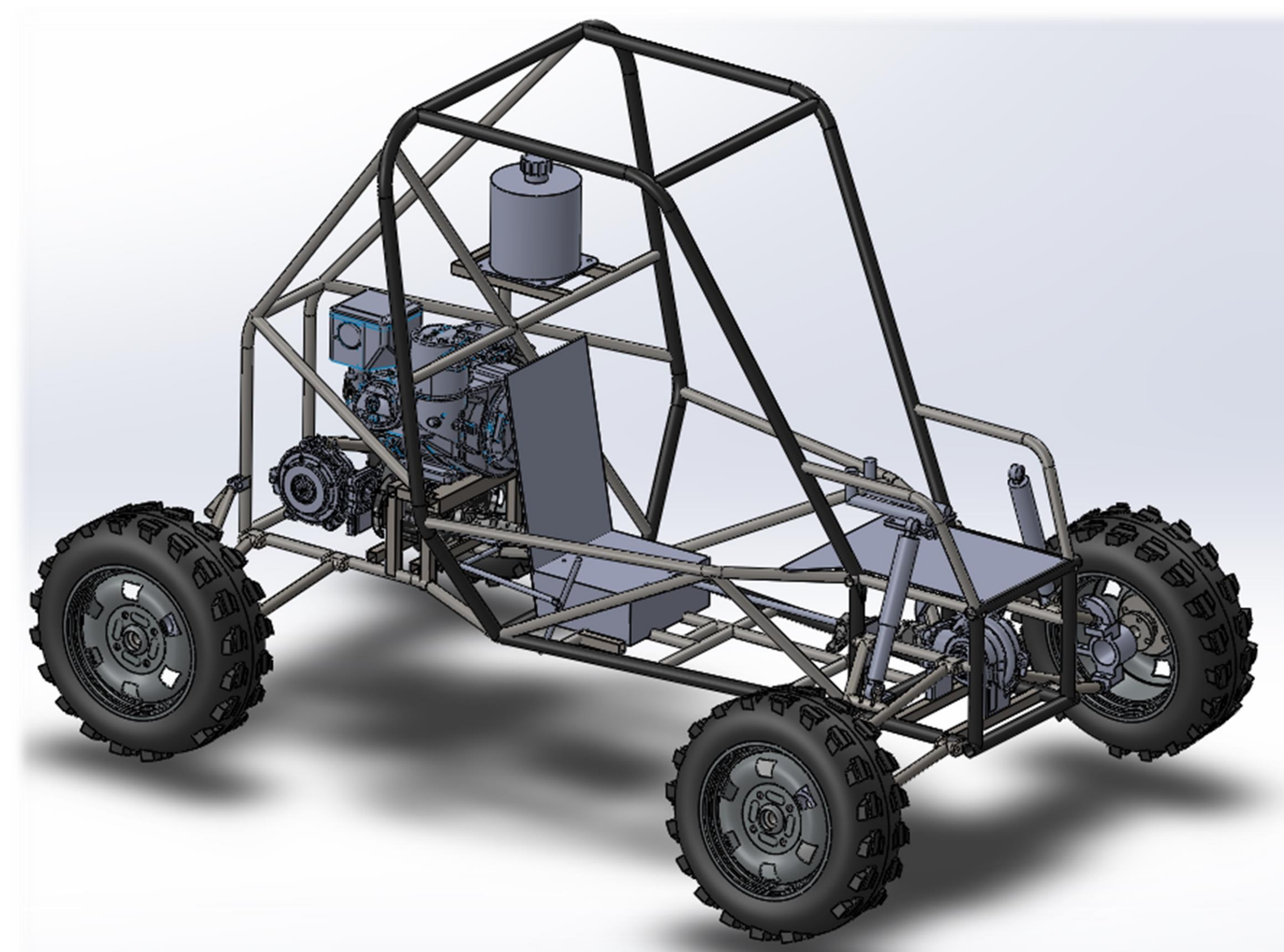


Overview

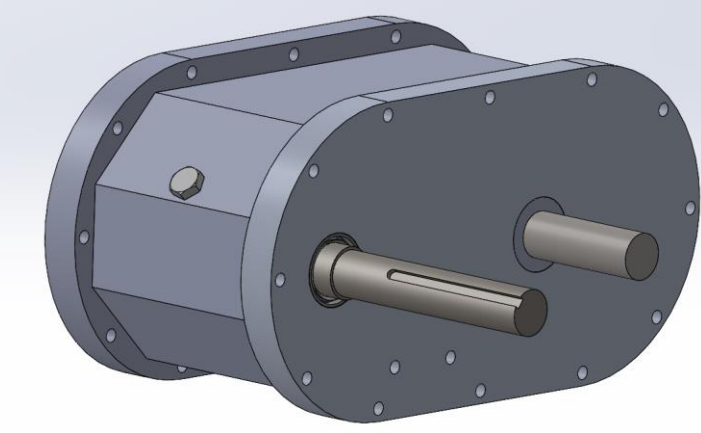


Project Outline

- **Our Task**
 - Design and manufacture single seat all-terrain vehicle
 - 4-wheel drive
 - Must fit SAE guidelines described in rule book
 - Can not modify motor
- **Competition:**
 - Static & Dynamic Events
 - Must pass technical inspection
 - Sled pull
 - Rock crawl
 - Maneuverability
 - 4-hour endurance race

