



Astronomy ESFRI & Research Infrastructure Cluster
ASTERICS - 653477



ASTERICS:

Astronomy ESFRI & Research Infrastructure Cluster

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Astronomy ESFRI & Research Infrastructure Cluster





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*



Participating institutions



Supporting organisations and networks



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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***





multi- λ , multi-messenger

- messengers: **photons, ν , grav. waves, VHE γ**



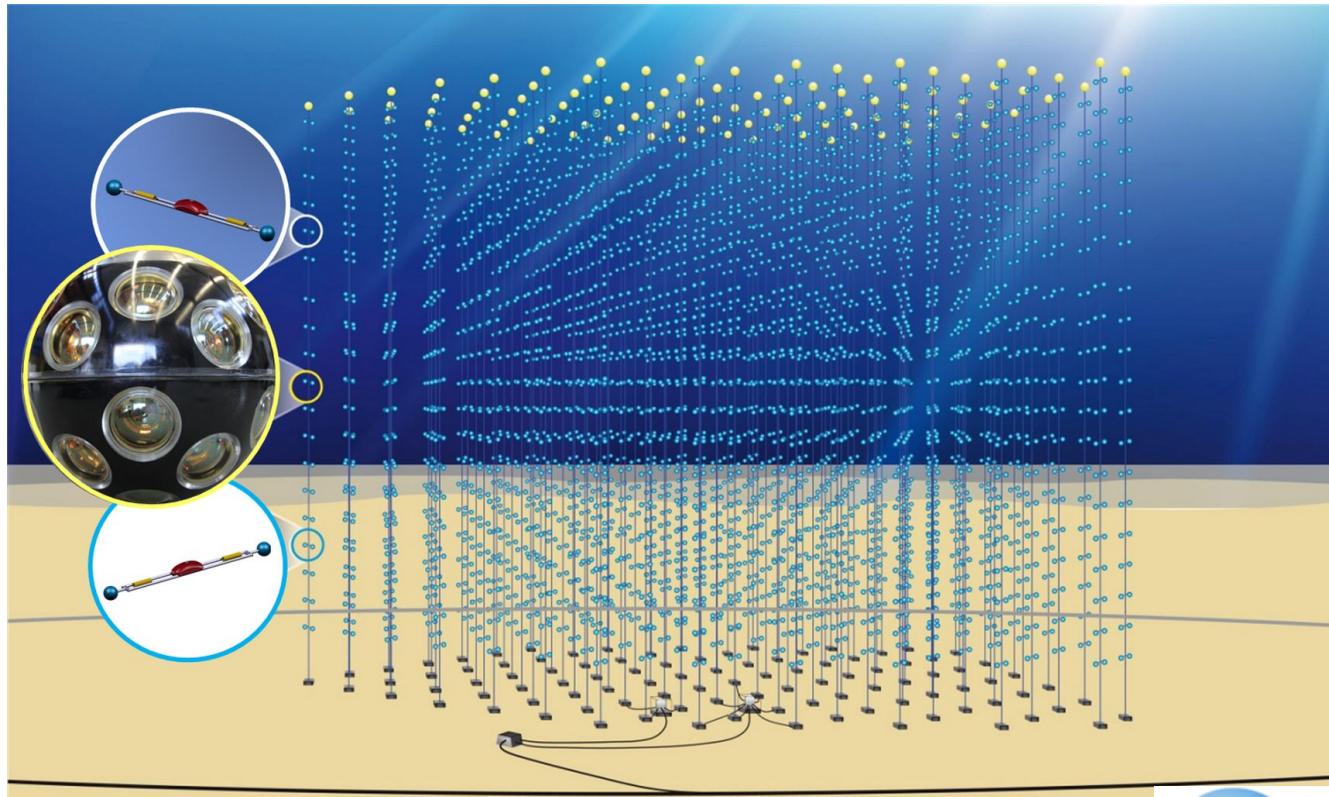
- transient source astronomy

To make it happen...

