

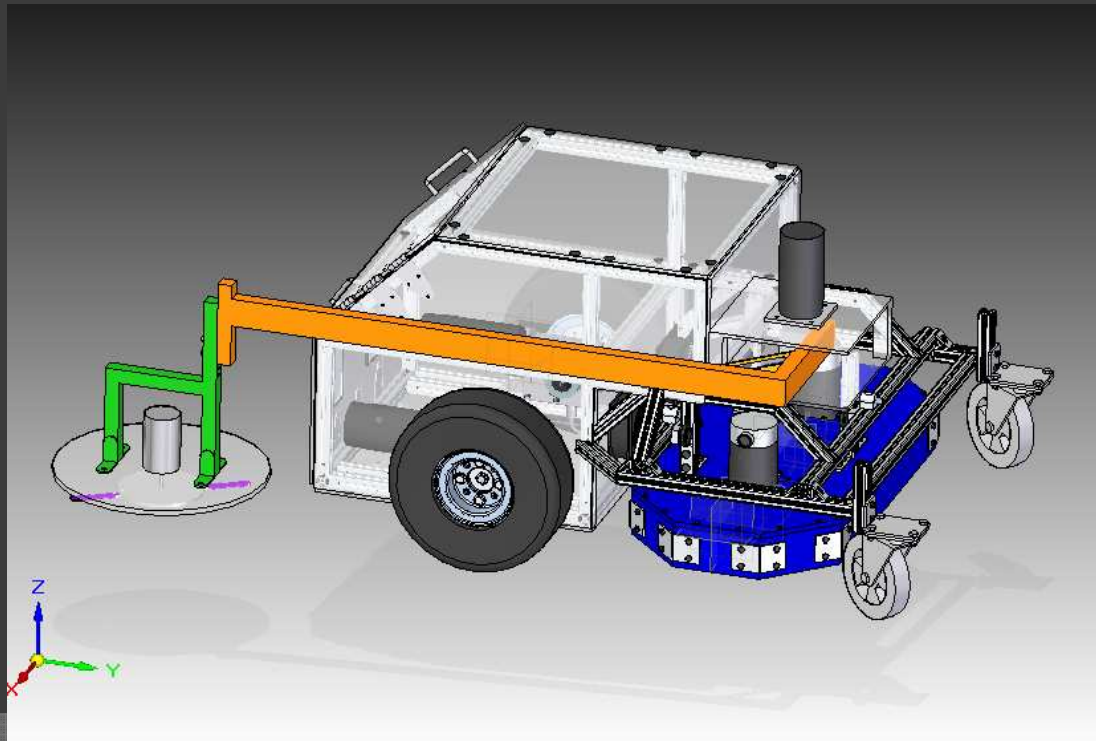
Terry Miller  
Casey Still  
Chris Warren

