First Nations Launch:
Build and Assembly Webinar

Presented by: Adrian Guither
February 13, 2024

ARTEMIS STUDENT CHALLENGES
nasa.gov/stem/artemis.html

NASA Partner

The material contained in this document is based upon work supported by a National Aeronautics and Space Administration (NASA) grant or cooperative agreement. Any opinions, findings, conclusions or recommendations expressed in this material are those of the author and do not necessarily reflect the views of NASA.

Meet the FNL Team

Wisconsin Space Grant Foundation

· Kevin Crosby, Director	kcrosby@carthage.edu
· Christine Bolz, Assistant Director	cbolz@carthage.edu
· Rob Cannon, FNL Project Manager	rcannon@carthage.edu
· Connie Engberg, Project Support Assistant	cengberg@carthage.edu
· Megan Goller, Accounts Assistant	mgoller@carthage.edu

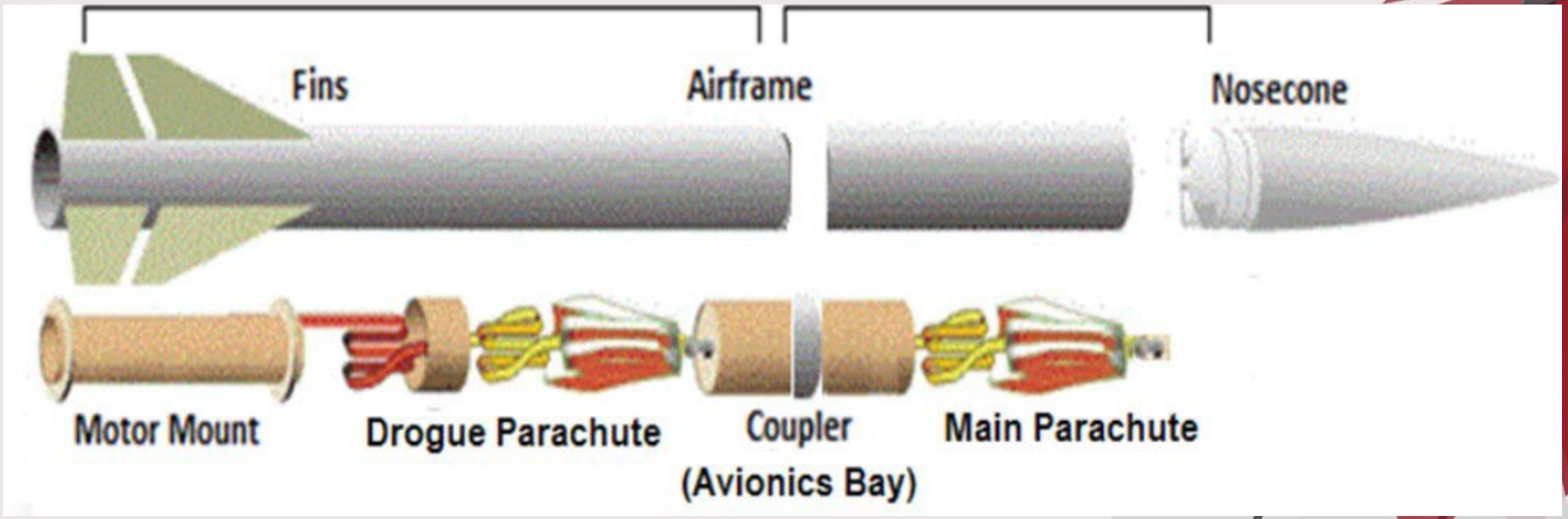
First Nations Launch

· Frank Nobile, Technical Coordinator, Wisconsin Tripoli	maxq3@aol.com
· Mark Abotossaway, Project Assistant/Advisor Liaison, Blue Origin (Alumni)	mark.a.abotossaway@gmail.com

