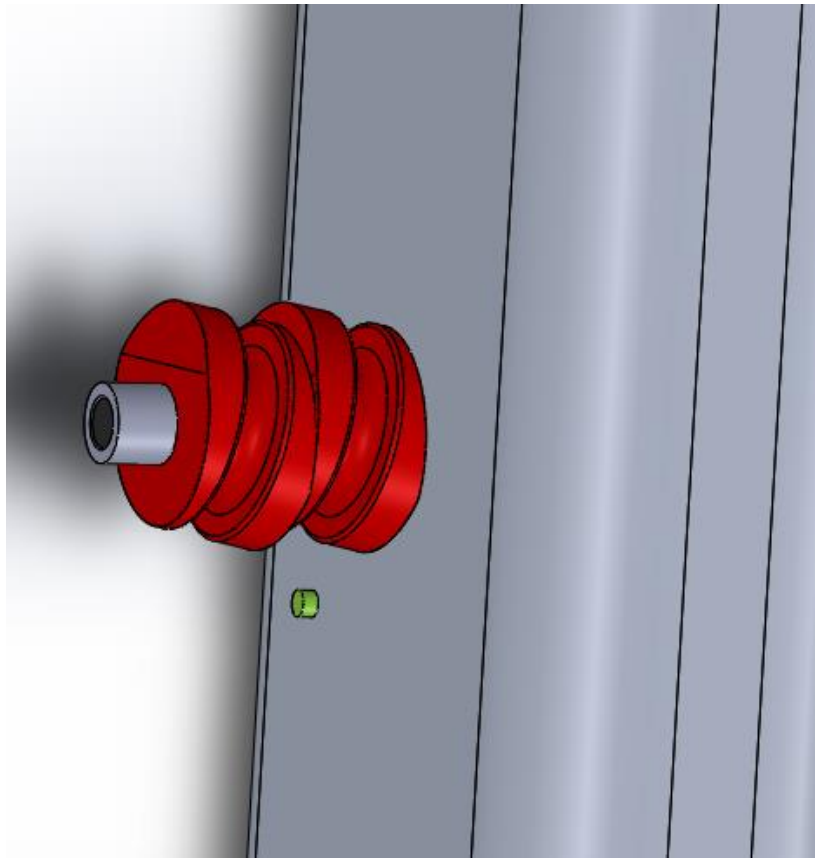
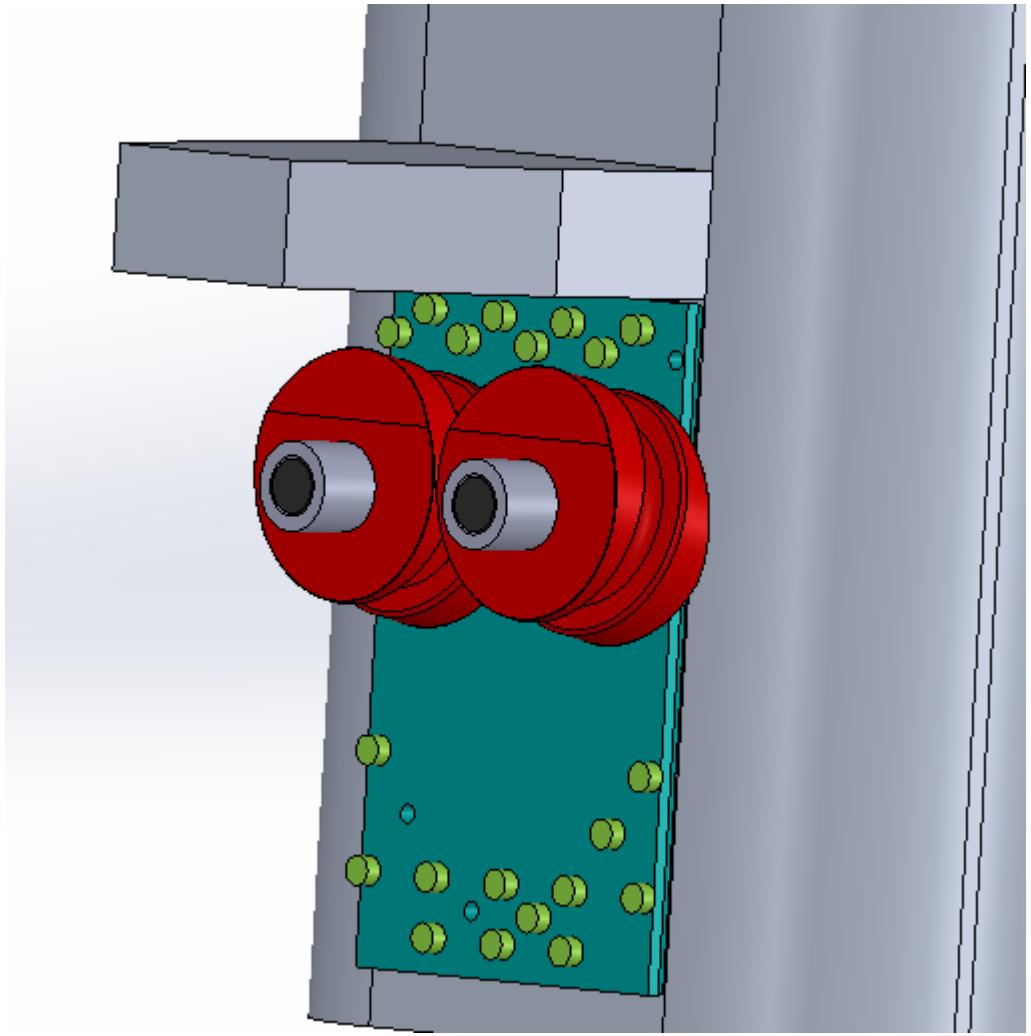
