



Design For Manufacturing 50x Yo-yo Project

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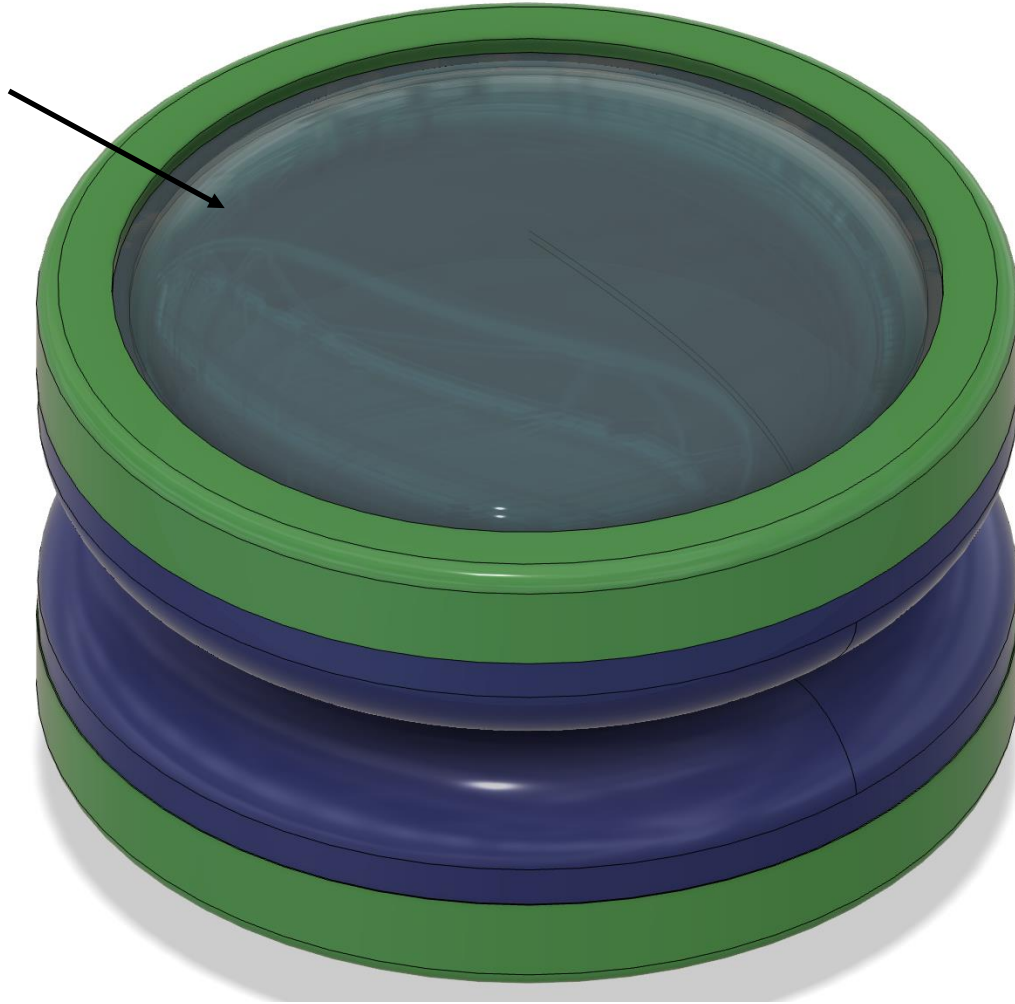
Massachusetts Institute of Technology

