

# Automated Mirror Cover Naval Precision Optical Interferometer

Team 8  
1/31/2013

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Aerial view of the NPOI facility

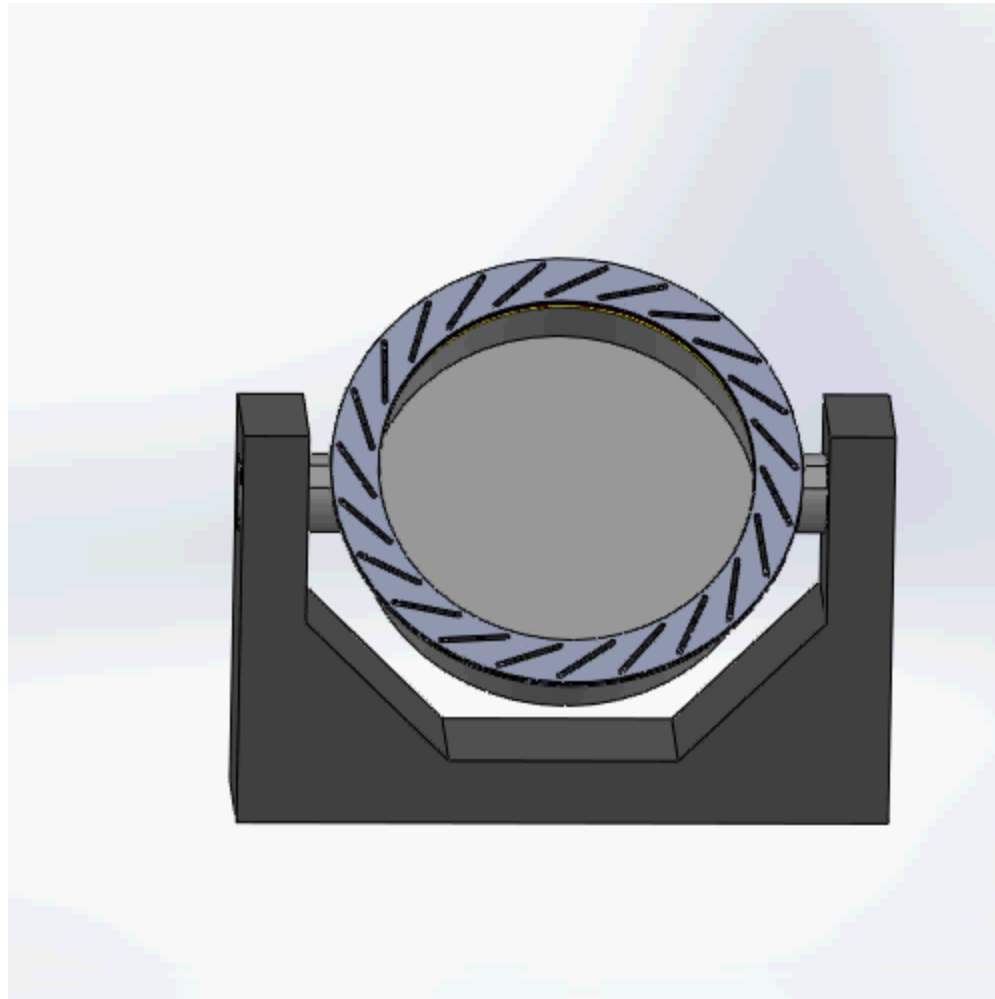
# Overview

- Problem Statement
- Iris Mechanism
- Scale Prototype
- Manufacturing Process
- Drive Mechanism
- Materials Selection
- Updated Gantt Chart

