

Group M1.01 - Bobcat Racing Wheel Assembly

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Project Description

The current wheel assembly will be replaced in next year's Car. We have been tasked with creating an Improved wheel Assembly. The aim is to achieve a balance of reduced weight, improved durability and streamlined maintenance.

Background

A wheel assembly is a vital component for a car. It serves as a crucial link between the car's structure and its mobility. Understanding the components and their interactions within the wheel assembly is essential for both proper maintenance and innovation in automotive engineering.

Sponsors & acknowledgements

- Assistant Professor of Practice
- Dr. James W. Davidson
- Learning Assistant
- Daniel Moodie
- Sponsor/ project advisor
- Abhimanyu Sharotry

Customer Needs

- Enhanced Design and Interchangeability
- Compliance with FSAE Regulations
- Improve performance
- Serviceability
- Material Optimization

Process and Design

- Using SolidWorks to sketch components
- Incorporate realistic tolerances

Material Selection

- Aluminum Alloys (6061-T6 or 7075-T6) Lightweight and strength
- 4130 steel: high corrosion resistance, a high strength-to-weight ratio, and good machinability and weldability.

Load Analysis

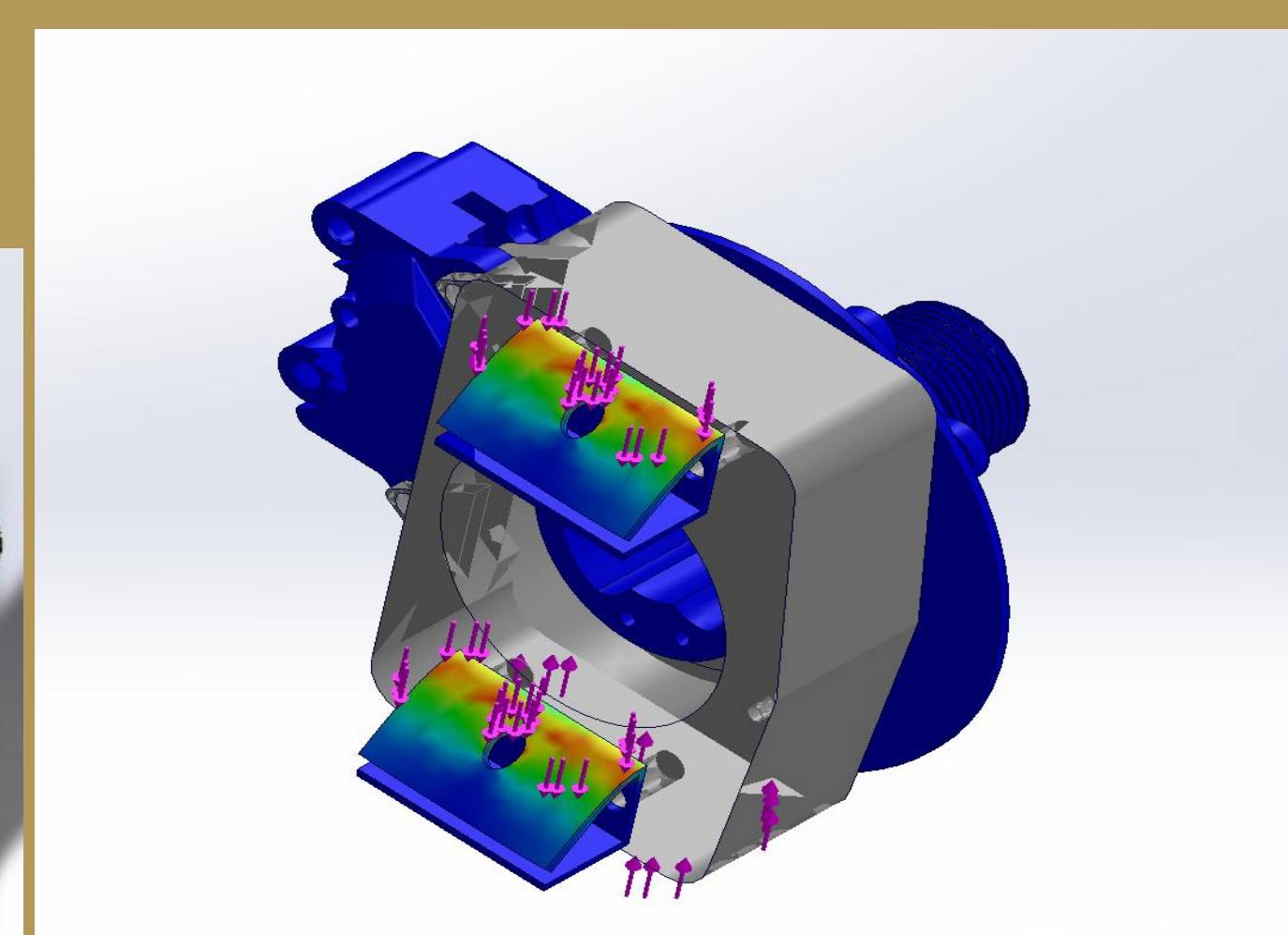
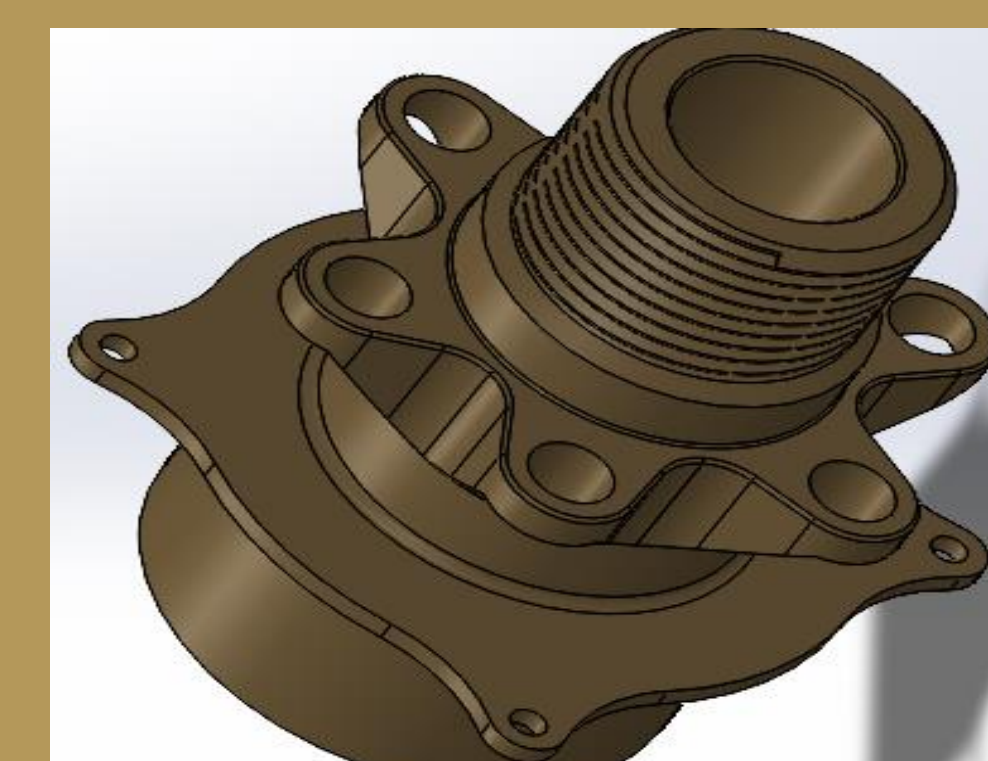
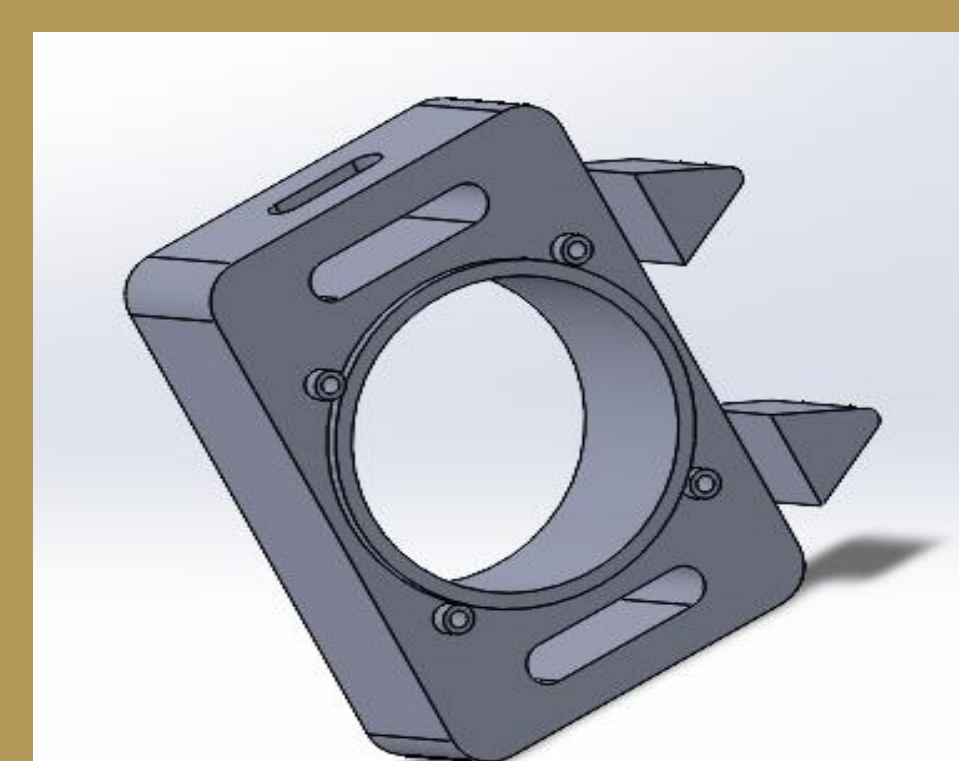
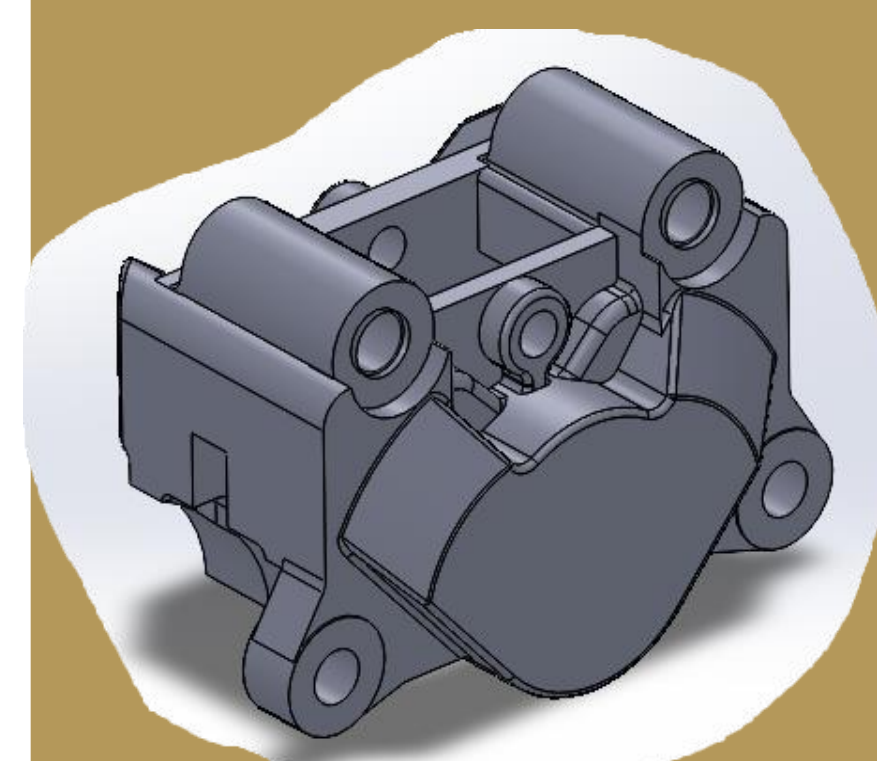
- Cornering : Lateral Loads based on car weight and cornering forces
- Braking : Braking Force and Brake Torque, Brake Bias (Brake balance)
- Perform Finite Element Analysis (FEA) for critical components

