Anteater Baja Racing: Rolling Chassis

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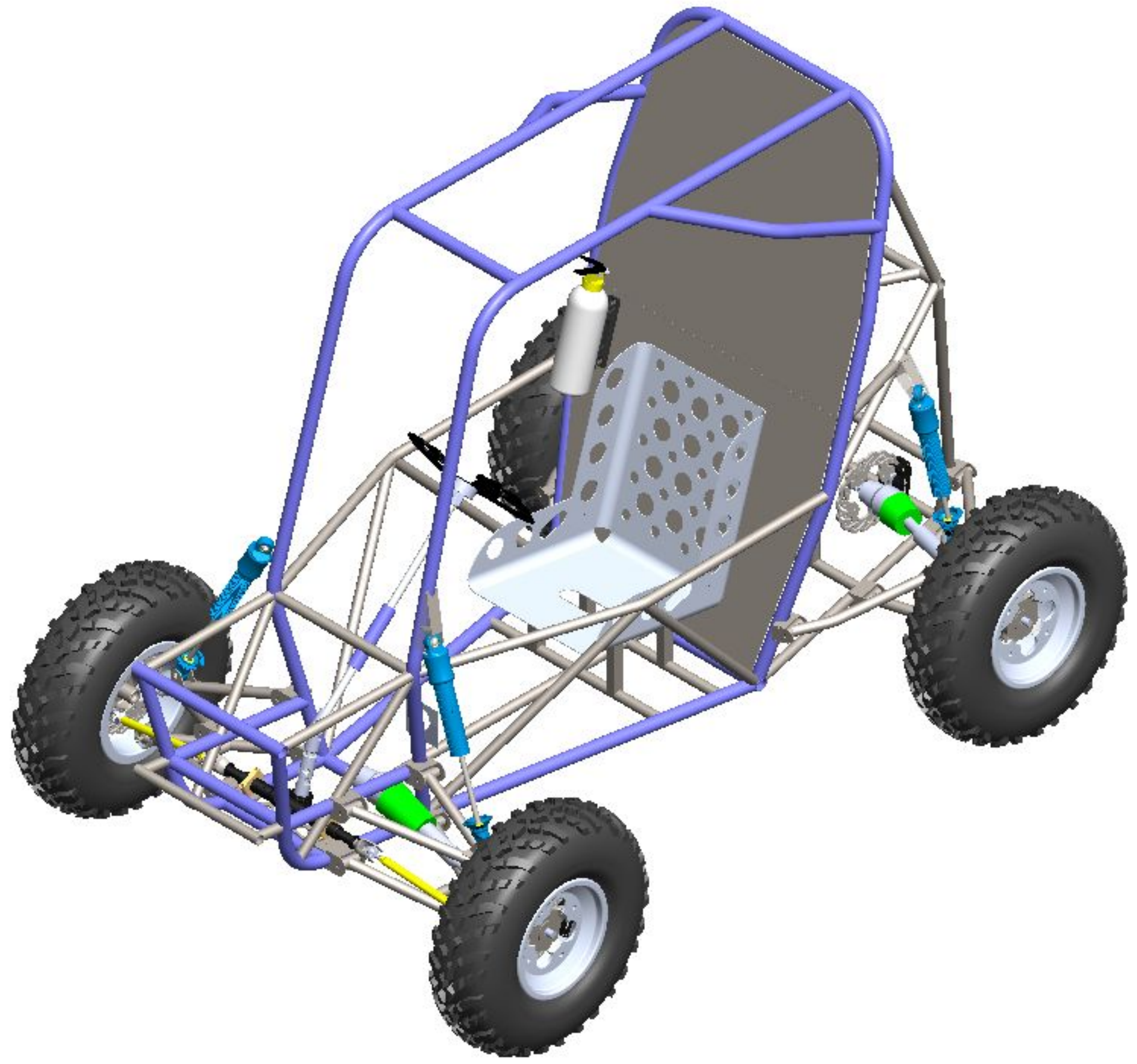
Project Summary

