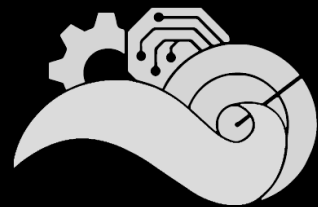
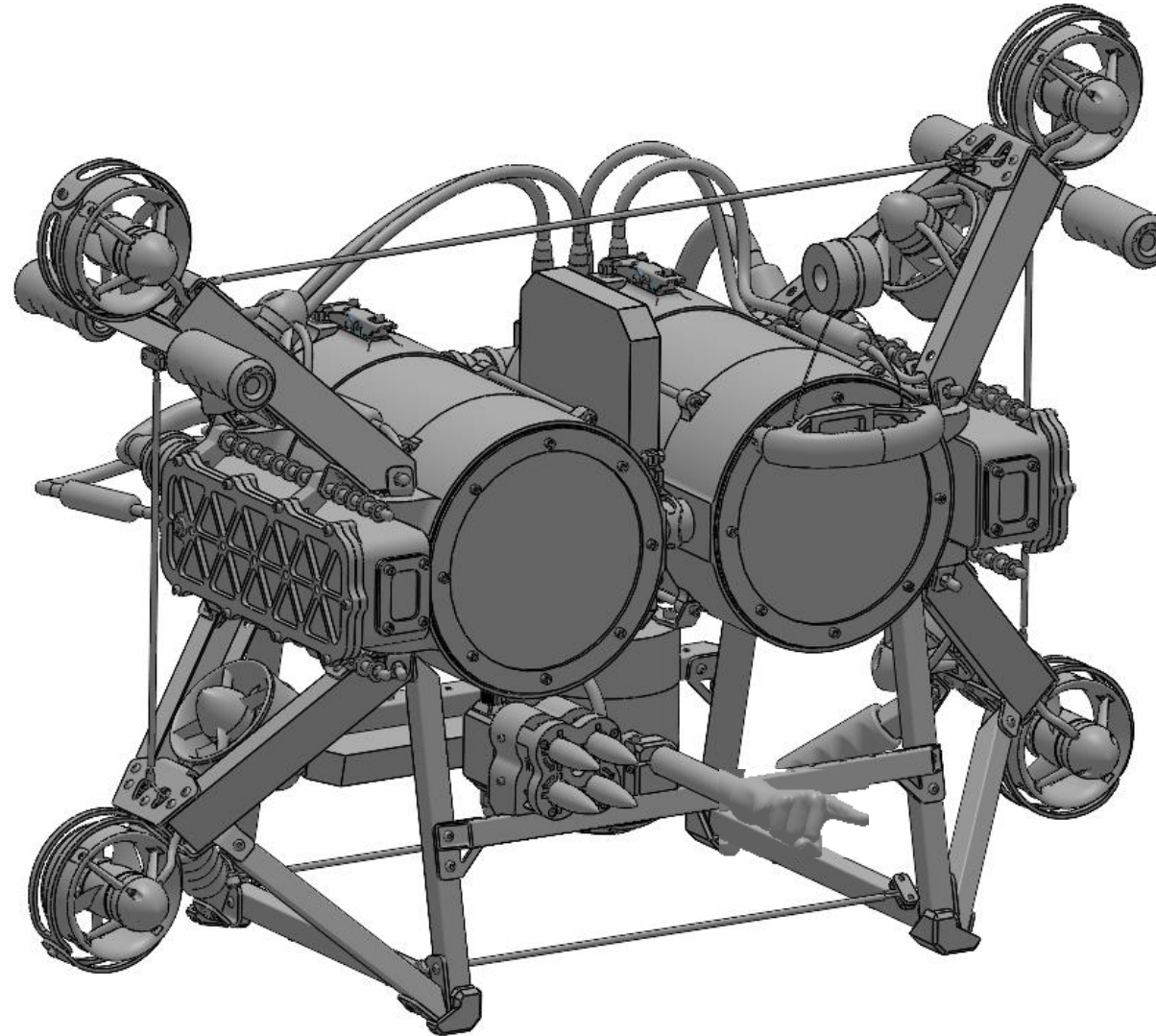
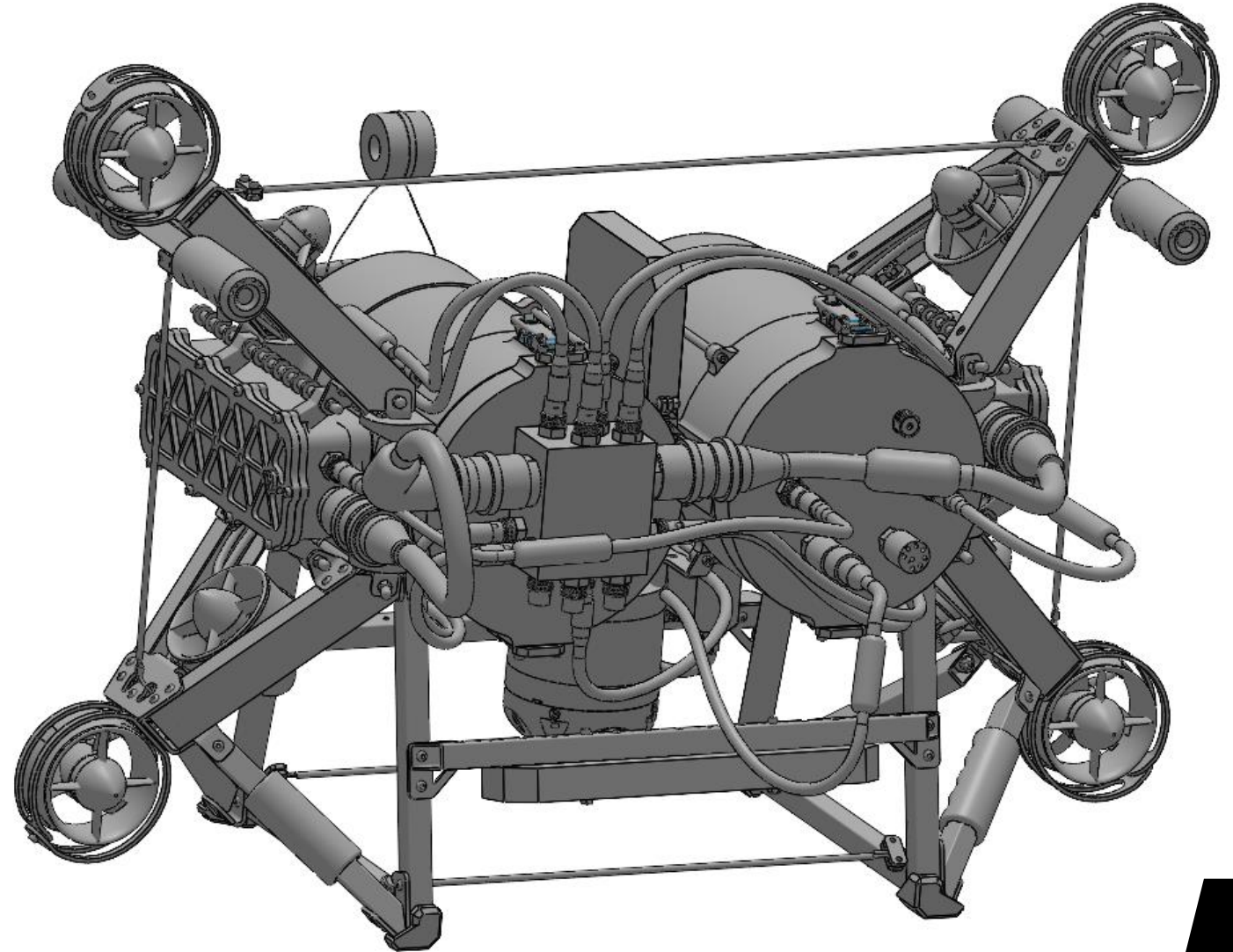


Talos

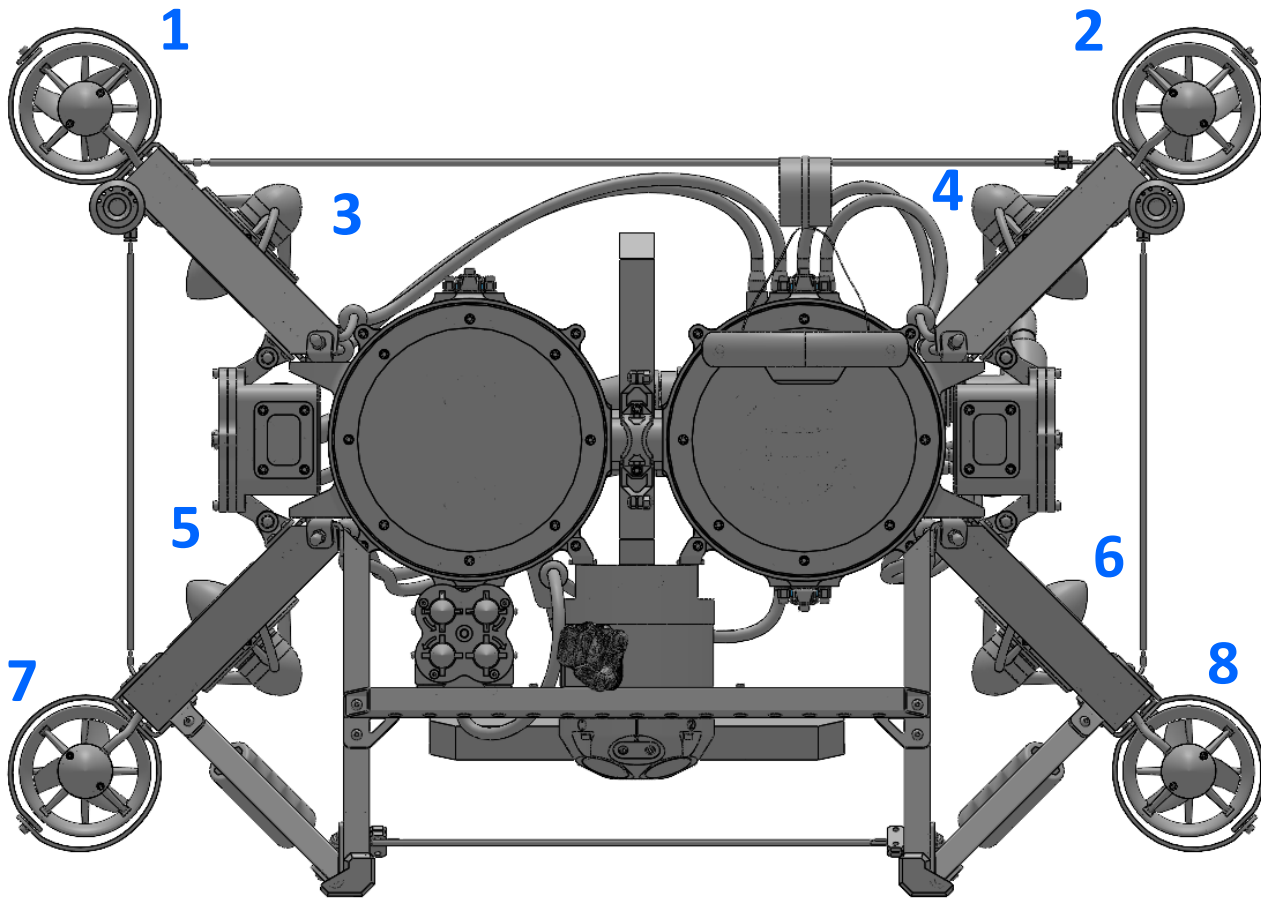
Assembly Instructions



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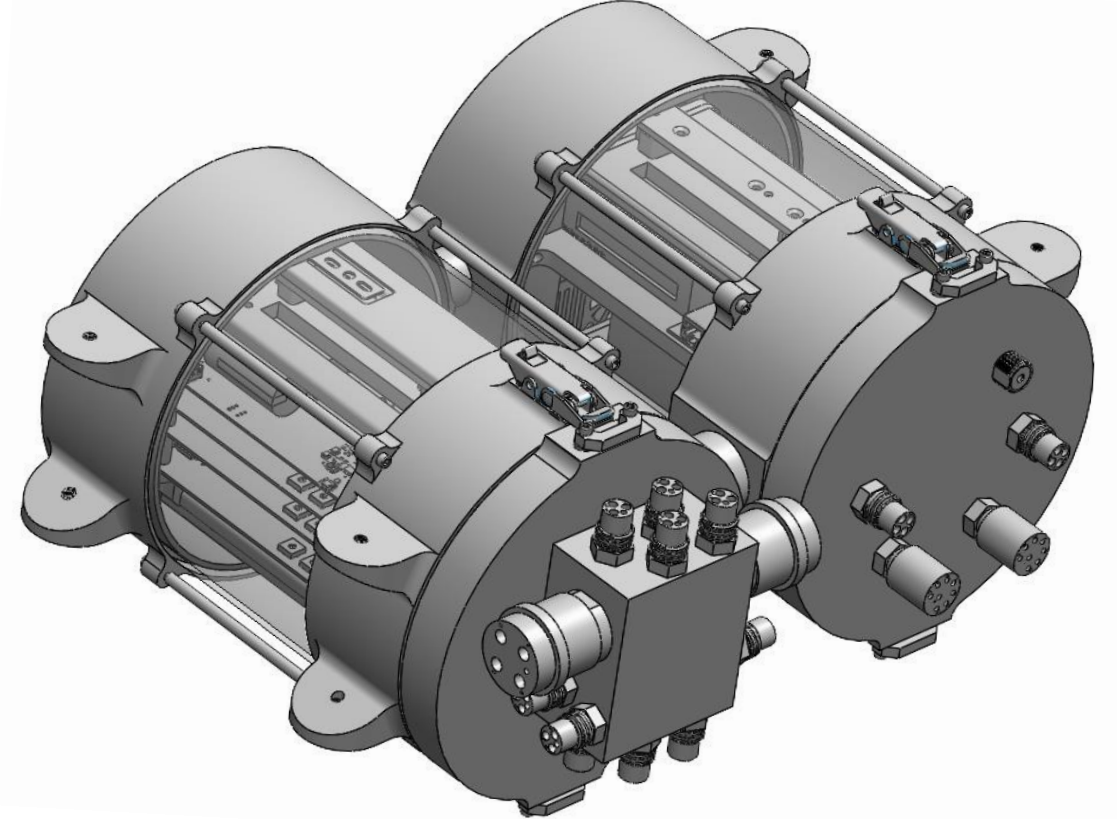
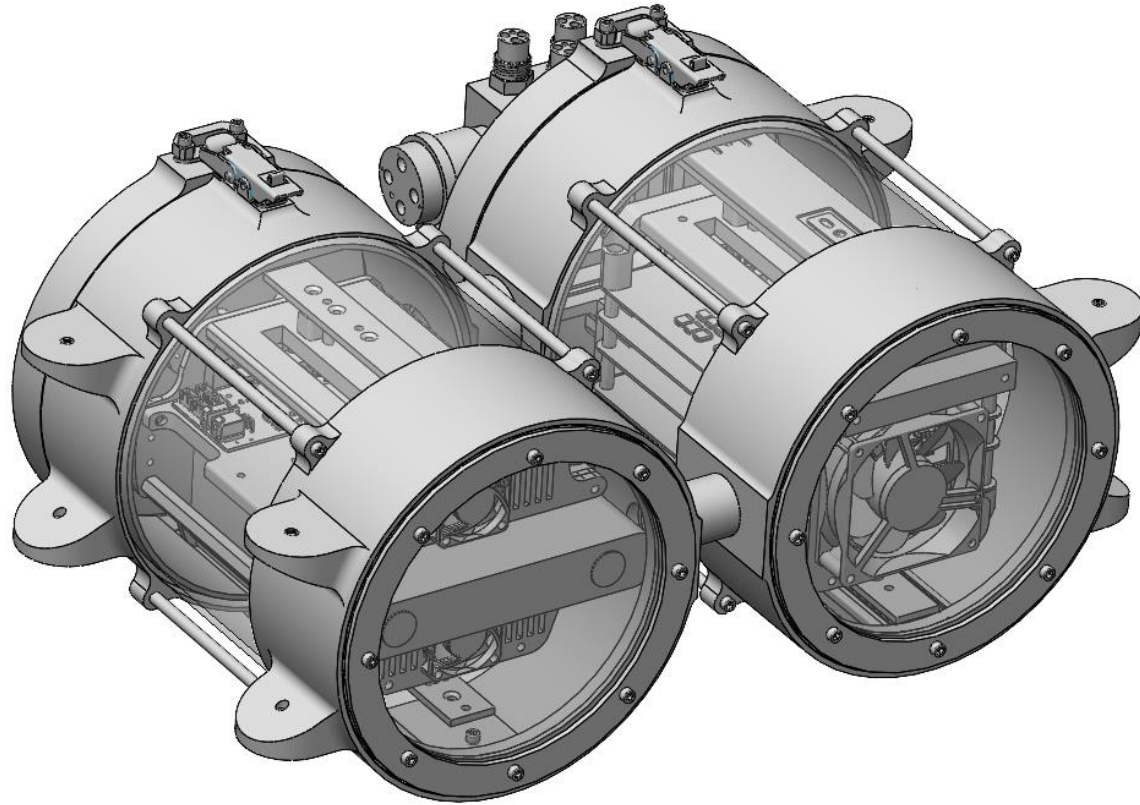
Thruster Numbering (Front View)



- New parts for each step will be colored blue, returning parts are colored gray
- The main assembly currently being worked on is highlighted in the upper left corner
- If a sub-assembly needs put aside, it's picture will shrink and go to the upper left
- Read the "Additional Instruction" notes, as they contain important information
- It is sometimes required to hot glue the 8-32 nylock nut into the 3D printed holder
- When in doubt, reference the master CAD assembly
- If the exact screw length is unknown, it will be denoted with *, use best judgment
- These instructions do not include smart battery housings or electronics cages

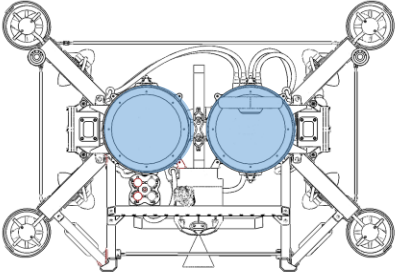
Talos

Hull + Lids

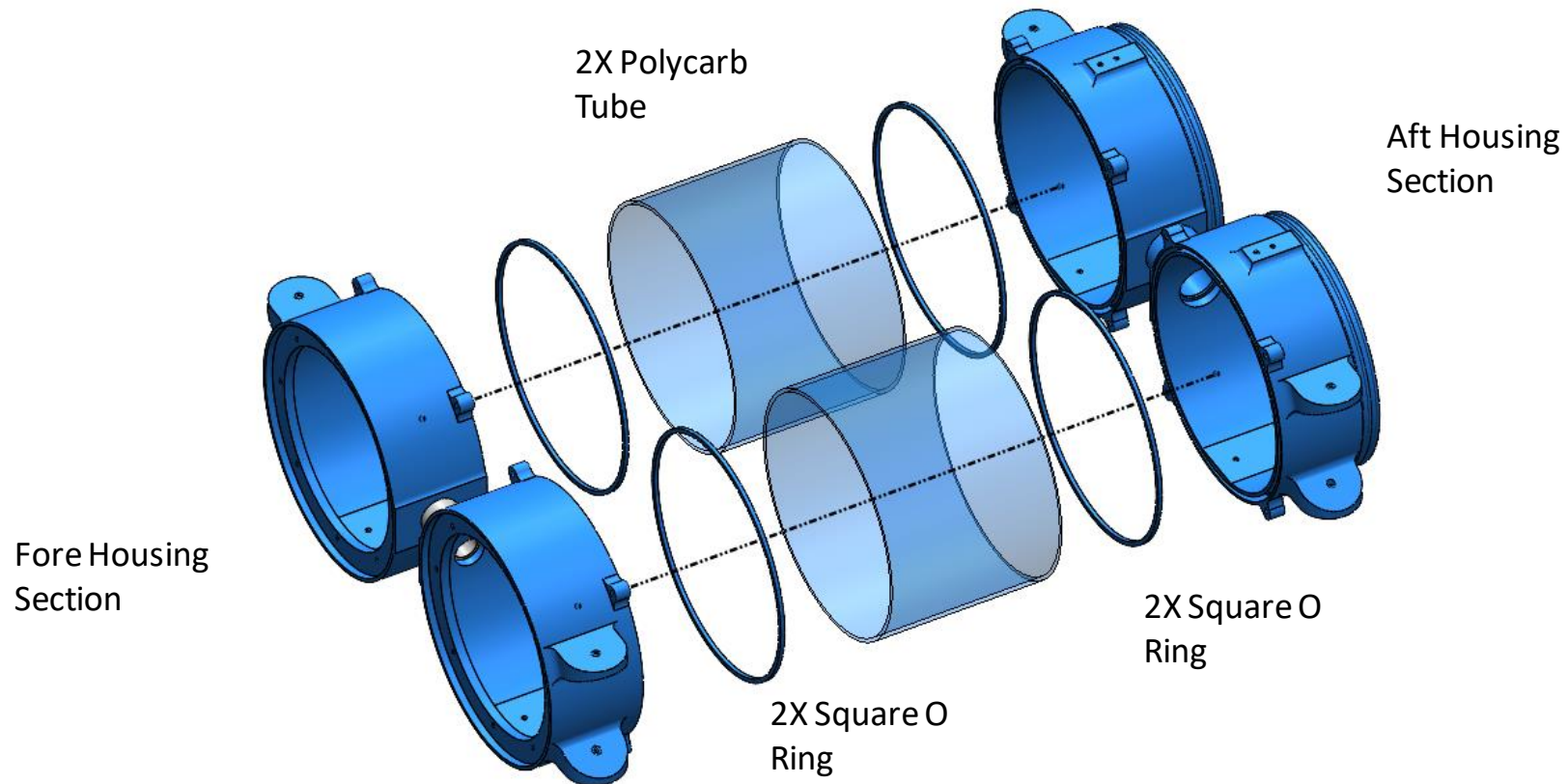


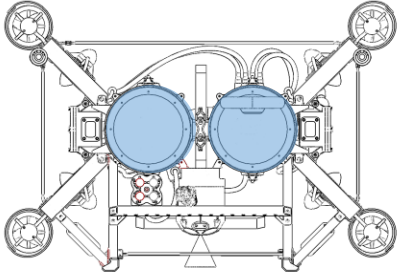
Main Hull

Additional Instructions

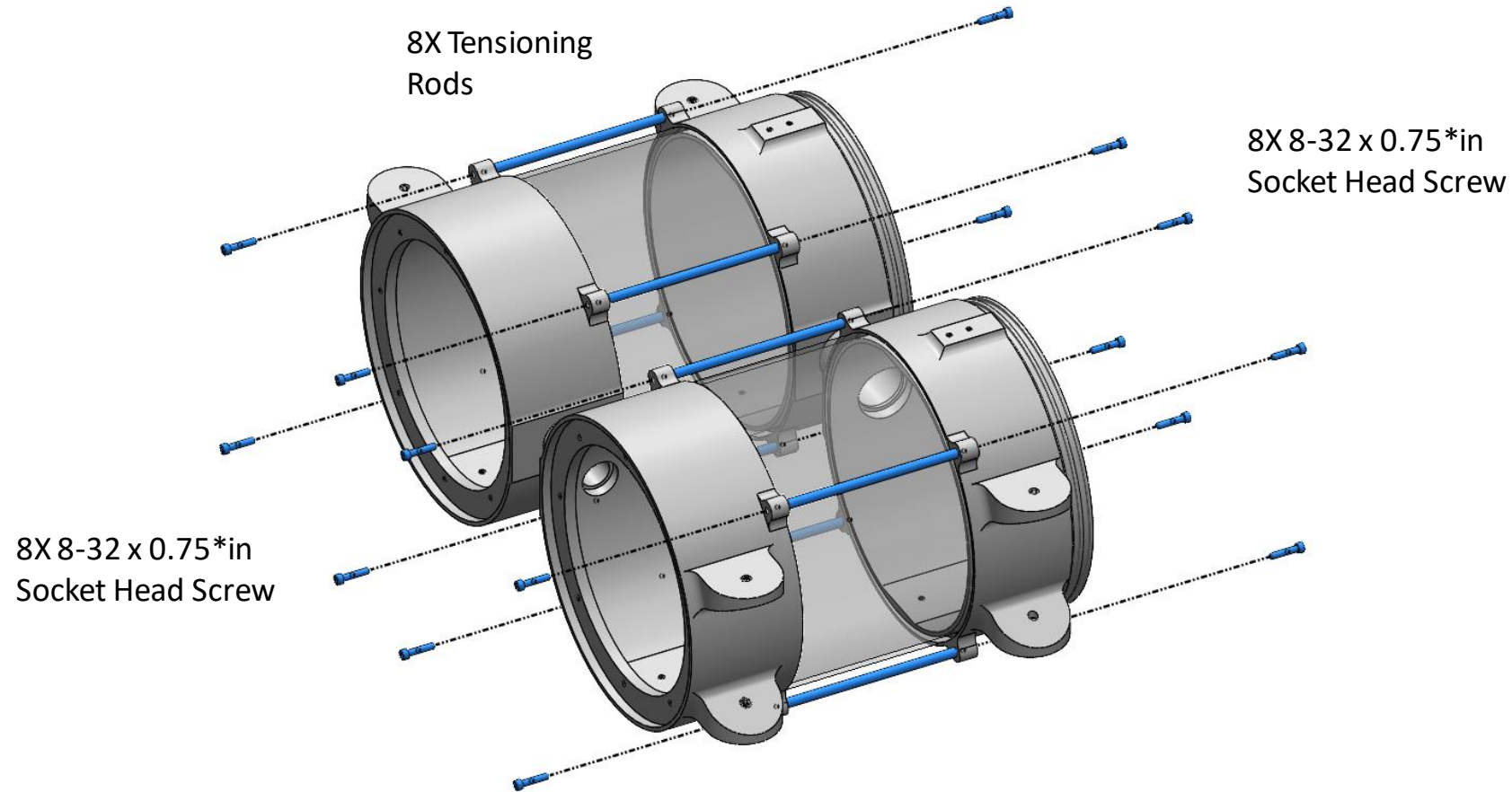


- The orientation of the hull halves don't matter (they're vertically symmetric)
- Setting one half of the hull face down on a table is recommended



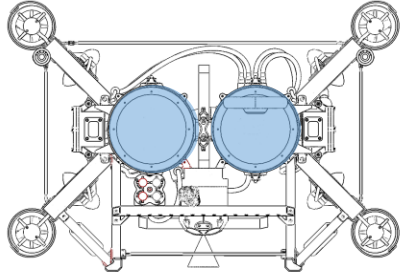


- Put the eight tensioning rods into position and then **loosely** screw them in
- Go back and torque the screws to **12 in-lb** in a star pattern
- It is helpful to have two Allen keys hold the opposite screw while tightening to prevent the rod from rotating

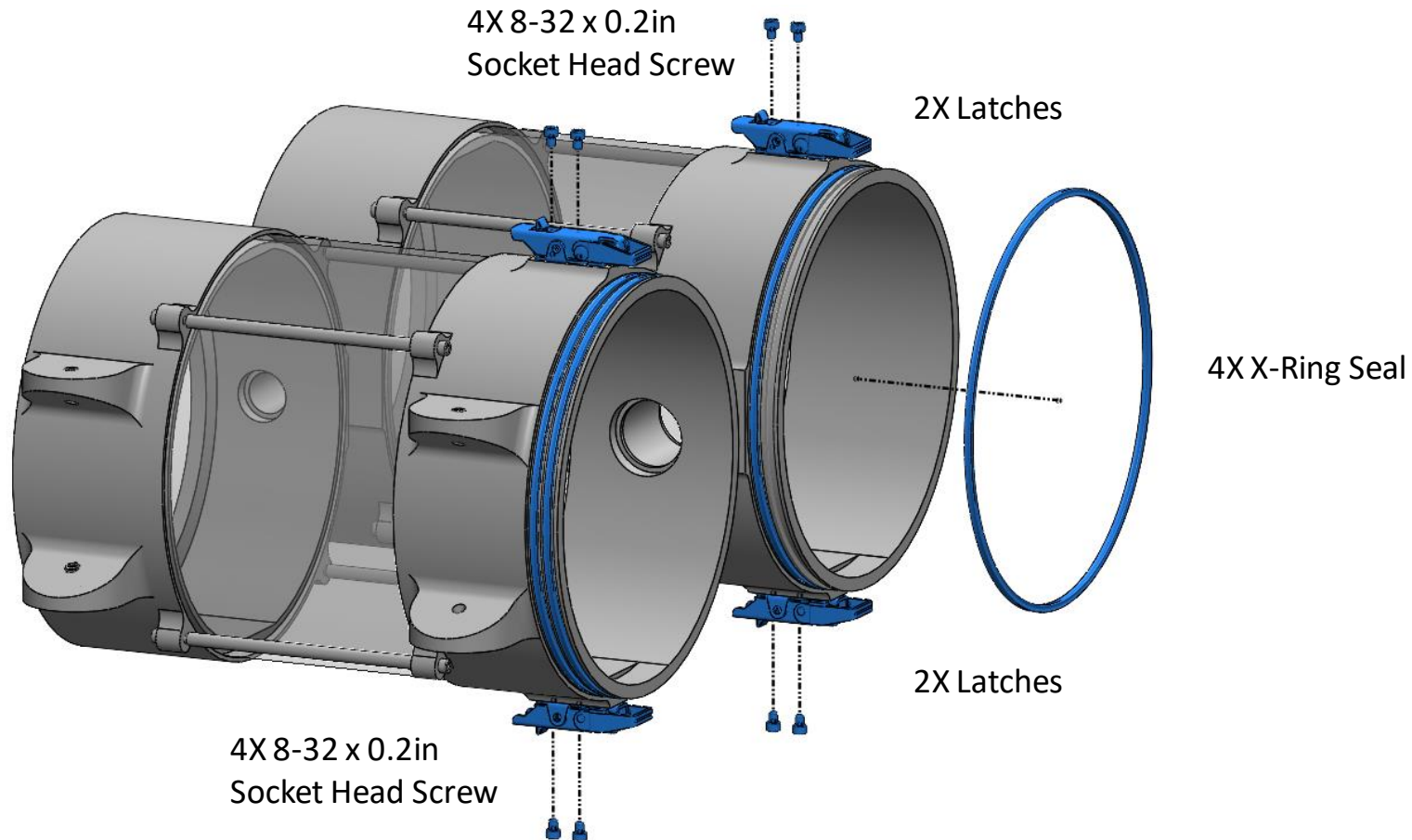


Main Hull

Additional Instructions

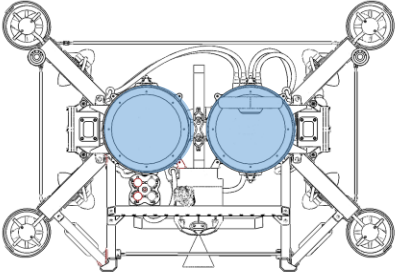


- Lift up the latch to gain access to the screw holes
- The o-rings should go on with a satisfying snap; if they don't, they are the wrong size.
- Ensure the o-rings are **lubricated** with grease
- Make sure the o-rings are **not twisted**

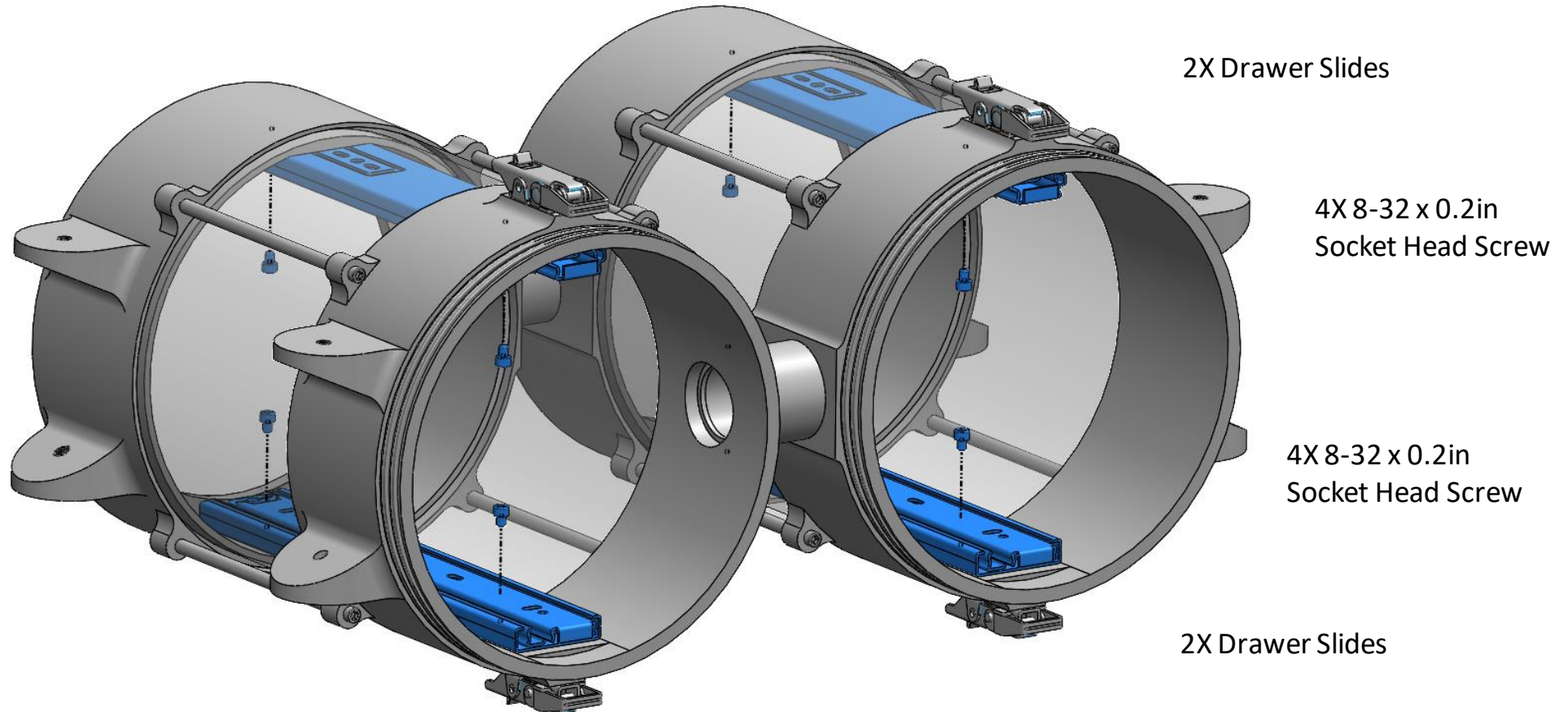


Main Hull

Additional Instructions

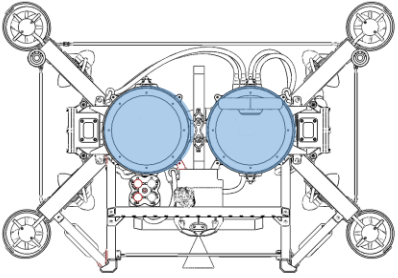


- Mount the drawer slide rails, there is one threaded hole on the hull that is messed up that uses a **1/4-20 screw**
- Slide the rails open to gain access to the screw holes

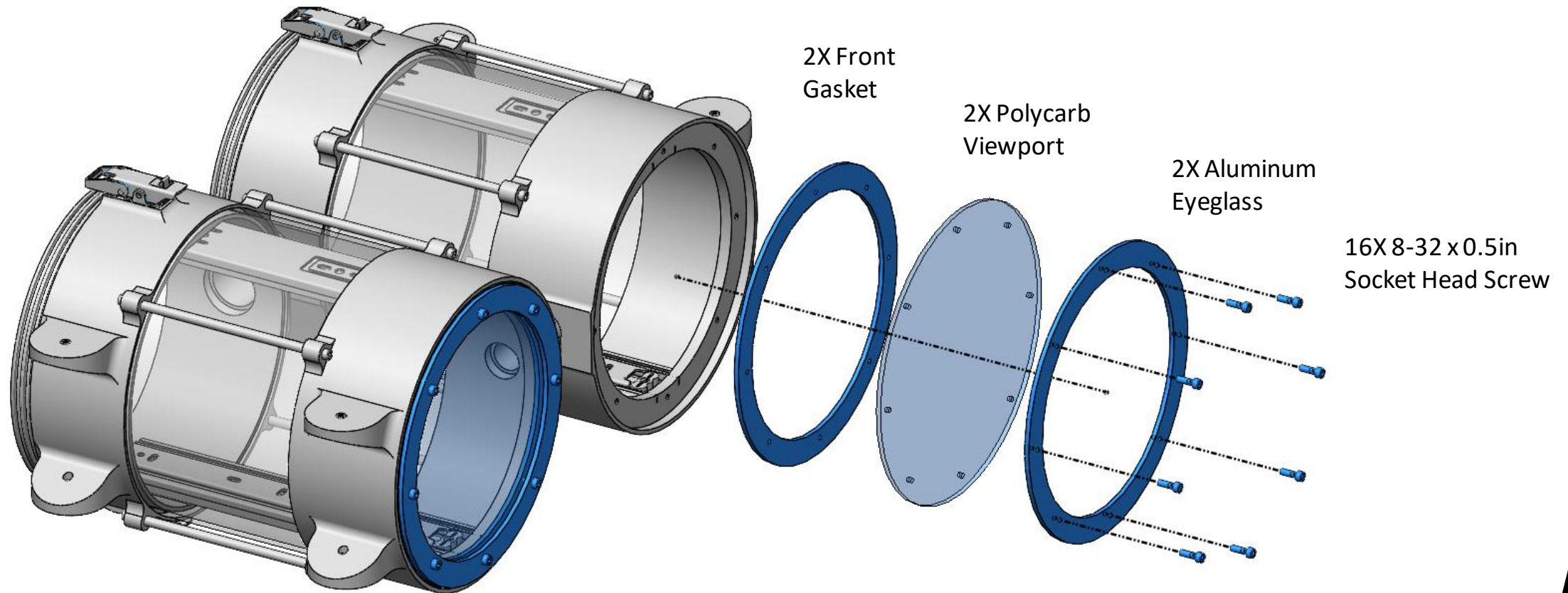


Main Hull

Additional Instructions



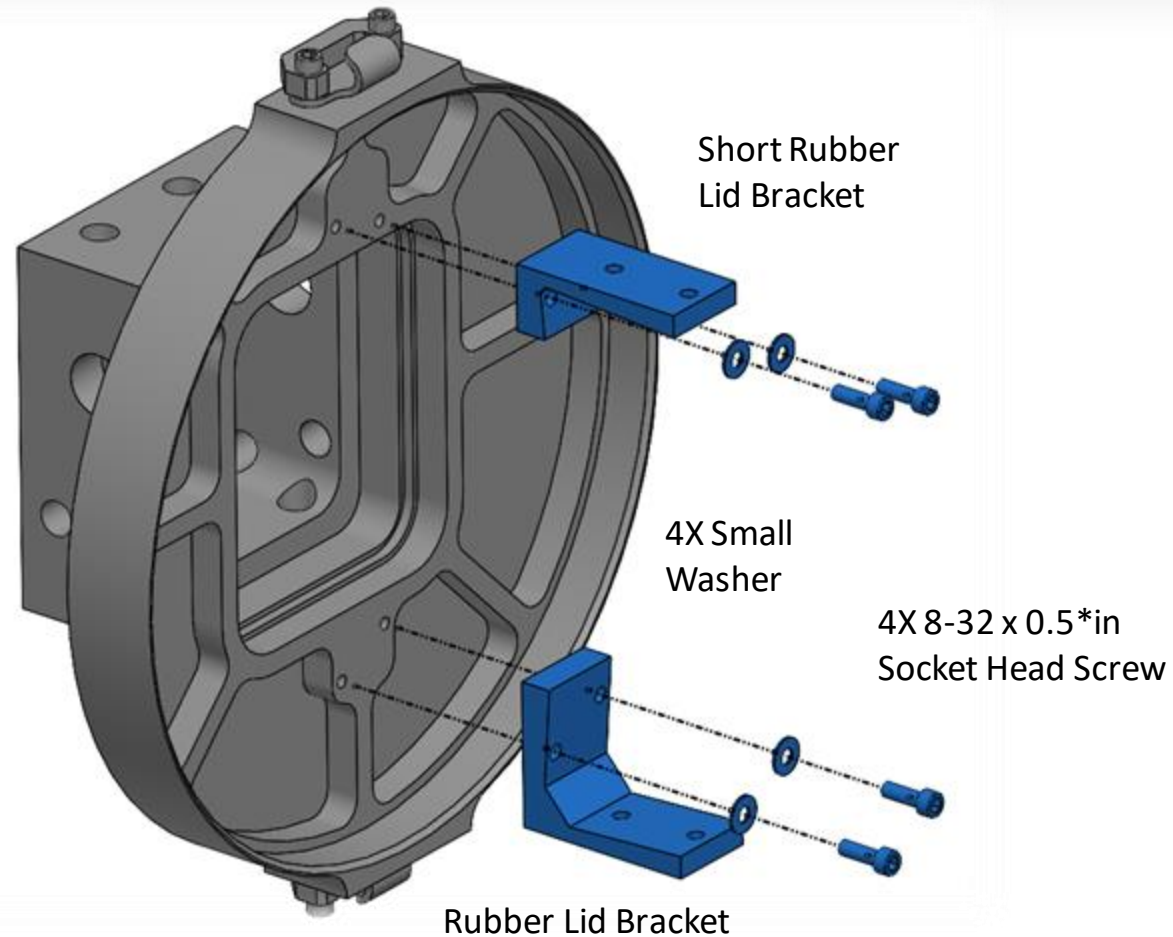
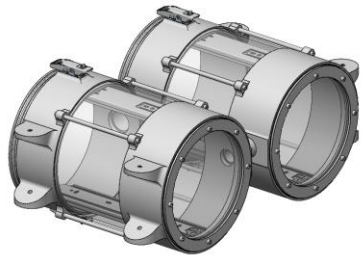
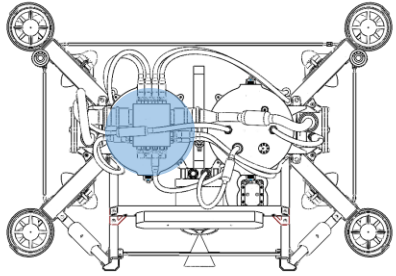
- Add the gaskets and view ports and tighten the screws **loosely** to start
- Once all screws are in, tighten to **12 in-lb** in a star pattern



Port Lid

Additional Instructions

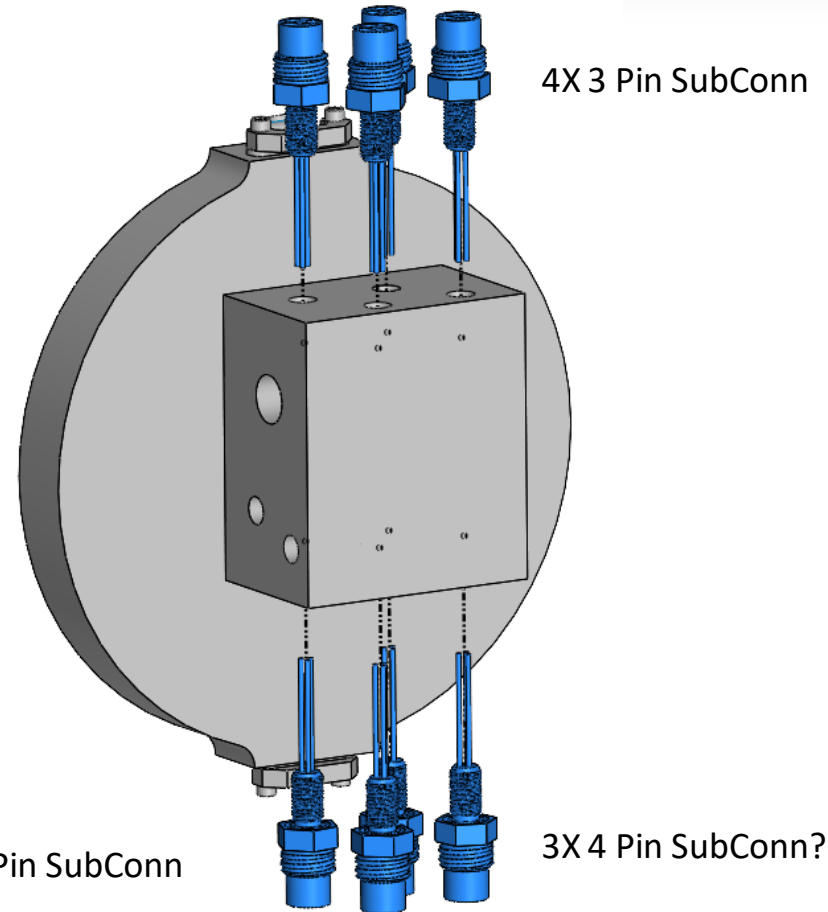
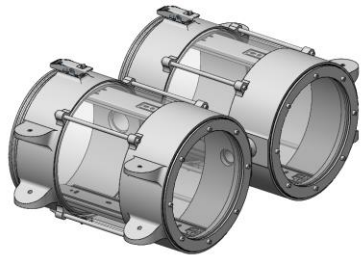
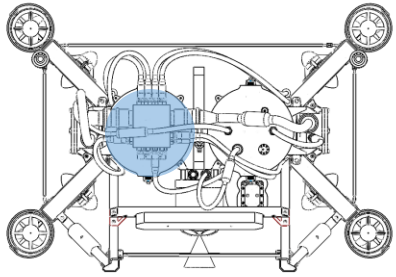
- Attach the lid brackets, the length of screws and number of washers may need to be adjusted



Port Lid

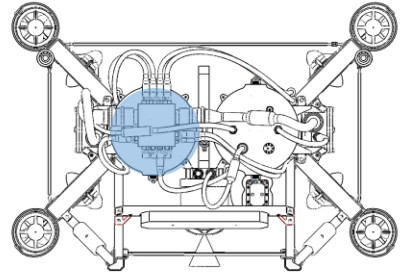
Additional Instructions

- Ensure there are **no SubConns** in the sides of the block. If there are, remove them as doing this step first would kill the SubConn!
- Ensure all SubConns have **o-rings!**
- Tighten these hard
- A hole on the bottom can be plugged if needed. Take a 7/16-20 hex bolt and a sealing washer to do this.

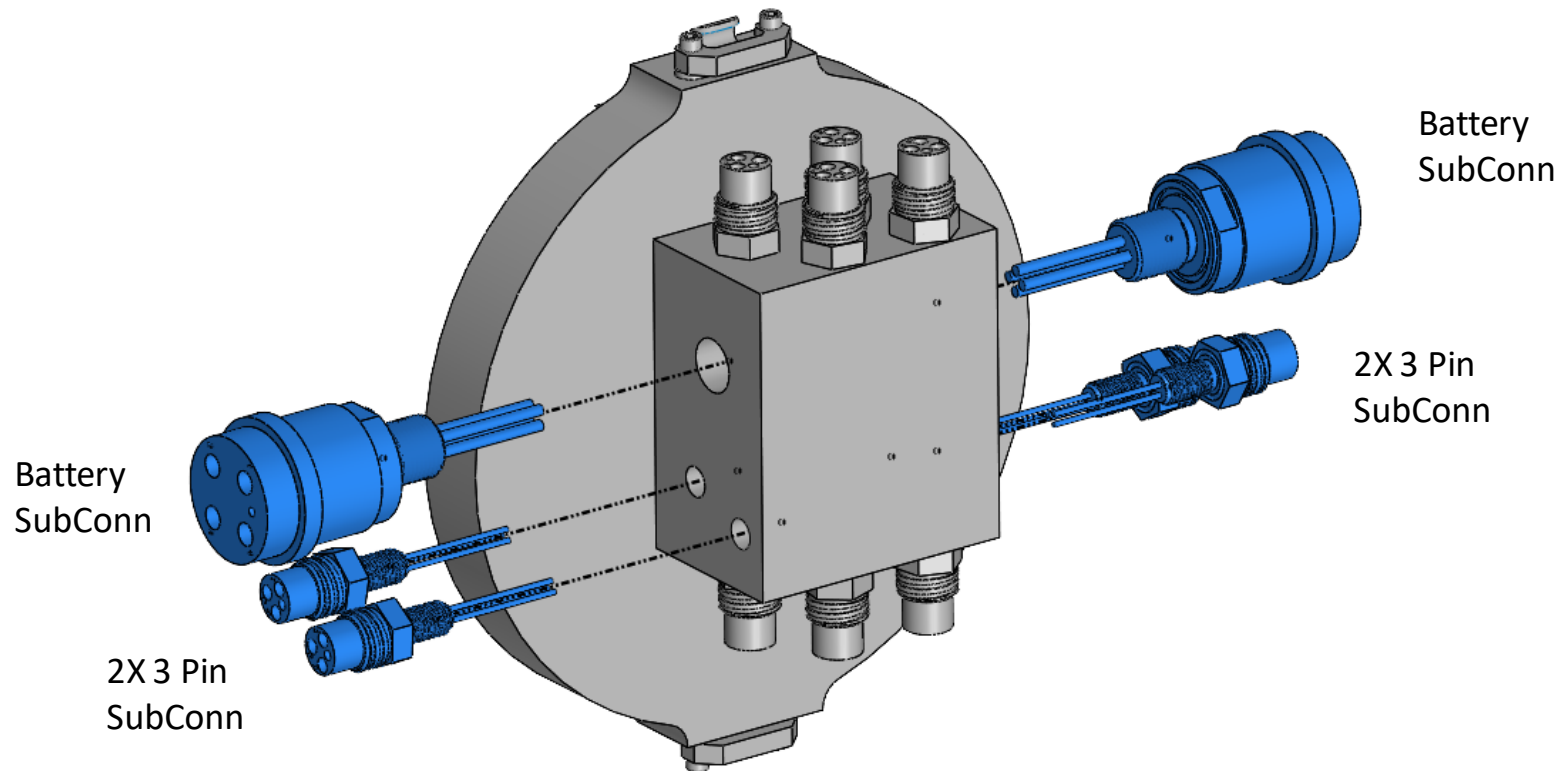
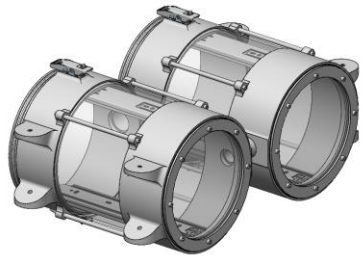


Port Lid

Additional Instructions



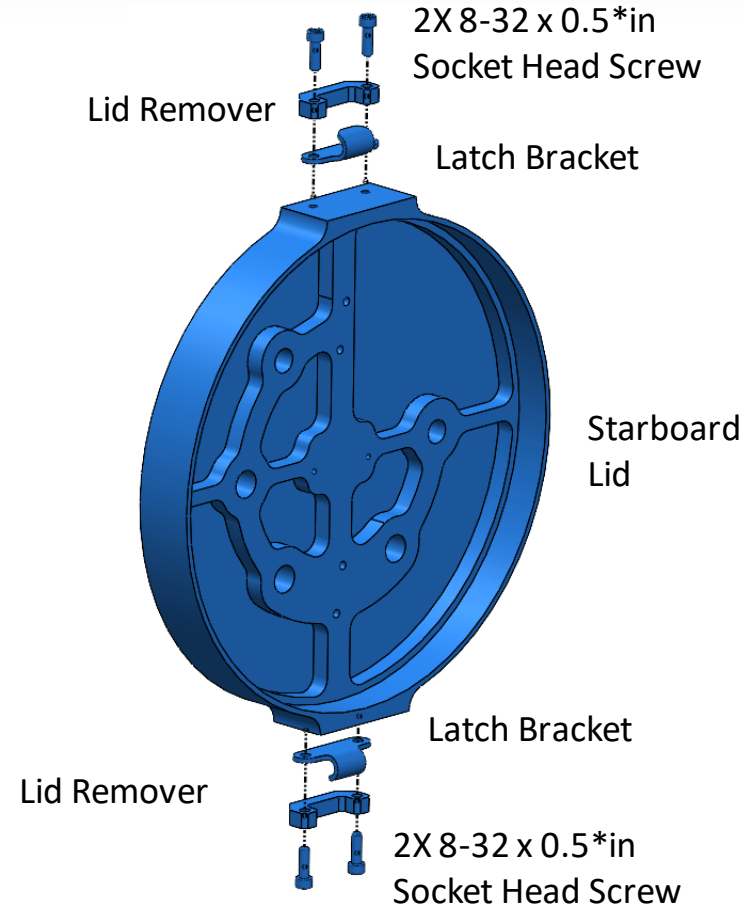
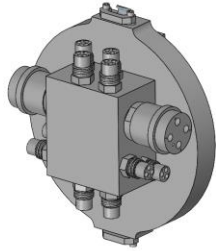
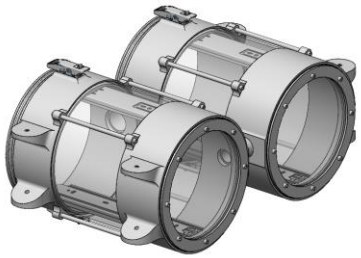
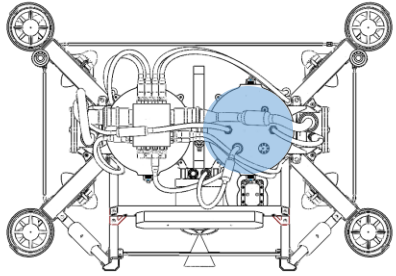
- Ensure all SubConns have **o-rings!**
- Put the power SubConns in first, make sure the wrench **doesn't scratch** the side of the block while tightening!
- Tighten these hard



Starboard Lid

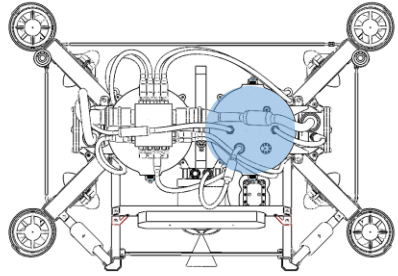
Additional Instructions

- Put the port lid aside
- Mount the latch bracket, ensuring it is facing the correct direction
- Be careful to **not cross thread** the screws! If it feels weird, back it out

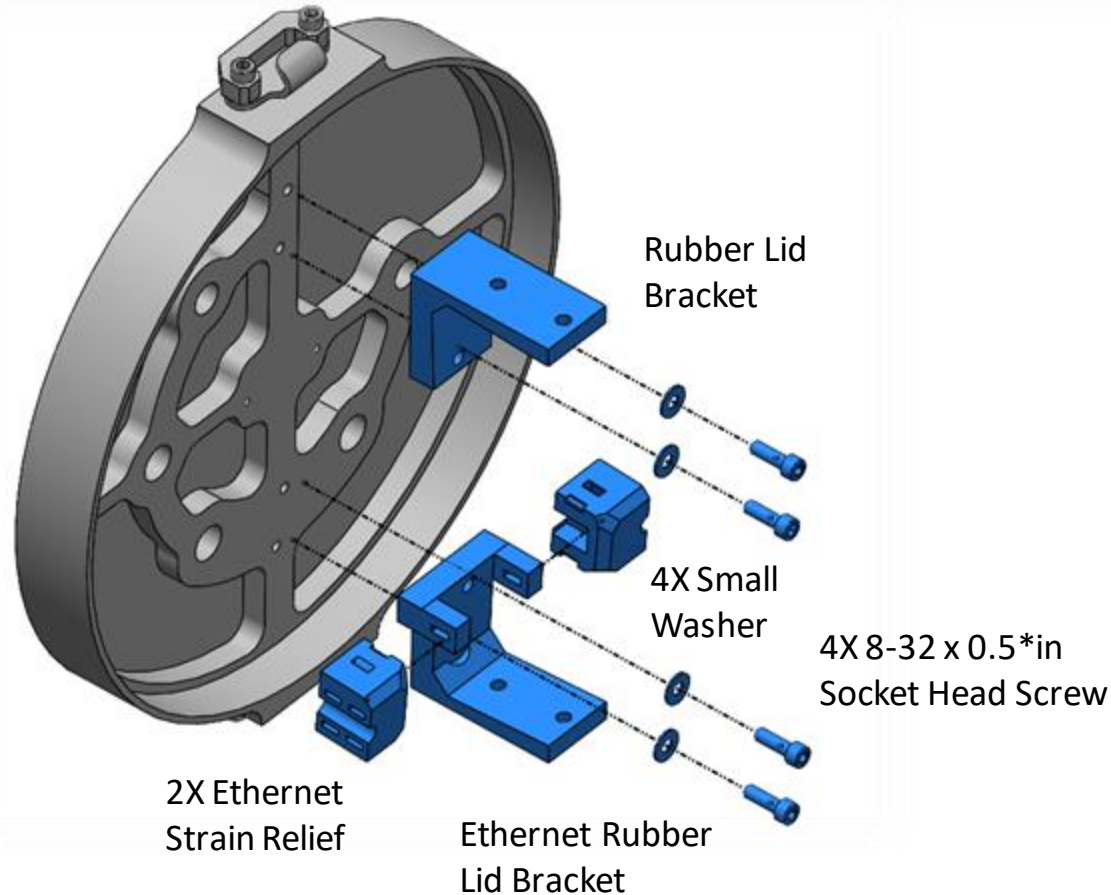
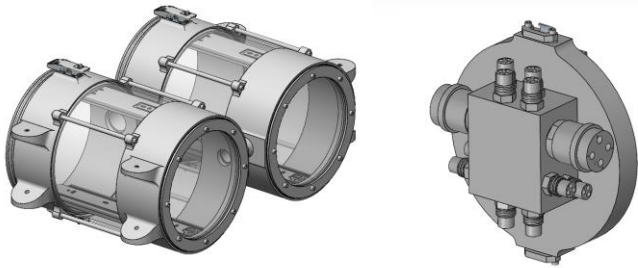


Starboard Lid

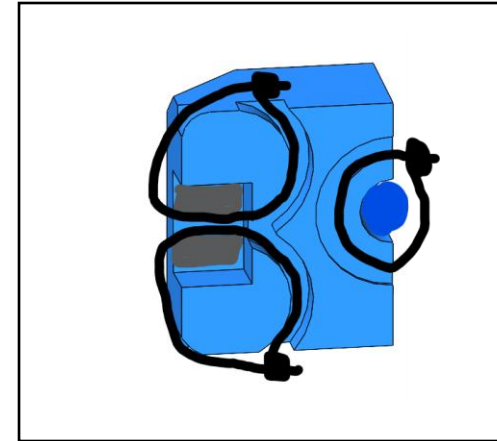
Additional Instructions



- Ensure the thruster cable is going through the notch on the bent sheet metal
- Tighten the thruster screws wells, as they will be very difficult to access later
- Don't forget the washers!
- The Ethernet cables get zip tied to the 3D printed strain relief, see image below

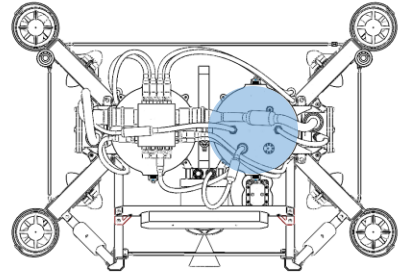


Zip tie routing path cross section

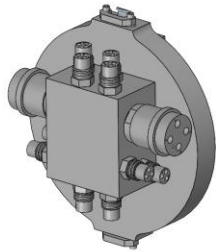
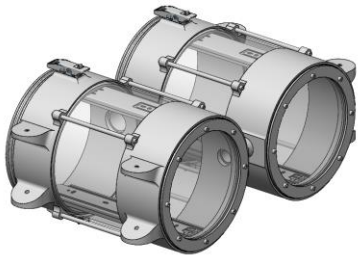


Starboard Lid

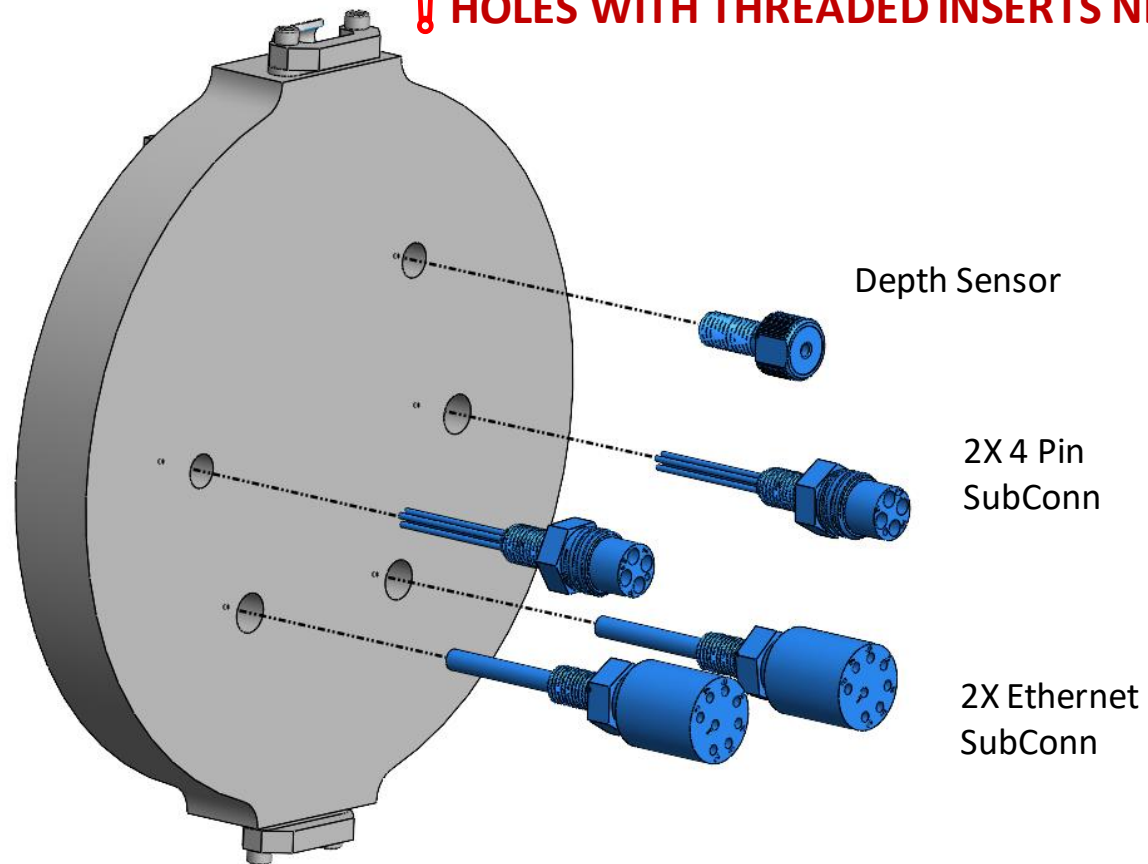
Additional Instructions

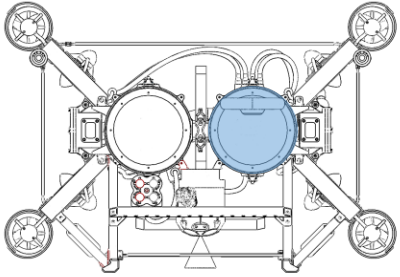


- Ensure all SubConns have **o-rings!**
- Tighten these hard
- Make sure the SubConns holes with a threaded insert have a **gasket washer** too!

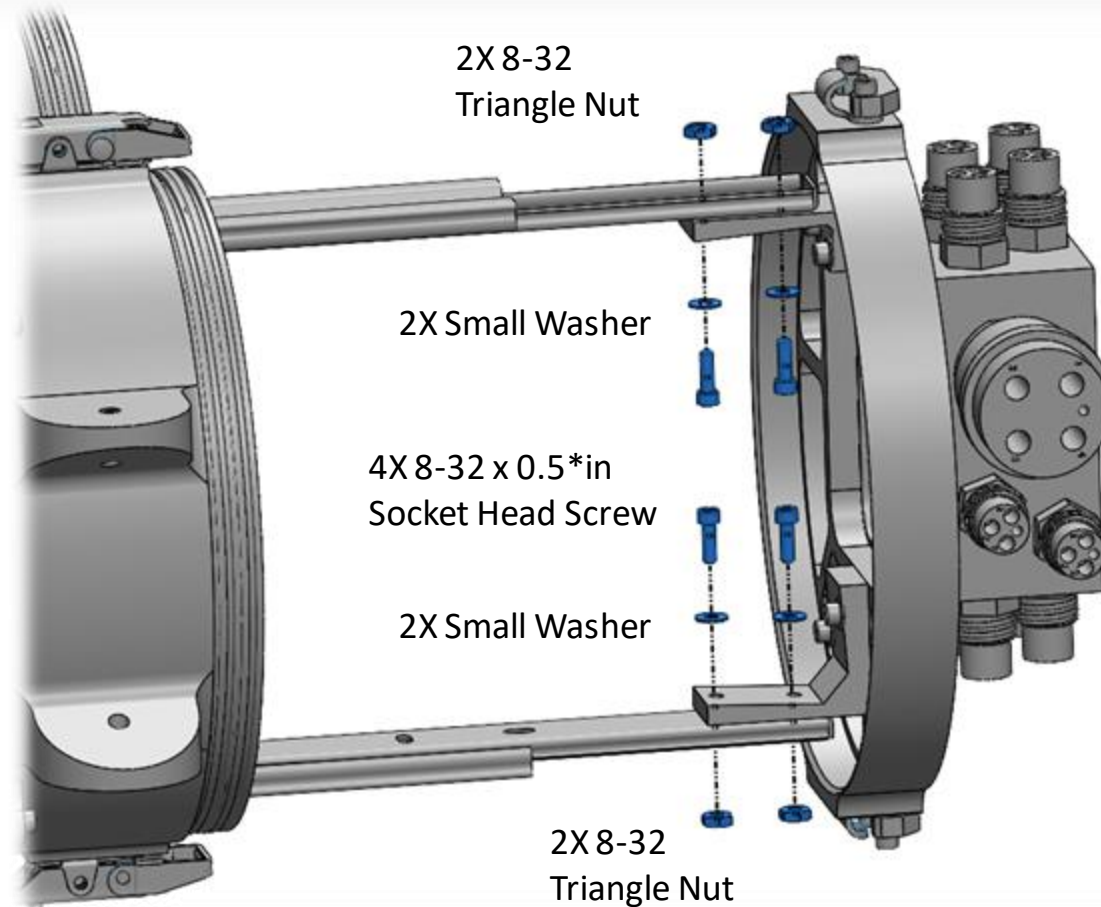
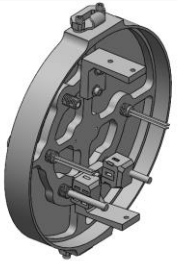


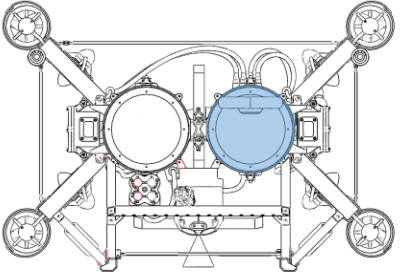
! HOLES WITH THREADED INSERTS NEED GASKET WASHERS !



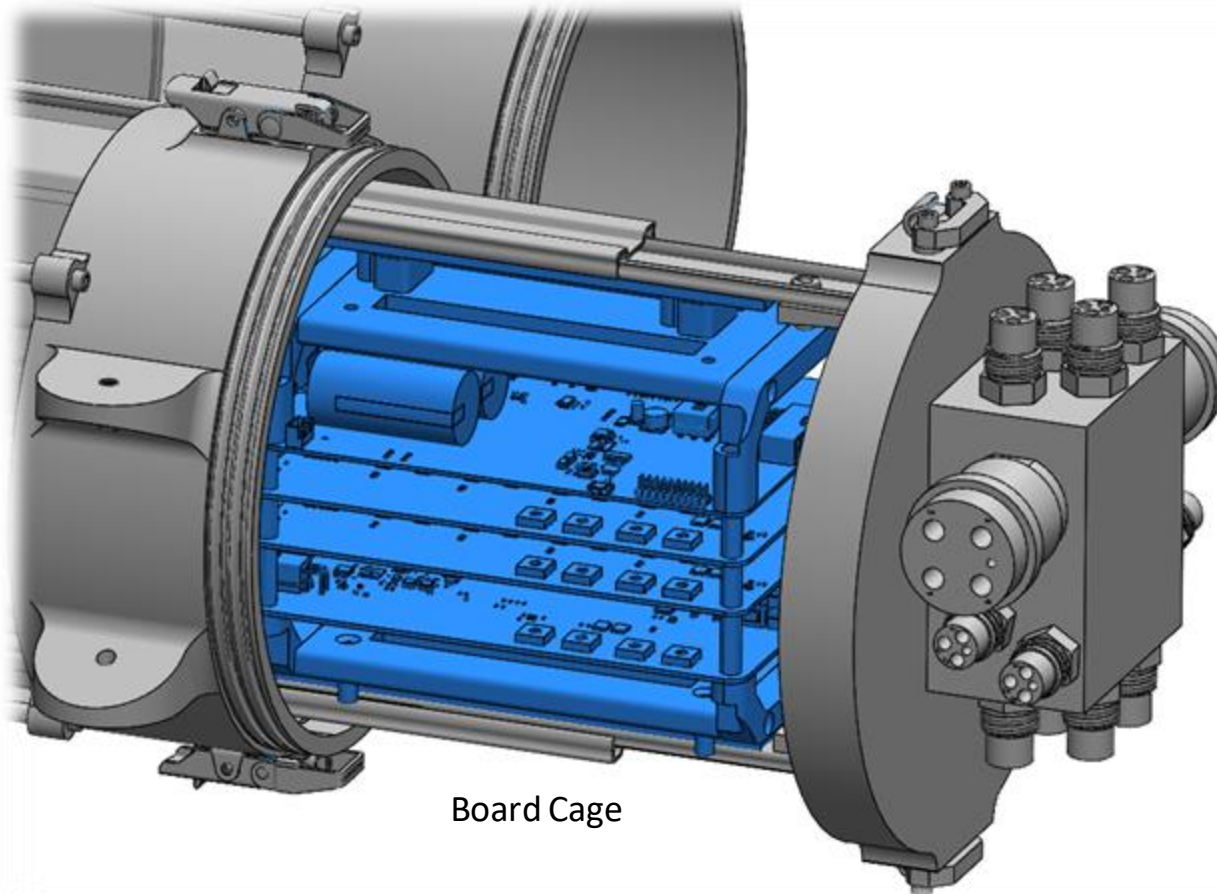
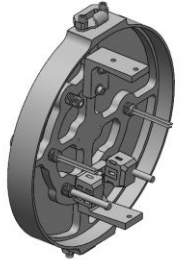


- Attach port lid to the rails, make sure it is not **upside down!**
- Use 8-32 nuts with a triangle on one side (It's a type of lock nut)
- The screws **can not** stick out past the nut at all or else the rail will jam. Grind the screws flush with a Dremel

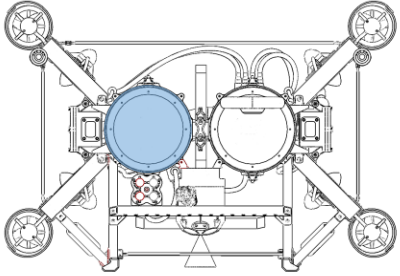




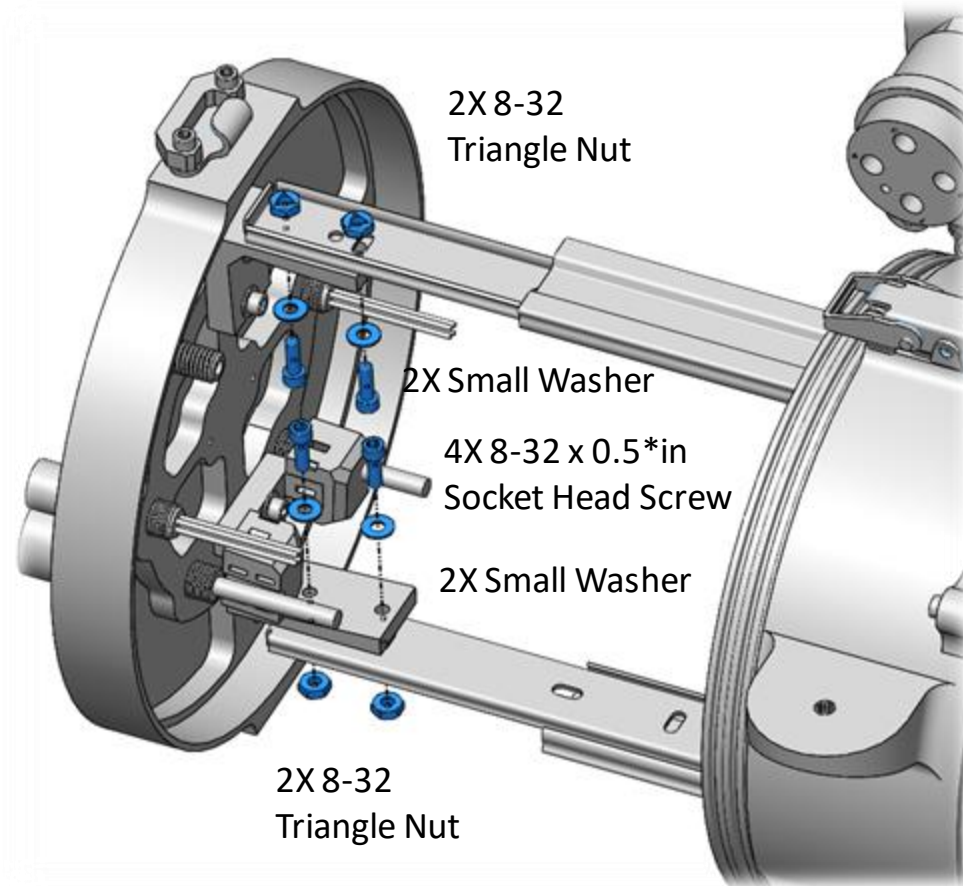
- Install the board cage assembly (Assembly is not covered in these instructions)
- Contact the Navionics team for assistance
- **Don't pinch** a cable when closing the lid!

