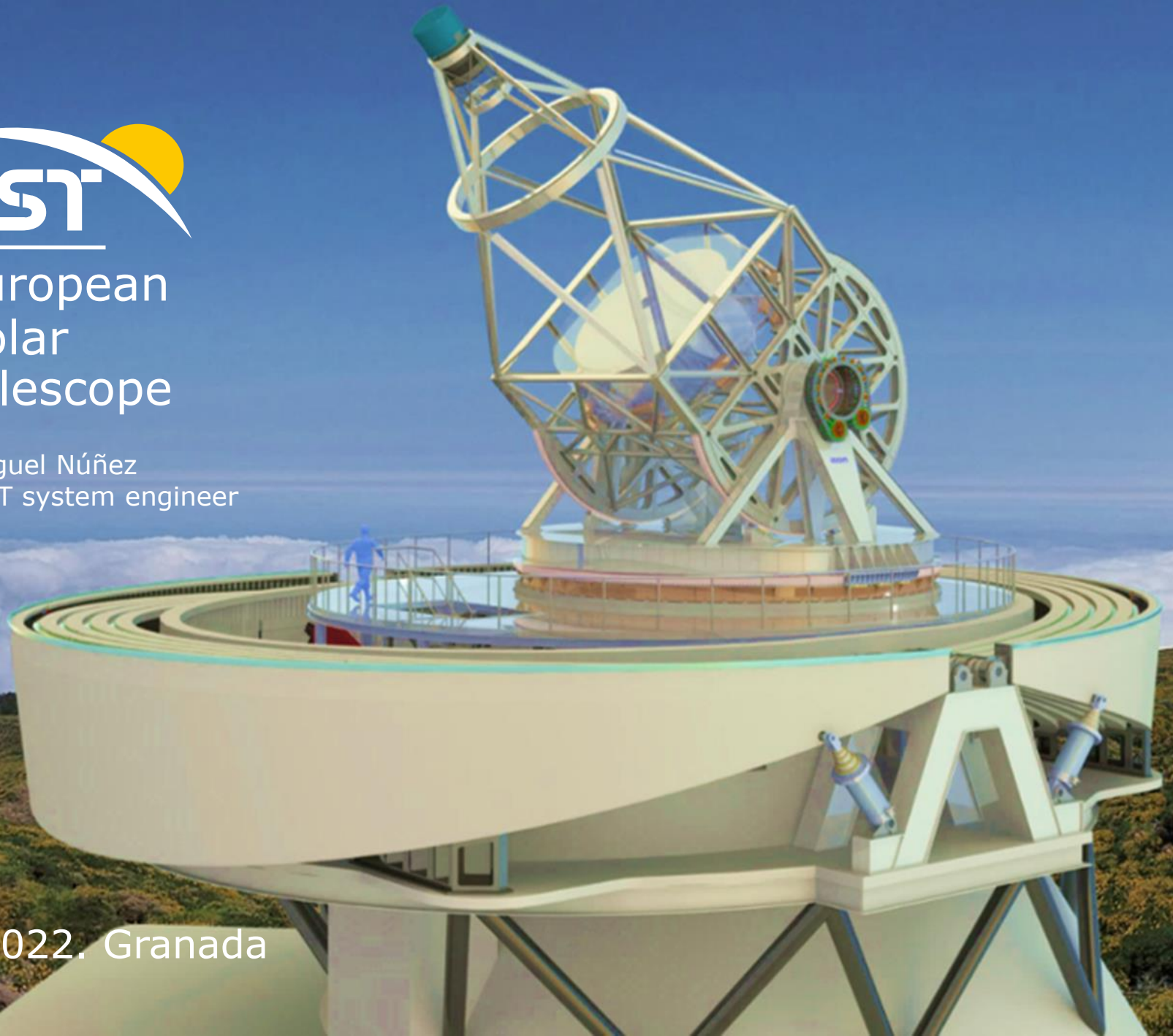




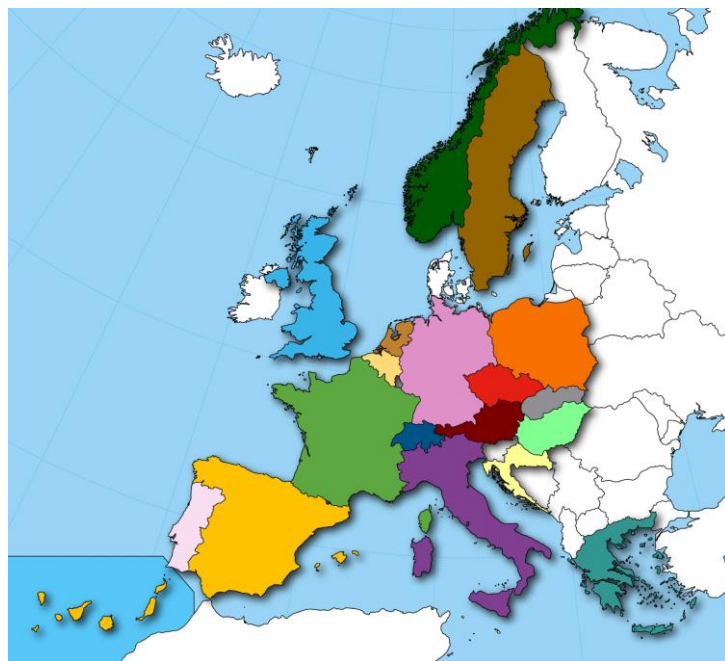
European Solar Telescope

Miguel Núñez
EST system engineer



BSBF 2022. Granada

EST Scientific partners



EAST

European Association for Solar Telescopes

Bringing together research groups from
18 European countries

EST became an ESFRI Strategic European Infrastructure in
March 2016



Project office Team



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EST Site



