

TCA Manufacturing Portfolio

By- Sanchit Arora

A bit about me

- Sophomore at Purdue graduating in '27
 - Majoring in Aerospace Engineering
 - Minoring in Mathematics
 - Interested in propulsion and advanced manufacturing
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Background

- Started tinkering in high school
- Currently work at the Bechtel Innovation and Design Center (BIDC)
- Manufacturing and propulsion engineer on Purdue Space Program (PSP)
- Undergrad Research Assistant at Zucrow Labs



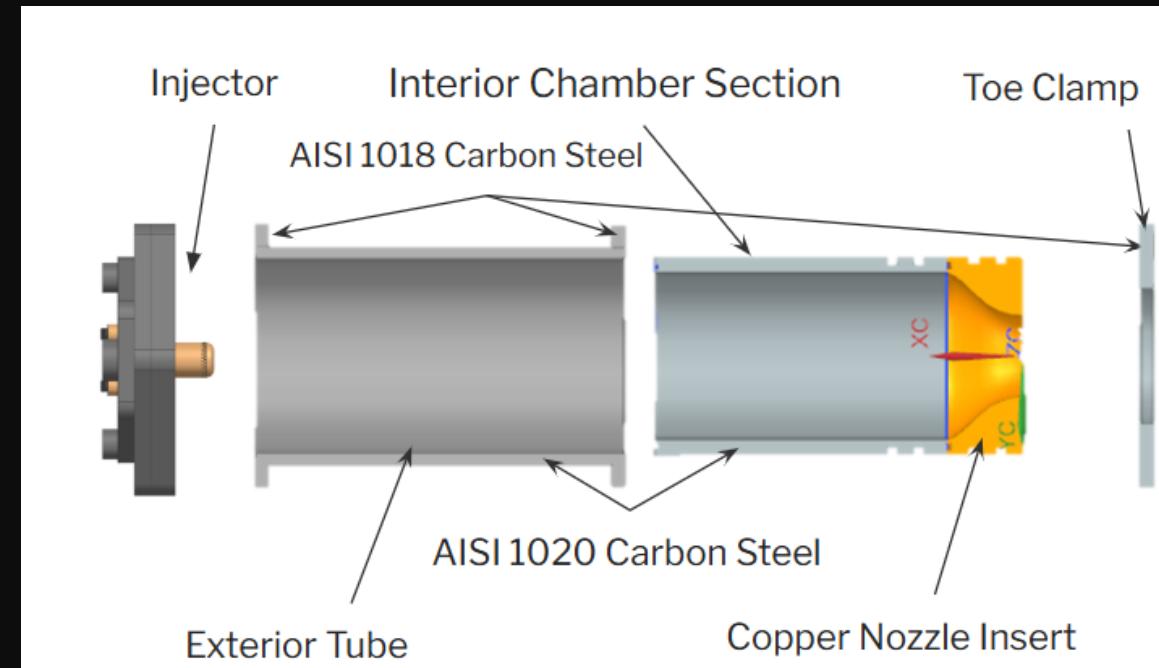
What I work on

- Manufacture a wide variety of parts for PSP
- Recently been focusing on TCA's
- Preparing to transition to manufacturing lead

