State of the IVOA

14-16 Nov 2025

Southern Spring Interoperability Meeting

Görlitz, Germany

JJ Kavelaars

IVOA Chair

IVOA Executive Chair/Vice-Chair

JJ Kavelaars – Chair
June-2025 to Nov-2026

Mark Allan – Vice Chair
June-2025 to Nov-2026

What is the IVOA?

IVOA founded in 2002.

23 Member Organizations/Projects

A **group of people** that agrees on **standards** on which to build applications that **interoperate** across data providers

Two **interoperability** meetings per year:

- “Northern Spring”
- “Southern Spring” (typically after ADASS)

Vision of the IVOA

Develop a FAIR data management framework for astronomy

- Interoperability standards (VO framework) amongst astronomical (ground and space based) archives
- Publishing tools for data centres

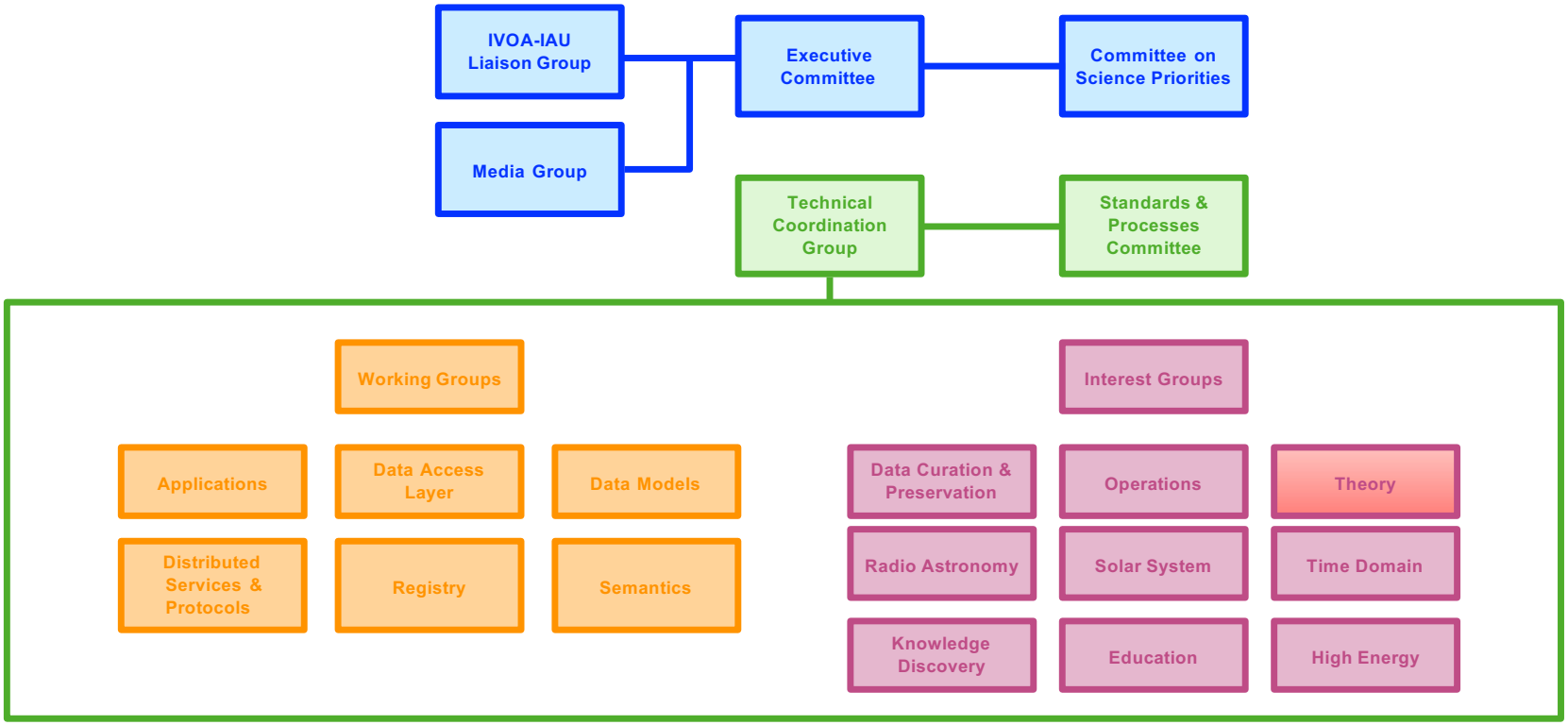
Enable new science through the VO

- Multi wavelength science, combining datasets from multiple sources
- Data discovery and data access tools
- Data analysis and visualization tools

World wide collaboration amongst astronomical VO projects

- No formal funding, nationally funded projects
- Diversity makes IVOA's richness

