



EST status

The large-aperture
high-resolution
European facility

M. Collados

*Instituto de Astrofísica de Canarias
and the EST team*





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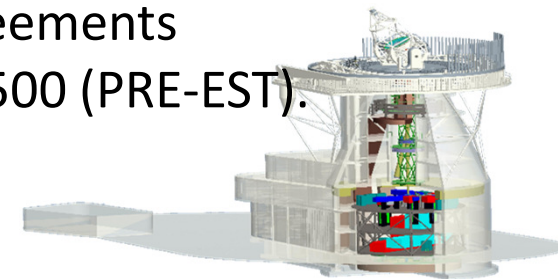


EST history & schedule

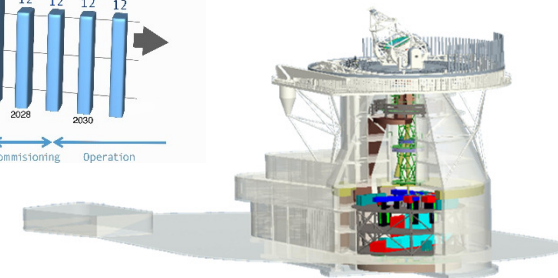
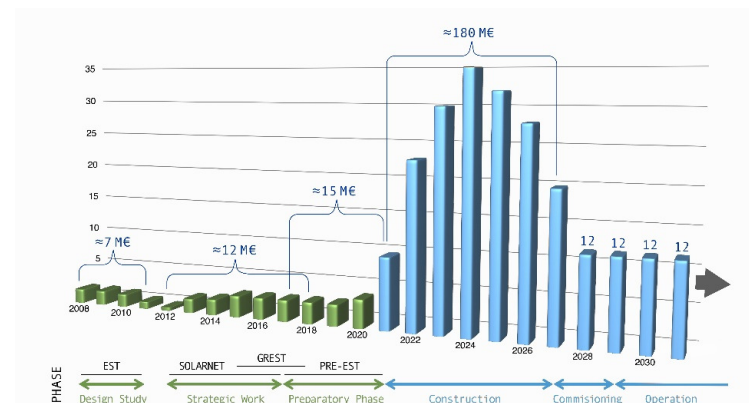
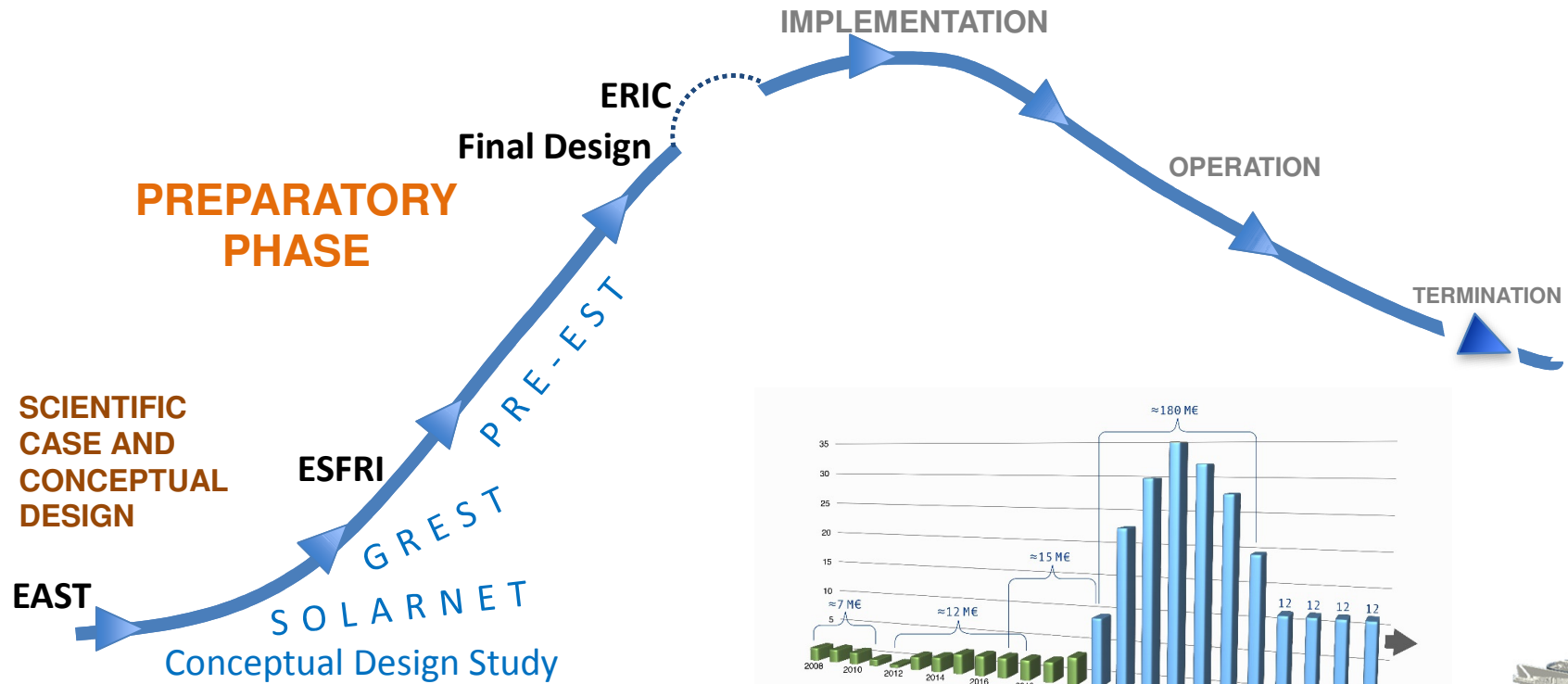


- **2008 – 2011** EST Conceptual Design Study (EST-DS)
- **2013 – 2017** Solarnet
- **2015 – 2018** GREEST
- **2017 – 2021** Preparatory phase (PRE-EST):
Legal framework, preparation of international agreements, construction design,
- **2022 – 2027** Construction phase

The EU has contributed with 16 M€ under the Grant Agreements 212482 (EST-DS), 312495 (Solarnet), 653982 (GREEST), and 739500 (PRE-EST).



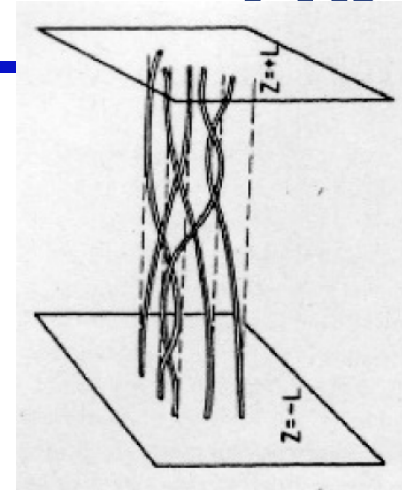
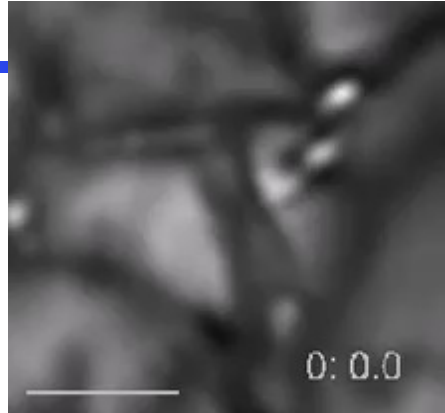
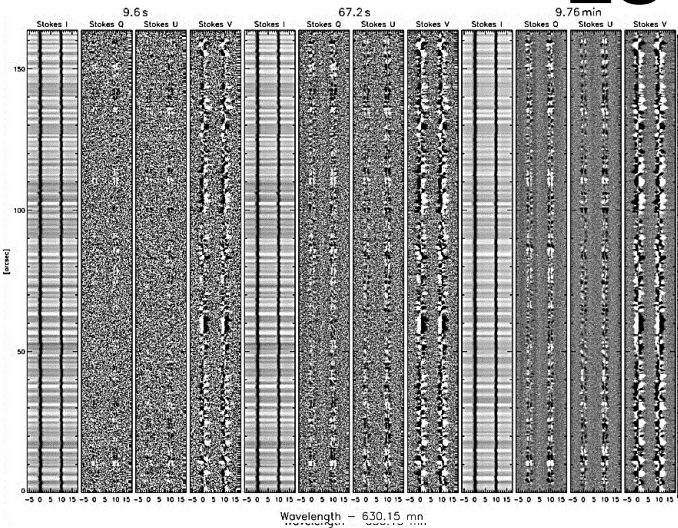
EST Life Cycle (phases)



