In discussing a “next endplate” we could be looking at 3 time frames:

1) an endplate that could be used with the current field cage
to be built in a ~ 2 years

2) an endplate that would be used on LP2,
something which would allow investigation of lighter construction
but would be at a much small size,
and therefore not address all issues,

3) an endplate which would be direct R&D for the ILD radius device.

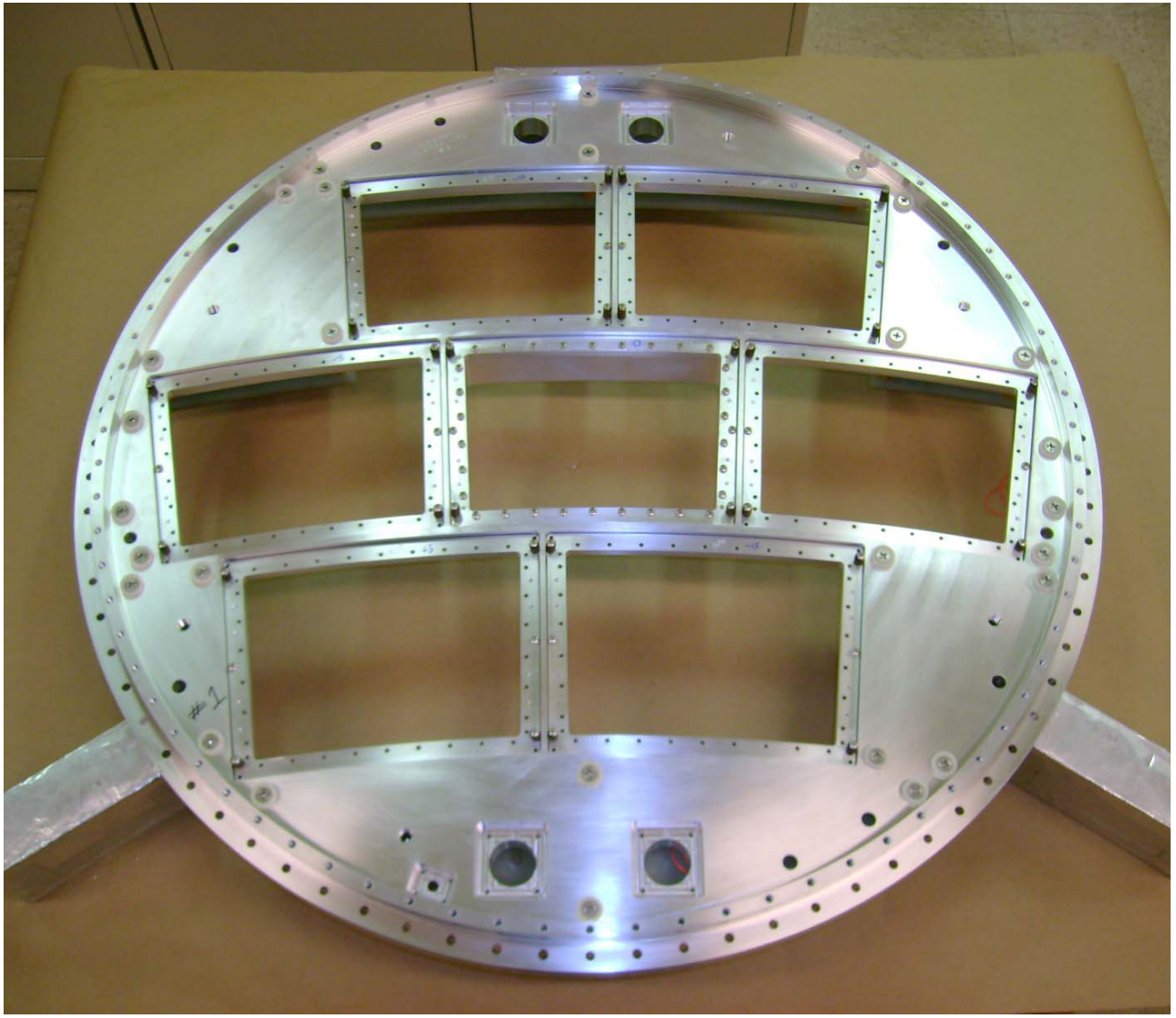
Technologies: and personal opinions

thinning the aluminum (1)
all beryllium (1, 2) why not (3)?
composites (2? ,3) why not (1)
hybrid of composites with metal (1, 2, 3)
space-frame construction (2 , 3)

