Anagrafica 2015

(richiesto prolungamento)

Progetto: NIRFE (Near InfraRed Fluorescence Eye)

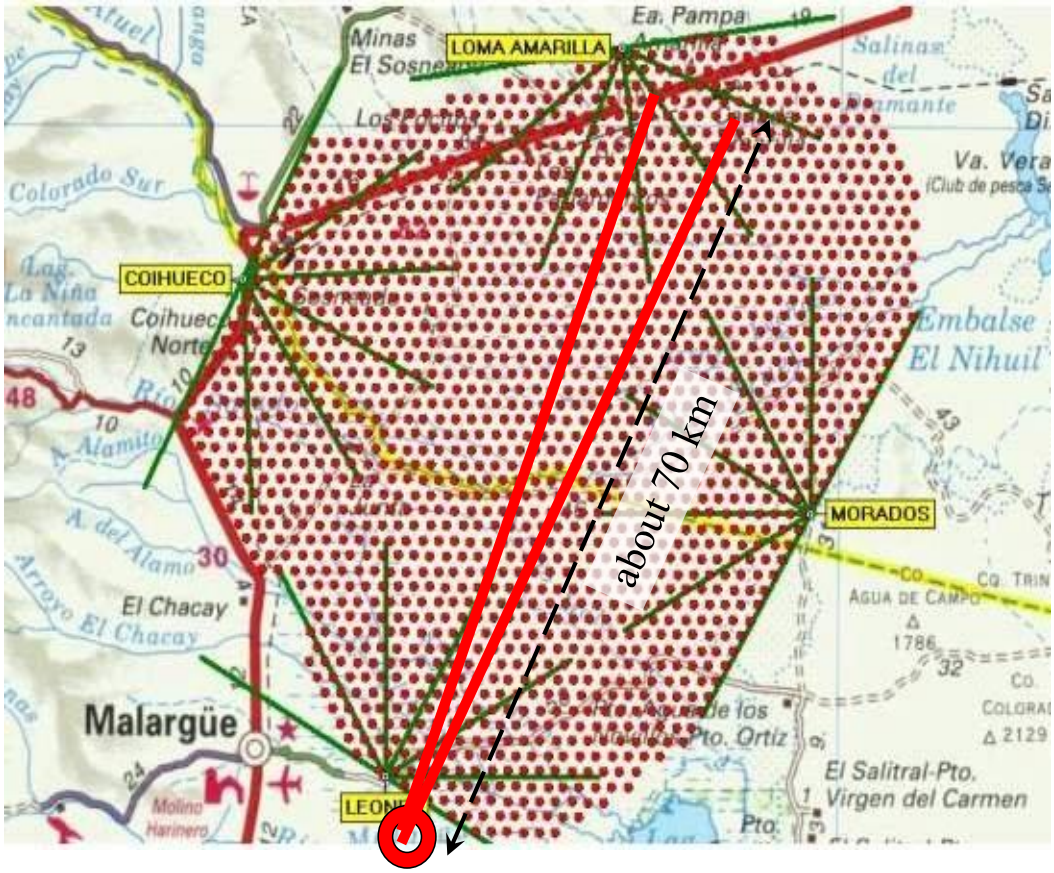
Responsabile Nazionale: Enrico Conti - *INFN Padova*

Durata: 3 anni (2012-2014) + 1 (2015)

