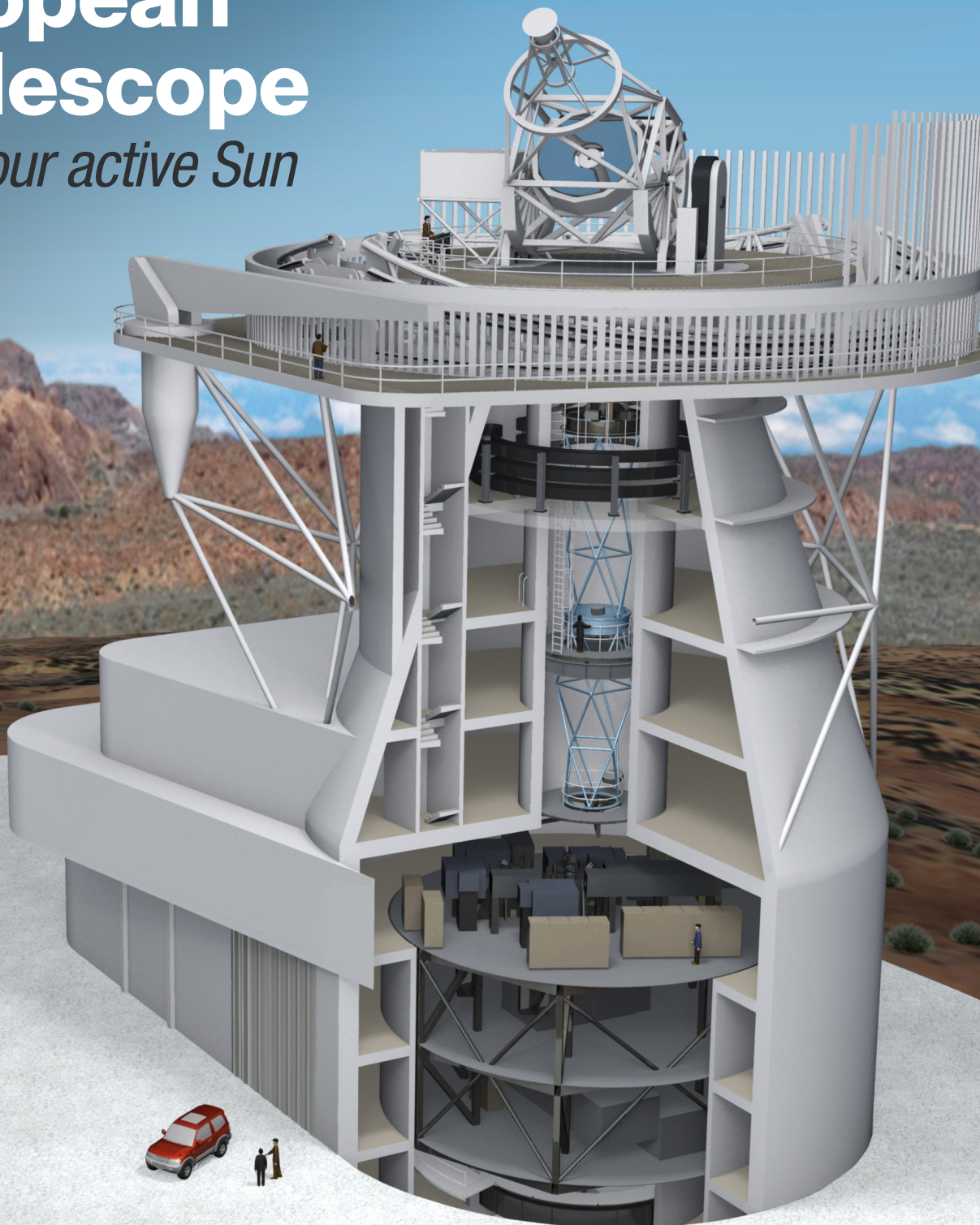


# The European Solar Telescope

*Understanding our active Sun*

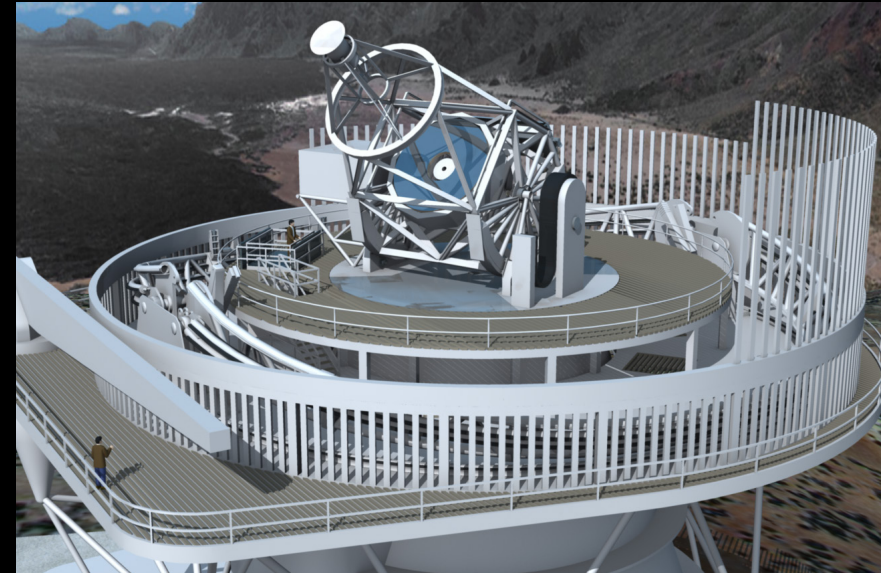


# EST

## European Solar Telescope

EST, the European Solar Telescope, will be the largest telescope ever built in Europe to observe the activity processes taking place on the Sun.

EST will have a 4-m primary mirror and the most advanced technology available, giving astronomers the most powerful tool ever conceived for observing the Sun.

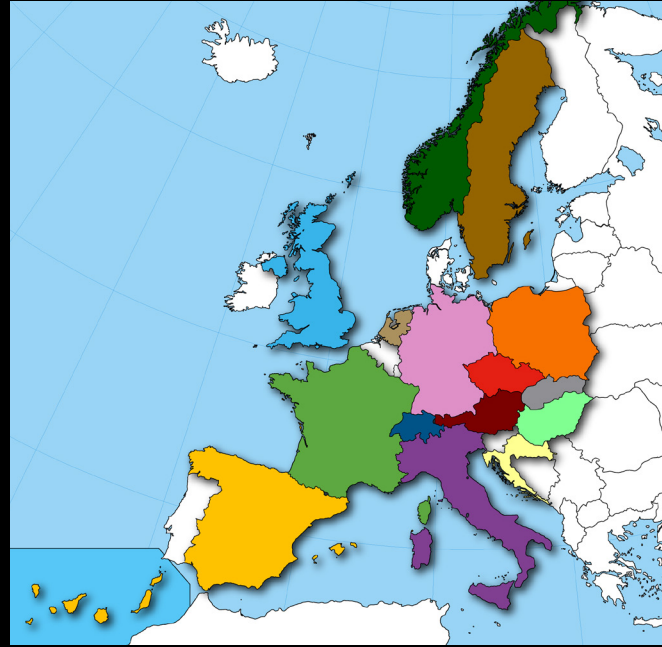


# EAST

## European Association for Solar Telescopes

The European Association for Solar Telescopes (EAST), founded in 2006 and currently formed by solar physicists from 15 European countries, aims at providing European solar astronomers with access to world-class high-resolution ground-based observing facilities.

In order to achieve that goal, EAST intends to develop, construct and operate a next-generation large-aperture European Solar Telescope (EST) in the Canary Islands. European solar physicists share a consensus about the need for a such next-generation facility and its technical requirements.