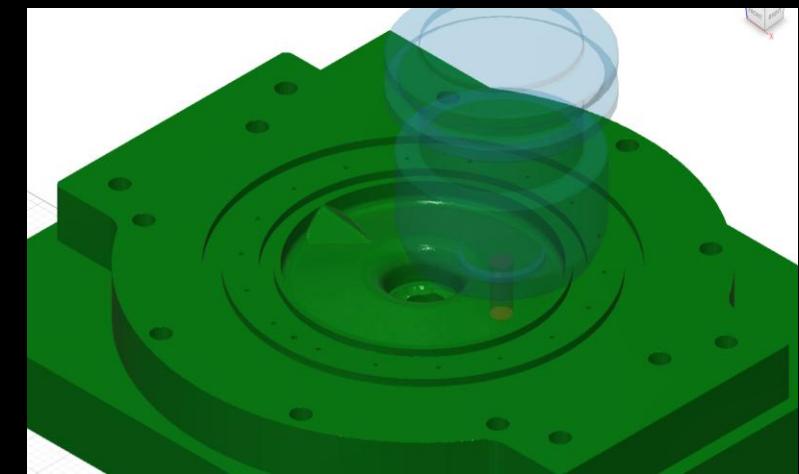
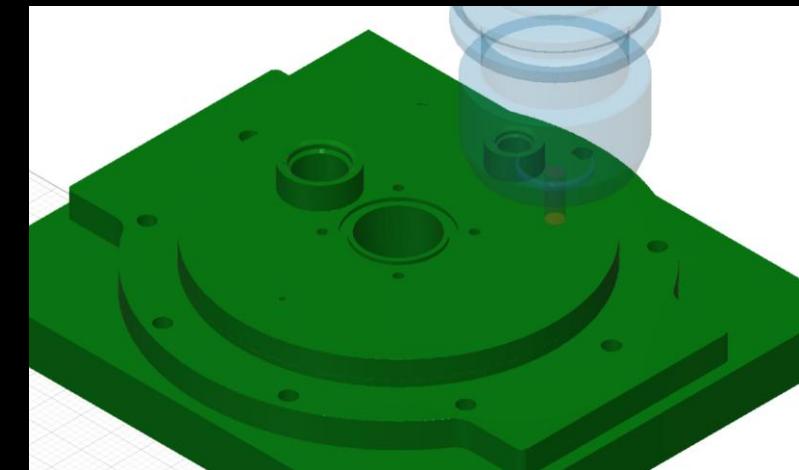
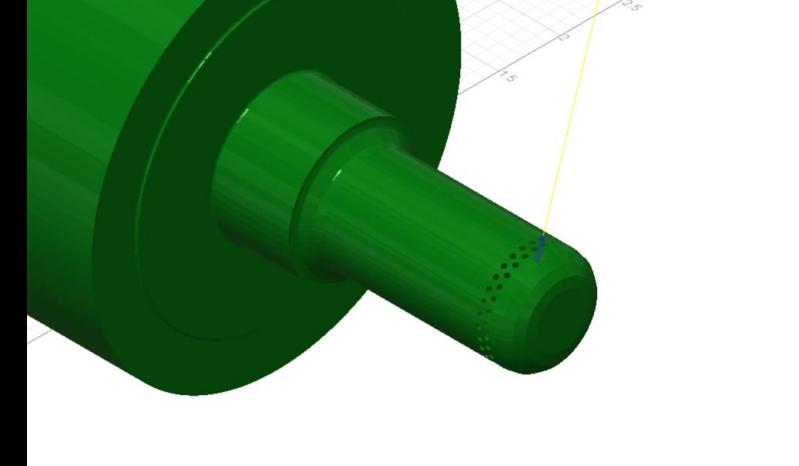


Phoenix Heatsink Engine

- Used for test cell validation
- First full TCA I worked on
- Worked on the design as well
- Fully owned TCA manufacturing