Quiet sun

EST science

Vortices and field dragging

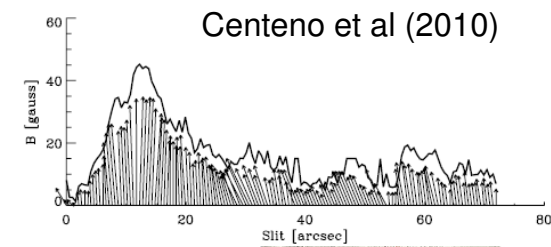
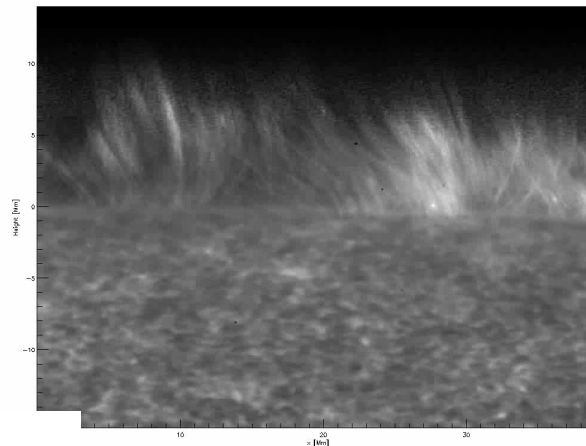
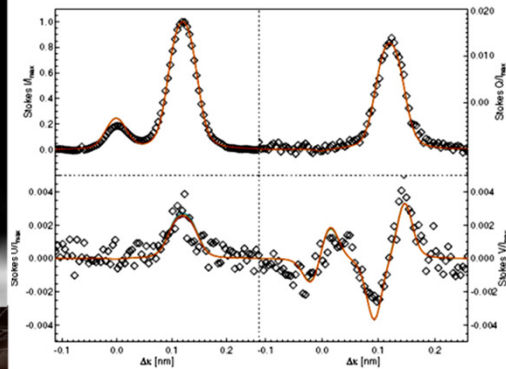
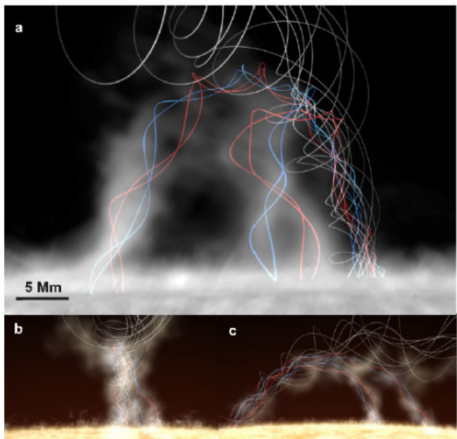


Bonet et al. (2008)

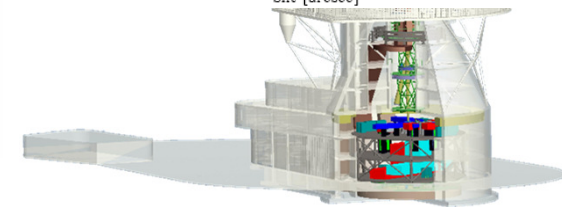
Bellot Rubio and Orozco Suárez (2012)

Prominences

Spicules



Centeno et al (2010)



Martínez González et al (2015, 2016)

Giardini Naxos (Sicily)
June 11 – 15, 2018



programme under grant agreement NO 739500

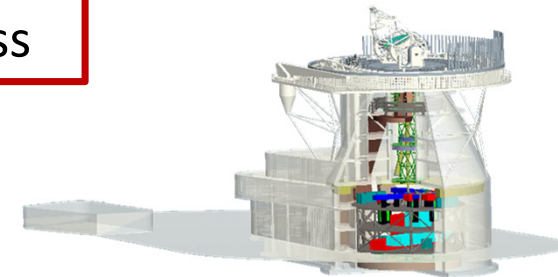
PRE-EST goals



- To provide the EST international consortium and the national agencies with a detailed plan for the implantation of EST
 - Governance (KIS)
 - Legal entity (UCL)
 - Financial issues (IAC)
 - Strategic actions (IAA-CSIC)
 - Technical works leading to final design (IAC)

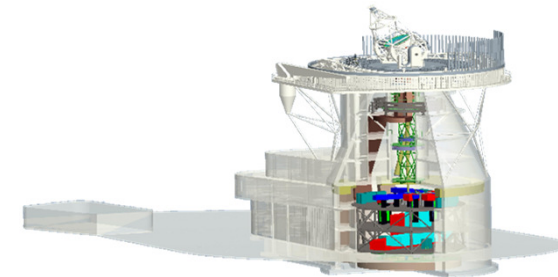
+

involve the Ministries for the decision-taking process



Important decisions/agreements

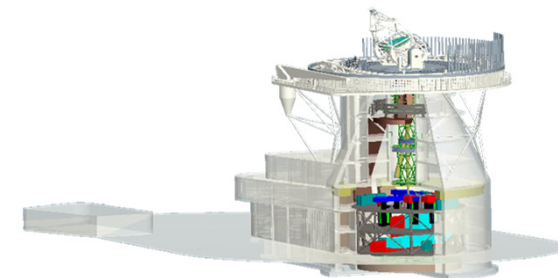
- Type of legal entity
- Host country for legal entity
- Consolidate funding quotas
- In-kind contributions
- Consolidate science requirements (SAG)
- Site selection



Important decisions/agreements



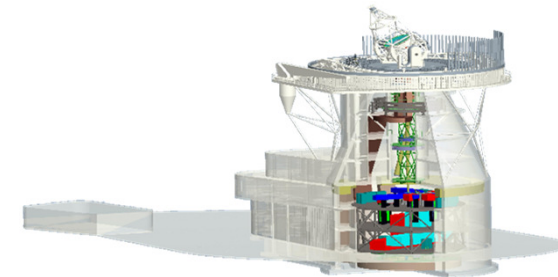
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- } PRE-EST



Important decisions/agreements



- Type of legal entity
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- Ministries
- PRE-EST

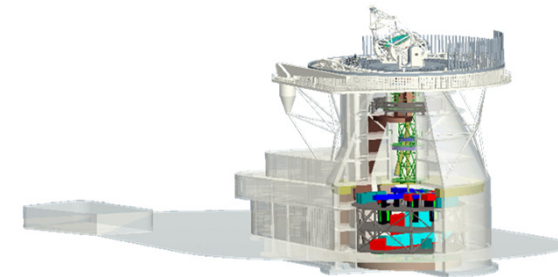


Important decisions/agreements

- Type of legal entity
 - Host country for legal entity
 - Consolidate funding quotas
 - In-kind contributions
 - Consolidate science requirements (SAG)
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- Ministries
- PRE-EST

Accompanying measures:

- Joint meeting of funding agencies
- Project office formation



(Aimed) Sharing percentages



Spain, Germany: 25% each (~50 M€ each)

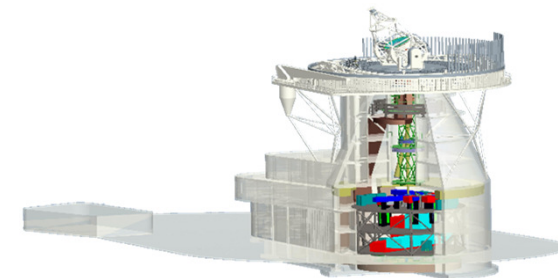
UK, Italy, France: 10% each (~20 M€ each)

Norway, Sweden: 5% each (~10 M€ each)

Austria, Croacia, Czech Rep., Hungary, Poland, Slovakia, Switzerland:
1.5% each (~3 M€ each)

+

(hopefully) Belgium, Greece,

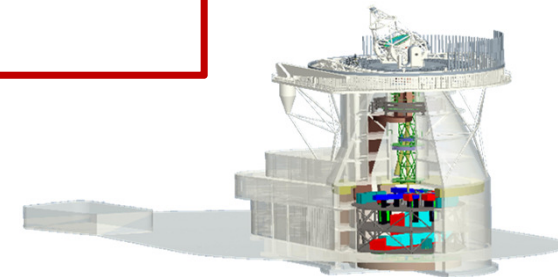


Legal entity



The PRE-EST Board decided to propose an EST-ERIC hosted in Spain

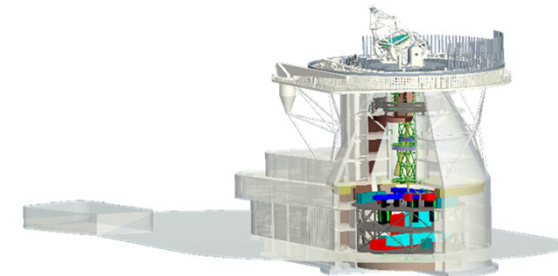
Contacts led by Spain will be established at Ministry level