IVOA Organisation



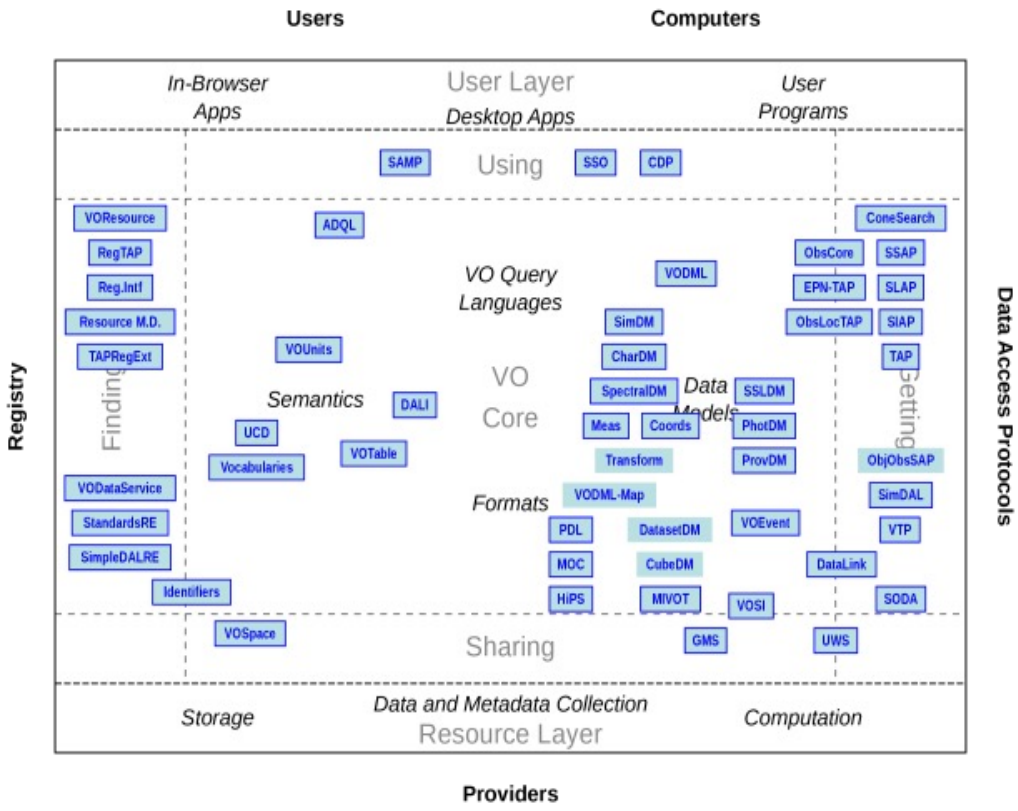
Working and Interest Groups

- WG/IG chairs and vice-chairs are 3- year terms, with one year extension possible
- There are currently one open position:
  - Radio Astronomy IG vice chair
- Note: Theory IG is currently on hiatus

	Chair	Vice-Chair
TCG	Marco Molinaro	Tom Donaldson
Working Groups		
Applications	Adrian Damian	Brigitta Sipőcz
Data Access Layer	Gregory Mantelet	Joshua Fraustro
Data Model	Mark Cresitello-Dittmar	MathieuServillat
Distributed Services & Protocols	Jesus Salgado	Sara Bertocco
Registry	Renaud Savalle	Tess Jaffe
Semantics	Baptiste Cecconi	Sebastien Derriere
Interest Groups		
Data Curation & Preservation	Gilles Landais	Gus Muench
Education	Shanshan Li	Jeremy McCormick
High Energy	Bruno Khelifi	Janet Evans
Knowledge Discovery	Yihan Tao	André Schaaff
Operations	Steve Groom	Tamara Civera
Radio Astronomy	Mark Kettenis	OPEN
Solar System	Stephane Erard	Markus Demleitner
Time Domain	Judith Racusin	Pierre Fernique
IVOA Committees		
Exec	JJ Kavelaars	Mark Allen
Science Priorities	Francesca Civano	Vandana Desai
Standard and Processes	Patrick Dowler	
IVOA IAU Liaison Committee	Bruce Berriman	

IVOA Architecture – All the Standards

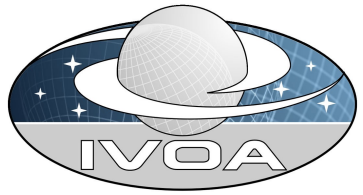
- IVOA Architecture 2024-10-25 draft
- IVOA is an open community –if a standard is close but doesn't fit – implement an extension & provide feedback to influence change to the standard
- Example –Radio extension to the ObsCore Data Model



IVOA Website and Newsletter

- New web site that is more dynamically maintained will be released VERY soon (today?)
- **A new addition of the IVOA Newsletter planned for January and then we hope annually after each Northern Spring InterOp.**
- Newsletter intended to be inward AND outward facing: tell the IVOA and the world about the cool new projects you're working on!

Email articles to ivoa-news-editors@ivoa.net



VO Project Updates

Armenian VO 20th Anniversary meetings

- Astronomical Surveys and Big Data 3 (ASBD-3), 15-19 Sep 2025, Byurakan, Armenia; https://www.bao.am/meetings/meetings/ASBD3/
- 4th Regional Astronomical Summer School (4RASS) "Astronomy and Data Science", 8-12 Sep 2025, Byurakan, Armenia; https://www.bao.am/meetings/meetings/4RASS/

Armenian VO collaborations

- Observatoire Virtuel France (OV-France)
- German Astrophysical Virtual Observatory (GAVO)
- Chinese Virtual Observatory (China-VO)

All-Sky Virtual Observatory

- Submitted $19M funding application for Data Central and CASDA
  - Integration of platforms via VO services
  - Enhanced storage and compute capabilities
  - Improved links between data team and researchers
  - New data engineering program for service monitoring and data contracts
  - Cybersecurity uplift

All-Sky Virtual Observatory

- Data Central
  - Published DEVILS Data Release 1 (Multiwavelength imaging, AAT optical spectra and catalogues)
  - **Developed** TAP authentication capability
  - Test ingestions for mock catalogue and ASKAP datasets

Canadian Virtual Observatory

Contributing to and proposing Working Drafts:
WD-**CAOM-2.5** proposed as a rich observation metadata model suitable **for all astronomy missions**
WD-**VOSI-next** support **for user-managed tables** via the VOSI-tables API (with OpenAPI spec)
WD-**DALI-1.2** adds a variety of **new xtypes to describe values in VOTable**
WD-**TAP-1.2** will add **user-managed table** support and an OpenAPI specifications