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



KM3NeT

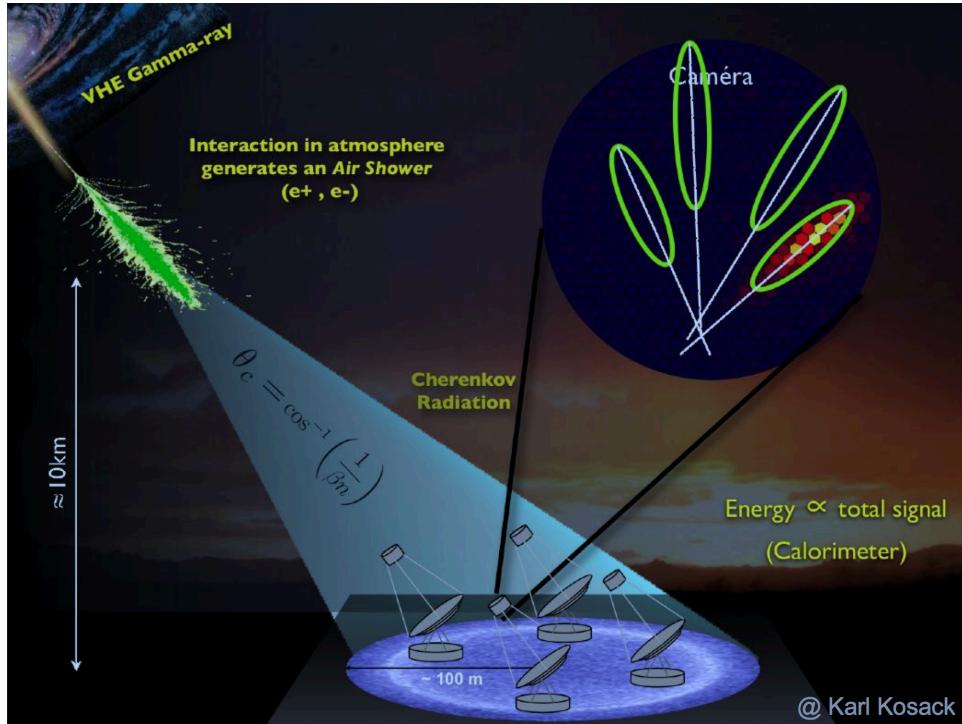


- **A multi-km³ neutrino telescope**
- Exploring our galaxy for high energy neutrino sources
- KM3Net2 on timescale of 2020



KM3NeT

Opens a new window on our universe

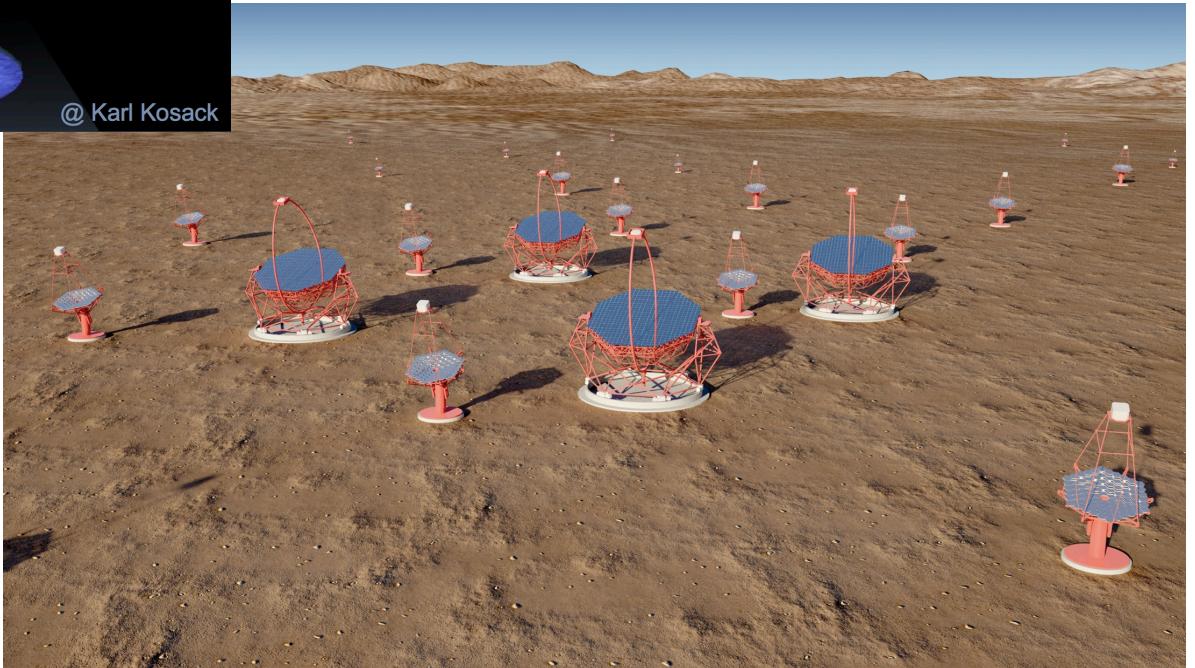


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CTA

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



Production phase 2018-2023

SKA

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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)