**MECH 4240 – CORP 4**  
**FINAL DESIGN REVIEW**

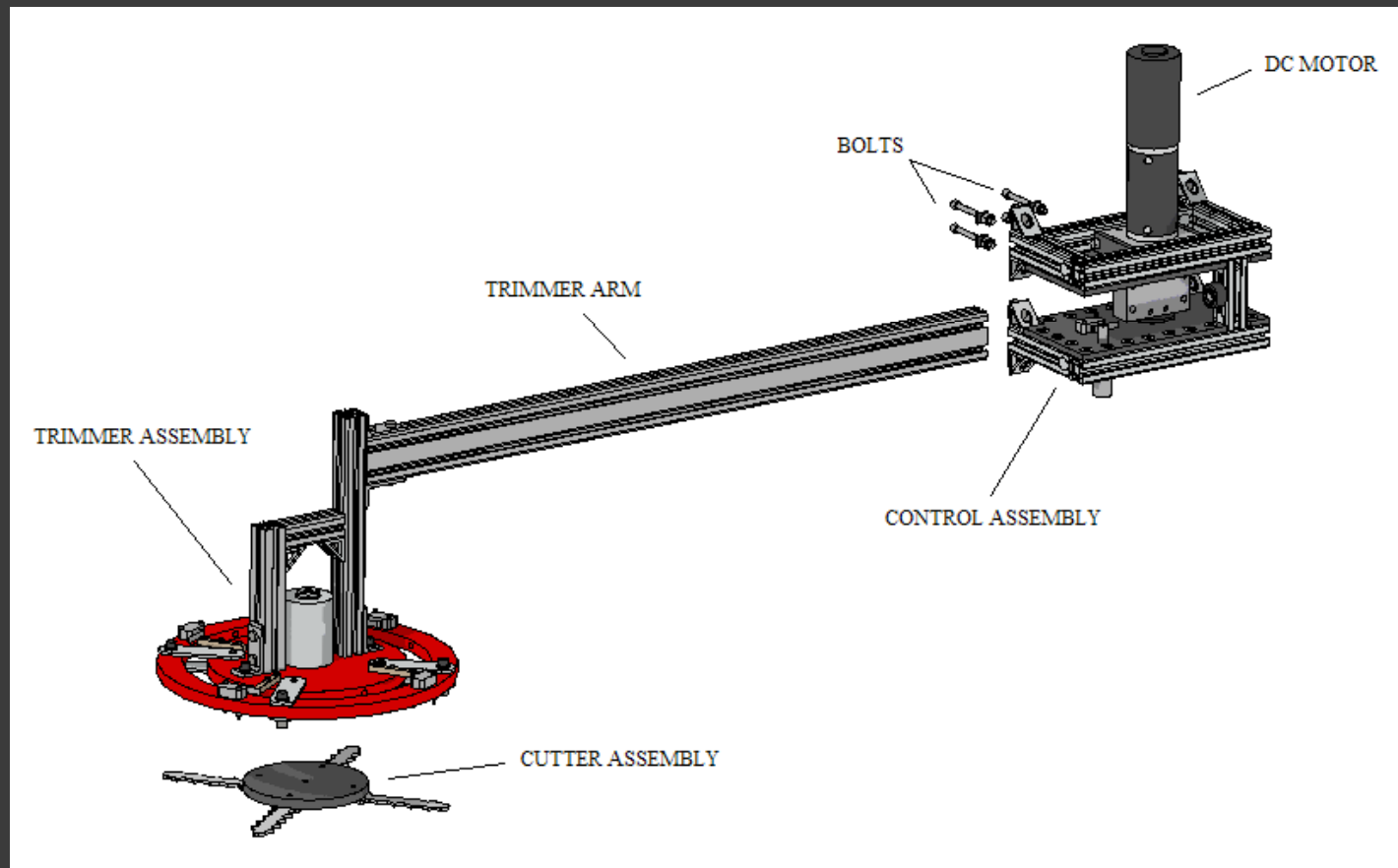
# Quick Review

## Subsystems

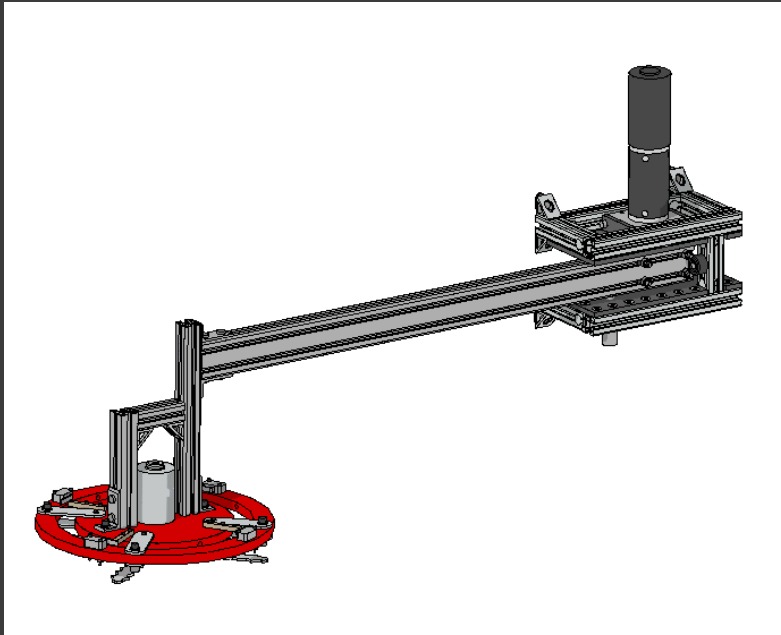
- Trimming Arm
- Thermal Management
- Environmental Protection



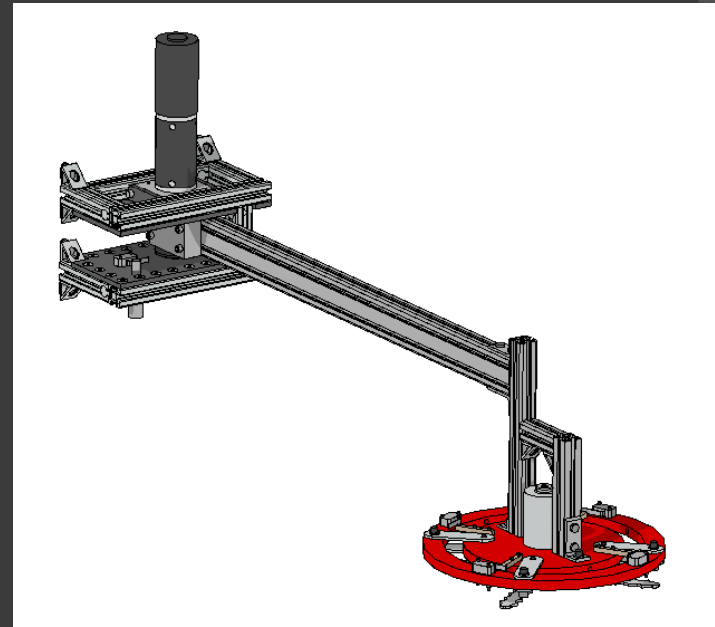
# Trimmer Arm Assembly



# Trimmer Arm Motion



Stowed Configuration



Deployed Configuration  
(shown deployed to 90°)

