



Overview of ESCAPE and WP4 'CEVO' status

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The acronym soup...

ESCAPE:

- **E**uropean **S**cience **C**luster of **A**stronomy & **P**article physics
ESFRI research infrastructures
 - **E**SFRI : European Strategy Forum on Research Infrastructures

Work Package 4 – WP4 “**CEVO**”

- **C**onnecting **E**SFRI projects to EOSC through the **VO** framework
 - **E**OSC – European **O**pen **S**cience **C**loud
 - **VO** – Virtual **O**bservatory



ESCAPE WP4 Technology Forum 1

Welcome to...

- **ESCAPE partner members of Work Package 4**
- **ESCAPE partner members from Work Packages 5 & 3, and 1... and 6!**
- **Invited experts and collaborators**

End of an era of Technology Forums...

EUROVO



Long live the Technology Forums !!!



Goals for Technology Forum 1.

- A meeting of the whole Work Package - 1 yr into the 3.5 yr project
- Interaction with invited experts (Solar, Radio, Applications, VO)
- Reports on initial progress
 - gather input on partner activities – in particular ESFRI/RI partners
 - finalise input for the annual report – urgent!
- Hack-a-thon sessions – *working meeting!!*
- Following from the Work Plan – link VO and ESFRI/RI expertise
- Prepare for the ESCAPE Progress meeting and next deliverables
- Prepare for the upcoming IVOA Interoperability meeting (May 2020)



ESCAPE in a nutshell

ESCAPE convenes a large scientific community

- **31** partners : **7** ESFRI & landmarks: CTA, ELT, EST, FAIR, HL-LHC, KM3NeT, SKA
- **2** pan-European International Organizations: CERN, ESO (with their world-class established infrastructures, experiments and observatories).
- **4** supporting ERA-NET initiatives: HEP (CERN), NuPECC, ASTRONET, APPEC
- **1 involved initiative/infrastructure: EURO-VO (Virtual Observatory)**
- **2** European research infrastructures: EGO and JIVE-ERIC
- Budget: **16 M€**, Started: **Feb 2019**, Duration: **42** months
- Coordinator: **CNRS** (Centre National de la Recherche Scientifique)

Home page: <https://projectescape.eu>



Radio



JIVE-
VLBI

SKA

Visible light



ELT

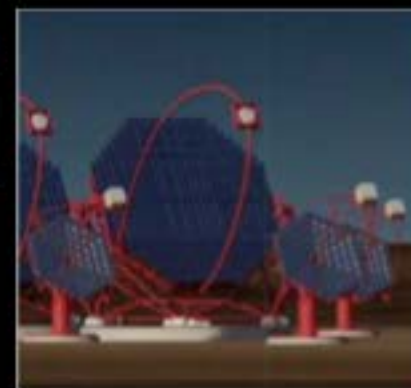


ESO



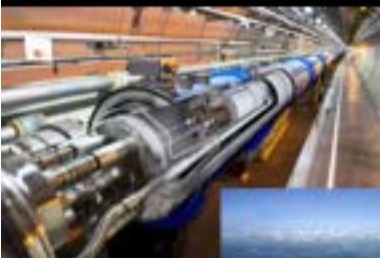
EST

Gamma rays



CTA

Accelerator-based Particle Physics

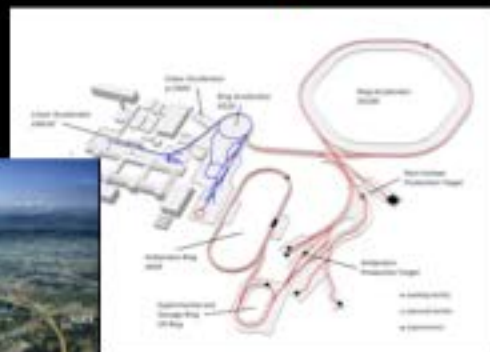


HL-LHC



CERN

Accelerator-based Nuclear Physics



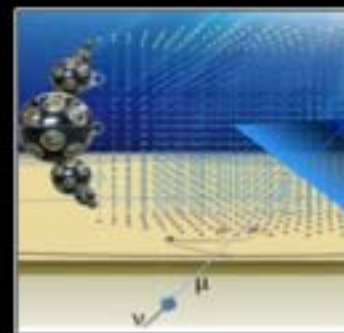
FAIR

Gravitational Waves



EGO-VIRGO

Cosmic-rays Neutrinos



KM3NeT



1. Implementing **Science Analysis Platforms** for EOSC researchers to stage data collections, analyse them, access ESFRIs' software tools, bring their own custom workflows.
2. Contributing to the **EOSC** global resources federation through a Data-Lake concept implementation to manage extremely large data volumes at the multi-Exabyte level.
3. Supporting **"scientific software"** as a major component of ESFRI data to be preserved and exposed in EOSC through dedicated catalogues.
4. Implementing a community foundation approach for continuous software shared development and training new generation researchers.
5. ***Virtual Observatory standards and methods for FAIR principles to a larger scientific context; demonstrating EOSC capacity to include existing frameworks.***
6. Further involving SMEs and society in knowledge discovery.





