

Cross Dragone,  $D = 100$   
cm,  $F\# = 4.5$ ,  $FOV = 10$  deg,  
alpha = 40, beta = 55

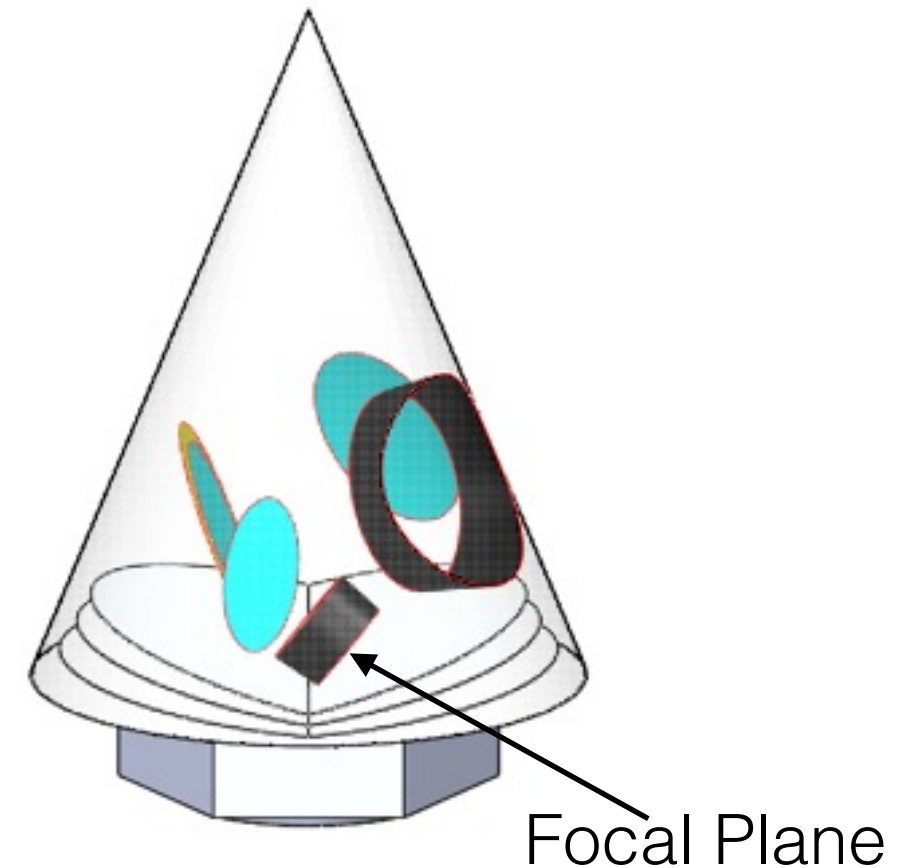
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Oct 3rd, 2017

- Last week:

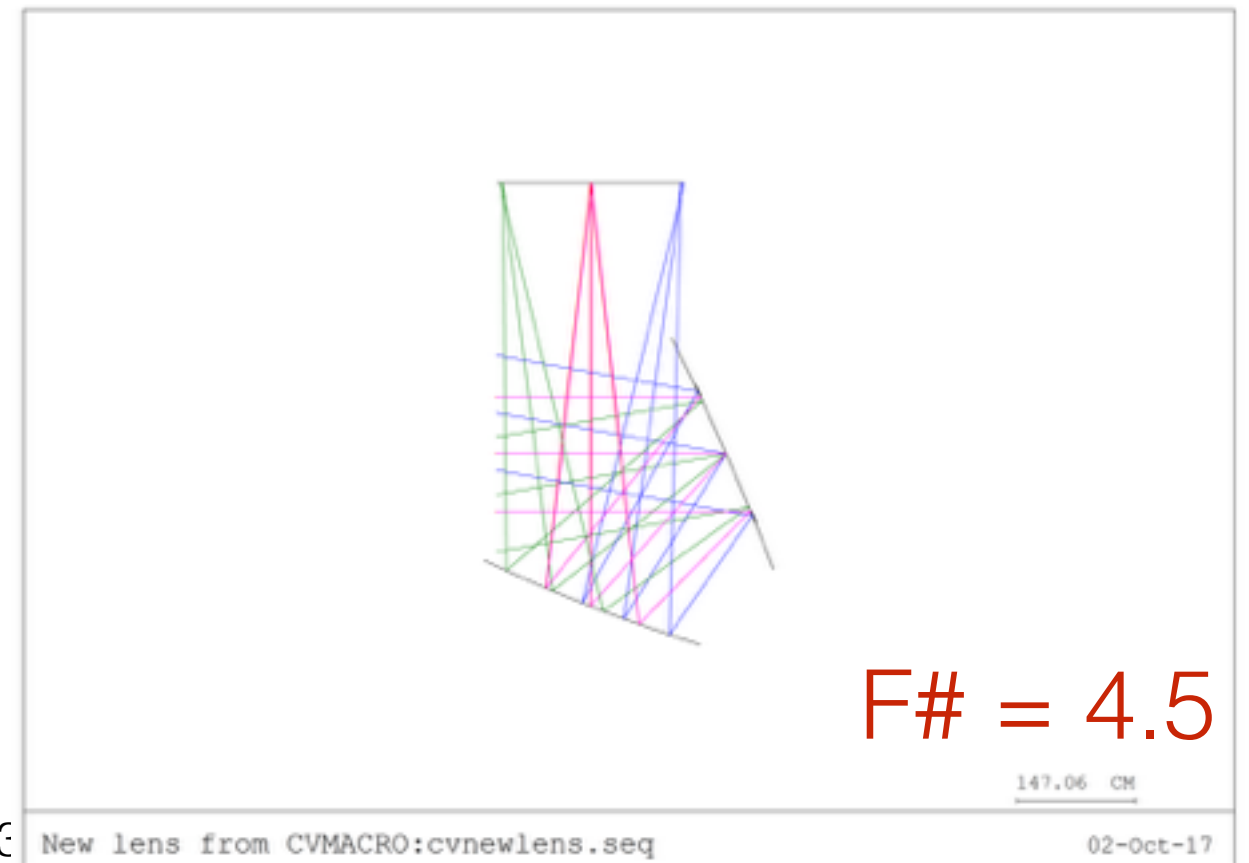
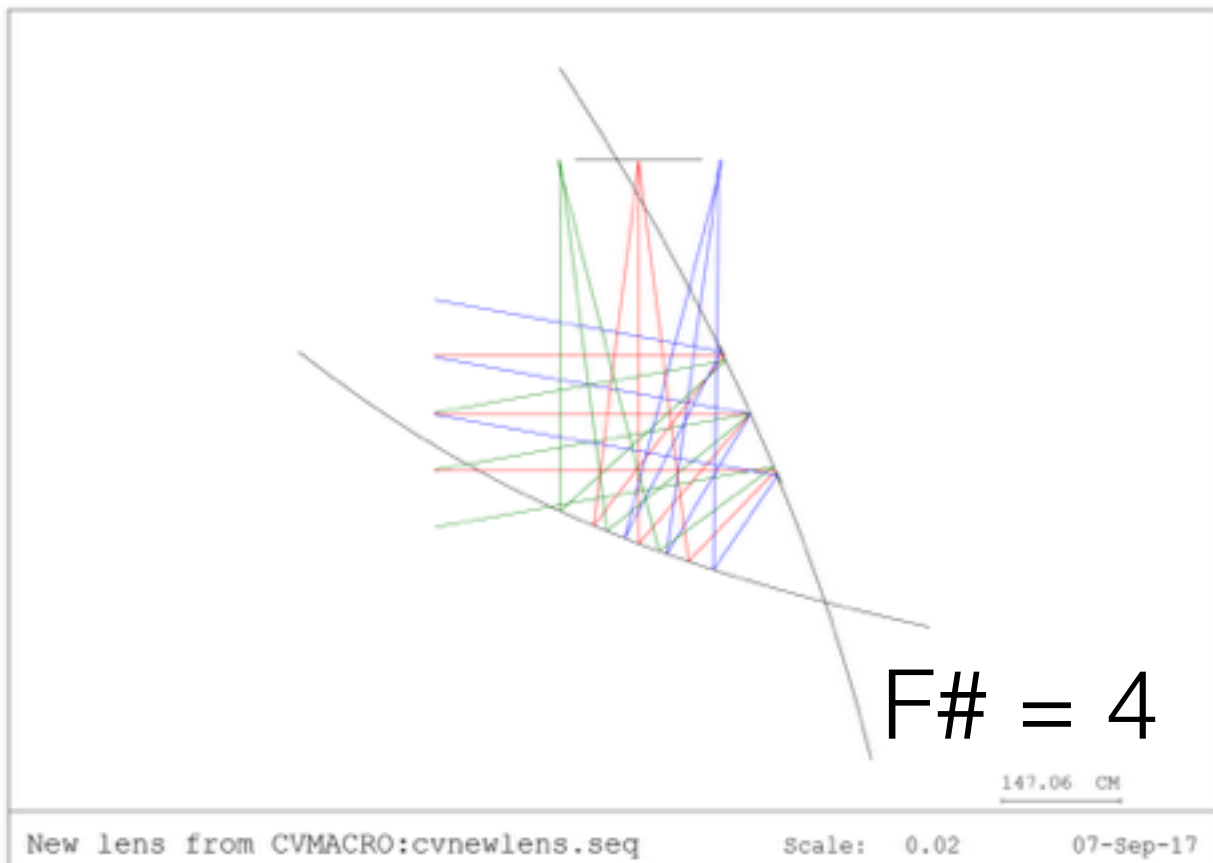
