

IVOA developments & the Astro-CC project

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DI ASTROFISICA

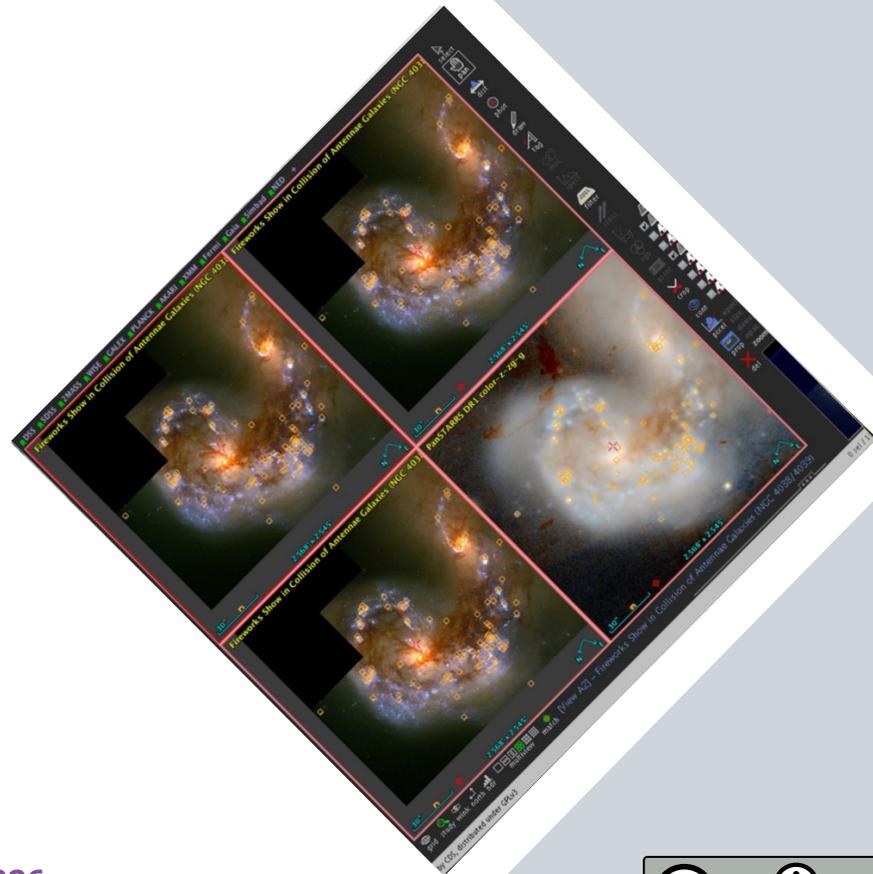


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OSCARS

Astro-CC



Wednesday 11 March 2026
USC-C General Assembly - Trieste



outline

- “**
- IVOA
 - refresh concepts
 - report updates
 - Astro-CC
 - project overview
 - status
- ”**

The *observational* challenge

// Any area of the sky not observed in a certain moment in time is missing data. //

...and its consequences

- **Preservation**
 - *“forever”*
- **Sharing**
 - **Open/Public** accessibility
- **Interoperability**
 - Technical & **Semantic**



D
A
T
A

IVOA: interoperable ecosystem



<https://ivoa.net/>

- **International Virtual Observatory Alliance**
- Formed in 2002
- Open standards organisation
- Interoperability as the core goal
- FAIR-enabler standards for astronomy

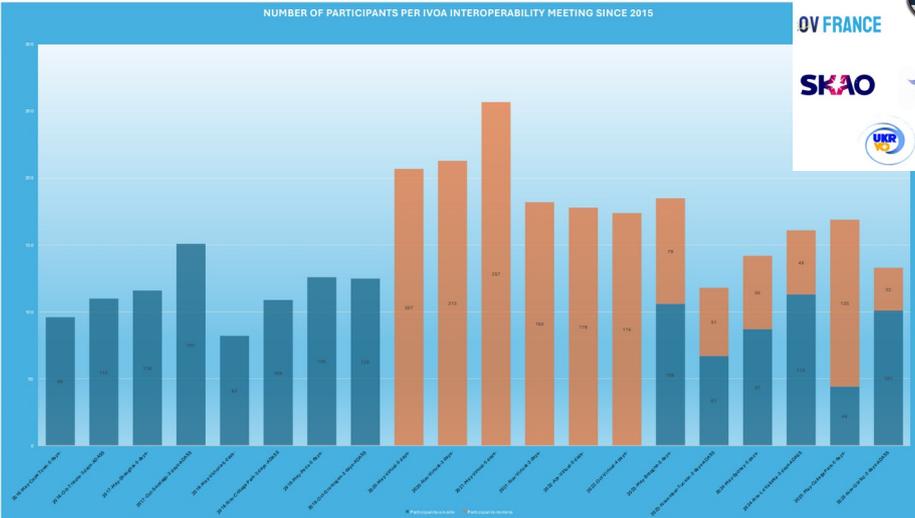
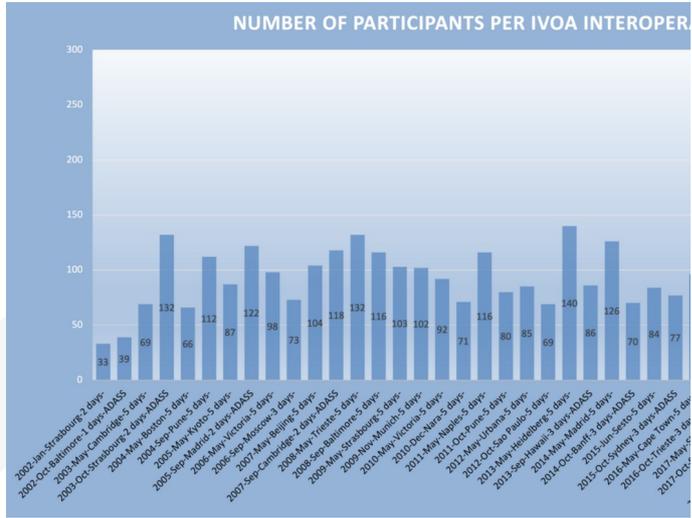
IVOA vision

