Optics Study 20170807

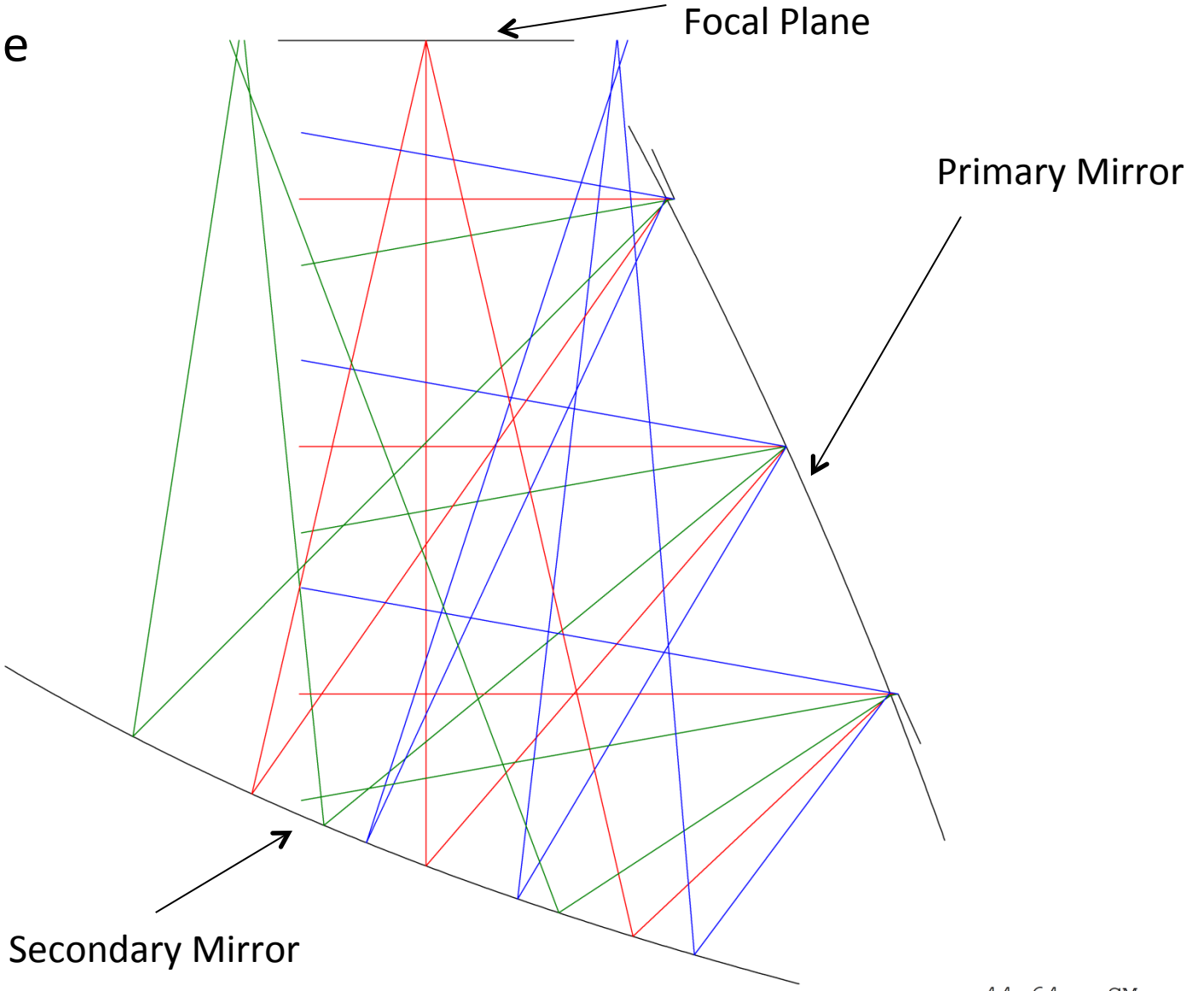
Topics

- Comparing DLFOV for Open/Cross Dragone
- Alpha/Beta scan angles as a function of aperture for Open Dragone

