


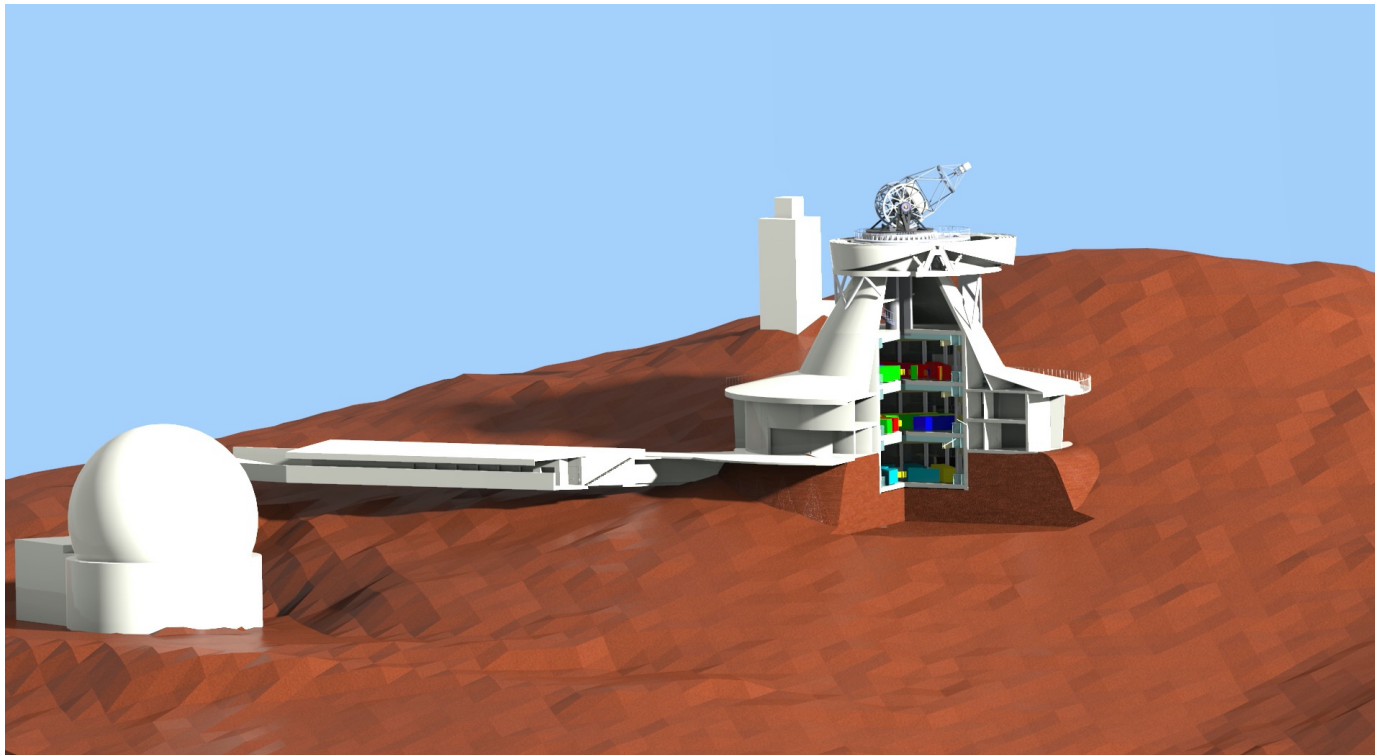
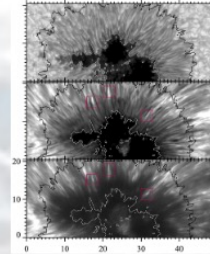


