Project Introduction

- Nicholas Gellerman - Undergrad student assistant under Zhenyu Ye and Nicole Apadula

- Assembly tooling for the SVT Disk
  - High precision alignment between a long silicon sensor to a carbon fiber flat sheet
  - Original concept by Emmy Duckworth

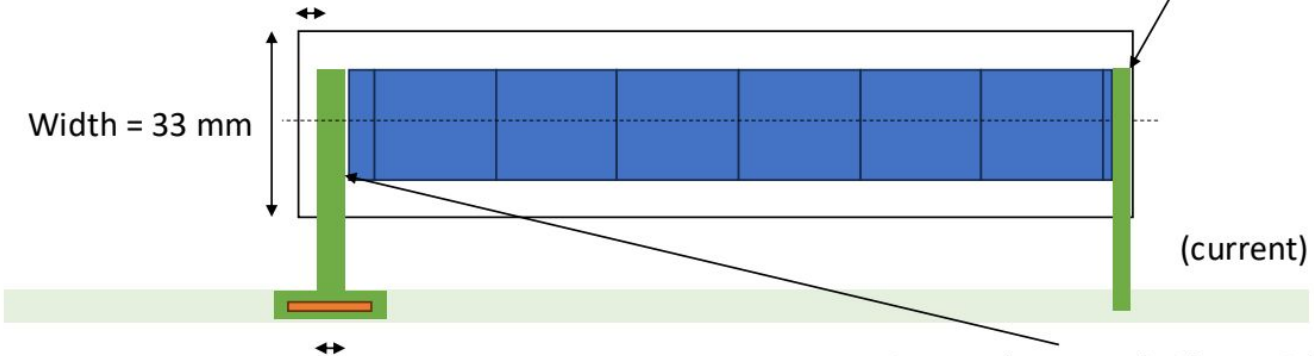
Design Details

- Alignment precision goal: 0.2mm translational and rotational
- Procedure for ~2300 alignments
- Sensor and carbon fiber sheet are ~0.15mm thick
  - Bending and small fractures are large concerns
  - Sensors always handled with vacuum

Carbon fiber Flat Sheet thickness = 0.15 mm
Density = 1.5 g/cm3

Distance from FS edge to REC FPC = 0.2 mm
Distance from REC FPC to REC = 0.2 mm

Distance from Flat Sheet (FS) edge to bridge FPC = 2.5 mm

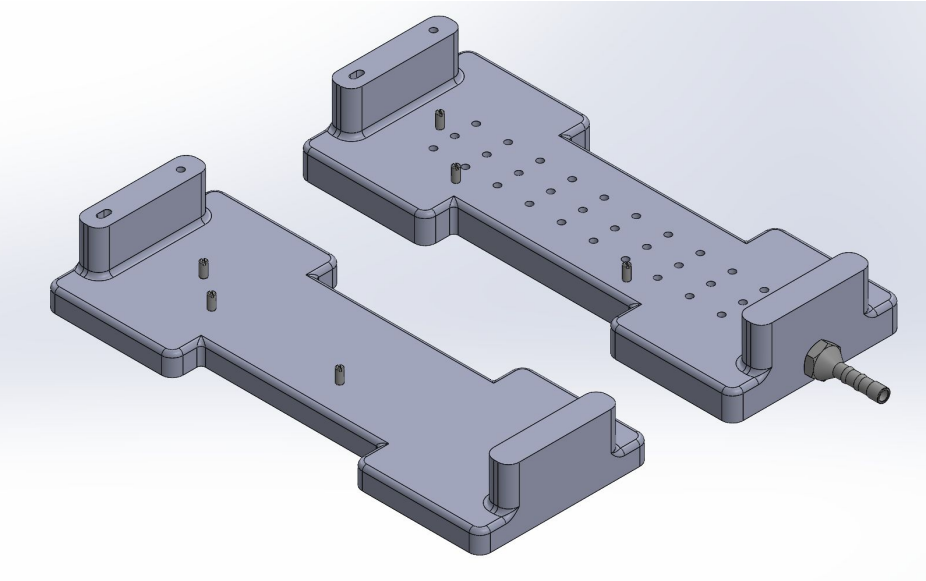


(current) Bridge FPC width = 5 mm
(current) Bridge FPC length ~ 29 mm
AncASIC placed at end of Bridge FPC. Exact shape of Bridge FPC TBD

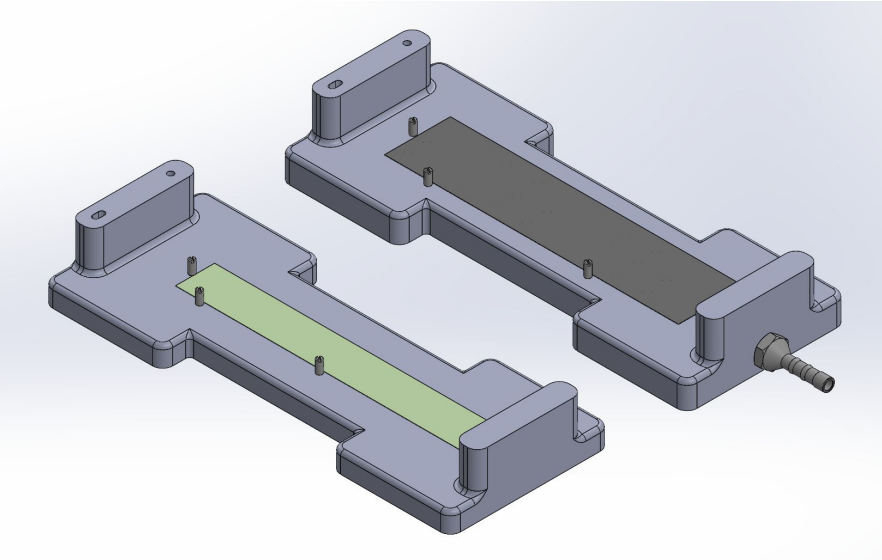
Distance between bridge FPC & EIC-LAS LEC = 0.2 mm

Total Length = 2.5 mm + Bridge FPC width + 0.2 mm + EIC-LAS length + 0.2 mm + REC FPC + 0.2 mm

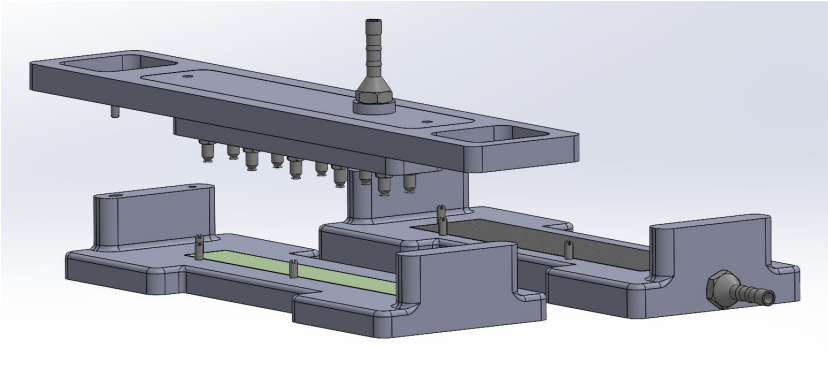
For 6 RSU LAS = 147.1 mm
For 5 RSU LAS = 125.5 mm



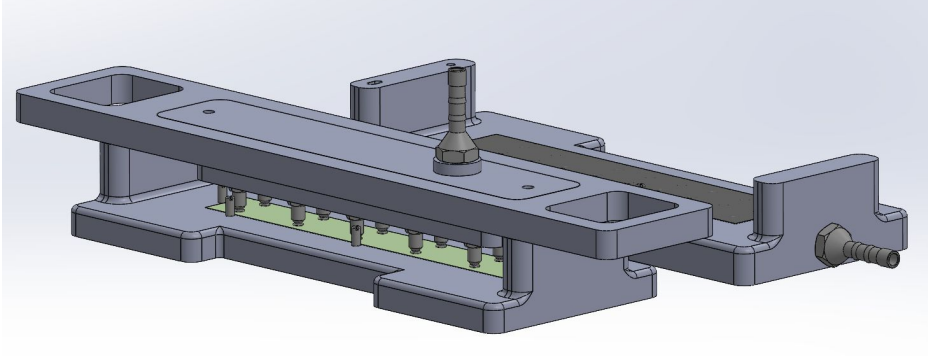
Carbon fiber pre alignment jig (top)
Sensor pre alignment jig (Bottom)



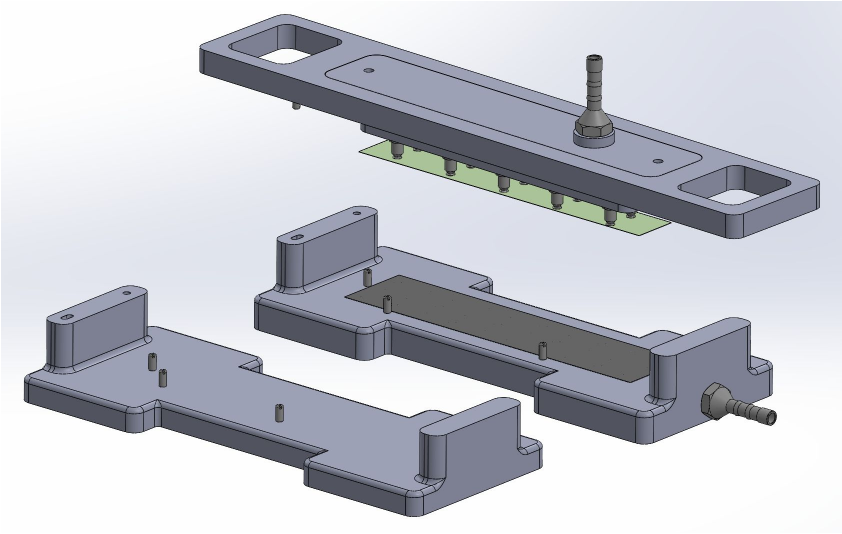
Flat sheets constrained with locating pins and vacuum



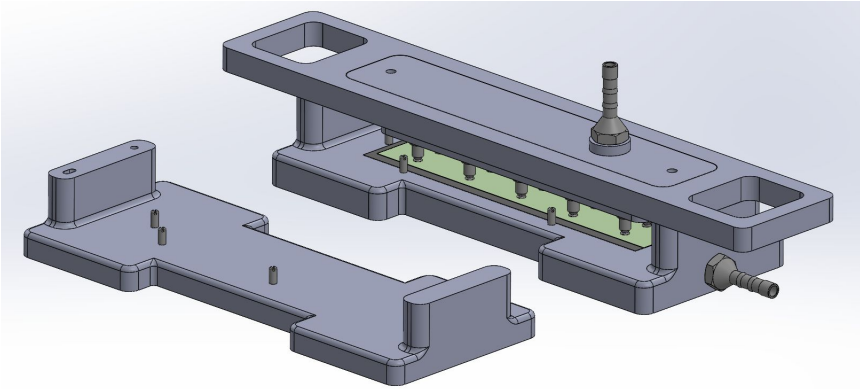
Vacuum holder with ESD safe suction cups handles the sensor at all times



Holder aligns to pre alignment jig with two pins



Sensor is lifted to carbon fiber pre alignment jig



Vacuum is maintained on both jigs while epoxy bonds

Design Specs:

- Fits both 5 and 6 RSU sensors
- Vacuum chamber fit tolerance +- 0.2mm - tape can be used if vacuum is insufficient
- Multiple jigs to be used at full production. Manufacturing is mainly gated by wire bonding