

# MRAD DESIGN REVIEW

**University of Idaho**  
College of Engineering



BLAKE WARNER, SELSO GALLEGOS, KYLE FLACK, FAWAZ ALHARBI

# PROBLEM DEFINITION

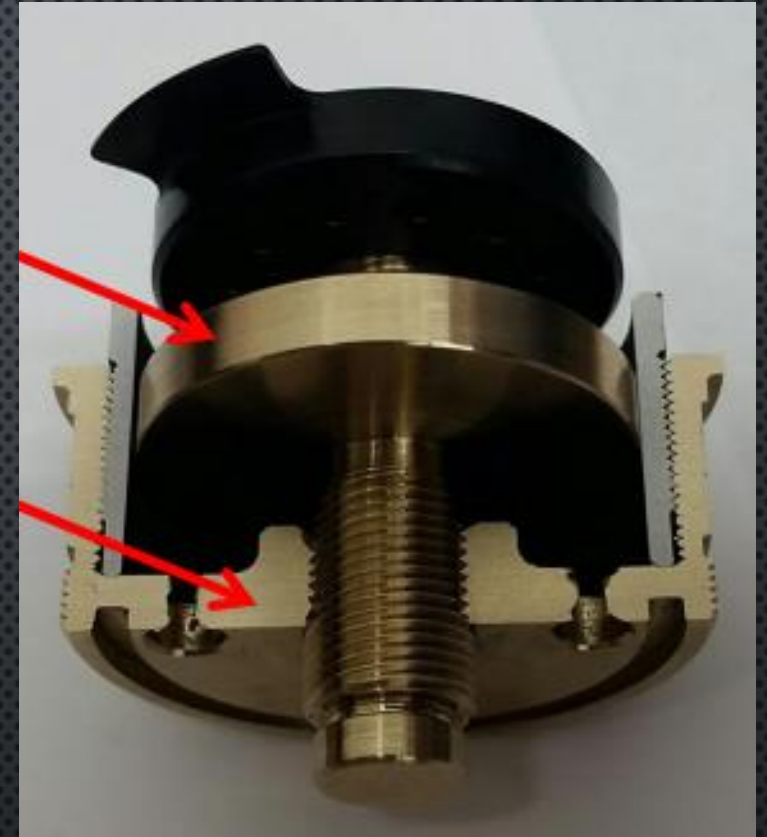
- AUTOMATED METHOD TO BURNISH THREADS
- MINIMAL USER INPUT
- REPEATABILITY IN THREAD BACKLASH AND TORQUE





