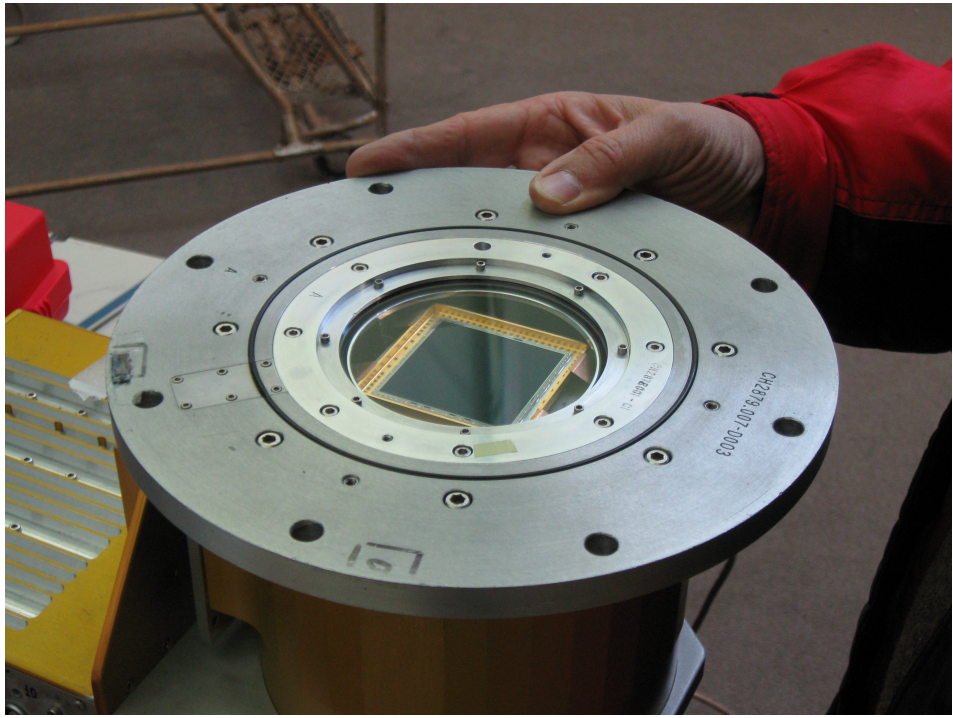
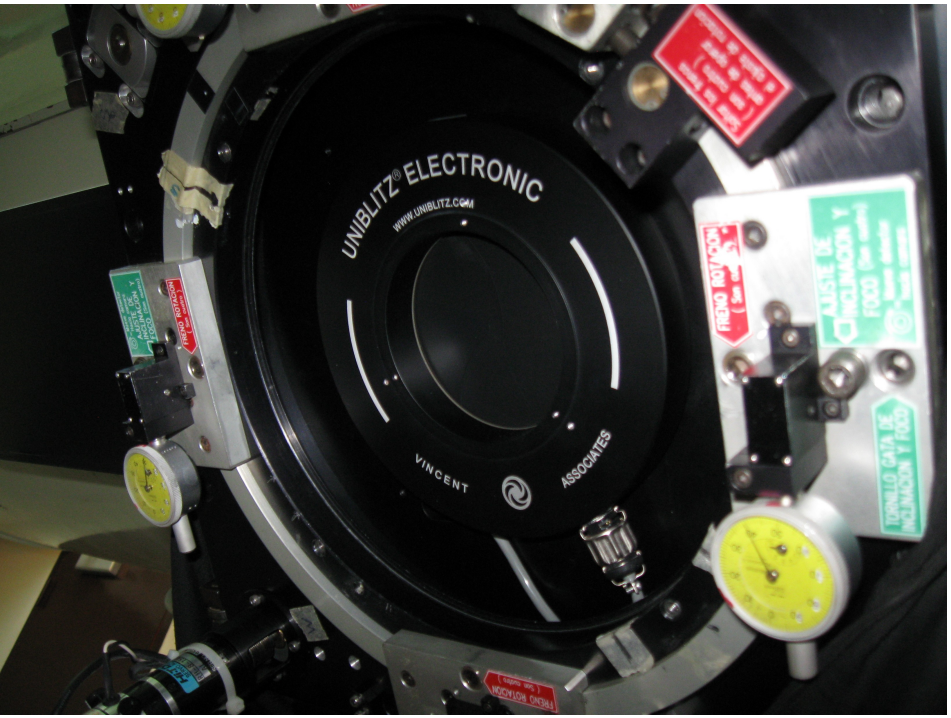
# The Camera