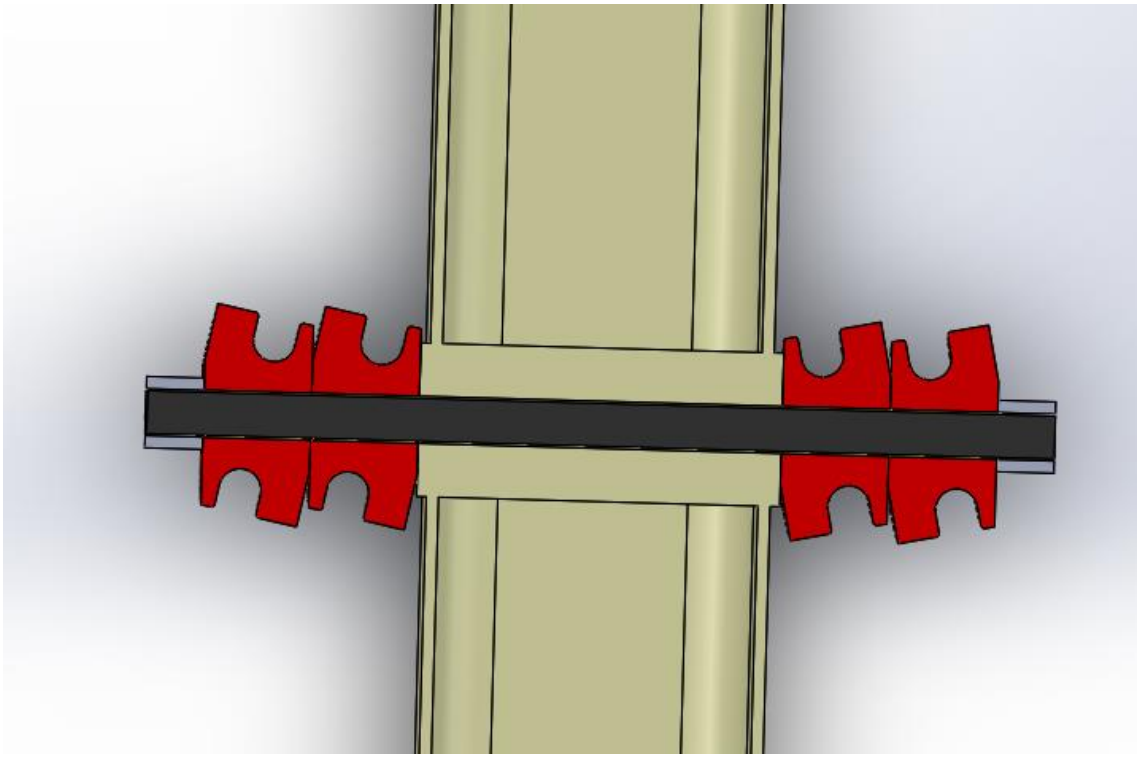
Original