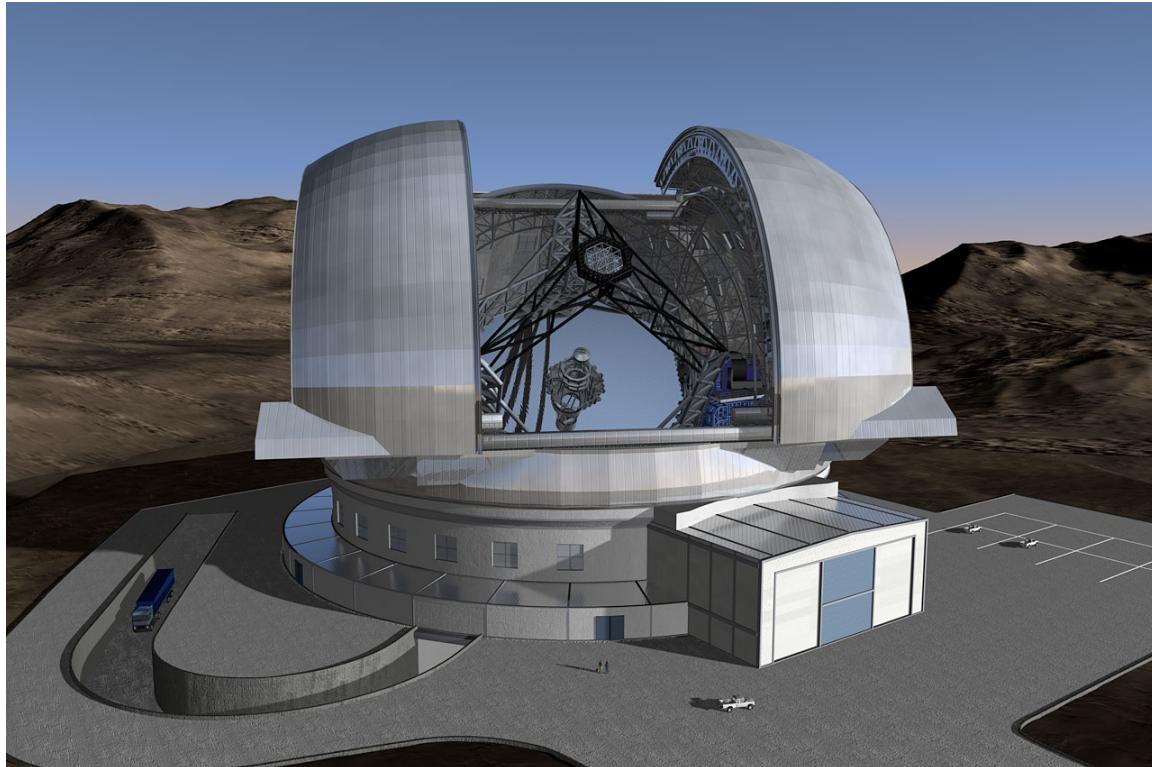
Phase 2 (2025-2033)

Challenges everything...