DLFOV for Open/Cross Dragone

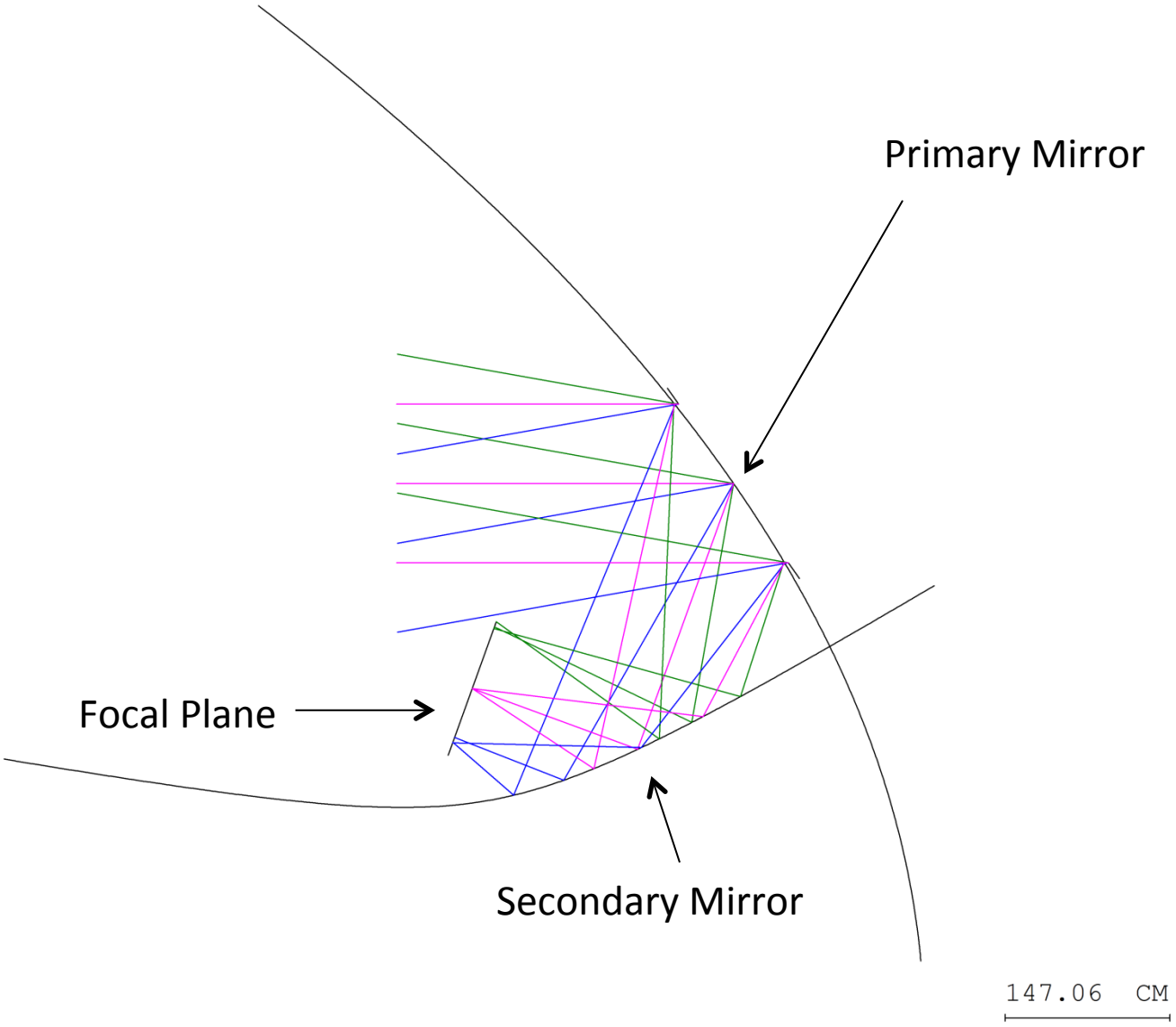
- Use equal aperture and equal f# for both systems
- find DLFOV for several frequencies
- form ratio open/cross
- Verify with several systems that have different tilt angles (all with the same aperture size and f#)