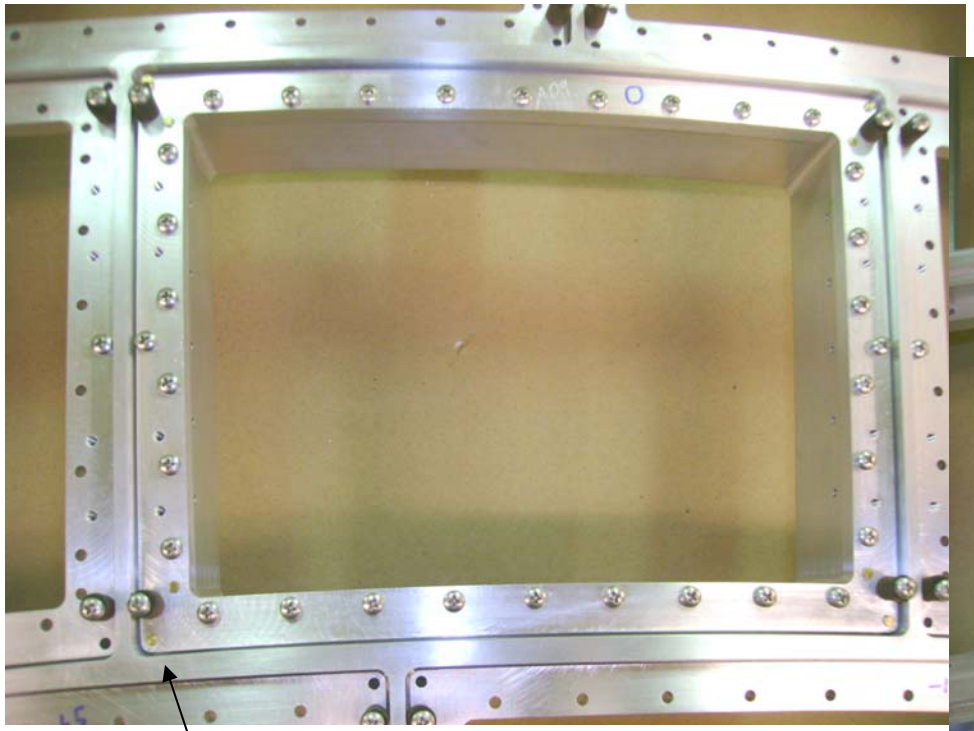
18750g
5000 cm^2

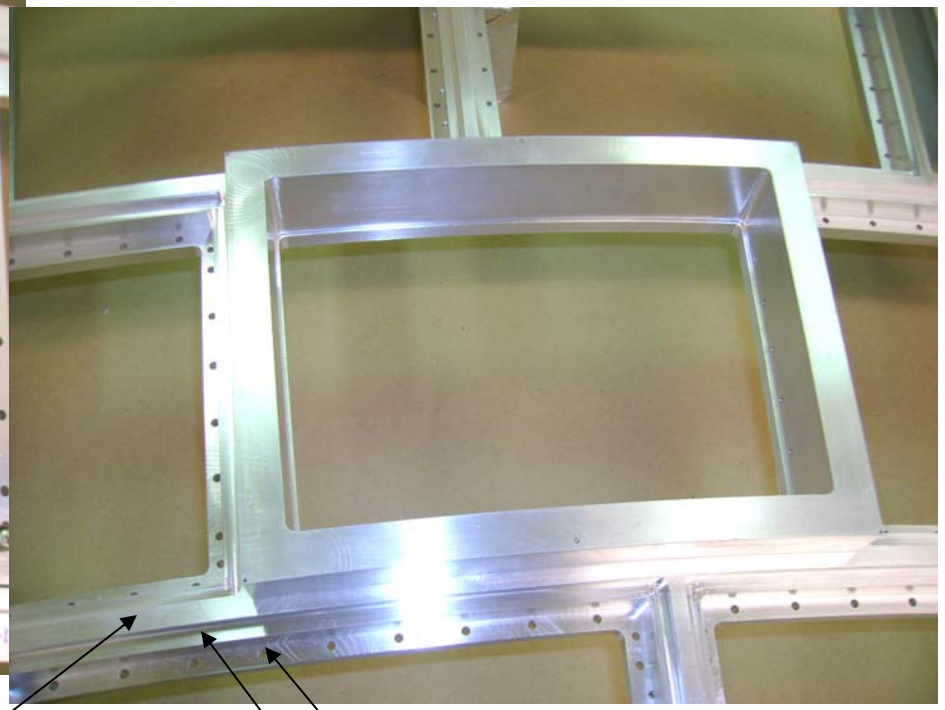
3.75 g/cm^2

Effectively
1.4 cm Aluminum



80 lbs, loaded…
36000g , 5000 cm^2 , 7.2g/cm^2 , effective 2.6 cm (1 inch) aluminum