“The Virtual Observatory (VO) is the vision that astronomical datasets and other resources should work as a seamless whole. [...] The International Virtual Observatory Alliance (IVOA) is an organisation that debates and agrees the technical standards that are needed to make the VO possible. **”**

IVOA "family picture"



IVOA community

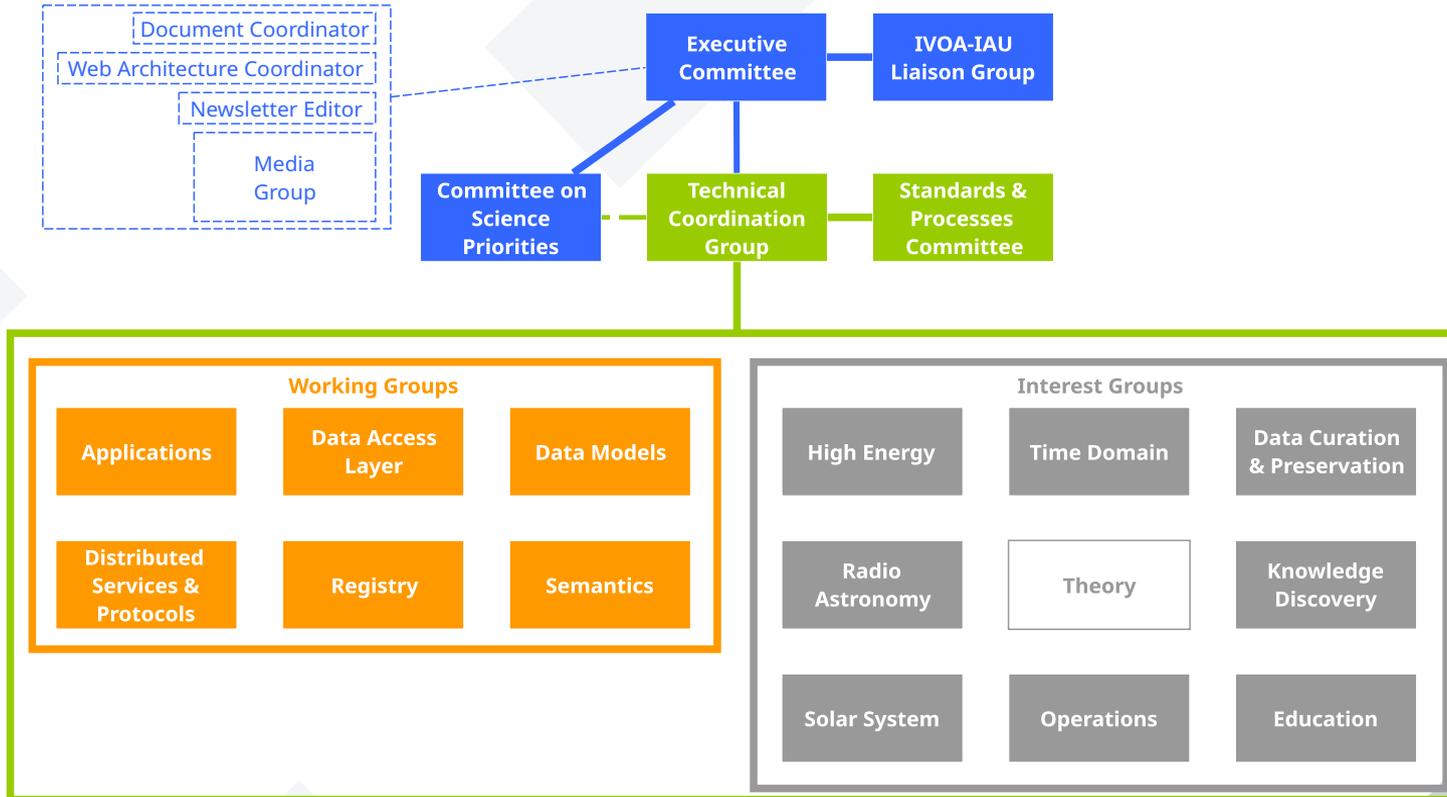


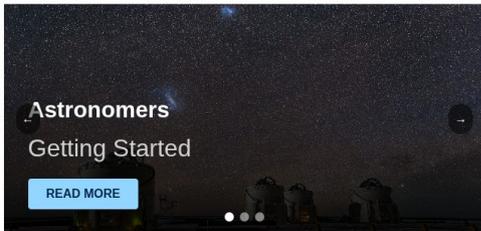
Semestral "Interoperability" Meetings with ~100 participants

next ones

- 8-12 June 2026: Strasbourg - <https://indico.ict.inaf.it/event/3454/>
- 6-8 November 2026: Perth – back-to-back to 1-5 November ADASS XXXVI

IVOA organisation





News

Event announcement: IVOA June 2026 Interoperability Meeting

New IVOA Homepage

IVOA November 2025 Interoperability Meeting

The Virtual Observatory (VO) is an international research data infrastructure in Astronomy and Astrophysics. Spelled out, this means it

- defines standards for finding, accessing, using, and describing data ranging from catalogues to images to cubes to complex datasets packaging measurements, calibrators, simulation data, derived data products or whatever else is necessary for research at the limits of the instruments.
- brings together about 50 data centres worldwide adhering to these standards, which includes many major players like the CDS, NASA, ESA, CADC, and many others.
- joins the efforts of the authors of client software, libraries, educational material, web portals, or science platforms, which all cooperate to make data-intensive research in astronomy a pleasure. Or, well, at least possible.

In 2025, this translates into some 30'000 "resources" (ranging from a catalogue of a few entries to huge data collections like, say, the CADC's data holdings), which serve hundreds of millions of data sets (e.g., images or spectra) and hundreds of billions of catalogue entries.

Most of the resources are immediately accessible for anyone. To learn how to do that, have a look at what Tools have VO support built in or how to do your first steps.

To build and maintain the VO, in the early 2000s several research organisations formed the International Virtual Observatory Alliance (IVOA), which debates and agrees the technical standards that are needed to make the VO possible. If you have suggestions for how to evolve the VO or provide other input, your first contact should be the member organisation next to you. But your input is also welcome directly with the IVOA's Working and Interest Groups.

https://ivoa.net/

- HUGO
 - static md/rst to html
- github repo + CI deployment
- issue driven community updates

new website

About the IVOA

- What is the VO?
- What is the IVOA?
- Who is involved?