E-ELT

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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





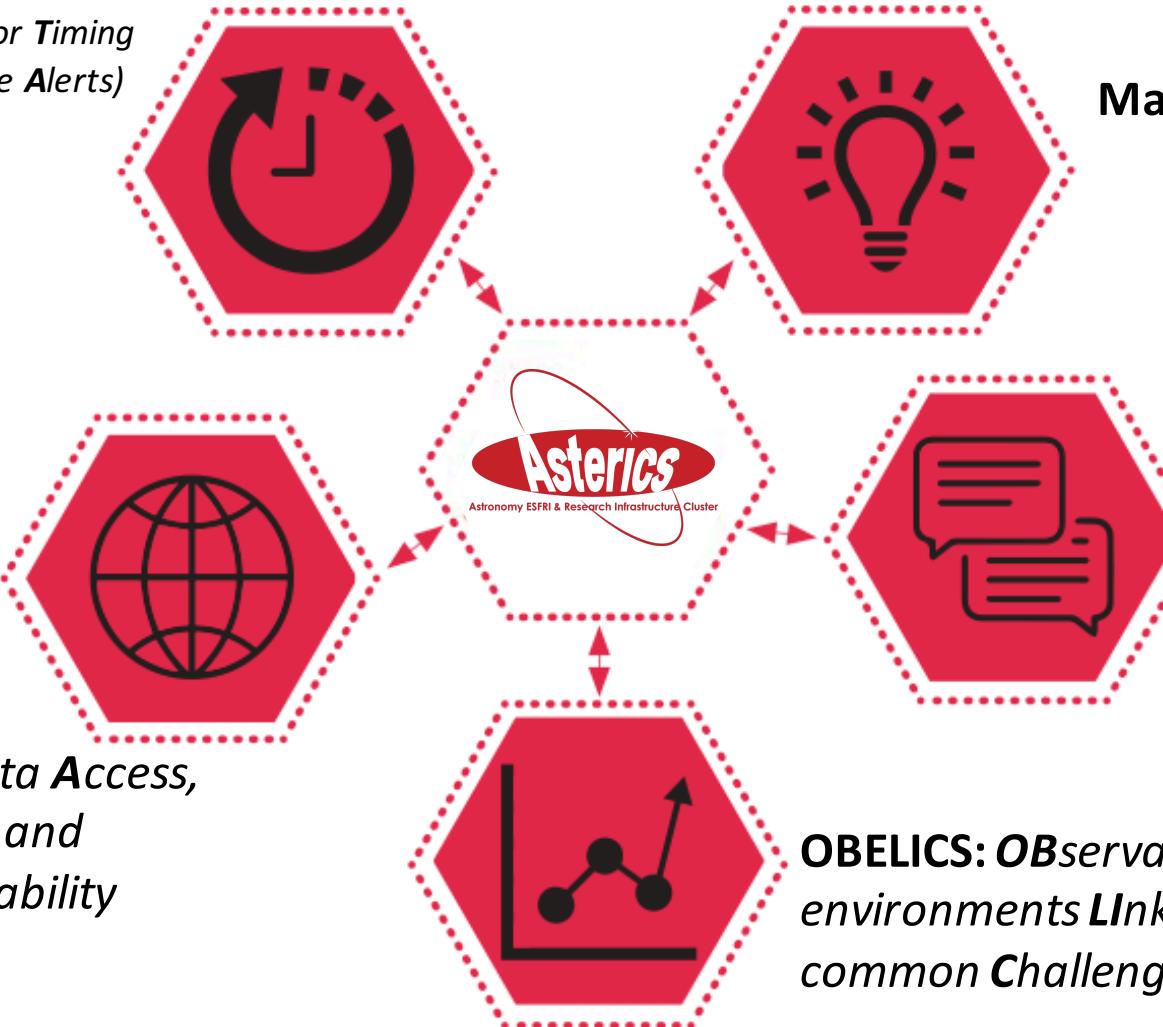
CLEOPATRA: *Connecting Locations of ESFRI Observatories and Partners in Astronomy for Timing and Real time Alerts)*

DADI : *Data Access, Discovery and Interoperability*

OBELICS: *OBservatory E-environments LInked by common ChallengeS*

Management

DECS: *Dissemination, Engagement and Citizen Science*





OBservatory E-environments LInked by common Challenges (OBELICS)



FR:

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

***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



Data Access, Discovery and Interoperability (DADI)



FR:

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

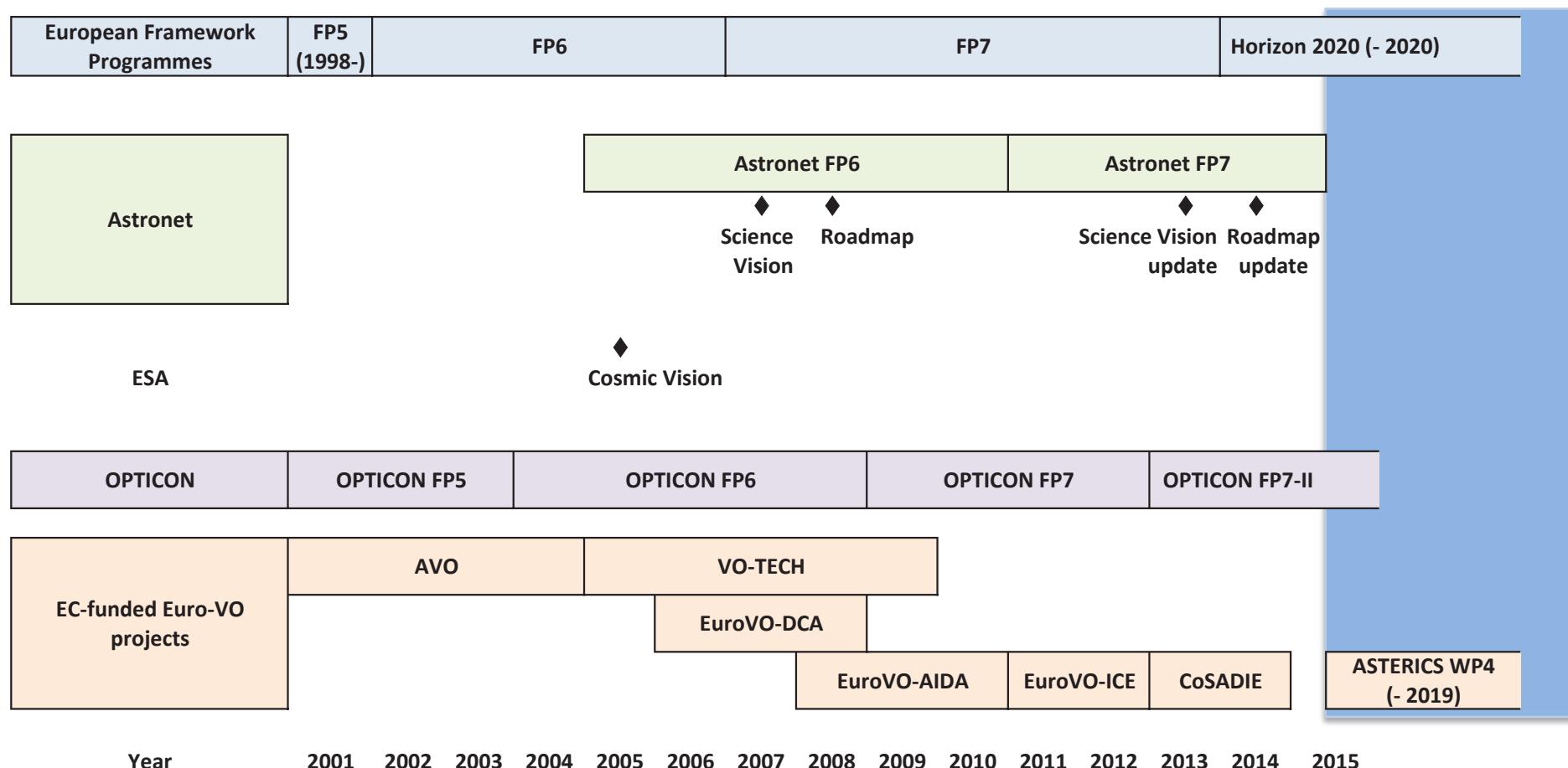
Make the ESFRI and pathfinder data available for discovery and use by the whole astronomy community

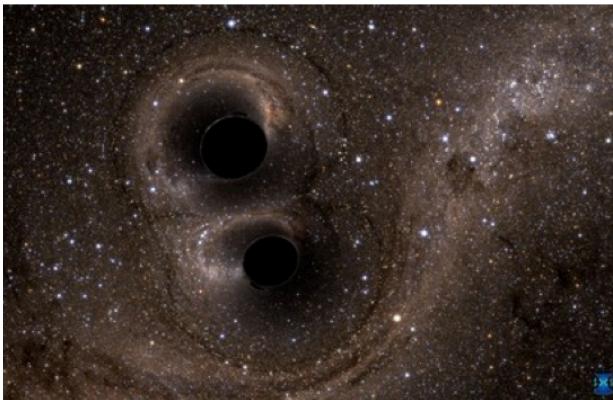
Interoperable in Virtual Observatory framework

