H2020 – ASTERICS

Addressing Cross-Cutting Synergies and Common Challenges for the Next Decade Astronomy Facilities

Fabio Pasian

INAF Person in charge

Chair of ASTERICS General Assembly

Governance & Management

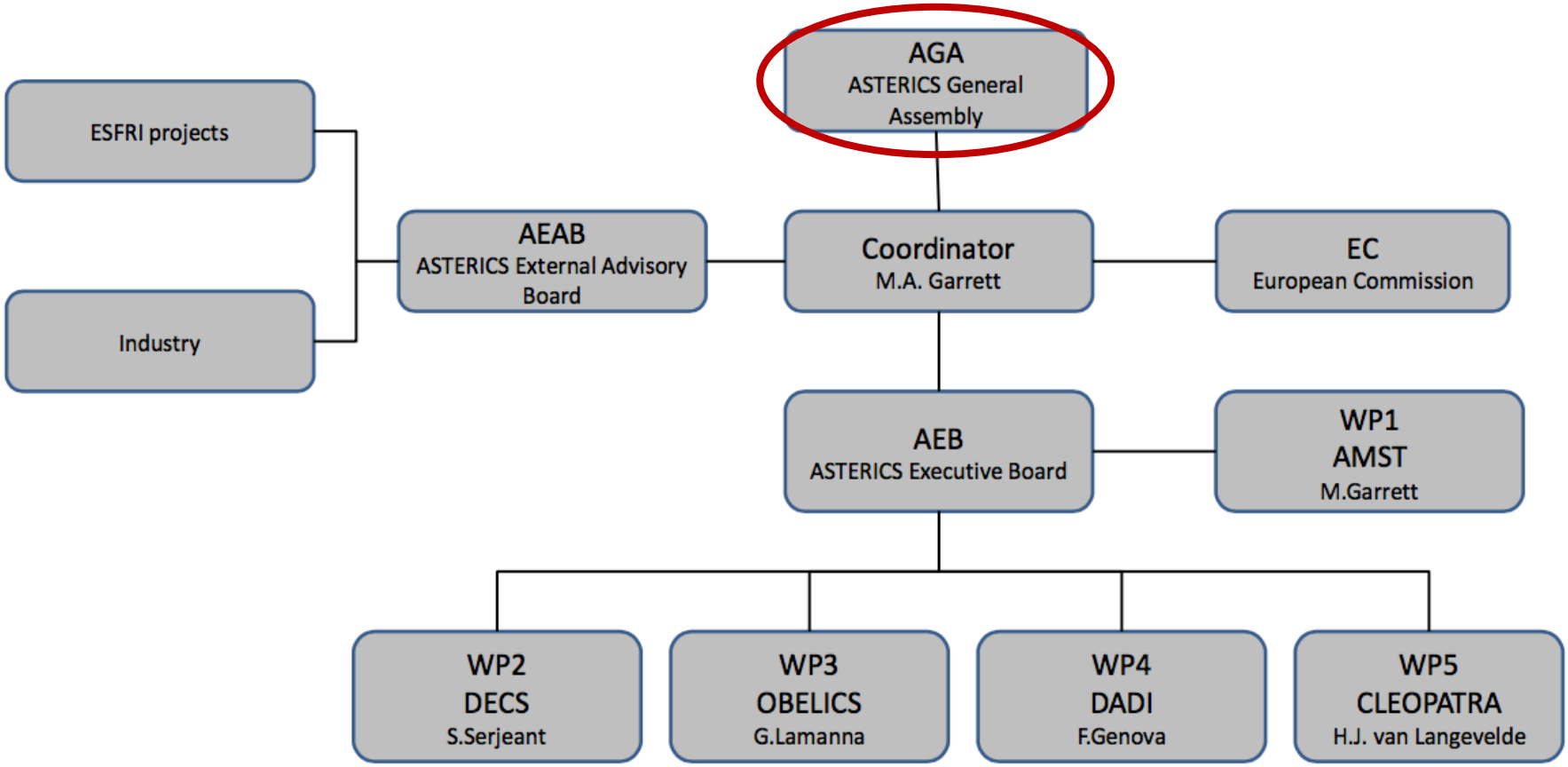


Figure 9: The overall governance and organisation of the ASTERICS project.

What is ASTERICS ?

