ASTERICS:

Astronomy ESFRI & Research Infrastructure Cluster

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Astronomy ESFRI & Research Infrastructure Cluster

European Commission

what is ASTERICS?

- A €15 million Research Infrastructure funded by EC Horizon 2020 framework *(2015-2019)*
  - 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*

Asterics
Astronomy ESFRI & Research Infrastructure Cluster

ASTRON

Participating institutions

Supporting organisations and networks

addressing common challenges in astronomy and astroparticle physics

- ***supporting*** and ***accelerating*** the implementation of a new generation of observatories
- ***Focus on ESFRI projects***
- helping scientists to access data
  - ***ESFRIs+ interoperating as an integrated multi-λ, multi-messenger facility***

European Strategy Forum on Research Infrastructures ESFRI

multi- λ , multi-messenger

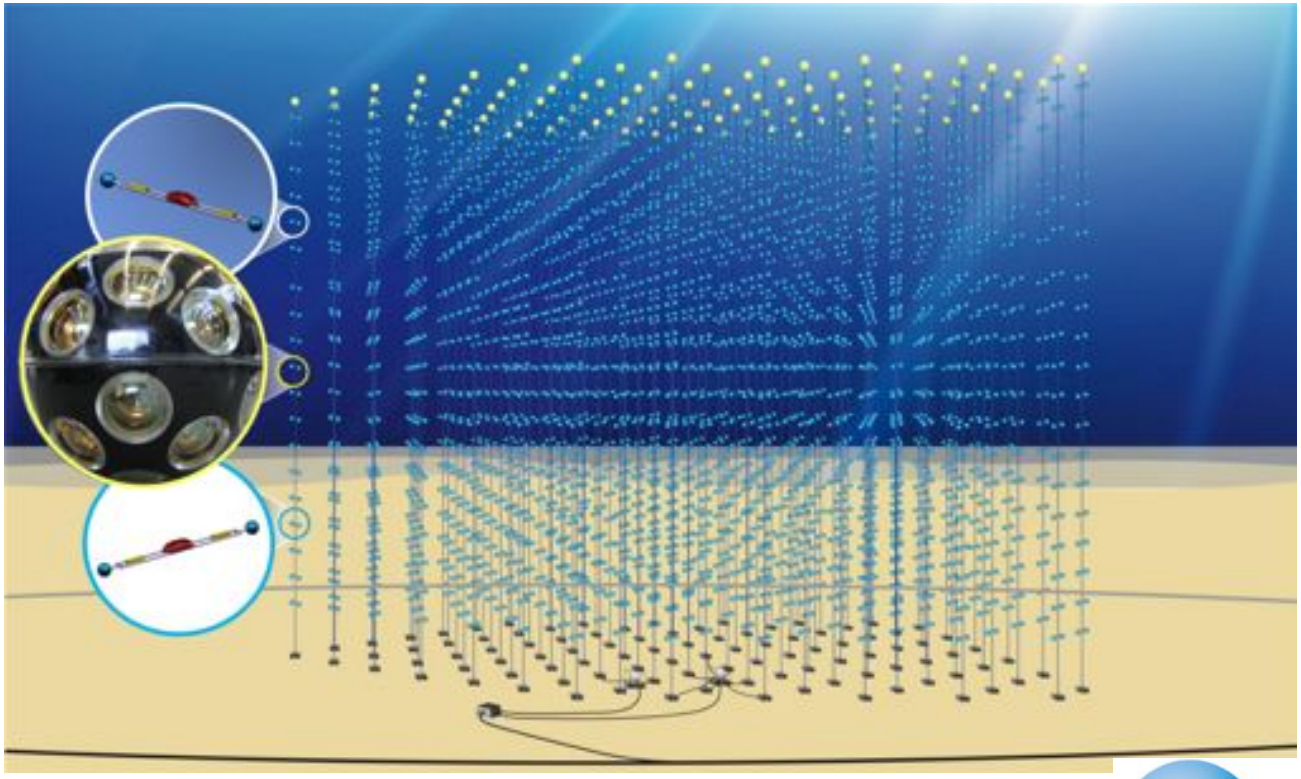
- messengers: **photons, ν, grav. waves, VHEγ**
- multi-λ:

- transient source astronomy

To make it happen…

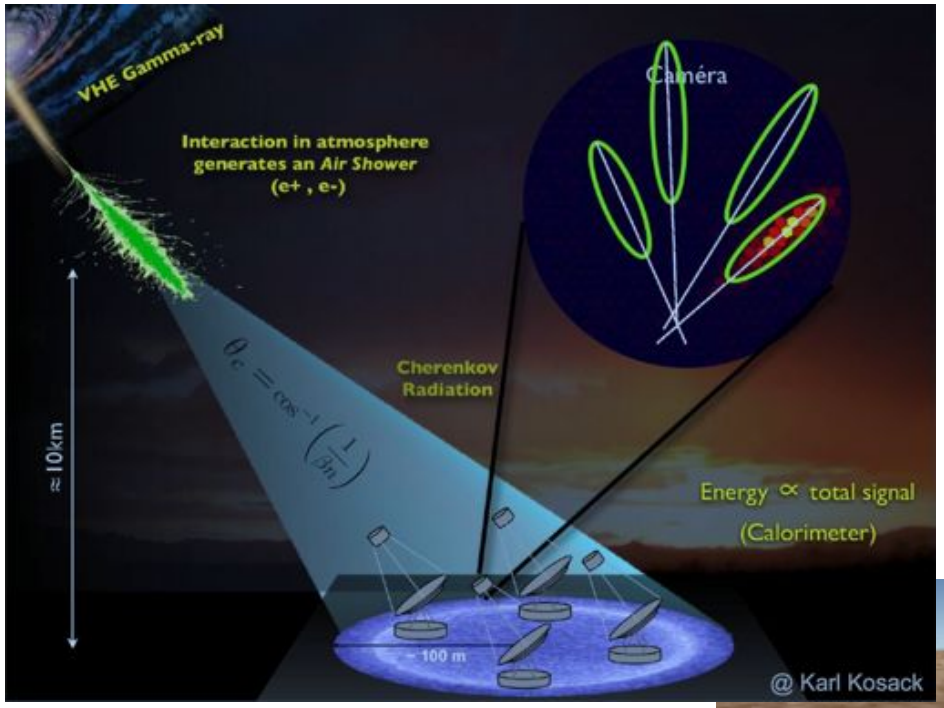
- Interoperability, VO, Open Data
- Scalability – processing and analysis
- Big Data, Data mining
- Streaming and timing