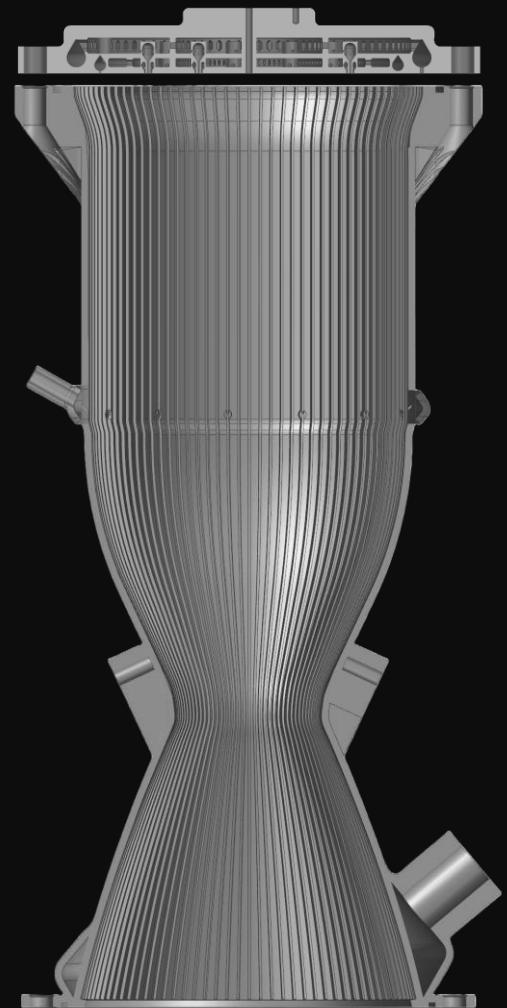
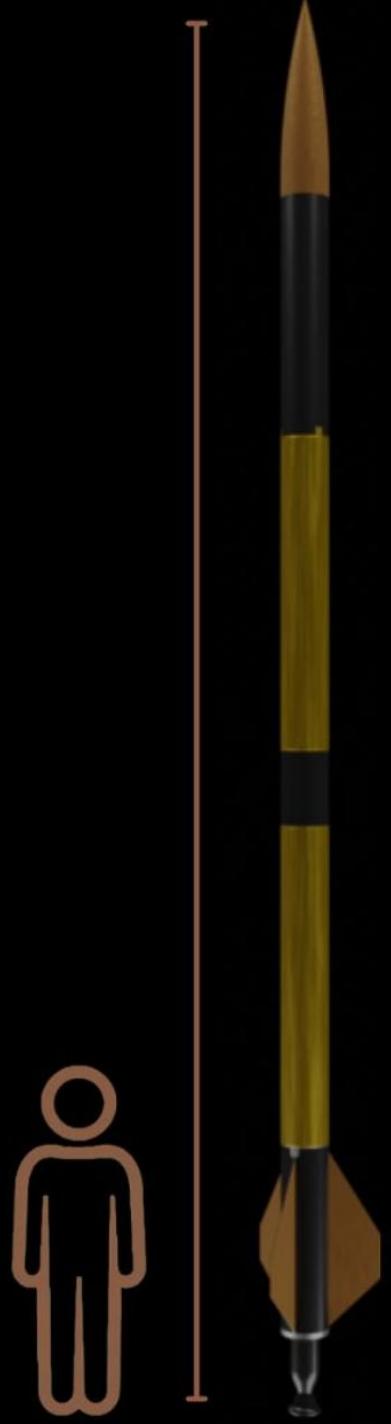