- Astronomy ESFRI Research Infrastructure Cluster (ASTERICS)
- Topic: Implementation of cross-cutting solutions for clusters of ESFRI research infrastructures
- Focus of ASTERICS is on projects endorsed by ESFRI: SKA, CTA, KM3NeT, with close links to E-ELT and EGO, plus other world-class experiments (e.g. LoFAR, Euclid)
- ASTERICS represents a major collaboration Astronomy/Astrophysics/Astroparticle Physics
- 23 partners funded by EC H2020 at 15 M€ for 4 years

ASTERICS partnership

ASTRON, CNRS, INAF, UCAM, JIVE, INTA, UEDIN, UHEI, OU, FAU, VU, CEA, EVA, UGR, FOR, IEEC, IFAE, UCM, INFN, STFC, DESY, SURFnet, Oxford

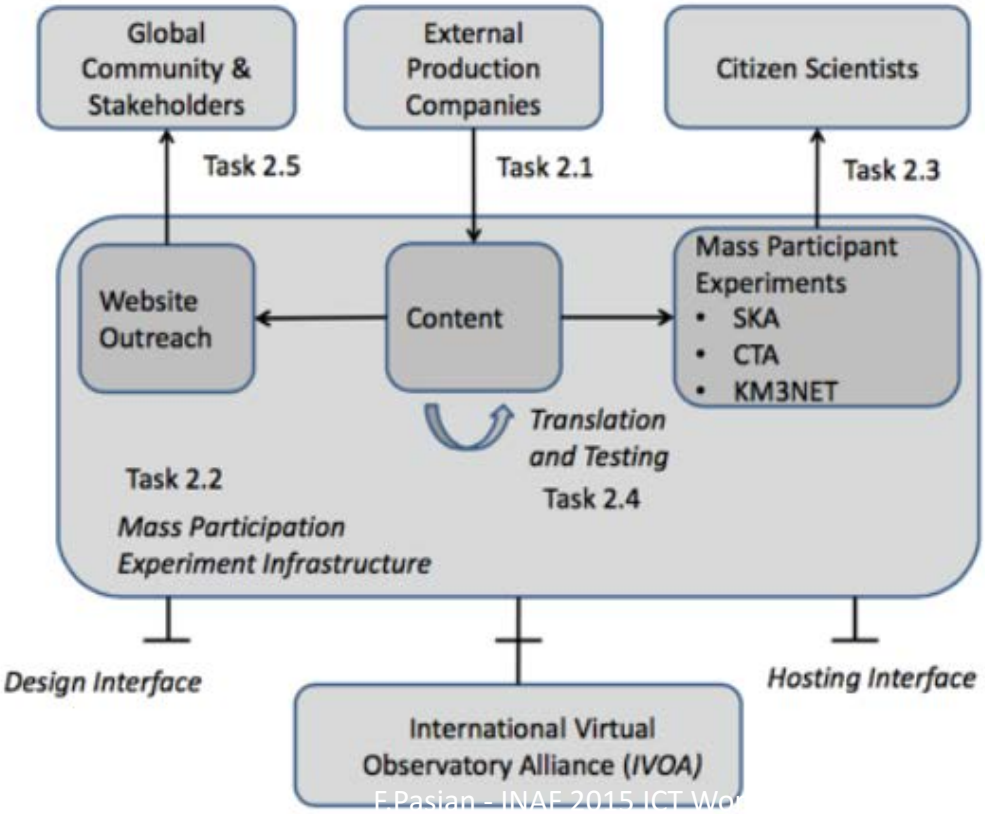
ASTERICS partnership

ASTERICS Programme

- ASTRONET identified some key common challenges for Astronomy:
  - Public engagement
  - Virtual Observatory (VO)
  - Big Astronomical Data (BAD?)
- ASTERICS has also identified some common R&D h/w (& s/w) technology challenges.