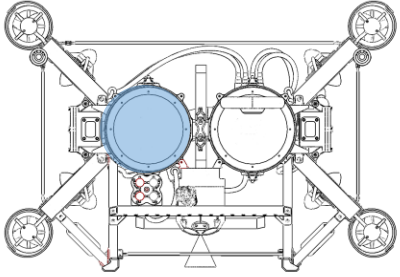


Board Cage

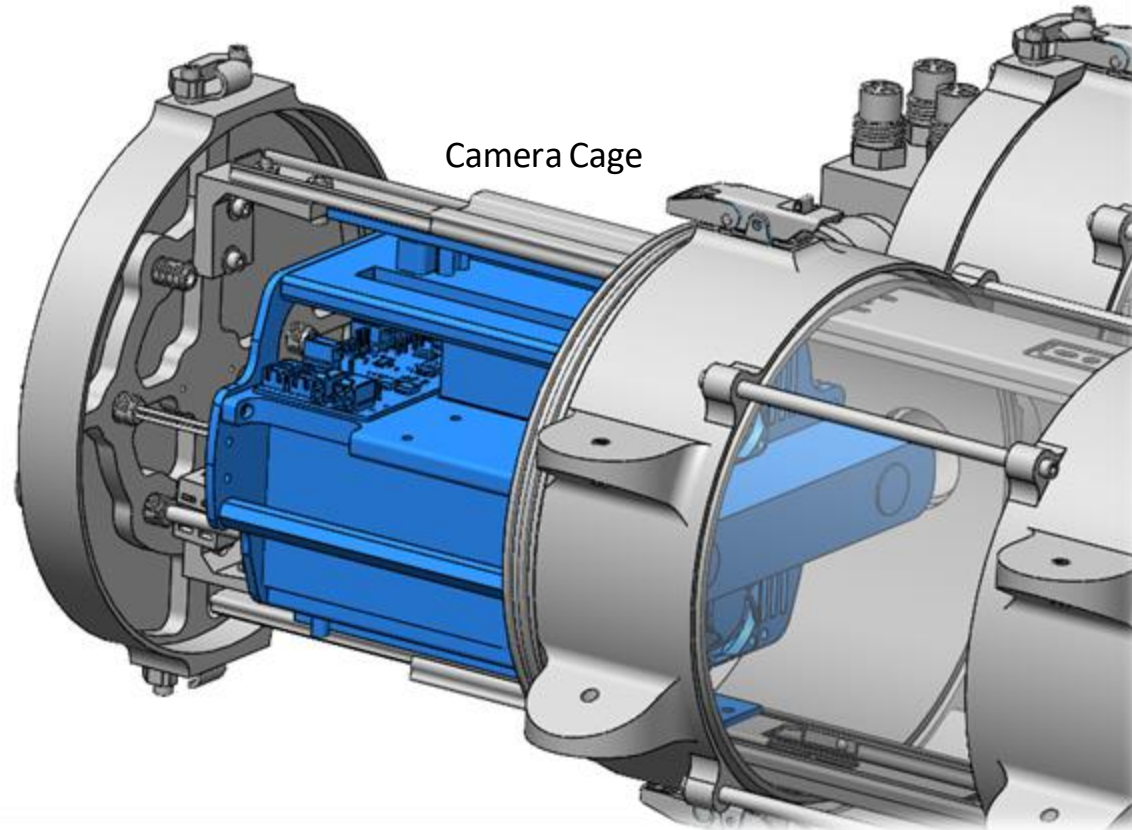


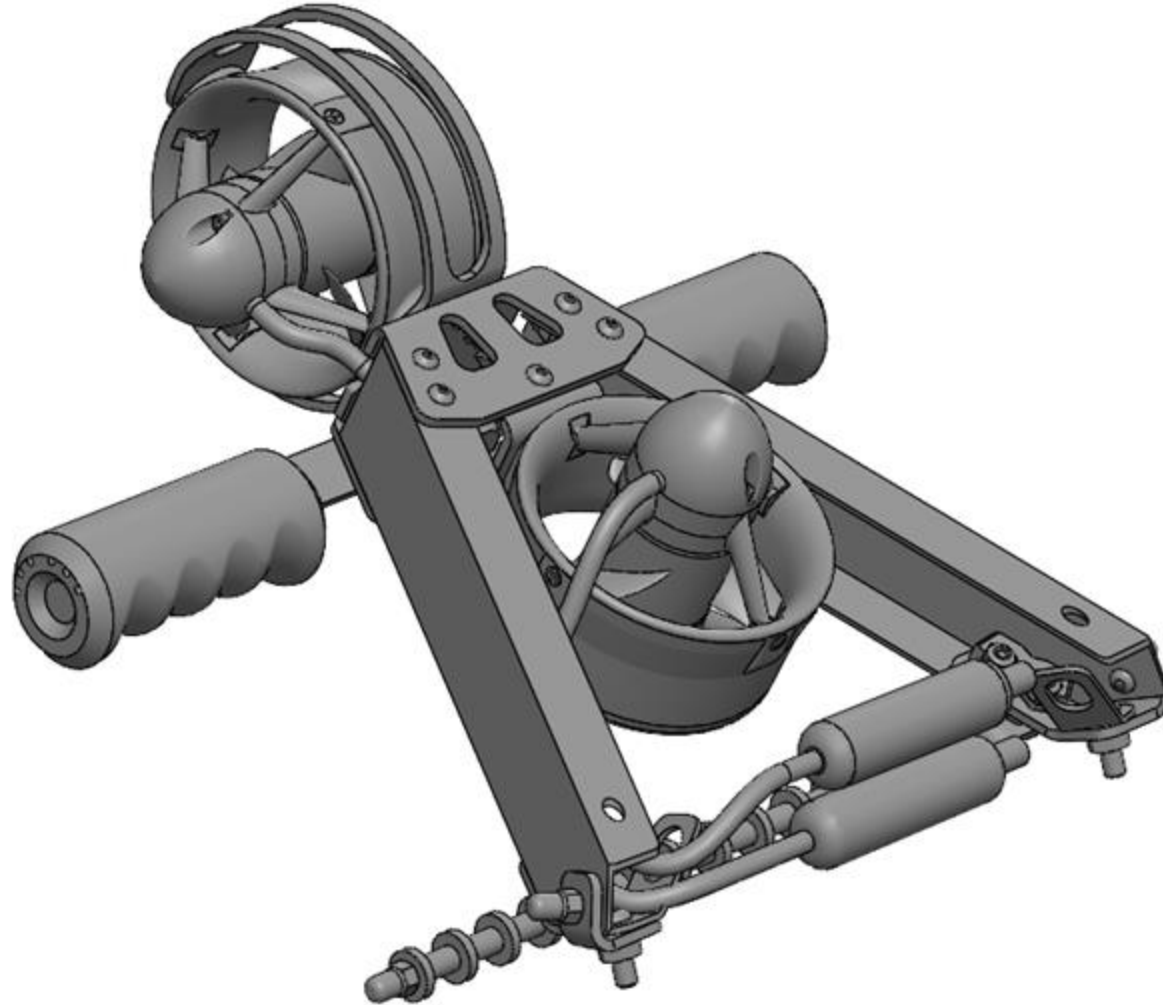
- Attach port lid to the rails, make sure it is not **upside down!**
- Use 8-32 nuts with a triangle on one side (It's a type of lock nut)
- The screws **can not** stick out past the nut at all or else the rail will jam. Grind the screws flush with a Dremel

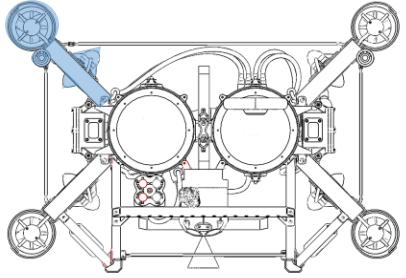




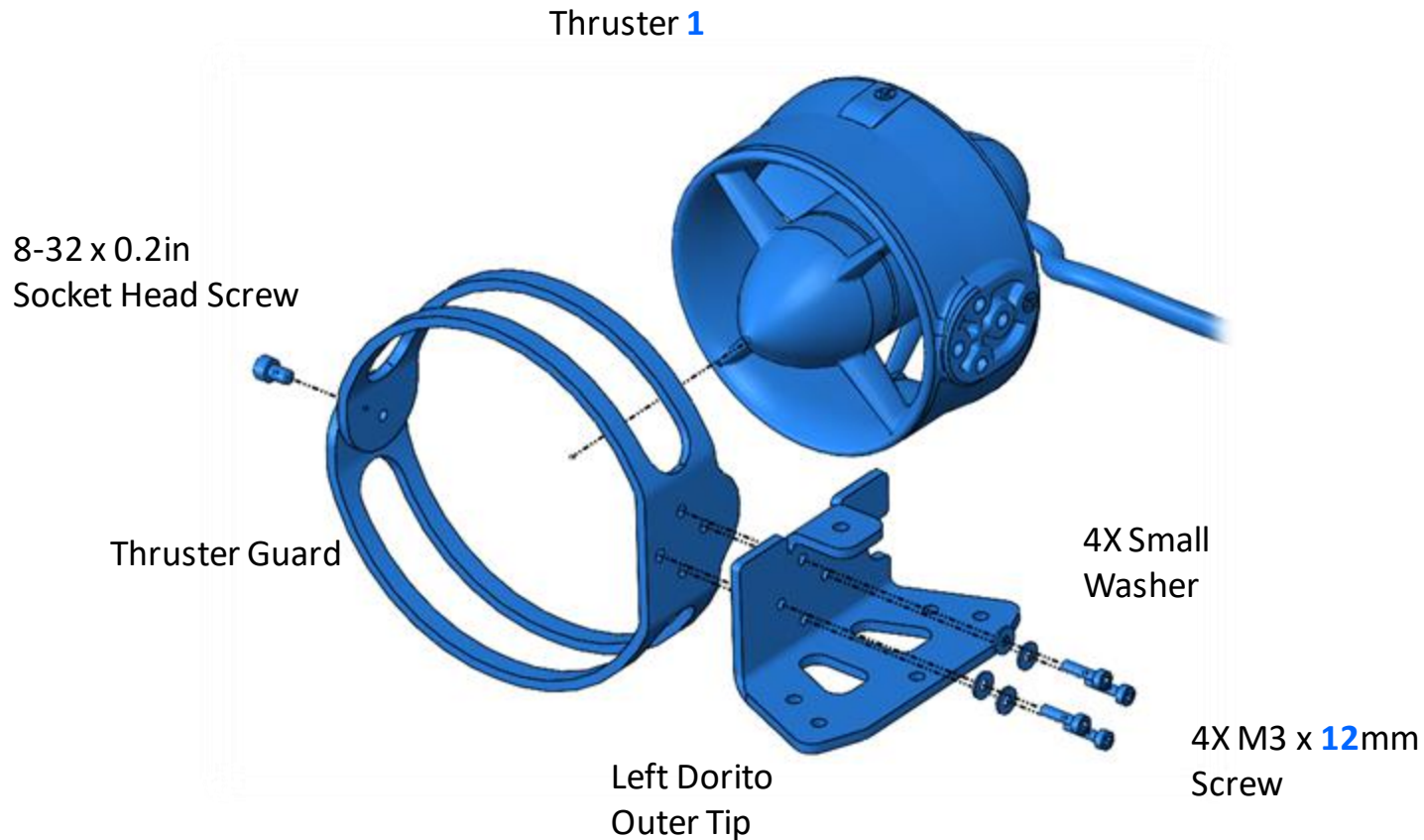
- Install the camera cage assembly (Assembly is not covered in these instructions)
- Contact the Navionics team for assistance
- **Don't pinch** a cable when closing the lid!



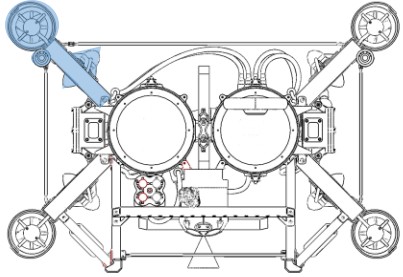




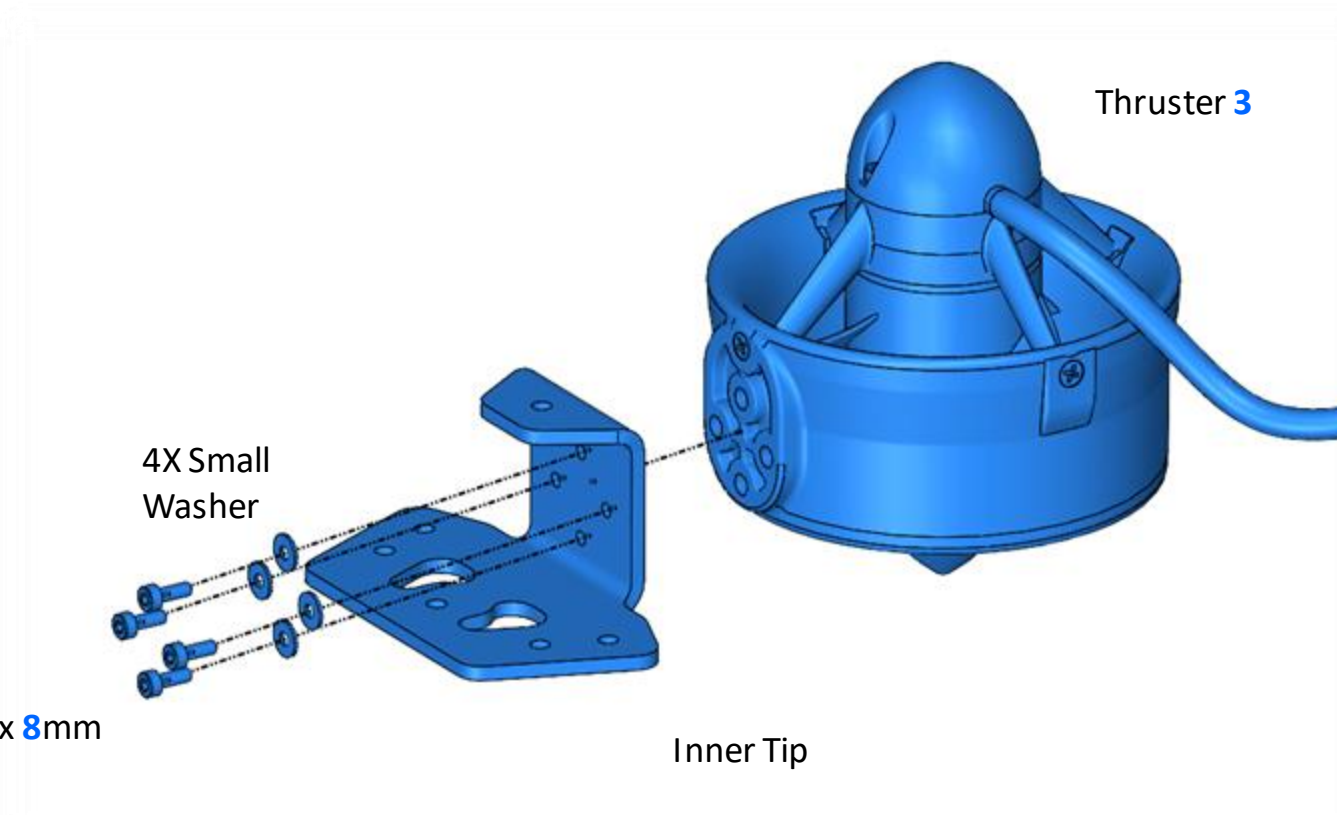
- The thruster guard may need bent slightly for the screw hole to line up
- Make sure the thruster **cable goes through notch** in sheet metal bracket
- Don't forget the washers
- Torque the M3 screws tight, as these will become very difficult to access later

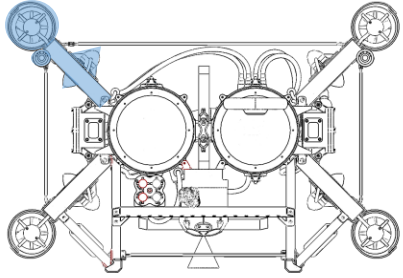


Additional Instructions

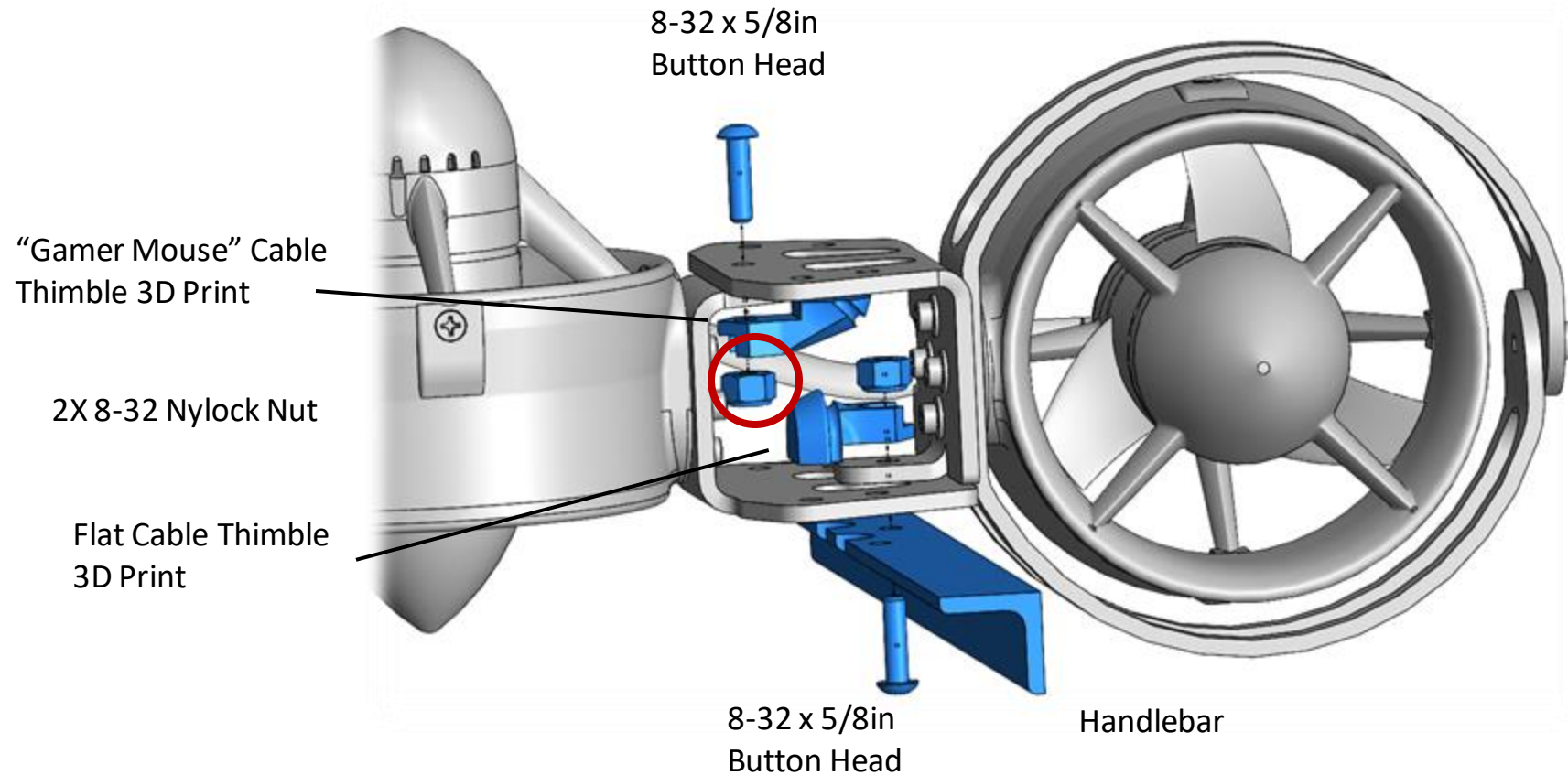


- Notice the orientation of the thruster relative to the bracket. **Don't put it on upside down!**
- Don't forget the washers
- Torque the M3 screws tight, as these will become very difficult to access later

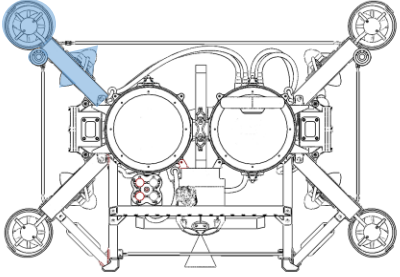




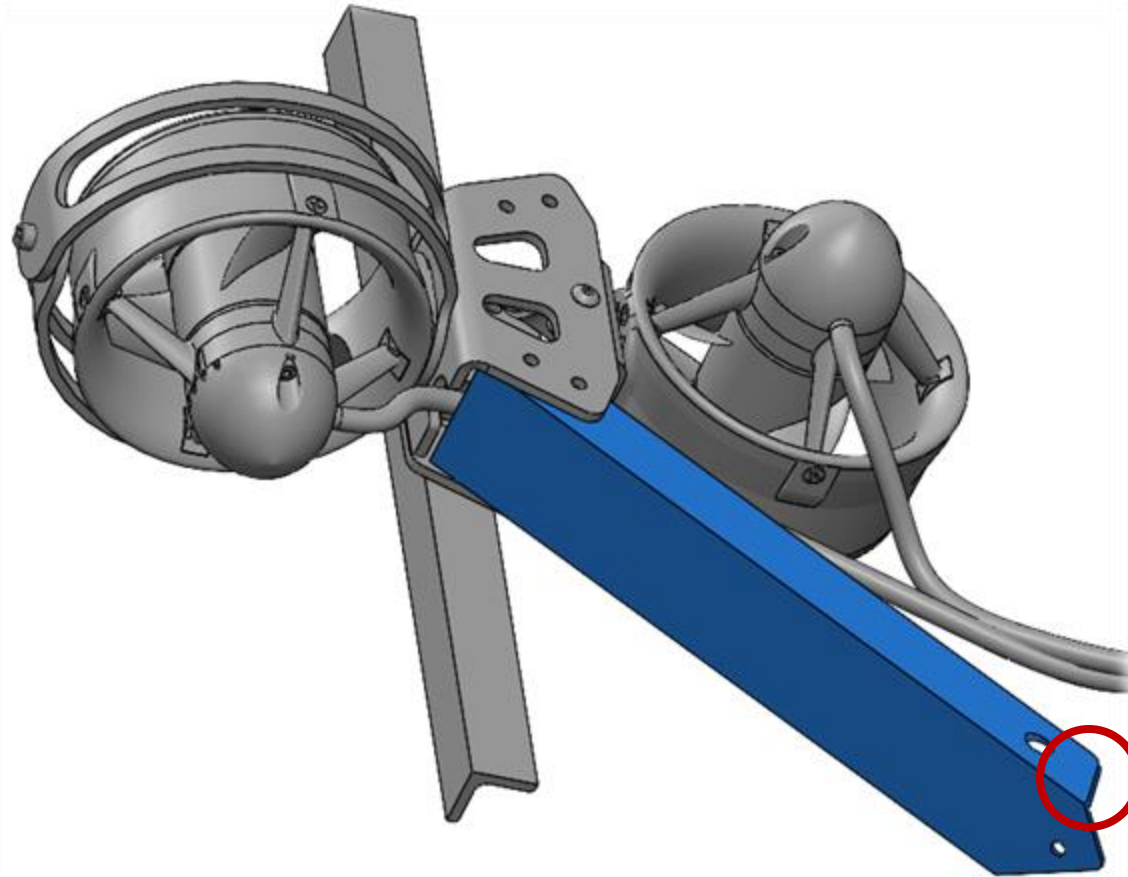
- There are two variants of the cable thimbles, ensure they are in the correct spot
- The nut that is by the handle is **nylon down** (circled in red). If it's not done this way the nylon is not engaged, and it could come loose



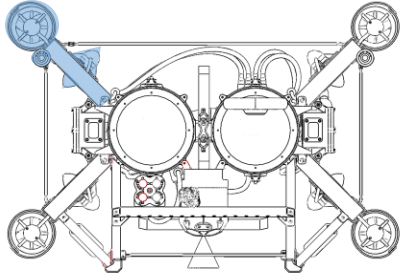
Additional Instructions



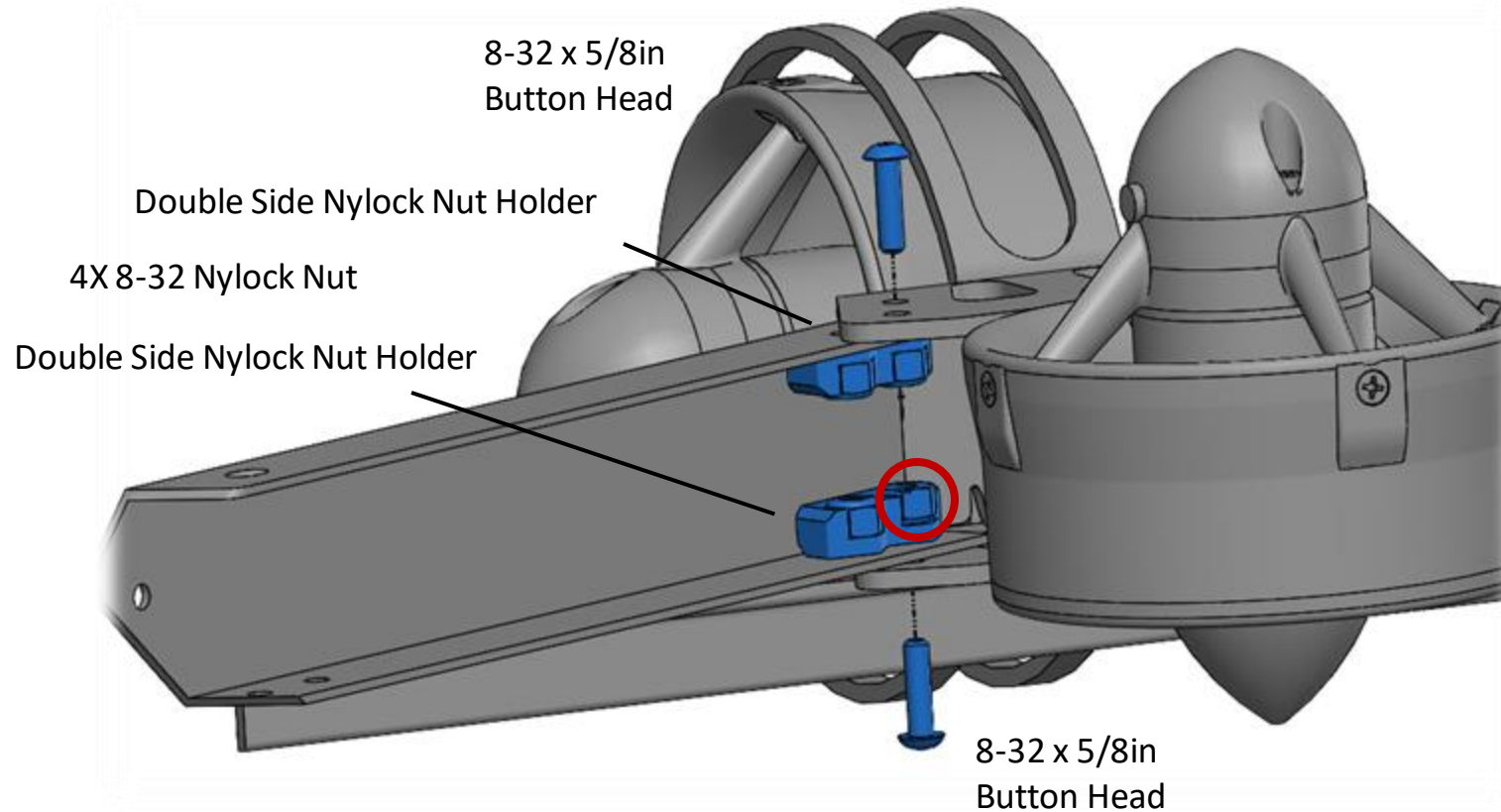
- Position the C channel as shown, make sure it has a **straight edge** (circled in red) by the screw access hole. The curved edge is needed for screw head clearance in the Taco assemblies
- Make sure the **orientation is correct!** Don't use the incorrect C channel
- The thruster cable must be **inside the C channel!** It will be a pain to fix later if not done correctly now

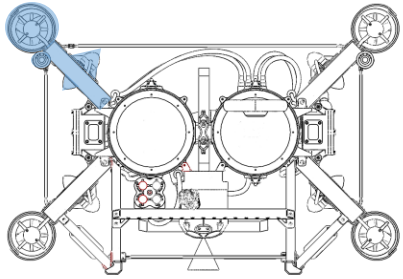


Left C Channel

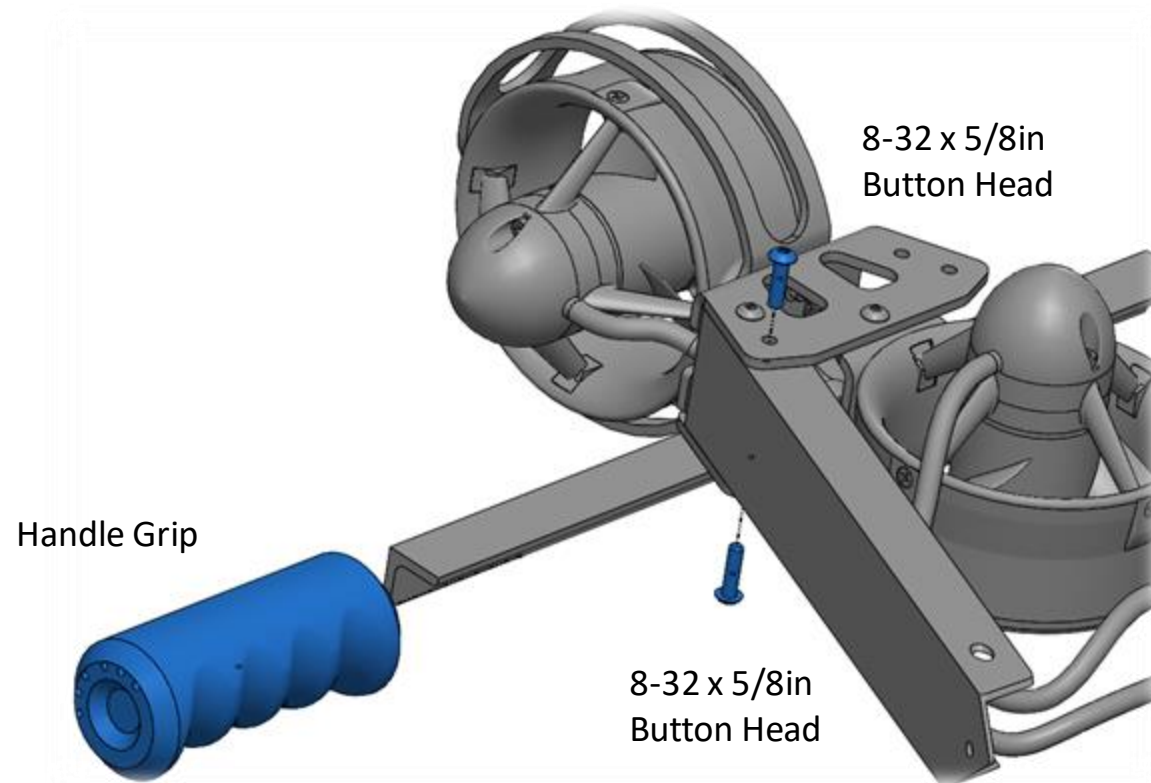


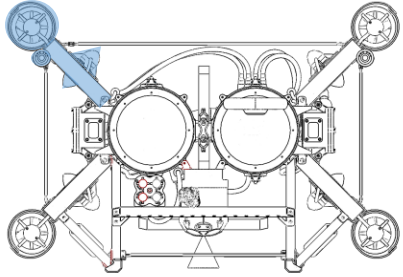
- Thruster cable hidden for better visibility
- Prepare double side nylock holders **without notches**
- Hot glue the nuts into 3D print, with the one that goes through the handle bar needing to be **nylon down** (circled in red)
- Instead of hot glue, some preferred to hold nuts in position with a long bar of metal



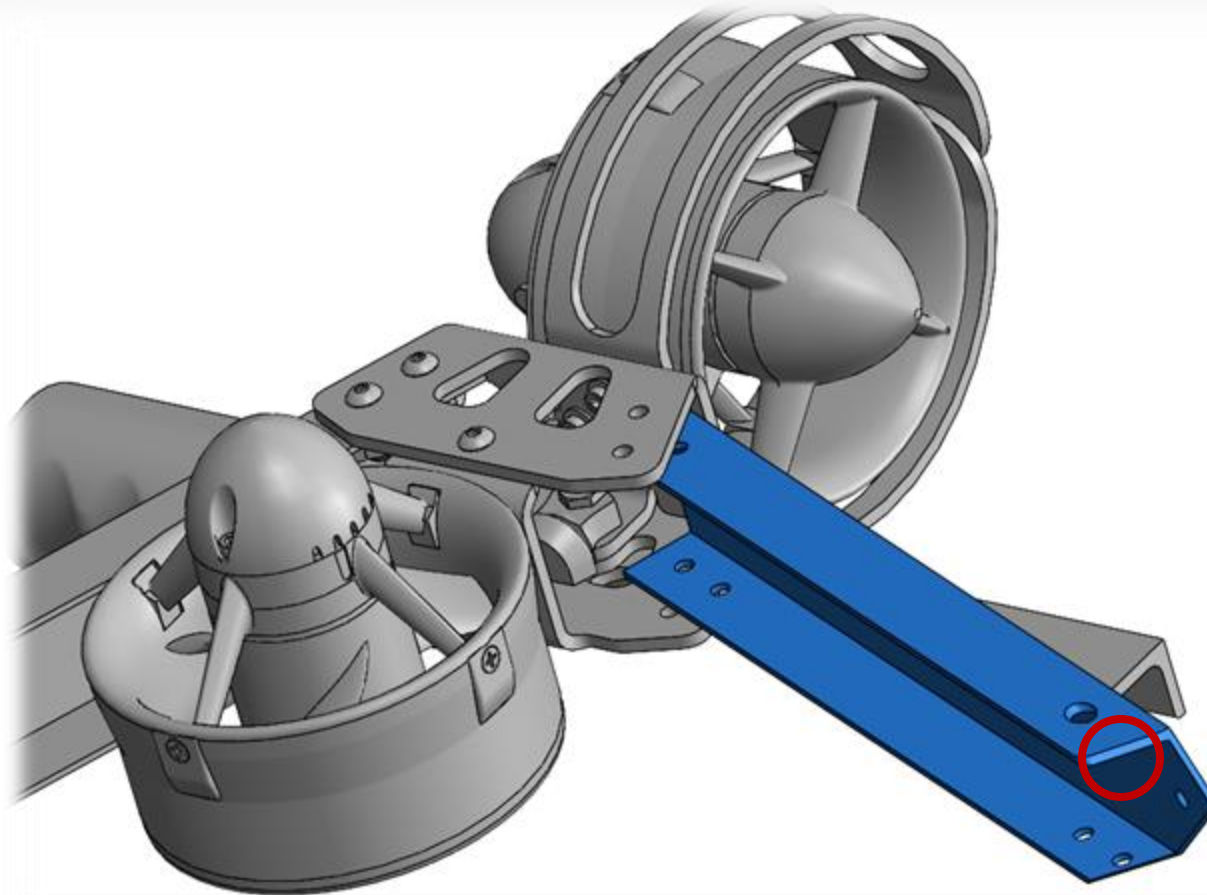


- Pivot the C channel into position. The thruster **cable must go through** the C channel!
- The handle may need banded on, as it is a tight fit



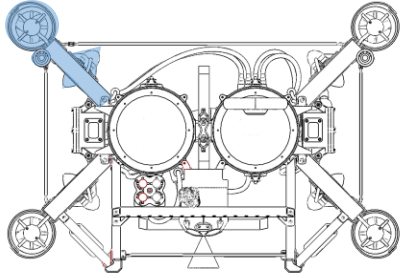


- Position the C channel as shown, make sure it has a **straight edge** (circled in red) by the screw access hole. The curved edge is needed for screw head clearance in the Taco assemblies
- Make sure the **orientation is correct!** Don't use the incorrect C channel

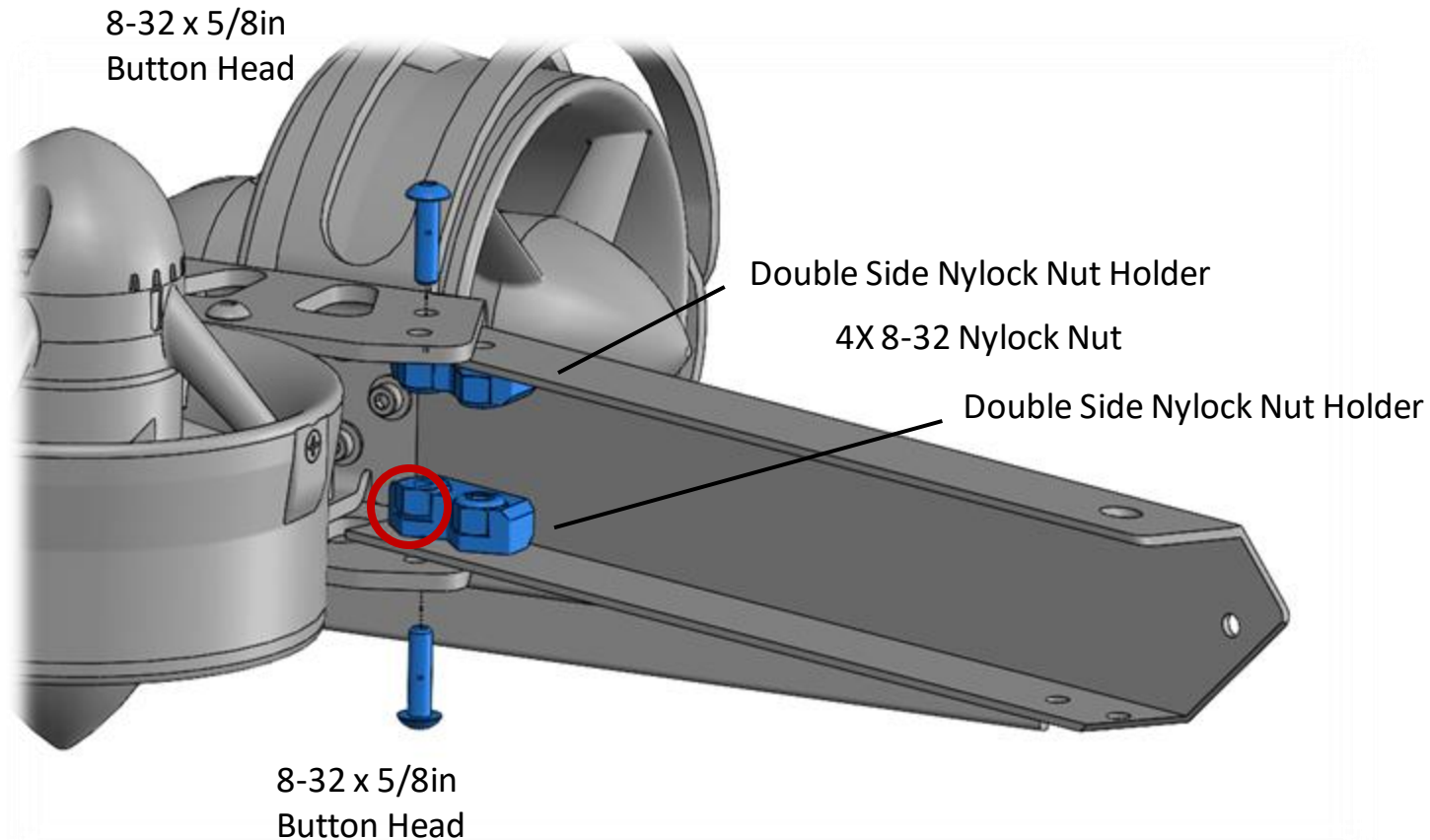


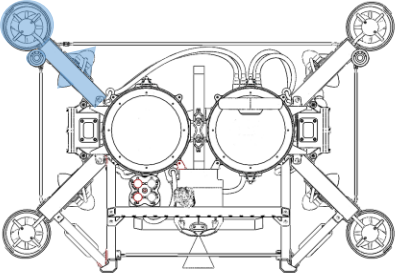
Right C Channel

Additional Instructions

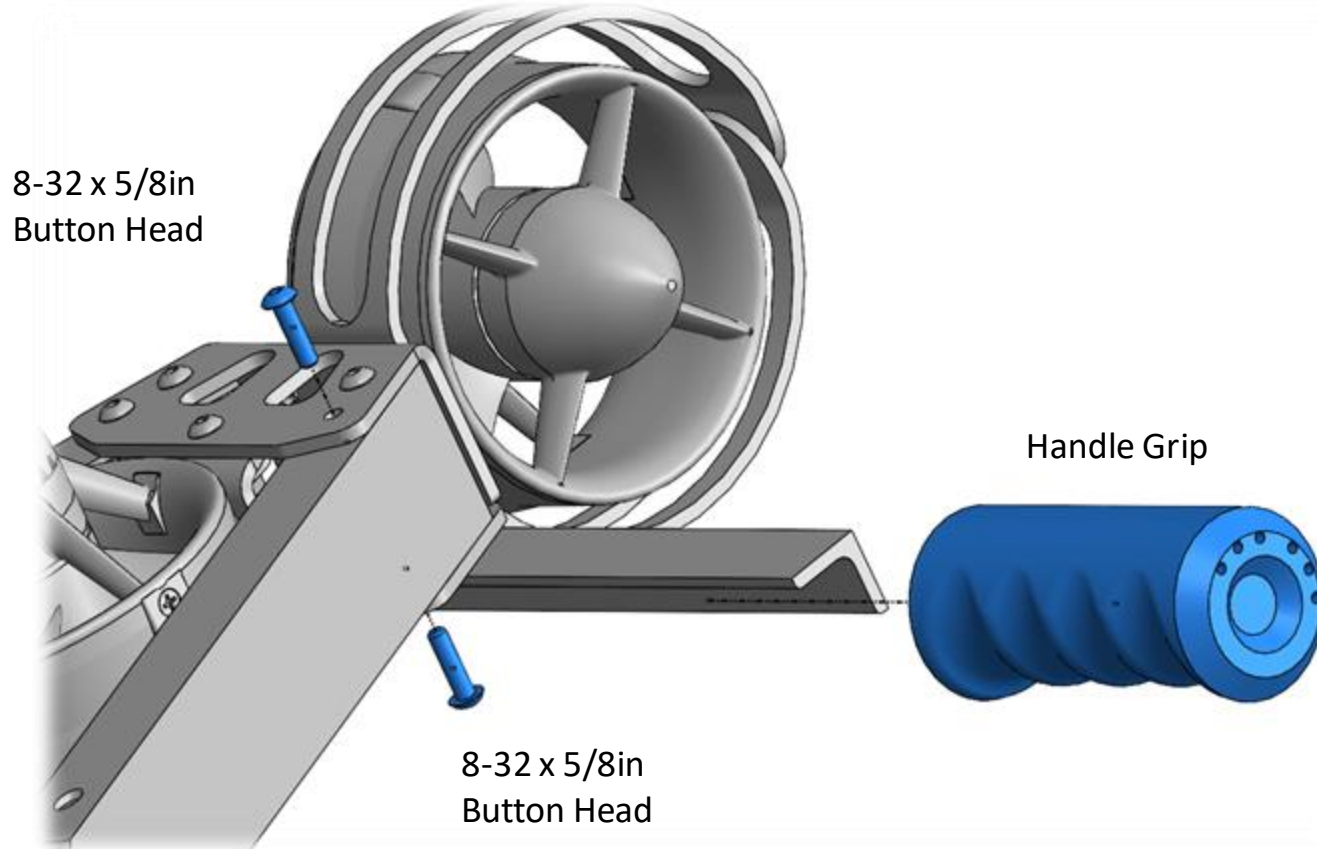


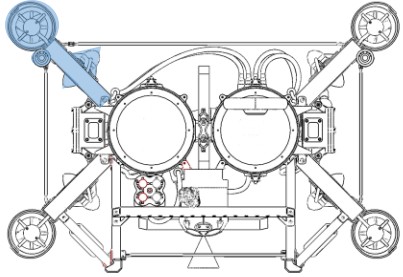
- Prepare double side nylock holders **without notches**
- Hot glue the nuts into 3D print, with the one that goes through the handle bar needing to be **nylon down** (circled in red)
- Instead of hot glue, some preferred to hold nuts in position with a long bar of metal



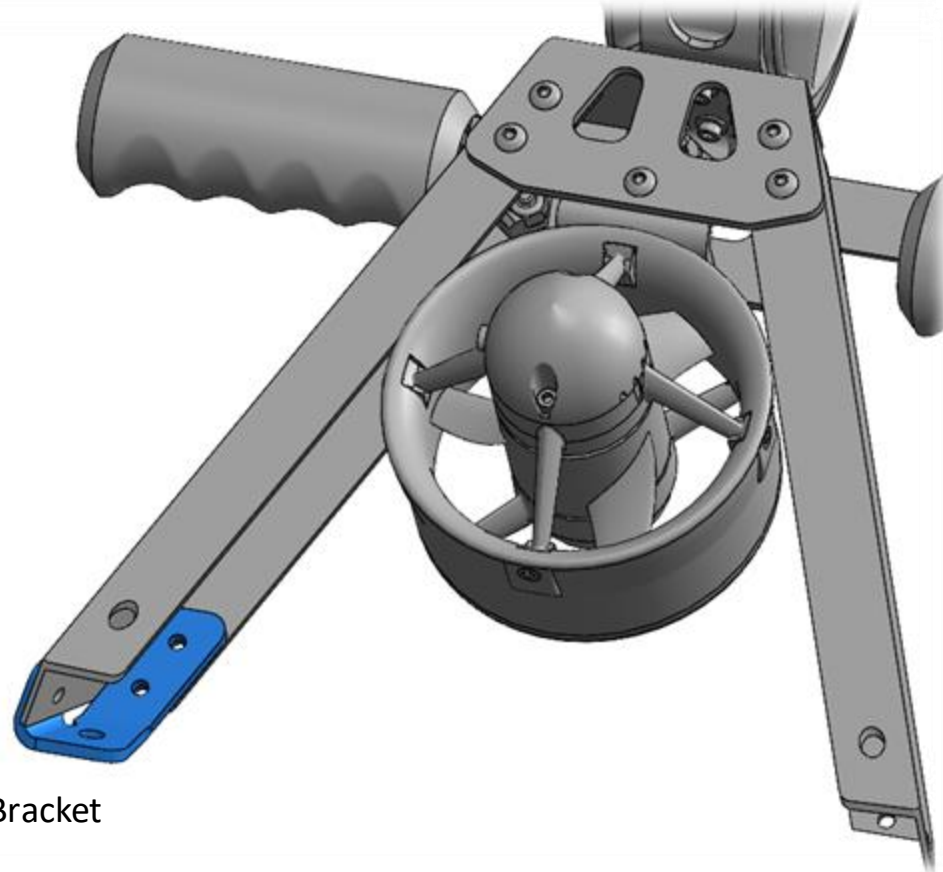


- Pivot the C channel into position.
- The handle may need banded on, as it is a tight fit

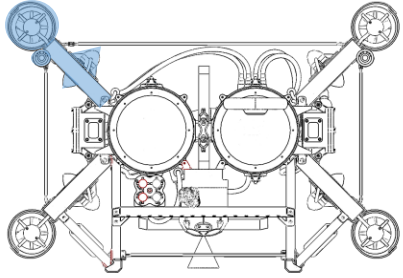




- Place the hull connecting bracket as shown. Notice the side with two holes is **inside** the C channel, and the side with one hole is **outside** the C channel

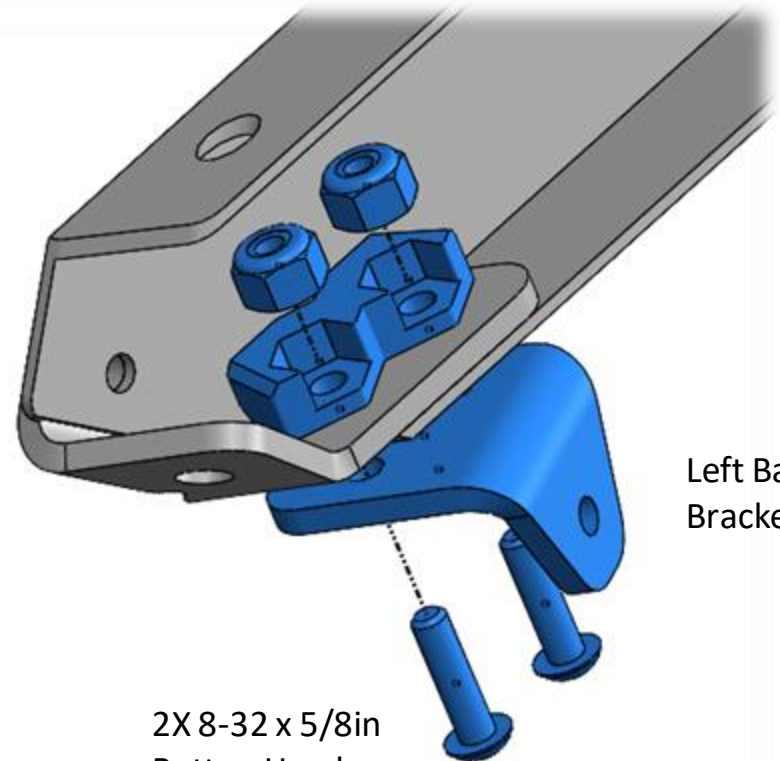


Left Hull
Connector Bracket



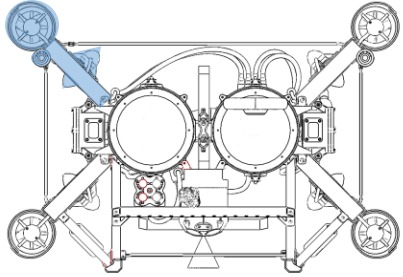
- Make sure the to use the correct battery bracket
- The nylock holder has a **notch**

2X 8-32 Nylock Nut
Notched Double Side
Nylock Nut Holder

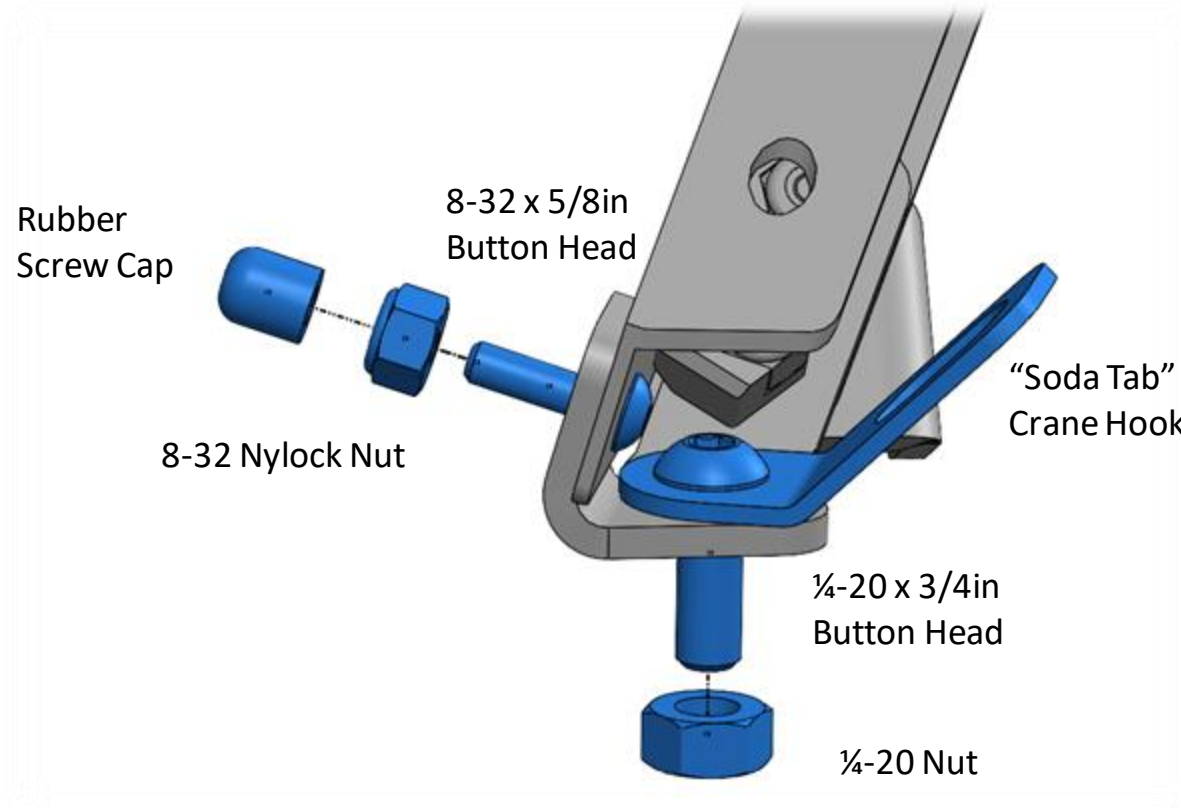


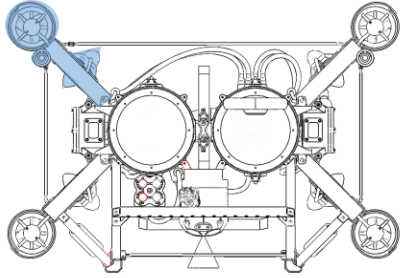
Left Battery
Bracket

2X 8-32 x 5/8in
Button Head

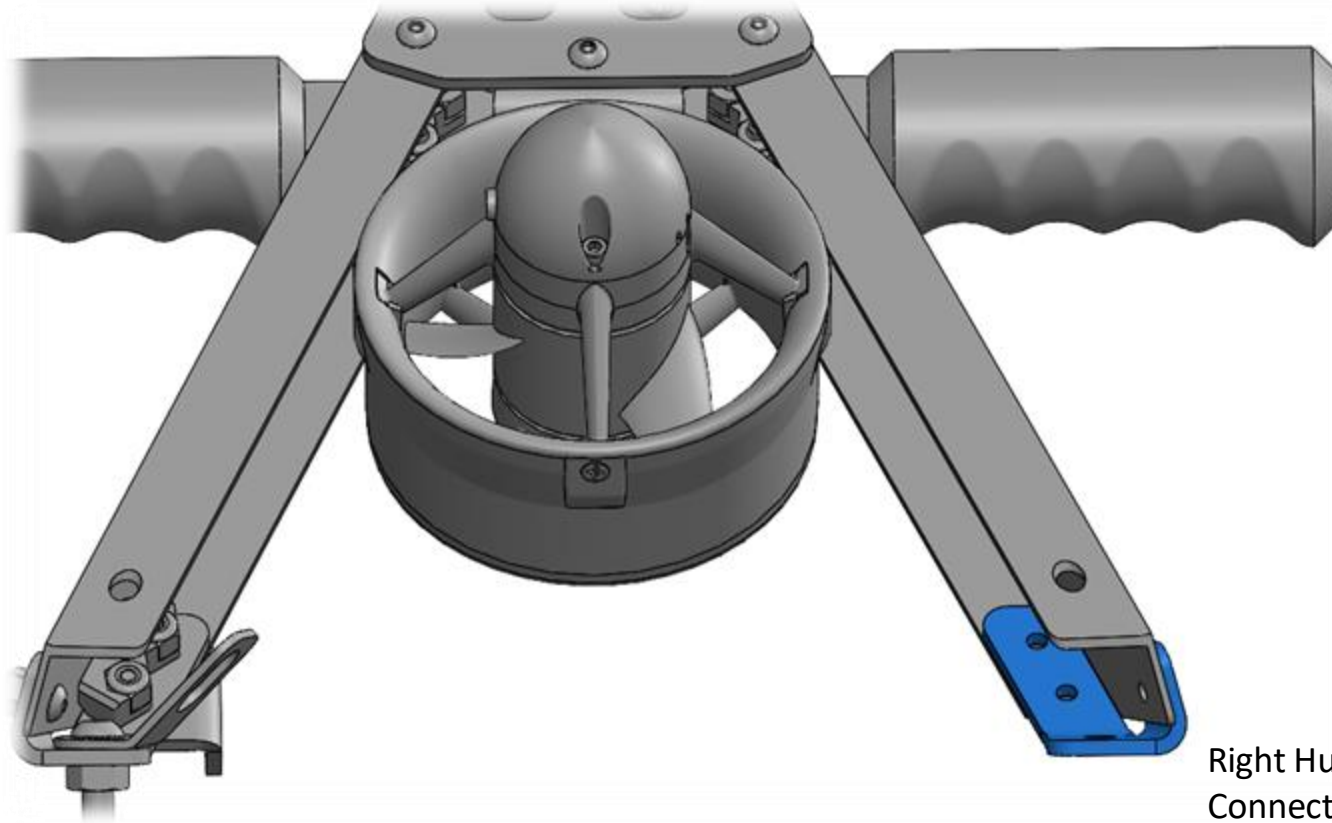


- The 1/4 – 20 nut will be removed later, it is just there to keep everything together
- You will need to use a wrench on this 8 - 32 nut, don't forget the rubber screw cap!



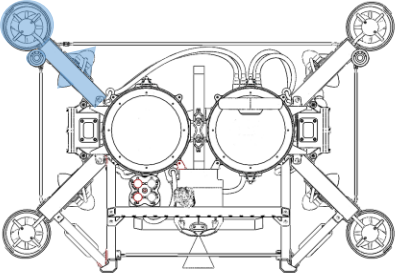


- Place the hull connecting bracket as shown. Notice the side with two holes is **inside** the C channel, and the side with one hole is **outside** the C channel

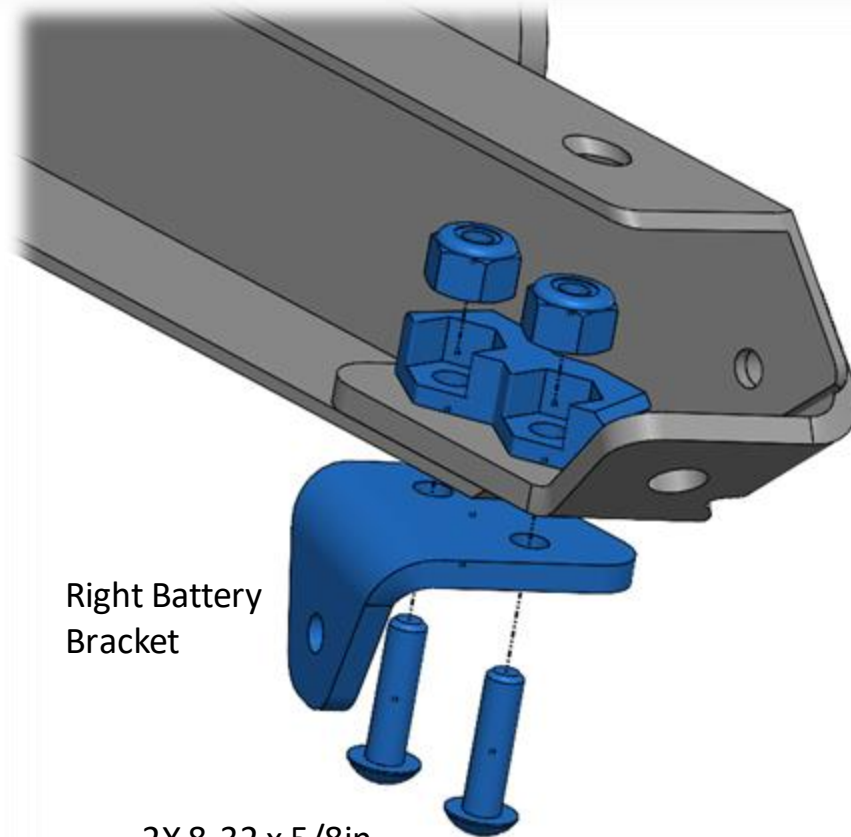


Right Hull
Connector Bracket

Additional Instructions



- Make sure the to use the correct battery bracket
- The nylock holder has a **notch**

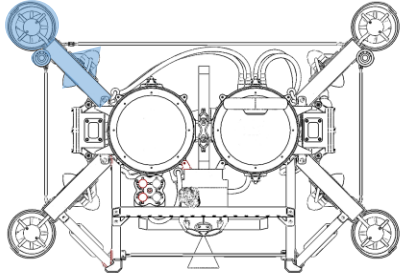


2X 8-32 Nylock Nut

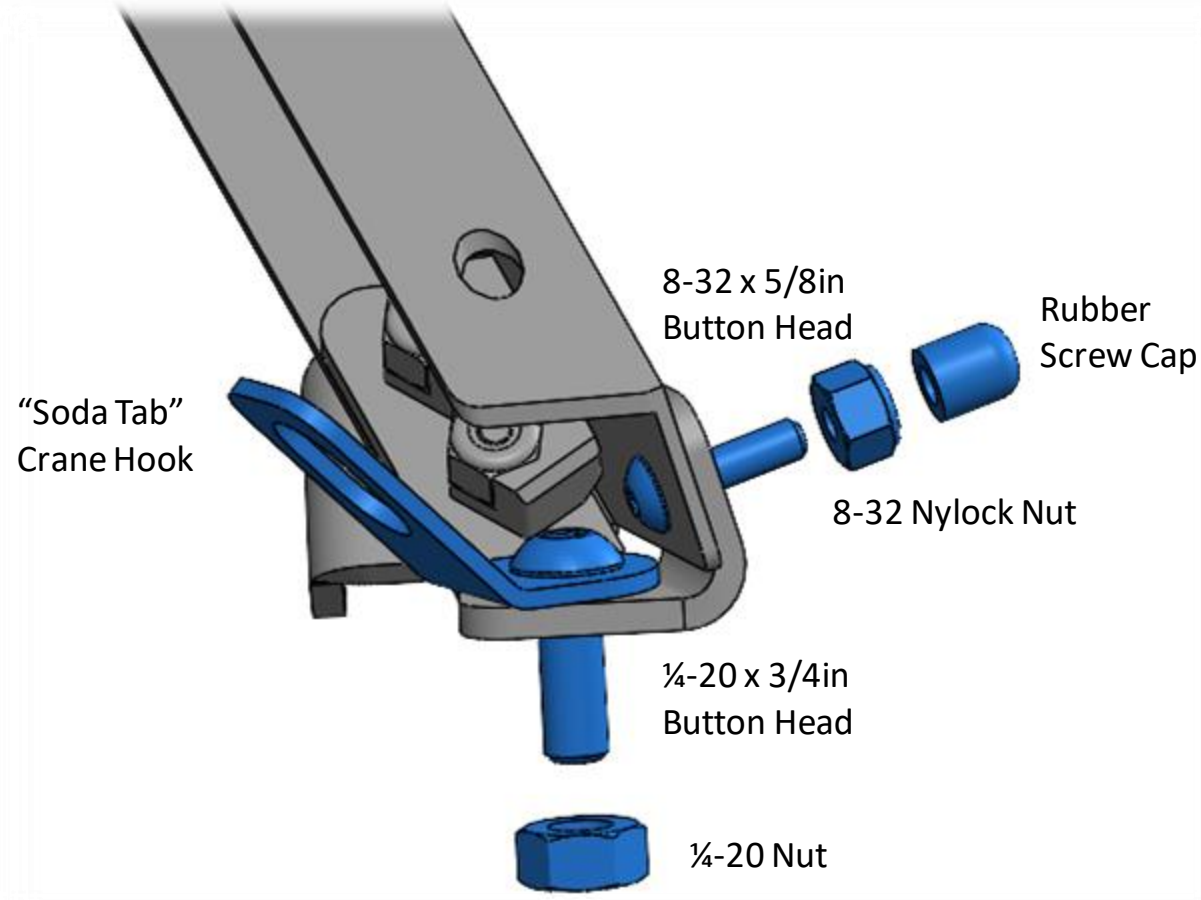
Notched Double Side
Nylock Nut Holder

Right Battery
Bracket

2X 8-32 x 5/8in
Button Head

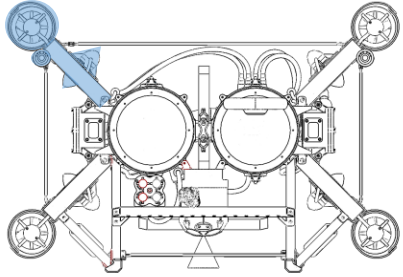


- The 1/4 – 20 nut will be removed later, it is just there to keep everything together
- You will need to use a wrench on this 8 - 32 nut, don't forget the rubber screw cap

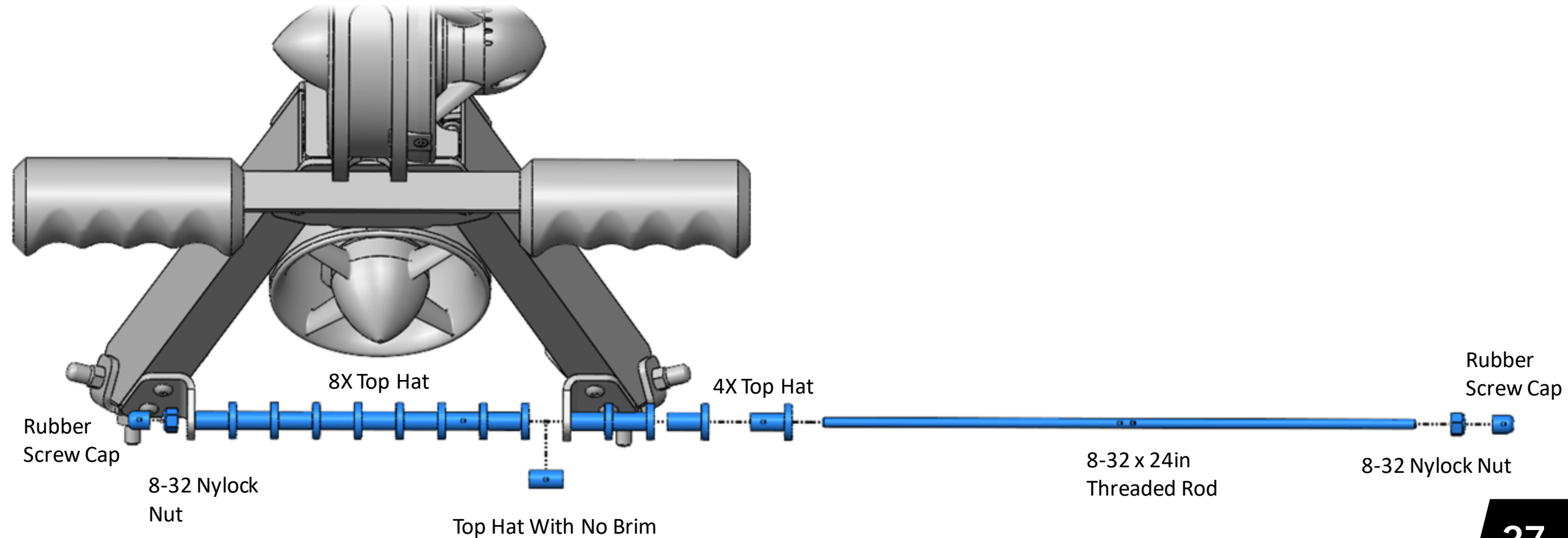


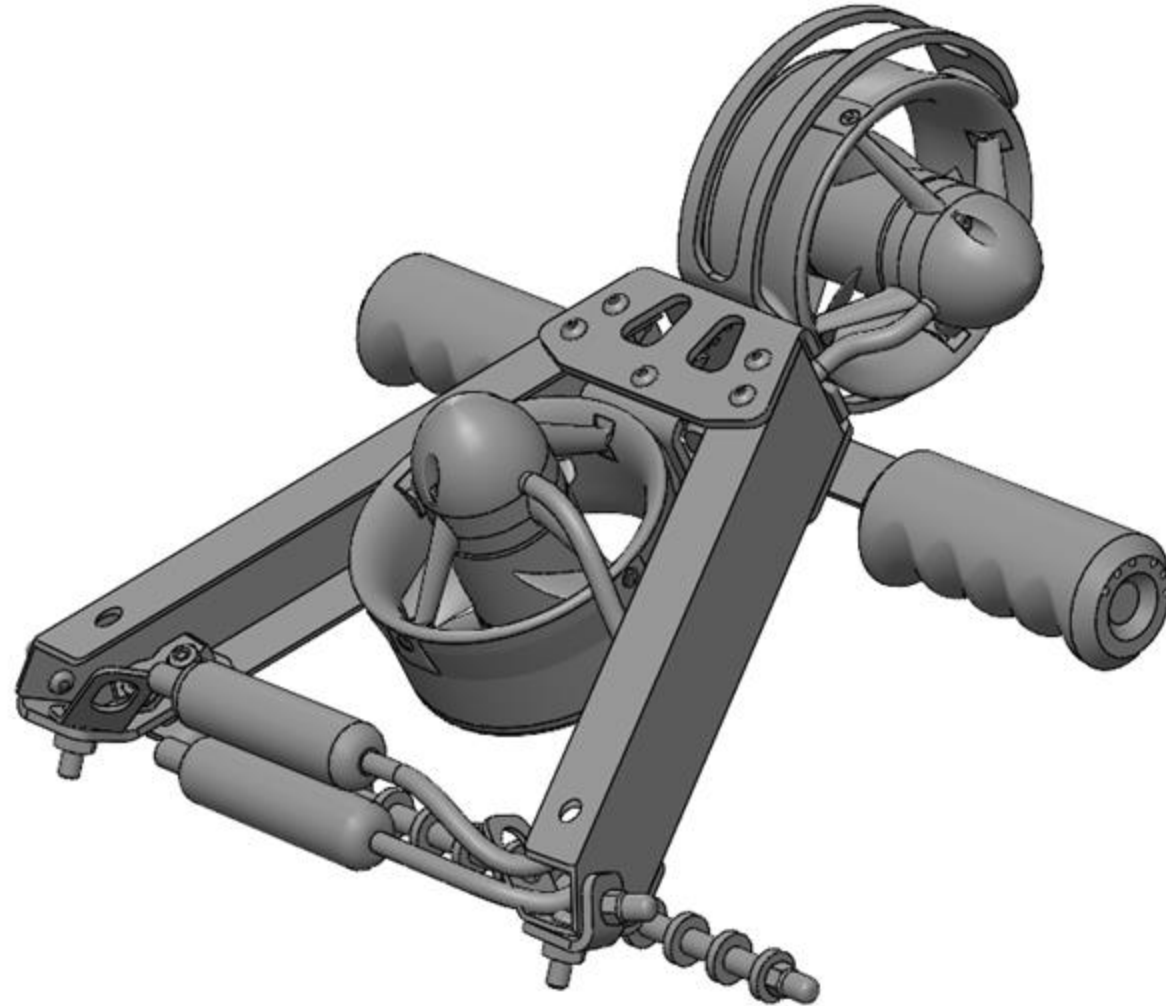
Left Dorito

Additional Instructions

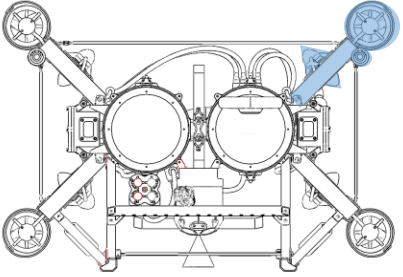


- Put the threaded rod through all the top hats before putting on the nuts
- To get rod even on both sides, may need to grip rod with vice grips while spinning nut with wrench
- **Don't tighten too hard** or it will bow the rod! Stop tightening when you can no longer spin the top hats with your fingers

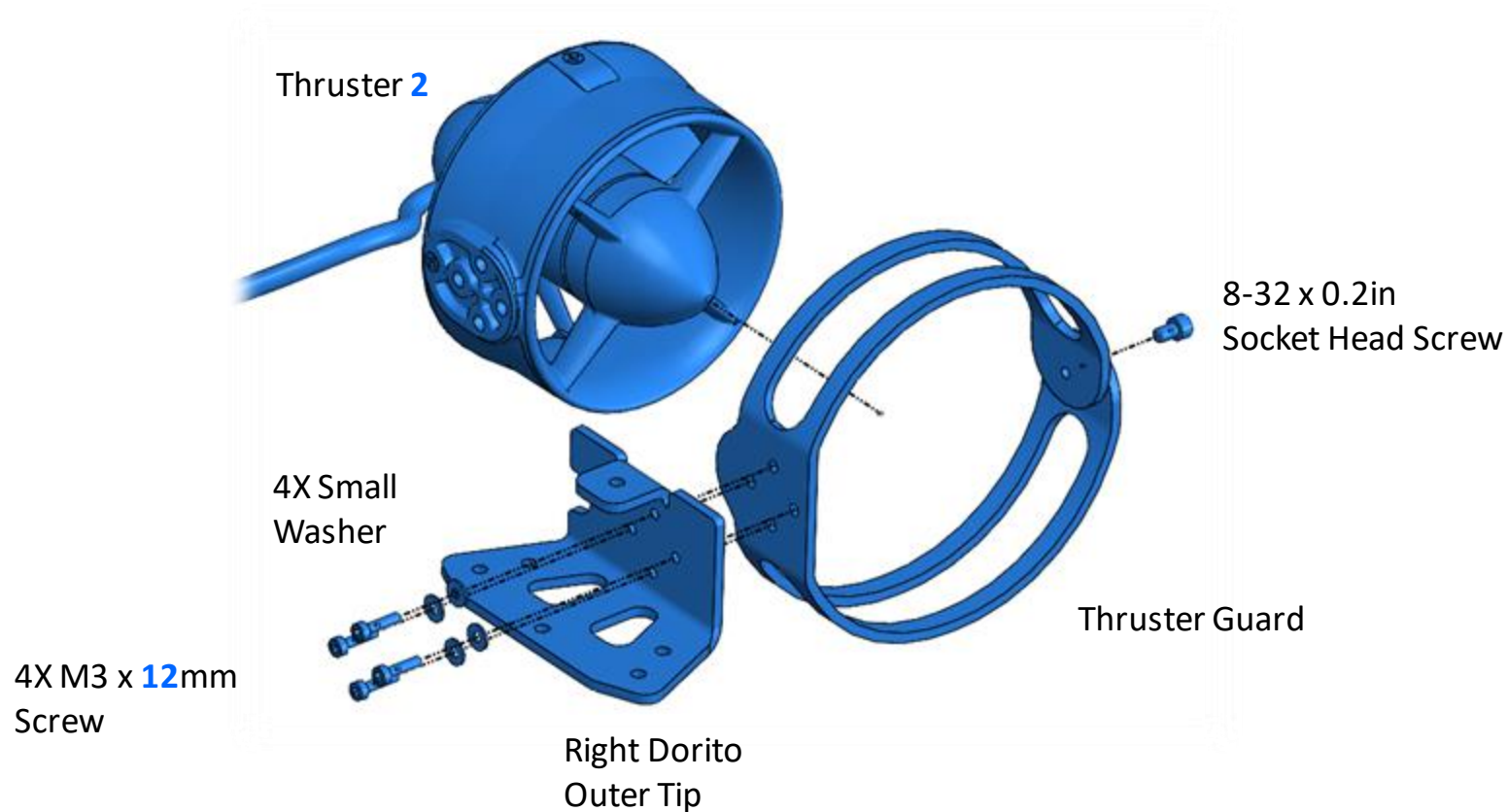




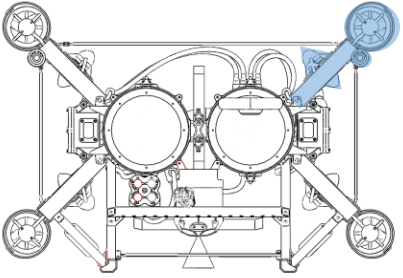
Additional Instructions



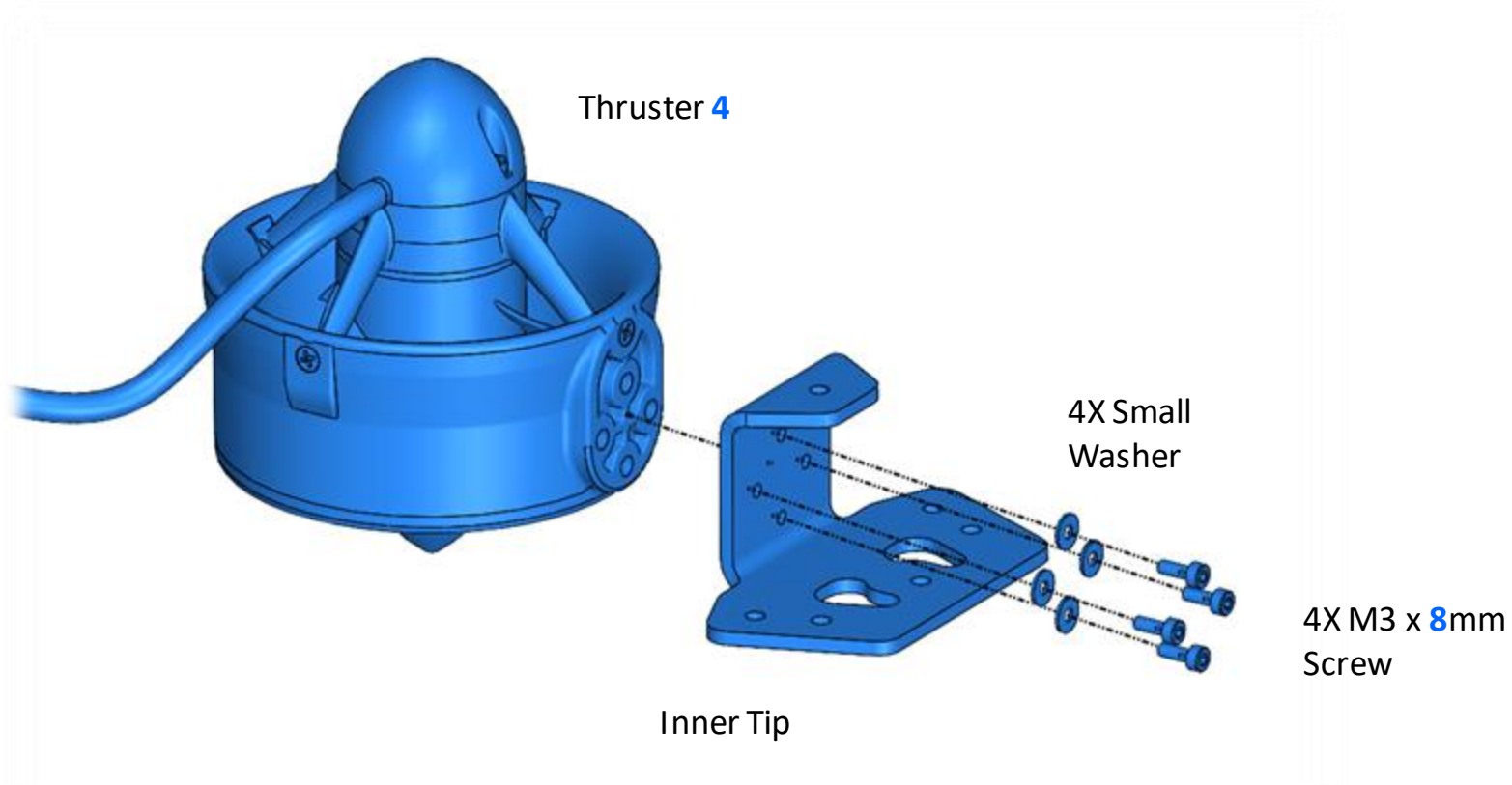
- The thruster guard may need bent slightly for the screw hole to line up
- Make sure the thruster **cable goes through notch** in sheet metal bracket
- Don't forget the washers
- Torque the M3 screws tight, as these will become very difficult to access later