- 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

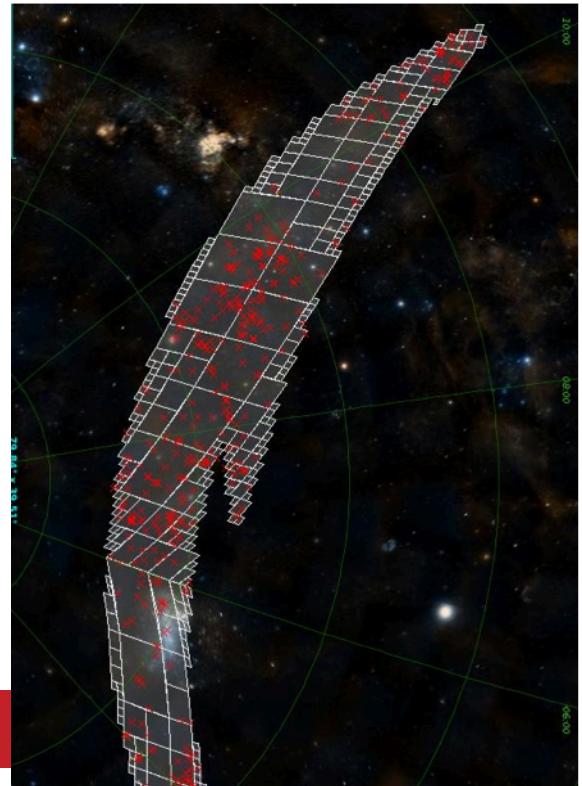


DADI: Building on Euro-VO, Astronet, +





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



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ASTERICS DADI connections: gravitational waves

Skymap Viewer

A sky atlas for understanding LIGO-Virgo skymaps. Help [here](#), or watch a [video about Skymap Viewer](#). Plenty simulated skymaps [here](#). If you do not see the big dark sky map, look below and widen your browser. Zoom with the + and - at the right of the sky.

LIGO-Virgo Skymaps [?](#)

This is skymap GW150914:LALI.
50% area = 149.0 sq deg
90% area = 616.4 sq deg

South North

Show Weighted Galaxies (or table).

Time and Place [?](#)