KM3NeT



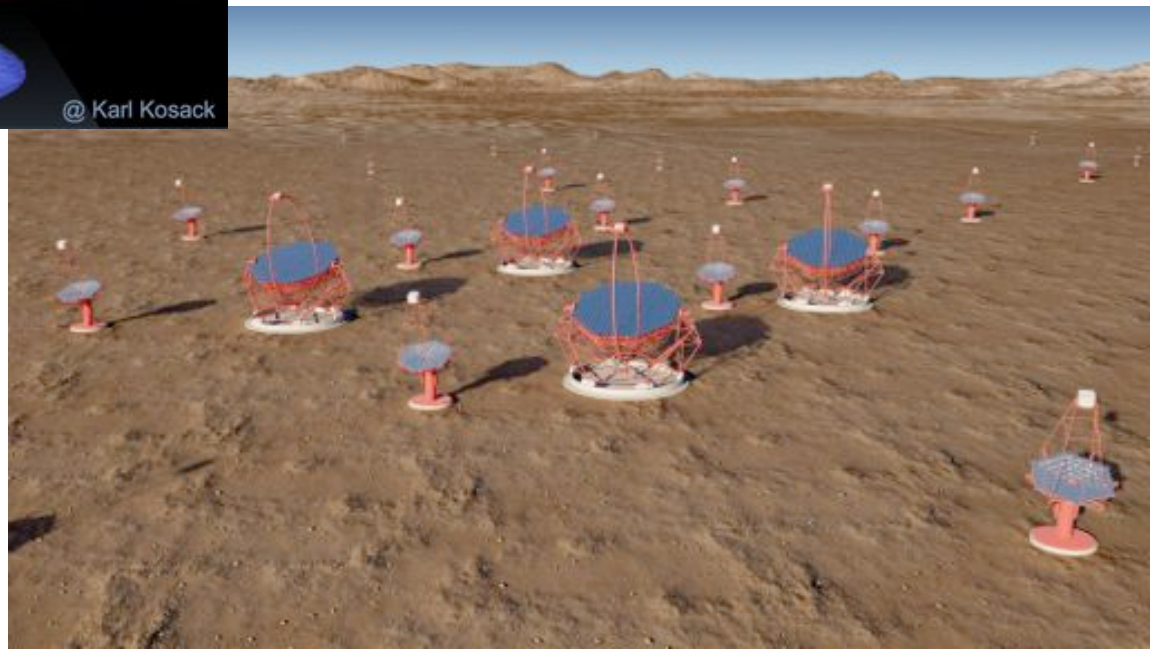
- ***A multi-km³ neutrino telescope***
- Exploring our galaxy for high energy neutrino sources
- KM3Net2 on timescale of 2020

KM3NeT
Opens a new window on our universe



CTA

- Very high energy γ-ray observatory
- Event re-construction
- Streaming and processing challenges
- Precursors: MAGIC and HESS