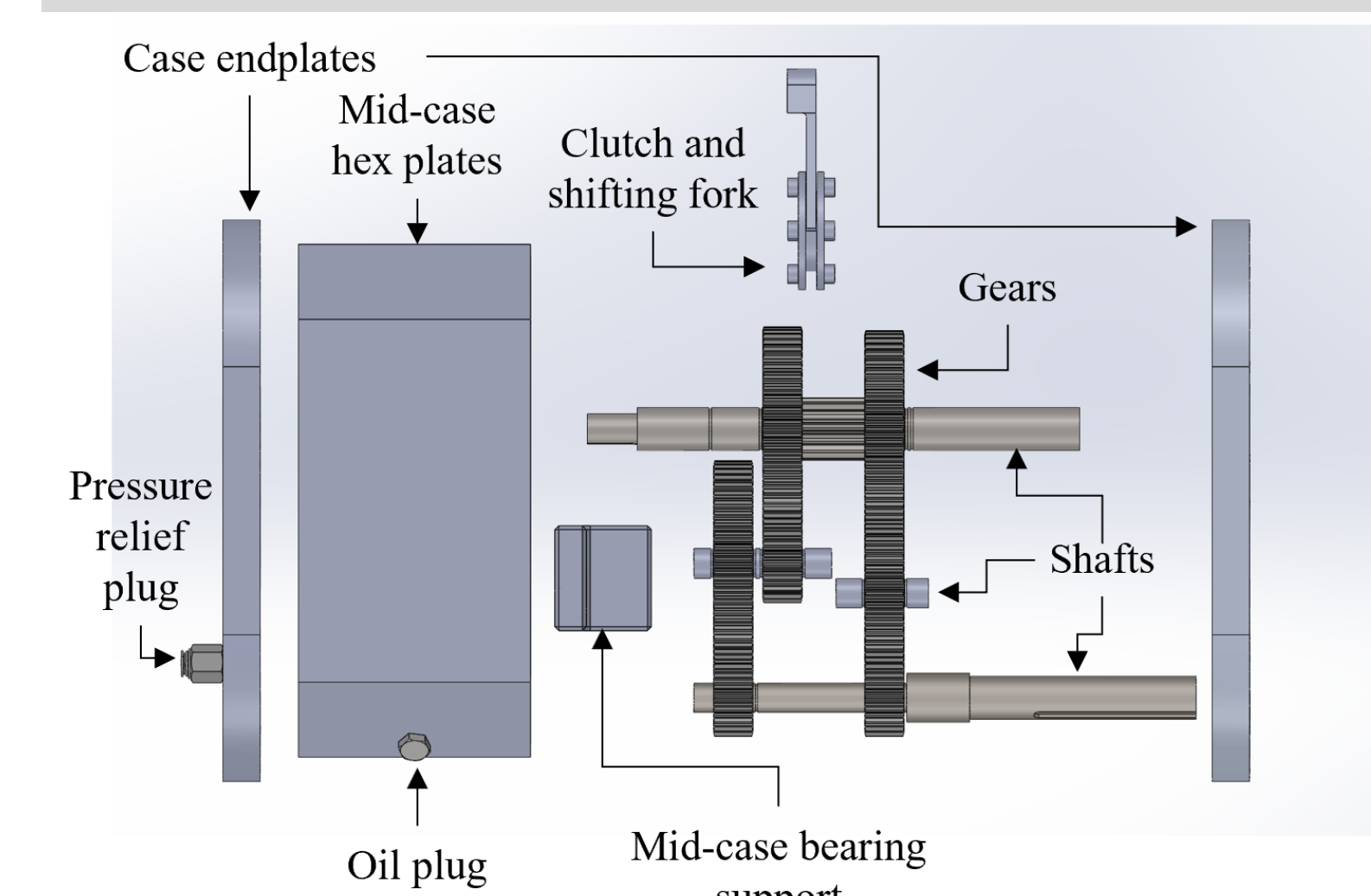


Drivetrain

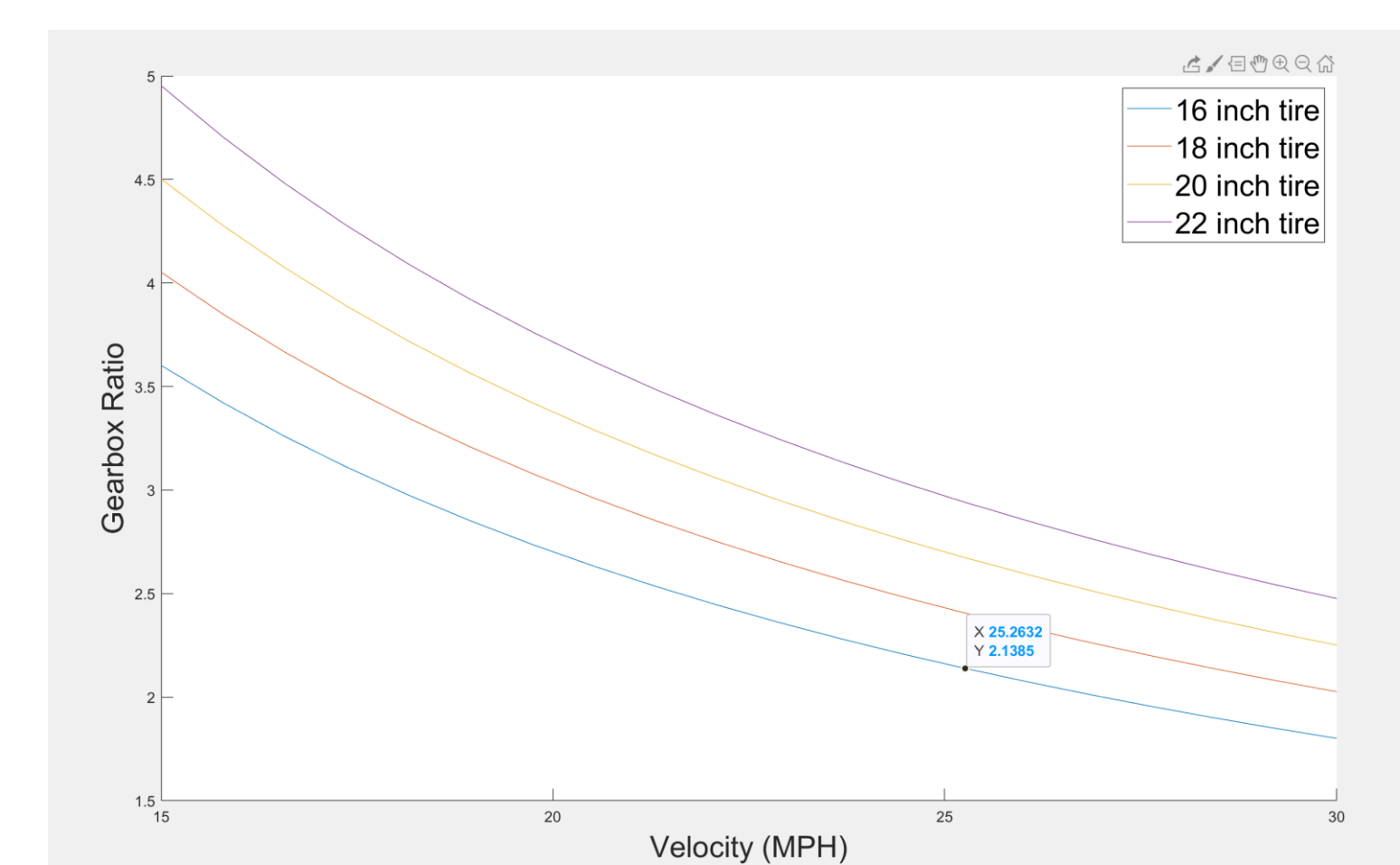


Fully Custom Gear Box:

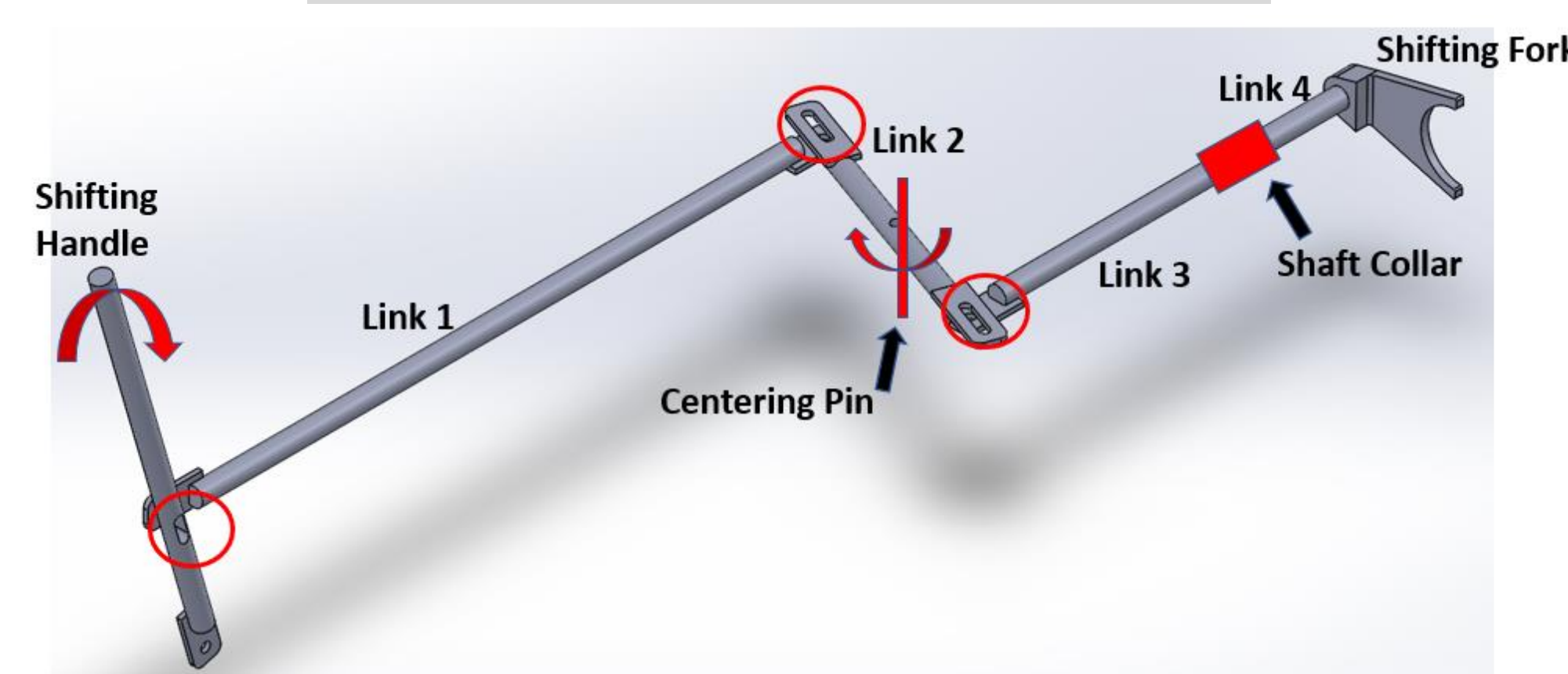
- **Manufactured components:**
 - Case end plates (CNC Mill)
 - Hexagonal mid case plates (cut and welded)
 - Input, output, and idler shafts (Mill & Lathe)
 - Bearing housing (Manual Mill)
 - Output shaft adapters (Mill & Lathe)
- **Bought Components:**
 - Gears (Misumi)
 - Bearings (Misumi / McMaster Carr)
 - Oil Seals (Misumi / McMaster Carr)
 - Oil Plug
 - Pressure Relief plug



