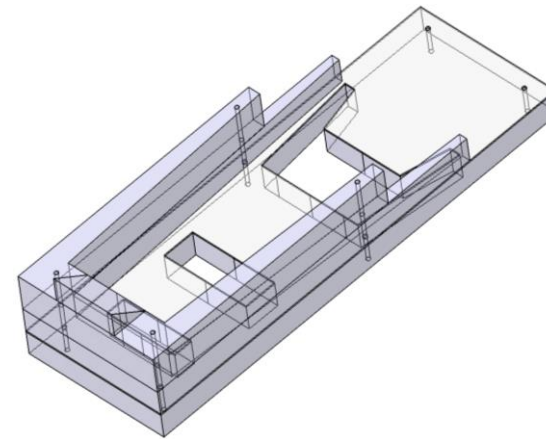
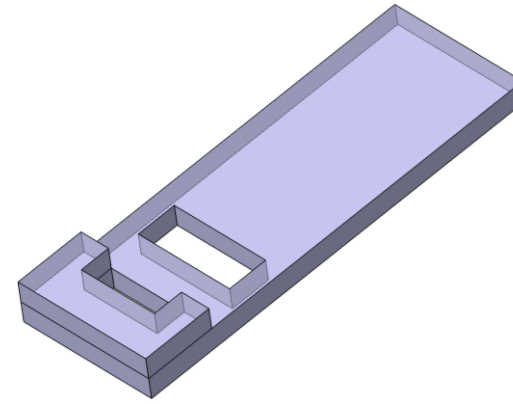
Small Parts Rack

- Designed modular, multi-functional, and adjustable small parts rack.
- Met requirements of one-person operation, ability to interface with electric pallet jack and forklifts, and ability to withstand long-distance transportation on a semi-truck.
- Sent design for quotes, ordered prototypes, and validated functionality.