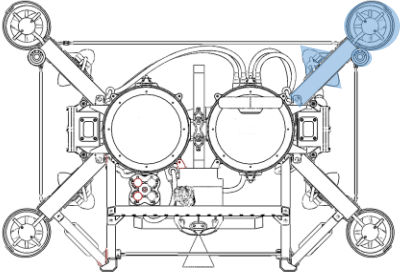
Additional Instructions



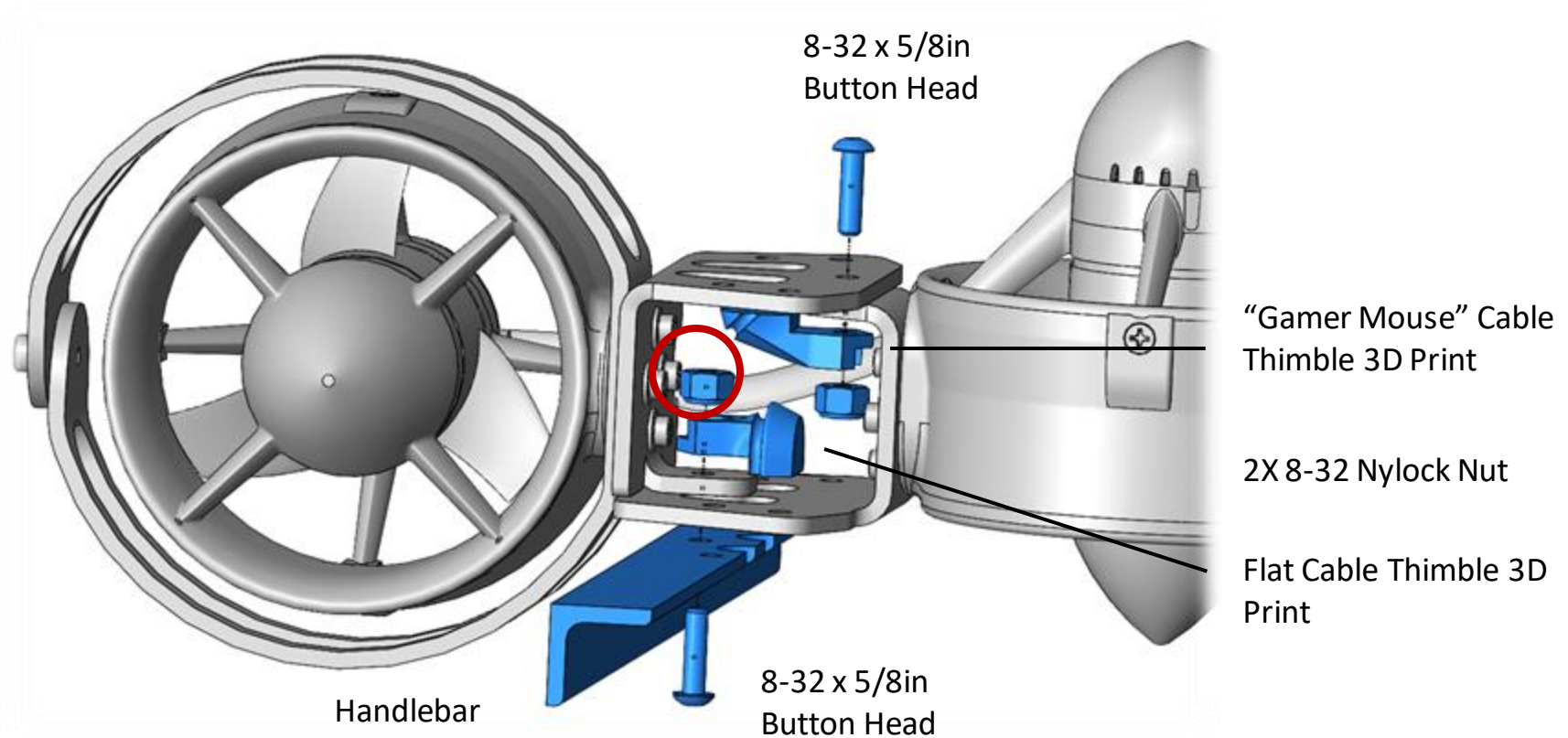
- Notice the orientation of the thruster relative to the bracket. **Don't put it on upside down!**
- Don't forget the washers
- Torque the M3 screws tight, as these will become very difficult to access later



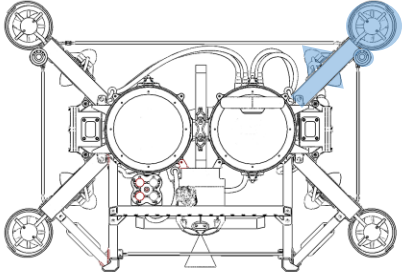
Additional Instructions



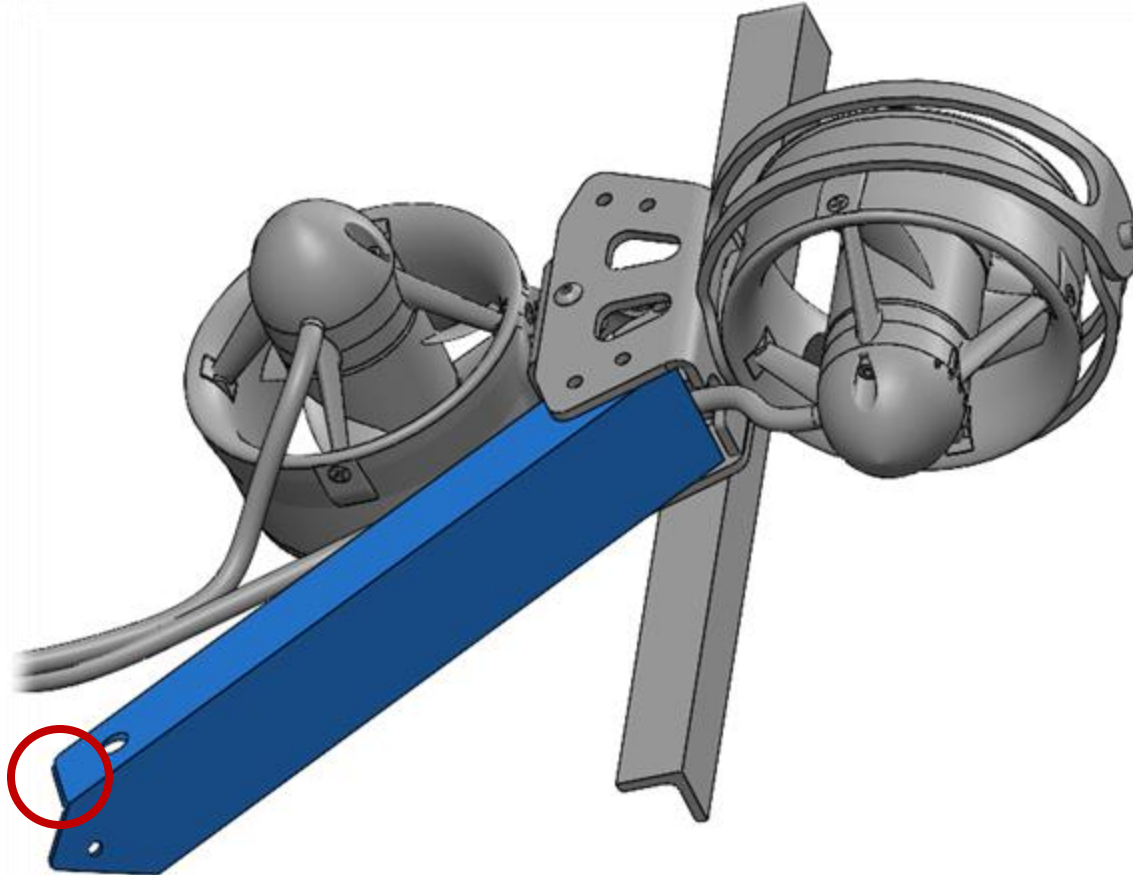
- There are two variants of the cable thimbles, ensure they are in the correct spot
- The nut that is by the handle is **nylon down** (circled in red). If it's not done this way the nylon is not engaged, and it could come loose



Additional Instructions

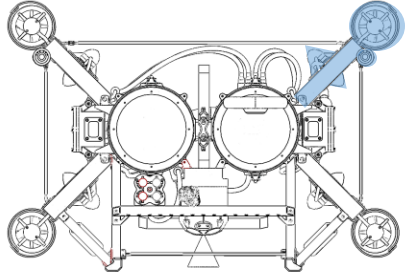


- Position the C channel as shown, make sure it has a **straight edge** (circled in red) by the screw access hole. The curved edge is needed for screw head clearance in the Taco assemblies
- Make sure the **orientation is correct!** Don't use the incorrect C channel
- The thruster cable must be **inside the C channel!** It will be a pain to fix later if not done correctly now

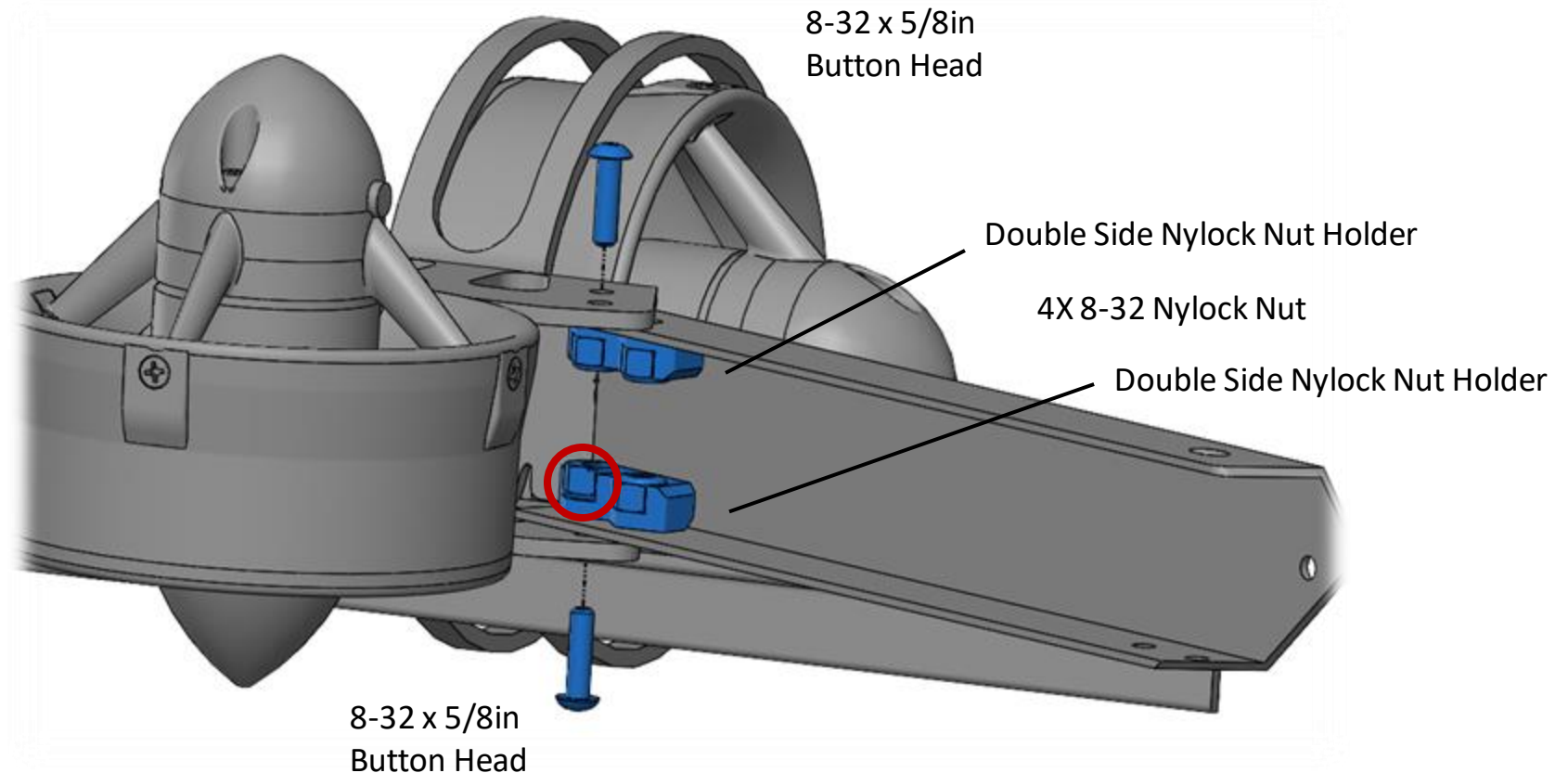


Right C Channel

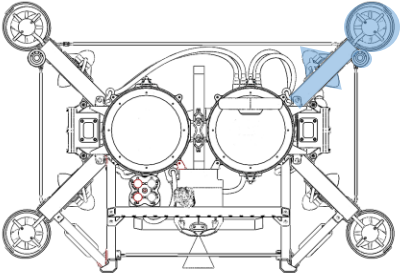
Additional Instructions



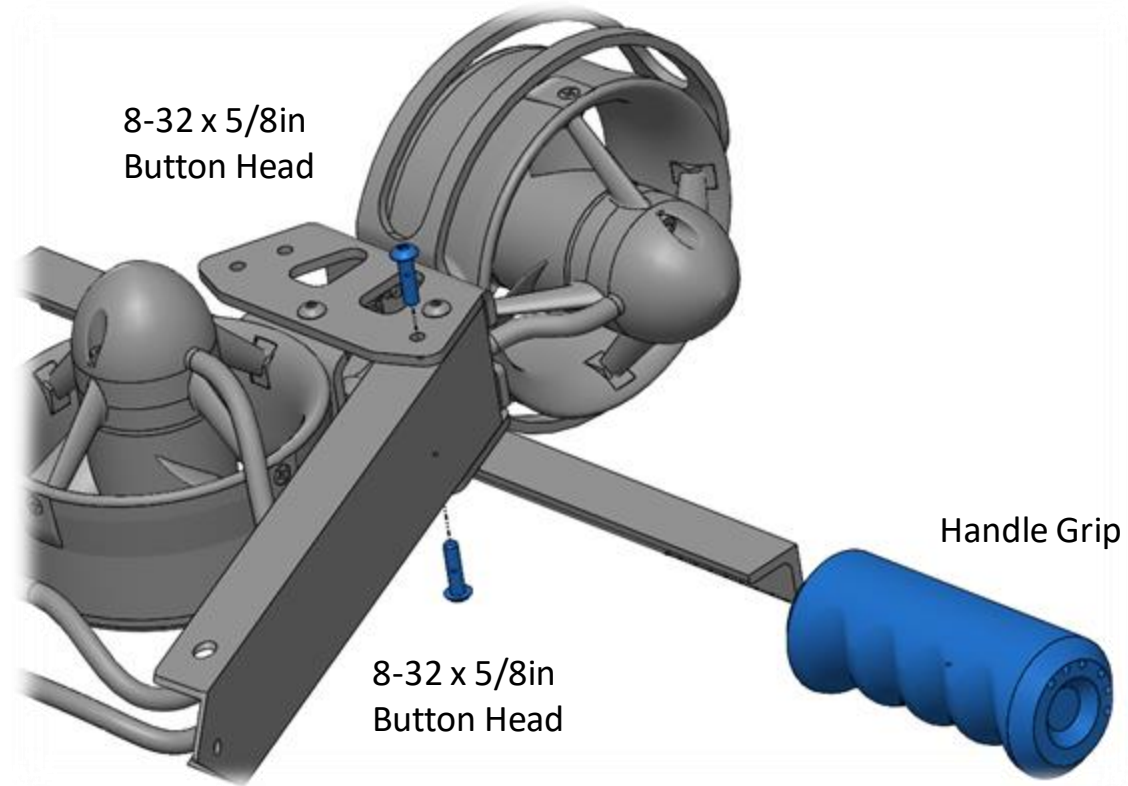
- Thruster cable hidden for better visibility
- Prepare double side nylock holders **without notches**
- Hot glue the nuts into 3D print, with the one that goes through the handle bar needing to be **nylon down** (circled in red)
- Instead of hot glue, some preferred to hold nuts in position with a long bar of metal



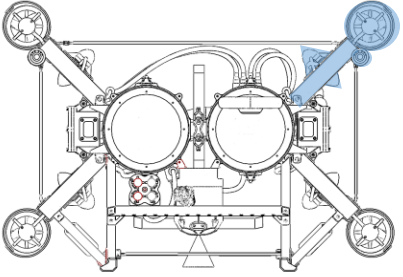
Additional Instructions



- Pivot the C channel into position. The thruster **cable must go through** the C channel!
- The handle may need banded on, as it is a tight fit

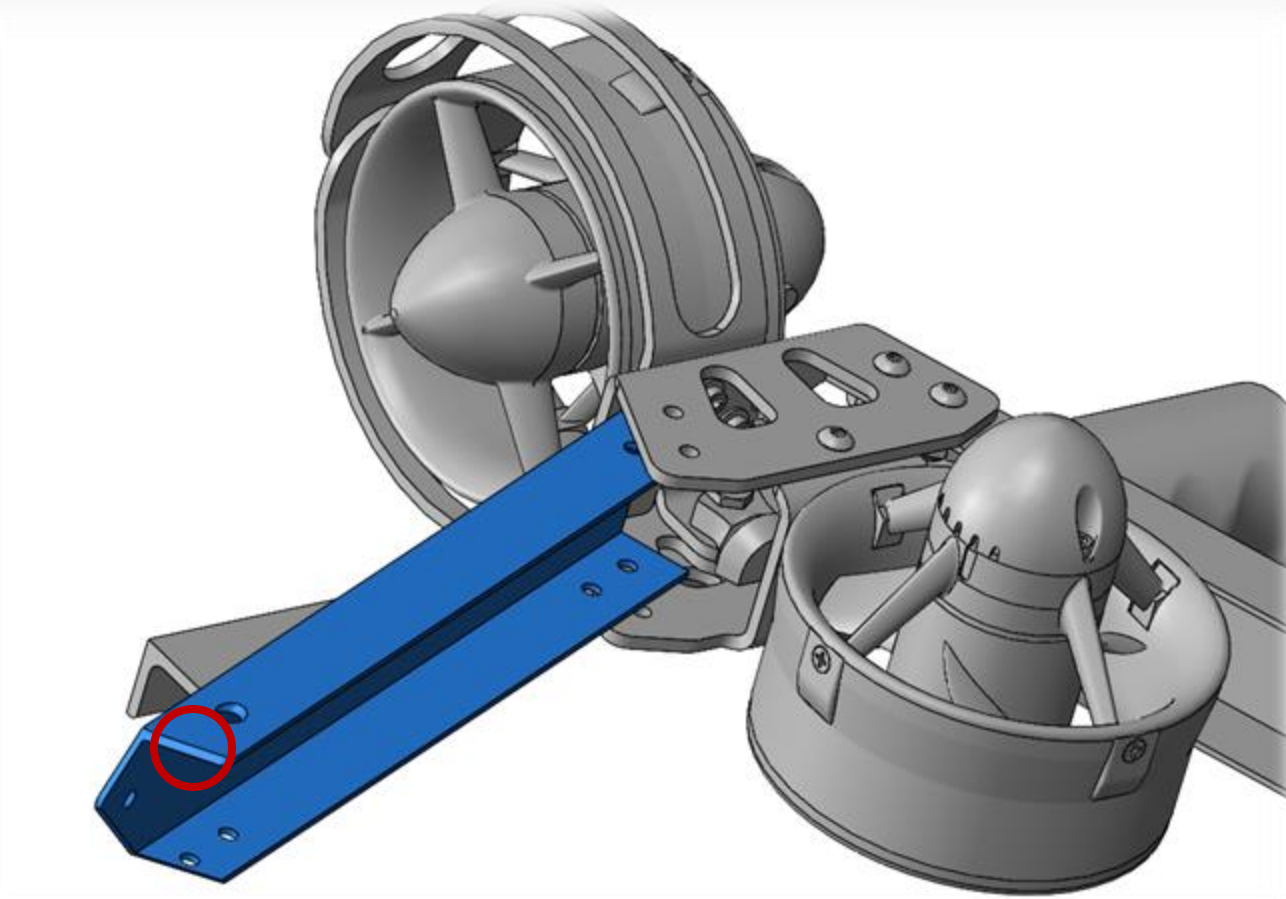


Additional Instructions

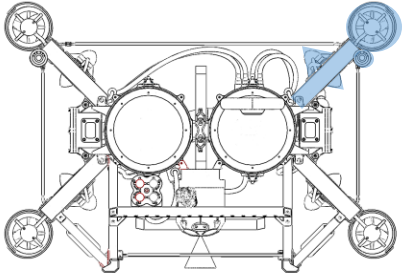


- Position the C channel as shown, make sure it has a **straight edge** (circled in red) by the screw access hole. The curved edge is needed for screw head clearance in the Taco assemblies
- Make sure the **orientation is correct!** Don't use the incorrect C channel

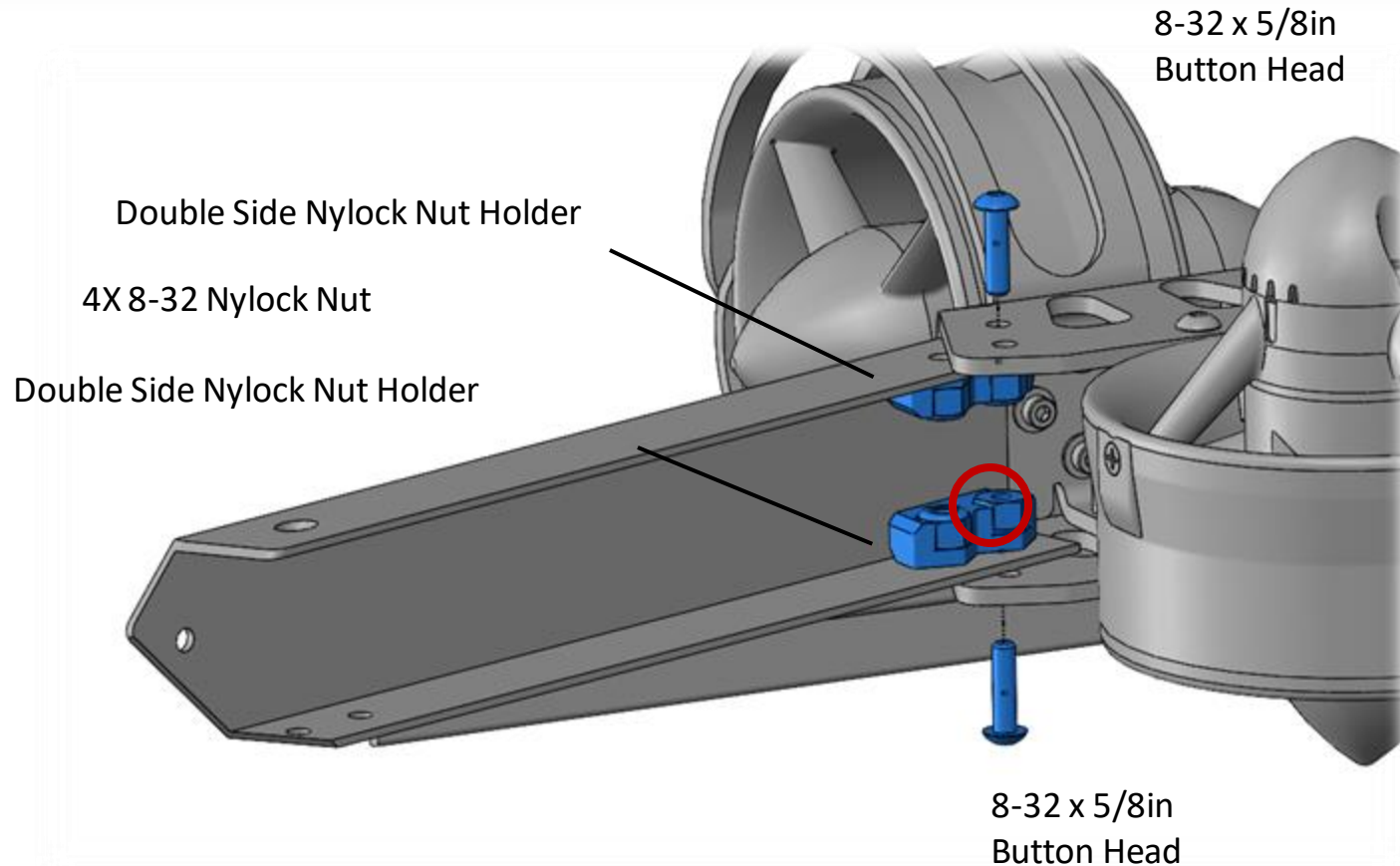
Left C Channel



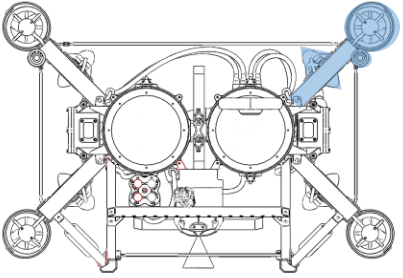
Additional Instructions



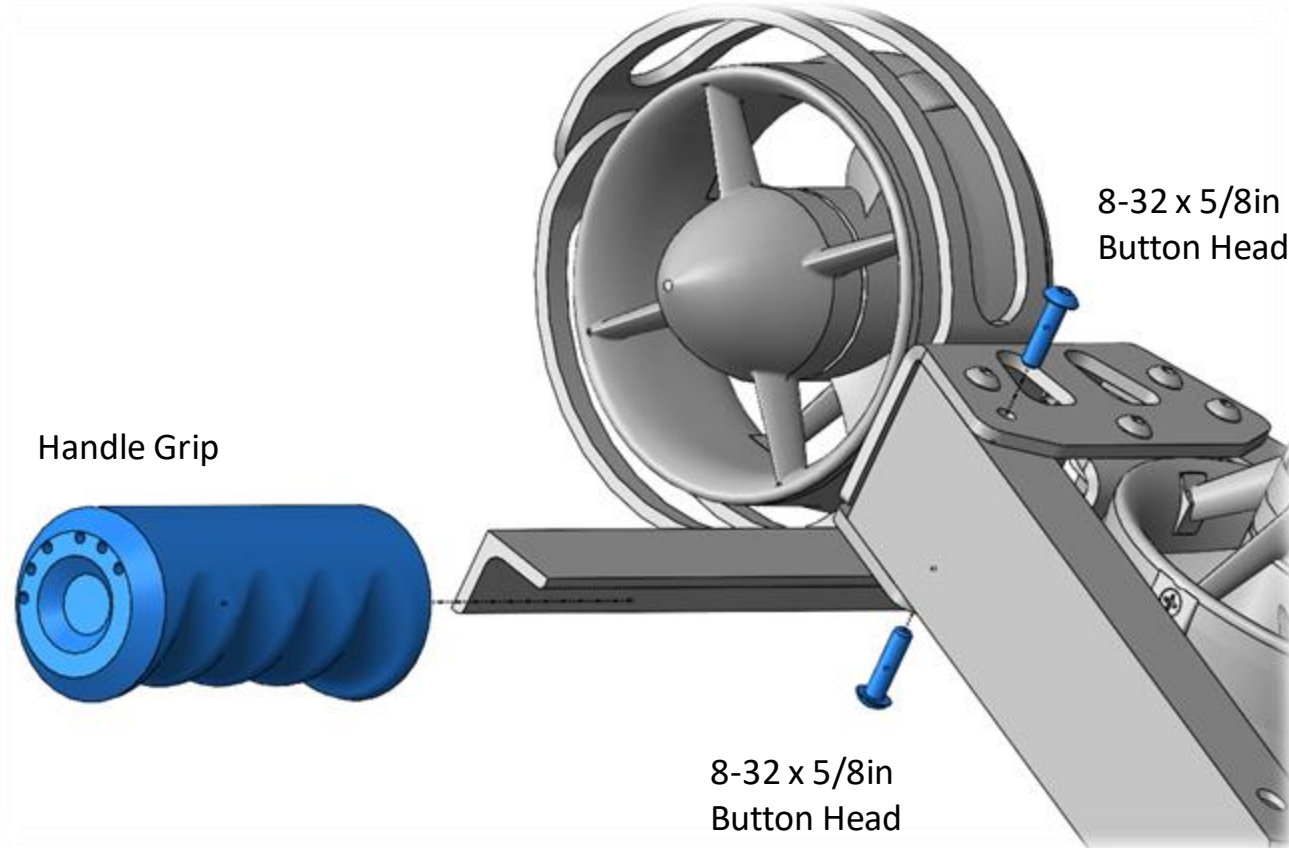
- Prepare double side nylock holders **without notches**
- Hot glue the nuts into 3D print, with the one that goes through the handle bar needing to be **nylon down** (circled in red)
- Instead of hot glue, some preferred to hold nuts in position with a long bar of metal



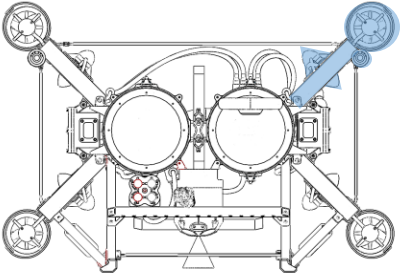
Additional Instructions



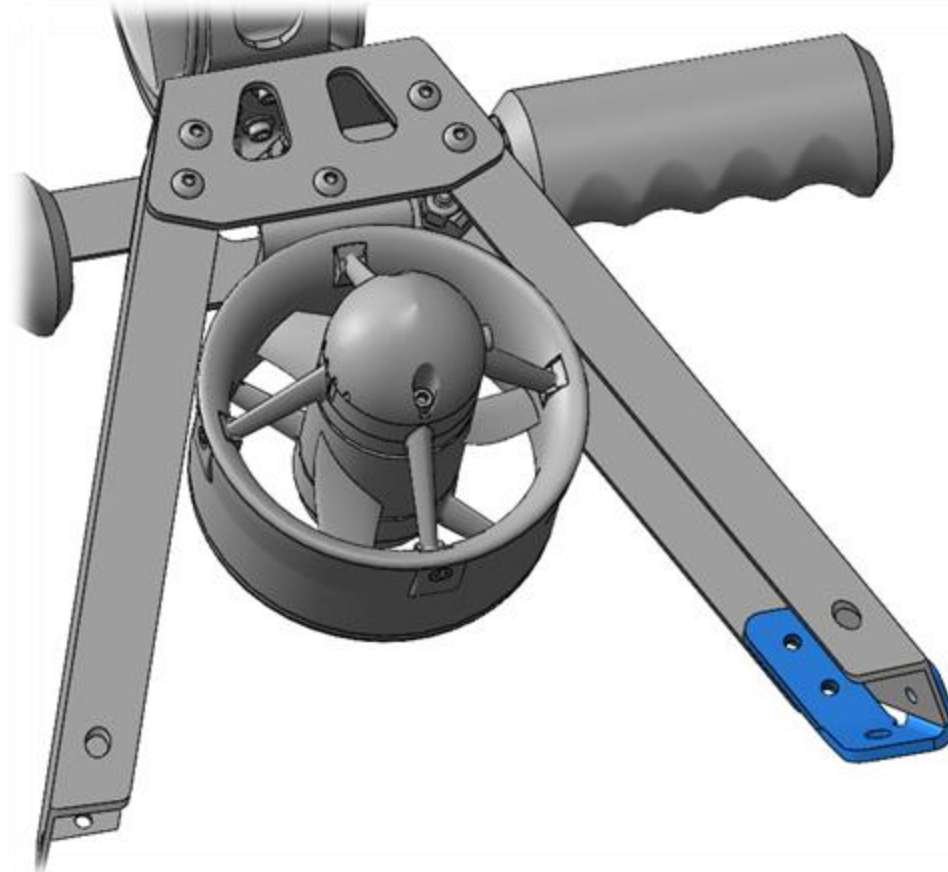
- Pivot the C channel into position.
- The handle may need banded on, as it is a tight fit



Additional Instructions

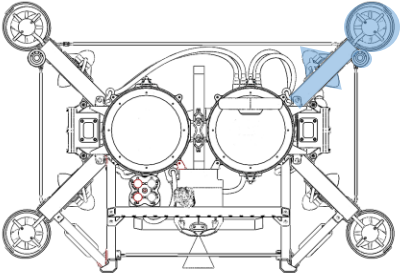


- Place the hull connecting bracket as shown. Notice the side with two holes is **inside** the C channel, and the side with one hole is **outside** the C channel

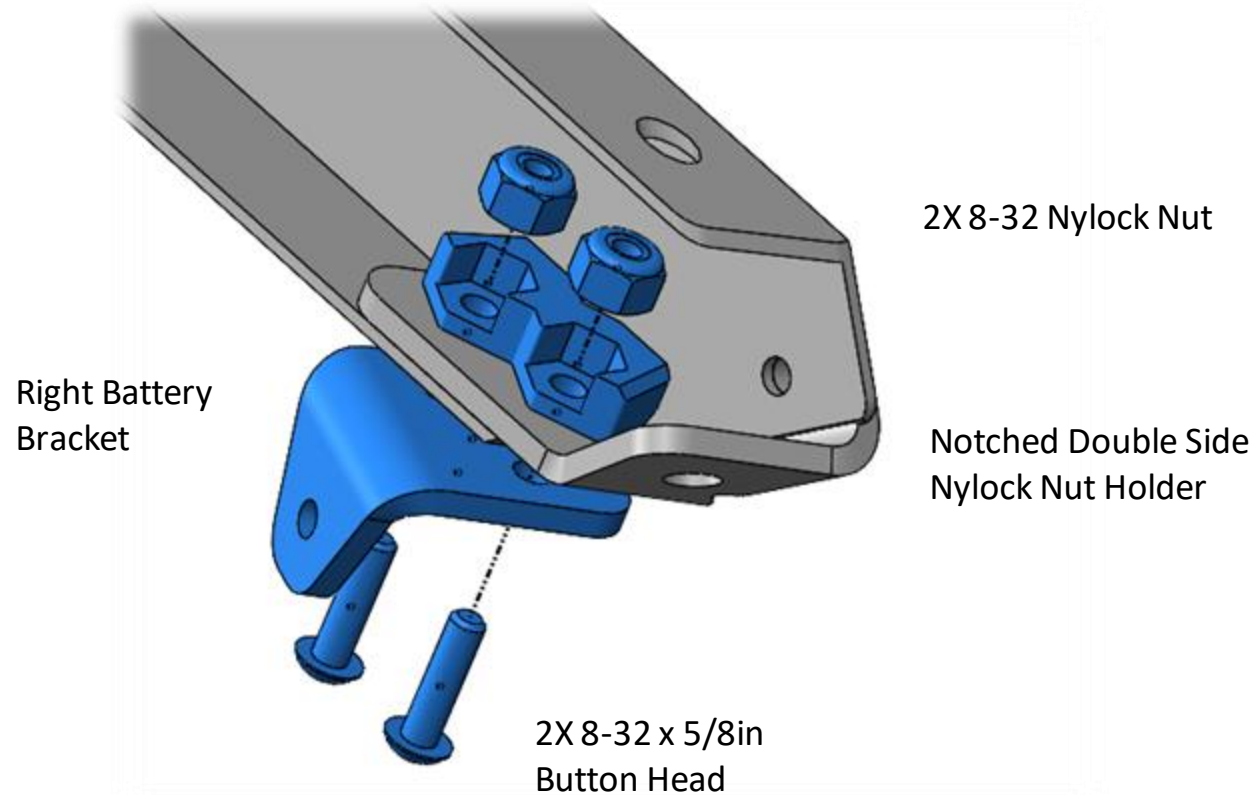


Right Hull
Connector Bracket

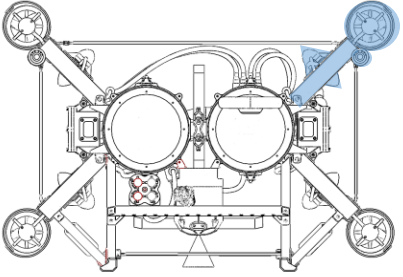
Additional Instructions



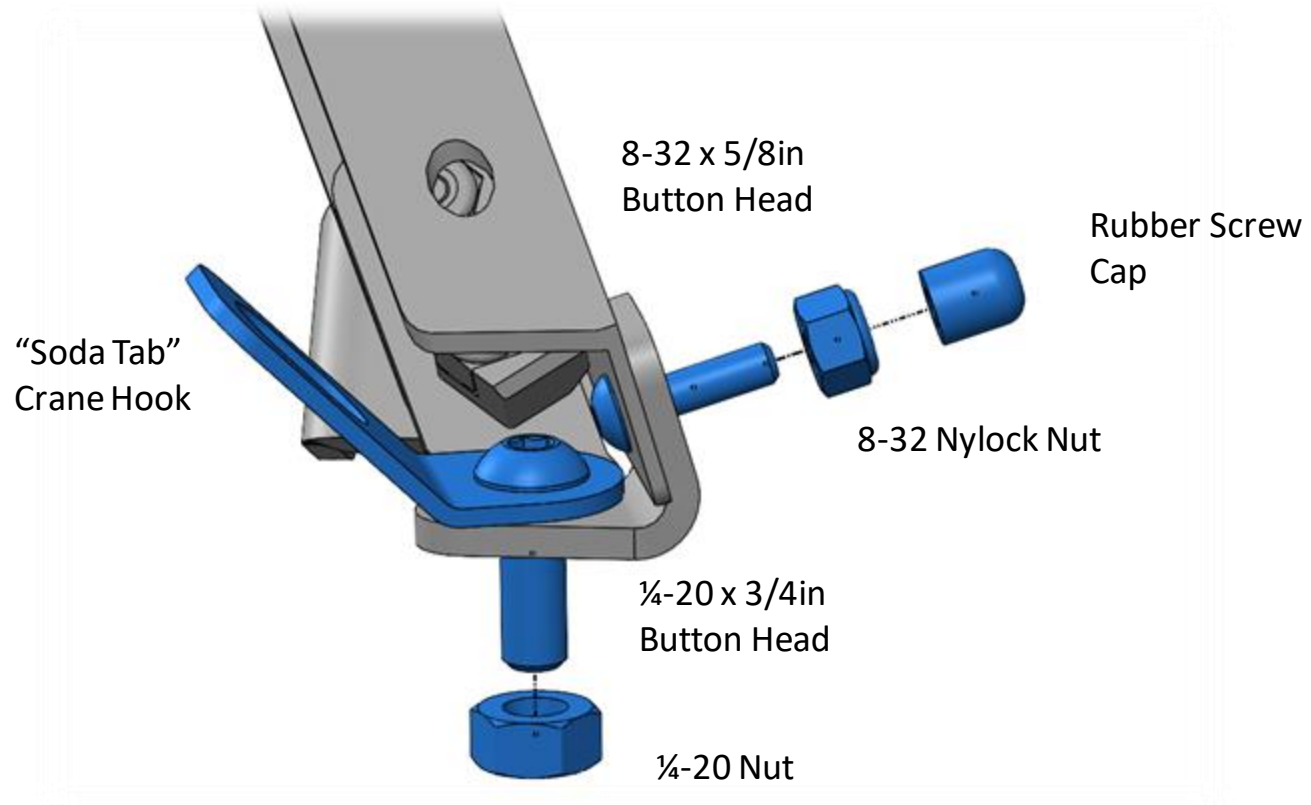
- Make sure the to use the correct battery bracket
- The nylock holder has a **notch**



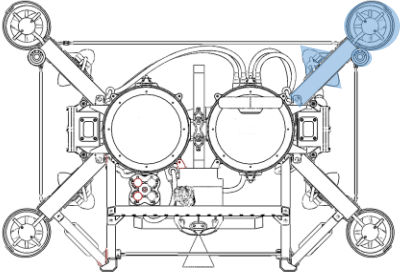
Additional Instructions



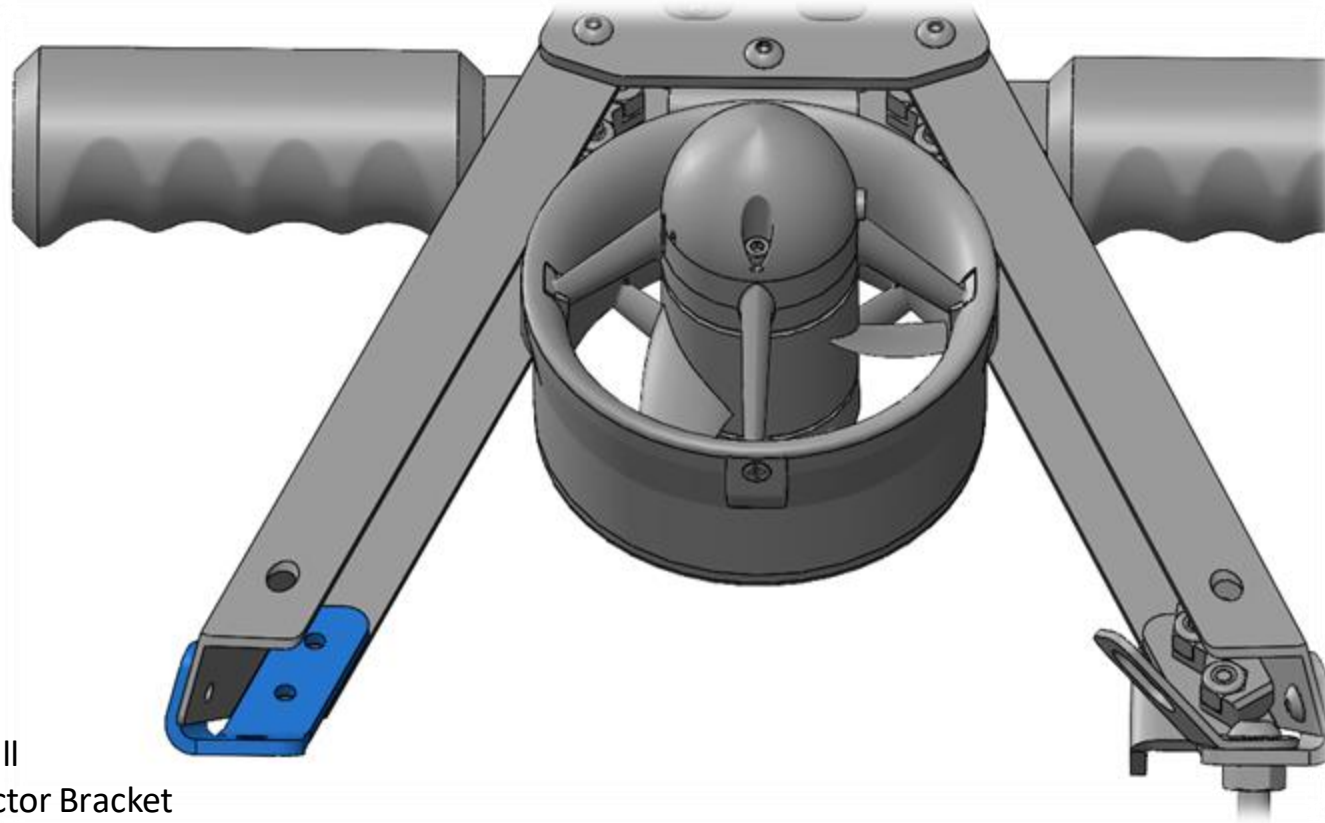
- The 1/4 – 20 nut will be removed later, it is just there to keep everything together
- You will need to use a wrench on this 8 - 32 nut, don't forget the rubber screw cap



Additional Instructions

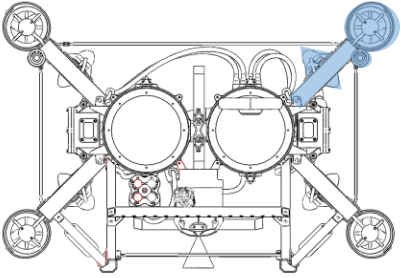


- Place the hull connecting bracket as shown. Notice the side with two holes is **inside** the C channel, and the side with one hole is **outside** the C channel

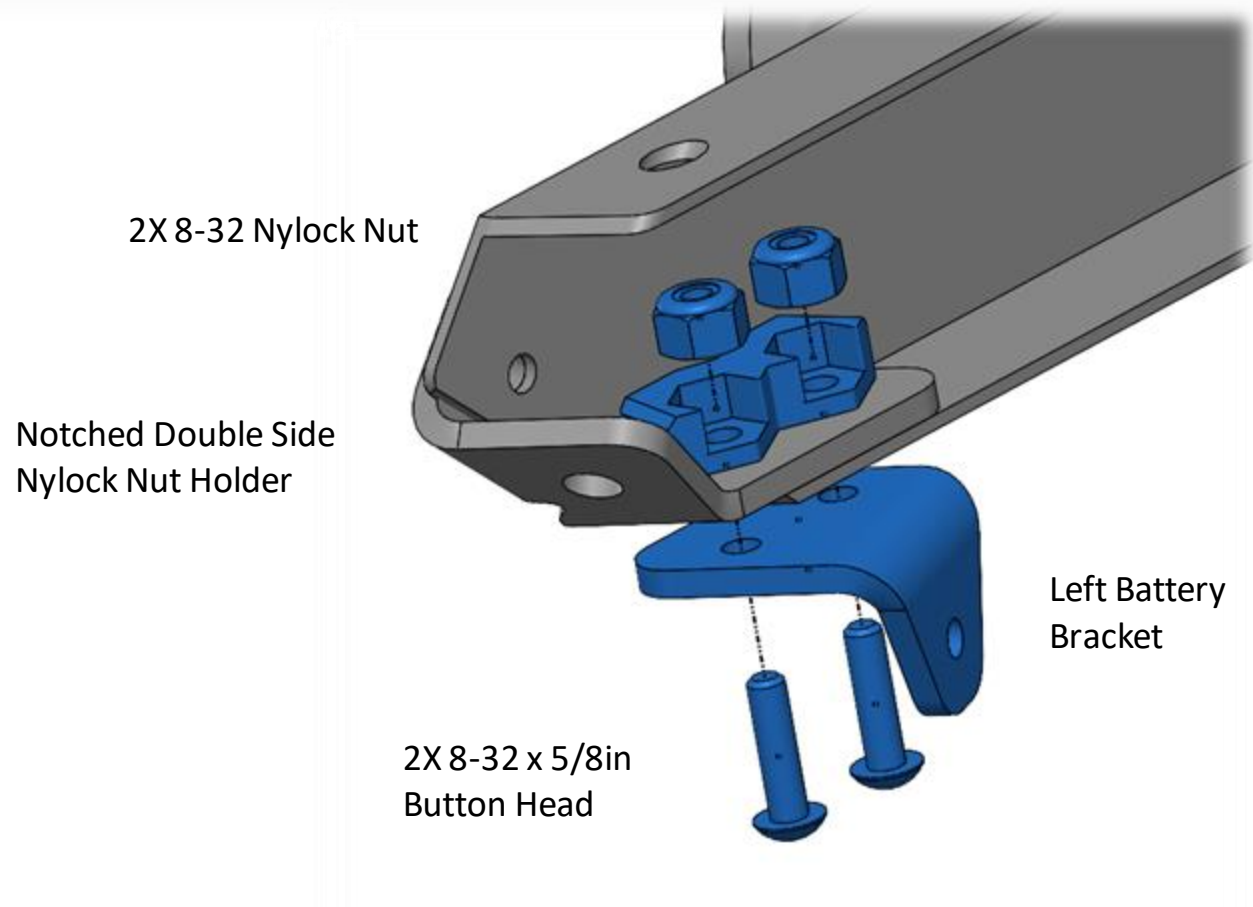


Left Hull
Connector Bracket

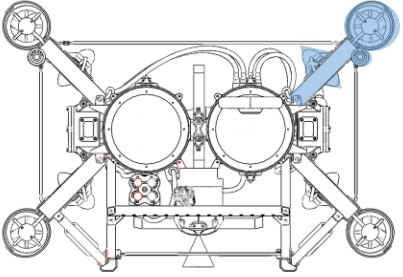
Additional Instructions



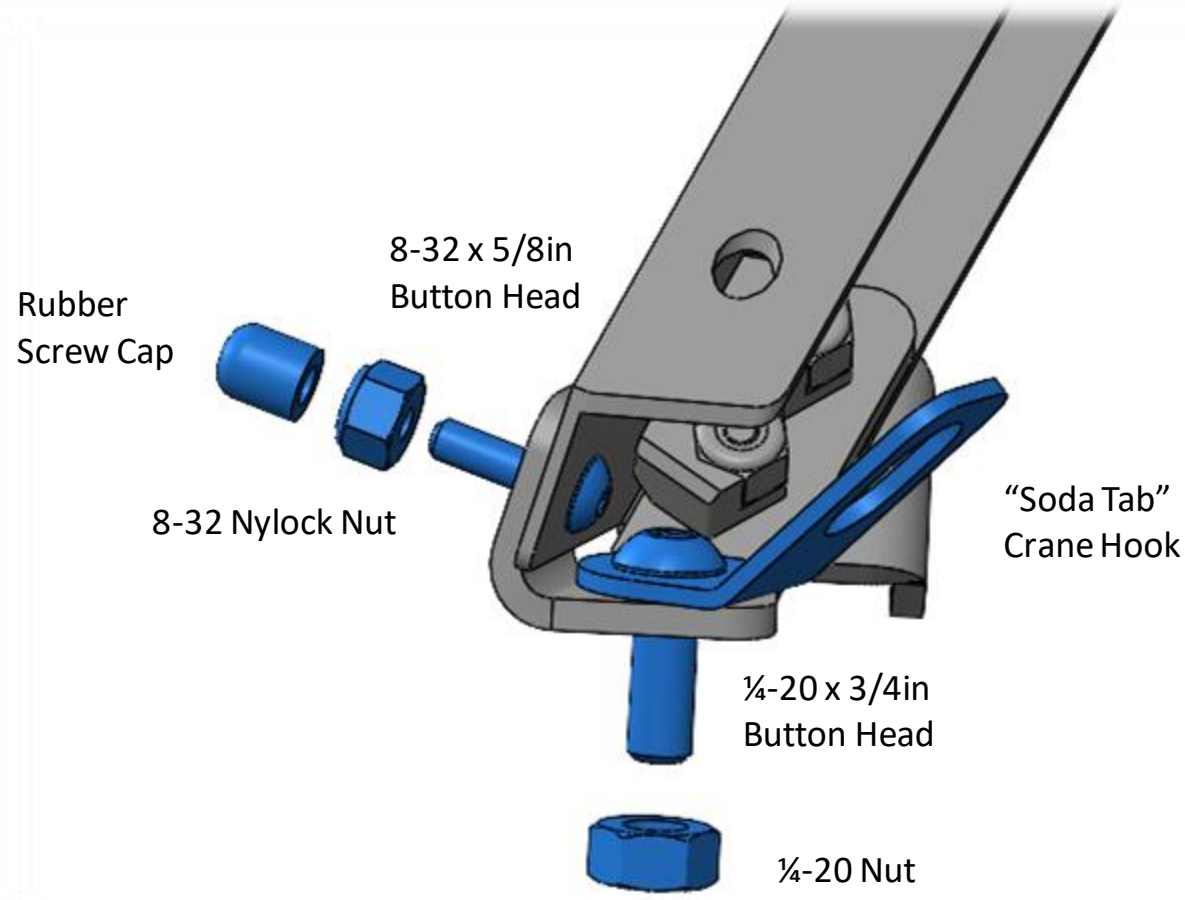
- Make sure the to use the correct battery bracket
- The nylock holder has a **notch**



Additional Instructions

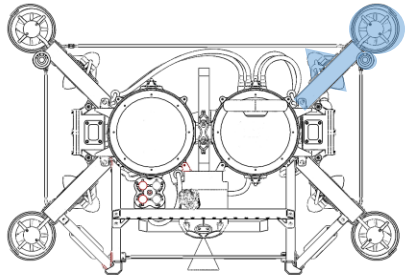


- The 1/4 – 20 nut will be removed later, it is just there to keep everything together
- You will need to use a wrench on this 8 - 32 nut, don't forget the rubber screw cap

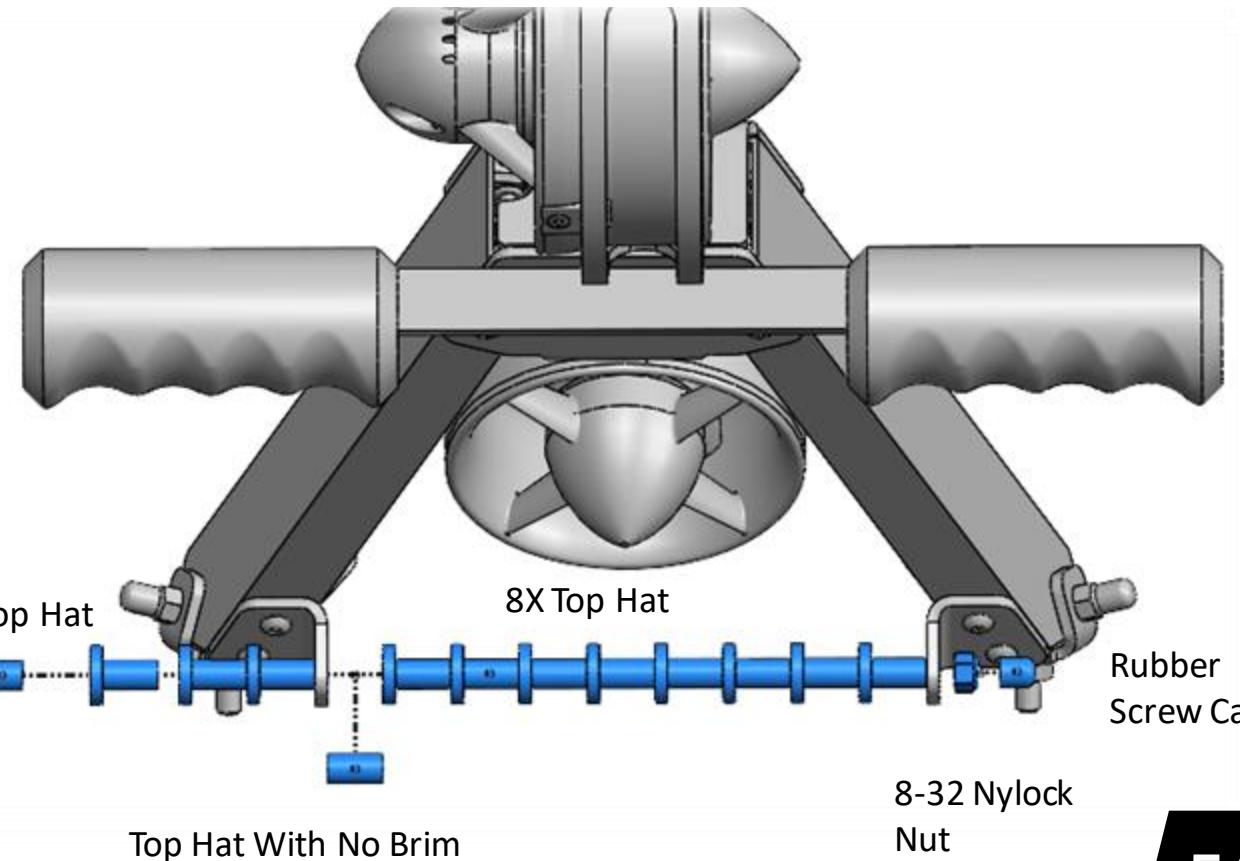


Right Dorito

Additional Instructions



- Put the threaded rod through all the top hats before putting on the nuts
- To get rod even on both sides, may need to grip rod with vice grips while spinning nut with wrench
- **Don't tighten too hard** or it will bow the rod! Stop tightening when you can no longer spin the top hats with your fingers



8-32 Nylock Nut

4X Top Hat

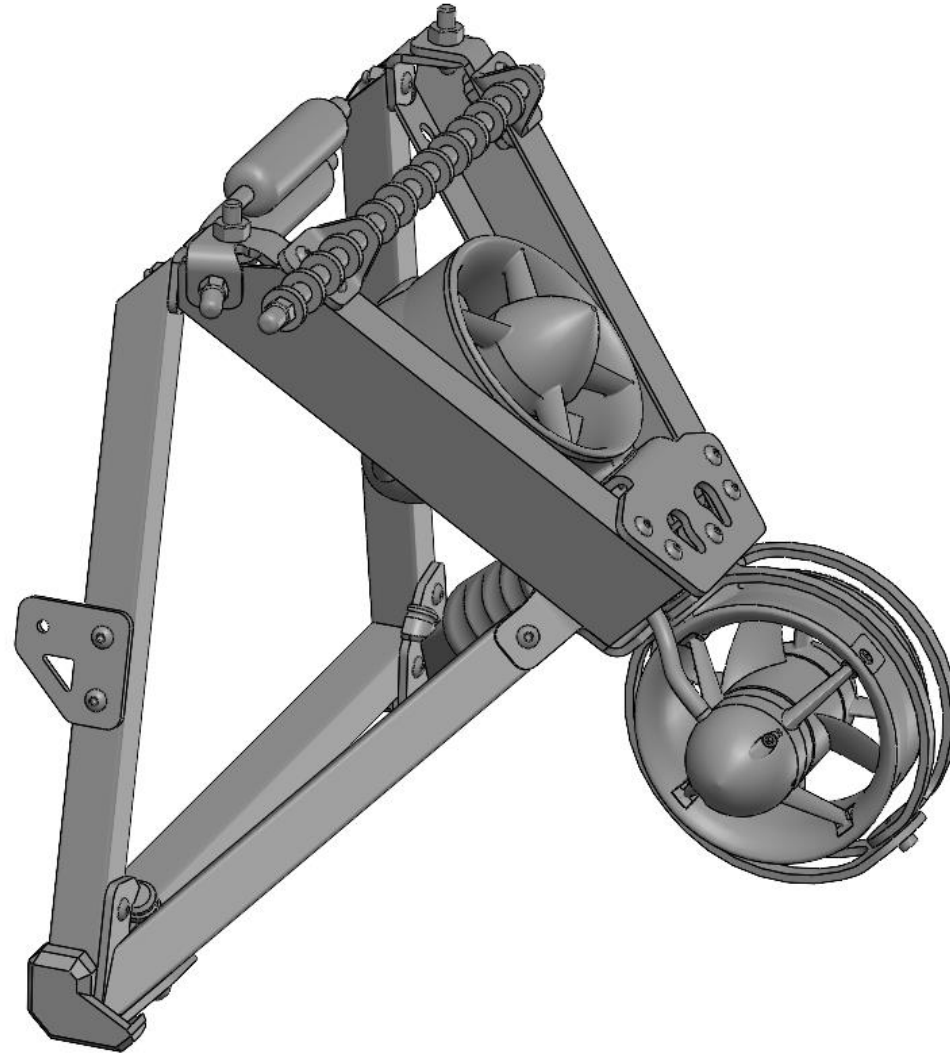
8X Top Hat

Rubber
Screw Cap

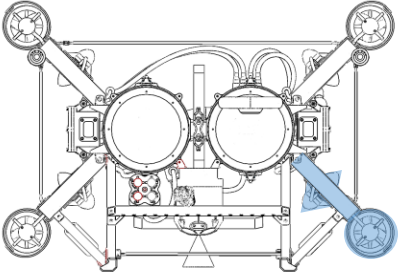
8-32 x 24in
Threaded Rod

8-32 Nylock
Nut

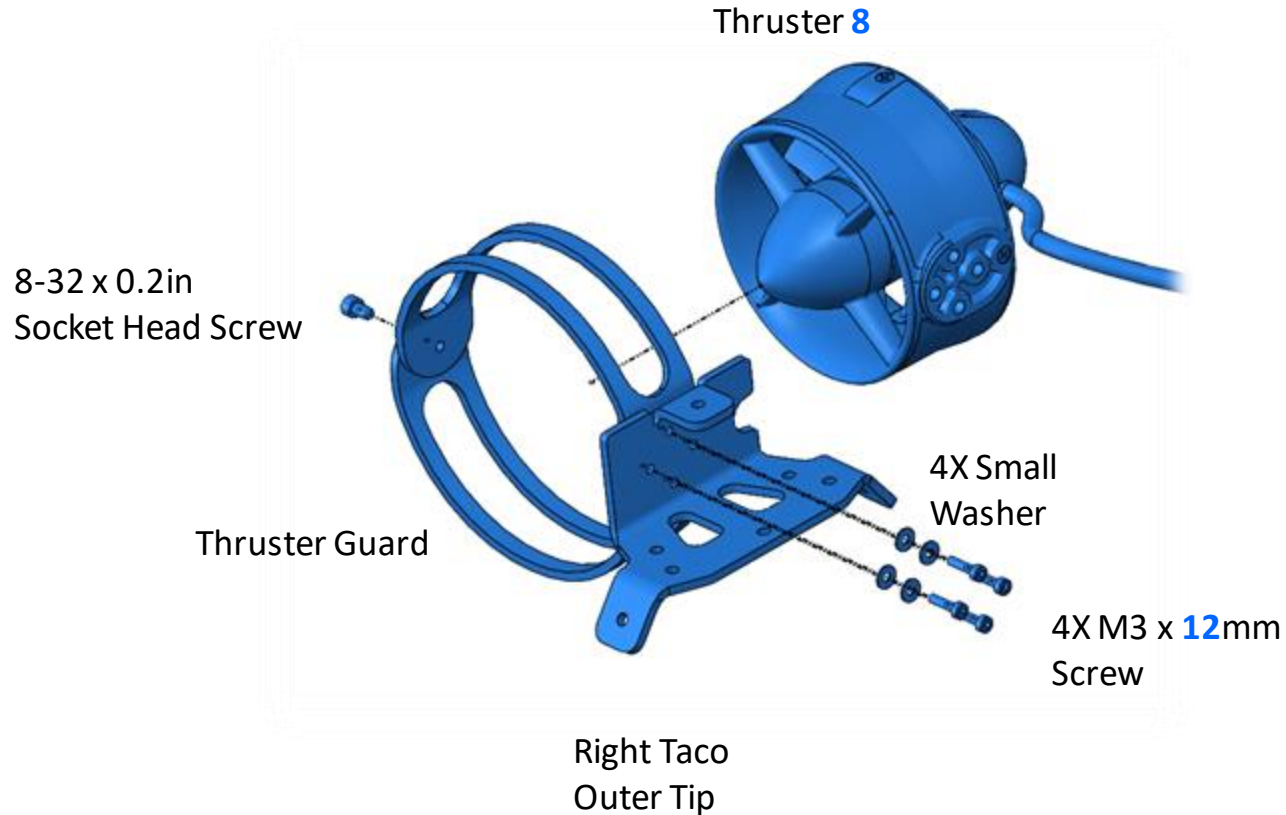
Top Hat With No Brim



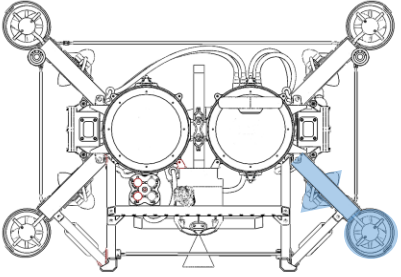
Additional Instructions



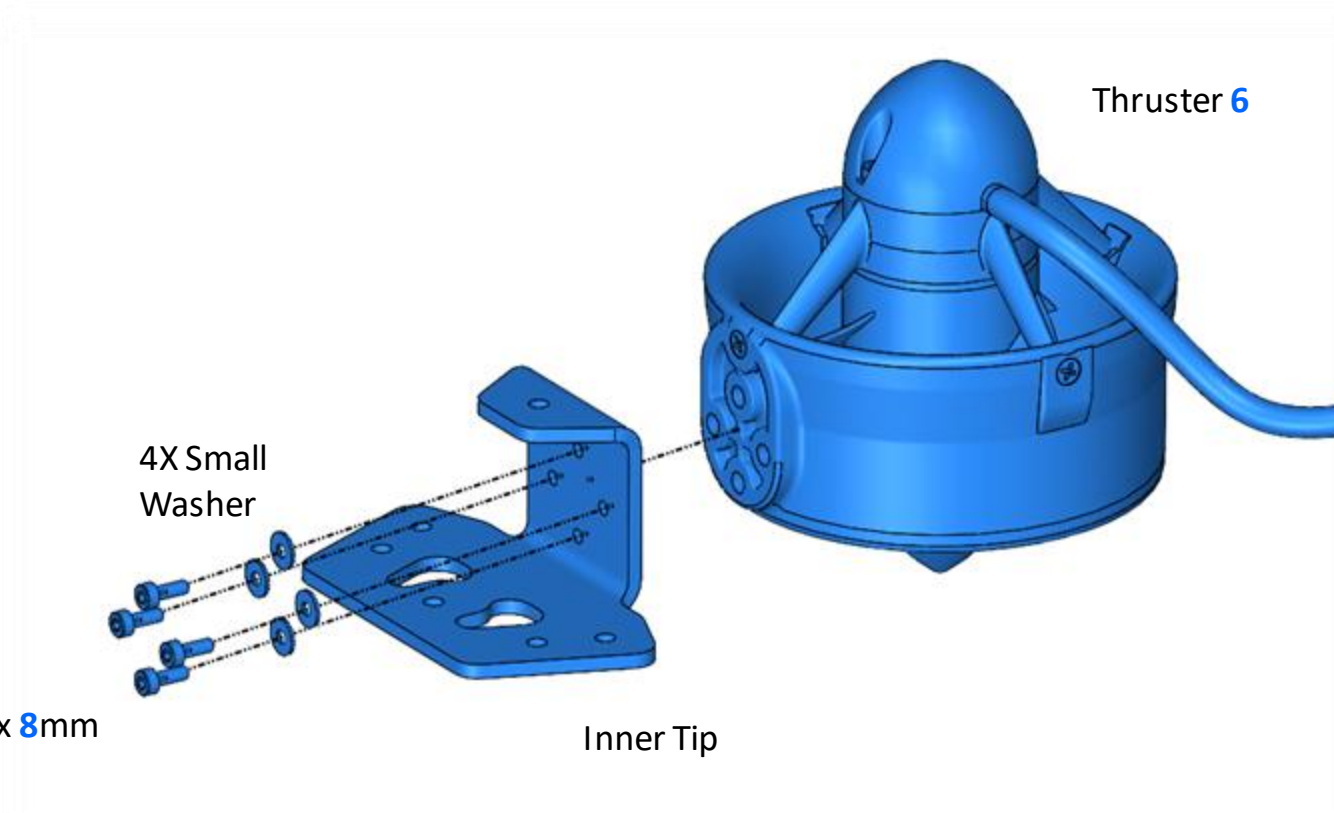
- The thruster guard may need bent slightly for the screw hole to line up
- Make sure the thruster **cable goes through notch** in sheet metal bracket
- Don't forget the washers
- Torque the M3 screws tight, as these will become very difficult to access later



Additional Instructions

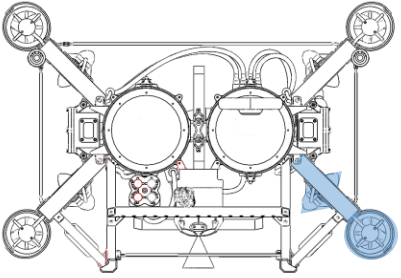


- Notice the orientation of the thruster relative to the bracket. **Don't put it on upside down!**
- Don't forget the washers
- Torque the M3 screws tight, as these will become very difficult to access later



Right Taco

Additional Instructions

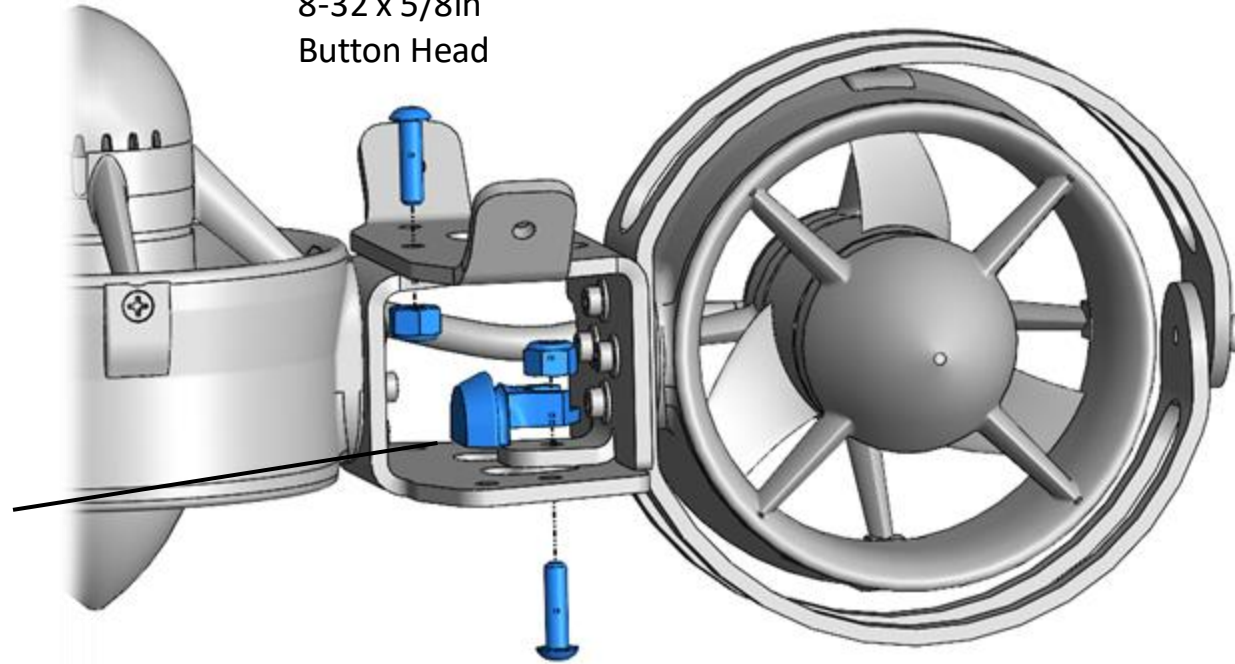


- There are two variants of the cable thimbles, ensure the correct one is used

2X 8-32 Nylock Nut

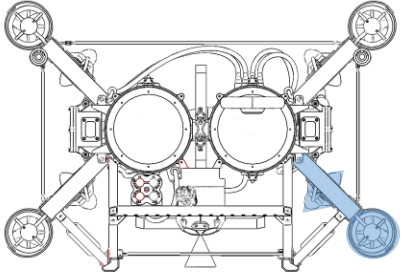
Flat Cable Thimble
3D Print

8-32 x 5/8in
Button Head

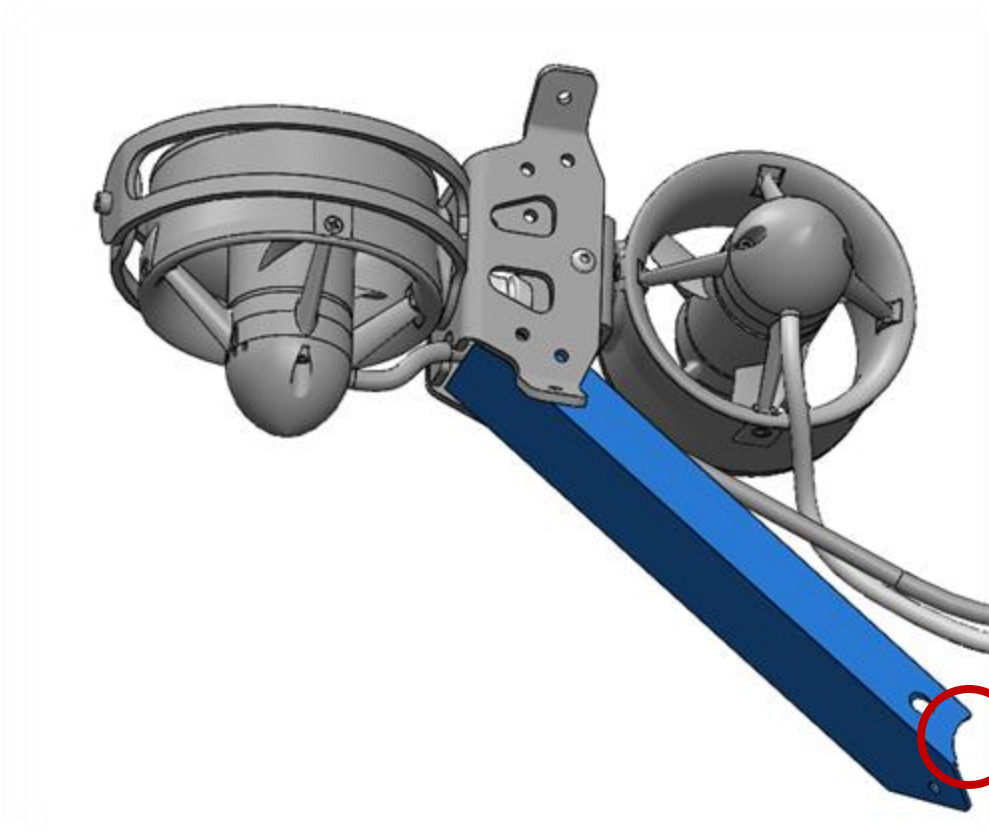


8-32 x 5/8in
Button Head

Additional Instructions

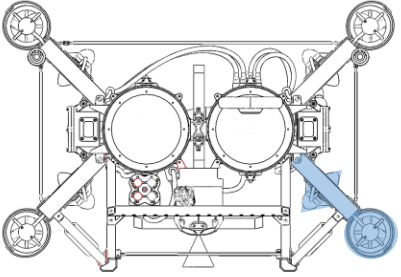


- Position the C channel as shown, make sure it has a **curved edge** (circled in red) by the screw access hole. This is needed later for screw clearance
- Make sure the **orientation is correct!** Don't use the incorrect C channel
- The thruster cable must be **inside the C channel!** It will be a pain to fix later if not done correctly now

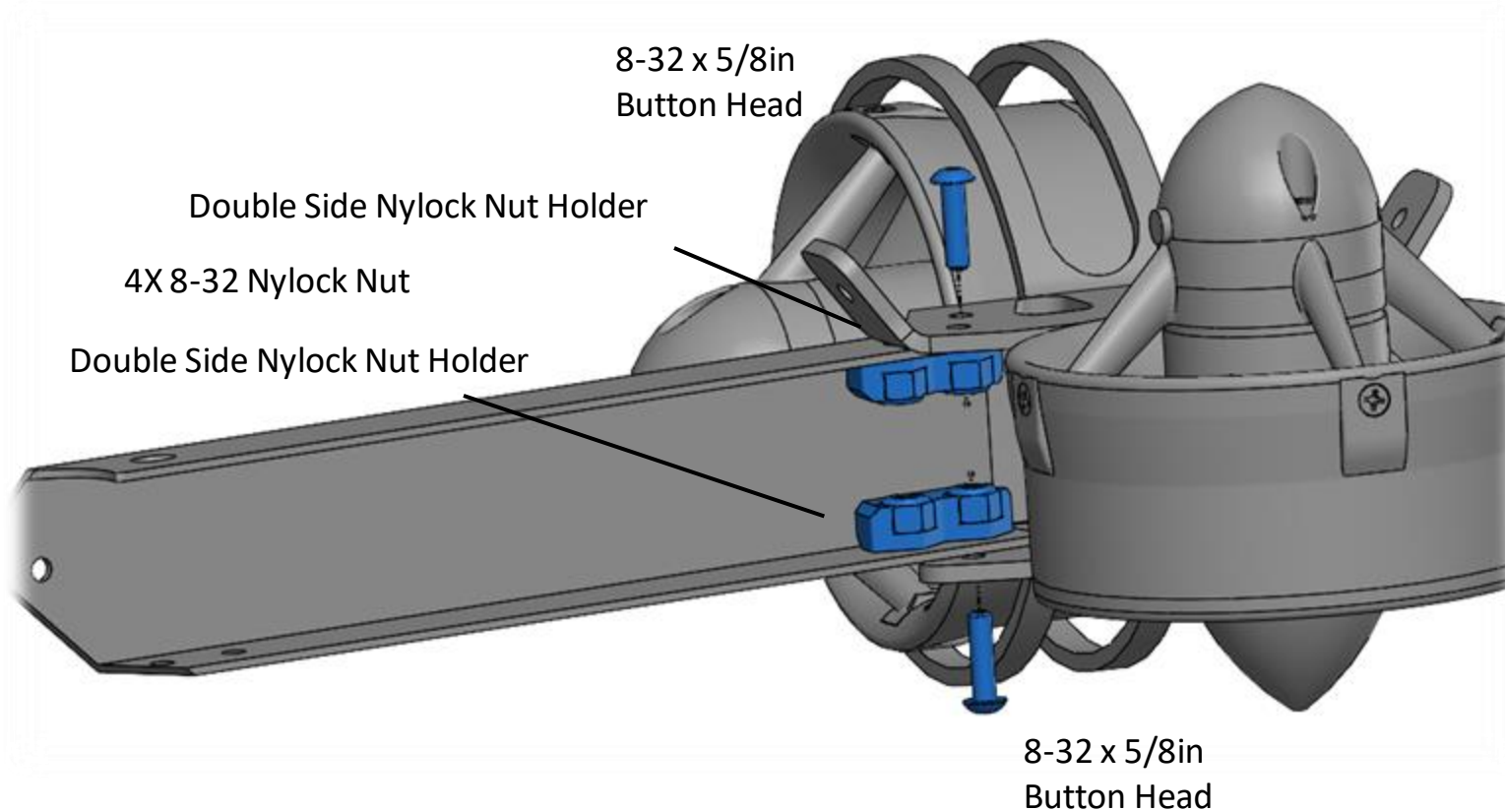


Left C Channel

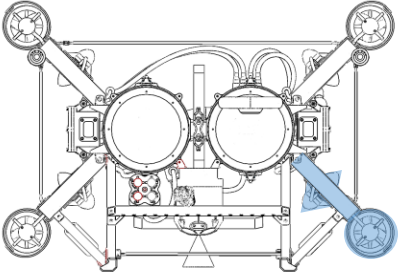
Additional Instructions



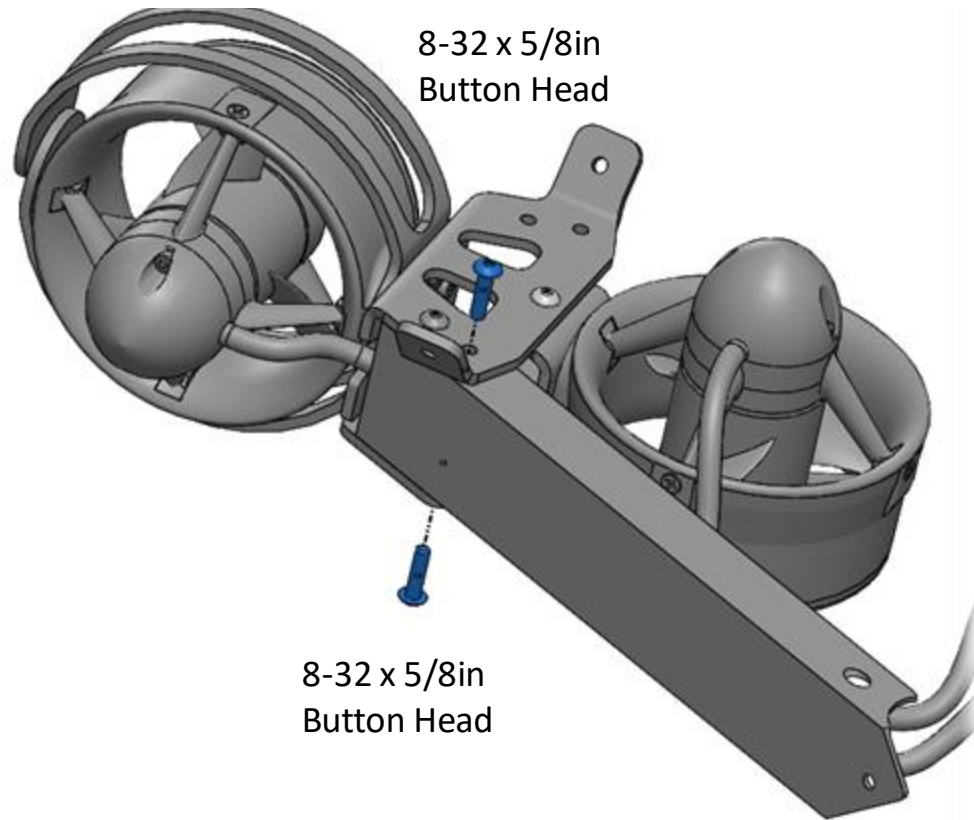
- Thruster cable hidden for better visibility
- Prepare double side nylock holders **without notches**
- **Hot glue** the nuts into 3D printed nylock holder
- Instead of hot glue, some preferred to hold nuts in position with a long bar of metal



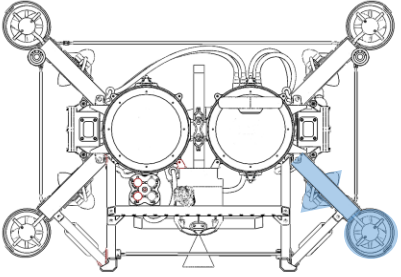
Additional Instructions



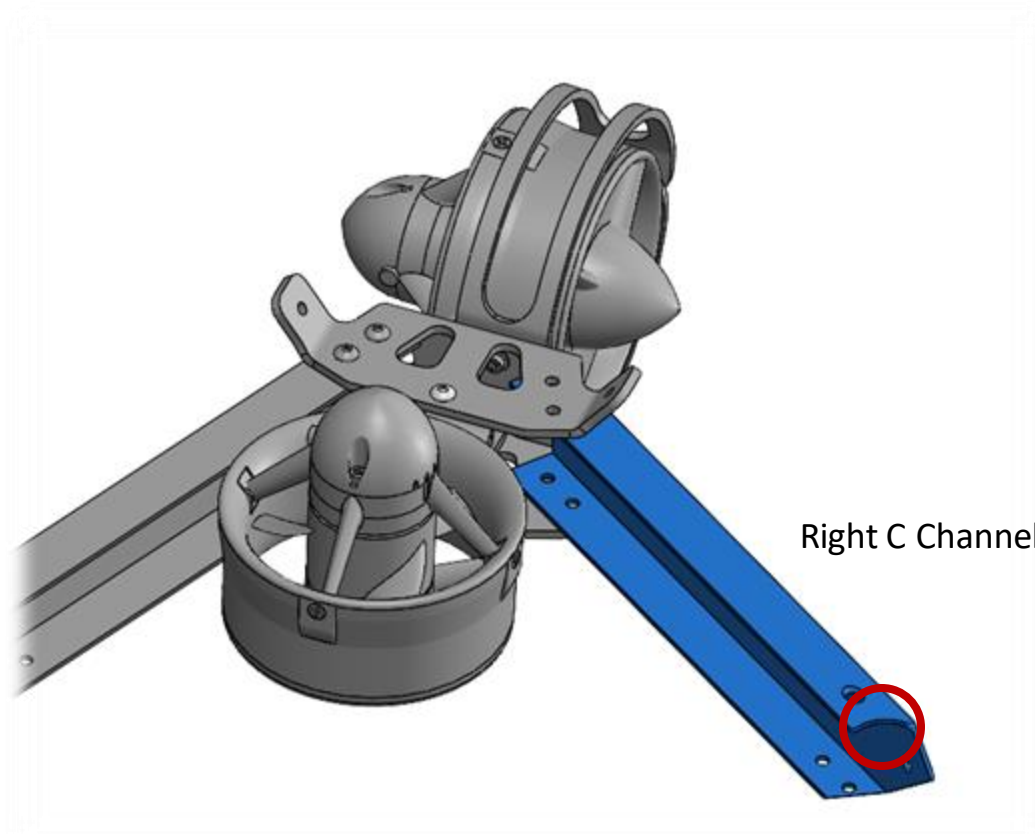
- Pivot the C channel into position. The thruster **cable must go through** the C channel!



