



ASTRONET Roadmap (2022- 2035) & MM Astrophysics

S.D. Vergani on behalf of M. Giard (DAS INSU/AA)



ASTRONET: Network of European funding organisations and infrastructures provide strategic planning mechanism and coordination mechanism for all of European astronomy

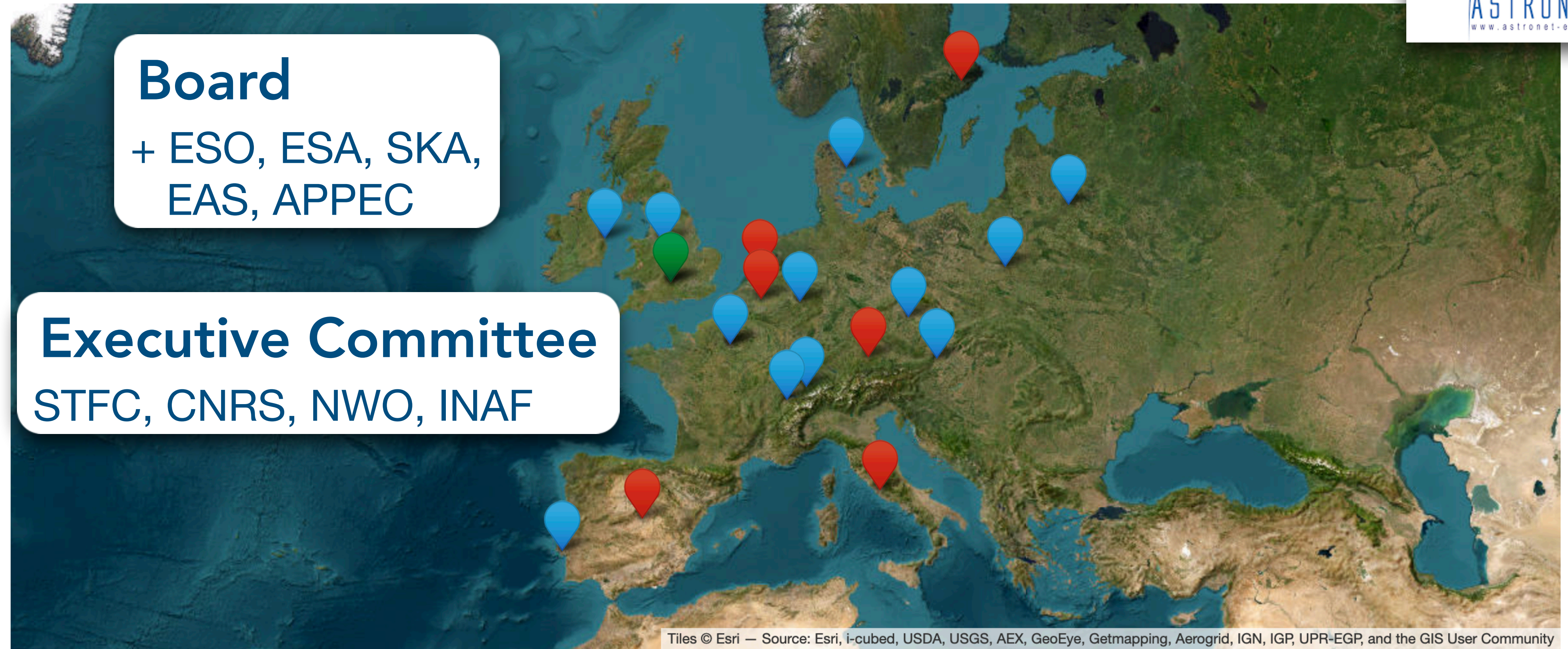


Board




+ ESO, ESA, SKA, EAS, APPEC

Executive Committee

STFC, CNRS, NWO, INAF



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-  : Team members
-  : Observers
-  : Invitees

ASTRONET NETWORK




2016: end of EU fundings —> partnership, in-kind contributions

Last roadmap: 2022-2035

Next board meeting:
24th octobre 2024, Toulouse (IRAP)