Gear Ratio Determination Graph



Shifting Linkage Design & Layout



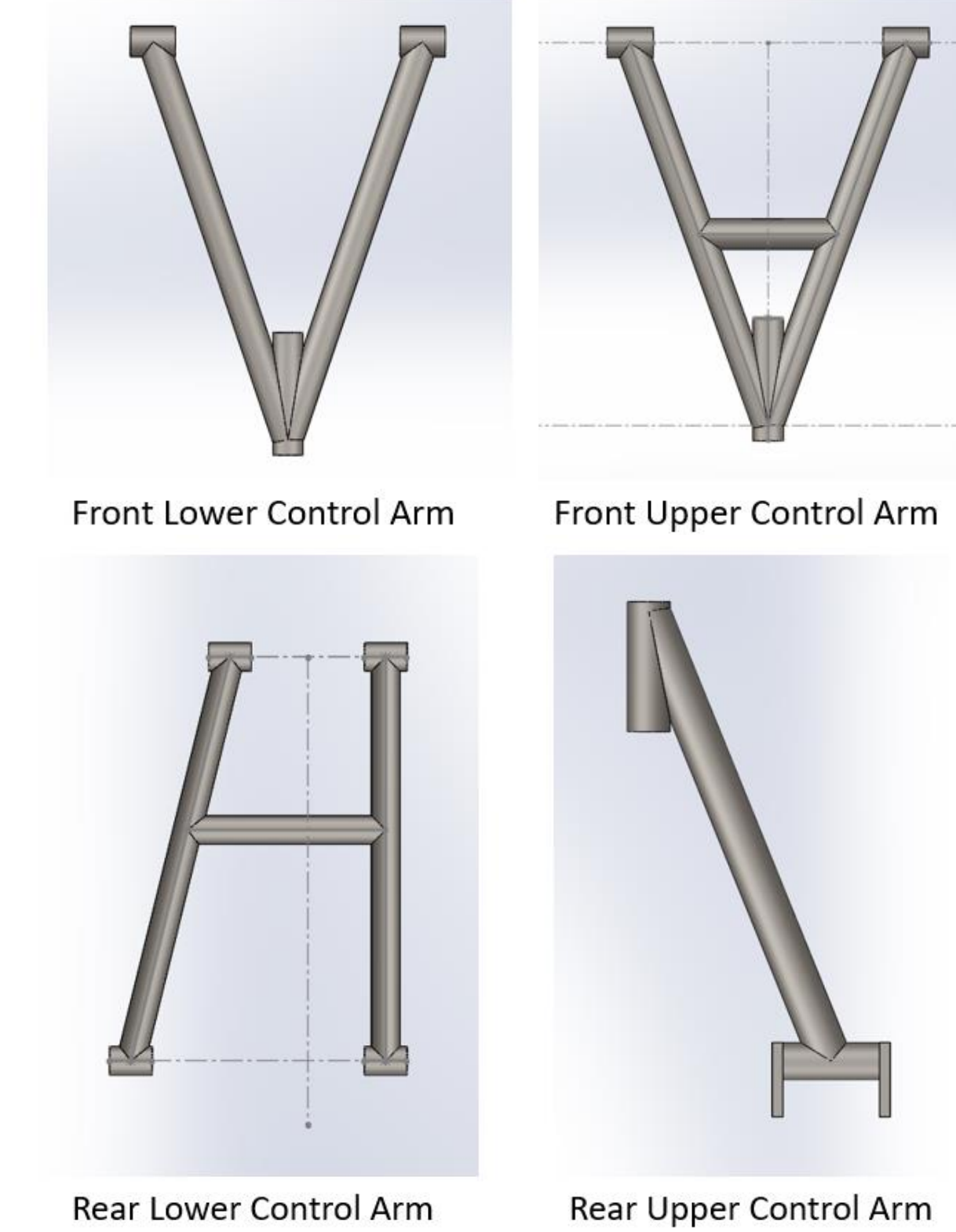
Suspension & Steering

Design Goals:

- Track width: 64"
- Wheel-base: 80"
- Ride height: 15"