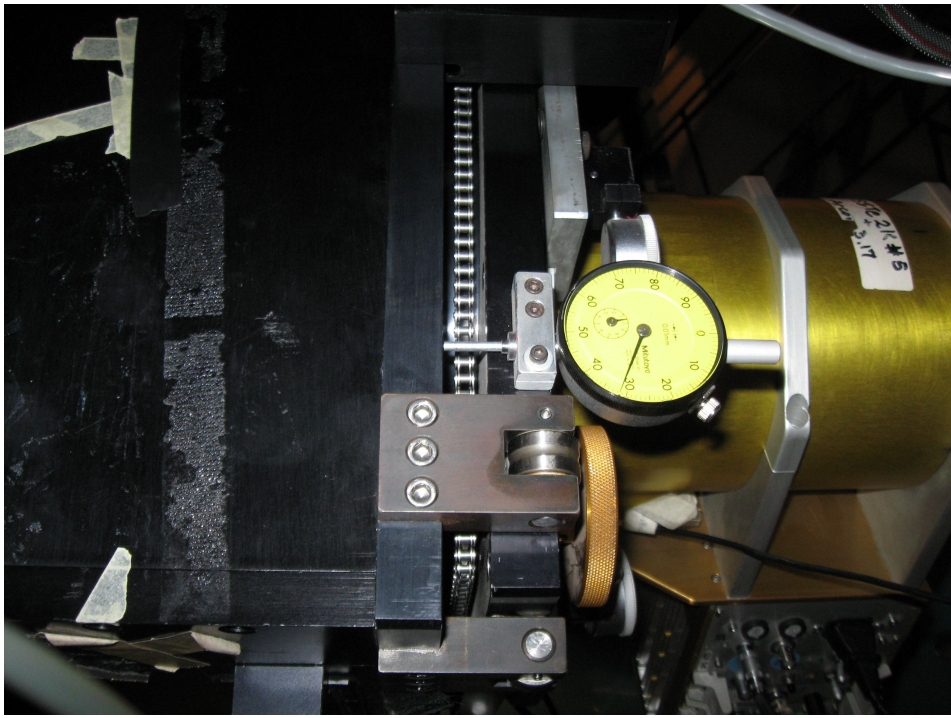


# Current CTIO Dewar: Pictures from Pat

# More Pictures from Pat

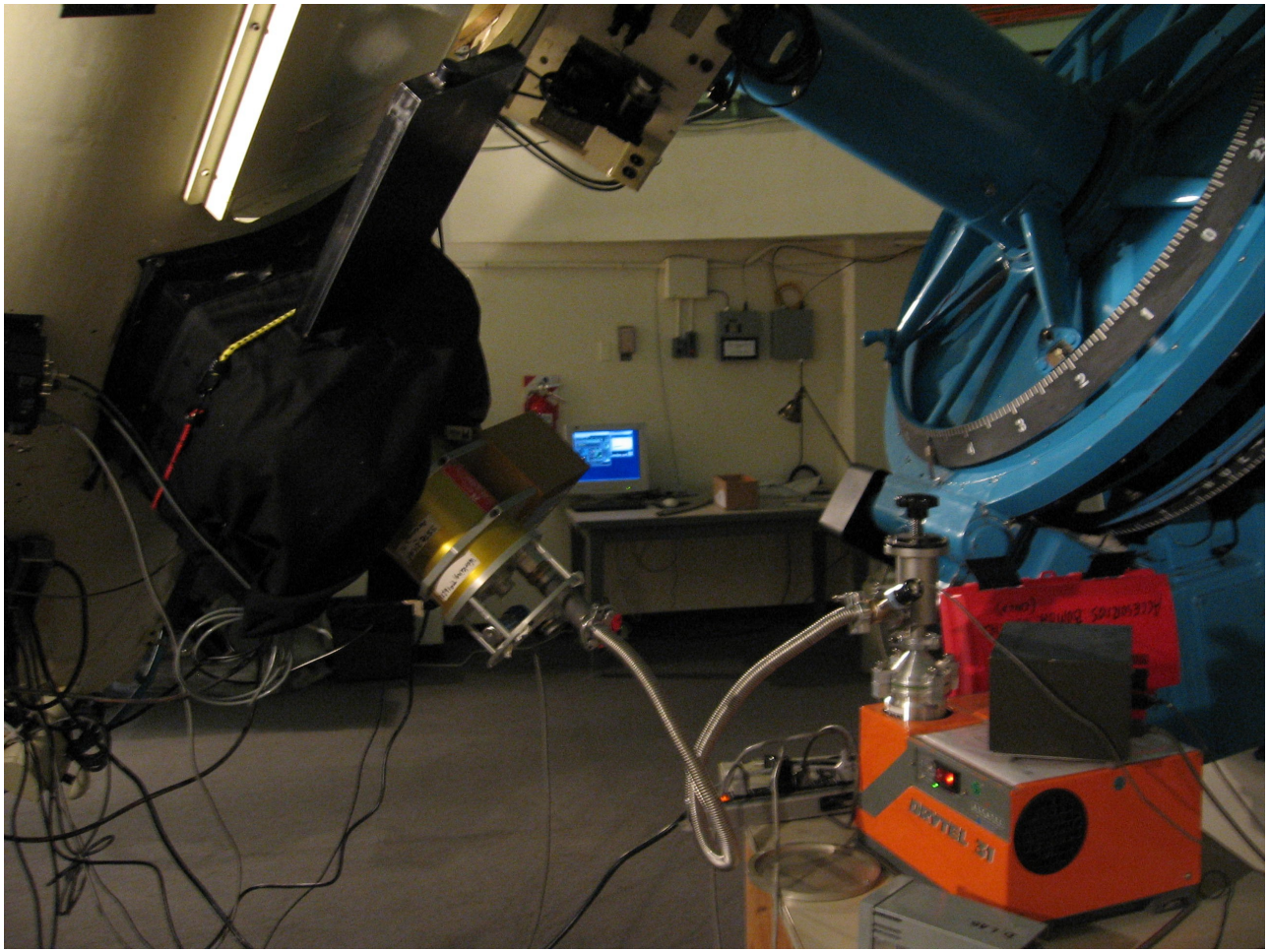



90 mm shutter



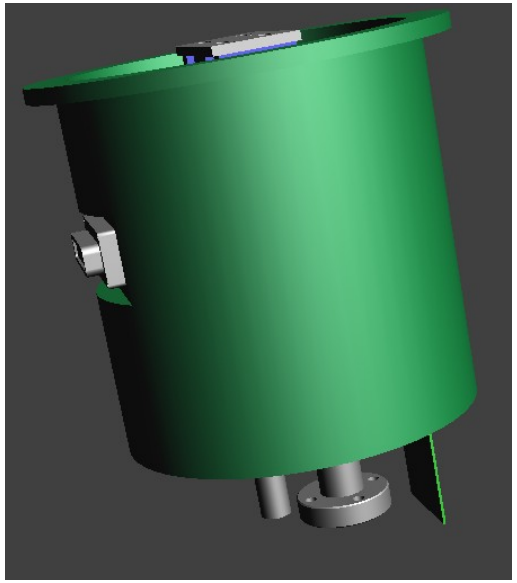
Side view of tilt/focus

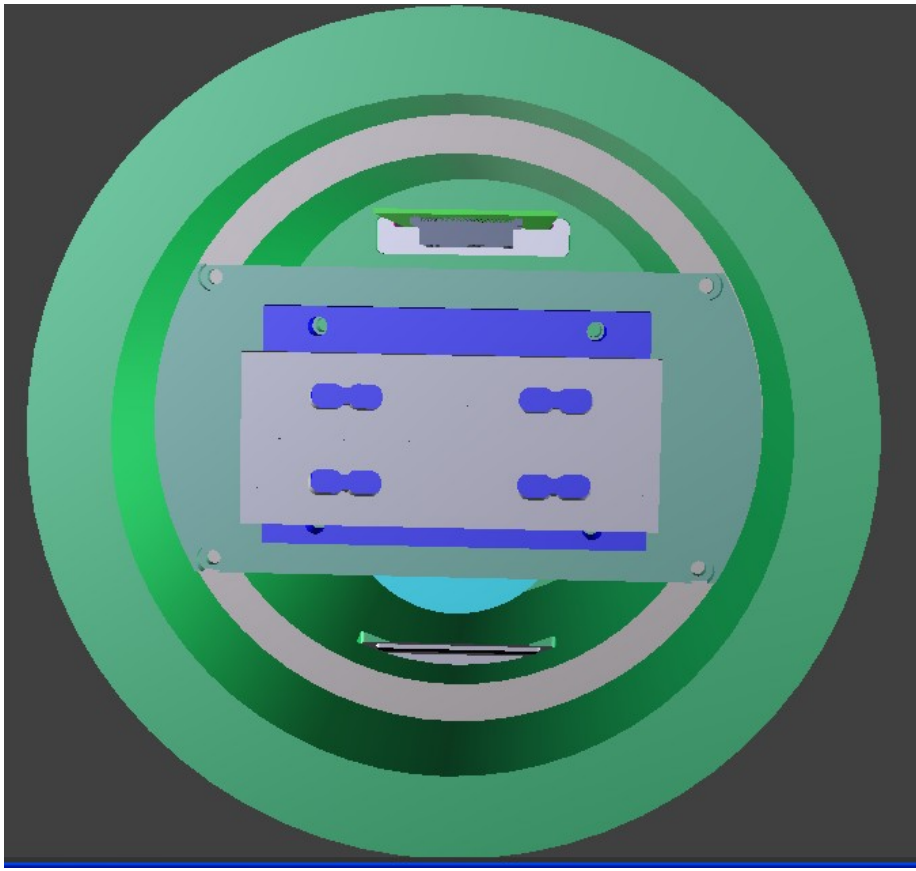
# Current Setup

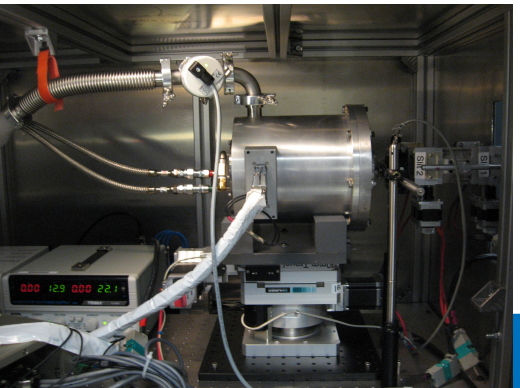


# Initial dewar model (Vic Guarino/ANL)

10” diameter, 9” long

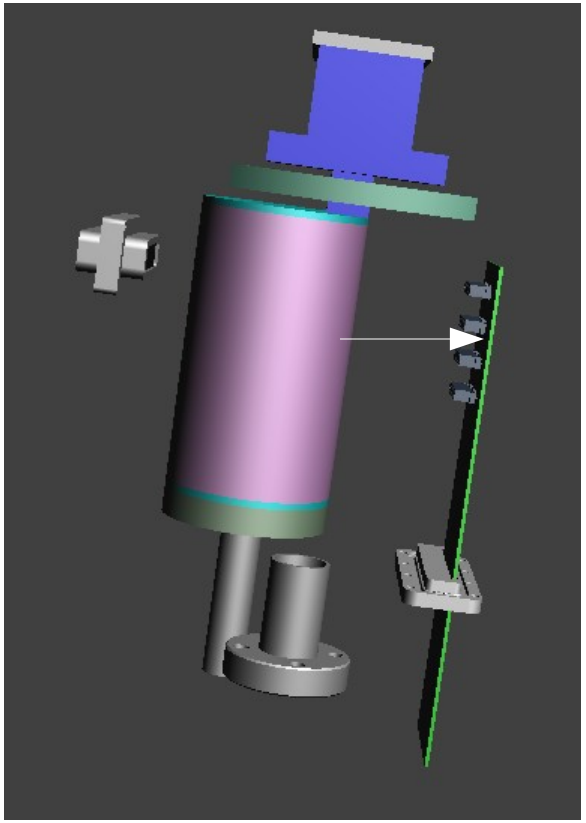


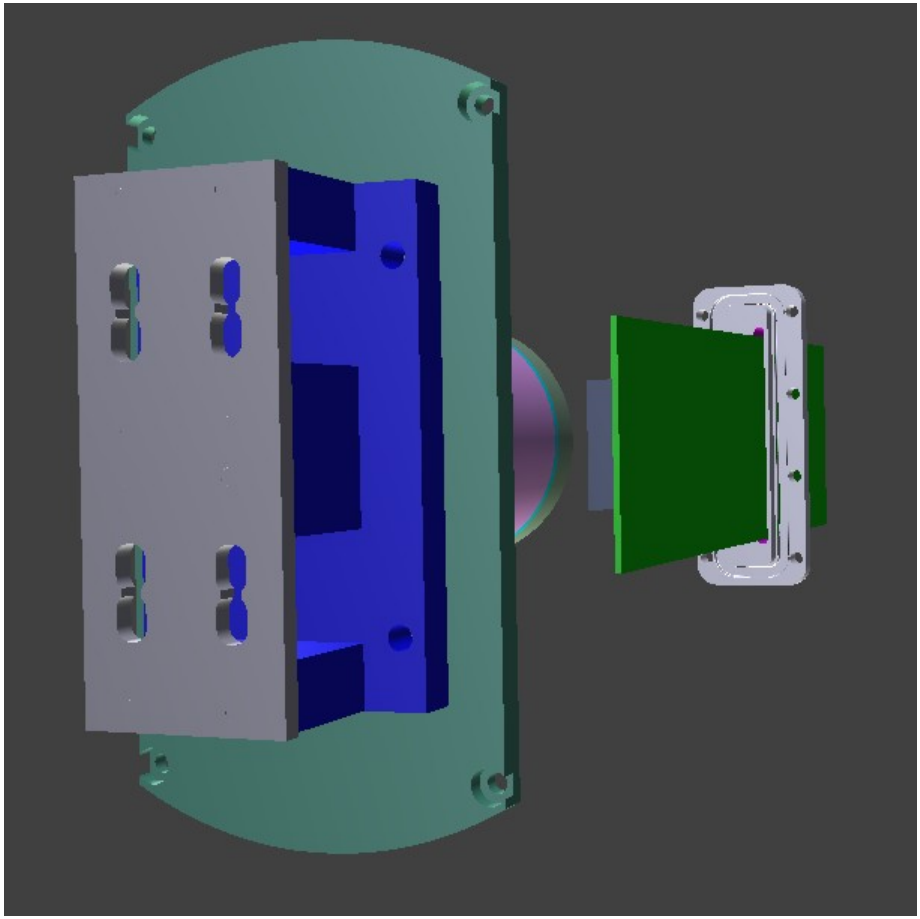




**Very similar to ANL vessel used for x-ray studies at APS, LN2 and VIB main difference.