Production phase 2018-2023

SKA

SKA-LOW, Australia

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

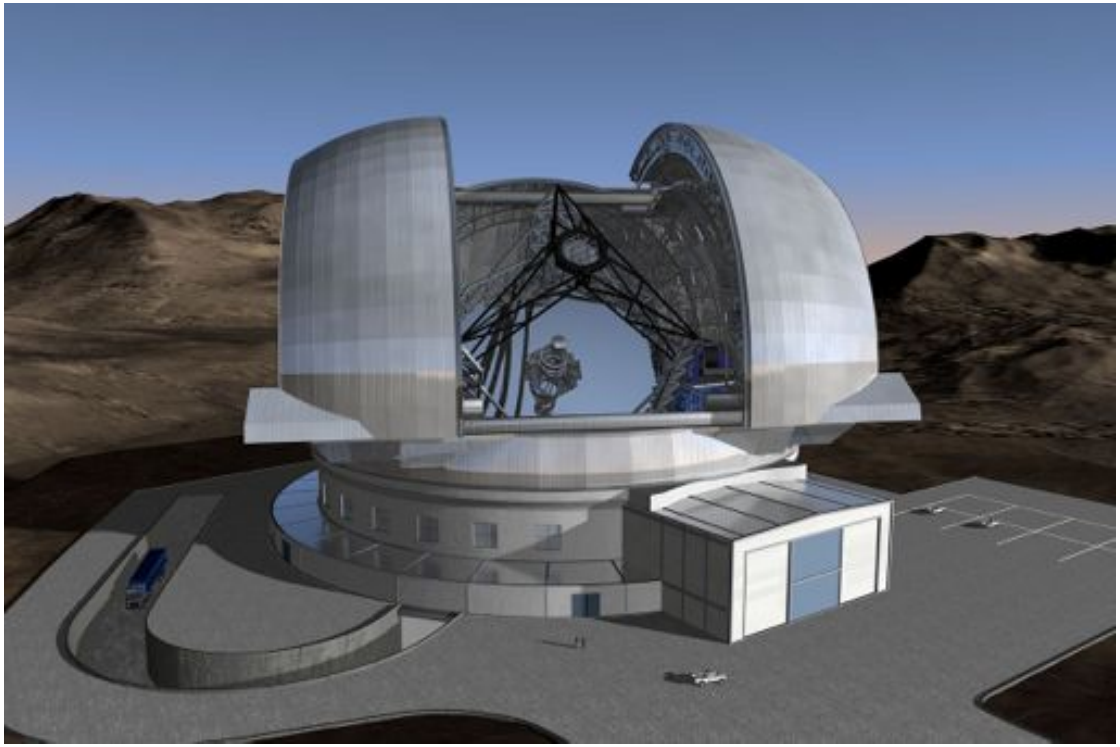
SKA-MID, South Africa

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

Includes other world class facilities and ESFRI pathfinders

- Connecting real facilities now as path to connected future facilities

CLEOPATRA: ***C****onnecting* ***L****ocations of* ***E****SFRI* ***O****bservatories and* ***P****artners in* ***A****stronomy for* ***T****iming and* ***R****eal time* ***A****lerts)*

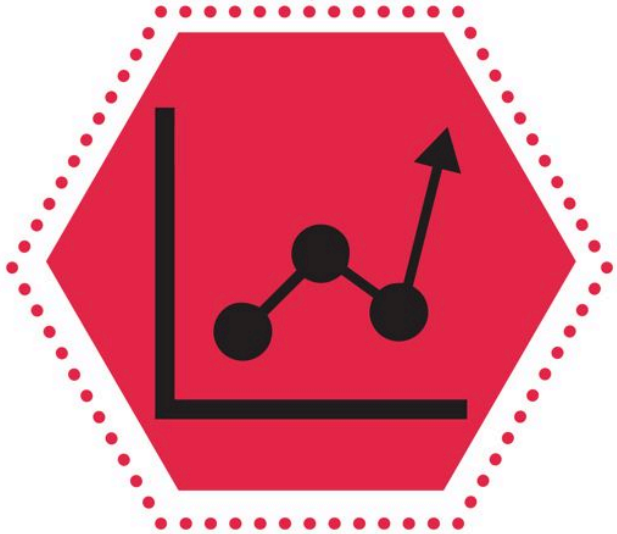
Management

DECS: ***D****isseminaton,* ***E****ngagement and* ***C****itizen* ***S****cience*

DADI : ***D****ata* ***A****ccess,* ***D****iscovery and* ***I****nteroperability*

OBELICS: ***OB****servatory* ***E****-environments* ***LI****nked by common* ***C****hallenge****S***

OBservatory **E**-environments **LI**nked by common **C**hallenges (OBELICS)



Interoperability and software re-use for data generation, integration and analysis

- Open innovation environment

Developing common solutions for:

- Streaming data processing
- Extremely large databases
- Advanced analysis algorithms
- Software frameworks

FR:
LAPP *(Work Package Lead, G. Lamanna)*
IAP, APC, CPPM, CEA

Data Access, Discovery and Interoperability (DADI)

Make the ESFRI and pathfinder data available for discovery and use by the whole astronomy community

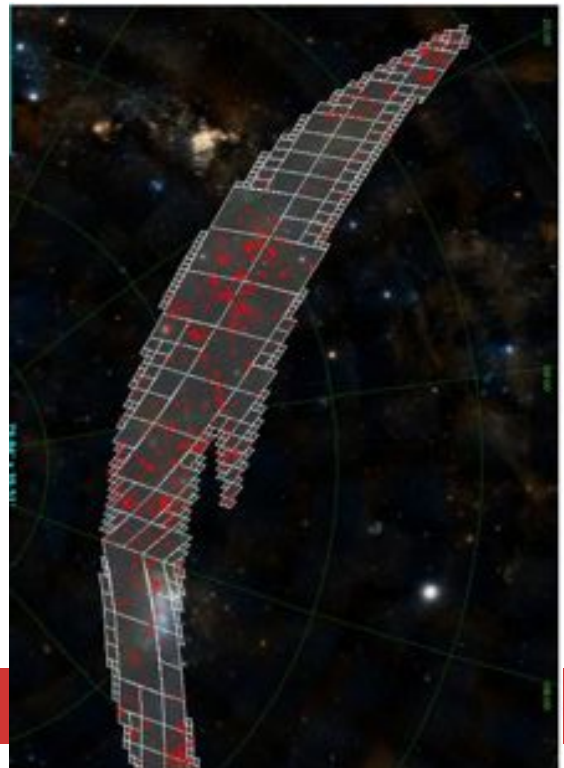
Interoperable in Virtual Observatory framework