<http://projectescape.eu>



CONTACT US

Communication Kit

in

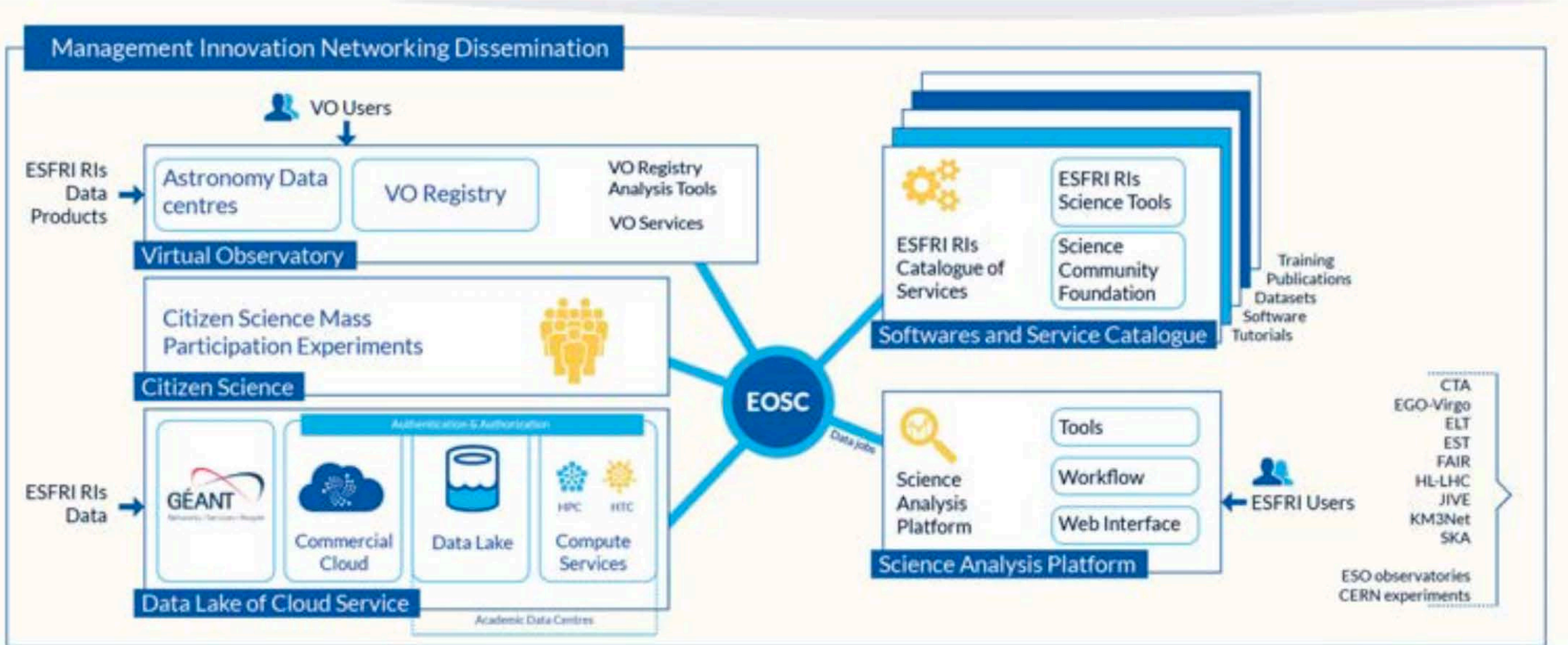


ABOUT US ▾ ESCAPE CATALOGUE ▾ SCIENCE PROJECTS NEWS EVENTS LIBRARY ▾ INTERNAL

European Science Cluster of Astronomy & Particle physics ESFRI research Infrastructures



The following sections describe the main ESCAPE contributions to ESOC through its work programme



Changing landscape of Data Sharing

Convergence of principles and language:

● FAIR

● Findable, Accessible, Interoperable, Reusable

● Open Science

- Data sharing with open and seamless services to analyse and reuse research data to improve science

● Stewardship

- Human skills for curation, quality content, data management, services



WP4 Objectives

- Assess and implement the connection of **ESFRI** and other **astronomy research infrastructures** to the **EOSC** by the **Virtual Observatory**
- Refine and pursue implementation of **FAIR principles for astronomy** data via common interoperability standards - extending the VO to new communities
- Establish **data stewardship practices** for adding value to scientific content of ESFRI data archives



Connecting ESFRI to the EOSC via the VO

In practice: ESFRI-VO-EOSC connection

- Inclusion of **VO registry** will be a key factor
- Implement **FAIR principles via interoperability standards**
- **VO next-steps:**
 - Requirements of ESFRI and European data providers, e.g. value added data at ESO, preparing for Big Data
 - Connection to computing, and extension to new communities
- **Stewardship** – technical and human
- **Training** – “Interoperable data schools”



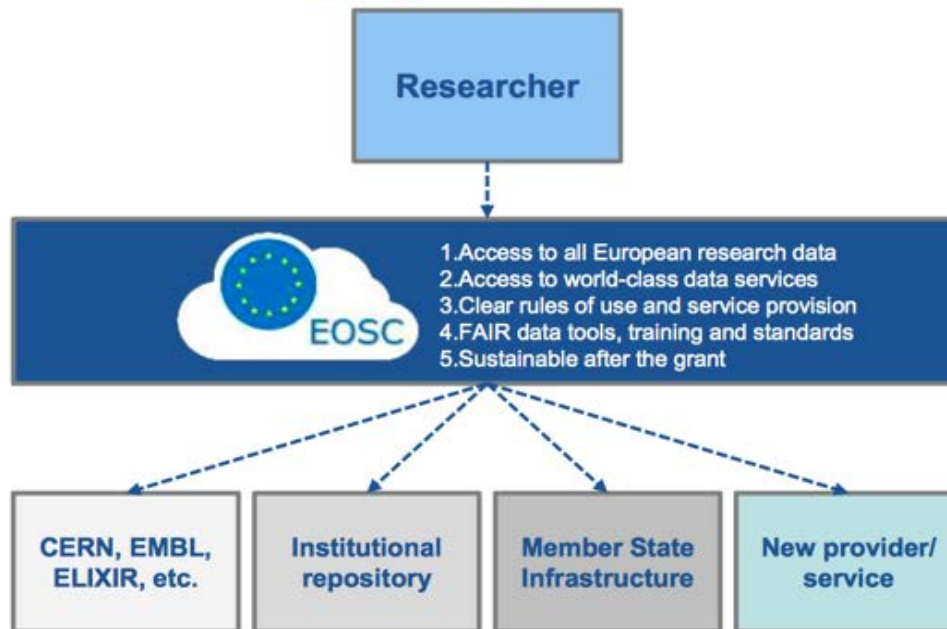
Following all steps of EOSC evolution – making the connection with VO and astronomy needs