IVOA in the SKA Regional Center

- Designing a software metadata architecture to support ***discovery of containers holding software*** of interest.
- ***Execution brokering*** in the CANFAR science platform
- **AAI** federation for LSST and SRC to inform AuthVO

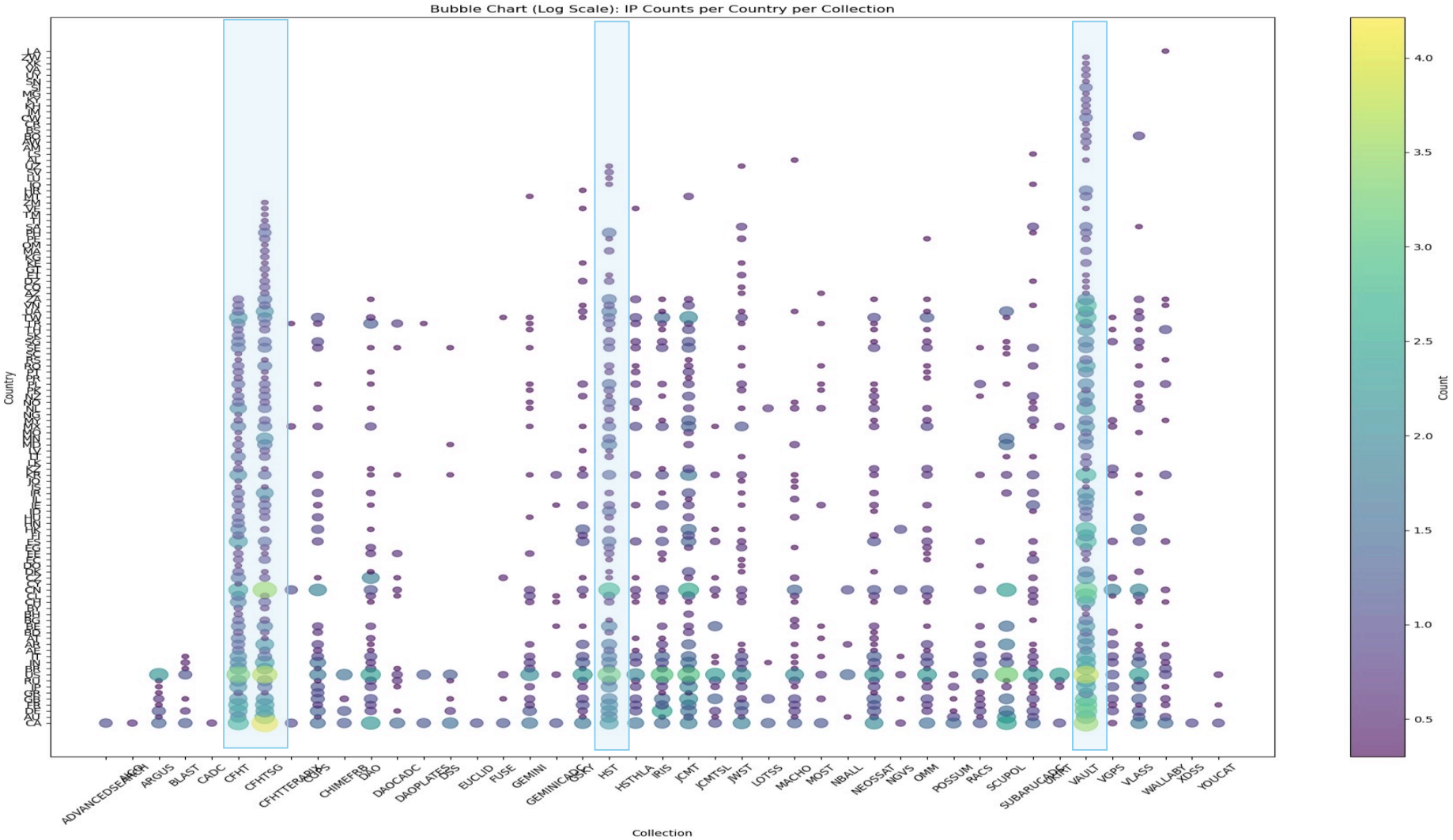
Development of ***PyVO*** and ***astroquery.cadc*** and other VO driven CLIs (e.g. ***cadc-data***, ***cadc-tap***)

Added BINARY/BINARY2 VOTable and parquet/VOParquet support to TAP libraries, release coming soon

CAOM2 Python and Java implementations available

Contributing to IVOA Web site updates:

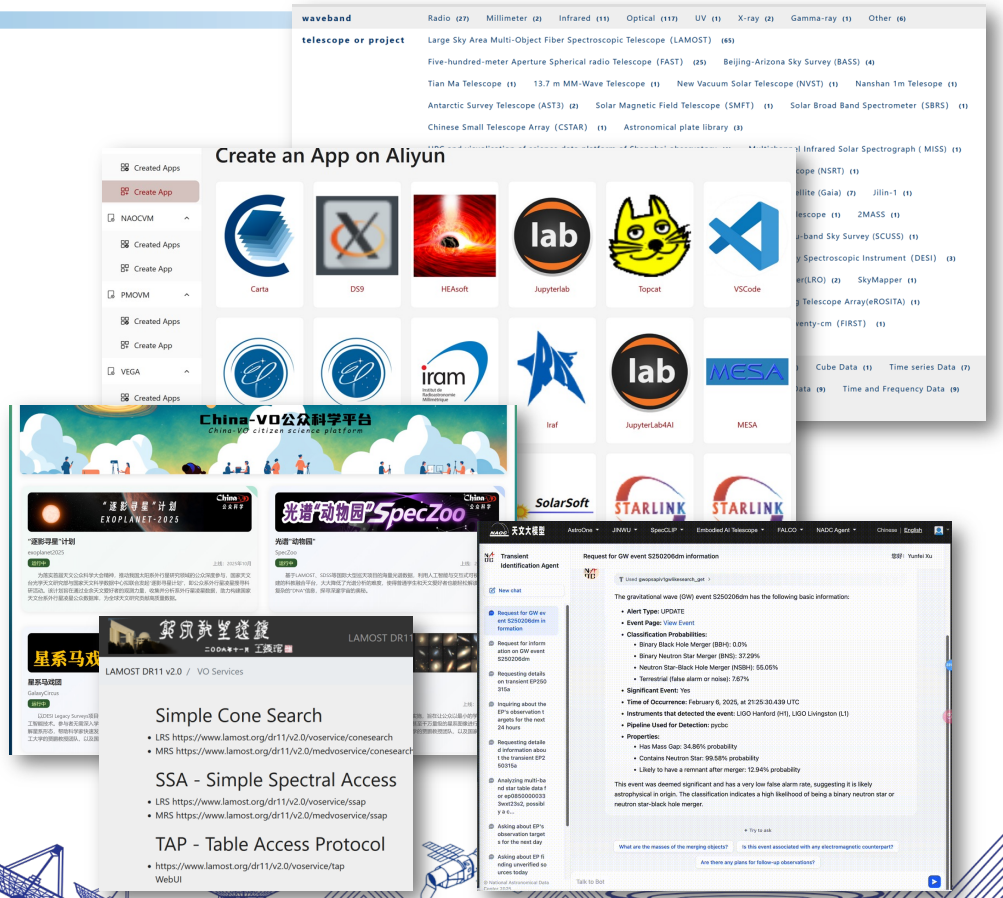
- Introduced foundational ***styling tools*** to support a clean and consistent design.
- O***ptimizing for mobile.***
- ***Unifying*** the visual identity.
- Aligning the user interface.
- ***Styling*** updates applied throughout.
- ***Cleanup*** and infrastructure ***updates***.
- Node ***tooling*** added.


Bubble Chart (Log Scale): IP Counts per Country per Collection
Country
Collection
Count
ADVANCEDSEARCH
ARGUS
BLAST
CADC
CFHT
CFHTSG
CHIMEFRB
DAO
DAOCADC
DAOPLATES
DSS
EUCLID
FUSE
GEMINI
GEMINICADC
GSAY
HST
HSTHLA
IRIS
JCMT
JCMTSL
JWST
LOTSS
MACHO
MOST
NBALL
NEOSSAT
NGVS
OMM
POSSUM
RACS
SCUPOL
SUBARUCADC
VAULT
VGPS
VLASS
WALLABY
XDSS
YOUCAT
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5

China-VO Latest State

National Astronomical Data Center
国家天文科学数据中心

- Registered Users: 43099
- Datasets: 1072
  - Open access: 1027
- China-VO Science Platform
  - 4 nodes
  - 18 apps
  - 230 users
- Citizen Science Projects: 9
- IVOA Interfaces: 160
- MCP Server Tools: 28



ESA Science Archives VO updates

VO Resources improvements

- JWST, Hubble, Integral, XMM-Newton TAP now fully compliant
- Working on other TAPs and SIAP, SSAP compliance
- ESDC TAP common code now stateless (see Osinde talk)

Euclid iDR1 release on 31 October

- TAP, DataLink, SIA, SSA, SODA, VOSpace

Gaia DR4 (Dec 2026) preparation:

- Datalink products from Parquet files

Various ESASky releases

- Supporting Euclid iDR1
- Seamlessly interactions with ESA Datalabs

How to send your ESASky session to an ESA Datalabs Jupyter notebook
https://sky.esa.int

Euro-VO Registry - Highlights

Euro-VO Registry 5.5

- Improvement of validator of VO Resources
- New validator for Object Observability Simple Access Protocol services – DAL session presentation

Improving the quality of the VO ecosystem

- Contacted the owners of almost all (98%) VO services with no or partial compliancy with the standard
- ~90% response and fix rate
- Details during the Euro-VO Registry Weather report presentation (Ops session)

Euro-VO Activities

The “Astronomy Open Science Competence Centre Pilot” project (Astro-CC) is supporting community events for the use and development of the VO:

- **Project started officially in April 2025, for 2 years**
- **https://www.oscars-project.eu/projects/astro-cc-astronomy-open-science-competence-centre-pilot**
- Funded by the EC Horizon Europe OSCARS project, and connected to ESCAPE collaboration
- **Partner leads:**
  - **CDS/CNRS (M. Allen PI)**
  - **INAF (M. Molinaro)**
  - **INTA (E. Solano)**
  - **UHEI (J. Wambsganss)**
  - **ObsParis (B. Cecconi)**

The project is a pilot of a "Competence Centre" for Open Science in the context of the European Open Science Cloud (EOSC).