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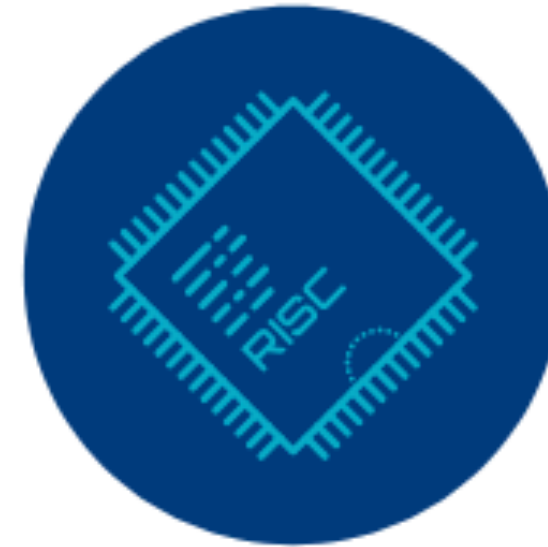
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Roadmap Panels



Computing; big data, HPC and data infrastructure



Origin and evolution of the Universe



Formation and evolution of galaxies



Formation and evolution of stars



Formation and evolution of planetary systems



The solar system and the conditions for life



Extreme Astrophysics



Astronomy and society



Roadmap

Scientific priorities

What is the nature of dark matter and dark energy?

Are there deviations from the standard theories and models (general relativity, cosmological model, standard model of particle physics)?

What are the properties of the cosmic microwave background, first stars, galaxies and black holes in the Universe?

How do galaxies form and evolve, and how does the Milky Way fit in this context?

What are the progenitors of astronomical transients?

What physical and chemical processes control stellar evolution at all stages, from formation to death, and how?

What are the necessary conditions for life to emerge and thrive?
Are we alone?

How do planets and planetary systems form and evolve?

What is the impact of the Sun on the heliosphere and on planetary environments?

What are/were the characteristics and habitability of various sites in the solar system, such as Mars or Jupiter's icy moons?

What is the origin of cosmic rays of all energies?

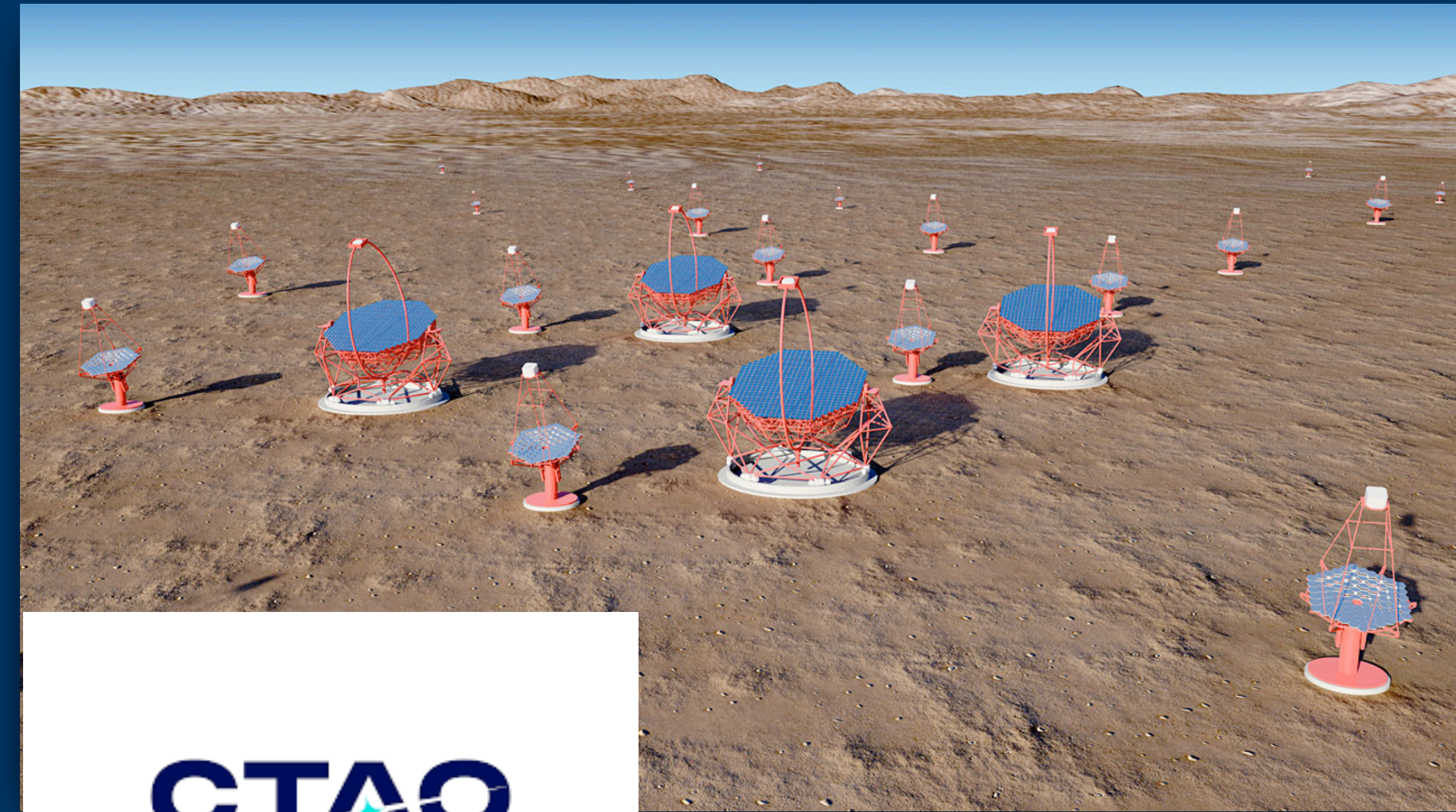
How can extreme astrophysical objects and processes probe new fundamental physics?