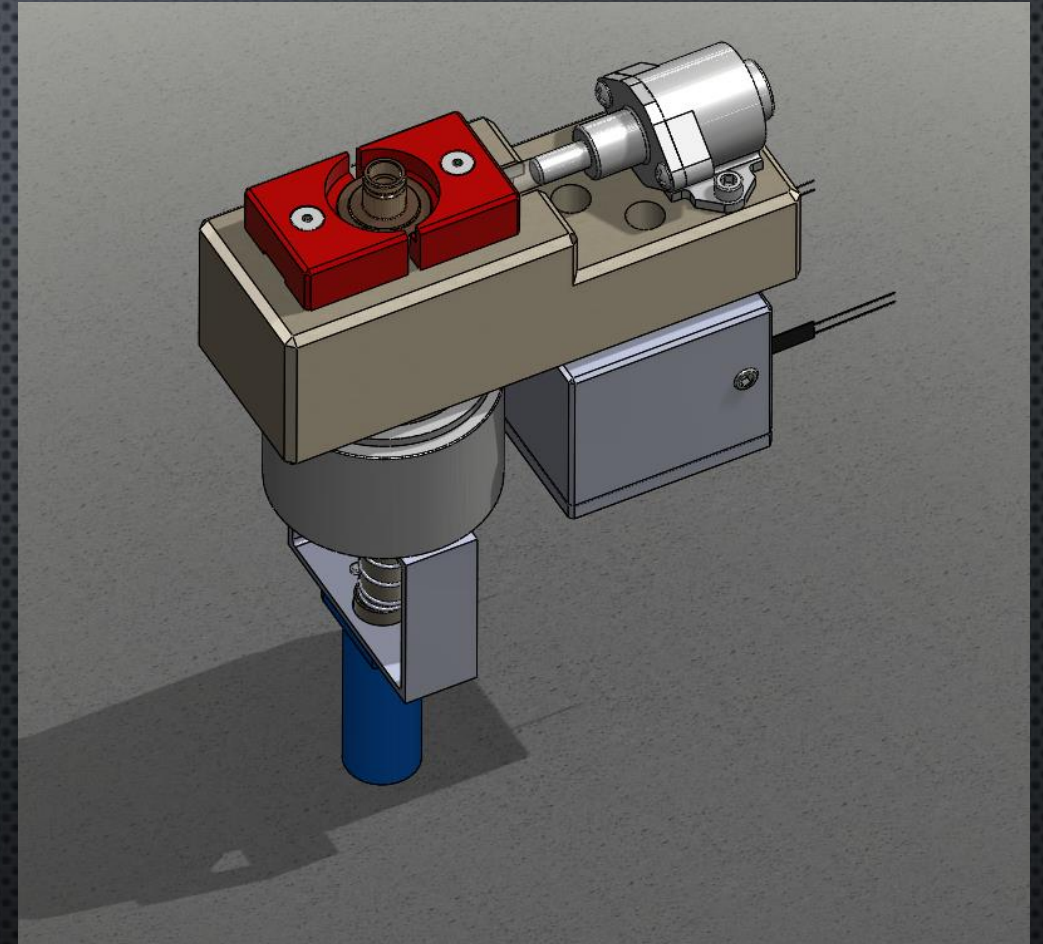
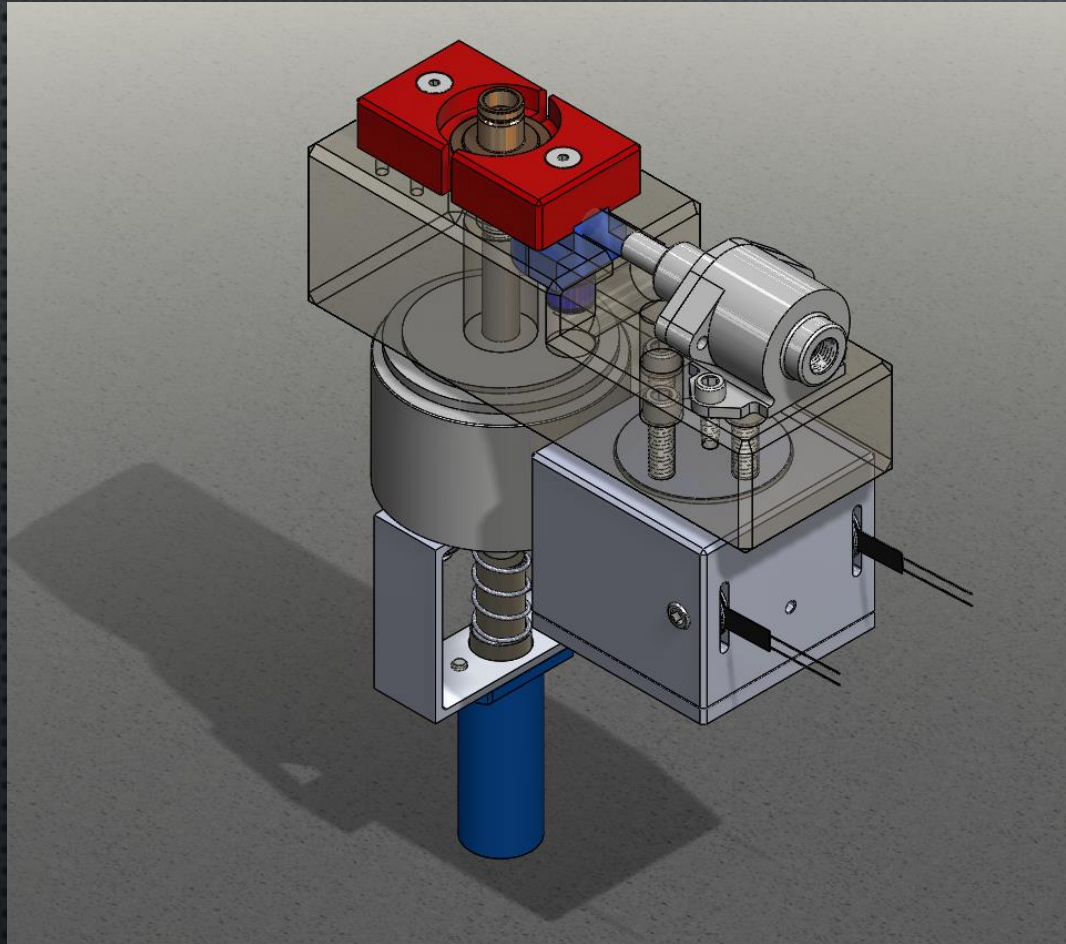
# DELIVERABLES

- DESIGN/PROTOTYPE AN AUTOMATED BURNISHING STAND
- ADJUSTABLE TO DIFFERENT MODELS
- MUST BE SIMPLE TO OPERATE
- CAPABLE OF BURNISHING TO A SPECIFIED TORQUE AND BACKLASH