# Arm Control

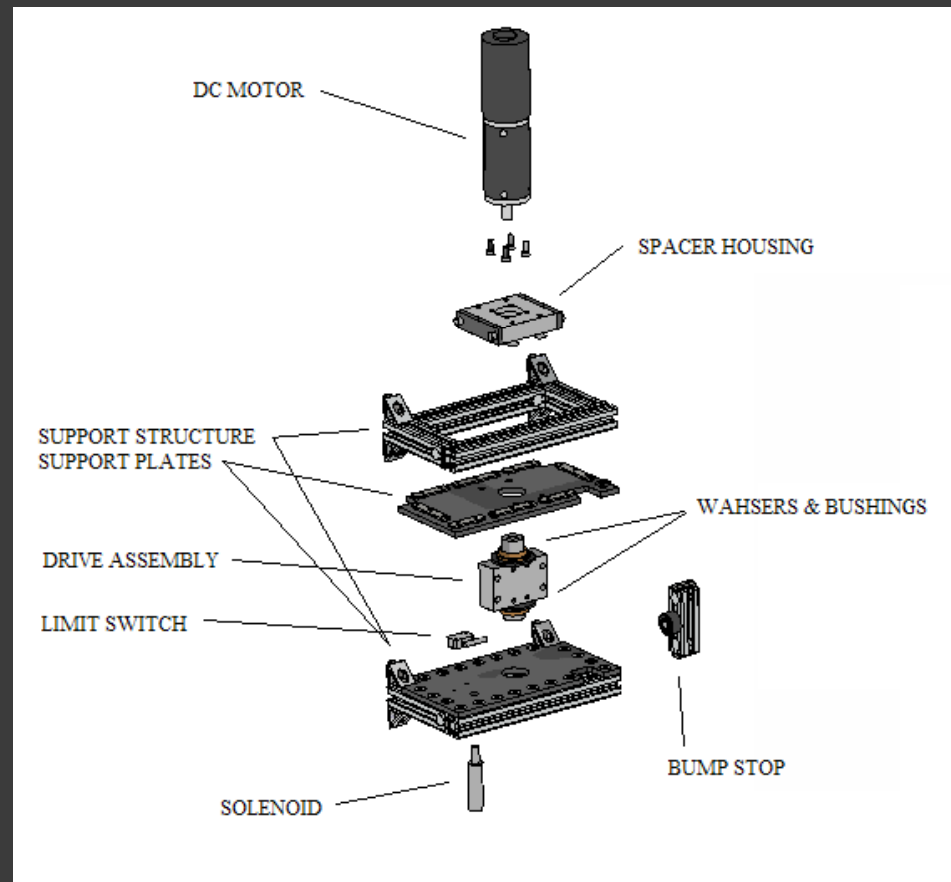
Reduction Ratio: 1:353

Torque: 100 kgf-cm → 7.25 ft-lbf

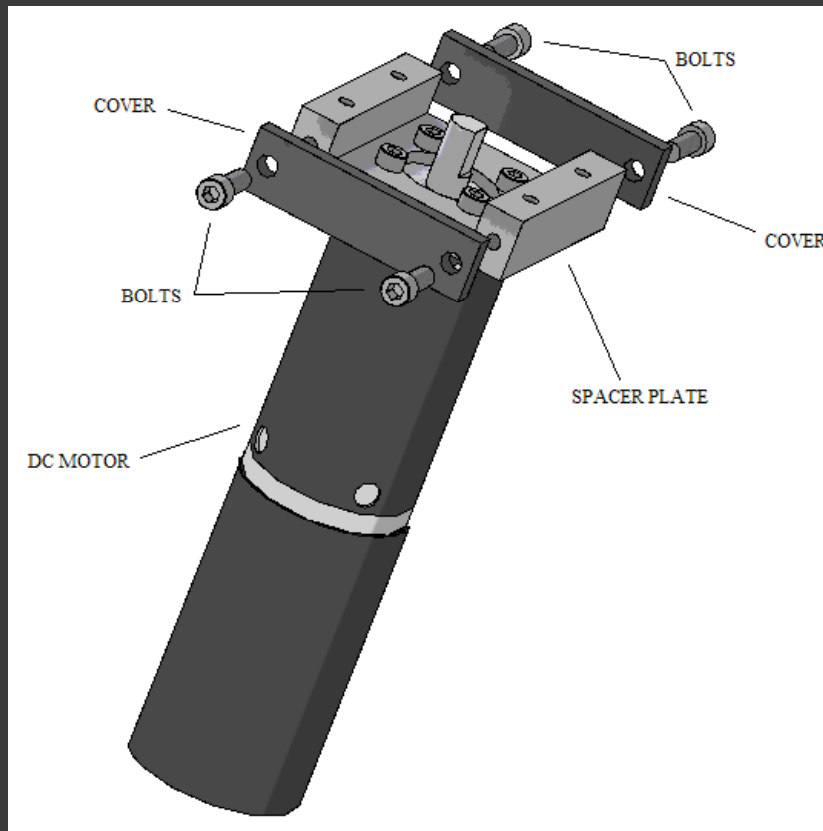
Speed: 10.4 rpm



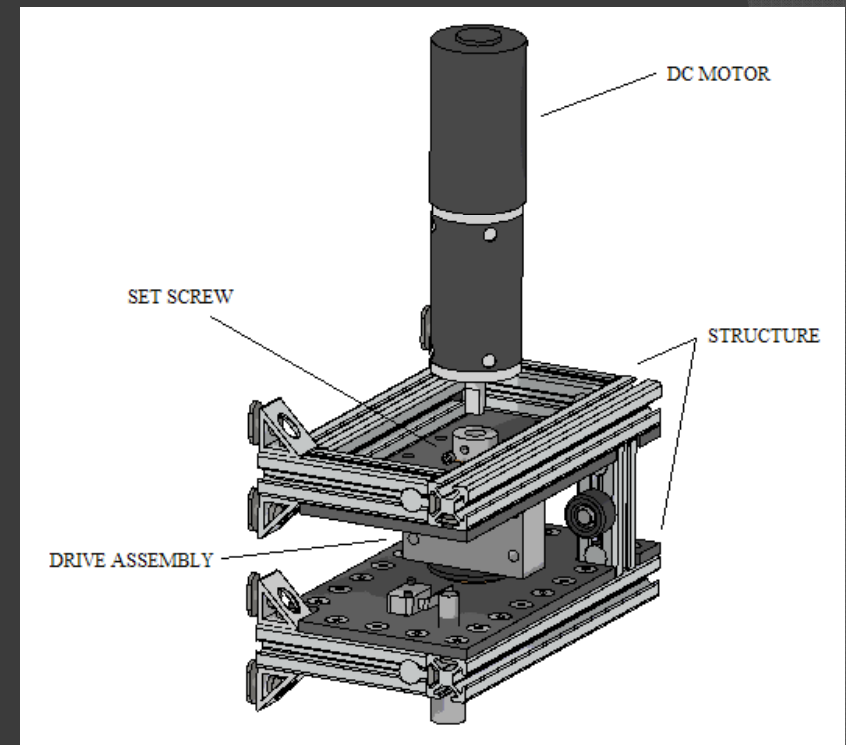
# Control Assembly



# Motor to Arm Connection

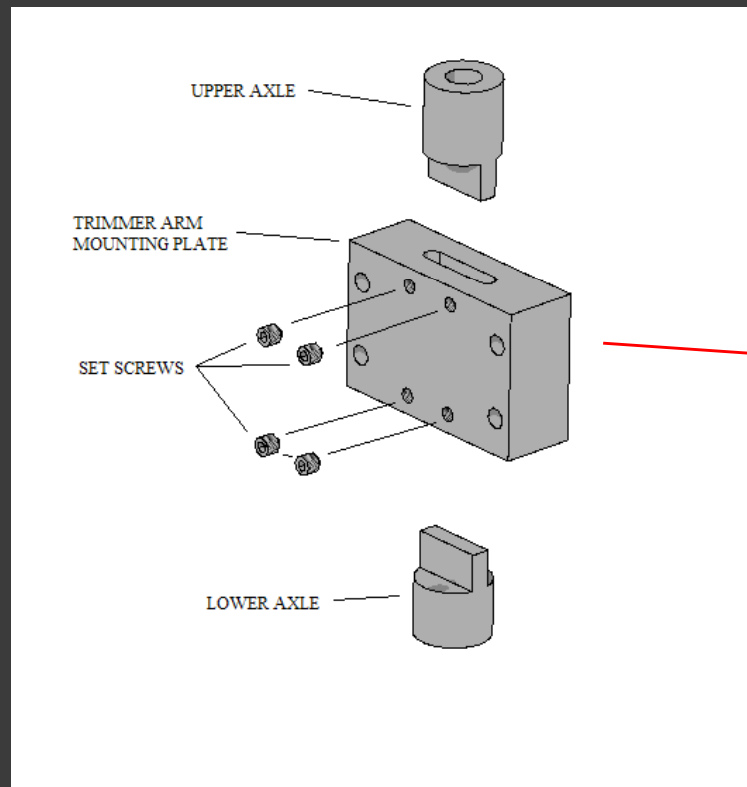