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Observatorio del Roque de Los Muchachos

La Palma, Canary Islands, Spain

William Herschel Telescope

Swedish Solar Telescope

Dutch Open Telescope

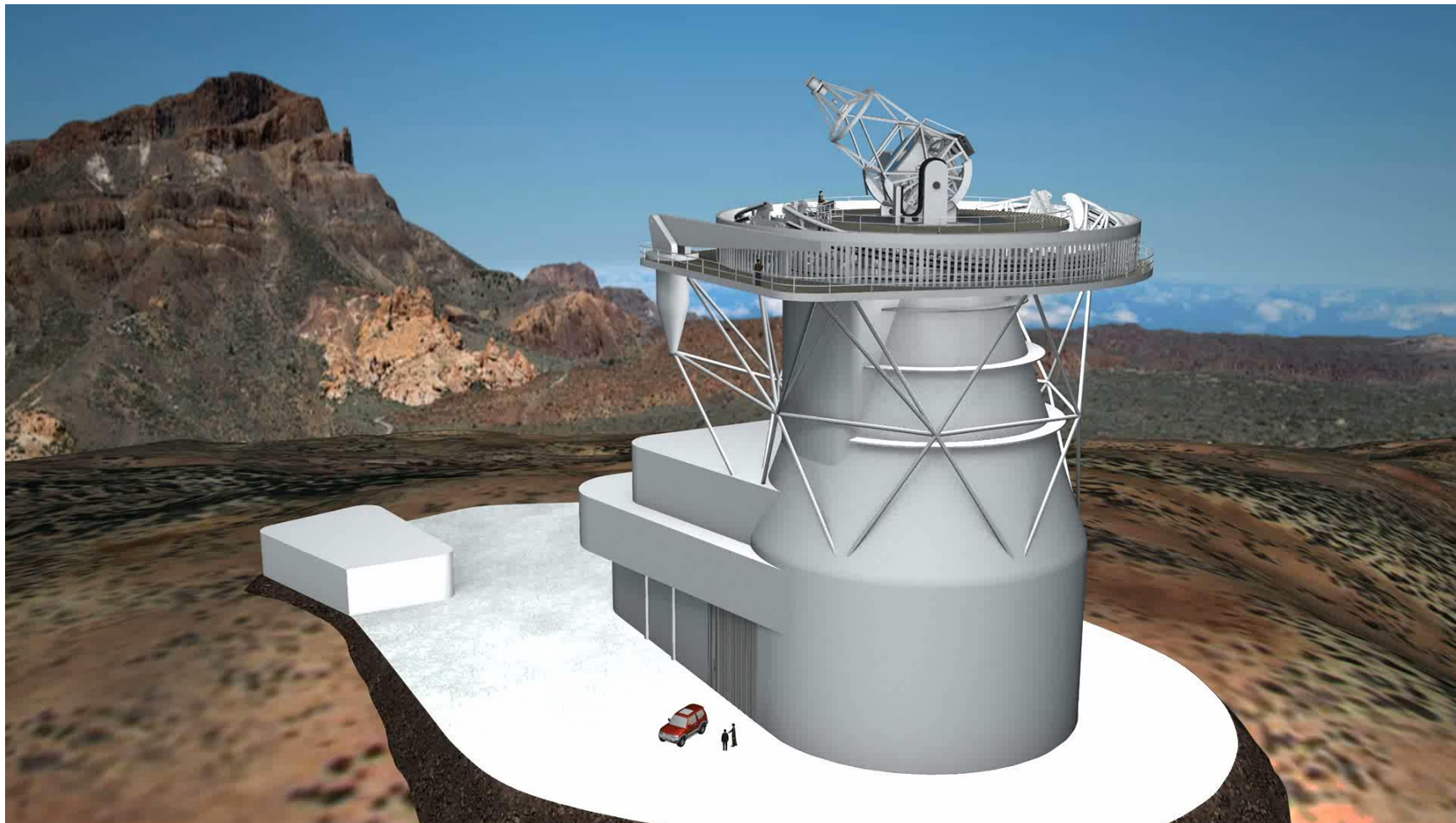
Future New Robotic Telescope



EST Optical path



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EST preliminary design



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- External contracts
- Project office
- In-kind contributions