WP2 - DECS

Dissemination, **E**ngagement and **C**itizen **S**cience - *Lead: S. Serjeant*



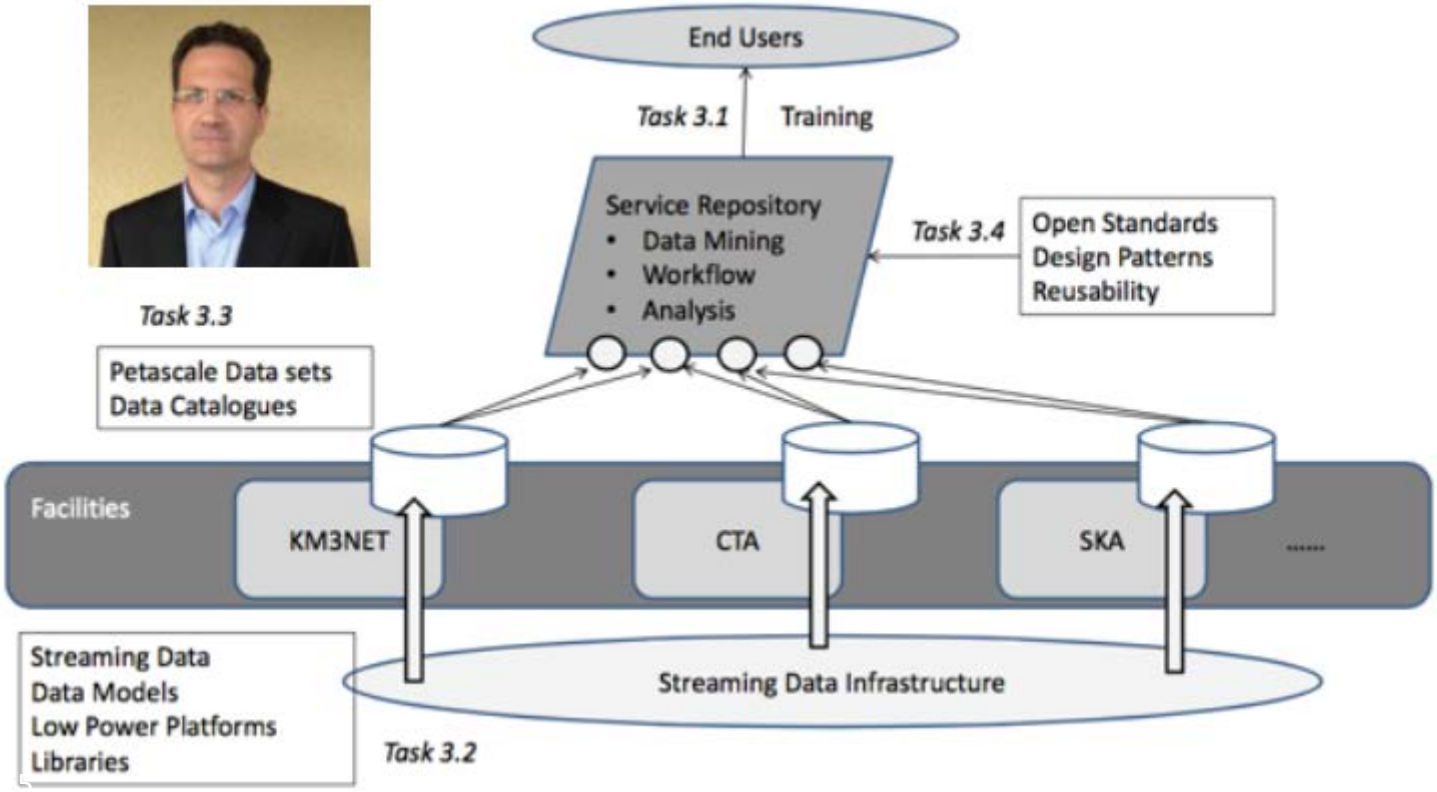
DECS

- Dissemination & public engagement
- Audiences: scientific & technical communities, academia, private industry, other public research centres, SMEs, policy makers, general public
- Open ESFRI facilities to wider stakeholders through citizen science (Science 2.0)
- Coordinated citizen science experiments to open ESFRIs & pathfinders/precursors to public
- Educational resources & efficacy metrics