European Open Science Cloud (EOSC)



A. The EOSC will allow for universal access to data and a new level playing field for EU researchers



- Easy access through a universal access point for ALL European researchers
- Cross-disciplinary access to data unleashes potential of interdisciplinary research
- Services and data are interoperable (FAIR data)
- Data funded with public money is in principle open (as open as possible, as closed as necessary)
- EOSC will help increase recognition of data intensive research and data science

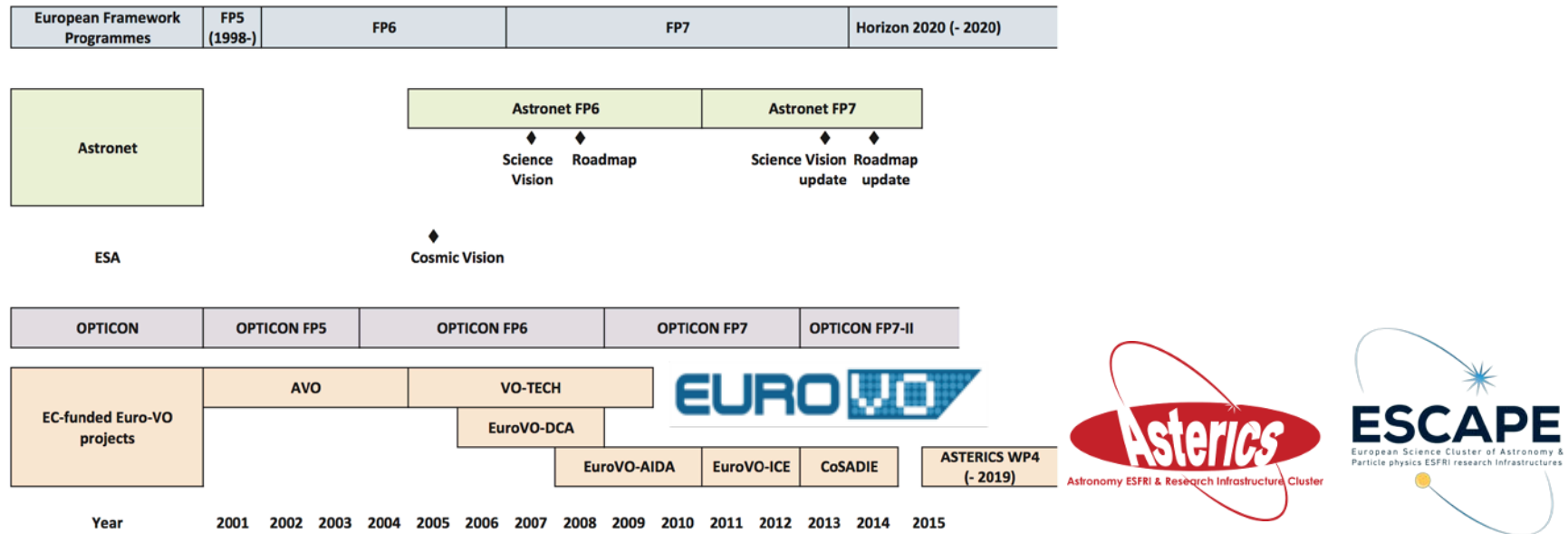
Seamless environment, enabling interdisciplinary research



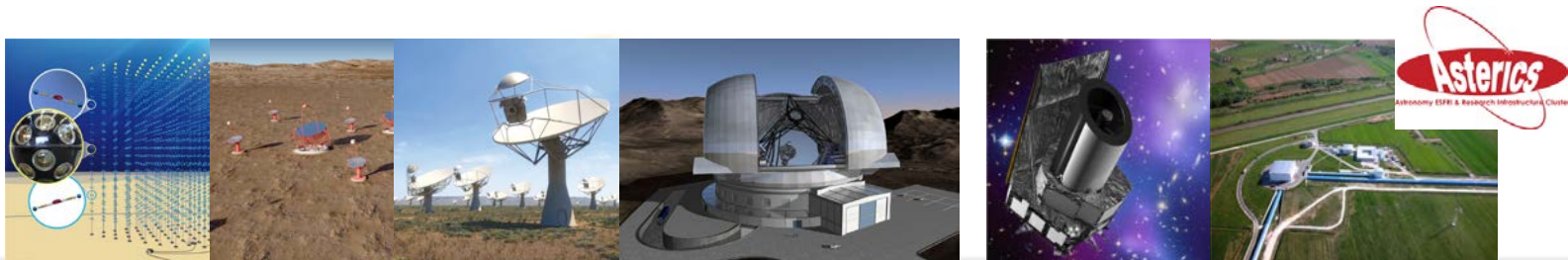
Background of the VO data aspects in Europe...

