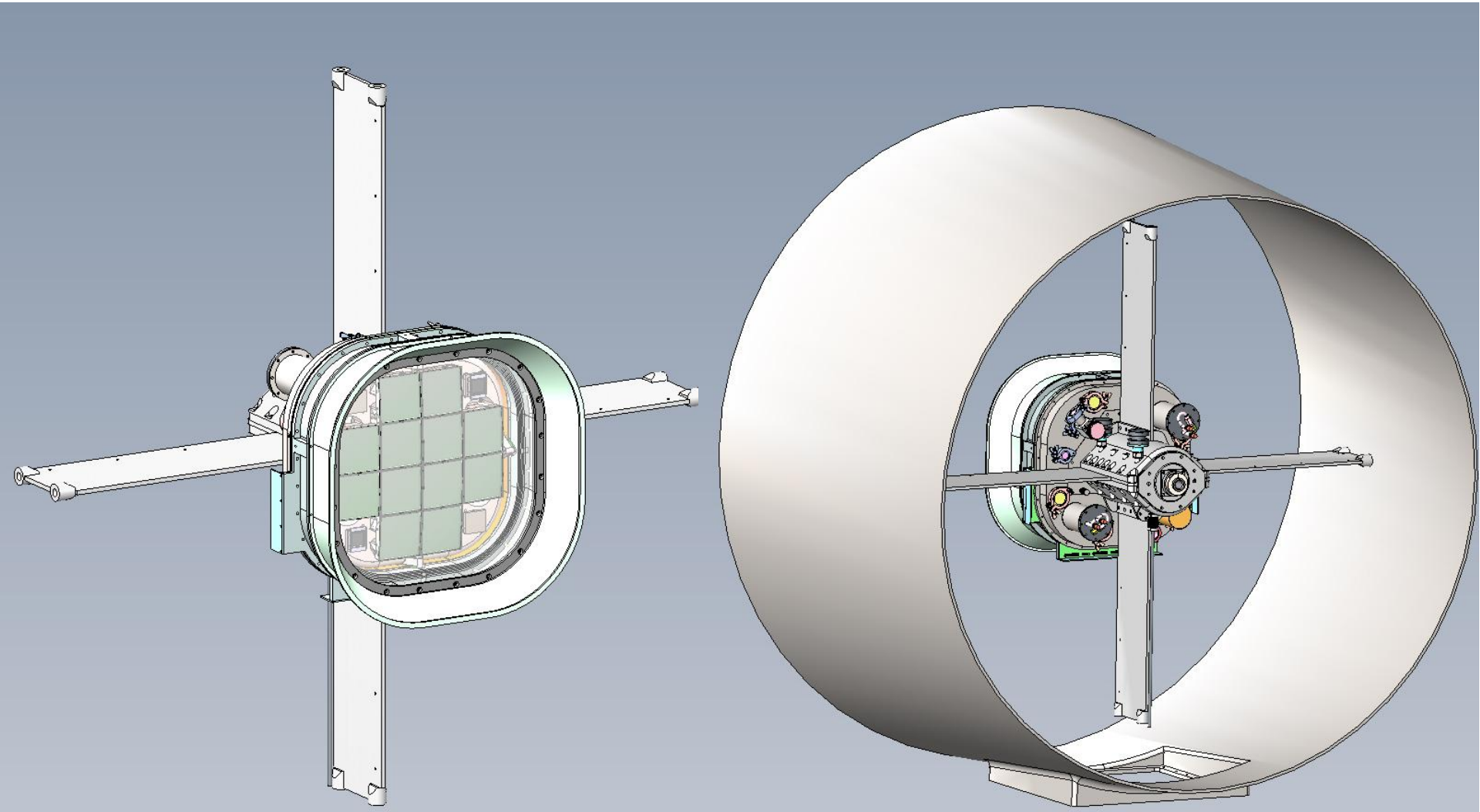
ZTF Mechanical Walkthrough

Matthew Hoff

2013-02-01

Mechanical Walkthrough

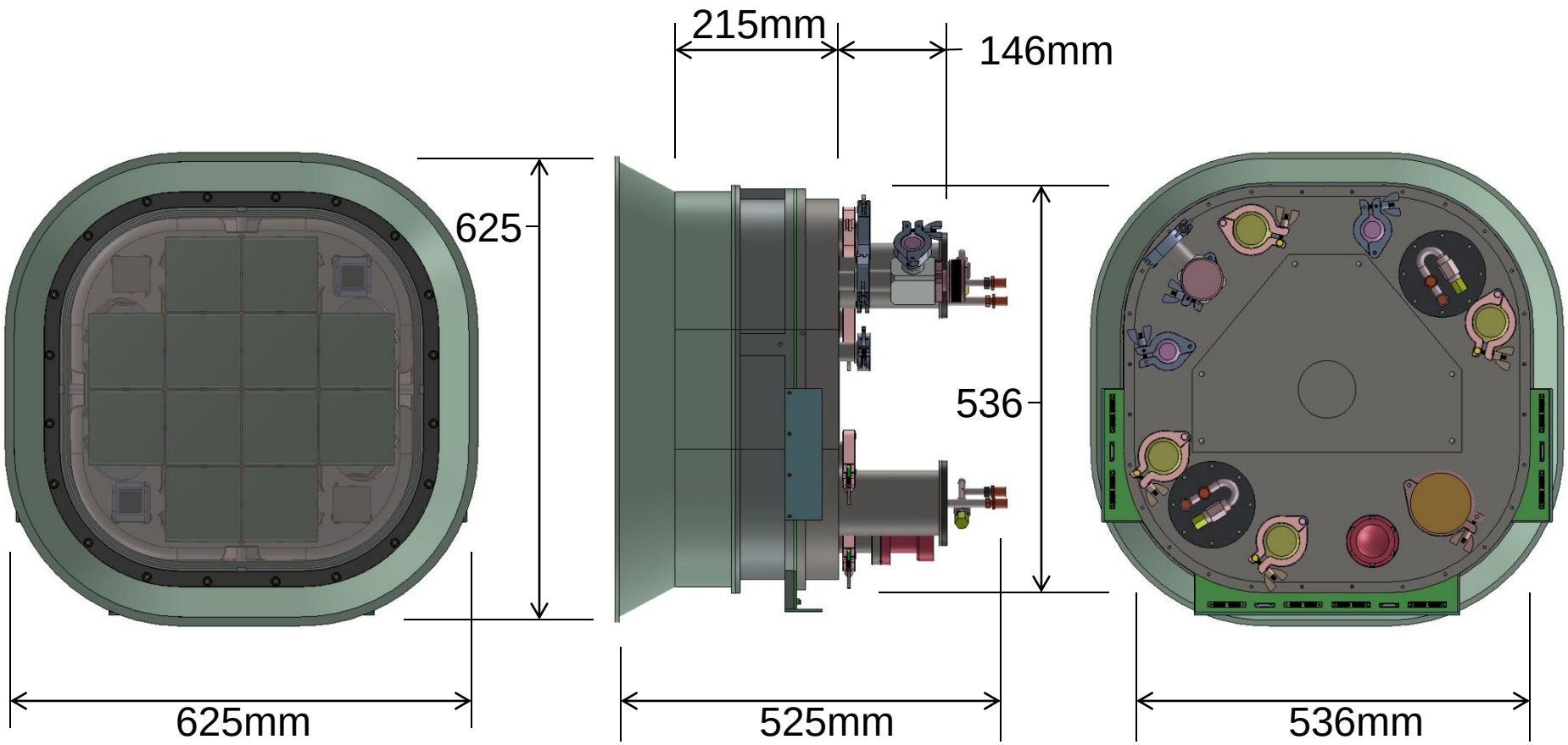


ZTF Dewar attached to focus hub

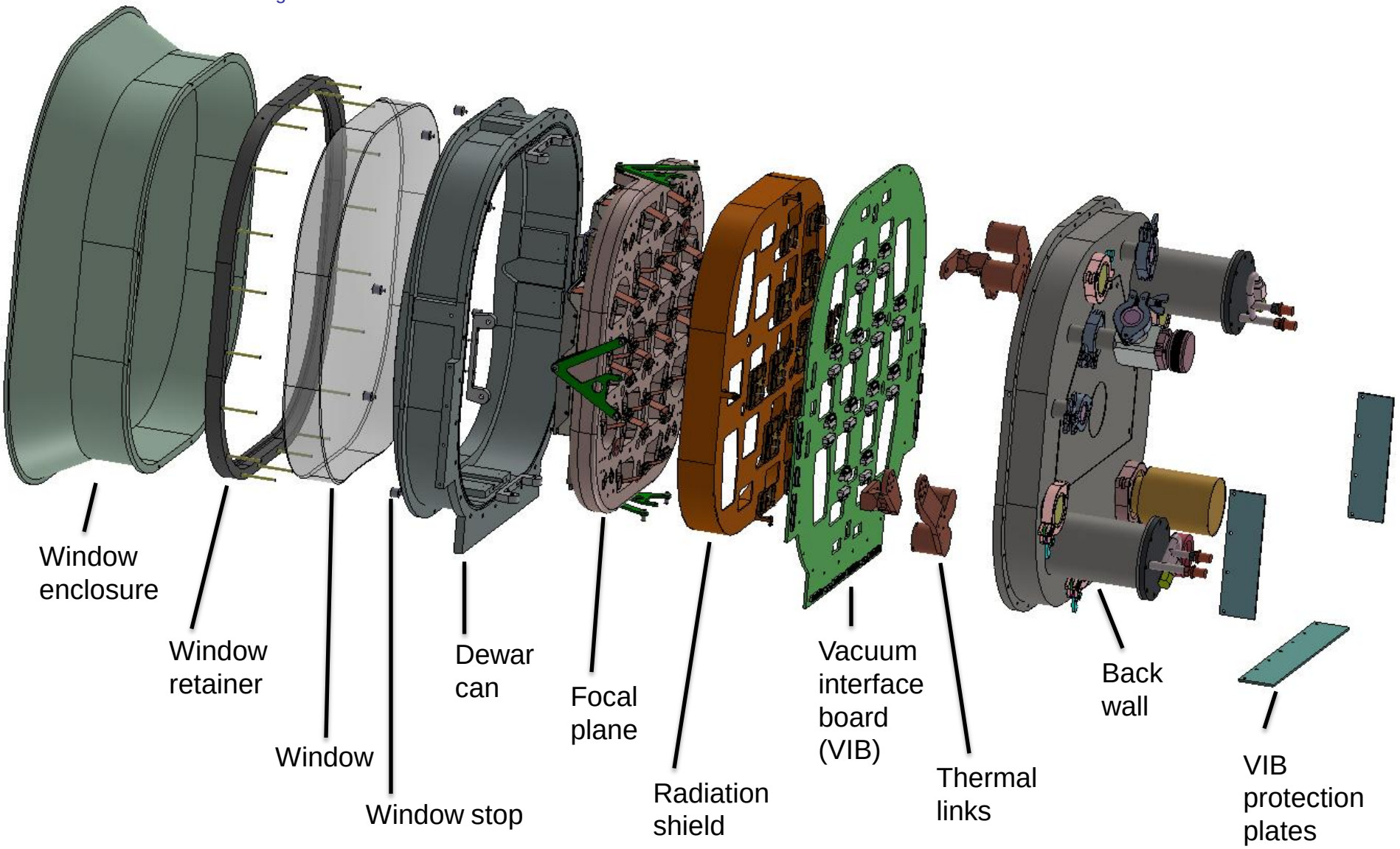
Basic Dimensions

Weight approx. 105 kg

O-ring length approx. 7,000mm



Exploded View

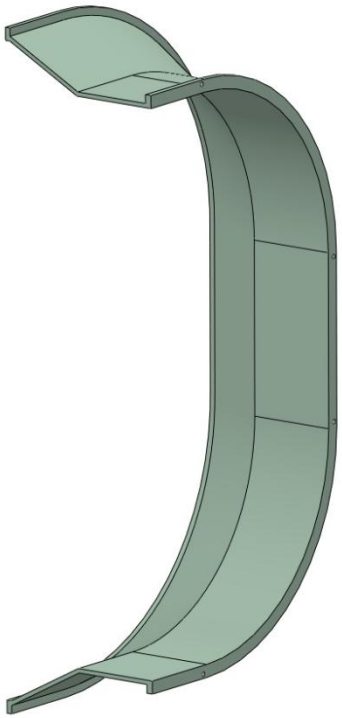


Window Enclosure

Aluminum, non-reflective treatment

Filter registers to this surface

This flange bolts to Dewar



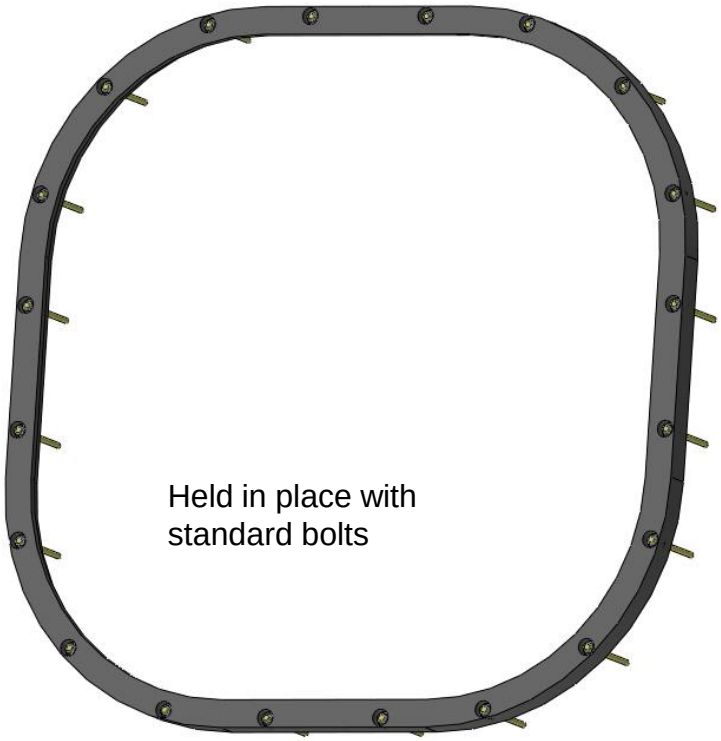
Section view

Enclosure slides over the window and bolts to the Dewar can. Easily attached or removed at any time.