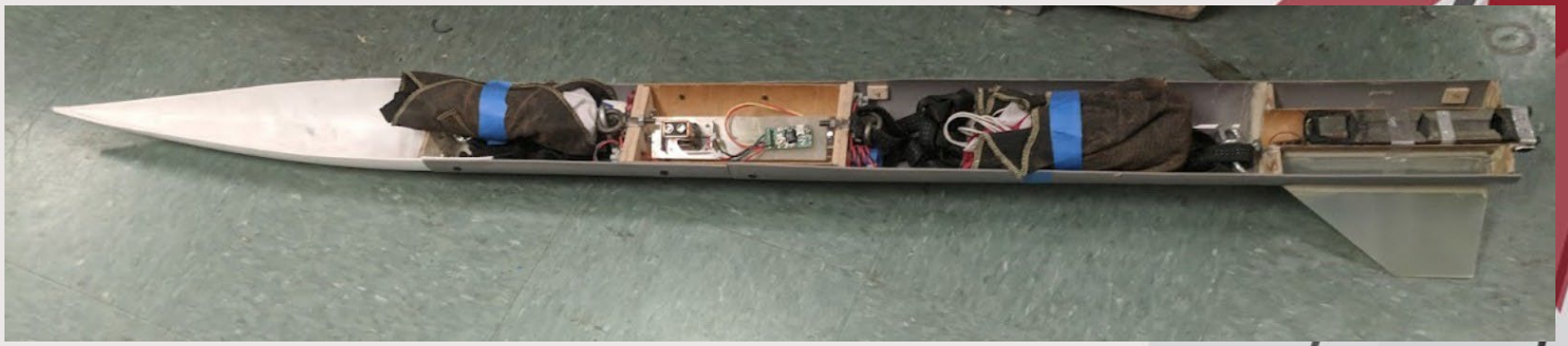
Tripoli Rocket Association

· Bob Justus, Tripoli Assistant, Illinois Tripoli	bob@mhbofni.com

Overview

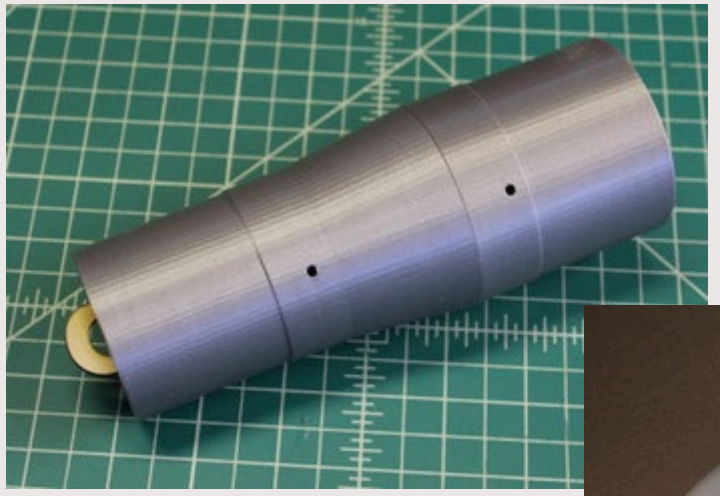

Fins
Airframe
Nosecone
Motor Mount
Drogue Parachute
Coupler
(Avionics Bay)
Main Parachute

Cutaway View



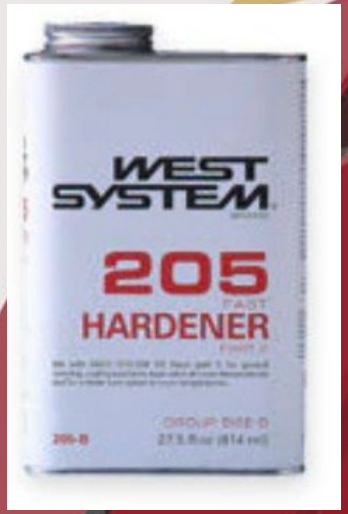
Transitions

- Combine two different size airframes
- Don’t skimp on shoulder lengths
- If transition is drastic in size change, turbulence will become a concern
- COTS transitions are limited in options