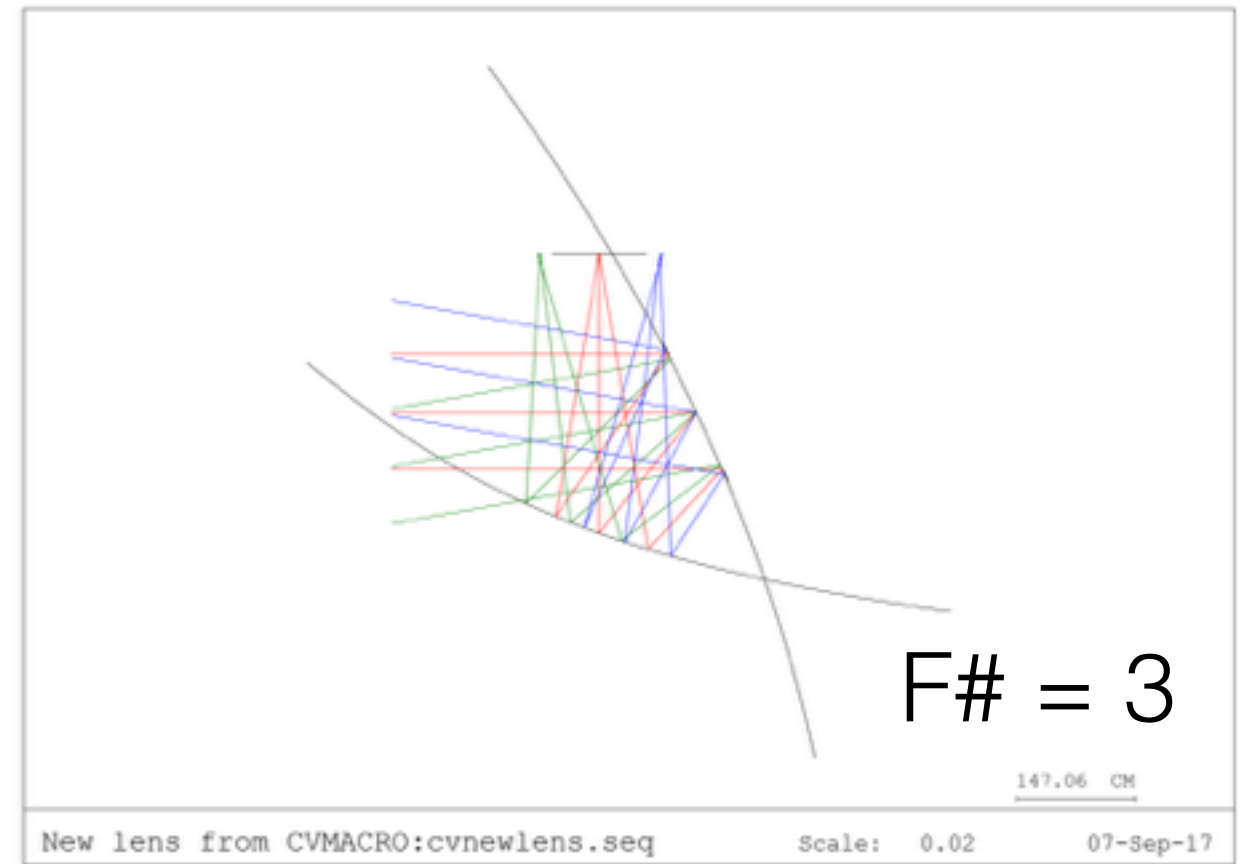
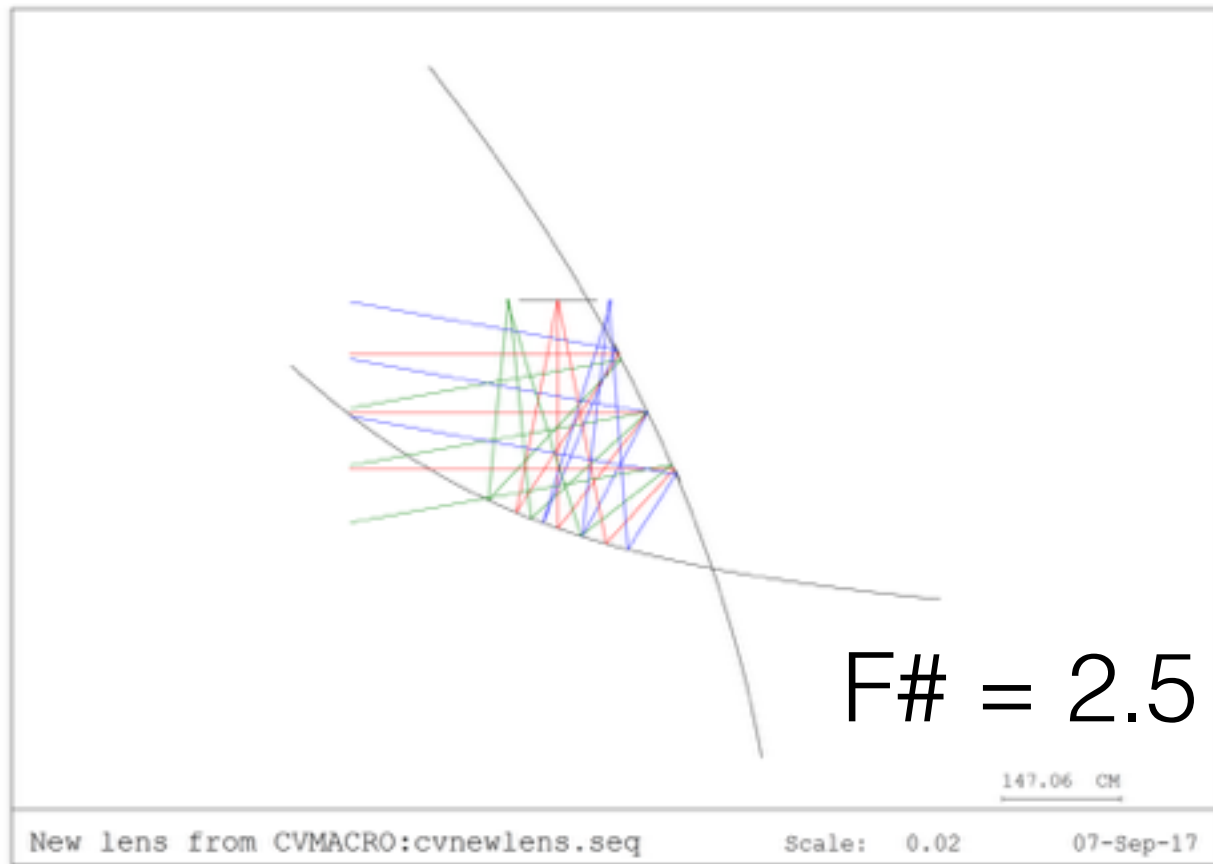
- $D=140$  cm,  $F\# = 3$ ,  $FOV = \pm 5$  deg
- fold, see reflection from tertiary mirror