Window Retainer and Stop

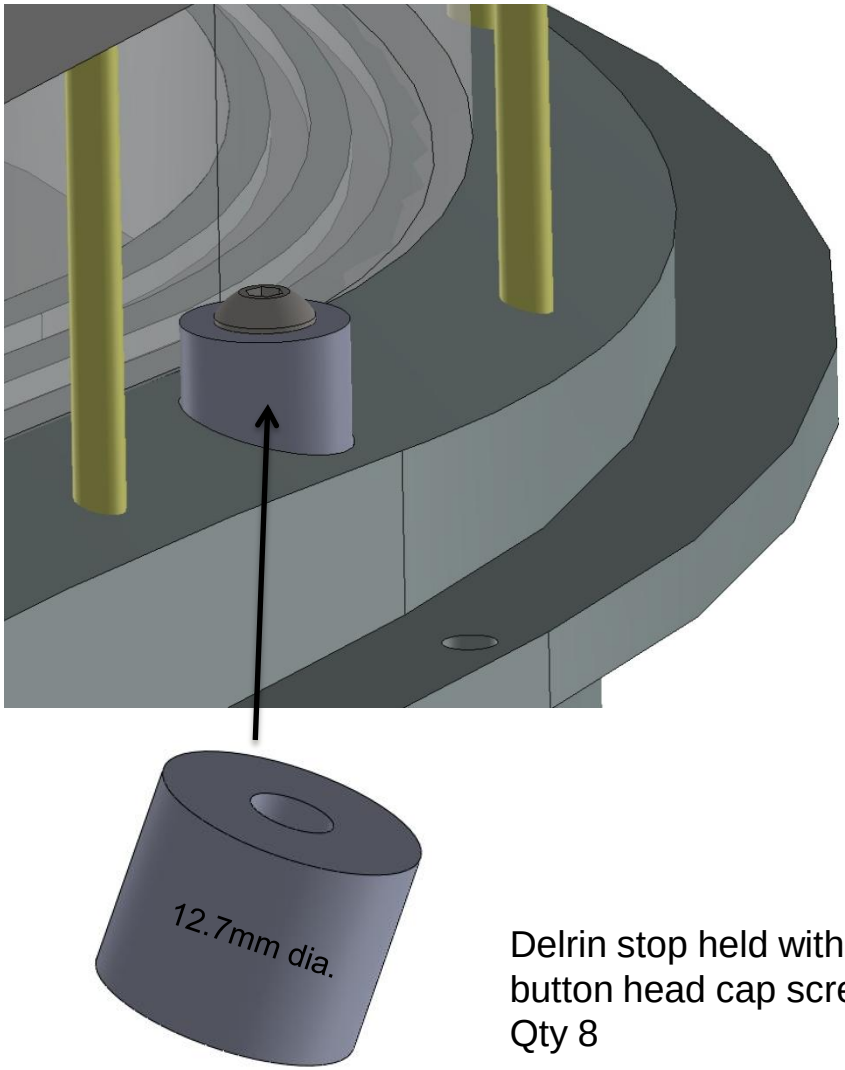
Delrin window retainer

Section view



Held in place with standard bolts

Window stop accurately locates the window

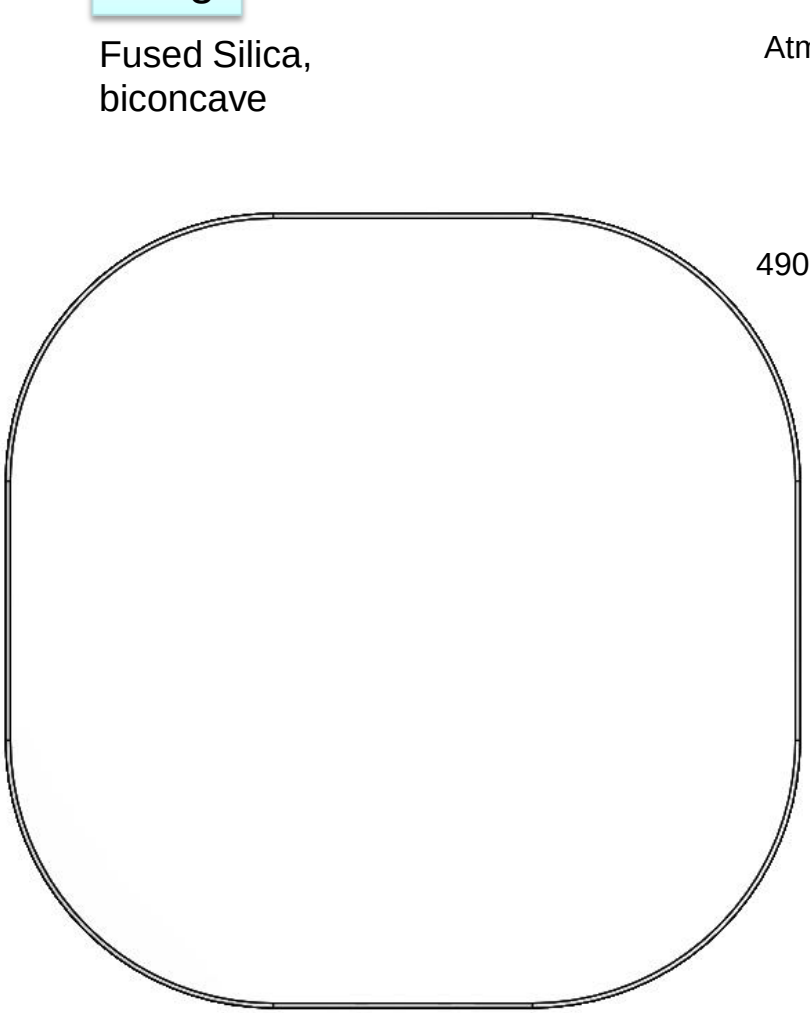


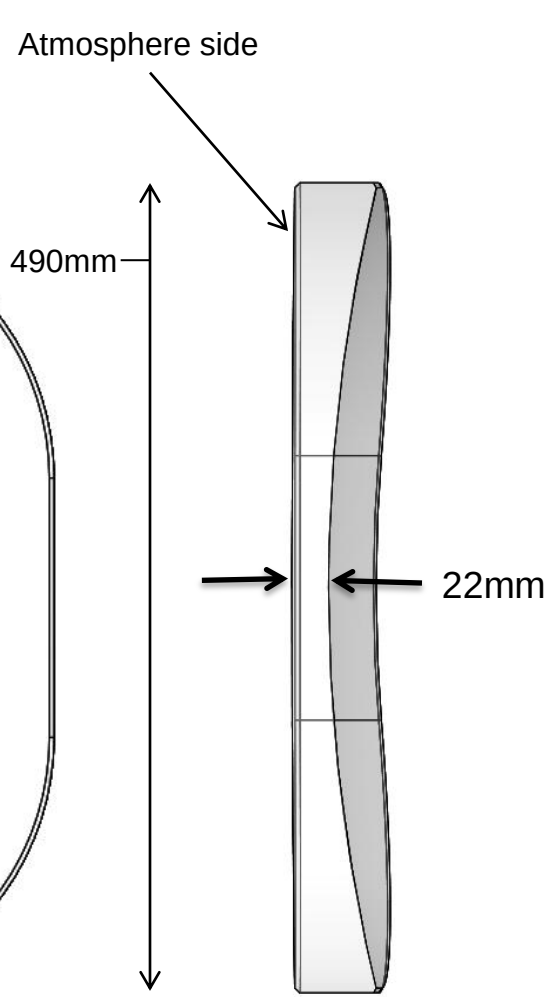
Delrin stop held with a button head cap screw. Qty 8