Bonding Components

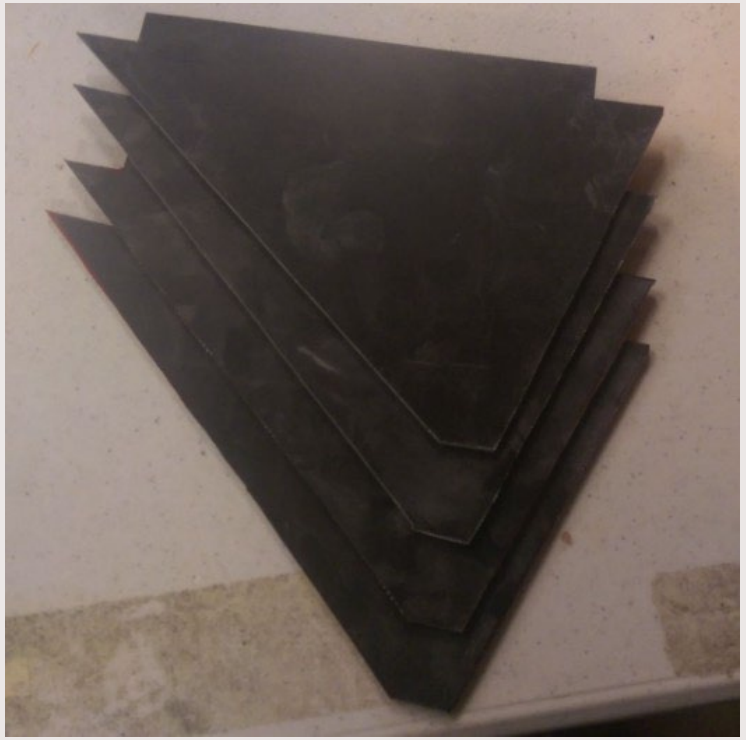
- Use the right adhesive
  - Wood Glue
  - CA (Super Glue)
  - Structural Epoxy
  - Laminating Epoxy

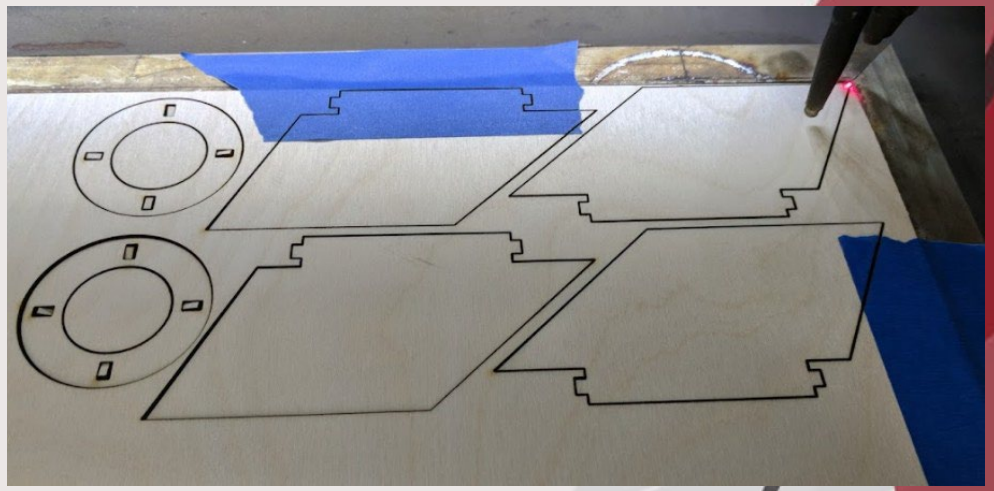


- Proper surface prep
  - Remove glassine layer from cardboard tubes
  - Surface free of grease and oil
  - Light sanding
  - Clean with IPA/Acetone