- This week:

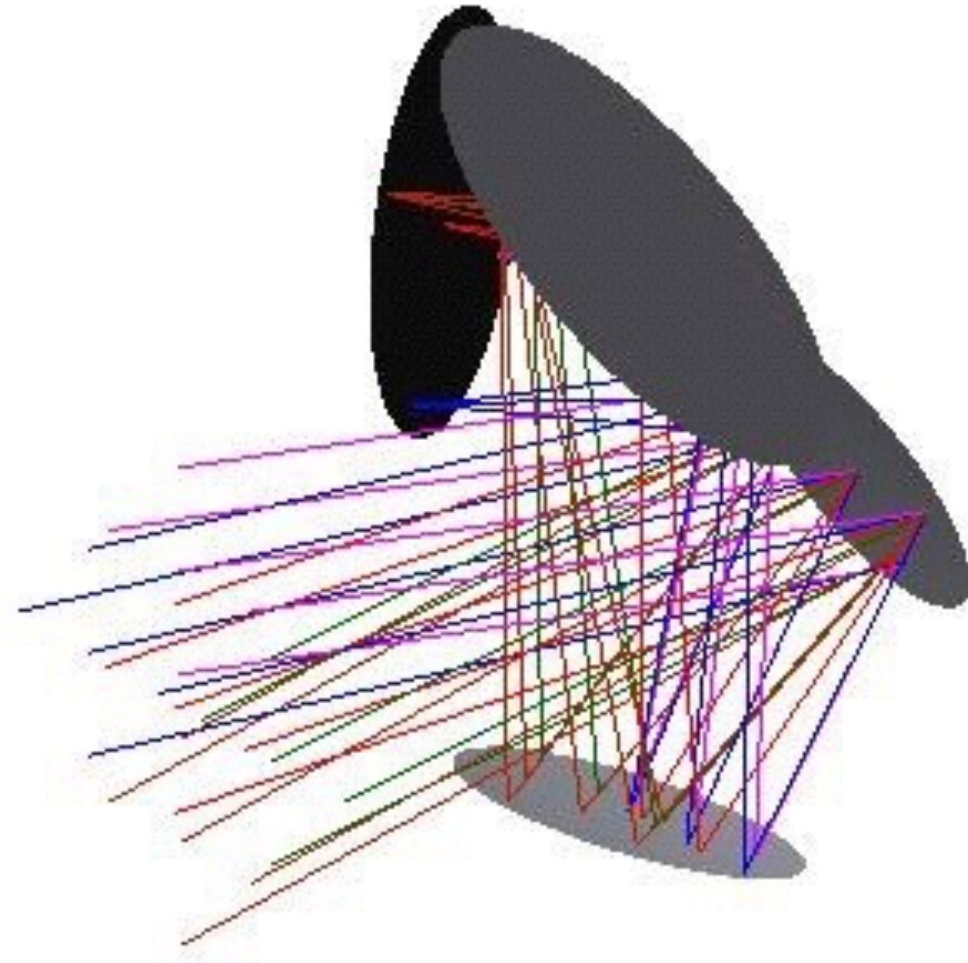
- try to increase FOV to  $\pm 10$  deg
- larger FOV  $\rightarrow$  larger  $F\#$  (4.5)  $\rightarrow$  smaller aperture (1 m) & larger envelope (extended shields)
  - physical DLFOV area (normalized in  $F\lambda$ )  $\sim (D * FOV)^2$
  - a factor of  $\sim 2$