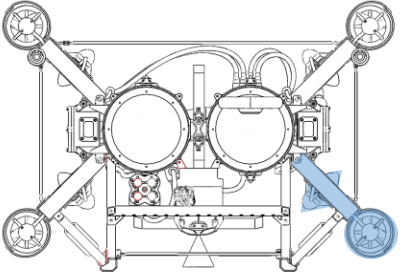
Additional Instructions



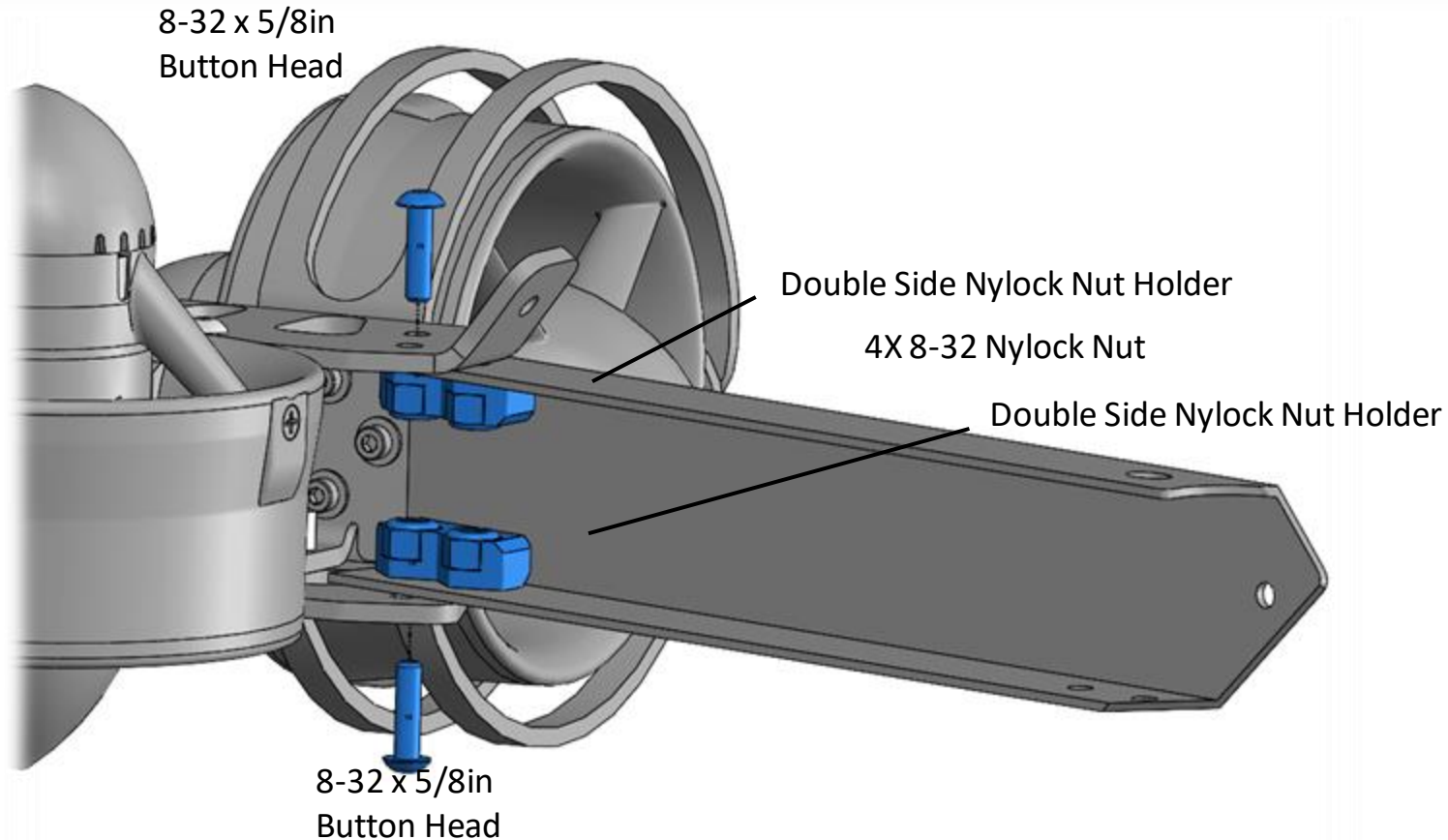
- Position the C channel as shown, make sure it has a **curved edge** (circled in red) by the screw access hole. The curved edge is needed for screw head clearance in the Taco assemblies
- Make sure the **orientation is correct!** Don't use the incorrect C channel

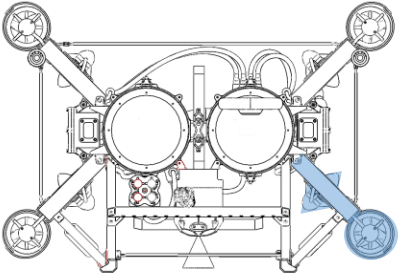


Additional Instructions

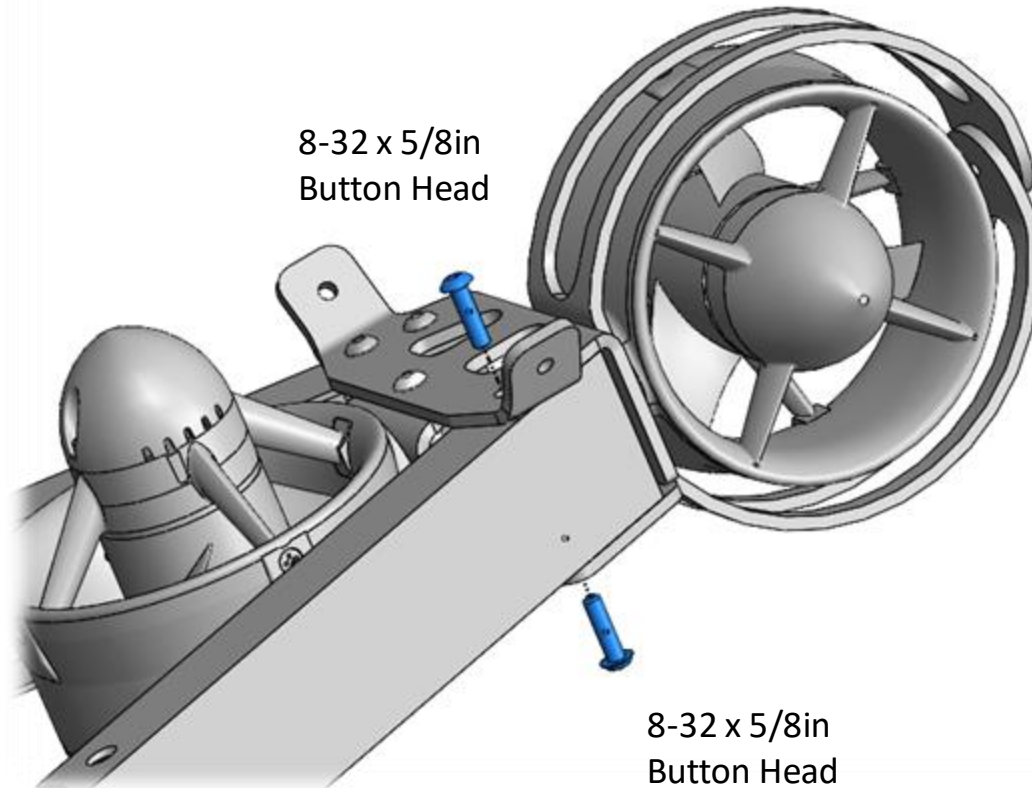


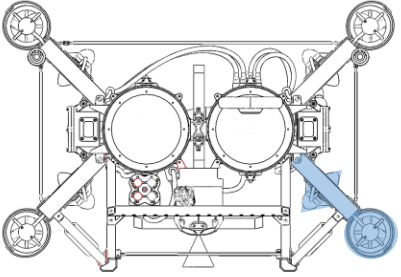
- Prepare double side nylock holders **without notches**
- **Hot glue** the nuts into 3D printed nylock holder
- Instead of hot glue, some preferred to hold nuts in position with a long bar of metal



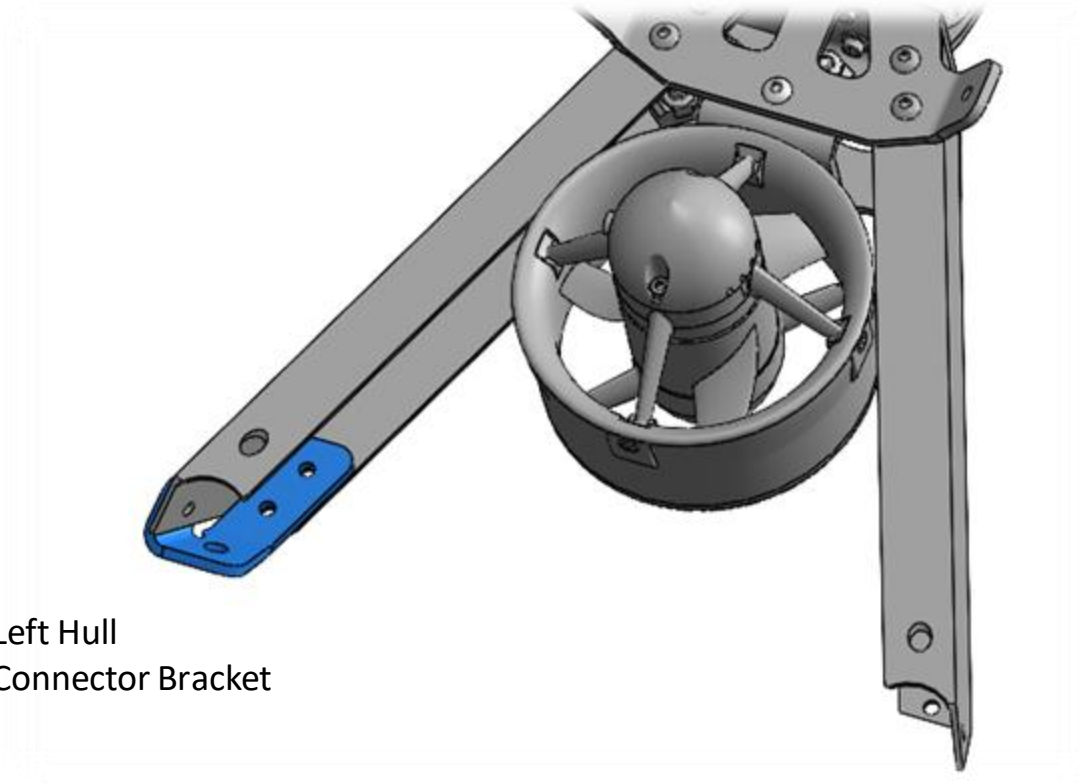


- Pivot the C channel into position.



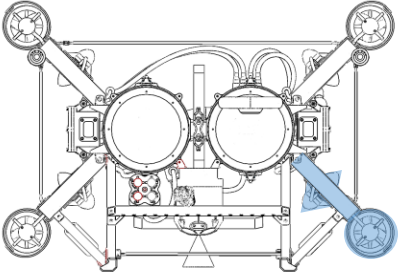


- Place the hull connecting bracket as shown. Notice the side with two holes is **inside** the C channel, and the side with one hole is **outside** the C channel

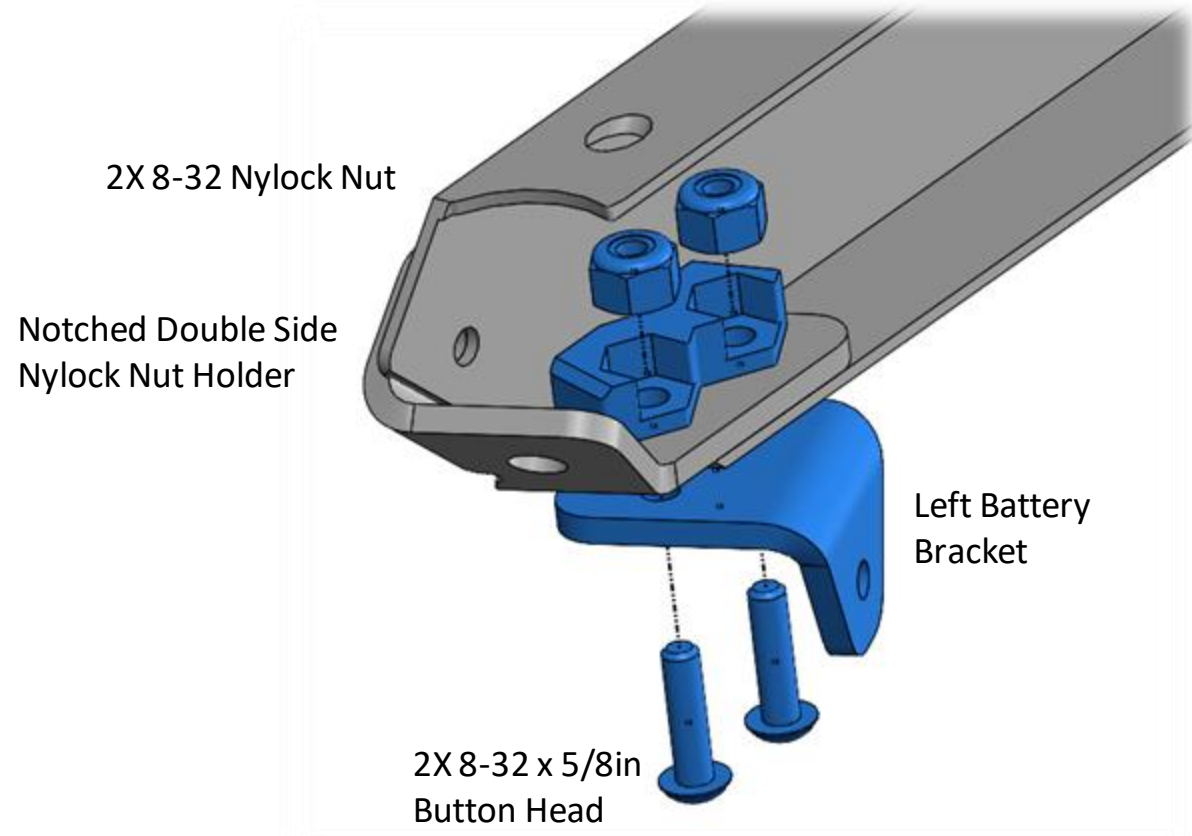


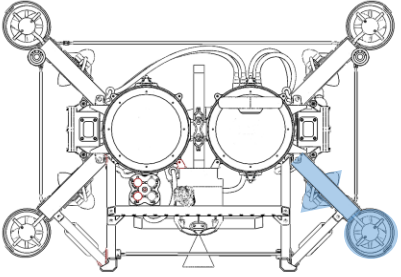
Left Hull
Connector Bracket

Additional Instructions

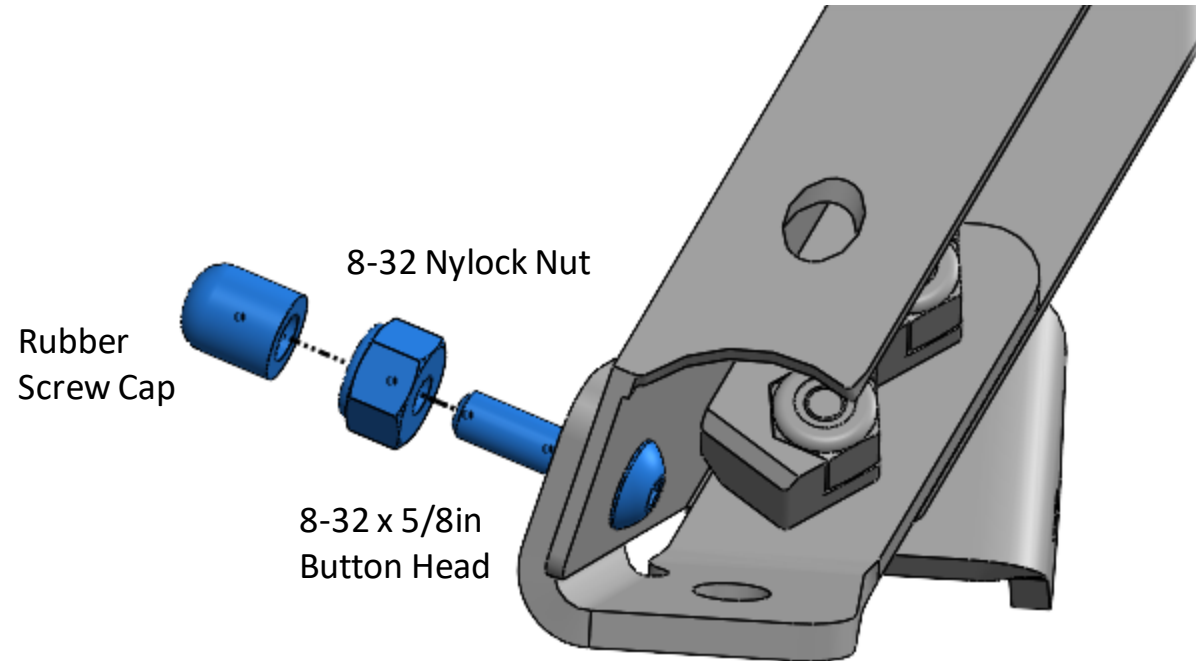


- Make sure the to use the correct battery bracket
- The nylock holder has a **notch**

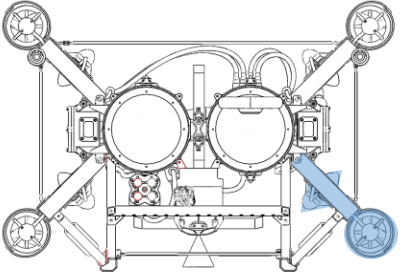




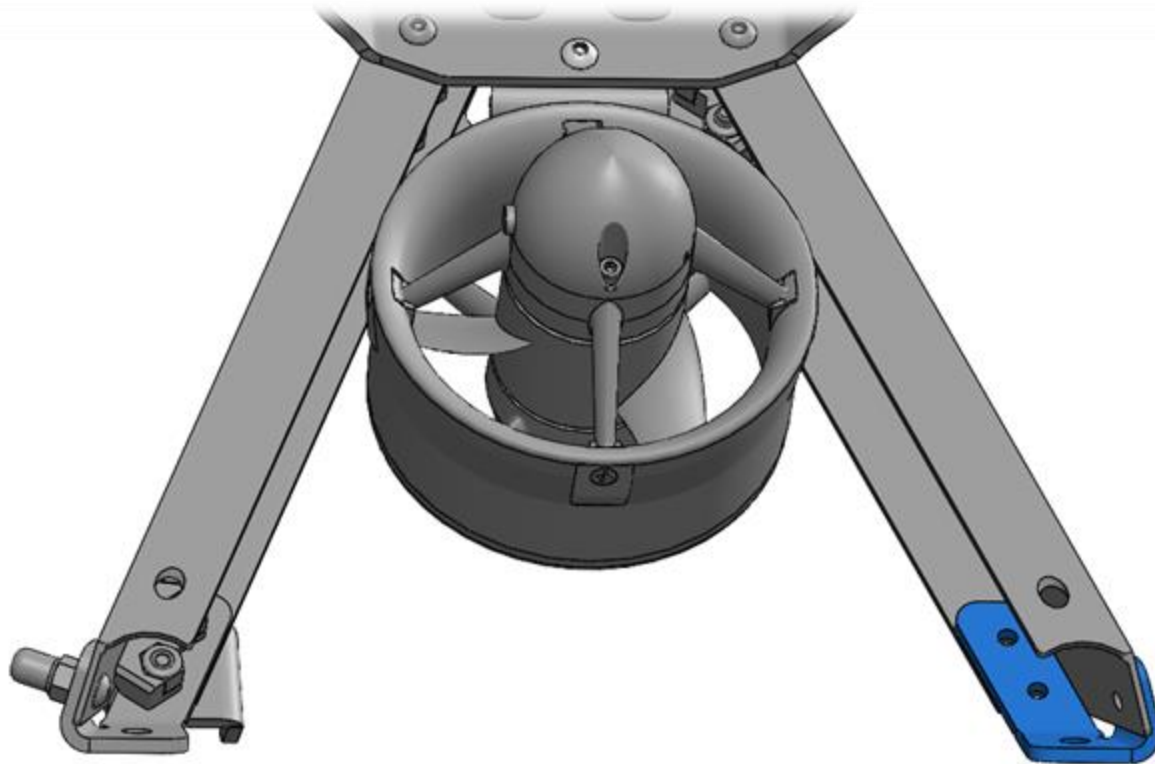
- You will need to use a wrench on this 8 - 32 nut, don't forget the rubber screw cap



Additional Instructions

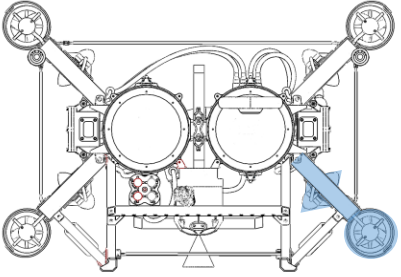


- Place the hull connecting bracket as shown. Notice the side with two holes is **inside** the C channel, and the side with one hole is **outside** the C channel

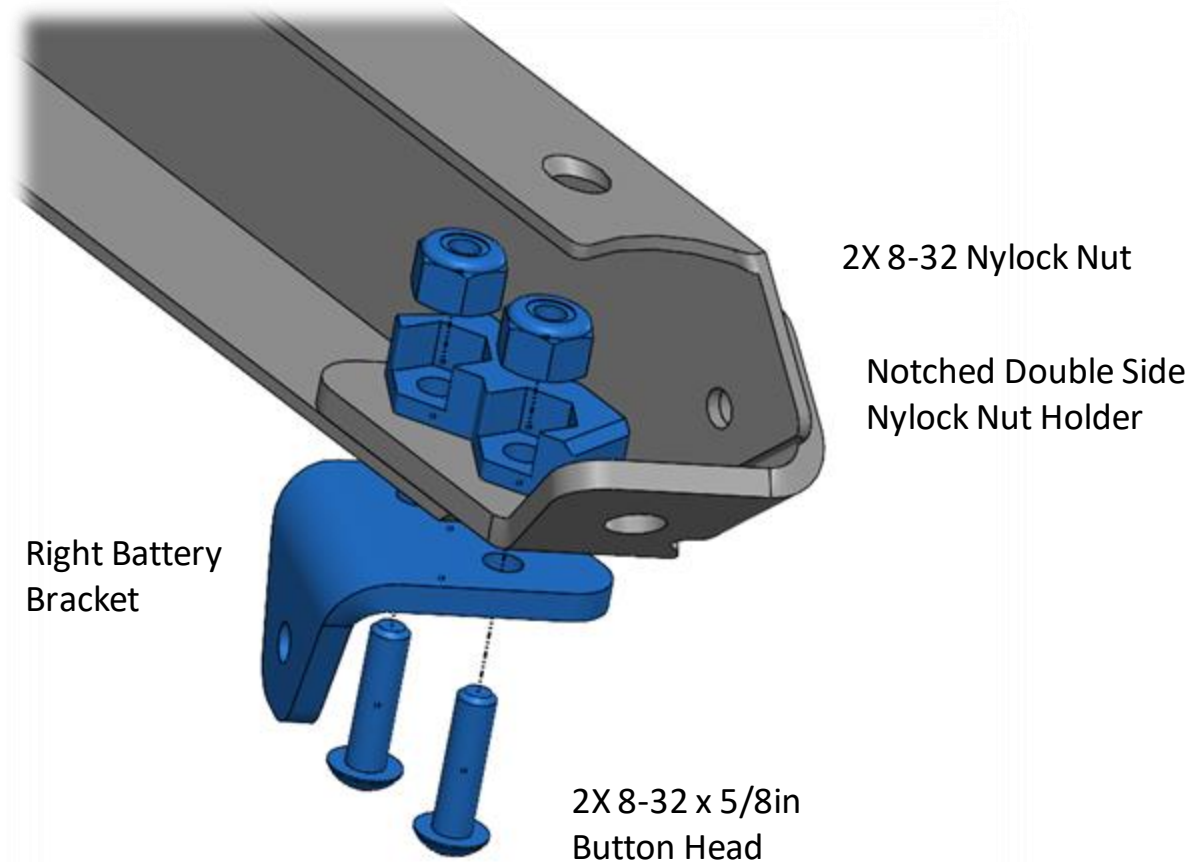


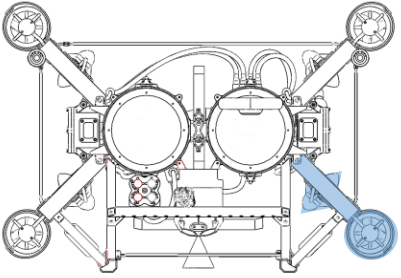
Right Hull
Connector Bracket

Additional Instructions

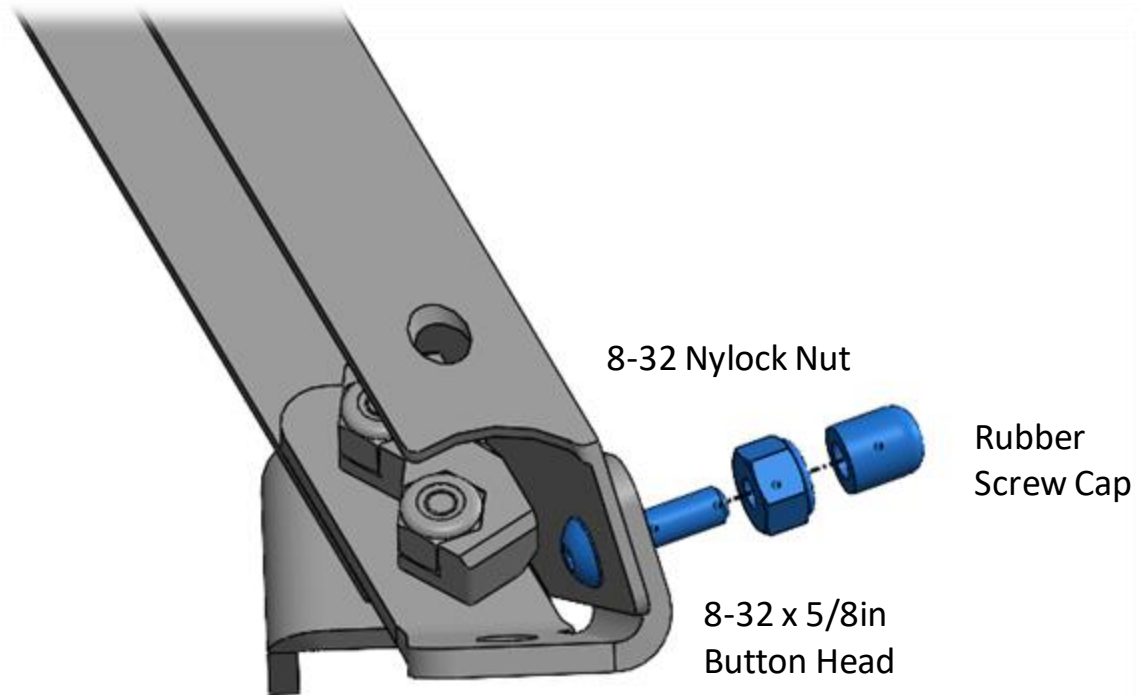


- Make sure the to use the correct battery bracket
- The nylock holder has a **notch**



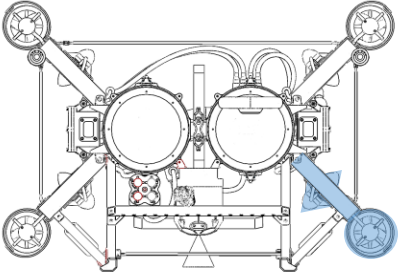


- You will need to use a wrench on this 8 - 32 nut, don't forget the rubber screw cap

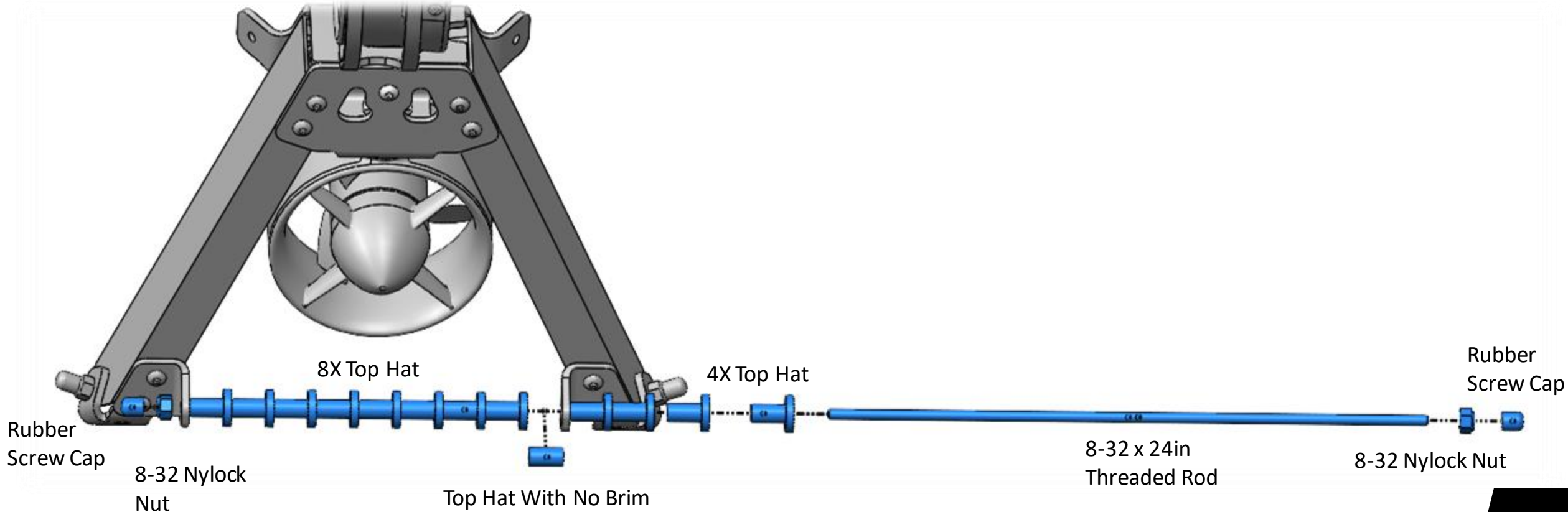


Right Taco

Additional Instructions

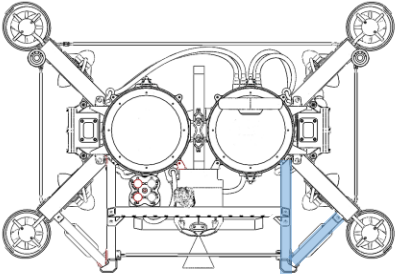


- Put the threaded rod through all the top hats before putting on the nuts
- To get rod even on both sides, may need to grip rod with vice grips while spinning nut with wrench
- **Don't tighten too hard** or it will bow the rod! Stop tightening when you can no longer spin the top hats with your fingers

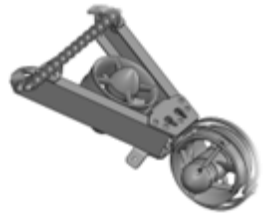


Right Taco

Additional Instructions

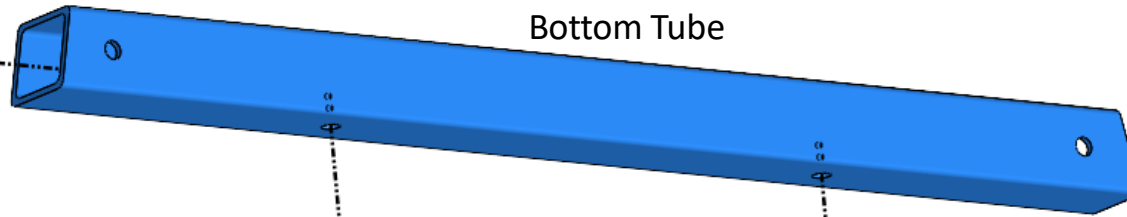


- Set the thruster triangle aside
- It may be helpful to hot glue nut into nylock holder
- These screws **must be socket head** not button head. They are used for locating with the COM scale



8-32 Nylock Nut

Single Nylock
Nut Holder



Bottom Tube

8-32 Nylock Nut



Single Nylock
Nut Holder

8-32 x 0.5in Socket
Head Screw



8-32 x 0.5in Socket
Head Screw

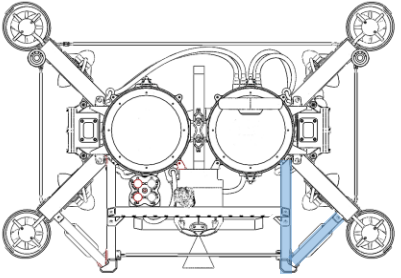


After install: (Bar is translucent to see inside)

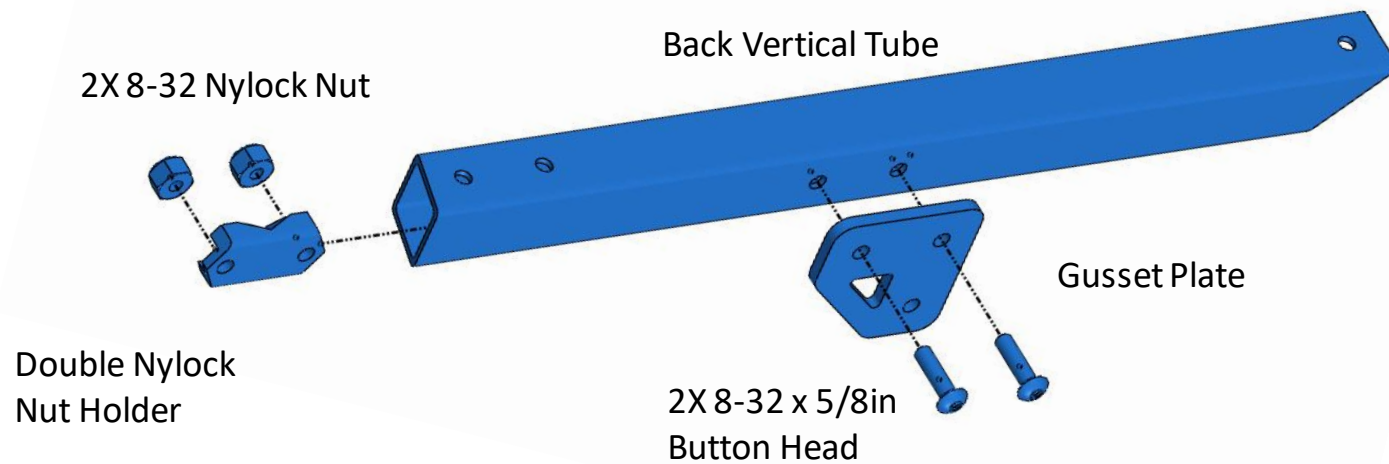
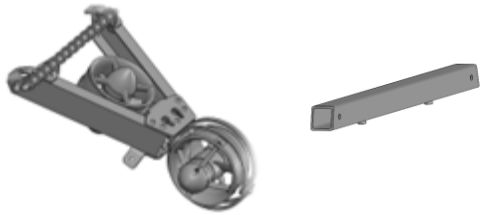


Right Taco

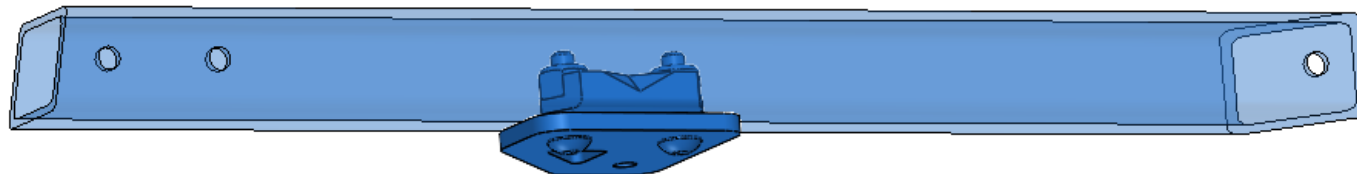
Additional Instructions



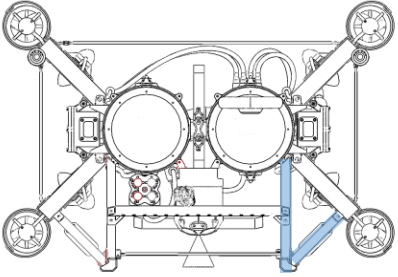
- Set the lower bar aside
- Hot gluing the nuts into the double nylock holder is **REQUIRED**. One of these screws will be removed in the future and the nut can not fall out



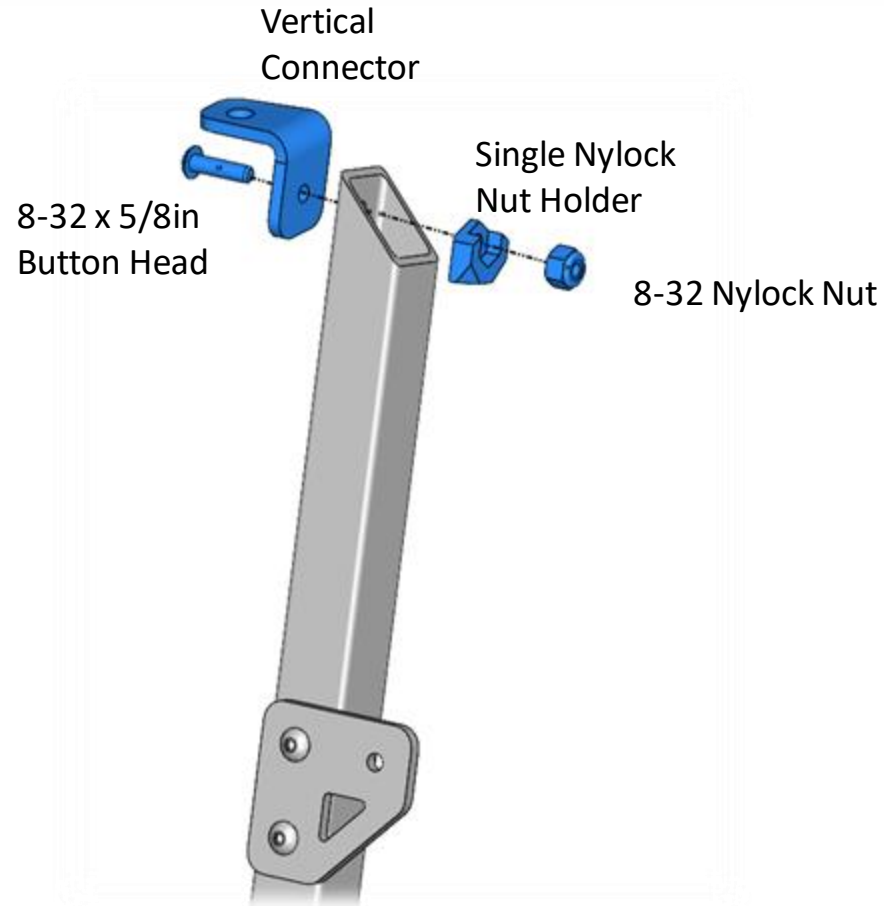
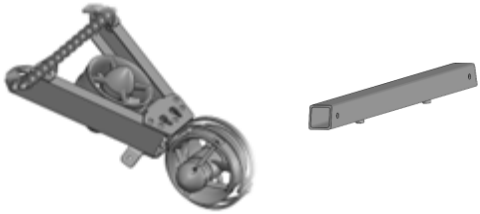
After install: (Bar is translucent to see inside)



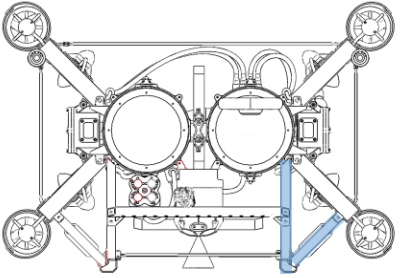
Additional Instructions



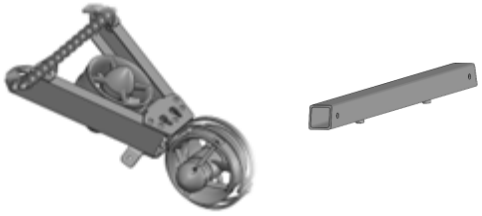
- Ensure you are using the correct vertical connector (there's two types). **Verify the angle matches** what is shown in the picture
- Tighten the 8-32 screw **firm** as it will not be accessible later



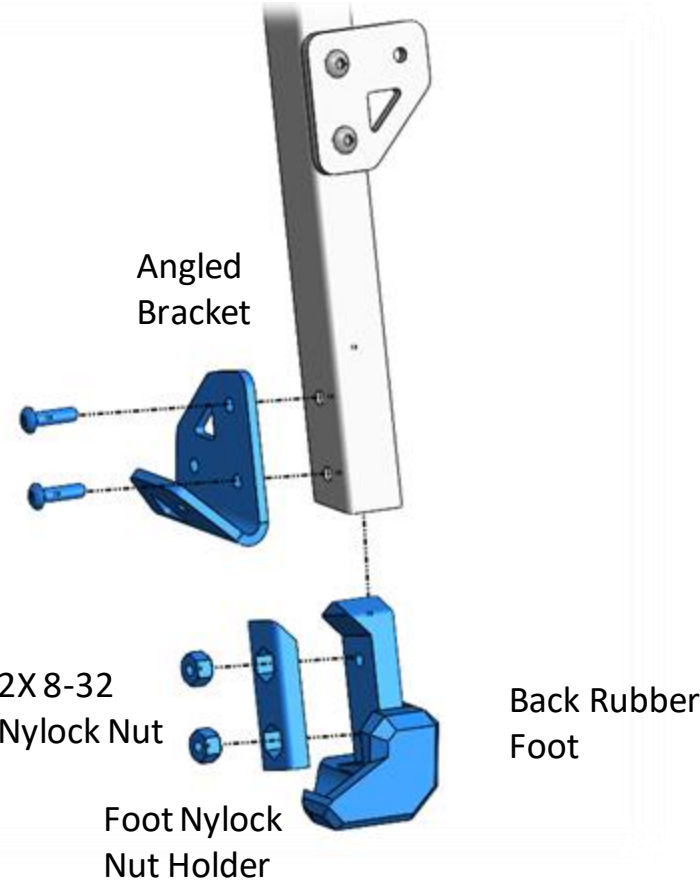
Additional Instructions



- Tighten the 8-32 screws **firm**, as they will not be accessible later



2X 8-32 x 5/8in
Button Head



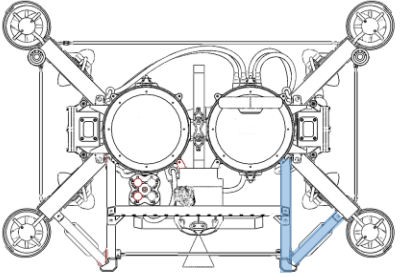
Angled
Bracket

2X 8-32
Nylock Nut

Foot Nylock
Nut Holder

Back Rubber
Foot

Additional Instructions

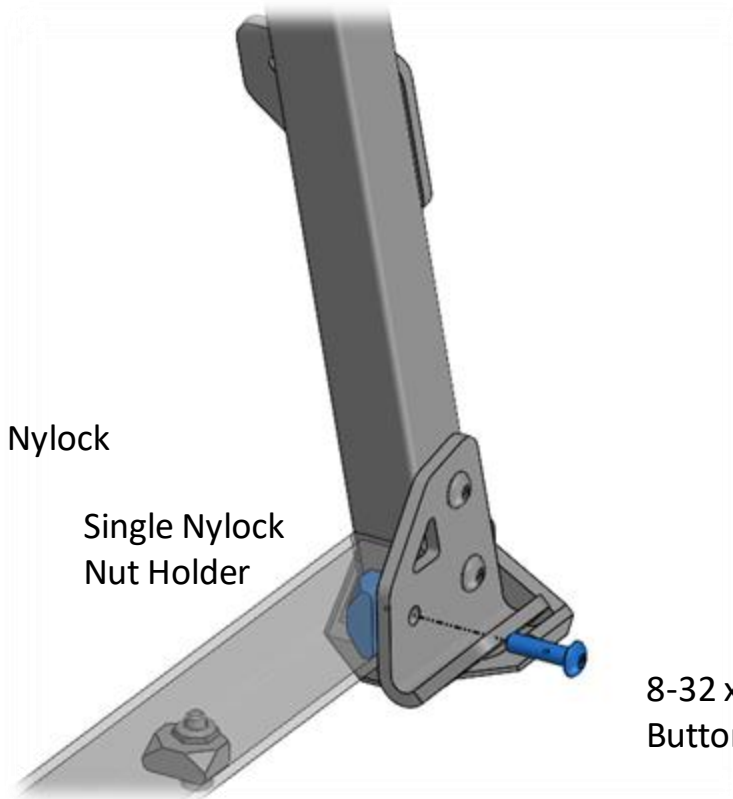


- Grab the bottom bar and connect it to the angled bracket
- The bottom bar was made translucent for visibility inside
- It may be helpful to hot glue the nut into the nylock holder
- Tighten the 8-32 screw **firm** as it will not be accessible later



8-32 Nylock
Nut

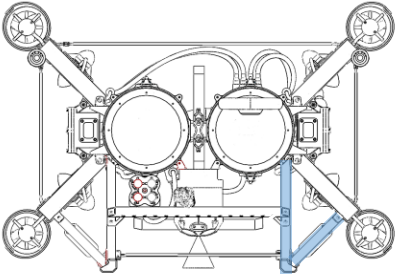
Single Nylock
Nut Holder



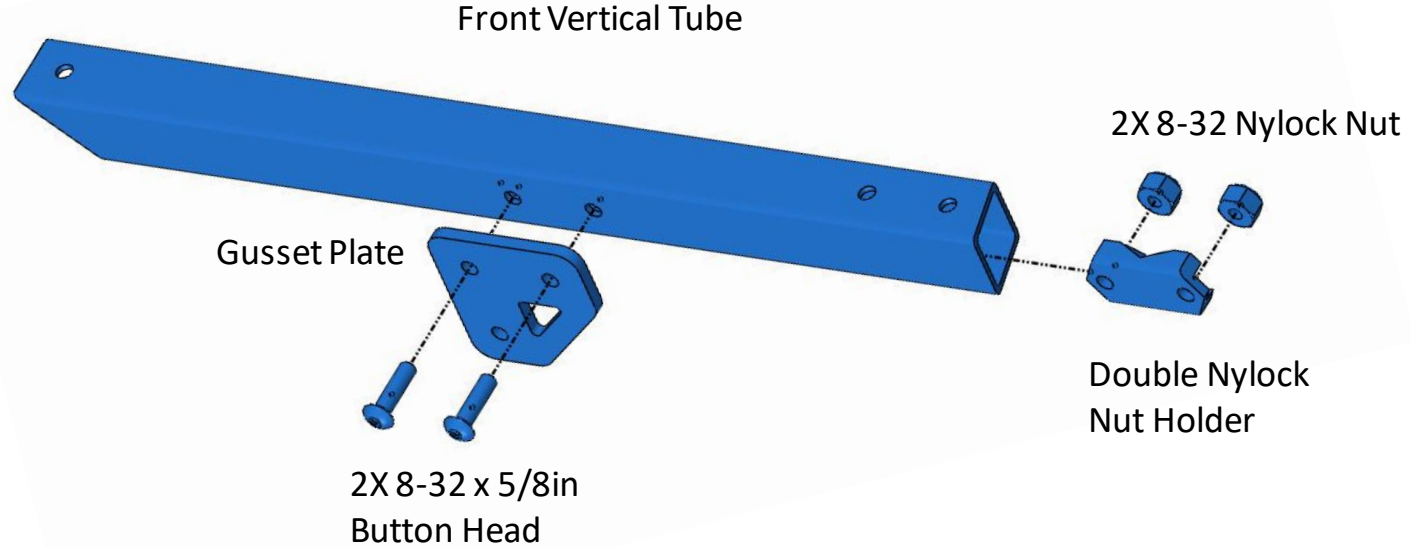
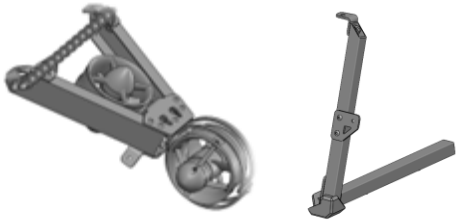
8-32 x 5/8in
Button Head

Right Taco

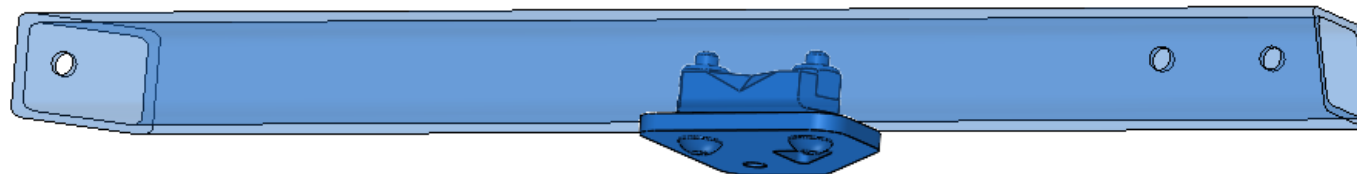
Additional Instructions



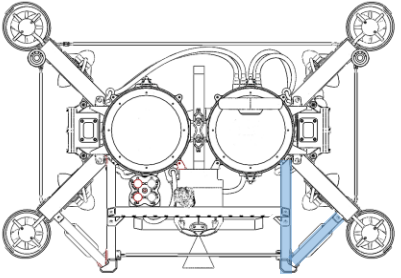
- Set the lower taco bars aside, a mirrored version will now be made
- Hot gluing the nuts into the double nylock holder is **REQUIRED**. One of these screws will be removed in the future and the nut can not fall out



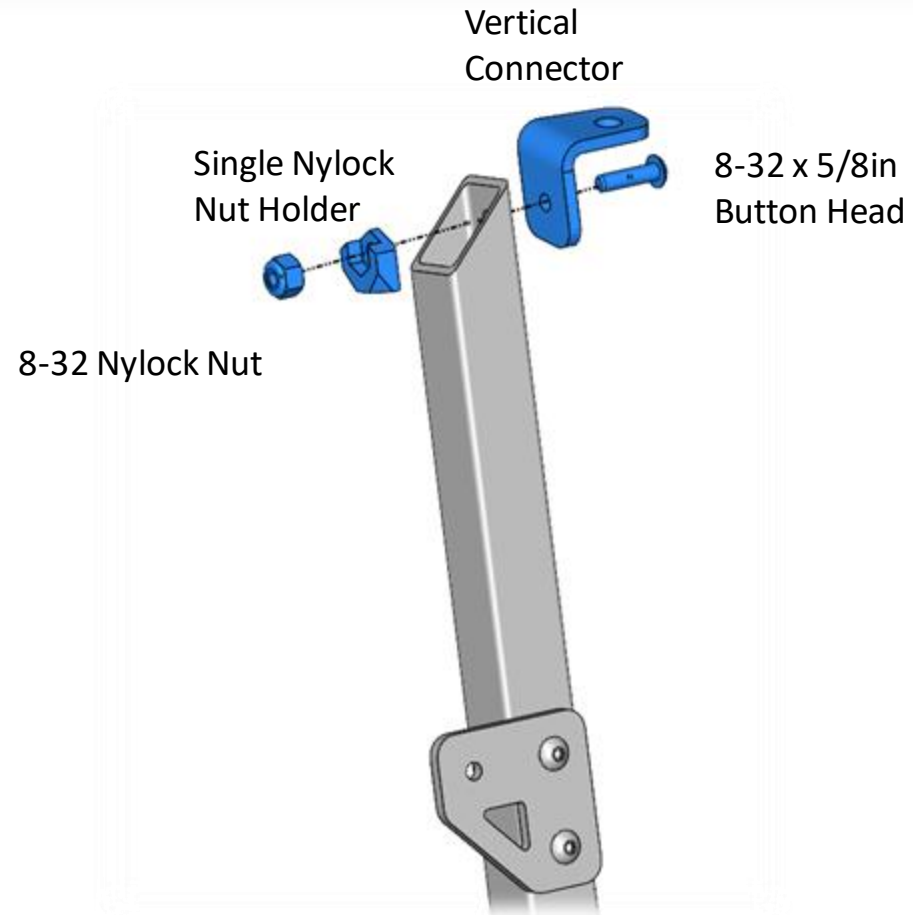
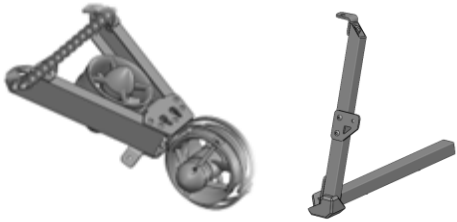
After install: (Bar is transparent to see inside)



Additional Instructions

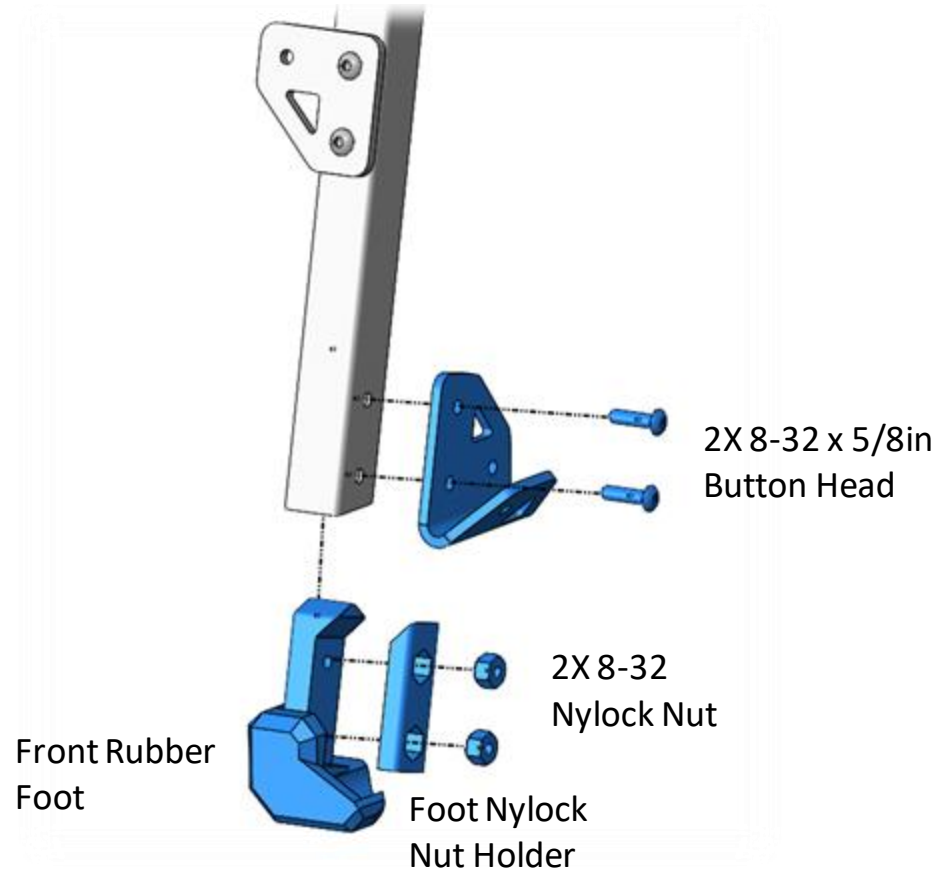
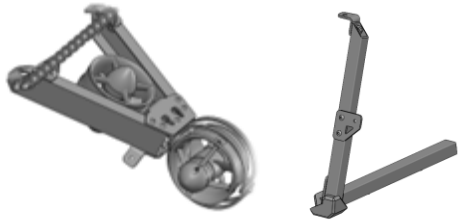
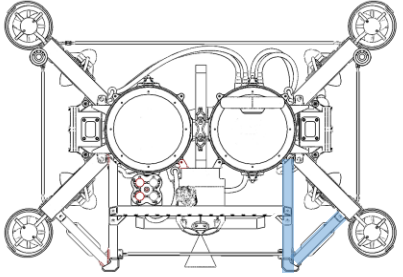


- Ensure you are using the correct vertical connector (there's two types). **Verify the angle matches** what is shown in the picture
- Tighten the 8-32 screw **firm** as it will not be accessible later

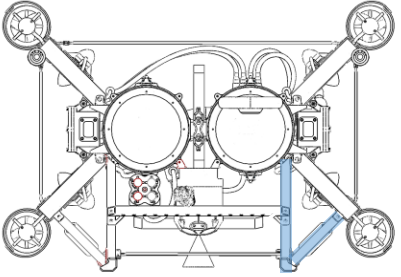


Additional Instructions

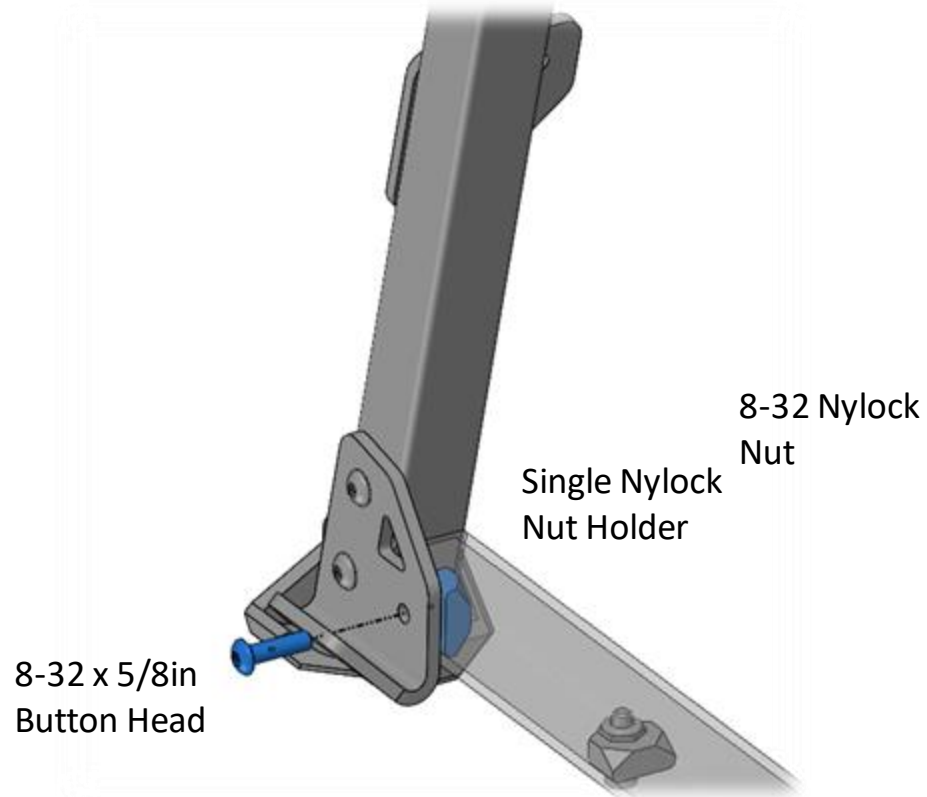
- Tighten the 8-32 screw **firm** as it will not be accessible later



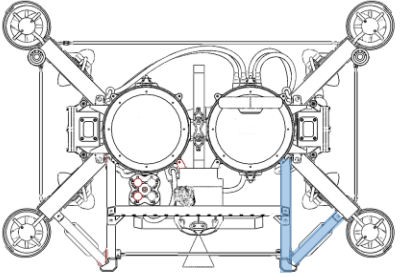
Additional Instructions



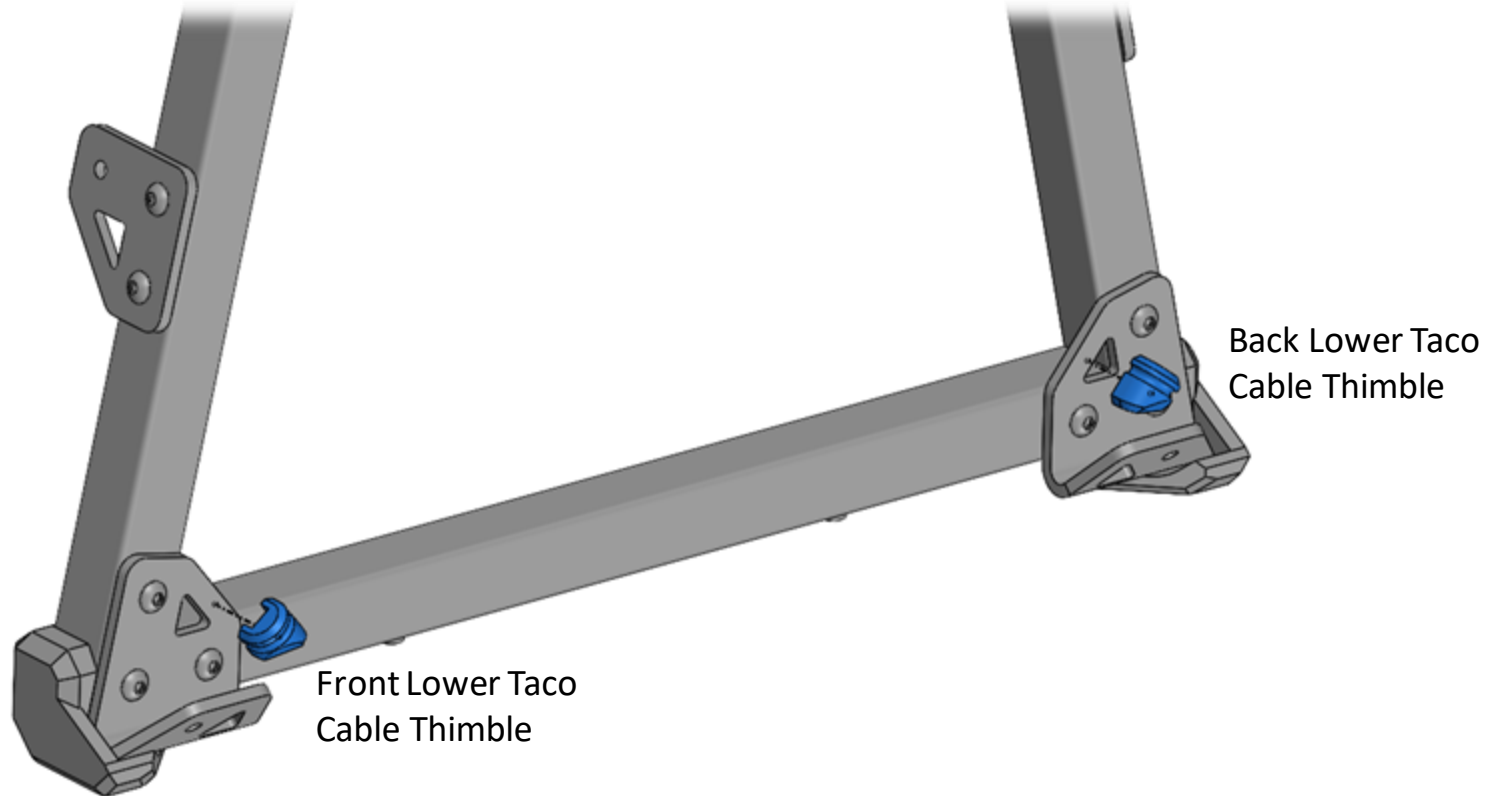
- Grab the bottom bar and connect it to the angled bracket
- The bottom bar was made translucent for visibility inside
- It may be helpful to hot glue the nut into the nylock holder
- Tighten the 8-32 screw **firm** as it will not be accessible later



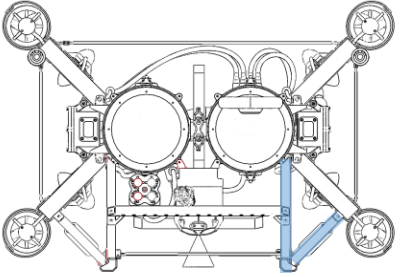
Additional Instructions



- Press on the lower cable thimbles. One side of the cylinder is cut at an angle, ensure it matches the picture
- Slide them up as high as they can go



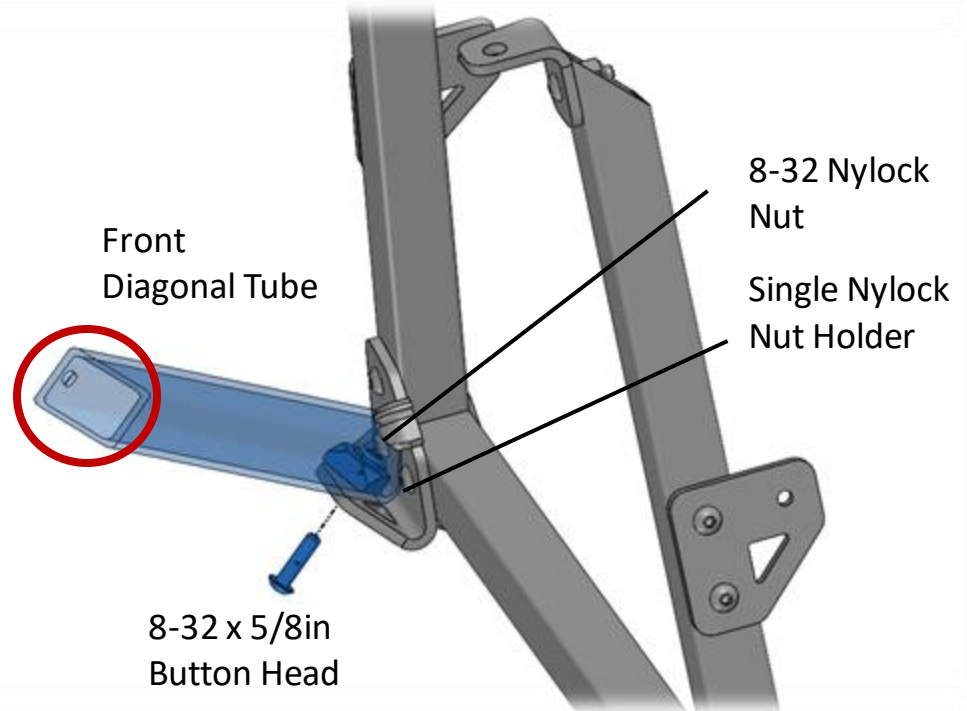
Additional Instructions



- It may be helpful to hot glue the nut into the nylock holder
- Ensure the free end has a **45° miter** as shown
- Tighten the 8-32 screw **firm** as it will be important later

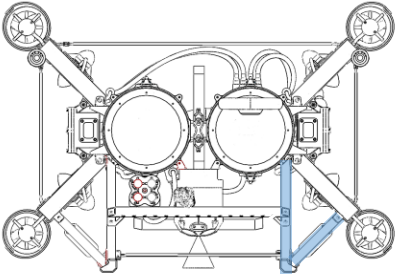


Should be 45° cut

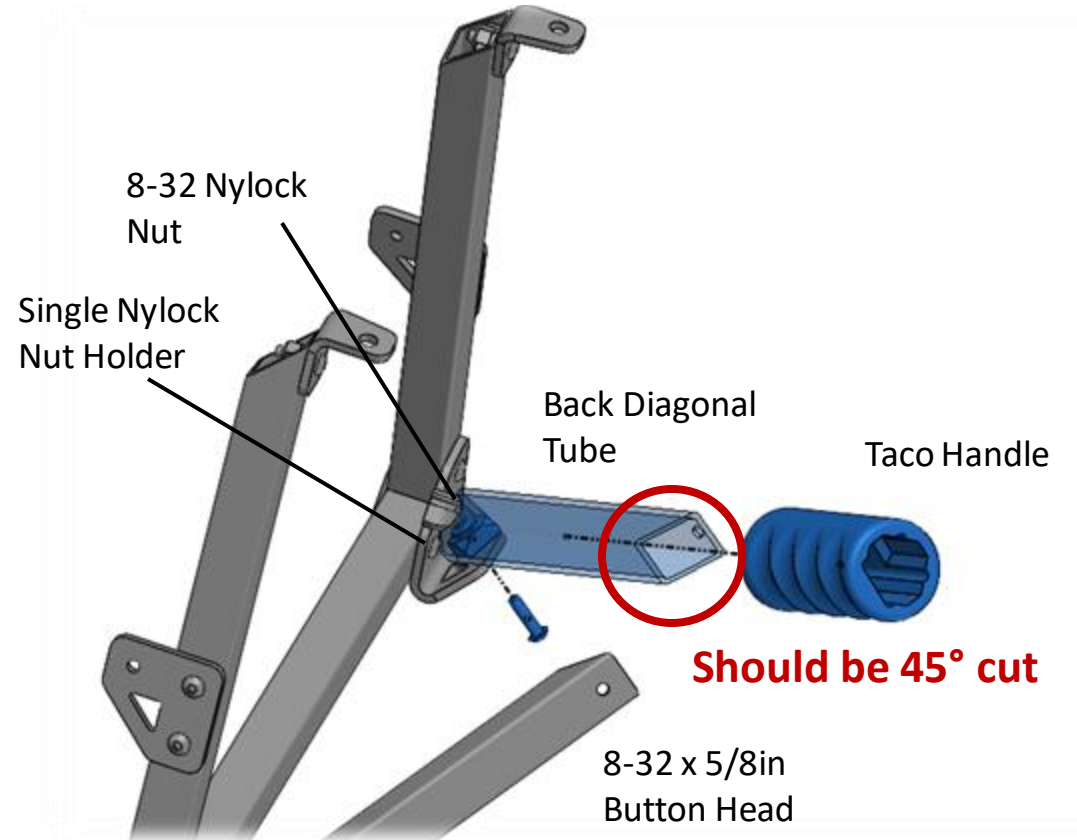


Right Taco

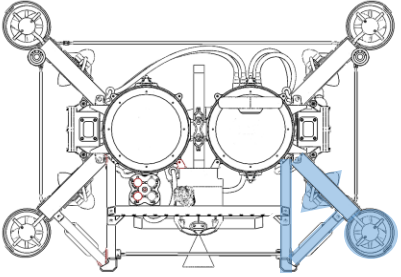
Additional Instructions



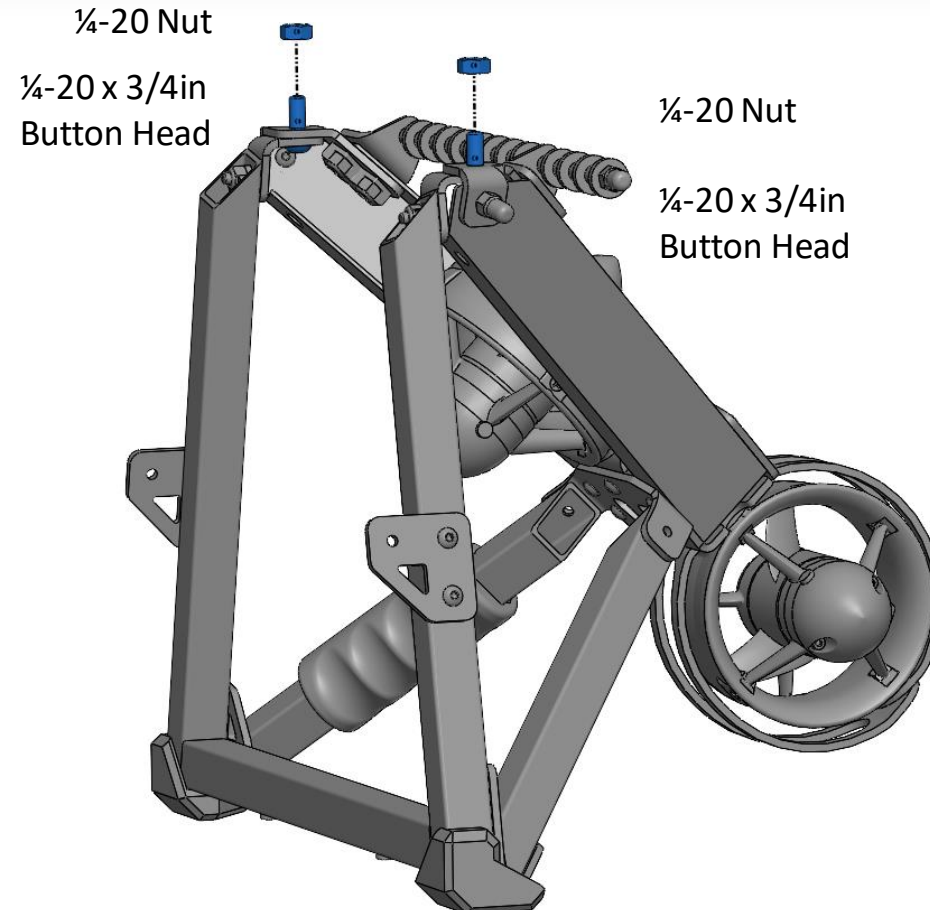
- Put the handle roughly in the middle of the tube, paying attention to the orientation of the finger grooves. The handle needs attached **before** attaching the tube to the rest of the assembly
- Ensure the free end has a **45° miter** as shown
- Tighten the 8-32 screw **firm** as it will become important later