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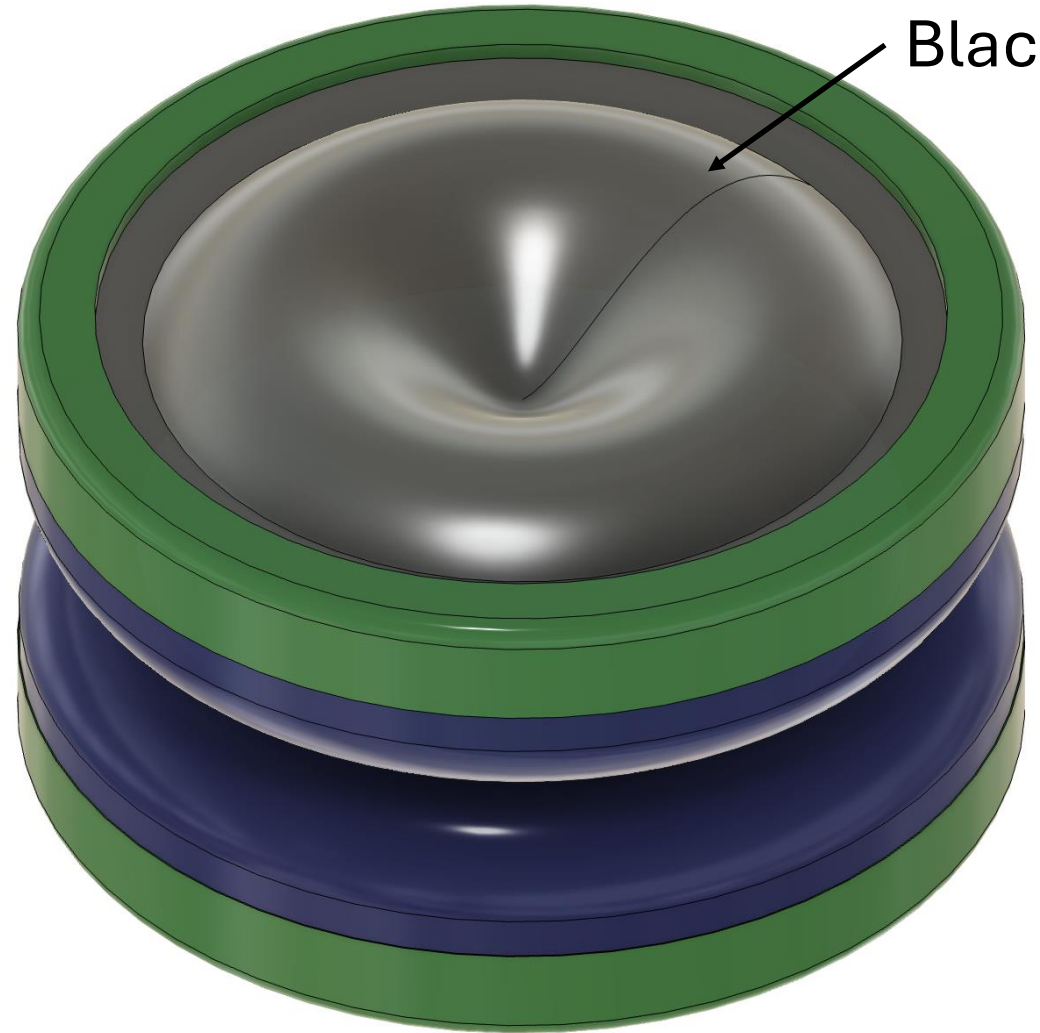
Objective: In a team of 6, design and manufacture 50x identical, custom yo-yos by the end of the semester to highlight our understanding of DFM processes, techniques, and guidelines