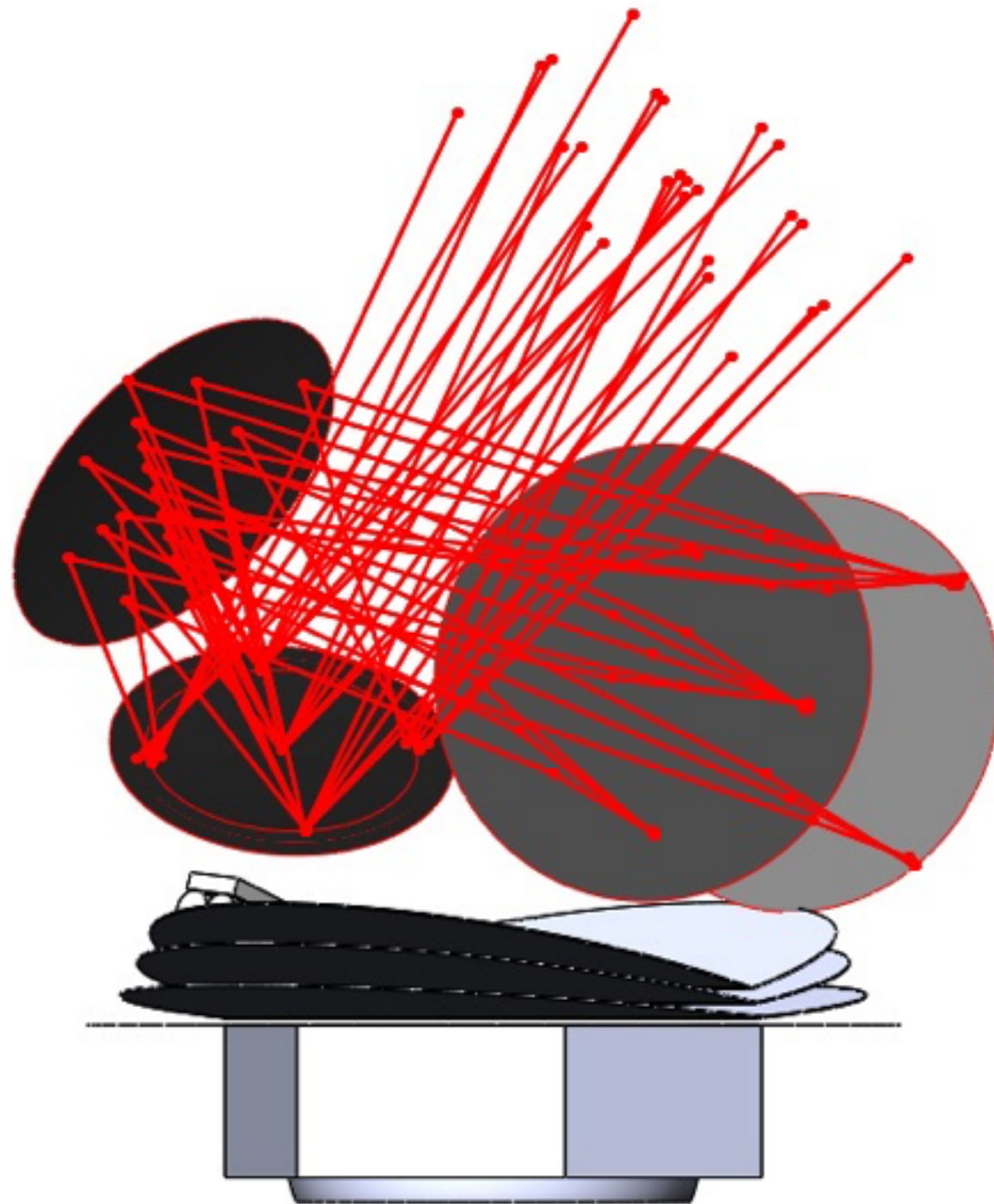
FOV = +/- 10°



FOV = +/- 10°, F# = 4.5



FOV = +/- 10°, F# = 4.5, D = 140 cm

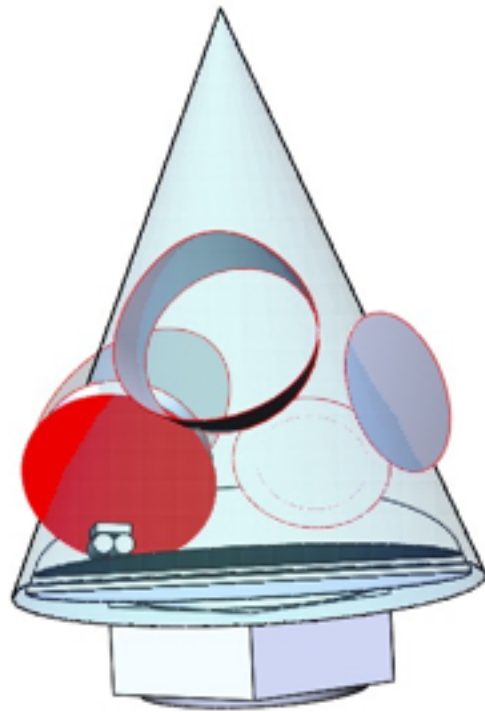


D = 100 cm

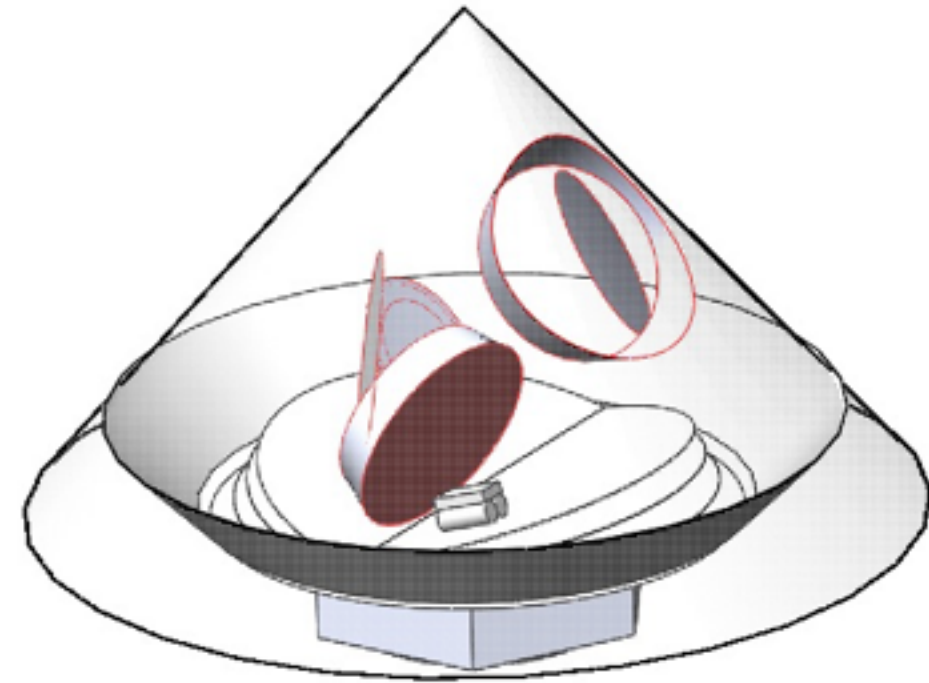
4.6 m

FOV = +/- 10°, F# = 4.5, D = 100 cm

No extension ( $\alpha = 22^\circ$ )