Secondary Mirror (M2)

Structure, pier and enclosure

Heat Rejecter (HR)

Primary mirror (M1)

Transfer Optics and Calibration

MCAO

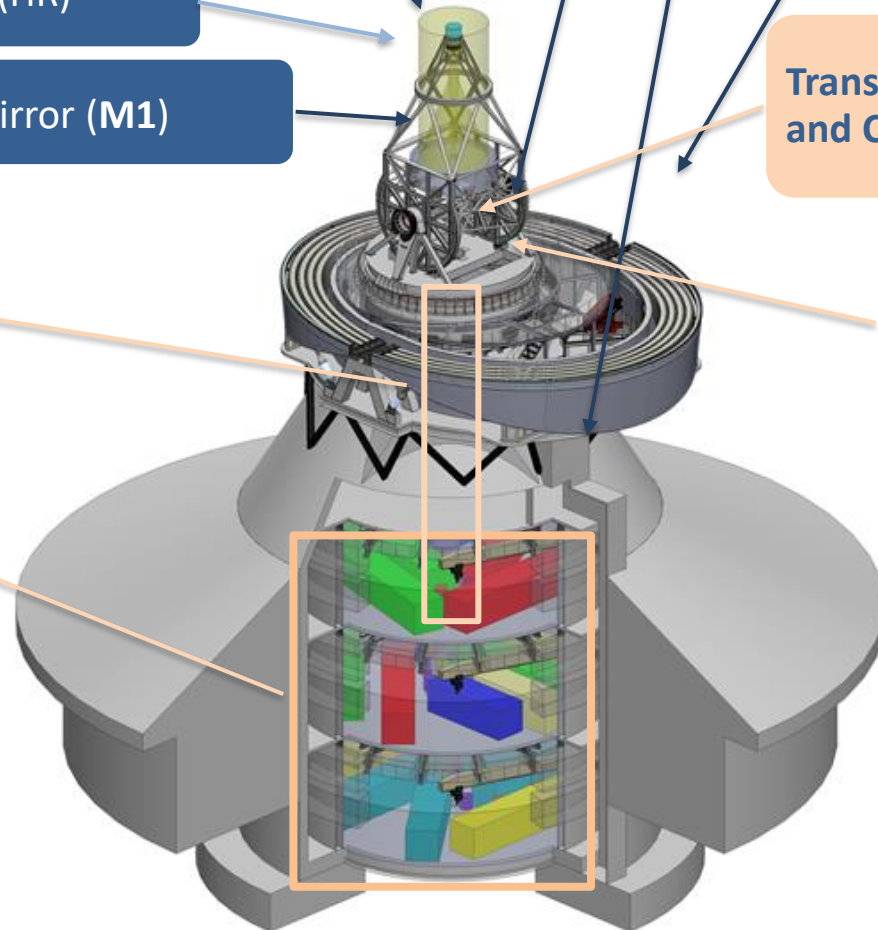
Pier Optical Path

Coudé light
Distribution

INSTRUMENTS

Control

Data center



New Call for tender. End of 2022



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Preliminary design for buildings, civil works and facilities. Environmental impact study

“PROYECTO BÁSICO DE EDIFICACIÓN, OBRA CIVIL Y OTROS ESTUDIOS”

Scope:

1. Geotechnical test
2. Adapt the current preliminary design of buildings, pier, and civil Works to the EST site
3. Support facilities at preliminary level.
4. Environmental impact study

Budget: 300kEuros

Technical requirements:

- Building and civil works: 38
- Pier: 37
- Support facilities: 146
- Geotechnical evaluation: 4



Short term Milestones

- **Finish the heat rejecter preliminary design.** Mid 2023
- **EST preliminary design external revision.** Mid 2023
- **Creation of the EST foundation.** End of 2022-beginning 2023.
- **Finish contract for Preliminary design for buildings, civil works and facilities.** End of 2023-beginning 2024.
- **Environmental impact study paperwork.** Required for construction licence.