How we got here, and where we're going

Virtual Observatory infrastructure for astronomy



Genova et al. 2015

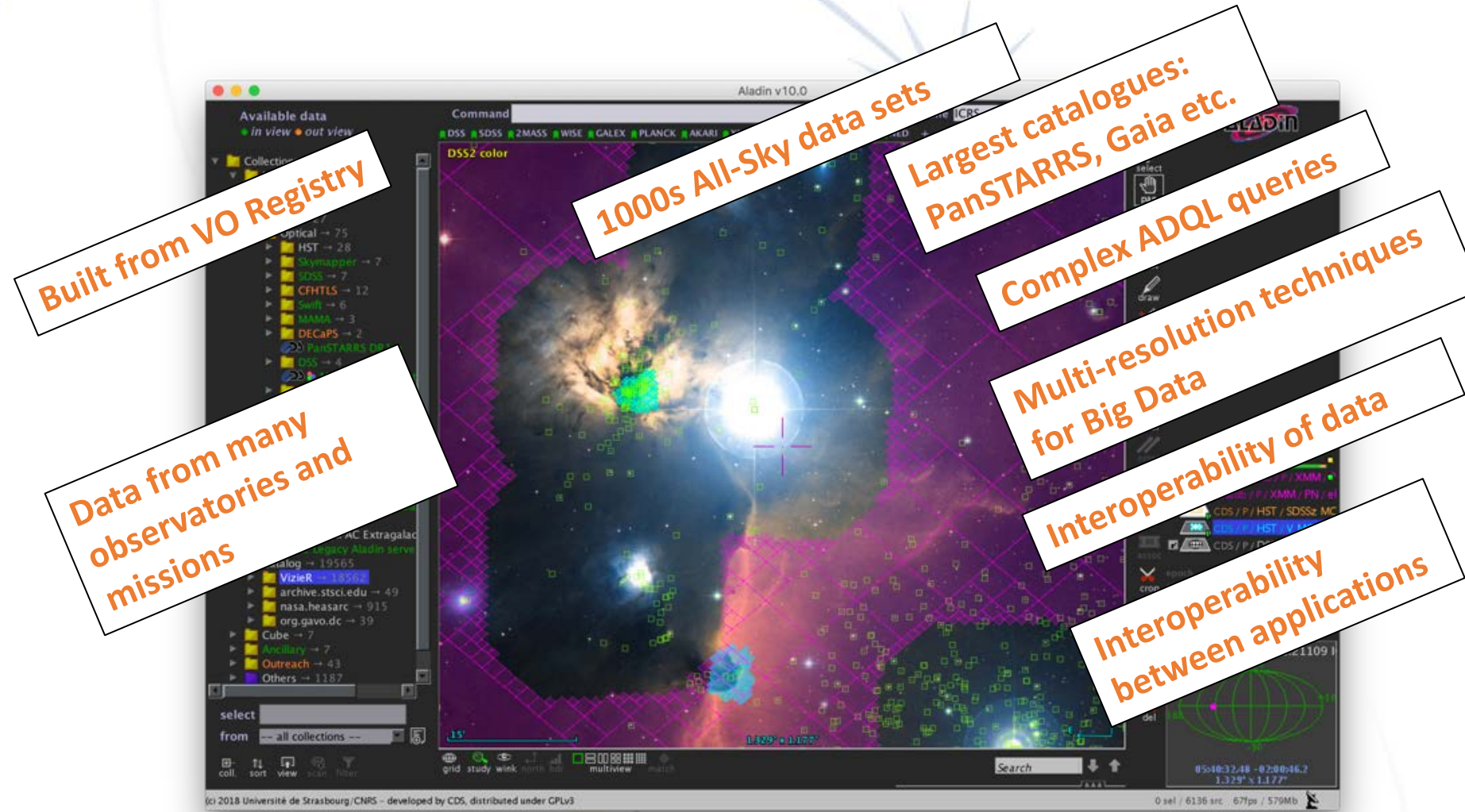


What is the Virtual Observatory?

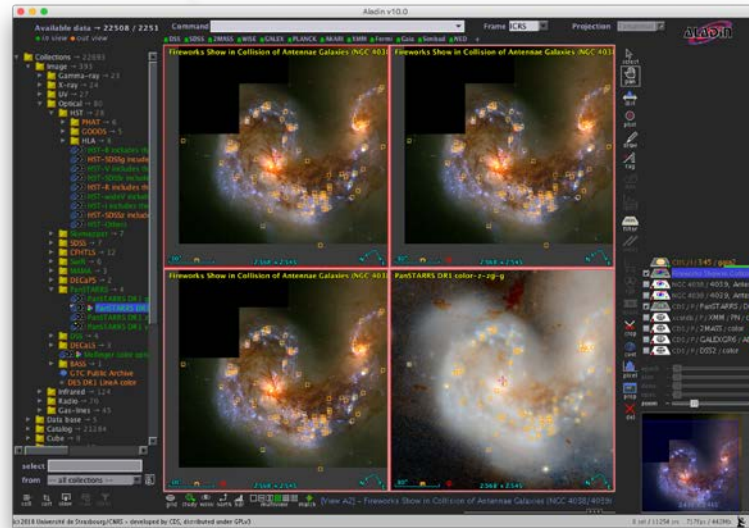
- **Operational framework** for interoperable access to astronomical data and services across all areas of astronomy
- Provides unique scientific capabilities, opening up new ways of using rich data in astronomy archives and services
- **A pioneer of FAIR data sharing** - an existing global **framework** – populated by major data providers (space and ground based) that is heavily used by the community (*e.g. Gaia data access is fully VO*)
- **Re-used and customized** by planetary science (EuroPLANET), atomic and molecular physics (VAMDC) and materials sciences (via RDA Working Group)