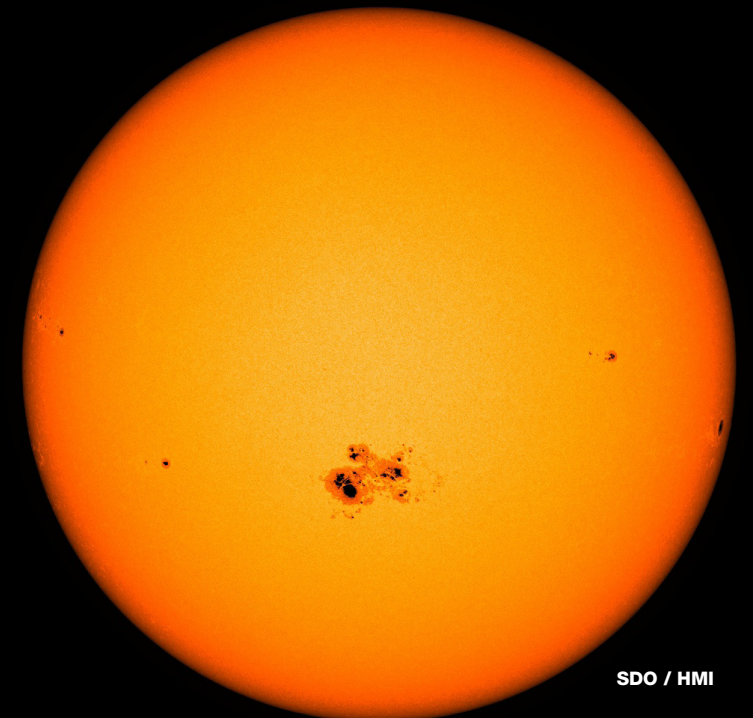


<b>Austria</b>	<b>IGAM</b>	Institutsbereich Geophysik, Astrophysik und Meteorologie der Univ. Graz
<b>Croatia</b>	<b>HVO</b>	Hvar Observatory, Hvar
<b>Czech Republic</b>	<b>AIASCR</b>	Astronomical Institute AS CR, v.v.i.
<b>France</b>	<b>THEMIS</b>	INSU-CNRS, THEMIS S.L.
<b>Germany</b>	<b>KIS MPS AIP</b>	Kiepenheuer-Institut für Sonnenphysik, Freiburg Max-Planck-Institut für Sonnensystemforschung, Göttingen Leibniz Institut für Sonnenphysik, Potsdam
<b>Great Britain</b>	<b>UCL-MSSL</b>	University College London - MSSL
<b>Hungary</b>	<b>DHO</b>	Debrecen Heliophysical Observatory
<b>Italy</b>	<b>INAF</b>	Istituto Nazionale di Astrofisica, Rome
<b>Netherlands</b>	<b>UU</b>	Utrecht University, Sterrekundig Instituut Utrecht
<b>Norway</b>	<b>ITA</b>	Institute of Theoretical Astrophysics, Oslo
<b>Poland</b>	<b>IA UW</b>	Astronomical Institute of the Wroclaw University, Wroclaw
<b>Slovakia</b>	<b>AISAS</b>	Astronomical Institute of the Slovak, Academy of Sciences
<b>Spain</b>	<b>IAC IAA</b>	Instituto de Astrofísica de Canarias, La Laguna Instituto de Astrofísica de Andalucía, Granada
<b>Sweden</b>	<b>SU</b>	The Institute for Solar Physics, Stockholm
<b>Switzerland</b>	<b>IRSOL</b>	Istituto Ricerche Solari Locarno

## Why to study the Sun?

The Sun gives us light and energy, which are indispensable for life on Earth. It is a very dynamic and active system with changes and perturbations that could potentially have dramatic consequences for our civilization. There are many reasons to study the processes taking place on the Sun. Some of them are:

- The Sun is an excellent laboratory of plasma physics, where we can observe interactions between plasmas and magnetic fields in conditions that cannot be reproduced in laboratories or numerical simulations.
- The Sun as a star is a fundamental model for understanding the rest of the Universe. It serves as a reference in terms of chemical composition, structure and evolution models, etc.
- Disturbances in the solar wind buffet the Earth's magnetic field and pump energy into the radiation belts, potentially disrupting satellites, electric power grids or electronic equipment on Earth.
- Its connection with the Earth's climate.