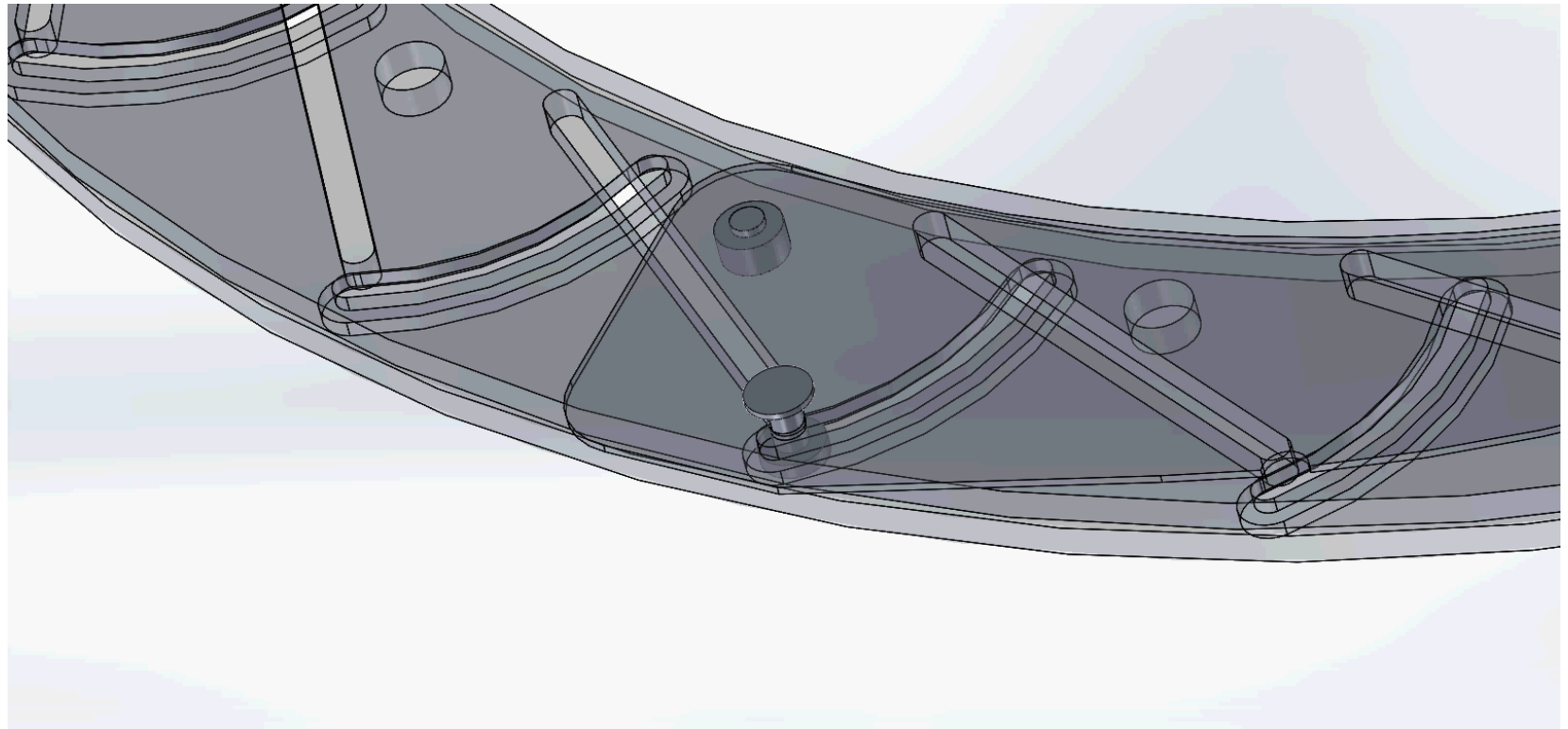
# Problem Statement

- An automatic mirror cover is needed at NPOI and must operate without interfering with current equipment while maintaining a nitrogen purge.

