

Automated Mirror Cover Naval Precision Optical Interferometer

Team 8
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Aerial view of the NPOI facility

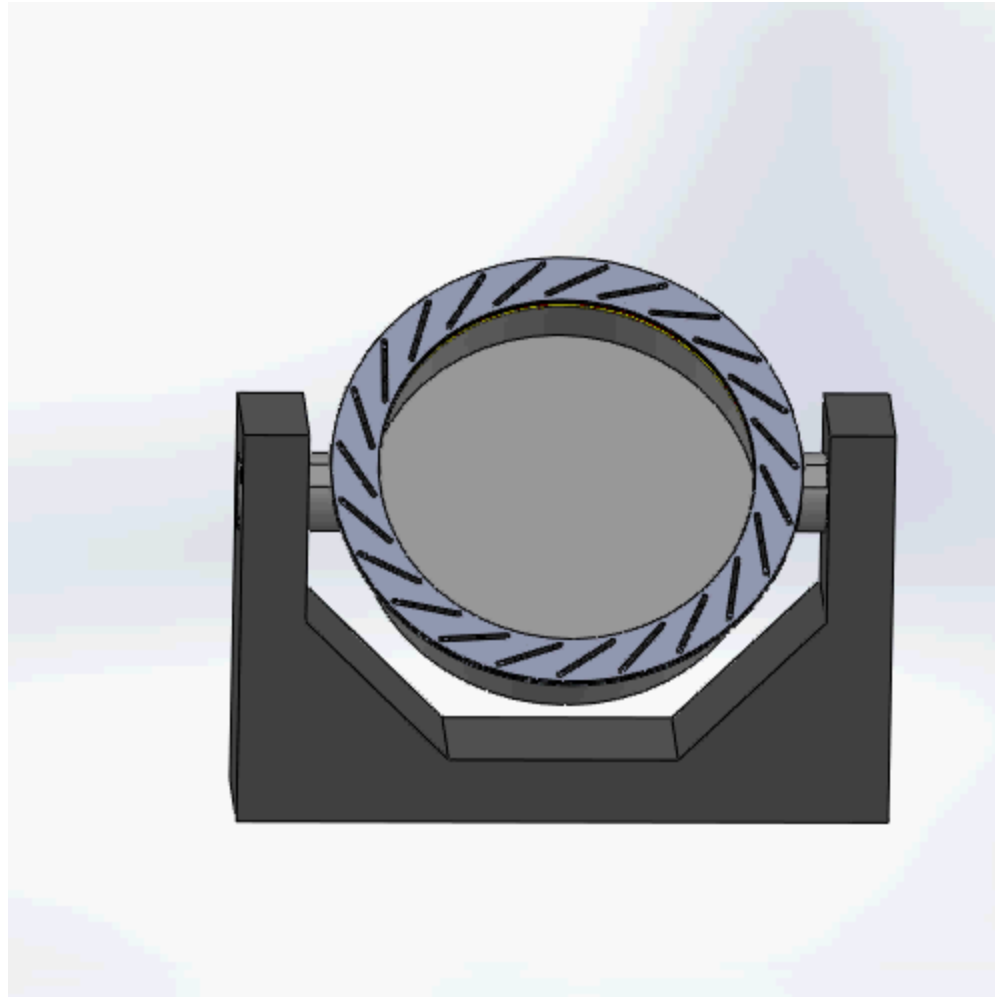
Overview

- Problem Statement
- Re-introduce Iris Mechanism
- Manufacturing Process
- Issues with the first Iris Prototype
- Current Prototype
- Areas for improvement
- Discuss a few design solutions
- Updated Gantt Chart

Problem Statement

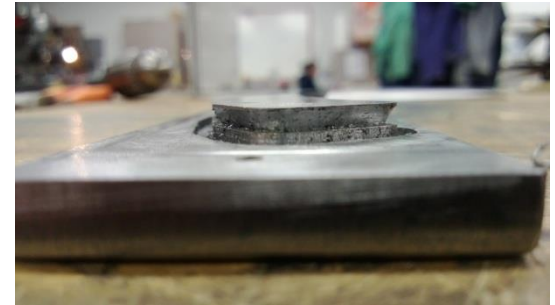
- An automatic mirror cover is needed at NPOI and must operate without interfering with current equipment while maintaining a nitrogen purge.