Fin Can

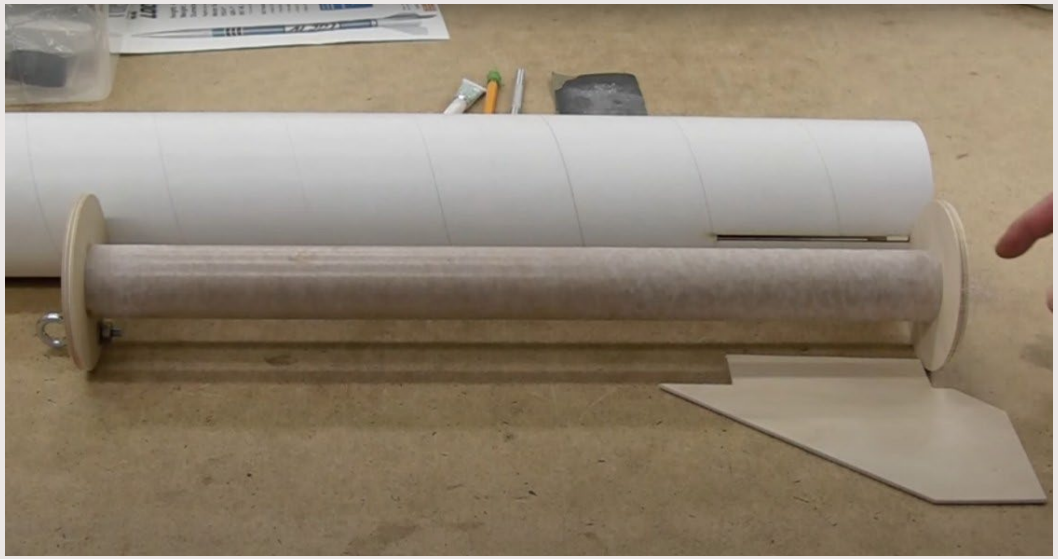
Cutting flat components



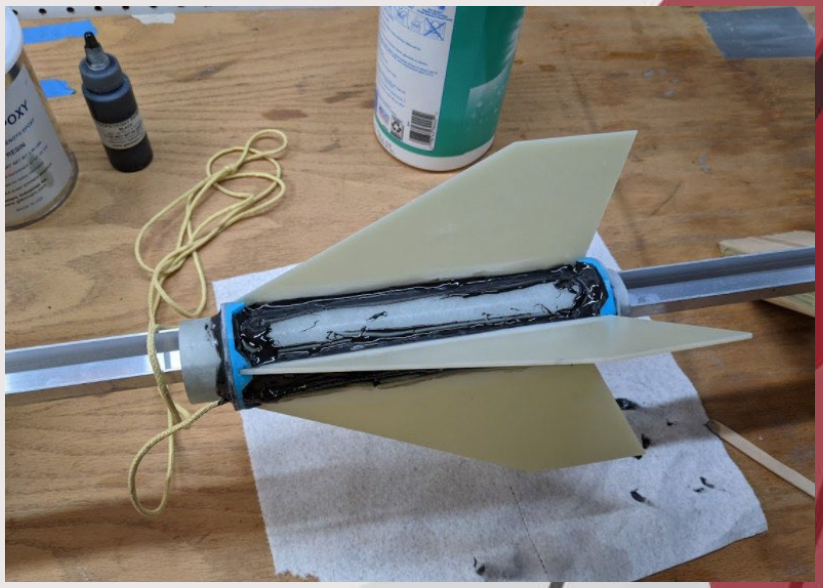


Fin Slots

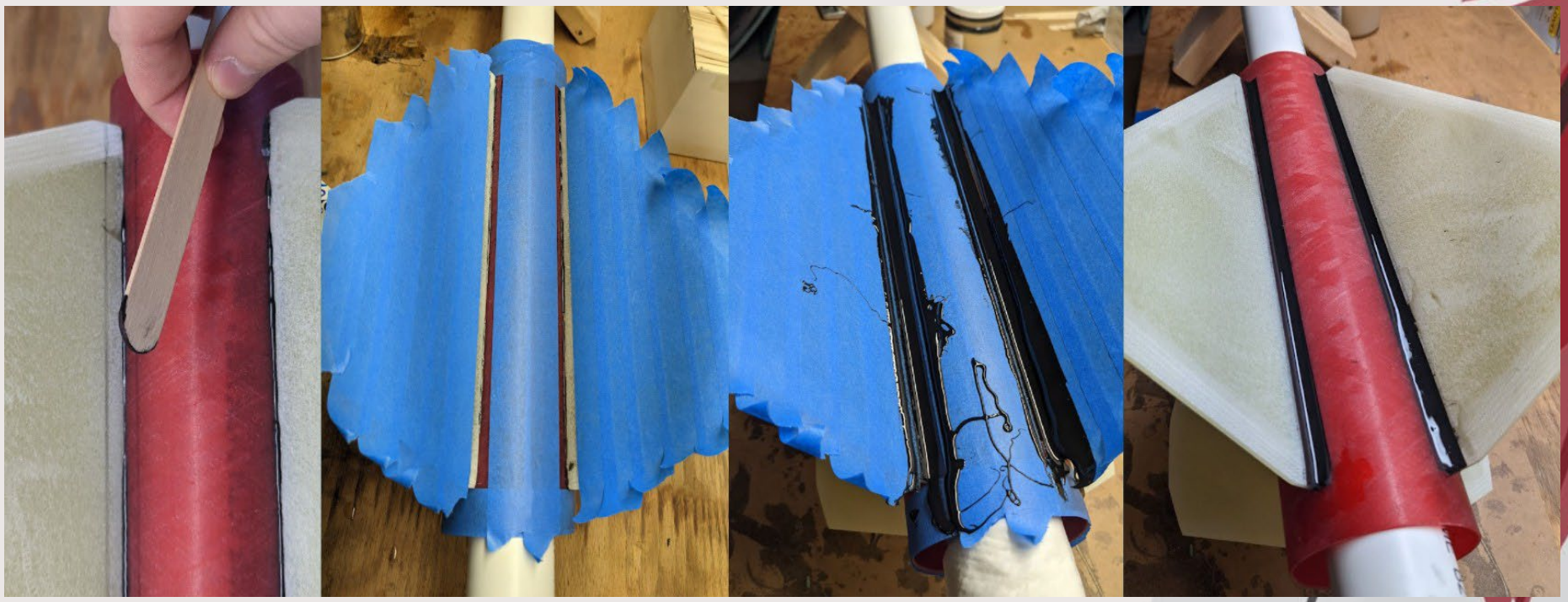