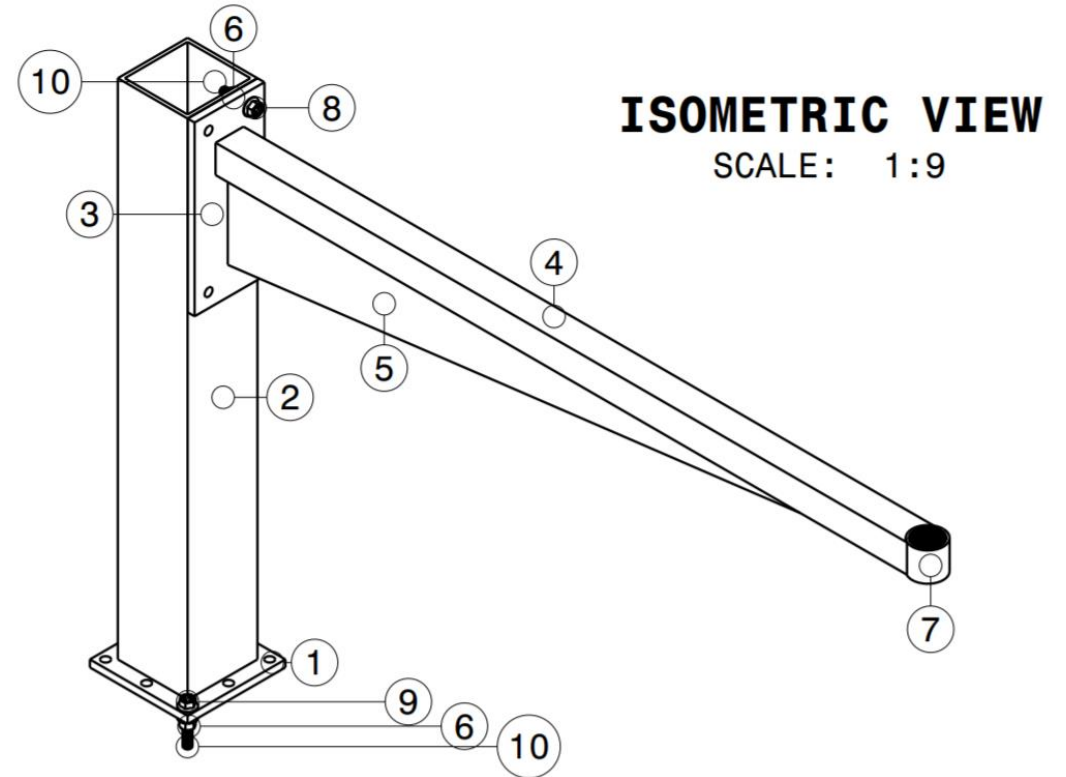
Center Console Dolly

- Redesigned existing foam shadow boards to accommodate an additional type of center console.
- Created and validated prototype in-house.
- Sent design for quotes and completed cost analysis comparing internal and external fabrication.



Camera Mount

- Designed camera mount for a pallet elevator.
- Fabricated, welded, and installed eight units.
- Reduced technician workload by allowing for problems to be remotely diagnosed and solved.



Project Experience

NU Baja

September 2017 - July 2022

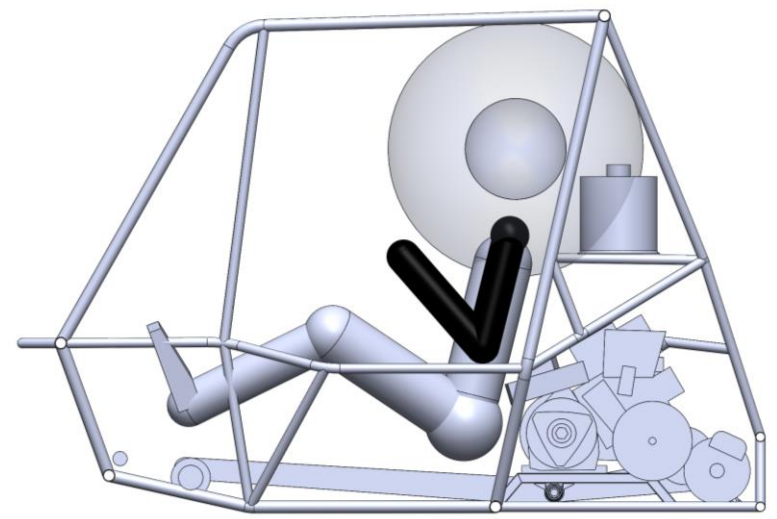
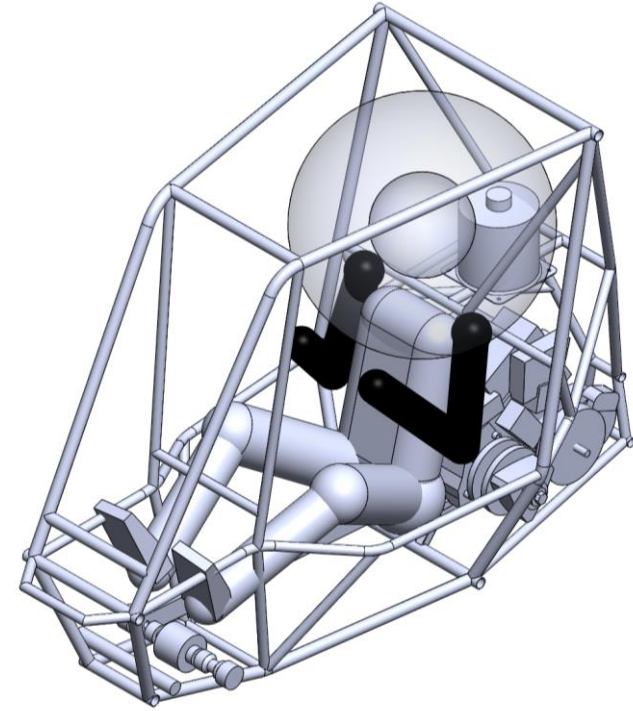
Chassis Design

- Developed design requirements that incorporated competition rules, requirements from other subsystems, and vehicle goals.
- Adapted to necessary changes resulting from the transition to a 4WD vehicle.
- Developed parametric model of chassis in SolidWorks to allow for rapid iteration.