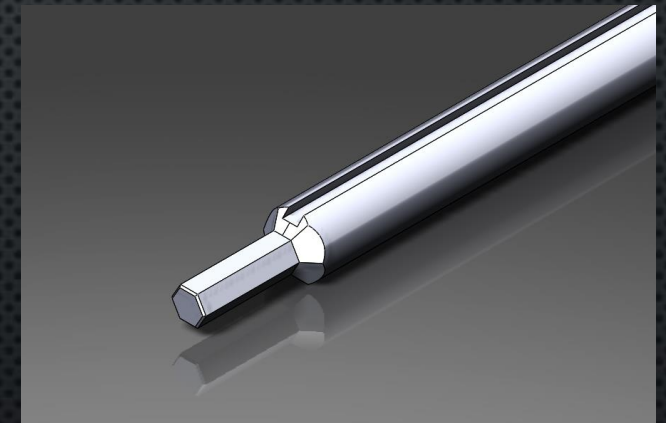
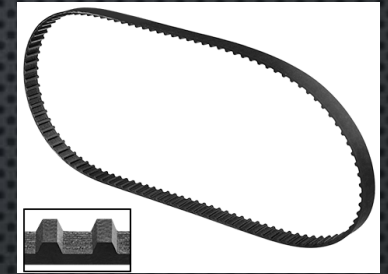
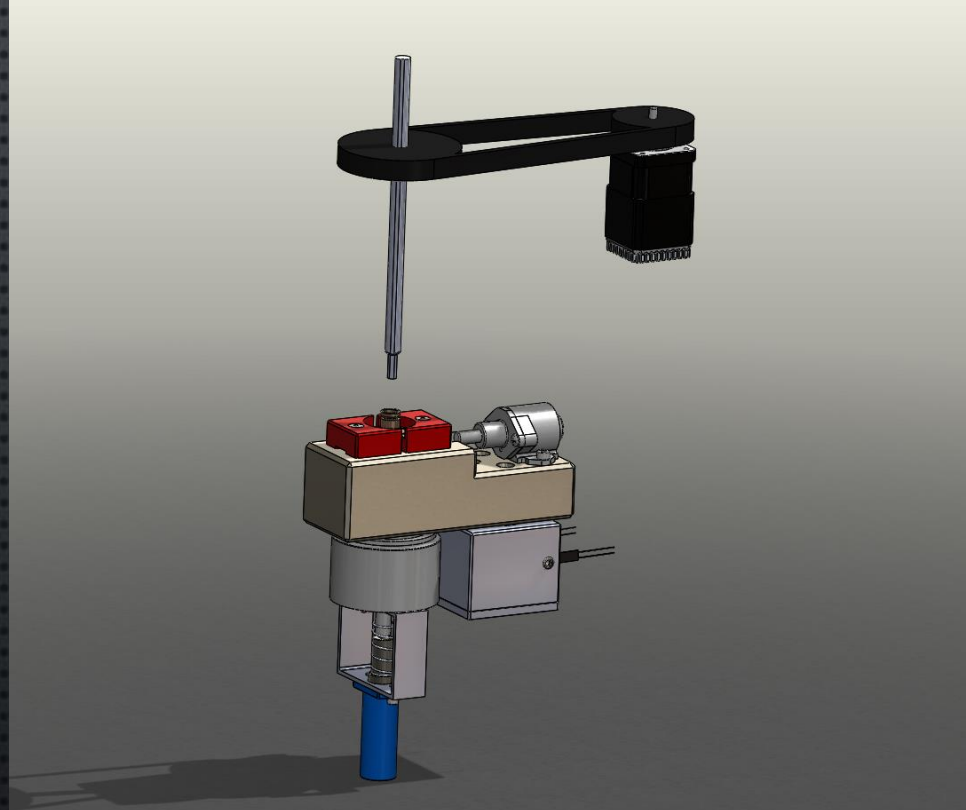
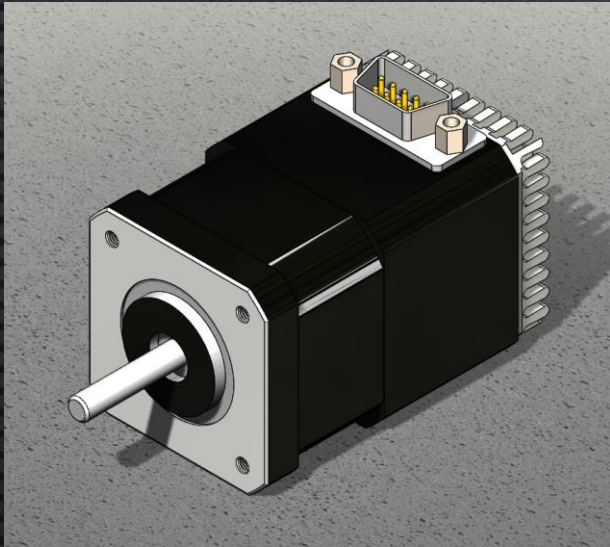