CAD Design

Space
Helmet

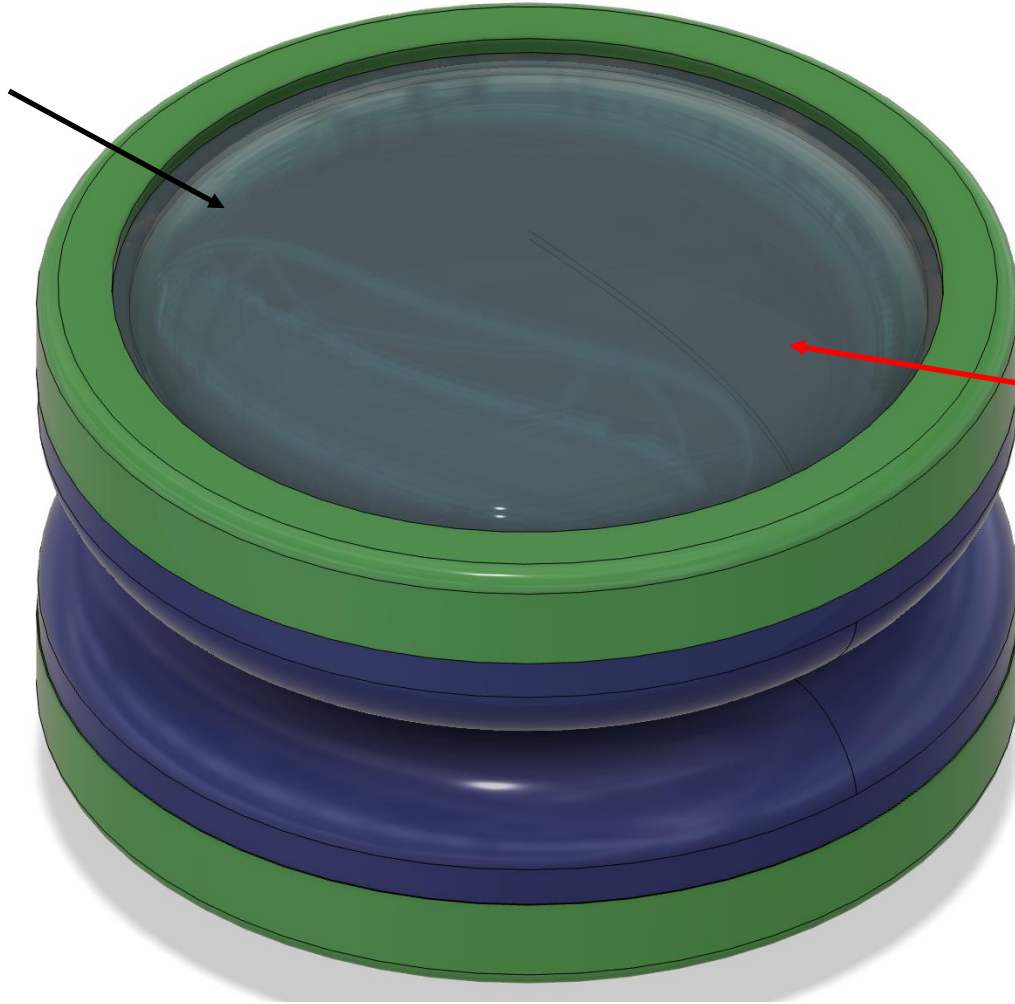


Blackhole

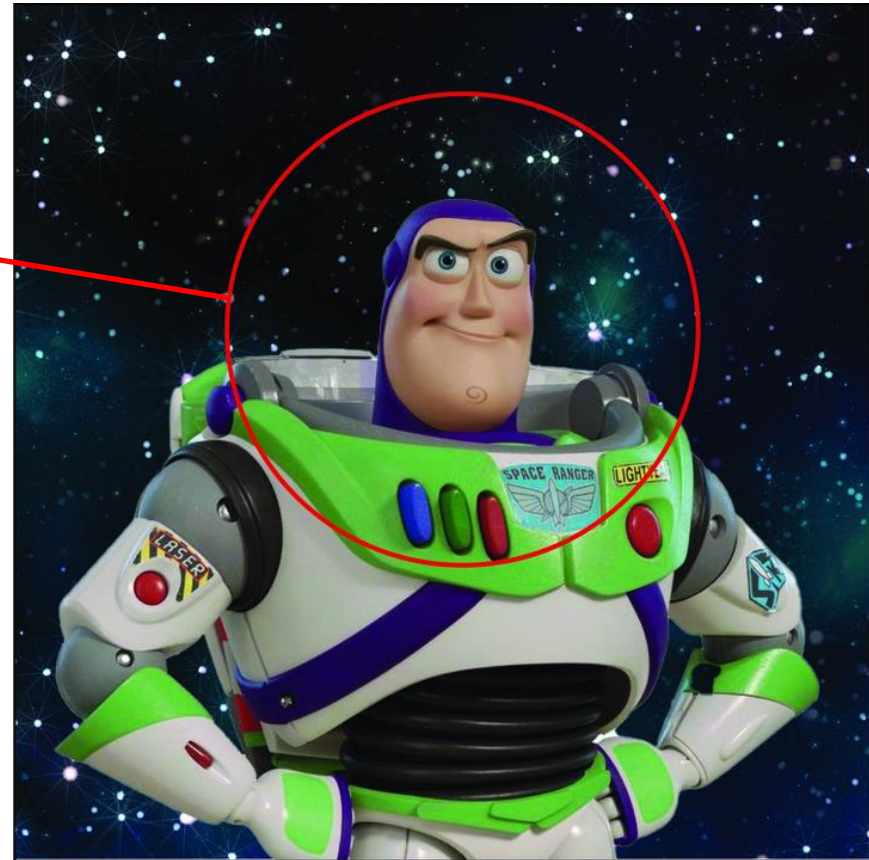