Bearing and Fastener Design

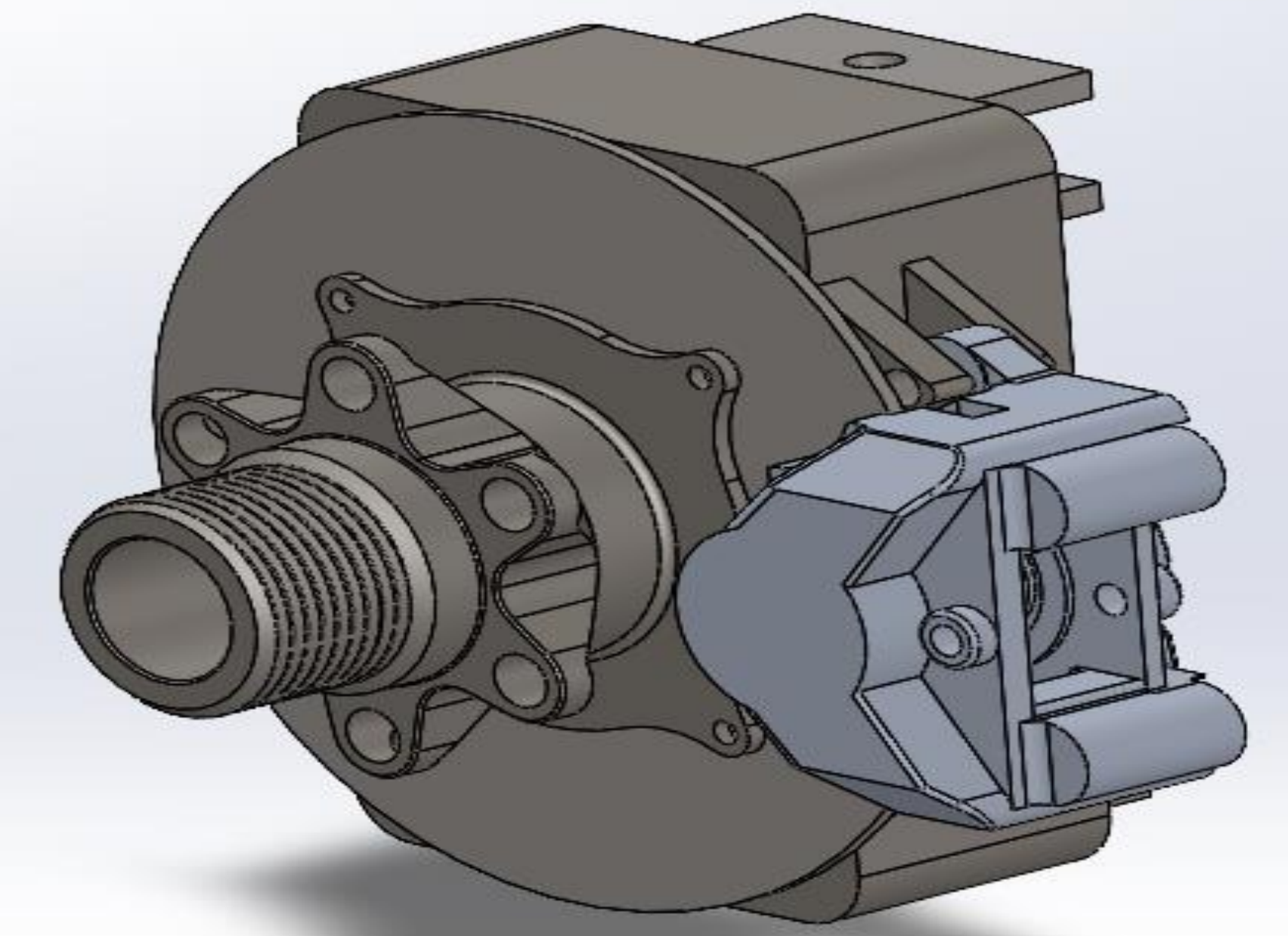
- Select bearings based on
 - Radial and axial load capacities
 - Operating speeds
- Choose bolts with sufficient tensile strength