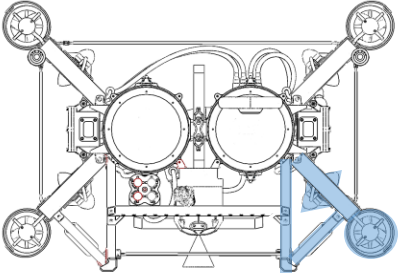
Additional Instructions



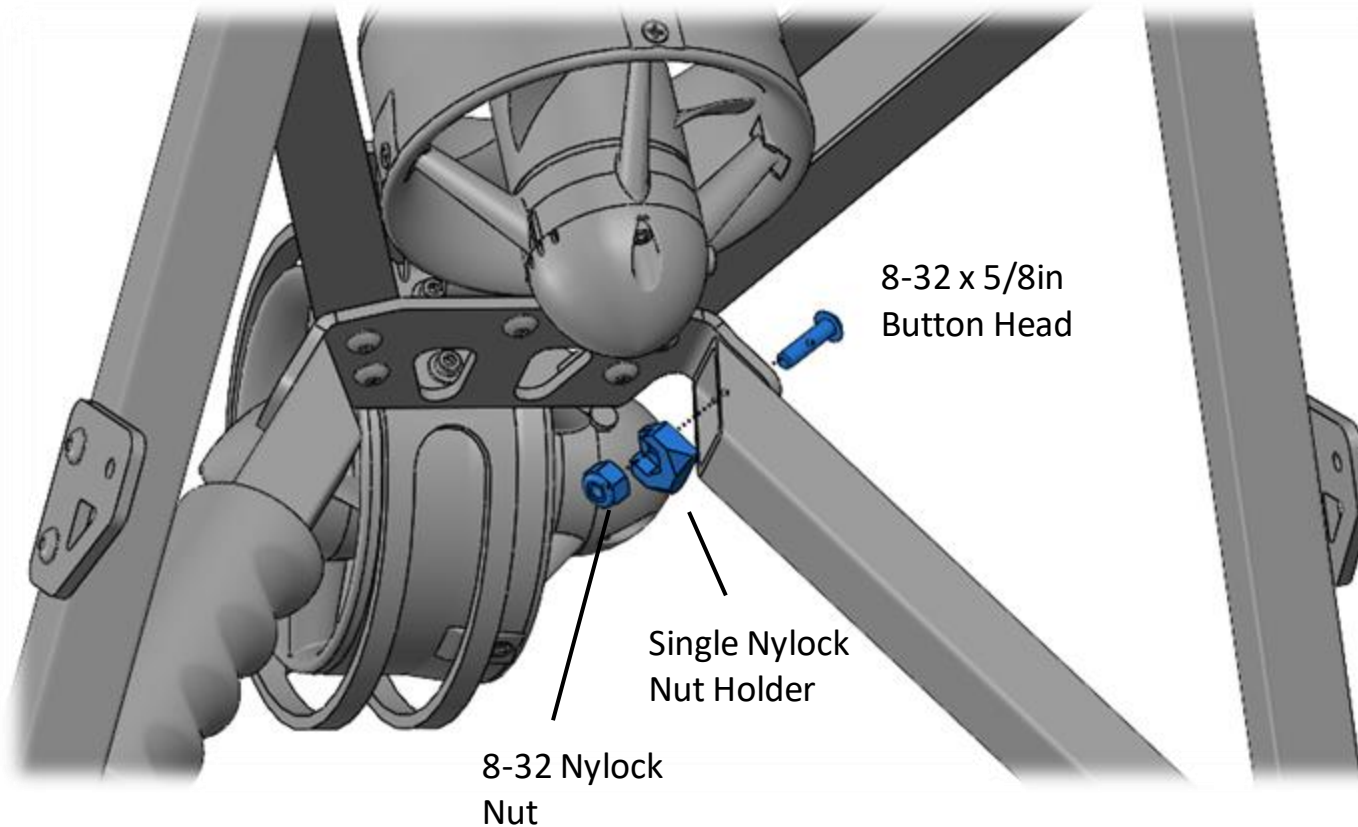
- Connect the two assemblies together at the top with the $\frac{1}{4}$ - 20 screws. Pay careful attention to the stacking of the sheet metal brackets. The vertical tube sheet metal bracket is **below** the thruster dorito sheet metal bracket



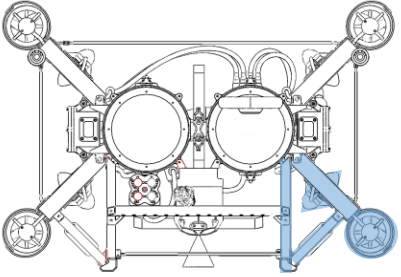
Additional Instructions



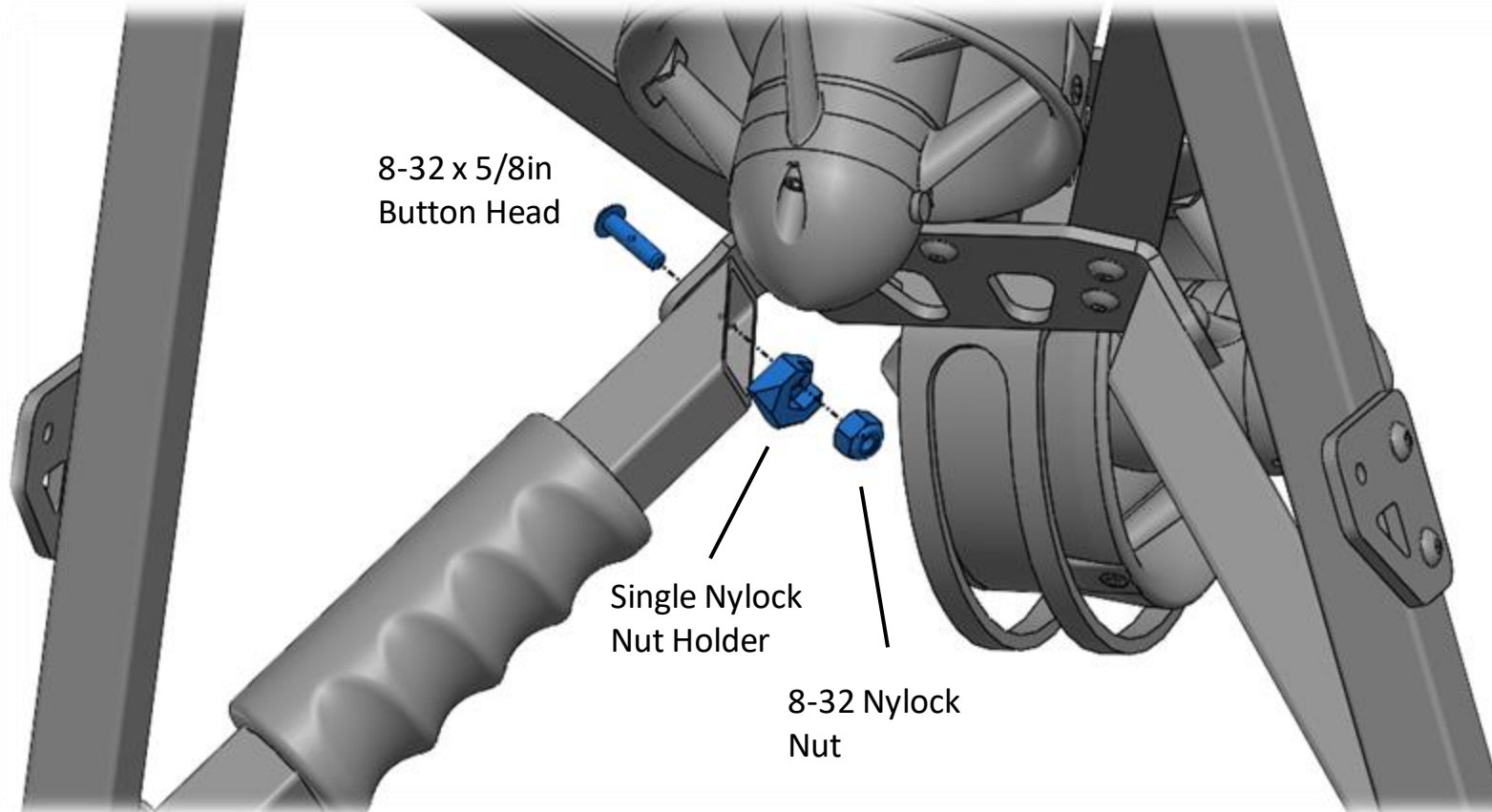
- The angled brackets at the bottom of the taco are supposed to be bent to 135° but they were only able to be bent to 130°. This means that the taco needs to be “bent” into position while the screw is going in. This causes the taco to act like a **spring** so be aware of this if it gets disassembled

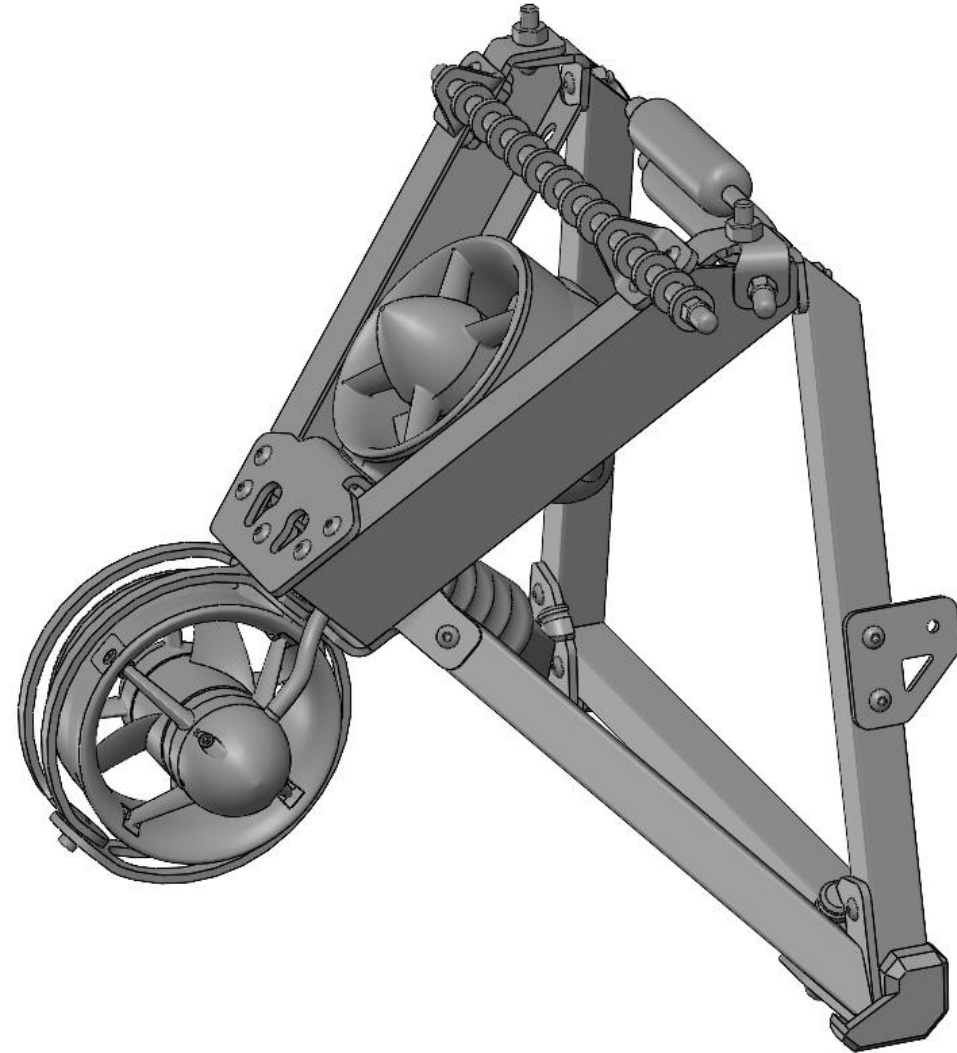


Additional Instructions



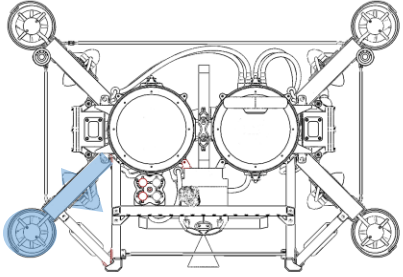
- The angled brackets at the bottom of the taco are supposed to be bent to 135° but they were only able to be bent to 130°. This means that the taco needs to be “bent” into position while the screw is going in. This causes the taco to act like a **spring** so be aware of this if it gets disassembled



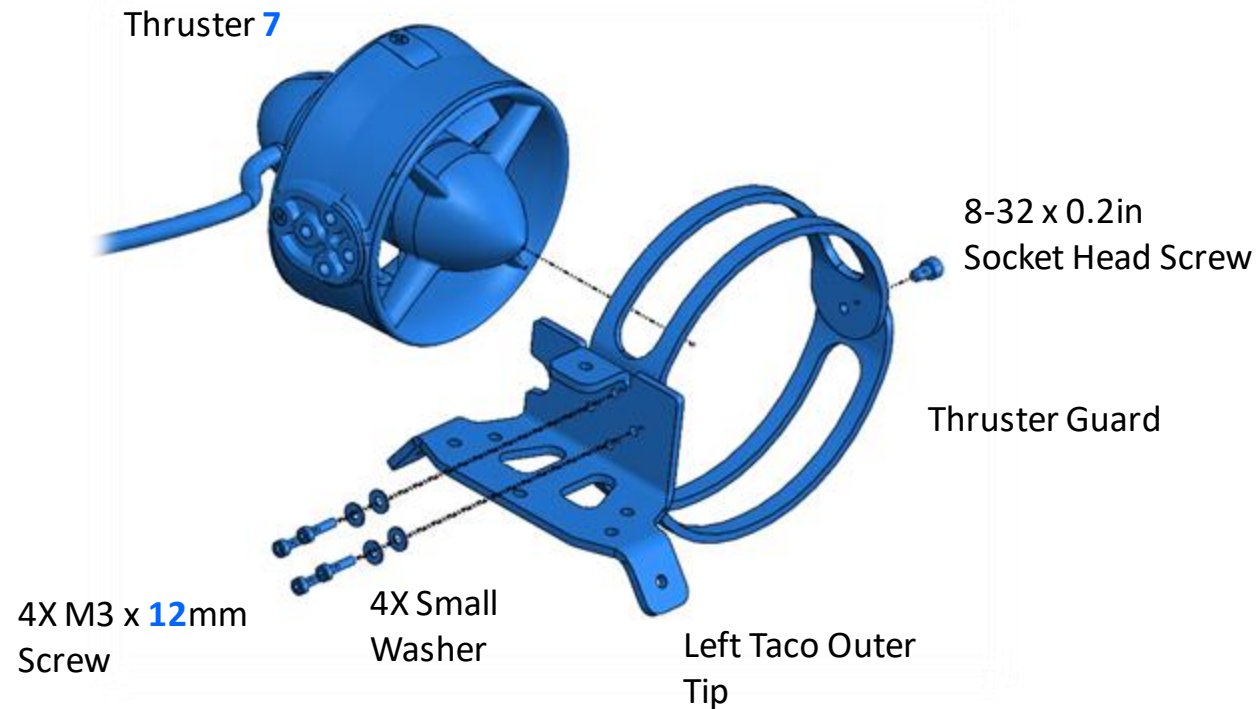


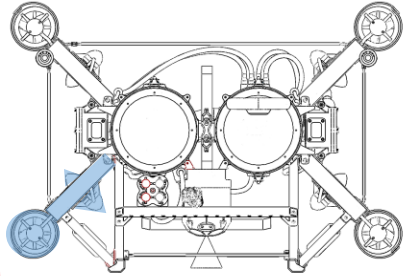
Left Taco

Additional Instructions

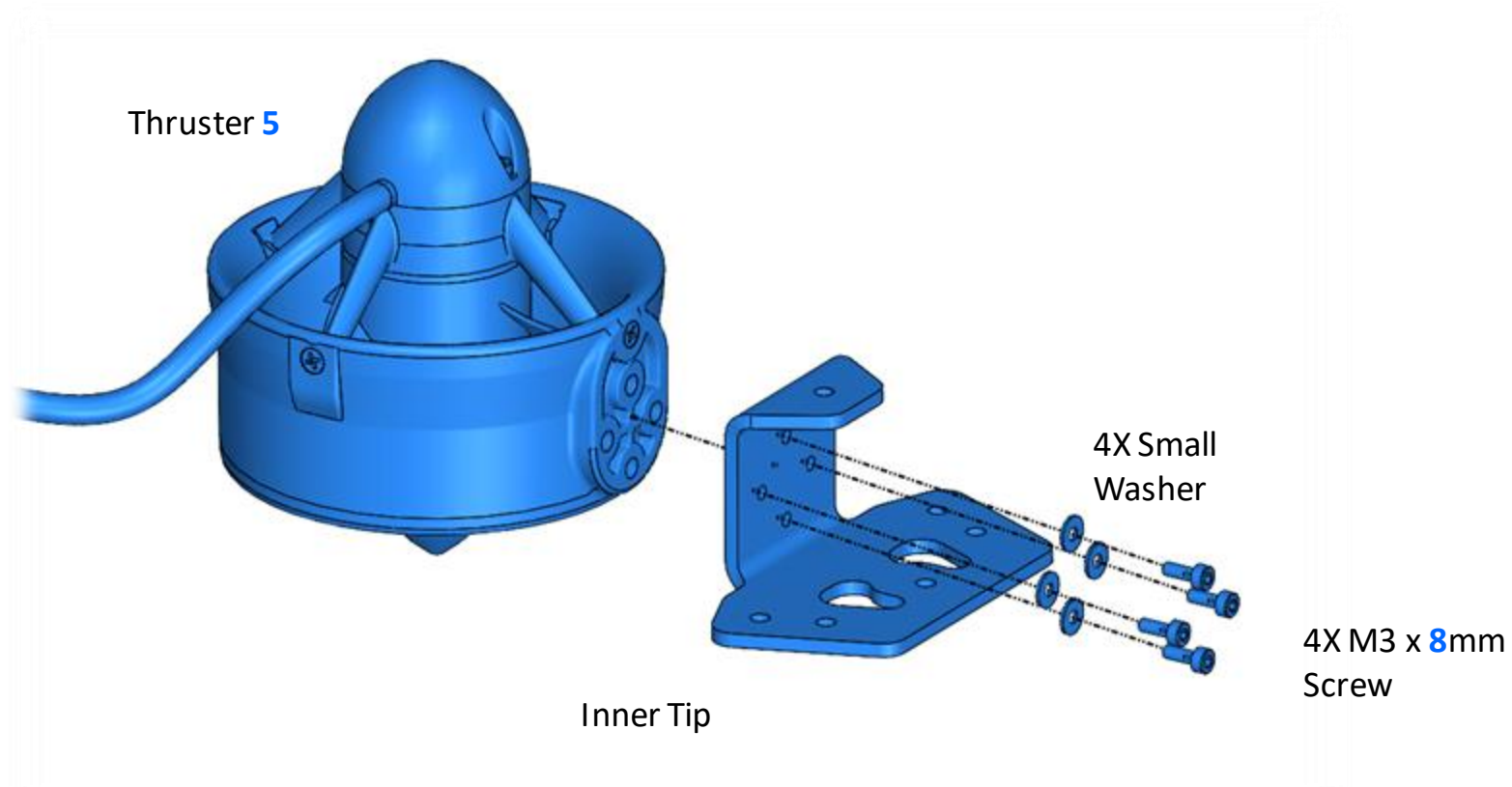


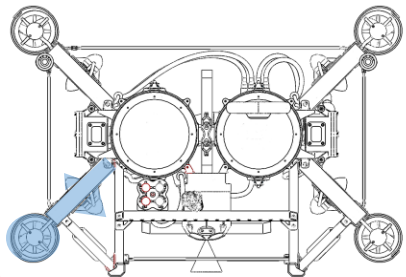
- The thruster guard may need bent slightly for the screw hole to line up
- Make sure the thruster **cable goes through notch** in sheet metal bracket
- Don't forget the washers
- Torque the M3 screws tight, as these will become very difficult to access later



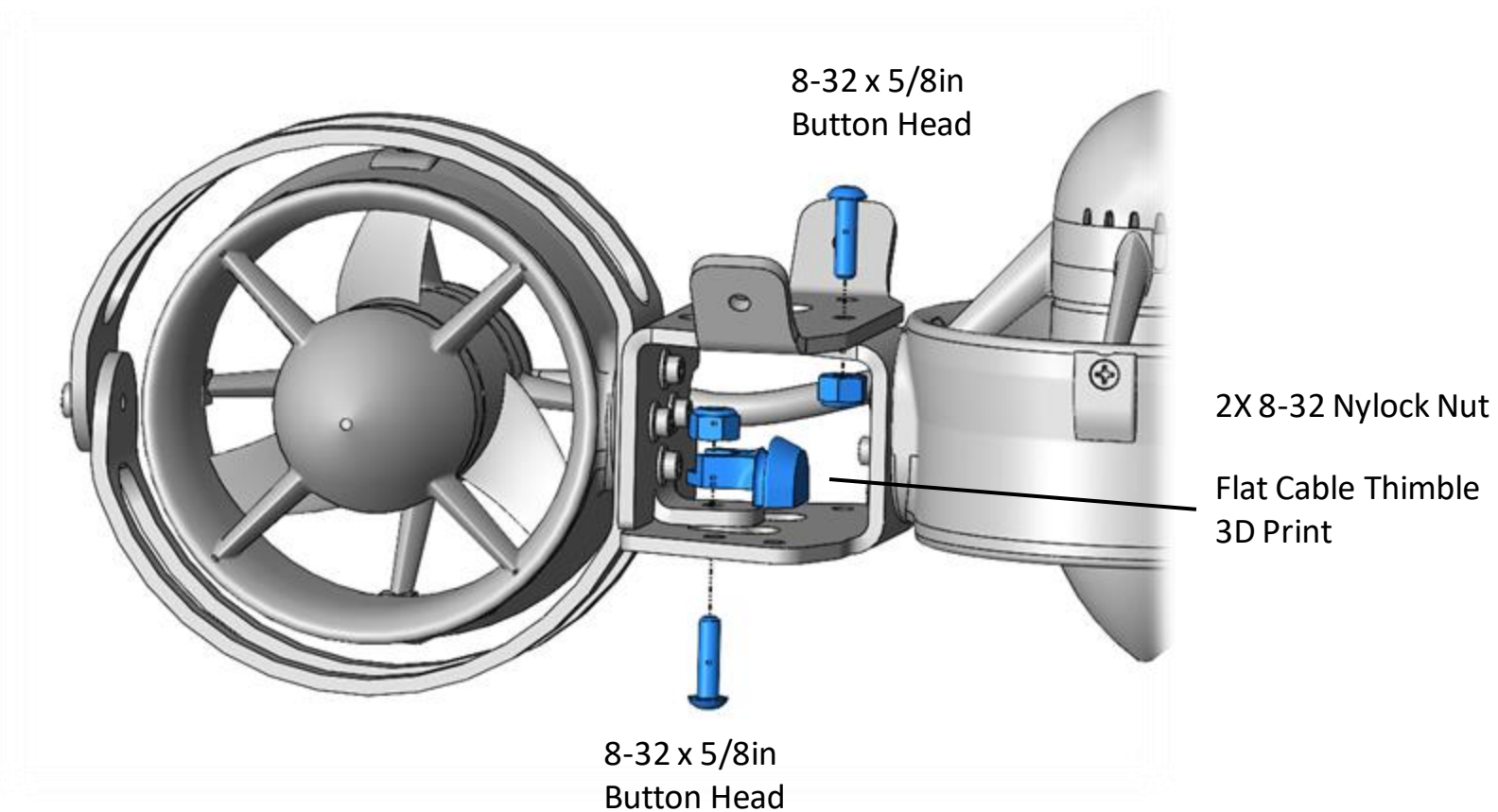


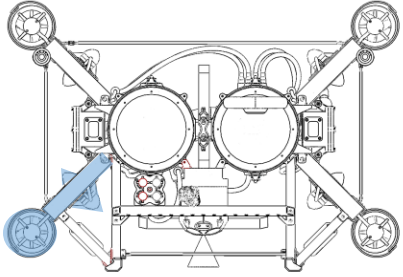
- Notice the orientation of the thruster relative to the bracket. **Don't put it on upside down!**
- Don't forget the washers
- Torque the M3 screws tight, as these will become very difficult to access later



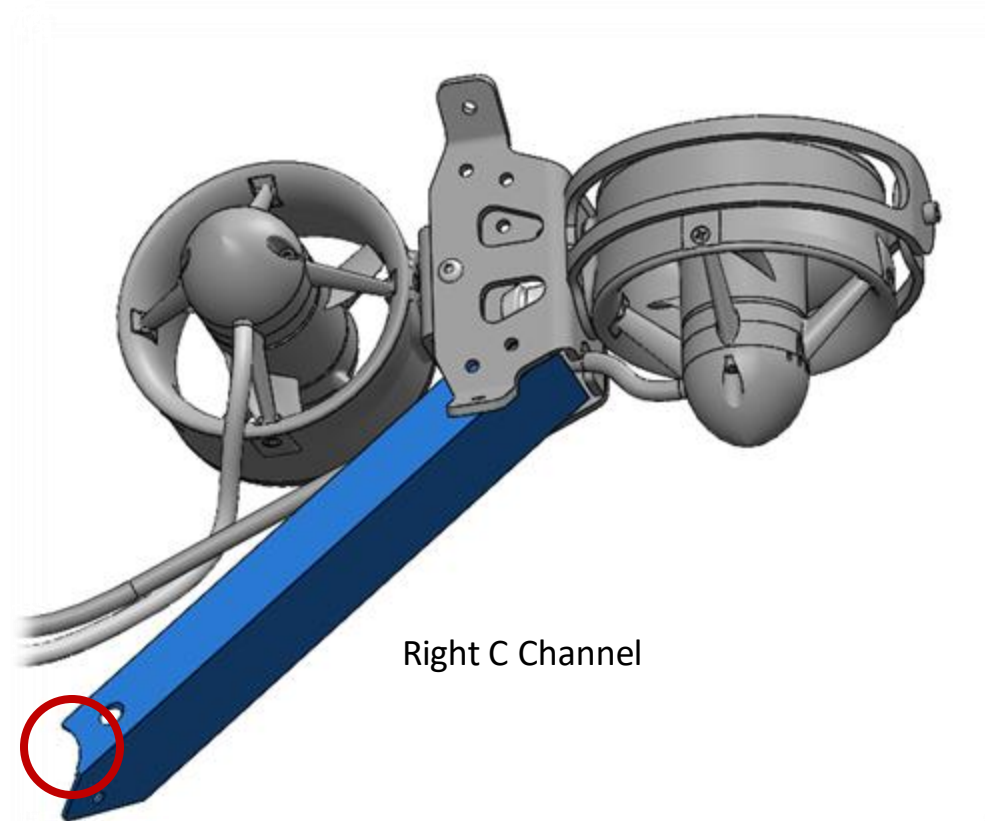


- There are two variants of the cable thimbles, ensure the correct one is used



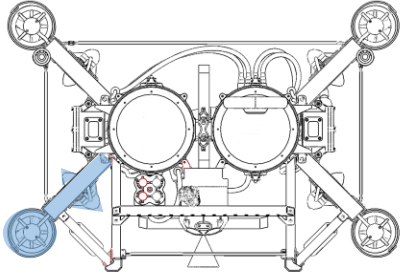


- Position the C channel as shown, make sure it has a **curved edge** (circled in red) by the screw access hole. This is needed later for screw clearance
- Make sure the **orientation is correct!** Don't use the incorrect C channel
- The thruster cable must be **inside the C channel!** It will be a pain to fix later if not done correctly now

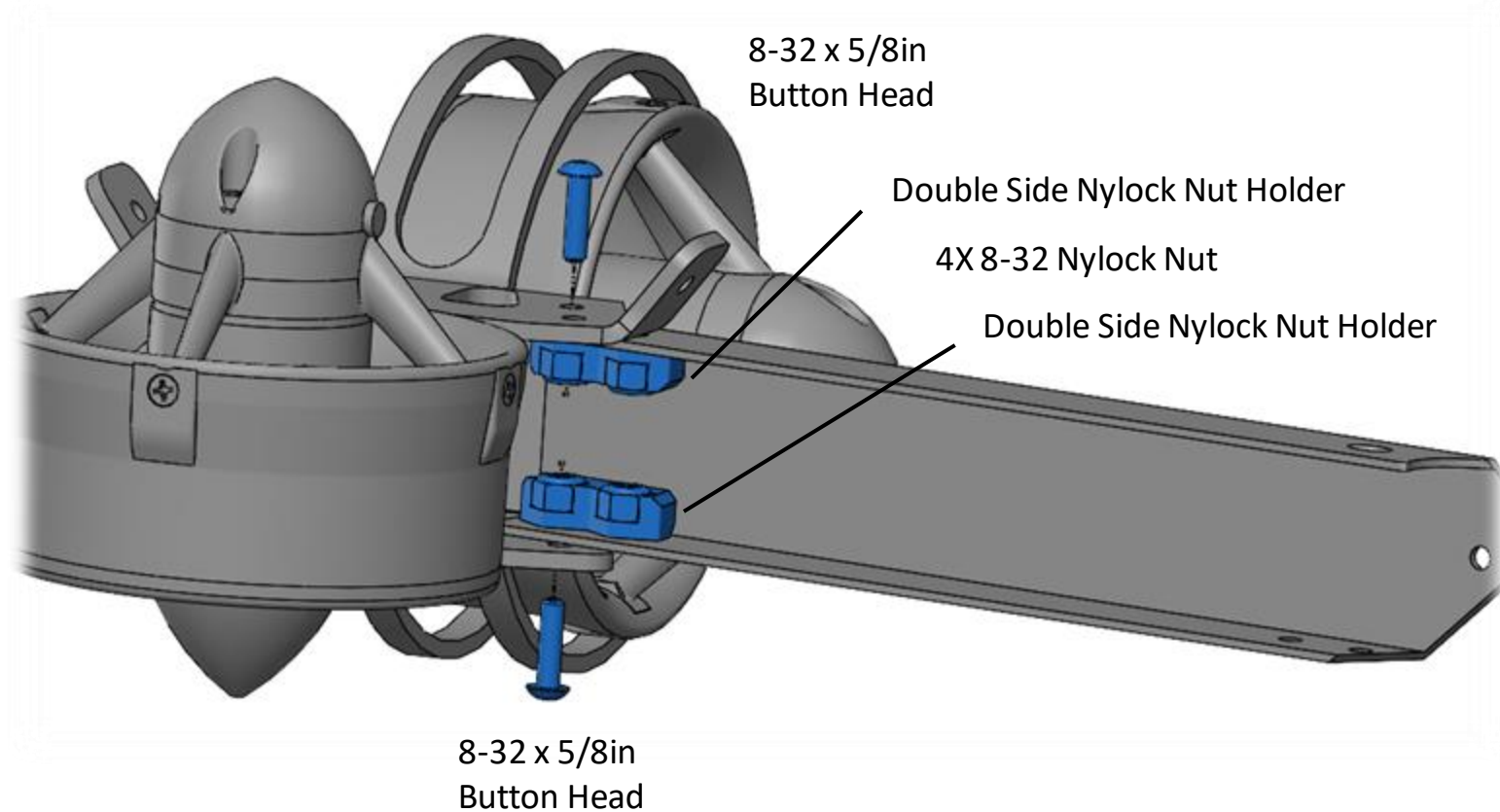


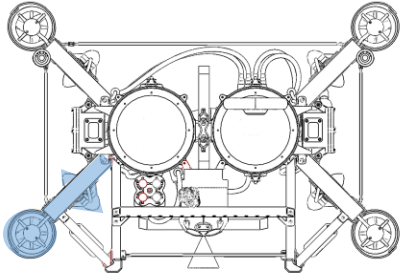
Left Taco

Additional Instructions

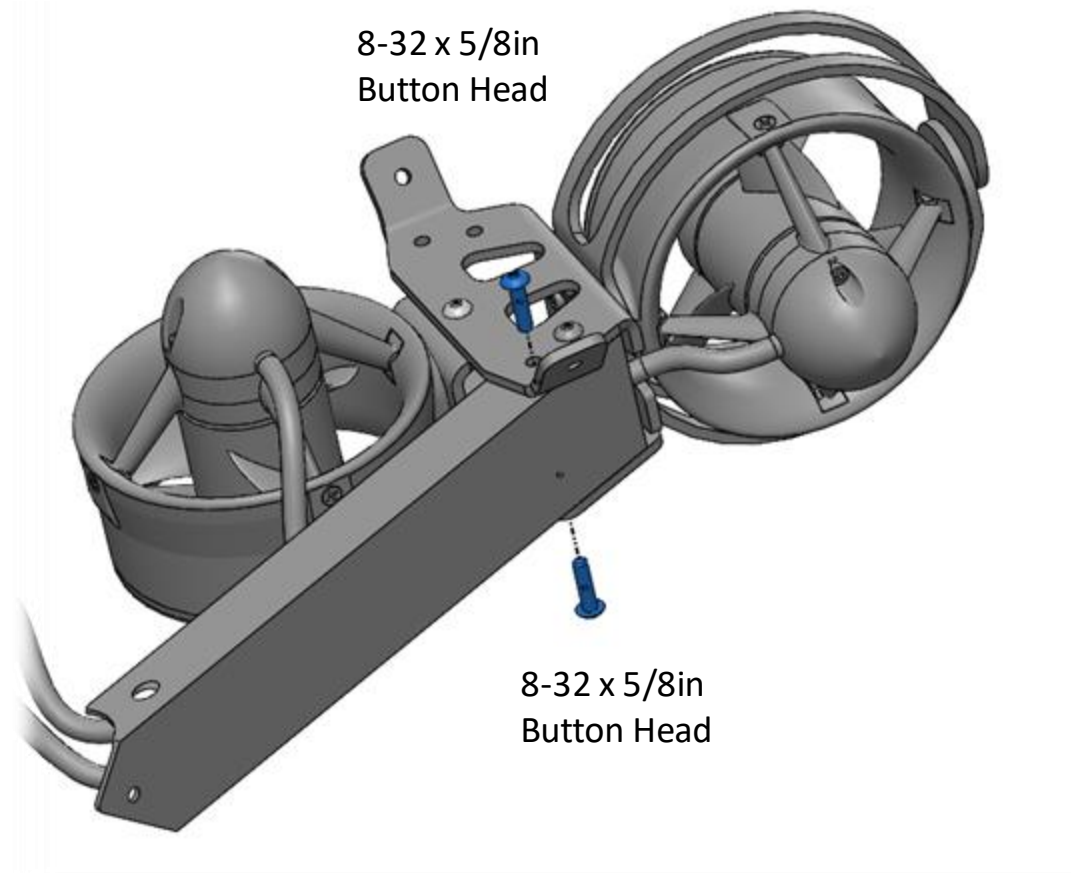


- Thruster cable hidden for better visibility
- Prepare double side nylock holders **without notches**
- Hot glue the nuts into 3D print, with the one that goes through the handle bar needing to be **nylon down** (circled in red)
- Instead of hot glue, some preferred to hold nuts in position with a long bar of metal



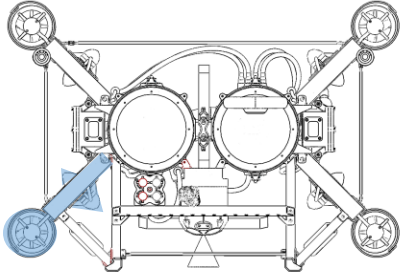


- Pivot the C channel into position. The thruster **cable must go through** the C channel!
- The handle may need banged on, as it is a tight fit

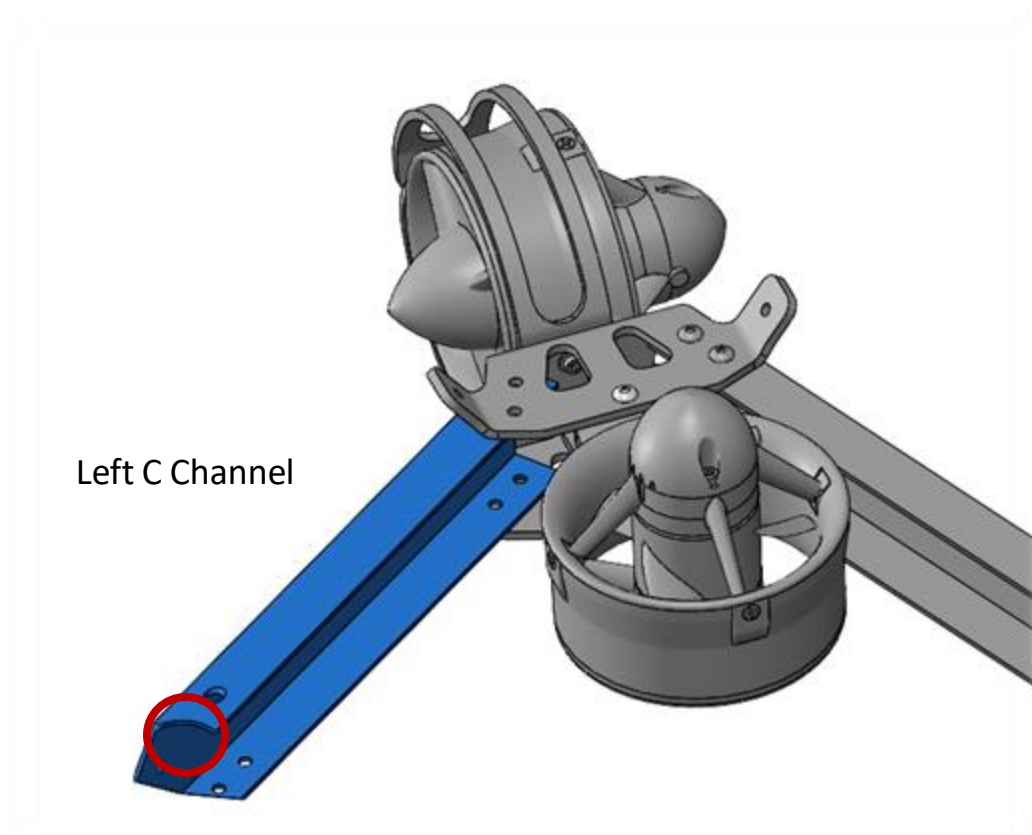


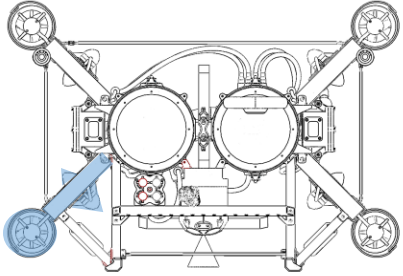
Left Taco

Additional Instructions

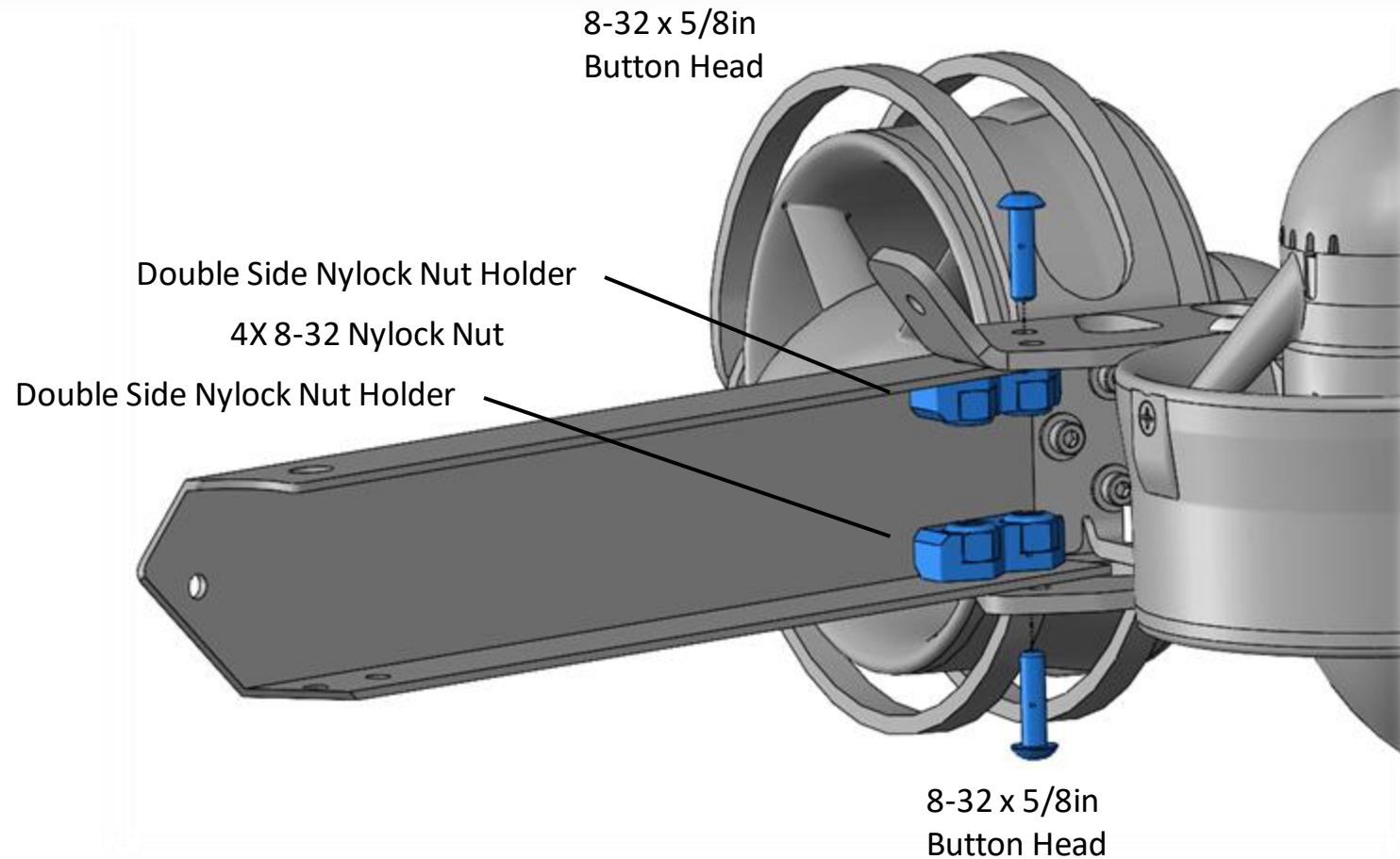


- Position the C channel as shown, make sure it has a **curved edge** (circled in red) by the screw access hole. The curved edge is needed for screw head clearance in the Taco assemblies
- Make sure the **orientation is correct!** Don't use the incorrect C channel

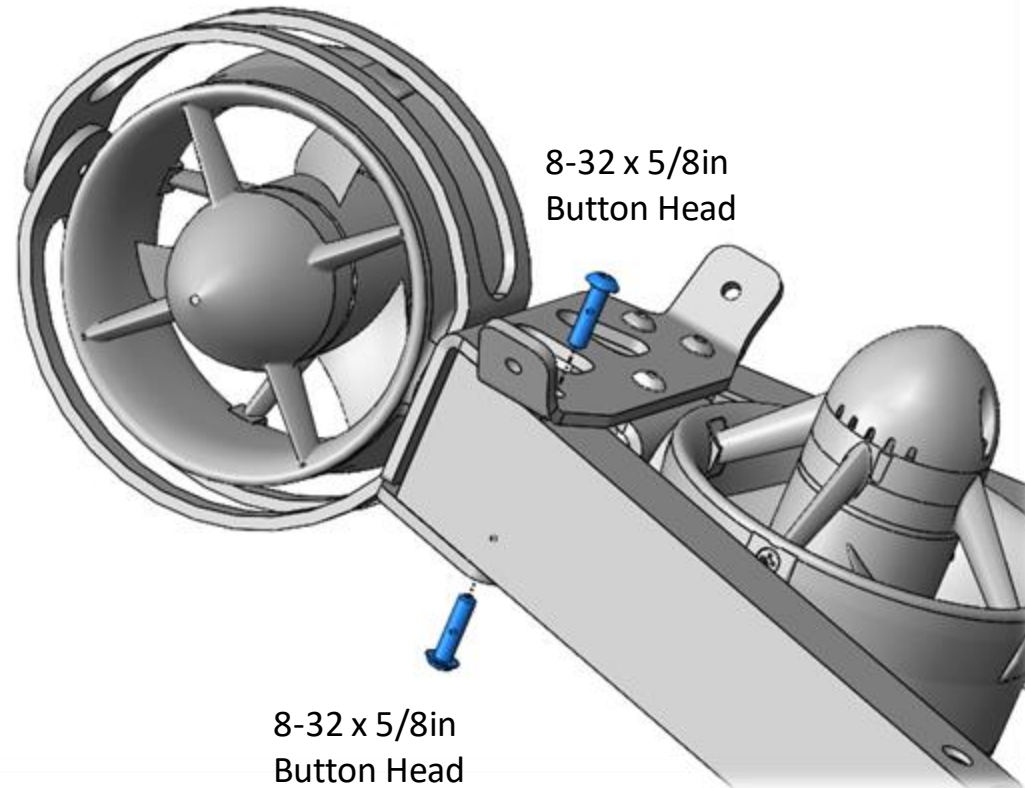
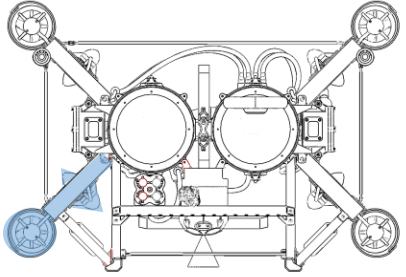


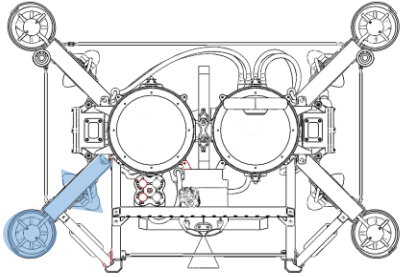


- Prepare double side nylock holders **without notches**
- **Hot glue** the nuts into 3D printed nylock holder
- Instead of hot glue, some preferred to hold nuts in position with a long bar of metal

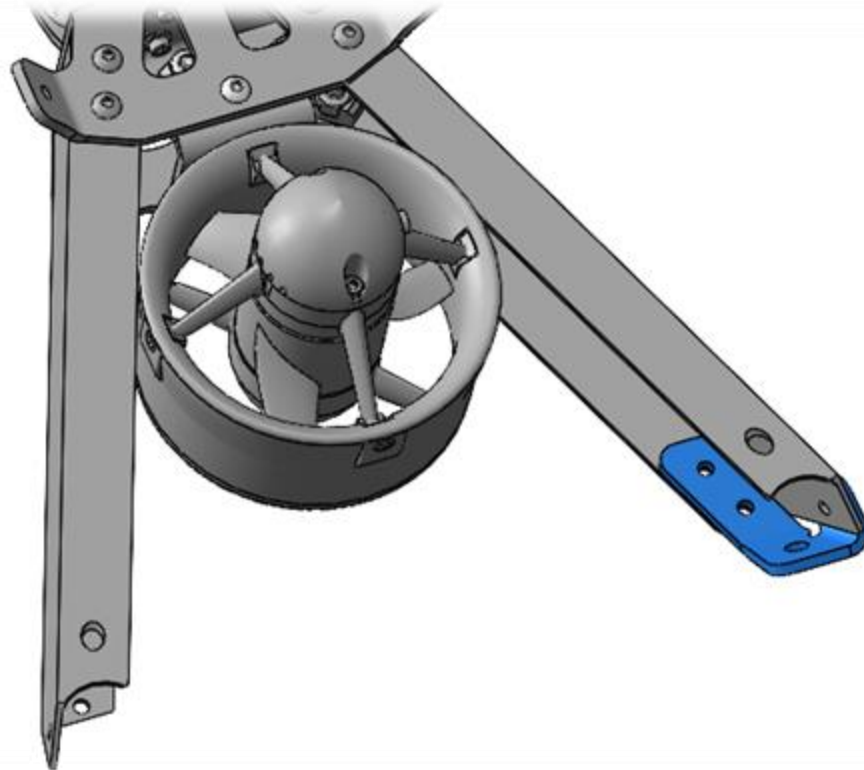


- Pivot the C channel into position.

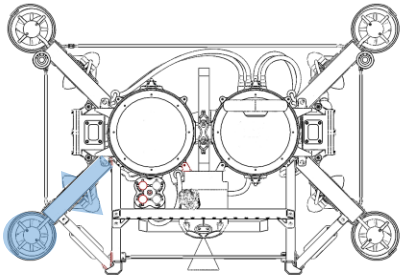




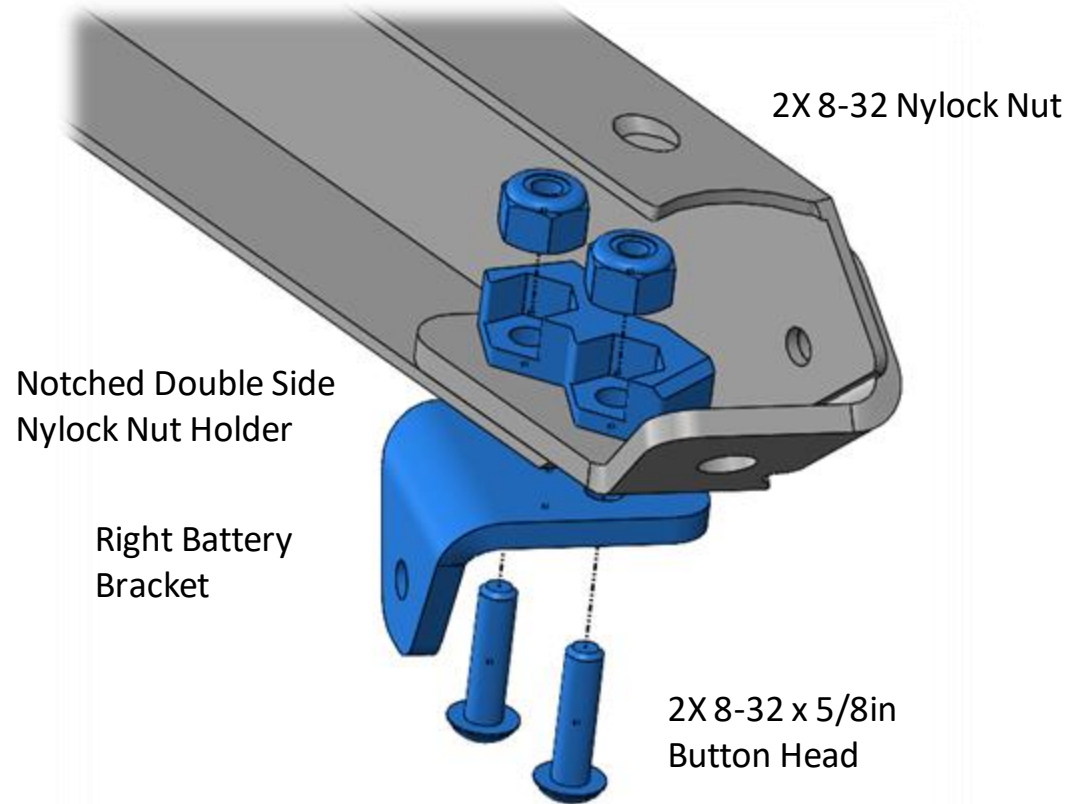
- Place the hull connecting bracket as shown. Notice the side with two holes is **inside** the C channel, and the side with one hole is **outside** the C channel

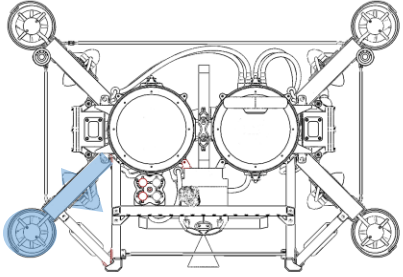


Right Hull
Connector Bracket

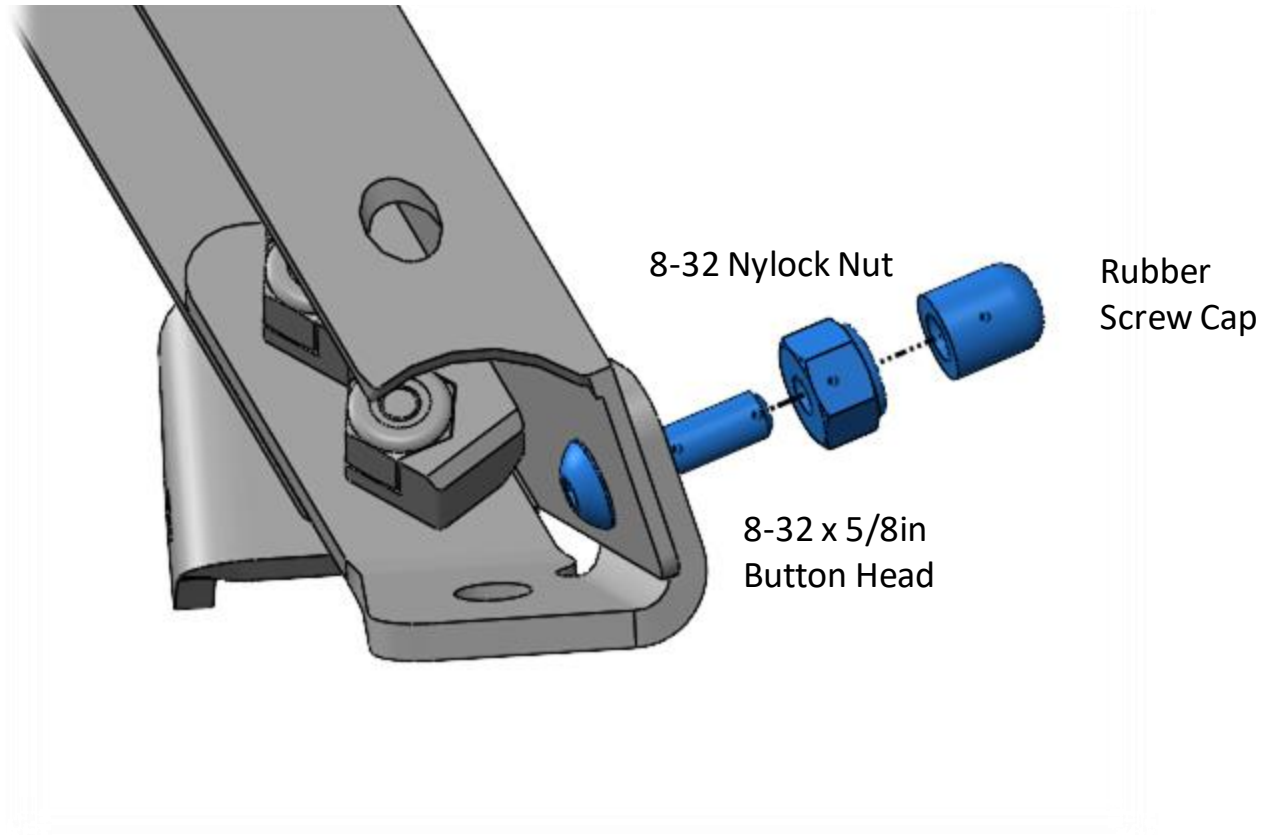


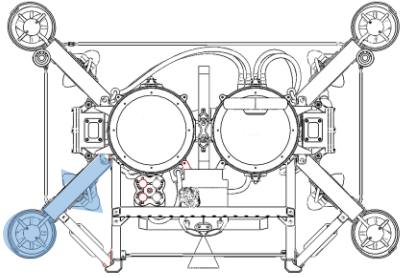
- Make sure the to use the correct battery bracket
- The nylock holder has a **notch**



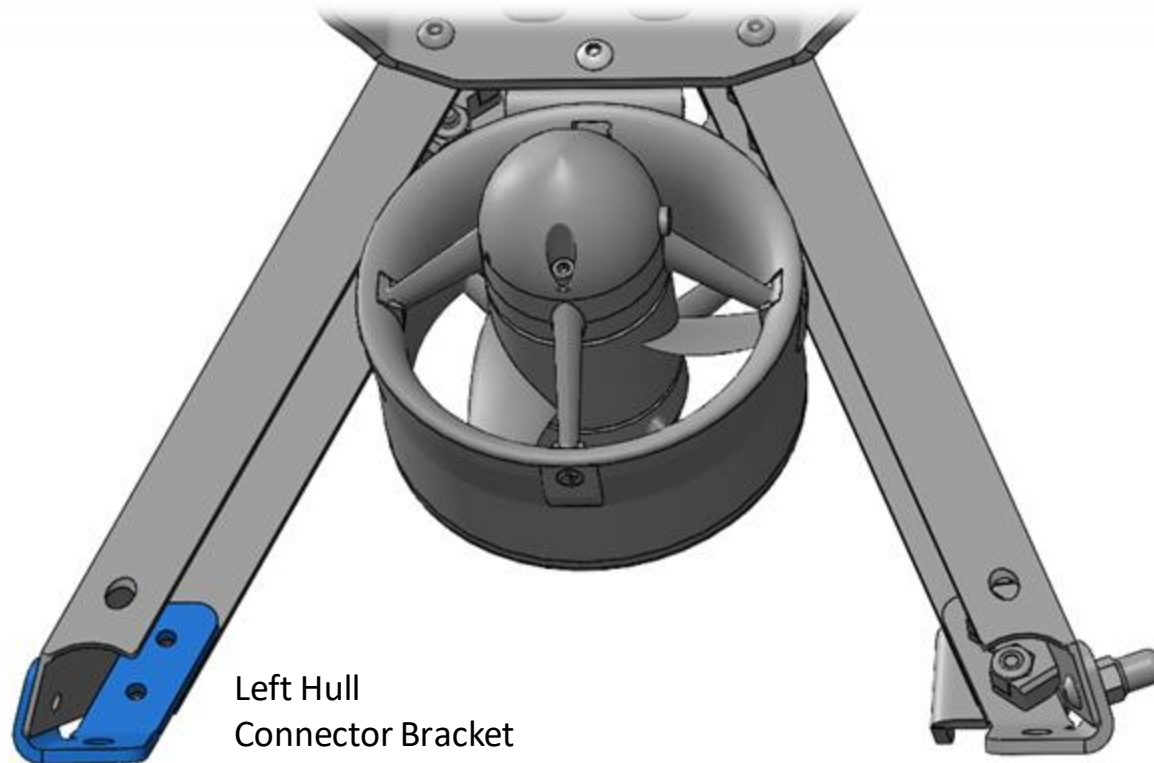


- You will need to use a wrench on this 8 - 32 nut, don't forget the rubber screw cap



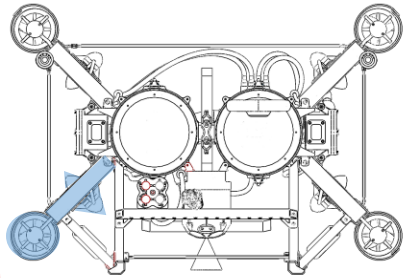


- Place the hull connecting bracket as shown. Notice the side with two holes is **inside** the C channel, and the side with one hole is **outside** the C channel



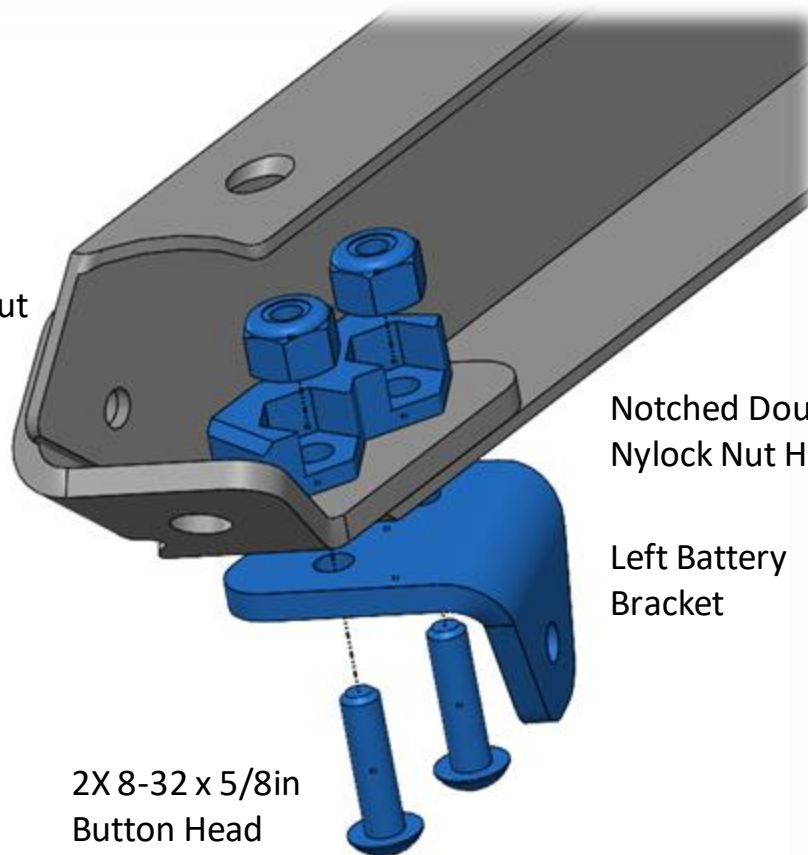
Left Taco

Additional Instructions



- Make sure the to use the correct battery bracket
- The nylock holder has a **notch**

2X 8-32 Nylock Nut

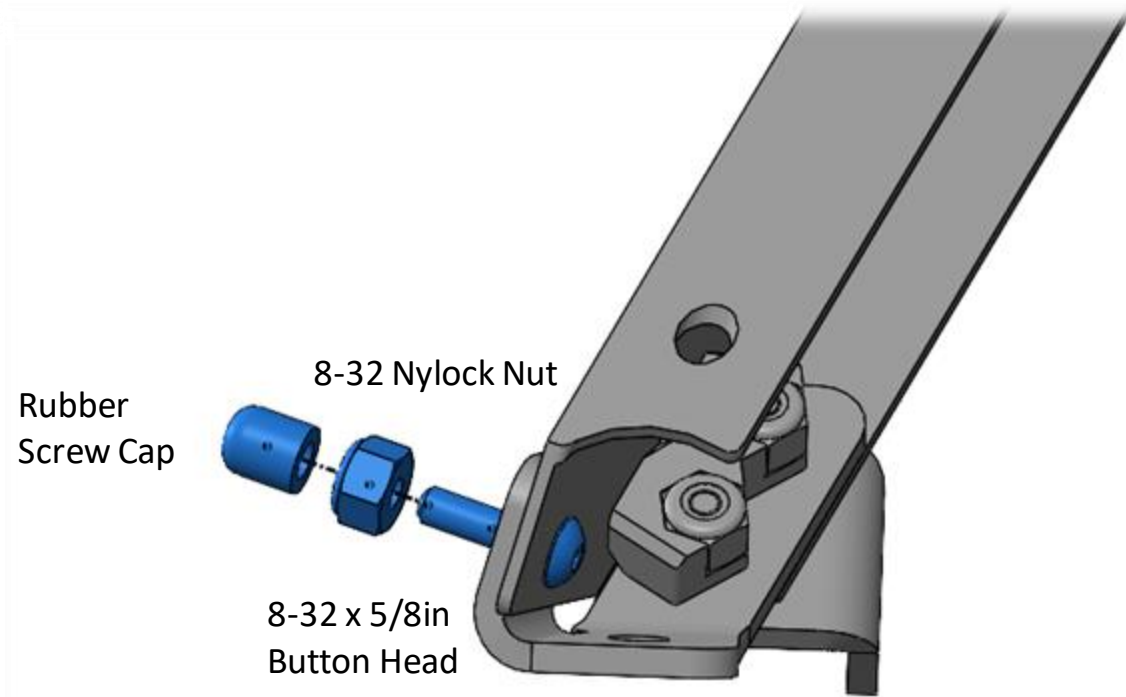
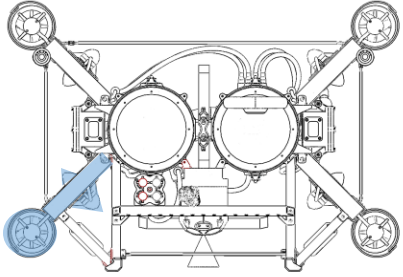


Notched Double Side
Nylock Nut Holder

Left Battery
Bracket

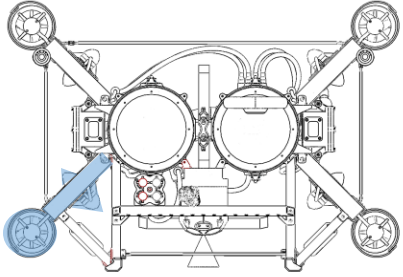
2X 8-32 x 5/8in
Button Head

- You will need to use a wrench on this 8 - 32 nut, don't forget the rubber screw cap

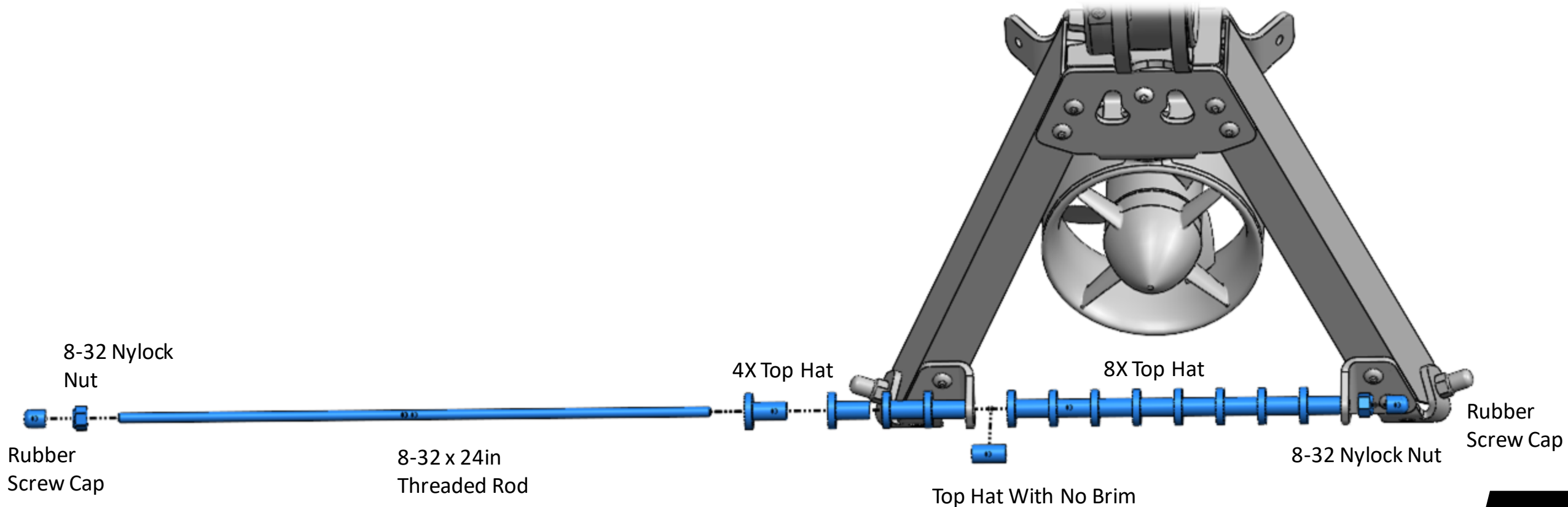


Left Taco

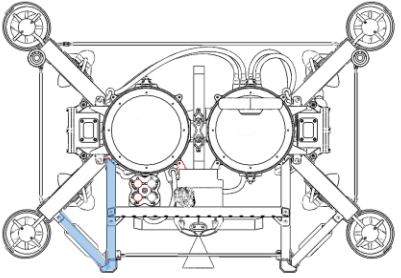
Additional Instructions



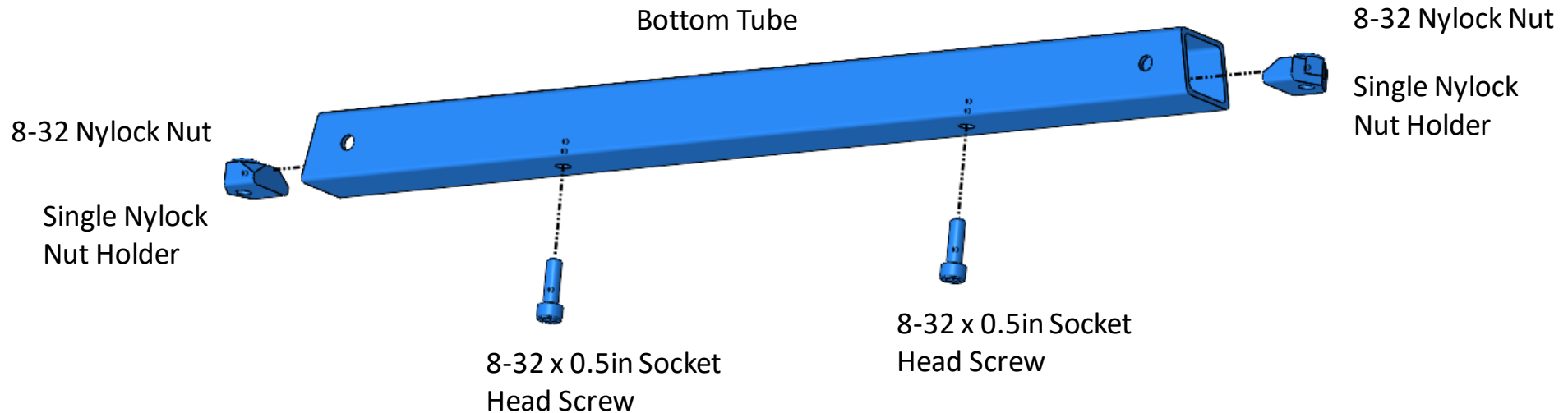
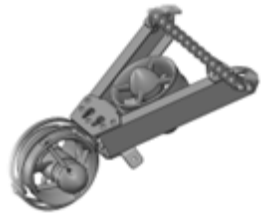
- Put the threaded rod through all the top hats before putting on the nuts
- To get rod even on both sides, may need to grip rod with vice grips while spinning nut with wrench
- **Don't tighten too hard** or it will bow the rod! Stop tightening when you can no longer spin the top hats with your fingers



Additional Instructions



- Set the thruster triangle aside
- It may be helpful to hot glue nut into nylock holder
- These screws **must be socket head** not button head. They are used for locating with the COM scale

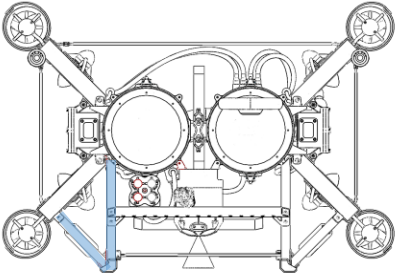


After install: (Bar is translucent to see inside)

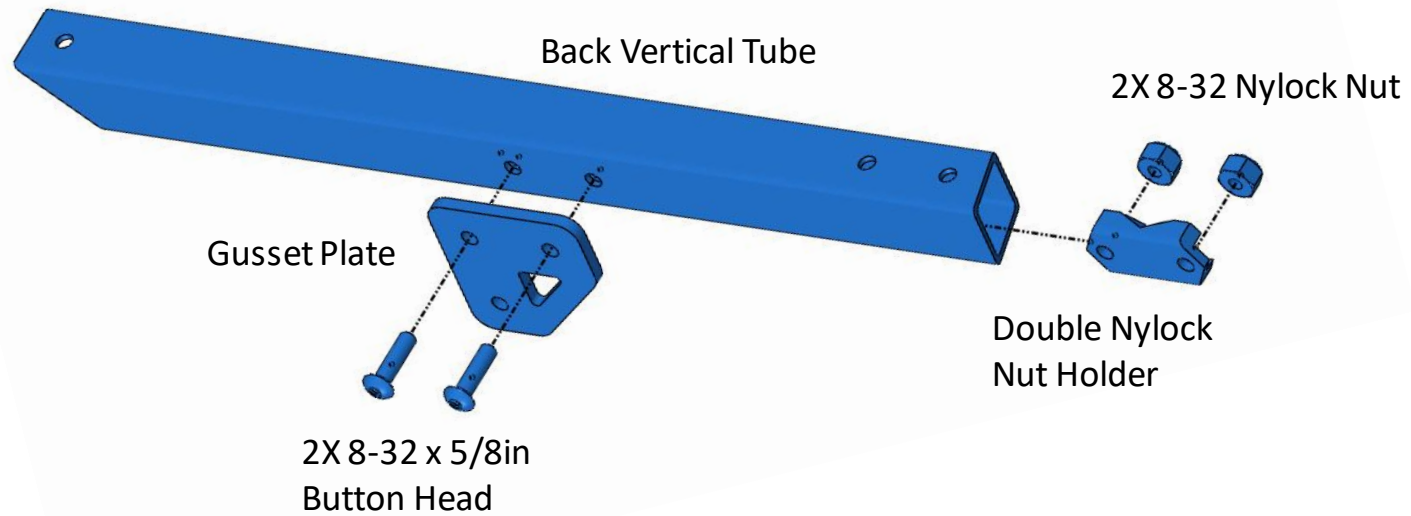
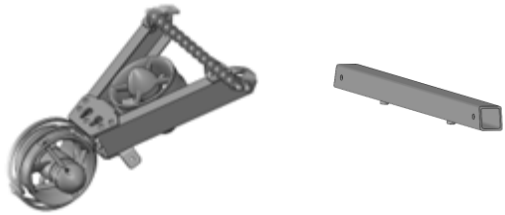


Left Taco

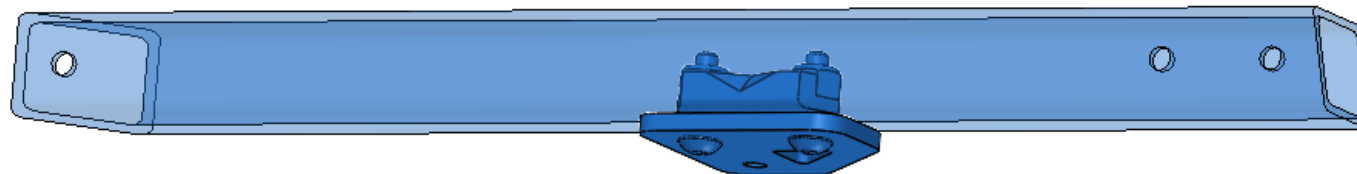
Additional Instructions

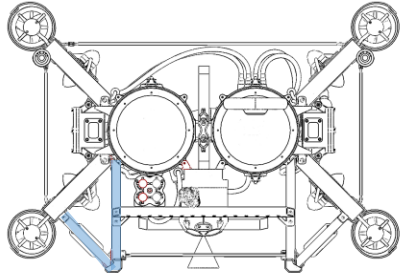


- Set the lower bar aside
- Hot gluing the nuts into the double nylock holder is **REQUIRED**. One of these screws will be removed in the future and the nut can not fall out