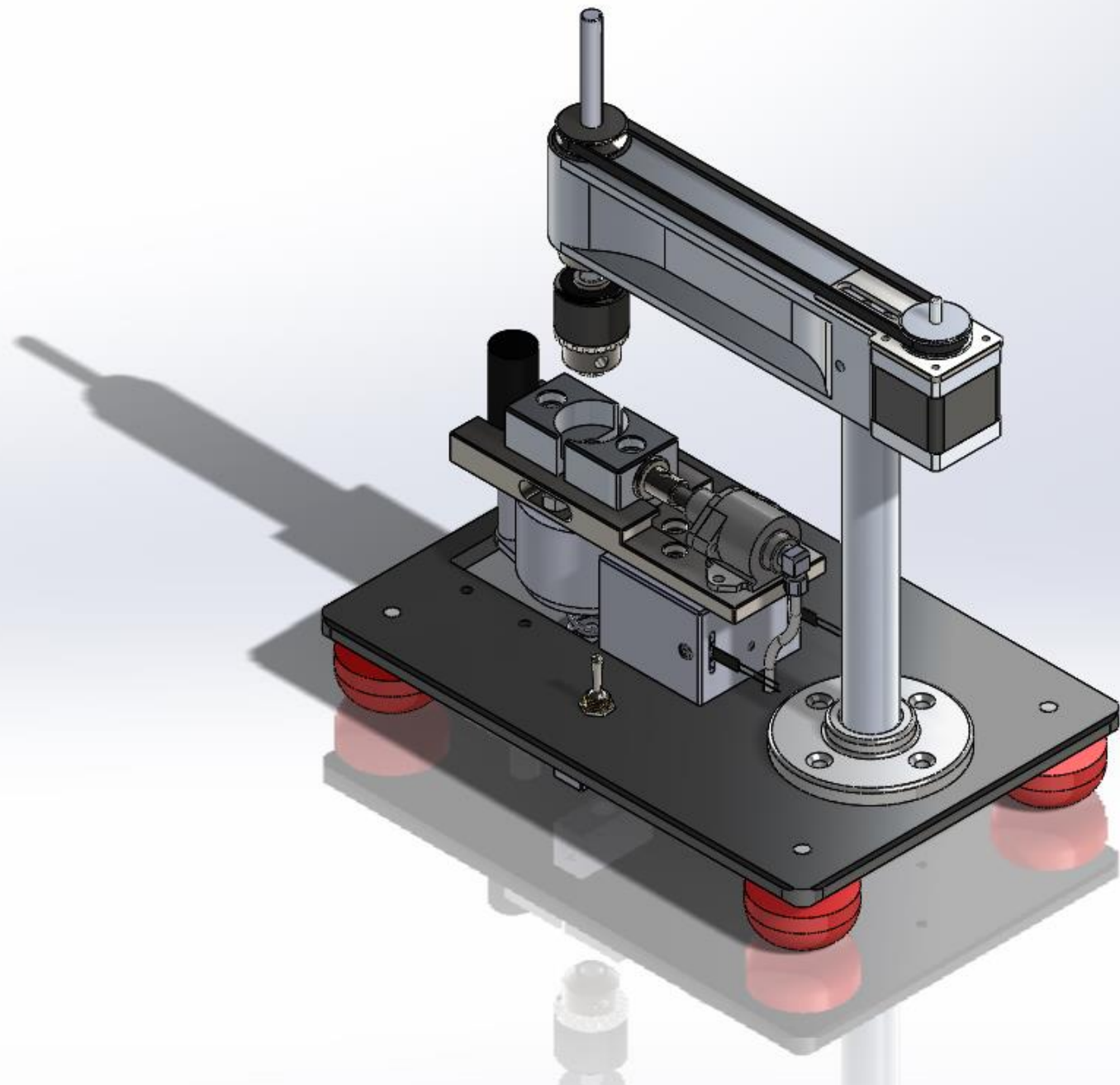
# EARLY DESIGN CONCEPTS