Designation	Requirement	Rationale	VnV Approach	VnV Description
C-R1	Chassis must conform to the rules	This is a requirement for passing technical inspection	Inspection	Technical inspection must be performed virtually before finalizing design and with vehicle after manufacturing
C-R2	Chassis must accommodate other subsystems and resulting loads	This is a requirement for system integration	Inspection	Vehicle must be
C-R3	Rollcage must withstand front impact of 9250 N	Normal operation of vehicle results in various impacts	Analysis	FEA simulation of three cases of impact value, must withstand impact case
C-R4	Rollcage must withstand rear impact of 9250 N	Normal operation of vehicle results in various impacts	Analysis	FEA simulation of three cases of impact value, must withstand impact case
C-R5	Rollcage must withstand shock impact of 5000 N	Normal operation of vehicle results in various impacts	Analysis	FEA simulation of three cases of impact value, must withstand impact case
C-R6	Rollcage must withstand rollover impact of 9250 N	Normal operation of vehicle results in various impacts	Analysis	FEA simulation of three cases of impact value, must withstand impact case
C-R7	Rollcage must withstand additional impact scenario of 9250 N	Normal operation of vehicle results in various impacts	Analysis	FEA simulation of three cases of impact value, must withstand impact case
C-R8	Chassis and guarding must accommodate the access of all components in the cockpit in less than 15 mins	Guarding and panels need to be quickly removable to allow for servicibility	Test	Time the removal and installation of panels
C-R9	All cockpit flooring must support 50 lbs without failure	Cockpit collects debris, too much debris can cause the bellypan to fail, in the past car has needed repairs mid-race due to this	Test	Put weight on the floor of the cockpit in increments, note when cockpit begins to fail
C-R10	Chassis should maintain or reduce aerodynamic drag force from 2019	Aerodynamic drag has the potential to reduce the speed of the vehicle	Analysis	Drag calculations vs. SolidWorks weight

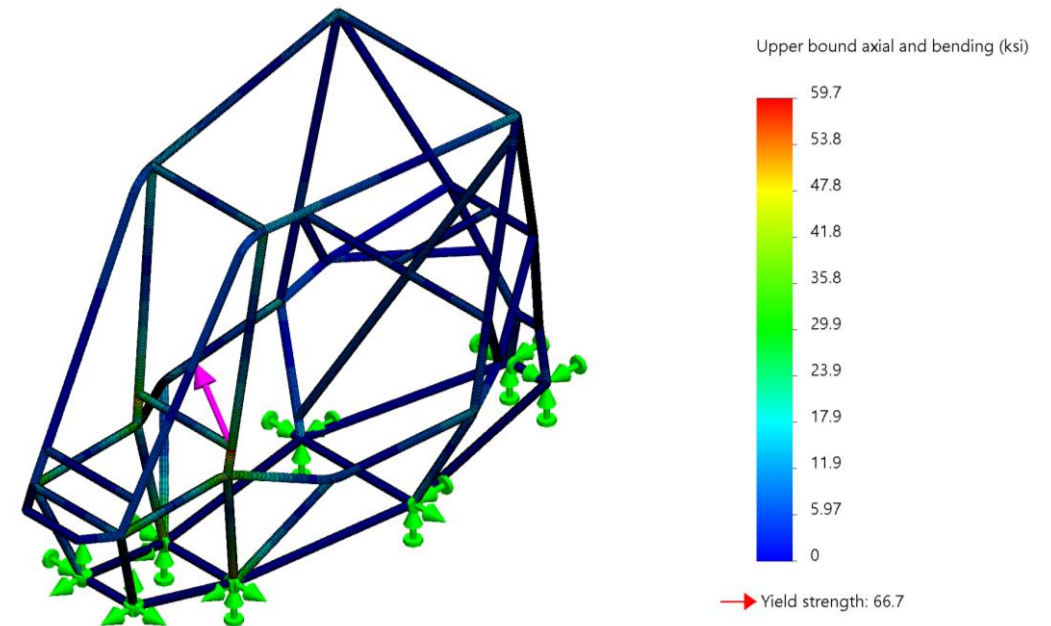
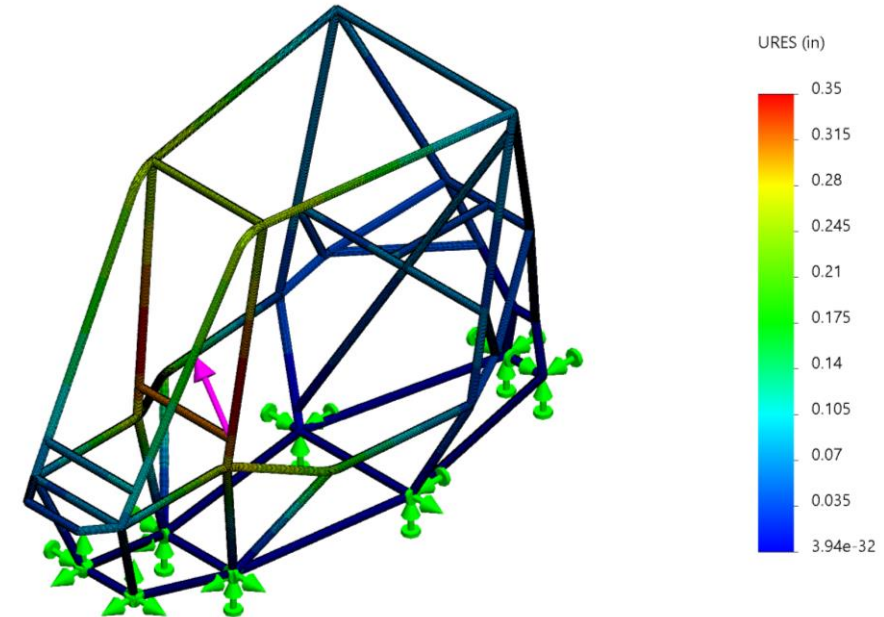
System Integration