Path for construction



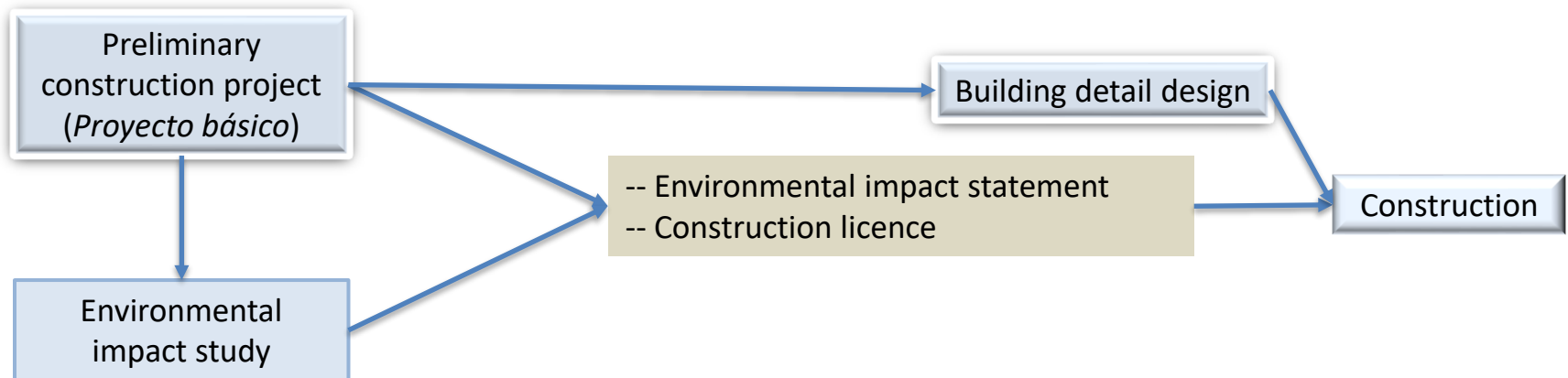
What do we need to start the construction of EST

Preliminary construction → **Environmental impact study**

Preliminary construction + Environmental impact study → **environmental impact statement**

Preliminary construction + Environmental impact study + environmental impact statement → **construction licence**

Construction licence + Building detail design → **Construction**



Construction

Calls for tender for 2024 (TBC)

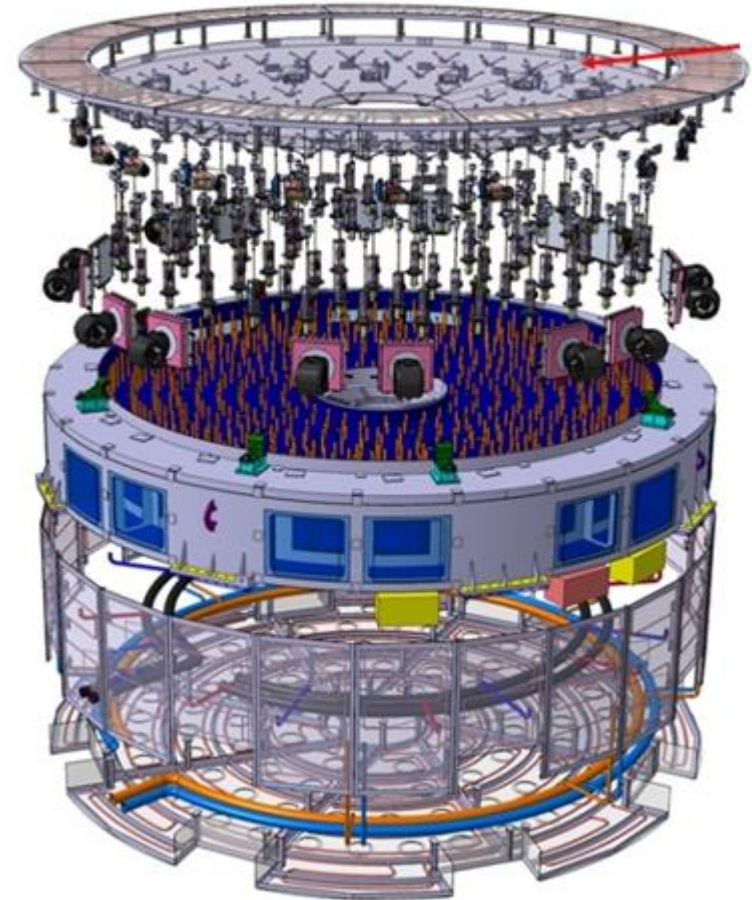


PROCUREMENT PLAN	Year -1				Year 0				Year +1				Year +2				Year +3			
	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4
Civil Works, Pier and Buildings																				
Telescope Structure																				
Enclosure																				
M1 Mirror																				
M1 Cell																				
Heat Rejecter Assembly																				
POP																				
M2 Assembly																				
MCAO																				
Light Distribution Assembly																				
Instruments																				
Data Centre																				

COST BUDGET		
Civil Works, Pier and Buildings	16	Tender (88,000,000€)
Telescope Structure	17	
Enclosure	8	
M1 Mirror	21	
M1 Cell	8	
Heat Rejecter Assembly	2	
POP	3	
M2 Assembly	11	
Light Distribution Assembly	2	
MCAO	10	
Instruments	50	In Kind Contribution (70,000,000€)
Data Centre	10	
TOTAL		158,000,000€

