

Design Portfolio

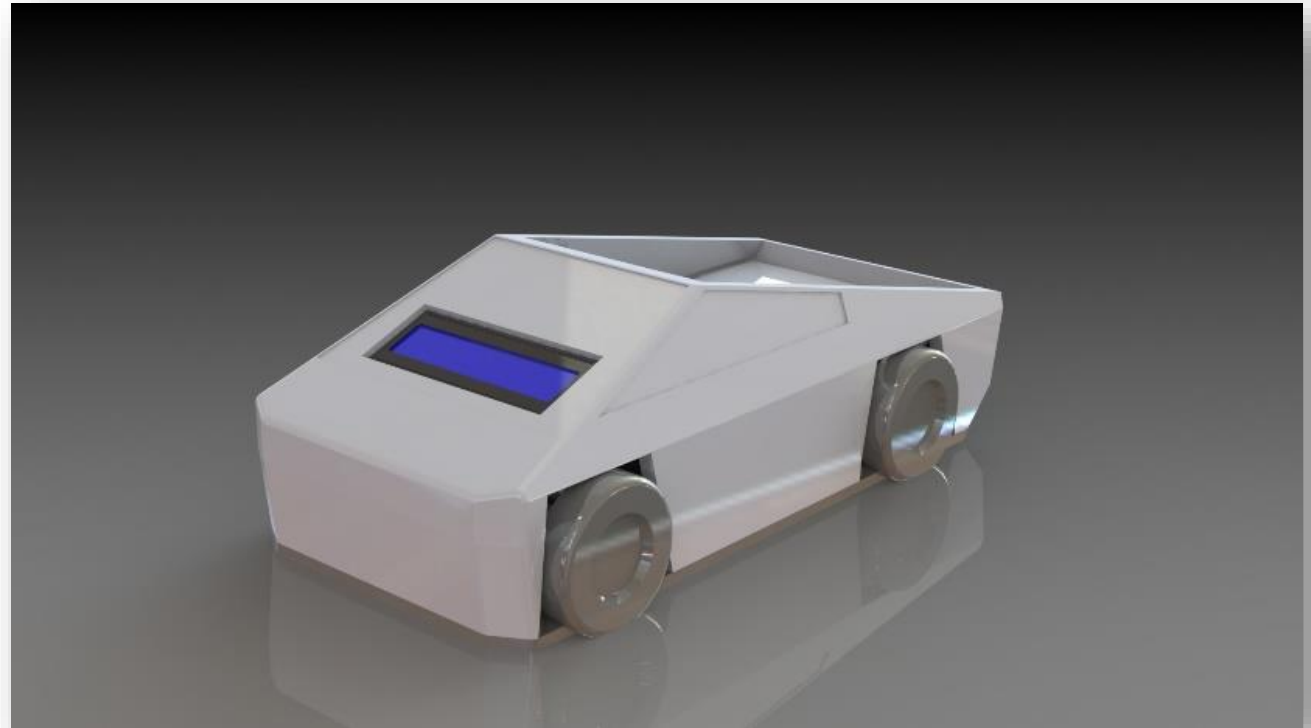
Jonathan Heins

Academic Projects:

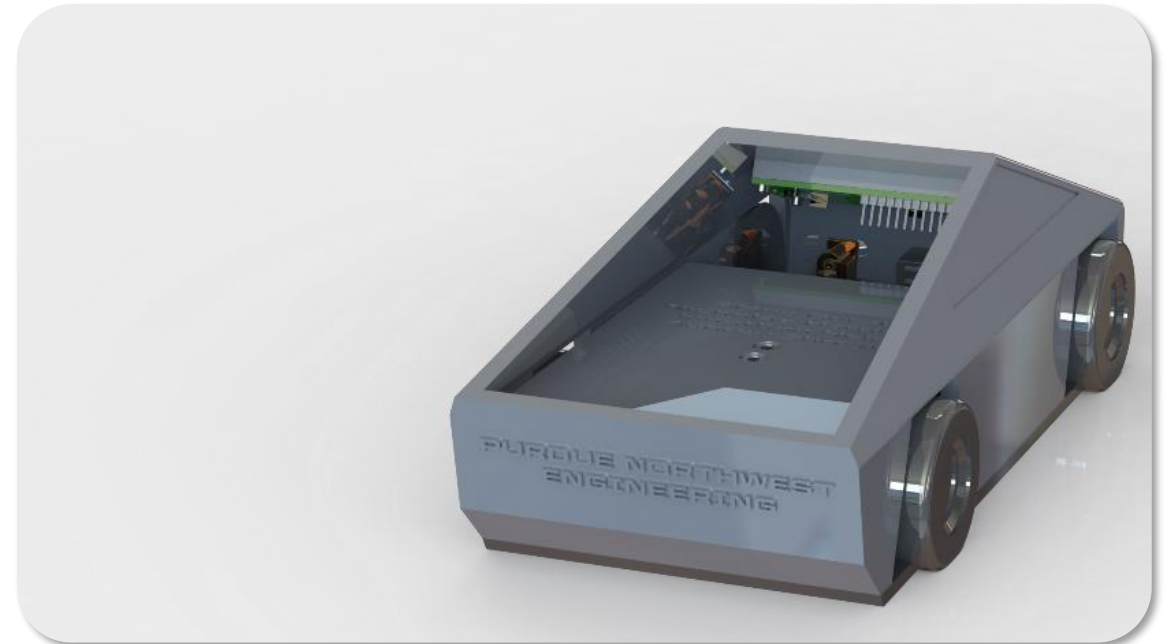
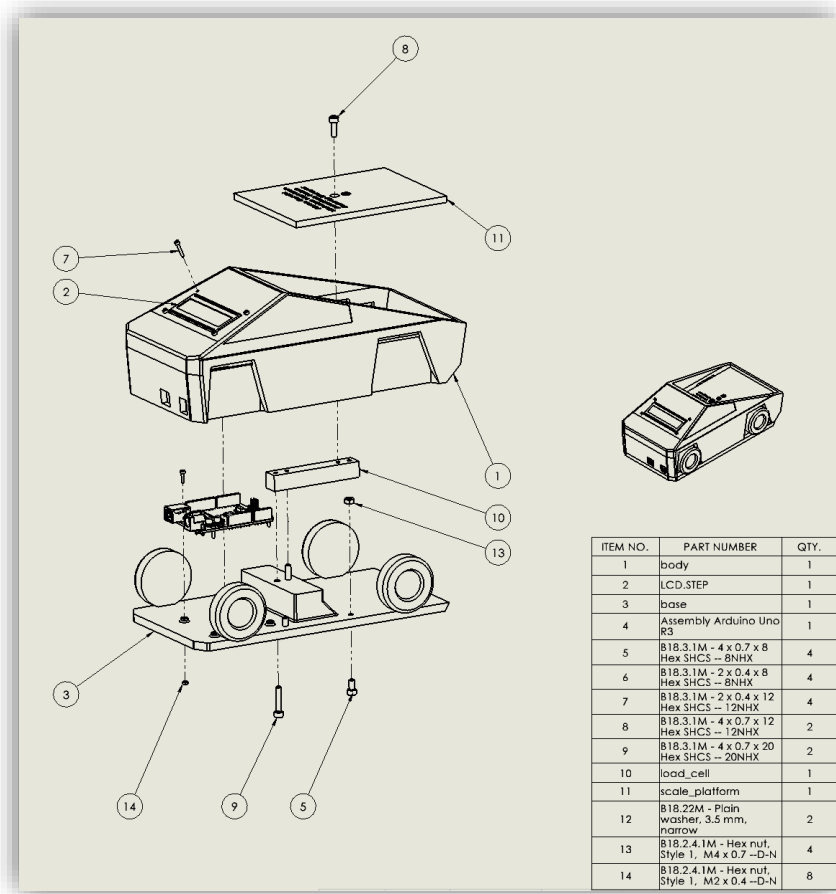
- Cyber Truck Digital Scale
- Aircraft Landing Gear
- Simulation of Rocket Combustion
- Simulation of Combined Cycle Jet Engine Combustion