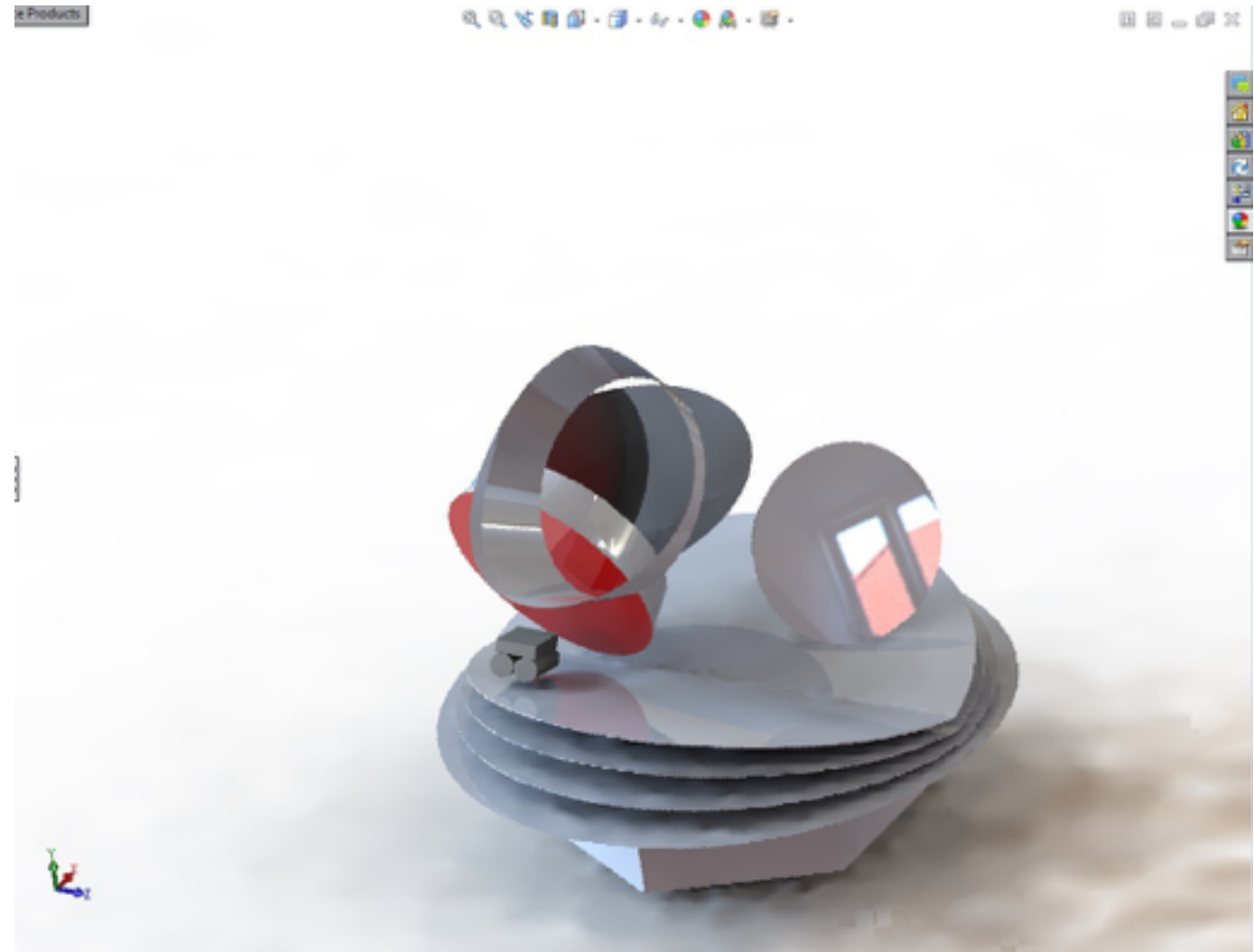
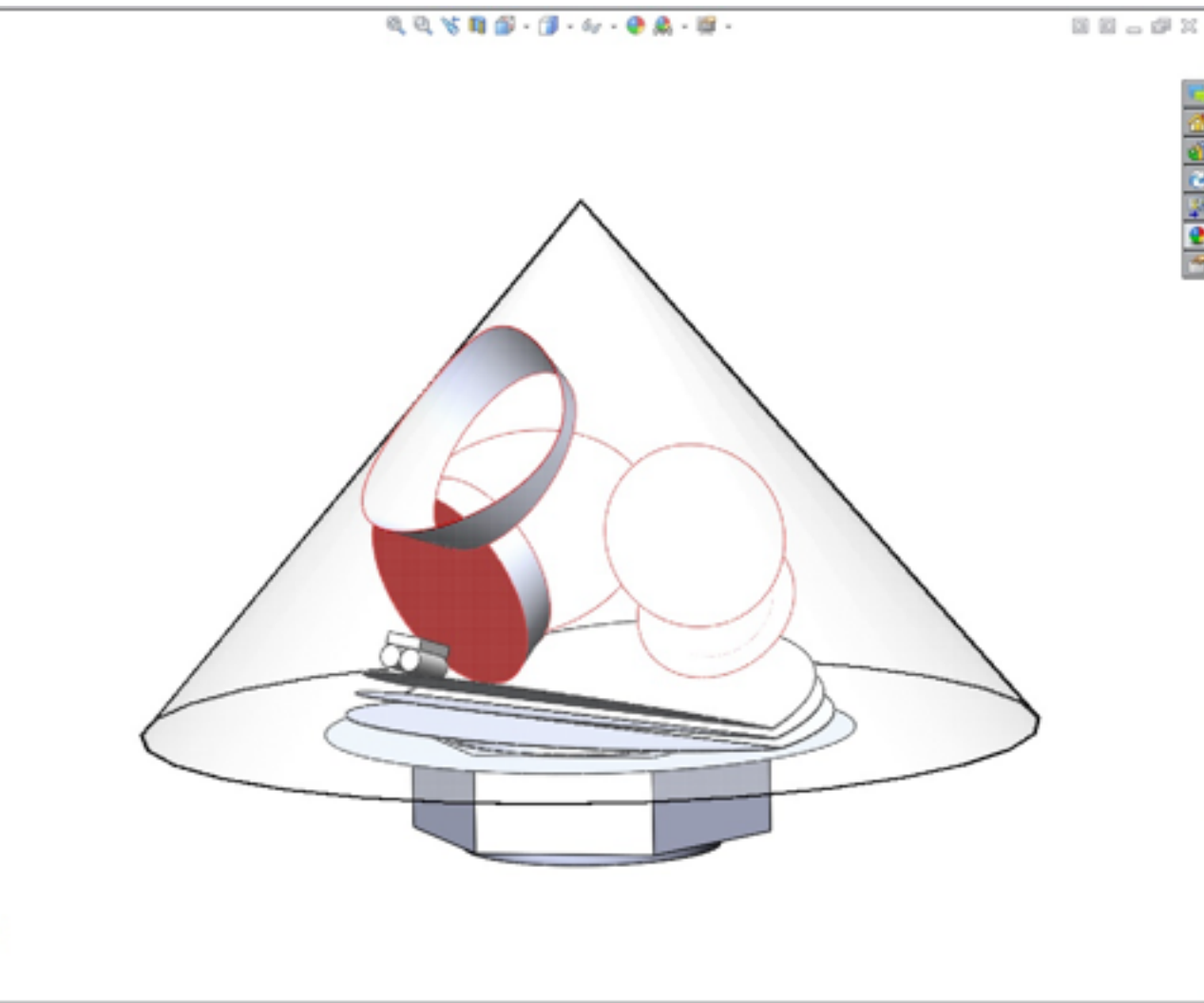