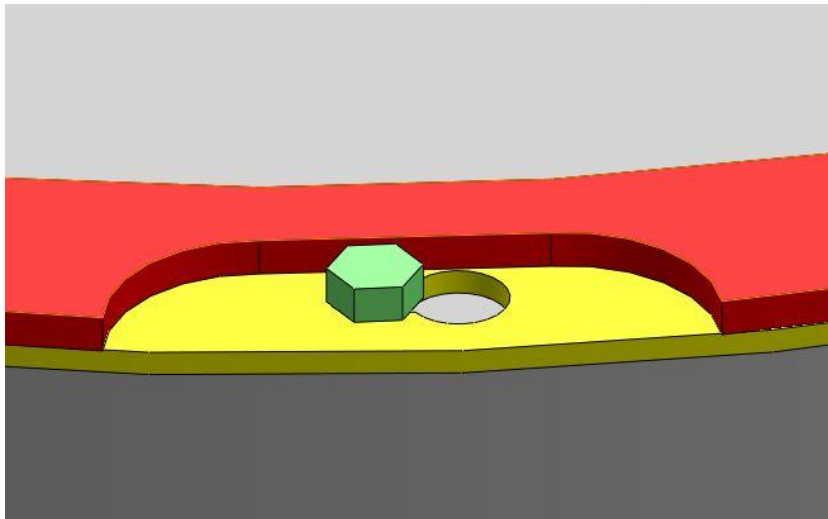
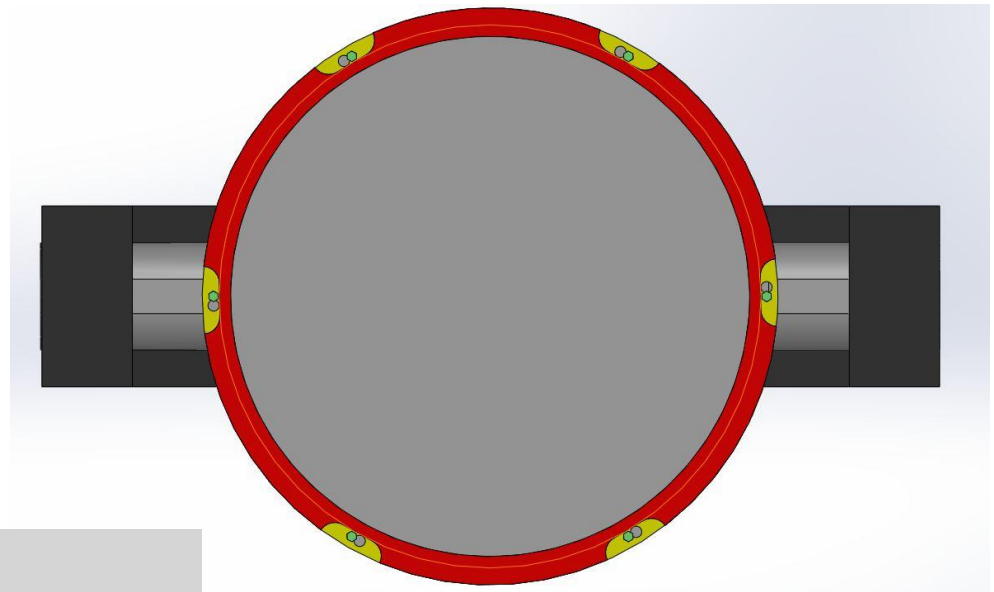
# Iris Mechanism



# Iris Mechanism



# Mounting Ring



# Scale Prototype

- 8 inch siderostat
- Minimal materials during testing
- Supermax table fits dimensions
- Fully operational by February 18

# Manufacturing Process

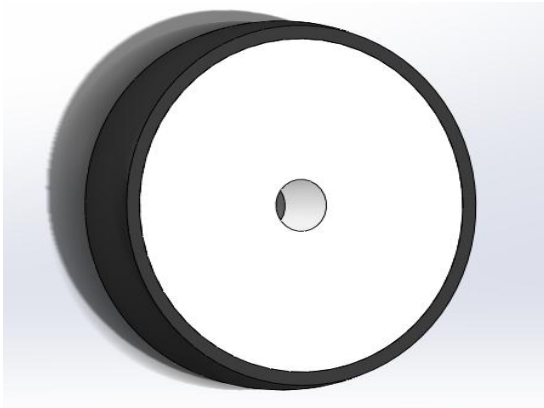
- **G-Code**
  - Codes developed for the base plate, top plate, and leaves for the scaled down Iris prototype.
- **Problems**
  - Issues with transferring WLPM codes to the Mach 3 of the SuperMax.
    - Cutter compensation is not the same.
    - Incorrect diameters are being machined.



# Manufacturing Process

- Full Scale model
  - Must machine in parts as the SuperMax table dimensions are too small to machine the iris rings in one go around.
- Codes must be refined from the scaled model.
- Must find a reliable way to clamp down the material while machining.