Engineering Experimentation: CyberTruck Digital Scale

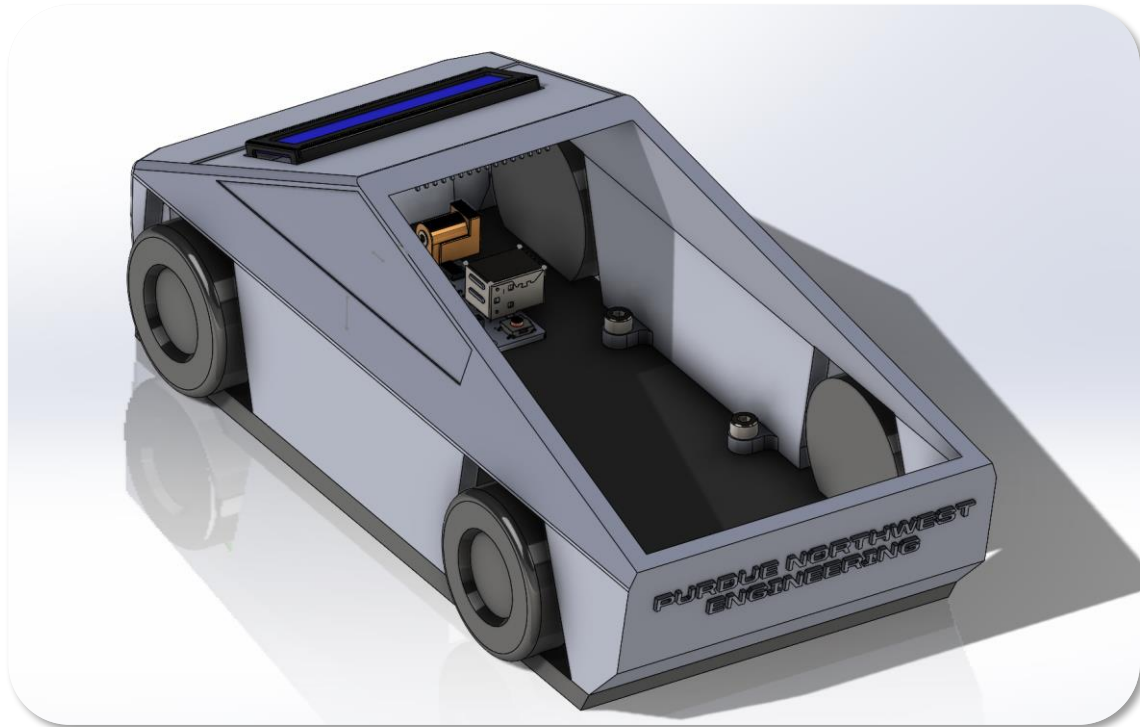
- Based off Tesla's CyberTruck
- Components:
 - Housing
 - Base
 - Load Cell
 - Arduino
 - LCD Display
- Programed
- 3D Printed



CyberScale Assembly Drawing & Render

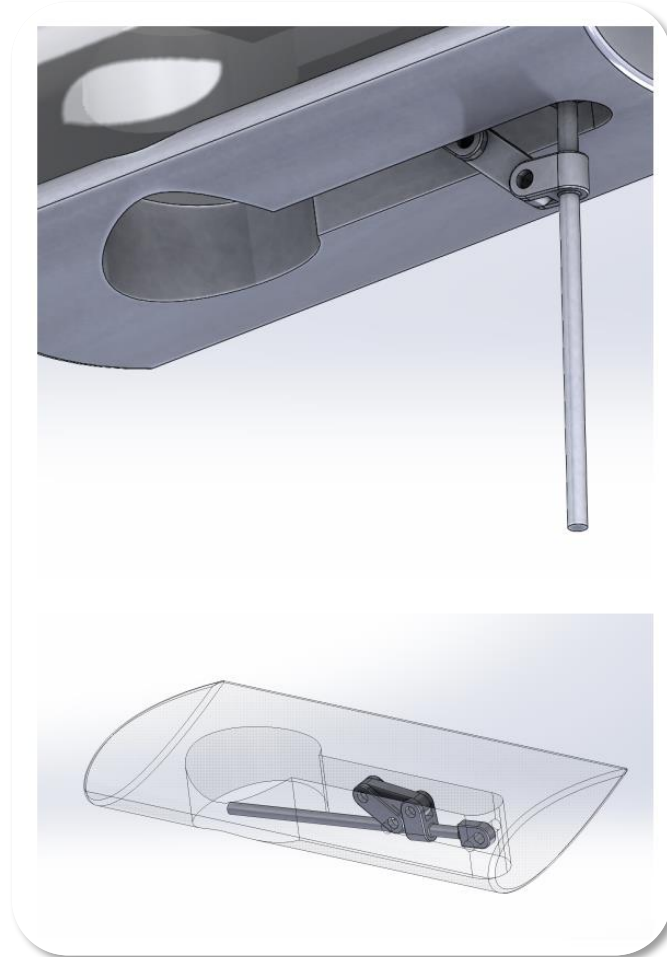


CyberScale Assembled



Kinematic analysis & design: Four bar linkage

- Use analysis software to design 4 bar linkage
- Landing gear mechanism
- Based off P-51 mustang
- NACA airfoil