Iris Mechanism



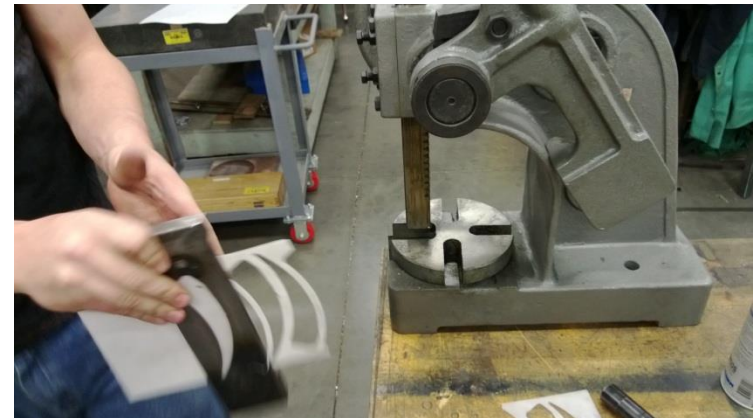
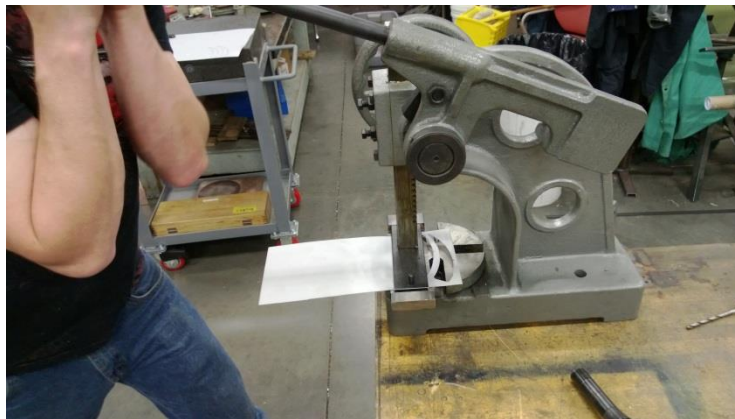
Iris Blades

- The stamp was machined using the Supermax.



The Blades

- Stamped out using a machined die and an arbor press



- Each Blade is filed to remove burs



The Rings

- Manufactured using the Supermax



Screen to Machine Failure

- Unexpected friction
 - Pivot points
 - Blade ring interface
- Binding issues with the retaining pin
 - The angle of attack was too high
- Concentricity call out
- Poor pin position tolerance

Working Prototype I.4



Room for Improvement

- The rings need to be made more concentric
- Pin configuration need to be optimized
- Top rings drive slot need to be redesigned

C-Clamps

- A pin goes through the top ring, an iris blade to the bottom ring
- A modified C-clamp will be used to insure the top and bottom rings are concentric
- The pin will no longer need to go through all three components

Pin Configuration

- The pivot pin will go through the iris blade into the bottom ring and will be static
- The drive pin will go through the iris blade into the top ring and will drive the mechanism

Slot Redesign

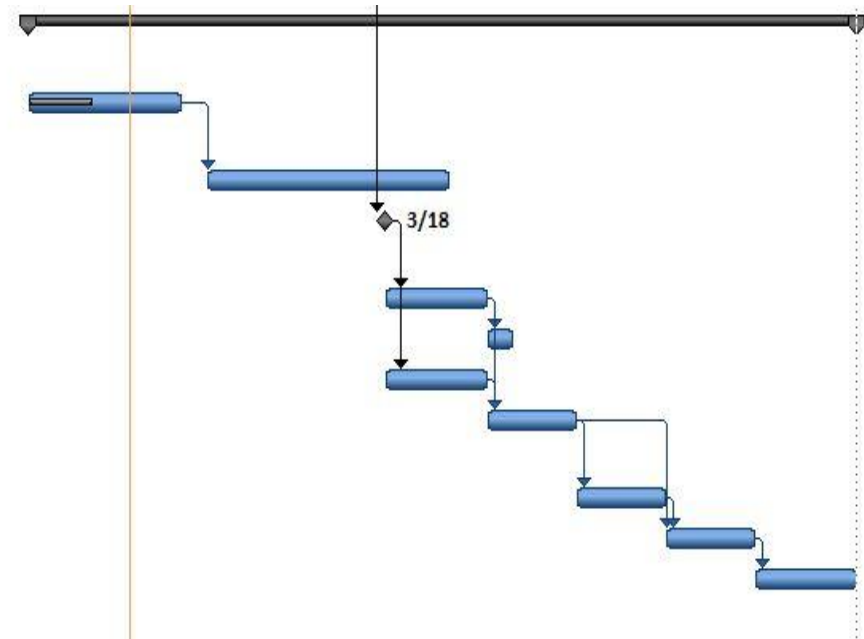
- The angle of the slots will be shallower
- The Slots on the bottom ring are no longer required

Low COF Coatings

- If there is still too much friction, there are low coefficient of friction coatings
- Three companies that offer such coatings include
 - [KECO](#)
 - [Orion](#)
 - [Plasma Coatings](#)

Gantt chart

Finished Product Production	47 days	Mon 2/18/13	Tue 4/23/13	
Revise Model and Design Improvement	10 days	Mon 2/18/13	Fri 3/1/13	
G-Code	15 days	Mon 3/4/13	Fri 3/22/13	17
Have Materials at the latest for	0 days	Mon 3/18/13	Mon 3/18/13	14
Cut Blades	6 days	Mon 3/18/13	Mon 3/25/13	19
Blade Testing	2 days	Tue 3/26/13	Wed 3/27/13	20
Cut 1/4 inch polymers	6 days	Mon 3/18/13	Mon 3/25/13	19
Assembly and Trouble Shoot	5 days	Tue 3/26/13	Mon 4/1/13	20,22
Create Gasket	5 days	Tue 4/2/13	Mon 4/8/13	23
Full Assembly	5 days	Tue 4/9/13	Mon 4/15/13	23,24
Testing of the Whole System	6 days	Tue 4/16/13	Tue 4/23/13	25





Questions?