Project Office



- Design development and international calls for
 - ❖ Telescope structure and mechanics
 - ❖ Primary mirror
 - ❖ Secondary mirror
- Make progress for the definition of the rest of subsystems (Heat rejecter, transfer optics, AO, ...)
- Collect information about construction and required civil works
- Update construction costs

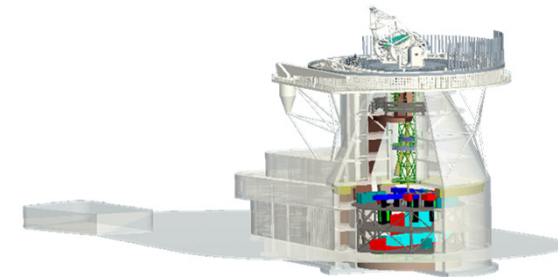


Project Office formation



Positions already announced:

- Project Manager
- Systems Engineer
- Thermal Engineer
- Mechanical Engineer
- Optical Engineer
- Administrative Assistant



Project Office formation

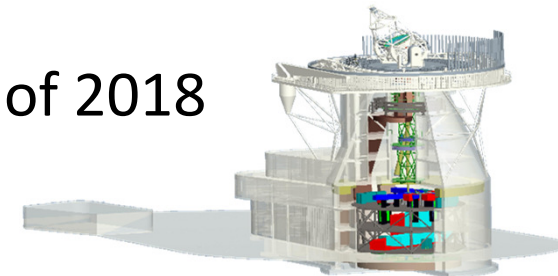


Positions already announced:

- Project Manager
- Systems Engineer
- Thermal Engineer
- Mechanical Engineer
- Optical Engineer
- Administrative Assistant

+

~14 additional positions during the second half of 2018

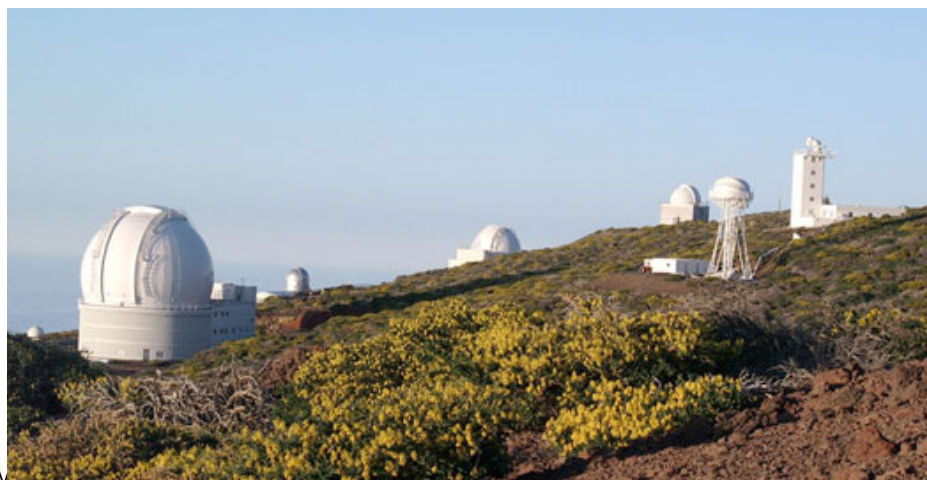


EST location



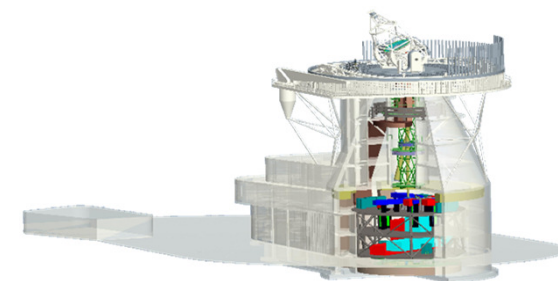
Obs. Teide (Tenerife)

THEMIS – VTT - GREGOR

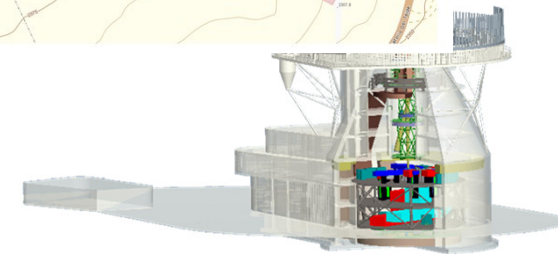
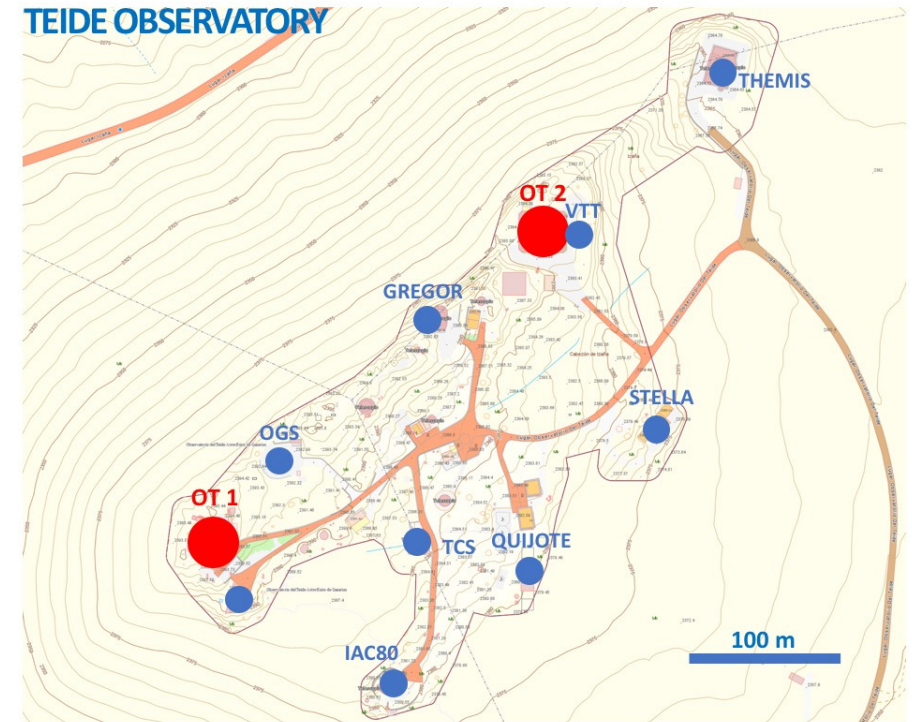
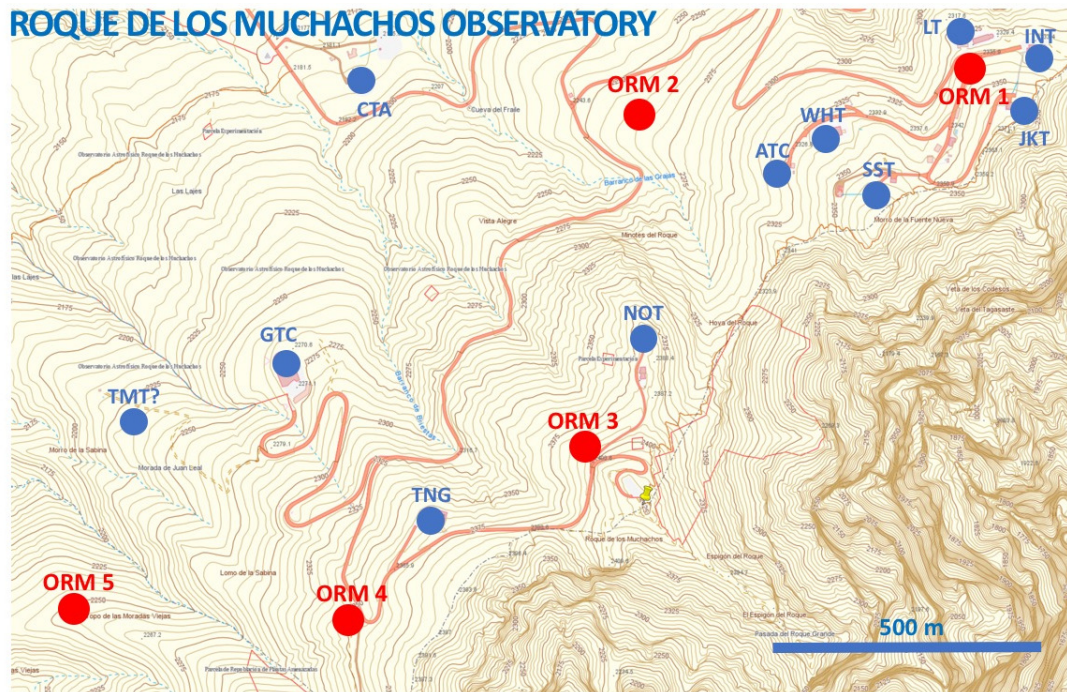