Combustion: Simulation of Rocket Engine

- Ansys Fluent Combustion Simulation
 - K-Epsilon Turbulence
 - RANS
 - DPM
- Developed python script to develop boundary conditions
- Limited to Ansys Student Mesh

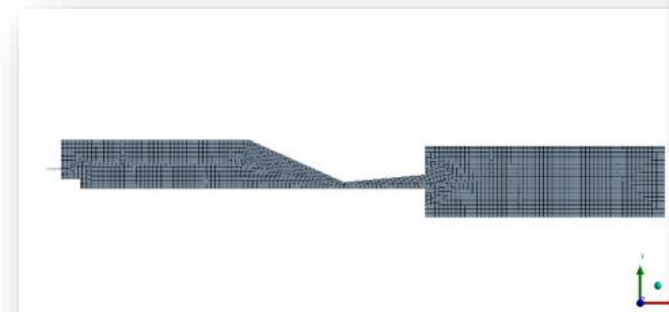


Figure 4: Computer mesh, 57,800 nodes & 56,811 elements.

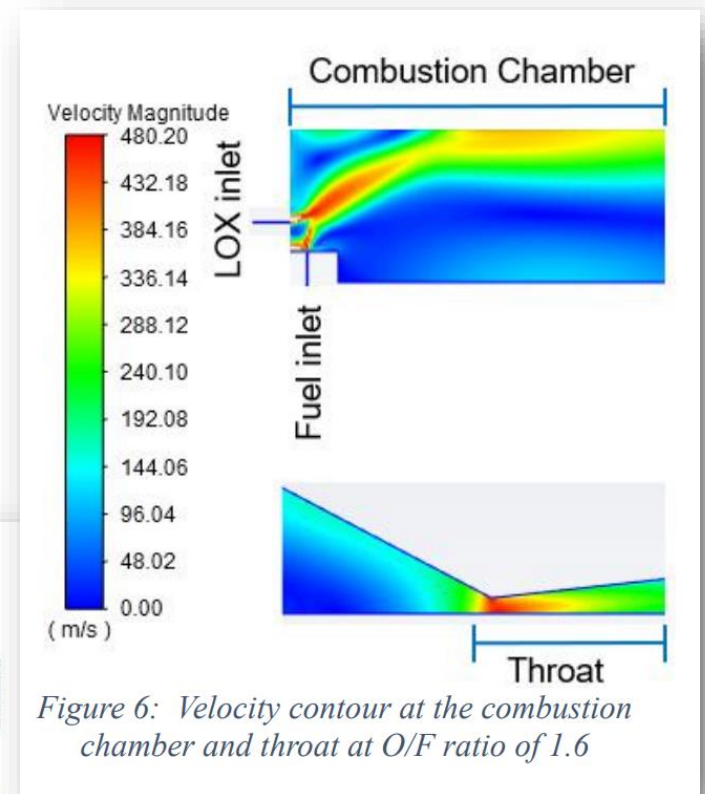


Figure 6: Velocity contour at the combustion chamber and throat at O/F ratio of 1.6

Professional Work: Selected Examples

- Sullair (Siemens NX):
 - Custom Panel – Sheet Metal
 - Exhaust – Aluminized Tubing
 - Engine/Fuel System – Hoses, fittings, tanks, mounts
 - Air End – Castings, Hydraulics, Gear/Drive Train.
- Dwyer Instruments (Solidworks)
 - Gage Brass Body - Forging
 - Gage Plastic Body – Injection Molding
 - Pressure Switch – Aluminum Diecast
- J&L Dimensional
 - 3D Scanning (GOM ATOS)
 - Coordinate Measuring Machine (CMM/PC-DMIS)
 - Romer Arm (PC-DMIS)

Sullair: Sheet Metal Panel

- Engineered Order required larger motor.
- Modified existing panel to bump out area around the motor.