- Utilized 5th percentile female and 95th percentile male CAD models to adjust vehicle design for ergonomics.
- Built vehicle chassis to accommodate suspension inputs and loads.
- Designed around an allocated keep-out-space for the engine, drivetrain, and gas tank.



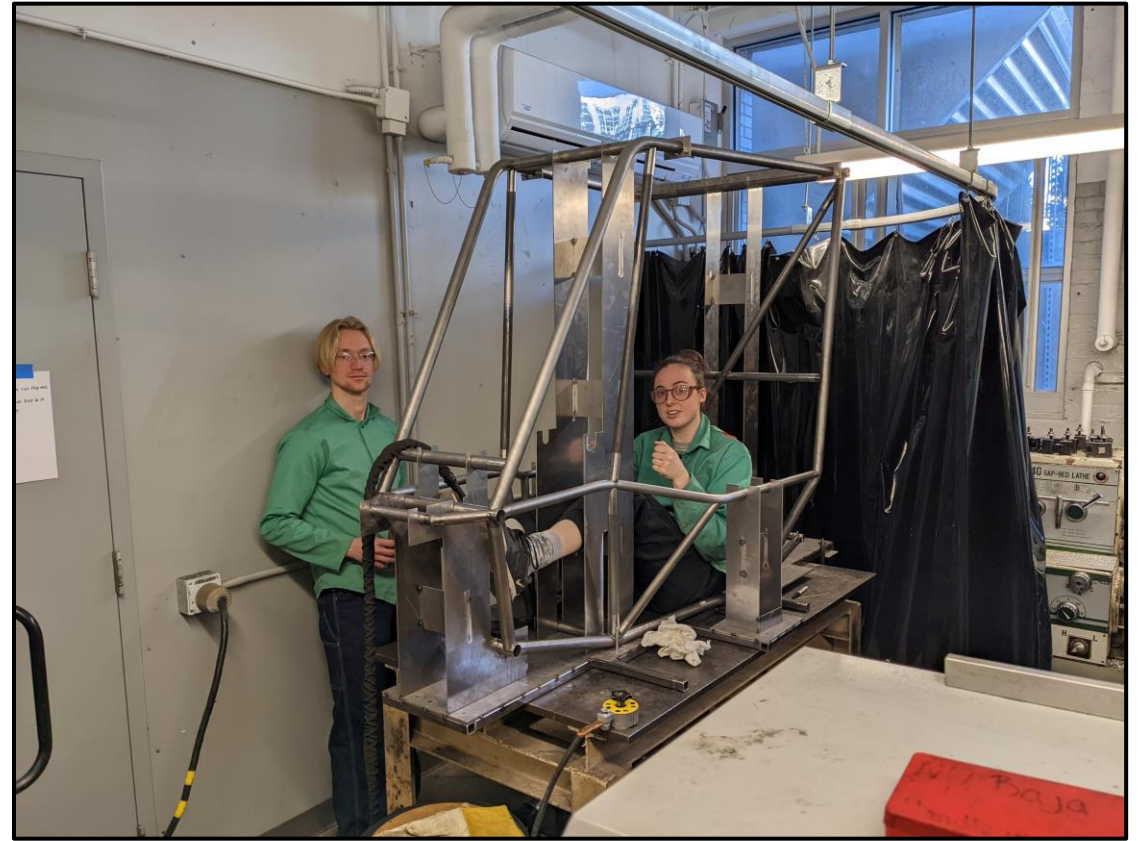
Chassis Analysis

- Calculated realistic impact values based on vehicle testing data.
- Iterated design based off results of SolidWorks FEA.
- Simulated multiple common impact cases to analyze expected stress and displacement.