Key MM facilities Covering the entire EM spectrum From ground and space

Roadmap

+ current precursors (LOFAR, MeerKAT, MAGIC, H.E.S.S.,...)

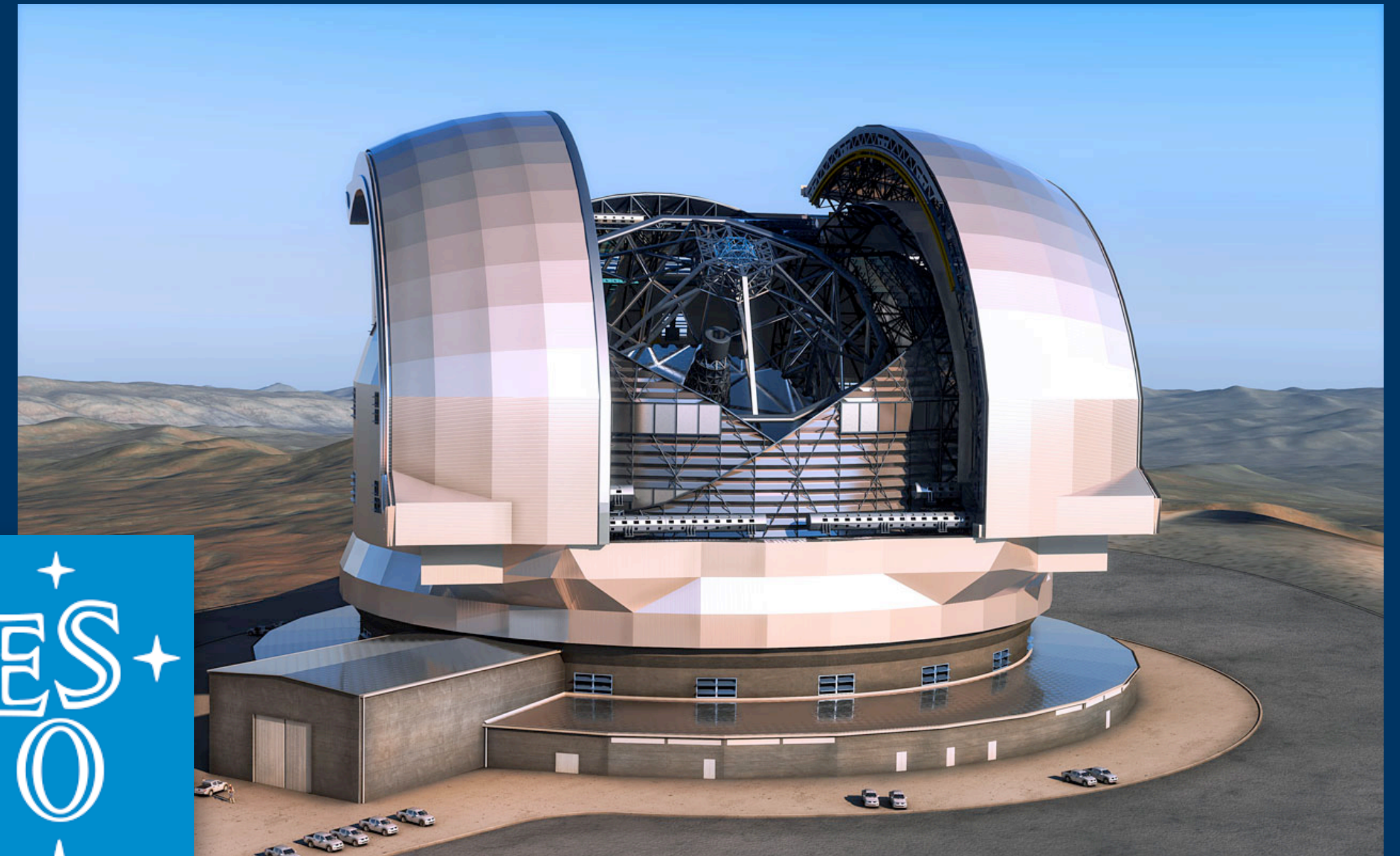