**

# Initial dewar model





**Need a new VIB, none of the current 4-6 CCD VIBs are for DECam electronics. T. Shaw says that VIB doesn't care if 2Kx2K or 2Kx4K, and 6 CCD version similar to 4 CCD. Therefore proceeding with 6 CCD VIB.**

# CCDs

Yield of 2Kx4K CCDs is currently good

~43 science grade,  need ~70 including spares

~20 more close-to-science grade,  many could be useful for Precam (such as ones with 10-20 bad columns or slightly high dark current such as 40 electrons/hour)

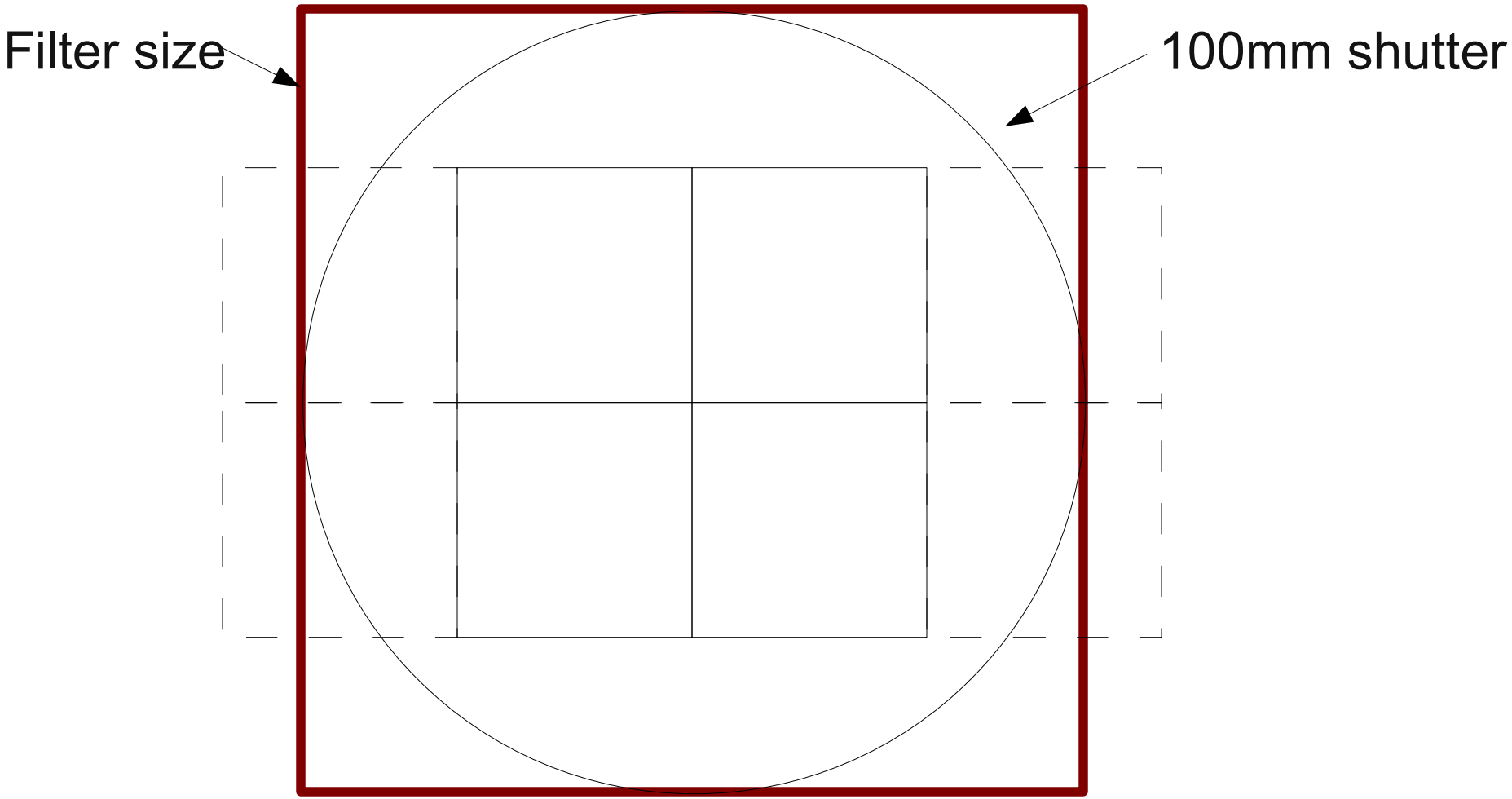
The first 2Kx2K devices look good as well.

Assume both are available,  tune survey based on 10s readout of 2Kx2K and 20s for 2Kx4K.

