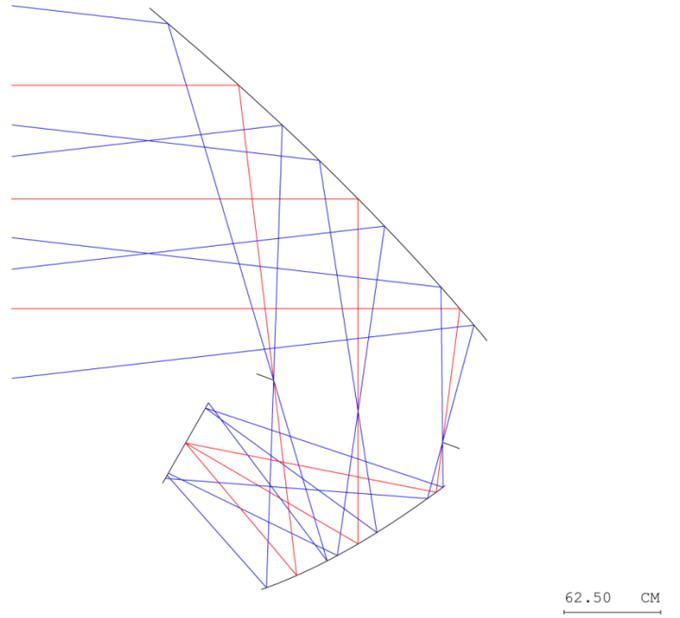
Updates on Designs of Cross Dragone

Shaul Hanany, Xin Zhi Tan, Qi Wen, Karl Young
Sep 26th, 2017

Motivations

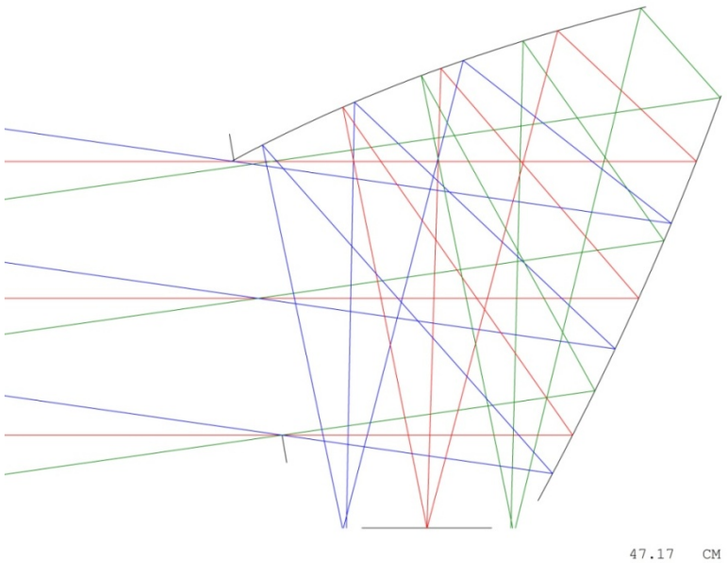
- Open Dragone has a larger primary mirror compared to Cross Dragone (~3m vs ~2m).

- The current Cross Dragone has both direct view of sky on the focal plane and “clipping” sidelobe issues.



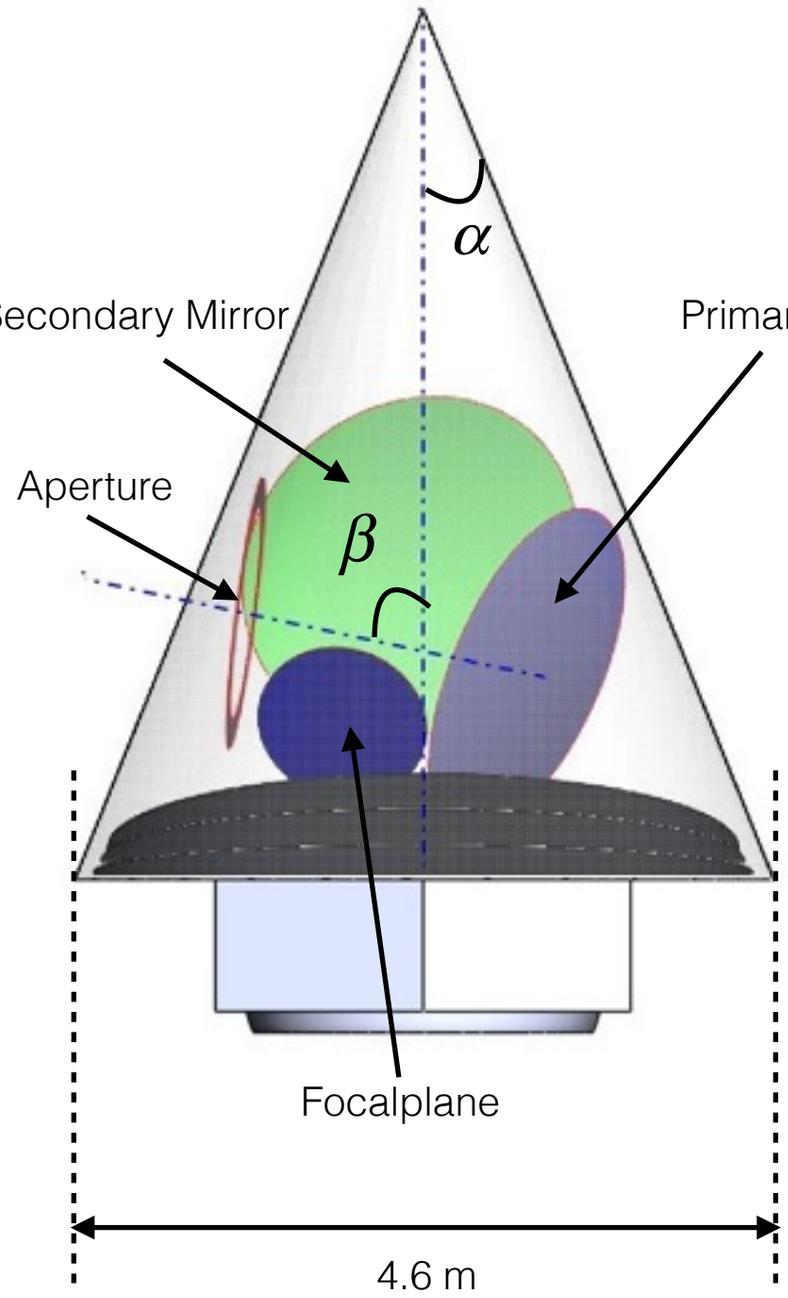
- A Cross Dragone that does not have direct view of sky on the focal plane or sidelobes, and with a 4K primary mirror is of interest.