A project included in the  Roadmap

EST - EUROPEAN SOLAR TELESCOPE



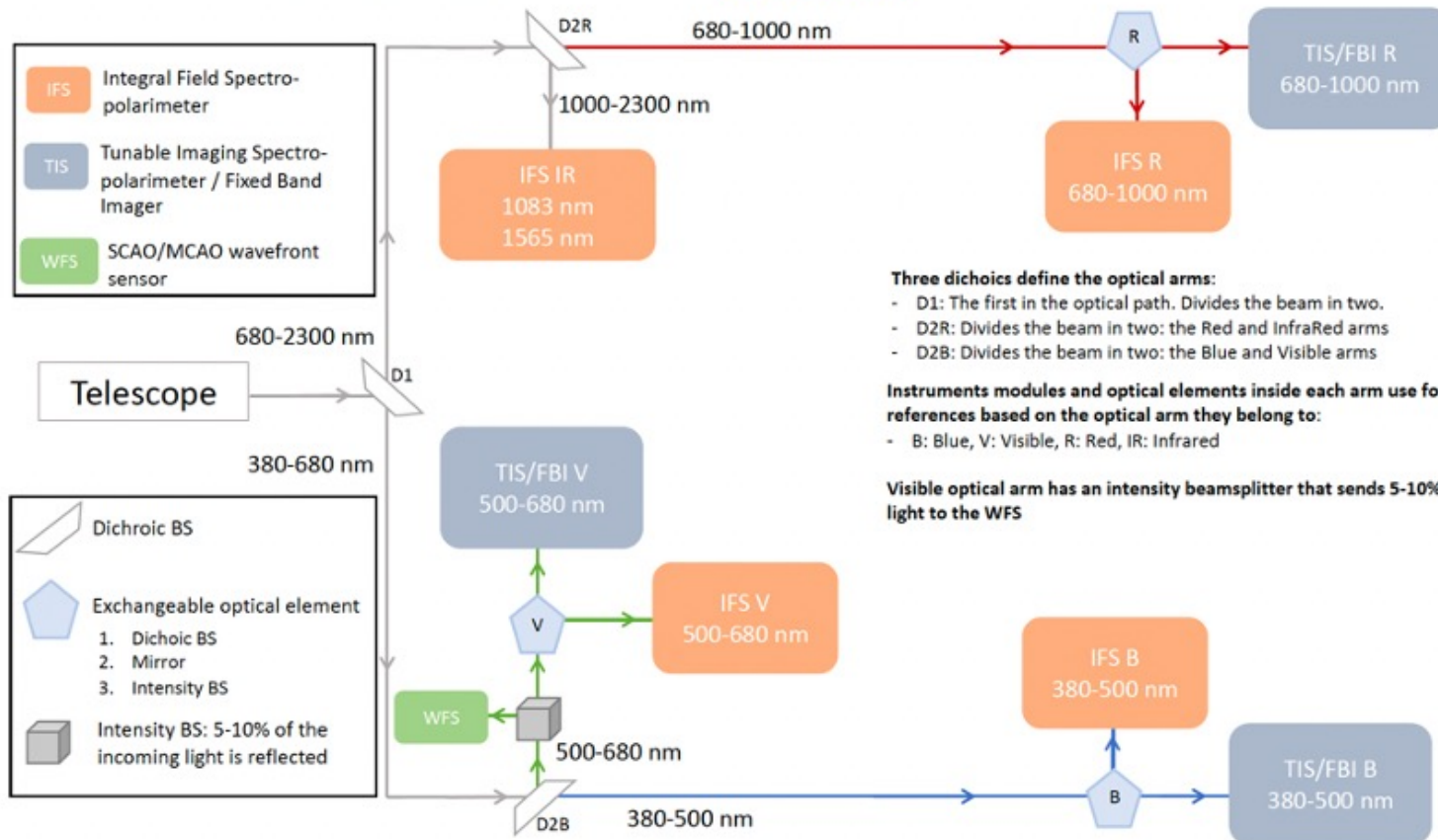
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on behalf of the Italian Teams
of EST, GRESt, PRE-EST, SOLARNET



Summary of EST future capabilities

Telescope	On axis Gregorian telescope
Aperture	4.2 m with a central obscuration of 1.1 m
Secondary mirror	ASM with 5 degrees of freedom (piston, δx , δy , and tip-tilt)
Mount	Altitude-azimuth mount
FOV	125" diameter
AO	MCAO
Spatial resolution	Diffraction limited at 0.025" at 500 nm
Polarimetric accuracy	5×10^{-4} of I_c
Spectral range	380-2300 nm
Observations	Multi-wavelength simultaneous observations
Coudé lab	Non-rotating platform
Instruments	1. Integral Field Spectropolarimeters, 2. Tunable Imaging Spectropolarimeters, 3. Fixed Band Imagers
Polarimeters	Polarimeter(s) in the blue, visible, red and near-infrared
Lifetime	At least two Hale solar cycles, i.e. 44 years

Light distribution and instrument suite inside the Coudé room of EST.



Summary of the Tunable Imaging Spectropolarimeter general requirements

Spatial resolution	Diffraction limit in each optical arm
FOV	60'' × 60''
Cycle time	A measurement cycle per spectral line of 20 s (goal: 10 s)
Spectral resolution	Minimum of 50000
Wavelength samples	10 per line including a nearby continuum point
Number of filters per module	At least 5
Reference spectral lines	<ol style="list-style-type: none">1. Blue: Ca II 396 nm, Ba II 455 nm, Sr I 461 nm, H_β 486 nm2. Visible: Mg I 517 nm, Na I 589 nm, Fe I 630 nm, H_α 656 nm3. Red: Fe I 709 nm, K I 770 nm, Ca II 854 nm
Broadband reference camera	Each module has 2 reference broadband cameras to perform image reconstruction techniques
Operation modes	<ol style="list-style-type: none">1. Narrowband spectropolarimeter2. Broadband context imager
Polarimetry	Dual-beam to reduce the seeing-induced crosstalk