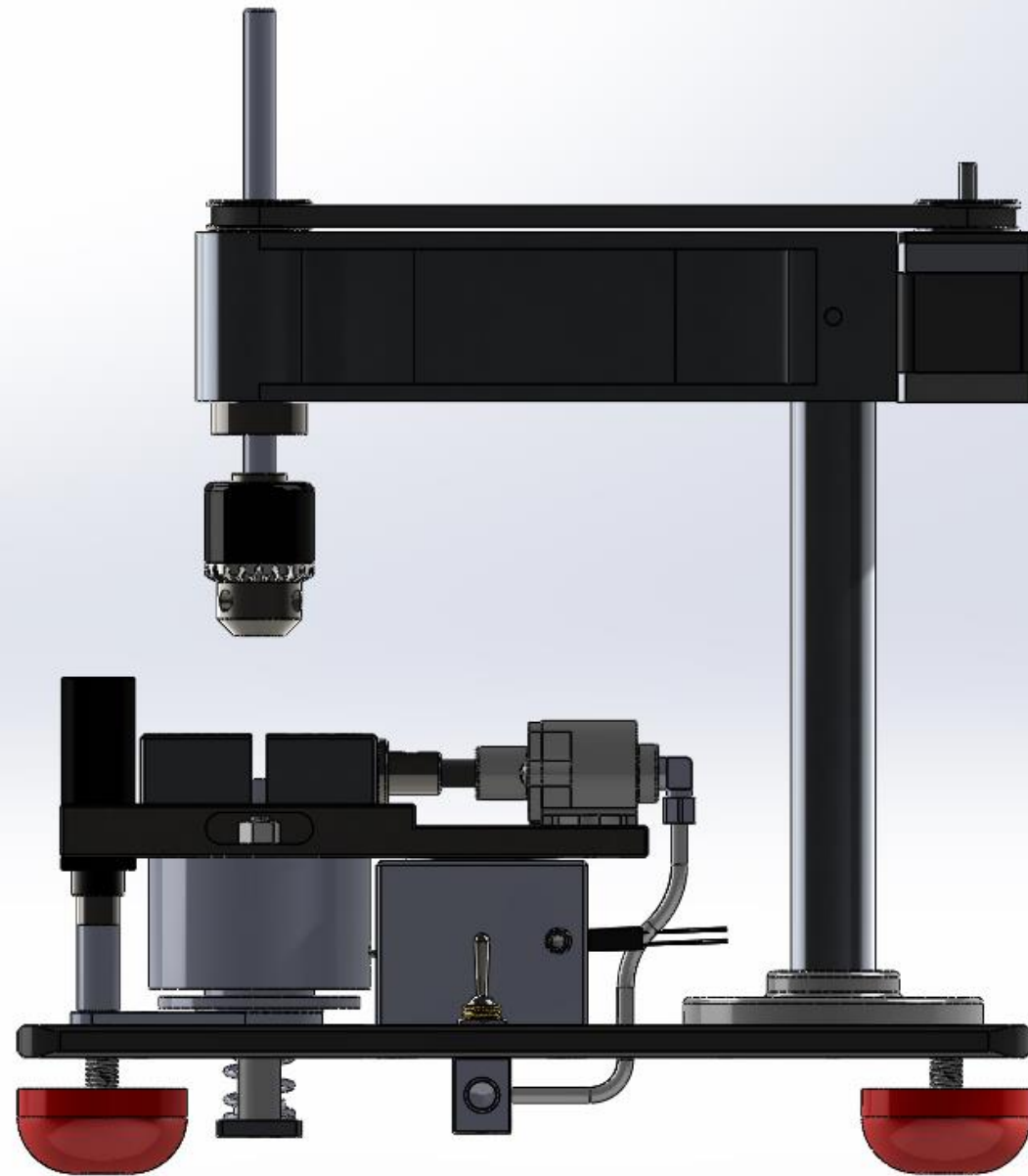


# ARBOR IDEAS?