Responsabile Locale: Sergio Fonti – *Unisalento*

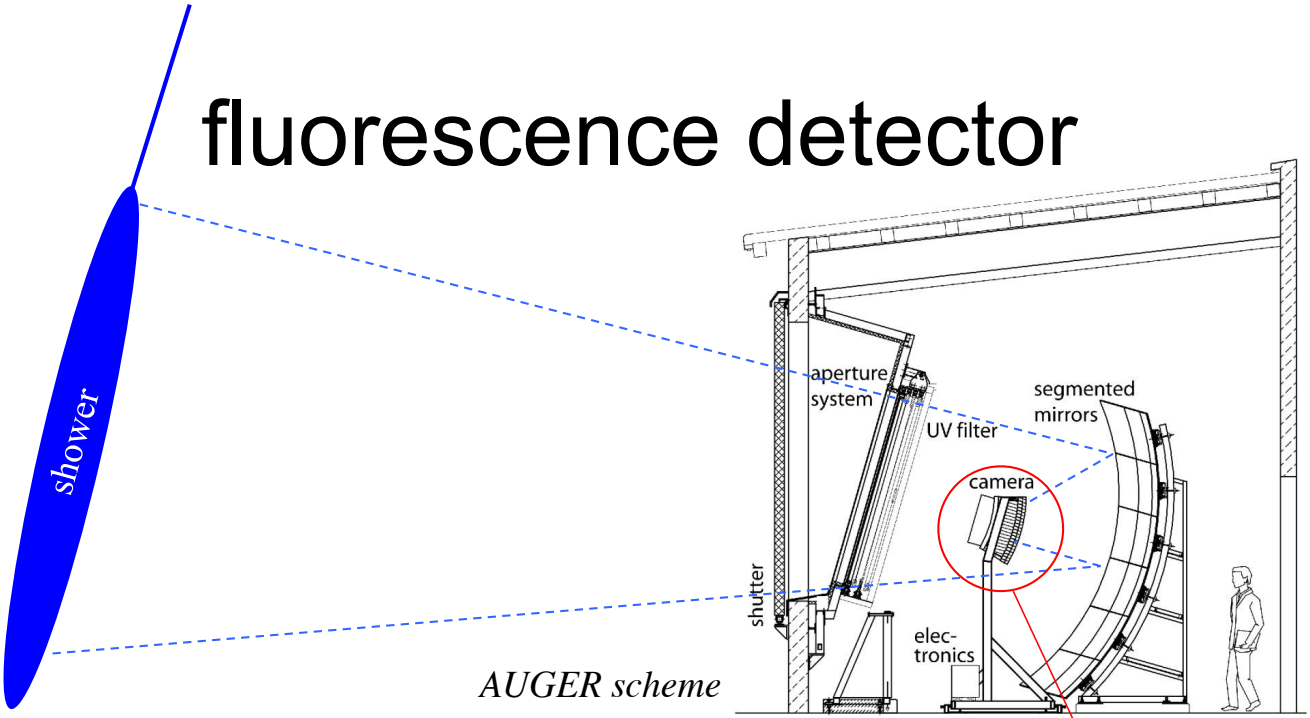
De Tomasi Ferdinando	Associato	Ricercatore	40 %
Fonti Sergio	Associato	Prof. Associato	40 %
Perrone Alessio	Associato	Prof. Ordinario	20 %

Non ci saranno richieste finanziarie da parte di Lecce per il 2015



TEST PROTOTYPE

fluorescence detector



AUGER scheme

PMT array

- light emitted from the shower is collected by a large mirror and focused on a light detector composed by PMTs

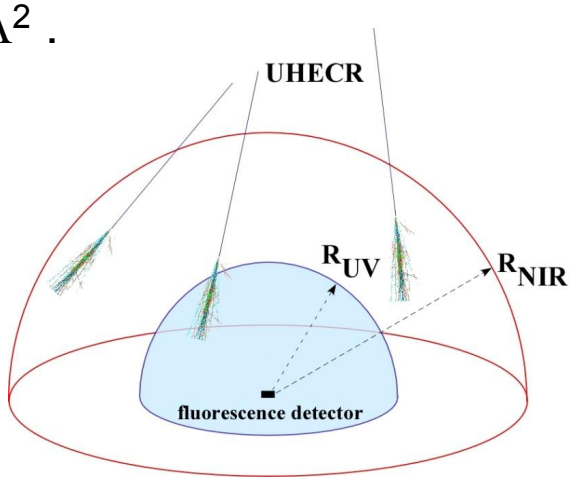
goal: increase event rate

- Introducing an extinction length $\Lambda(\lambda)$

  $$I(x) = I(0)\ exp(-x/\Lambda)$$

  the absorption of the air reflects into a short Λ. For UV, Λ ~ 10 km.
- This has implications on the observable event rate, which goes approximately as Λ^2 .

Maximum useful range $R \propto \Lambda$



The ultimate goal of the NIR fluorescence is to increase a lot the observable event rate.