For Astronomers

- Getting Started
- Using the VO
- VO Glossary

For Developers

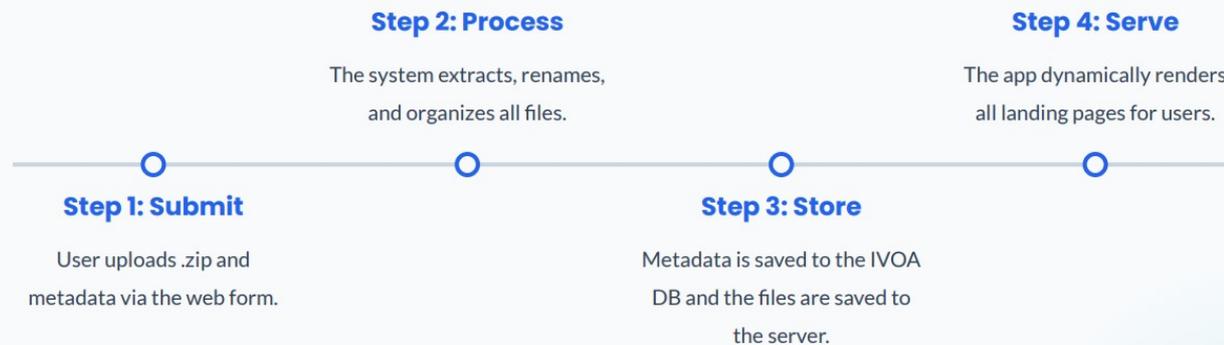
- Intro to VO Concepts
- IVOA Standards
- Guide to Publishing in the VO

For Members

- IVOA Calendar
- Working Groups
- Twiki

document repository

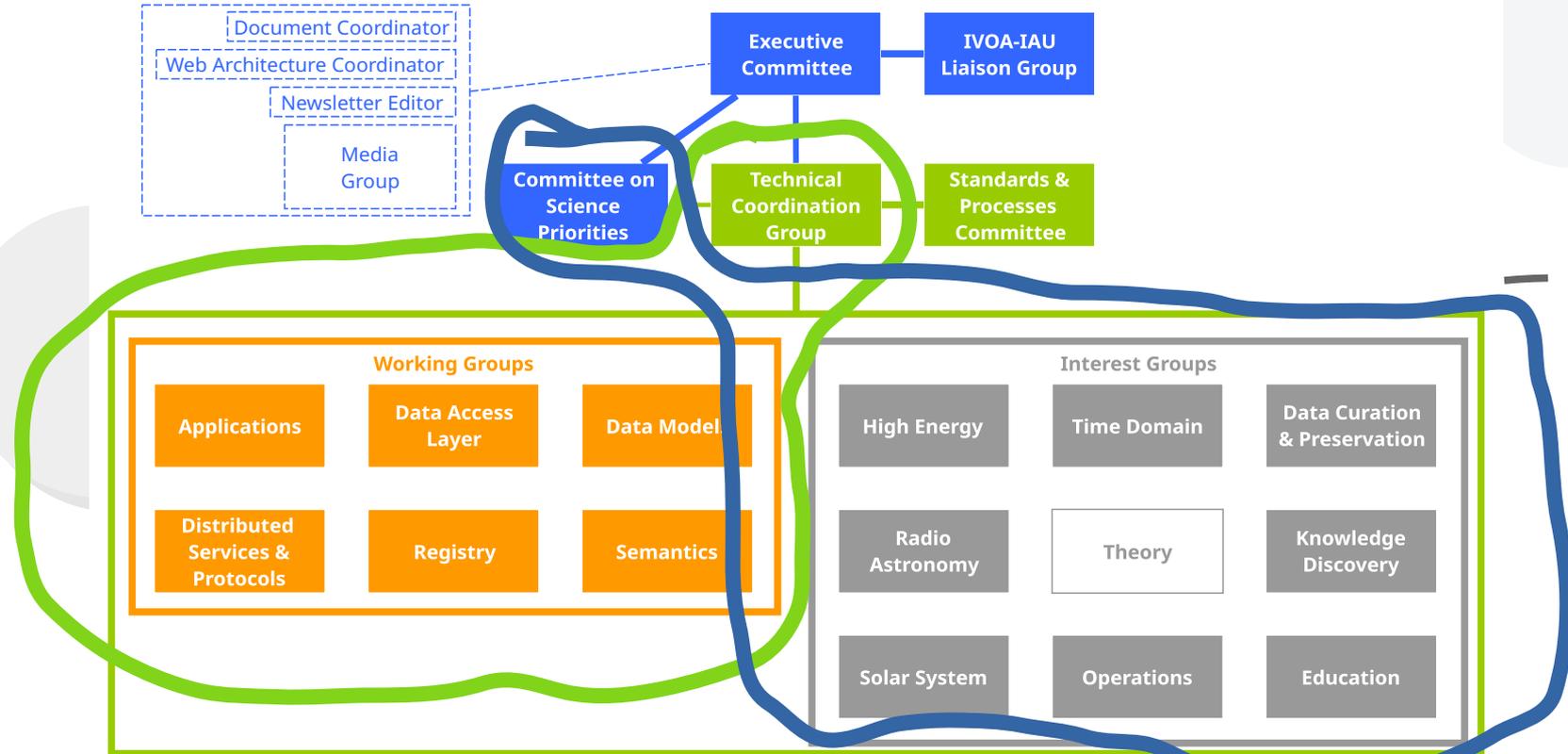
The Automated Workflow



- ... work in progress
- automate processes
- ask Kalyani for details!

https://wiki.ivoa.net/internal/IVOA/InterOpNov2025DocStdDiscussion/Pedamkar_docrepo.pdf