Cross Dragone



New lens from CVMACRO:cvnewlens.seq Scale: 0.06 02-Aug-17

Open Dragone



New lens from CVMACRO:cvnewlens.seq Scale: 0.02 02-Aug-17

DLFOV Size Comparisons

aperture = 1.4 m, f#=2.20

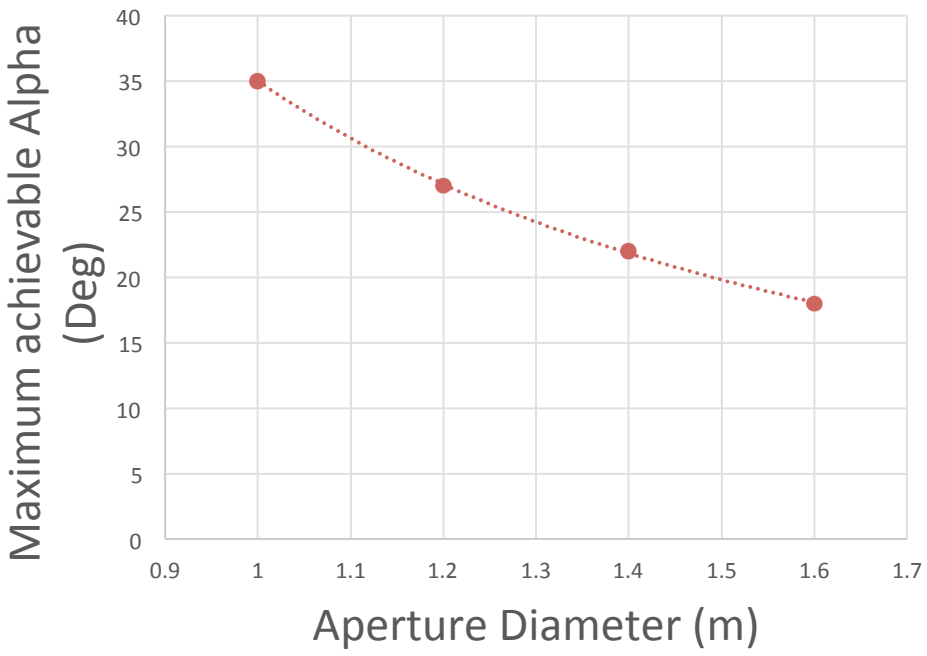
Frequency (GHz)	Type of Dragone	DLFOV Size (strehl > 0.8)	
		X (cm)	Y (cm)
70	Cross	111.2	86.3
	Open	75.2	63.3
Open/Cross		0.68	0.73
150	Cross	66.4	54.5
	Open	48.1	41.0
Open/Cross		0.72	0.75
350	Cross	33.4	30.2
	Open	27.7	24.3
Open/Cross		0.83	0.8

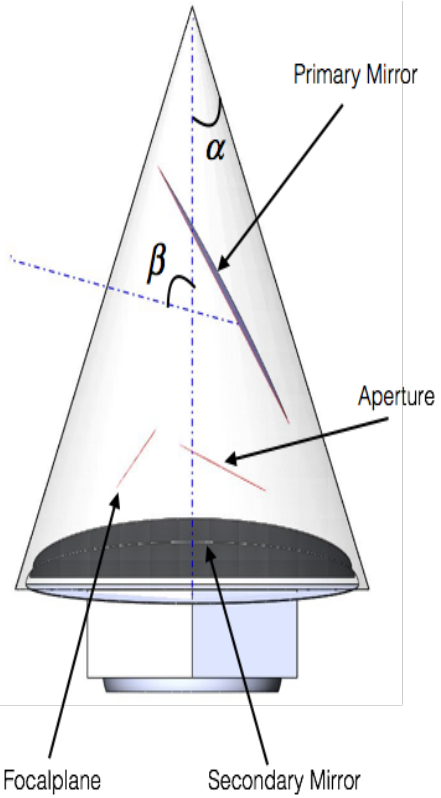
Conclusion: DLFOV for ‘open’ is ~3/4 of ‘crossed’

Alpha/Beta vs. aperture for Open Dragone

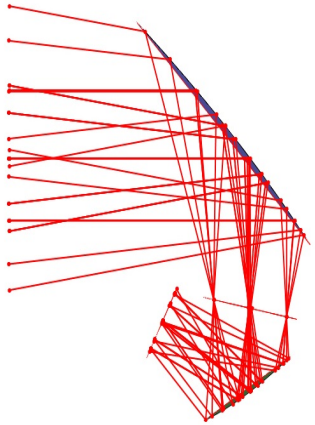
- Use different aperture sizes
- Pack inside shroud with focal plane near bus
- Find largest alpha possible
  - (alpha+beta = 95 deg)

Open Dragone Mid stop





Aperture size (m)	Alpha, focal plane (deg)	Beta
1	35	60
1.2	27	68
1.4	22	73
1.6	18	77



Conclusion: both ‘open’ and ‘crossed’ have ~7 deg/20 cm aperture tradeoff