Chassis Fabrication

- Developed detailed work instructions for assembling and welding chassis based on order of construction and tolerance considerations.
- Utilized custom jigs to constrain chassis during welding.
- TIG welded 4130 steel chassis.

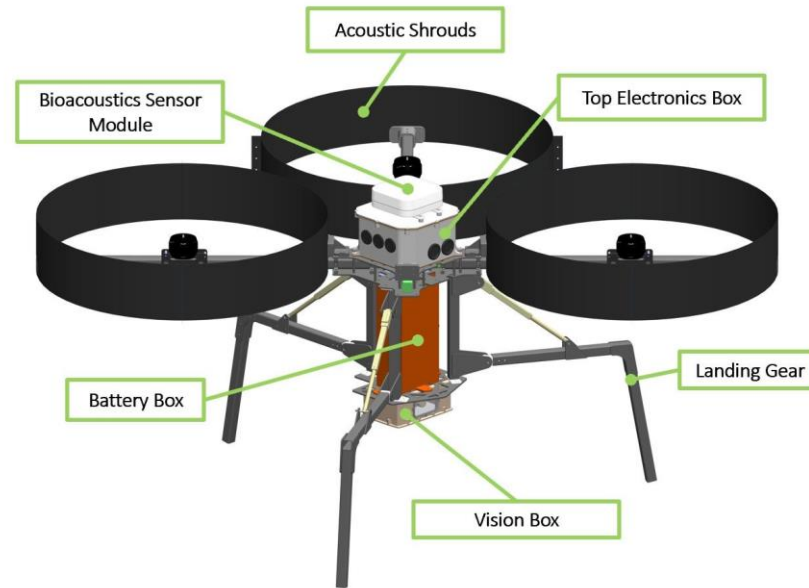


ME Capstone Project

June 2021 - December 2021

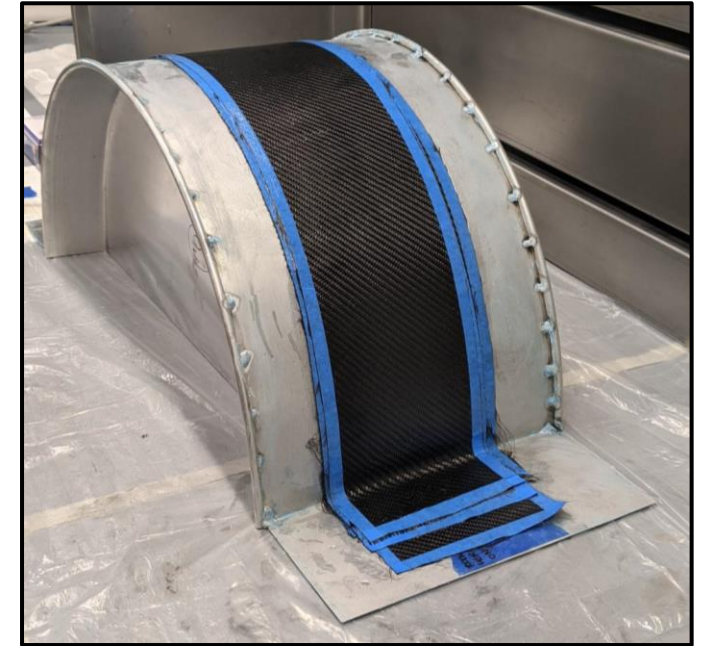
Rainforest Bioacoustics Drone

- Informed group design decisions based on available resources, DFM, and DFA.
- Fabricated all carbon fiber and acrylic components.