FUTURE

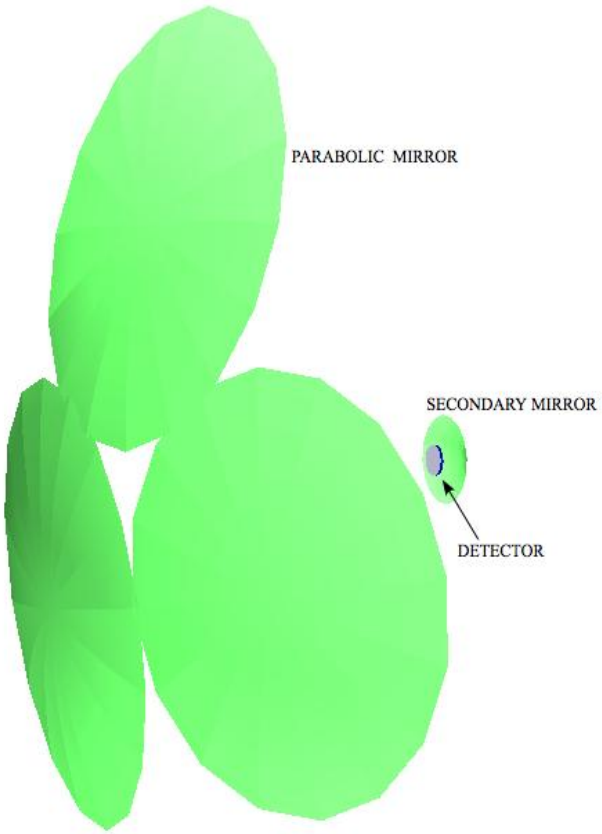
Feasibility study of the secondary mirror and the focal plane (Padova)

Update and optimization of the optical design (Lecce)

Last slide of last year presentation

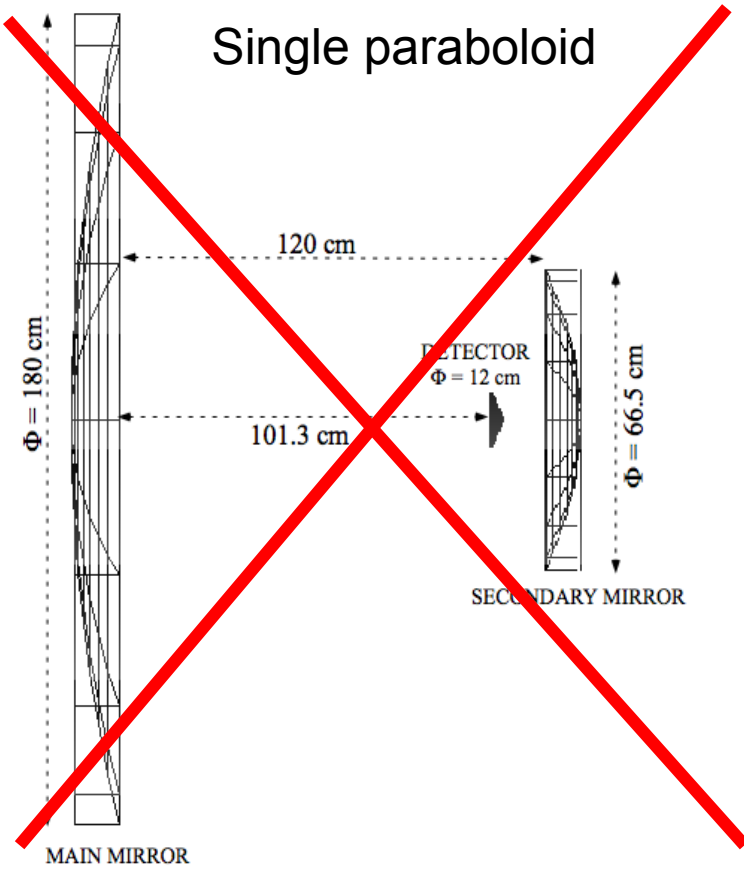
OPTICAL ARRANGEMENT

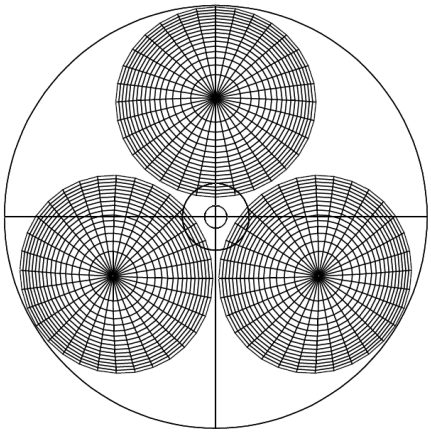
Three paraboloids (trifoglio)