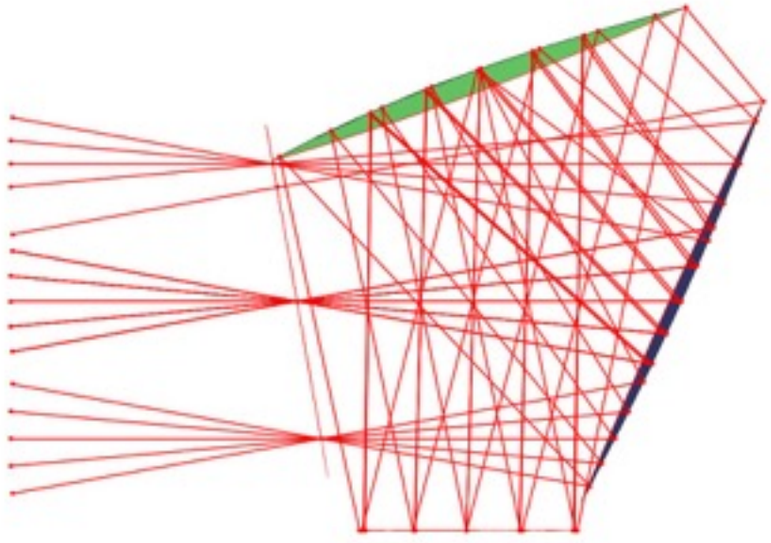
- In order to do so, we need increase effective focal length and have a fold mirror.

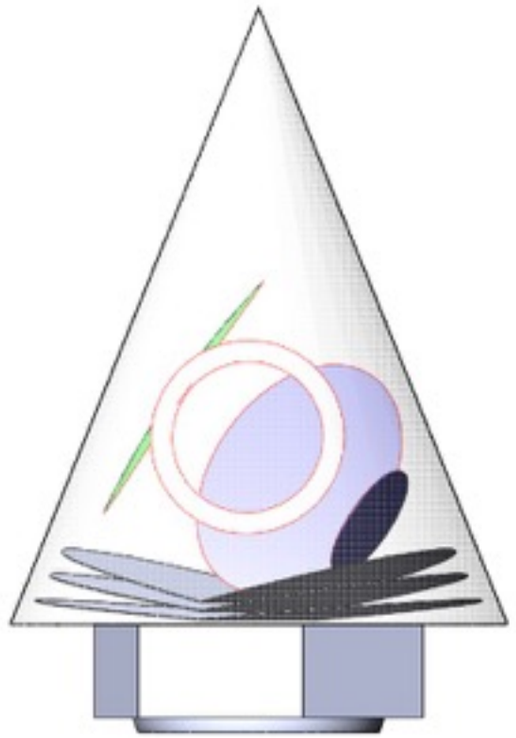


Cross dragone, aperture = 1.4 m (EPIC-IM)

