

ASTERICS

Astronomy ESFRI & Research Infrastructure Cluster

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what is ASTERICs?

A major collaboration (23 partner institutions) in astronomy, astrophysics and astroparticle physics.

It is funded by EC Horizon 2020 framework at € 15M for 4 years (2015-2019)



Scope of ASTERICs:

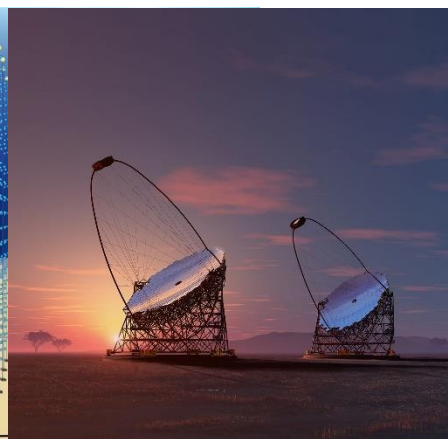
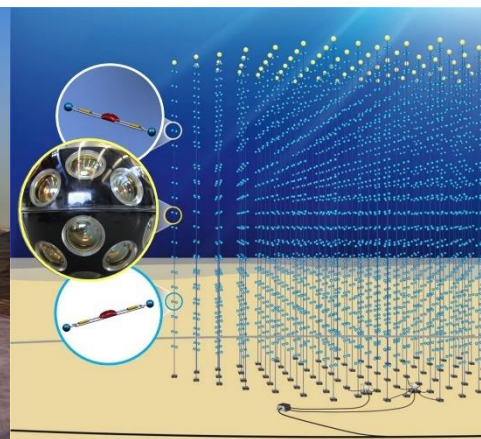
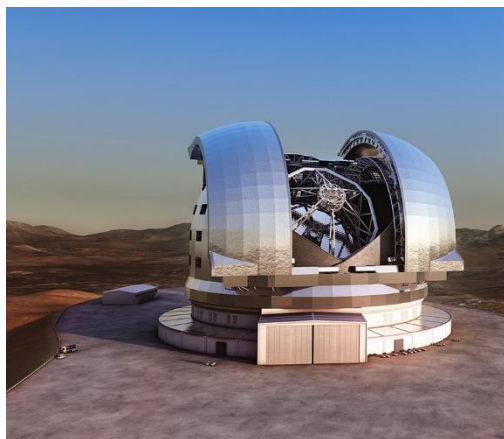
To help solve the **Big Data** challenges of European astronomy
To provide direct interactive access to the best European astronomy data in an international framework

Cross-cutting synergies and common challenges

concept and approach

- Supporting the European Strategy Forum on Research Infrastructures (ESFRI)
- Aspiring ESFRI projects + pathfinders
- Other world-class research infrastructures
 - e.g. LOFAR, Euclid, LSST, Virgo

European Strategy Forum
on Research Infrastructures




addressing common challenges in astronomy and astroparticle physics

- ***supporting*** and ***accelerating*** the implementation of a new generation of observatories
- ***enhancing performance***
- helping scientists to access data
 - ESFRIs interoperating as an integrated multi- λ , multi-messenger facility