SDO / HMI

SST / IAC

# Projects



Project FP7 “EST: The large aperture European Solar Telescope”, focused on the conceptual design study of EST, and was completed in 2011. This project successfully demonstrated the scientific, technical and financial feasibility of EST.

The conceptual design was possible thanks to the co-funding allocated specifically by the EU and the combined efforts of many scientists and engineers committed to developing new ideas to make this facility a unique infrastructure to study the Sun.



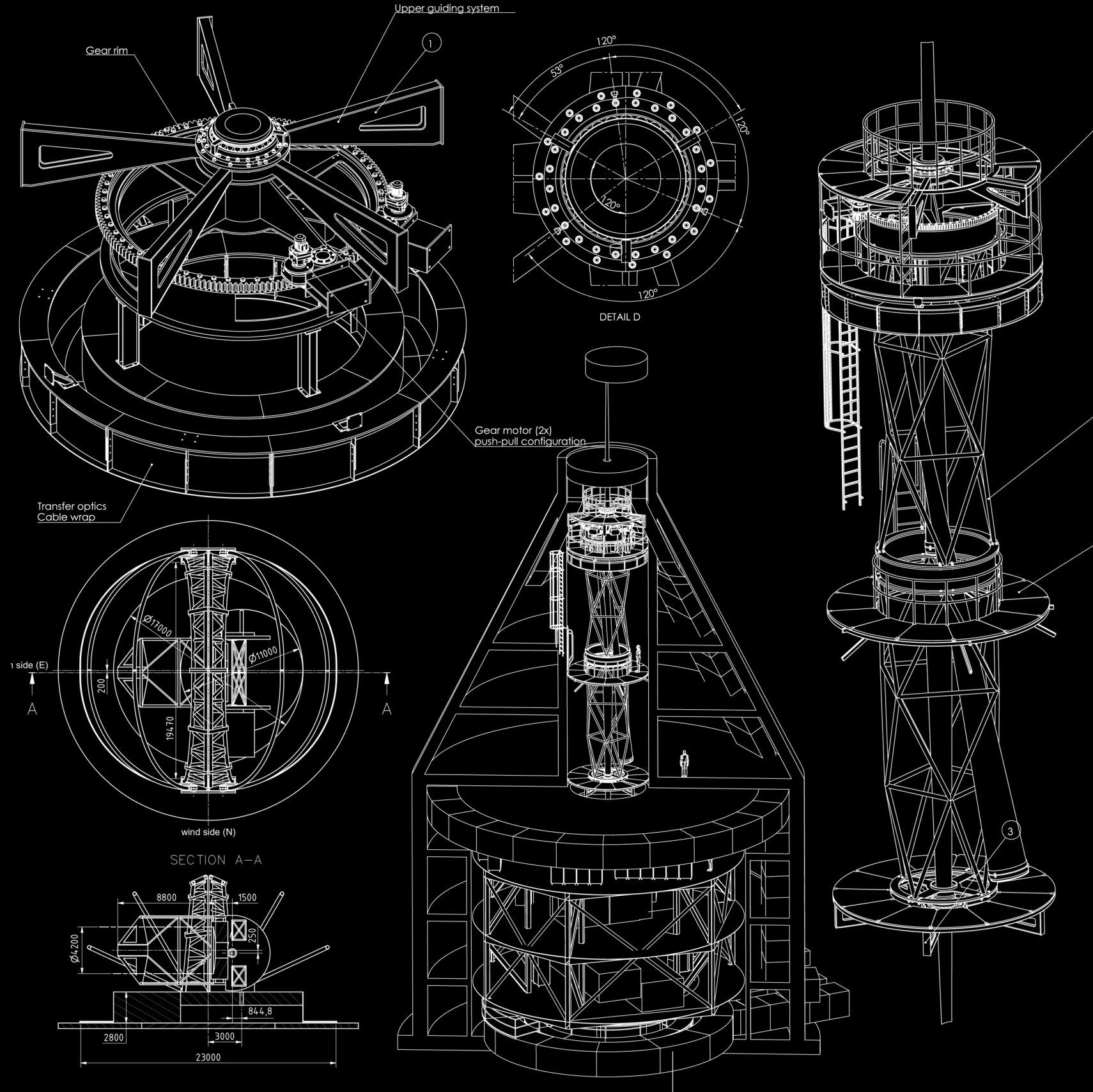
Project FP7 “SOLARNET – High-resolution Solar Physics Network” is an ongoing project with the goal of integrating all the major European infrastructures in the field of high-resolution solar physics.