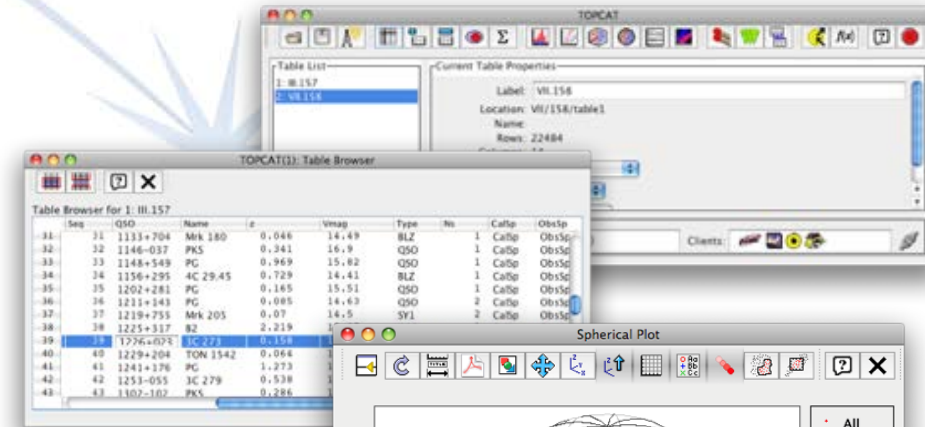
One view of the VO from an application:



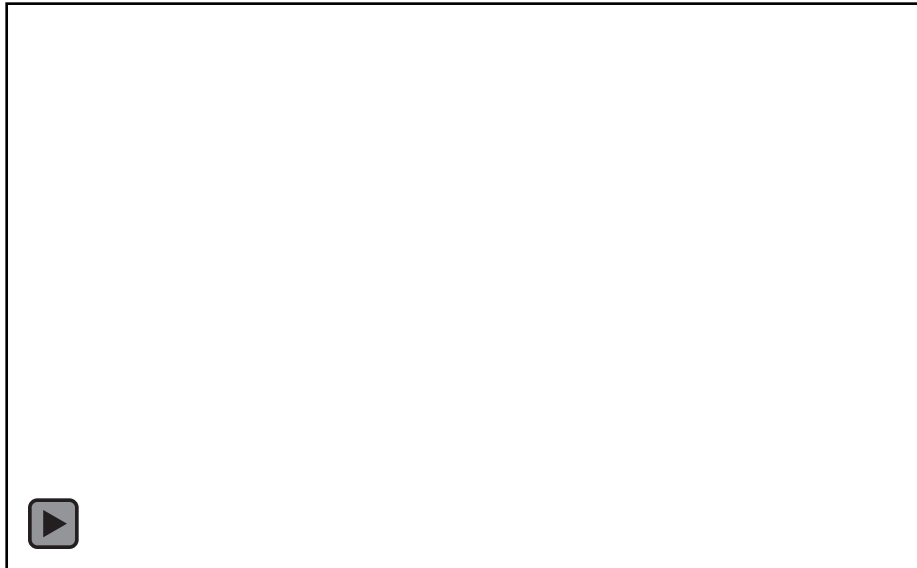
Interoperable applications and services



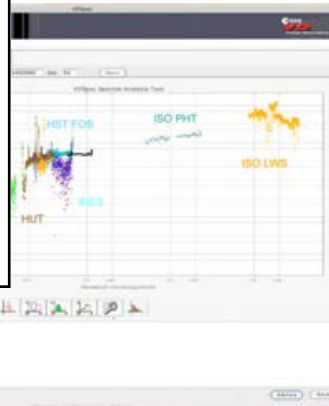
Data exploration and integration tools



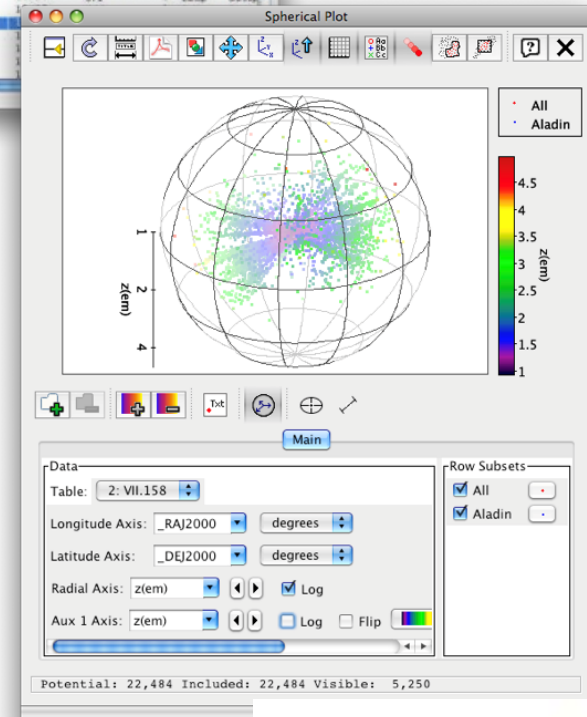
Your apps
& programs



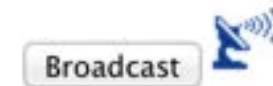
Notebooks



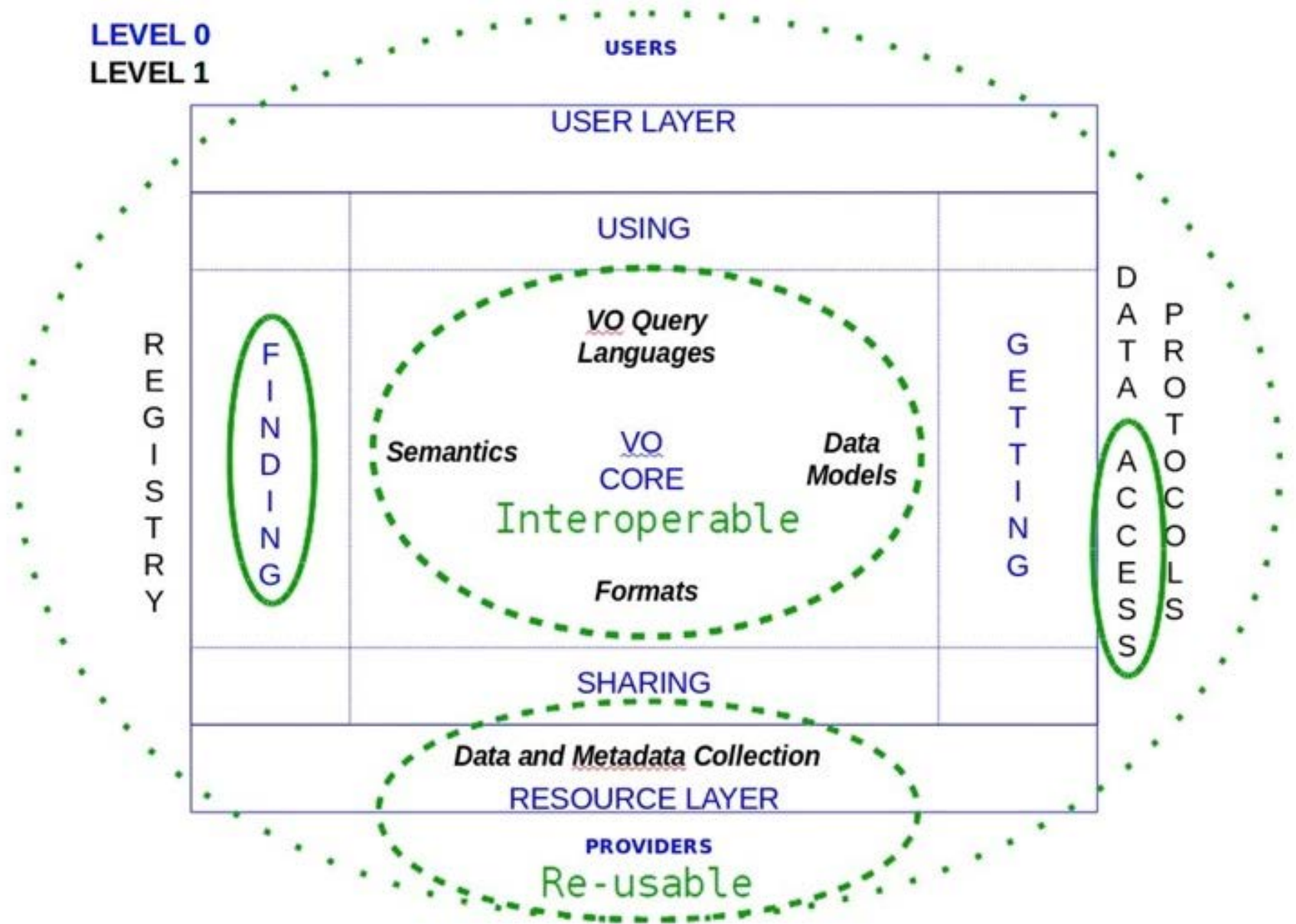
Spectral tools

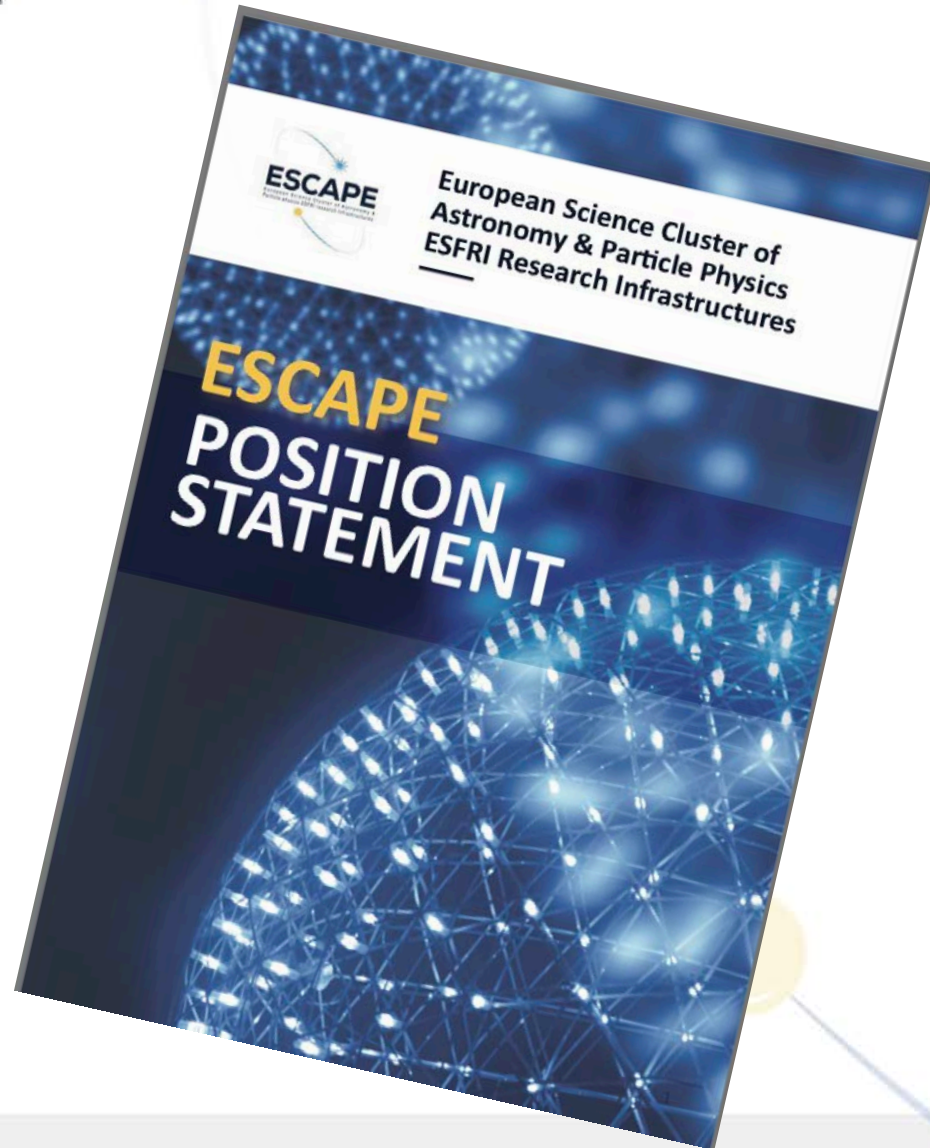


TOPCAT

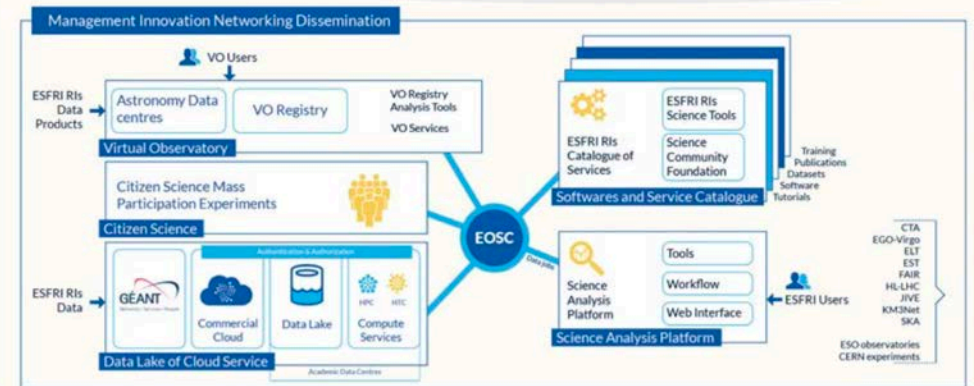


VO is FAIR





The following sections describe the main ESCAPE contributions to ESOC through its work programme



Project - now in full operation

- ESCAPE Executive Board : E-EB – having regular meetings
- Other WPs – having regular telecons, and meetings
- Communication – active, looking for things to highlight
- WP4 - First Milestone – Paris IVOA meeting report ✓
- WP4 – First Deliverable – **WP4 Project Plan** ✓
- WP4 - Second Milestone – Groningen IVOA meeting report ✓
- WP4 calendar – in Project Plan document, subscribable
- Project tools: Indico / mailing lists / file sharing repository / wiki



WP4 Tasks

Task 4.1 Integration of astronomy VO data and services into the EOSC

Lead: Marco Molinaro (INAF)

Task 4.2 Implementation of FAIR principles for ESFRI data through the Virtual Observatory

Lead: Françoise Genova (CNRS-ObAS)