Stiffening rib

Inside surface

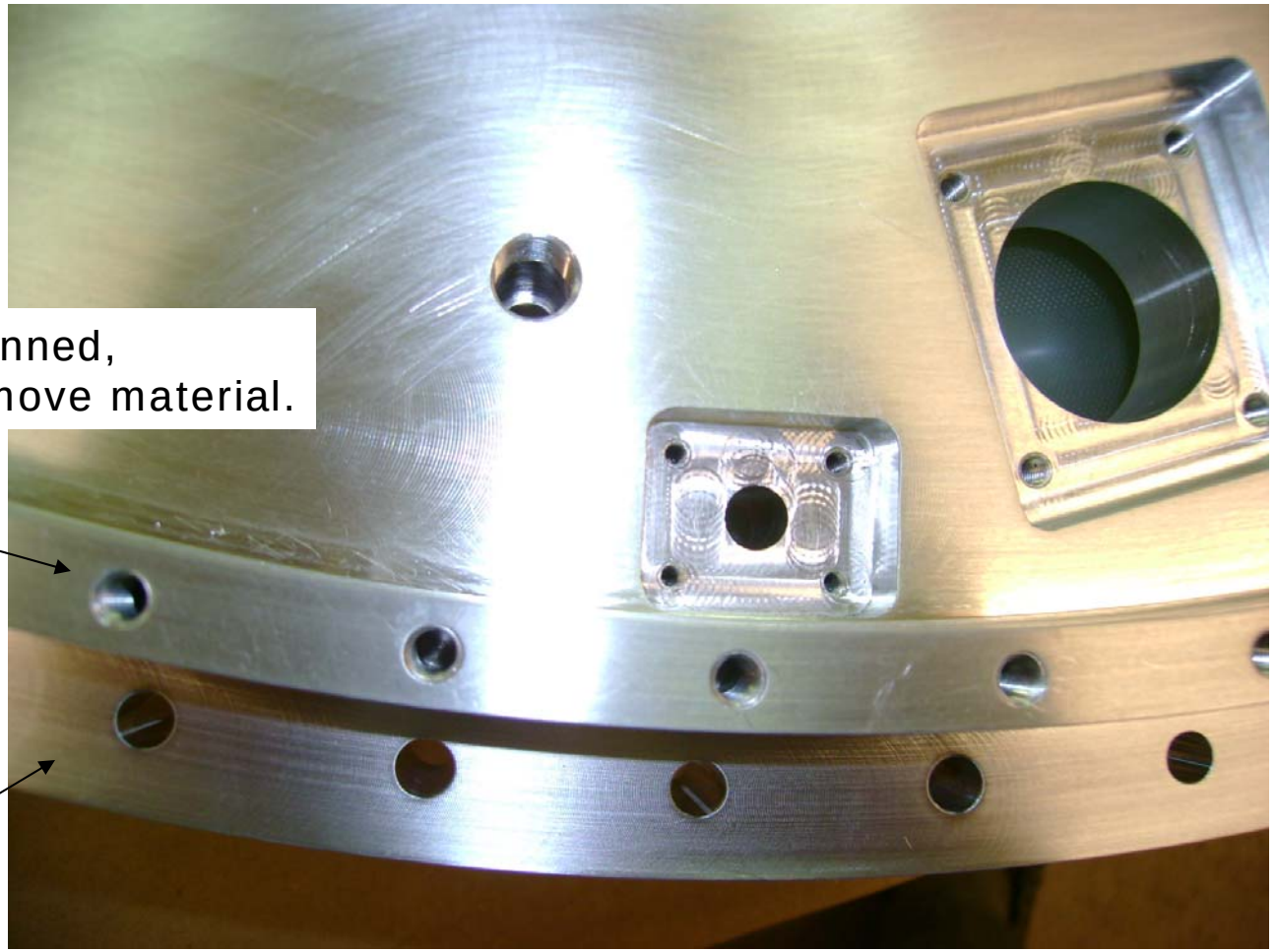
Precision surfaces,
gas seal

The stiffening rib could be made of fiber. One way to do this is to hollow out the frame in a preliminary machining, fill with fiber, build up the rough shape of the fiber stiffening rib, re-machine.