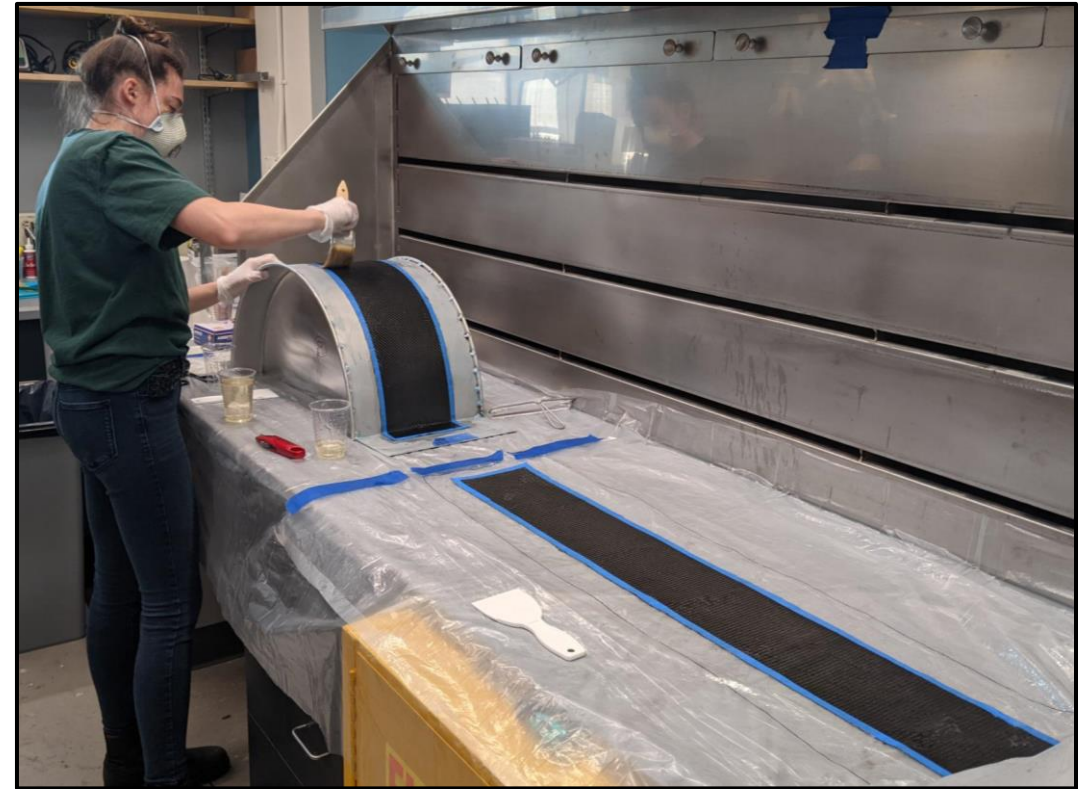
Acoustic-Damping Shroud Mold

- Ideated method of fabricating custom mold for acoustic-damping shroud.
- Created mold by welding together a repurposed cake pan and bent sheet metal.
- Resulted in consistent parts within tolerance.



Carbon Fiber Wet Layup

- Constructed eight carbon fiber, acoustic-damping shrouds using wet layup.
- Fabricated 16 halves out of six layers of carbon fiber fabric and epoxy resin.
- Shaped resulting parts into final form using hand and power tools.



Contact Information

piperjacobs@gmail.com | 716.361.7378 | Allston, MA 02134
<https://www.linkedin.com/in/piper-jacobs/> | <https://www.piperjacobs.com/>