Obs. Roque de los Muchachos (La Palma)

DOT – SST



Potential telescope locations

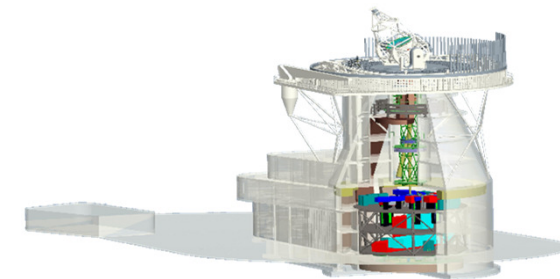
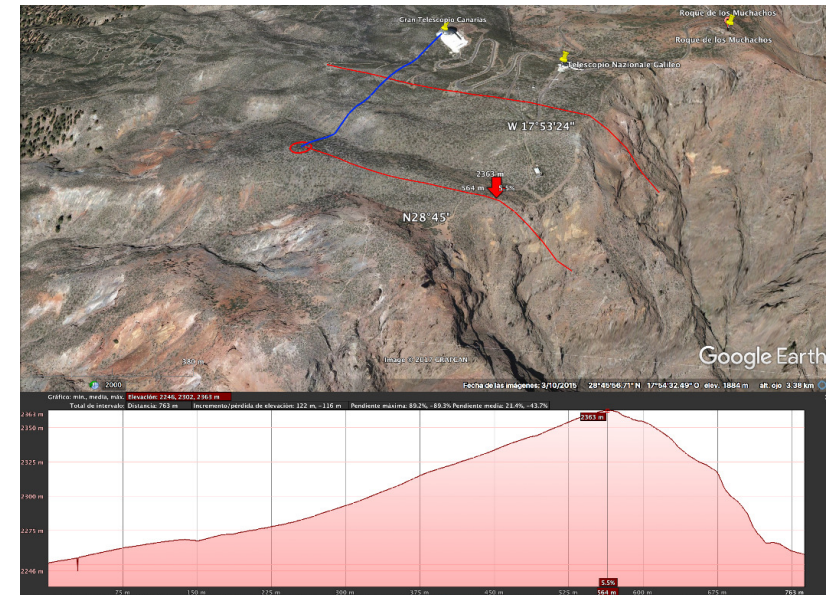


Potential telescope locations

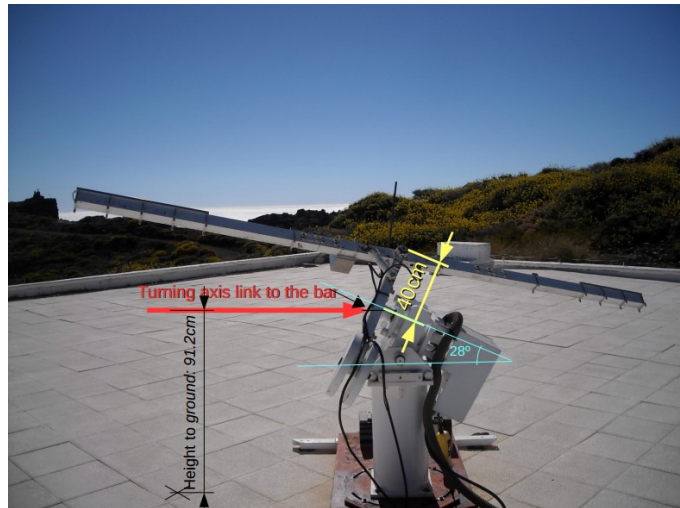


Aspects that need to be considered:

- Sky quality
 - Turbulence profiles/seeing measurements
 - # of clear days
- Wind-direction
- Humidity
- Dust storms
- Nearby infrastructures
- Altitude of the horizon
- National Park restrictions



Day-time Shabar Cn2



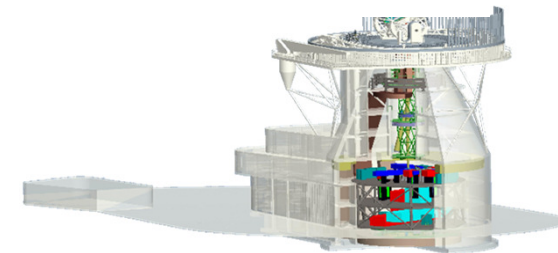
SHABAR AT ORM
ON THE GROUND



SHABAR AT OT
ON THE GROUND

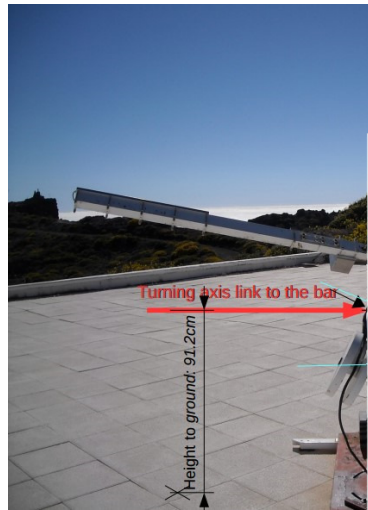


SHABAR AT OT ON TOP
OF AN 8-METRE TOWER

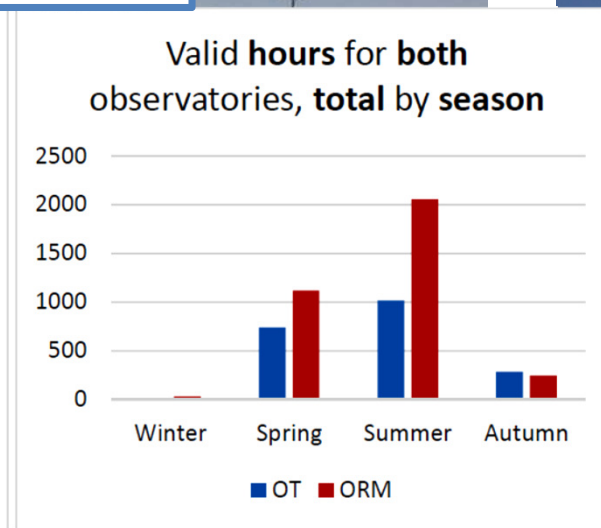
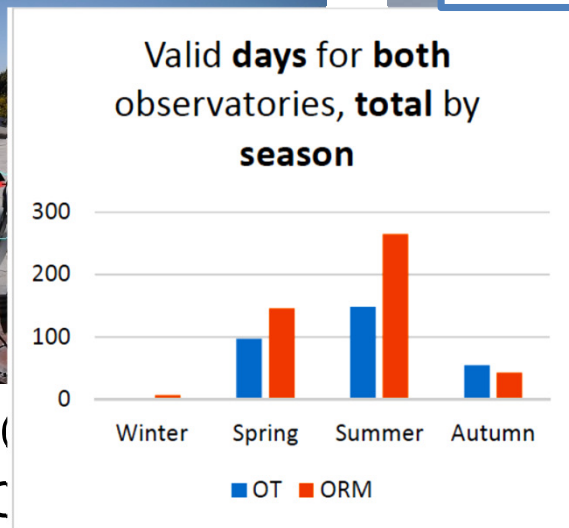