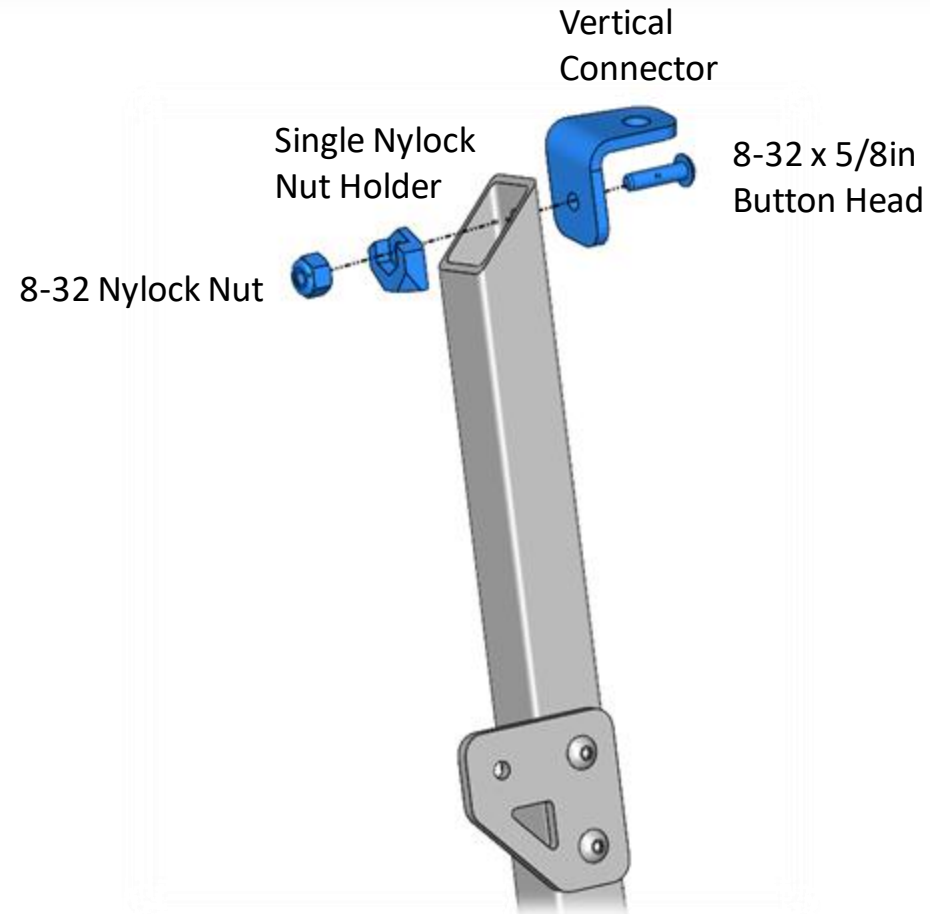
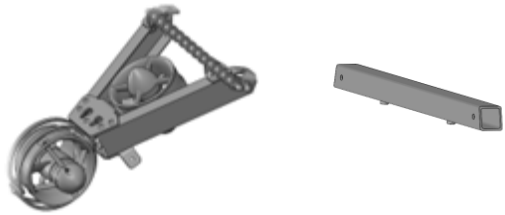


After install: (Bar is translucent to see inside)

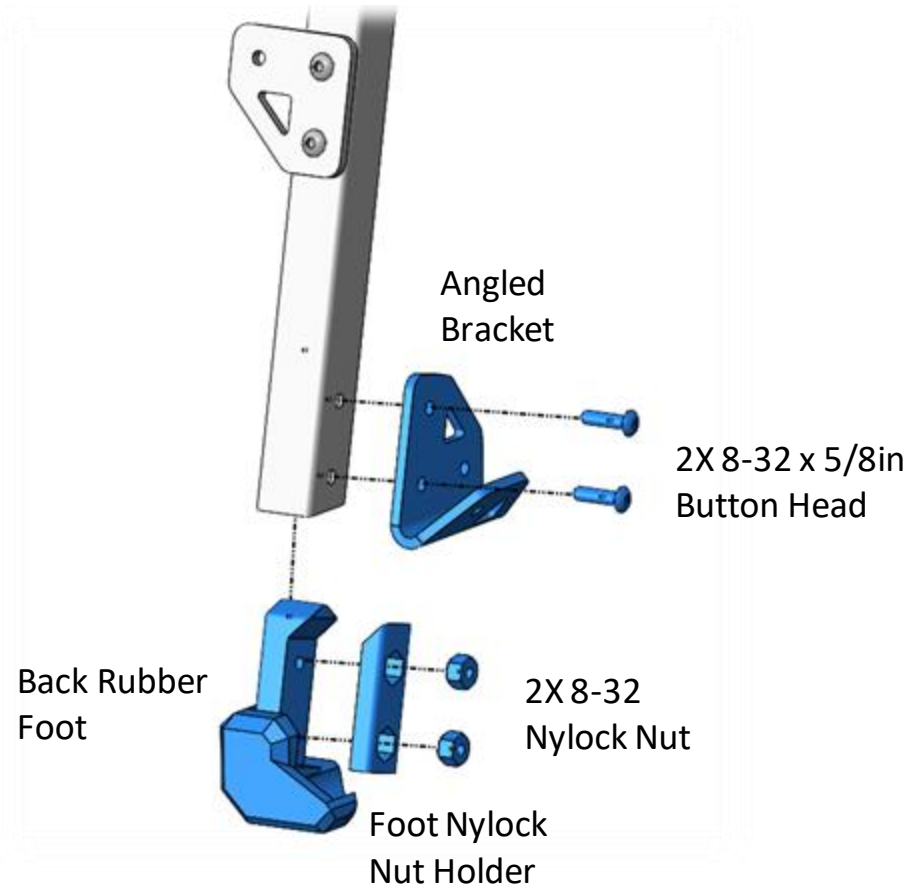
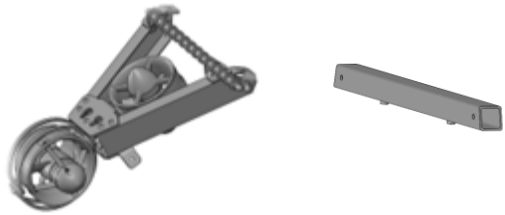
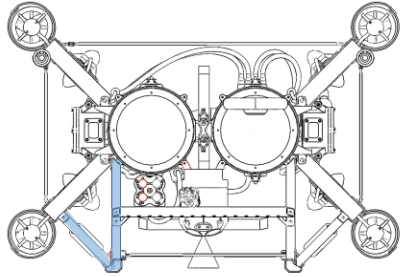


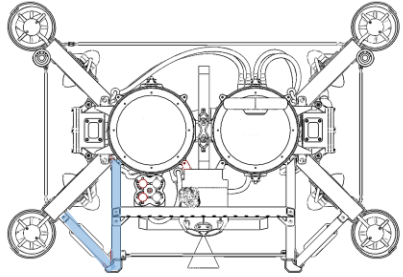


- Ensure you are using the correct vertical connector (there's two types). **Verify the angle matches** what is shown in the picture
- Tighten the 8-32 screw **firm** as it will not be accessible later

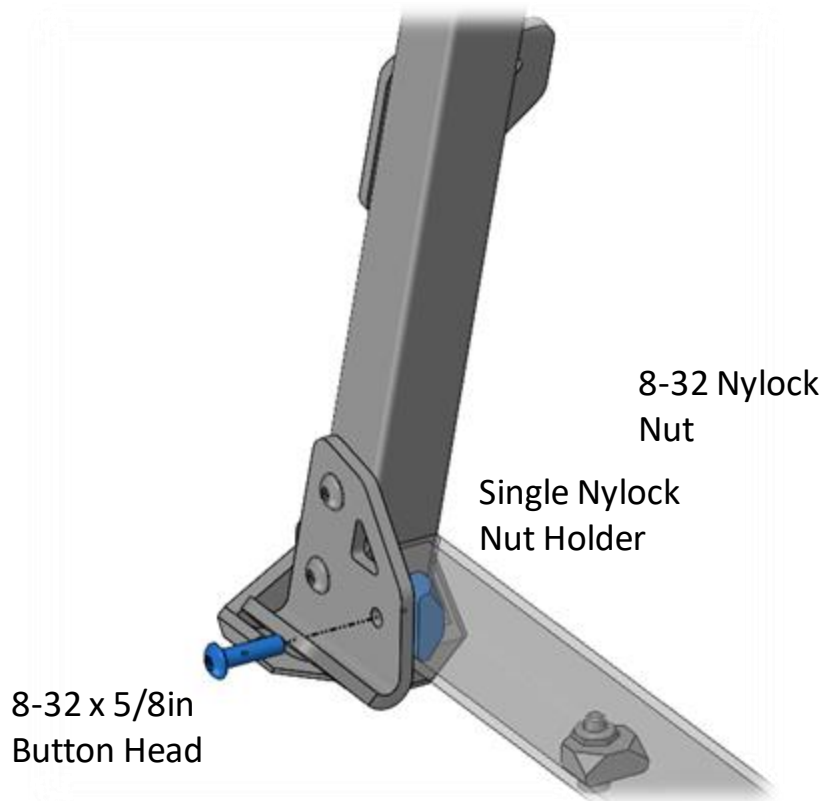


- Tighten the 8-32 screws **firm**, as they will not be accessible later



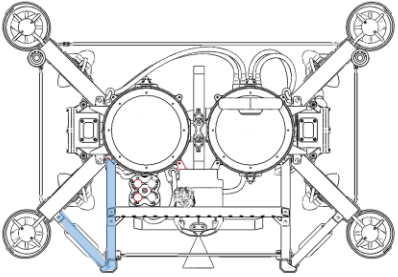


- Grab the bottom bar and connect it to the angled bracket
- The bottom bar was made translucent for visibility inside
- It may be helpful to hot glue the nut into the nylock holder
- Tighten the 8-32 screw **firm** as it will not be accessible later

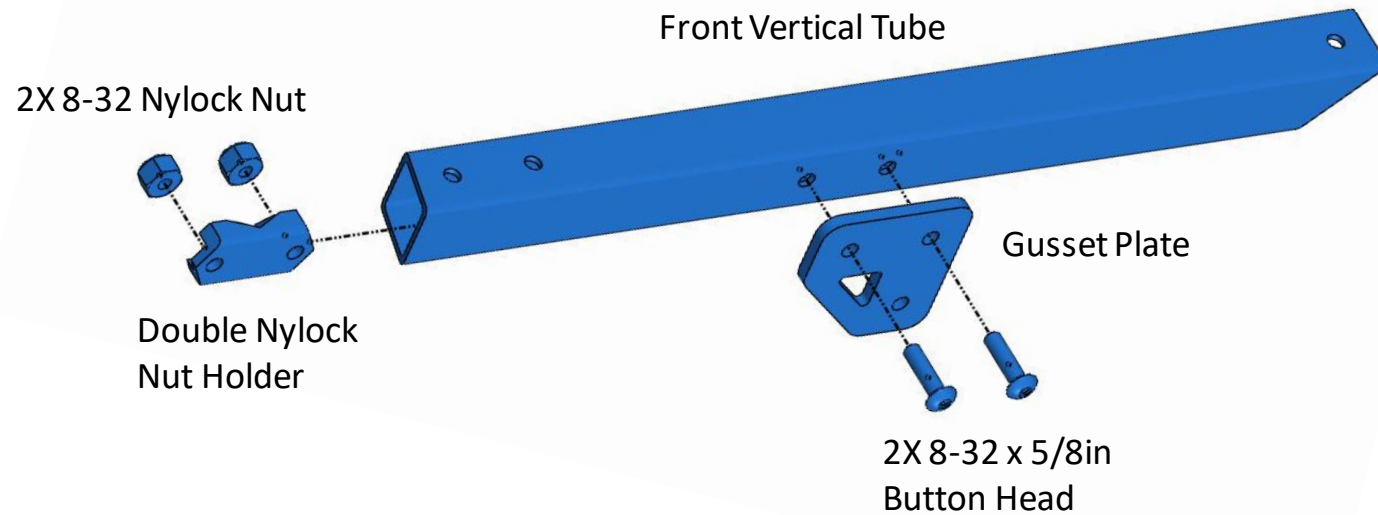
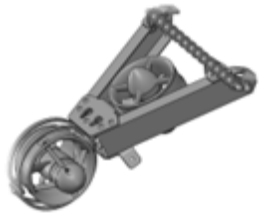


Left Taco

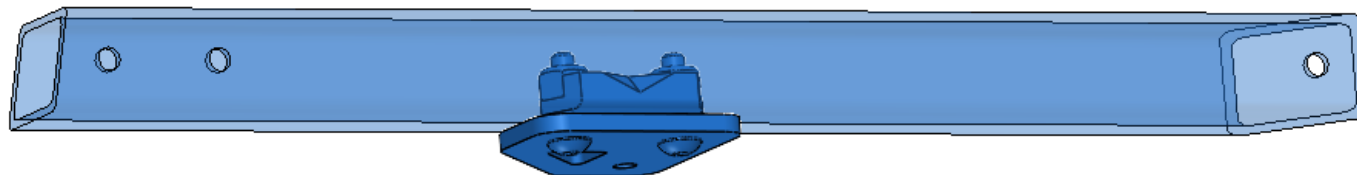
Additional Instructions



- Set the lower taco bars aside, a mirrored version will now be made
- Hot gluing the nuts into the double nylock holder is **REQUIRED**. One of these screws will be removed in the future and the nut can not fall out

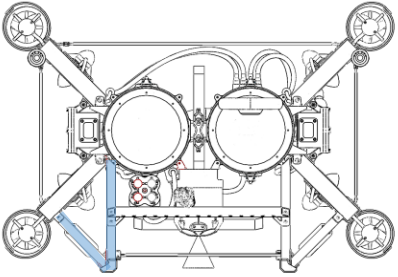


After install: (Bar is transparent to see inside)

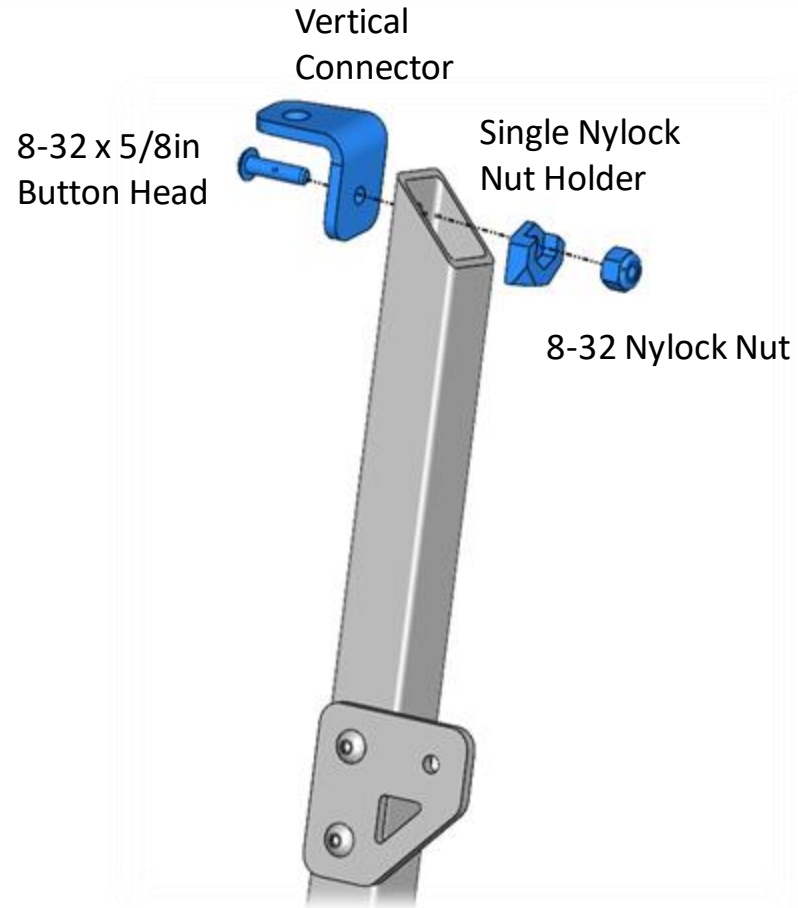
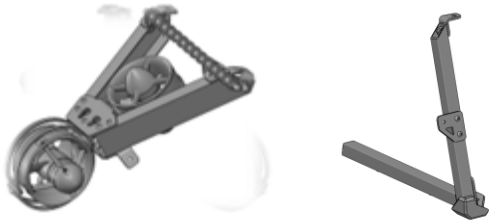


Left Taco

Additional Instructions



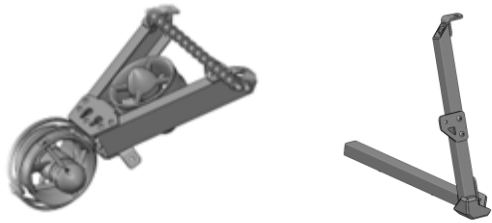
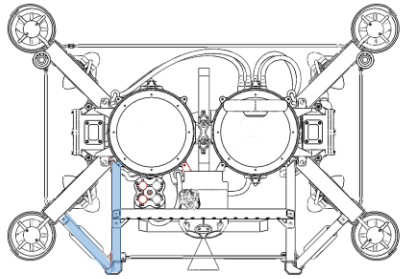
- Ensure you are using the correct vertical connector (there's two types). **Verify the angle matches** what is shown in the picture
- Tighten the 8-32 screw **firm** as it will not be accessible later



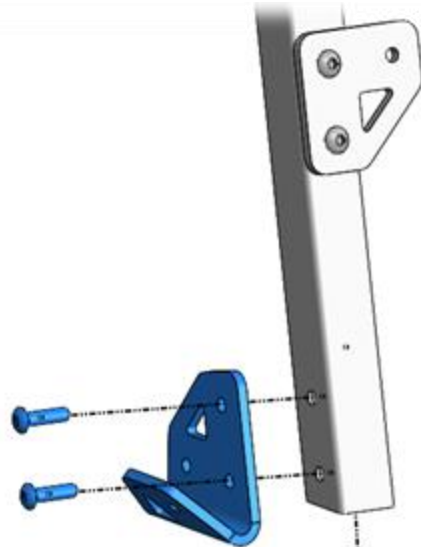
Left Taco

Additional Instructions

- Tighten the 8-32 screw **firm** as it will not be accessible later

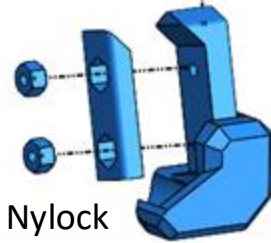


2X 8-32 x 5/8in
Button Head



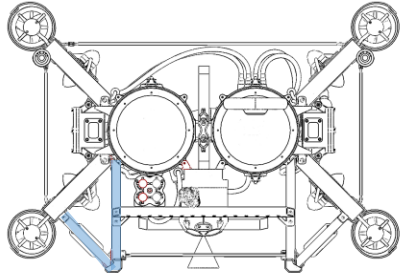
2X 8-32
Nylock Nut

Foot Nylock
Nut Holder



Front Rubber
Foot





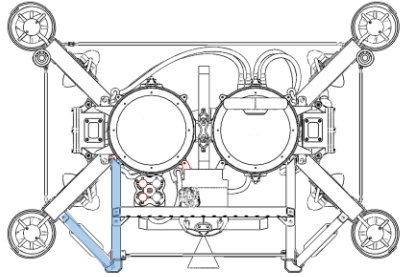
- Grab the bottom bar and connect it to the angled bracket
- The bottom bar was made translucent for visibility inside
- It may be helpful to hot glue the nut into the nylock holder
- Tighten the 8-32 screw **firm** as it will not be accessible later



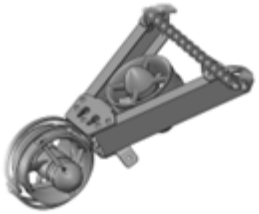
8-32 Nylock
Nut

Single Nylock
Nut Holder

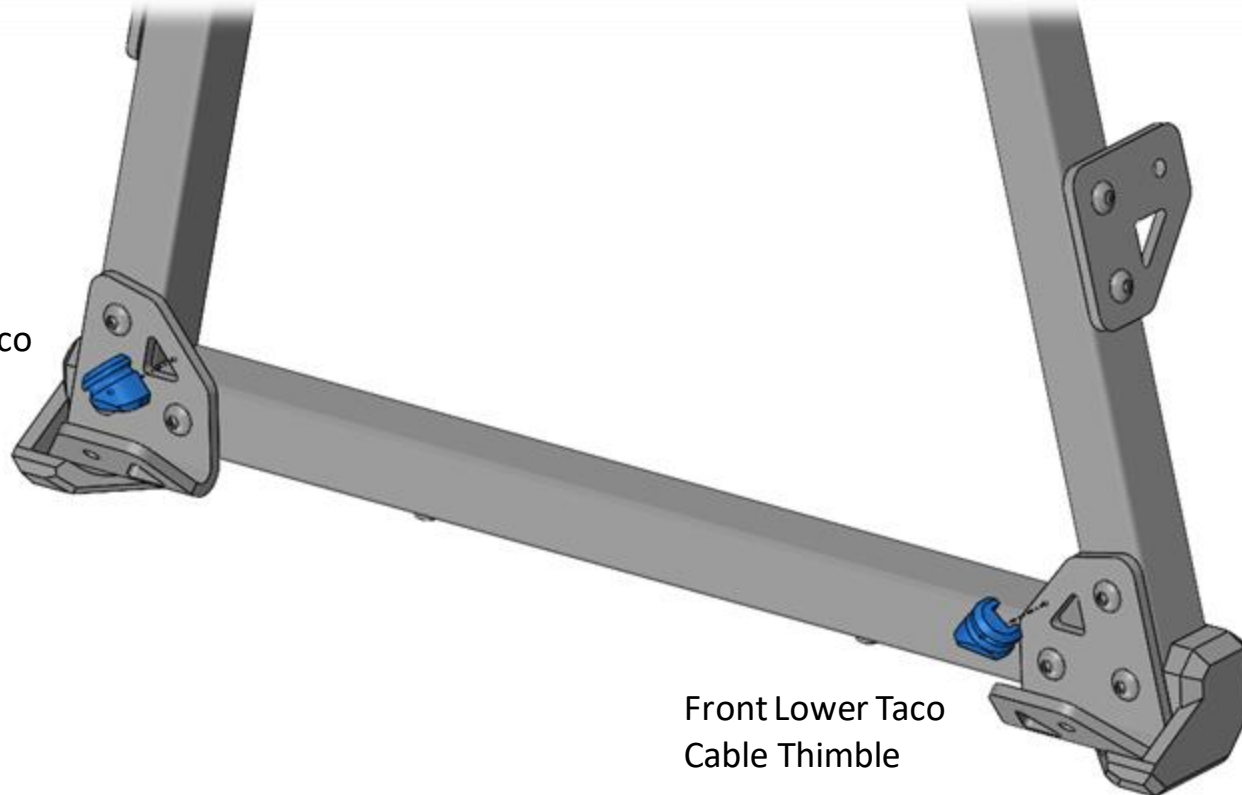
8-32 x 5/8in
Button Head



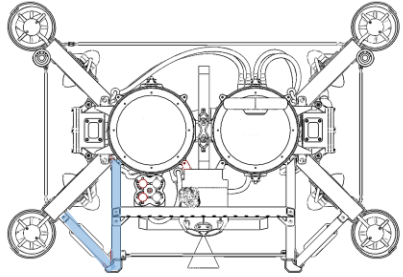
- Press on the lower cable thimbles. One side of the cylinder is cut at an angle, ensure it matches the picture
- Slide them up as high as they can go



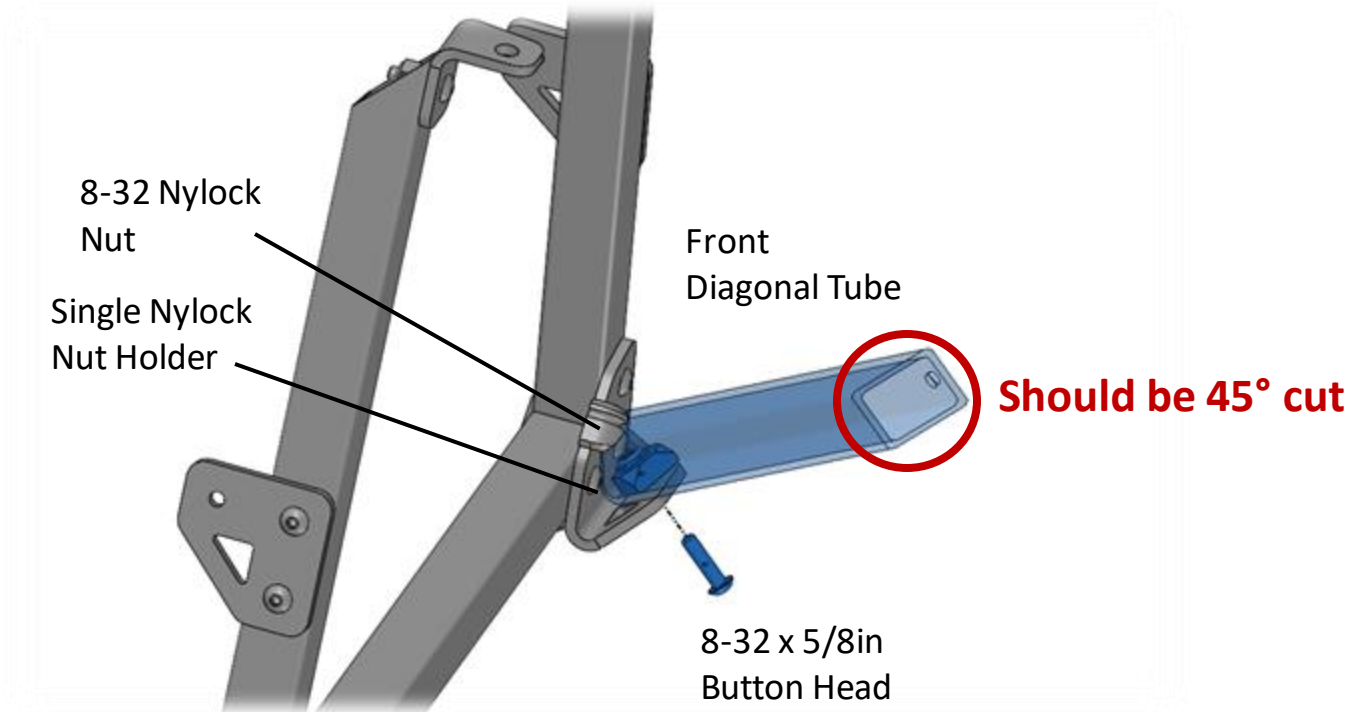
Back Lower Taco
Cable Thimble



Front Lower Taco
Cable Thimble

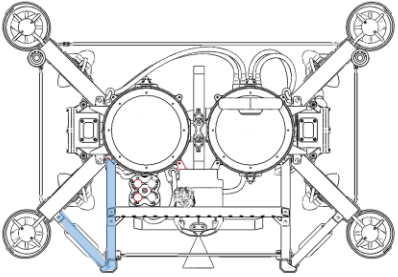


- It may be helpful to hot glue the nut into the nylock holder
- Ensure the free end has a **45° miter** as shown
- Tighten the 8-32 screw **firm** as it will be important later

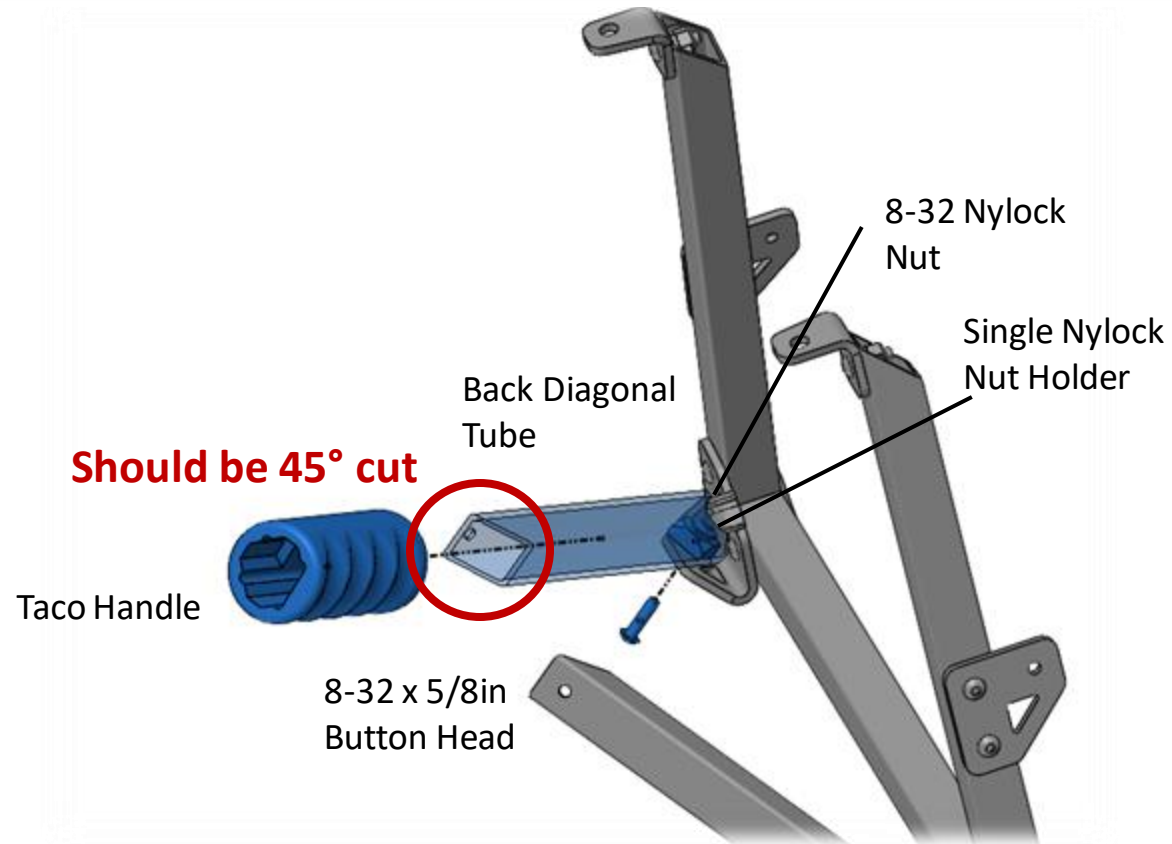


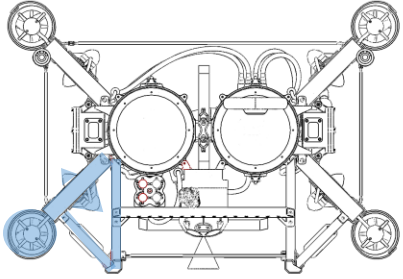
Left Taco

Additional Instructions

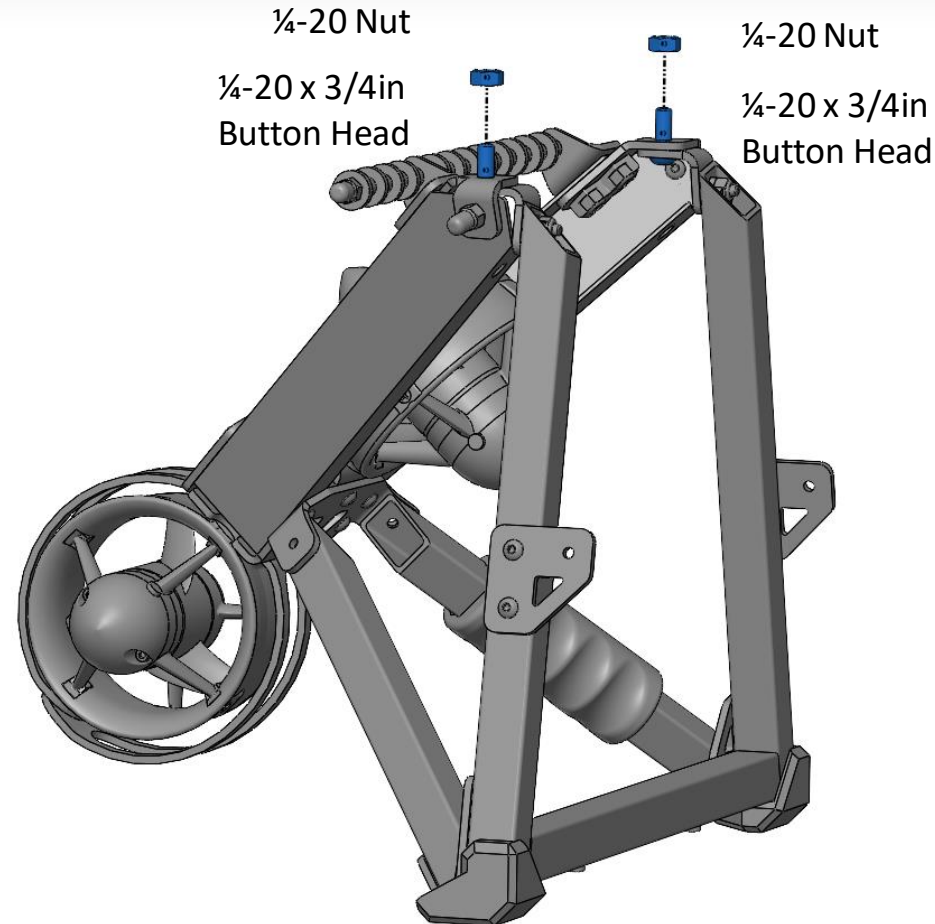


- Put the handle roughly in the middle of the tube, paying attention to the orientation of the finger grooves. The handle needs attached **before** attaching the tube to the rest of the assembly
- Ensure the free end has a **45° miter** as shown
- Tighten the 8-32 screw **firm** as it will become important later



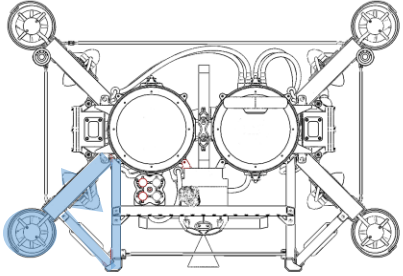


- Connect the two assemblies together at the top with the $\frac{1}{4}$ - 20 screws. Pay careful attention to the stacking of the sheet metal brackets. The vertical tube sheet metal bracket is **below** the thruster dorito sheet metal bracket

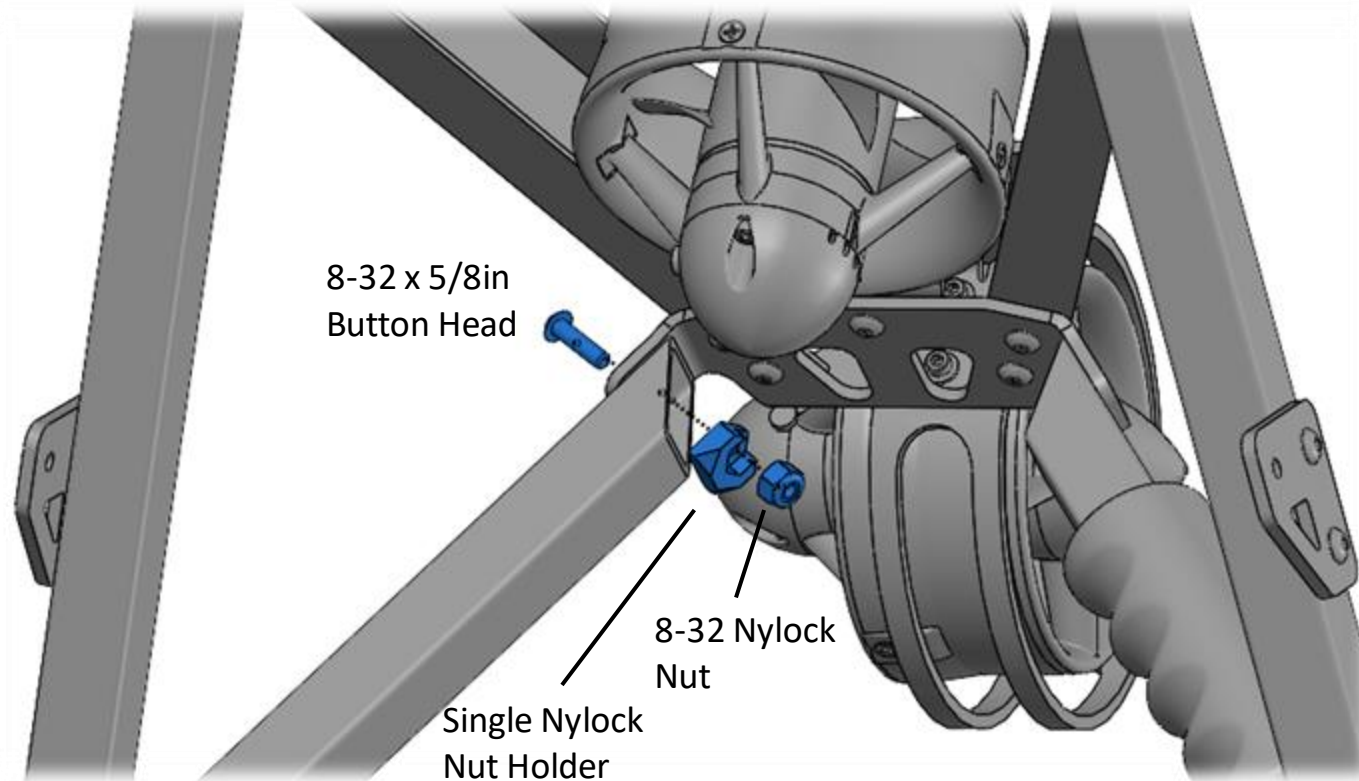


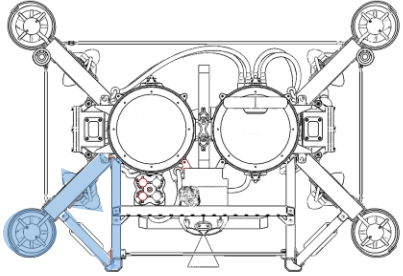
Left Taco

Additional Instructions

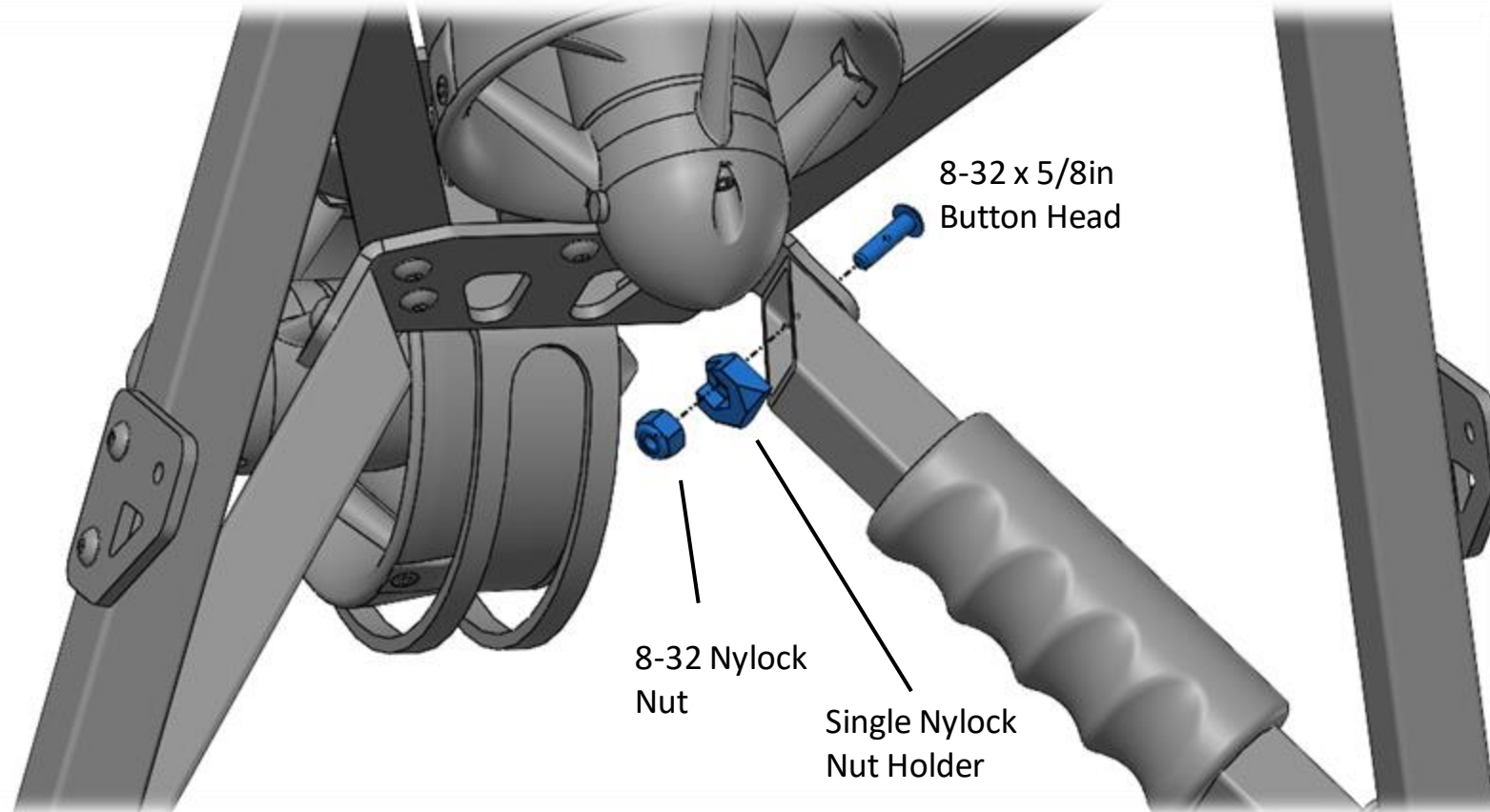


- The angled brackets at the bottom of the taco are supposed to be bent to 135° but they were only able to be bent to 130°. This means that the taco needs to be “bent” into position while the screw is going in. This causes the taco to act like a **spring** so be aware of this if it gets disassembled



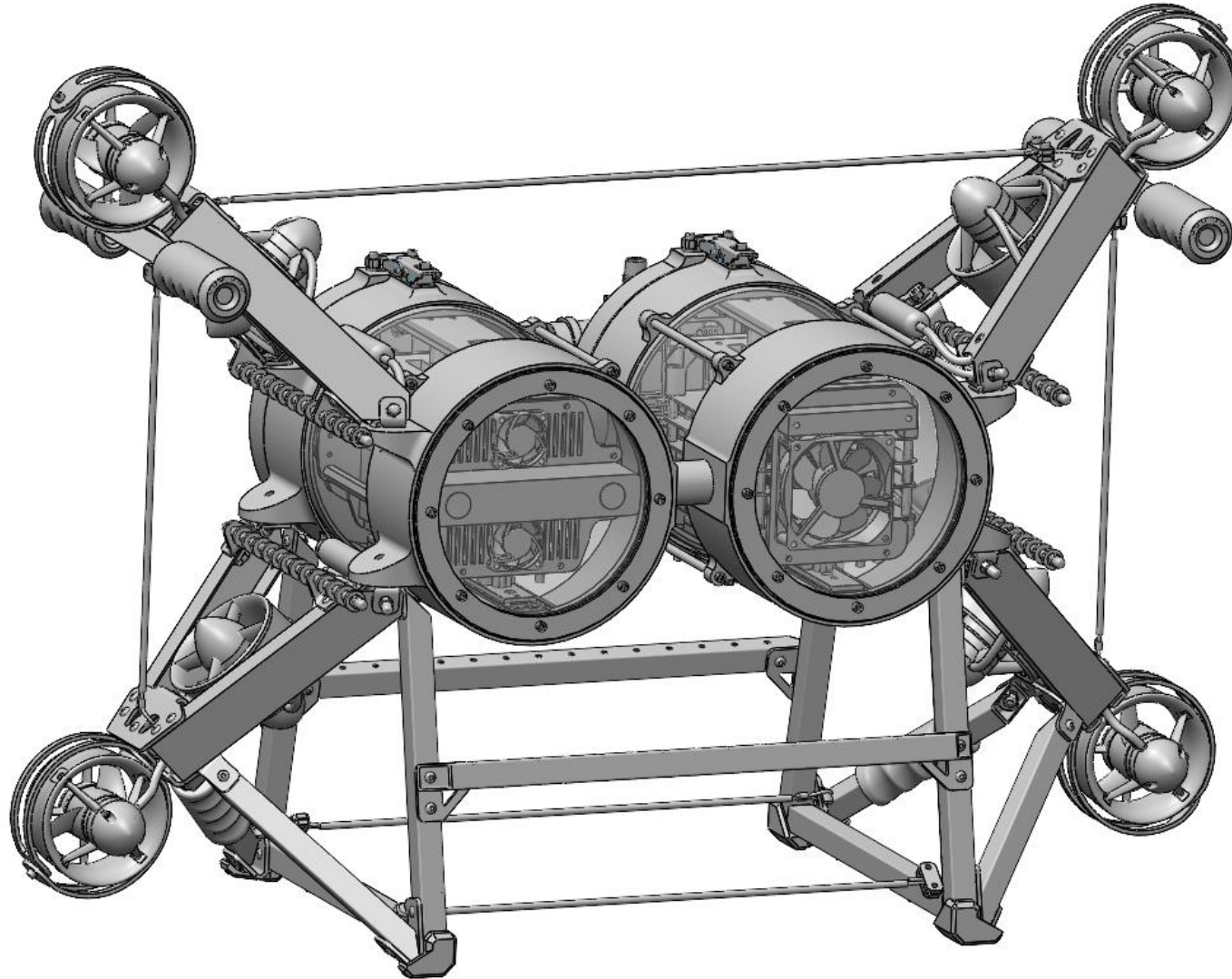


- The angled brackets at the bottom of the taco are supposed to be bent to 135° but they were only able to be bent to 130°. This means that the taco needs to be “bent” into position while the screw is going in. This causes the taco to act like a **spring** so be aware of this if it gets disassembled

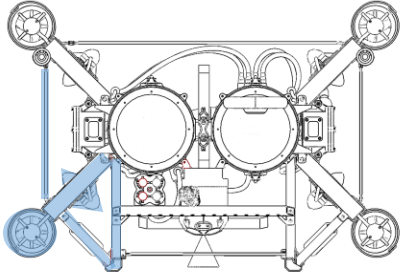


Talos

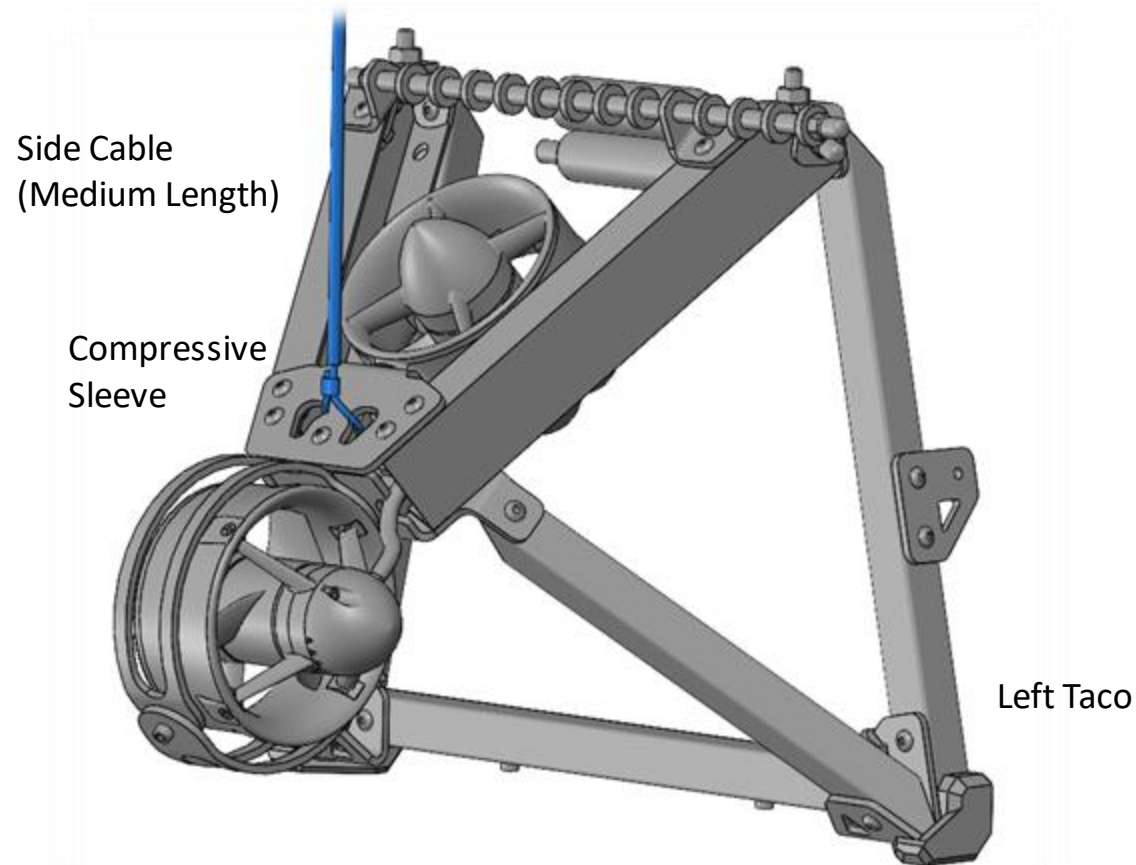
Combining



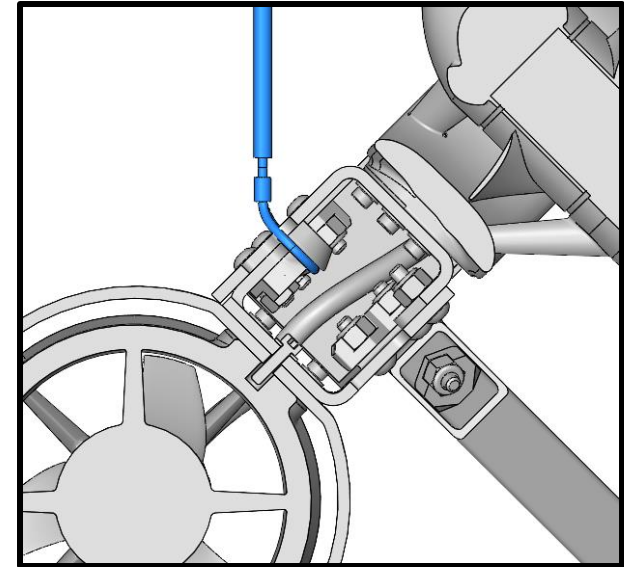
Additional Instructions

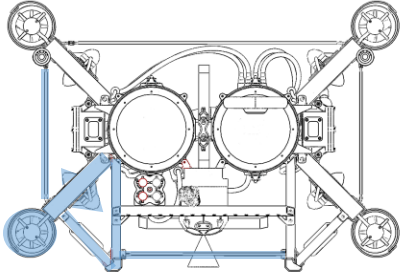


- Before connecting these assemblies to the hull, the cables should be crimped on while it is still easy to do so.
- **Follow this order:** Put compressive sleeve through one end of cable, loop cable around thimble, go through other side of compressive sleeve, transport to vice to crimp by tightening as hard as physically possible

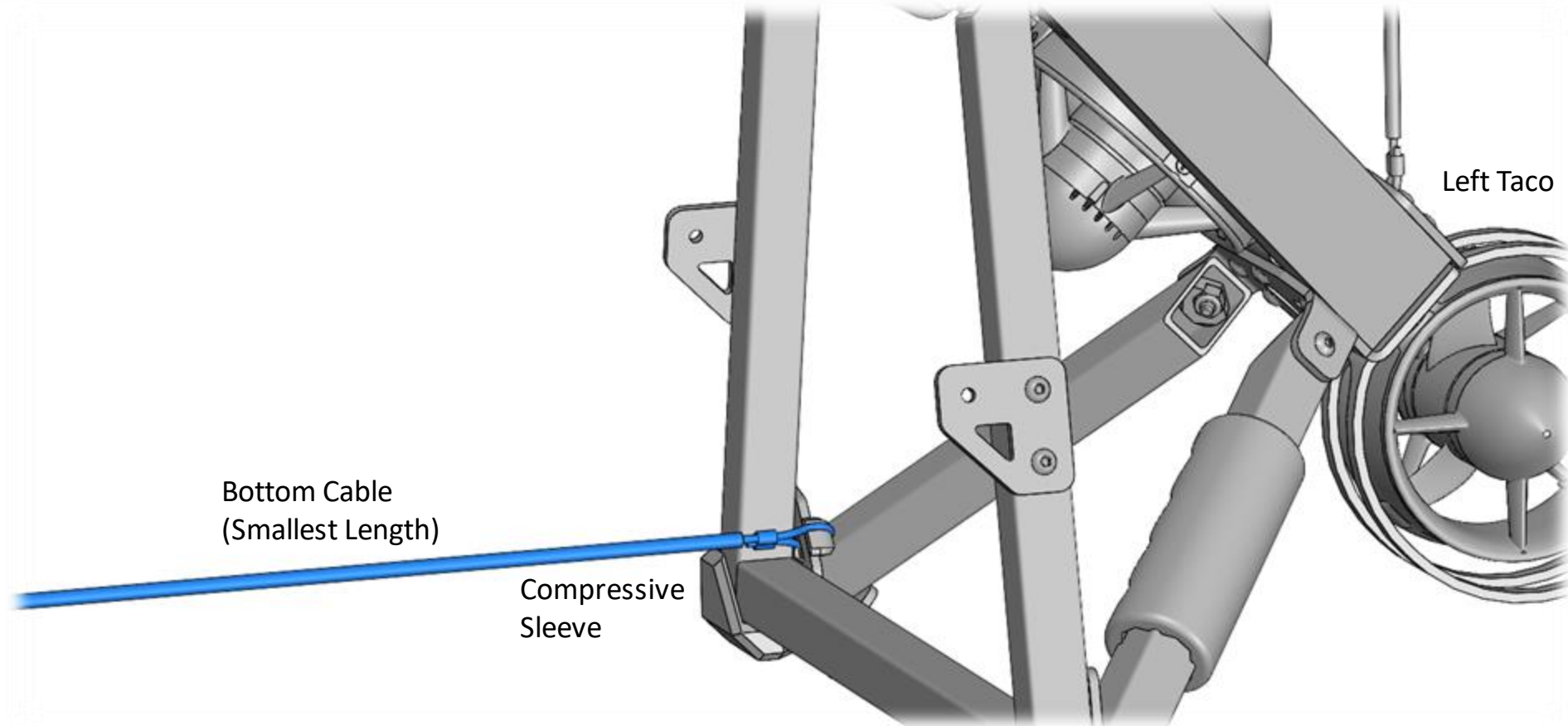


Cross Section View:

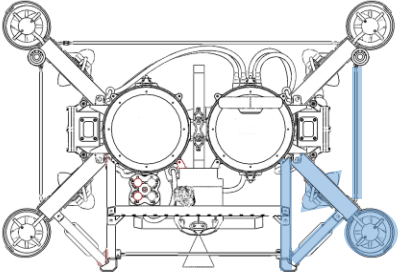




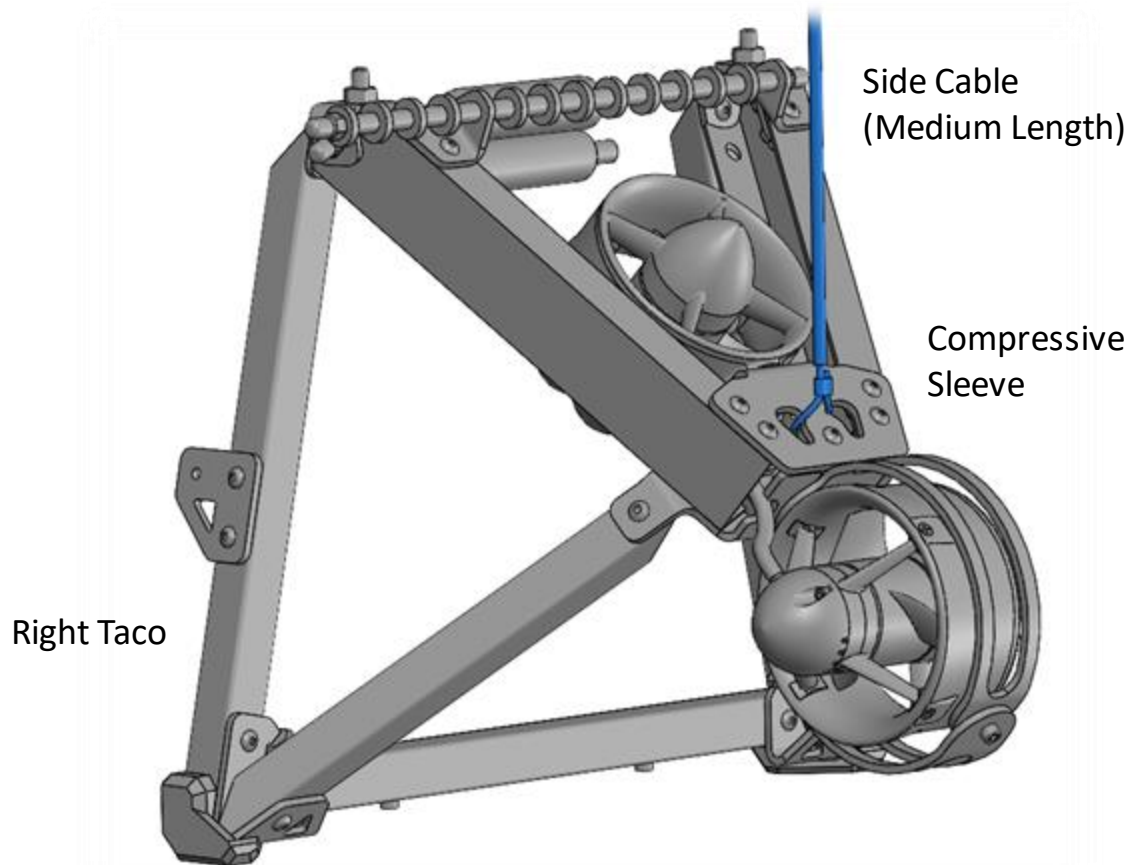
- **Follow this order:** Put compressive sleeve through one end of cable, loop cable around thimble, go through other side of compressive sleeve, transport to vice to crimp by tightening as hard as physically possible



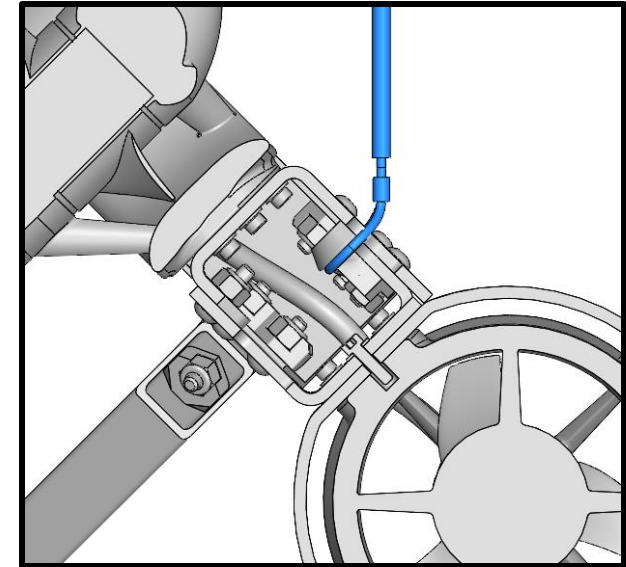
Additional Instructions

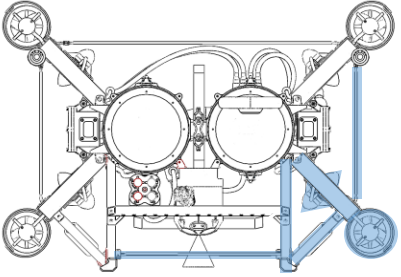


- Now move to the other Taco
- **Follow this order:** Put compressive sleeve through one end of cable, loop cable around thimble, go through other side of compressive sleeve, transport to vice to crimp by tightening as hard as physically possible

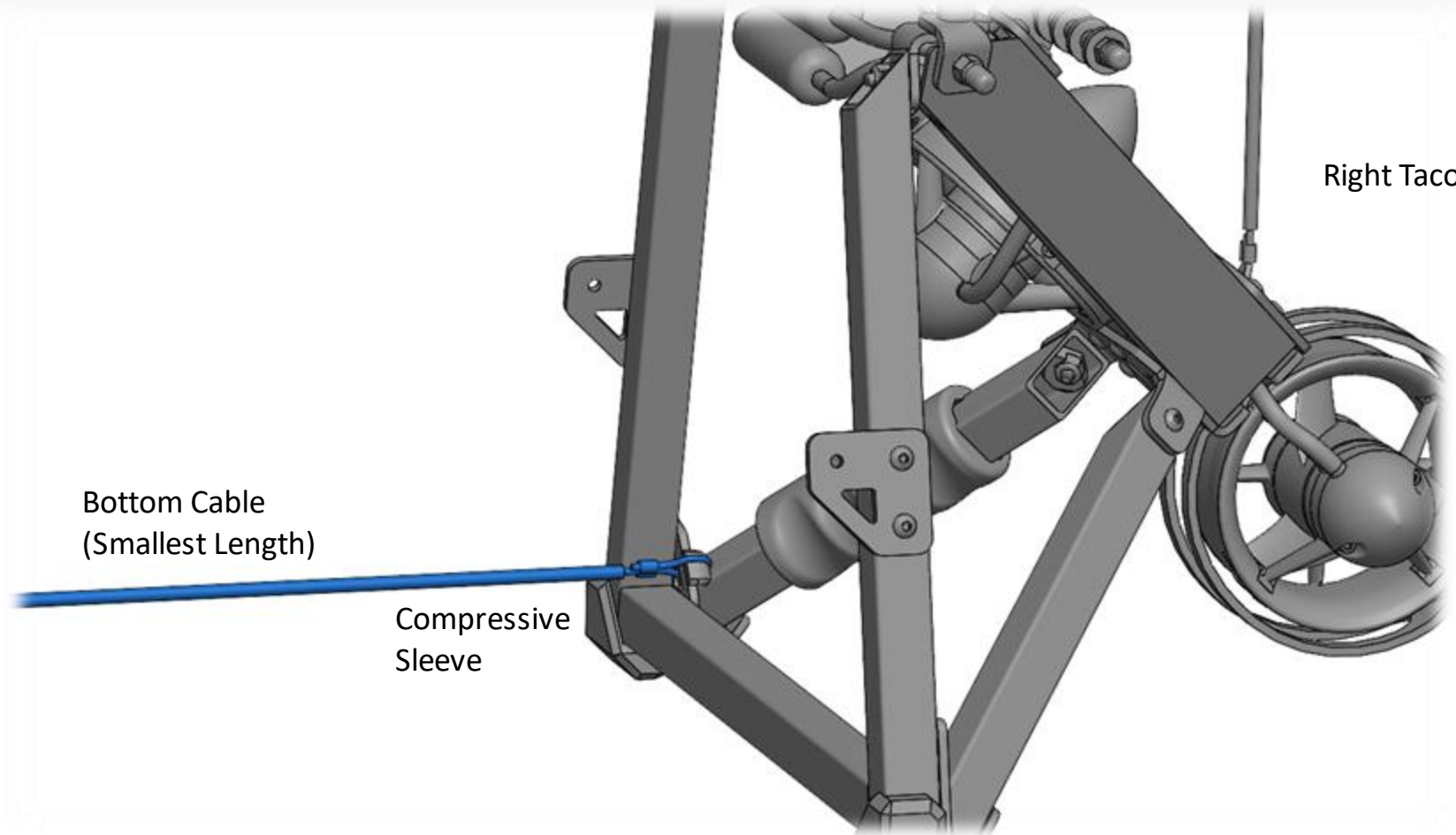


Cross Section View:

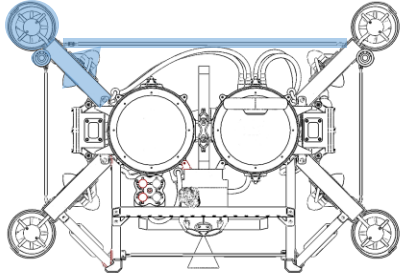




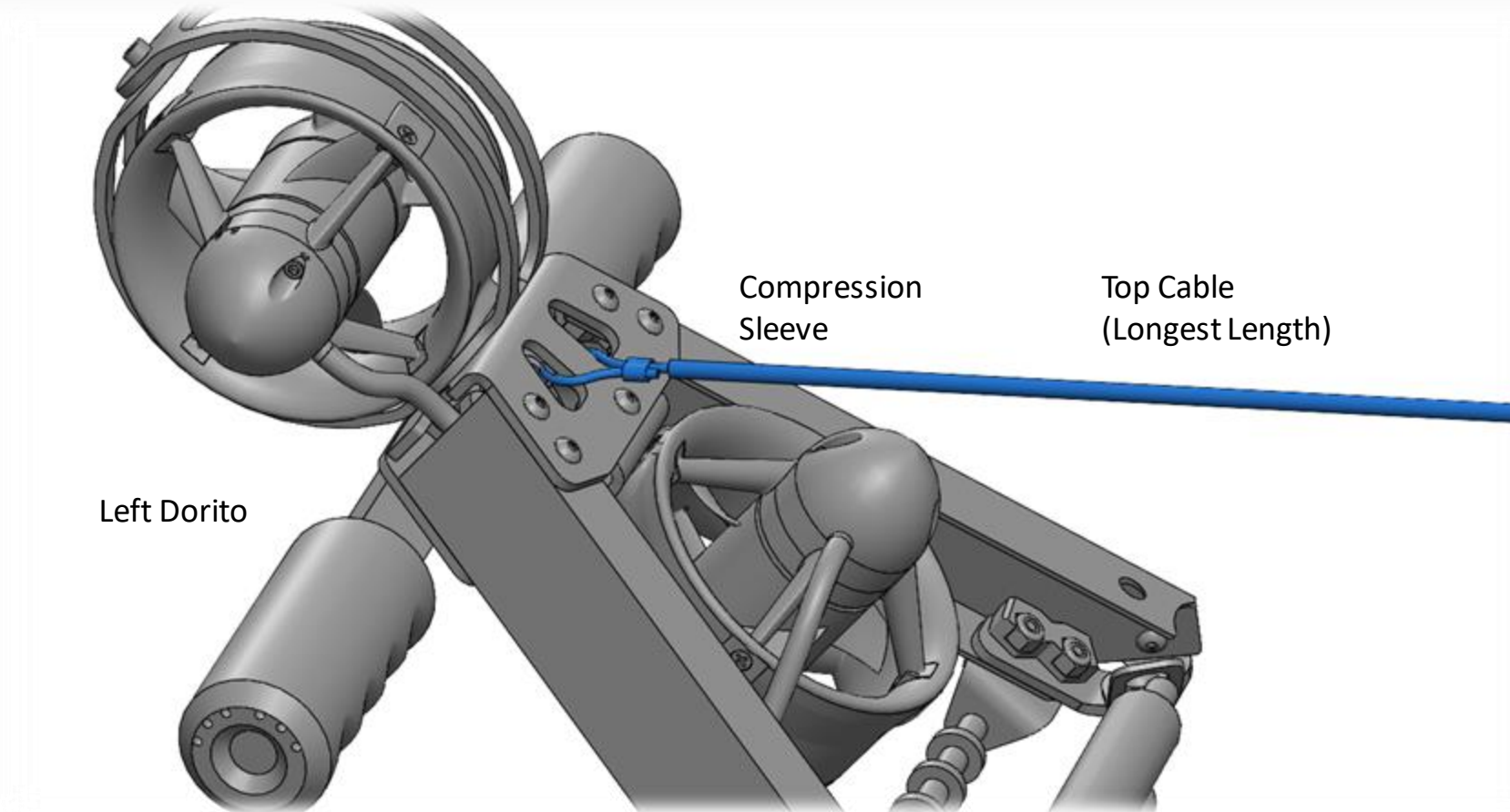
- **Follow this order:** Put compressive sleeve through one end of cable, loop cable around thimble, go through other side of compressive sleeve, transport to vice to crimp by tightening as hard as physically possible



Additional Instructions

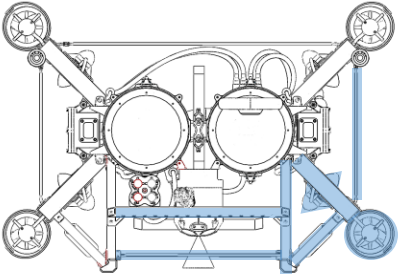


- Now move to the left Dorito
- **Follow this order:** Put compressive sleeve through one end of cable, loop cable around thimble, go through other side of compressive sleeve, transport to vice to crimp by tightening as hard as physically possible

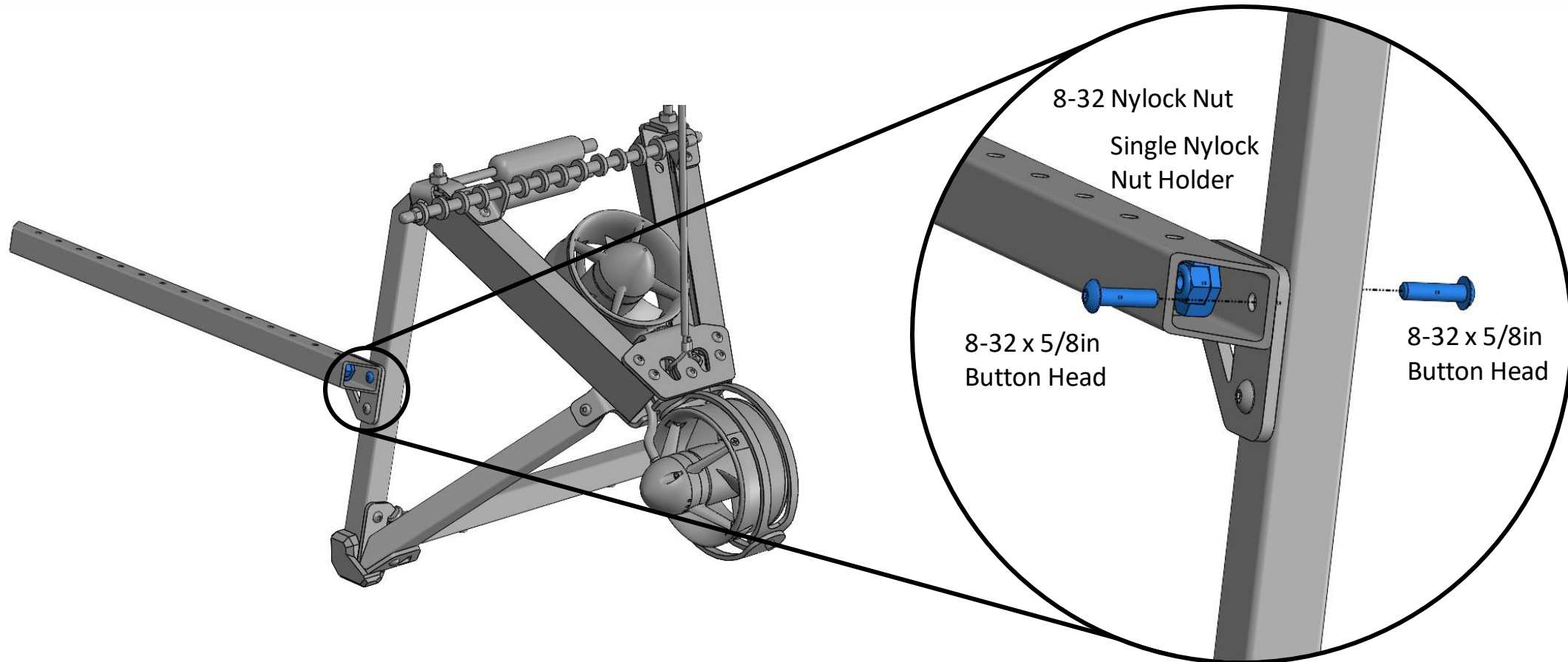


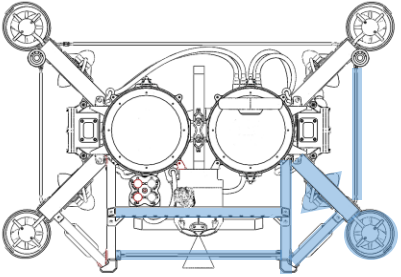
Combining

Additional Instructions

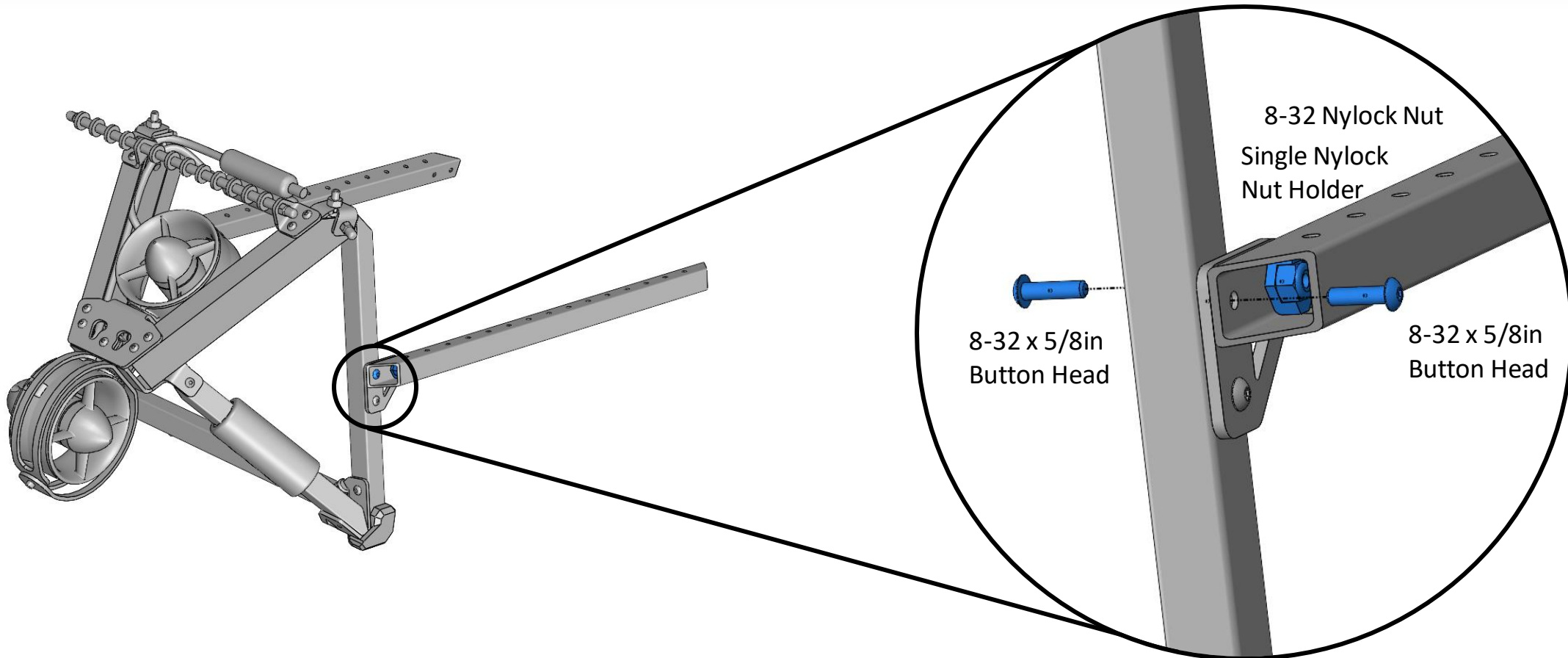


- Grab the right Taco
- Tensioning cables have been **hidden** going forward for visibility
- **Remove** the top screw on the gusset plate, and then reattach it going through the *Holy Bar* (this is why it was required to hot glue the nut in earlier)