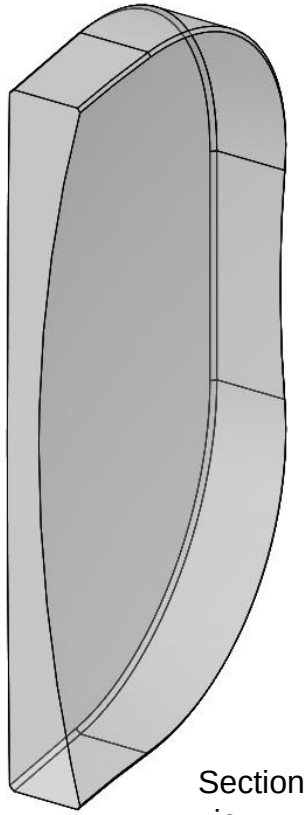
Window

20kg

Fused Silica,
biconcave



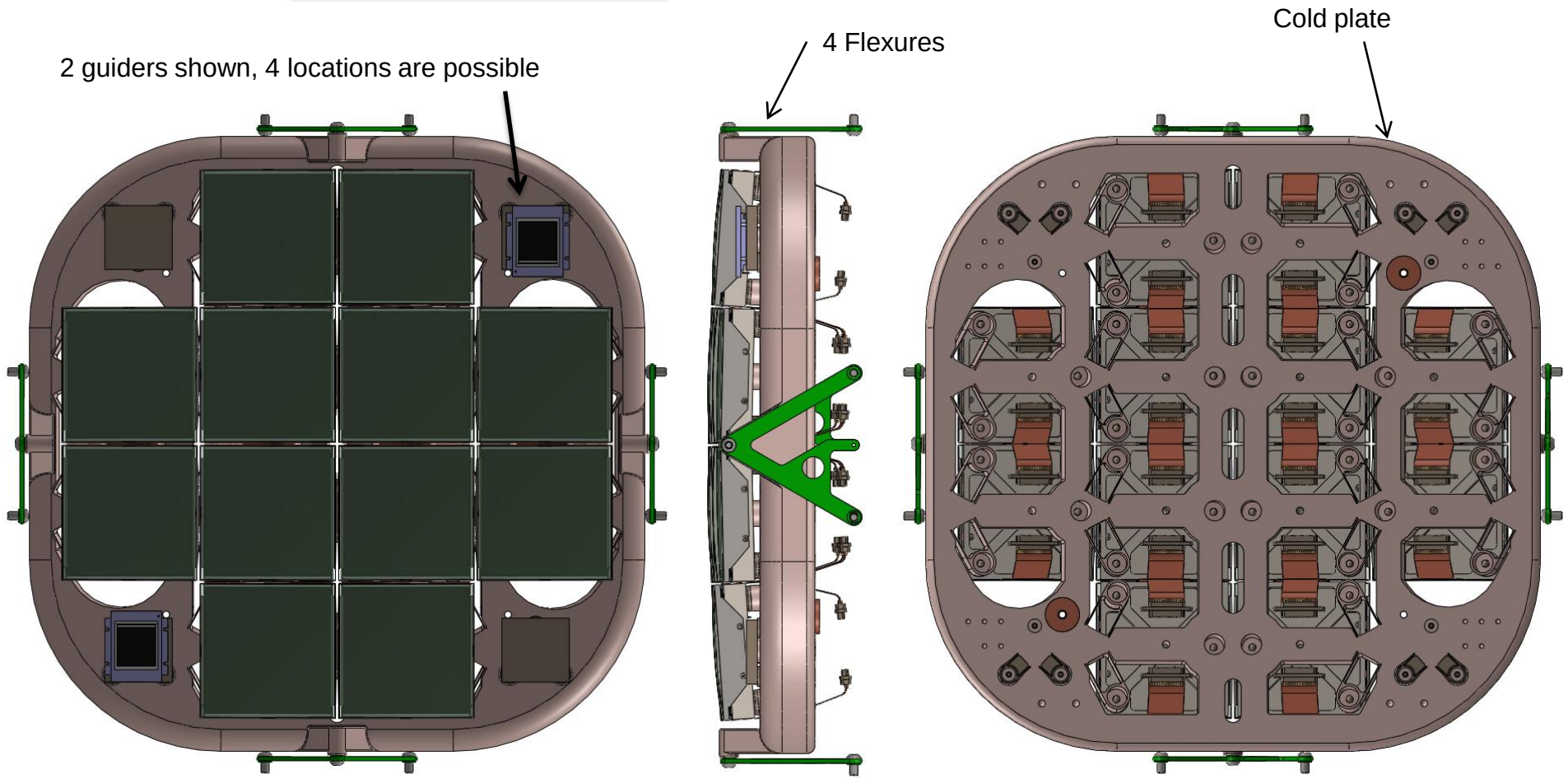




Section
view

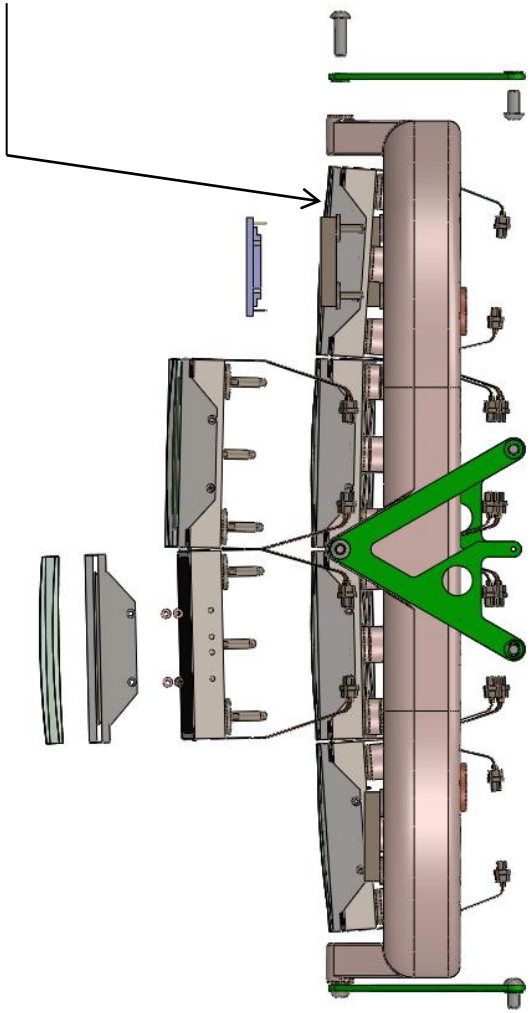
Faceted Focal Plane Assembly

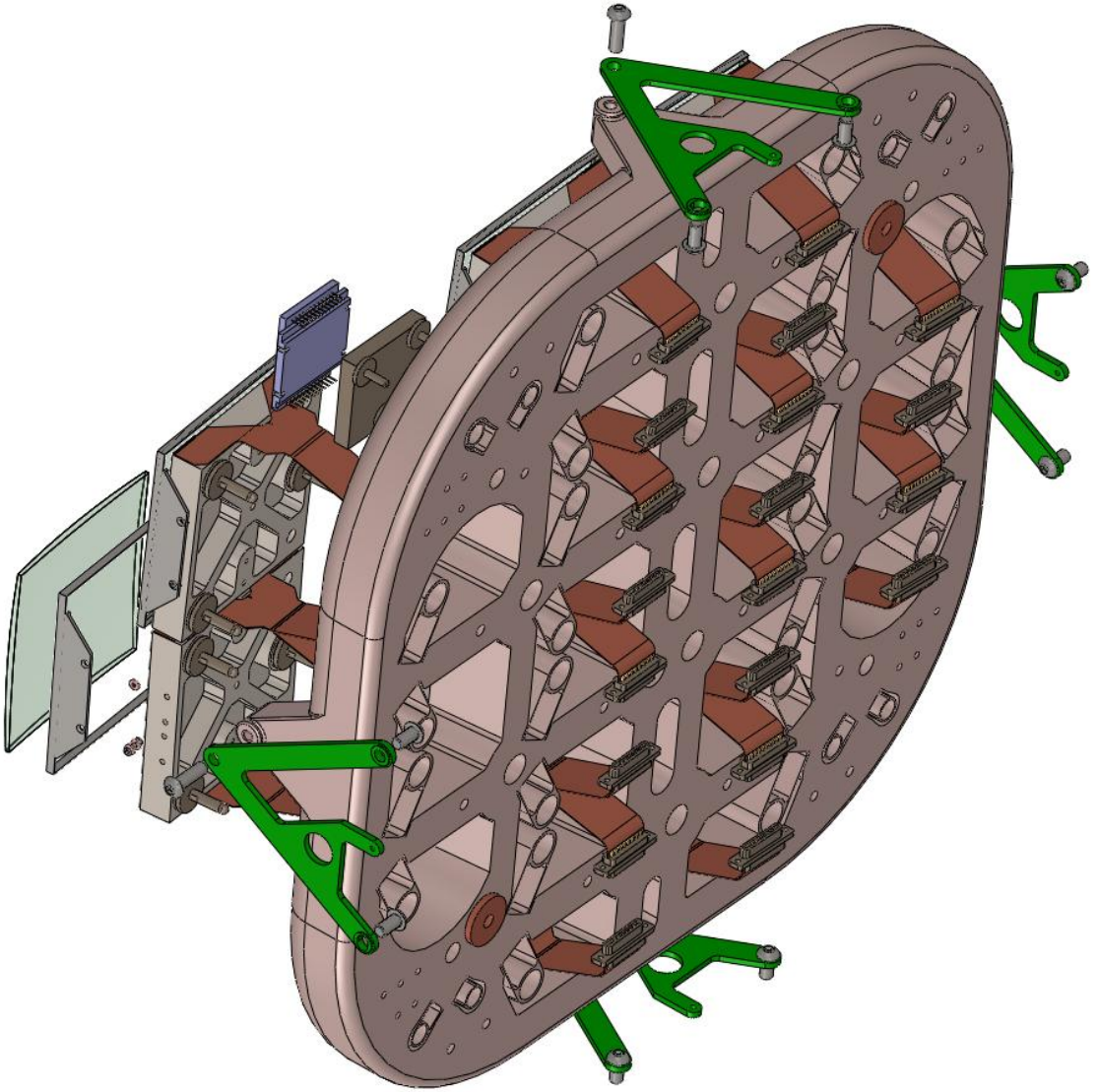
12 CCD packages



Exploded view of Focal Plane

Note the spherical curve formed by the faceted placement of the CCD packages

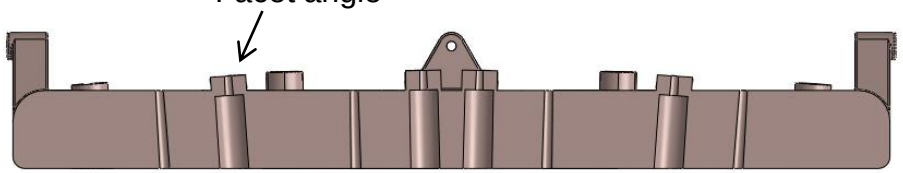




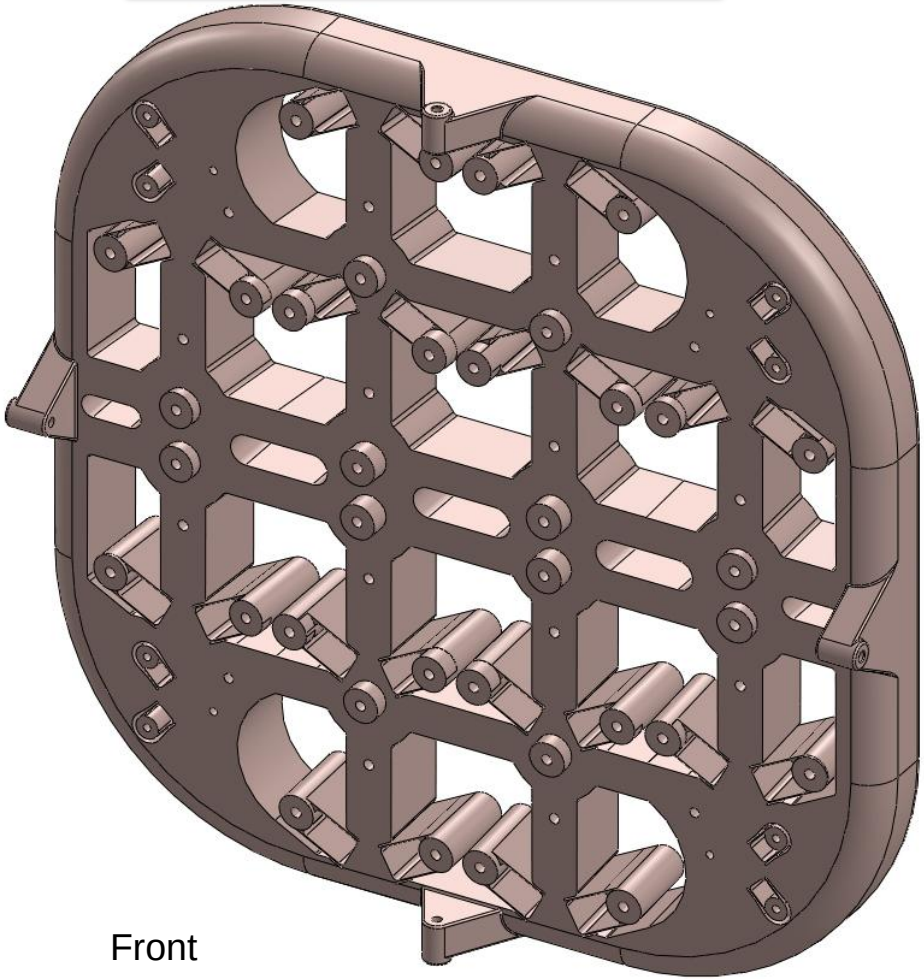
Cold Plate

Aluminum, machined from a single piece of plate stock
11.5kg