Motor Mount Assembly



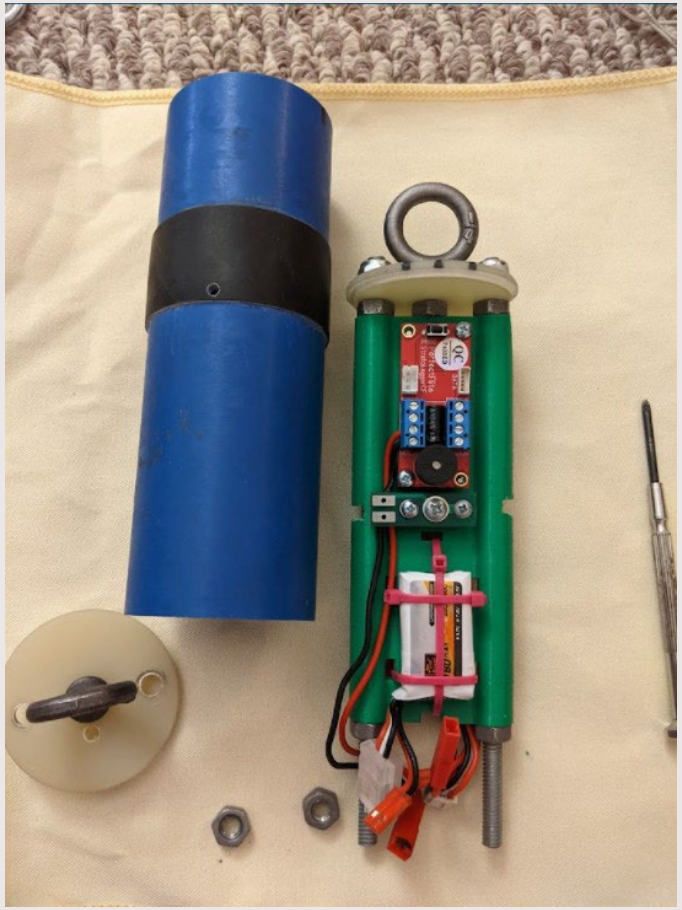
Fins and Internal Fillets

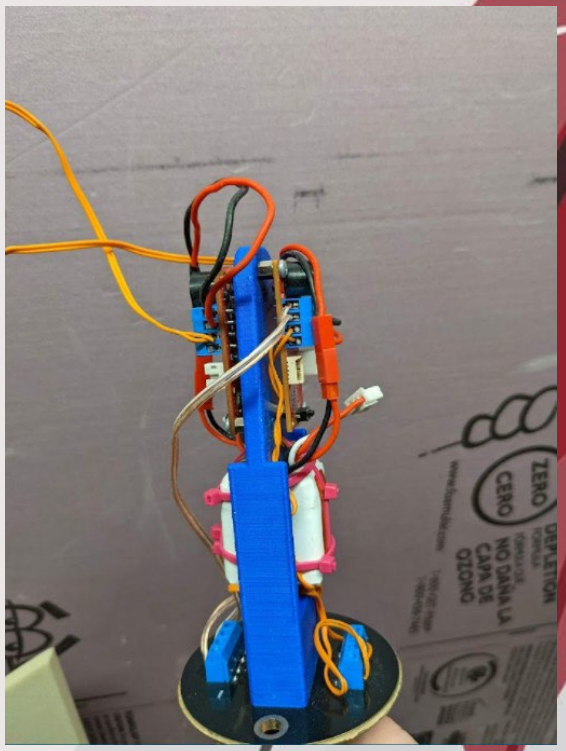


External Fillets

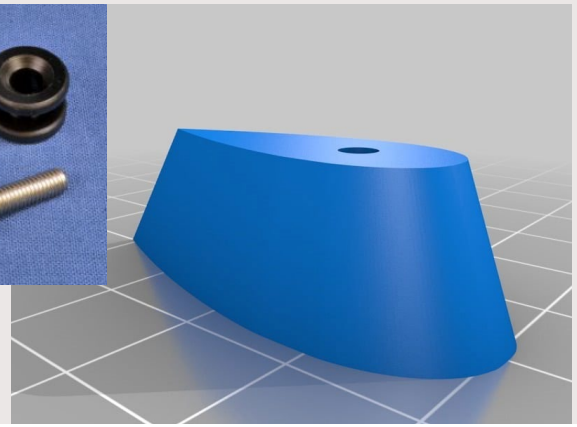