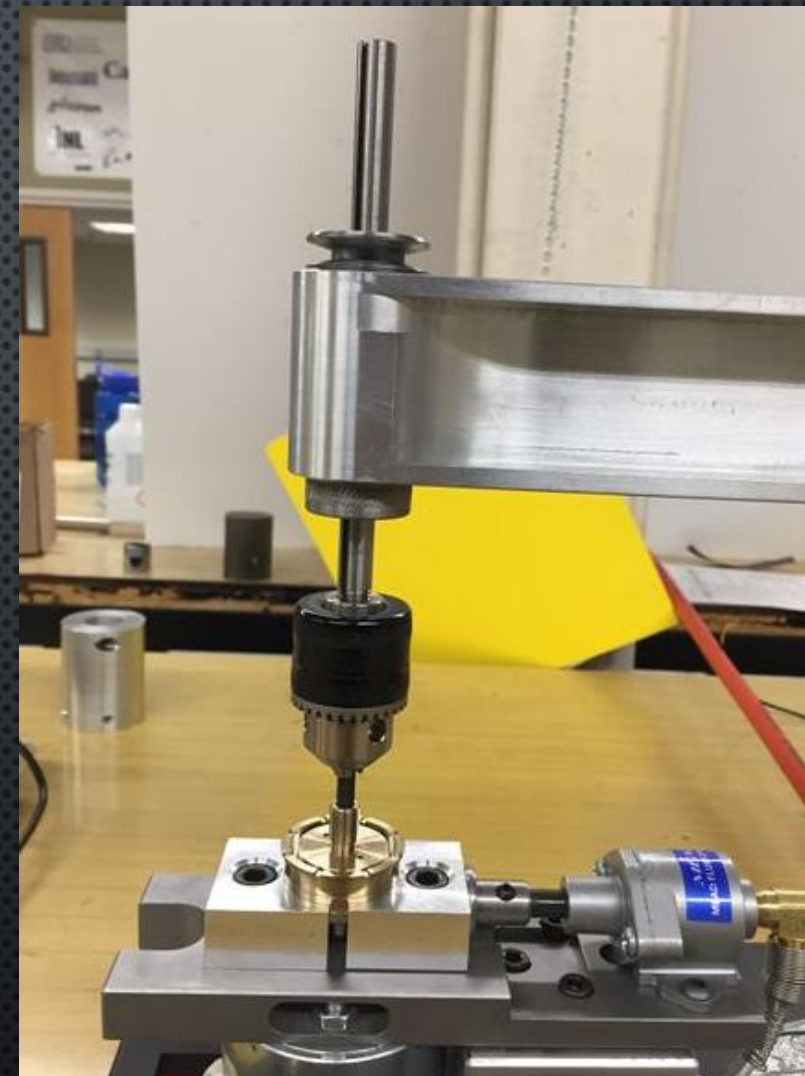
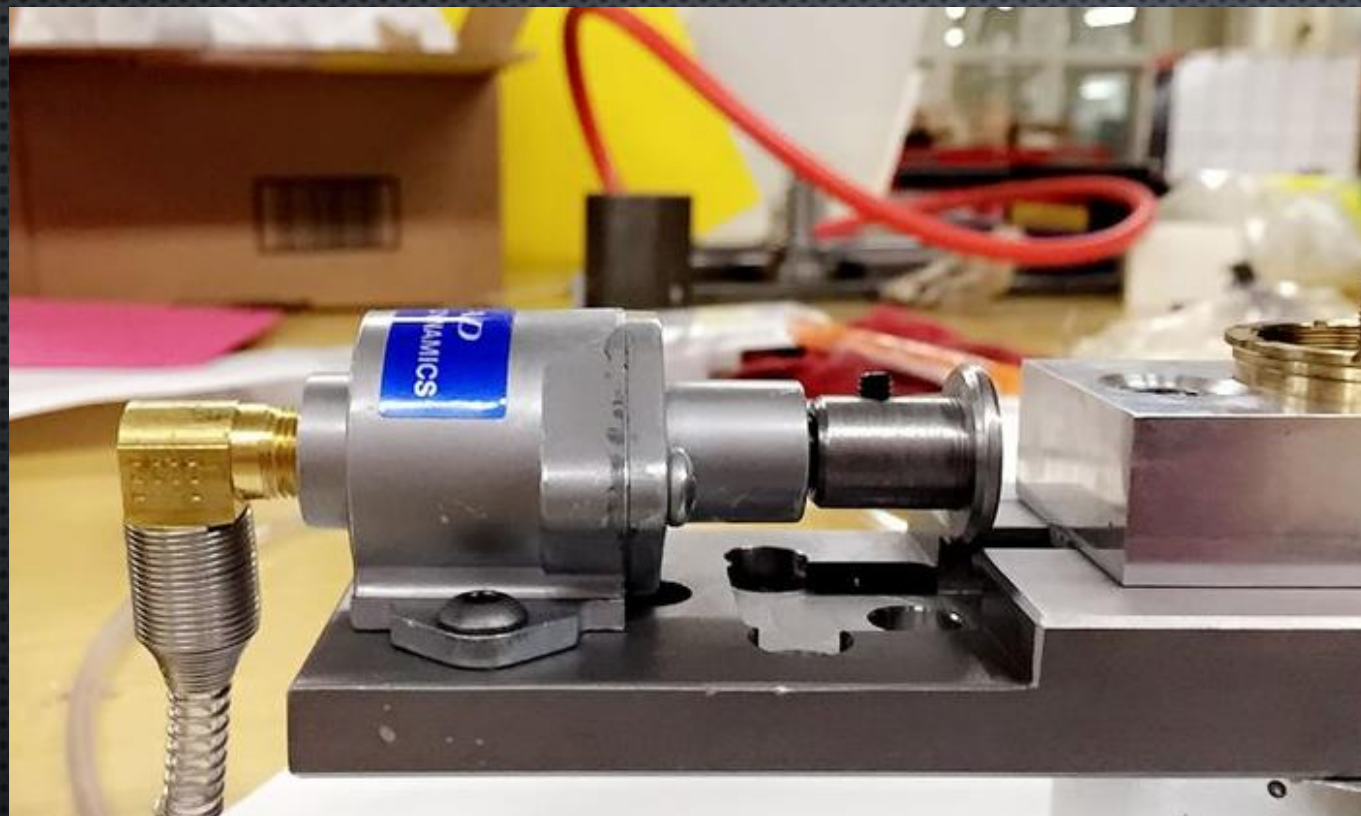