Phoenix Heatsink Injector



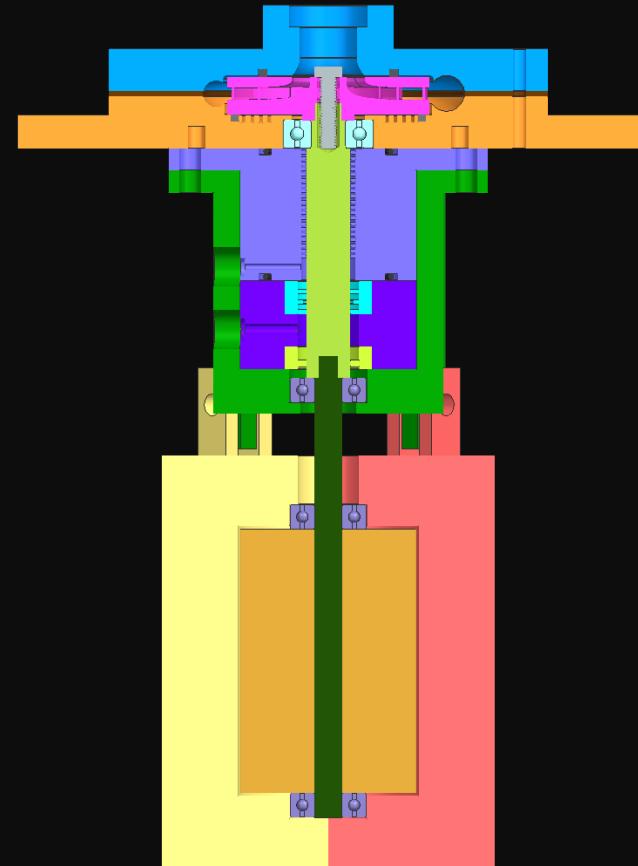
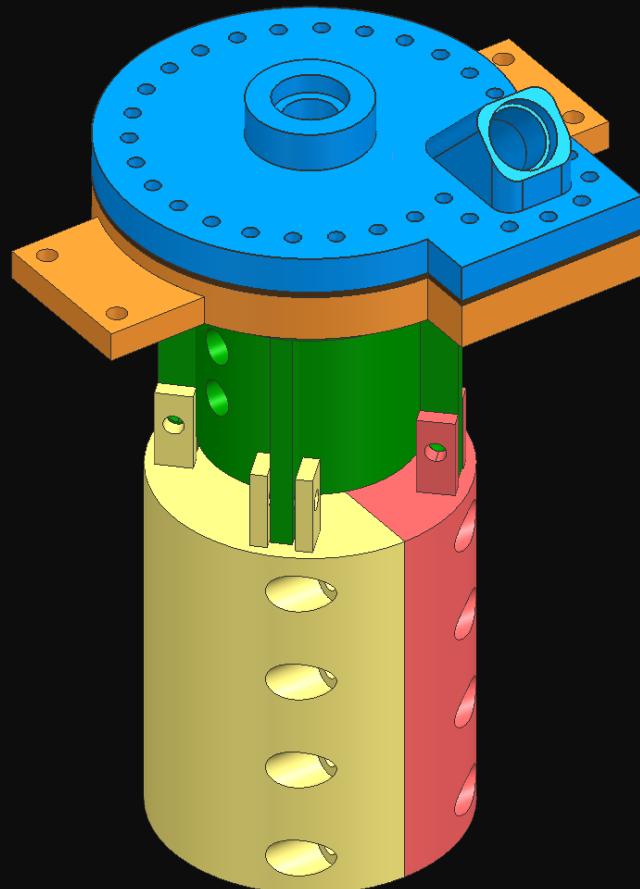
Copperhead