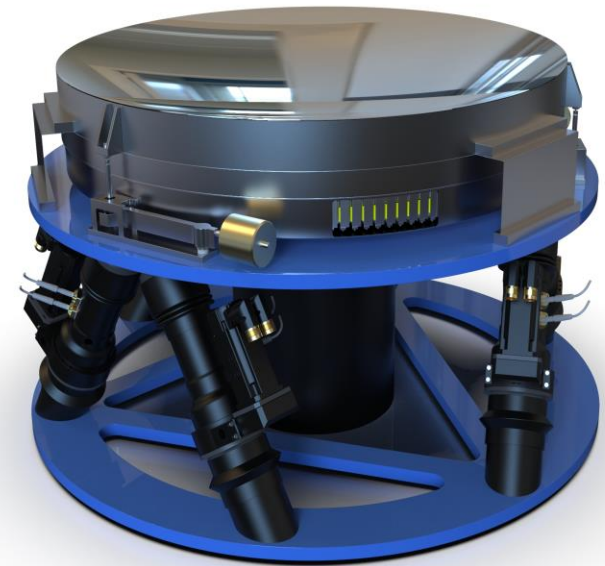
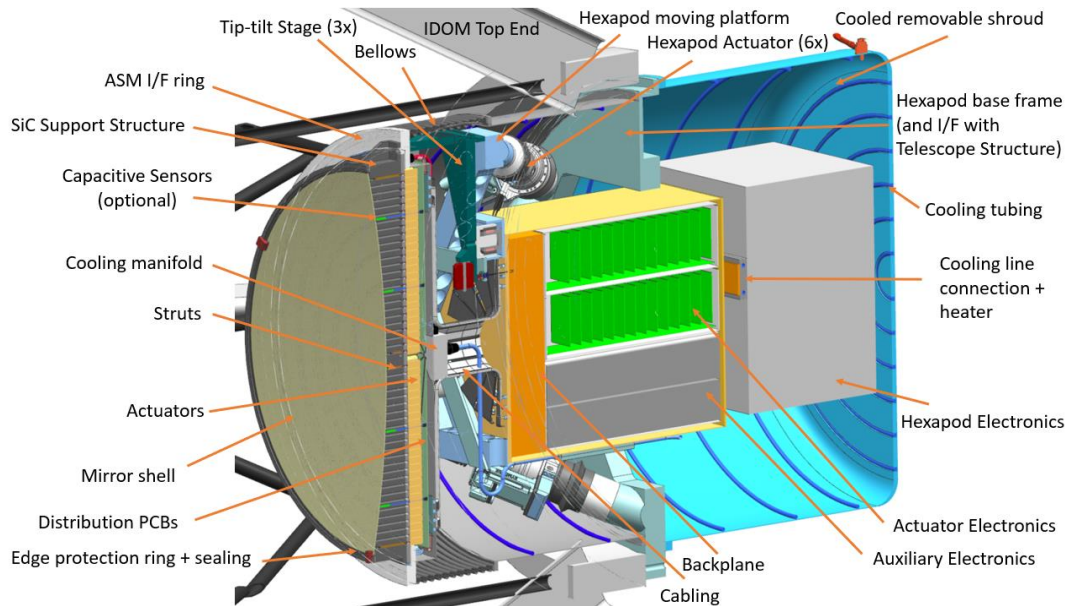
Primary Mirror

M1 Mirror	
Type	Solid meniscus (tripods)
Material	ZERODUR
Diameter	4.25 m
Thickness	70 mm
M1 Cell	
Support system	80x El.-mech. Actuators
Thermal control	Air jet impingement
I/F with Telescope	8
Main characteristics	
Mirror Temperature	Tamb +0.5°C/-2°C
Mirror SFE (quasi-static)	60 nm rms (AcO)
Mirror SFE (dynamic)	150 nm rms (no AcO)