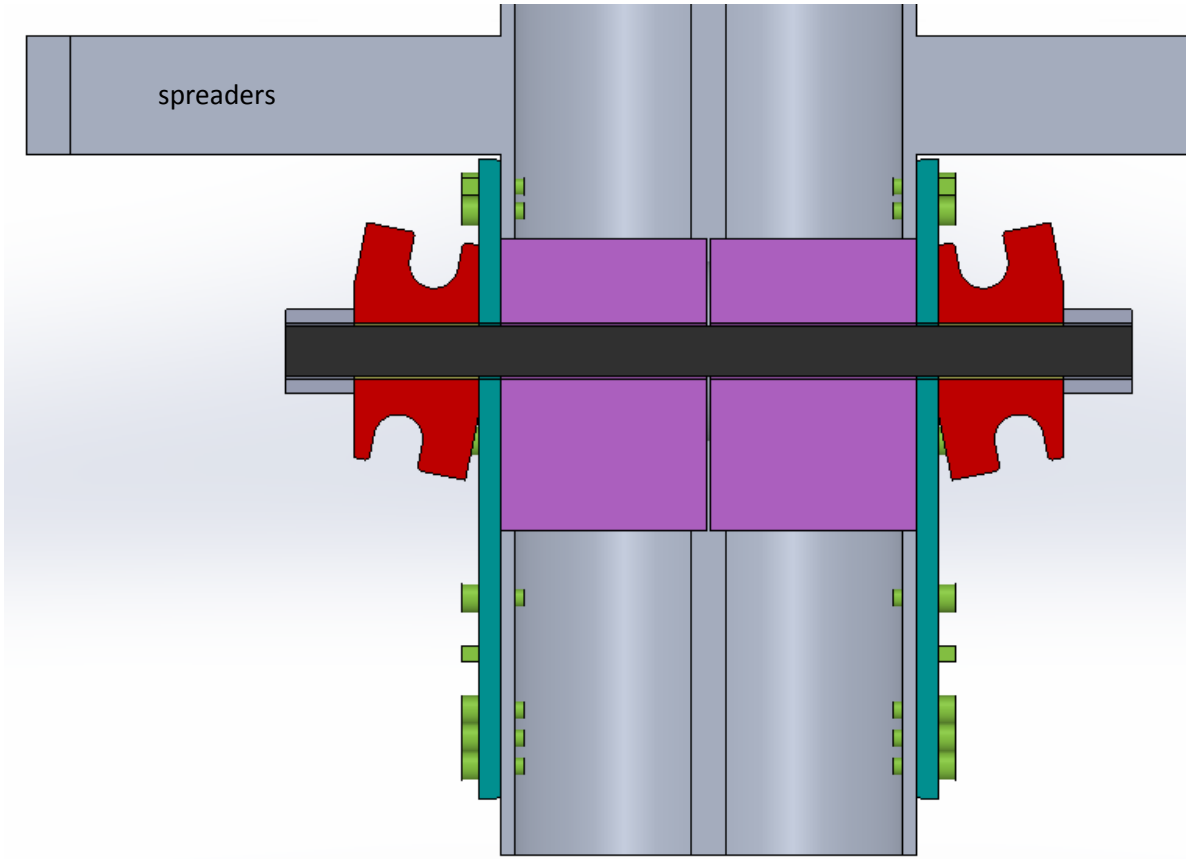
Repaired



Original



Repaired



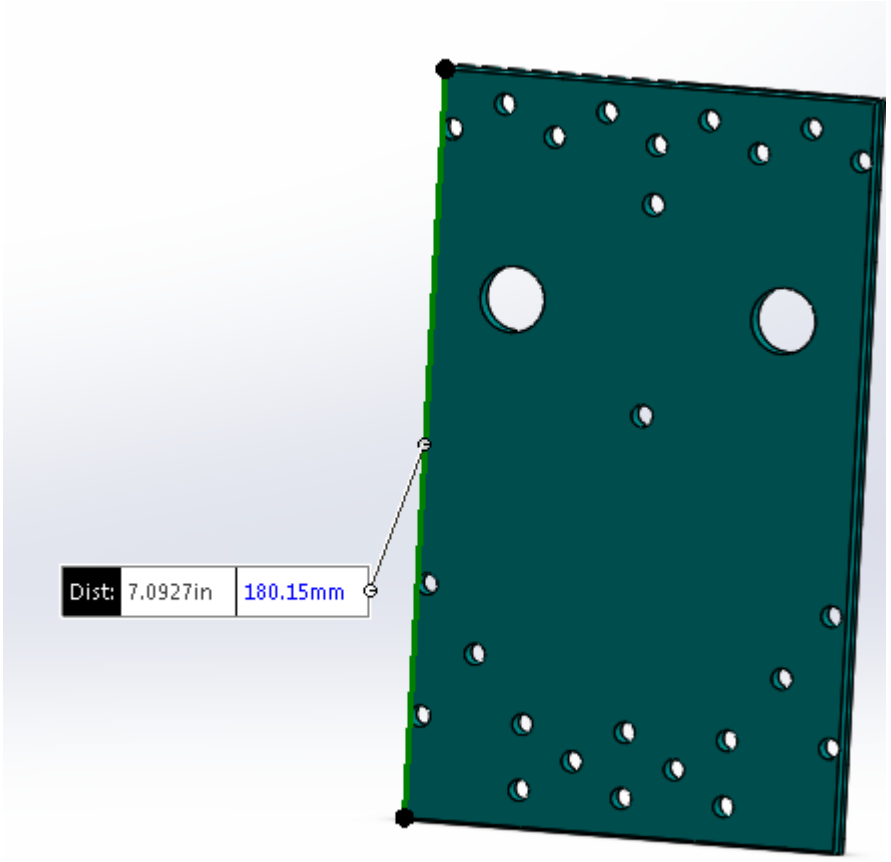
Original	Repaired
Doubly cantilevered design	Still cantilevered, but only half as badly (improvement factor 2)
One fastener taking all bending load	Two fasteners to share the same load (improvement factor 2)
<30ksi yield strength for the fastener	>150ksi yield strength for the fasteners (improvement factor 5)
Compression tube not designed to react any moment	Compression tube bigger where it counts for reacting moments
.156” wall thickness, aluminum	.250” wall steel repair plates, covering all buckled area Fastened with quantity 23 10-32 screws for >35,000 pounds of clamping load. Screws in offset pattern so as to minimize loss of strength in original material