SOLARNET was conceived as a framework to ensure that all European solar physicists have access to state-of-the-art facilities and data archives, as well as a source for collaborations aiming at the development of tools and prototypes for innovative instruments and data processing of importance for the future operation of EST.



Project H2020 “GREST – Getting Ready for the EST” is an ongoing project to take the European Solar Telescope to the next level of development by advancing in crucial activities to improve the performance of current state-of-the-art instrumentation. Legal, industrial and socio-economic issues are addressed as key questions for the building of EST.

**Other EST related studies** – “Report on Technical, Financial and Socio-Economic Aspects of the EST”, produced in the context of the conceptual design phase for the EST. This report is a result of an intensive analysis and data collection on industrial and socio-economic aspects related to the construction and operation of the European Solar Telescope.



# The Canary Islands

The Canary Islands observatories (Roque de los Muchachos Observatory on La Palma and Teide Observatory on Tenerife) are first-class locations to host the EST because of the sky quality and excellent conditions for astronomical observations at these sites. Continuous monitoring and characterization of the sky quality has been conducted for many years now. The sky quality is also protected by a National Spanish Law.

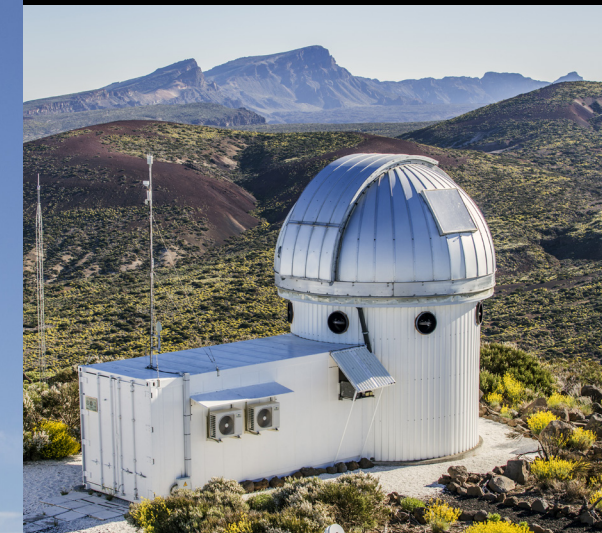
The Canary Islands Government supports the construction of EST and has included it in the Regional Research and Innovation Strategy for Smart Specialization (RIS3) as a large-scale infrastructure to be installed in one of the Canarian observatories.

## Sky protection in the Canary Islands

The Spanish Government, at the request of the Canary Islands Parliament, passed the Law for the Protection of the Astronomical Quality of the IAC Observatories (Law 31/88) on the 31st October 1988, and on the 13th March 1992 the Regulations enforcing it (R.D. 243/1992).