Universal time
2015-09-14T09:50:45 Now

E Longitude east long Latitude latitude

Show Sky

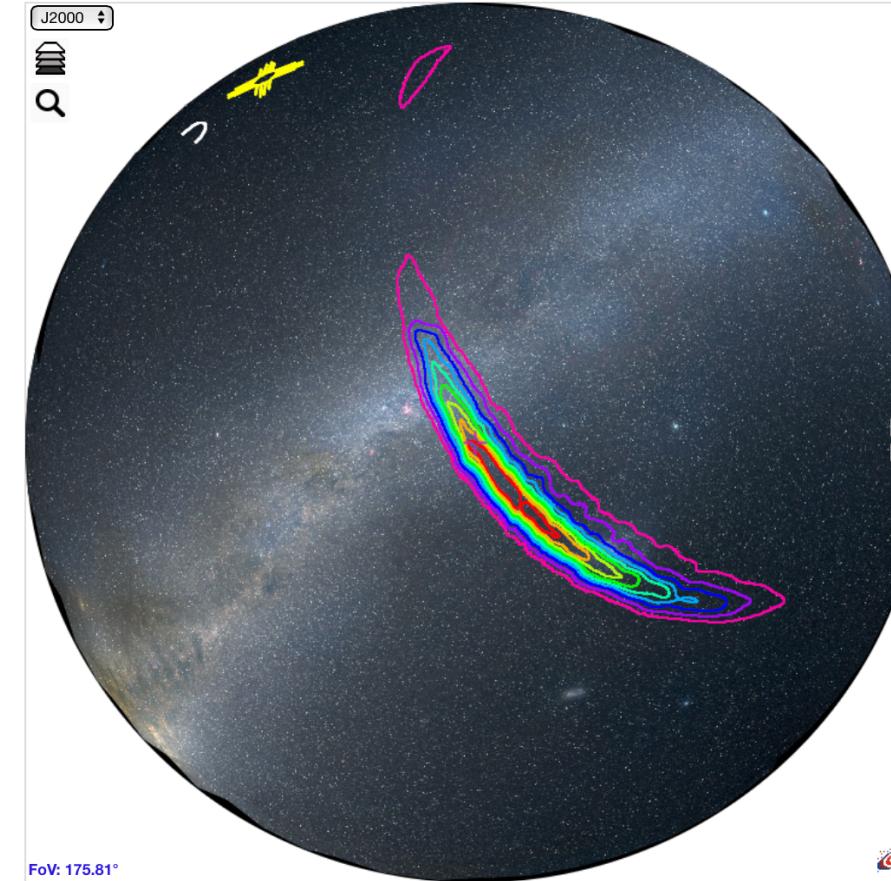
Sun = and Moon =

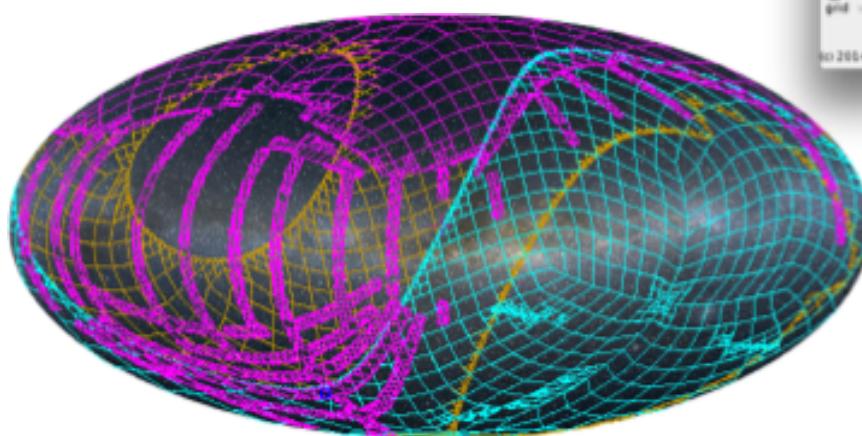
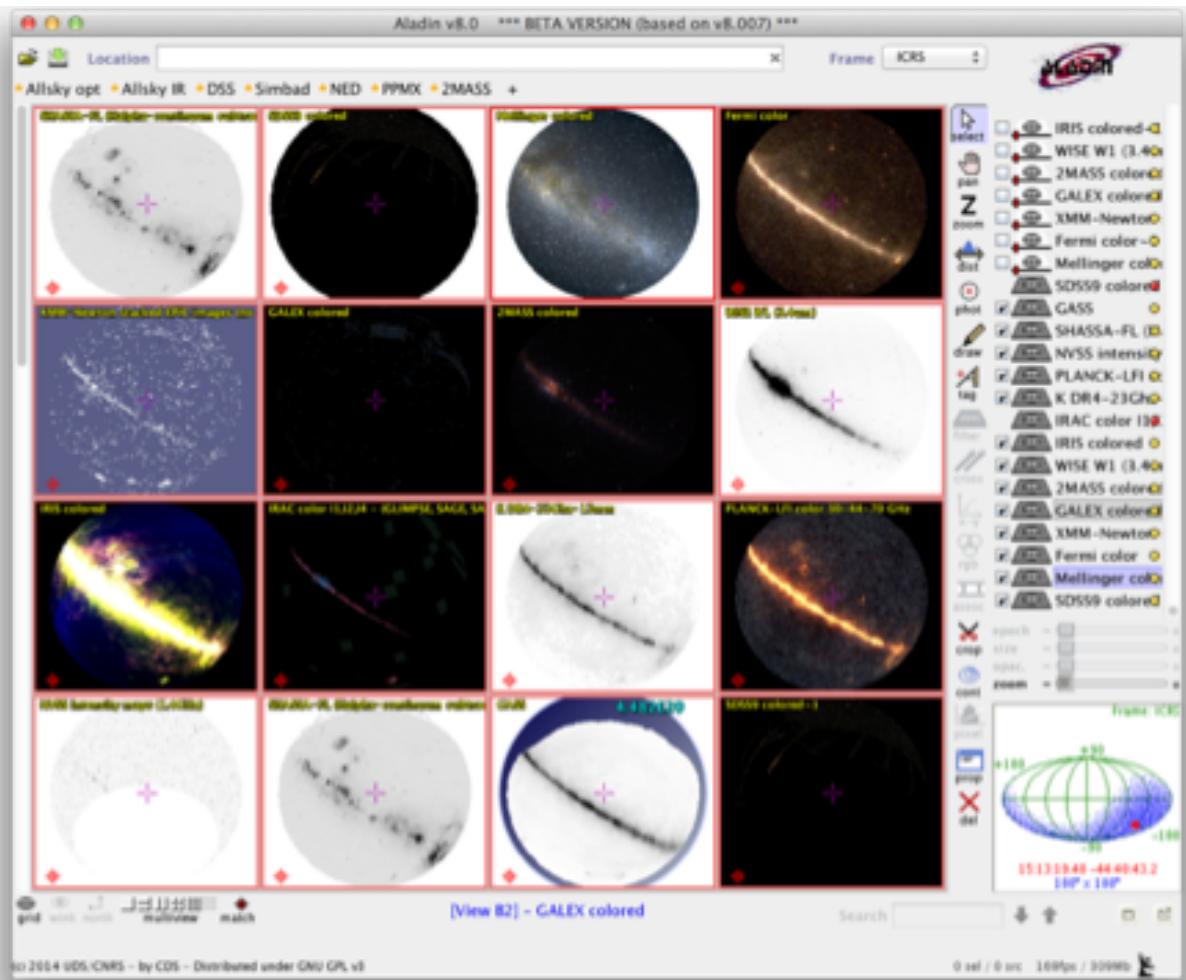
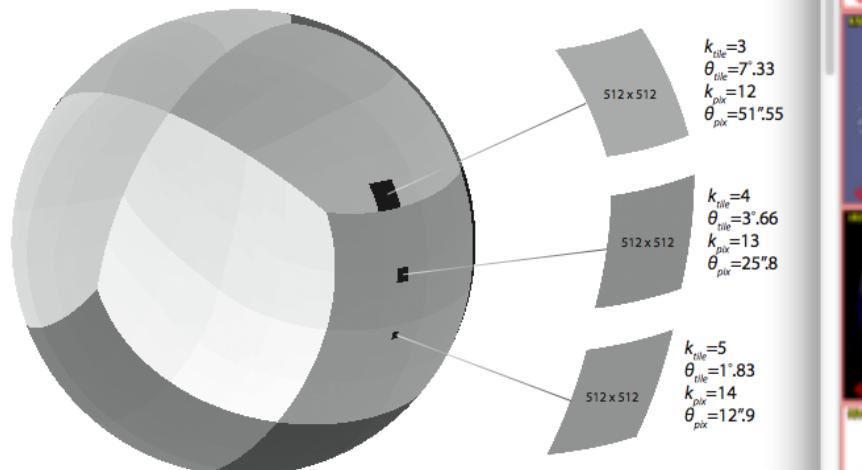
Catalog Sources [?](#)

Click the Layers icon to switch on catalogs.
If you click on the sources on the sky, information will appear here with links to Simbad and NED.

Zoomable Multiwavelength Sky

Zoom in on the sky with the mouse or the +/- icons on the right of the sky. To change the image



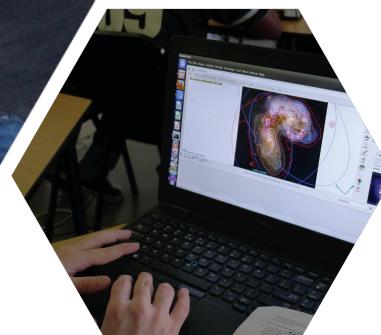


- ***IVOA standardisation***
- ***VO infrastructure and Science tools***



Hands-on Training

- Training and support
 - Science and Infrastructure
 - VO School Madrid, Dec 2015
 - VO School Strasbourg, Nov 2016
 - **VO School Madrid, Nov 2017**



Outcomes in
Europe and beyond



Summary

- ASTERICS project going at full speed
 - Part of global VO engagement with big astronomy projects
 - Open DADI events, e.g. Schools, Training, Forums
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- <https://www.asterics2020.eu>
 - <http://www.euro-vo.org>