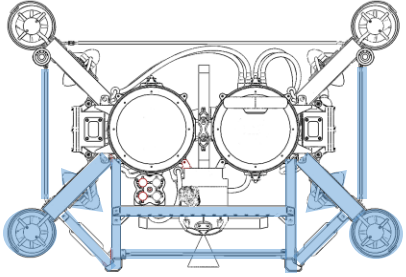




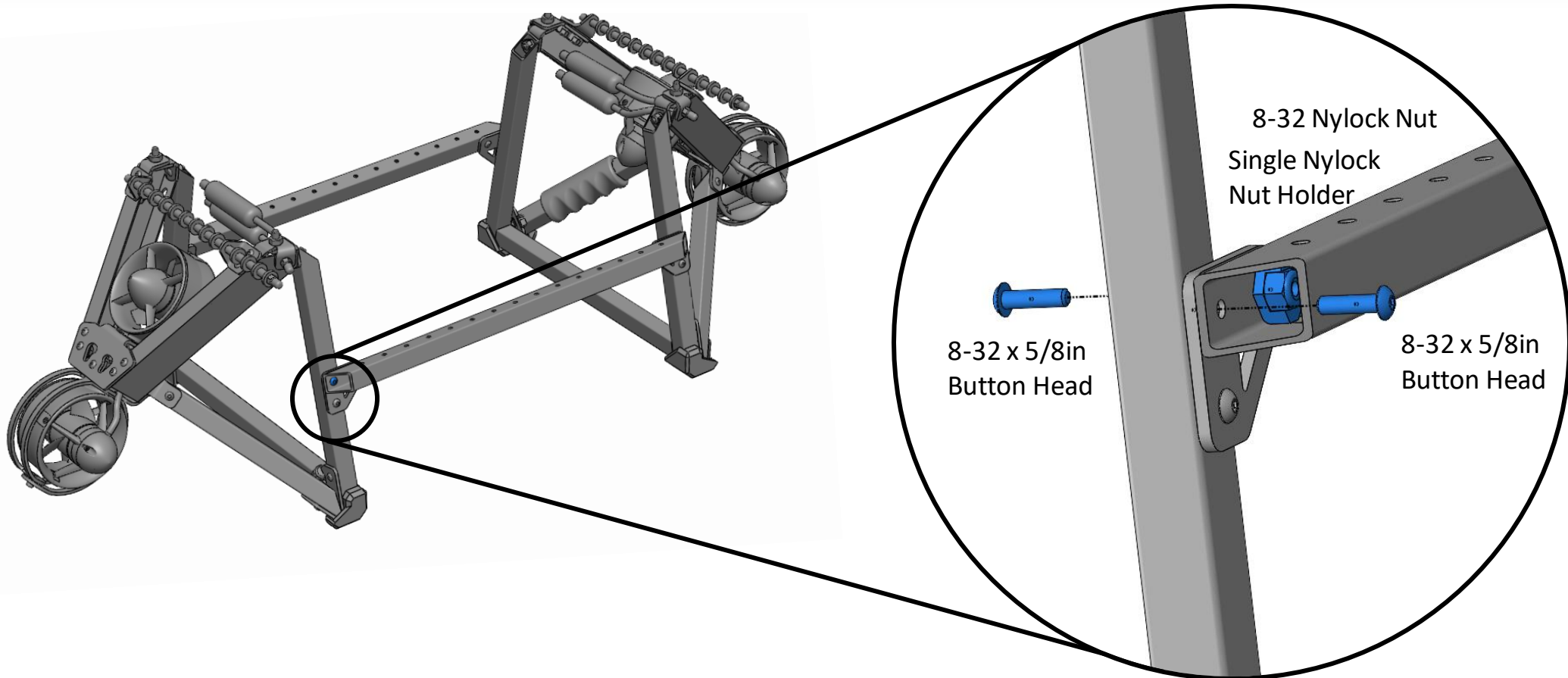
- Grab the right Taco
- **Remove** the top screw on the gusset plate, and then reattach it going through the *Holy Bar* (this is why it was required to hot glue the nut in earlier)



Additional Instructions

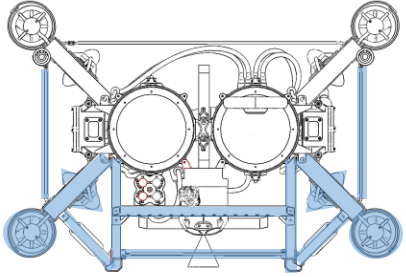


- Grab the left Taco, it will be connected to the other side of the holy bar
- **Remove** the top screw on the gusset plate, and then reattach it going through the *Holy Bar* (this is why it was required to hot glue the nut in earlier)
- **Don't tighten** these tight yet, it should still be able to pivot. This play is needed when attaching it to the hull

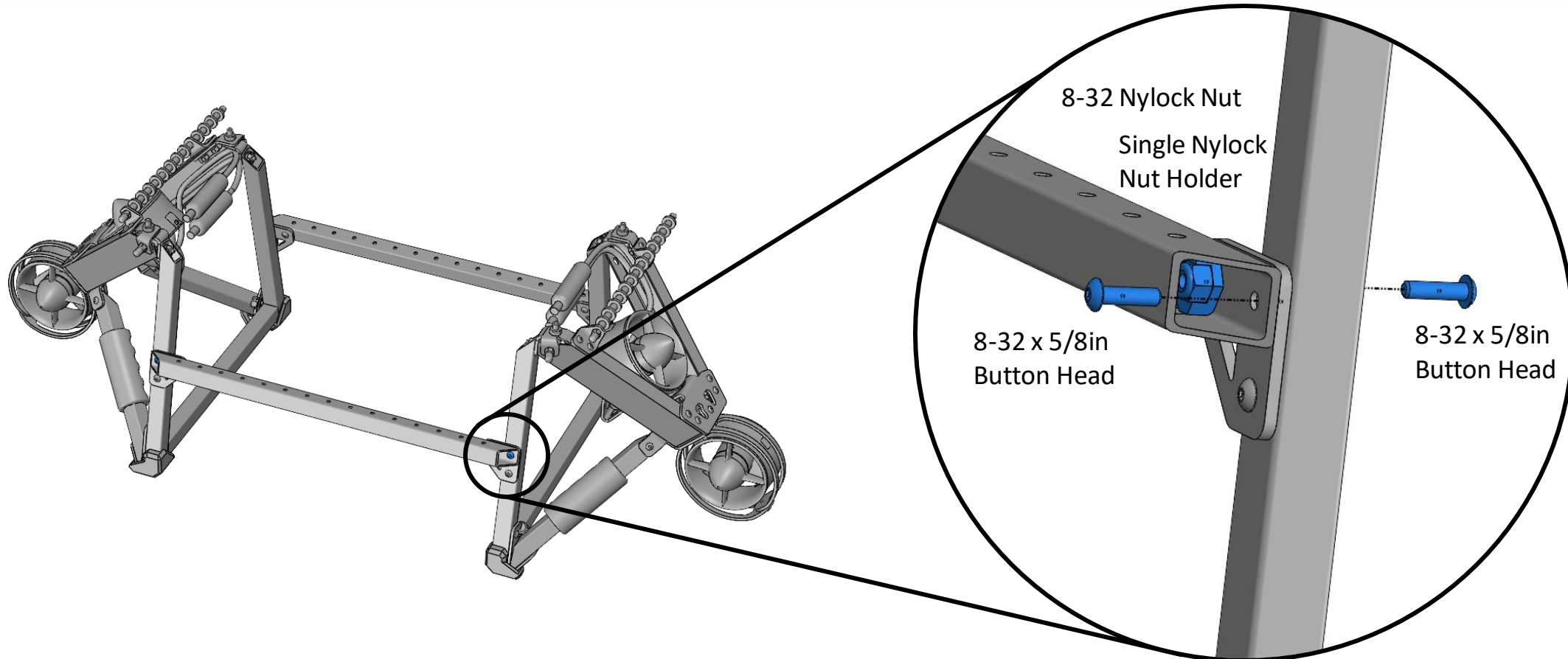


Combining

Additional Instructions



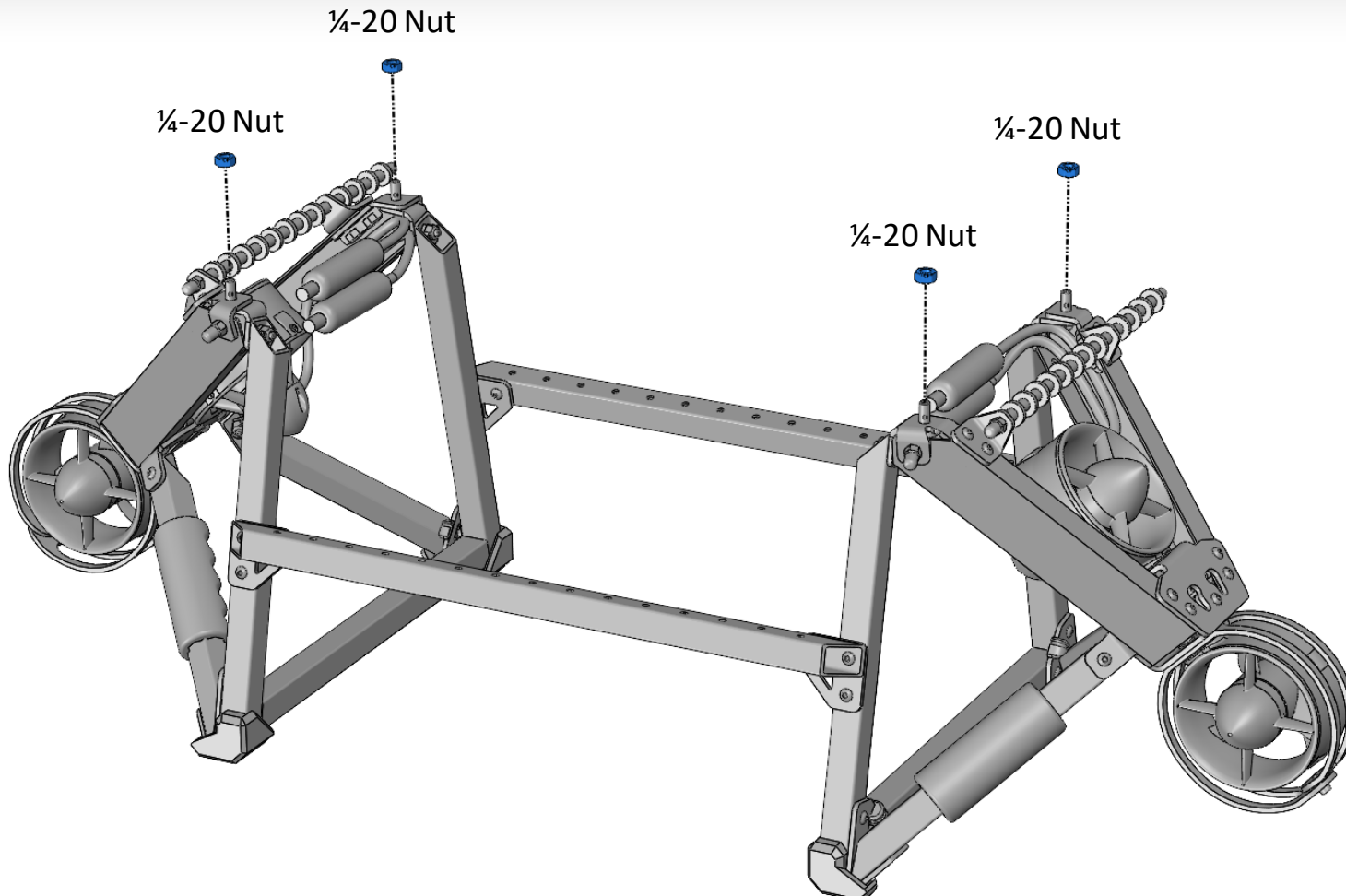
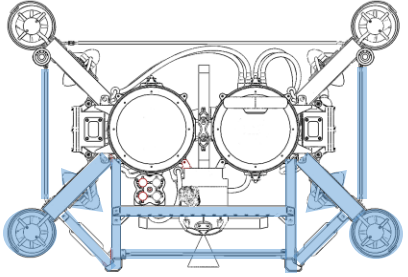
- Grab the right Taco (tensioning cables hidden for visibility)
- **Remove** the top screw on the gusset plate, and then reattach it going through the *Holy Bar* (this is why it was required to hot glue the nut in earlier)
- **Don't tighten** these tight yet, it should still be able to pivot. This play is needed when attaching it to the hull

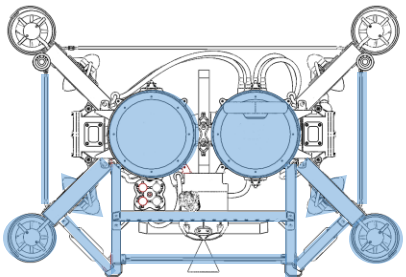


Combining

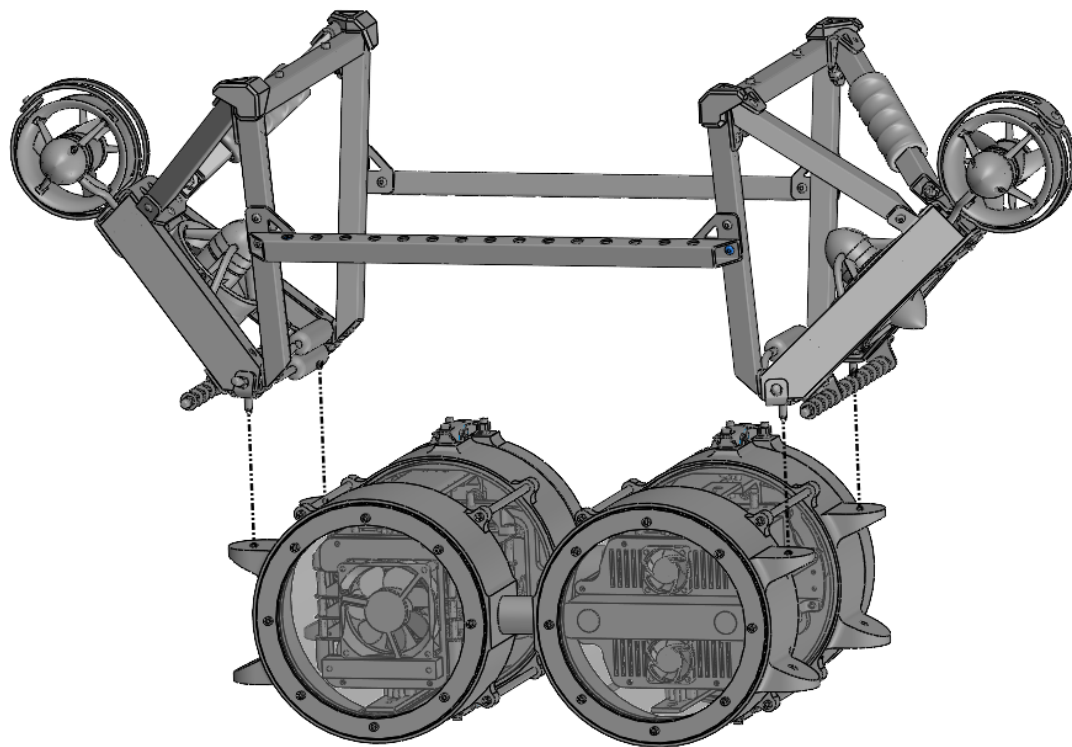
Additional Instructions

- **Remove** the four ¼-20 nuts on top



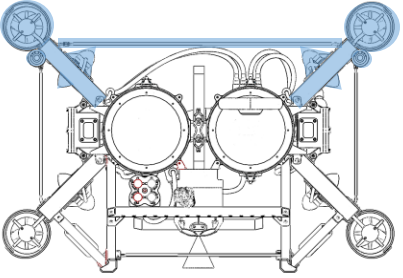


- The long side of the battery rails should be **pointing towards the front**
- Flip the main housing upside down, get each of the four ¼-20 screws started **loosely**, and then go back and tighten them
- After the Tacos are attached, **go back** and tighten the screws on the *Holy Bar* gussests
- Notice which side the boards are on, don't put it on **upside down**

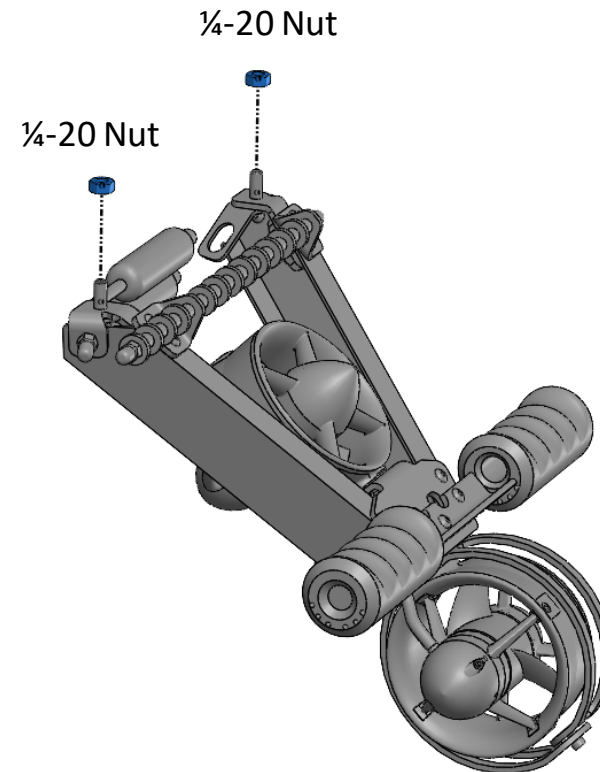
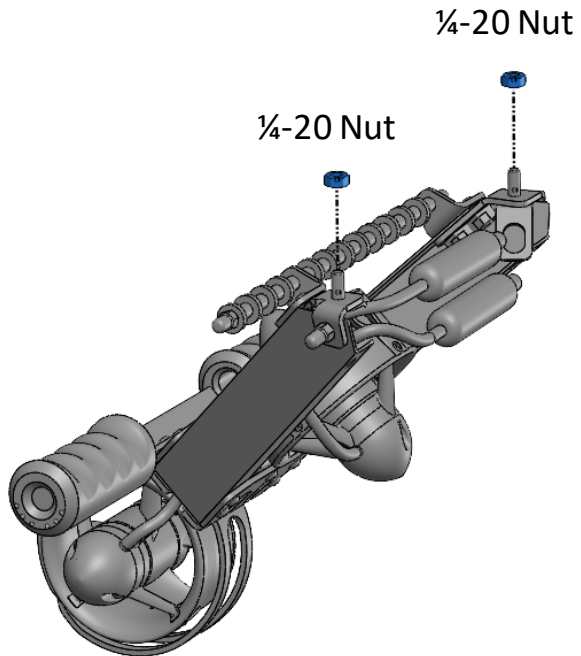


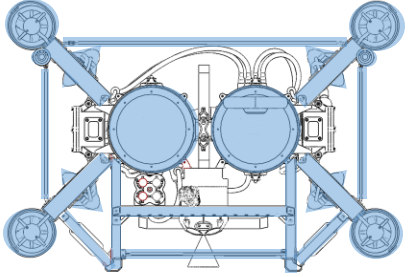
Combining

Additional Instructions

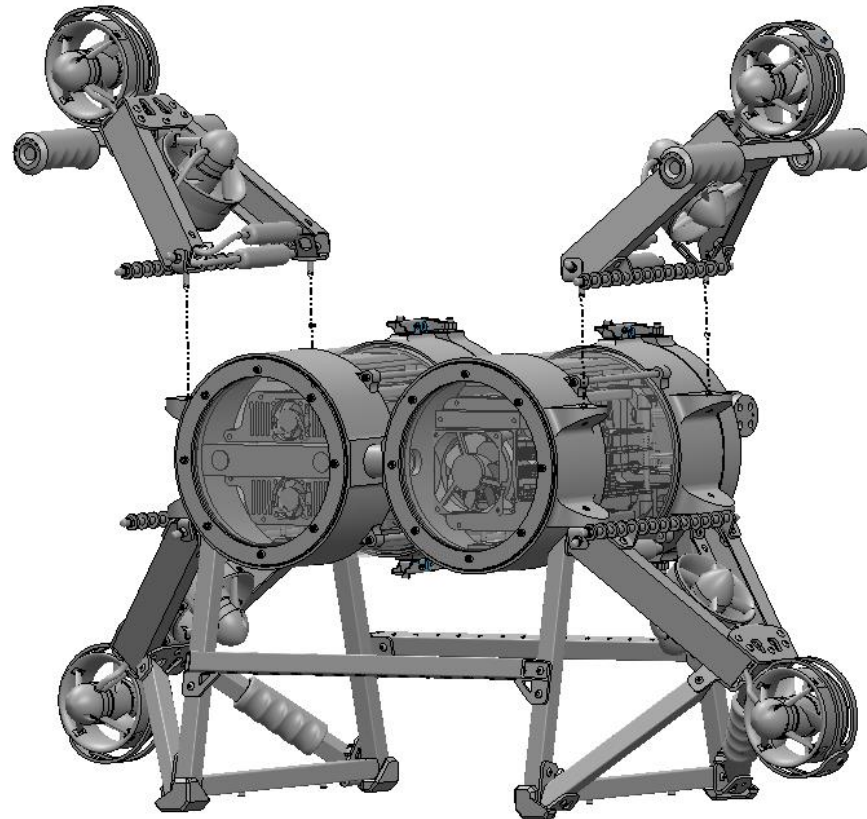


- **Remove** the four 1/4-20 nuts on the underside of the Doritos

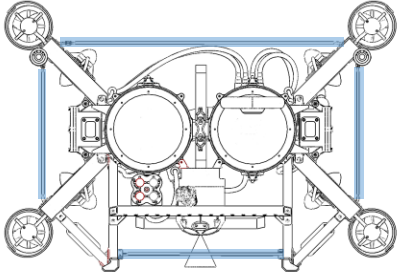




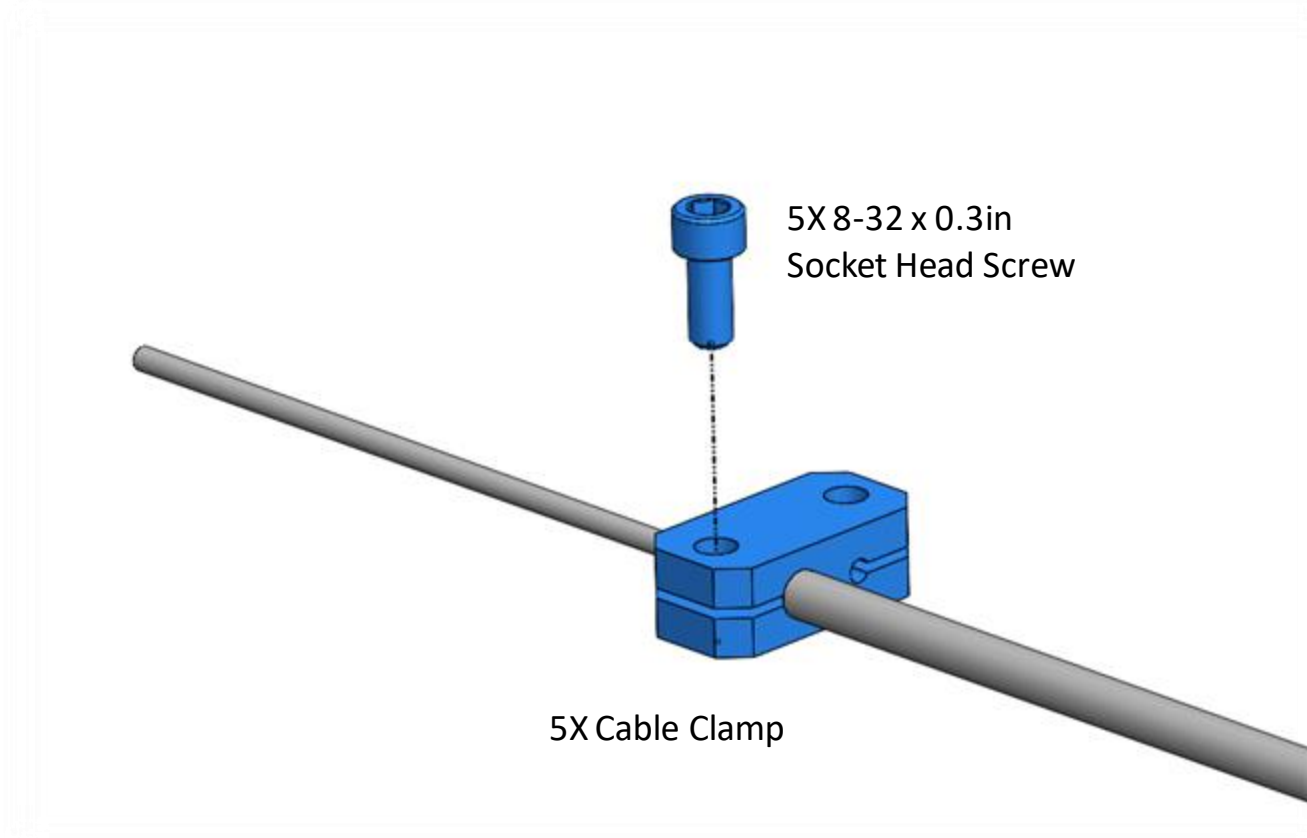
- The long side of the battery rails should be **pointing towards the front**
- Flip the main housing on its feet, get each of the four $\frac{1}{4}$ -20 screws started **loosely**, and then go back and tighten them



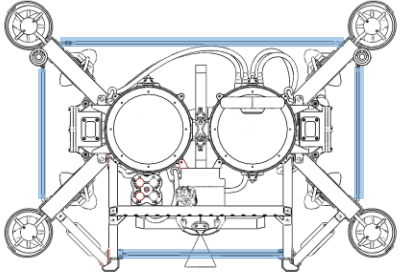
⚠ IT IS NOT SAFE TO LIFT UP TALOS FROM THE HANDLES UNTIL THE CABLES ARE TENSIONED ⚠



- Do this for **all five** free ends of the tensioning cables
- Slide the cable clamp block up to where it hits the insulation
- Tighten 8-32 screw hard to secure the clamp to the cable



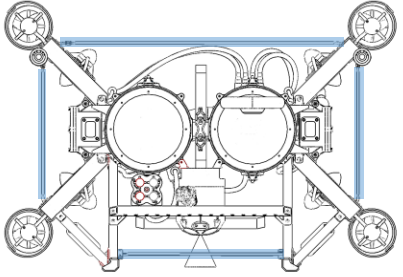
Additional Instructions



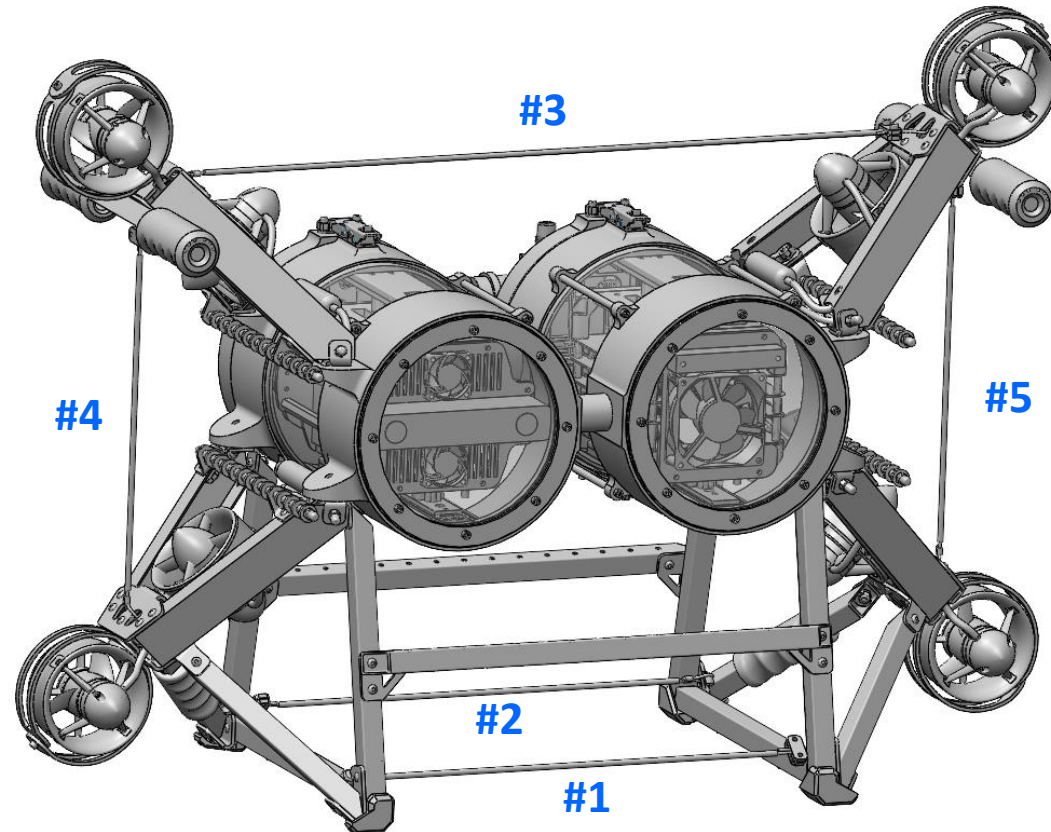
- Do this for **all five** free ends of the tensioning cables
- Wrap the cable around the cable thimble and then back through the cable clamp
- Grab the free end of the cable with pliers and pull **lightly** to remove all slack. **Do not pull it hard!**
- Tighten the 8-32 screw firmly to clamp the cable

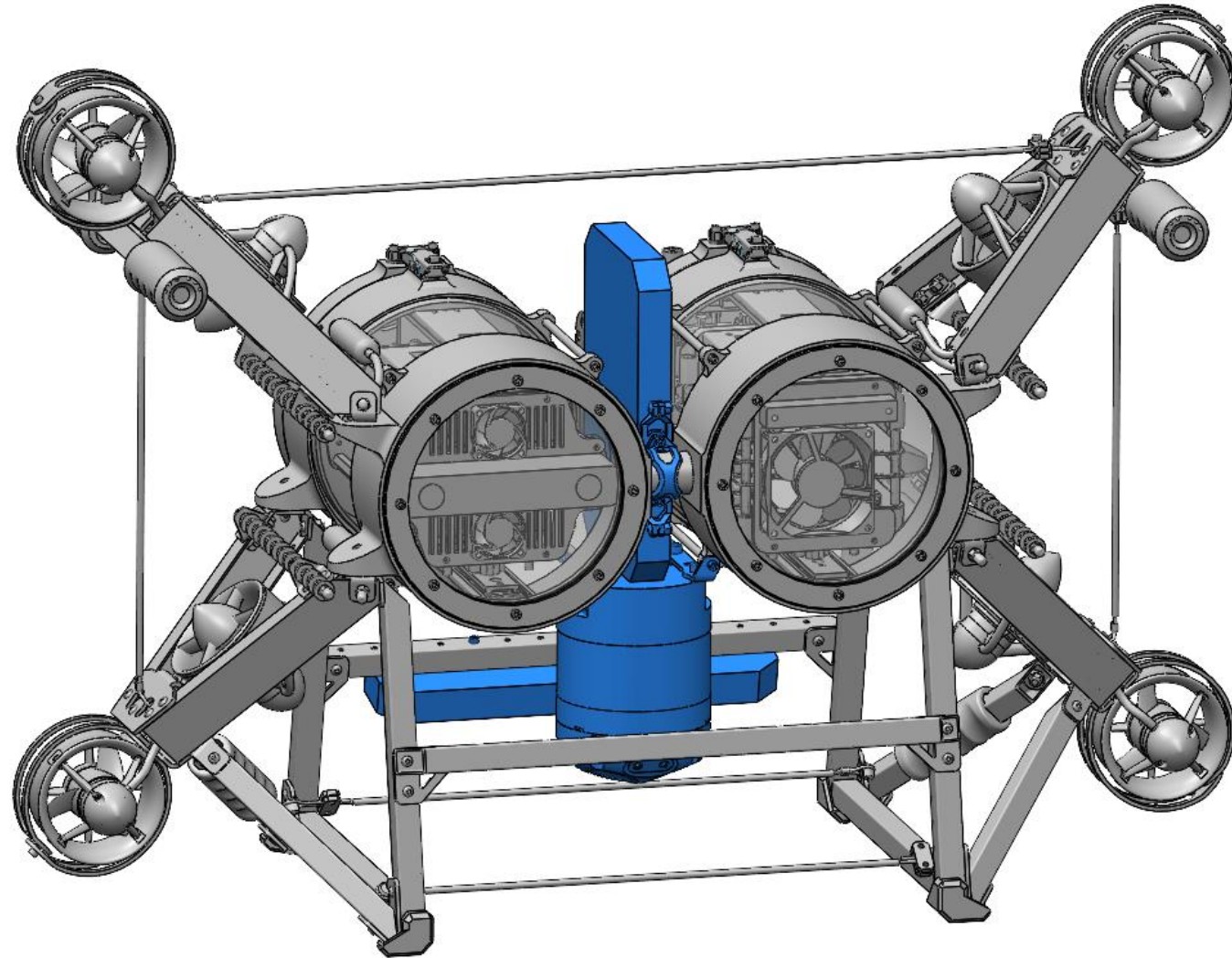
⚠ DO NOT PULL HARD, JUST ENOUGH TO REMOVE ALL SLACK! ⚠

5X 8-32 x 0.3in
Socket Head Screw

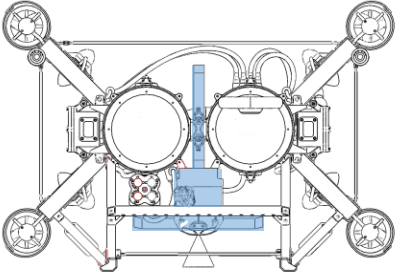


- For all five cables, **follow the procedure below**. Tension the cables in the order pictured
 - Grab free end with pliers, have someone else loosen the 8-32 screw on the cable clamp
 - Pull cable with pliers as hard as you can, keep pulling until told
 - Clamp the cable by tightening the 8-32 screw, and once tightened, stop pulling with pliers

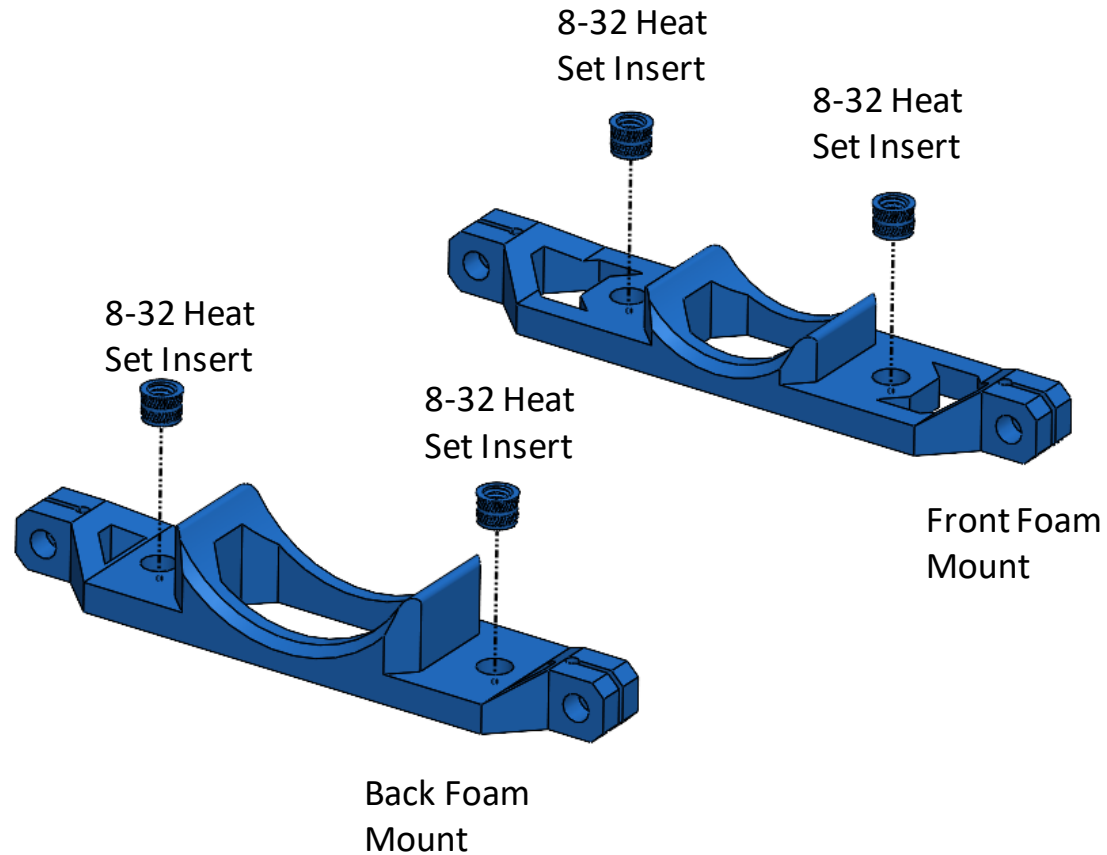


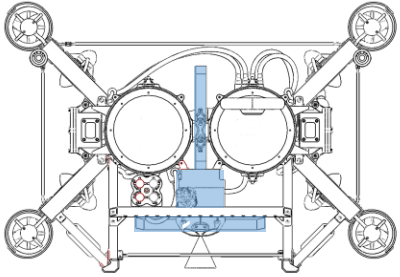


Additional Instructions

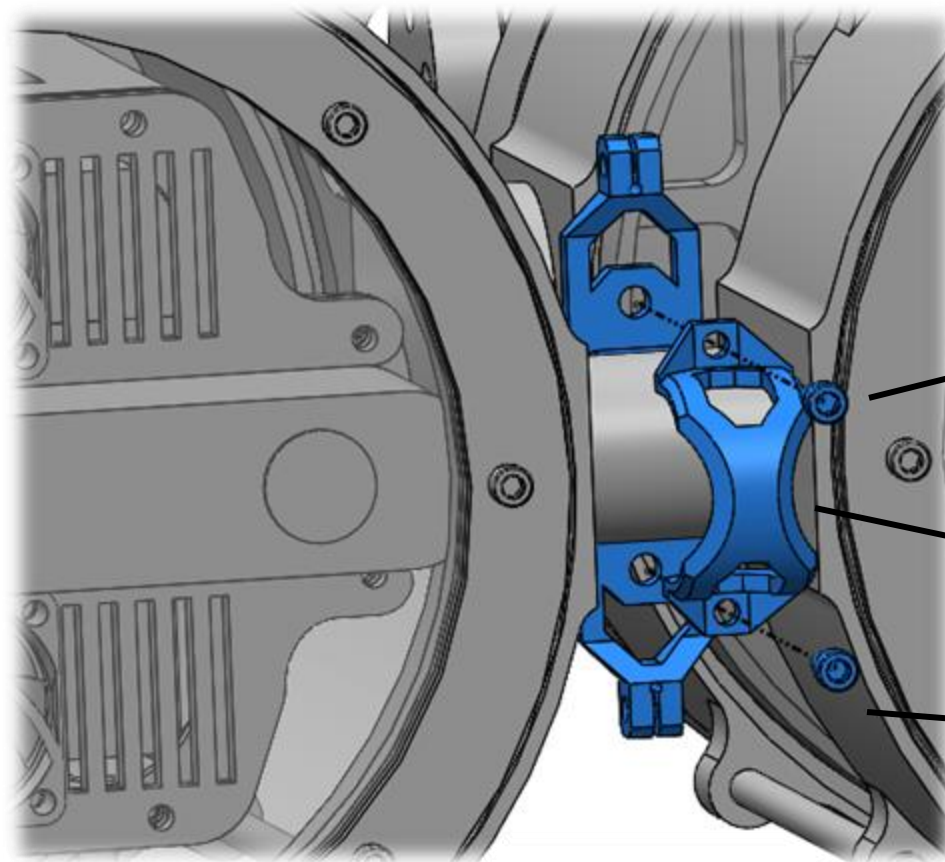
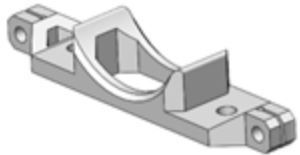


- Install heat set inserts into 3D prints with soldering iron
- After each insert is put in and while it is still hot, screw in an 8-32 screw and move it normal to the face. Once positioned, remove the screw. This positions the heat set straight





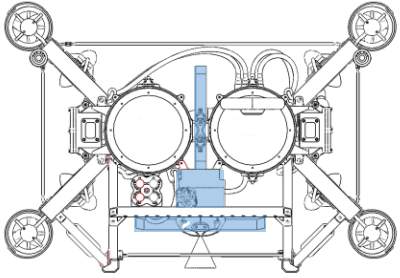
- Set the larger rear foam mount aside
- Center the front foam mount between housings and align vertical
- Tighten the two screws **evenly** to secure the bracket from rotating



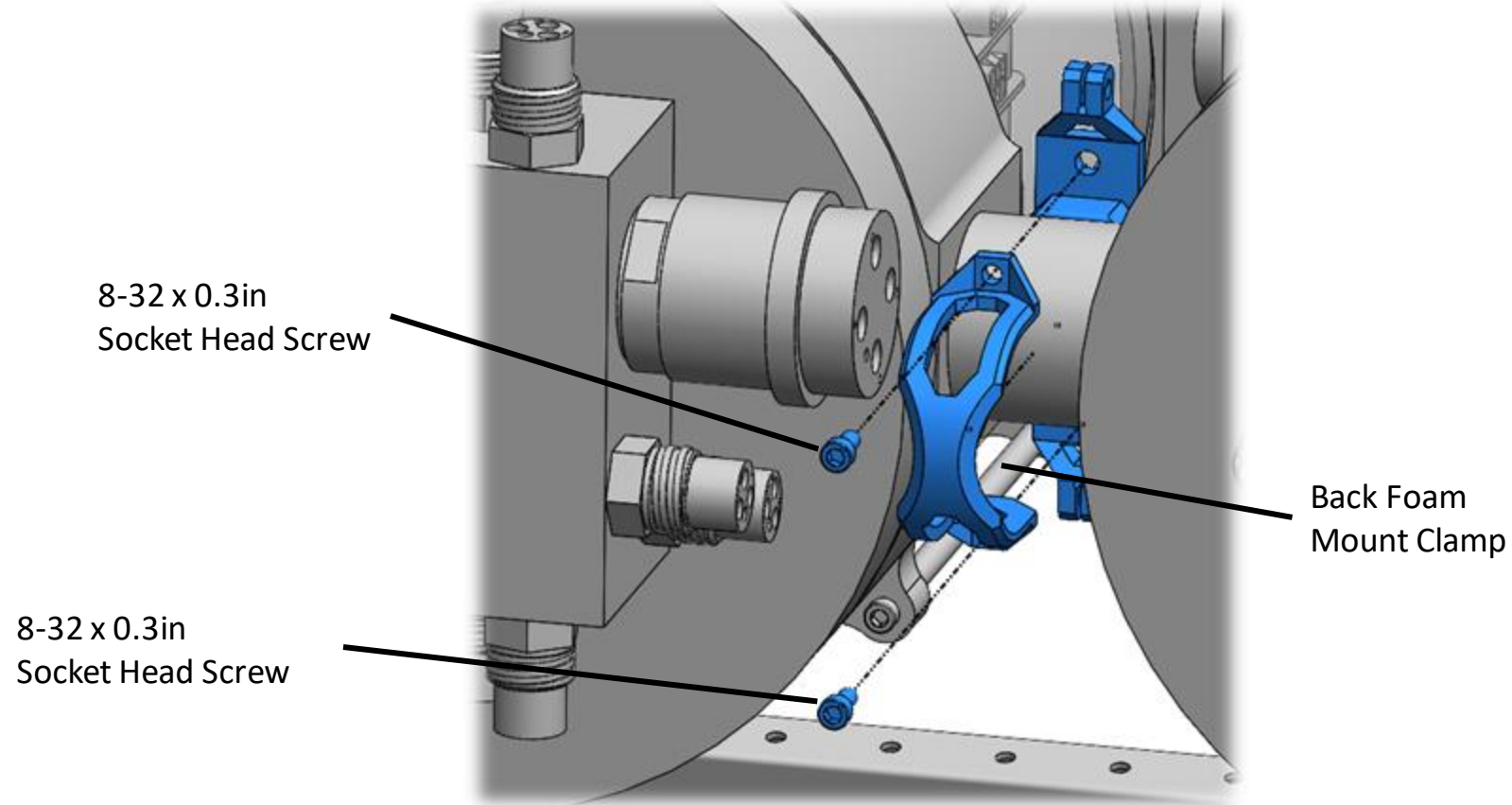
8-32 x 0.3in
Socket Head Screw

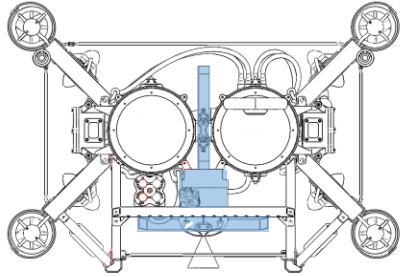
Front Foam
Mount Clamp

8-32 x 0.3in
Socket Head Screw

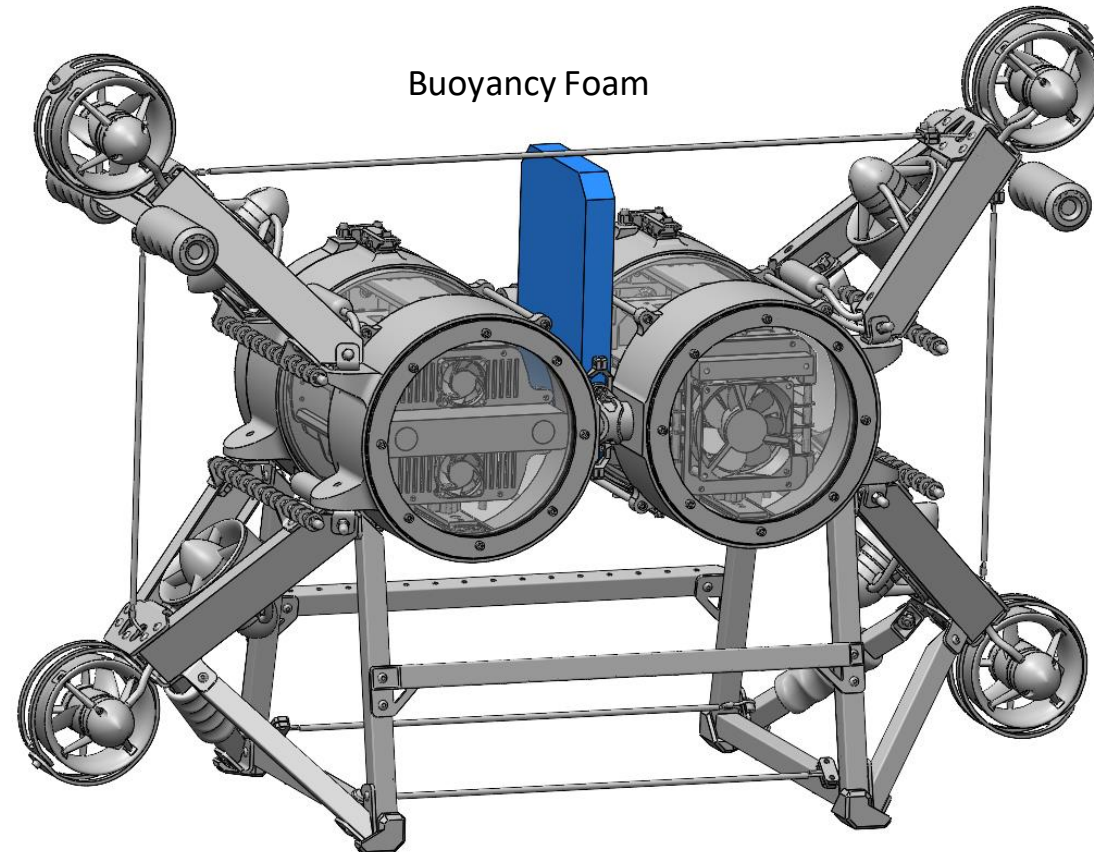


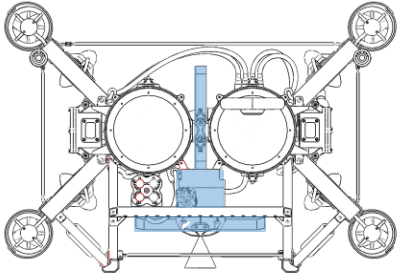
- Grab the larger rear foam mount and place on the back tube
- Center the front foam mount between housings and align vertical
- Tighten the two screws **evenly** to secure the bracket from rotating





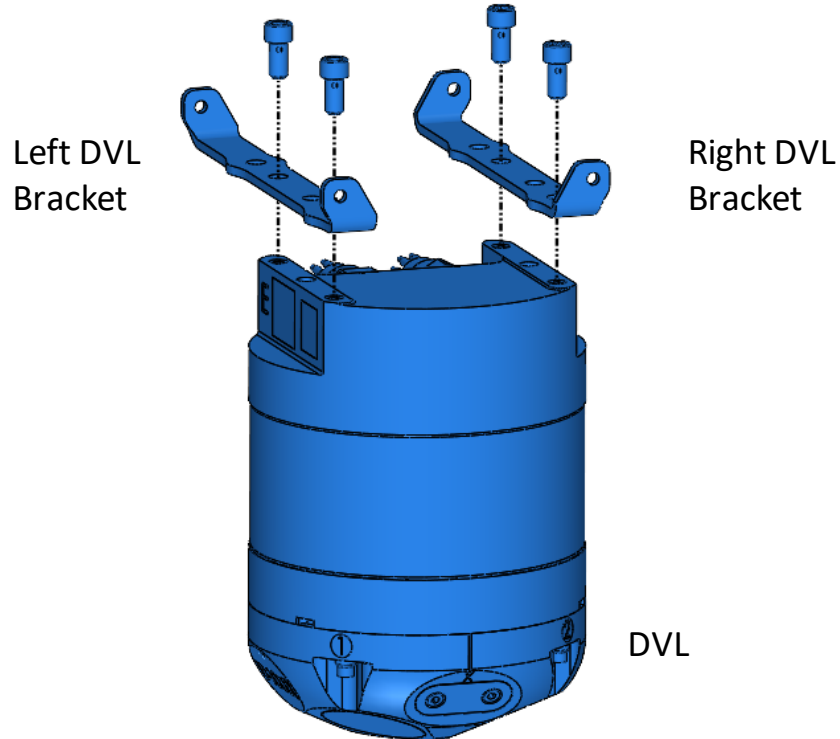
- Lift the vehicle, and slide the buoyancy foam up between the hulls **from underneath** with the notch at the bottom
- Use a piece of tape to temporarily attach the foam to the top cable to prevent it from falling



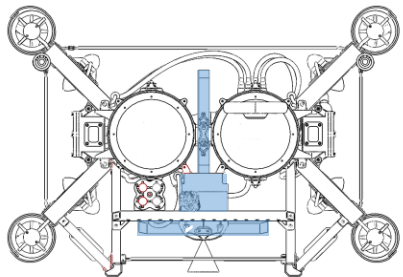


- Lift the vehicle, and slide the buoyancy foam up between the hulls **from underneath** with the notch at the bottom
- Use a piece of tape to temporarily attach the foam to the top cable to prevent it from falling

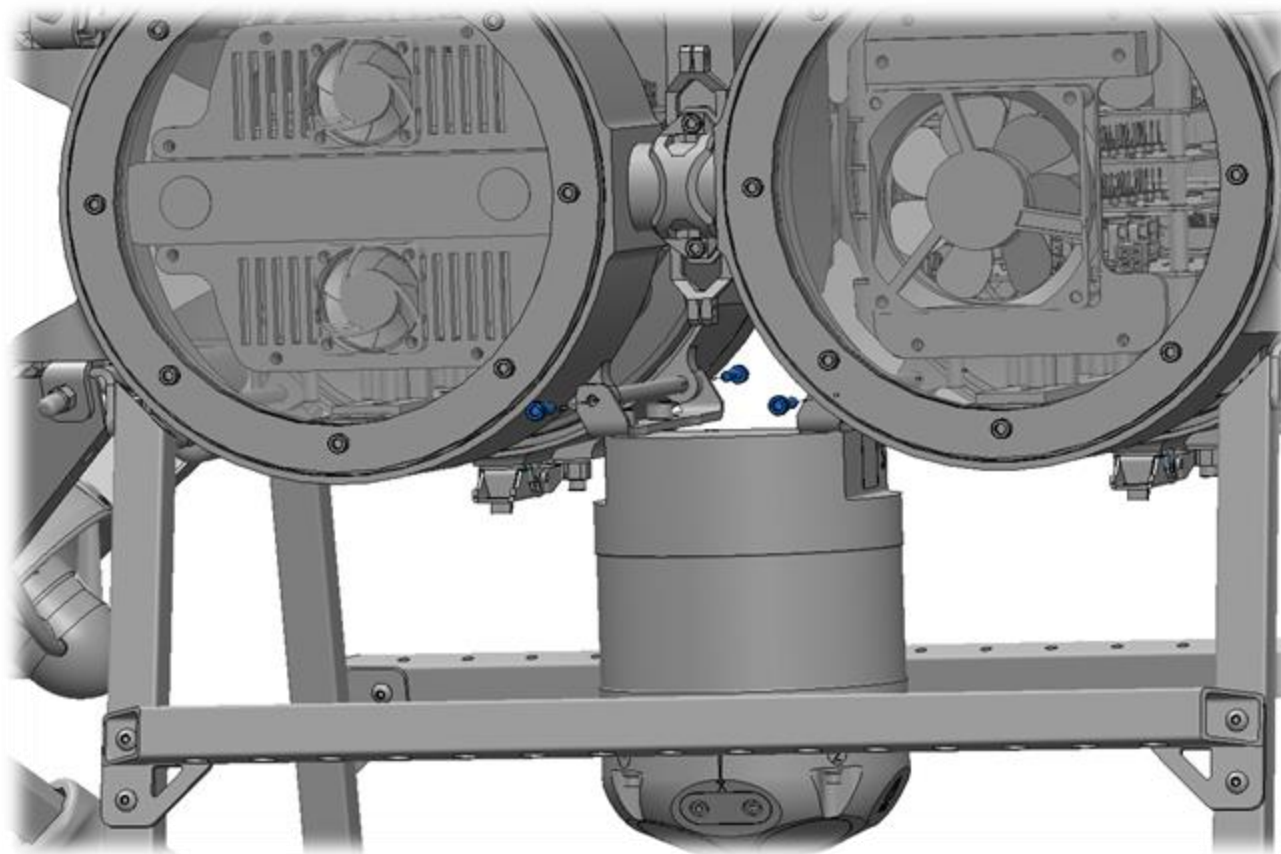
4X ¼-20 x 0.5in Socket Head Screws

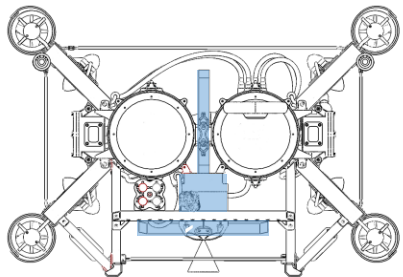


⚠ DVL IS \$15,000, SOMEONE SHOULD ALWAYS HOLD WITH BOTH HANDS WHILE NOT ON ROBOT ⚠

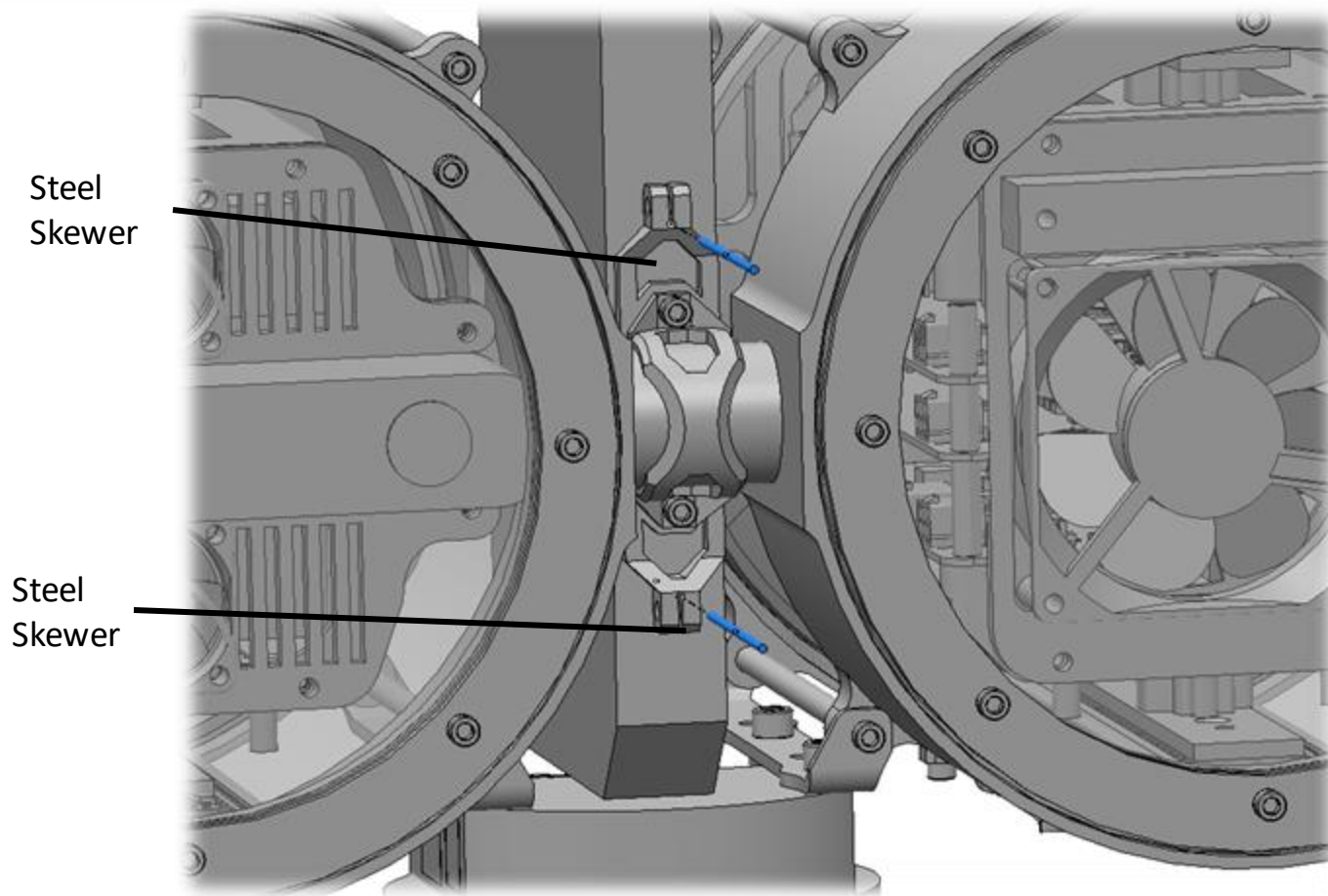


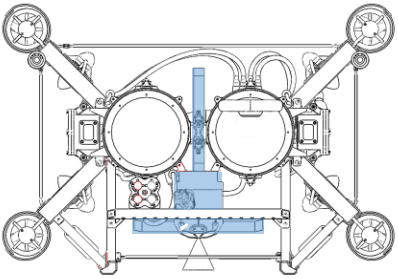
- Remove the bottom middle four screws that hold on the tensioning rods
- Slide the DVL assembly up from the bottom. Somebody should hold it with **both hands** during this whole process
- Screw the 8-32 screws back in to **12 in-lb**, this time going through the DVL bracket as well



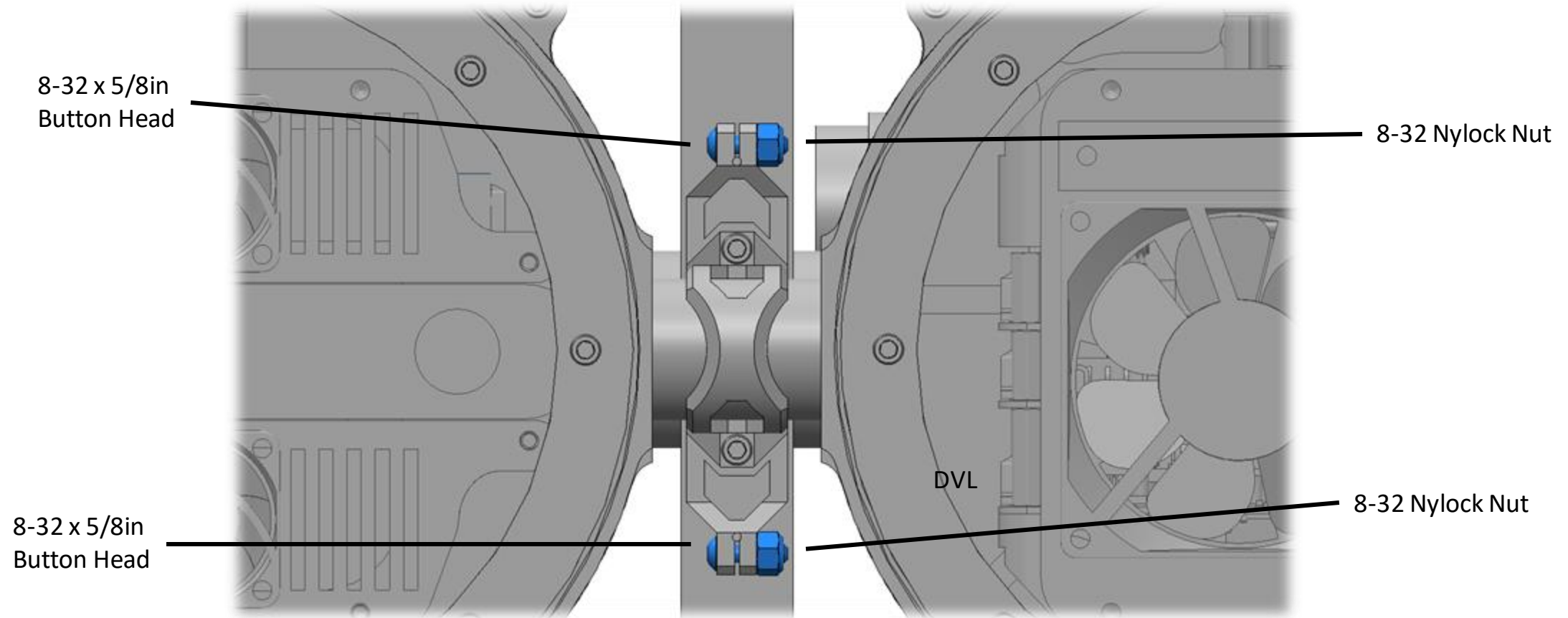


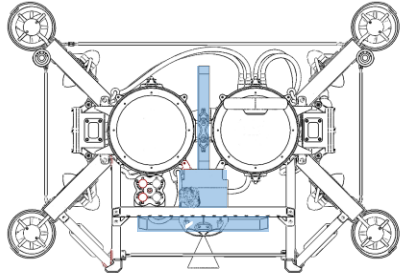
- Remove the tape holding up the buoyancy foam, and rest the foam **on top** of the DVL
- While ensuring the foam is centered, **hammer in** the front two steel skewers
- Leave about an 1/8in of skewers **sticking out**, so it could be pulled out with pliers in the future



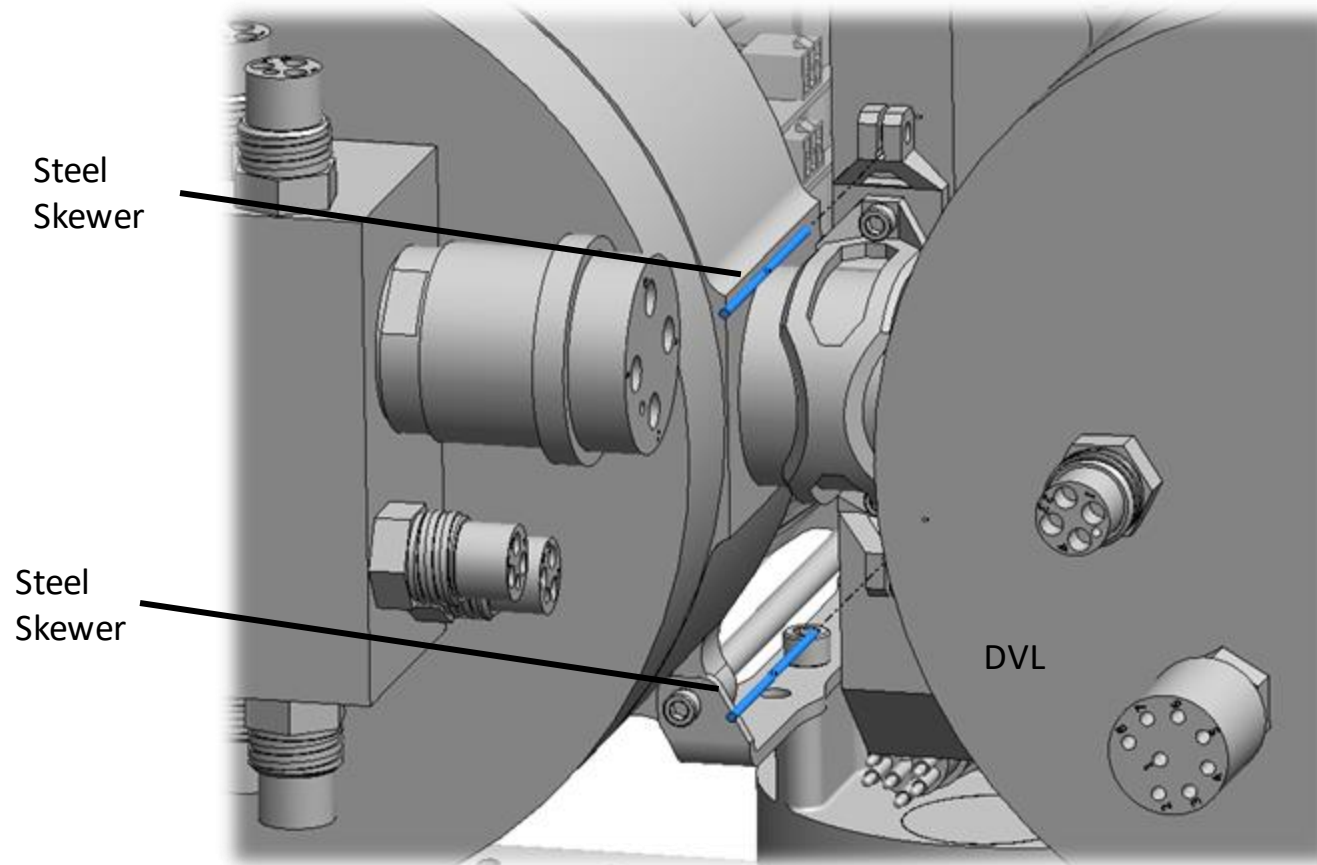


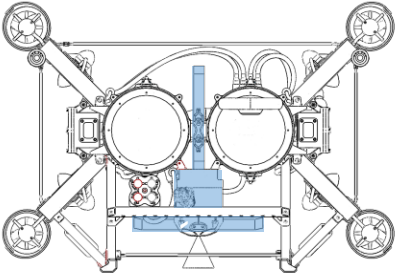
- Secure the skewers in place by clamping it with a screw and nut



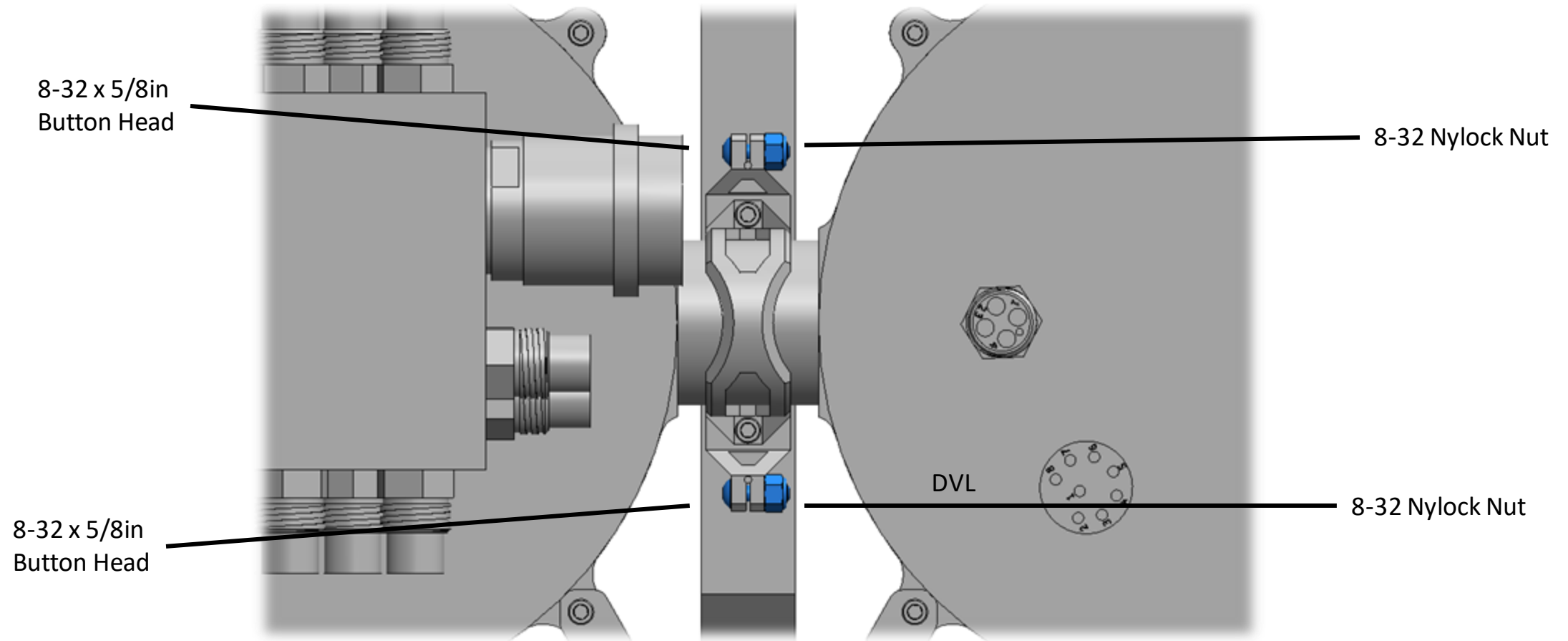


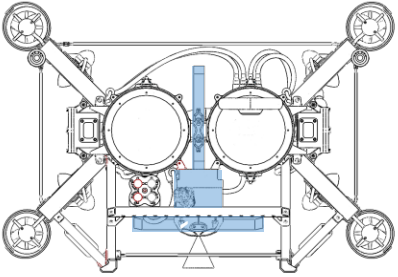
- While ensuring the foam is centered, **hammer in** the back two steel skewers
- Leave about an 1/8in of skewers **sticking out**, so it could be pulled out with pliers in the future



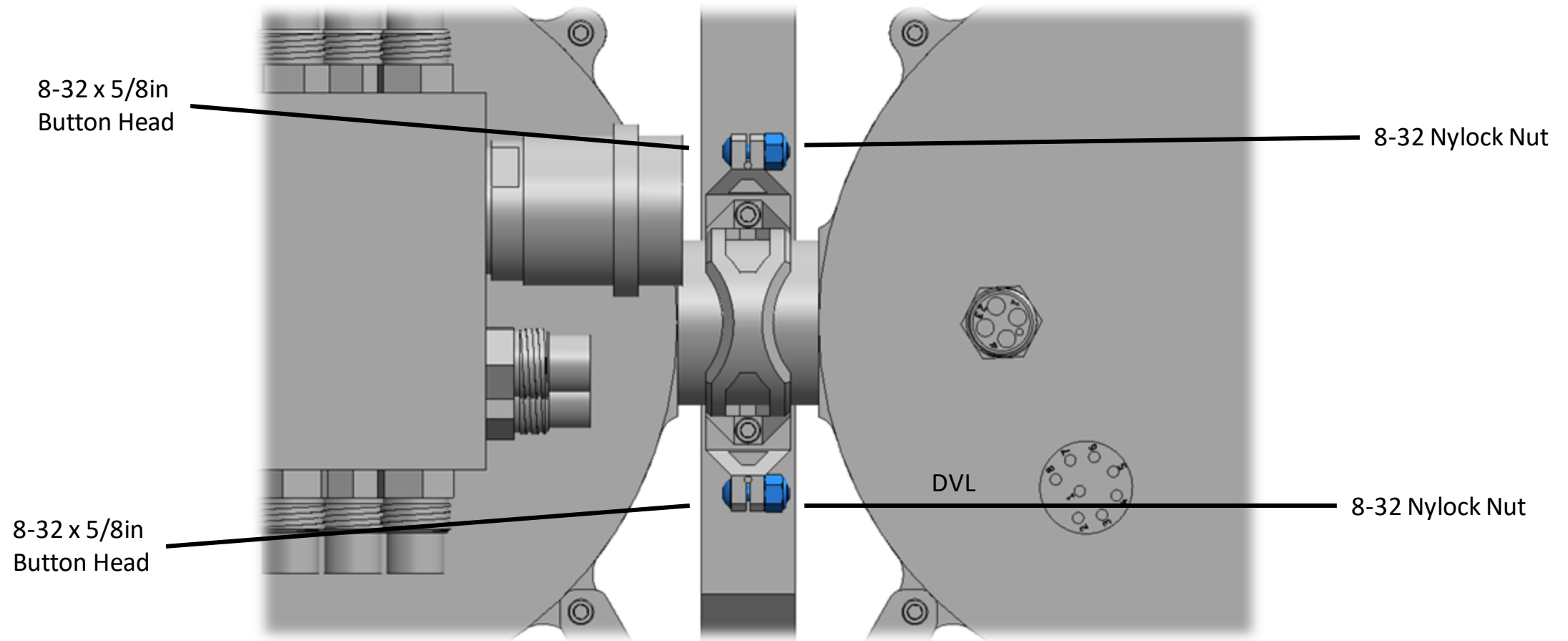


- Secure the skewers in place by clamping it with a screw and nut

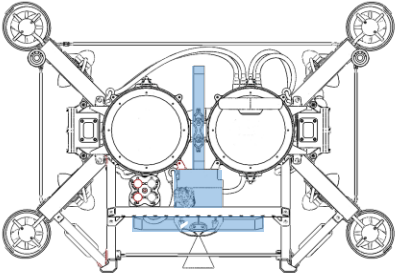




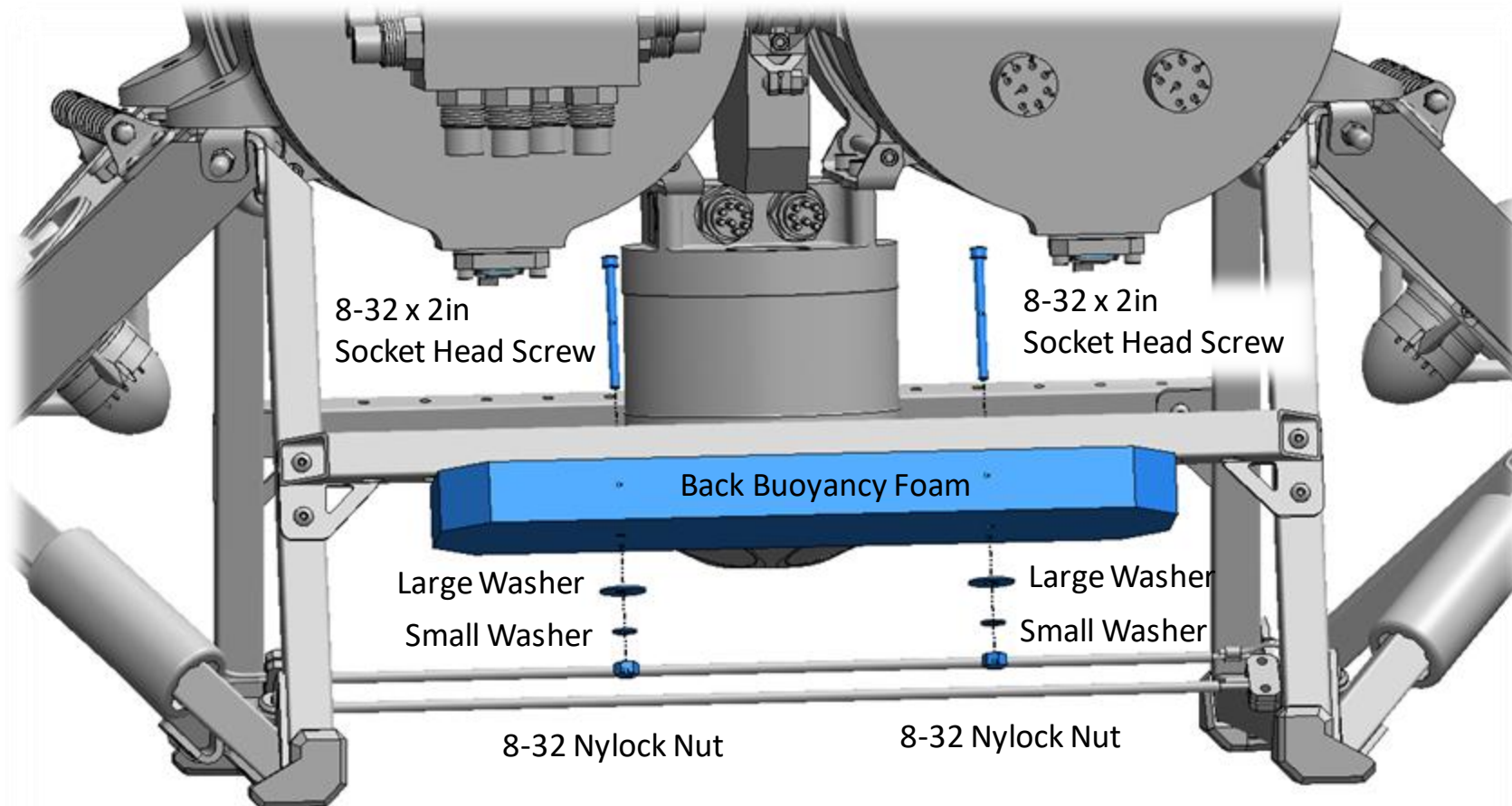
- Secure the skewers in place by clamping it with a screw and nut