Assembly of Spacer Plate

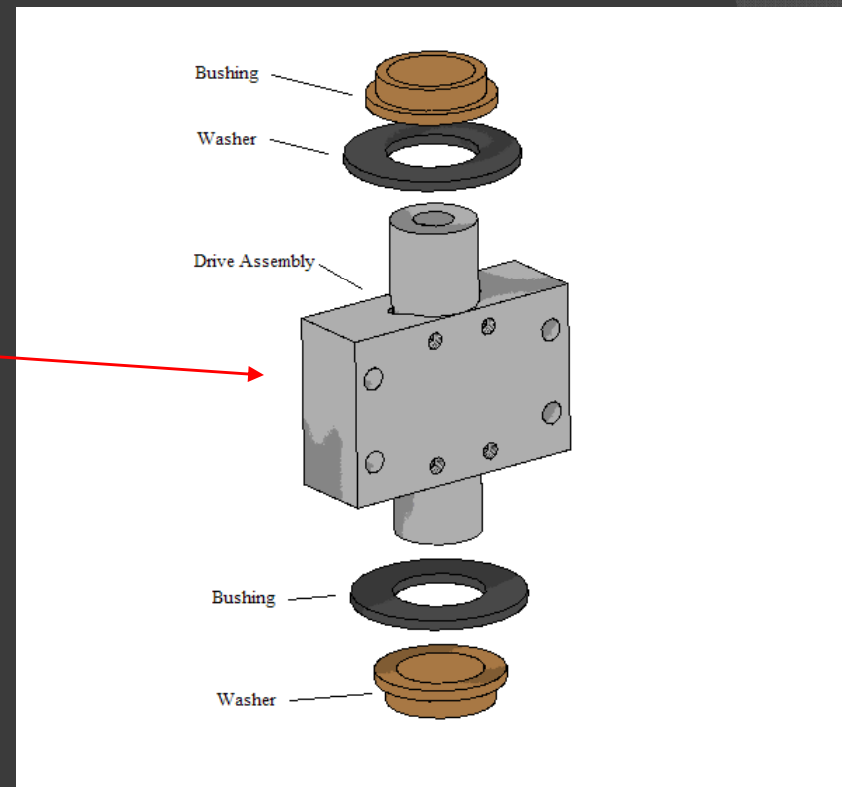


Installation of Set Screw

# Drive Assembly



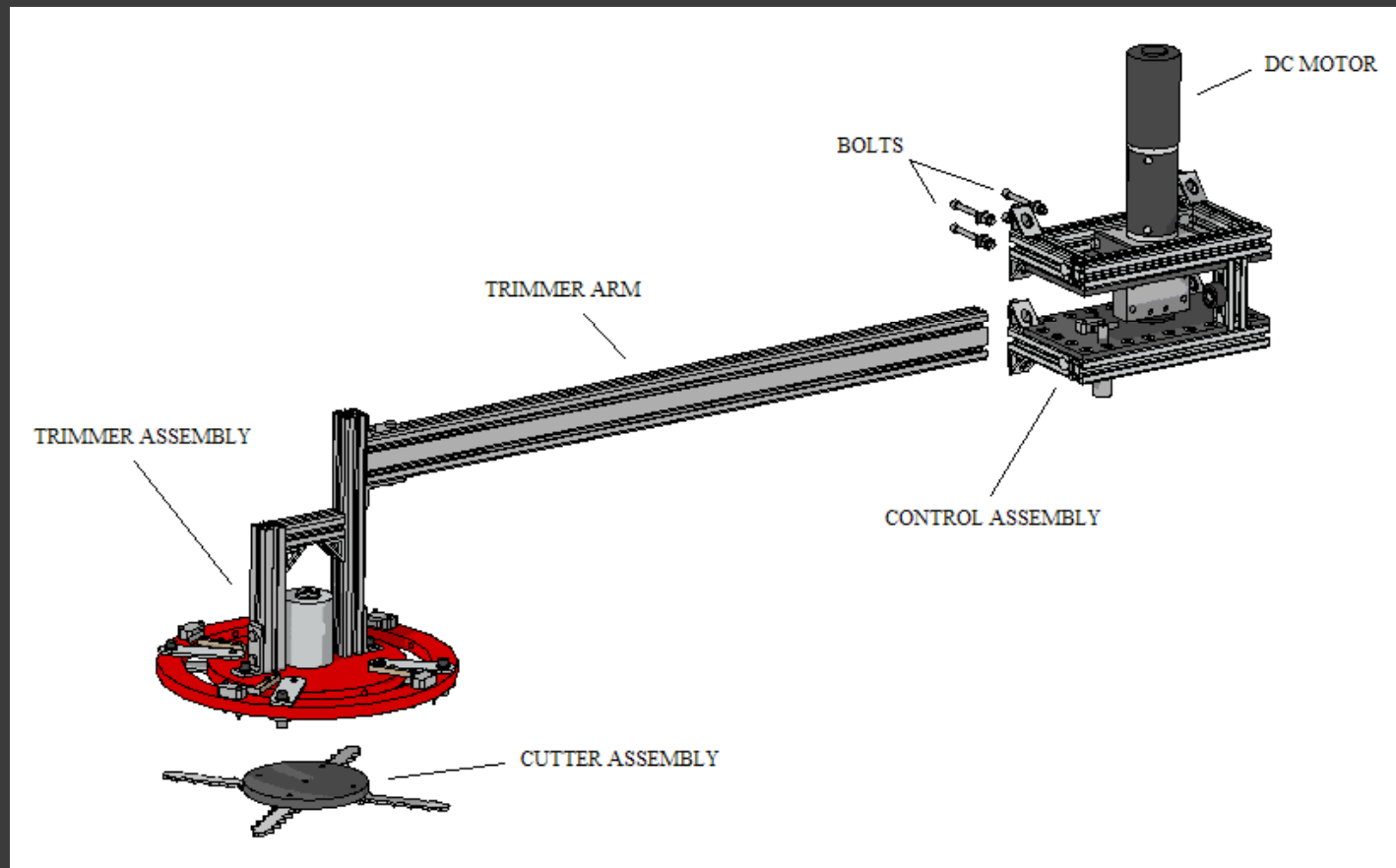
Exploded View



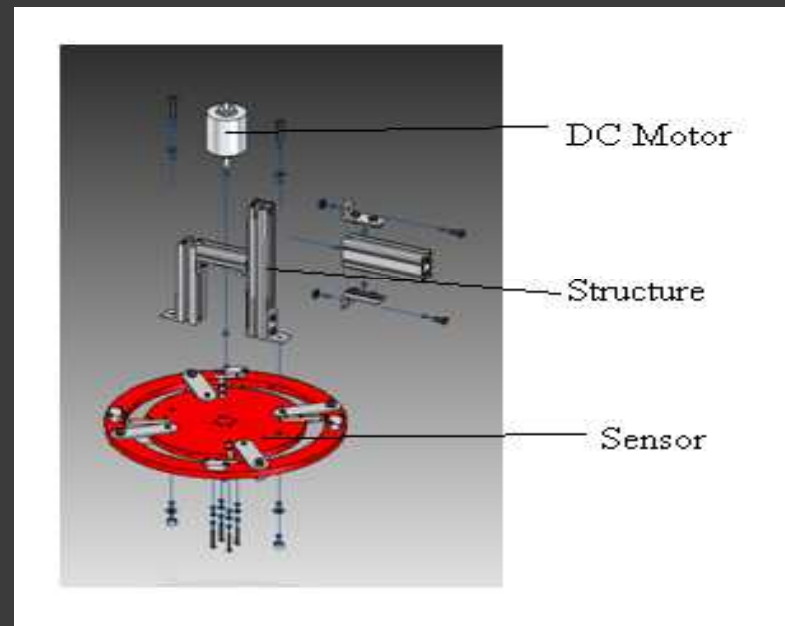
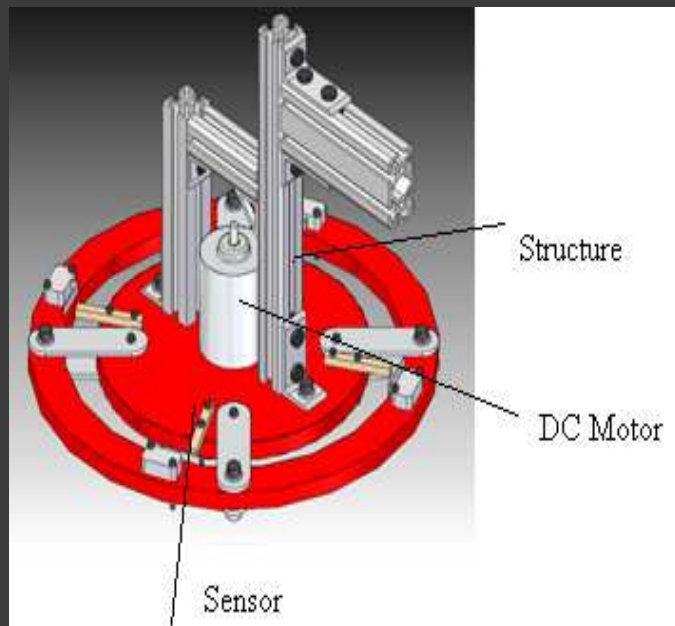
Shown with Bushings