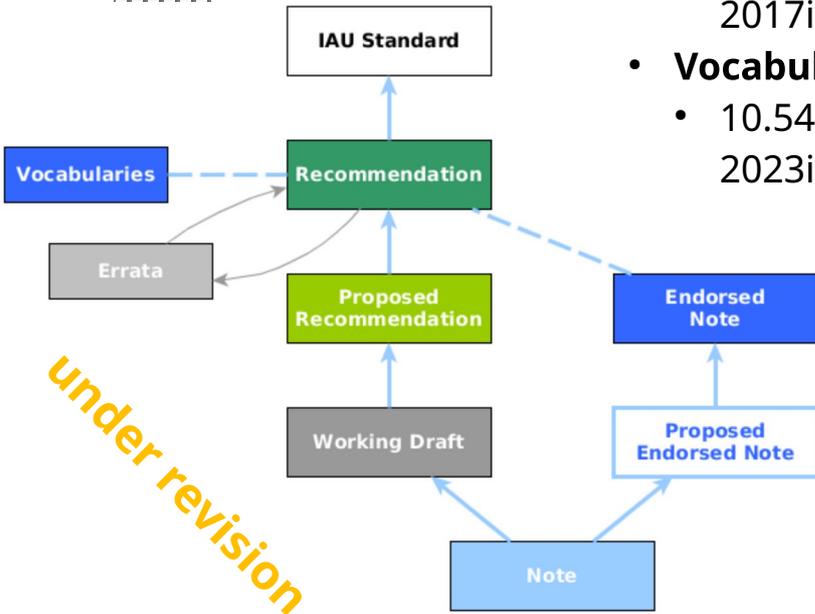
role of IGs & CSP



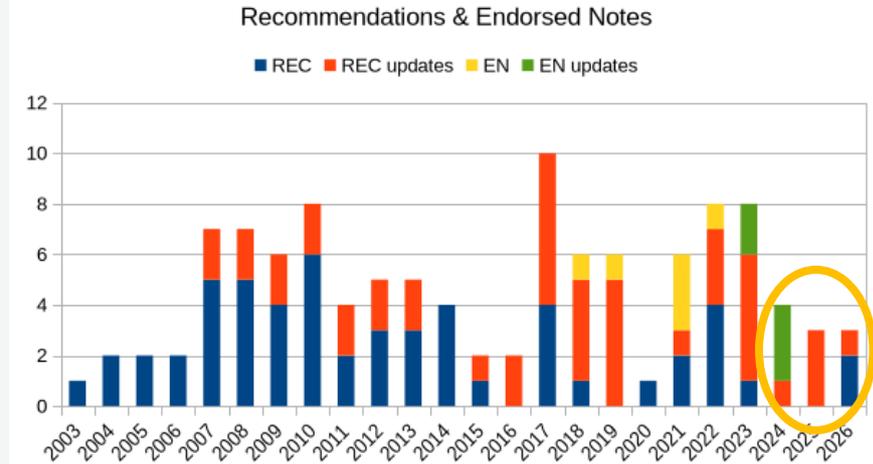
IVOA processes

- **IVOA Document Standards 2.0**
 - 10.5479/ADS/bib/2017ivoa.spec.0517G
- **Vocabularies in the VO 2.1**
 - 10.5479/ADS/bib/2023ivoa.spec.0206D