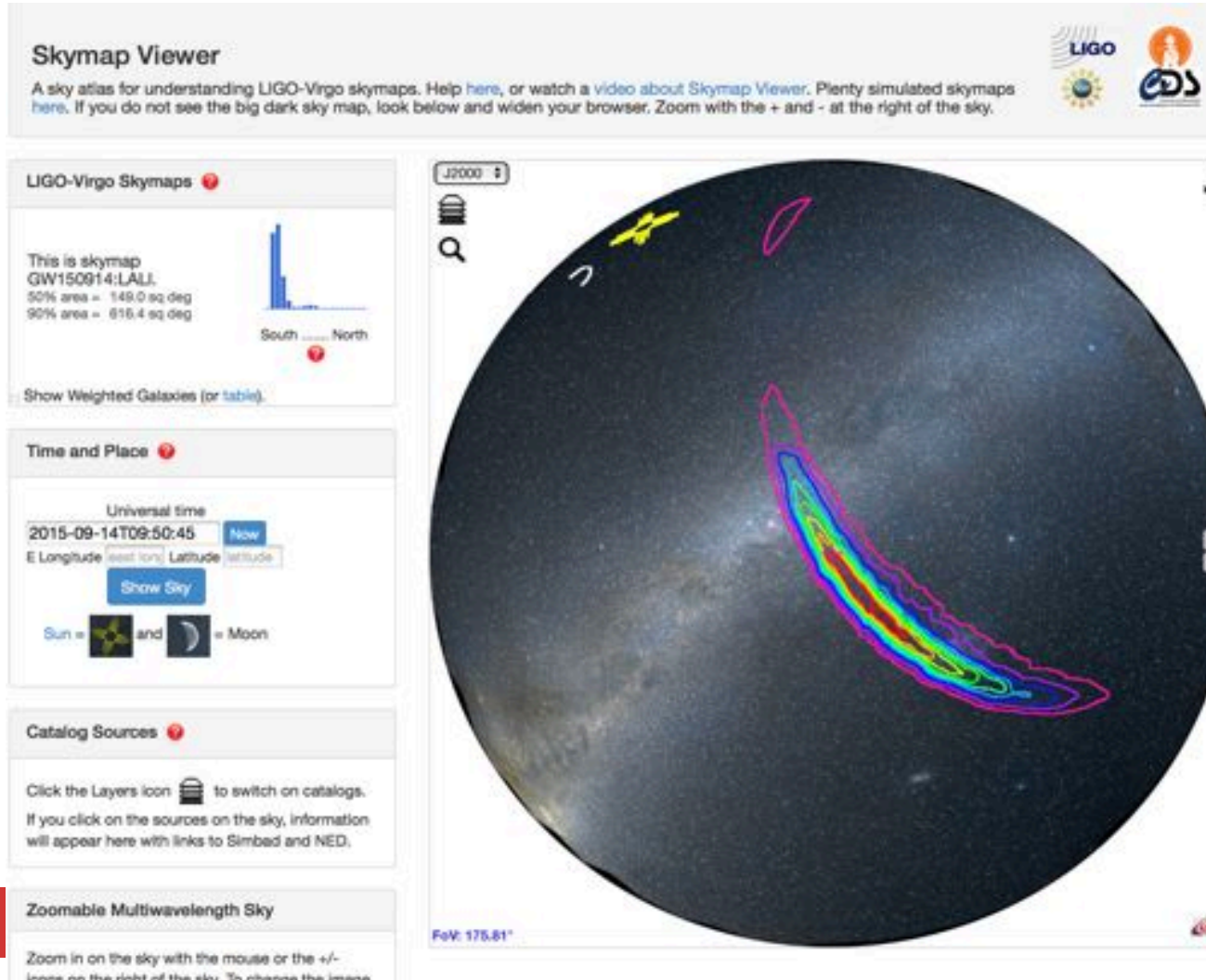
- Train and support ESFRI in use and implementation of VO
- Train and support wider community in scientific use of VO
- Adapt VO framework for ESFRI needs