Role and Leadership of INAF Researchers and INAF Associates since 2008

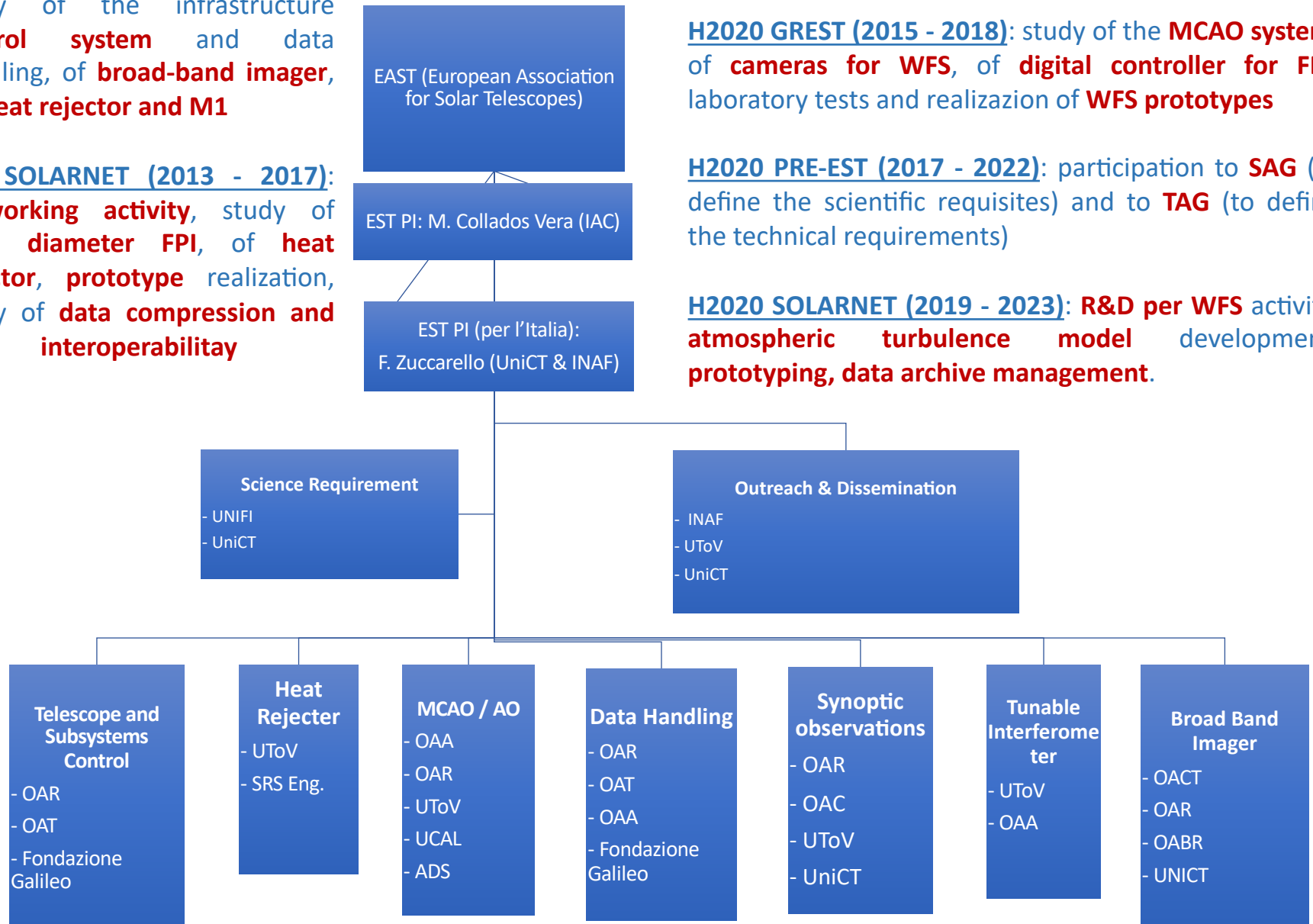
FP7 EST (2008 - 2011): design study of the infrastructure **control system** and data handling, of **broad-band imager**, of **heat rejector and M1**

FP7 SOLARNET (2013 - 2017): **networking activity**, study of large **diameter FPI**, of **heat rejector**, **prototype** realization, study of **data compression and interoperability**

H2020 GREY (2015 - 2018): study of the **MCAO system**, of **cameras for WFS**, of **digital controller for FPI**, laboratory tests and realization of **WFS prototypes**

H2020 PRE-EST (2017 - 2022): participation to **SAG** (to define the scientific requisites) and to **TAG** (to define the technical requirements)

H2020 SOLARNET (2019 - 2023): **R&D per WFS** activity, **atmospheric turbulence model** development, **prototyping, data archive management**.



EST Timeline, People and Funds

- Project started in: 2008 – First light planned for 2028 - 2029
- ~ 620 European researchers; ~ 40 Italian researchers; 3 Italian SME involved in FP7 and H2020 related projects
- Opportunity for in-house R&D and technologic transfer (MCAO, optomechanic design, big data, data mining, instrument control,...)
- Total EC Funds : 26.2 M€; EC funds to Italy:: 3.28 M€

C. Quintero Noda et al. 2022, submitted to A&A

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