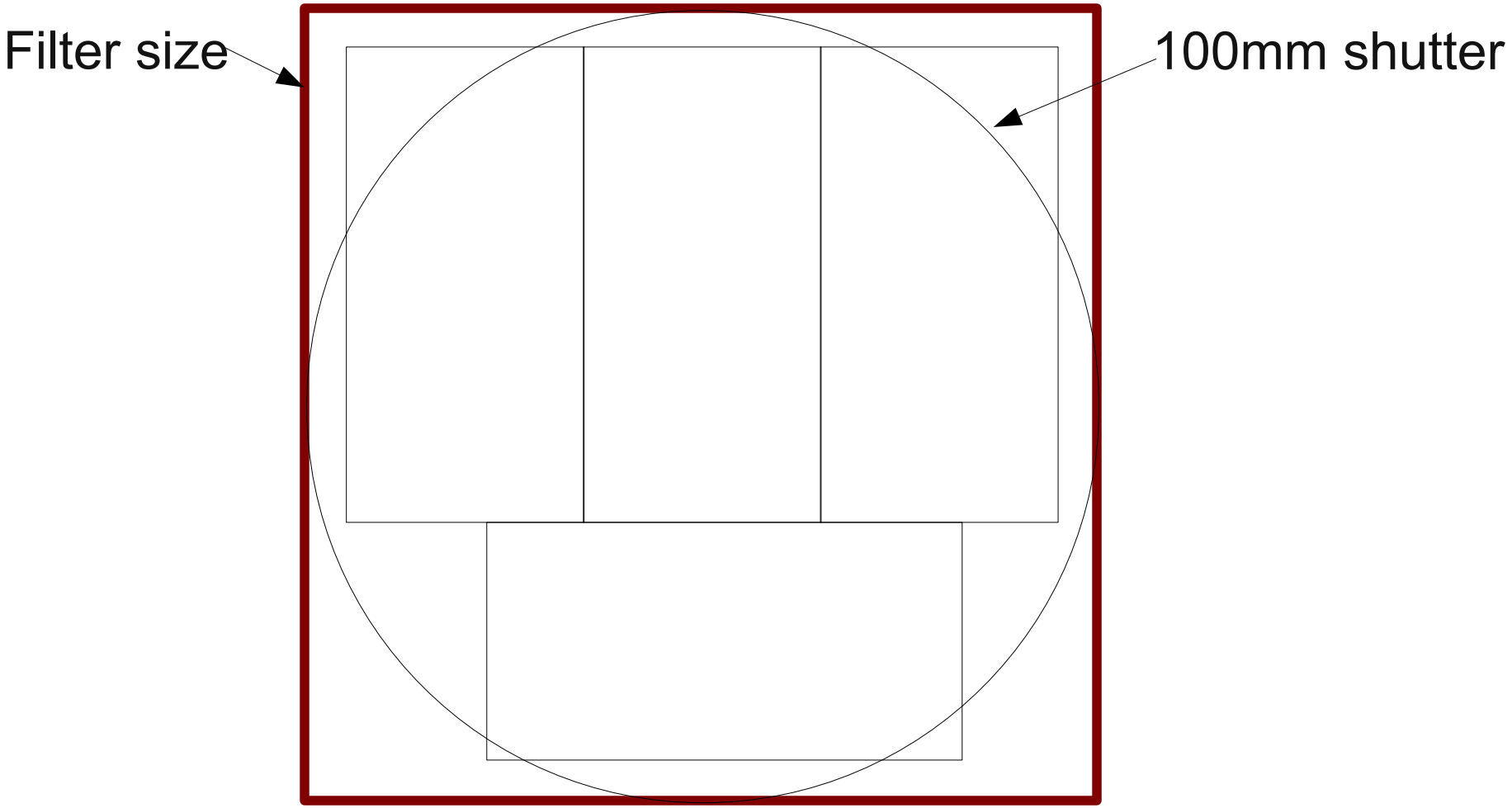
Assuming no vignetting...

| Configuration | Readout Time | Area | Survey Time |
|---|---|---|---|
| Four 2Kx2K | 10s | 2.56 sq. deg. | 88 nights |
| Six 2Kx2K | 10s | 3.84 sq. deg. | 59 nights |
| Four 2Kx4K | 20s | 5.12 sq. deg. | 49 nights |

