Florida Tech Cylindrical μRWELL Detector Progress

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FLORIDA TECH

Outline

- Base Structure - Base Structure Molds

  -Methods

    - Epoxy/resin
    - Prepreg
    - Thermoplastic

-Foam R&D

- Assembly

-Future Tasks

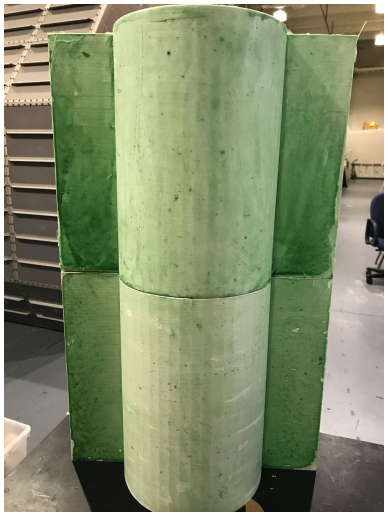
Epoxy/ Resin Base

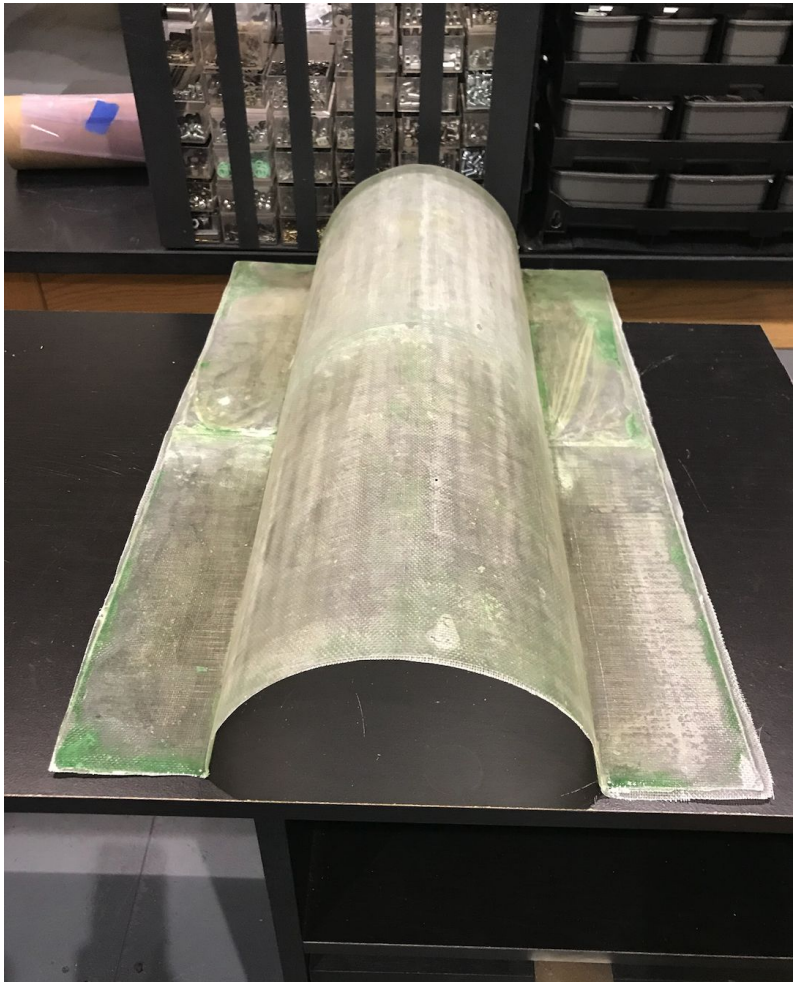
UPDATES

20 Diameter x 50cm Epoxy Resin Fiberglass

-wax , pla remover preparation
-2 Days drying
-No vacuum

-Pla removed washing and scrubbing, epoxy lost sticky finish





PrePreg Fiberglass

Update : Curing Pre-preg

Update: Preparation

-Wax coat
-PVA Release coat
-Prepreg Fiberglass
-High Temp Release Film Plastic
-Breather
-Valve
-Vacuum Bag/puddy -

Curing

-Modifying Oven to make use vacuum

- Connectors
- 320 degrees 1 hour. With ramp up ramp down 5 degrees a minute:

Removal & Final Product

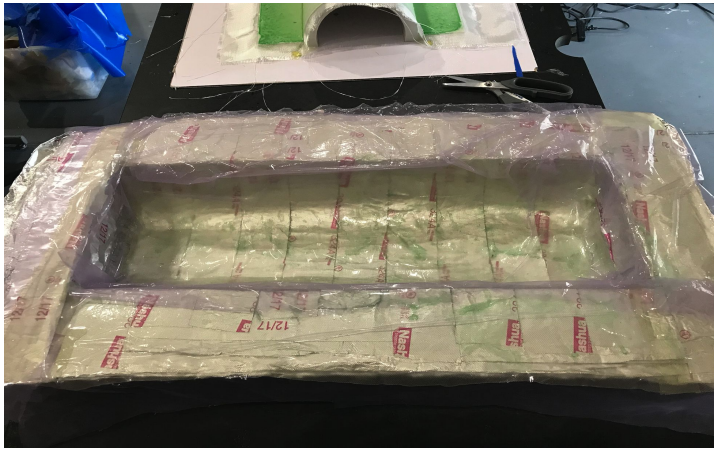
Easily Removable

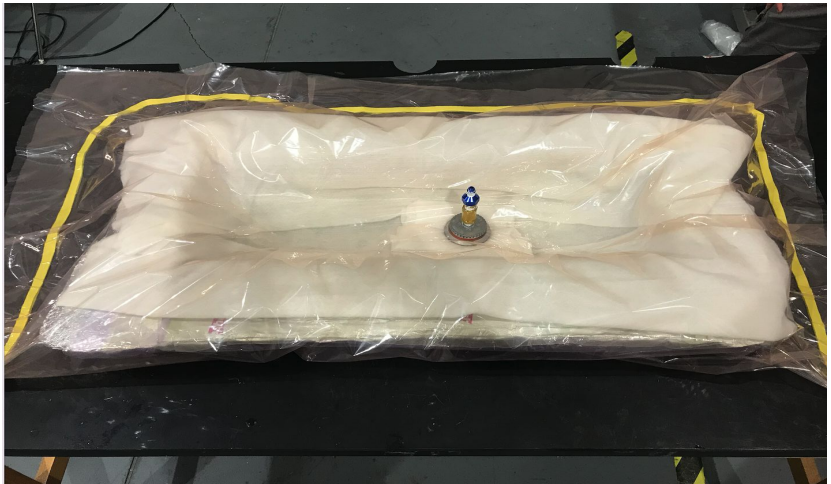
.2mm thickness

Improvements:

- No PVA , Vacuum started smoking from oil, Metal heated up vacuum bag and burnt hole through the bag.
- (Smoothness) Two metal top and bottom Try this . Doing it on inside of mold instead of outside. Try this
- Metal Machining not precise with Roller method

Pre Impregnated Fiberglass: Mold Method Attempt





Thermoplastic

https://thermtekplastics.com/

Creating 20Dx 50cm Base

PETG (Polyethylene terephthalate glycol) plastic provides excellent toughness, chemical resistance and is easy to thermoform.

Method 2: ThermoFlexible Plastic 1mm thick

Heating to 350 degrees, 3-5 seconds cool
- 3 people to press.

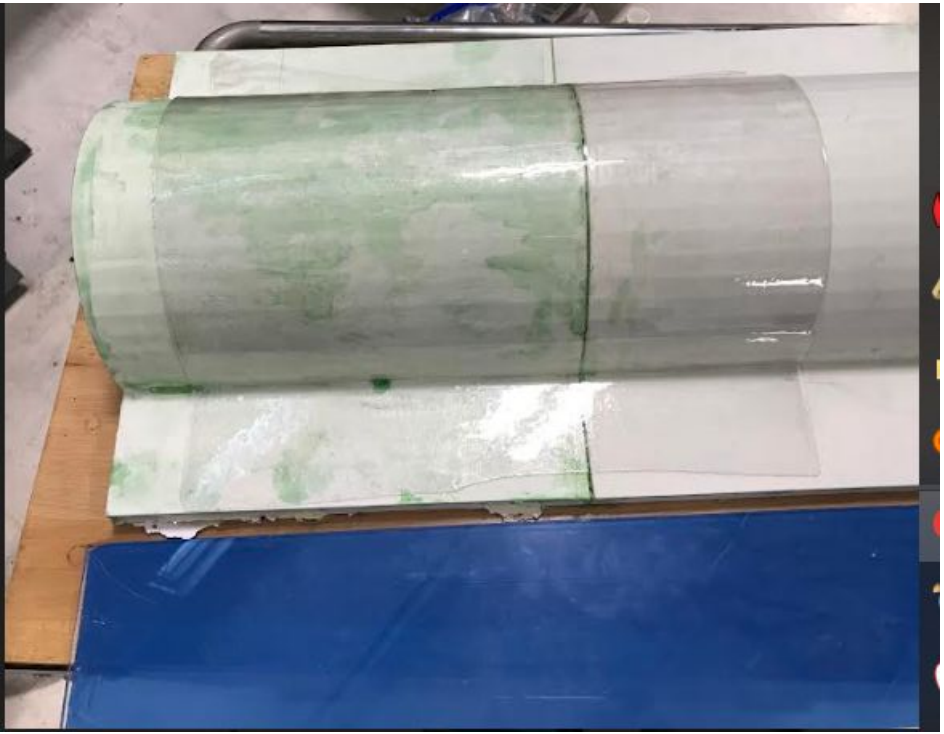
Clear plastic side
Press

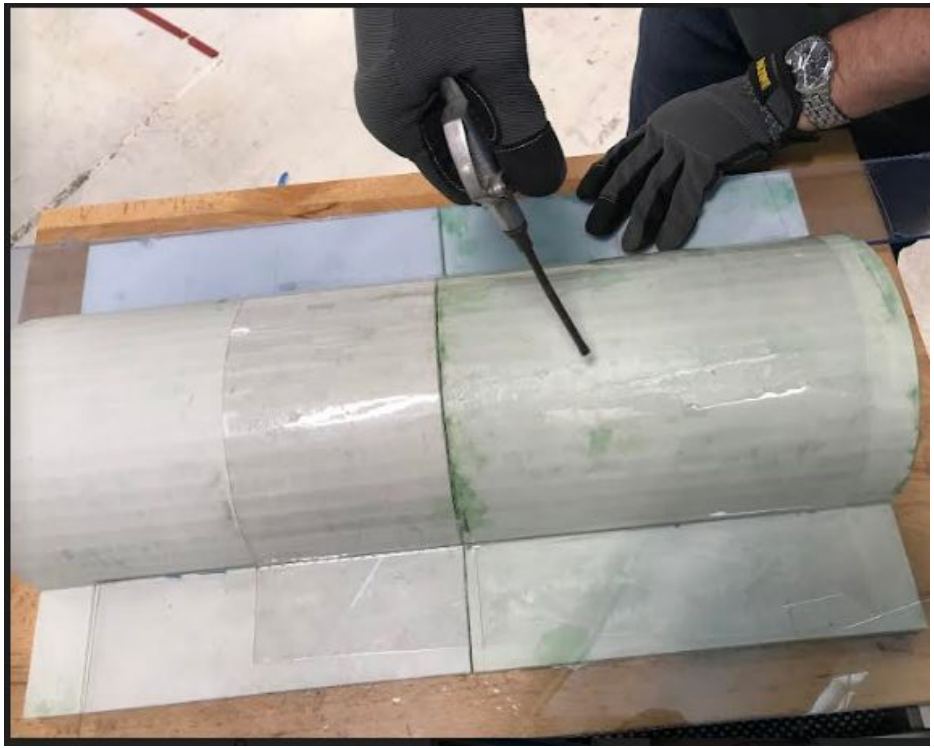
-Cheap
-Easy
-Scalable?

Clear Plastic Sample

-ABS BLack warped, repeated process with PETG

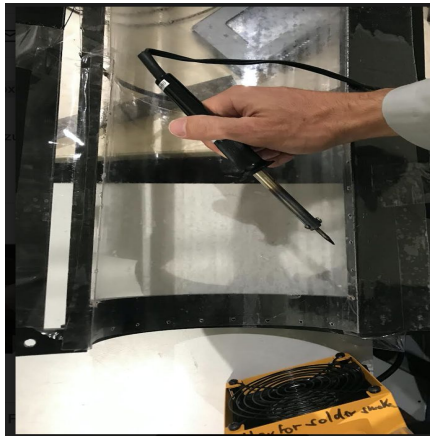
-Removal use compressed air (**could use it instead of green PVA remover)

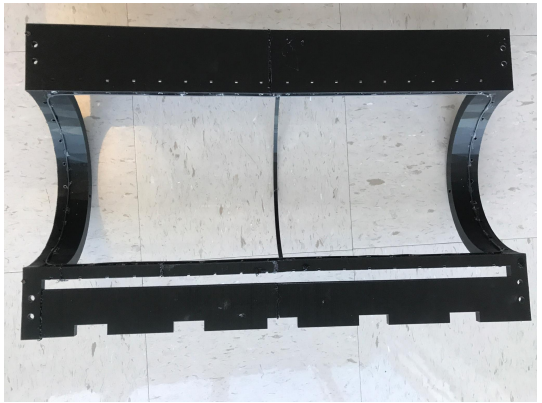




Finished Product

Assembly of Thermoplastic into Frame





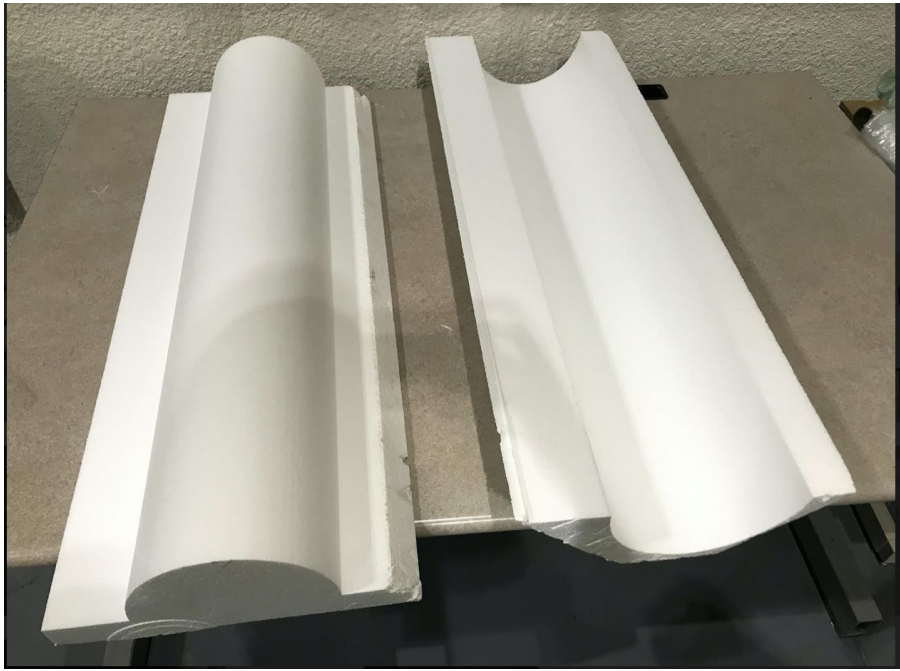
Foam Base R&D

Foam base

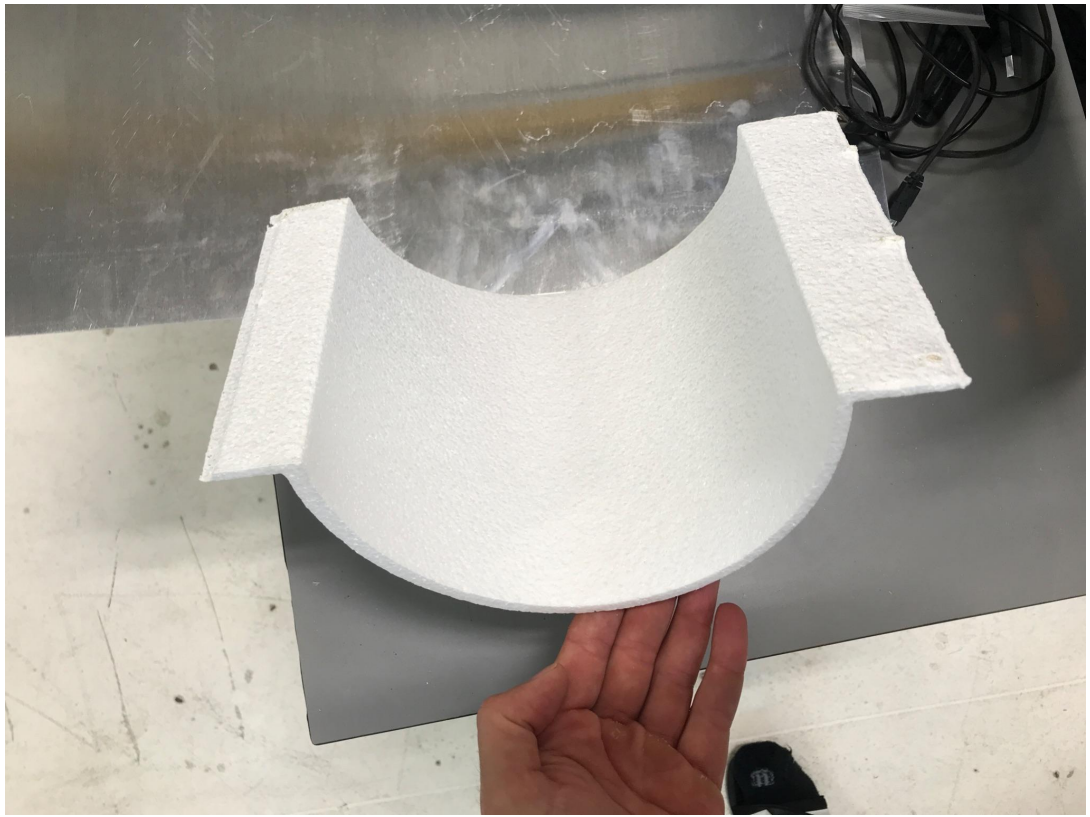
Foam Base Design

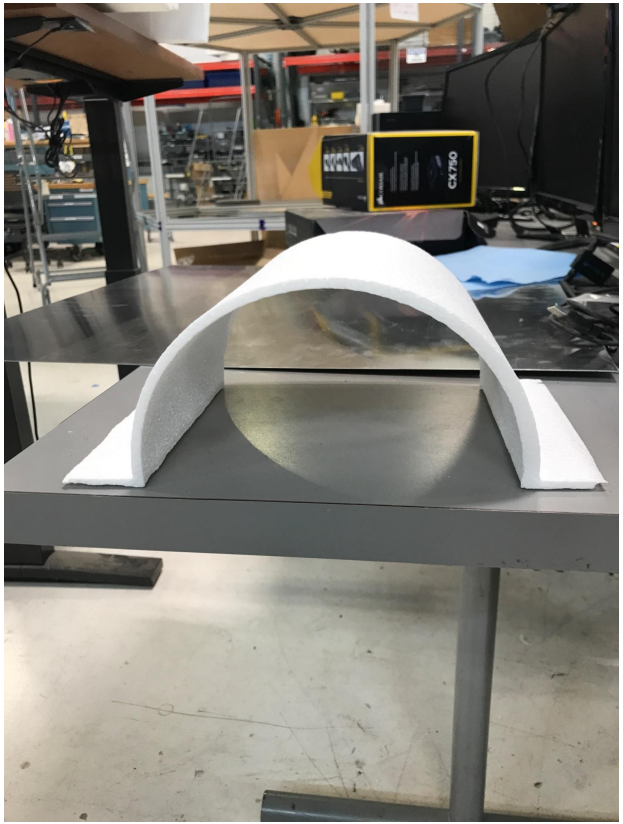
Previous design Base Mold was 3d Printed Abs

- Pro’s -CNC Accuracy - Smoothness - Densities
- Temperatures

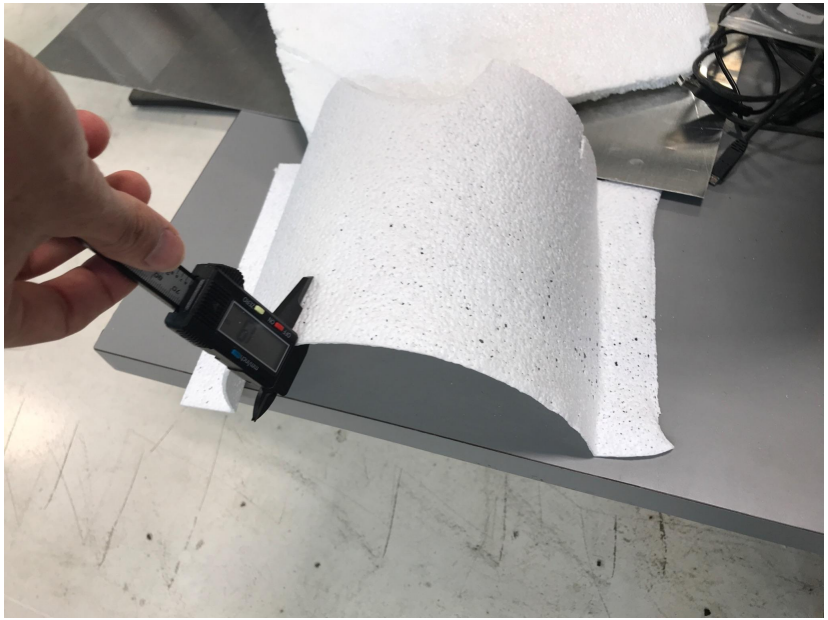


5 mm Styrofoam

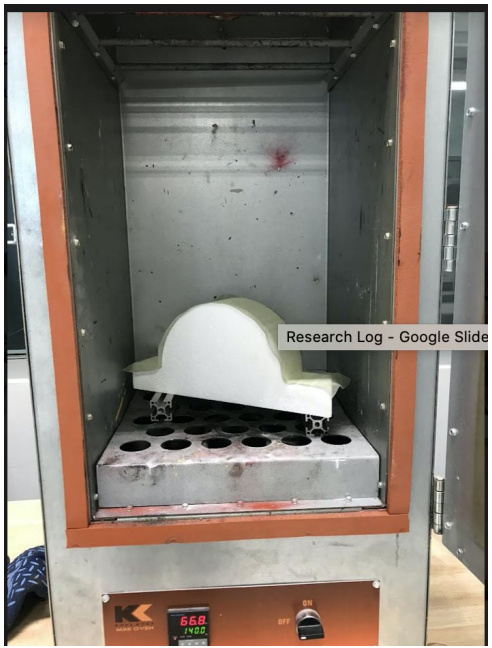




.4mm and 1.9 mm thin



Foam and Prepreg
310 degrees



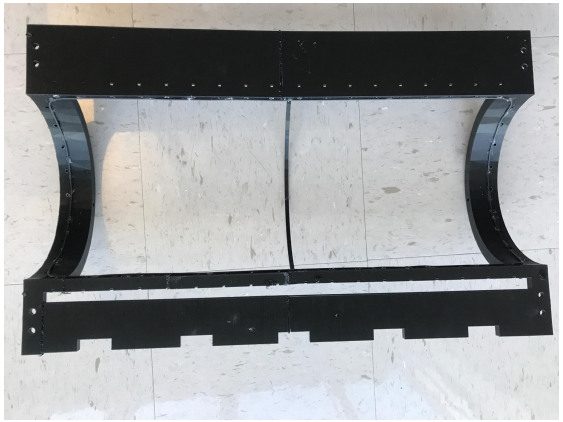
Possible Solution: High Density Foam Velocity Aircrafts

Summary

Material	Thickness	Notes	Radiation Length
Epoxy Resin…	.3mm	Even coating	41.6
Prepreg Fiberglass	.2mm	Heat , vacuum, smooth mold	25
Carbon Fiber	.1mm	Conductive , Strong	42.7
PETG Thermo	.5mm	Strong, Easy	28.5
Styrofoam	.4- 5mm	Light , Precise, smooth	43.1

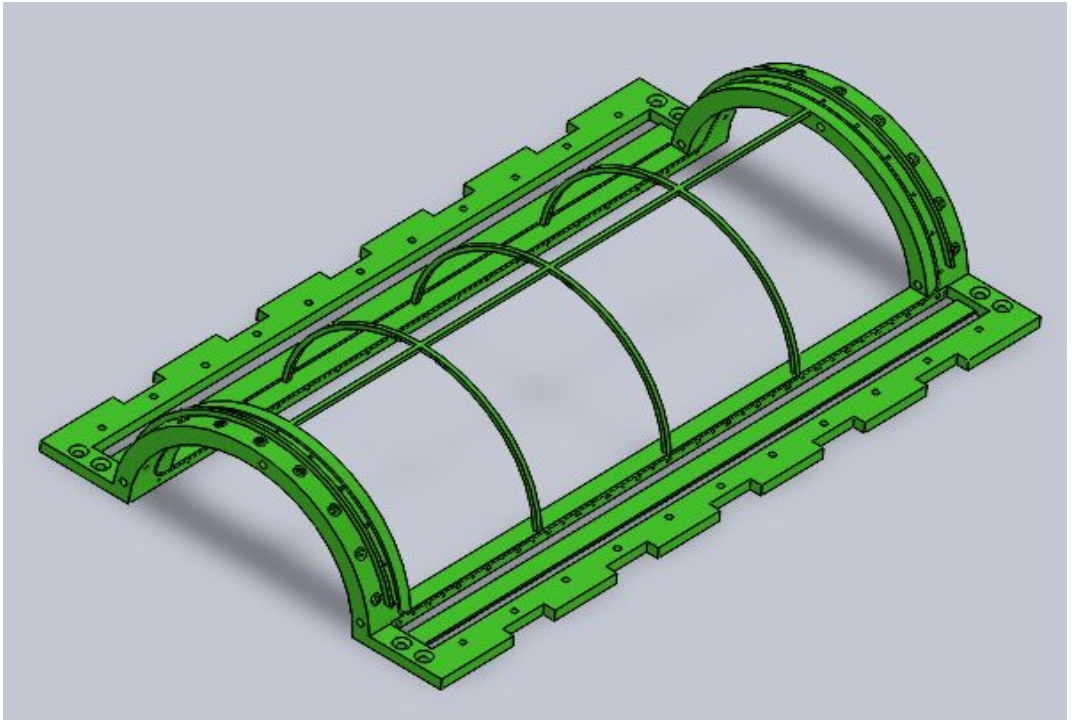
Assembly

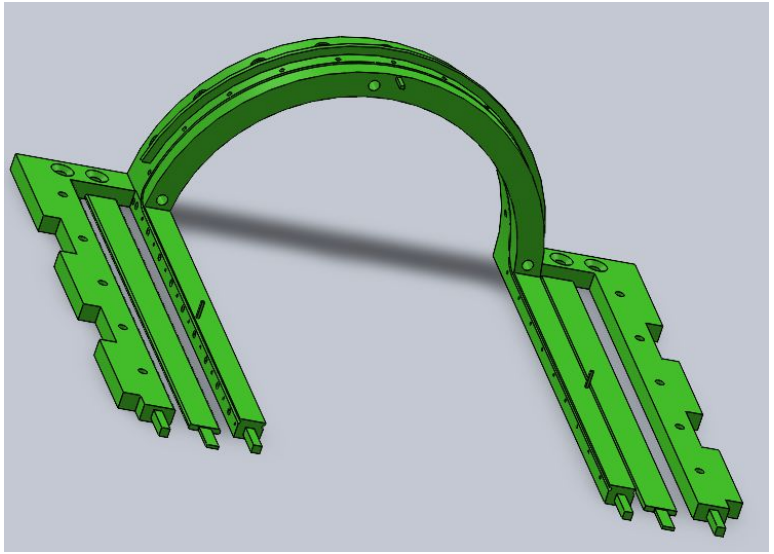
Assembly with Thermoplastic- O rings- Screws - Frame - Kapton clamp



Design Improvements

Prototype Design Improvements





Future Tasks

- Mold for prepreg
- Assembly of other materials
- 3d Print in Nylon (Higher Quality Frame)
- O ring Testing/ Sealing

END