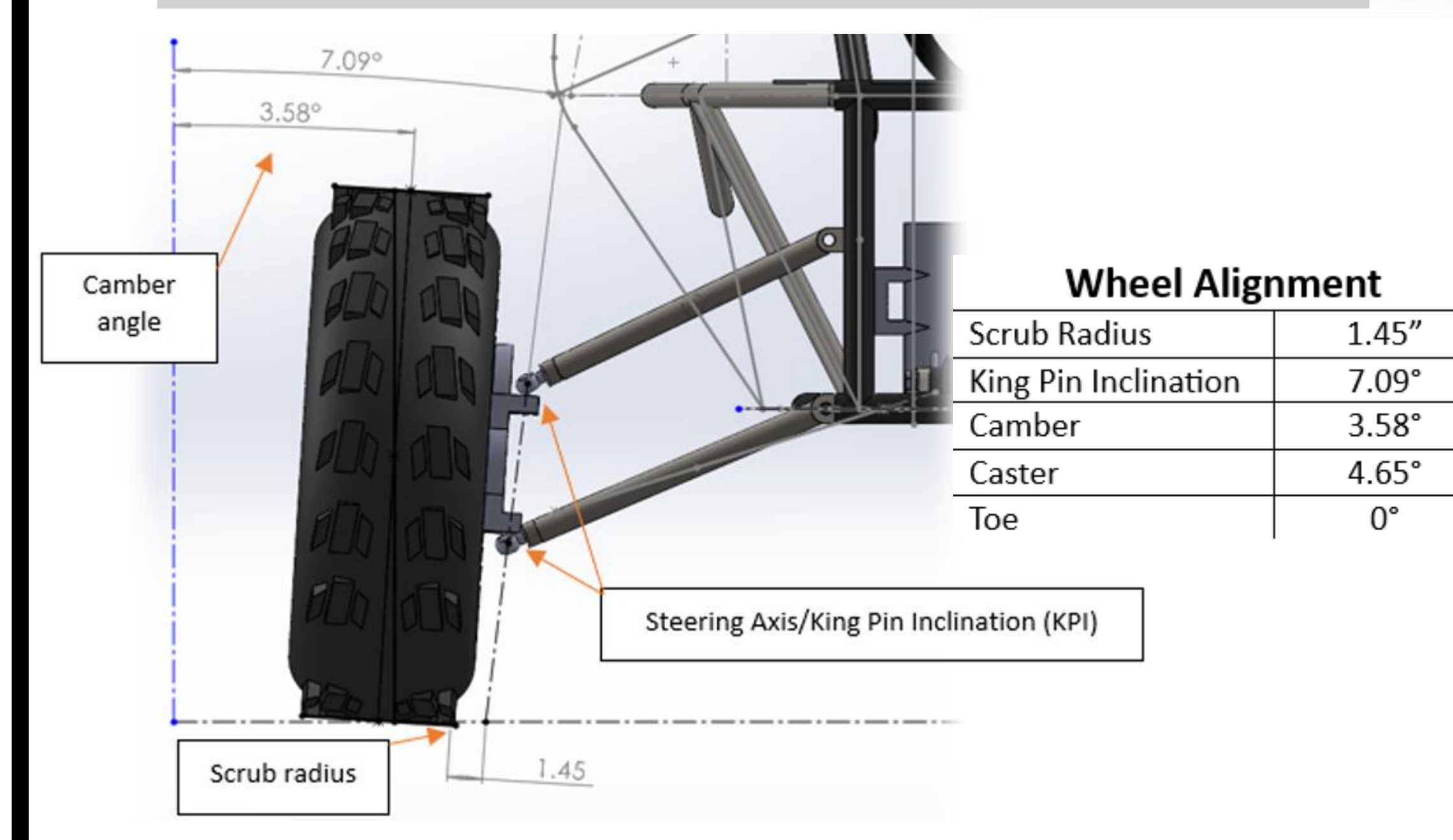
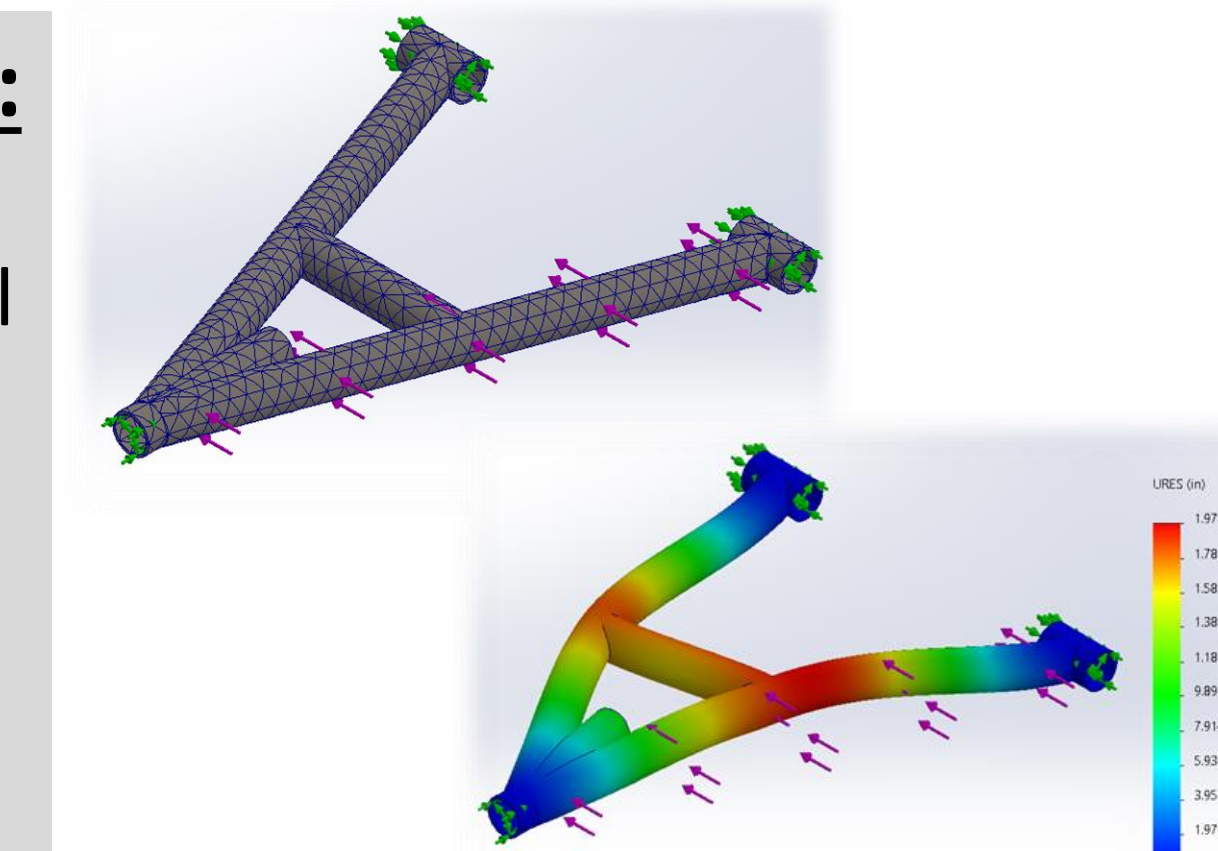
Design Results:

- Track width = 62"
- Wheel-base = 72"
- Ride height = 12"