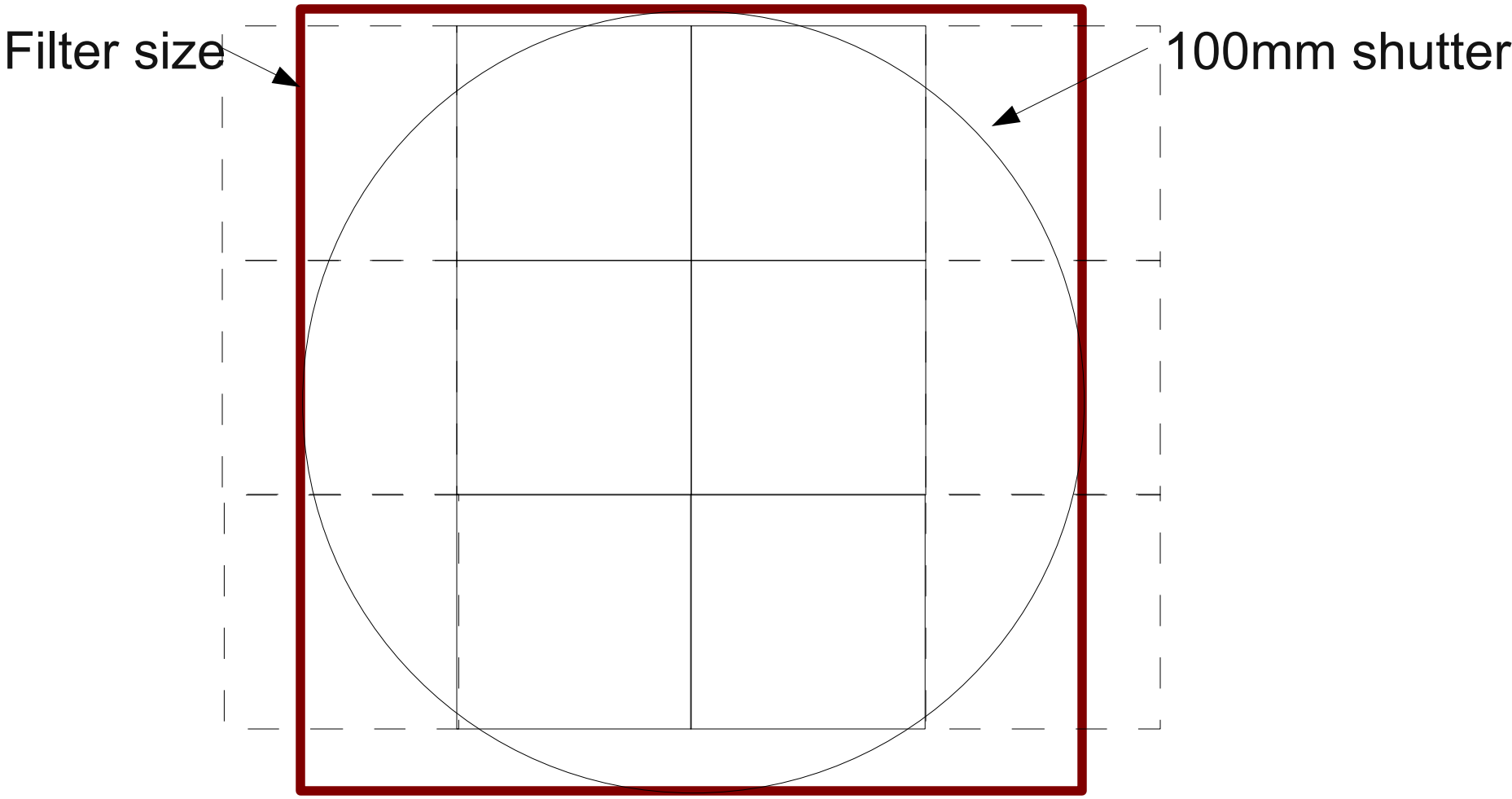
# 4 2Kx2K in 2Kx4K pedestal



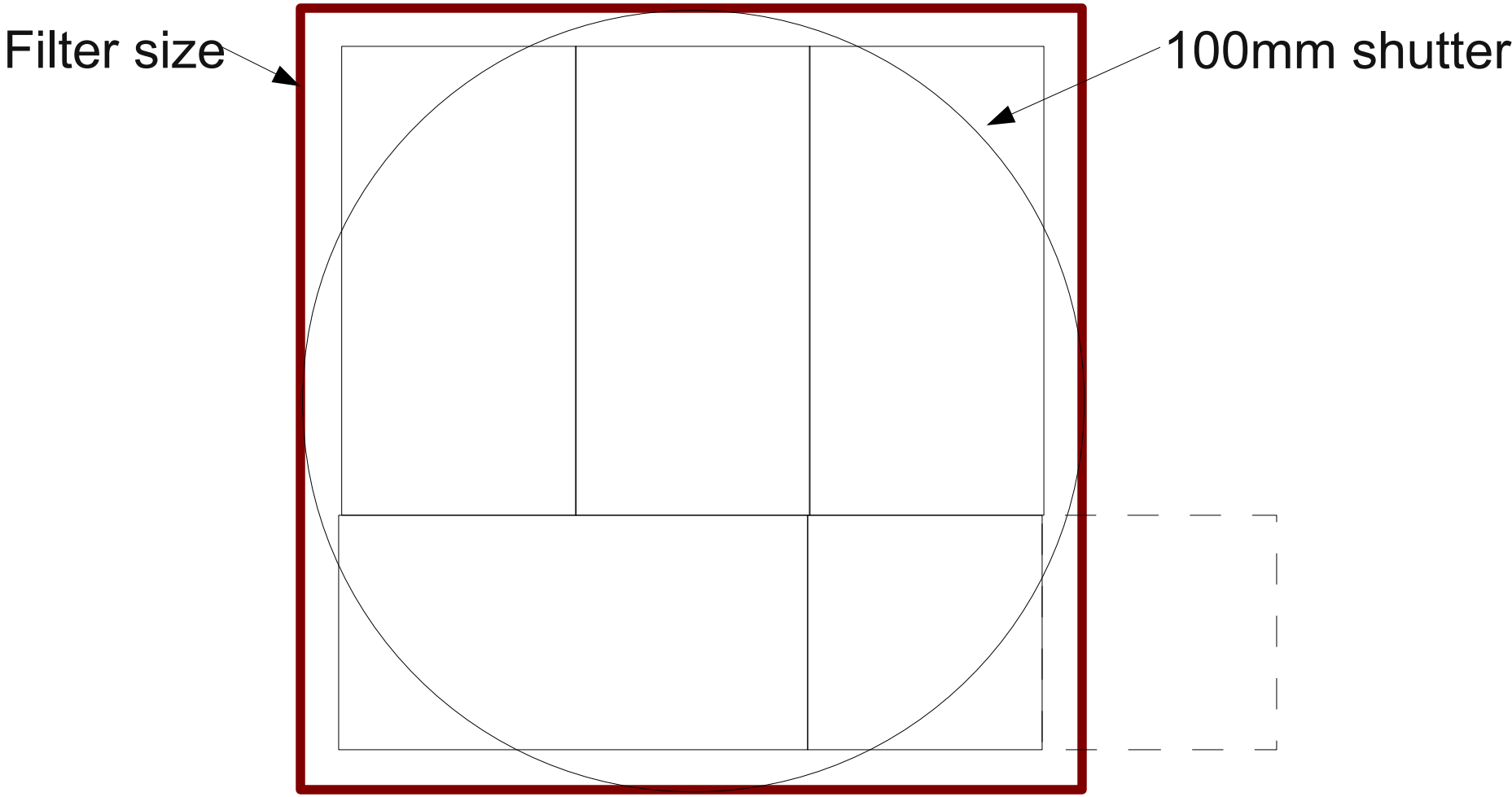
# 4 2Kx4K



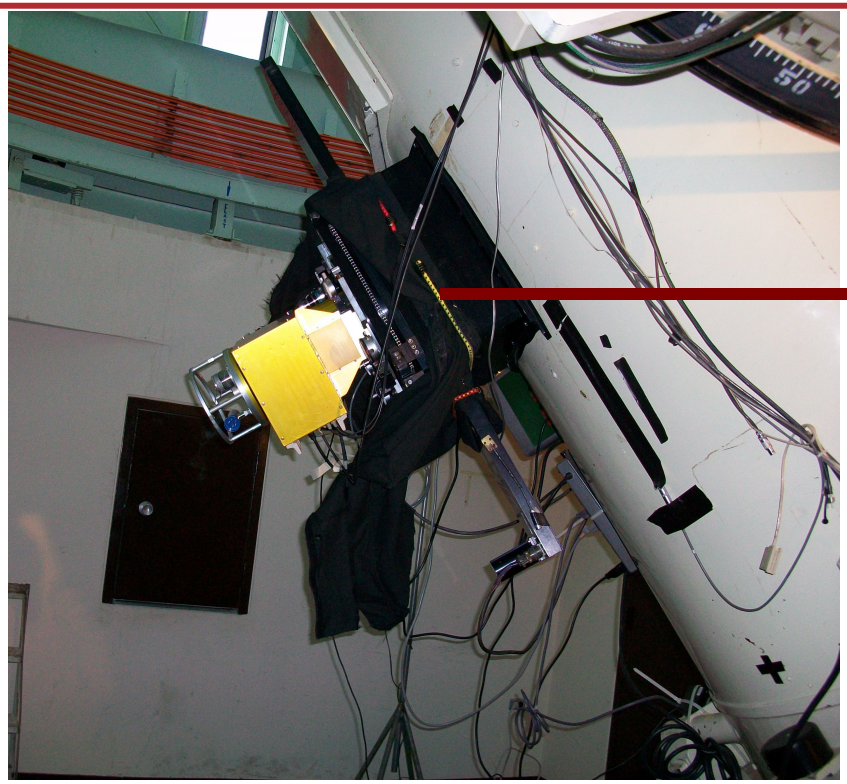
# 6 2Kx2K in 2Kx4K pedestal

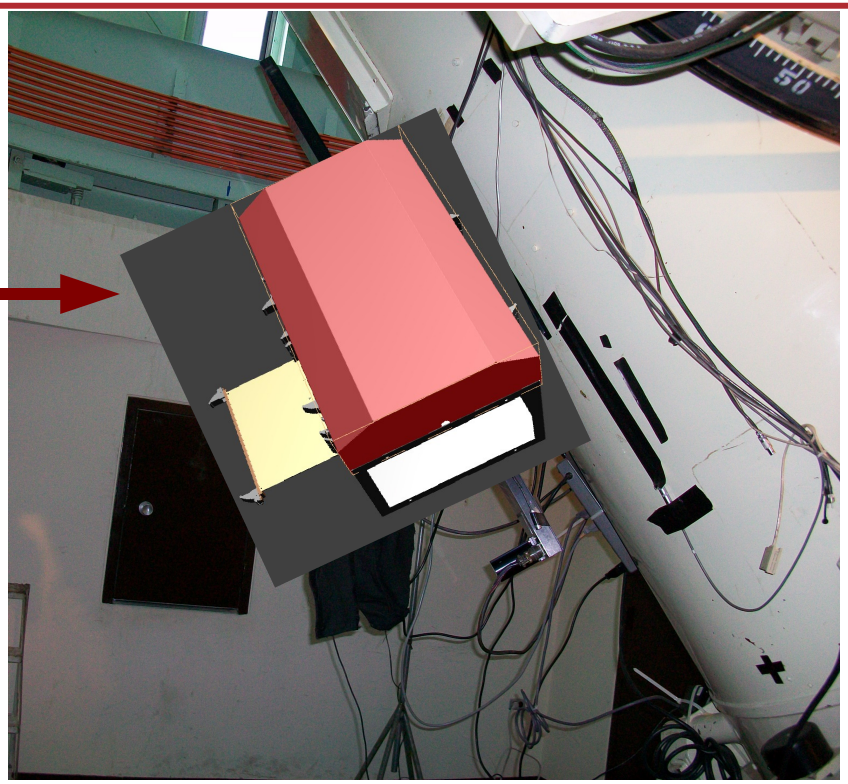


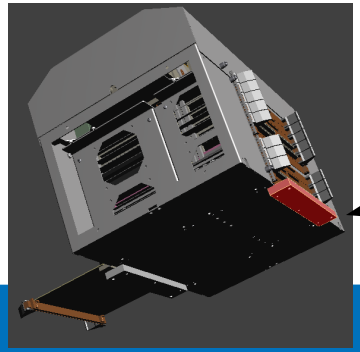