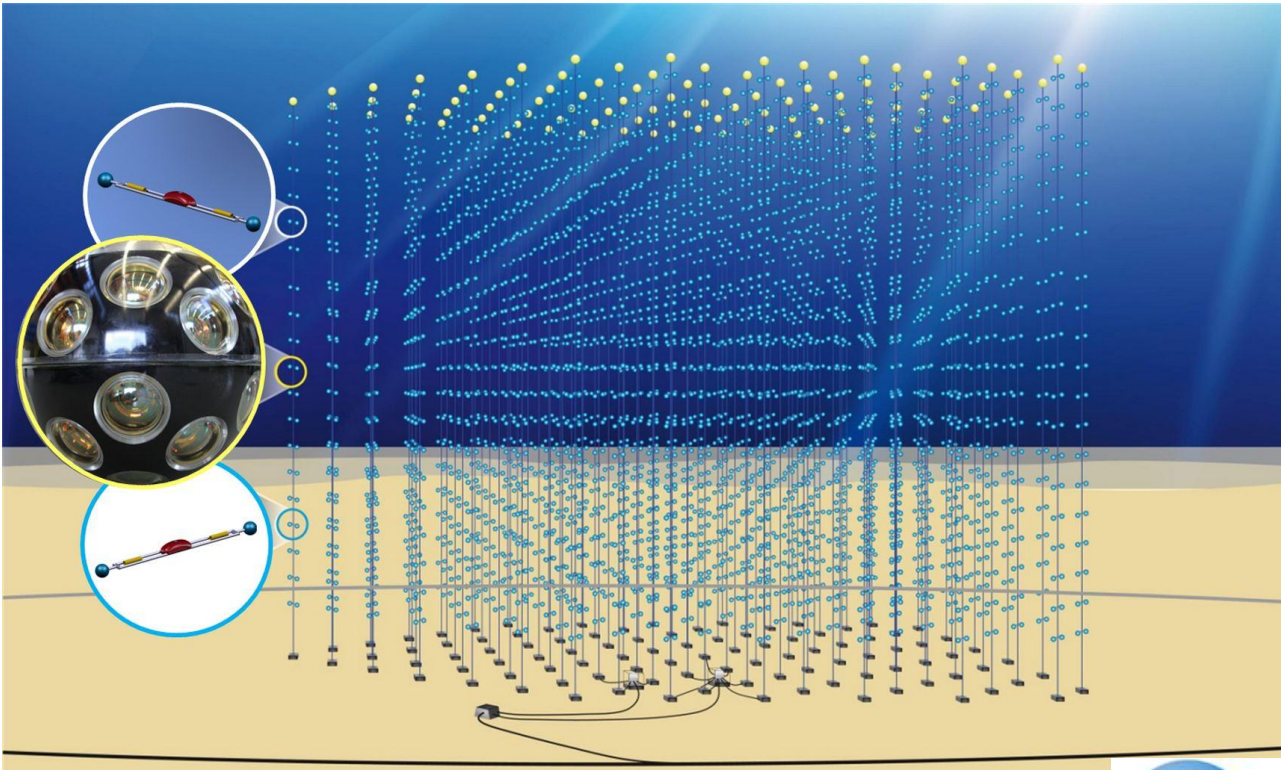
multi- λ , multi-messenger

- messengers: **photons, ν , gravitational waves, VHE γ**
- multi- λ : 
- transient source astronomy

To make it happen...

- Interoperability, cooperation, Open Data
- Scalability – processing and analysis
- Big Data, Data mining,
- ***Streaming and timing***

KM3NeT



- ***A multi-km³ neutrino telescope***
- Exploring our galaxy for high energy neutrino sources
- KM3Net2 on timescale of 2020