CAD design continued

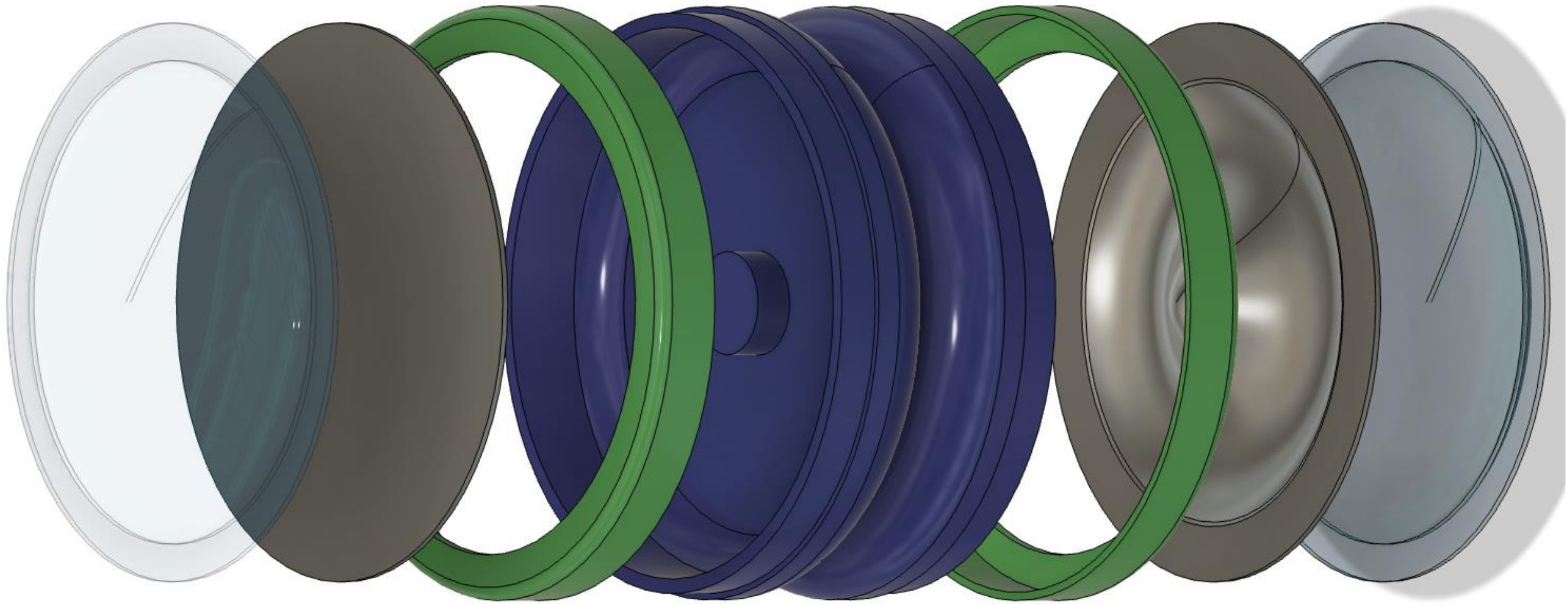
Space
Helmet



Featuring Poka-Yoke technique!