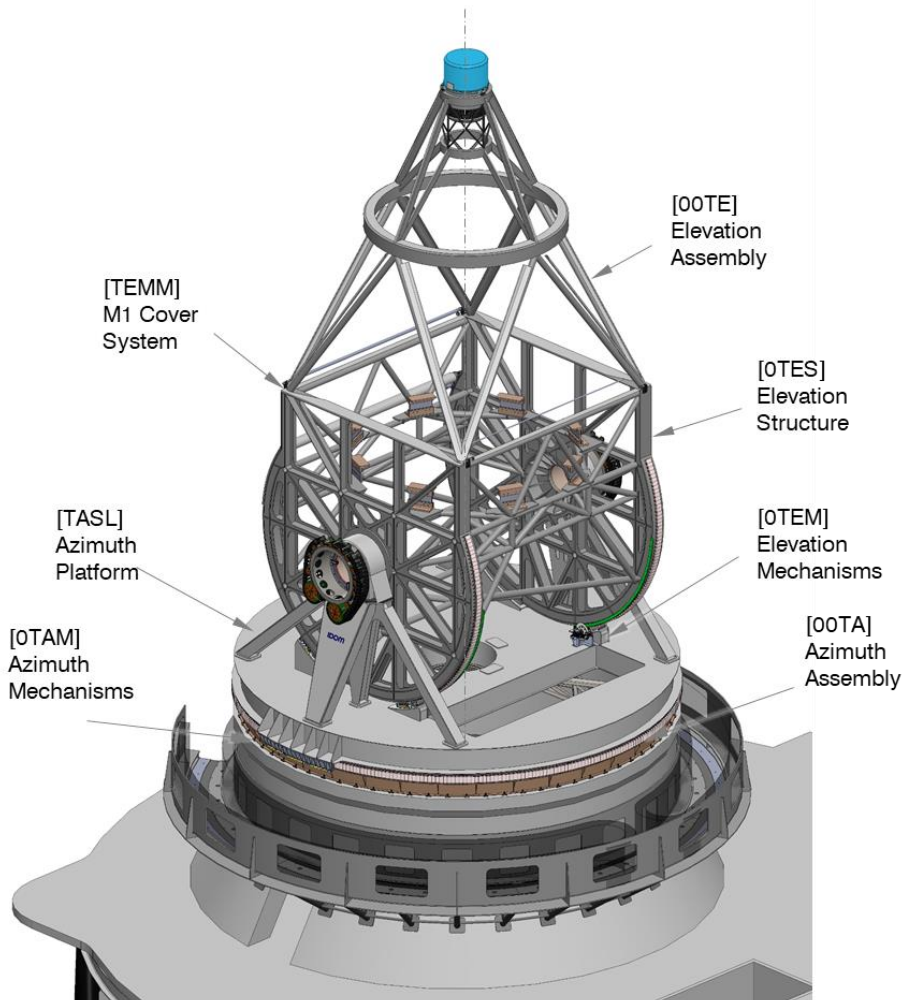


Secondary Mirror

- ❑ M2 is an adaptive secondary mirror to reduce the number of optical surfaces
- ❑ Divided in Hexapod, deformable mirror and tip-tilt stage.