Day-time Shabar Cn2

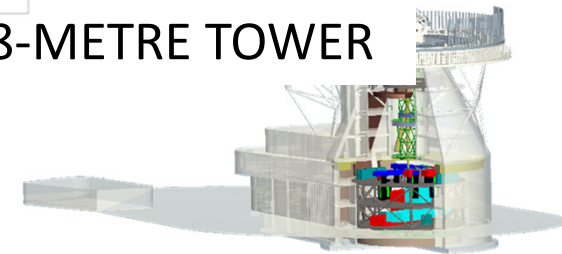
2011-2014



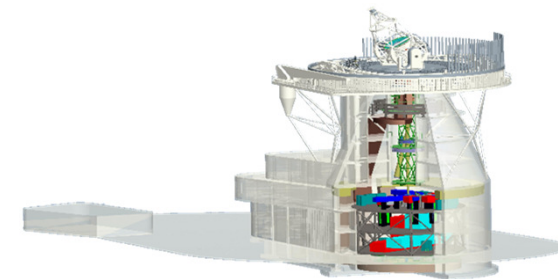
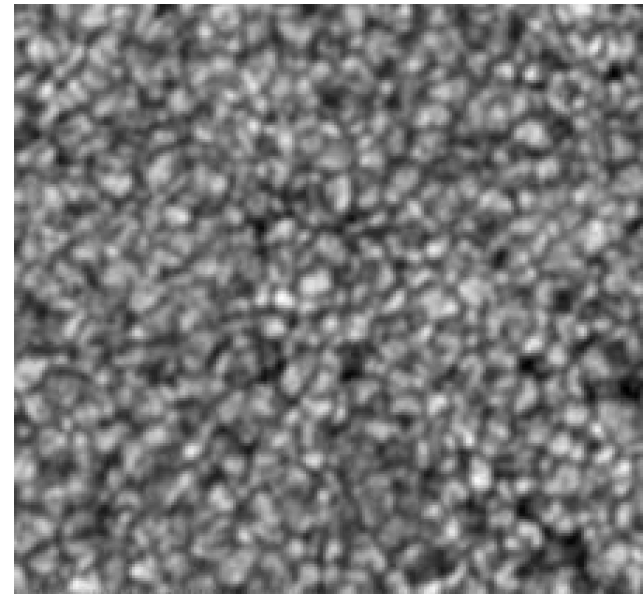
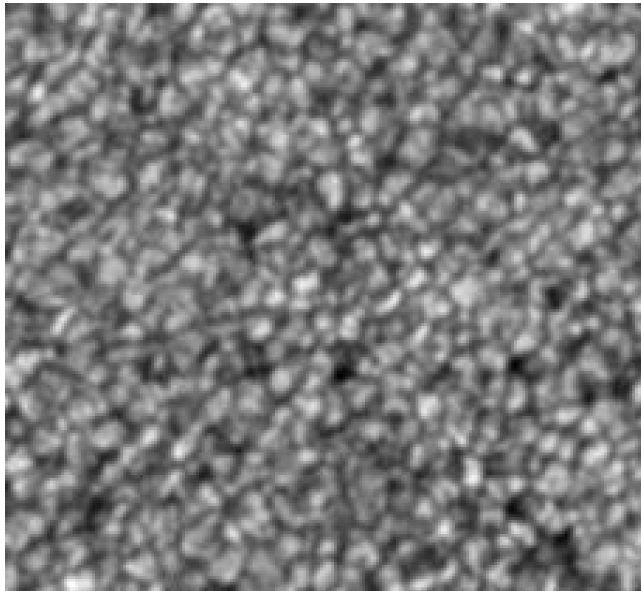
SHABAR AT
ON THE GRO



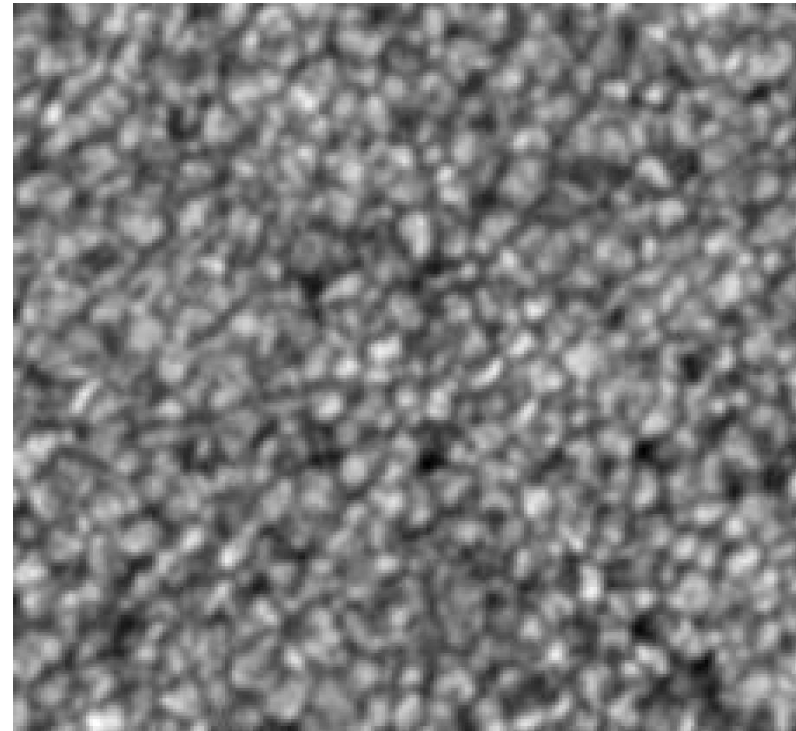
SHABAR AT OT
ON TOP OF AN
8-METRE TOWER



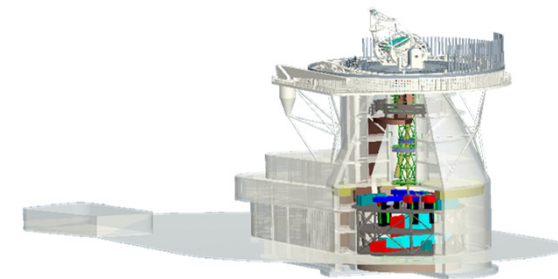
Day-time WFWFS (2018-2019)



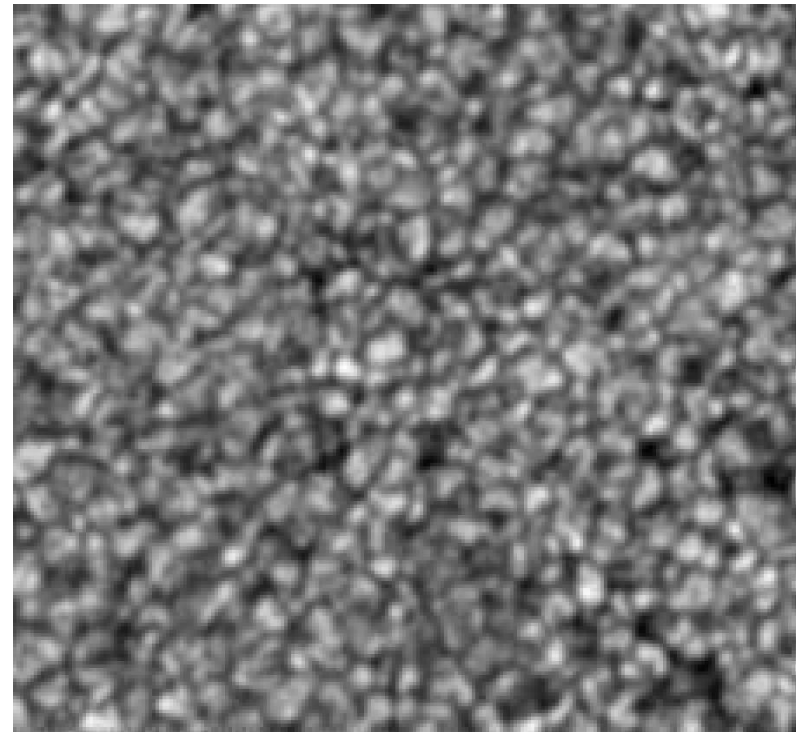
Day-time WFWFS (2018-2019)



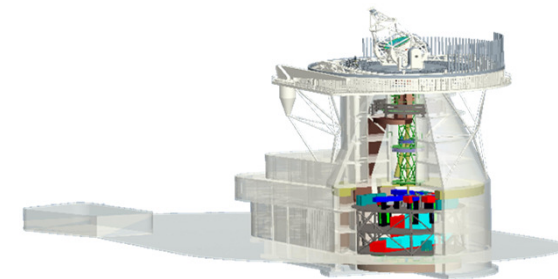
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Day-time WFWFS (2018-2019)