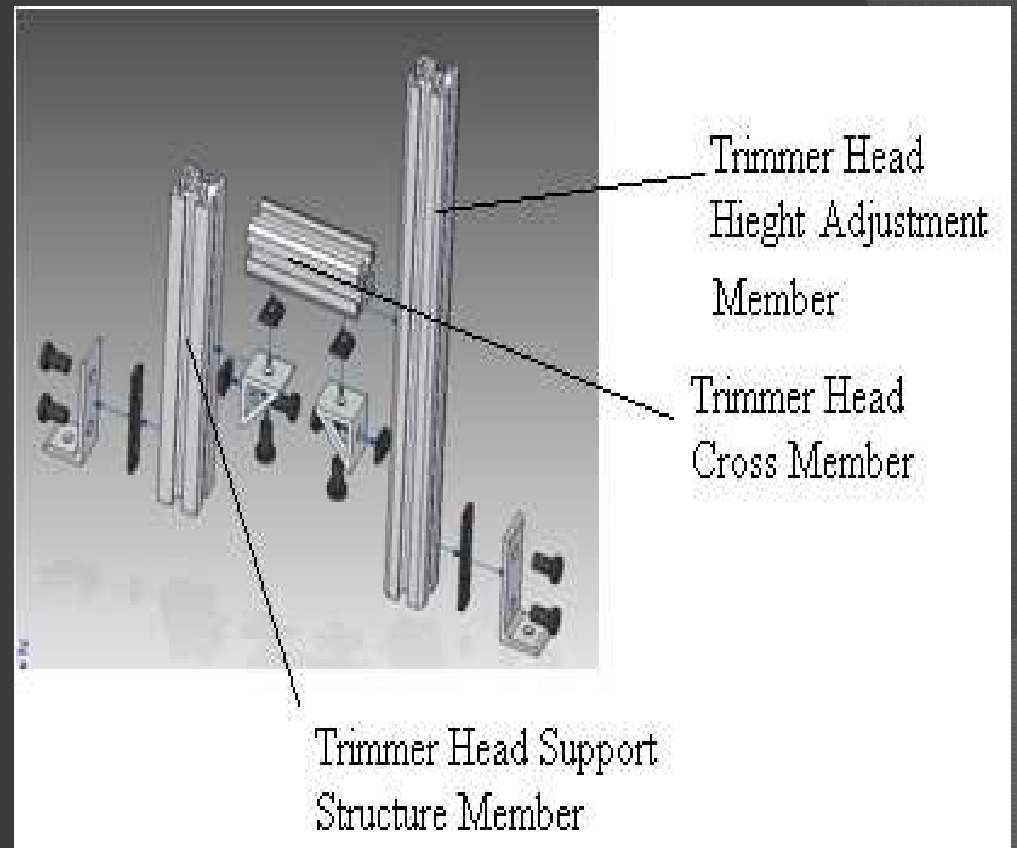
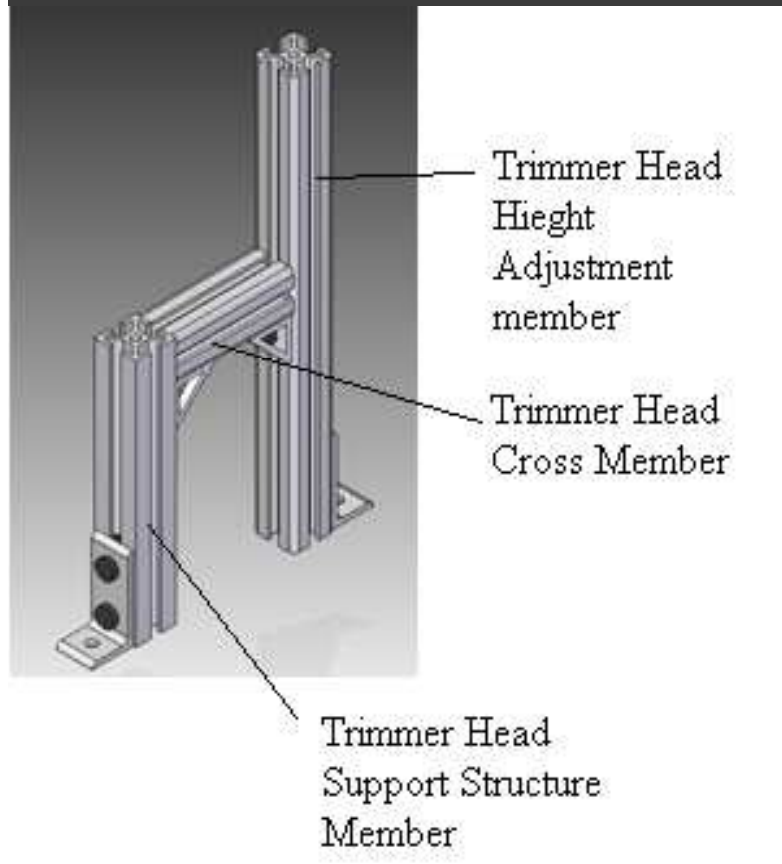
# Trimmer Arm Assembly