- **Focused on community events:**
  - **2 Technology Forum events** - for the developers of software/services, to discuss and refine community open interoperability standards.
    First Tech Forum: week of October 2025, Trieste, Italy (30 participants) ✓ *done*
    https://indico.in2p3.fr/event/36318/
    Second Tech Forum: late 2026 in Paris
  - **2 Scientific Training events** - for 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.
    First School: 2-4 December, Madrid, Spain (aiming for ~30 participants)
    https://indico.in2p3.fr/event/36738/
    Second School: 2026 in Strasbourg
  - **Data Provider Forum event** - for astronomy data providers to use standards to ensure their data is FAIR
    25-27 March 2026, Heidelberg, Germany – to be advertised.

OSCARS Open Science Clusters' Action for Research & Society
Funded by the European Union

OV FRANCE

News from the CDS:

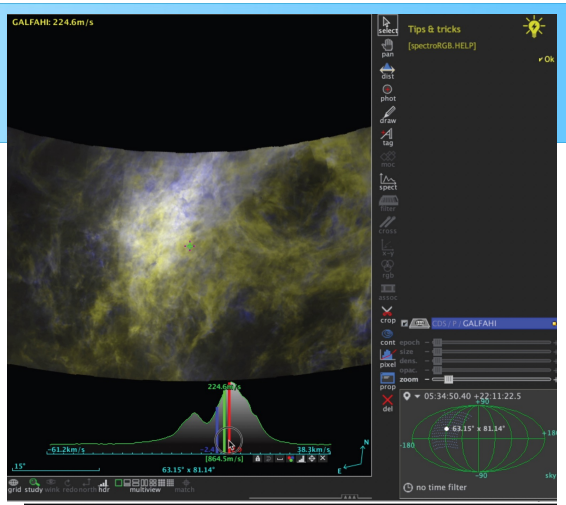
- Under development - **HiPS3D**
  - **frequency / time axes**
- Testing of **HATS** for large tables
- CDS participation in **SKA SRCNet prototyping (**HiPS, ObsCore, SODA, Aladin Lite
- Participation to **Astro-CC events**

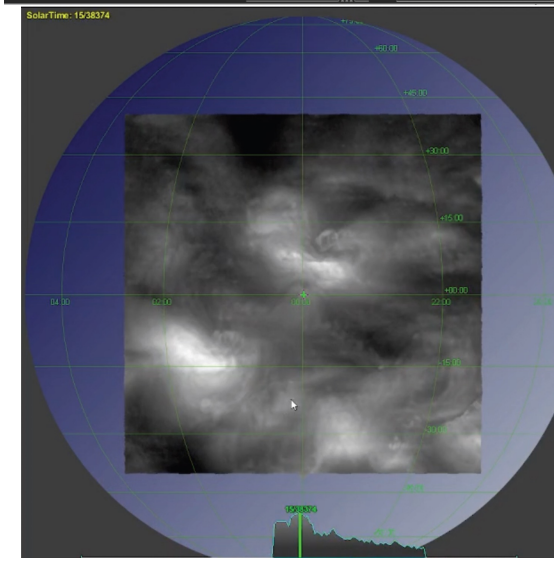
News from the PADC:

- Assessment of ESOC infrastructure
- Pro-Am collaboration support
- New ObsCore services at ObsParis

News from VESPA/Europlanet

- Progress on the 2 **data nodes for Planetary surfaces and Small bodies**
- Participation **to Astro-CC events**
- The Europlanet Society is **seeking collaborations** with the astronomy community on future European calls





OV FRANCE

IPDA B. Cecconi chair for 2 years

OntoPortal

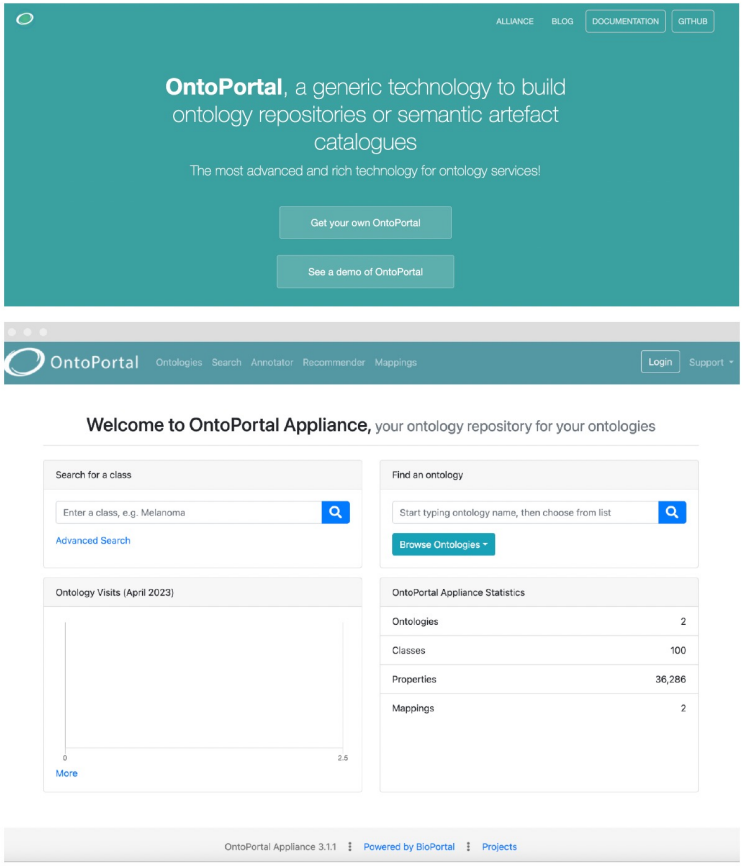
- **2 people recruited**
- **Interactions with the IHDEA community** (e.g. adoption of VOUnit)
- **Revision of the UAT** to add terms related to heliophysics

OSTRAILS :

- DMP management tool; data impact monitoring tool (science knowledge graph) and FAIR assessment tool
- ObsParis = Astronomy pilot (2 applications: low-frequency radio + CTA)

EOSC:

- Preparation of a future EOSC “astronomy” node => discussions with ESCAPE, CDS, ESO, Europlanet. Preparation of a roadmap.