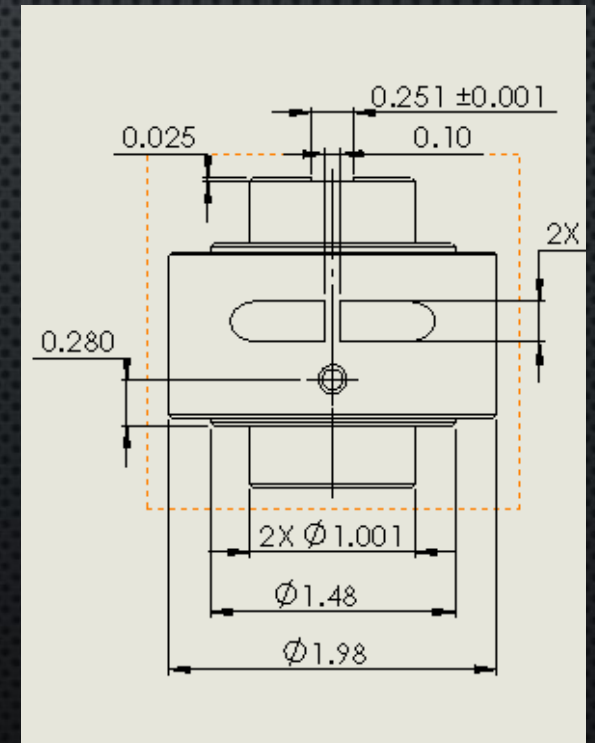
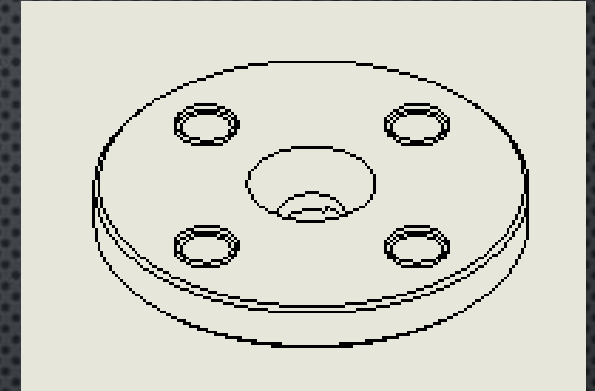
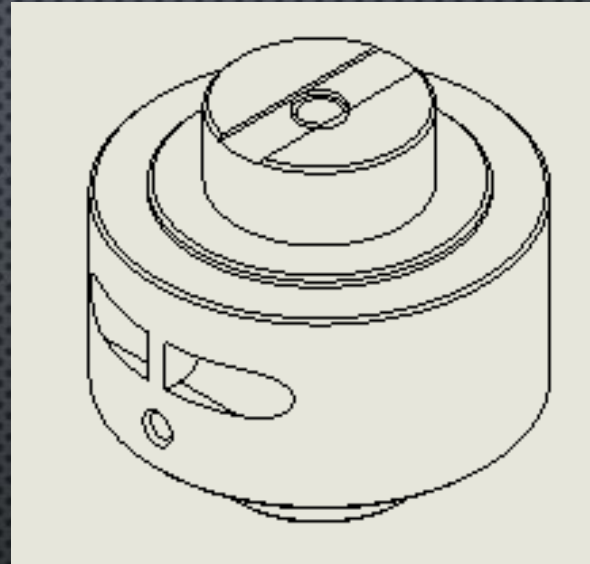
# CURRENT BURNISHING PROCESS