α = 22 deg, β = 78 deg



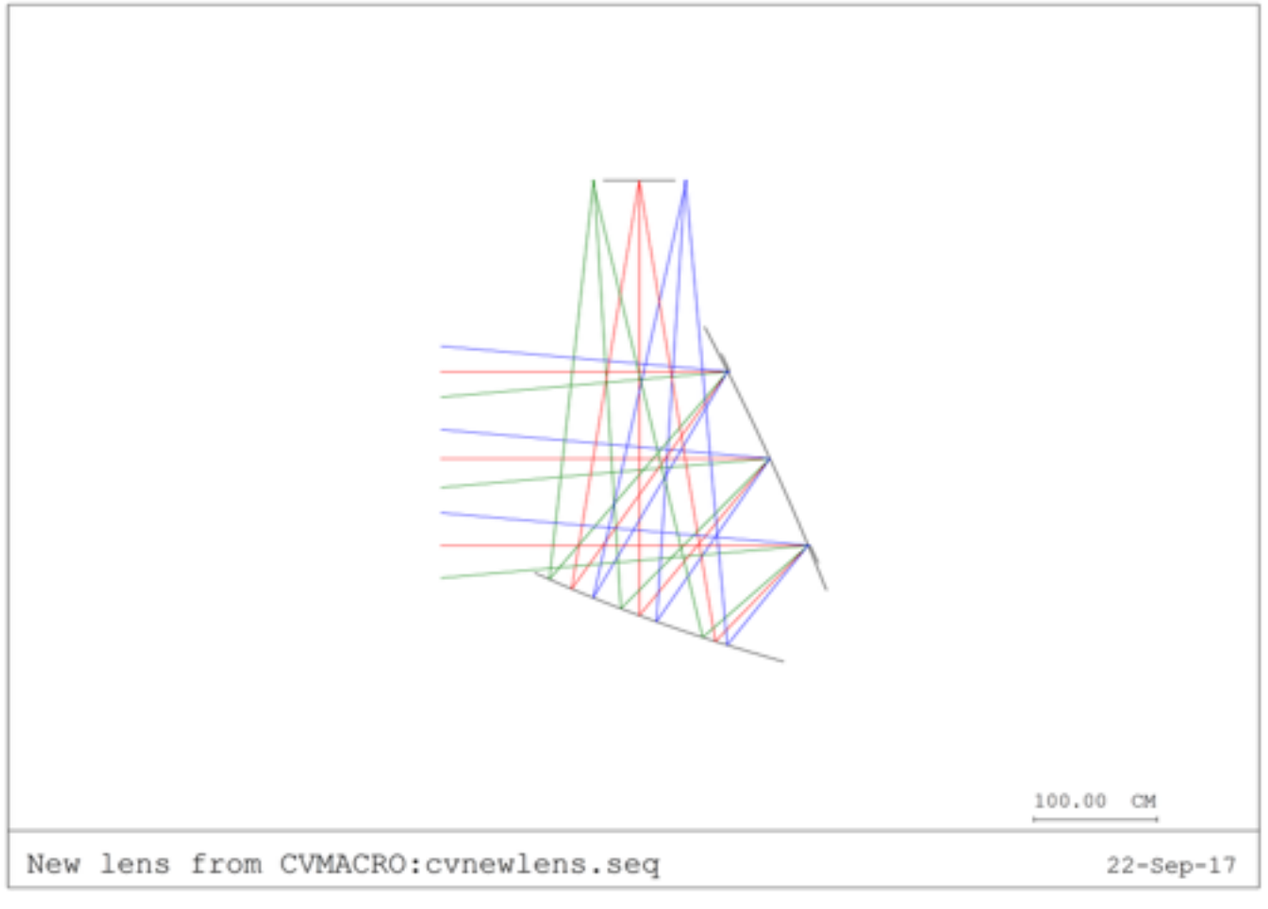


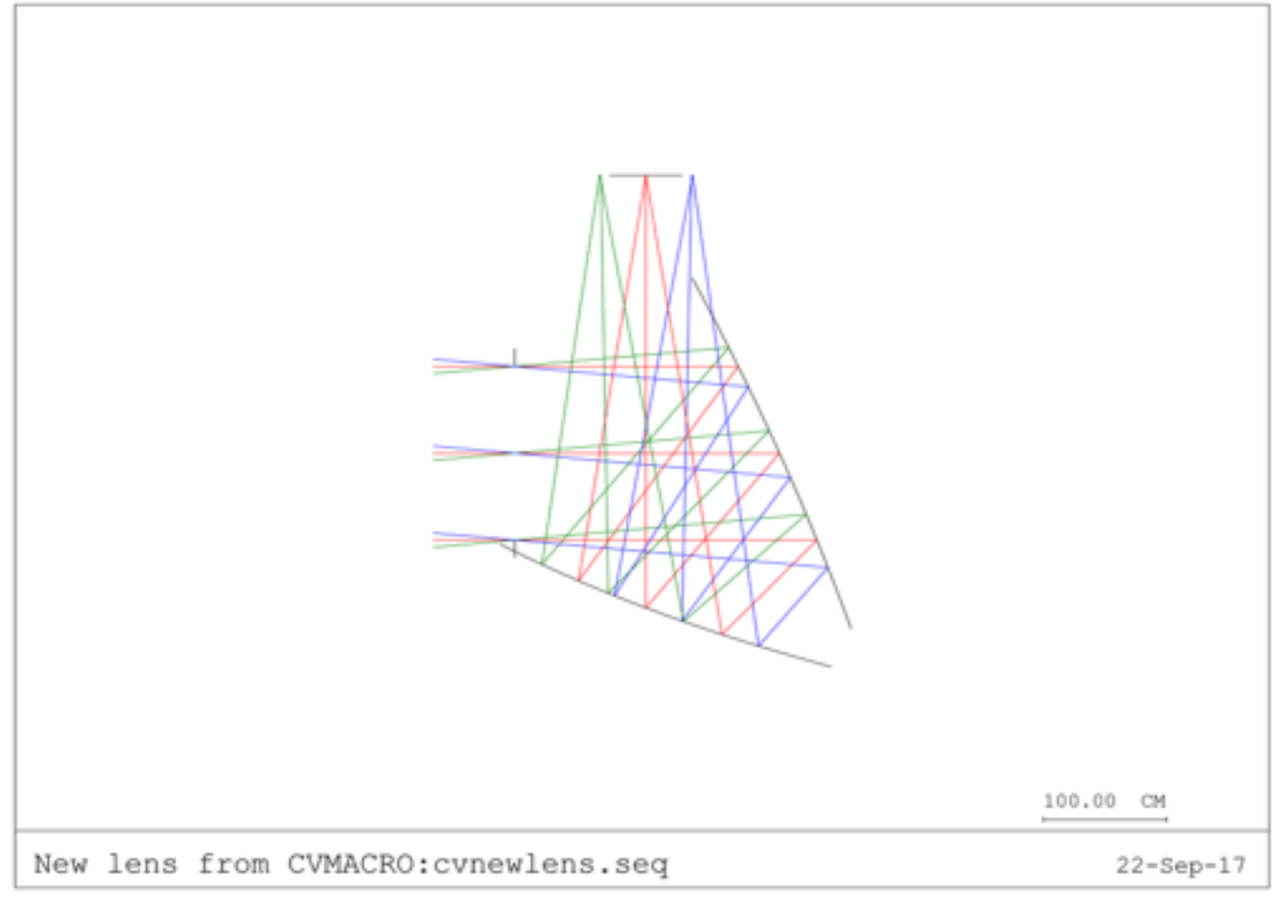


Physical sizes & tele centricity as a function of stop position for Cross Dragone