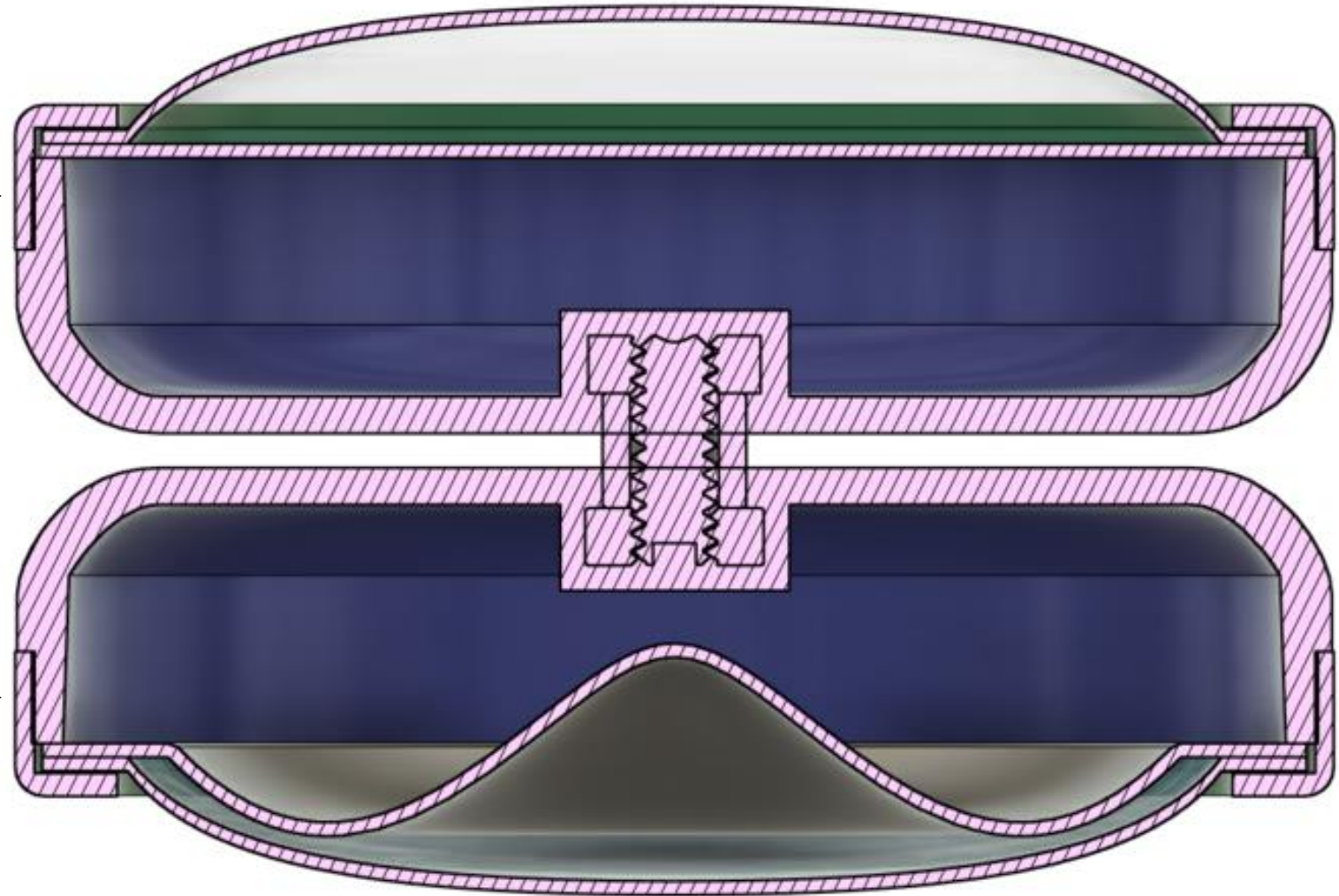
Exploded view



← Top Bottom →

Press-fit design

Press fit LOE : 0.020"
With 2% vertical taper



Press-fit analysis

Injection Molding Target Sizes:

Body Outer Diameter (Nominal): **2.800 ± 0.001 "**

Ring Inner Diameter (Nominal): **2.788 ± 0.001 "**

Nominal Press-fit Interference: **0.012 ± 0.002 "**

Length of engagement: **0.2"**

Injection Molding Scaled Sizes:

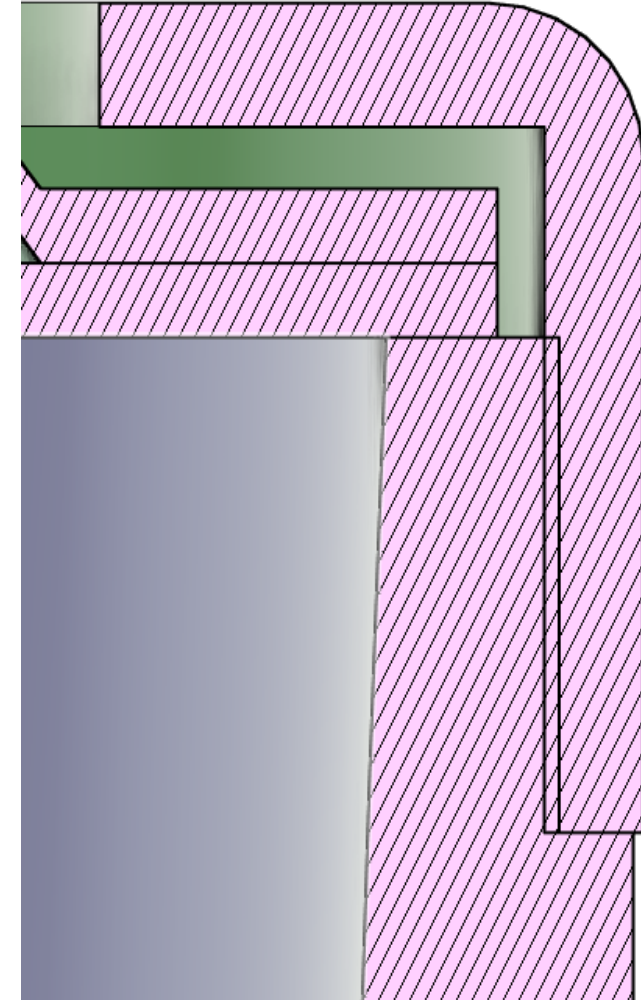
Body Outer Diameter (2% Scaled): **2.856"**

