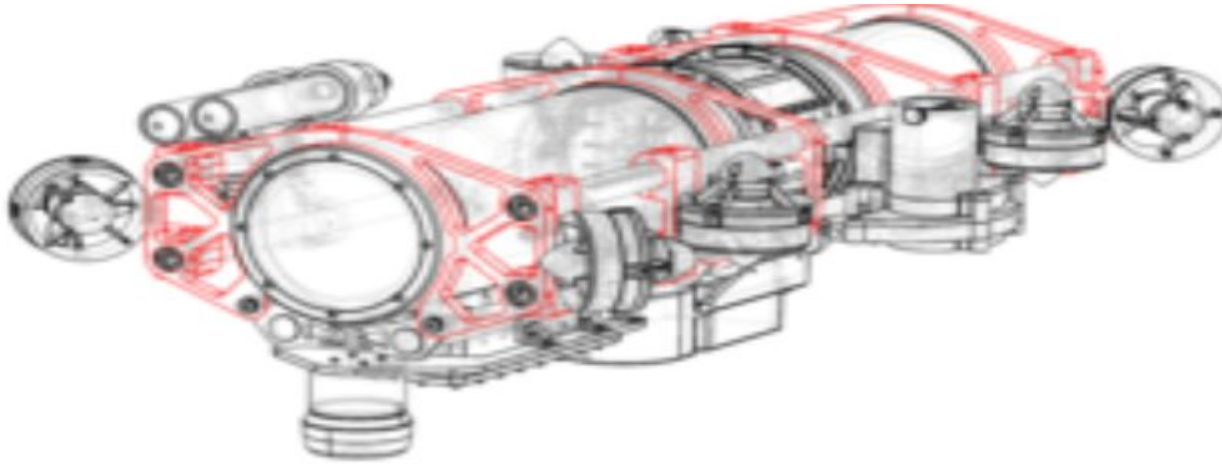


## Carnegie Mellon TAUV (Tartan Autonomous Underwater Vehicle)

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***KINGFISHER***

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# Project Description

**Name:** Acoustics Enclosure

## **Purpose and Specifications:**

An enclosure is needed to hold hardware used to detect objects and aid the sub in navigation.

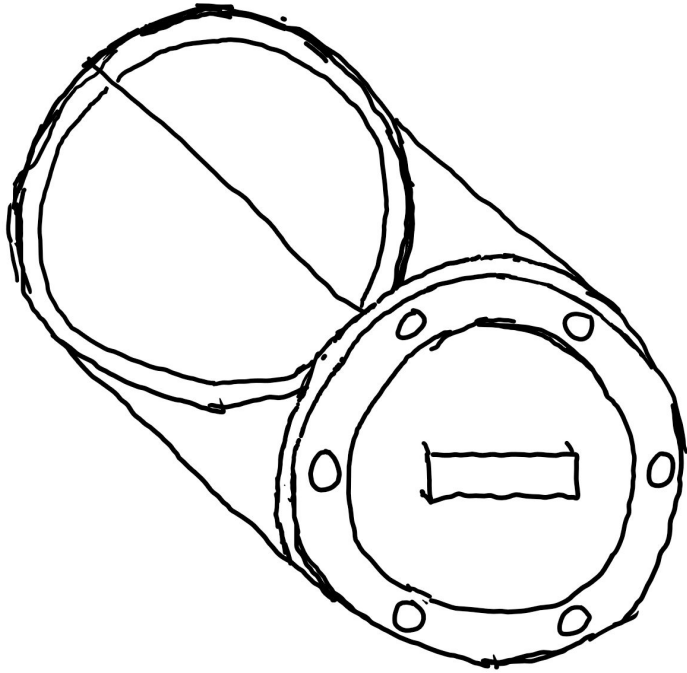
The enclosure should be 4 inches in diameter and hold:

- 2x ADALM Boards
- 1x Raspberry Pi
- 1x Power Board
- 4x Pre-Amps
- 4x XLR's

### **Side Note:**

- The enclosure should be made with easy access to hardware (For quick adjustments for competition runs)
- Enclosure should not clash with vehicle design (Too long, Extravagant geometries, etc.)

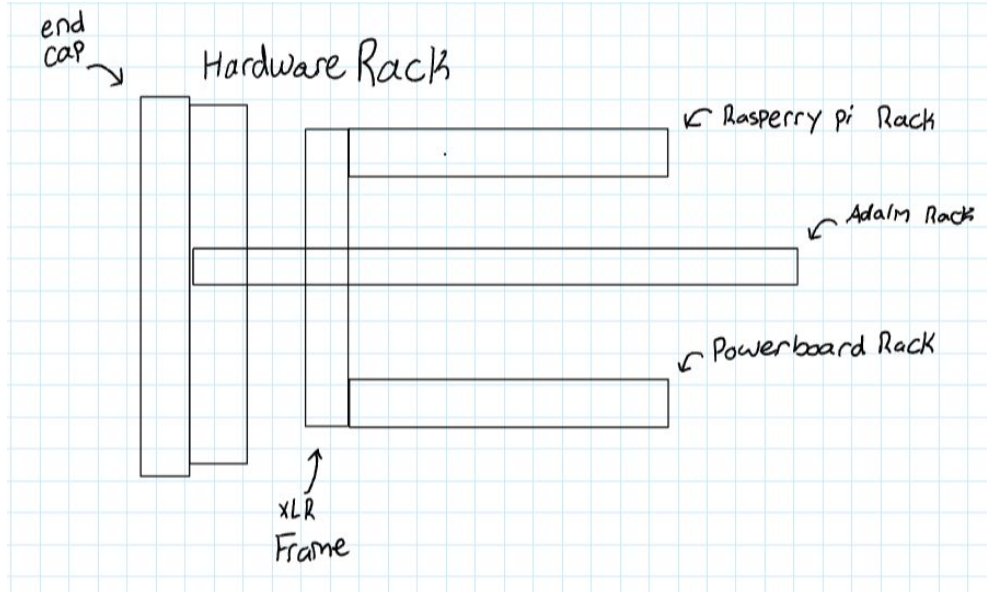
# Drafted Design - Body



- Simple cylindrical tube design with a removable faceplate for easy access to hardware.
- O-rings are fixed to both ends of the tube to prevent water from seeping in

Note/Concern: The removable faceplate has to be sealed in a way that allows it to be easily removed while preventing water intrusion.

# Drafted Design - Hardware Rack

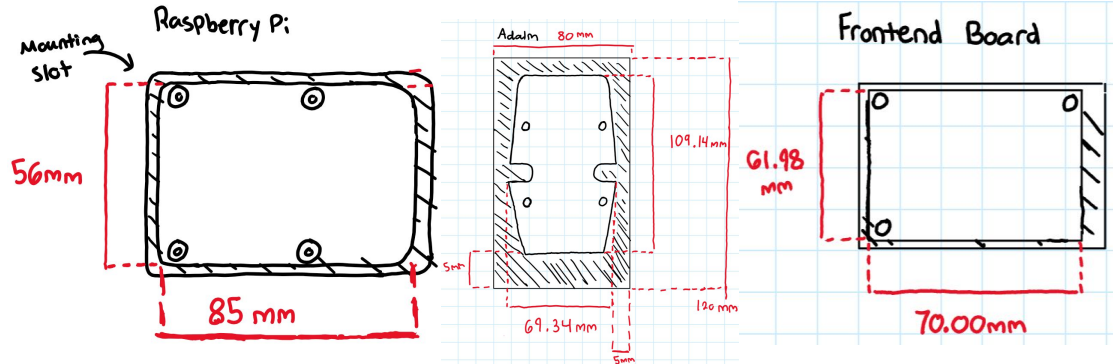


- The distance between the Raspberry Pi and ADALM should be at least 20mm due to the height of the board and its components.
- The XLR's will be screwed into the same plate that each rack extrudes from, minimizing the length of tube needed

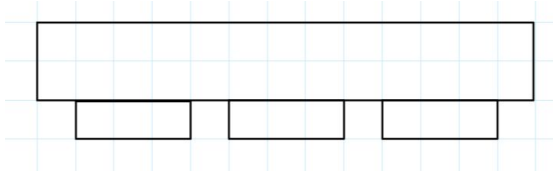
## Potential Design Issues:

- The racks are only supported at the XLR Frame which could lead to sagging and deformation of the part.
- The issue stated also applies to the connection of the rack to the end-cap, which is held by a single beam

# Drafted Design - Mounting Slots



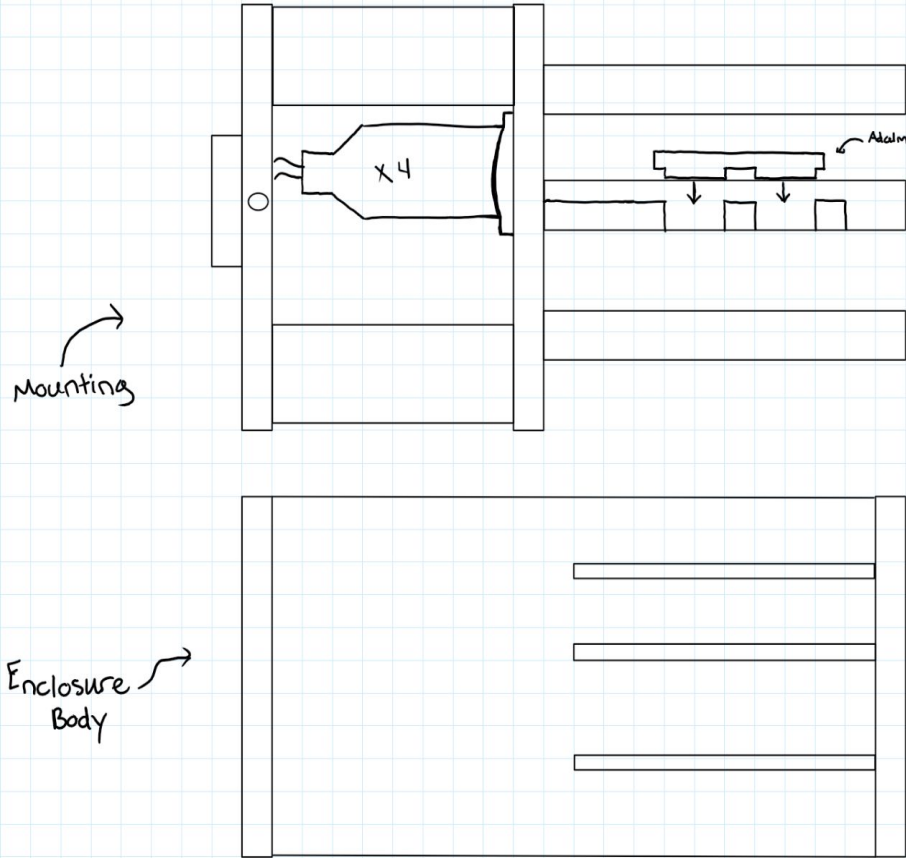
- Each Mounting Slot has "teeth" that will fit into the hardware rack.
- Rectangular teeth prevent forward and backward sliding.



## Potential Design Issues:

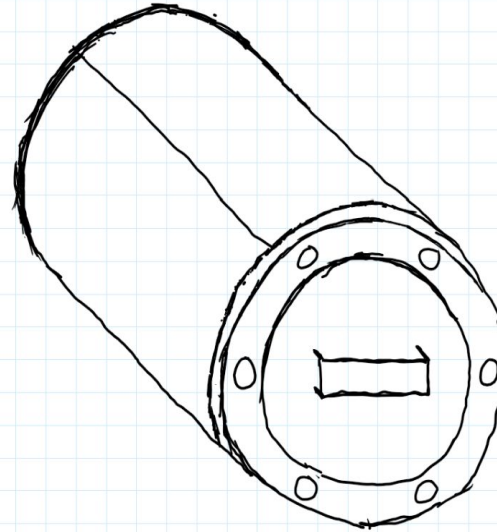
- How will movement along the y axis be prevented? The hardware should be fully constrained.

# Final Sketch

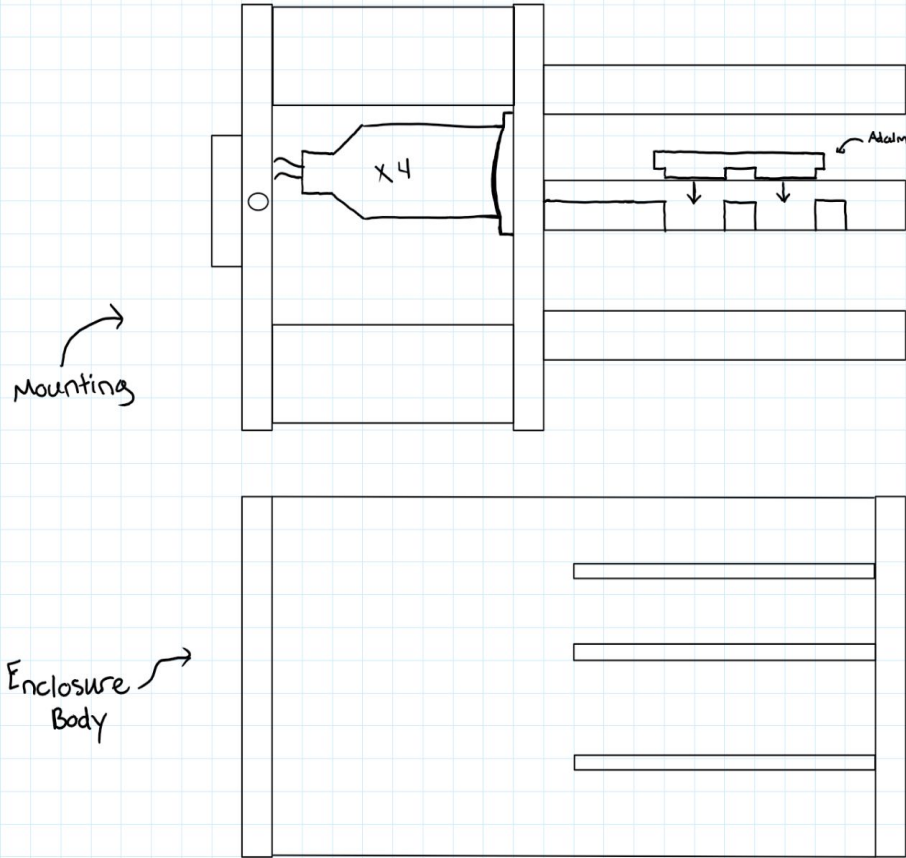


Solution to XLR Frame Integrity:

The frame has supporting beams connecting to the removable faceplate, providing a robust structure for the hardware rack.

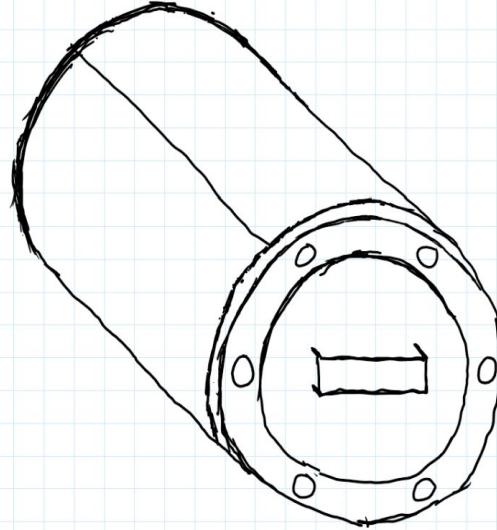


# Final Sketch

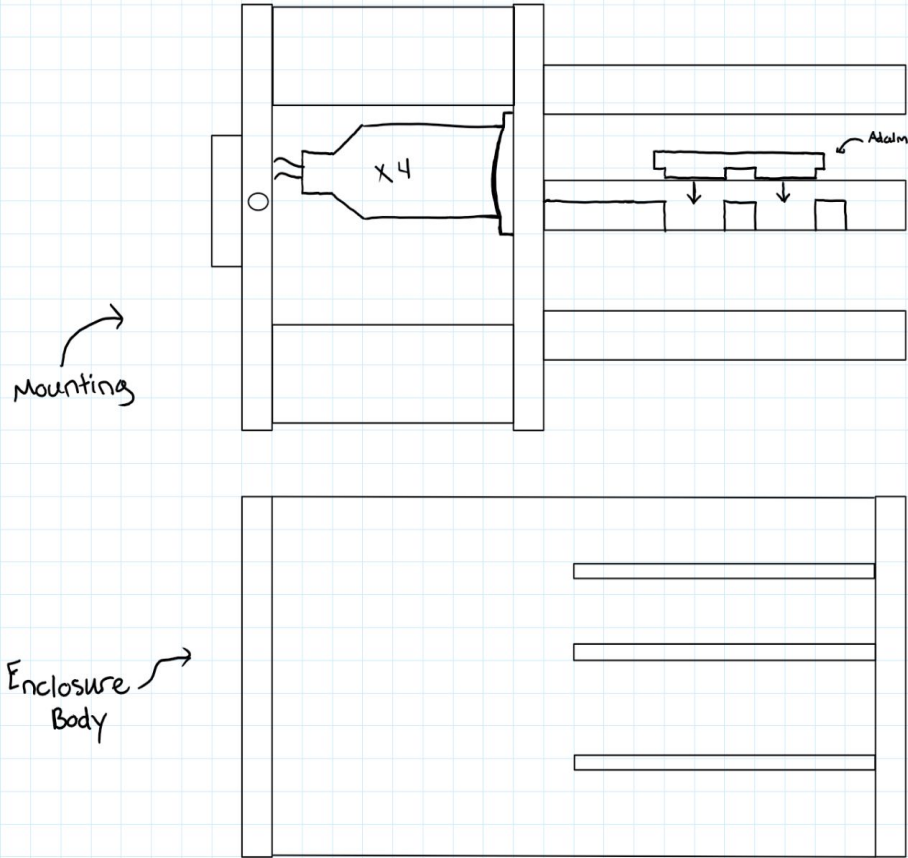


Solution to Hardware  
Rack Integrity:

The utilization of  
light-weight T-slot  
aluminum extrusion will  
improve the integrity of  
the racks while  
supporting the weight of  
the hardware.

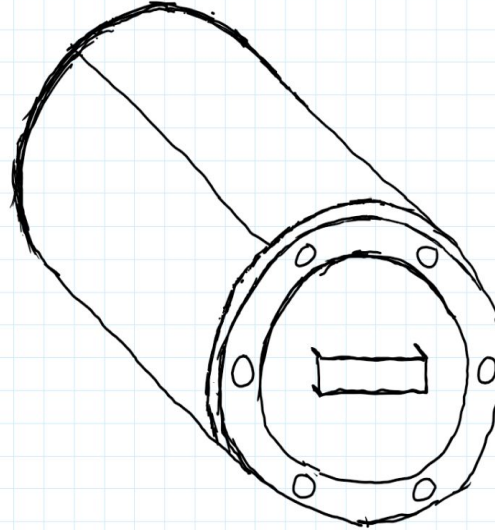


# Final Sketch



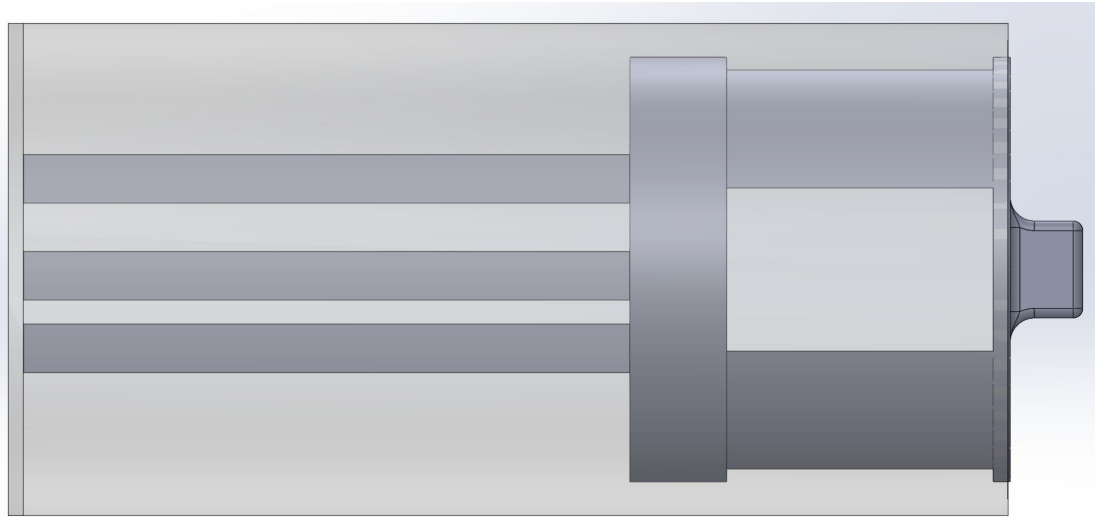
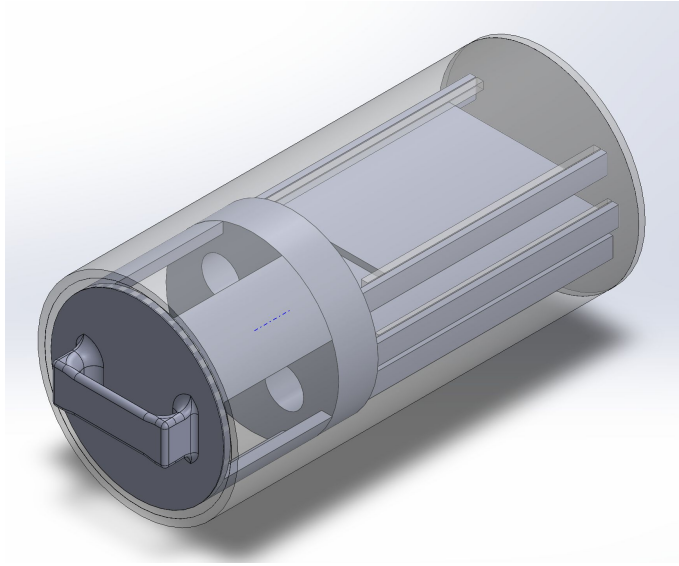
Solution to constraining the mounting slots:

Along the end-cap on the far end of the enclosure, there are bars that will be fixed to the end-cap. These bars slide along the top edge of the hardware racks, blocking any upward motion.

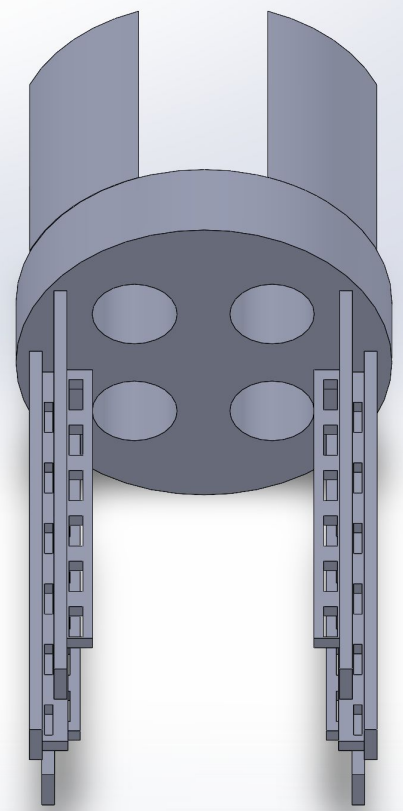




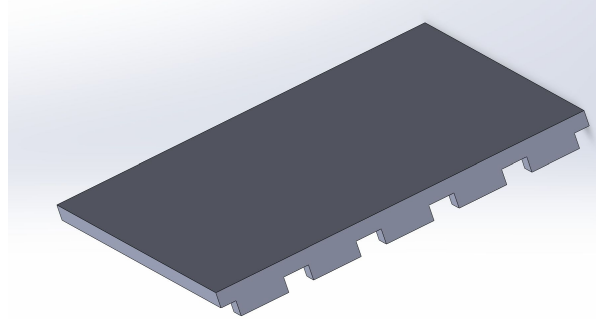
# Solidworks Design



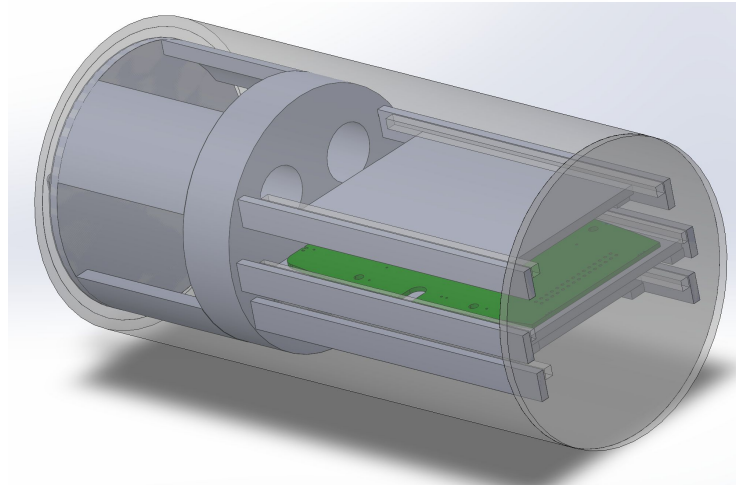
# Additional Sketches and CAD



- Top View of the Hardware Rack with specified mounting slots



- Hardware mount concept



- Full assembly including a ADALM Board