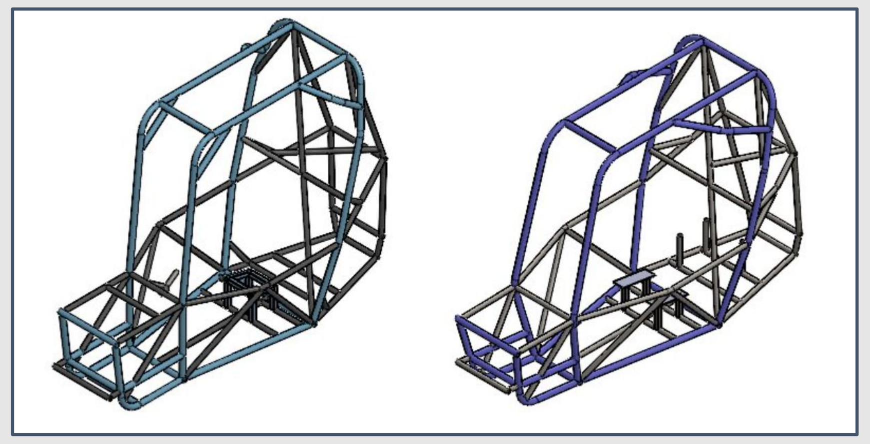
Corsair is Anteater Baja Racing's lightest 4-Wheel Drive (4WD) All-Terrain Vehicle (ATV). Our objective is to design and manufacture a reliable rolling chassis, including the chassis, suspension, and brakes subsystems. This is to achieve our team's goal to complete every event at Baja SAE Arizona 2025 scheduled for May 1st-4th, 2025.

The Baja SAE competition features student teams from over 100 universities directly competing in several performance event categories: Acceleration, Maneuverability, Hill Climb, Suspension, and Endurance.

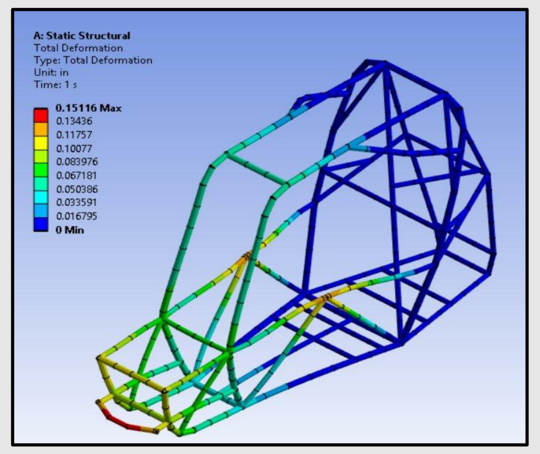


Corsair Rolling Chassis
Suspension, Chassis, Brakes & Human Interface

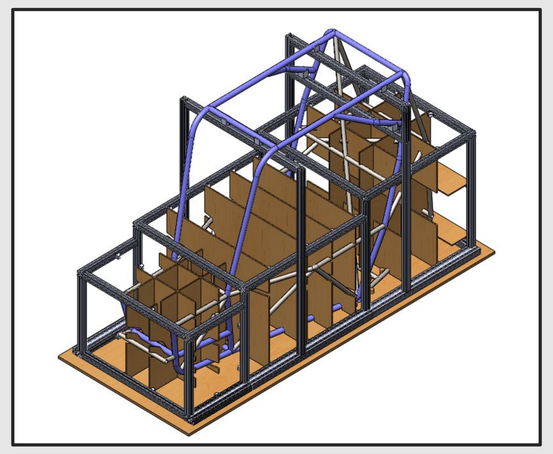
Chassis Frame



Scoundrel (87.5 lbs) vs. **Corsair** (76.8 lbs)



SolidWorks Simulation used to simulate "Front Impact" to verify Chassis Frame (5.03% Max Clearance)



Manufacturing Jig for verification of CAD geometry and minimization of weld distortion

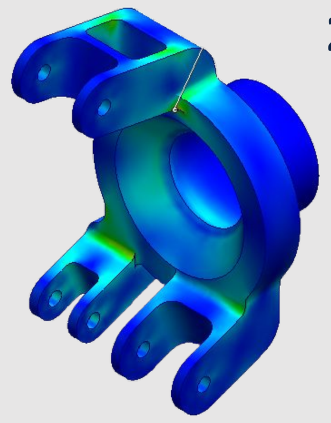
Suspension

Description	Requirement	Reason
Suspension Type	Double A-arms with Toe Link	Allows for dynamic camber and toe gain design
Toe Angles	0.5 deg at full droop and 1.5 deg at full compression throughout wheel travel	Provides more stability landing from a jump
Camber Angles	0 deg at full droop and a max of -3 deg throughout wheel travel	Minimal stress on components while improving handling

Suspension geometry requirements determined from analysis of previous year's competition vehicles

ATV Style Double Wishbone Front & Rear Suspension featuring 10 inches of suspension travel

1.