Task 4.3 Adding value to trusted content in astronomy archives

Co-leads: Mark Allen (CNRS-ObAS) & Martino Romaniello (ESO)



WP4 Partners

Partners from ESFRI research Infrastructures and astronomy Research Infrastructures



Partners bringing experience from European Virtual Observatory projects



WP4 – CEVO partners

CEVO Partners:

ESFRI/RI or VO	CEVO Work Package Partner
CTA	CTAO (Cherenkov Telescope Array Observatory)
CTA / VO	ObsParis (Observatoire de Paris)
EGO-Virgo	EGO-Virgo (European Gravitational Observatory)
ELT / ESO	ESO (European Southern Observatory)
VLBI ERIC	JIVE (Joint Institute for VLBI ERIC)
EST	KIS (Kiepenheuer Institut für Sonnenphysik)
EST	ROB (Royal Observatory of Belgium) / ORB (Observatoire Royal de Belgique)
SKA	SKAO (Square Kilometre Array Organisation)
SKA	NWO-I-ASTRON (the Netherlands Institute for Radio Astronomy)
KM3NeT	CNRS-CPPM (Center for Particle Physics of Marseille)
VO	CNRS-ObAS (Observatoire Astronomique de Strasbourg)
VO	INAF (Istituto Nazionale di Astrofisica – Astronomical Observatory of Trieste)
VO	INTA (Instituto Nacional de Técnica Aeroespacial)
VO	UEDIN (The University of Edinburgh)
VO	UHEI (Heidelberg University)
WP3 interface	HITS (The Heidelberg Institute for Theoretical Studies)