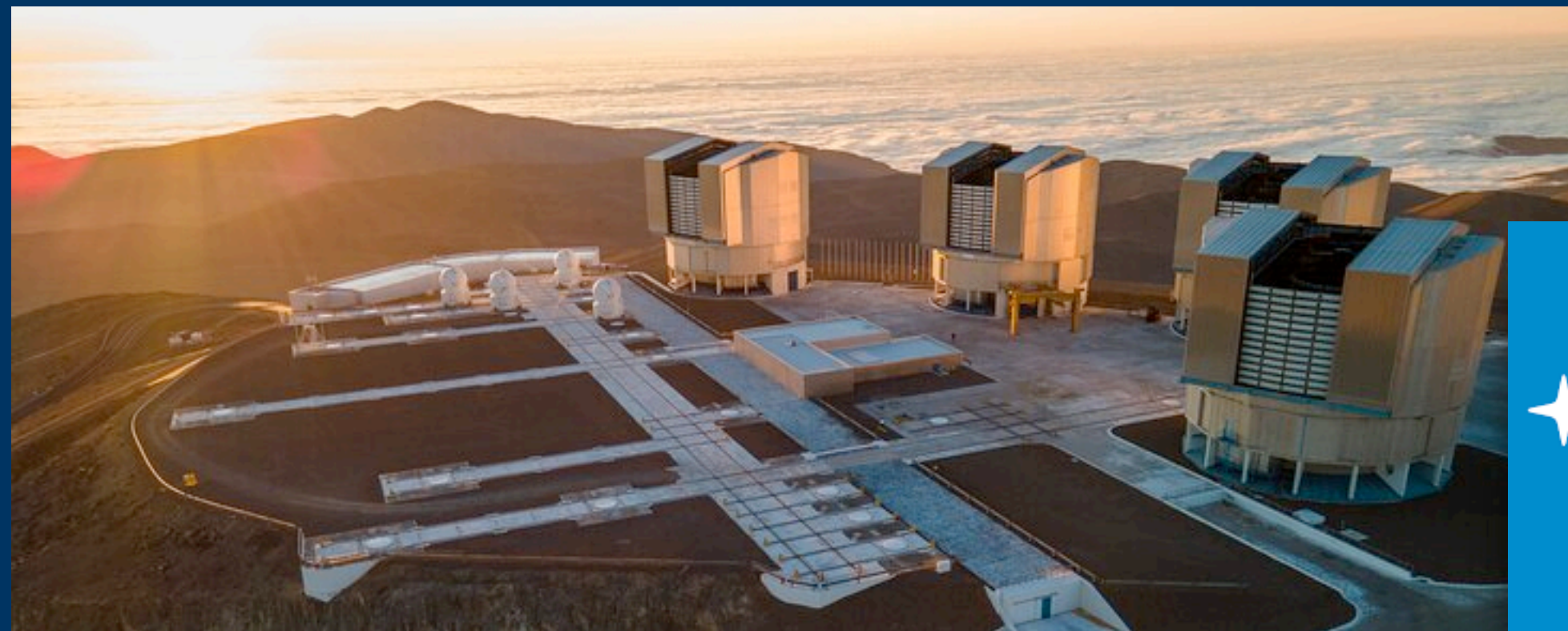




Roadmap

Key MM facilities Covering the entire **EM spectrum** From **ground and space**

+ current VLT, GTC, Vera Rubin Observatory, small robotic telescopes,...