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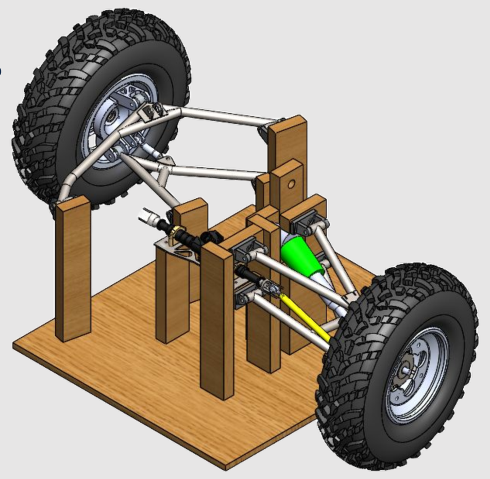
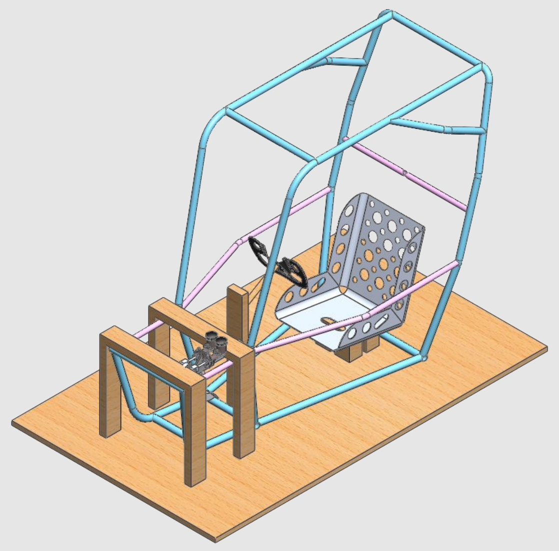


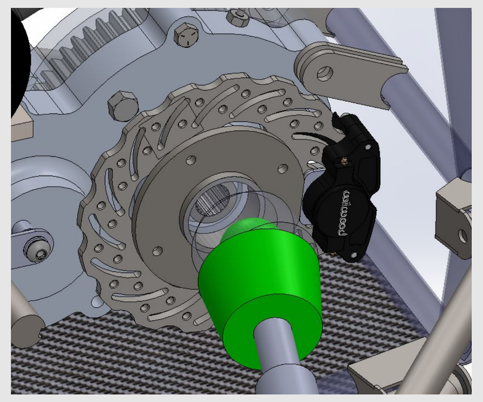
1. **Rear Upright FEA to determine if strength requirements are met**
2. **3D Printed Rear Upright to verify packaging in rim**
3. **Suspension Prototype to verify suspension geometry**

Brakes and Human Interface

Subsystem Prototype:

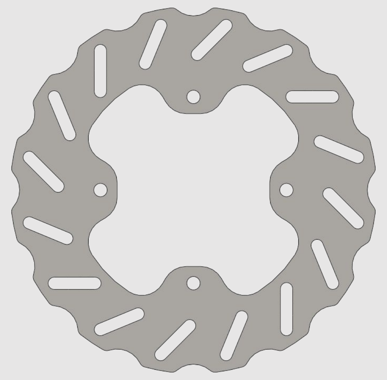


PVC chassis with seat & pedal assembly to verify driver clearances and test pedal effort



Inboard rear brakes for reduced unsprung weight

Requirement to Lock all Wheels with 150 lb Driver (*SAE B.7.1*)	Design Target
Brake Torque Produced by System	220 lbf-ft
Pedal Effort	58 lbf



Custom-designed brake rotor CAD model

Future Improvements

- Design and manufacture custom rack and pinion for greater freedom in steering geometry
- Custom carbon fiber steering wheel with integrated dashboard display and push-to-talk radio system
- Further reduce chassis weight by optimizing the number of members in the design phase

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