The inside surface would remain aluminum, or could expose the fiber in places.

The precision surfaces would remain aluminum.

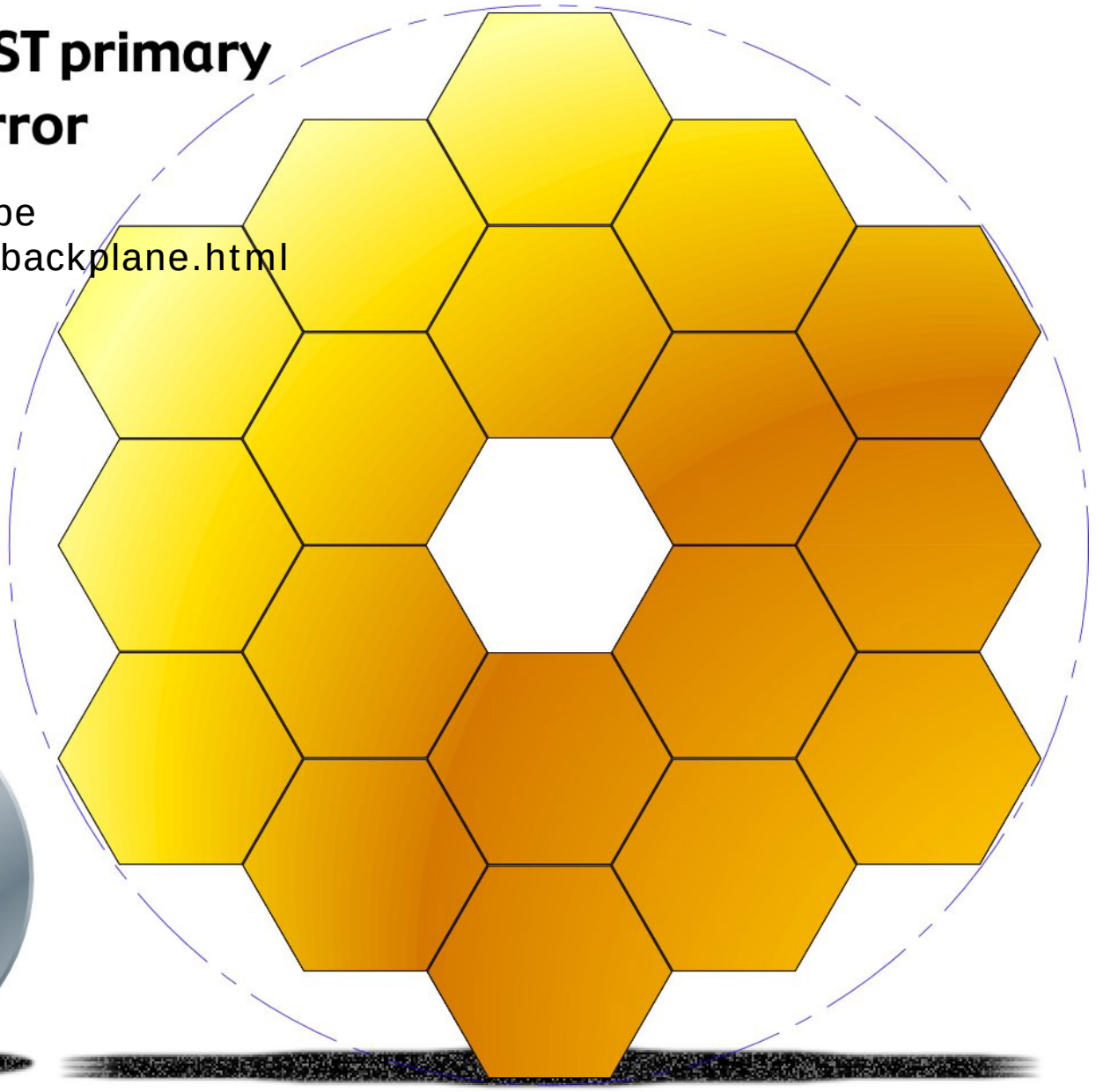
Stiffening ring can be thinned,
radial holes added to remove material.