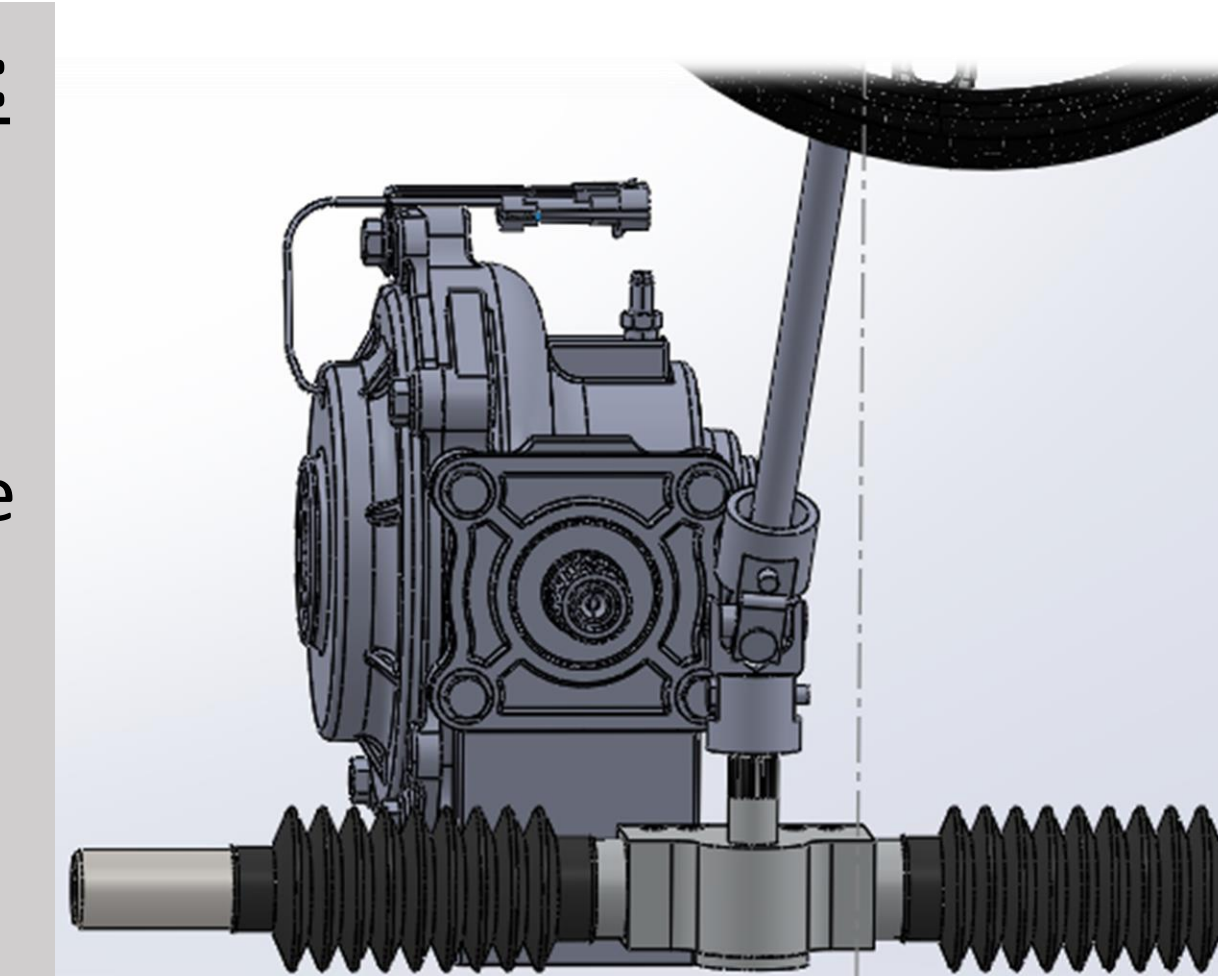
Finite Element Analysis:

- Front & rear control arms:
 - Front, rear, side, and fall impact tests
 - Coarse, medium, & fine mesh
 - Tested worst case scenario: 5000 lbf

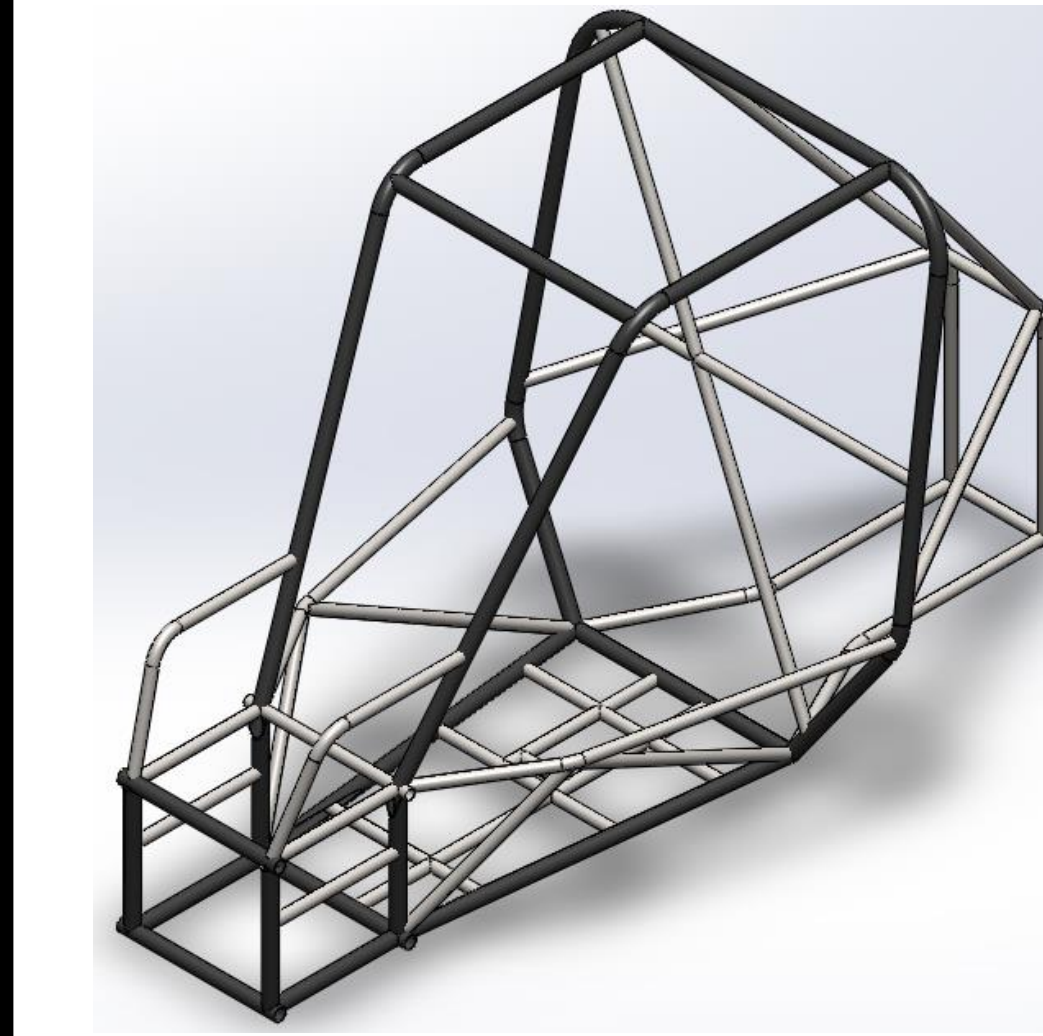


Rack and Pinion Offset:

- The front differential is running through the middle of the vehicle; therefore, we had to move the rack and pinion off to the right side of the differential.
- By doing this we had to create an extension for the left side.