The Law contains a range of measures designed to assure the outstanding quality of the observatories of the “Instituto de Astrofísica de Canarias”, as recommended by the International Astronomical Union.

This law makes the IAC’s Observatories a legally protected site (in effect an astronomical “reserve”), where continued dark skies, low radio frequency fields, and control over other sky-polluting effects (including aircraft flight paths) are guaranteed.



## Opportunities

Siting the EST at the Canary Islands observatories will reinforce Spain’s current role in solar Physics and foster scientific and technological development, with quantifiable economic returns through the creation of highly skilled jobs and increasing the number of special services.

For the Canarian and European industries, the construction of the EST will be an attractive scenario of technological opportunity including, in addition to the ordinary operational expenses, production of mirrors, actuators and sensors, large mechanical structures, adaptive optics and post focal instrumentation, active support systems, guiding and precision mechanisms, system integration, etc.



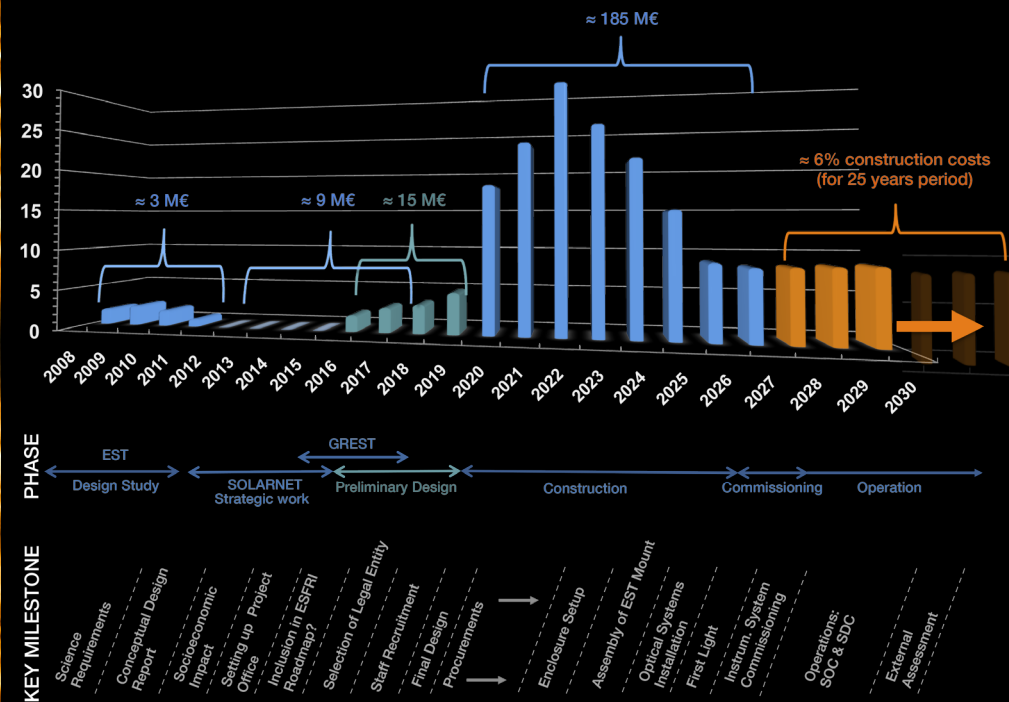
# EST - ESFRI

ESFRI (European Strategy Forum on Research Infrastructures) is a strategic instrument to develop the scientific integration of Europe and to strengthen its international outreach.

The EST project has been proposed for inclusion in the ESFRI Roadmap 2016 update.

A positive decision on this matter, expected by spring 2016, would imply a major boost towards the assurance of the financial feasibility of this trans-national project, as well as priority within the corresponding national policies on large-scale research infrastructures.

## EST Timeline: Design, construction and operation





**more information:**

[www.solarnet-east.eu](http://www.solarnet-east.eu)

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SDO