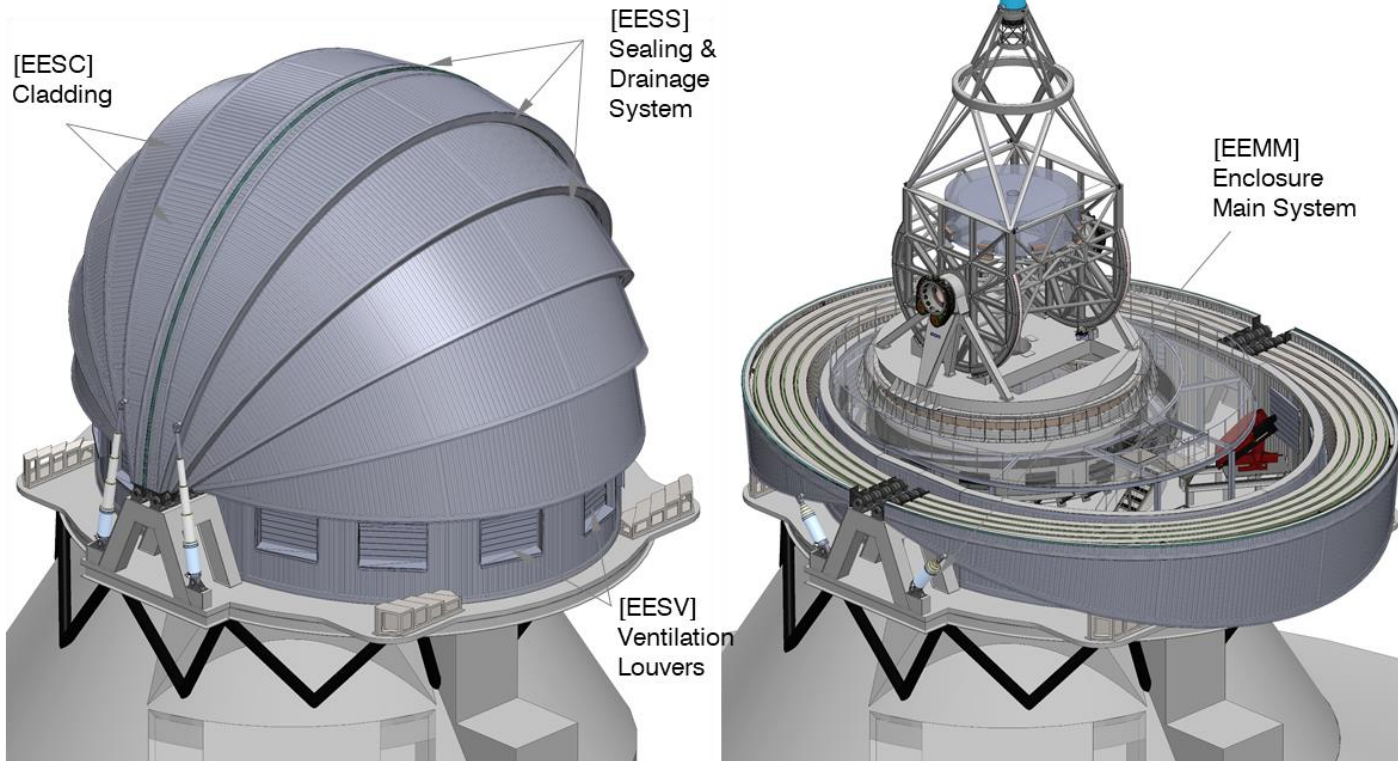


Telescope Structure

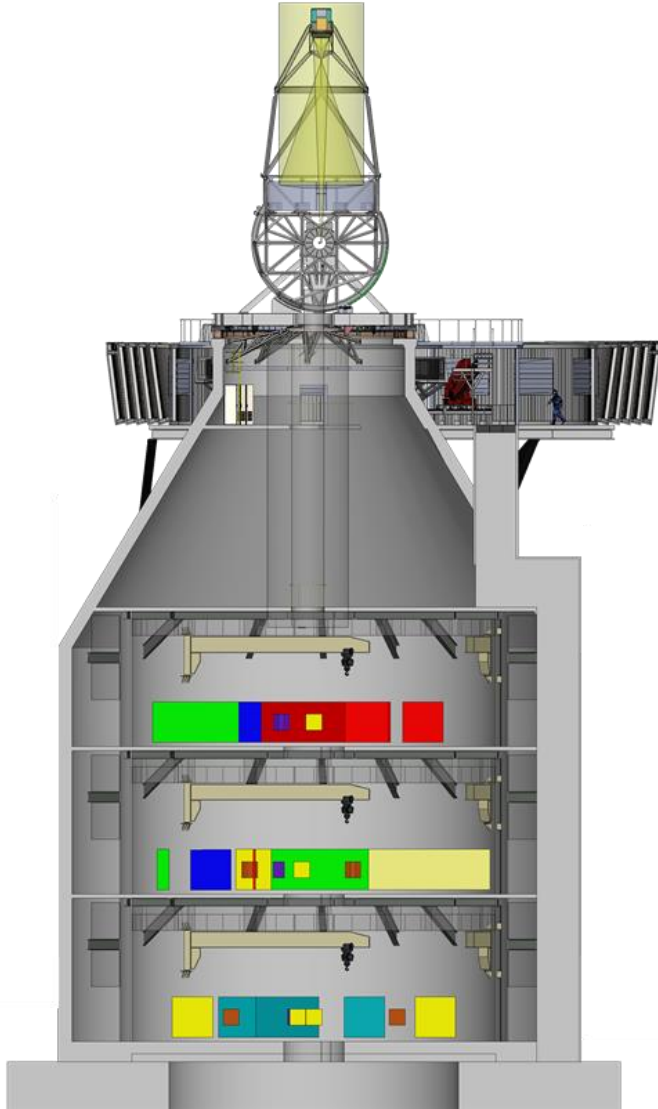


- ❑ EST Telescope Mount is a Gantry type telescope using hydrostatic bearings.
- ❑ The Elevation Structure is composed of a retracted top ring and a lightweight spider
- ❑ The Azimuth Structure is composed of:
 - two lateral pillars
 - azimuth platform to transmit radial loads to central bearing
- ❑ The total weight of the telescope mount is 150 tons

Enclosure



- ❑ 10 rigid and a fixed structure with ventilation windows.
- ❑ Segments in open configuration are 1,5m below the telescope azimuth axis to avoid wind turbulence effects