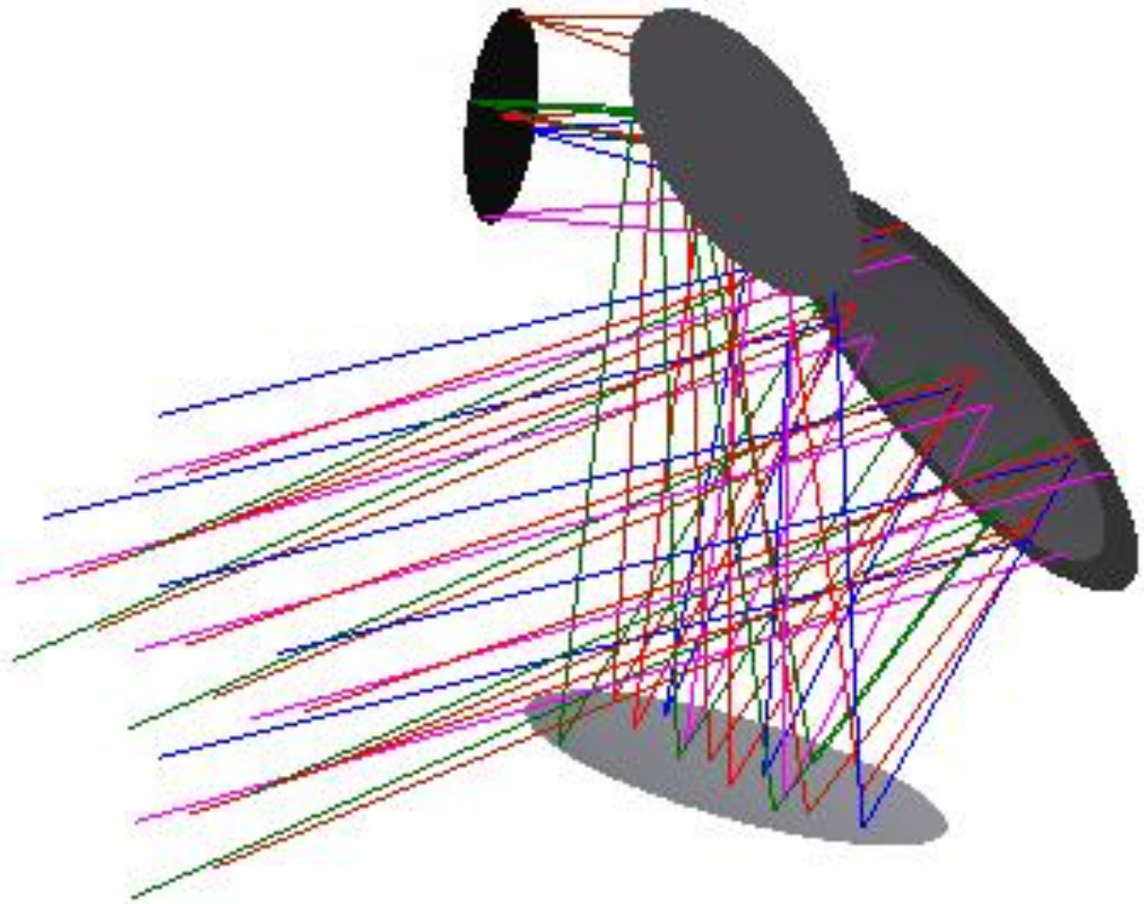
Stop Position	PM	SR	FP	Telecentricity
Primary	155 cm	155 cm	75 cm	+/- 3.7
In Front	197	190	75	+/- 1.25