- PSP's next flagship rocket
 - Regeneratively cooled engine
 - Pump fed
 - 1800 lbf thrust
 - Ouroboros - Flight Engine
 - Ostrich - Test Engine.
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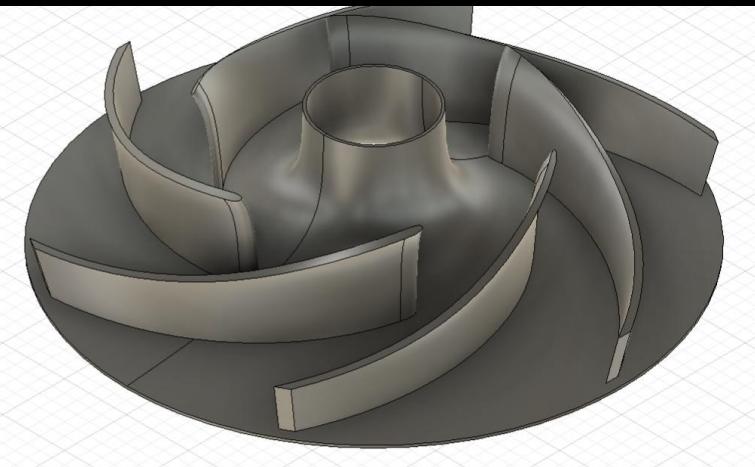
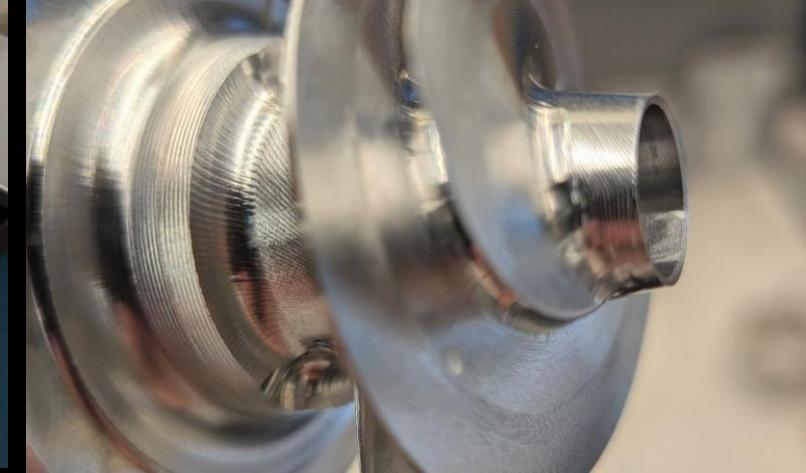
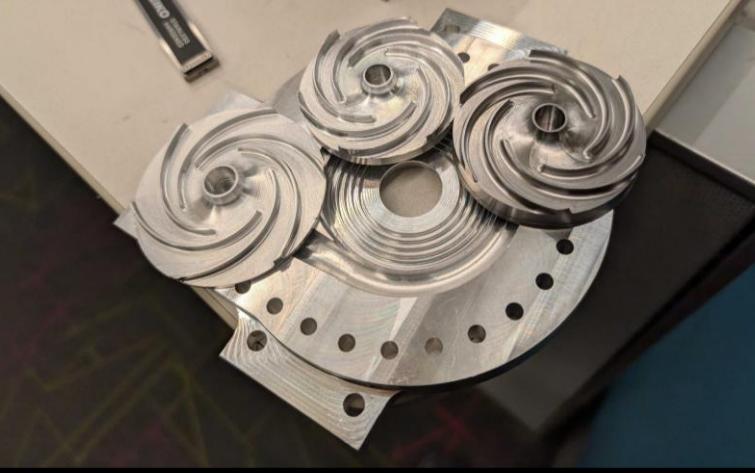


Copperhead- Pumps

- First collegiate pump fed rocket
- Building out custom test rig
- Flight pumps will be printed and post-machined
- All test pump components are traditionally manufactured