Flange area can be thinned
and pockets of material removed

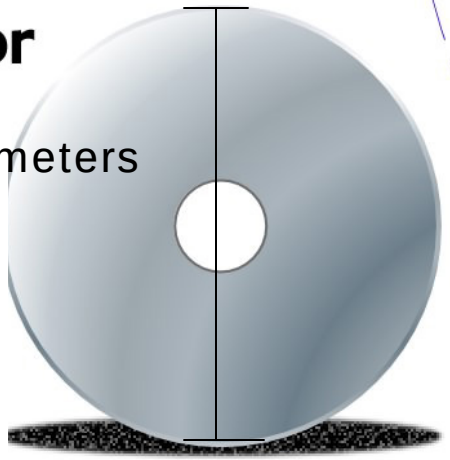
JWST primary mirror

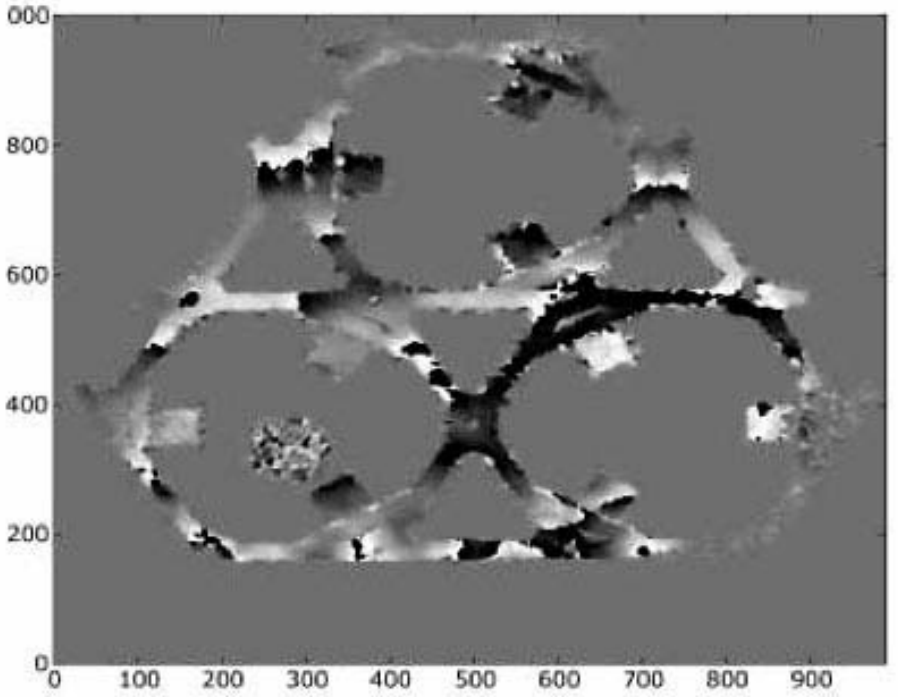
James Webb Space Telescope
http://www.jwst.nasa.gov/backplane.html