Recommendations (standards) are **agreed on consensus**



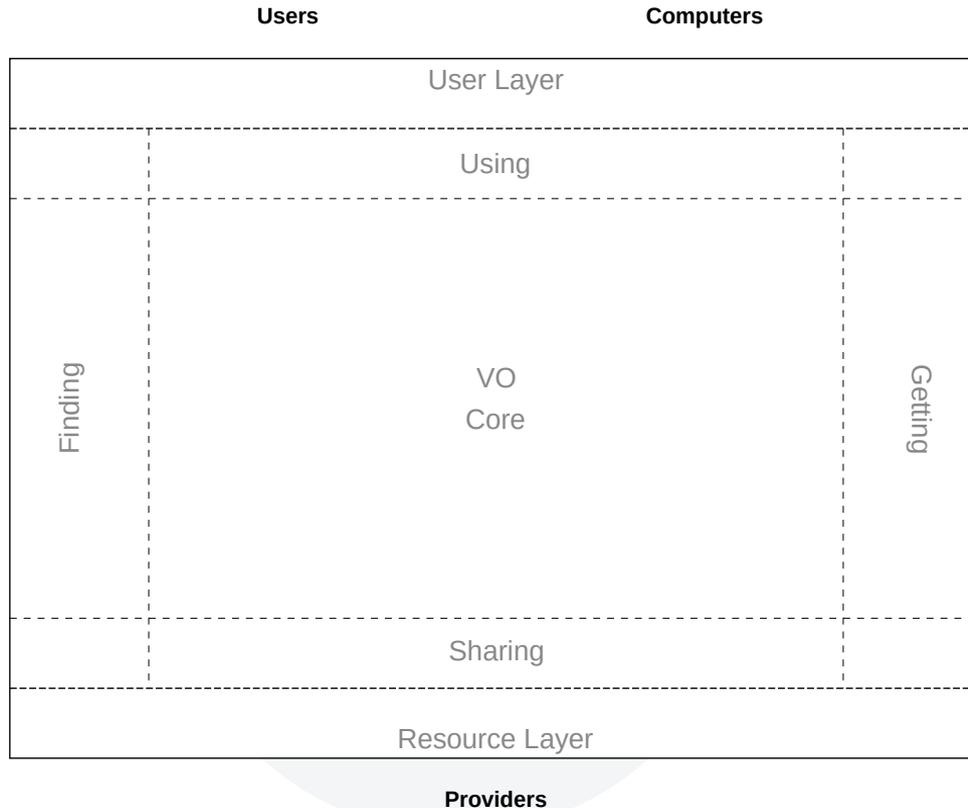
under revision



IVOA architecture

IVOA Architecture 2.1

<https://ui.adsabs.harvard.edu/abs/2024ivoa.spec.1114E>

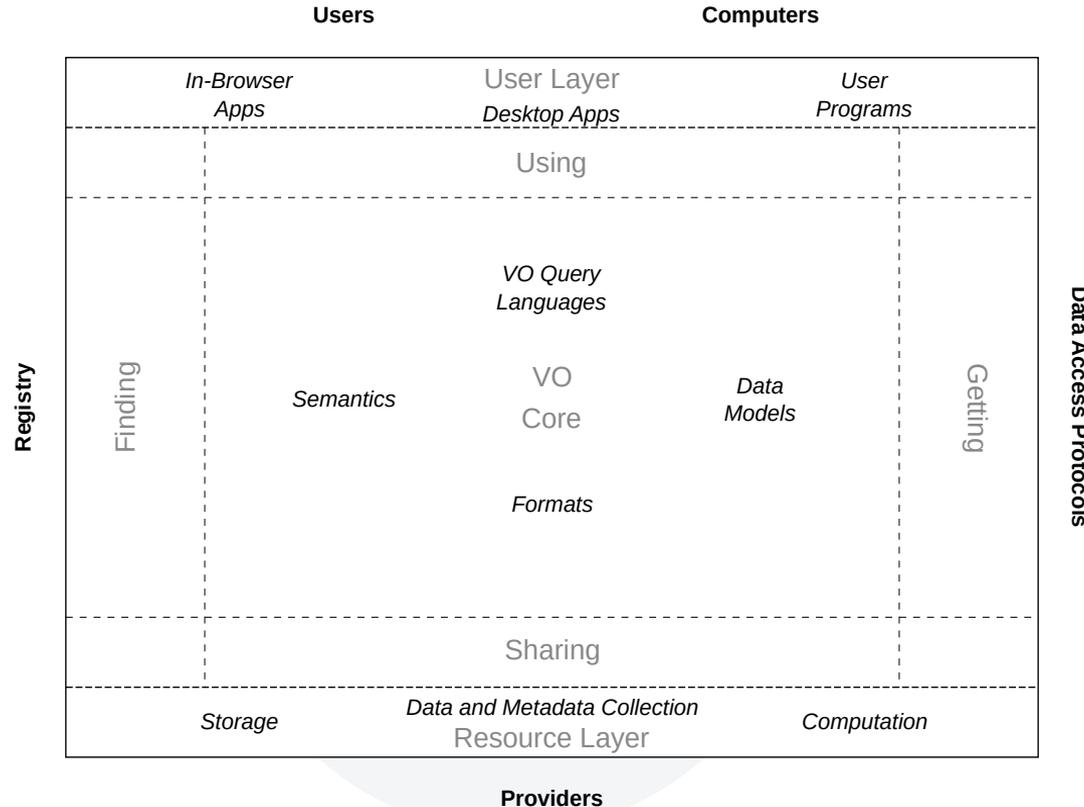


level 0

IVOA architecture

IVOA Architecture 2.1

<https://ui.adsabs.harvard.edu/abs/2024ivoa.spec.1114E>