	Shroud lengths stay same

Risks and regrets

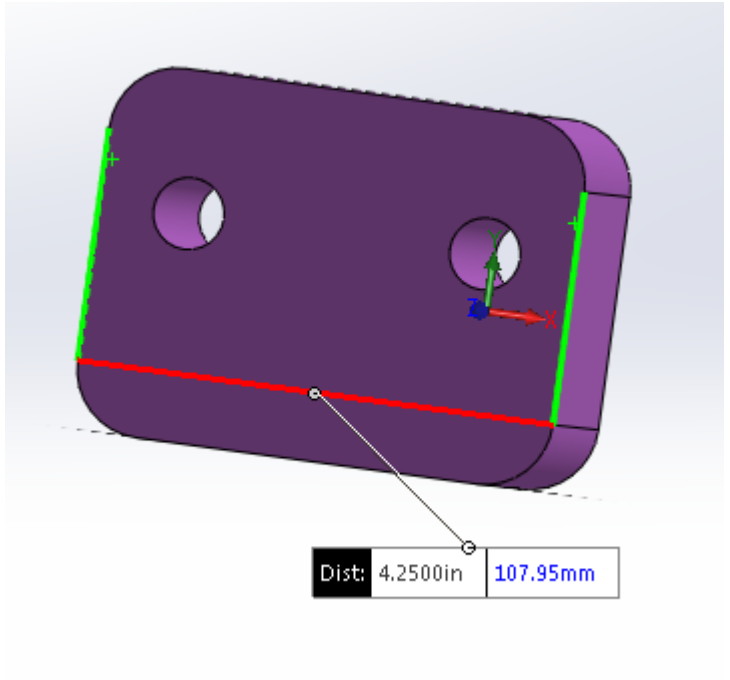
- The original mast might be weakened to some degree, due to all the fasteners, but I don’t have a good alternative w/ the lack of space. Welding weakens it too, so, accepting this risk
- The mast will have to come down, because the spreaders have to be removed for drilling access. This will probably cost $1000 I didn’t want to spend, but, safer+easier and opportunity to fix leaking wiring the right way. Also will allow replacing weak fastener on uppers, installing a bunch of necessary chafe gear more easily, and fixing a topping lift situation