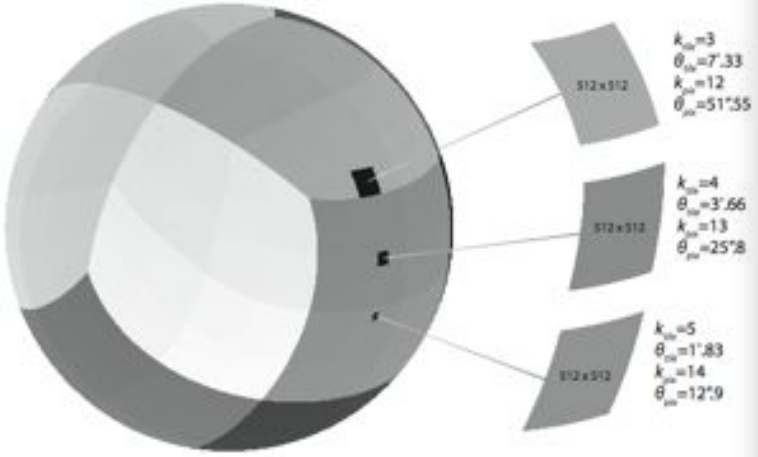
FR:
CDS *(Work Package Lead, F. Genova)*
Observatoire de Paris/LUTH ***(CTA)***
APC ***(EGO/VIRGO/ET)***
CPPM ***(KM3Net)***