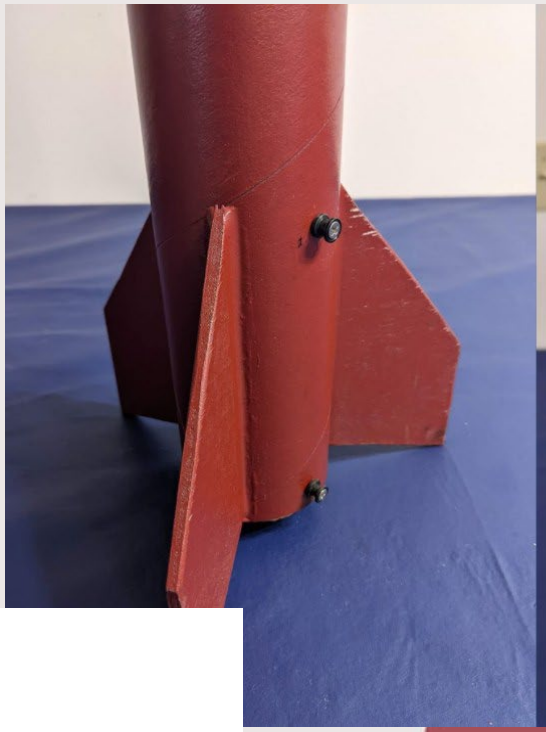
Avionics Bay



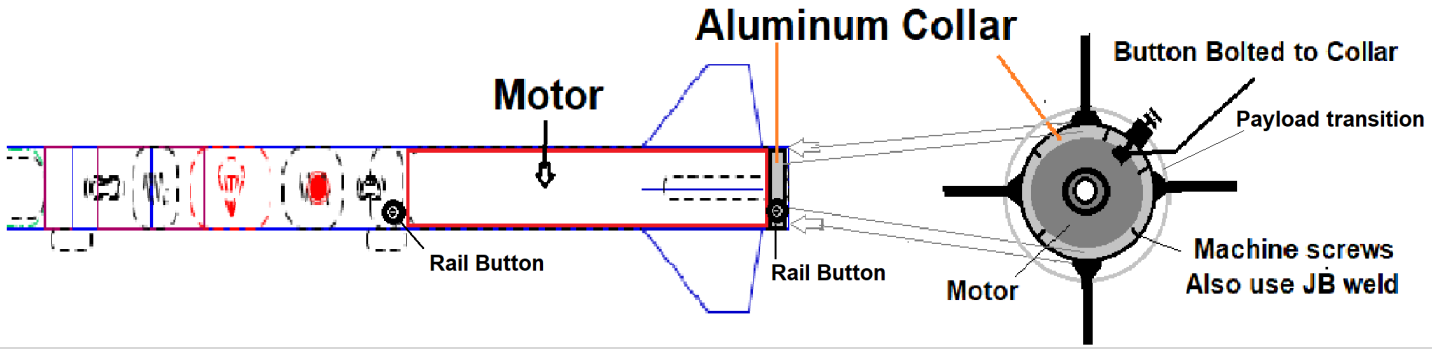


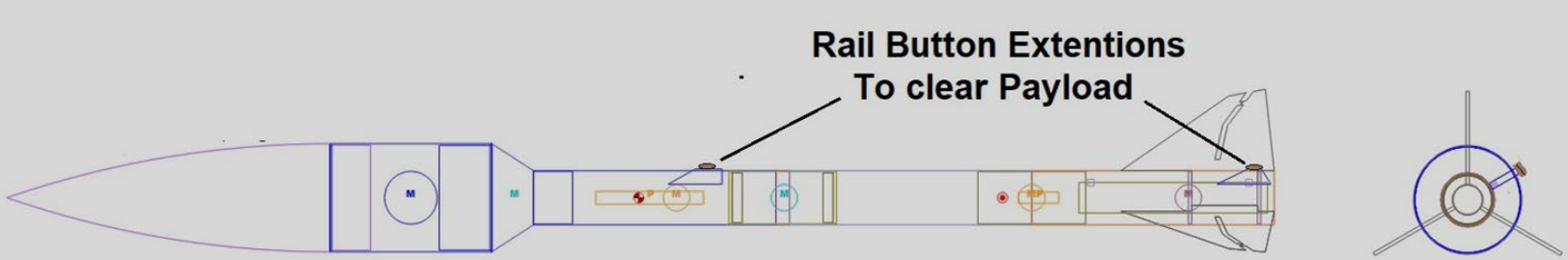
Rail Buttons