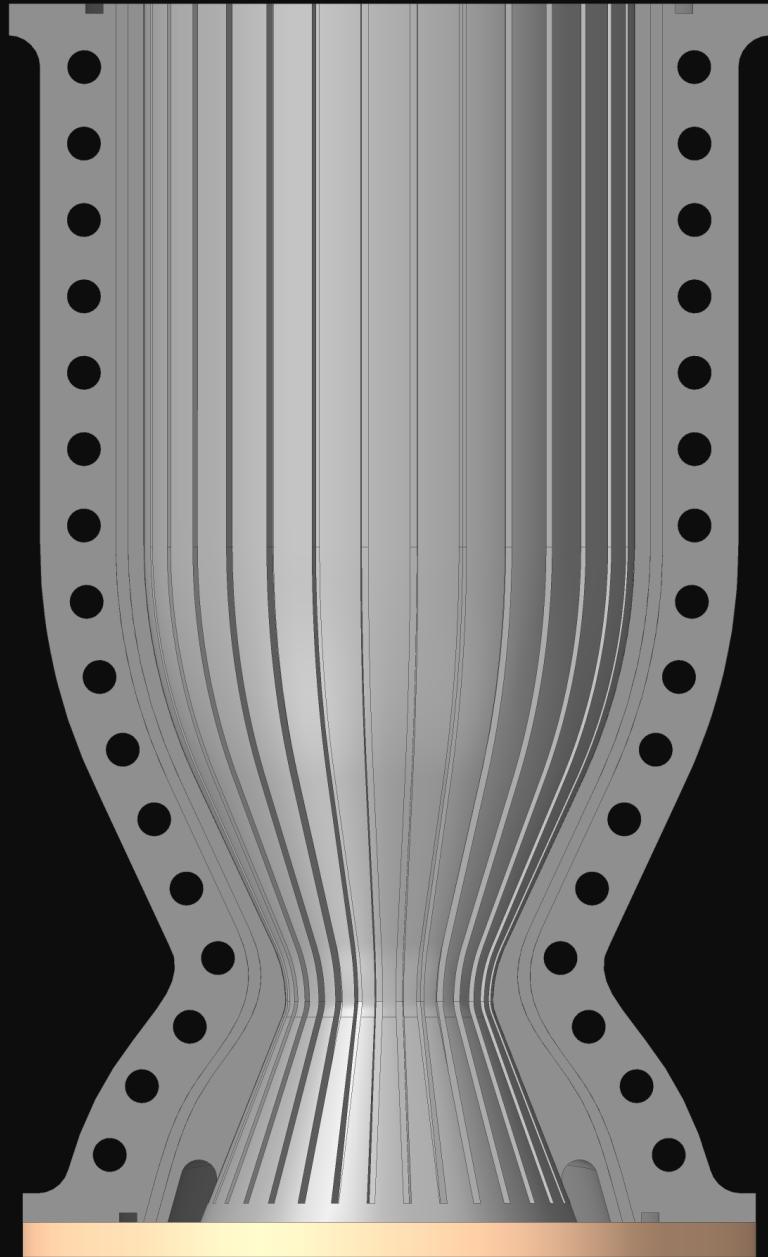


Copperhead Pump Photos

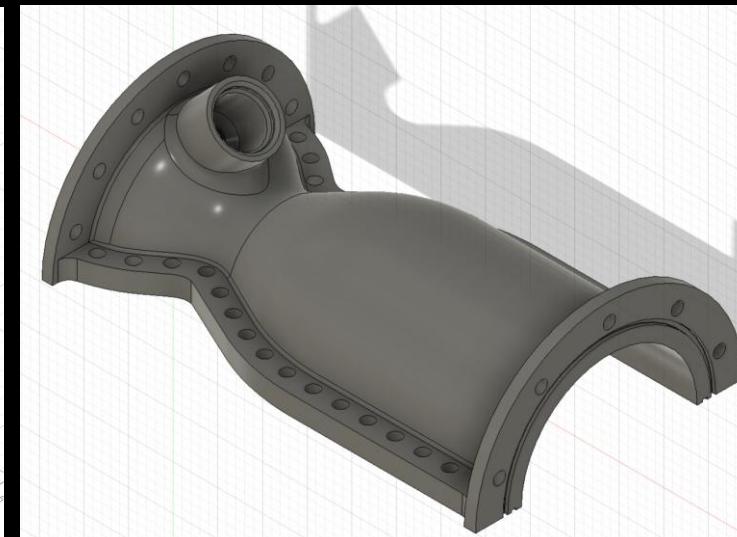
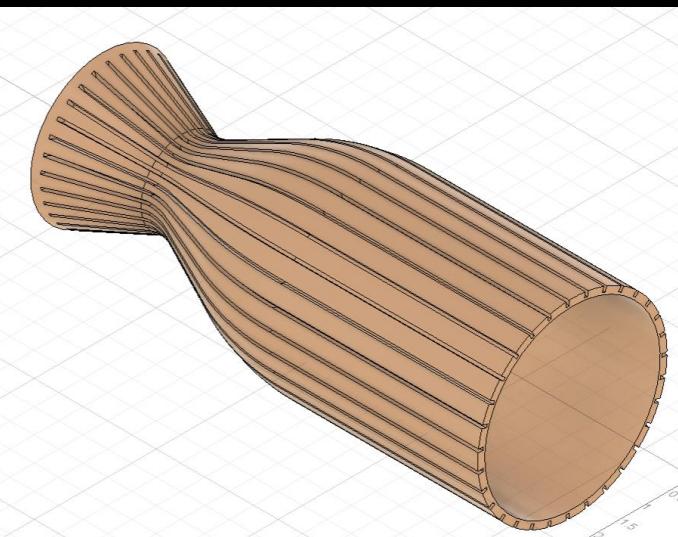
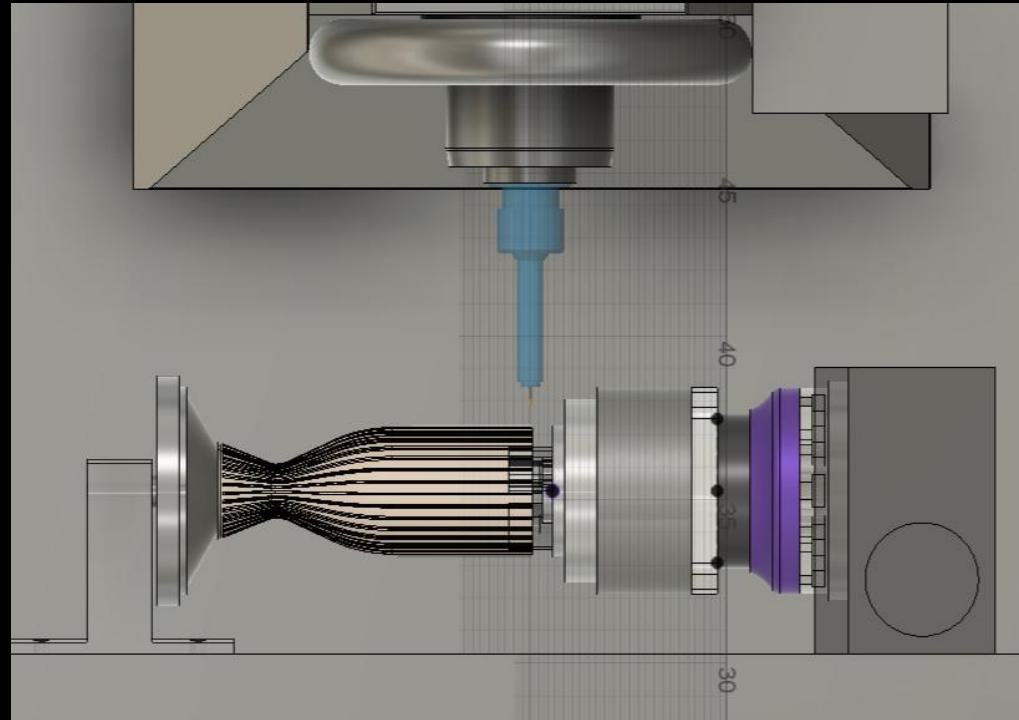


Copperhead- Ostrich

- Test engine to prove out sizing and regen code
 - Traditionally manufactured
 - Clamshell design
 - 400 lbf thrust
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Copperhead Ostrich Photos