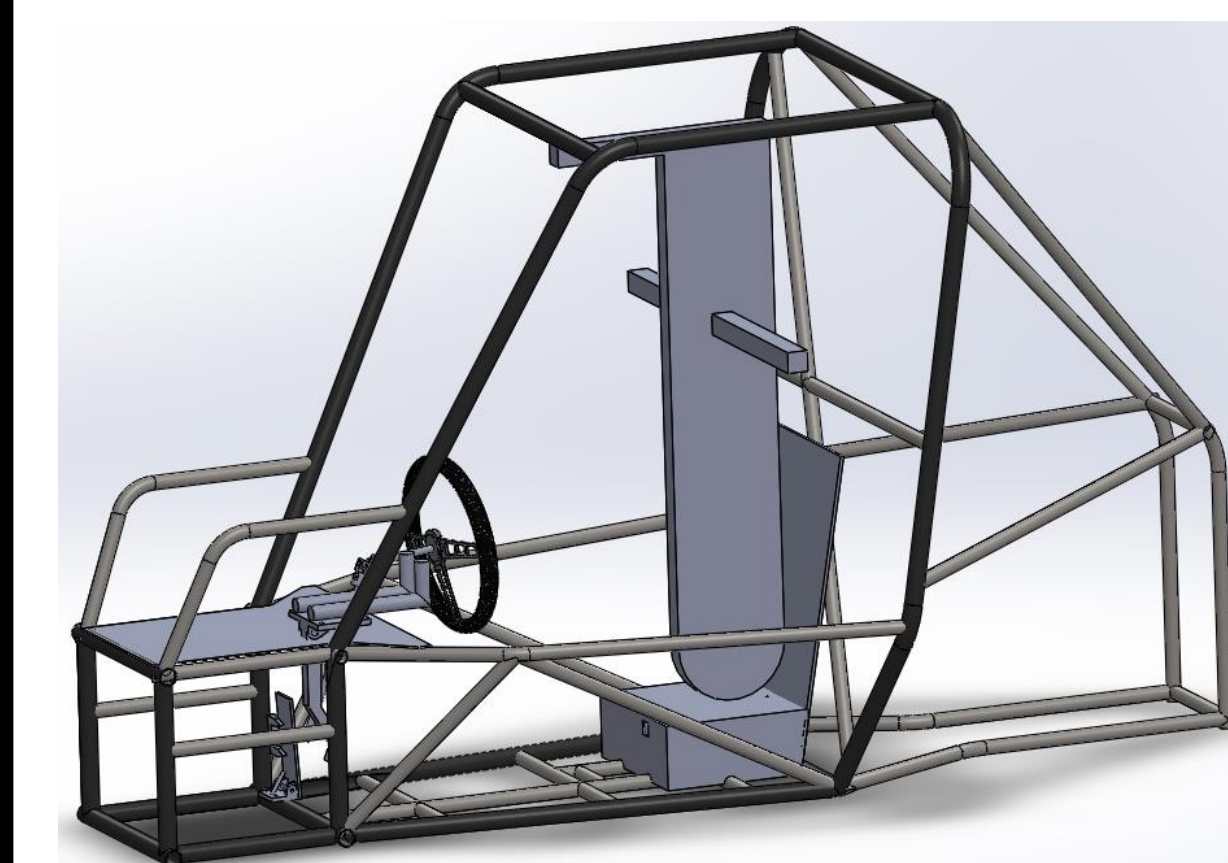


Frame



Primary & Secondary Members:

- Primary Member (Black)
 - 1.25in diameter
 - 0.065in wall thickness
- Secondary Member (Grey)
 - 1.00in diameter
 - 0.065 wall thickness