Person-months per partner in WP4

Table 3.1a.4: ESCAPE WP4: CEVO (Connecting ESFRI projects to EOSC through VO framework)

WP number	4			Start Date			M1	
WP title	CEVO (Connecting ESFRI projects to EOSC through VO framework)							
Participant Nr	1	1	28	23	5	11	26	22
Short name	CNRS-CPPM	CNRS-ObAS	CTAO	EGO	ESO	INAF	INTA	JIVE
Person months:	12	69	12	12	40	46	15	36
Participant Nr	16	3	17	8	6	20	18	
Short name	KIS	NWO-I-ASTRON	ObsParis	ORB	SKAO	UEDIN	UHEI	
Person months:	12	12	12	24	12	14	20	



WP4 specific events in the past year (*more details in the Task presentations*)

- Transition event – ASTERICS Tech Forum (Feb 2019)
- Radio Astronomy and VO meeting / EST and VO meeting (Feb 2019)
- Visit to Royal Obs Belgium (European Solar Telescope) (Feb 2019)
- EOSC-Hub Week (April 2019)
- KM3NeT and VO meeting – September 2019
- Task 4.3 Meetings (September, December 2019)
- Provenance – CTA, KM3NeT (Nov 2019)
- SCIOPS – presentation of ESCAPE (Nov 2019)
- EOSC Symposium (Nov 2019)

Paris, Interoperability meeting
May, 2019



Groningen, Interoperability meeting
October, 2019



Detailed WP4 Project Plan

- Constructed via many individual meetings with ESFRI/RI partners to understand their needs for VO
- Consists of tables of tasks, and outline of effort for each task
- Timelines – controlled by individual partners
 - in particular when number of PM < 15, or spreading resources over multiple work packages
- Timeline also strongly linked to IVOA meeting milestones
- Work Plan has been set up to track progress
- Next step now – linking of VO expertise to ESFRI/RI needs



JIVE

Develop the concept of Radio Astronomy UV data in the VO

- Contribute to the development of IVOA standards to enable interferometric data in the VO
- Participate in IVOA to provide feedback on common standards relevant to radio astronomy

(Part of Tasks 4.2.a 4.2.b, contributes to D4.2, D4.8.)

Implement VO services for the EVN archive

- Build up expertise on the implementation of VO standards, libraries and tools for use in the EVN archive
- Implementation of VO data access standards for the EVN archives
- Register JIVE resources in the VO registry

(Part of Tasks 4.2.a 4.2.c, contributes to D4.2, D4.8. Potential application in training events of 4.2.d)

IVOA Interoperability Meetings



- Participation in the IVOA global effort for establishing interoperability standards
- ESCAPE requirements are introduced at the IVOA level
- Very important that ESFRI/RIs participate and interact with VO-expert partners
- Progress and priorities are tracked in the Milestone reports



Calendar

Technology Forum – Strasbourg, 4-6 Feb, 2020

ESCAPE Progress Meeting, GA – Brussels, 26-27 Feb, 2020

VO School – ESAC/Madrid, 26-28 May, 2020

ESCAPE summer school 2020

CEVO Project schedule table

Month 1	February 2019	
Month 2	March	
Month 3	April	
Month 4	May	
Month 5	June	M4.1 Progress and priorities at IVOA
Month 6	July	D4.1 Detailed project plan for WP4 (<i>This document</i>)
Month 7	August	
Month 8	September	
Month 9	October	
Month 10	November	M4.2 Progress and priorities at IVOA
Month 11	December	
Month 12	January 2020	
Month 13	February	
Month 14	March	D4.2 Intermediate report on use of IVOA standards
Month 15	April	
Month 16	May	D4.3 1st Science with interoperable data school
Month 17	June	M4.3 Progress and priorities at IVOA
Month 18	July	D4.4 Intermediate analysis report of VO data and service integration into EOSC
Month 19	August	
Month 20	September	
Month 21	October	
Month 22	November	M4.4 Progress and priorities at IVOA
Month 23	December	
Month 24	January 2021	



Month 25	February	
Month 26	March	
Month 27	April	
Month 28	May	M4.5 Hands-on workshop for data providers
Month 29	June	M4.6 Progress and priorities at IVOA
Month 30	July	D4.5 Prototype demonstrator for value-added archive services
Month 31	August	
Month 32	September	
Month 33	October	
Month 34	November	M4.7 Progress and priorities at IVOA
Month 35	December	D4.6 2nd Science with interoperable data school
Month 36	January 2022	
Month 37	February	
Month 38	March	D4.7 Final analysis report on integration of VO data and services into EOSC
Month 39	April	
Month 40	May	D4.8 Final analysis report on IVOA standards and stewardship best practices
Month 41	June	
Month 42	July	



Presentation of the 3 Tasks

Task 4.1 Integration of astronomy VO data and services into the EOSC

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Next steps...

- ESCAPE Progress Meeting, Brussels, 26-27 Feb
- Deliverables, Milestones...
- VO School (ESAC/Madrid, May 26-28)
- Participation in EOSC events as needed
- Mid-term review of ESCAPE : September 2020