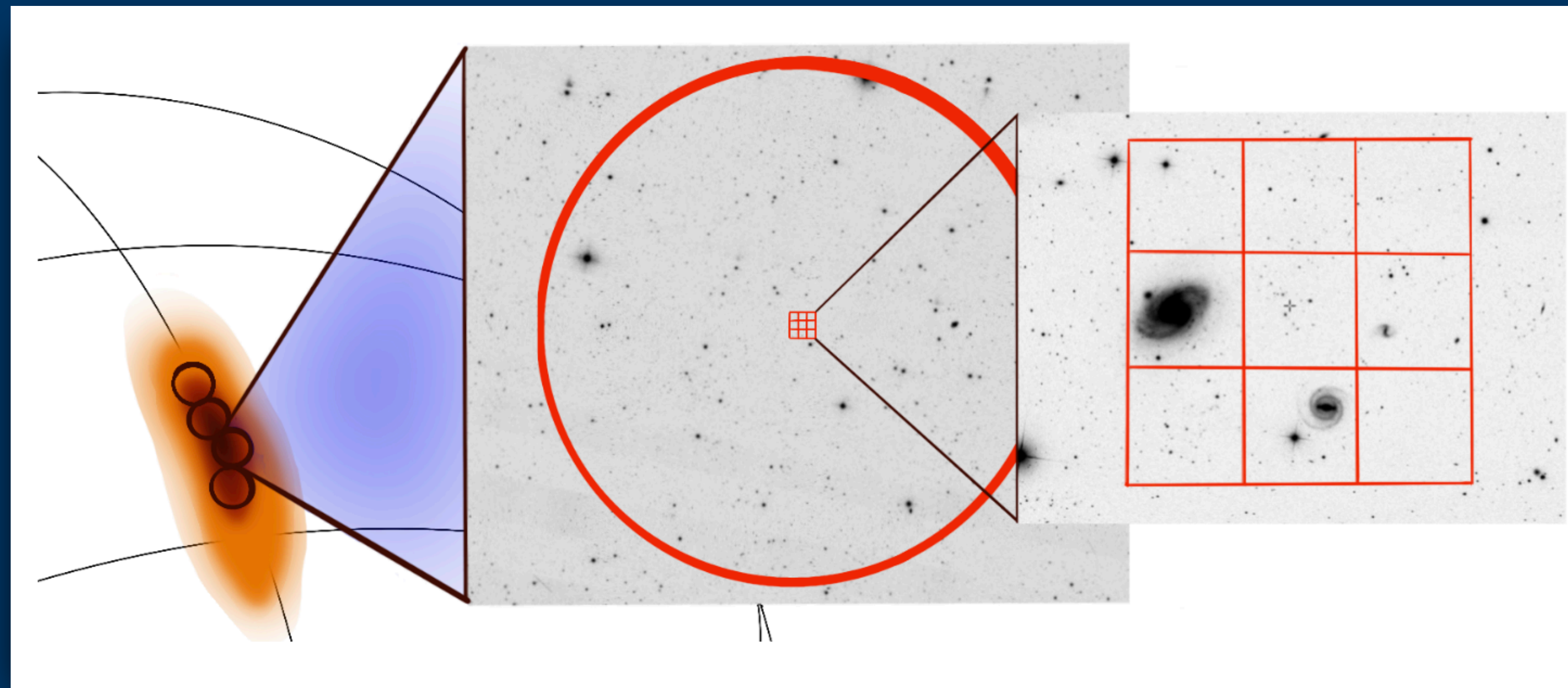




Roadmap

Key MM facilities Covering the entire **EM spectrum** From **ground and space**

general-purpose, wide-field, high multiplex spectroscopic facility



Credits: S. Bisero, WST White Paper



Roadmap

Key MM facilities Covering the entire **EM spectrum** From **ground and space**

+ current HST, JWST, XMM, ...