Ring Inner Diameter (1% Scaled): **2.816"**

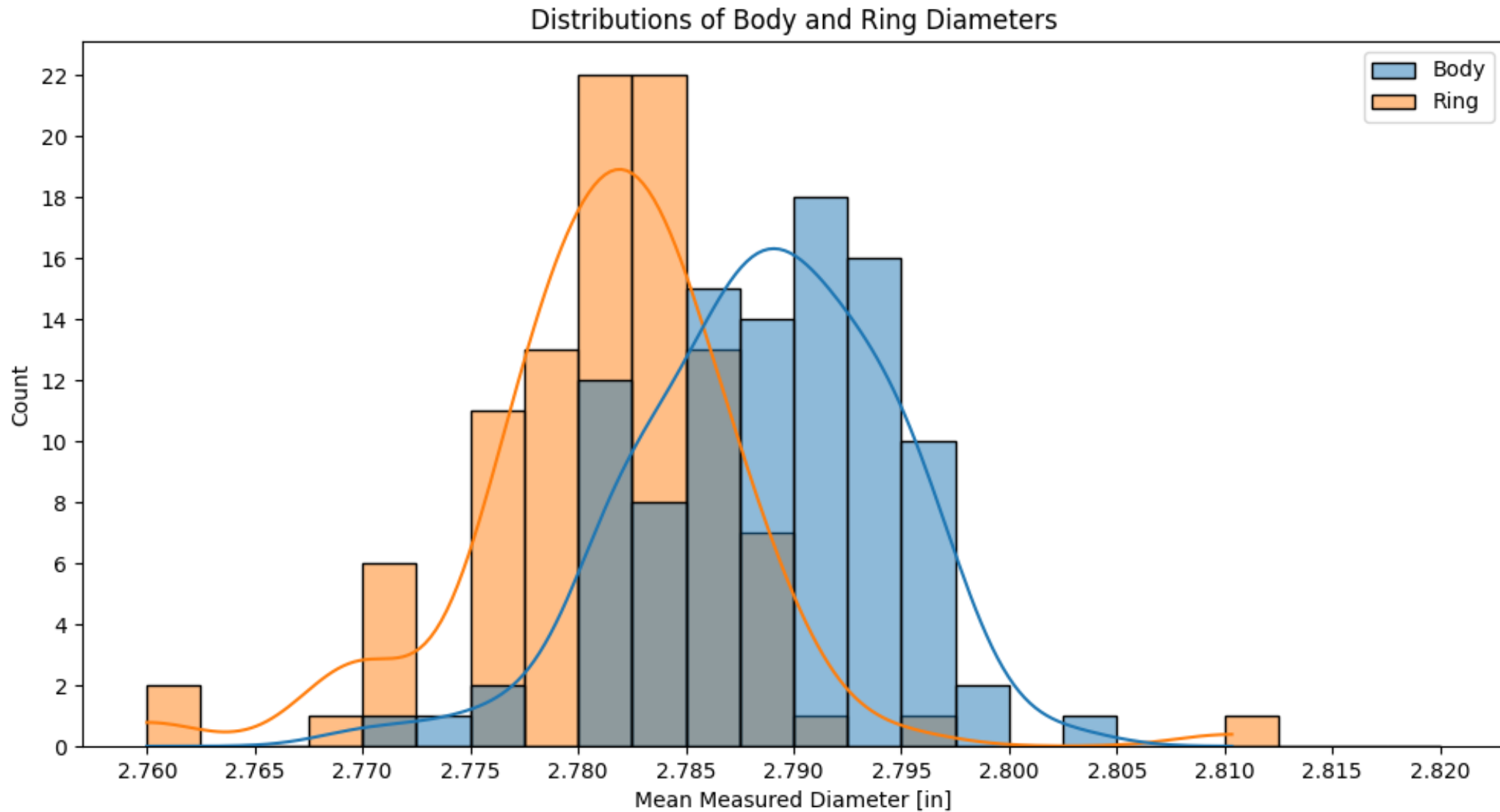
Measured Final Values:

Body Outer Diameter: **2.789" with SD 0.006"**

Ring Inner Diameter: **2.781" with SD 0.006"**

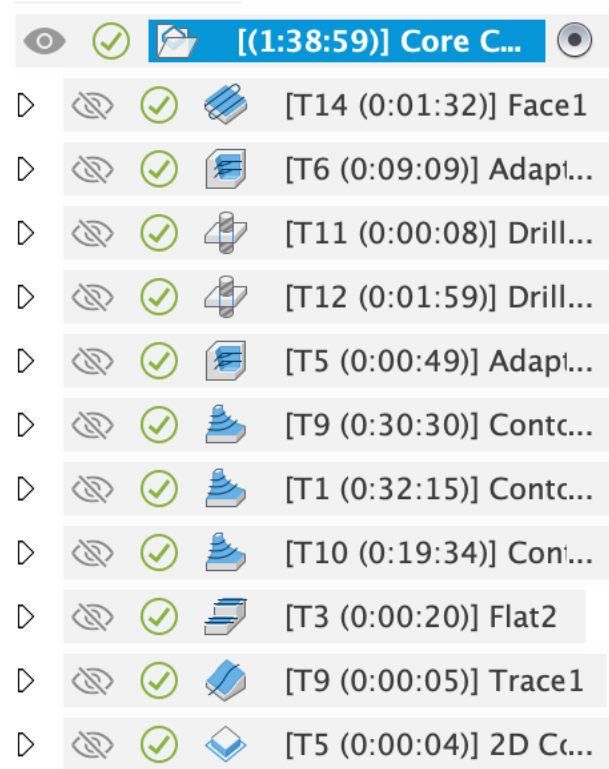


Press-fit analysis cont.