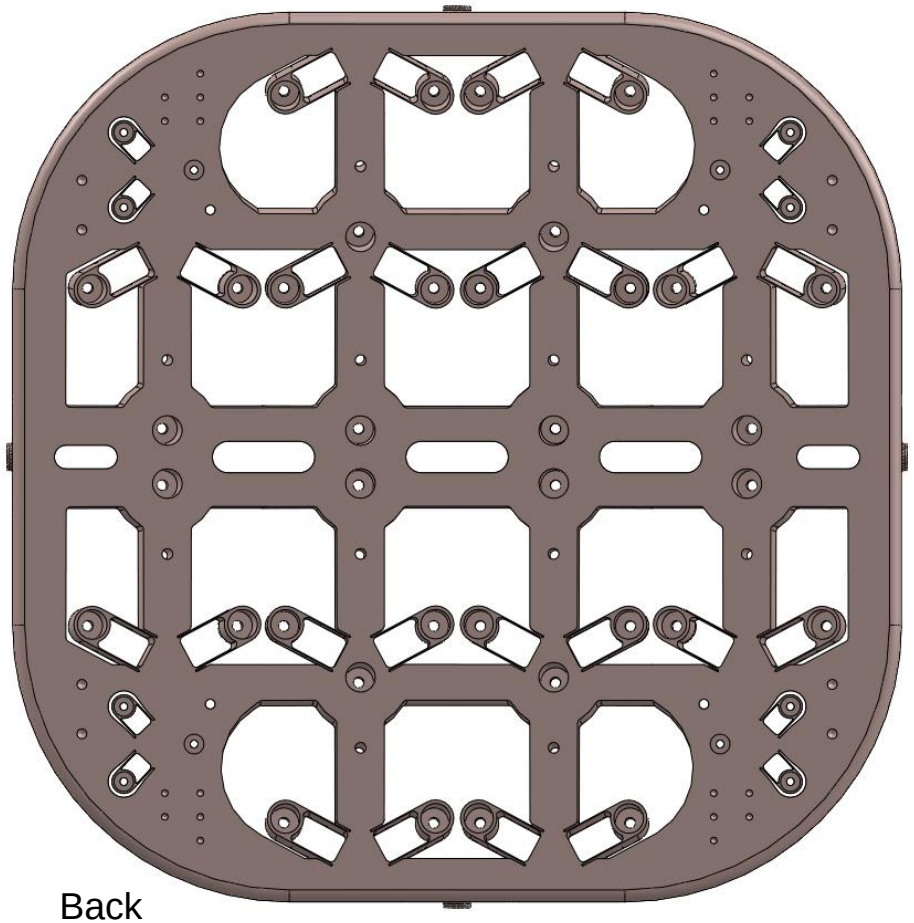
40mm thick



Section view

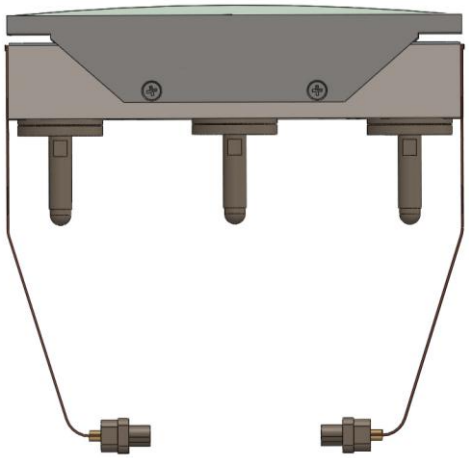


Front

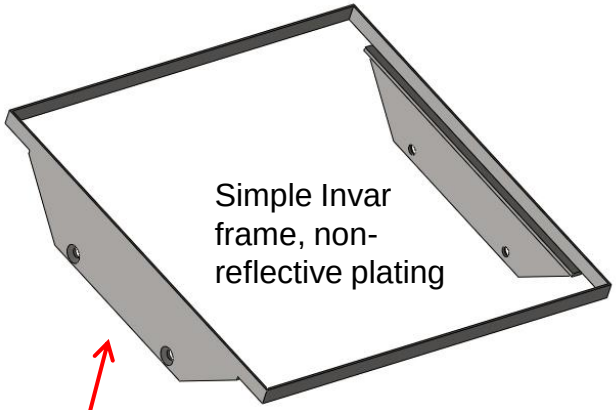


Back

CCD Package and Flattener Assembly

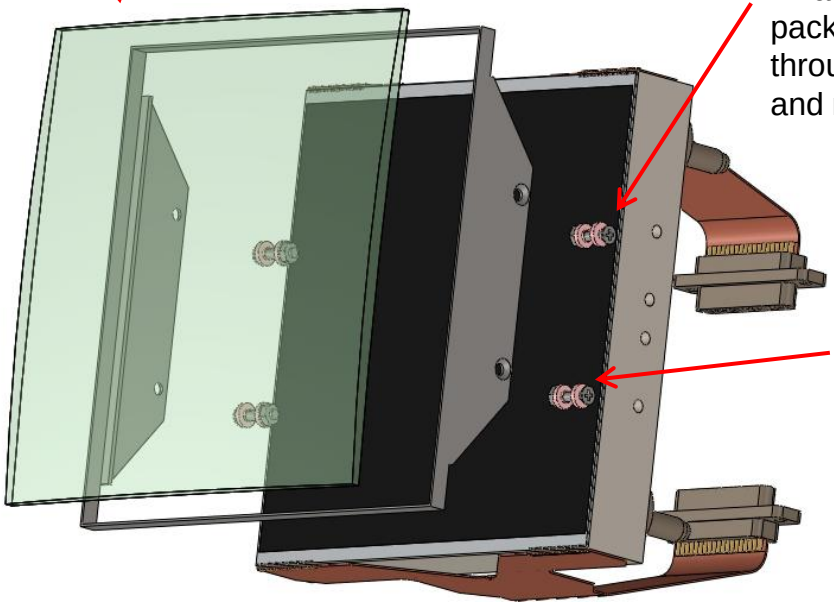


Simple Invar frame, non-reflective plating

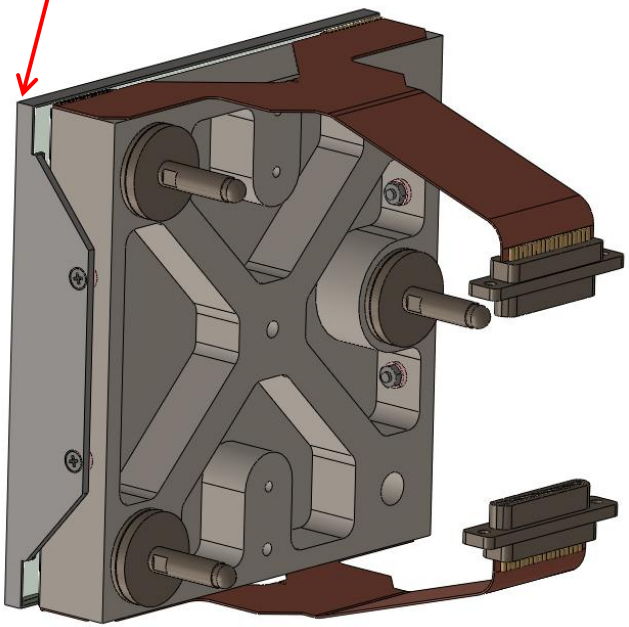


Flattener glued to Invar frame

Invar frame fastened to CCD package using existing through holes using a screw and nut



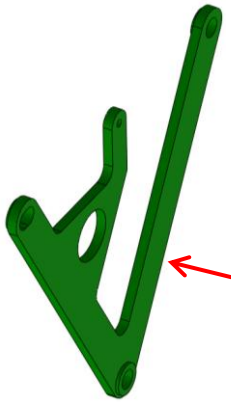
Invar frame insulated from CCD package with G-10 sleeve washers