# 4 2Kx4K and 1 2Kx2K



# Production Monsoon Crate Mounting (1 possibility)

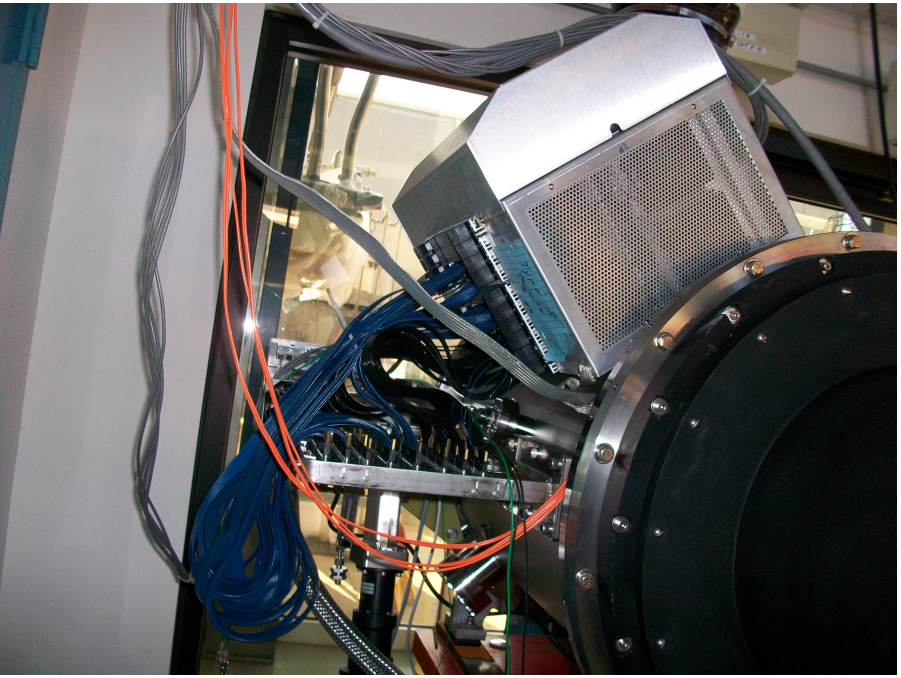


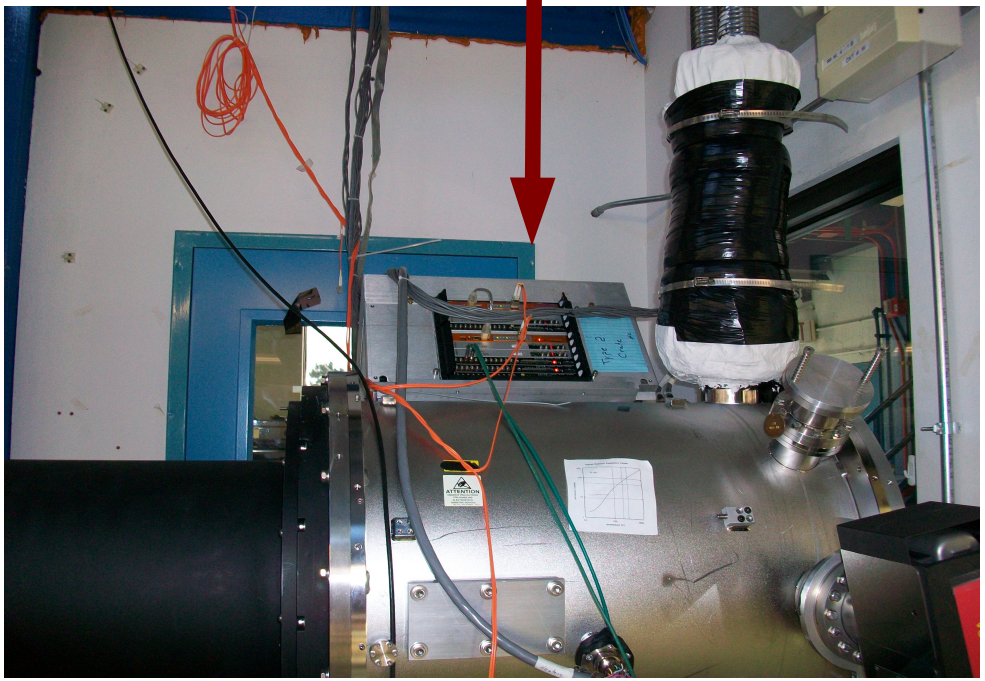




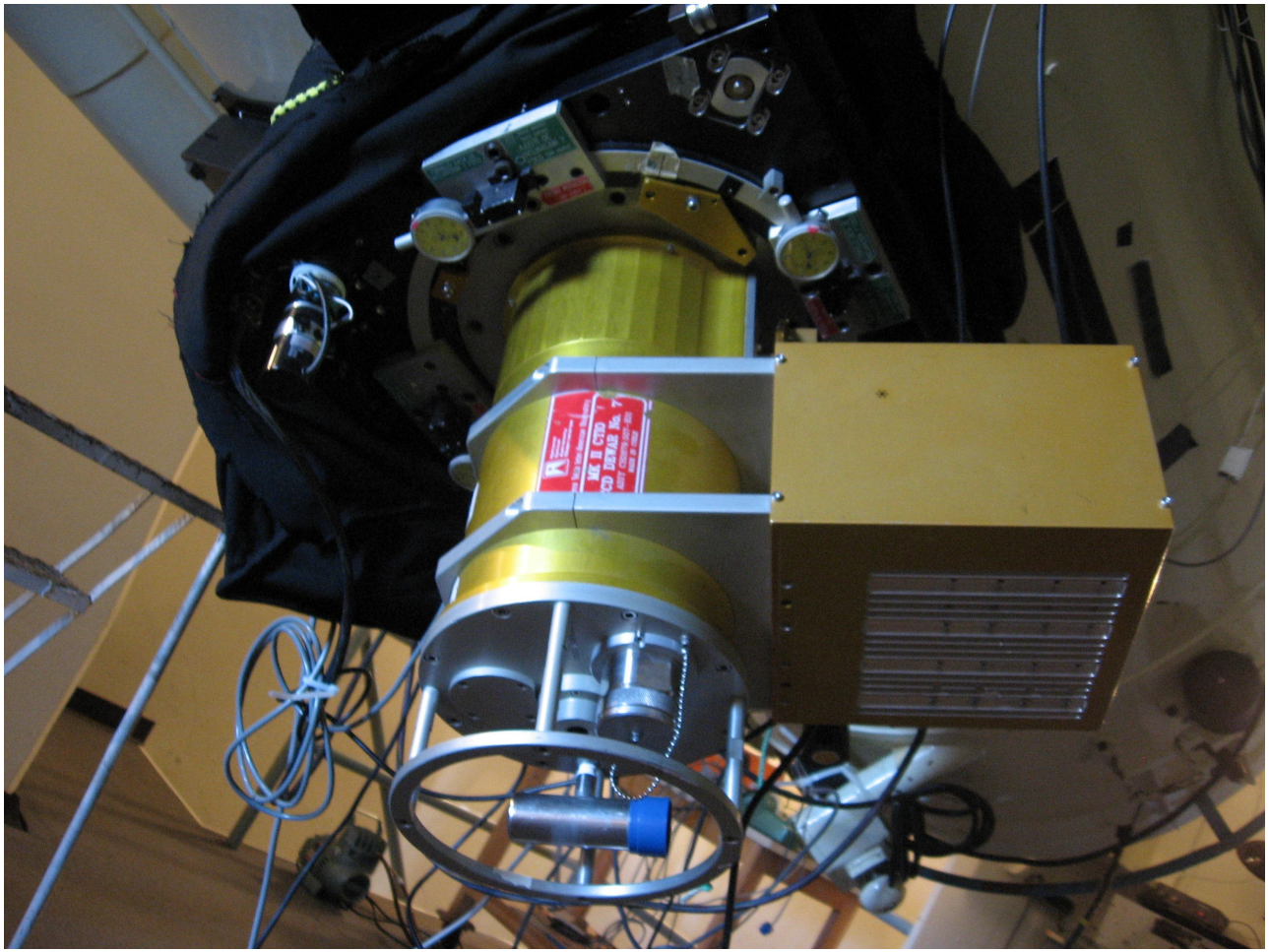
Mounting brackets on Monsoon

One optical fiber for readout (and 1 cable for exposure sync?)