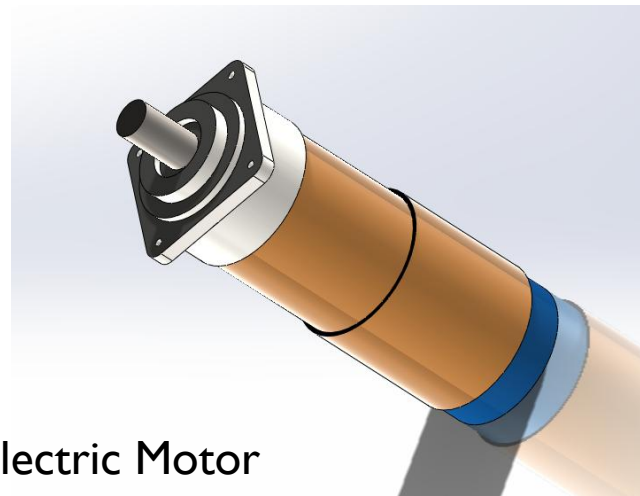
# Drive Mechanism Components



Friction Wheel

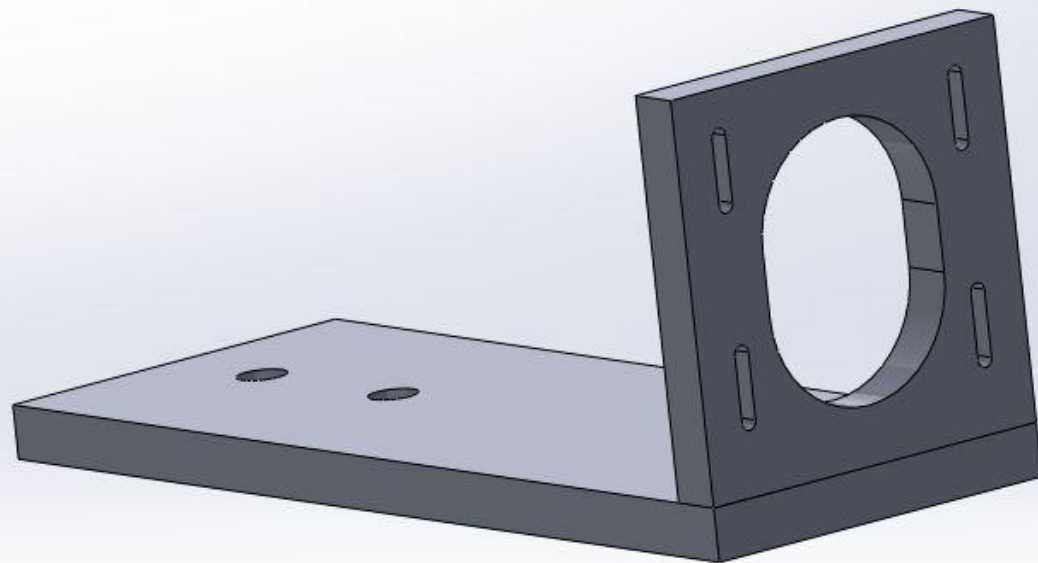


Limit Switch



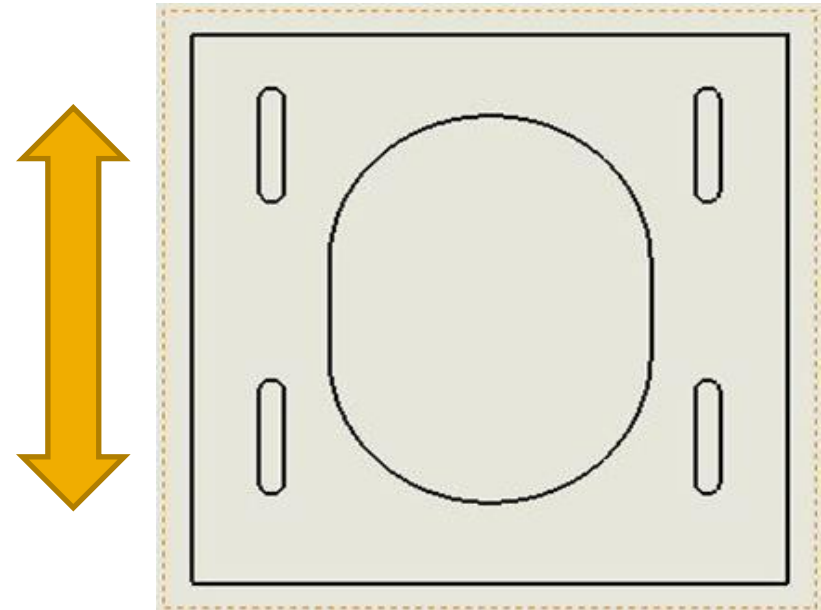
Electric Motor

# Motor Mount



# Motor Mount

- **Ridged and Secure Mount for Face of Motor**
- **Adjustable Y-Direction for Tolerance Considerations**