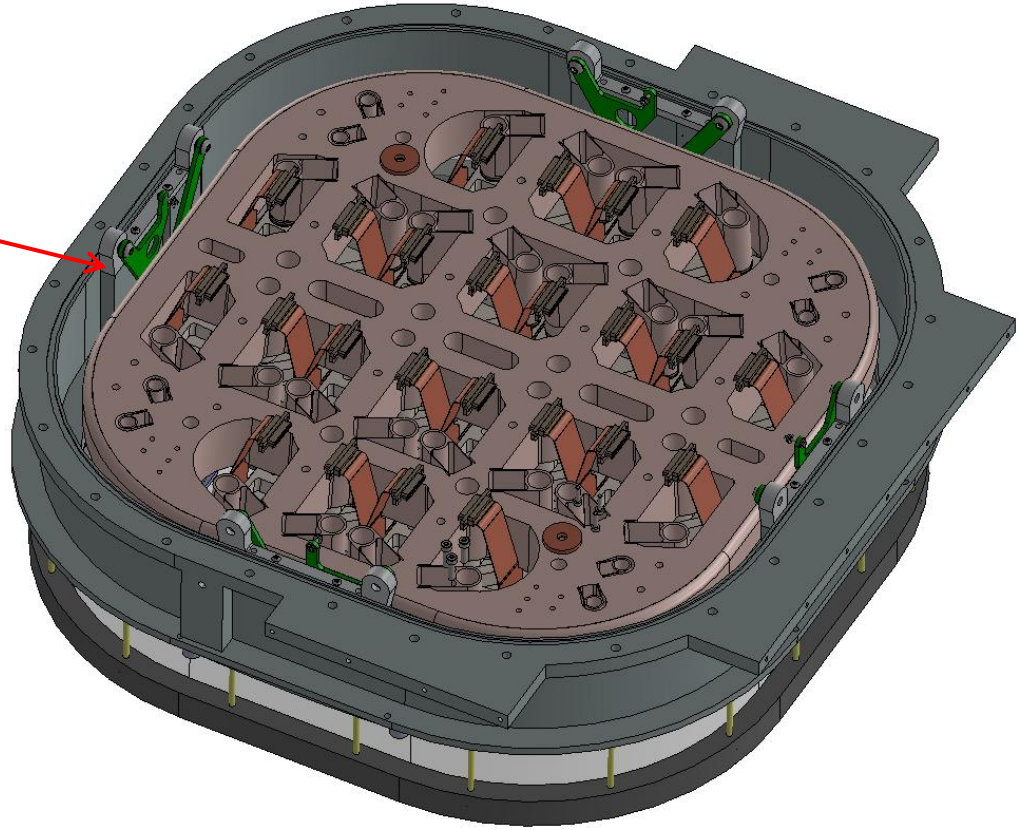


e2v CCD231-C6

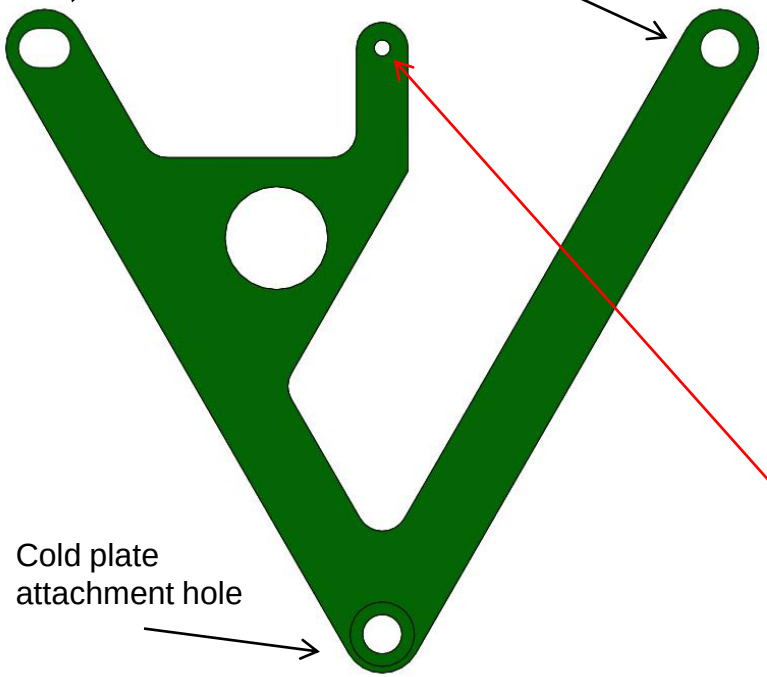
Flexure

G-10
Quantity 4





Dewar can attachment hole



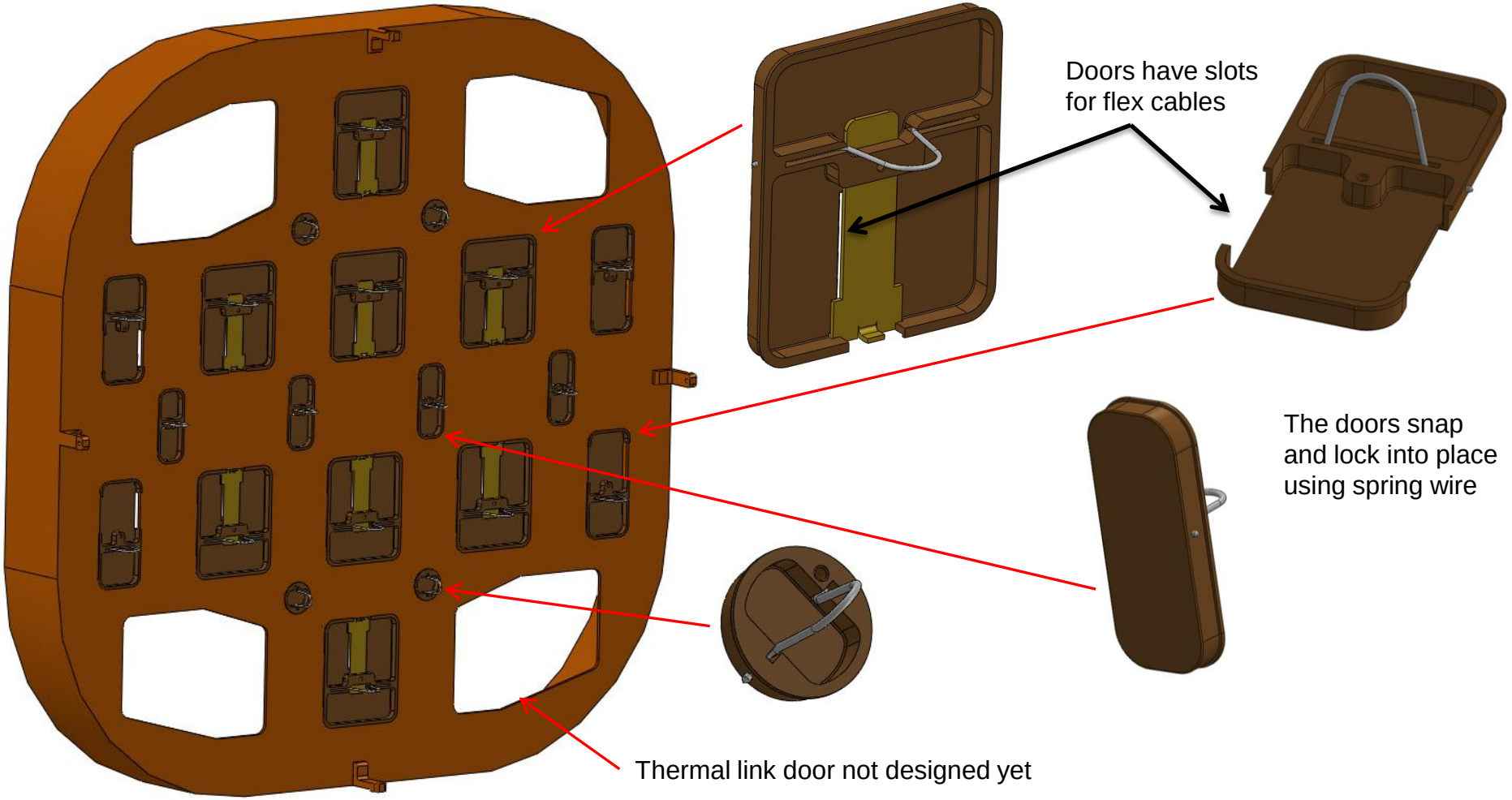
Radiation Shield mounting hole

Cold plate
attachment hole

Radiation Shield with Doors

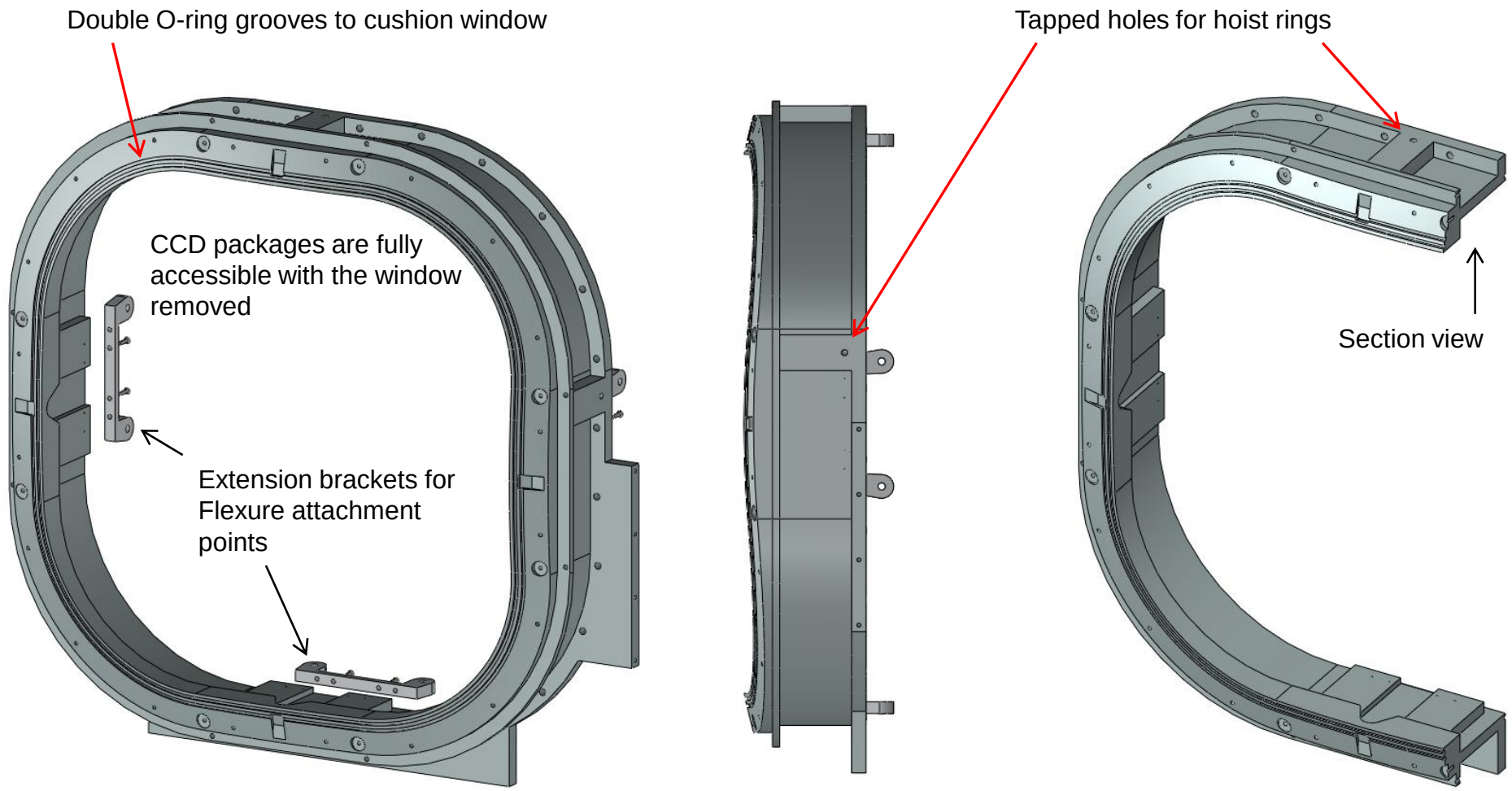