# Tilt/focus box



| Camera and Electronics Parts List | Cost | Institution |
|---|---|---|
| Pfeiffer TSH071E Economy Pumping Station and Gauge | $6,673 | DES |
| Lakeshore Model 331S-T2 Cryogenic Temperature Controller | $3,174 | DES |
| DAQ computer | $2000 | DES |
| Monsoon Crate | in-kind | FNAL |
| DECam Master Control Board | in-kind | FNAL |
| DECam 12channel board | in-kind | FNAL |
| DECam Clock board | in-kind | FNAL |
| Vacuum Interface Board | $10K+layout | FNAL |
| CCDs | in-kind | FNAL |
| Cables from focal plane to VIB and cables from Monsoon to VIB. | in-kind | FNAL |
| Camera vessel and focal plane raw materials and engineering/machining | $30,000 | ANL |
| Opto-Sigma Fused Silica 10cm Window, 15mm thickness, 045-0435 | $735 | ANL |
| Positronic Industries Hermetic Connector (XAVAC50M) for temperature control | $350 | ANL |
| PT103 Omega RTDs same as DECam (5 including spares) | $225 | ANL |
| HTR-25 Lakeshore cartridge heaters, same as DECam (4 including spares) | $216 | ANL |

Need in February 2010

Need in November 2009

Need 1 month before VIB

Assume on 14th floor

Assume on 14th floor

Assume on 14th floor

Assume on 14th floor

**FNAL modified design**

Assume DECam spares

Assume DECam spares

Underway

In hand

In hand

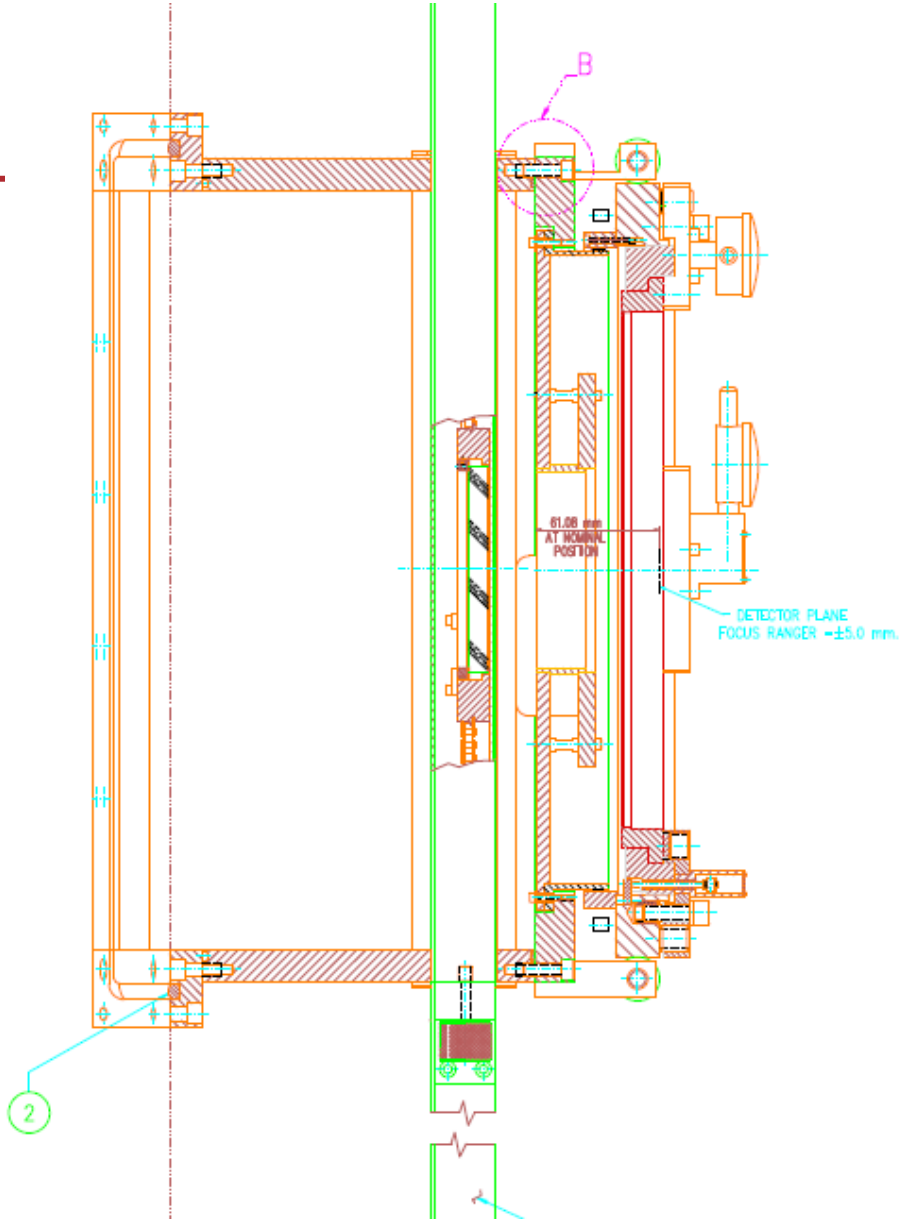
Ordered

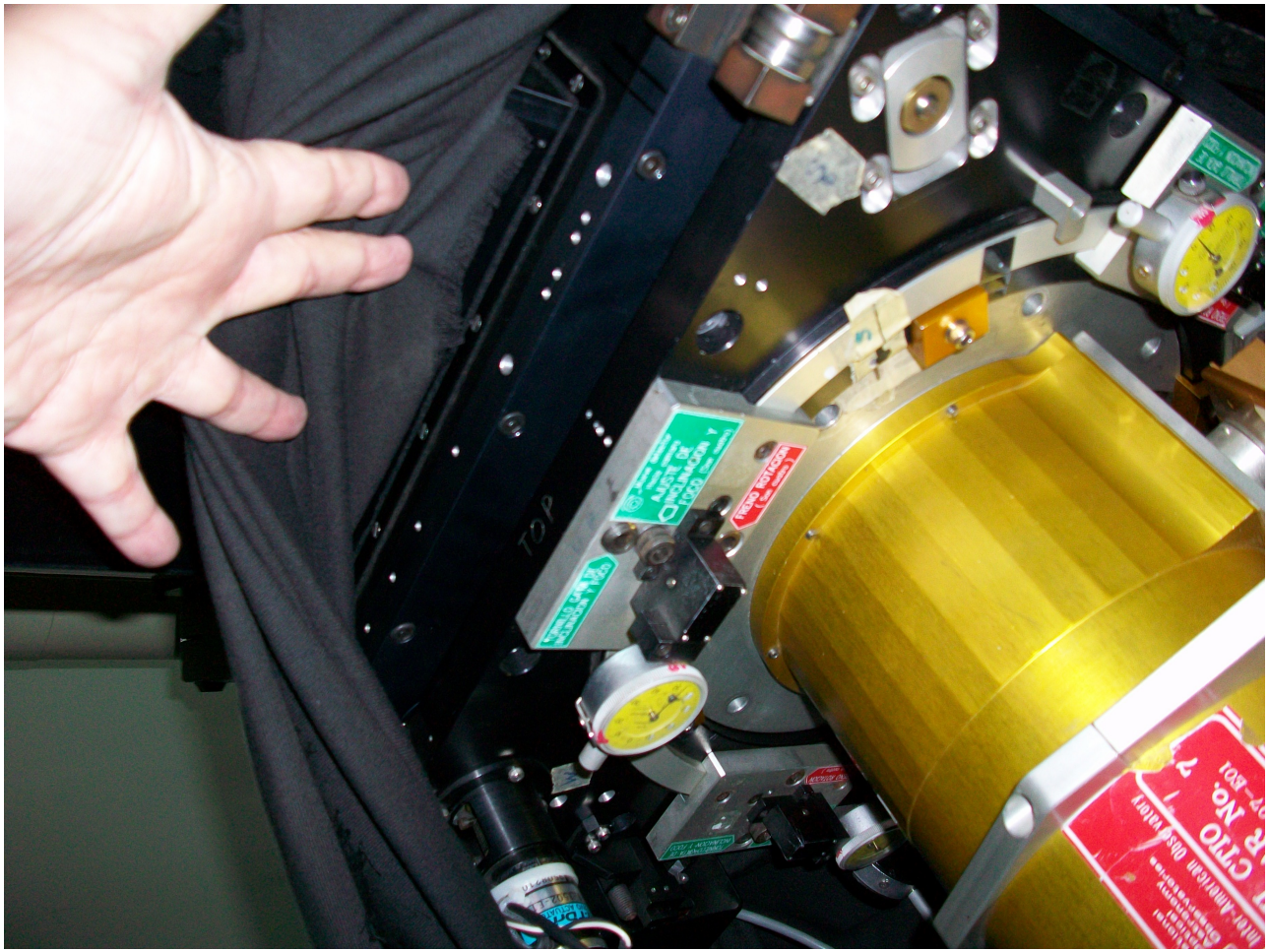
Ordered

# Schedule

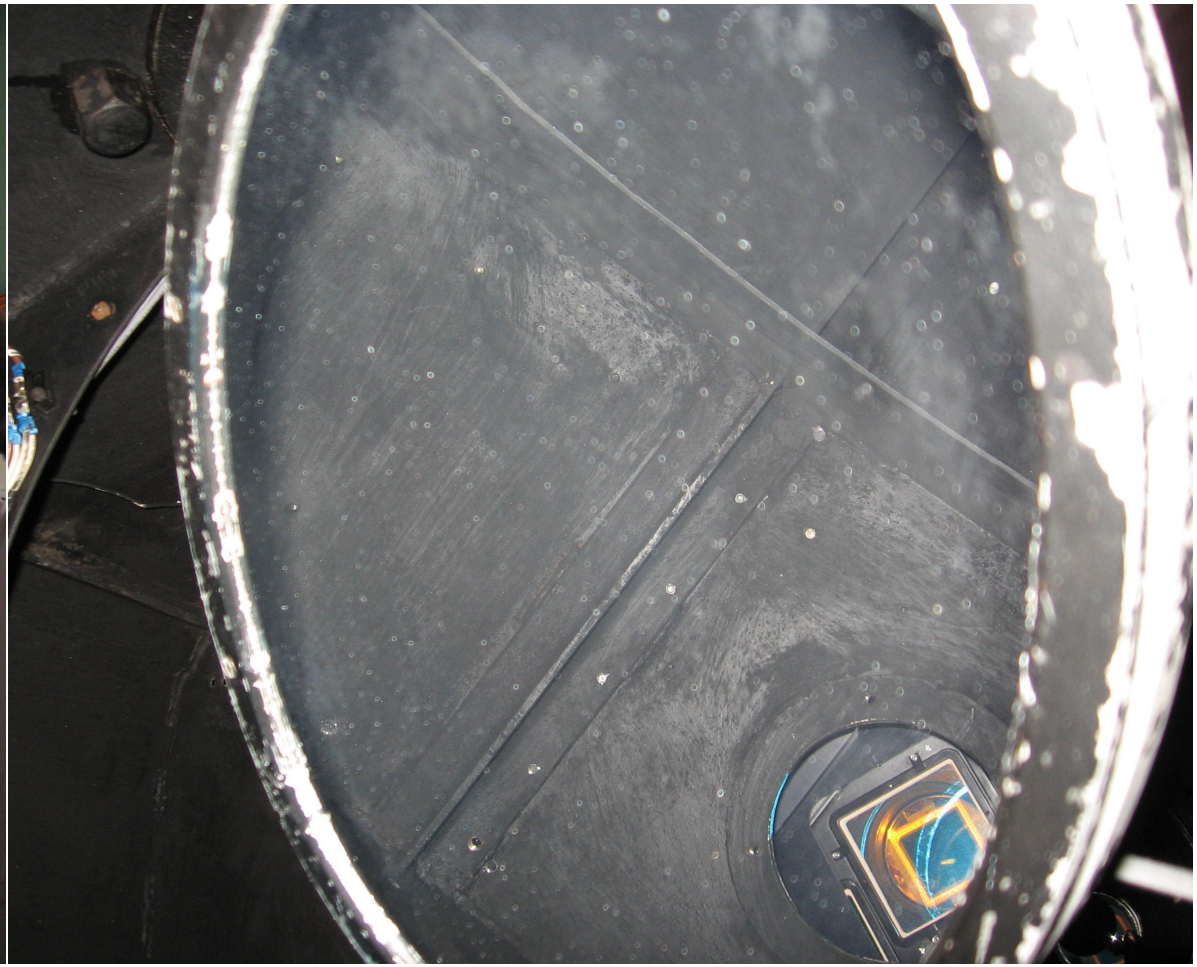
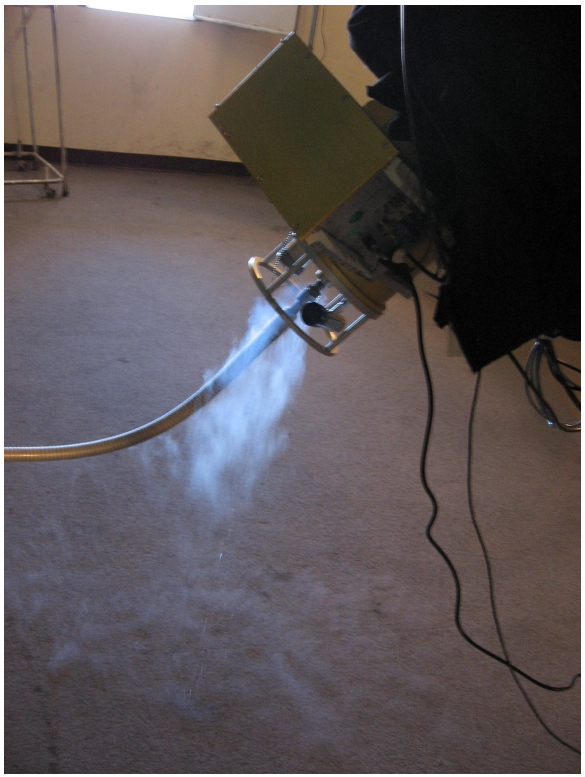
- Refine vessel design now until VIB layout submitted
- November do a “toy” thermal test with LN2, Lakeshore controller, DECam heaters and DECam RTDs
- Assume VIB design submitted for fabrication early Dec
- Machine vessel and focal plane in December
- Setup DAQ computer and Monsoon in January
- Test vessel vacuum and thermal properties in January
- Assume complete VIB available end of January
- Assemble and begin tests in February
- Ship to CTIO June/July 2010

Backup slides...


B
61.08 mm
AT NOMINAL
POSITION
DETECTOR PLANE
FOCUS RANGER =±5.0 mm.
2


TOP

# View from inside



# LN2 fill