New machined components (2 each)

a friend will help make them



4140 steel

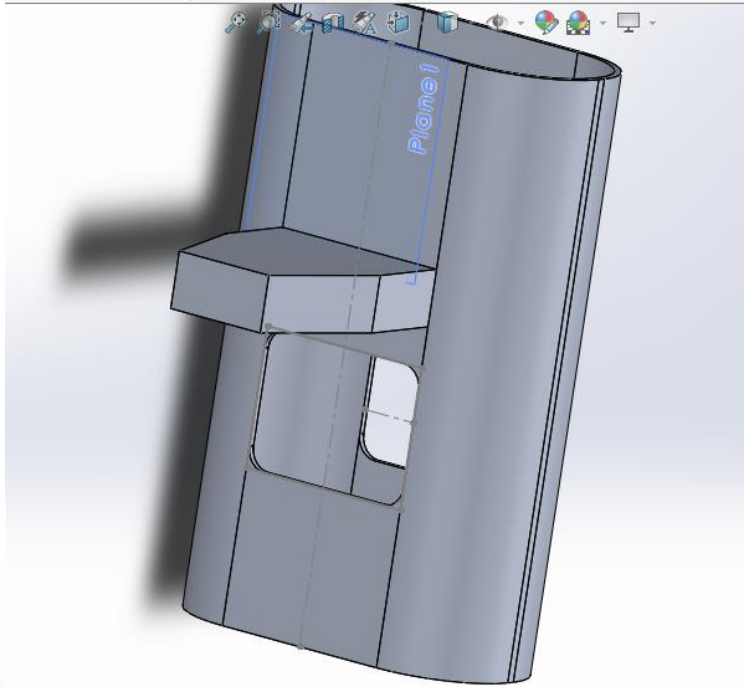


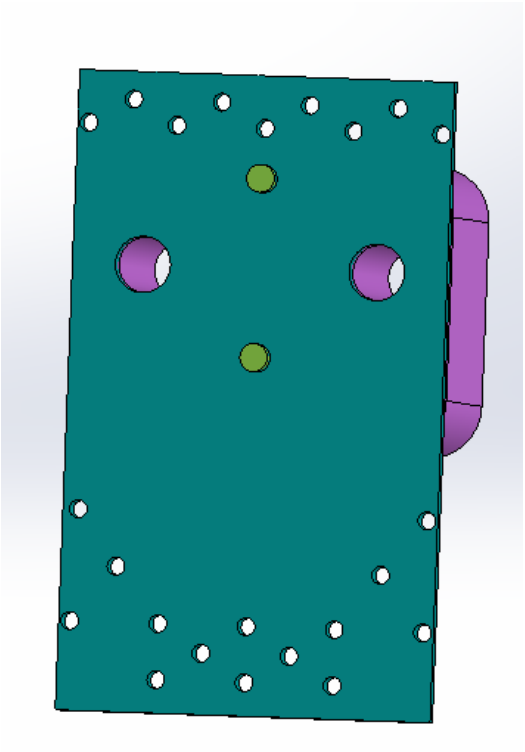
6061
aluminum

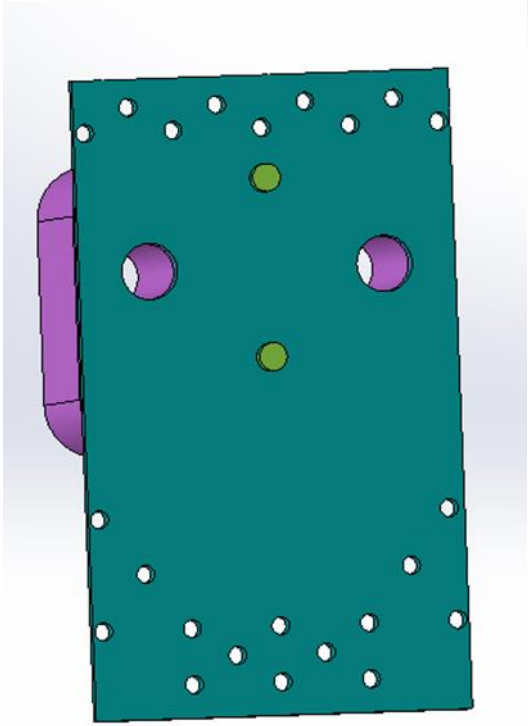
Repair procedure

- Cut out old compression tube