WP3 - OBELICS

Observatory **E**-environments **Li**nked by **C**ommon challenge**S**

Lead: G. Lamanna

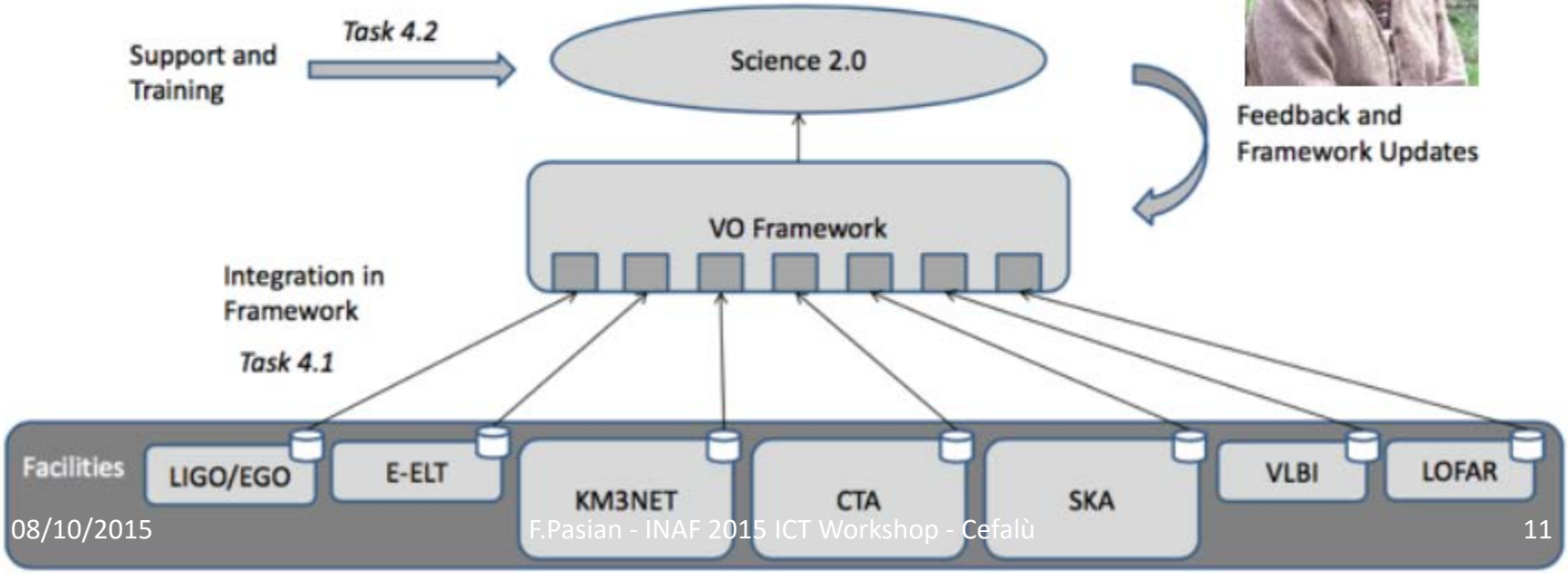


OBELICS

- Software interoperability; establishing open standards and software libraries
- Training in parallel programming and big data frameworks
- Adapt & optimise extremely large database systems for ESFRIs
- Demonstrate data integration across ESFRI & pathfinder projects using data mining tools & statistical analysis techniques on petabyte data sets