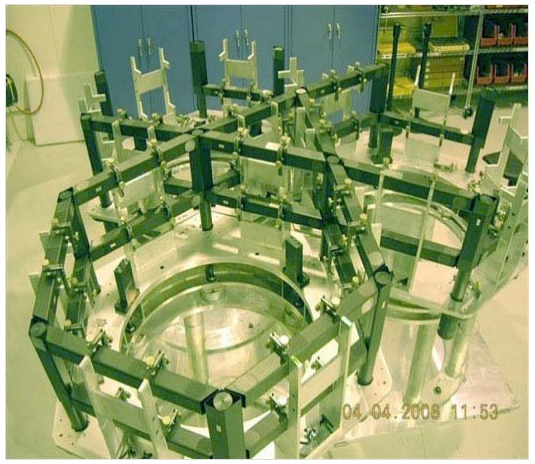
Hubble primary mirror

3 meters



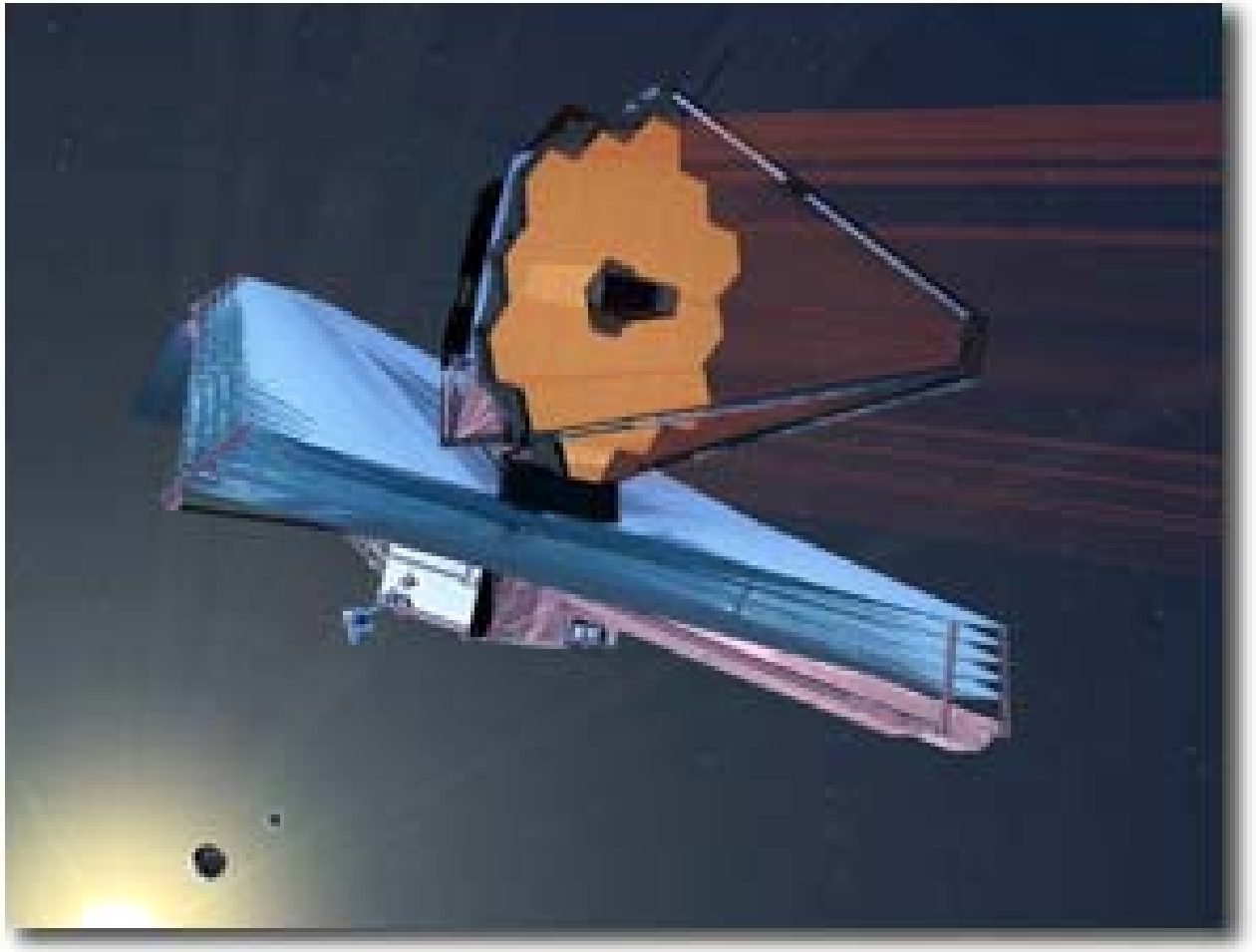


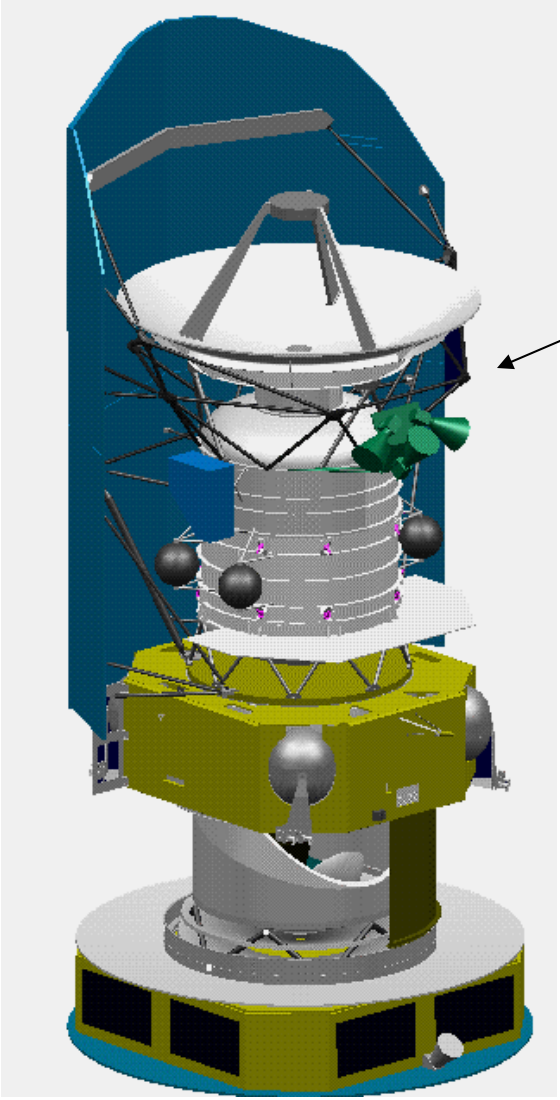
Bonded structure: BackplaneStabilityTestArticle
interferometric fringe
the full size device