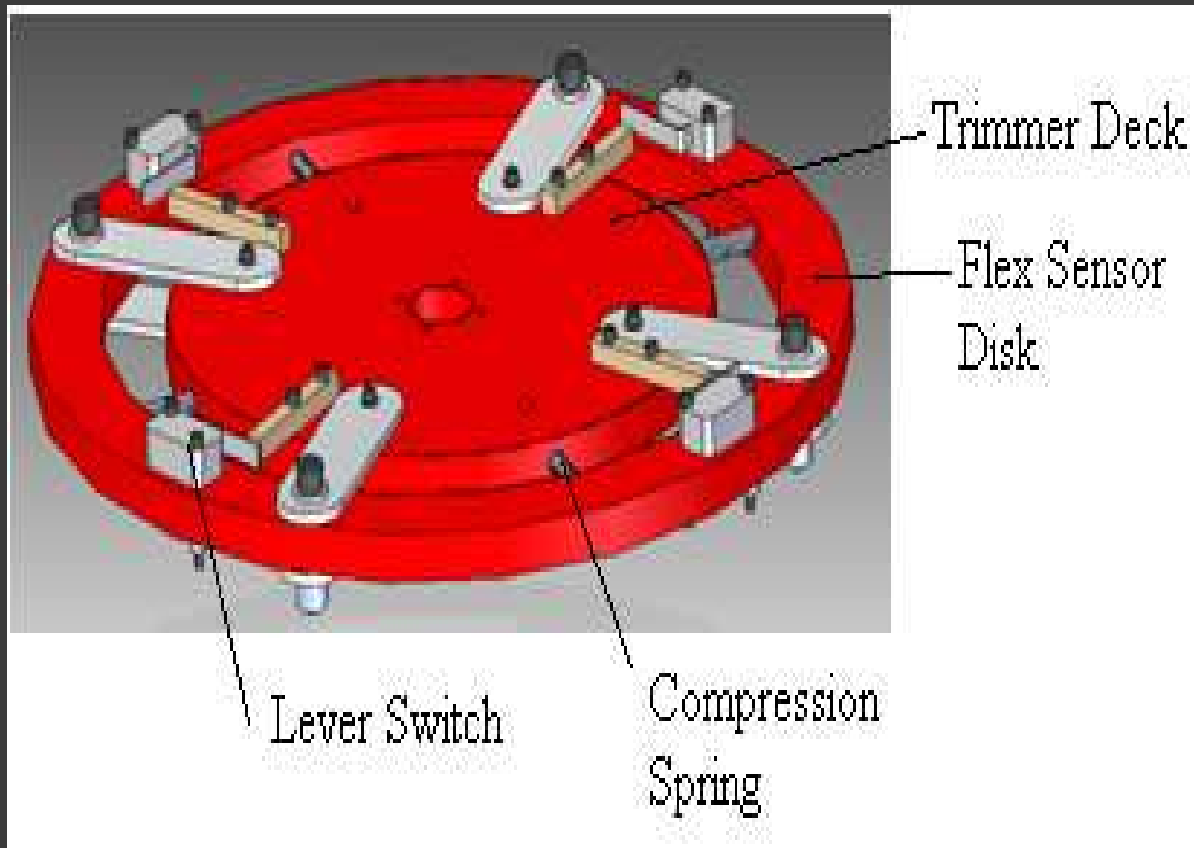
# Trimmer Head



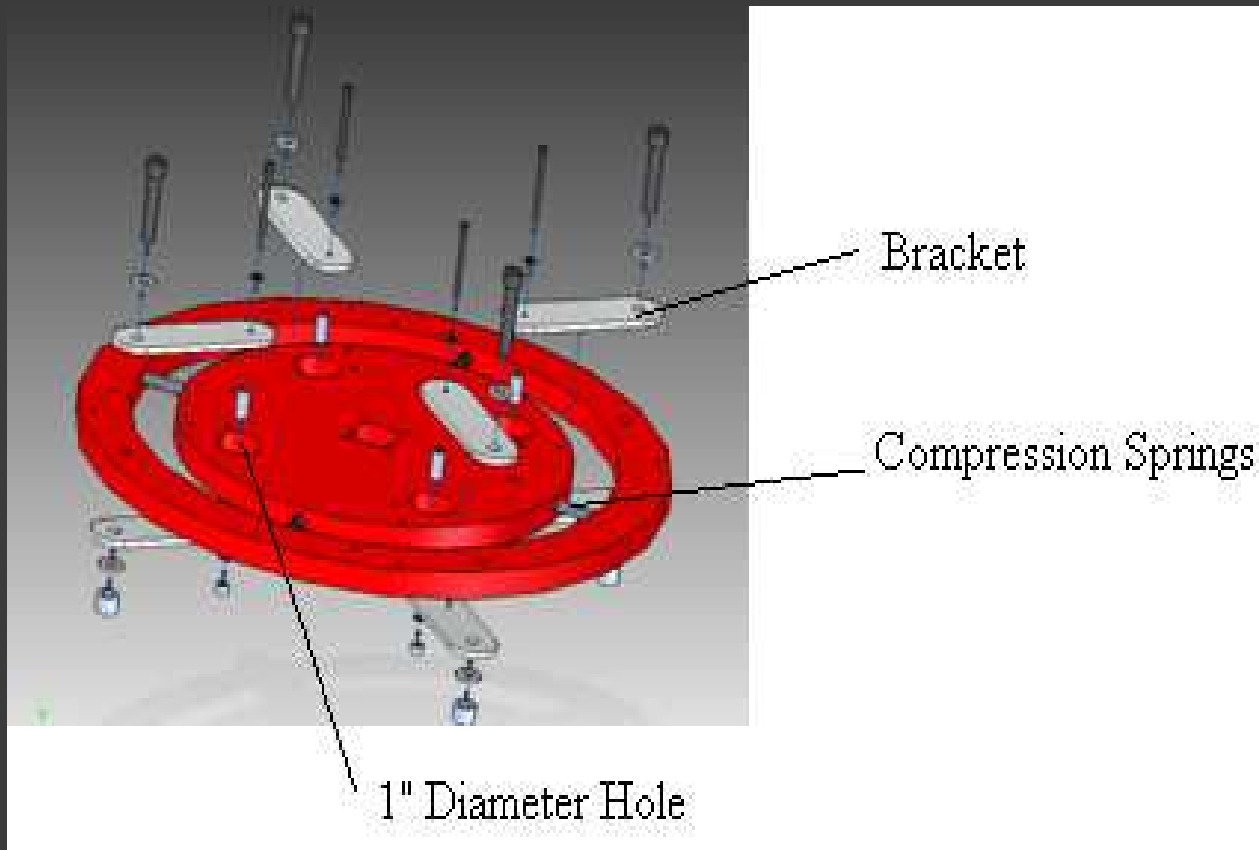
# Trimmer Head Structure



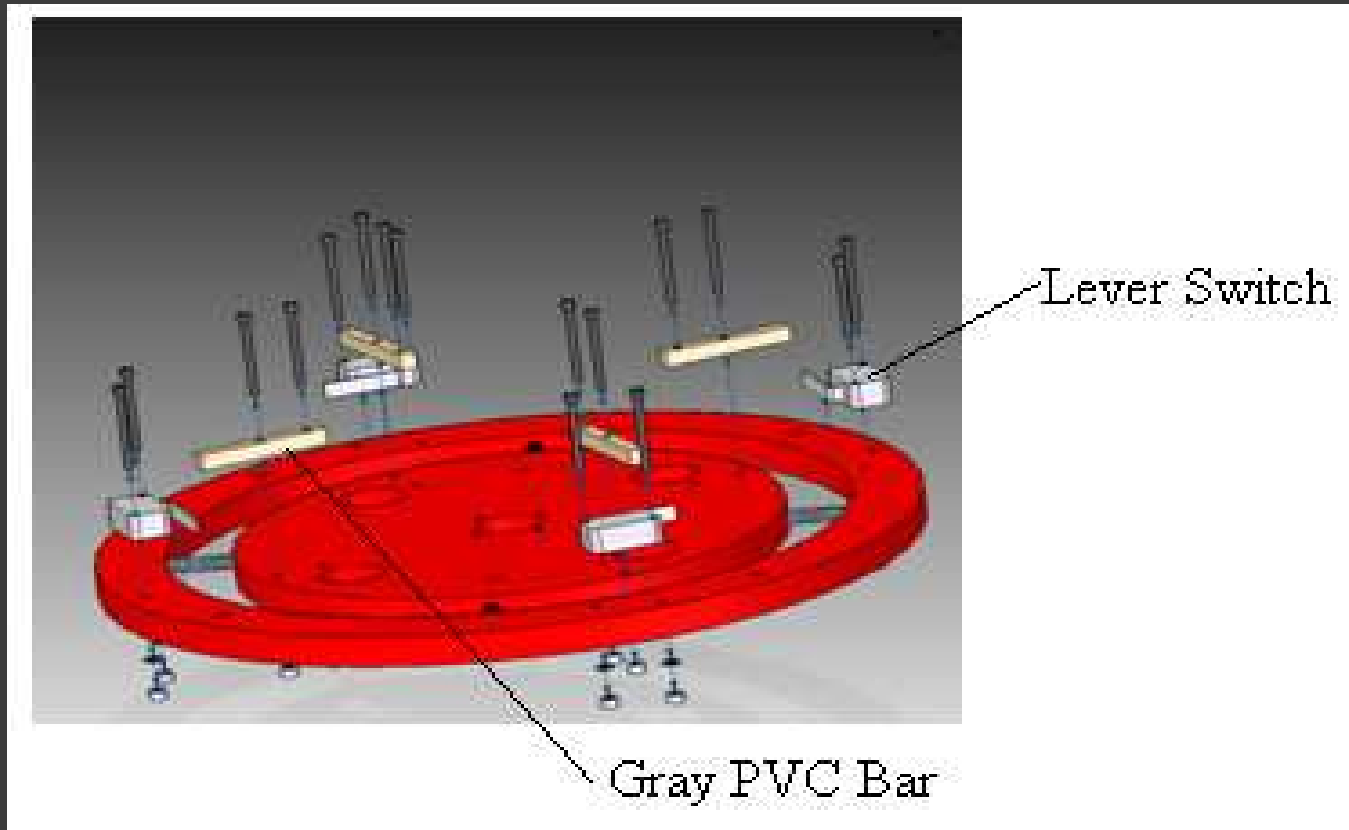
# Trimmer Head Sensor



# Sensor Motion Control



# Trimmer Head Obstacle