The new portal is open

German Astrophysical Virtual Observatory

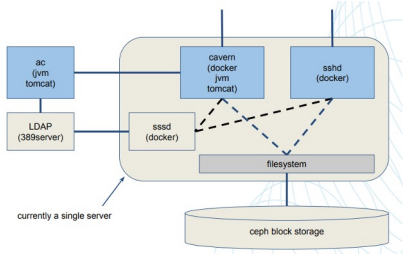
- The GAVO data centre keeps adding a few resources per semester; Flagship this time: Carmenes DR1 spectra and time series, a true curation challenge.
- Maintenance of the VO server package DaCHS: (e.g., prototype for registration of VOEvent streams).
- GVO is moving! **Five positions at DZA for VO work** will open over the next few years. If interested, please **talk to Markus**!.
- Mastodon move: New resources in the Registry now tooted at gavo@fediscience.org.
- Please review DocRegExt **quickly**: https://dc.g-vo.org/VOTT

Kazakh National Virtual Observatory

Latest updates

FESENKOV ASTROPHYSICAL INSTITUTE

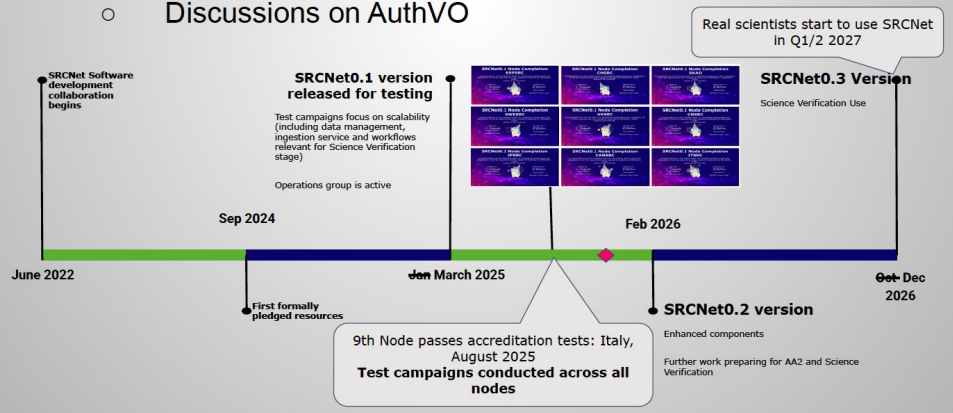
- A **VOSpace service** compliant with IVOA standards has been deployed within the FAI's infrastructure, providing unified REST-based access to astronomical data. It is built on the Cavern (CADC) server and runs in a Debian 11 container with Tomcat 9, OpenJDK 11, and PostgreSQL. The service integrates with a FAI's NAS via NFS for centralized and fault-tolerant storage. External access is available at https://vos.fai.kz/cavern through an HTTPS proxy, and testing confirmed full functionality and compatibility with standard VOSpace clients.



- The first **release of photometric and spectroscopic data** was completed within the Kazakhstan Virtual Observatory (KazVO) infrastructure **in accordance with IVOA standards.** A full technological workflow was refined — from metadata generation to exposure through VO protocols (TAP/ADQL, ObsCore, DataLink). Photometric data and three VO-compliant spectroscopic catalogs were published, successfully validated, and registered in the IVOA registry. The work confirmed KazVO's readiness for large-scale integration of modern and archival data into the global Virtual Observatory ecosystem and established a foundation for future releases aligned with the FAIR principles.

- C**omputational and Storage Capabilities of KazVO has been expanded**: KazVO's infrastructure was upgraded with a Supermicro AS-5126GS-TNRT2 server featuring dual 128-core AMD EPYC 9755 CPUs. Storage was doubled to 589 TB using 40-drive Synology RS4021xs+ NAS units in HA-mode. This upgrade significantly enhanced KazVO's readiness for data analysis, machine learning, and VO-standard archival publication.

- **Construction Progress - SKA Low, Australia AA0.5**
  - 14,000 antennas deployed, about 10% of the total array
- **Science Data Platform (SRCNet):**
  - Spain, Switzerland, Sweden, the UK, China, Japan, SKAO small node, Italy and Canada have passed accreditation process for SRCNet nodes. Ingestion node in Australia
  - SRCNet 0.1 tested. First public version (Science Verification) expected for Q1/2 2027
- **Standards & Protocols:**
  - Contributing to ExecutionBroker definition
  - Discussions on AuthVO



SRCNet 0.1 2025

Milestone passed!