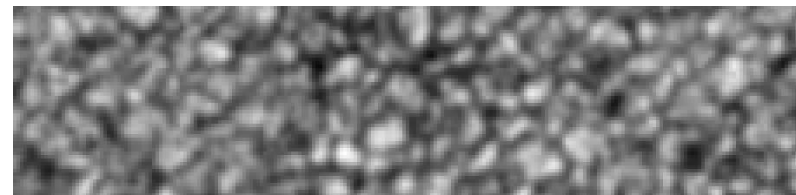
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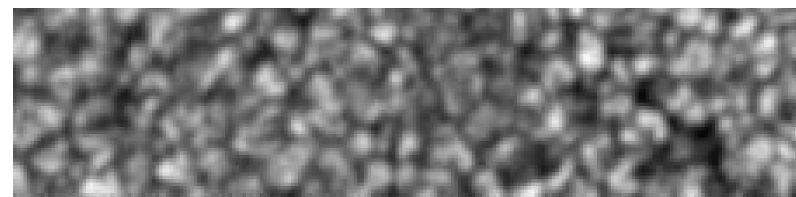
Day-time WFWFS (2018-2019)



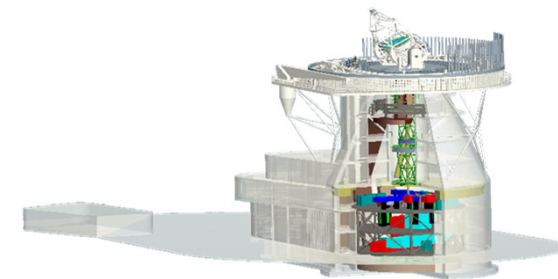
WFWFS operating at SST and VTT



SITE DECISION: END OF 2019



2



Communication



www.est-east.eu

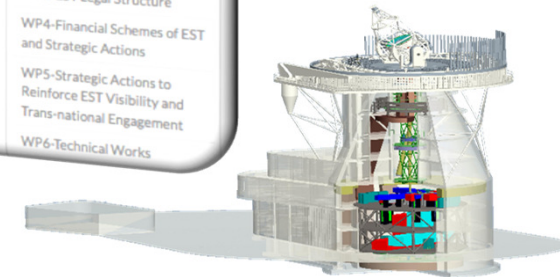
The top screenshot displays the 'PROJECT LEGAL DOCUMENTATION' page. The sidebar on the right includes sections for 'RESTRICTED AREA' (General information, Logout), 'DOCUMENTATION' (Legal Documentation, PRE-EST Templates, PRE-EST Logo), 'GOVERNING AND ADVISORY BODIES' (Governing and Advisory Bodies), 'MEETINGS' (PRE-EST Board meetings, SAG meetings, Executive Committee meetings), and 'WORKPACKAGES' (WP1-Project Coordination and Management, WP2-EST Governance, WP3-EST Legal Structure, WP4-Financial Schemes of EST and Strategic Actions, WP5-Strategic Actions to Reinforce EST Visibility and Trans-national Engagement, WP6-Technical Works).

The bottom screenshot displays the 'PREPARATORY PHASE' page. The sidebar on the right includes a 'PRE-PHASE' section with links for Objectives, Consortium, Governance, Work Packages, and Restricted Area. The main content area features the PRE-EST logo and text describing the preparatory phase's goals.

EST Science Meeting
Giardini Naxos (Sicily)
June 11 – 15, 2018



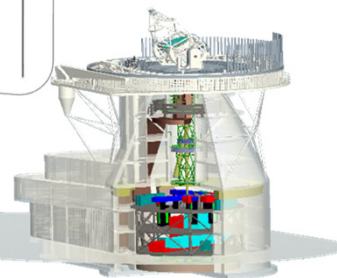
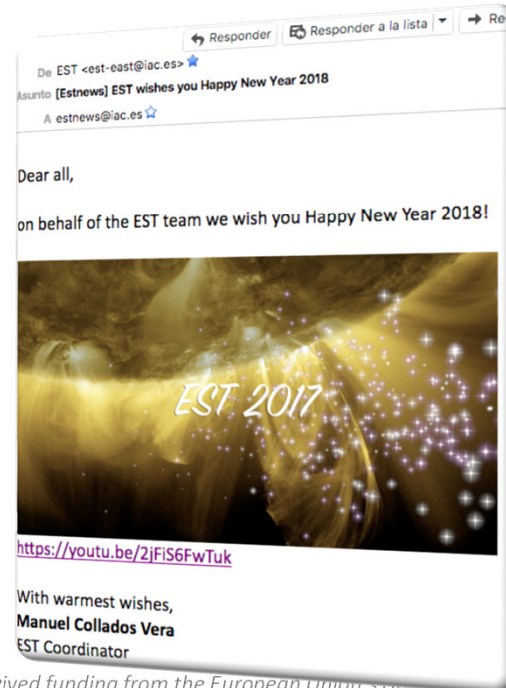
"This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 739500"



Communication



- ESTnews mailing list
- EST NewsLetter
- Support Communication Office

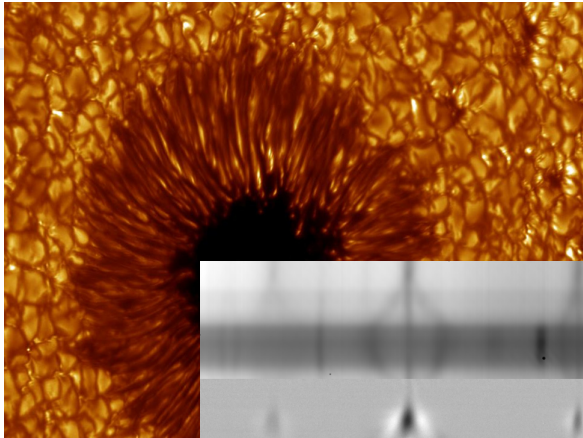


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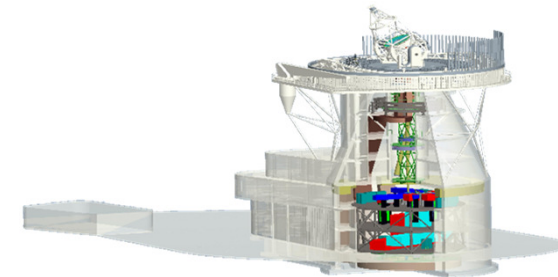
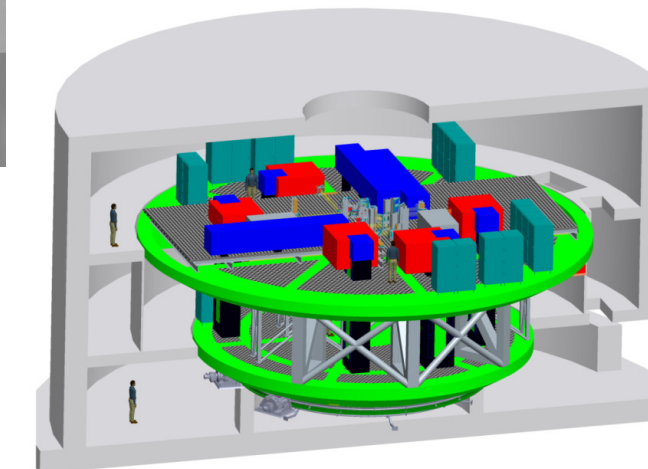
EST key aspects



- Superb spatial resolution

- Excellent polarimetric performance

- Adequate set of instruments

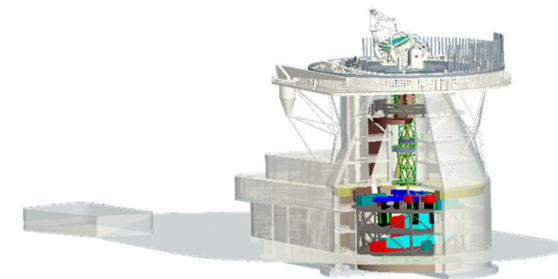
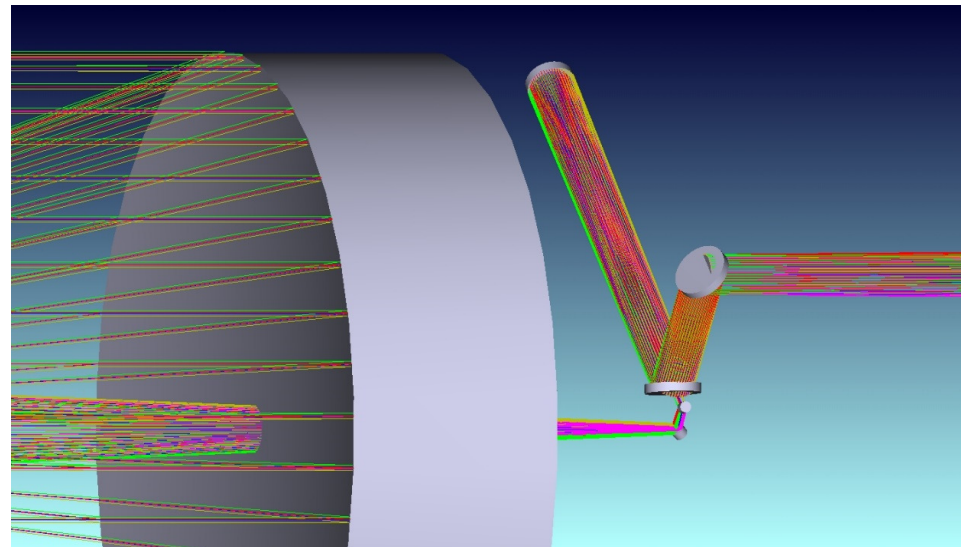