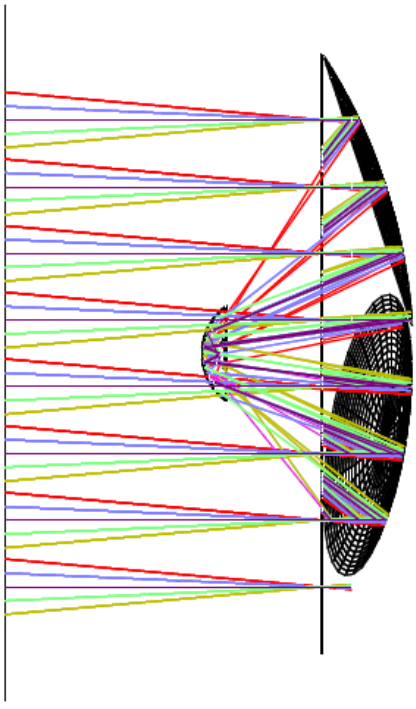
D = f = 1800 mm (F# = 1)

Single paraboloid

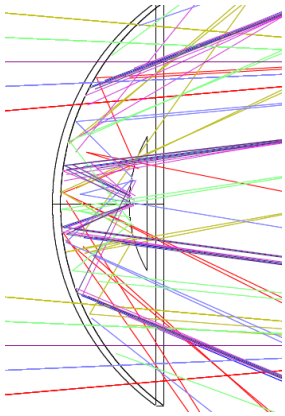




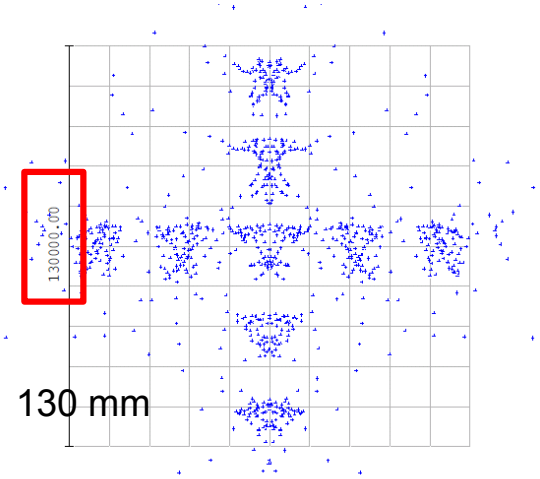
Trifoglio

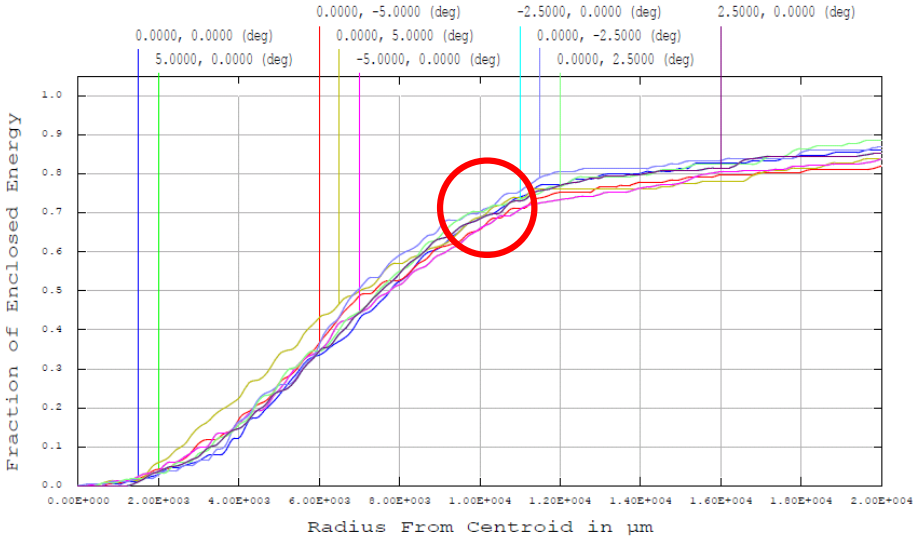


The optical design
has been finalized

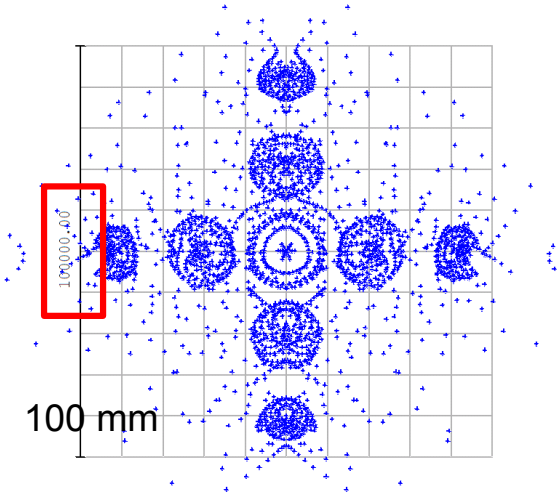


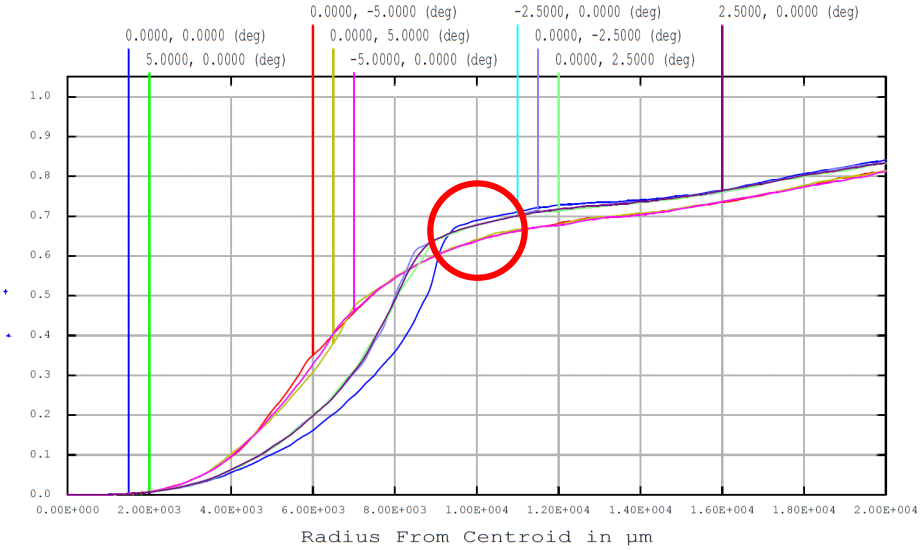
2013


130000.00
130 mm

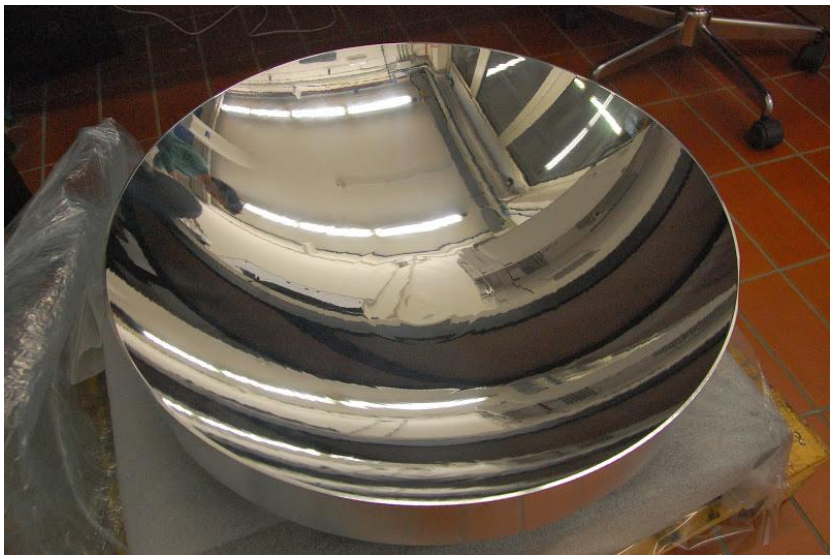

0.0000, -5.0000 (deg)
-2.5000, 0.0000 (deg)
2.5000, 0.0000 (deg)
0.0000, 0.0000 (deg)
0.0000, 5.0000 (deg)
0.0000, -2.5000 (deg)
5.0000, 0.0000 (deg)
-5.0000, 0.0000 (deg)
0.0000, 2.5000 (deg)
Fraction of Enclosed Energy
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
0.00E+000
2.00E+003
4.00E+003
6.00E+003
8.00E+003
1.00E+004
1.20E+004
1.40E+004
1.60E+004
1.80E+004
2.00E+004
Radius From Centroid in µm