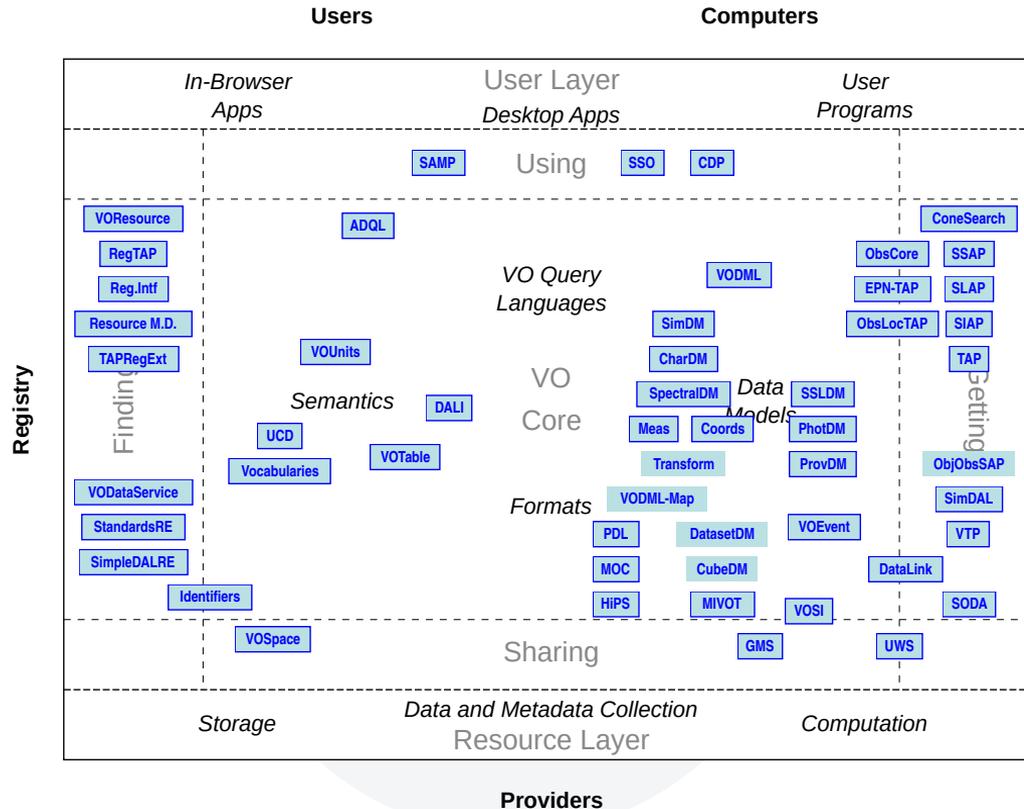


level 1

IVOA architecture

IVOA Architecture 2.1

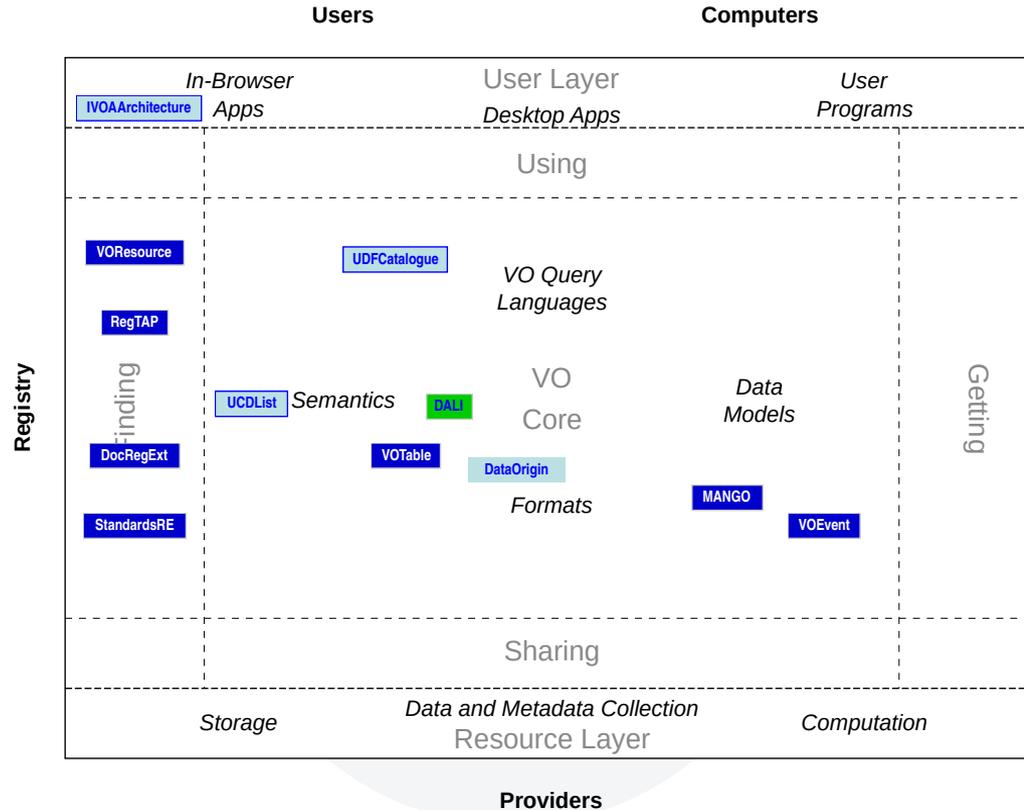
<https://ui.adsabs.harvard.edu/abs/2024ivoa.spec.1114E>



level 2

Data Access Protocols

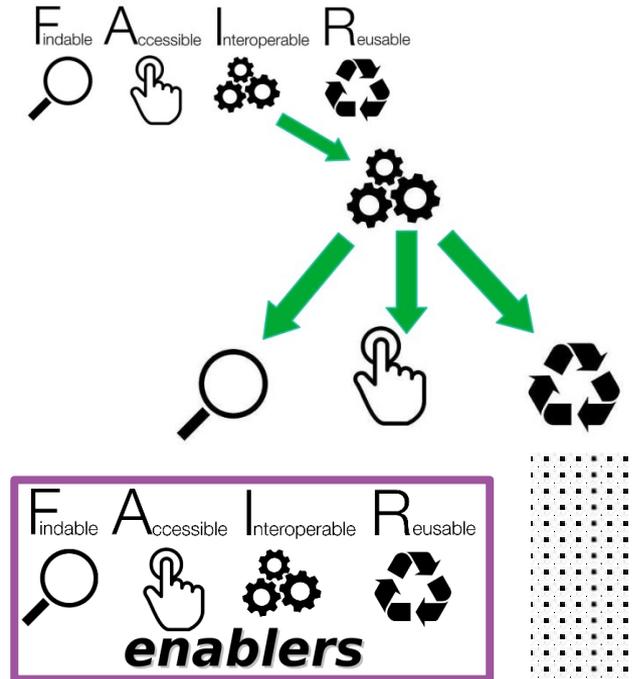
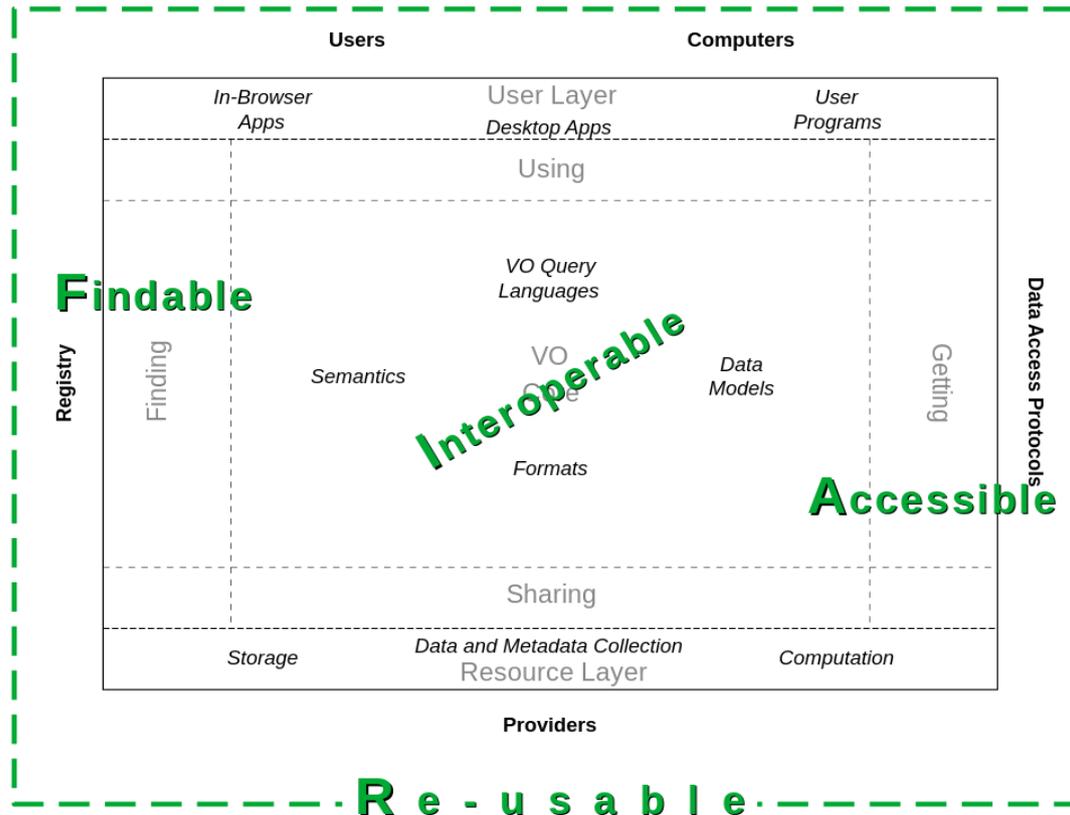
standards updated