EST properties



➤ Telescope Mueller Matrix is **Unity** for all wavelengths and independent of:

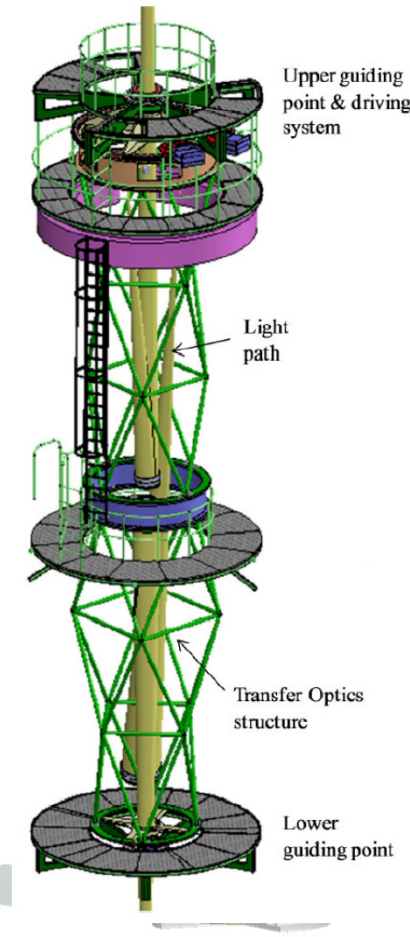
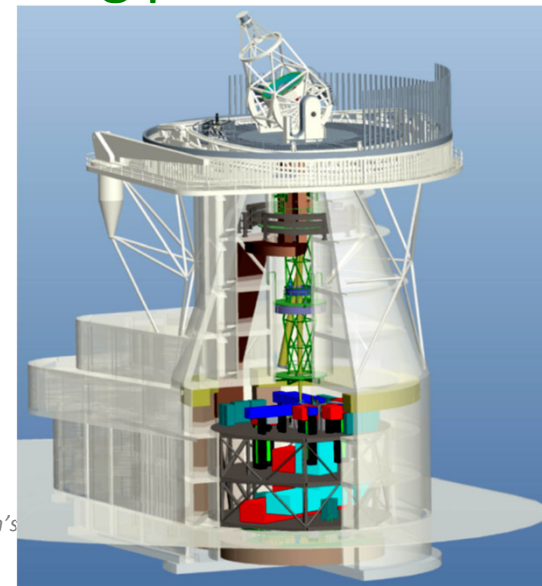
- Elevation
- Azimuth



EST properties



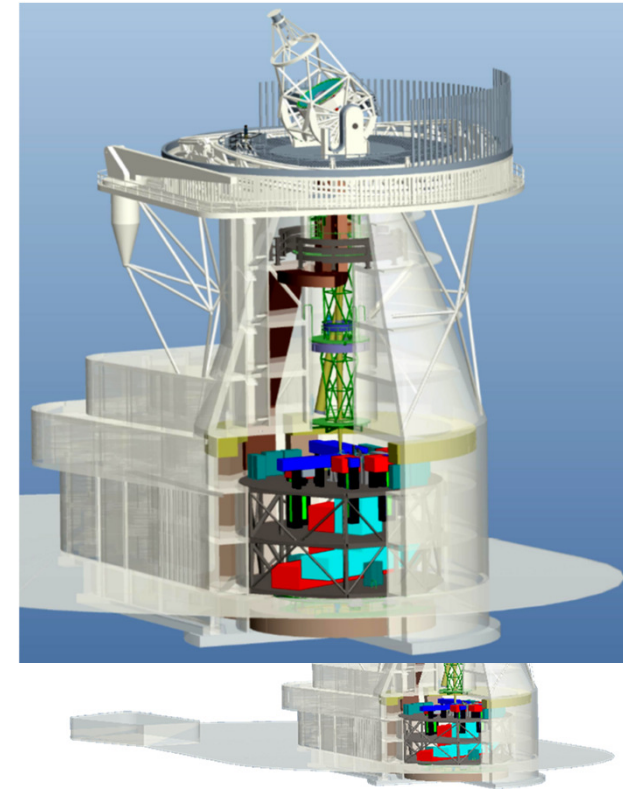
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- The transfer optics represents a **de-rotator** with Mueller matrix **Unity** (7 mirrors) \Rightarrow no rotating platform is needed for instruments



EST properties



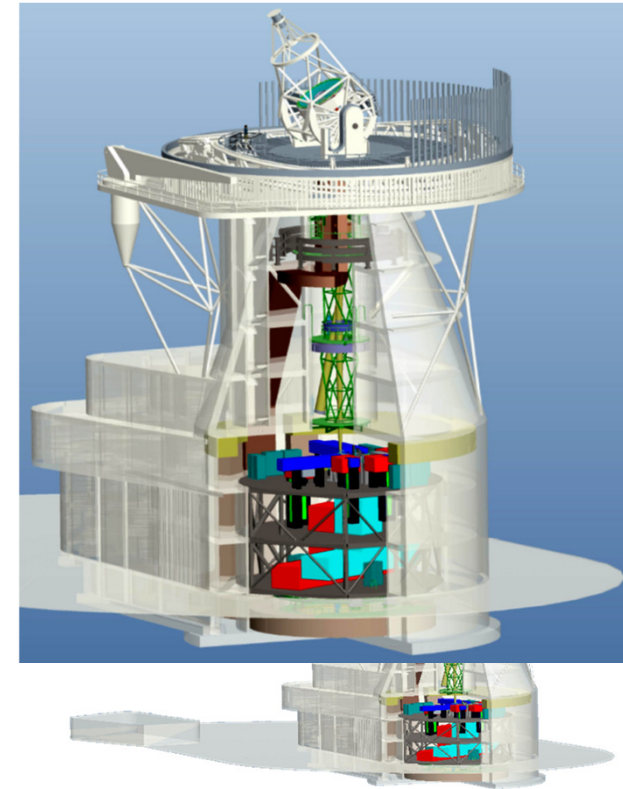
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- Instruments are fixed \Rightarrow **larger stability**
- Polarimeters may be located in any place \Rightarrow **flexibility**



EST properties

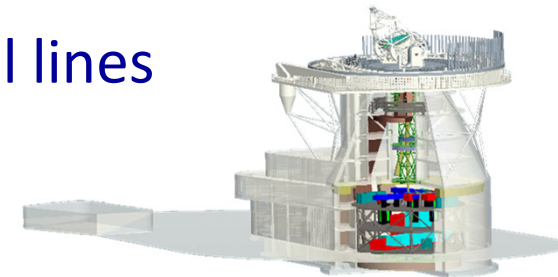


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- Instruments are fixed \Rightarrow **larger stability**
- Polarimeters may be located in any place \Rightarrow **flexibility**
- 5 DM's \Rightarrow **most powerful AO/MCAO system**