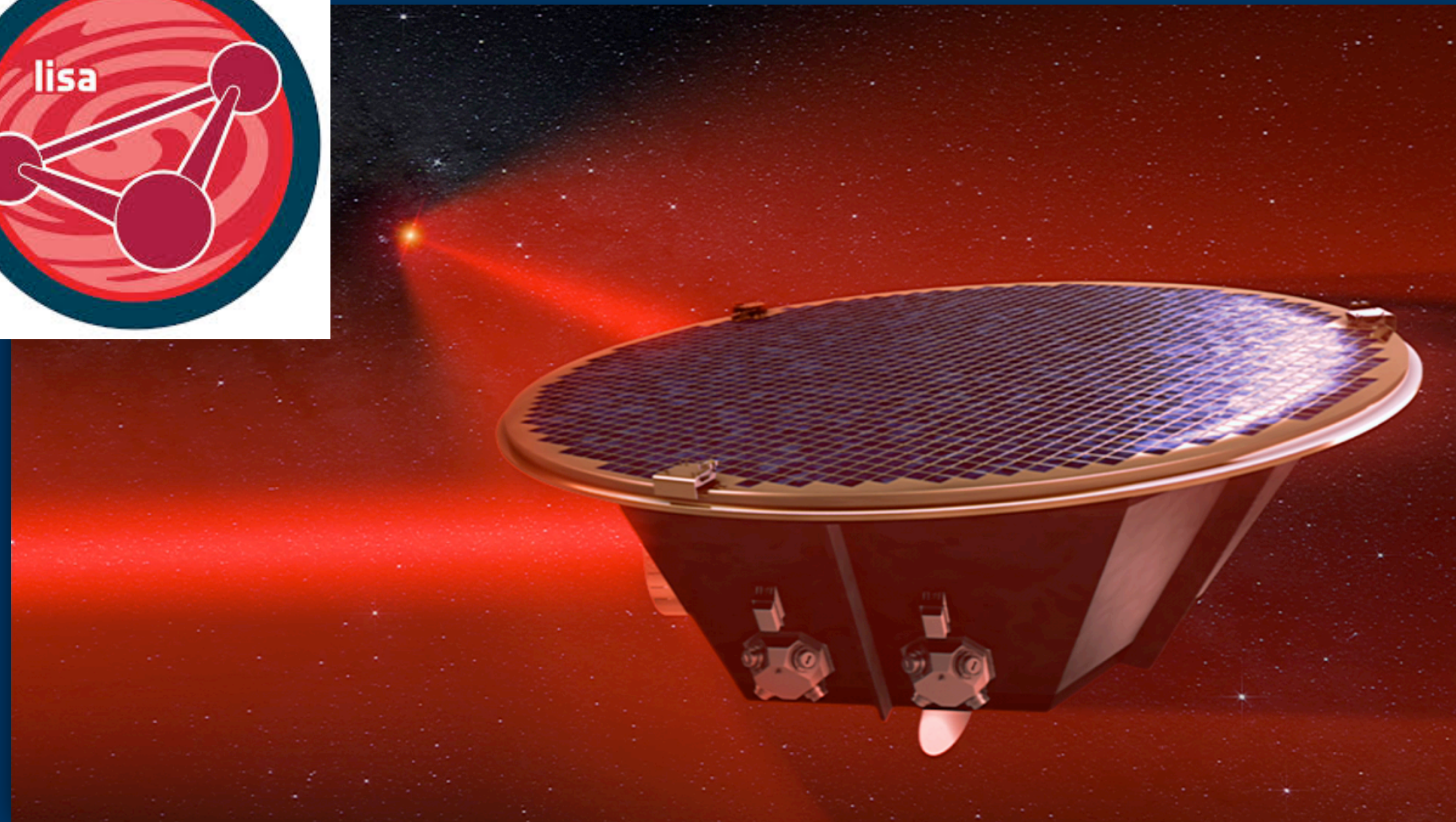


NewATHENA



Key MM facilities Covering the entire EM spectrum but also other messengers

Roadmap





Roadmap

Key MM facilities Covering the entire EM spectrum and **laboratory astrophysics**



In addition to observational facilities, calculations and laboratory measurements of fundamental parameters such as equations of state and high-precision atomic and molecular line lists are required.



Big Science, Big Data

Roadmap

- Mission and facility should integrate plans for science-ready data products and analysis tools, and to be funded for the long-term preservation and exploitation of the scientific data.
- A “tiered” approach for Data Infrastructure should be adopted and developed, for all types of data pertaining to astrophysics, and where beneficial to connect with similar frameworks developed for other disciplines of science.
- The community should work towards a fully collaborative, open and synergistic view of the Astronomy-computing ecosystem. Data and software storage/sharing facilities, archives, and cloud computing platforms are all facets of this integrated framework requiring funding.

GO ACME !

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