# TORQUE SENSOR

- NEW BEARINGS
- PROOF OF CONCEPT
- PURCHASED SENSOR BACKUP



```
% Moment arm length, inches
L = 7;

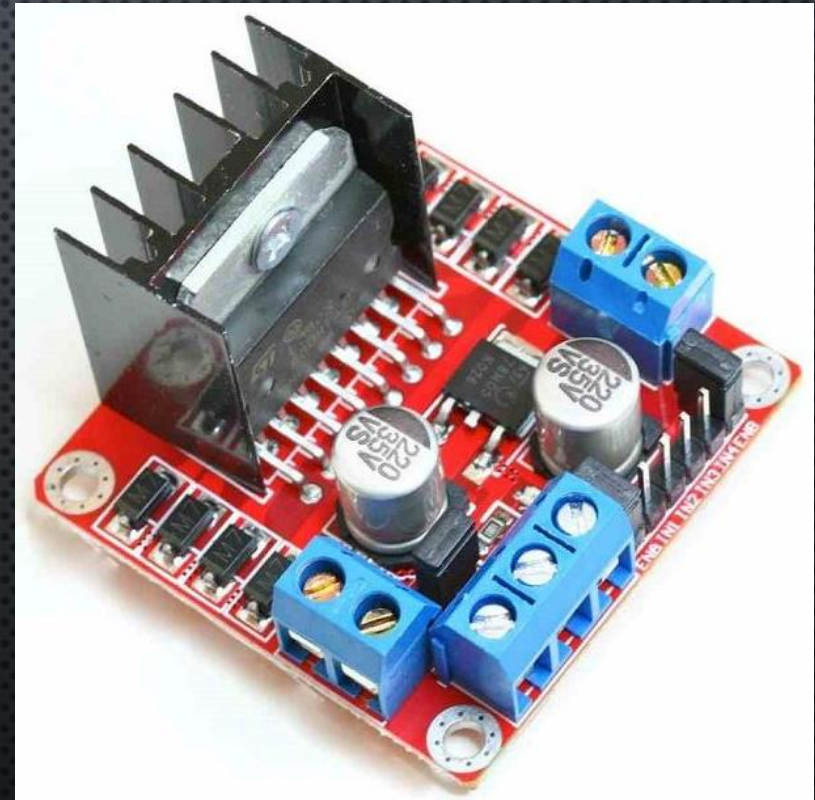
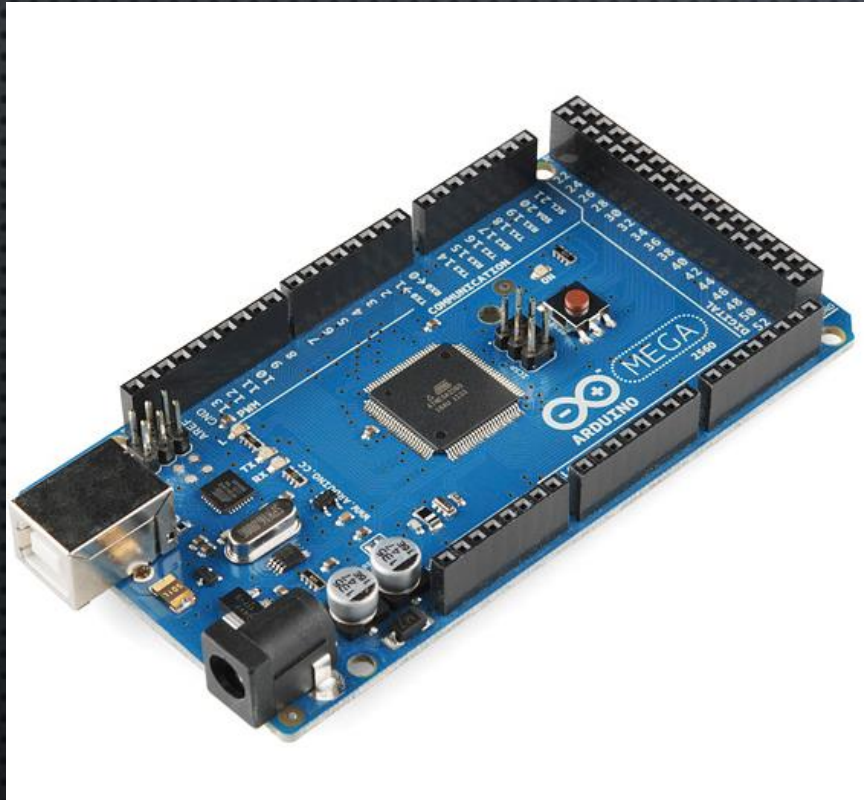
% Applied Load, lb force
F = [0 10 20 30 40 50 60 70 80 90 100 150 200 400 500 1000 1500]*.002204622622;

% Applied Torque lb-in
T = L.*F;

% Voltage Read
V = [49 50 50.5 51.5 53.5 56.5 57.5 62.5 66.5 67 74.5 81 91 129 183 281 371];

plot(V,T,'ro')
title('Torque Sensor Calibration')
xlabel('Voltage Multiplier')
ylabel('Applied Torque(lb-in)')
grid on
```

# ARDUINO CODE





# STEPS FORWARD

- STEPPER MOTOR
- BACKLASH DEVICE
- INTERFACES
- USER PREFERENCES



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