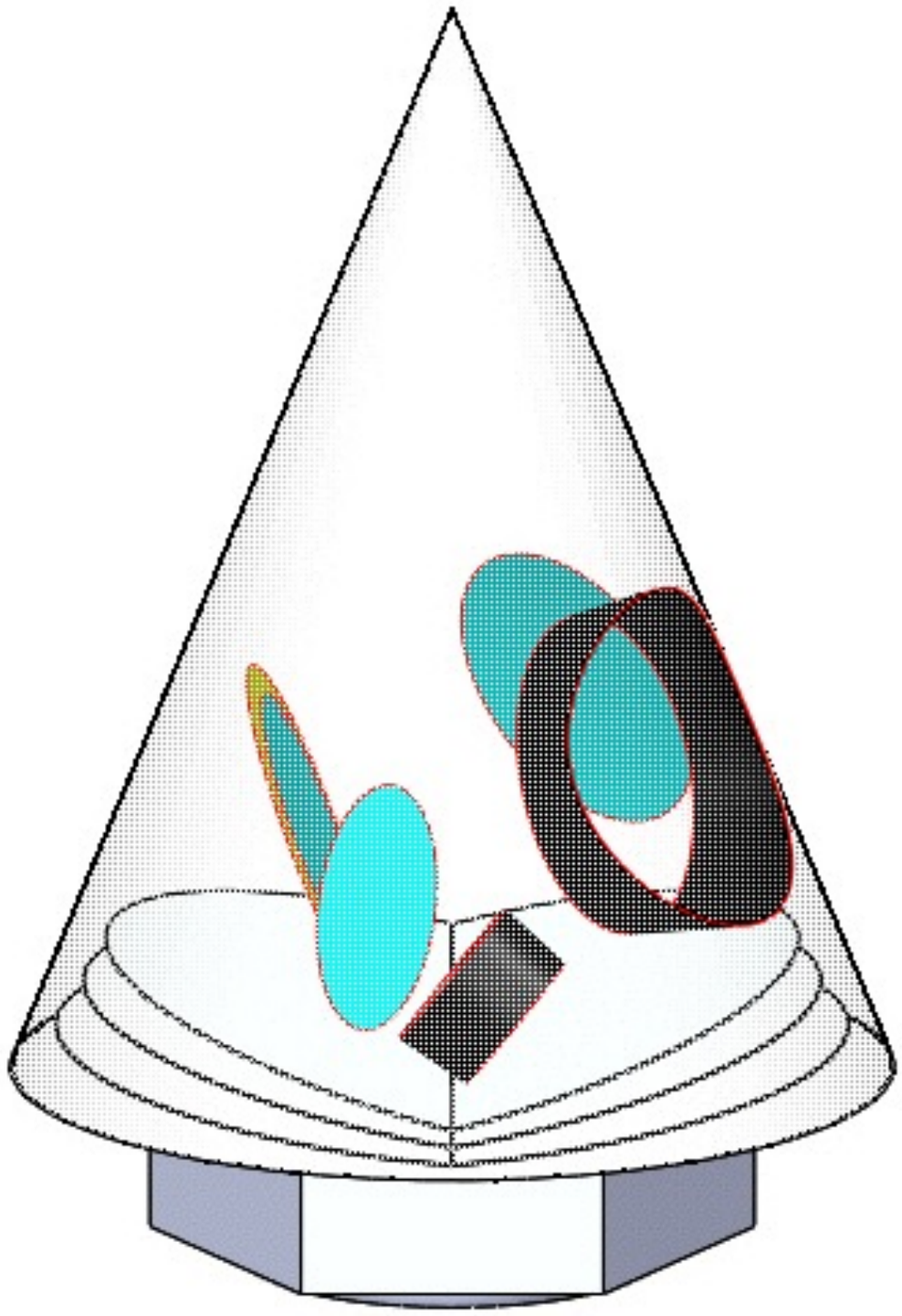
- D=140 cm, F# = 3, FOV = +/- 5 deg

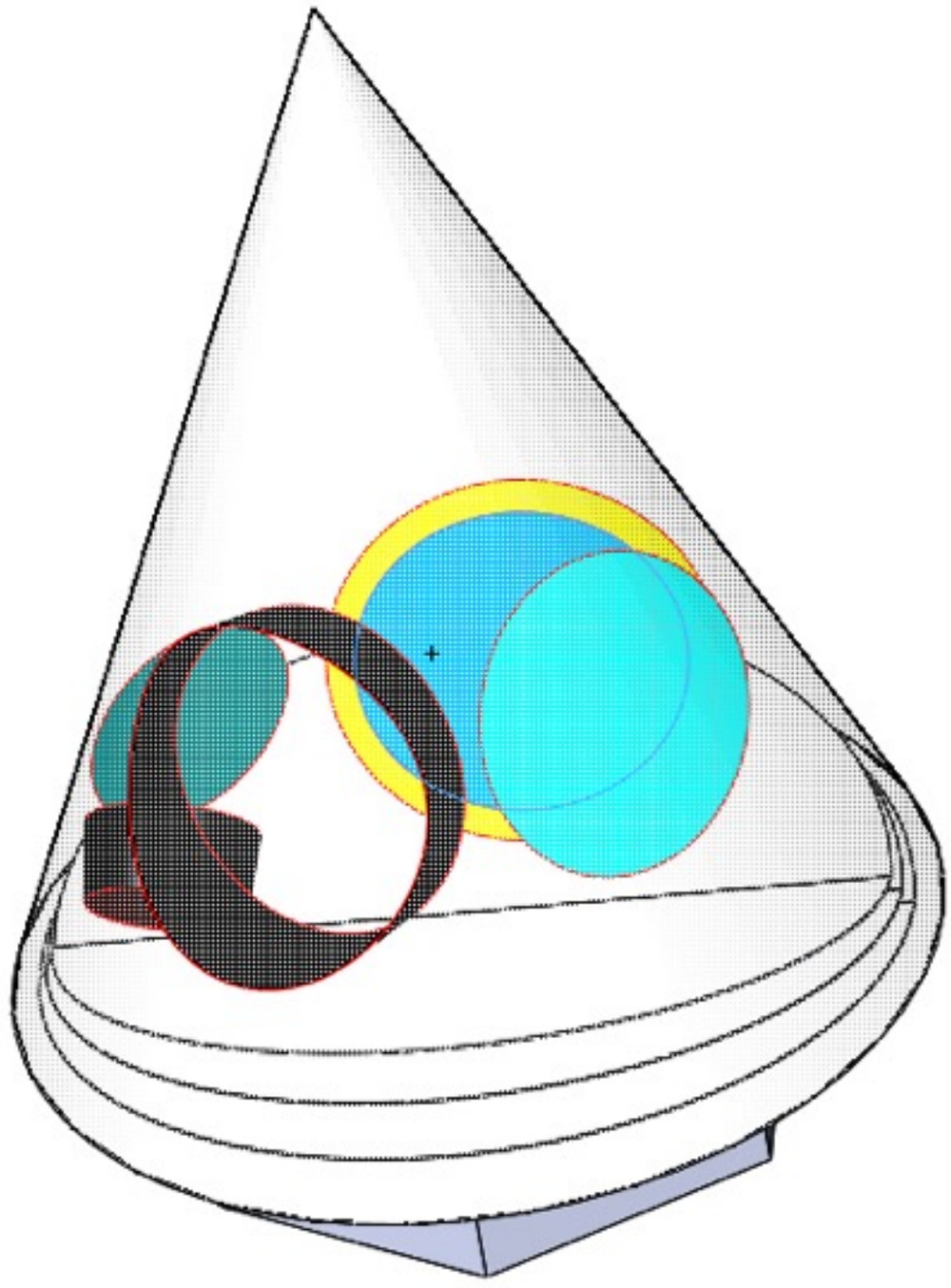


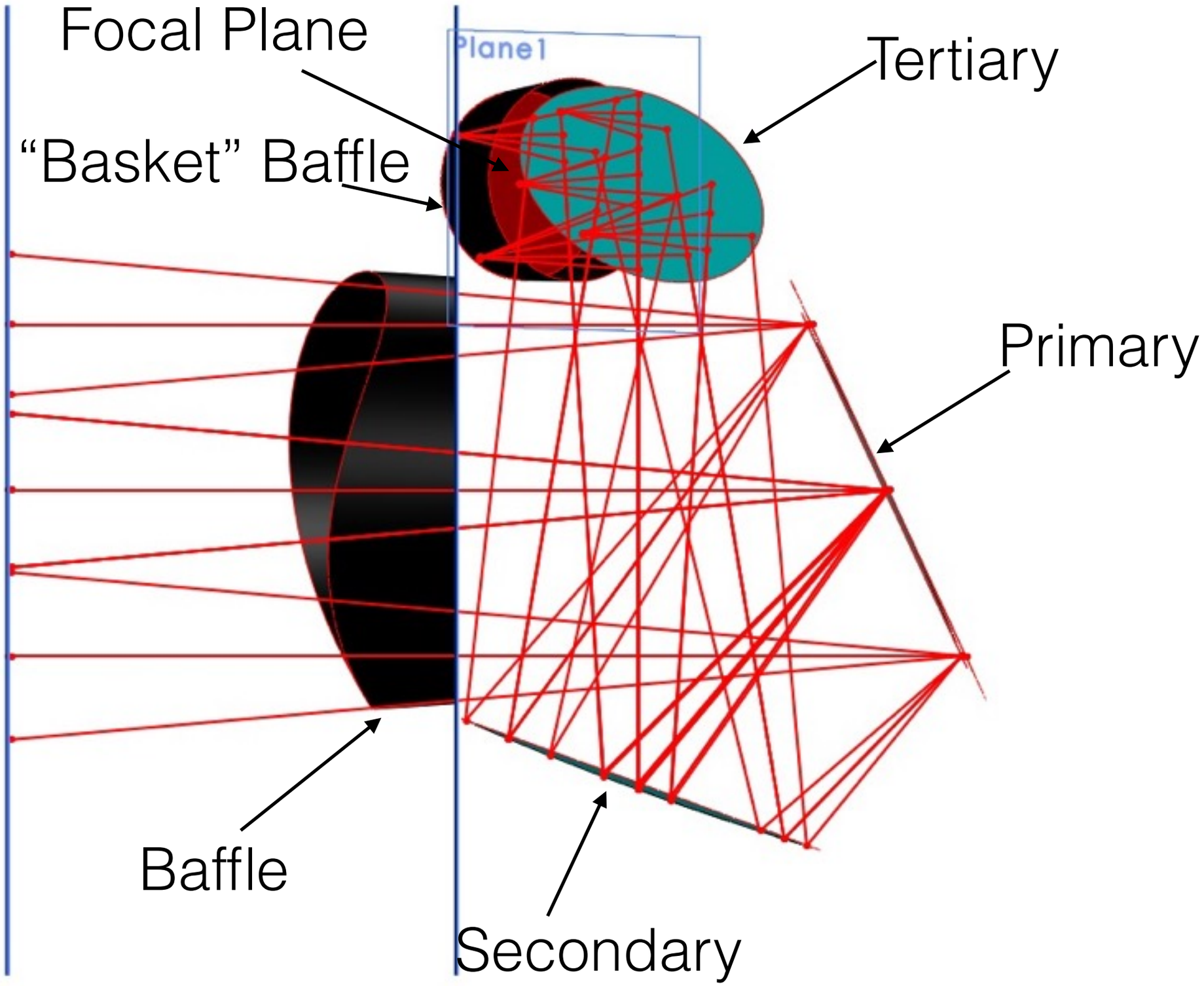


- Below is a D = 1.4 m, F = 3, FOV = +/- 5 deg, Stop_PR Cross Dragone

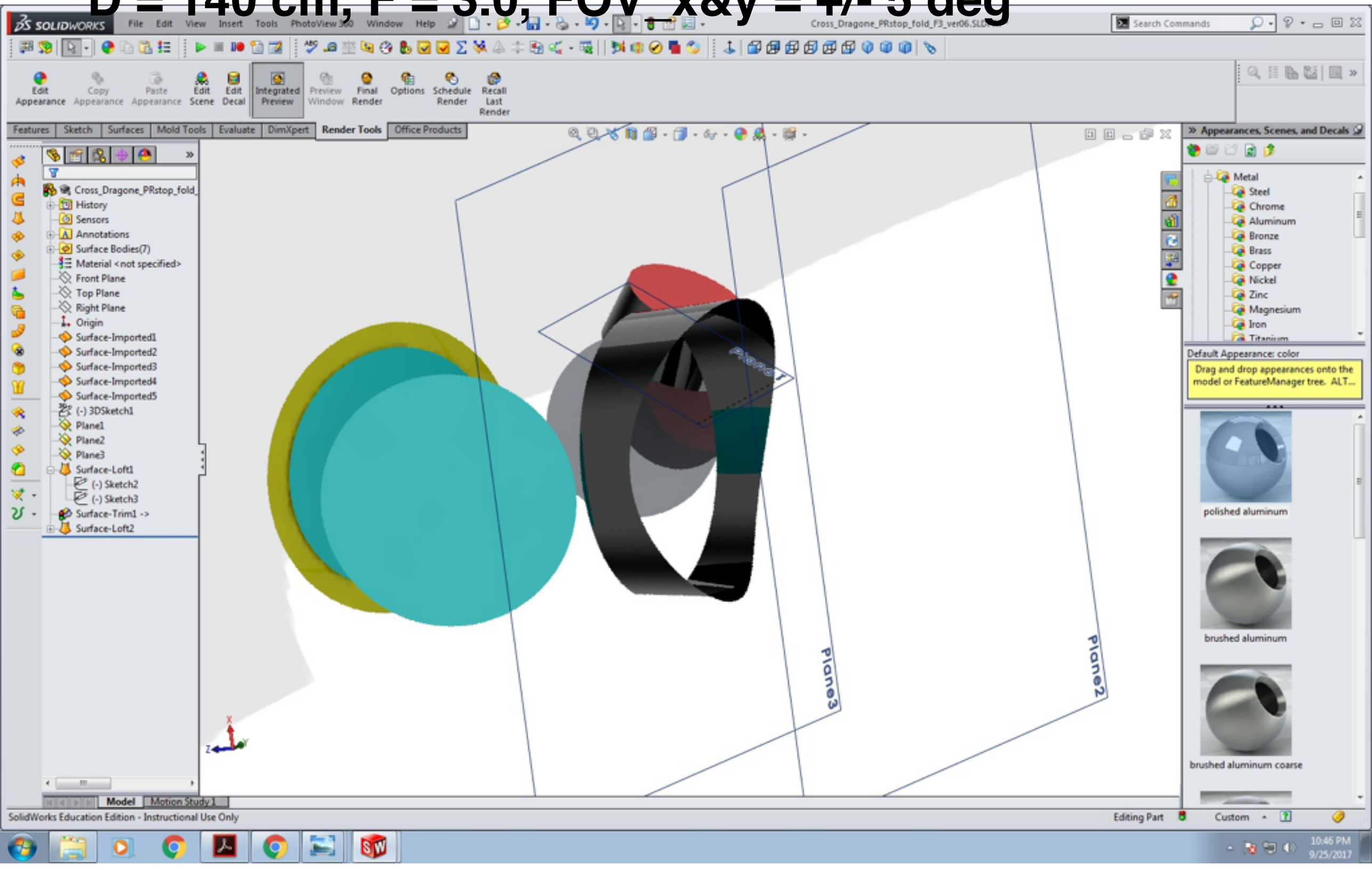