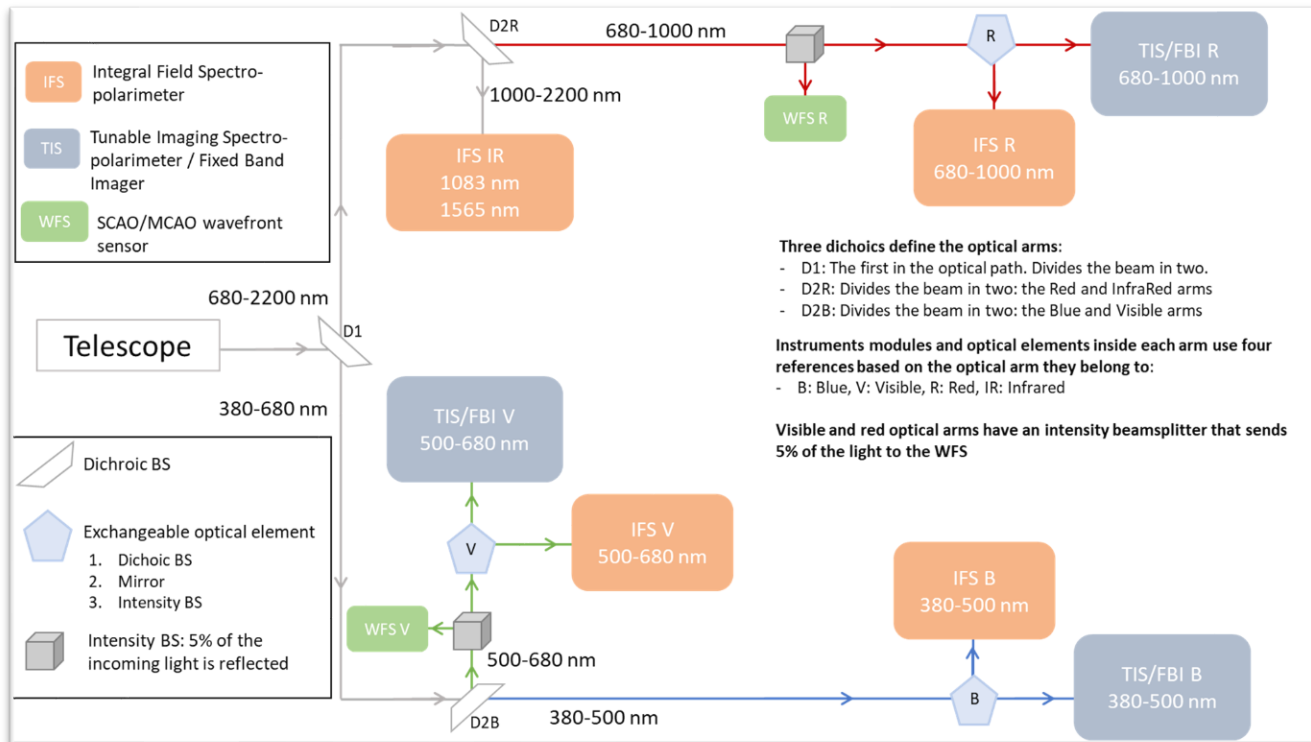


- ❑ The telescope pier isolates the telescope from wind turbulence and heat emitted by the terrain
- ❑ It accommodates the transfer optics, three Coudé rooms and handling equipment
- ❑ A single frame tower solution
- ❑ Independent thermal control for each Coudé Room

Instruments



Task	Consortia		
	TIS/FBI	IFS-S	IFS-M
Project Management	IAA	IAC	SU+MPS



Present Funding



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2022

Countries



Funding Agencies



European Union
European Regional
Development Fund



European
Commission



Gobierno de Canarias
Agencia Canaria
de Investigación, Innovación
y Sociedad de la Información

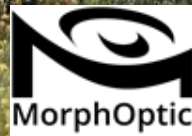




Small-ELF (SELF): a prototype for the future ExoLife Finder (ELF) hybrid telescope

Nicolas Lodieu

R. Rebolo, J. Kuhn, G. Moretto, Y. Zhou, M. Langlois, K. Lewis





Upcoming call for tender

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2022

Call for tender planned for the construction of the mechanical structure of the Small-ELF prototype

Funding from PRTR

Total = 1.25 MEuros

End of 2022 or start of 2023

Nicolas Lodieu
nlodieu@iac.es



○ **IACSAT-1 - Scientific small satellite for astronomical observation**

- Dawn-Dusk Sun-Sync (@600-800 km)
- 100-180 kg
- ESPA ring
- Absolute pointing error (8 hours) < 30 arcsec/axis (sigma)
- Pointing stability error (8 hours) < 8 arcsec/axis (sigma)
- 5 years life
- Payload developed by IAC



Exoplanets



Primitive asteroids

○ **PHASE-1 ITT:**

- Expected publication date: Q1-2023
- Scope: Preliminary Design of the platform for IACSAT-1 satellite and AOCS demonstrator
- Budget: 1 M€
- Duration: 12-14 months



Blazars



Stellar activity

More info: [visit IAC booth S25](#)

[Dr. Alex Oscoz: aoscoz@iac.es](mailto:aoscoz@iac.es)

<https://www.iac.es/en/projects/iactec-space>

New Robotic Telescope (NRT)



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Estimated date	Description	Estimated cost
November 2022	Advanced and detailed design for the secondary mirror support and positioning. Including prototype.	300k€
January 2023	Supply two blanks for primary mirror prototype.	256k€
June 2024*	Supply and manufacturing of hexapod and opto-mechanics for the secondary mirror.	320k€
June 2024*	Supply secondary mirror blank .	150k€
June 2024*	Supply of ten blanks for the primary mirror. Final product for the telescope.	800k€
June 2024*	Supply and manufacturing opto-mechanics for the primary mirror.	1.200k€

* To be confirmed

Contact person: jonatan.martinez@iac.es

Thank you!!

Miguel Núñez
EST system engineer
est@est-east.eu

For on-going call for tender:
<http://www.est-east.eu/procurements>
contratacion@iac.es

www.est-east.eu