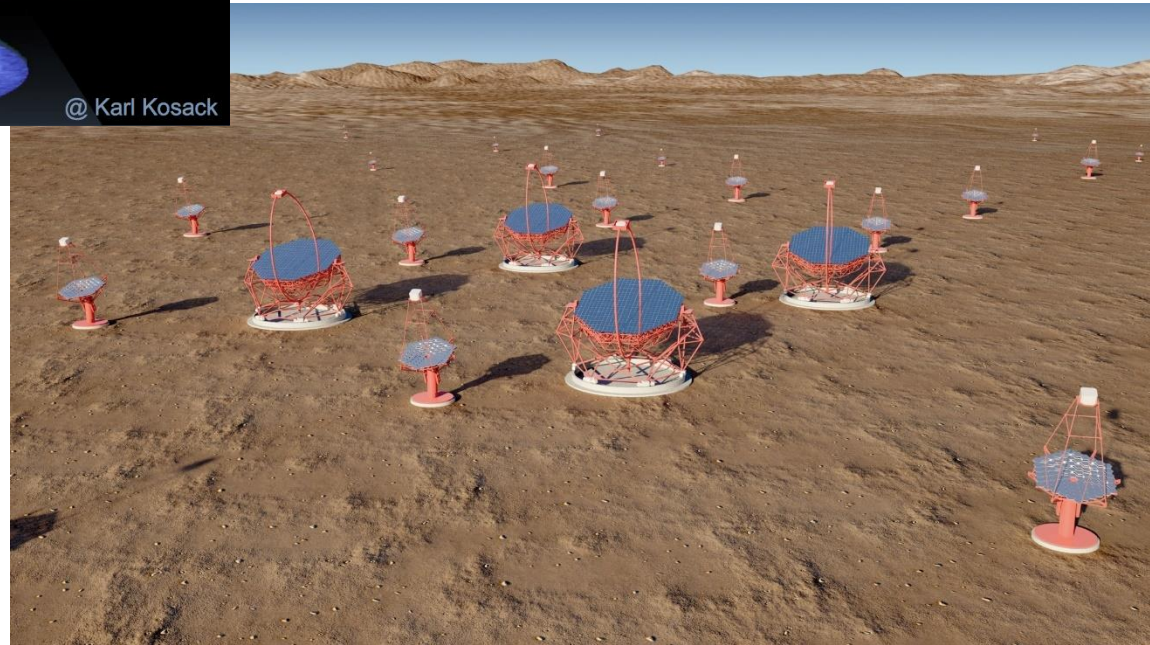
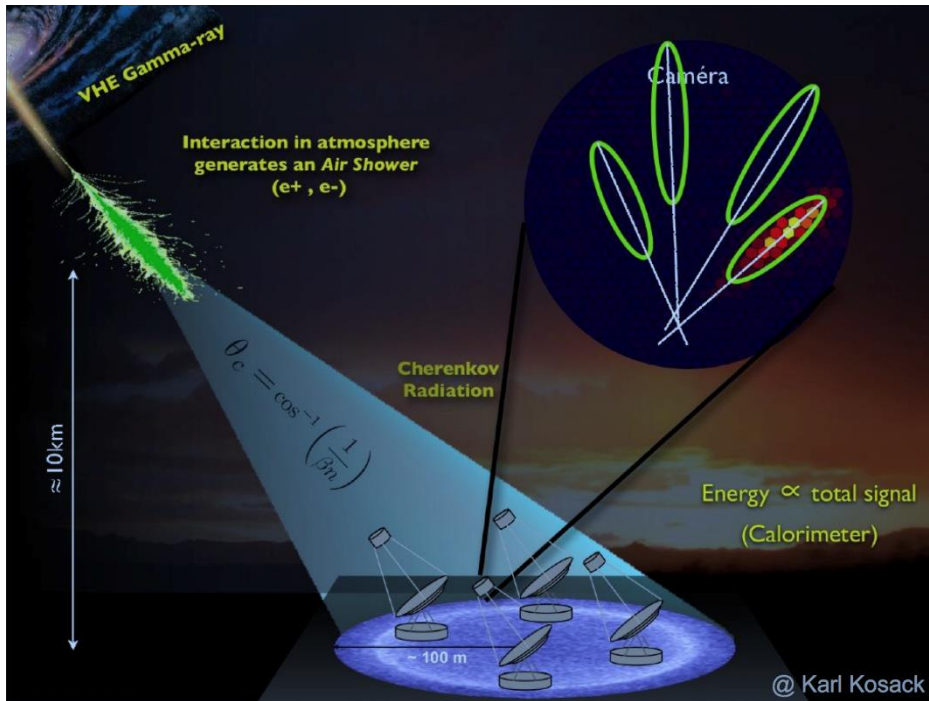


KM3NeT
Opens a new window on our universe



CTA

- Very high energy γ -ray observatory
- Two arrays of 100 (N) and 20 (S) telescopes
- Event re-construction
- Complex metadata
- Streaming and processing challenges
- Precursors: MAGIC and HESS