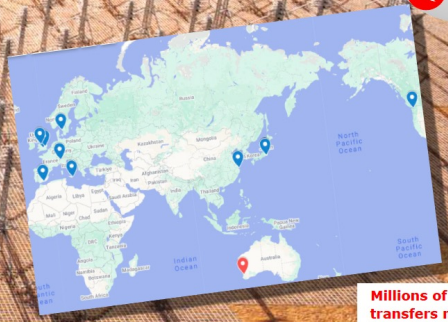
9 nodes now

Test campaigns already taking place

Data movement between sites centrally managed

Data ingestion at SDP location in Perth

Internal version, testing architecture



Millions of global data transfers made in test campaigns already

https://svo.cab.inta-csic.es

Spanish Virtual Observatory

CENTRO DE ASTROBIOLOGÍA

Grant PID2020-112494GBI00 fun

Home | Archives | VO Science | Tools and Services | Big Data | Education & Outreach | Dissemination | Help Desk | Internal | User Menu

Start New Search

abs:"Virtual Observatory" year:(2024-2025)

Your search returned 32 resul

Collection +((astronomy OR physics))

Collection +astronomy

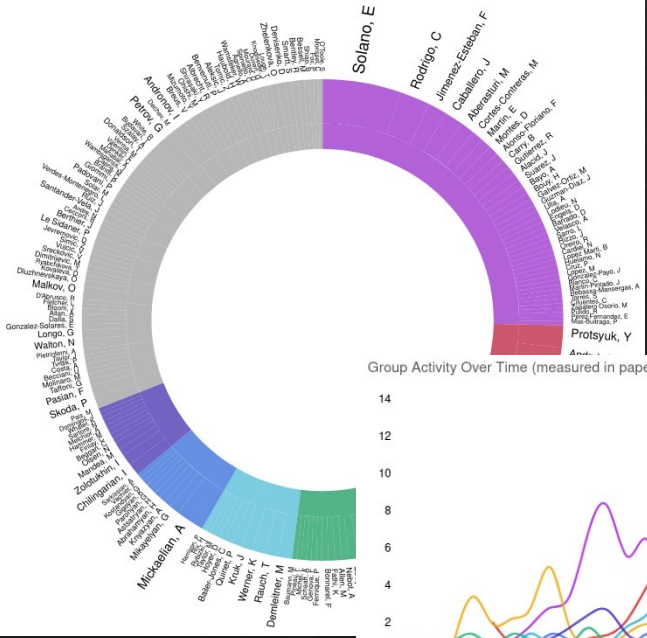
Property +property:refereed

AUTHORS

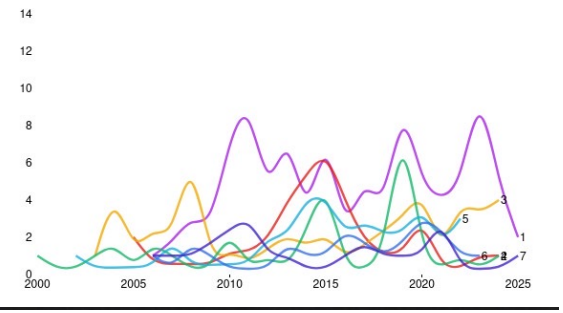
- Solano, E 5
- Cortes-Contreras, M 4
- Rodrigo, C 4
- Aller, A 3
- Cui, C 3

more

View Link Overlay



Group Activity Over Time (measured in papers published)



A&A, 689, A93 (2024)
https://doi.org/10.1051/0004-6361/202449998
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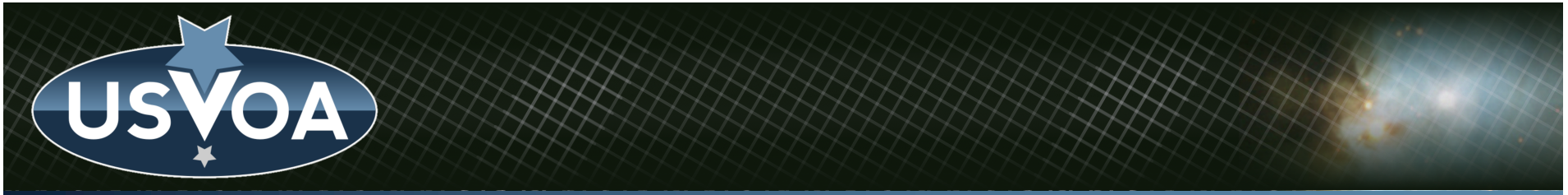
Astronomy & Astrophysics

Photometric segregation of dwarf and giant FGK stars using the SVO Filter Profile Service and photometric tools

Carlos Rodrigo[1,⋆], Patricia Cruz[1], John F. Aguilar[2,3], Alba Aller[4], Enrique Solano[1], Maria Cruz Gálvez-Ortiz[1], Francisco Jiménez-Esteban[1], Pedro Mas-Buitrago[1], Amelia Bayo[5], Miriam Cortés-Contreras[6], Raquel Murillo-Ojeda[1], Silvia Bonoli[7,8], Javier Cenarro[8], Renato Dupke[9], Carlos López-Sanjuan[8], Antonio Marín-Franch[8], Claudia Mendes de Oliveira[10], Mariano Moles[8], Keith Taylor[11],

⋆ *In Memoriam*: This work is dedicated to the memory of our dearest friend and colleague Carlos Rodrigo. The Spanish Virtual Observatory will certainly miss one of its best ambassadors.



USVOA Report

CfA/CXC, NAVO, NOIRLAB, NRAO, ADS

USVOA Collaboration

A splinter session of the AAS Jan 2026 meeting on VO activities and prospects has been scheduled for Monday January 5, 2026

USVOA/CfA Participation (1/3)

CXC

Technical Coordination Group (TCG)

M. Dittmar serving as Chair of Data Model Working group

J. Evans serving as V Chair of High Energy Interest group

Working HEIG ObsCore Extension Note with completion expected by end of year

R. D'Abrusco is contributing to the DCP note on DOI usage

Upgraded the CXC TAP service to bring into compliance with current standards

HEIG Interest Group (2/3)

- I Evans is major contributor to the ObsCore Extension Note
- J Evans is working with Chair to manage HEIG efforts through meetings, notes, & actions
- M Dittmar is participating in meetings and providing Data Model WG insight
- CXC archive team working on a prototype for Discovery of High Energy Data based on the note