We could think of building a rigid bonded structure,
attached to a relatively thin
gas-seal and module support structure.

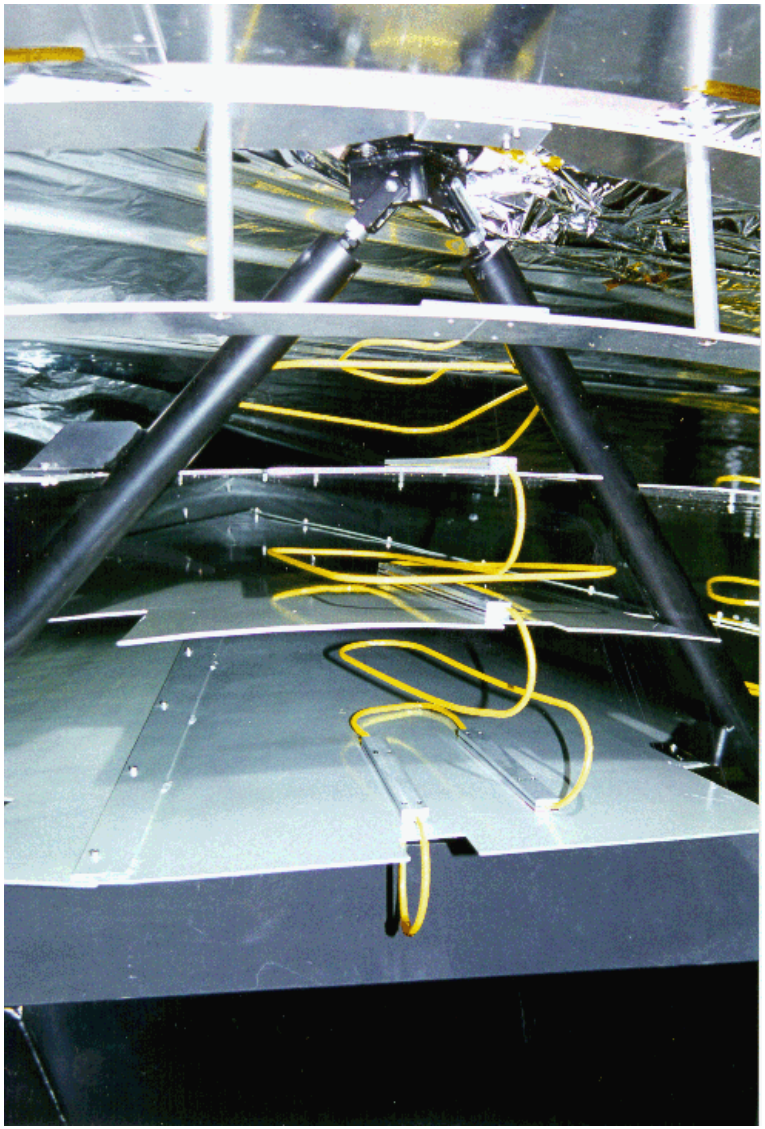
Plank Telescope
http://www.rssd.esa.int/index.php?project=PLANCK&page=index
Launch April 2009