Production phase 2018-2023



SKA-LOW, Australia

Phase 1: 130,000 dipoles over 80 km
Phase 2: 500,000 dipoles over 250 km

SKA-MID, South Africa

Phase 1: 200 dishes over 150 km
Phase 2: 2500 dishes over 3500 km

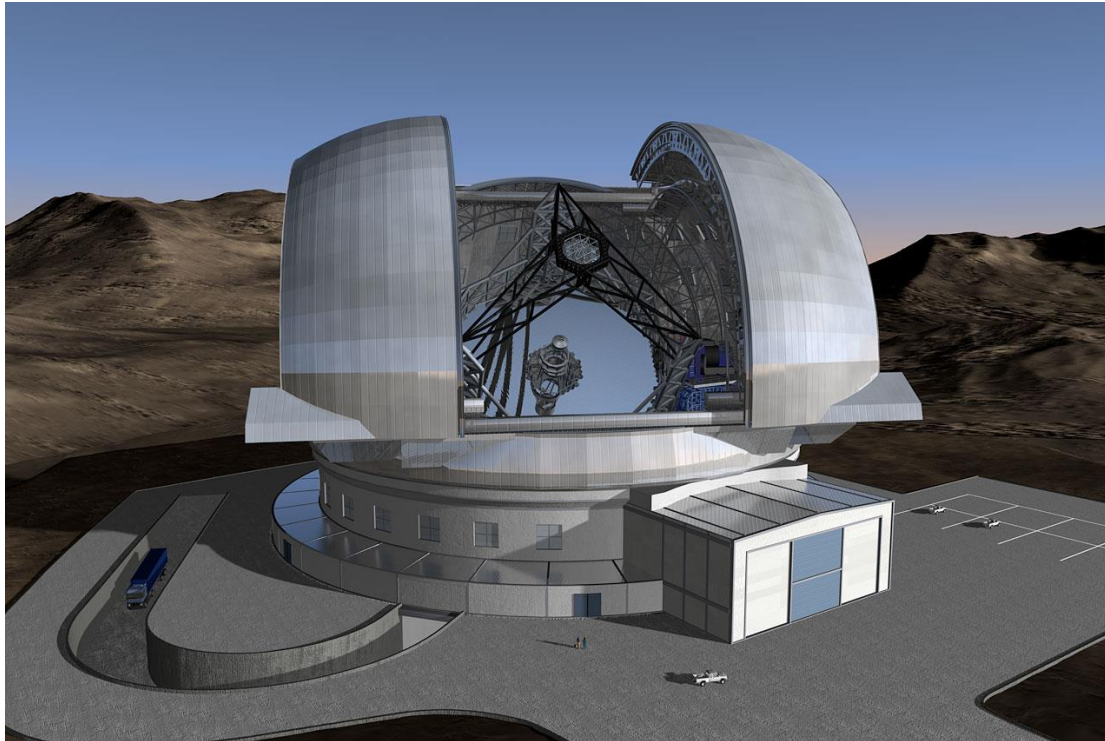
Phase 1 (2018-2023)

Phase 2 (2025-2033)

Challenges everything...



E-ELT



General purpose optical/infrared telescope

- Several scientific instruments (fast switching)

Science areas include:

- high redshift galaxies
- star formation
- exoplanets
- protoplanetary systems



39m European-Extremely Large Telescope
First Light targeted for late 2024

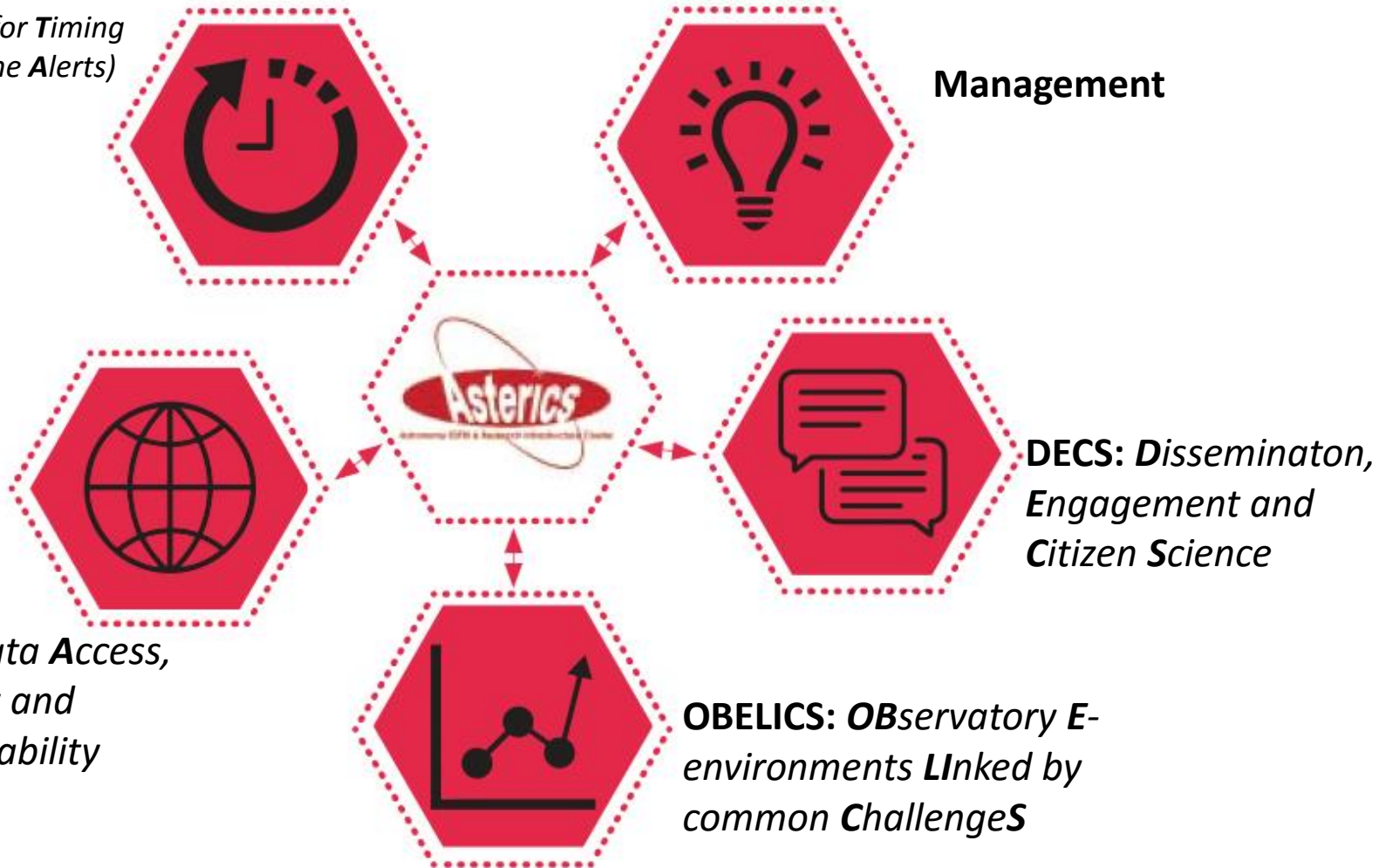
World class facilities and ESFRI pathfinders

Connecting real facilities now as path to connected
future facilities



Together, the ESFRI projects – and their pathfinders – open new windows on the universe, significantly extending our observational capabilities across the electromagnetic spectrum, in addition to neutrino detectors and gravitational waves.

CLEOPATRA: *Connecting Locations of
ESFRI Observatories and Partners in
Astronomy for Timing
and Real time Alerts)*



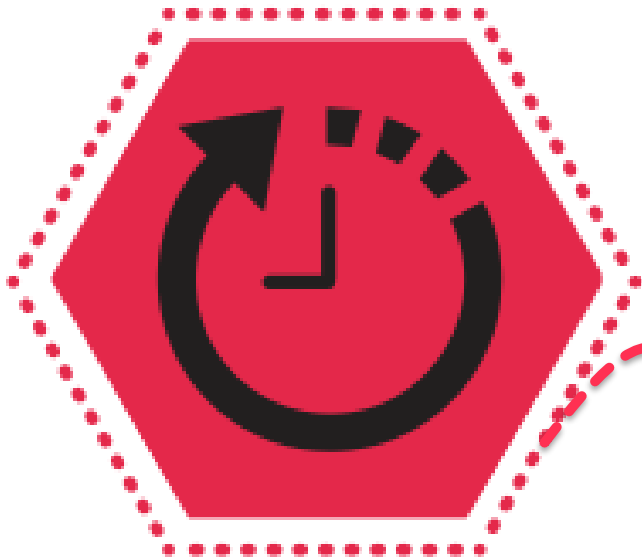
connections & openness

- connecting infrastructures:
enhancing individual capabilities -
necessary for science!
 - *ICT: high speed data
transport/timing*
- Embracing **Open Science, Open
Data**
 - many challenges, many
opportunities
- Engage with society at large
 - Astro community, education, public



multi-messenger timing and synchronisation

- Building on success of e-VLBI
 - EXPReS, NEXPReS
- ...here comes the White Rabbit



Strengths from connections

- Enabling data science
 - Training and support
 - Skill sets for astronomy and the market place



Participating institutions



Supporting organisations and networks