Gold plated sheet copper, polished

The doors seal the Radiation shield after CCD packages are installed.

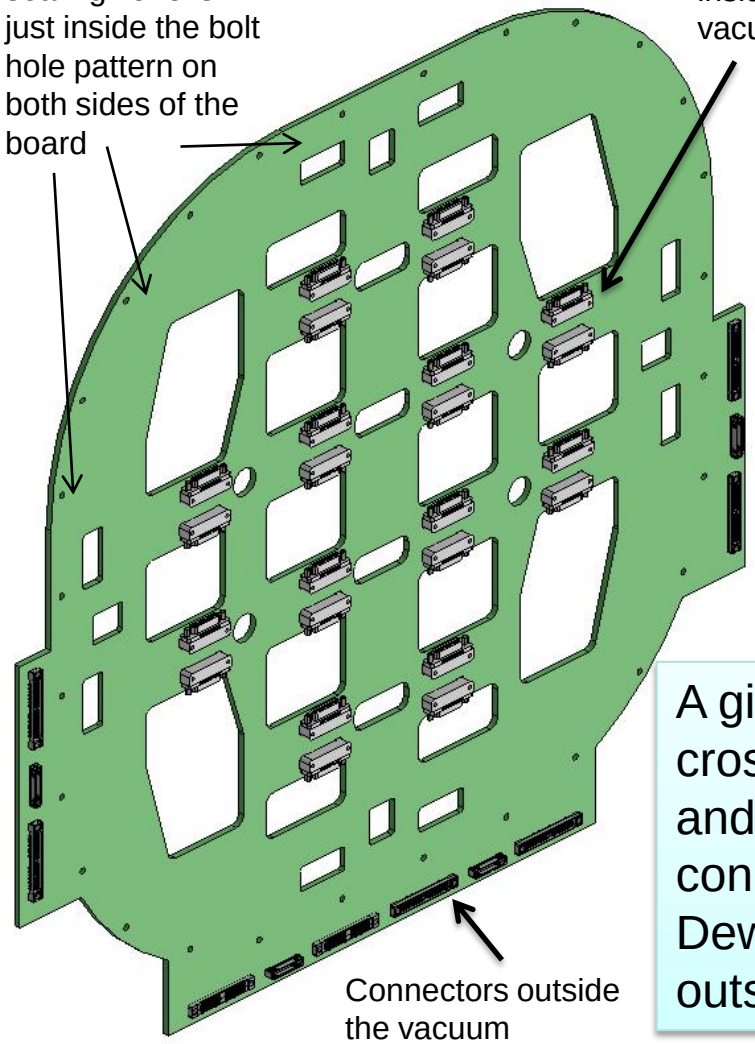


Dewar Can

Aluminum, machined from plate stock, no welding
9kg



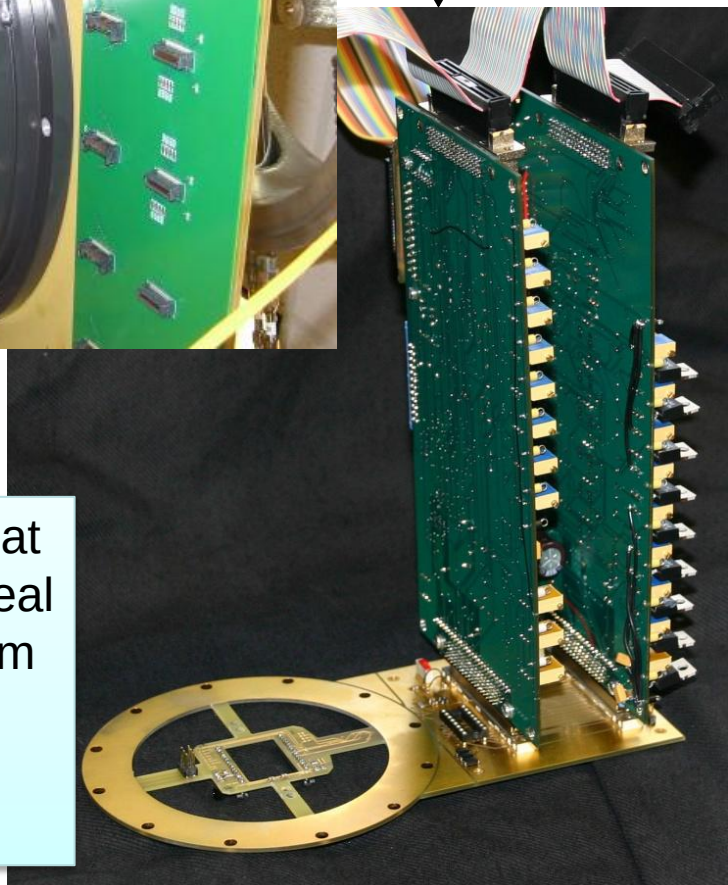
Vacuum Interface Board (**VIB**)