Extended shields ( $\alpha = 40^\circ$ )





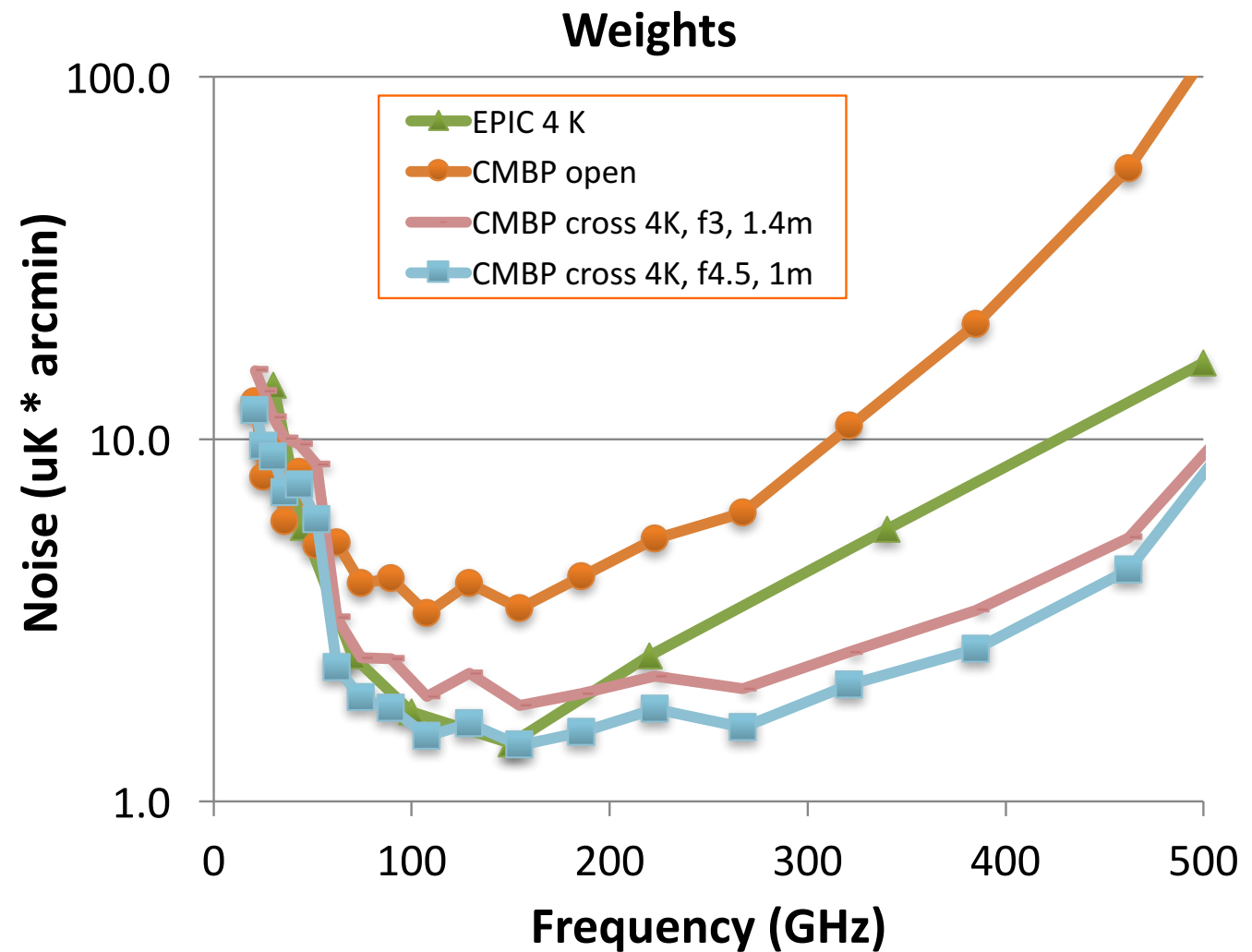
FOV = +/- 10°, D = 100 cm, extended shields



Still, reflection!

# Polarization weight, 4K system

- Edge tapers:
  - 10, 21, 43 dB
  - 2 F\*lambda spacing
- 1.4 meter system, f-number = 3.0
- 1 meter system, f-number = 4.5
- Entire system at 4K
- Full sky and 4 yr mission at 100% observing.
- 7k / 11k detectors
- Focal plane limited by vignetting at low frequencies.
  - This limited area for low frequency pixels.
  - Decreased the number of pixels in lowest 2 bands relative to the higher bands.





# Summary

- For Cross Dragone systems, folding can provide larger DLFOV area given the envelope constraint. Tradeoff between aperture size  $D$  and FOV.
- $D = 1\text{m}$ ,  $F = 4.5$  can only fit if there is extended shields. Also larger alpha angle.
- The reflection from tertiary mirror seems hard to eliminate by finding better orientations.