2024-2026
timespan

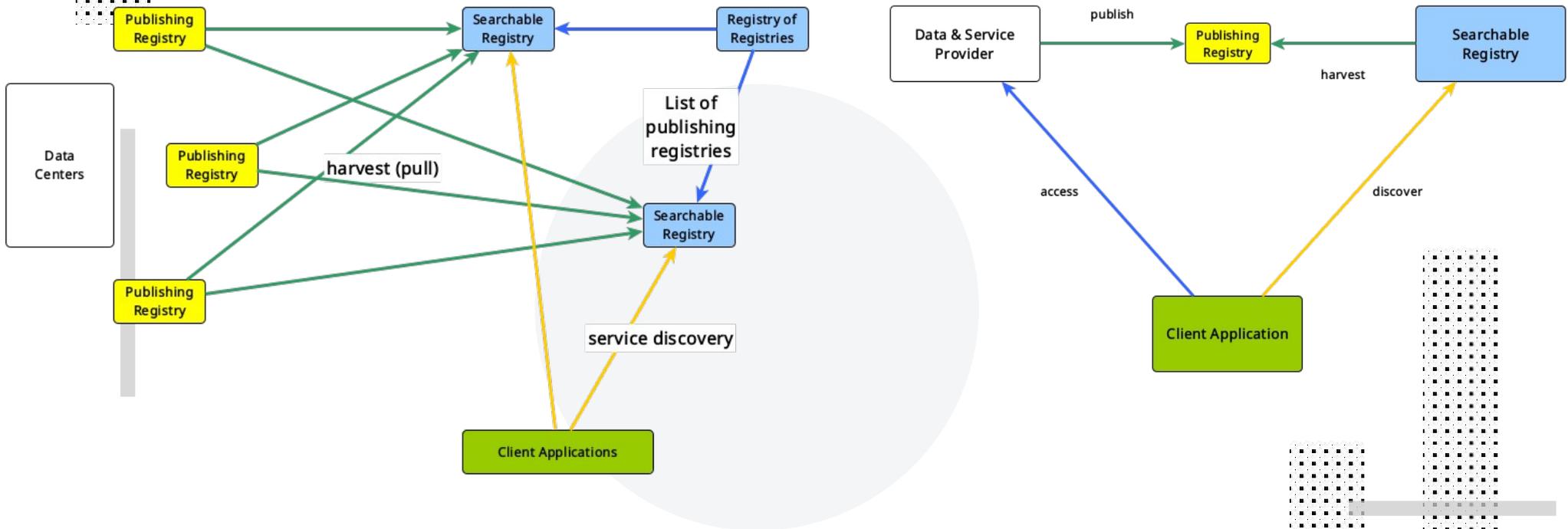


IVOA - FAIR mapping



The IVOA Registry

Findability of Resources



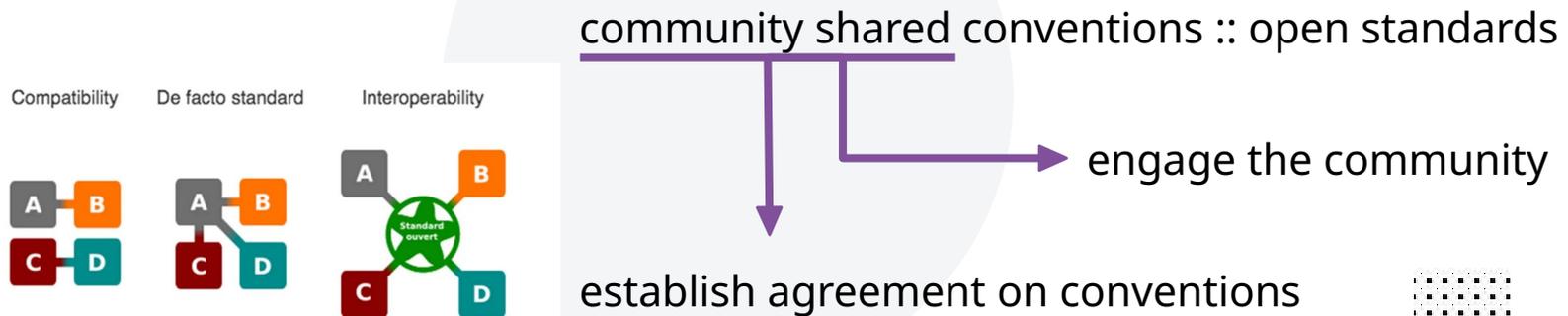
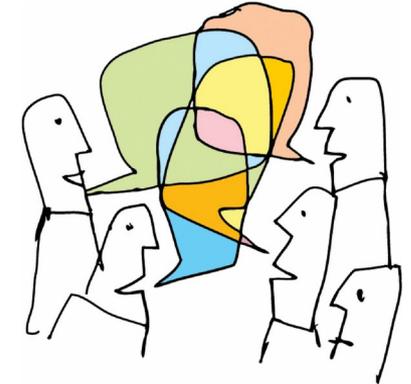
What to do?

“

As a data providers,
manager, describe your
resources, add them to
the Registry, and let the
applications connect. ”

Driven by “open community”

- Open Science <> opposite of bad science
- Digital resources -> leverage FAIR principles
- Principle \neq Rule/Convention/Norm
- Research domain -> Intrinsic characteristics
- Characteristics -> turn principles into conventions
- Conventions -> Standards
- Research domain :: Community





Astronomy Competence Center Pilot project overview

The Astronomy Open Science Competence Centre Pilot (**Astro-CC**) is an ESCAPE cluster related project meant to enable the astronomy research communities to accelerate their use of **Open Science** by supporting the implementation of **FAIR principles**.



kick-off: April 2025

duration: 2 years

Community Events

By running Community Competence Centre events, Astro-CC will provide **training** on the implementation of interoperable services, the **development** of the underlying Virtual Observatory data sharing framework and its integration in EOSC, and exploitation of the system for scientific research. The events will specifically target different facets of the astronomy communities:

- A **Data Provider Forum** event: for Research Infrastructures and data-intensive projects to share best practices for the implementation of standards to provide services for FAIR data.
- **Technology Forum** events: for the developers of astronomical software/services; to discuss community open standards and approaches to FAIR in the astronomy (in its largest definition) research domain.
- **Scientific Training** events: for astrophysics Ph.D students and early career researchers; to learn using interoperable tools and services as well as to gain skills for Open Science publication and research in astronomy. These training events leverage operational services, software and training tutorials that have been on-boarded in EOSC.