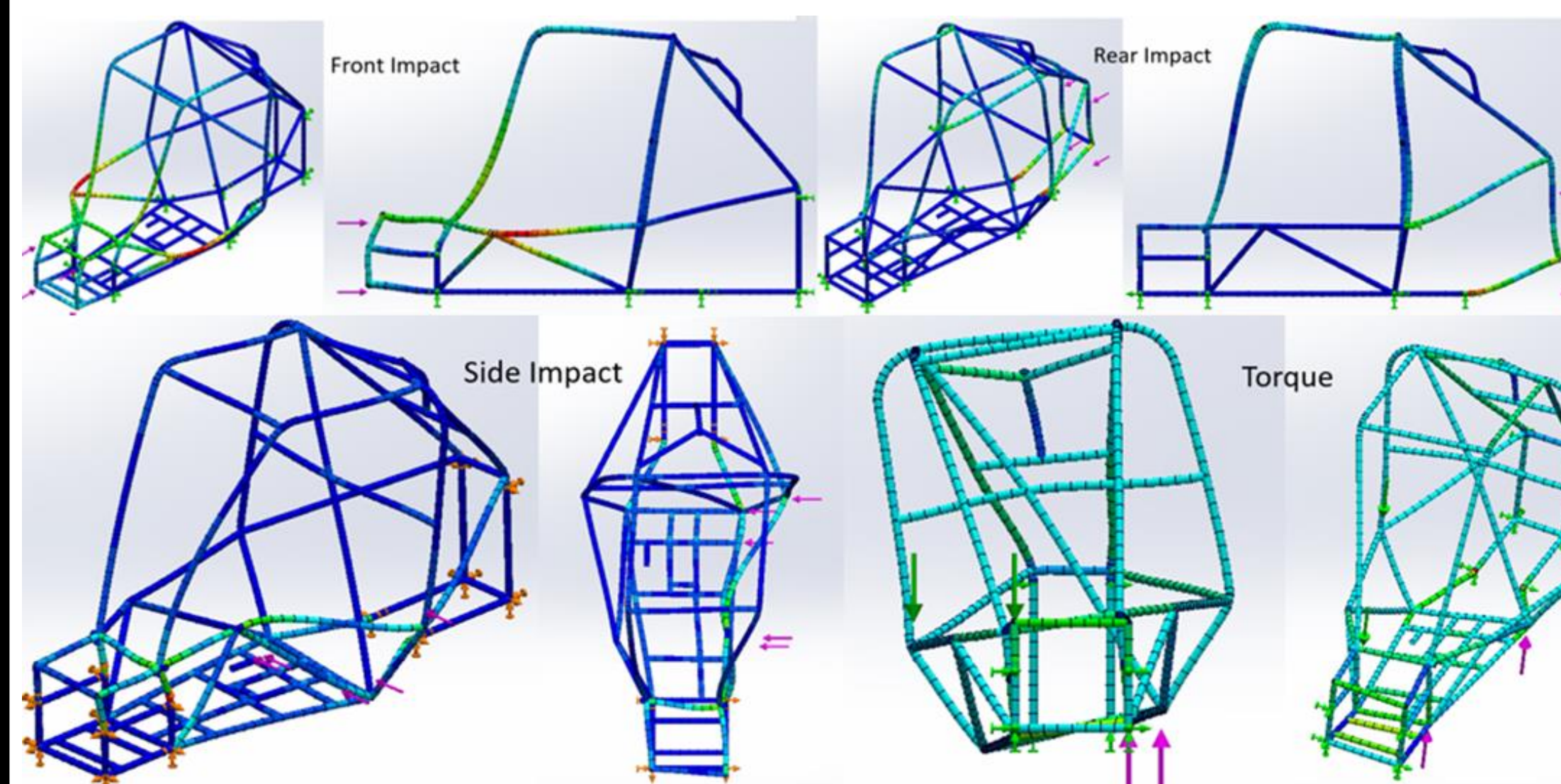


Roll Cage & Safety:

- Driver Model Shown (see image)
- Driver model needs to fit inside roll cage
- If a roll was to happen drive need to be contained.
- Driver needs to be able to exit vehicle in 3 sec.

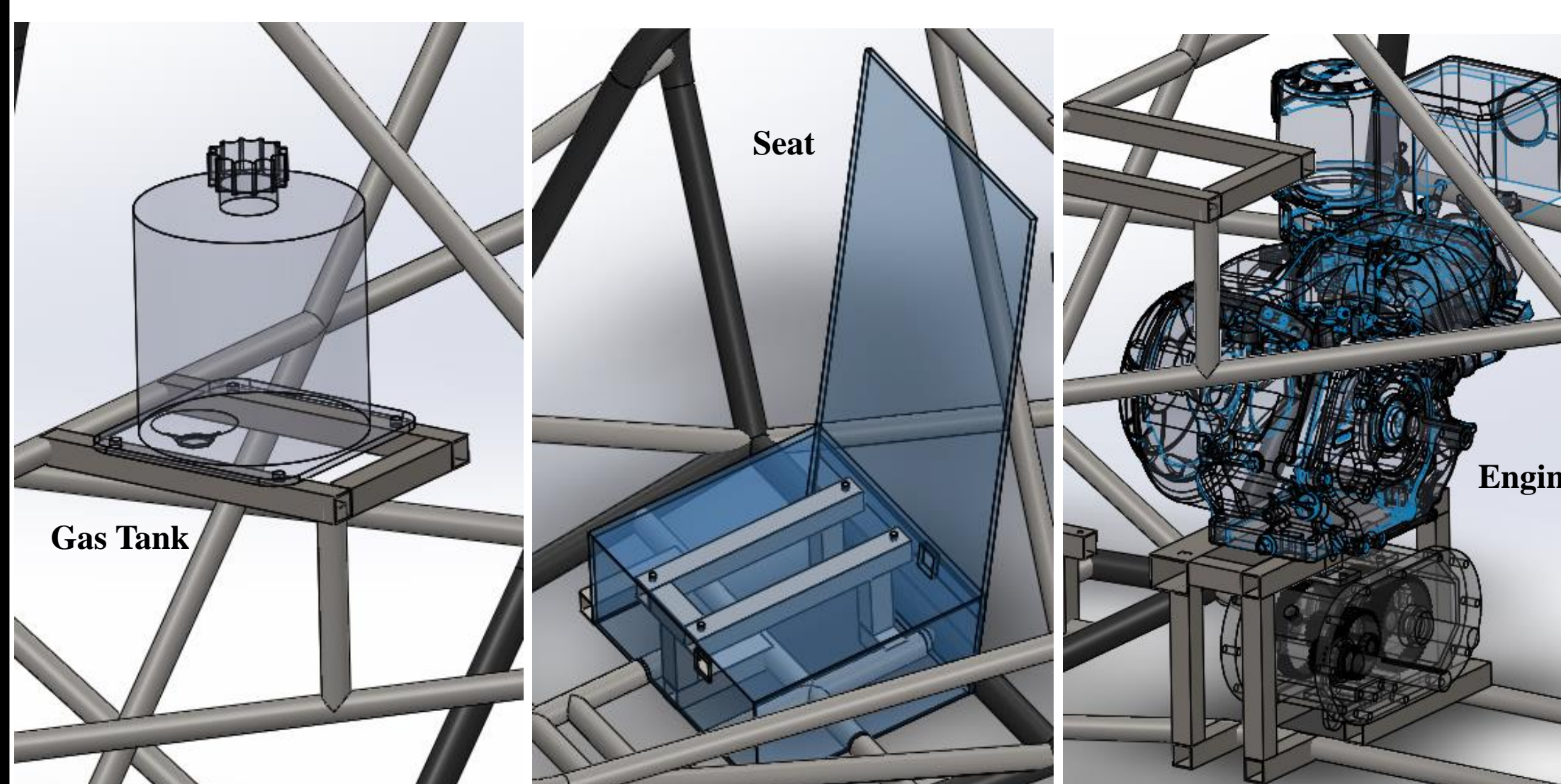
Simulations:

Front, rear, and side impacts and torsion



Mounting Members:

- Seat
- Gas tank
- Engine
- Gear Box



Sponsors: