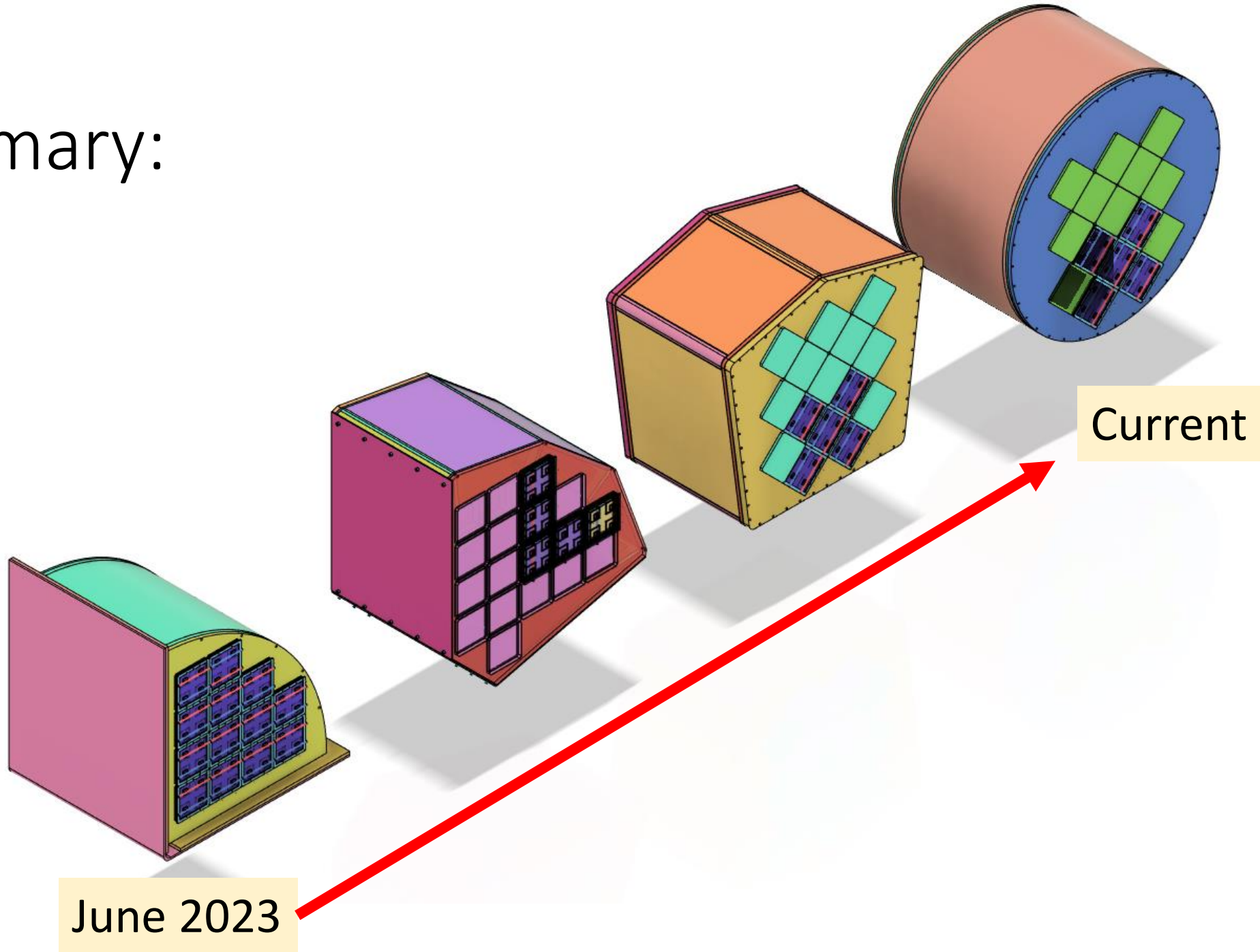# pfRICH Engineering Design Update

Presentation by: Alex Eslinger (JLAB) / Dan Cacace (BNL)
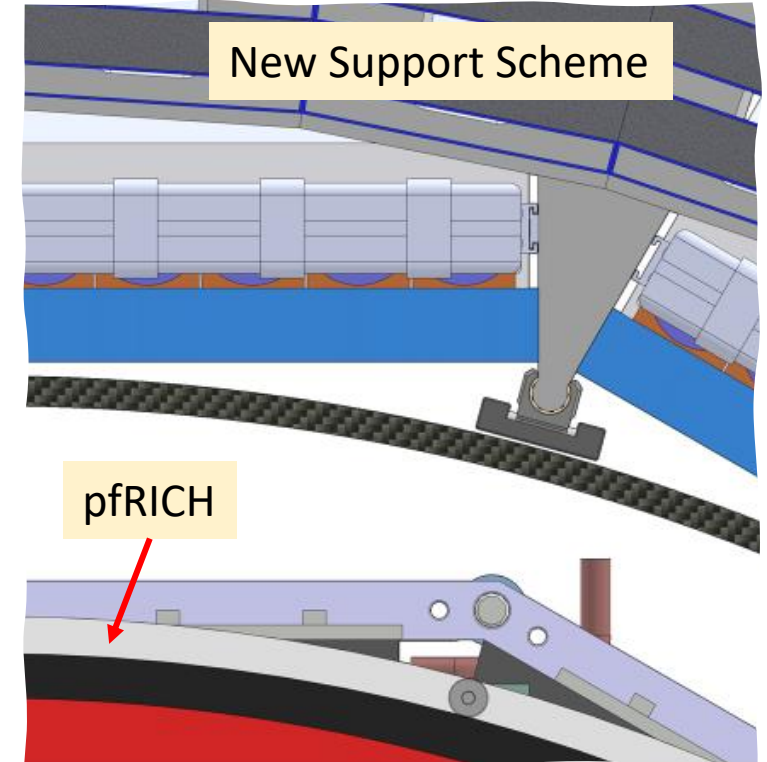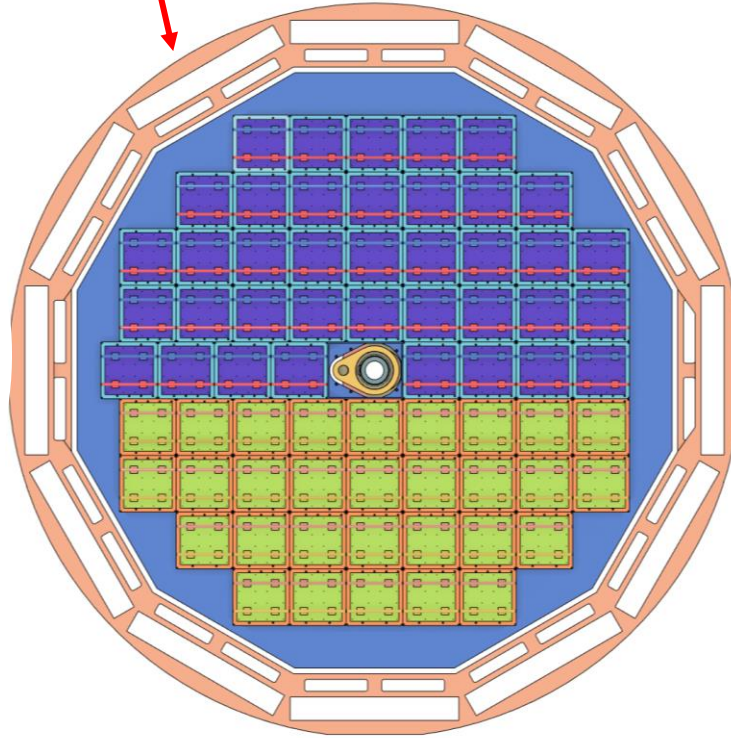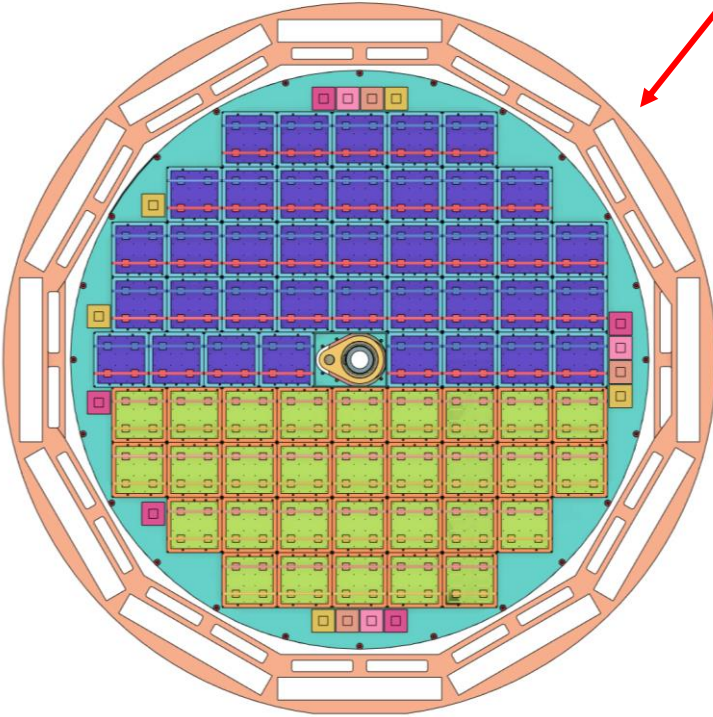
9-21-23

Summary:

Current

June 2023

Primary Driver:

OLD hpDIRC Support Structure Design (dictates pfRICH outer geometry)

New Support Scheme

pfRICH

- There are 12 DIRC bar boxes which sit in the space just outside the pfRICH in the overall ePIC model.
- Until recently, the support structure has been designed as a dodecagon (12-sided) on the pfRICH side (shown in peach)
- A change has been proposed to marry the support of the DIRC bar boxes directly to the barrel EMCAL structure which means that the inner detector support structure was turned into a cylinder
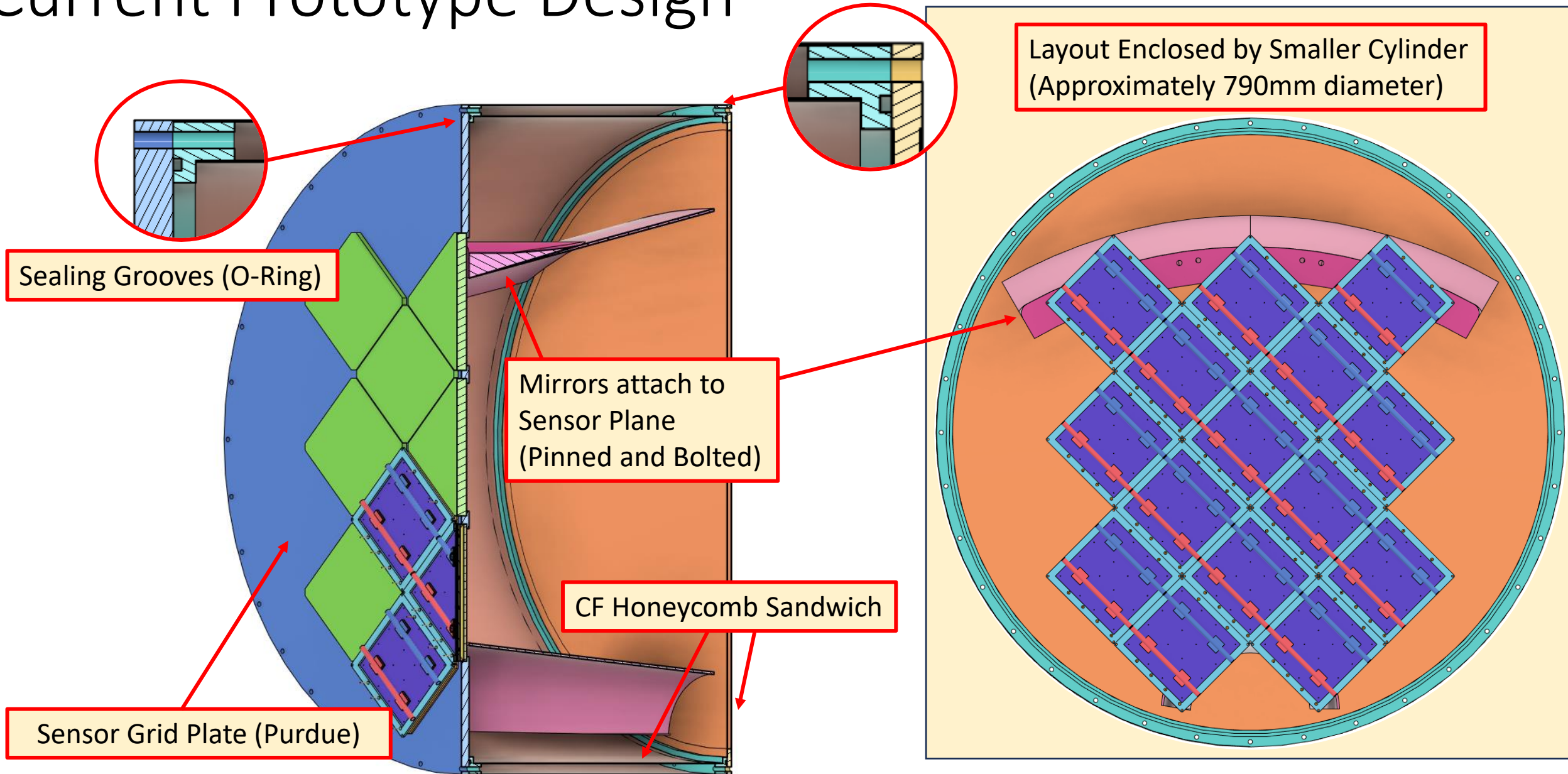
Reasoning:

- A decision was made in late June to follow the hpDIRC frame with a dodecagon shape (as shown in the middle picture of the previous slide)
    - Advantages: Efficient use of space within our detector volume, better mirror segmentation (allowing for support from outer frame), an attempt to simplify production (with flat panels), and easier prototype segmentation (allowance to use as few custom pieces as possible).

- However, the [dodecagon] hpDIRC support frame was not fully capable of holding the tolerance it needed and working within the space constraints, so a proposal was made (late August) to decouple the DIRC bar boxes with the inner [cylindrical] support system.
    - This process is still ongoing…

Back to a Cylinder:

- Last week Tom Hemmick showed their mandrel production design
- At that time, there was a debate on how to produce the 60-deg panels – mandrel or separate piece(s)
- SBU gave a presentation this past Monday about how much it would cost to modify their mandrel system to fit the pfRICH geometry and noted that the *biggest* schedule driver was the end rings.
- After much discussion, it was brought up that a smaller cylinder that could encompass the necessary components of a 60-degree sector would be the simplest/most effective approach. This was agreed upon by everyone at the meeting.

Current Prototype Design

Layout Enclosed by Smaller Cylinder
(Approximately 790mm diameter)

Sealing Grooves (O-Ring)

Mirrors attach to
Sensor Plane
(Pinned and Bolted)

CF Honeycomb Sandwich

Sensor Grid Plate (Purdue)

Questions?