Skills Learnt

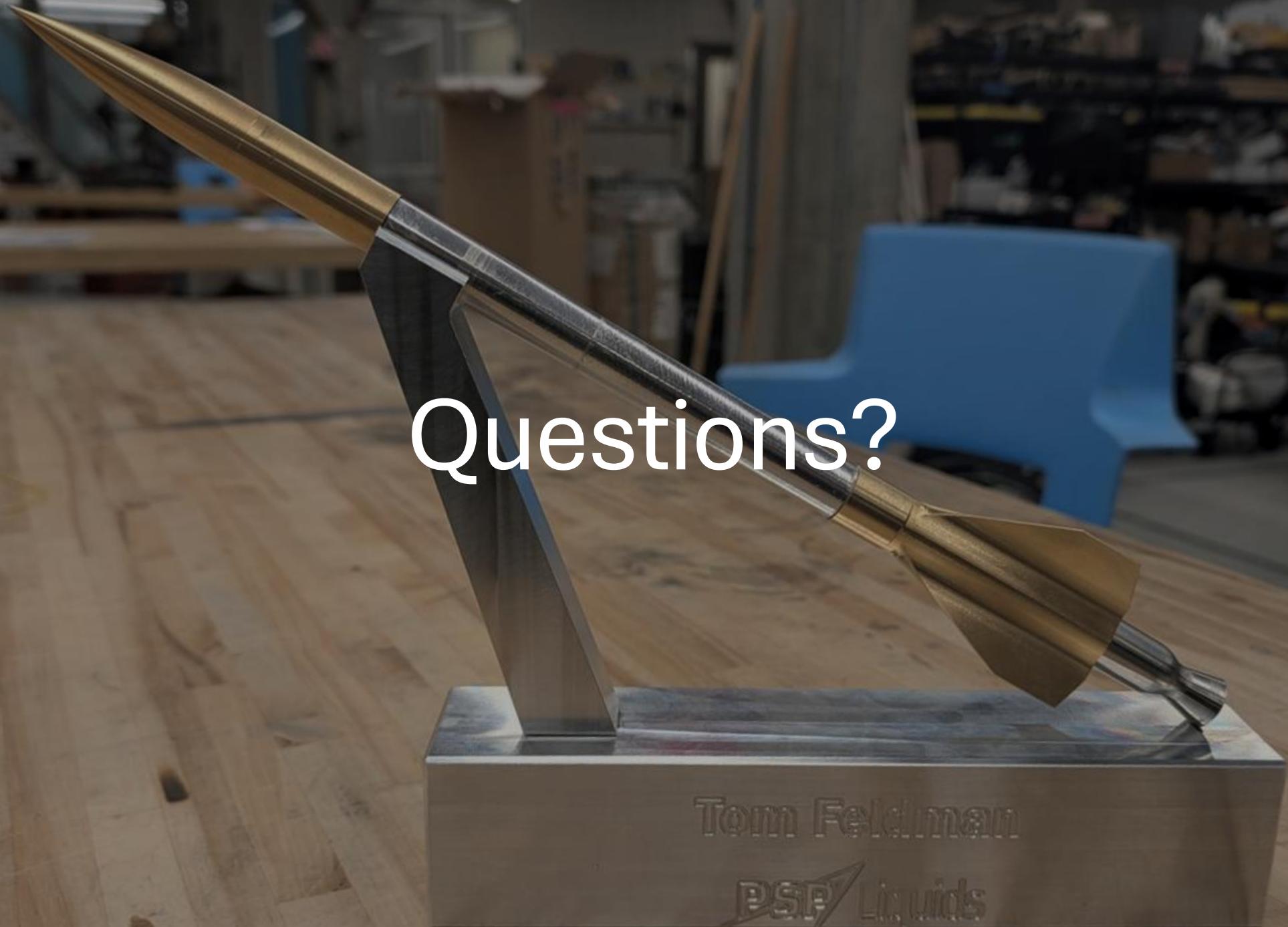
- CNC machine operation
 - Design for manufacturing (DFM)
 - Non-destructive testing (NDT)
 - Rocket subsystem integration
 - End-to-end product development
 - Leadership
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Lessons Learnt

- A failure/crash isn't the end
 - Stay curious, Stay hungry
 - Good communication is vital
 - Always push yourself
 - There's always more to learn
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Questions?

Tom Feldman
PSP Liquids