Brake System Integration

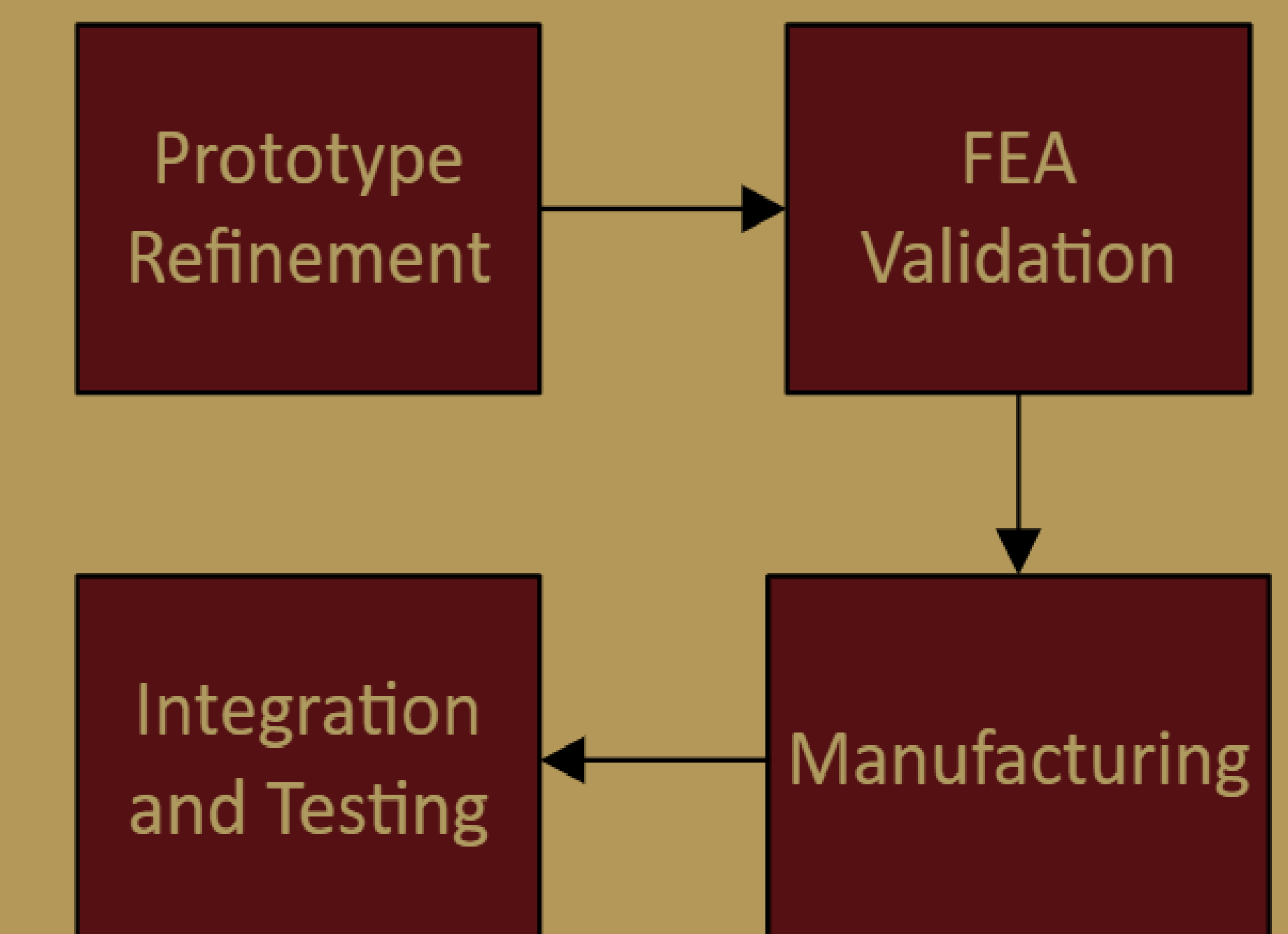
- Design mount for calipers
- Ensure sufficient space for cooling of brake rotor and caliper



Current Prototype



What's Next?



Meet the Team!