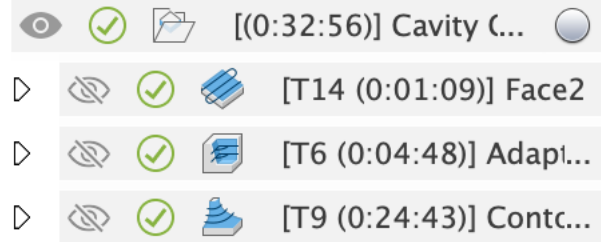


Custom developed CAM programs

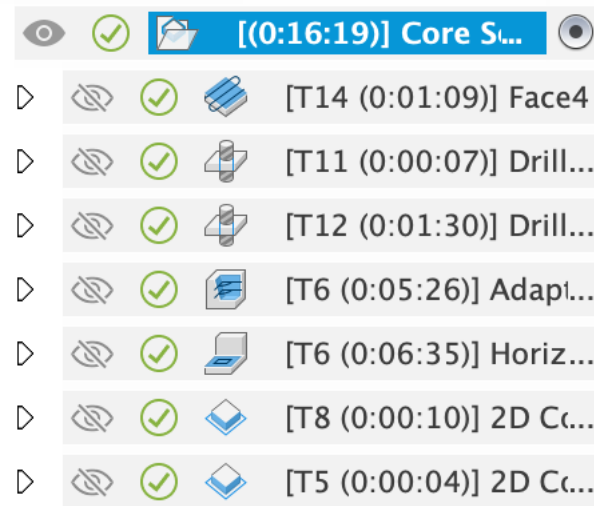
Body Core:



Body Cavity:



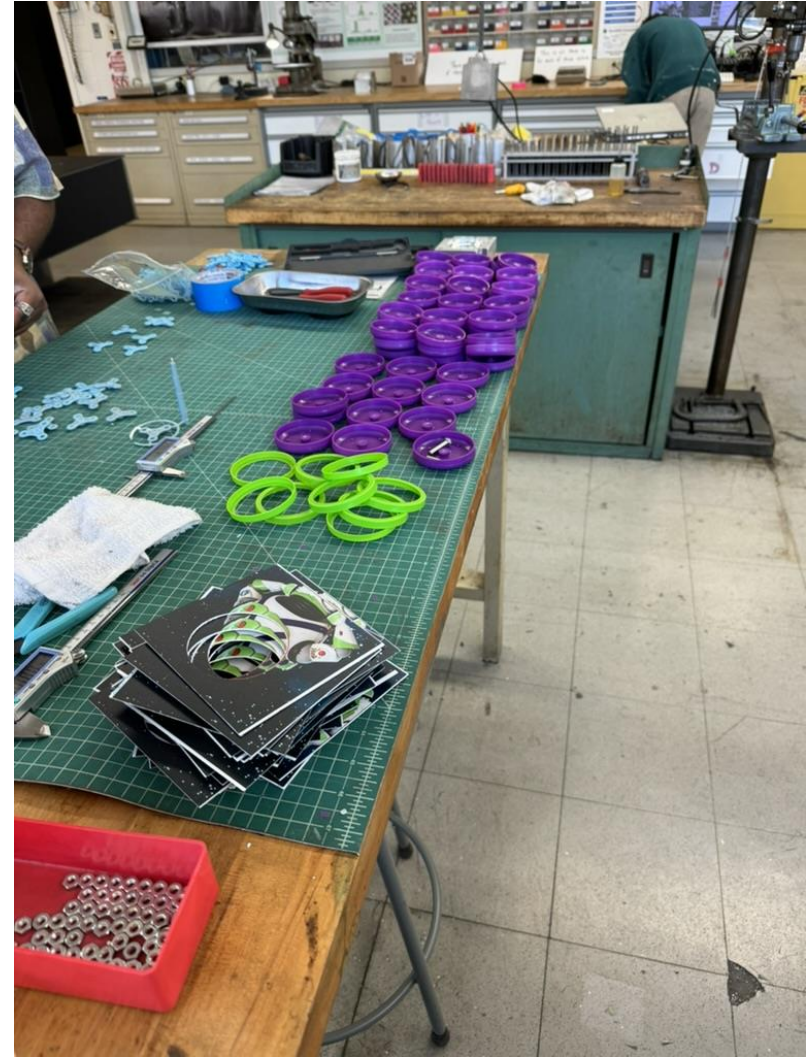
Ring Core:



Ring Cavity:



...to create custom injection molds



Manufacturing results