Previous VIB's

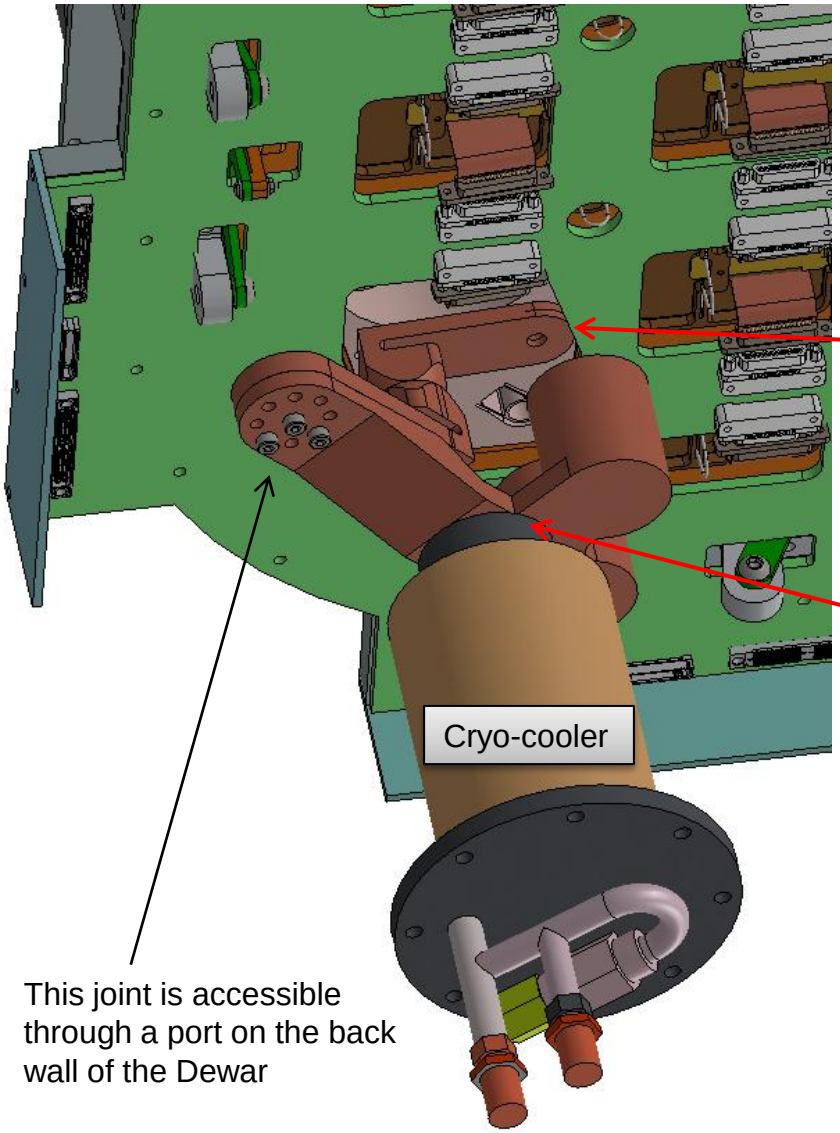
KMTNet VIB

Cambridge VIB



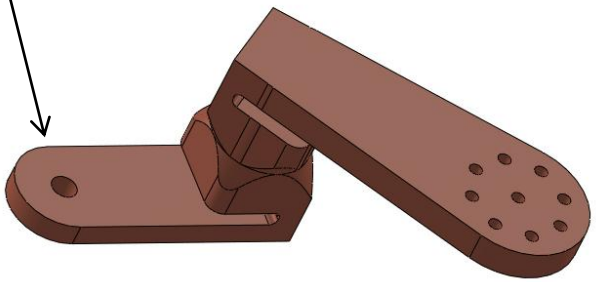
A giant circuit board that crosses the vacuum seal and carries signals from connectors inside the Dewar to connectors outside the Dewar.