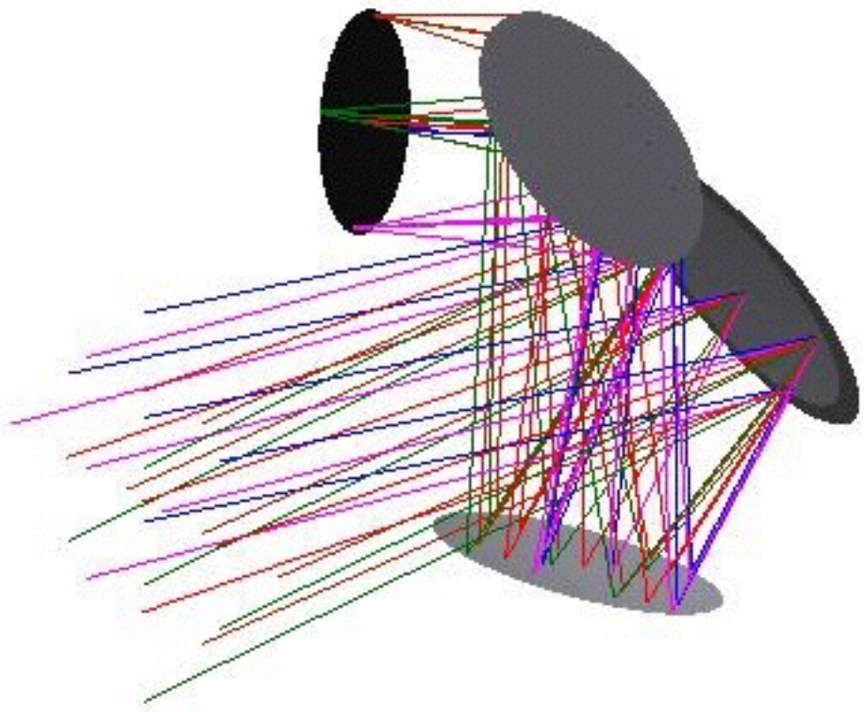

Focal Plane
“Basket” Baffle
Plane 1
Tertiary
Primary
Baffle
Secondary

D = 140 cm, F = 3.0, FOV_x&y = +/- 5 deg



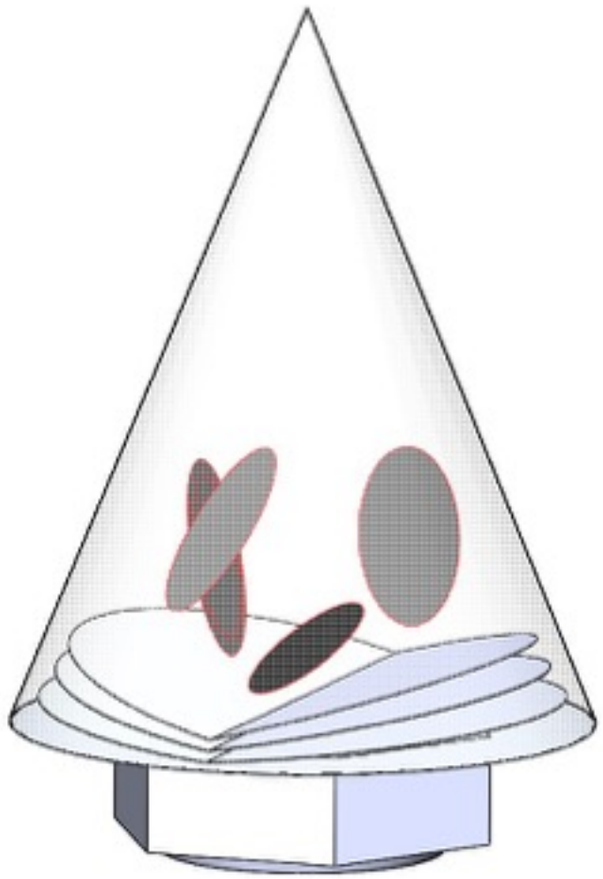
- To increase FOV, we need to reduce aperture size from 1.4m to smaller and sacrifice angular resolution