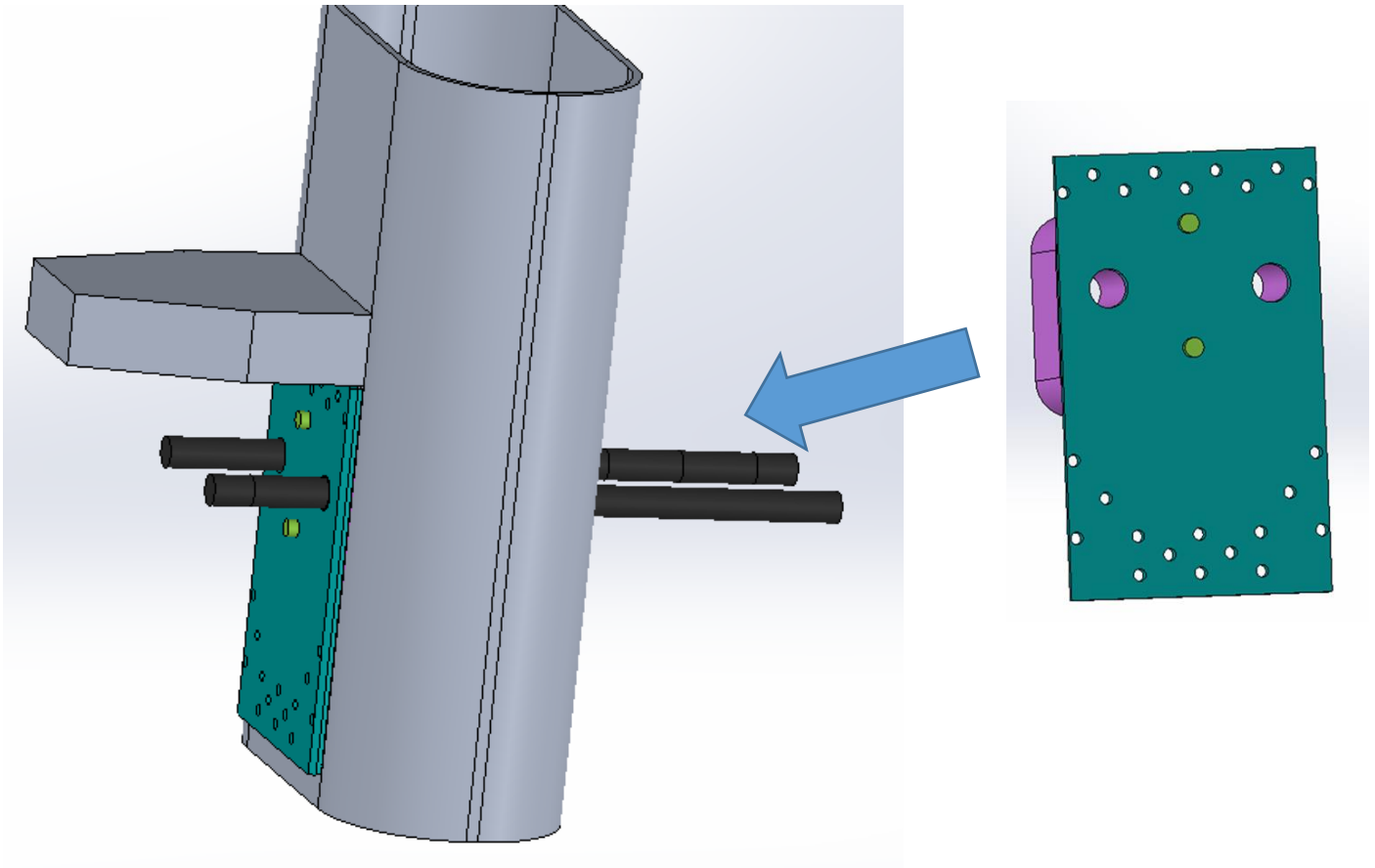
- Assemble the new components



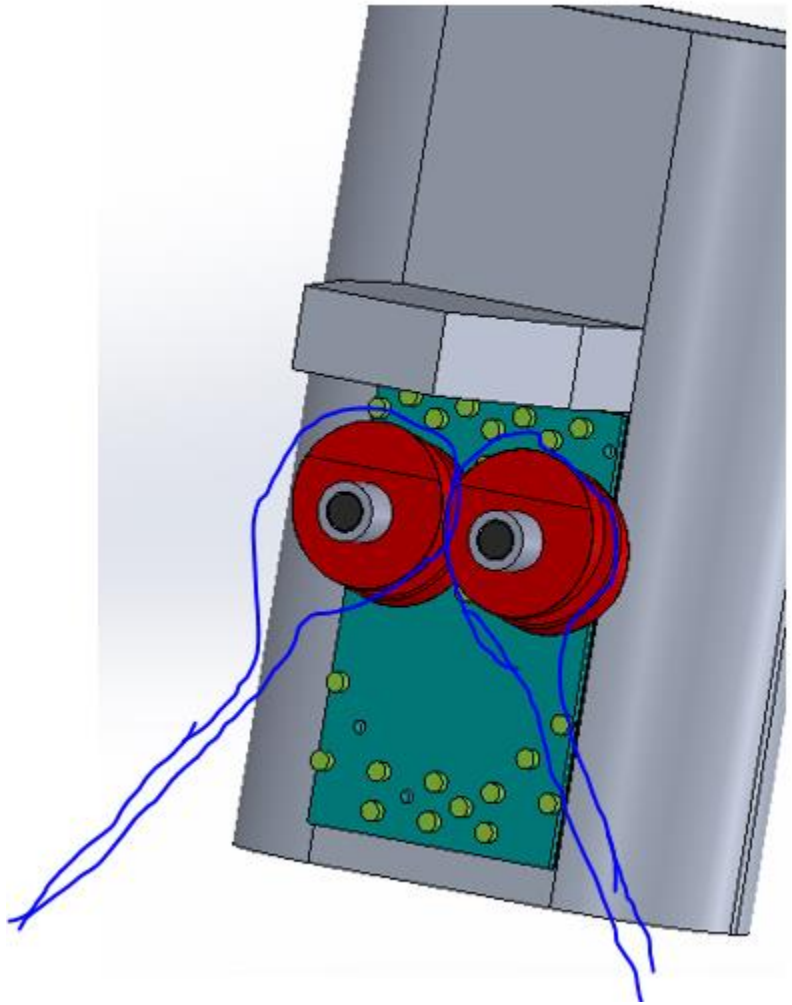




- Sand surfaces to be glued
- Install one assembly from each side of the mast, meeting in the middle, with threaded rods used for alignment
- g/flex epoxy the large surface area (possibly with thickener, tbd)



- Tefgel and torque all fasteners (dyneema shroud loops must be on hangers already when they go on)
- Paint white



Chafe

- Seems unlikely due to the way the fortunate way the compression member will force halyards/wiring to be routed fore and aft