Thermal Link

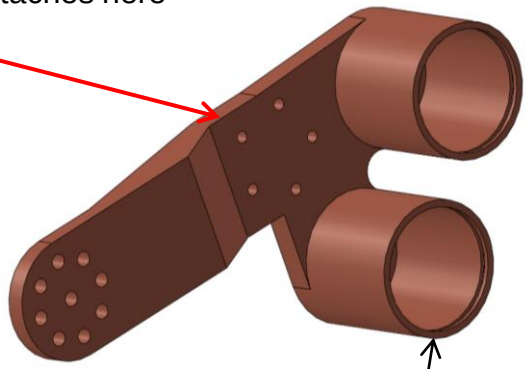


Copper

Cold Plate end



Cryo-cooler attaches here

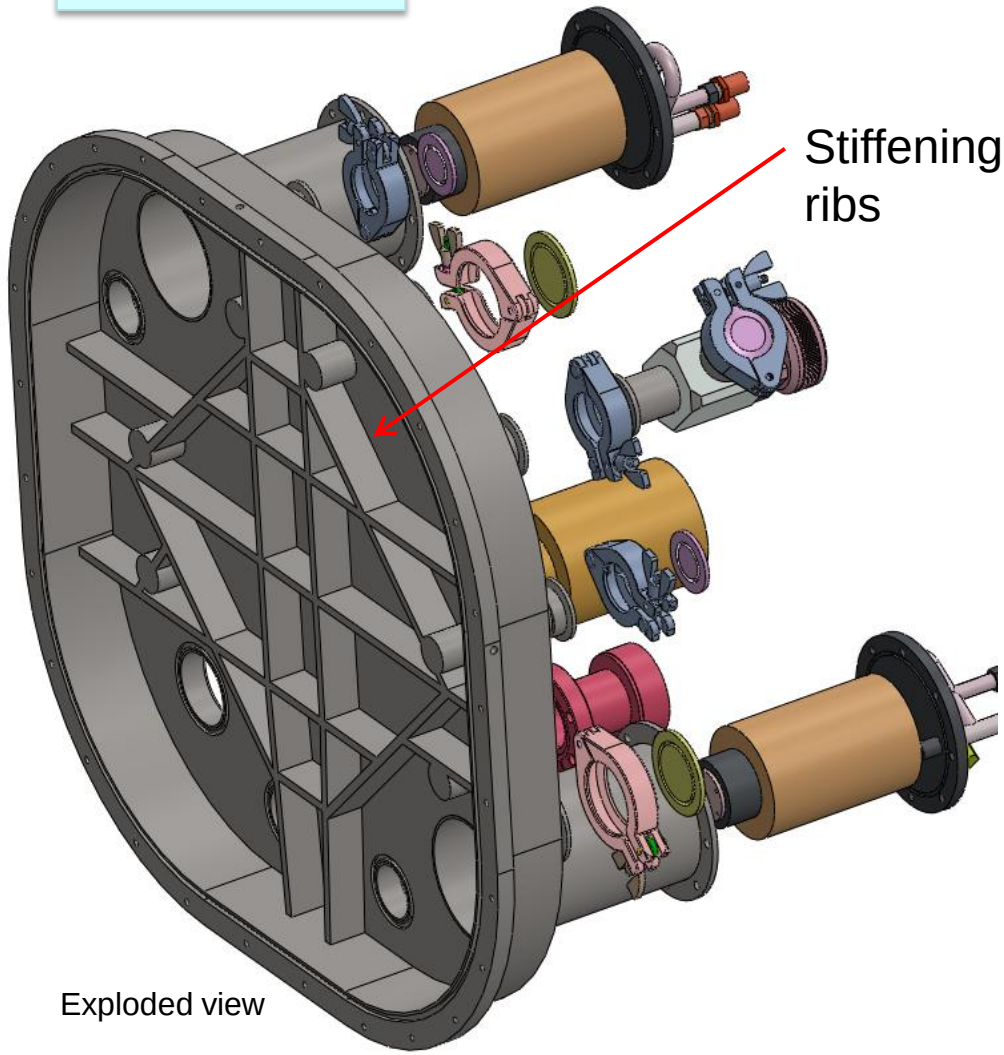


This joint is accessible through a port on the back wall of the Dewar

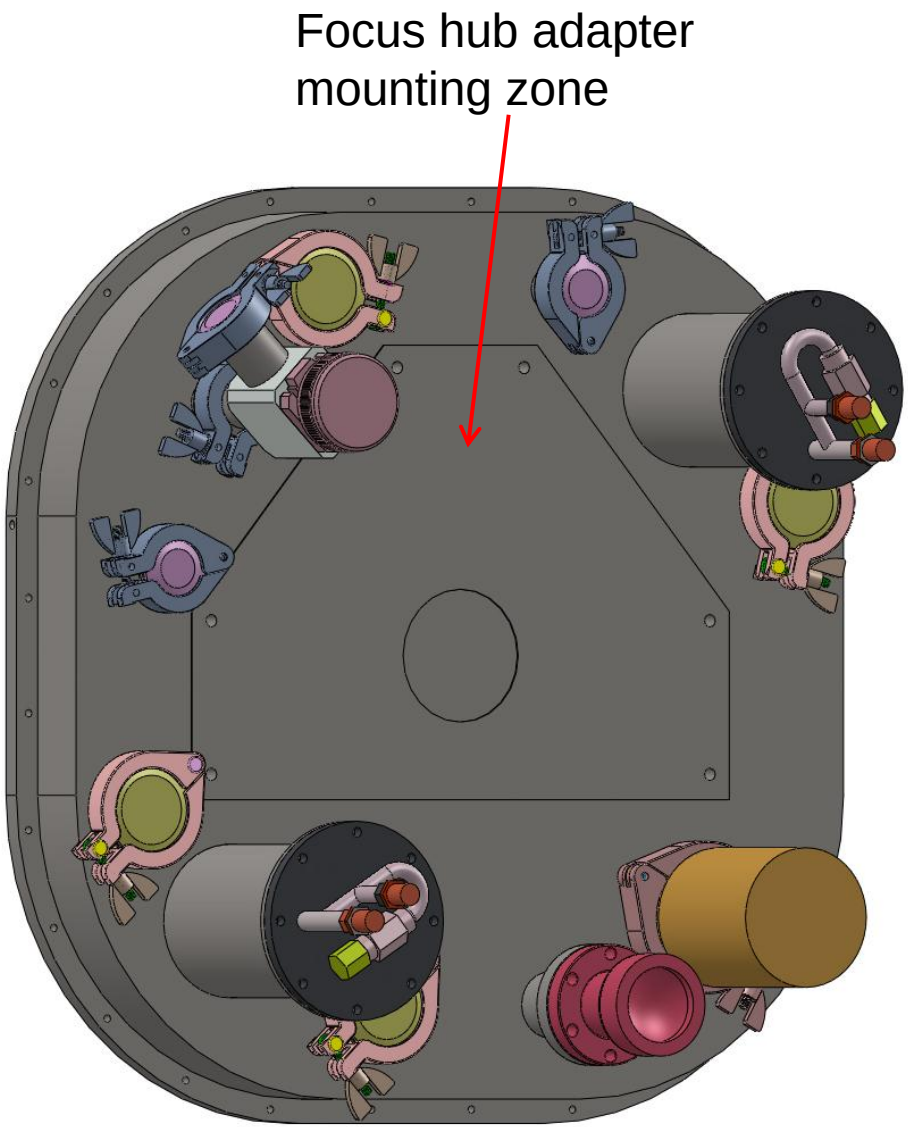
Activated Carbon housing (Getter cups) (38ml each cup)

Back Wall

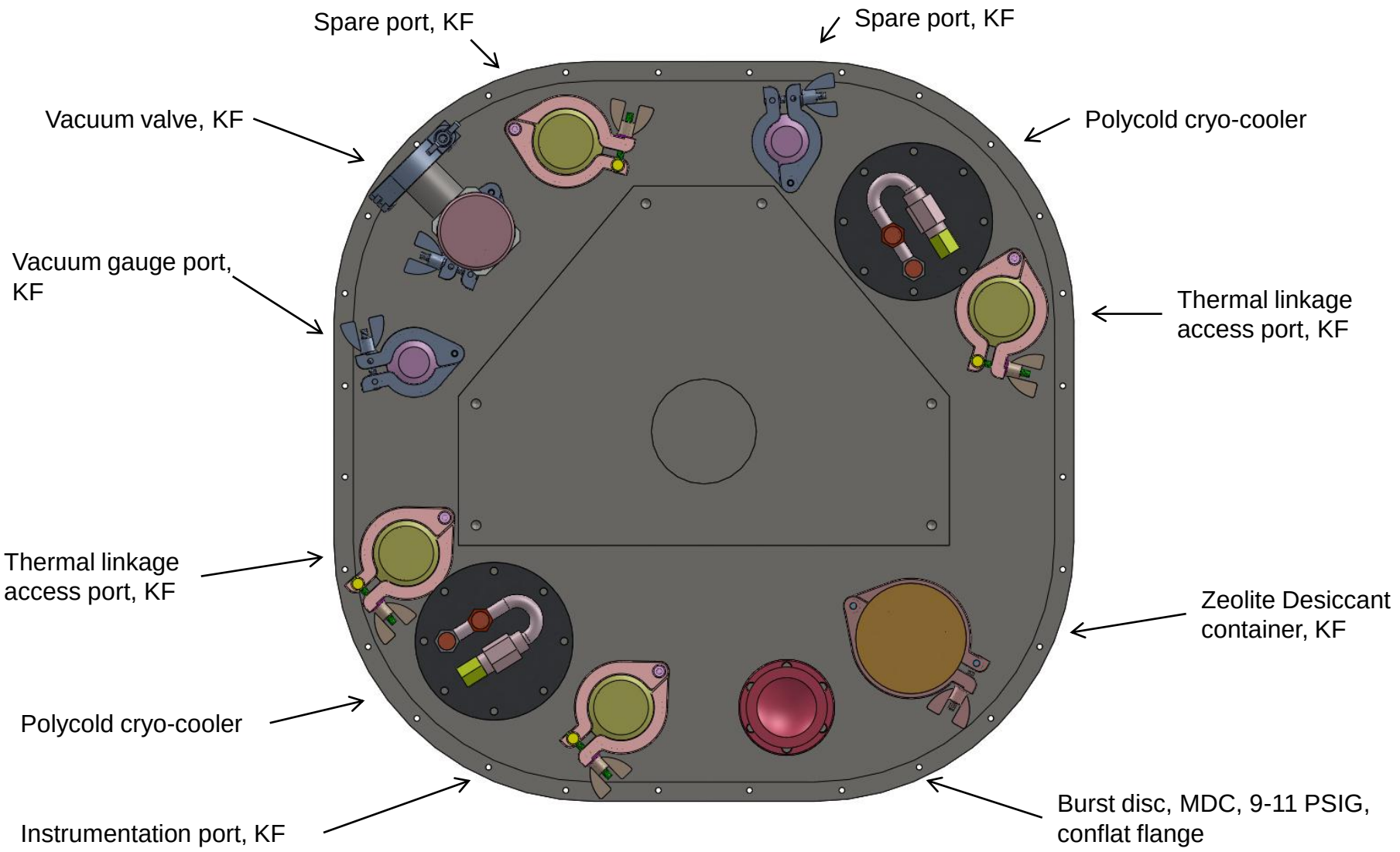
Stainless steel



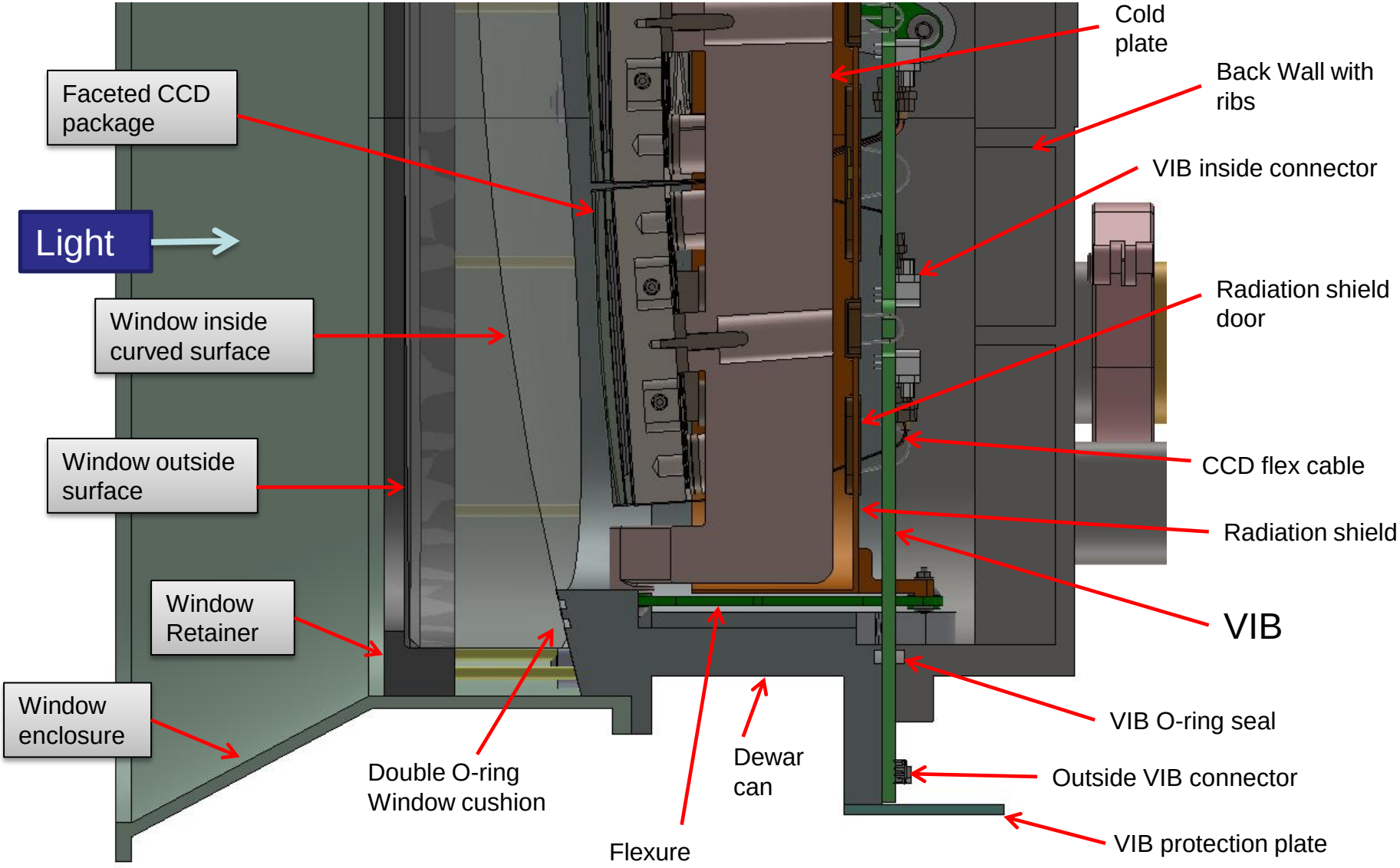
Exploded view



Back Wall Ports



Cross-section Detail



Future Work

VIB redesign

- *Rotate inside connectors on the board 90 degrees*
- *Reduce hole quantity and hole size in the board*
- *Relocate the outside connectors on the board to a single run on the bottom*

Design a 4th flexure that is not over determined

Simplify thermal links to 2 flex joints and 2 bolted connections

Front mask (radiation shield) design

Integrate guiders and connectors

Integrate heaters and thermal couples on the cold plate

Integrate window handling parts

Integrate focus hub mounting plate and possible tip – tilt mechanism

Integrate precise distance from window and CCD surfaces to focus hub.

Assembly Sequence