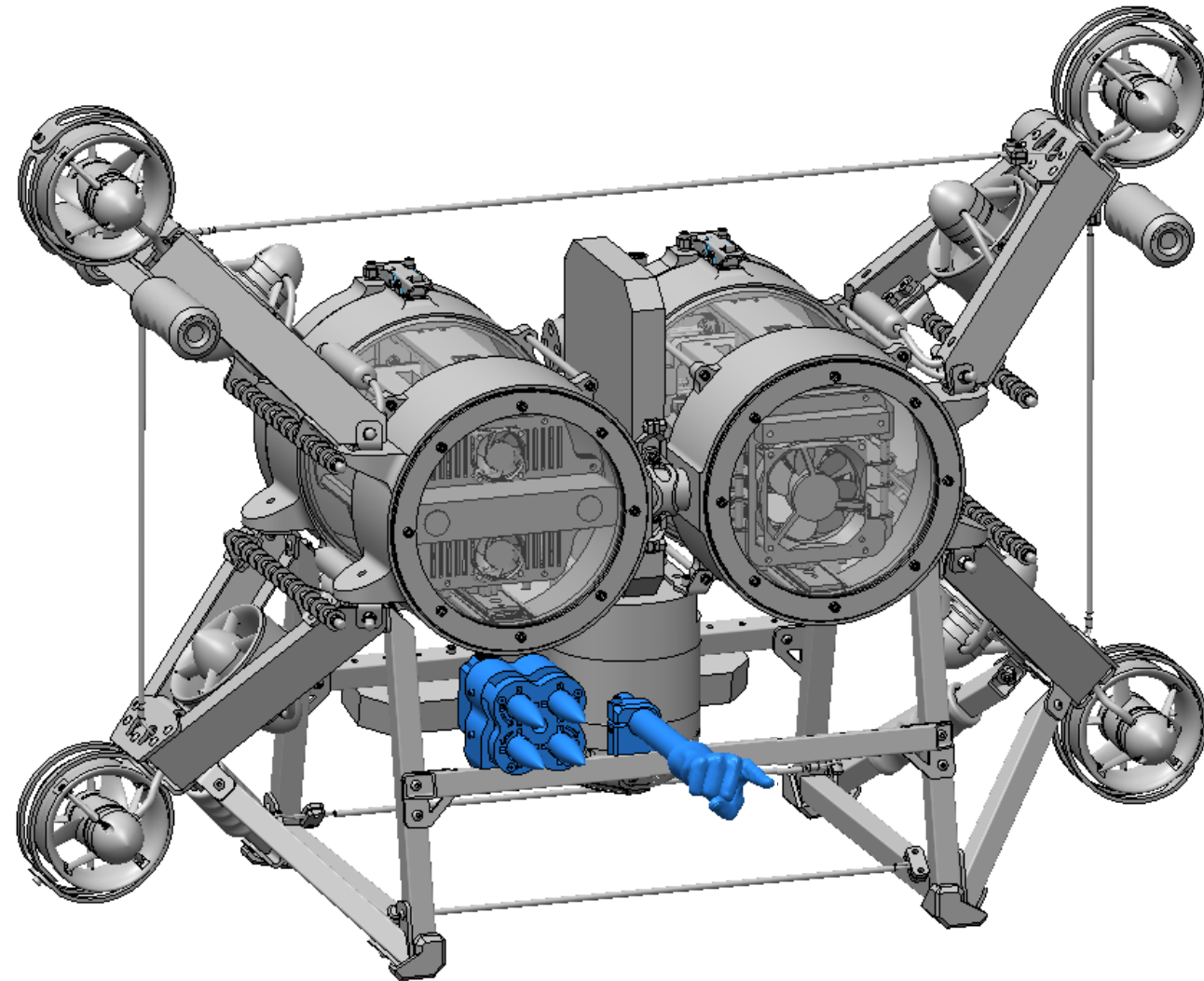


Additional Instructions

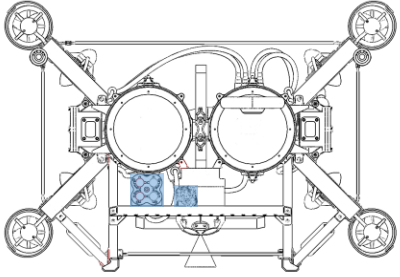


- Secure the back buoyancy foam in place. **Don't tighten too hard**, as it could crush the foam
- You will likely need to cut a screw to length with a Dremel. Grind the cut end smooth to make it thread on smoothly

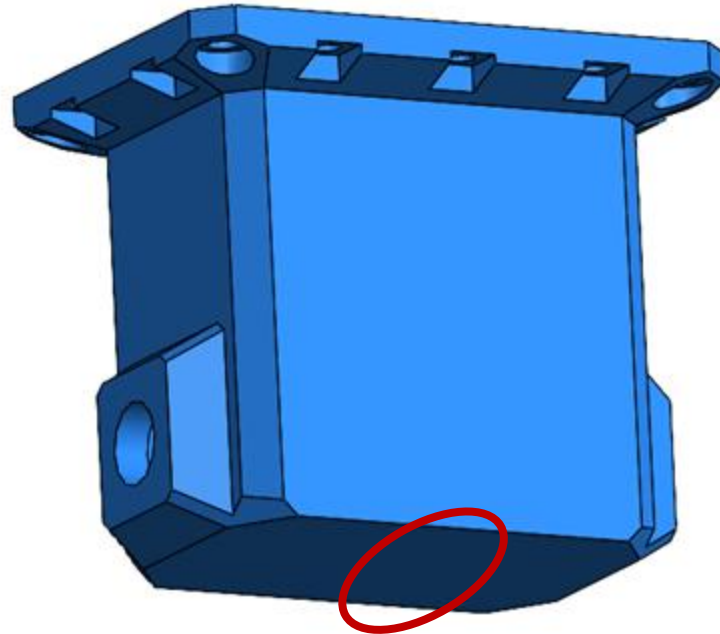




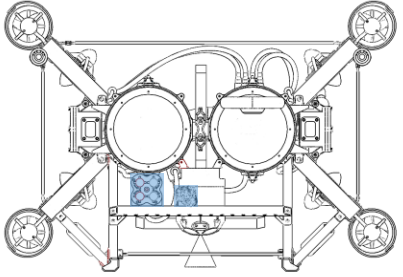
Task Mechanisms Additional Instructions



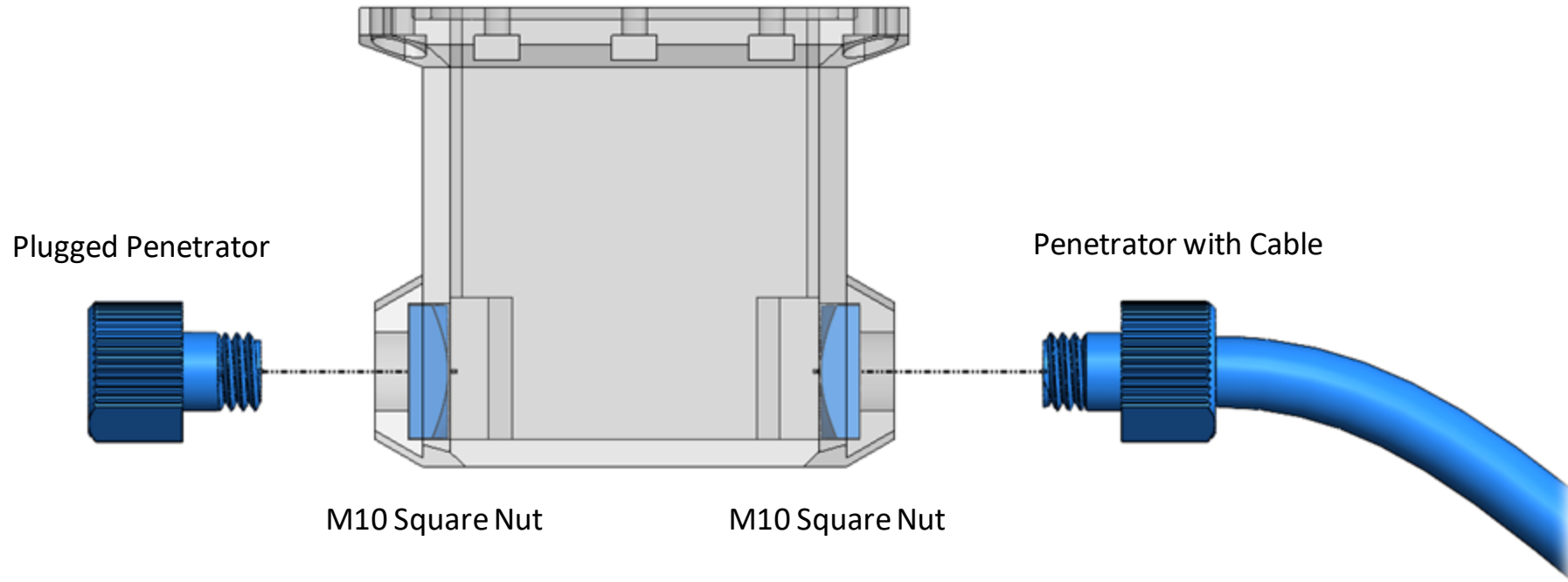
- Grab the actuator case, ensure there is **no holes** on the bottom (circled in red)



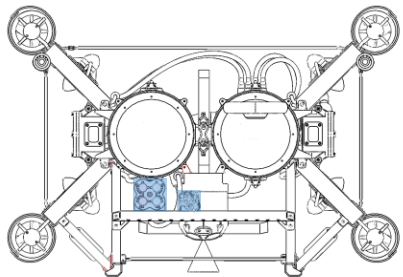
Task Mechanisms Additional Instructions



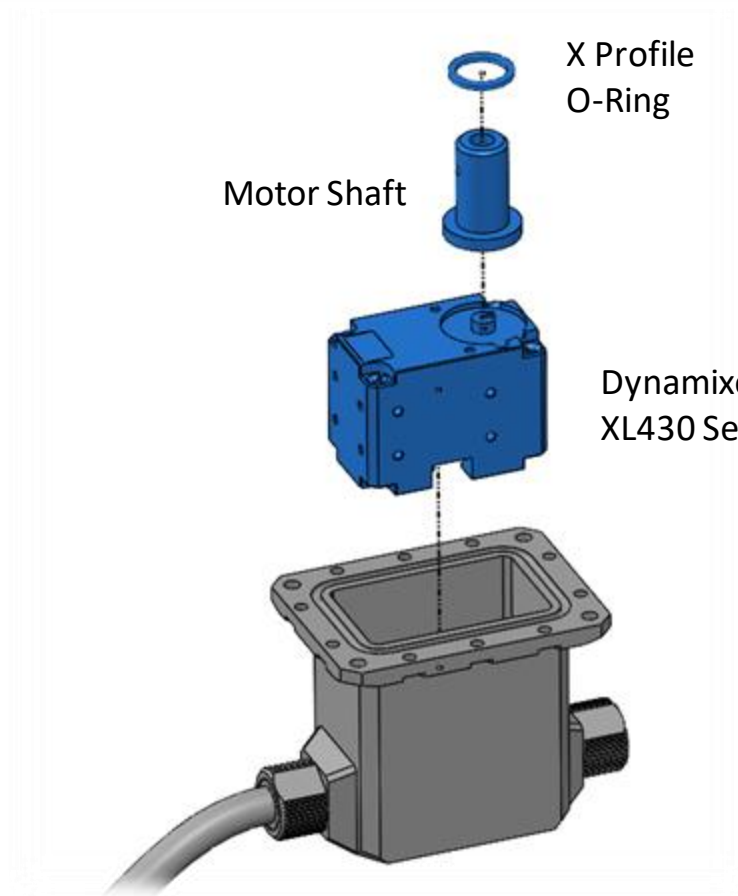
- Actuator case has been made translucent for visibility
- Install the two penetrators. One end should be plugged and the other should have a cable
- Confirm the penetrators have **O-rings** before putting them on!



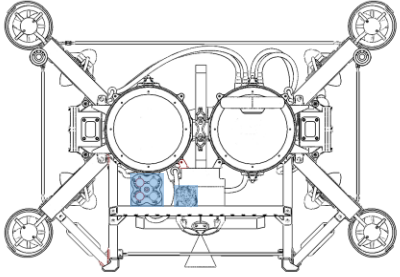
Task Mechanisms Additional Instructions



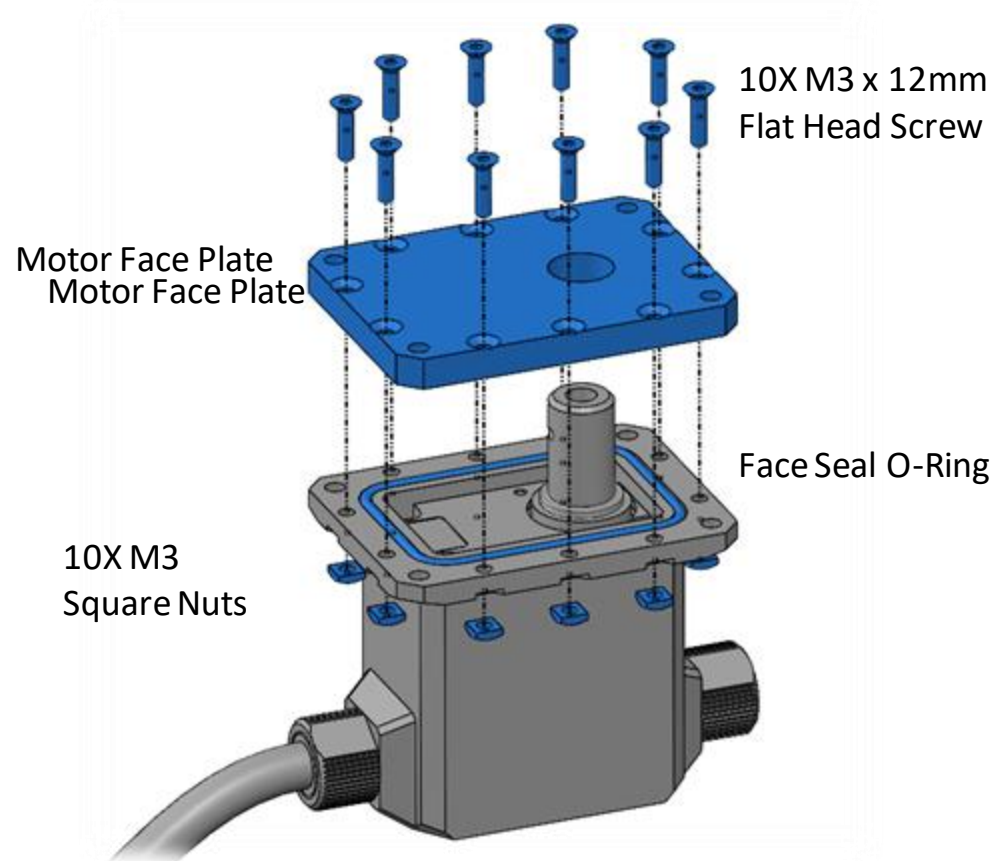
- Plug in the servo, making sure the colors on the bullet connectors match
- The motor shaft should be on the **opposite side** the cable is coming out of
- The motor shaft lines up with a **key** on the servo, make sure the key is lined up and is sitting down all the way
- **Don't pinch** the cable when pushing the servo into place!



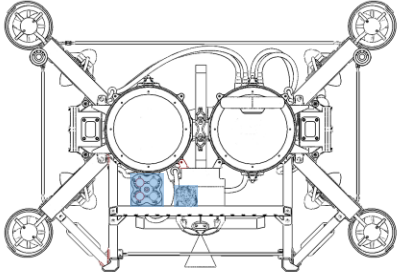
Task Mechanisms Additional Instructions



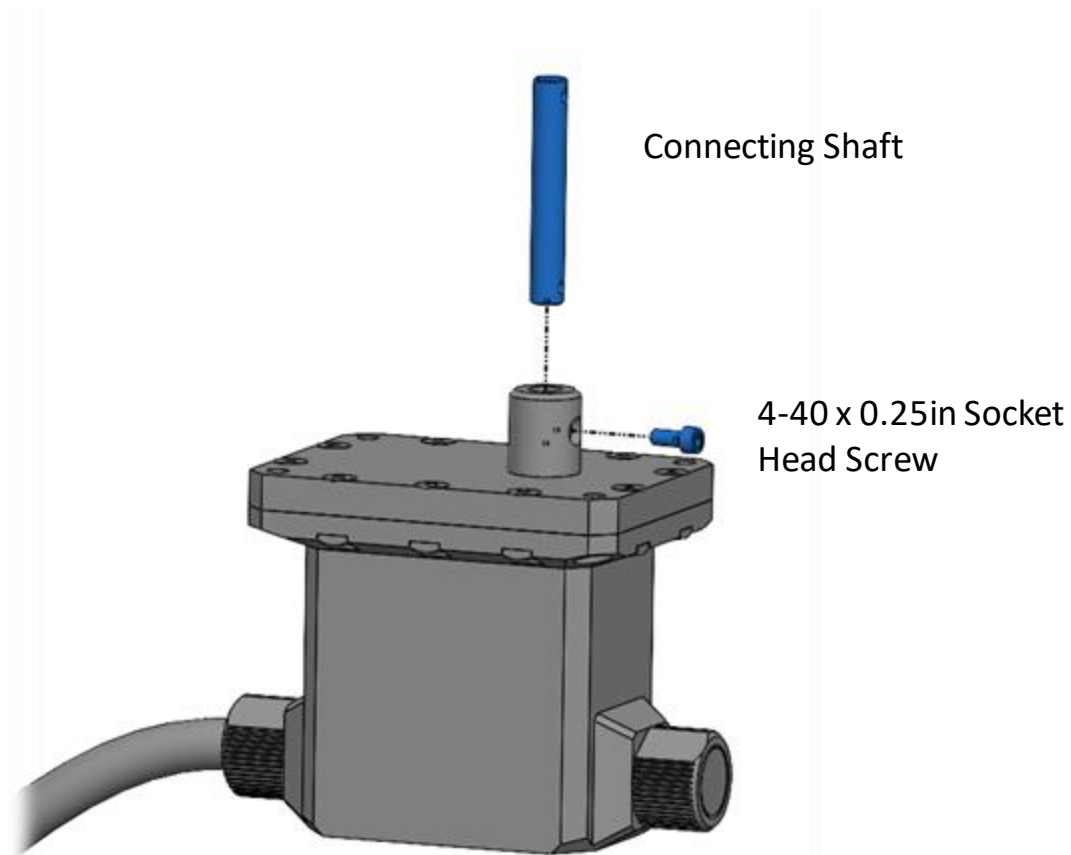
- Put the **O-ring** in the groove, ensure it doesn't pop out while putting the face plate on
- Tighten the screws **evenly**



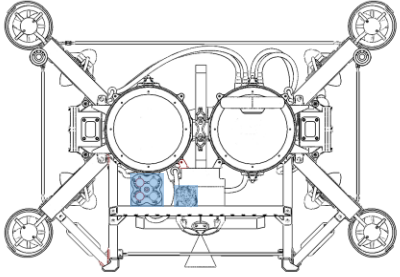
Task Mechanisms Additional Instructions



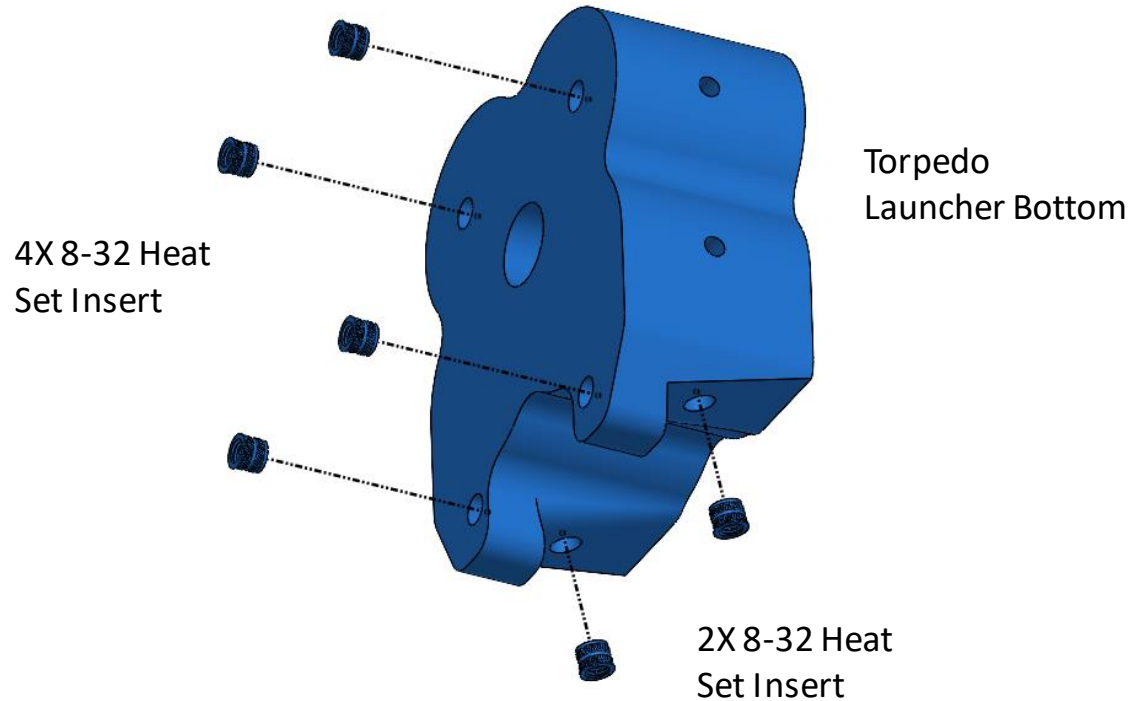
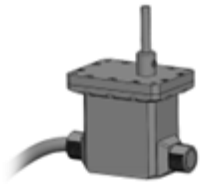
- Put the connecting shaft in, then secure it in position with the 4-40 screw



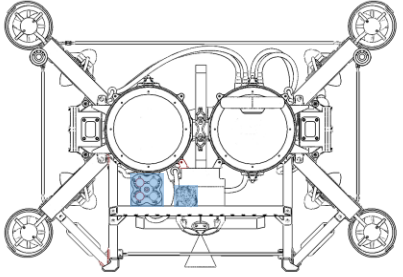
Task Mechanisms Additional Instructions



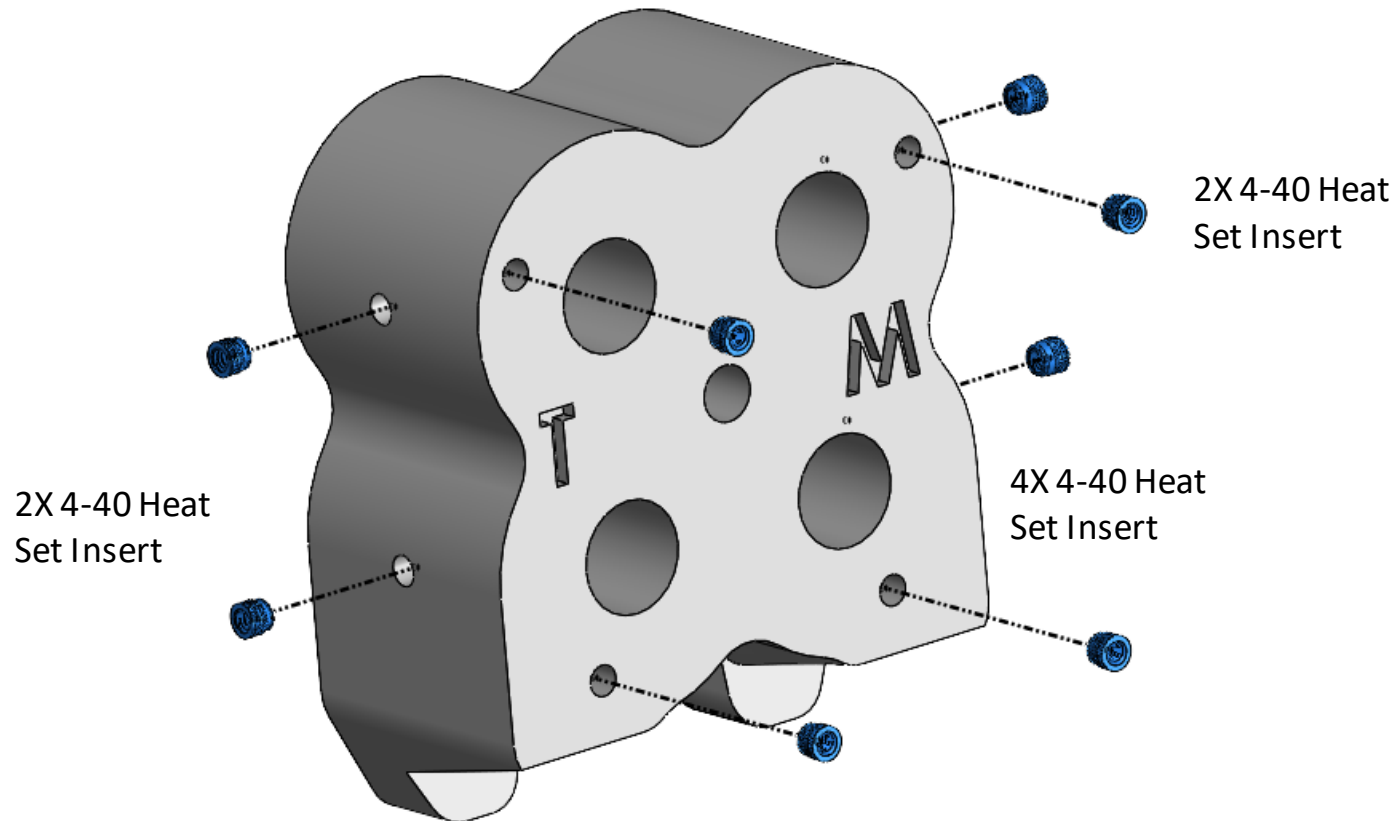
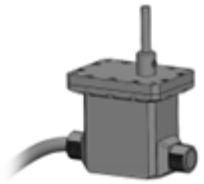
- Set the servo aside
- Install heat set inserts into 3D prints with soldering iron
- After each insert is put in and while it is still hot, screw in an 8-32 screw and move it normal to the face. Once positioned, remove the screw. This positions the heat set straight



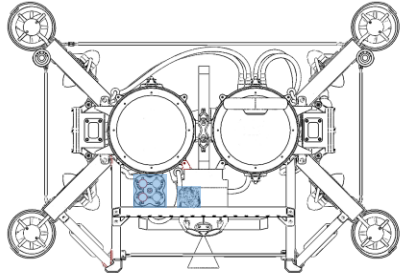
Task Mechanisms Additional Instructions



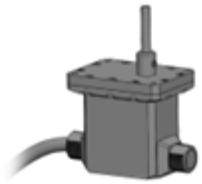
- Install heat set inserts into 3D prints with soldering iron
- After each insert is put in and while it is still hot, screw in an 4-40 screw and move it normal to the face. Once positioned, remove the screw. This positions the heat set straight



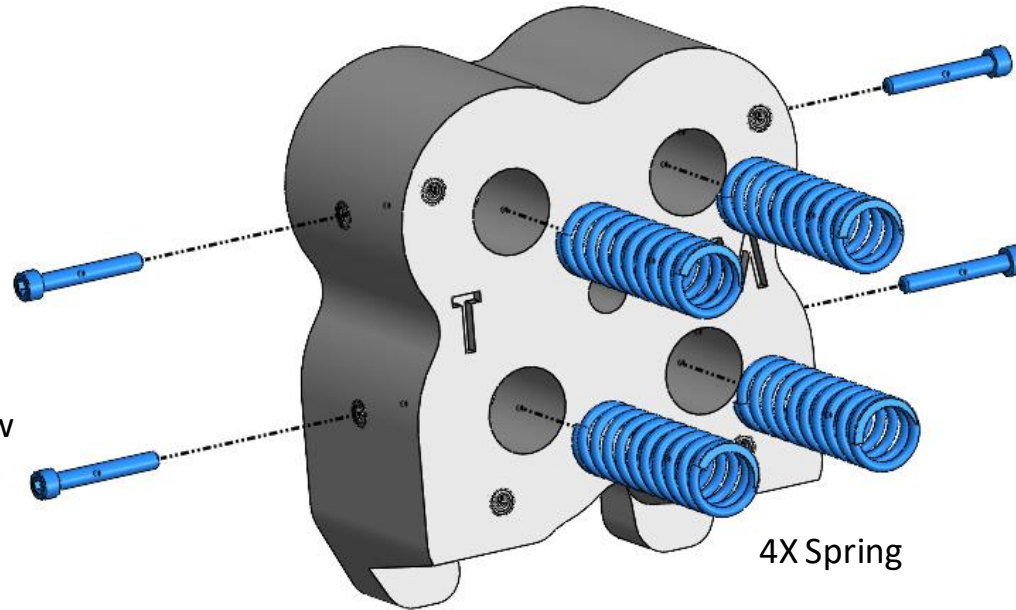
Task Mechanisms Additional Instructions



- Put the springs in **first**, and then put in the 4-40 screws in from the side. These screws prevent the spring from flying out after the torpedo gets launched



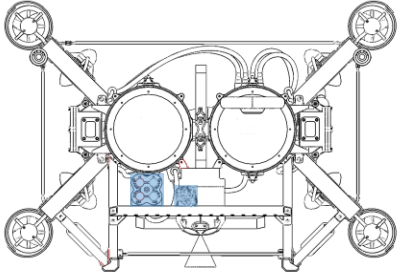
2X 4-40 x 0.75in
Socket Heat Screw



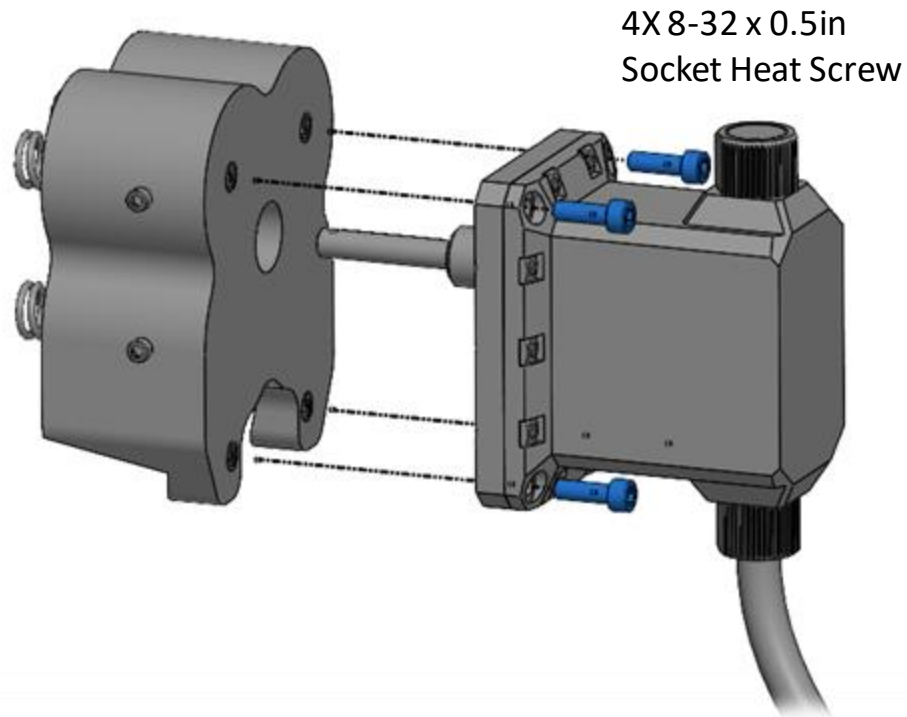
2X 4-40 x 0.75in
Socket Heat Screw

4X Spring

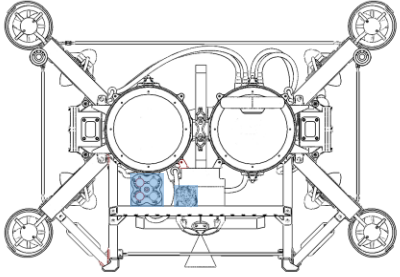
Task Mechanisms Additional Instructions



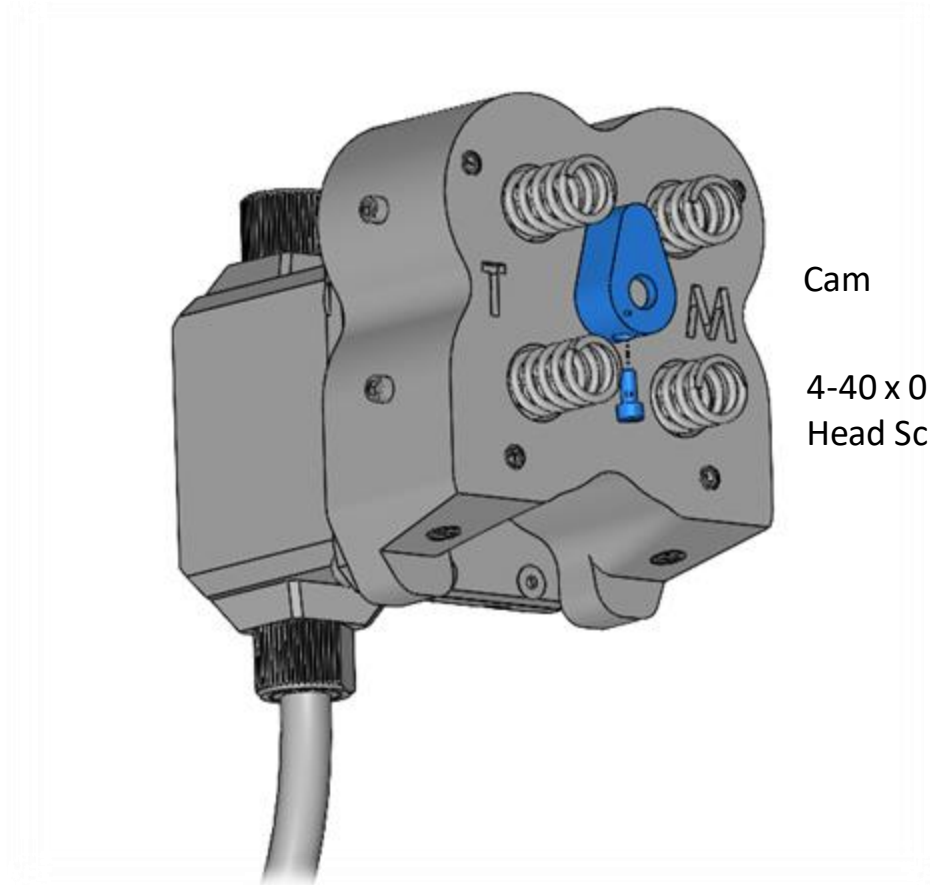
- Attach the servo casing to the bottom of the torpedo with the four screws in the corner



Task Mechanisms Additional Instructions



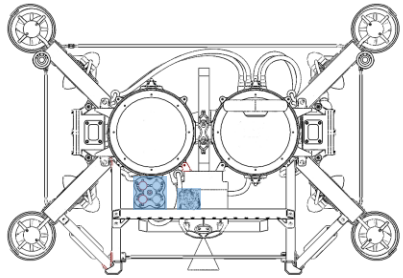
- Attach the servo cam to the shaft with the 4-40 screw
- Position the cam in the **angle** as shown



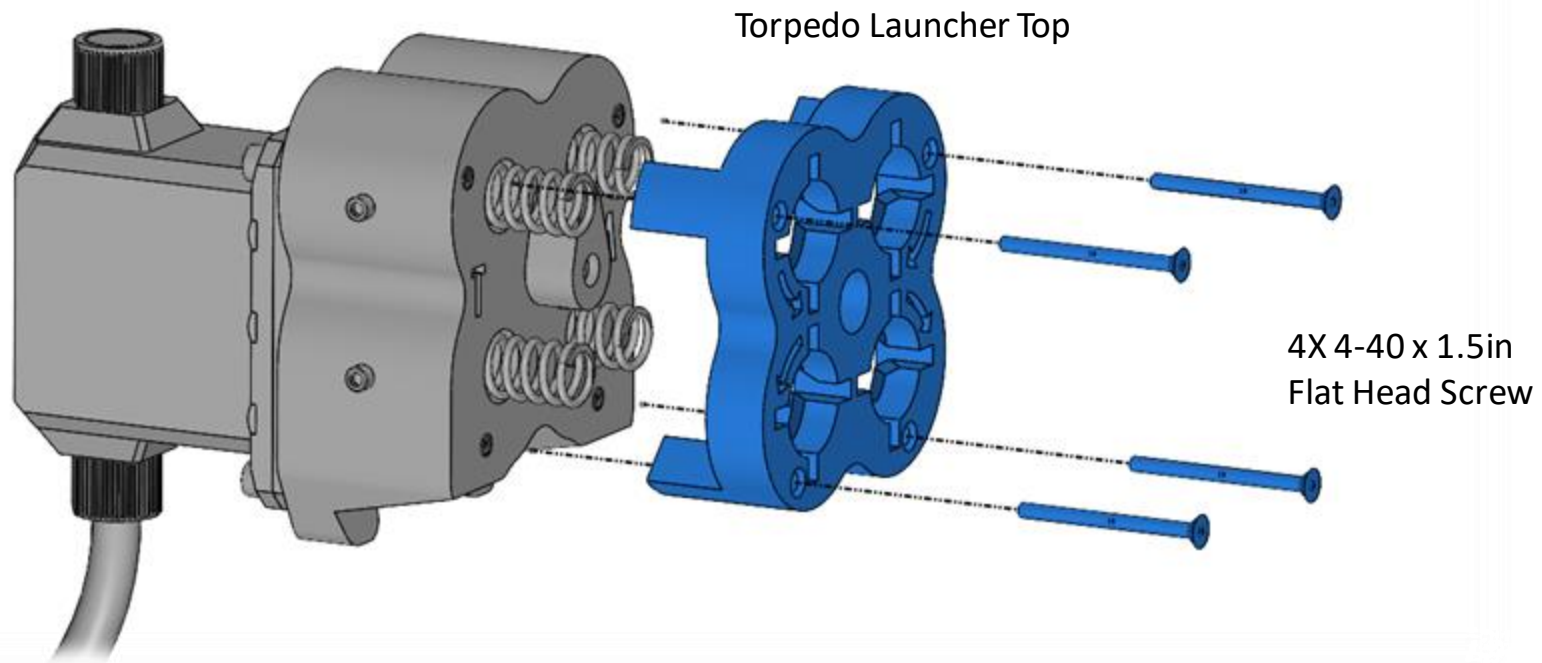
Cam

4-40 x 0.25in Socket
Head Screw

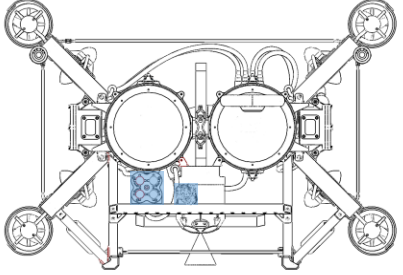
Task Mechanisms Additional Instructions



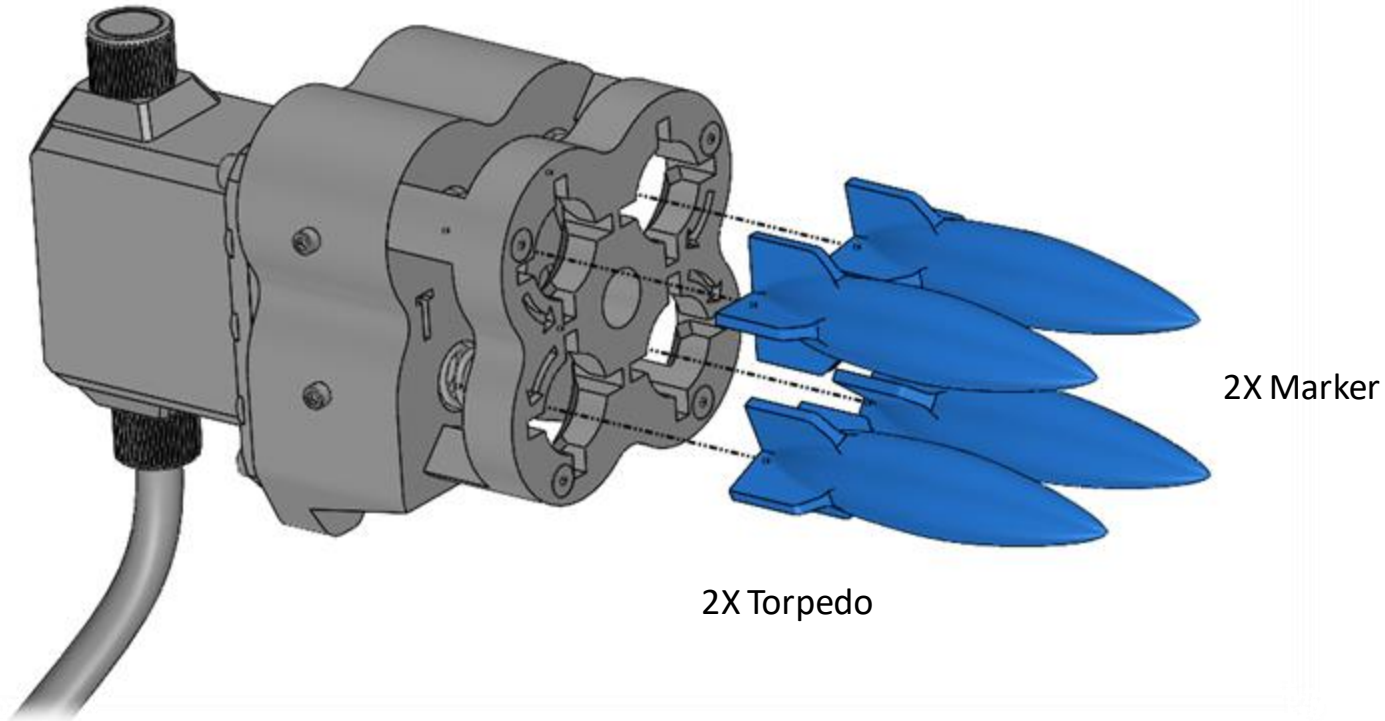
- Attach the top with four screws



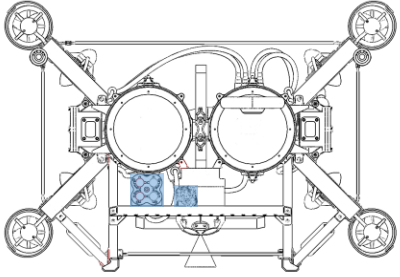
Task Mechanisms Additional Instructions



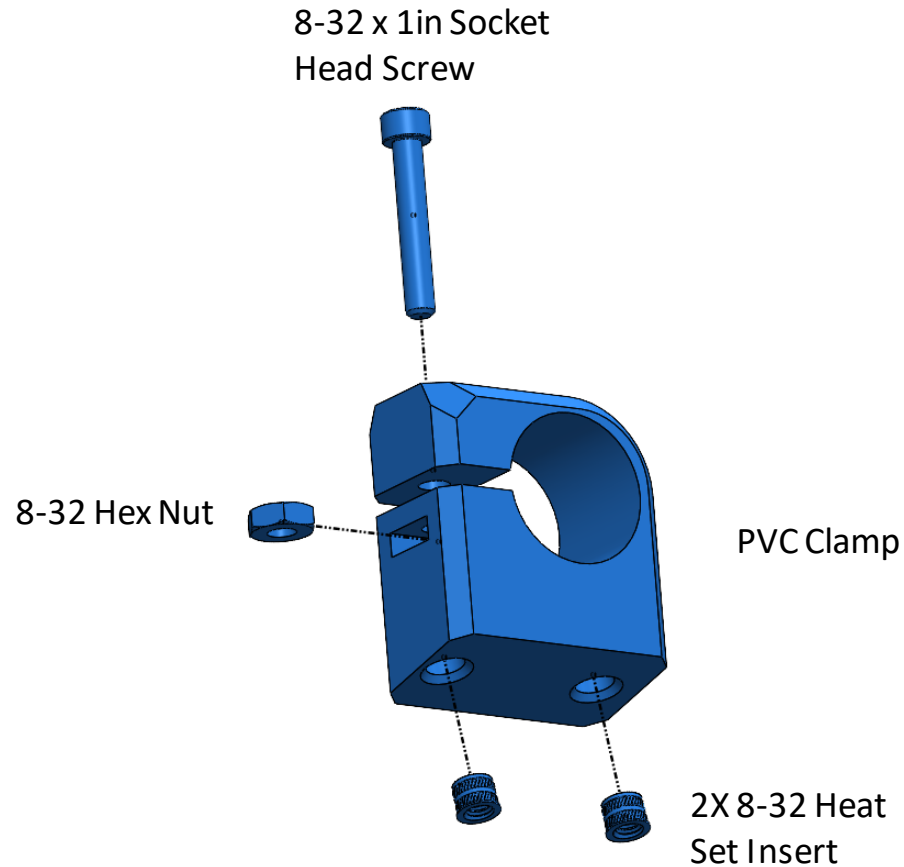
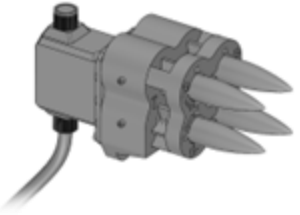
- Insert the torpedoes/markers by aligning their fins with the slot and rotating them according to the arrow on the print
- The torpedoes are red and go on the left side, and the markers are gray and go on the right side



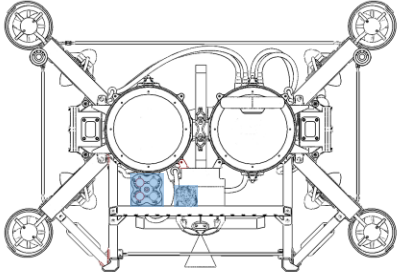
Task Mechanisms Additional Instructions



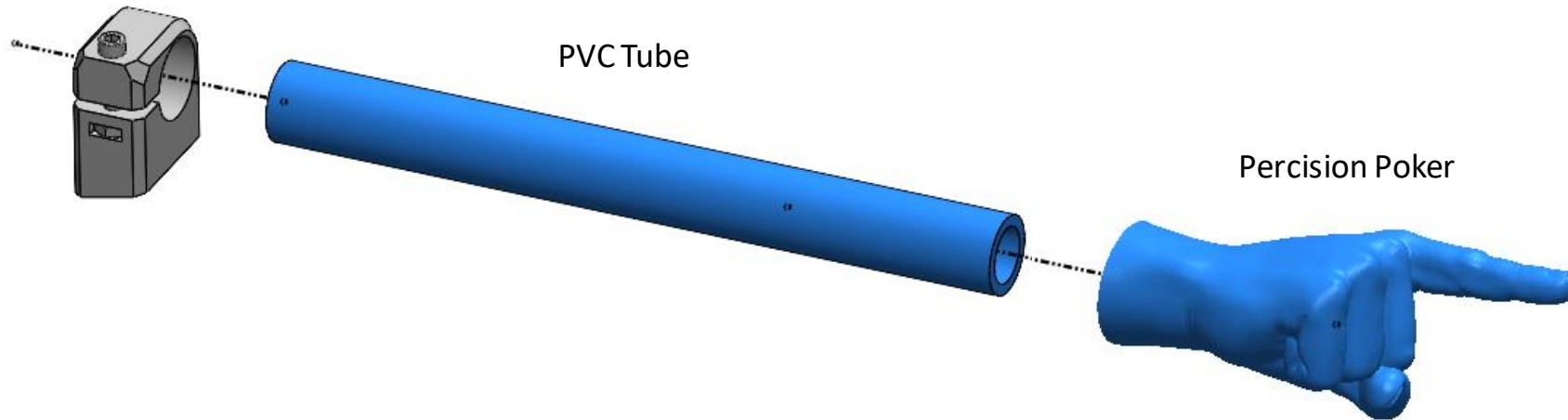
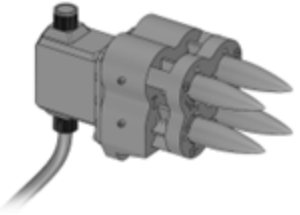
- Insert the nut **before** putting in screw
- **Don't tighten** screw yet, just start threads
- Install heat set inserts into 3D prints with soldering iron
- After each insert is put in and while it is still hot, screw in an 8-32 screw and move it normal to the face. Once positioned, remove the screw. This positions the heat set straight



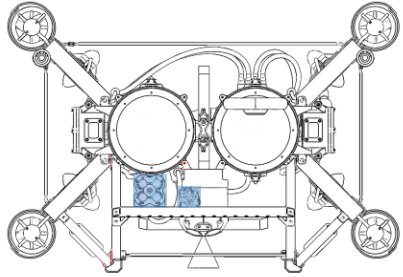
Task Mechanisms Additional Instructions



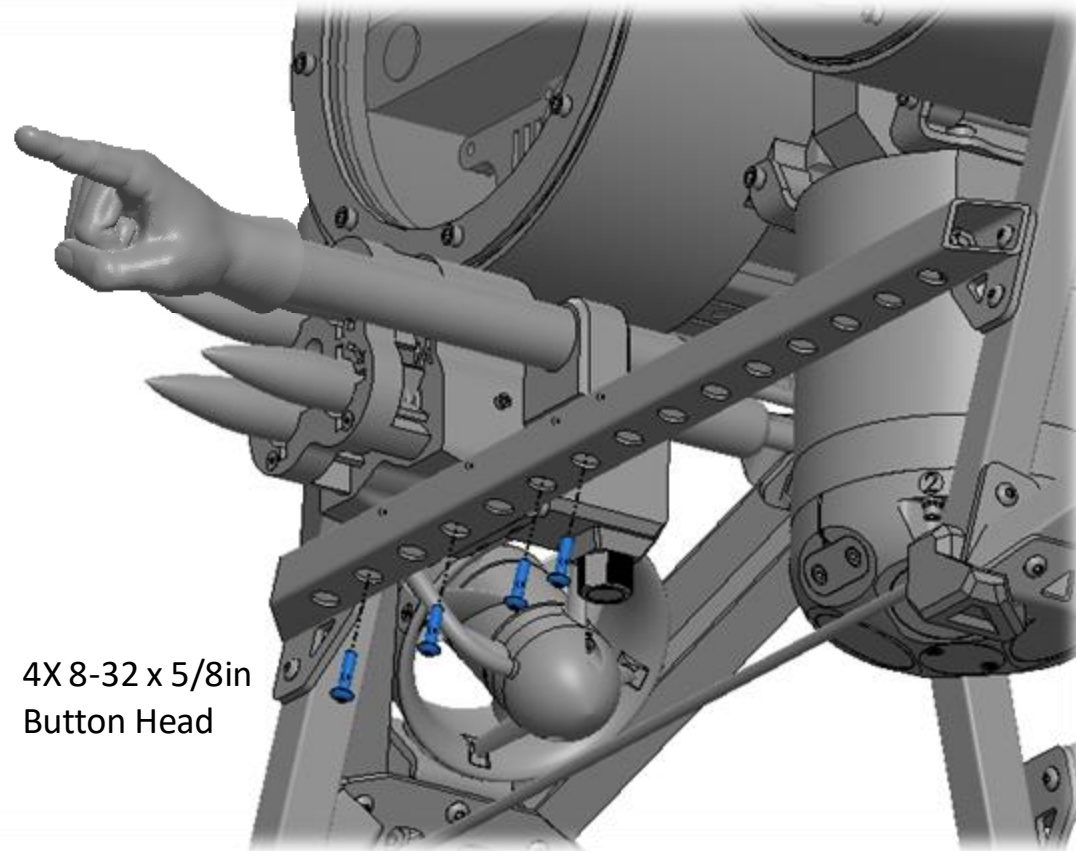
- Press the precision poker into the PVC tube, and put the tube into the clamp
- Tighten the 8-32 screw to **lock** the PVC pipe in place



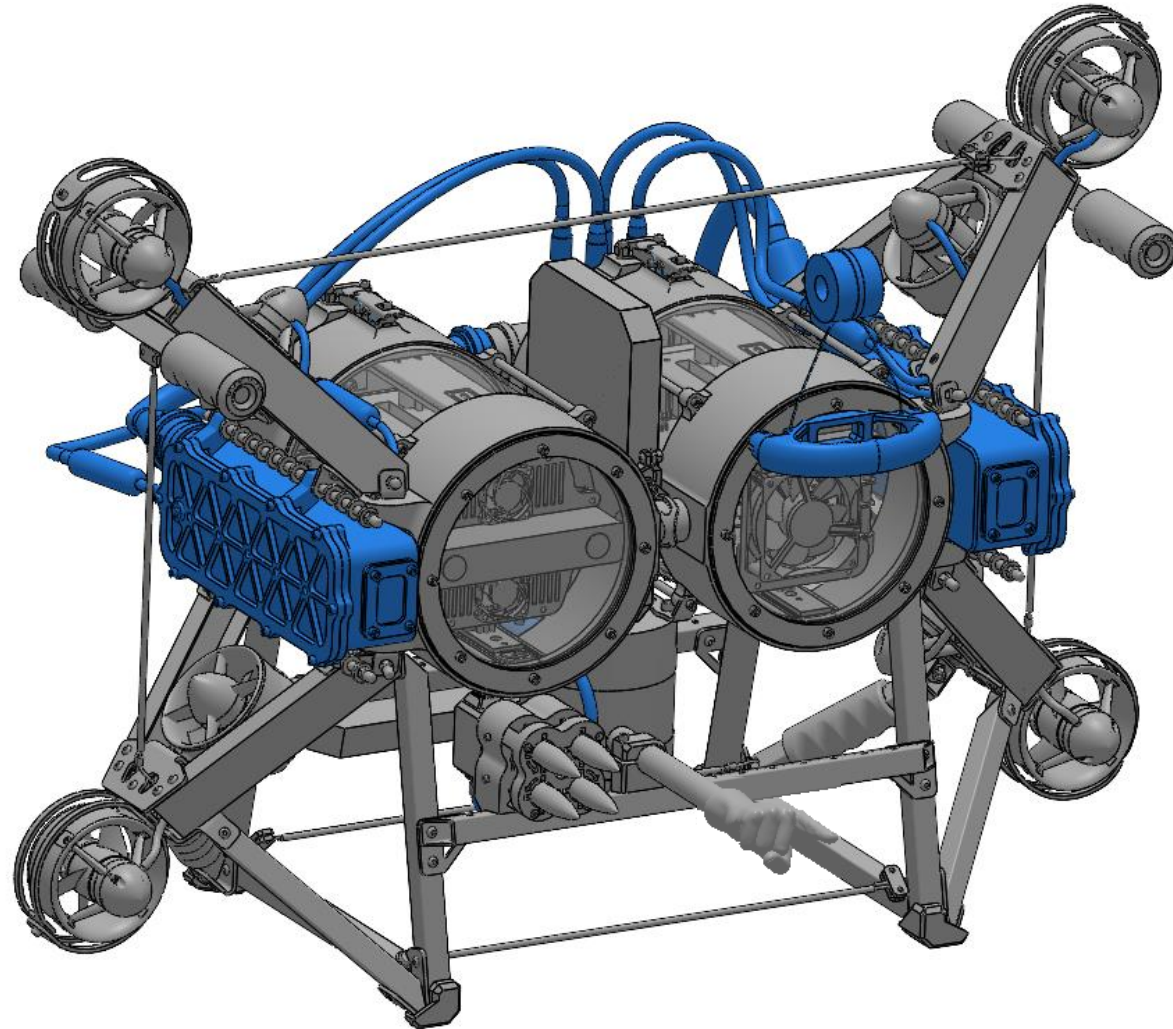
Task Mechanisms Additional Instructions

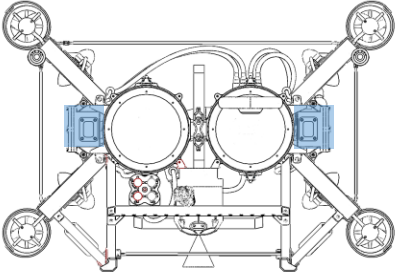


- Install the task mechanisms to the *Holy Bar*
- Notice the holes they are **positioned** at

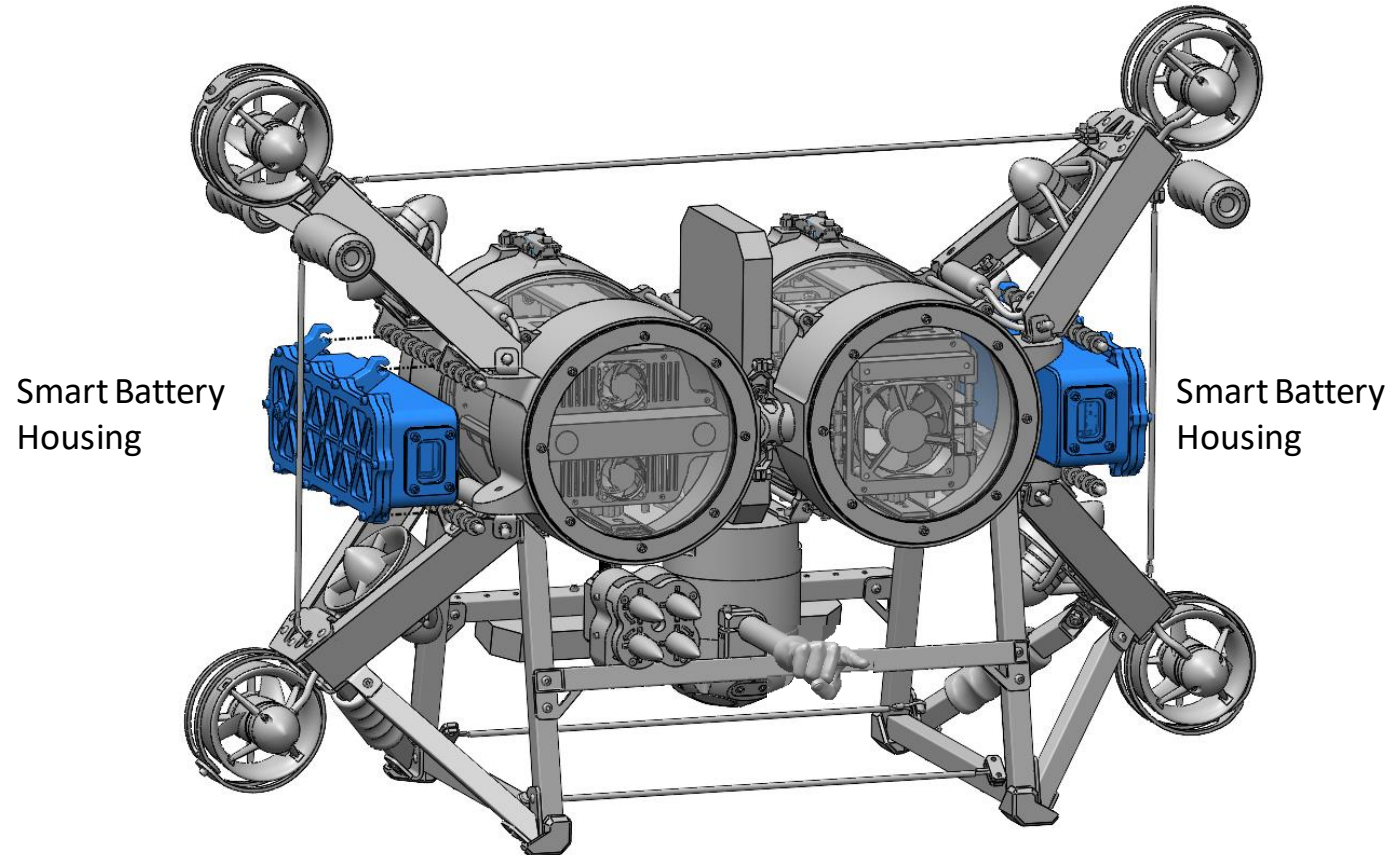


4X 8-32 x 5/8in
Button Head

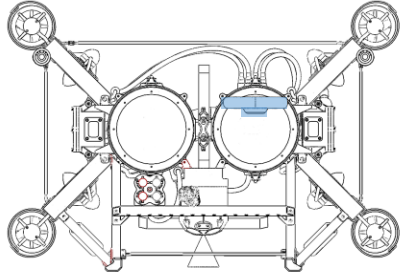




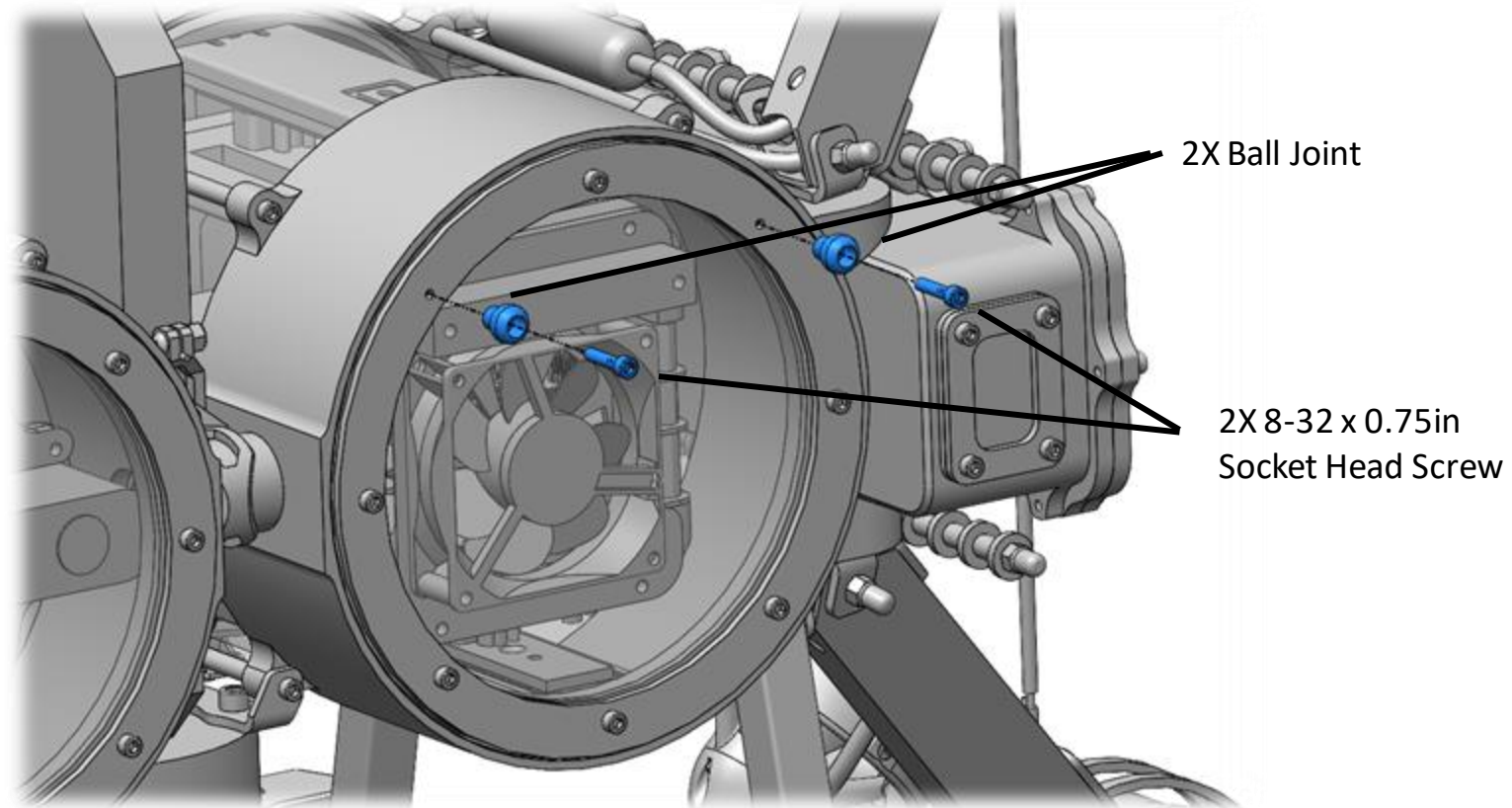
- Clip the smart batter housings in position
- The assembly of them is not covered in these inscriptions

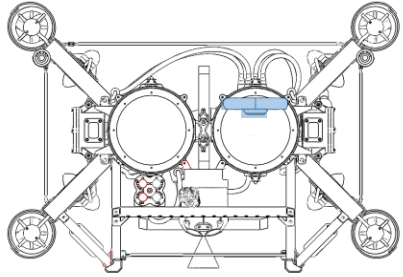


Additional Instructions

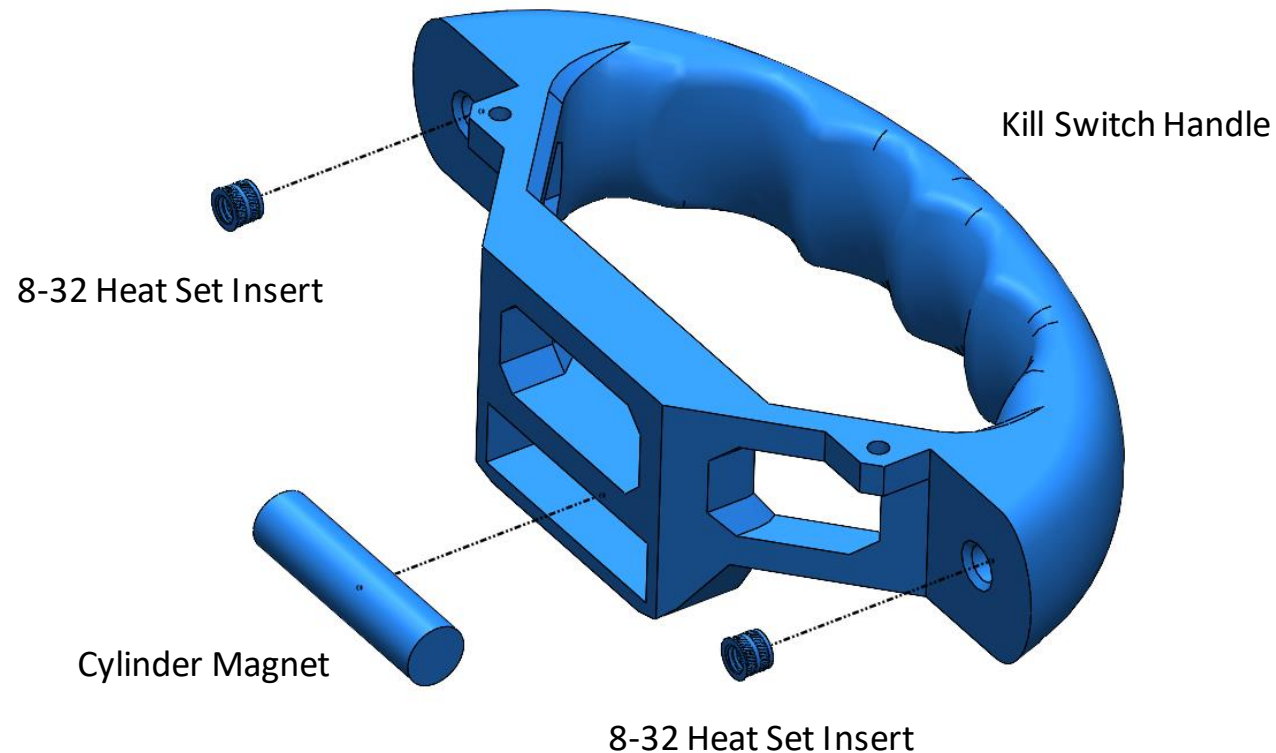
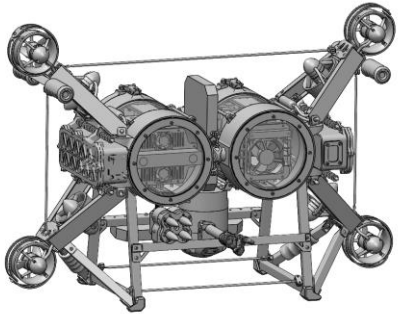


- Remove the highlighted screw on the needed position on the front eyeglass
- Add in the new screws with spheres, and torque to **12 in-lb**

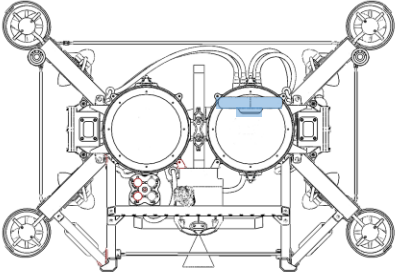




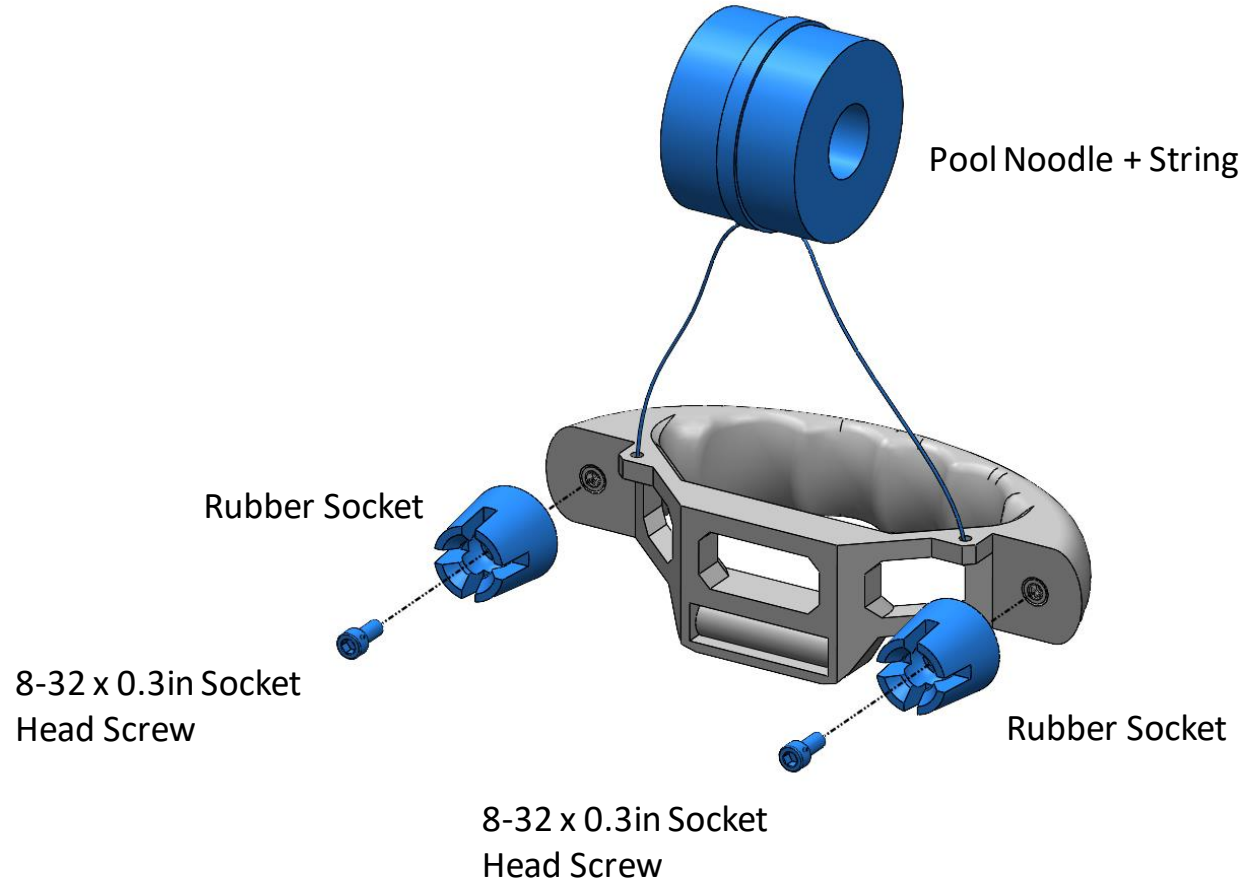
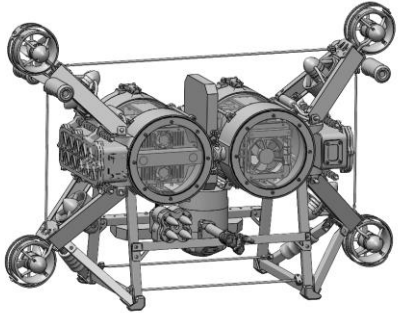
- Set the Talos aside
- Install heat set inserts into 3D prints with **soldering iron**
- After each insert is put in and while it is still hot, screw in an 8-32 screw and move it normal to the face. Once positioned, remove the screw. This positions the heat set straight
- **Epoxy** in the cylindrical magnet

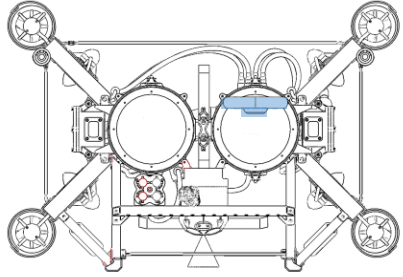


Additional Instructions

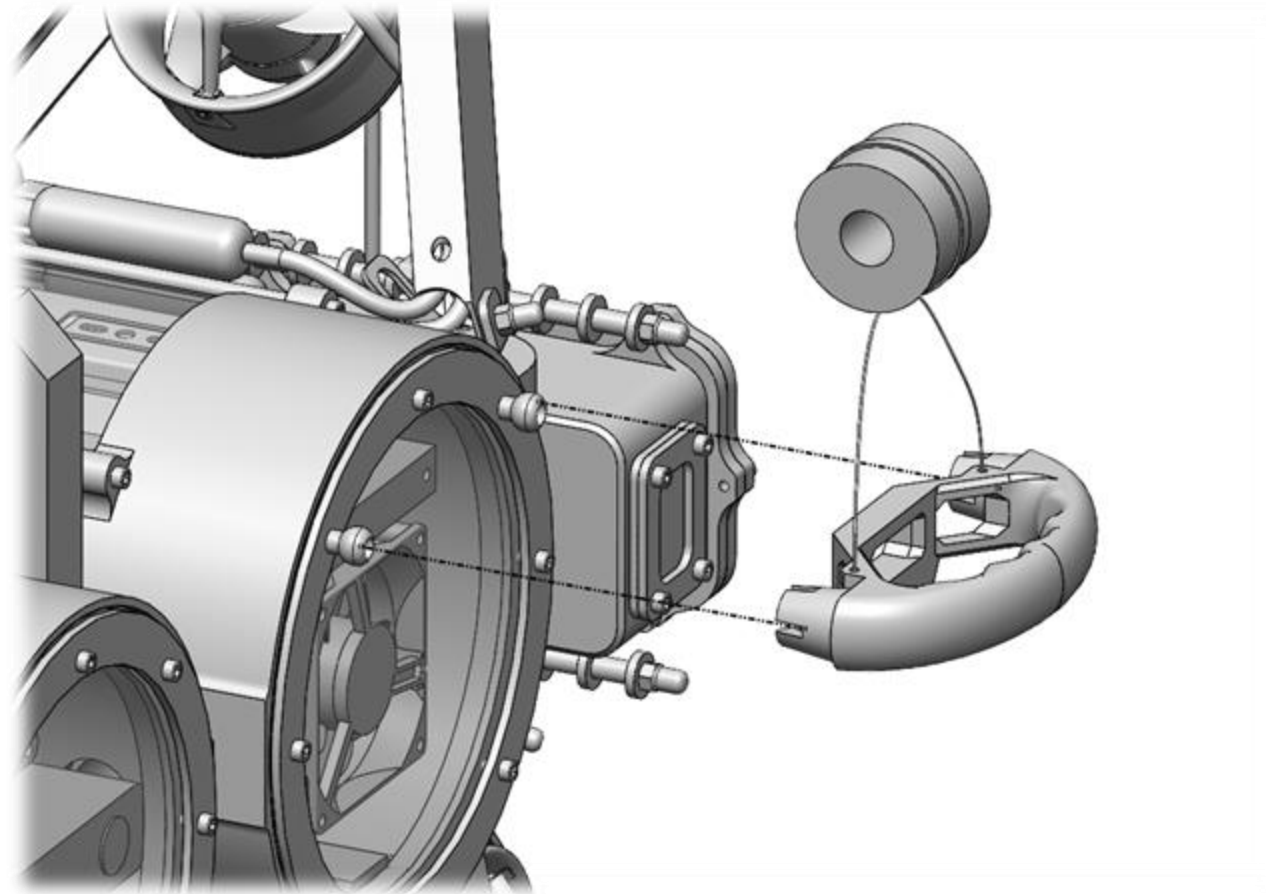


- Zip tie a piece of string onto a short segment of pool noodle.
- Feed each end of the string through the holes of the kill switch, and tie two **knots** to prevent it from coming out
- Cut and burn each the loose ends of string

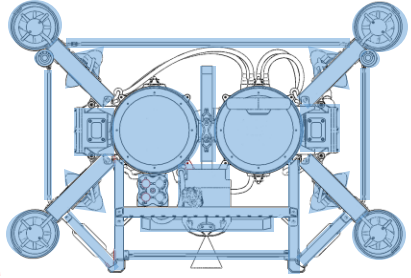




- Insert the kill switch on Talos



Additional Instructions



- Connect and route SubConn cables as shown
- Use a zip tie on either side of the thruster epoxy pill to secure the joint in place