Sensing



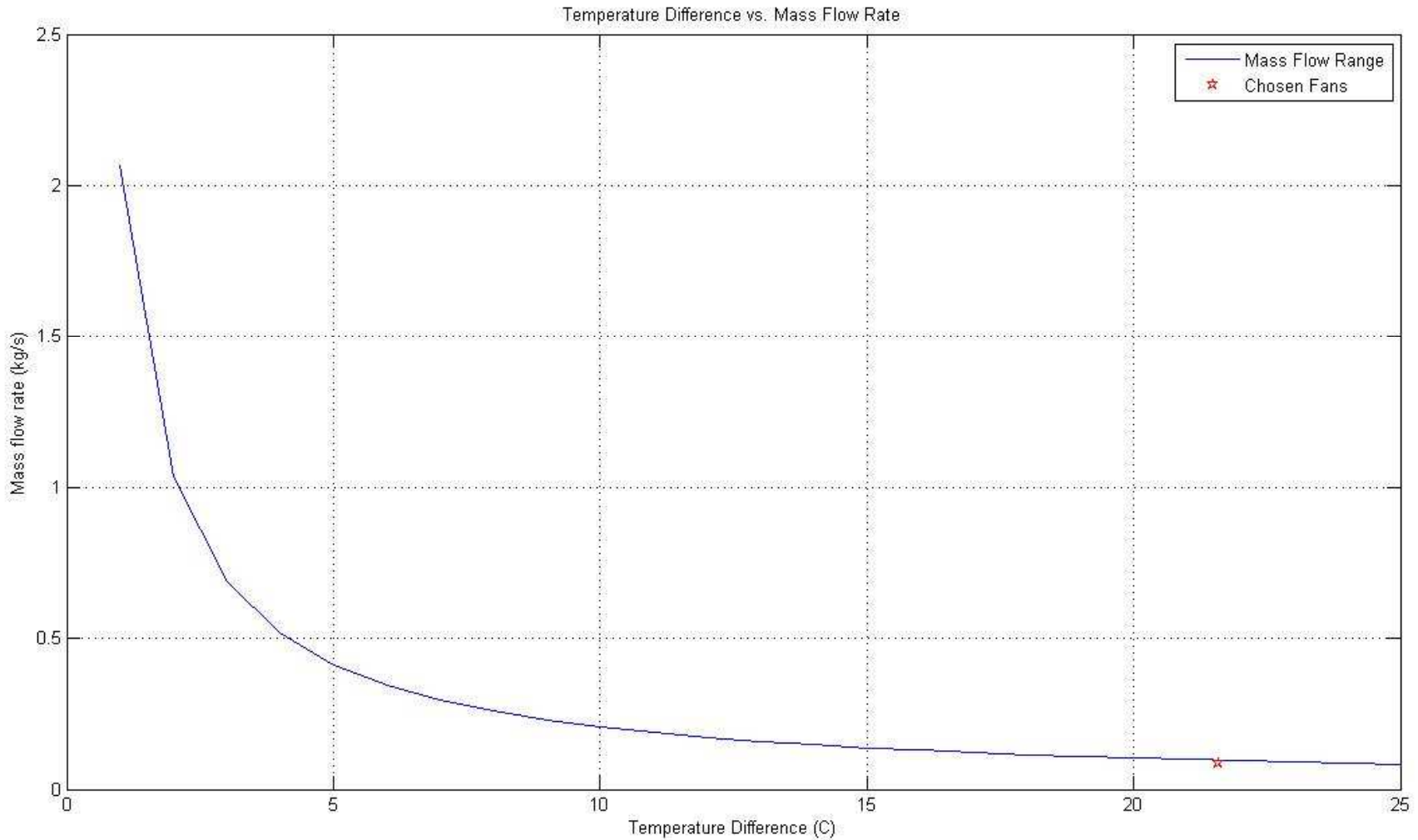
# Thermal Management

- ⦿ Requirements
  - High volumetric flow rate
  - Low power use
- ⦿ Cooler Master R4 Series
  - 90 CFM→0.0957 kg/s
  - .35 amp
  - Provides a 36°F difference
- ⦿ Relationship Used