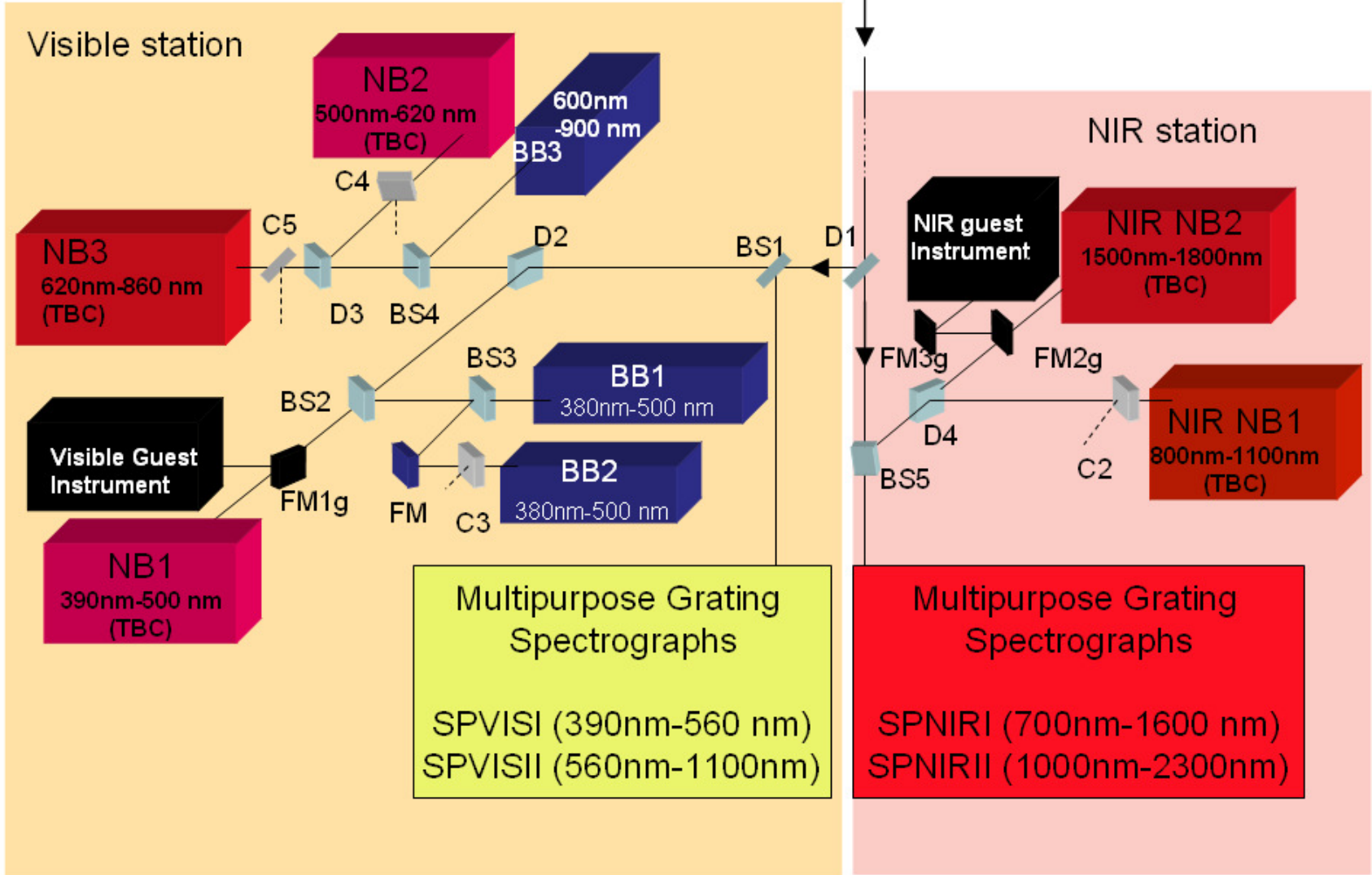
EST Instruments

- **Instruments:**
 - Broad-band imagers
 - Narrow-band tunable filter spectropolarimeters
 - Grating spectropolarimeters
- **Number of instrument channels:**
 - Broad-band imager: 3
 - Visible narrow-band filter ($\lambda < 1100$ nm): 3
 - NIR narrow-band filter ($\lambda > 700$ nm): 2
 - Visible spectrograph ($\lambda < 1100$ nm): > 5 spectral lines
 - NIR spectrograph ($\lambda > 700$ nm): > 3 spectral lines

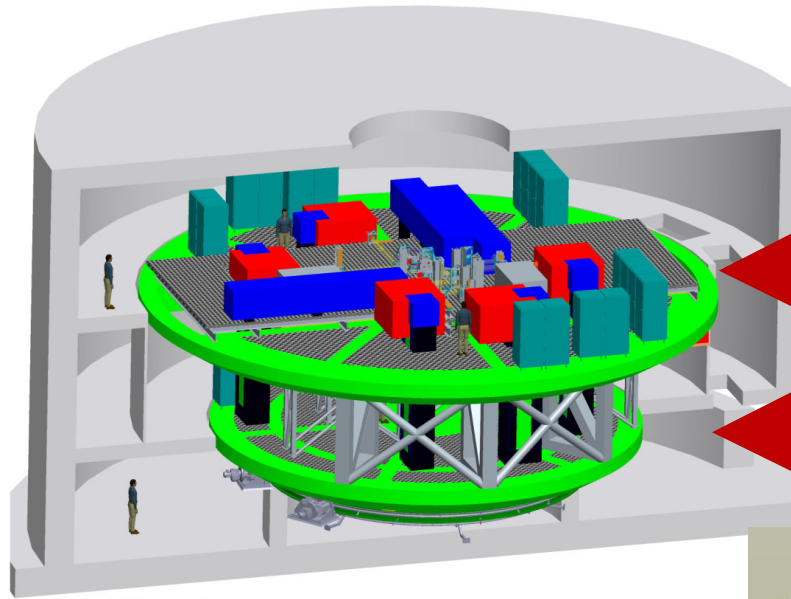


Light Distribution

Light beam from telescope

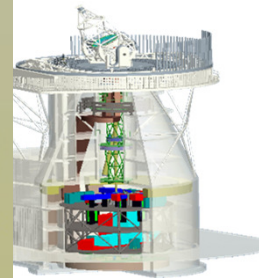
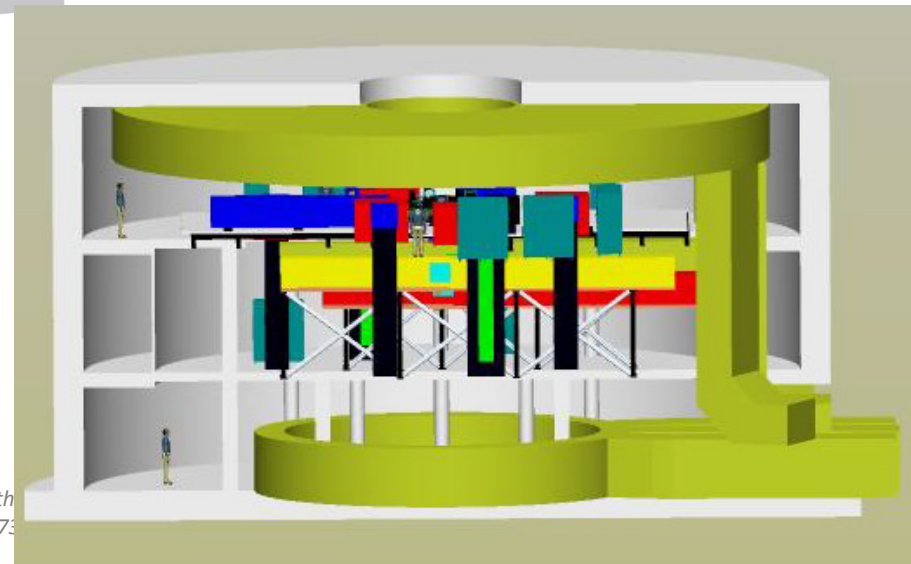


Instruments distribution



Imagers (BB and NB)

Spectrographs

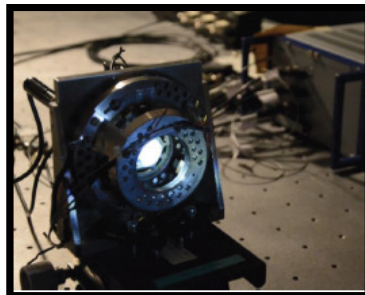
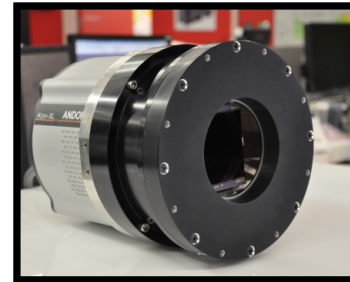


Instrumental developments

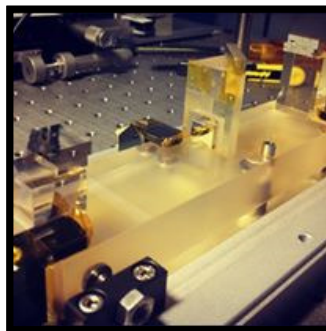


Boosting **new generation of detectors:**

Large format, High precision, Low noise.



Development of a large **Fabry-Perot prototype** for a high mechanical stability and high quality control of the parallelism of the etalon plates.



Development of **large format liquid-crystal modulators (LCVR)**

New techniques for 2D solar spectro-polarimetry