WP4 - DADI

Data **A**ccess, **D**iscovery and **I**nteroperability - *Lead: F. Genova*

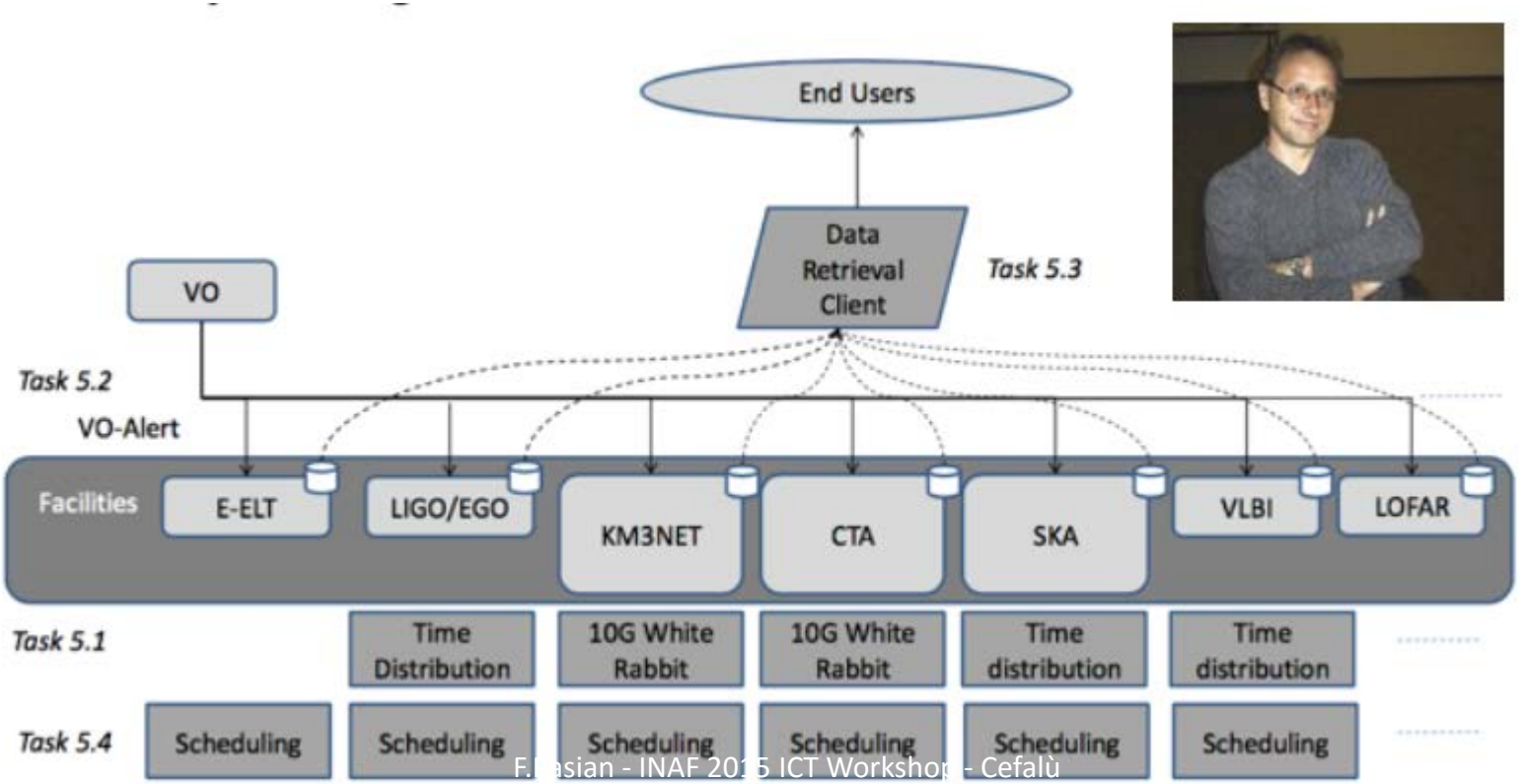


DADI

- Train & support ESFRI staff in Virtual Observatory
- Train & support wider astronomical community in scientific use of VO framework in particular for pathfinder data, & gather their requirements & feedback
- Adapt VO framework & tools to ESFRI project needs