1st Technology Forum



OSCARS
Open Science Clusters' Action
for Research & Society

Astro-CC
Astronomy Competence Center Pilot Project

<https://indico.in2p3.fr/event/36318/>

Welcome! Benvenuti! Dobrodošli!

Technology Forum I

7-9 October 2025

Basovizza Observing Station

INAF – OATS



1st Scientific Training

First Astro-CC Pilot training event

2-4 Dec 2025
Europe/Paris timezone

Enter your search term

Overview

Timetable

Registration

Logistics & Accommodation

Additional material

Feedback

Contact

✉ esm@cab.inta-csic.es

The first Training Event of the Astronomy Competence Centre Pilot project (Astro-CC Pilot) will take place at [Centro de Astrobiología](#) (Madrid, Spain) from **Tuesday 2 to Thursday 4 December 2025**. The goal of the Astro-CC project is to enable members of the astronomy, heliospheric physics, planetary science, and astro-particle physics communities to accelerate the use of Open Science by supporting the implementation of FAIR principles.

The Virtual Observatory (VO) is opening up new ways of exploiting the huge amount of data provided by the ever-growing number of ground-based and space facilities, as well as by computer simulations. The goal of this Training Event is twofold:

- Expose participants to the variety of VO tools and services available today so that they can use them efficiently for their own research.
- Gather requirements and feedback from participants.

<https://indico.in2p3.fr/event/36738>



European Data Providers Forum



OSCARS | Astro-CC

Astro-CC European Data Provider Forum

25–27 Mar 2026
Heidelberg
Europe/Paris timezone

Enter your search term

Hasn't happened yet!
But registrations are closed.
If interested contact me asap (today)!

<https://indico.in2p3.fr/event/37439/>



Overview

The Data Provider Forum of the Astronomy Competence Center Pilot project will take place in Heidelberg from **Wednesday 25 to Friday 27 March 2026**.

Registrations are closed.

The goal of this forum is to bring together researchers and technicians, Research Infrastructures, data-intensive projects, astronomy data providers to exchange knowledge and experience related to the **online publication of astronomical and astroparticle data** and related services using the International Virtual Observatory Alliance (IVOA) standards to ensure their data is findable and usable with common, standard tools. This forum is the right place if you want to be FAIR in astronomy, or help others become FAIR.

The forum offers a space to:

- discuss shared challenges in data publication;
- present approaches, solutions, and lessons learned;
- engage with peers and build connections across projects and infrastructures;
- participate in practical, hands-on sessions on widely used VO data publication tools and technologies.

Astro-CC ... next

- stay tuned for announcements!
- 2nd Scientific Training
 - date TBD
- 2nd Technology Forum
 - date TBC: within the week 19-23 October 2026
- Vision on an Astronomy Thematic EOSC Node



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*If you want to go fast, go alone.
If you want to go far, go together.*



Astro-CC

IVOA
Astro-CC

*Thank you for your attention!
...and an announcement...*

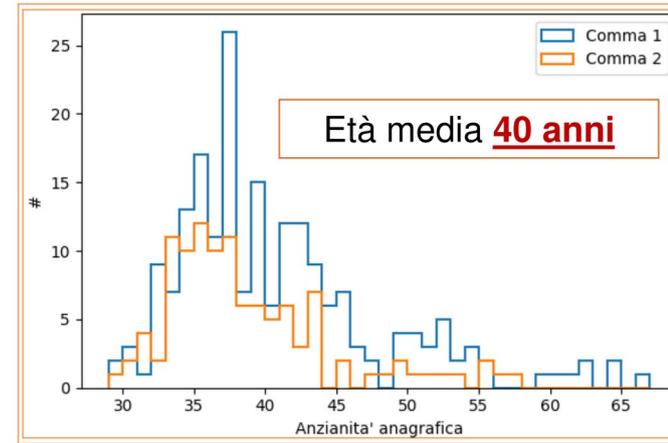
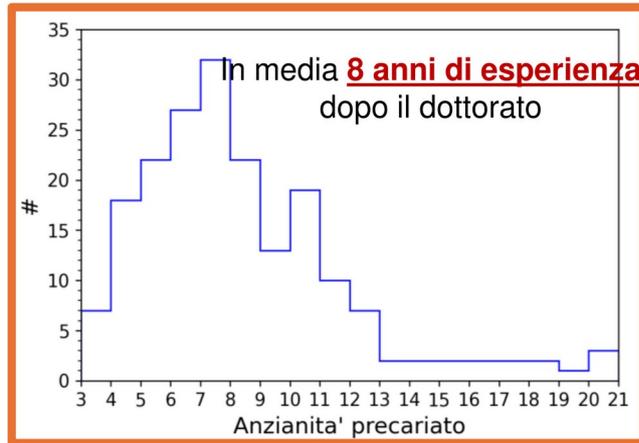
Marco Molinaro
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La situazione del personale precario in INAF è **CRITICA**

1.200 Tempo Indeterminato Vs **650** precari: più di 1 precario ogni 2 persone di ruolo. Tra questi, 300 potrebbero essere assunti a tempo indeterminato con la legge Madia (che scade a fine 2026)



Più 100 precari altamente qualificati e con esperienza decennale rischiano l'esodo da INAF

L'impatto su progetti nazionali e internazionali in cui INAF è coinvolto sarebbe **dirompente**
La raccolta firme a sostegno della Rete Stabilizzandi è ancora aperta

National VO School

- where
 - **Area CNR Bologna**
- when
 - week of **23-27 November 2026**
 - probably 2.5 days 24 to 26
- pre-registration
 - limited number of participants
- ~20 hours of **formazione**
 - to be confirmed
- stay tuned for the 1st announcement

Don't miss out *other engagement chances!*

- Interop June 2026, Strasbourg
 - 8-12 June
 - <https://indico.ict.inaf.it/event/3454/>
 - AI & archives plenary session (planned)
- 2nd Astro-CC Scientific Training, Strasbourg
- 2nd Astro-CC Tech Forum, Paris
- Interop November 2026, Perth

Look out for announcement emails!
(or contact me: marco.molinaro@inaf.it)