$$Q = \dot{m} C_p (T_{m_o} - T_{m_i})$$



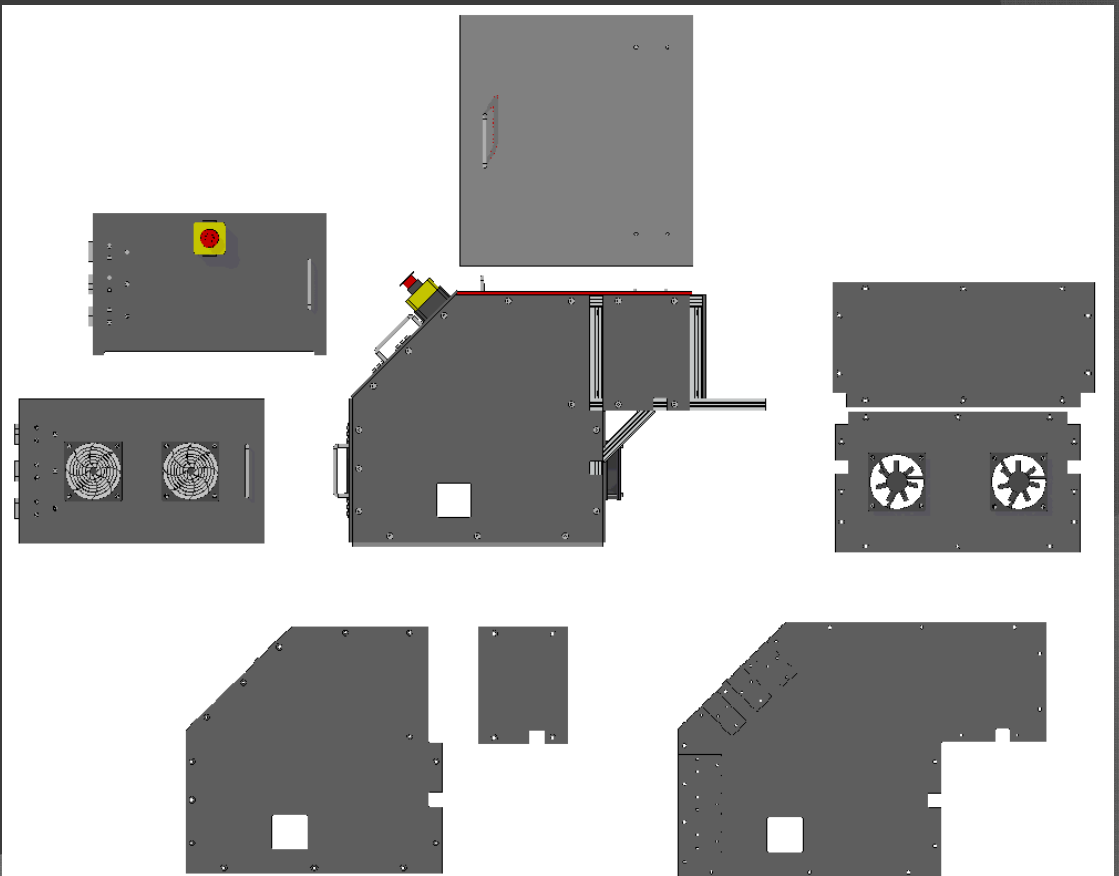
# Thermal Management





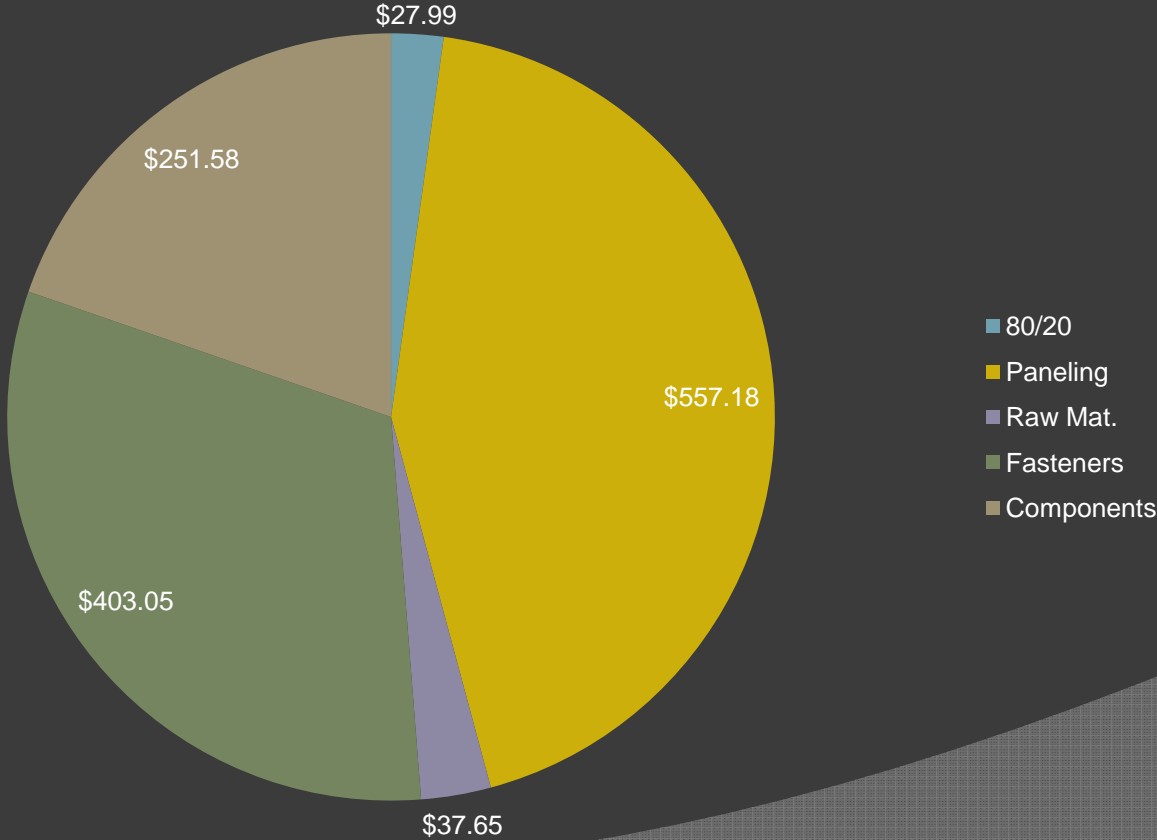
# Environmental Protection

- Polycarbonate Panels
- Rubber Gaskets



# Cost Analysis

● \$1277.45



# Questions?