WP5 - CLEOPATRA

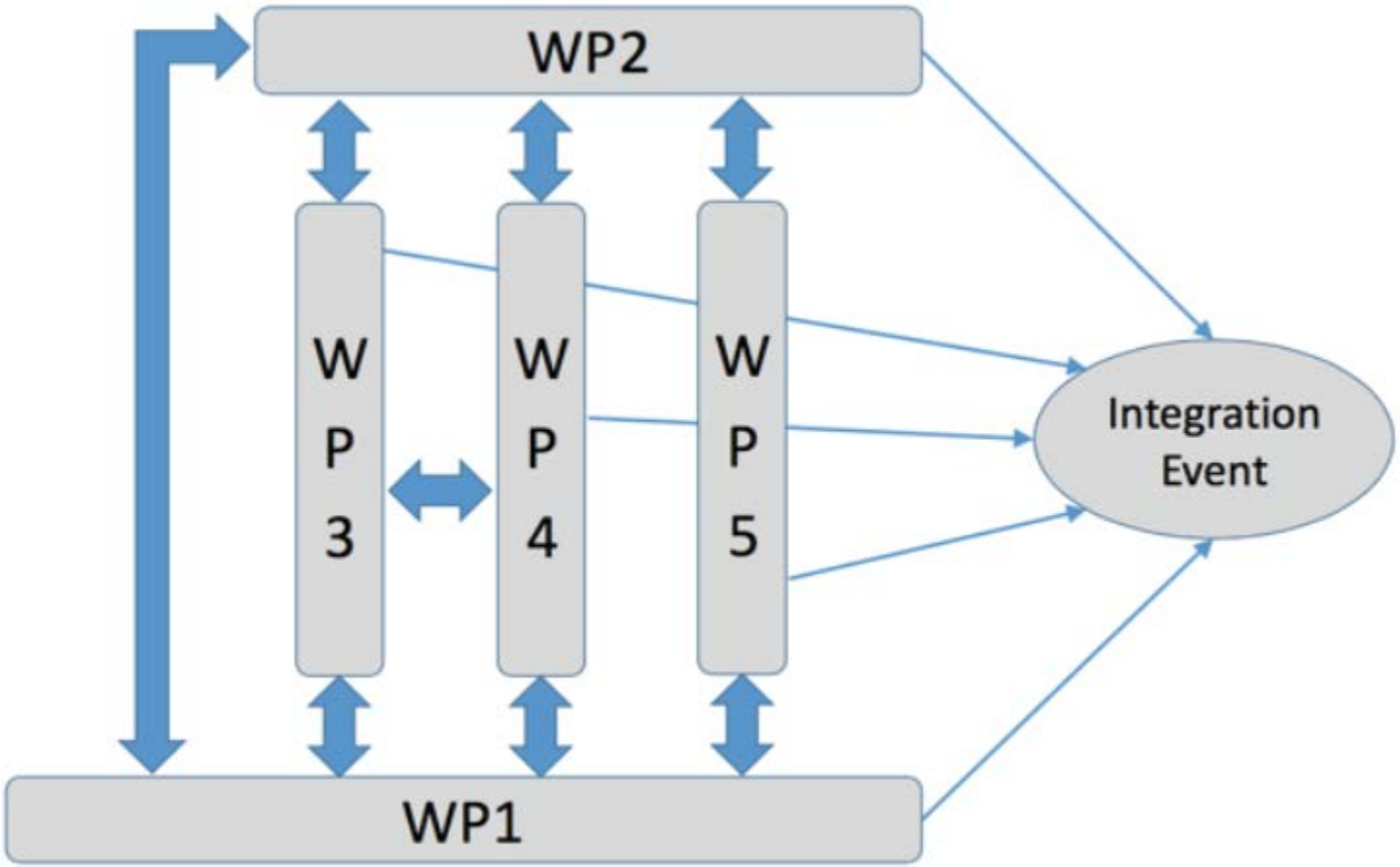
Connecting **L**ocations of **E**SFRI **O**bservatories and **P**artners in **A**stronomy for **T**iming and **R**eal-time **A**lerts - *Lead: A. Szomoru*



CLEOPATRA

- Technology development for fibre connectors; relaying alerts; data streaming software; data dissemination (including ALMA & E-ELT); advanced scheduling algorithms
- Builds on WRE (White Rabbit Ethernet) and the EC DG-EXPReS/NEXPRES projects

WP integration



INAF participation (I)

- Italian participation: INAF (third-largest partner 1.46 M€) + INFN (240 K€)

- Chair of General Assembly participates in Executive Board
- DECS (ref. M. Ramella):
  - T2.4* - co-ordinate translation and adaption of MPE resources, and testing in educational environment
- DADI (ref. F. Pasian):
  - T 4.1* - Support to astronomy ESFRI projects
  - T 4.2 - Support to the astronomical community
  - T 4.3 - Updates of the VO framework

INAF participation (II)

- OBELICS (ref. L.A. Antonelli):
  - T3.2.3* - optimised handling of secondary data streams and meta-data
  - T3.2.4* - low-power computer platforms for data-driven scalable parallel programming
  - T3.3.2 - prototype benchmarks for testing (e.g. XLDB initiative)
  - T3.3.3 - open services for data integration (including VO-integration)
  - T3.3.4 - software frameworks for data catalogues and query solutions to maximise data integration
  - T3.4.1 - open source software libraries for Peta-scale analysis/mining
  - T3.4.2* - workflow architectures + improving existing authorisation, authentication and accounting protocols
  - interface and complementarity with DADI

Summary

- ASTERICS funded at €15 million, up and running (1 May 2015)
- Bringing together the astronomy, astrophysics and astroparticle physics communities on a European scale for the first time
- Programme closely modelled on ASTRONET priorities → aims to tackle common problems, solutions, and cross-facility synergies
- Strong focus on “interoperability” - enabling multi-messenger / multi-wavelength astronomy
- Best practice platforms, interfaces, education, impact monitoring