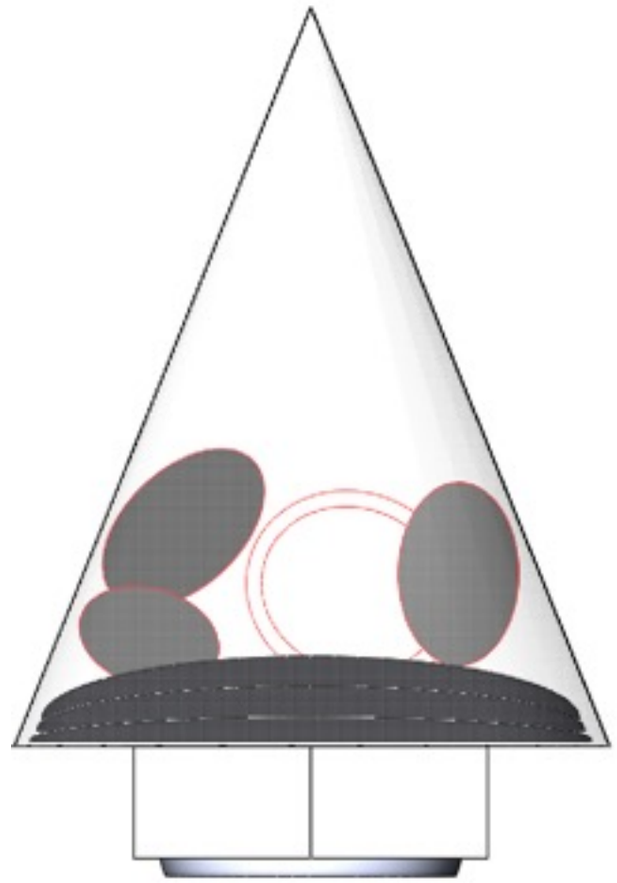
- Below is a D = 1.2 m, F = 3.5, FOV = +/- 7 deg Cross Dragone



- Below is a D = 1.2 m, F = 3.5, FOV = +/- 7 deg Cross Dragone

- Fits well in the envelope. More work needs to be done.





Summary

- Cross Dragone with cold primary mirror is still of interest.
- With a flat fold mirror, we can put D=1.4m, FOV=+/-5 deg, F=3 Cross Dragone into the envelope
- To have larger FOV, we need to reduce aperture stop.
  - for example, a D=1.2m, FOV=+/-3 deg, F=3.5 Cross Dragone can fit