# Materials Selection

- **The Rings**
  - Mounted to a cast aluminum mirror cell
  - The mounting points must account for the thermal expansion of the aluminum.
- **Available Materials**
  - Lexan, PVC or Plexiglass

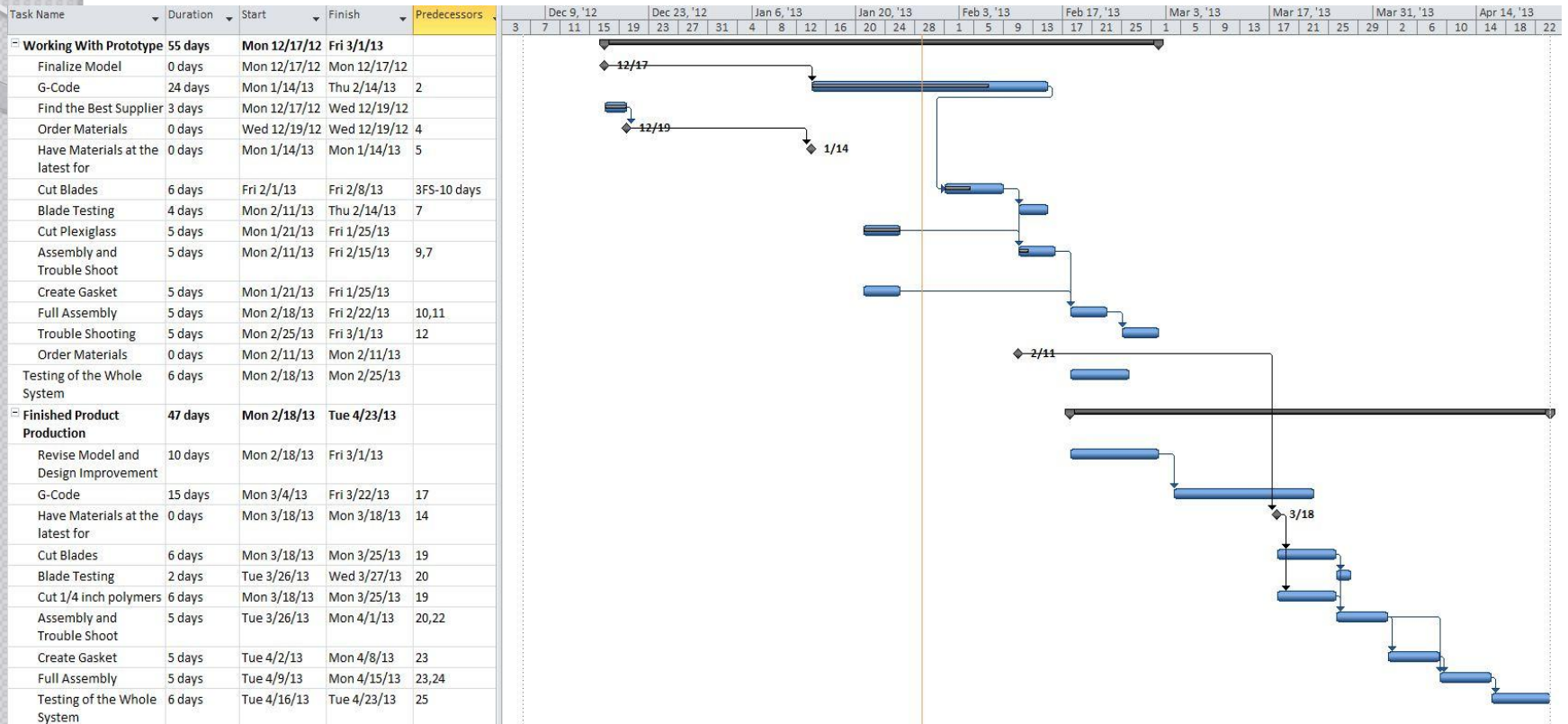
# Materials Selection

- Iris blades
  - Low coefficient of friction
  - Low thermal expansion
  - High tensile strength
  - Low density
  - Inexpensive

# Materials Selection

- Polyoxymethylene “[Delrin](#)”
  - UV degradation- Ultra Violet rays activate Tertiary Carbon bonds
  - [Black Homopolymer](#) Delrin® 100 is UV stabilized

# Gantt chart







Questions?