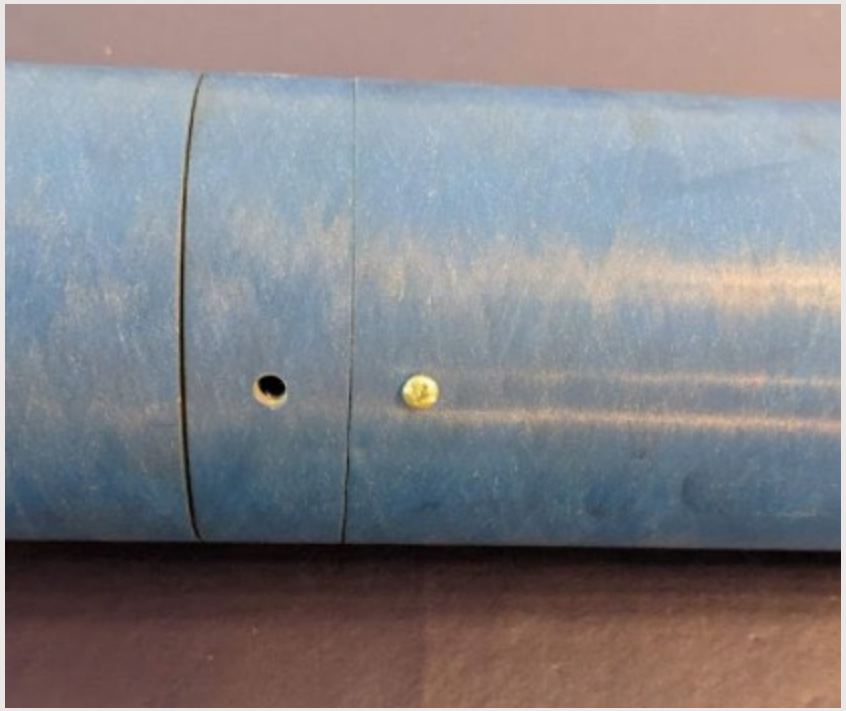


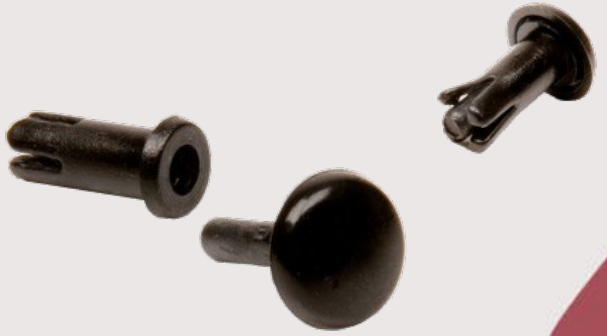
Move fins and motor forward 2" install a solid collar to bolt the AFT rail button