2014


100000.00
100 mm

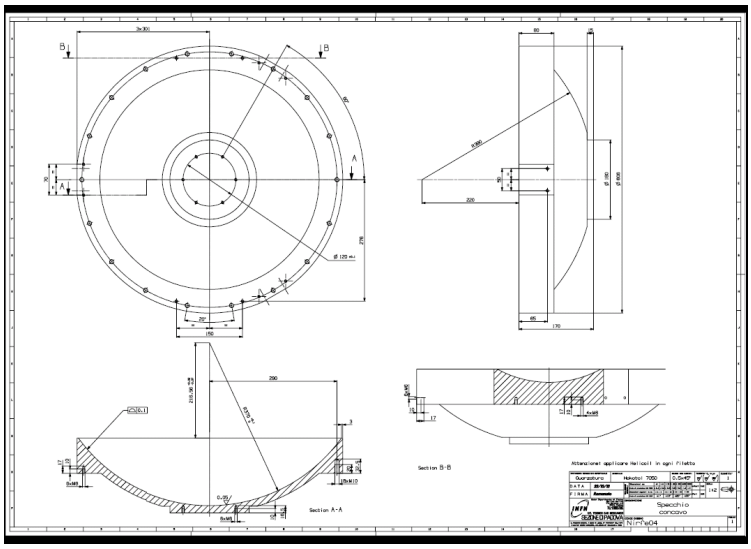

0.0000, -5.0000 (deg)
-2.5000, 0.0000 (deg)
2.5000, 0.0000 (deg)
0.0000, 0.0000 (deg)
0.0000, 5.0000 (deg)
0.0000, -2.5000 (deg)
5.0000, 0.0000 (deg)
-5.0000, 0.0000 (deg)
0.0000, 2.5000 (deg)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
0.00E+000
2.00E+003
4.00E+003
6.00E+003
8.00E+003
1.00E+004
1.20E+004
1.40E+004
1.60E+004
1.80E+004
2.00E+004
Radius From Centroid in µm

2. Produced

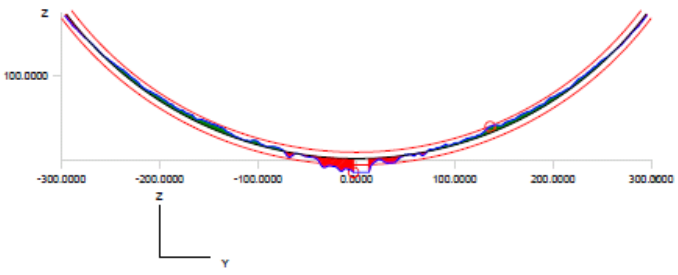


Secondary Mirror

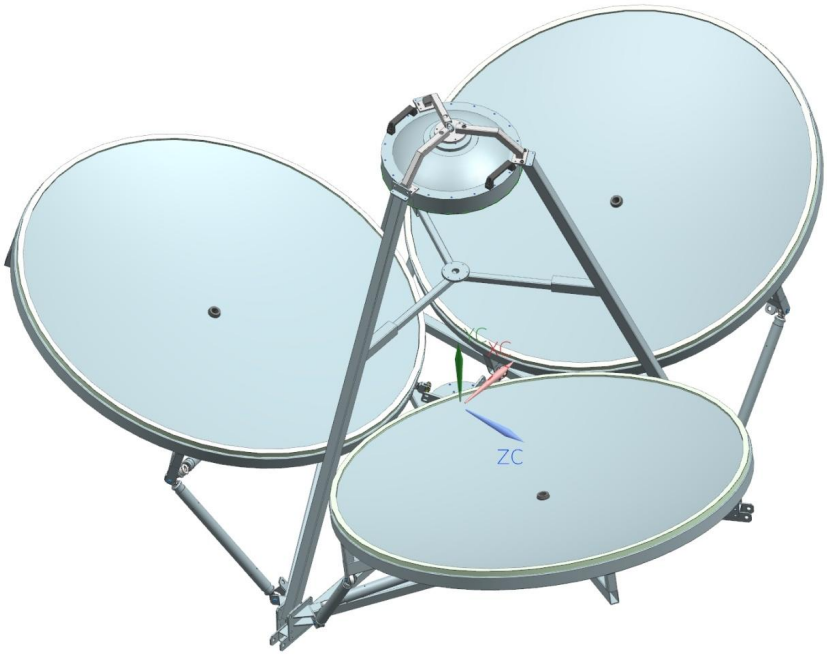
1. Designed



3. Tested



Currently the Trifoglio mounting has been designed and production is going to start soon



Lecce’s last task will be the alignment procedure and tools