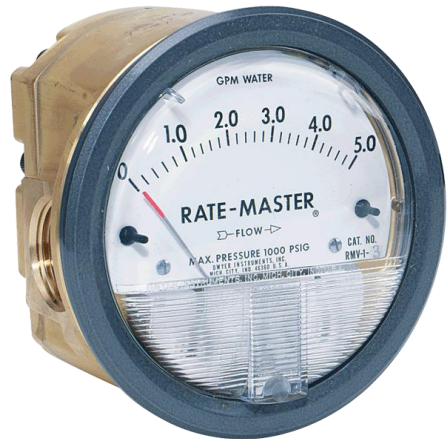


Sullair: Fuel & Exhaust Design (Various Machines)



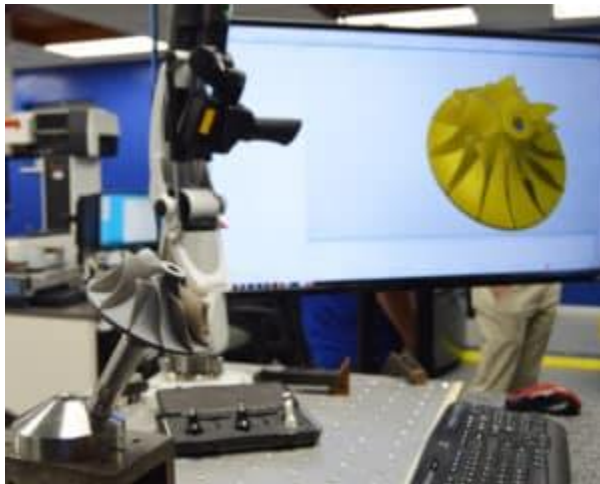
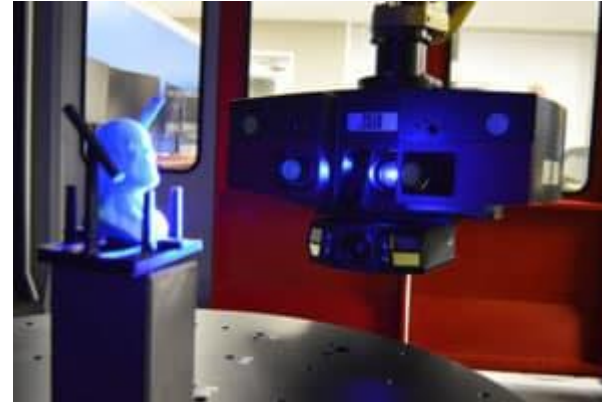
Dwyer Instruments: Housings

- Redrawn from hand drafted drawings & 2D CAD Drawings
- Forged Brass, injection molding, and diecast



J&L Dimensional

- 3D Scanning (ATOS)
- Coordinate Measuring Machine (PC-DMIS)
- Romer Arm
- Shop Tools
- Profilometer

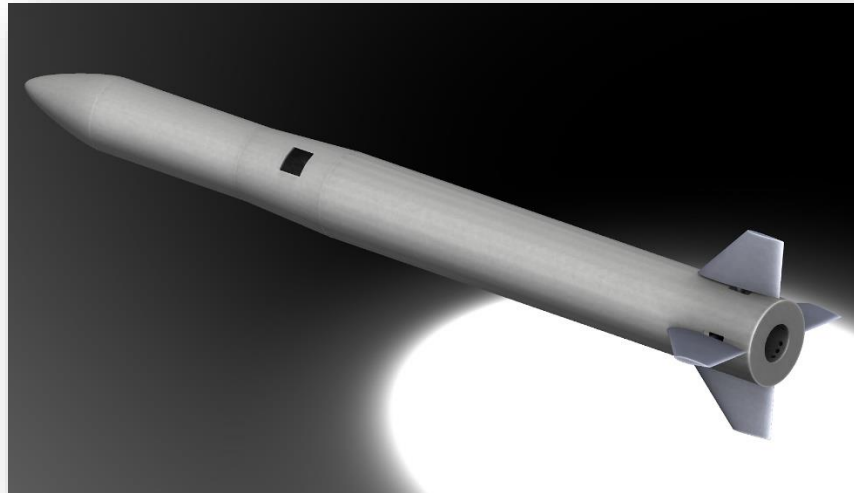
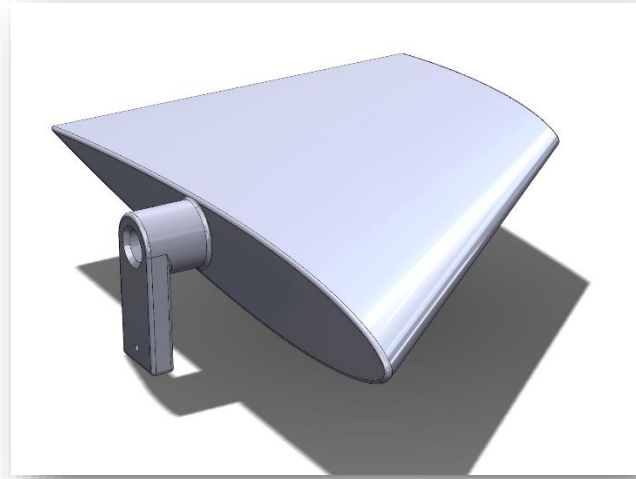