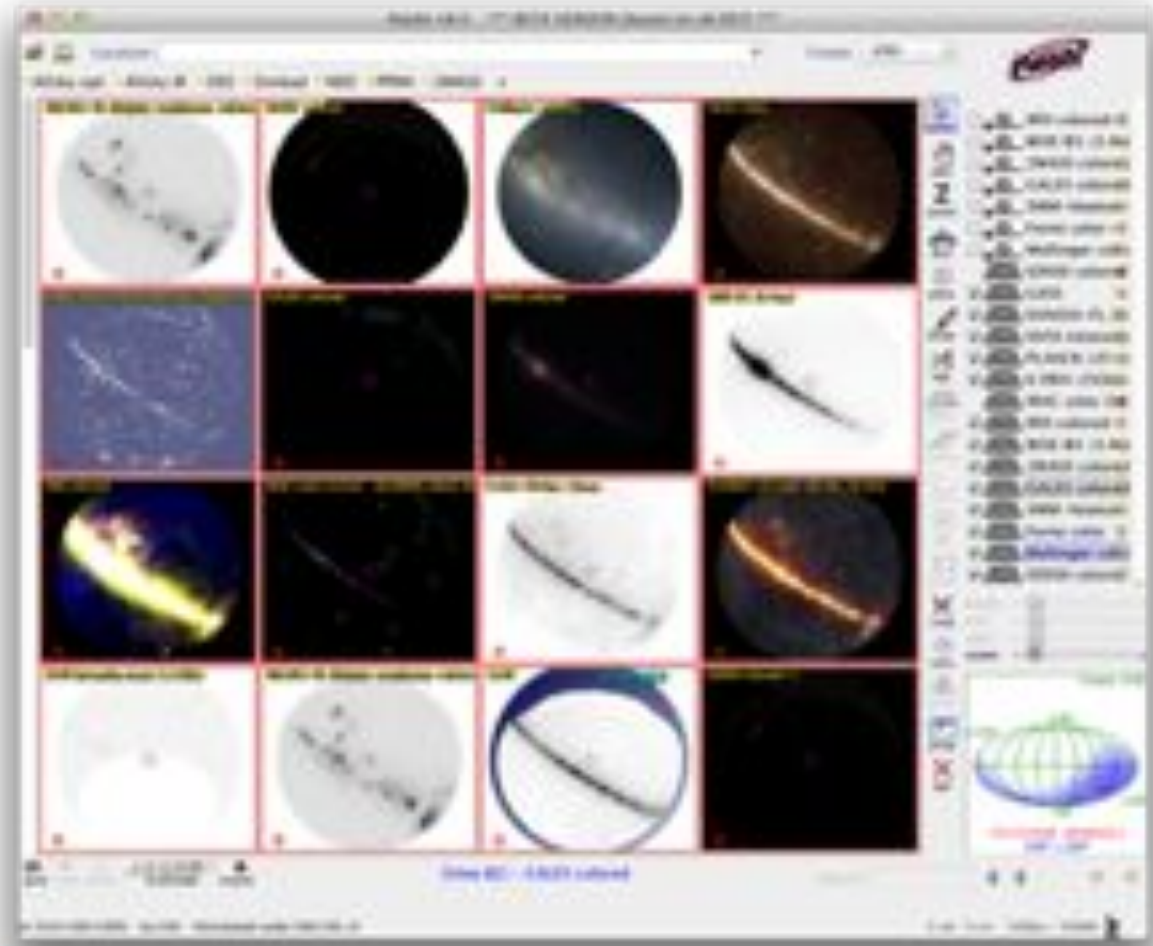
ASTERICS DADI connections: *gravitational waves*

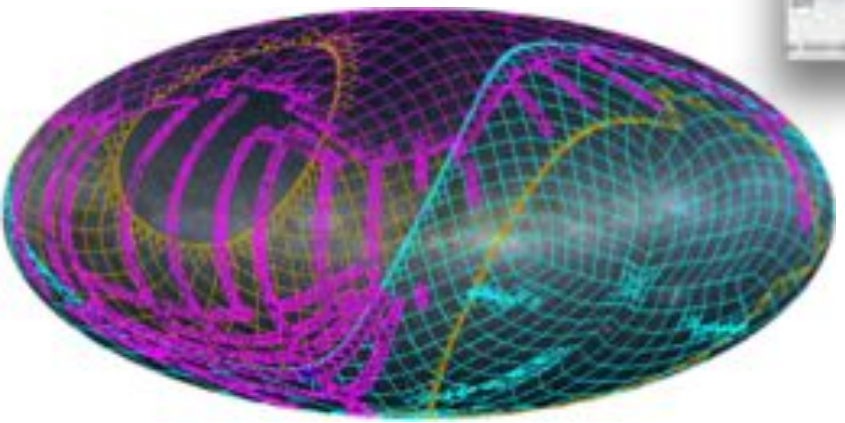
ASTERICS fostered use of VO for grav wave EM follow-up











- ***IVOA standardisation***
- ***VO infrastructure and Science tools***

Hands-on Training

- Training and support
  - Science and Infrastructure
    - VO School Madrid, Dec 2015
    - Data Centre Forum, June 15-17
    - Next VO School: Nov 15-17, Strasbourg

Outcomes beyond Europe

Summary

- ASTERICS project going at full speed
- Part of global VO engagement with big astronomy projects
- Open DADI events, e.g. Schools, Training, Forums

- https://www.asterics2020.eu
- http://www.euro-vo.org