## Telescope focal calculus + FoV

### initial

F1 = 425 mm

D (M1, M2) = 350

D diff = 75 mm

D to Fstop = 300 mm

M = 300/75 = 4

=> F eff = F1 \* 7 = 1700 mm

FoV:

for 1.5 mrad = 0.0015 radians

Fov = aperture / focal (radians)

aperture = Fov \* focal = 0.0015 \* 1700 = 2.55 mm

for 3 mrad = 0.003 radians = 5.1 mm

**Image definition in Zemax**

@ 250 m

laser initial image is 20 mm

laser divergence is 0.5 mrad

@ 1 m I have 0.5 mm

@ 50 m I have 25 mm

@ 100 m I have 50 mm

@ 200 m I have 100 mm

@ 250 m I have 125 mm + 20 mm = 145 mm => 75 mm offset (THIC = 250000 = 2.5e+5 mm)

@ 1000 m I have 500 mm

@ 10000 m I have 5000 mm + 20 mm = 5020 mm => 2510 mm offset (THIS = 10 000 000 = 1e+7 mm)

Offset from the telescope axes is 100 mm + 10 mm = 110 mm (10 mm comes from half laser beam)

=> **image tilt**:

@ 250 m: 110 mm / 250 m = 0.44 mrad (PARAM = 0.02521)

@ 10000 m: 110 / 10000 m = 0.01 mrad (PARAM = 0.0005729)

Focal for doublet lens:

fT = (f1\*f2)/(f1+f2)

Dimensions:

- diameter of initial colimated ray: actual 15 mm (maximum 16 mm)

How to calculate focal of colimation lens:

DT/Dcol = FT/Fcol

DT = 150mm

FT = 1700 mm

Dcol = 15 mm

F col = FT \* Dcol / DT = 1700 \* 15 / 150 = 170 mm

For Colimation lens: doublet of 150 radius (300 mm focal LA1484) => col focal is (f1\*f2)/(f1+f2) = 90000/600 = 150 mm

=>

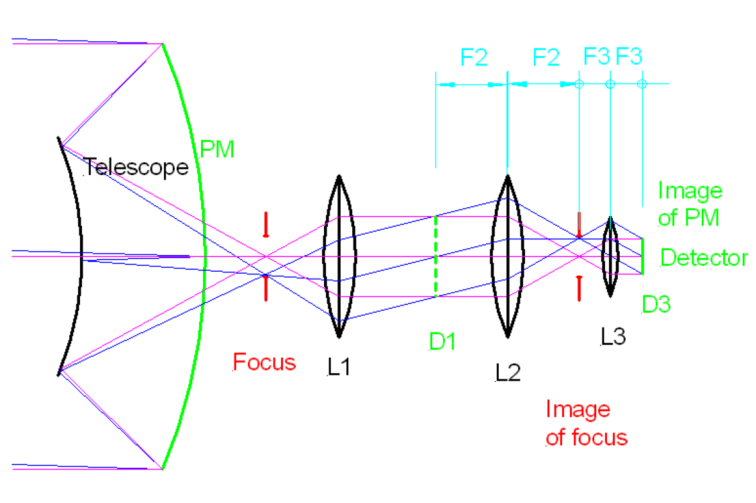
What is the diameter of the image?

DT/Dcol = FT/Fcol

150 / Dcol = 1700 / 150 => Dcol = 150\*150/1700 = 13.23 mm

OK!!!!

Eye Piece:



D1/D3 = F2/F3

D1 = Dcol = 13.23

F2 should be similar to F col = 150 mm but nooooo, it is too high

Let us try:

F2 = 150 mm

D1 = 13.23 mm

D3 should be less than 5 mm (5 mm)

F3 should be: F3 = F2 \* D3 / D1 = 150 \* 5 / 13.23 = 56.68 mm

1. so let us choose a 62.5 mm focal doublet (125 mm singlet LA1986)

For this, we have a exact image of:

D1/D3 = F2/F3

D3 = F3/F2 \* D1 = 62.5 / 150 \* 13.23 = 5.51 mm not OK

2. so let us choose f= 50 mm doublet (100 mm singlet LA1509)

D3 = 4.41 OK!!!!!

raport focal M = 3

Distante prea mari

=> le injumatatesc

- In noua varianta am 2 lentile de 150 si 2 lentile de 50 mm