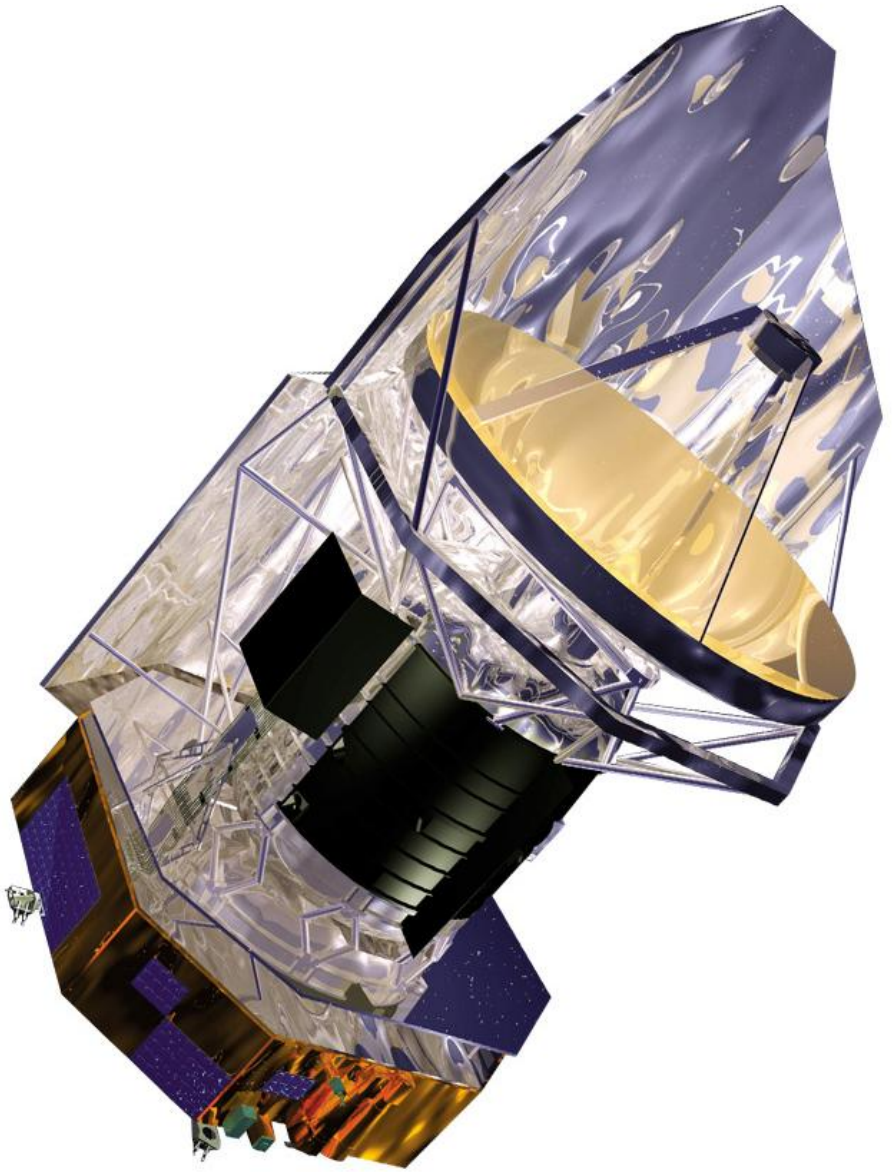


The area of the space-frame.

Note: these are individual adjustable struts.
I would question whether we want to make a system with this many degrees of freedom.



Hershel Telescope
to be launched with Plank



http://herschel.jpl.nasa.gov/
http://sci.esa.int/science-e/www/area/index.cfm?fareaid=16

This also has a space-frame.
It appears to be a rigid object.

The sensor support is cool.

Note the little cones.