Bolted Connections





Motor Retention

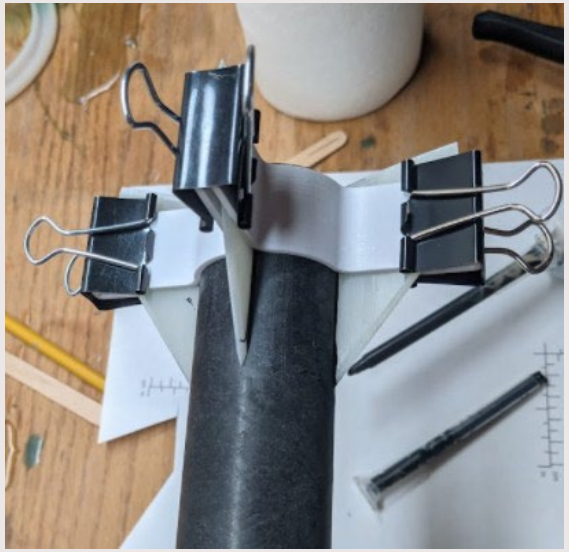
Painting and Finishing

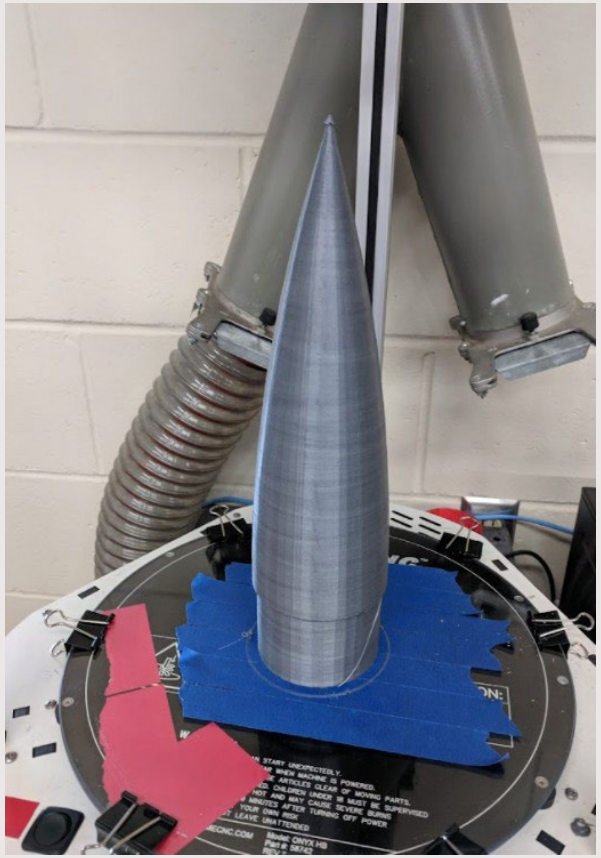
- Select the right paint
- Surface prep
- Multiple light passes
- Re-coat and Dry times on each can

Composite Reinforcement

3D Printing

Motor Mount tube is the one exception, it must be COTS and cannot be 3-D printed





Failure Modes

- Recovery Attachment Failure
- Drag Seperation
- Zipper
- Fin Flutter
- Motor fly through

Any Questions?

Other Resources

- John Coker's YouTube videos
  - Certify Level 1
    - https://www.youtube.com/watch?v=Xtr3758PvzA
  - Level 2 in Style
    - https://www.youtube.com/watch?v=PMqzxl1tVF4
- The Rocketry Forum
  - "Properly bonding composites and what your government doesn't want you to know"
    - https://www.rocketryforum.com/threads/properly-bonding-composites-and-what-your-government-doesnt-want-you-to-know.58389/
  - Build threads
- Kit instructions
  - Not just for the kit you are building