Personal Projects

- Rocket-Fin Design
- 3D Printing
- CAD Design

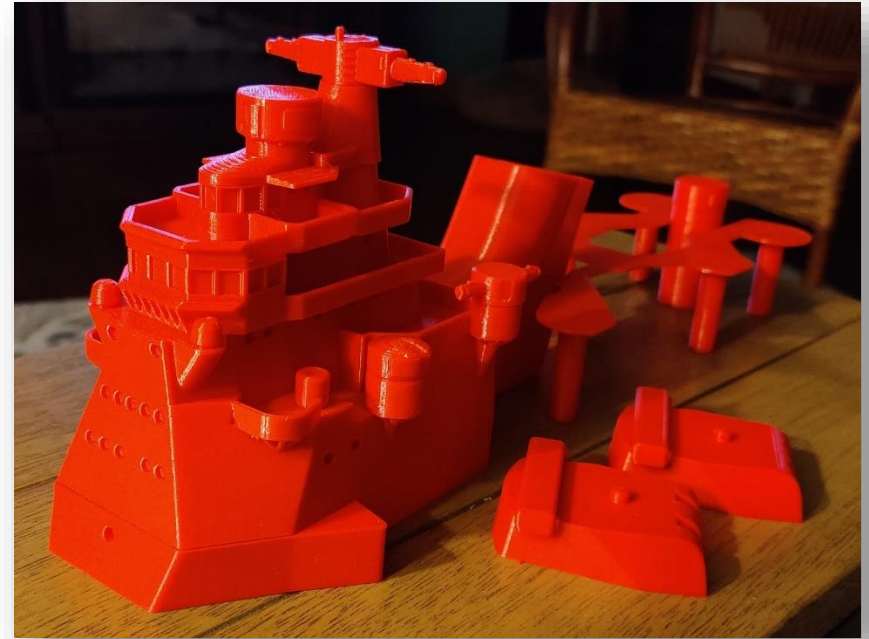
Rocket-Fin

- Designed in conjunction with other hobbyists
- Subsonic Rocket
- Fin to be actuated with Servo motors



3D Printing

- Prusa MK3S Printer
- Calibrated
 - Extrusion Width
 - E-Steps
 - PID



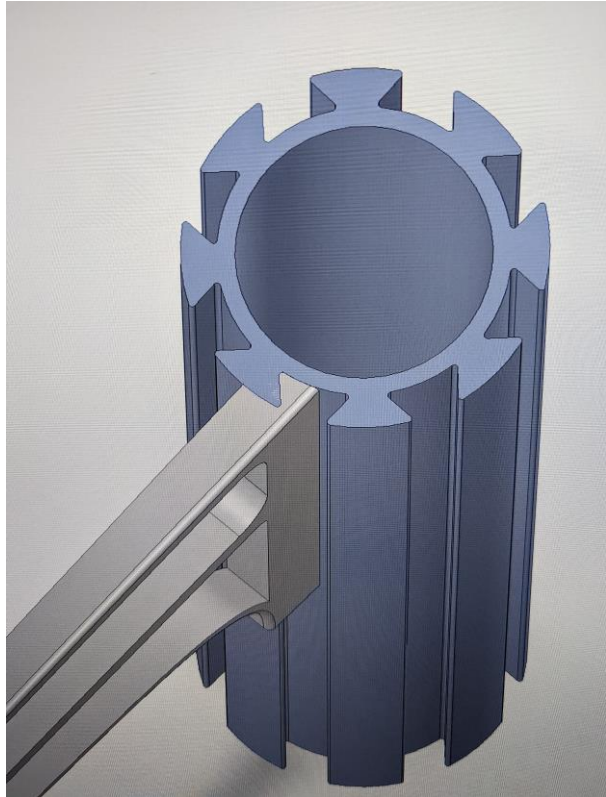
3D Printing (cont.)

- Calibration is better than .01 micron
- Cube is 25mm x 25mm with .90mm walls



3D Modelling

- Currently working on a desk street light model to be 3D printed.



3D Scanning