International Virtual Observatory Alliance

CXC

IVOA ObsCore Extension and Discovery of High Energy Astrophysics Data

Version 1.0

Proposed Endorsed Note 2025-11-05

Working Group
High Energy Interest Group
This version
https://www.ivoa.net/documents/HighEnergyObsCoreExt/20251105
Latest version
https://www.ivoa.net/documents/HighEnergyObsCoreExt
Previous versions
This is the first public release

Author(s)
The IVOA High Energy Interest Group
Editor(s)
Ian Evans, Mathieu Servillat, Bruno Khélifi, Janet Evans

Version Control
Revision f1fa7d1-dirty, 2025-10-22 19:01:17 +0200

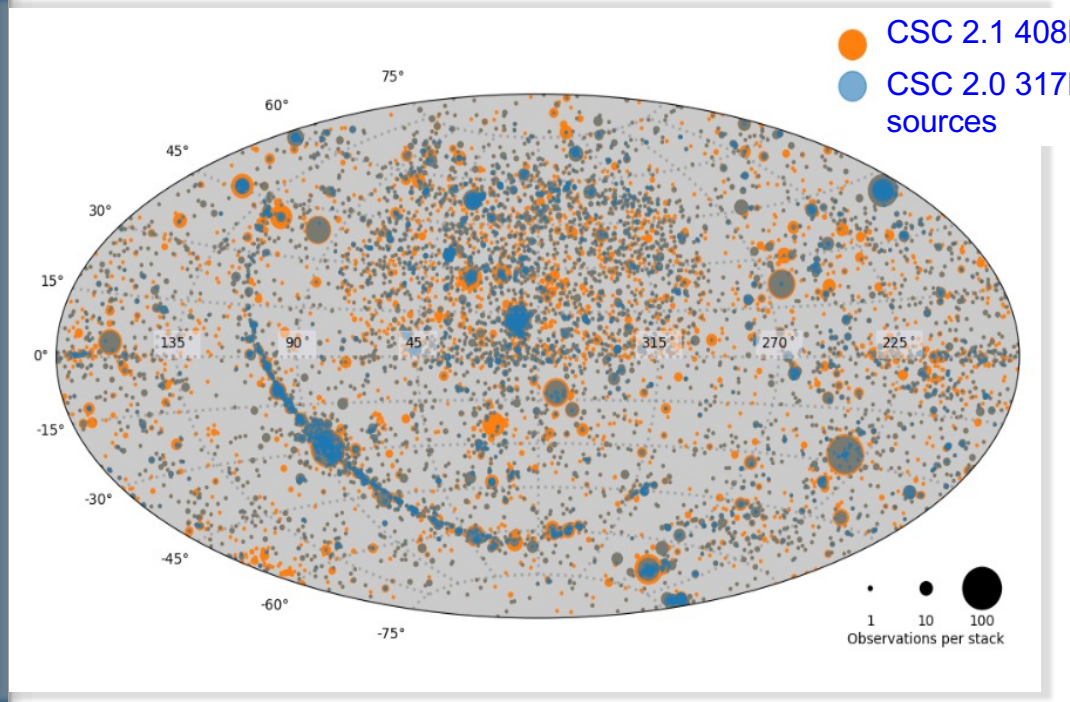
Abstract

This document describes a proposed extension to the ObsCore specification for data description, discovery and selection of High Energy Astrophysics (HEA) data. It includes proposed updates to the data product vocabulary, UCDs, and MIME-types to support discovery of HEA data.

CSC 2.2 Planning (3/3)

Planning CSC 2.2 catalog production processing run

- Add 2 years to the current Catalog – 2022 – 2023
- Plan to start production Mid-Dec and complete in 2026
- Mostly speed improvements and short list of upgrades gathered from last run
- HEIG ObsCore extension will enable CSC data discovery in the IVOA



CSC 2.2 Adds 2 years of data to the CSC

NAVO

- IRSA Released SPHEREx-specific ObsTAP/DataLInk to support SPHEREx GUI
  - IRSA SPHEREx data included in SIA/SSA results
- HEASARC ObsTAP service vetted and approved by ESASky client
- IRSA General ObsTAP v1.0 / DataLink release
- HEASARC released BurstCube and XL-Calibur datasets, including in VO services
- IRS and HEASARC have ObsCore in production
- IRSA General ObsTAP v1.0 / DataLink release
- HEASARC released BurstCube and XL-Calibur datasets, including in VO services
- MAST SIAv2 service deployed with /access to flagship missions in Obscore
- MAST OAI registry service replacement complete
- MAST demo notebook showing how to do region queries using CAOM TAP.

NAVO

NOIRLab/CSDC/Astro Data Lab

- New Astro Data Lab web portal utilizes IVOA protocols on the backed (TAP, SIA); new xmatch service in testing
- Improvements to existing CSDC VORegistry records (TAP, SIA, SCS); some bugs reported..
- Maintenance of our Python-based VO Publishing Registry
- Cont'd integration of Aladin Lite v3 viewer at Data Lab. New Jupyter NBs deployed (with ipyaladin), showing hipscat and pymoc use. Integration into Data Lab's new Web UI later in FY26.

VO Updates from Rubin (1/3)

Since our small-scale Data Preview 1 launched at the end of June, we have serviced 2 million TAP queries from registered users (and returned 1.7TB of catalog results) and we are nearing 1 million cutouts. This is just a small dataset from our commissioning camera.... everything is fine...

VO Updates from Rubin (2/3)

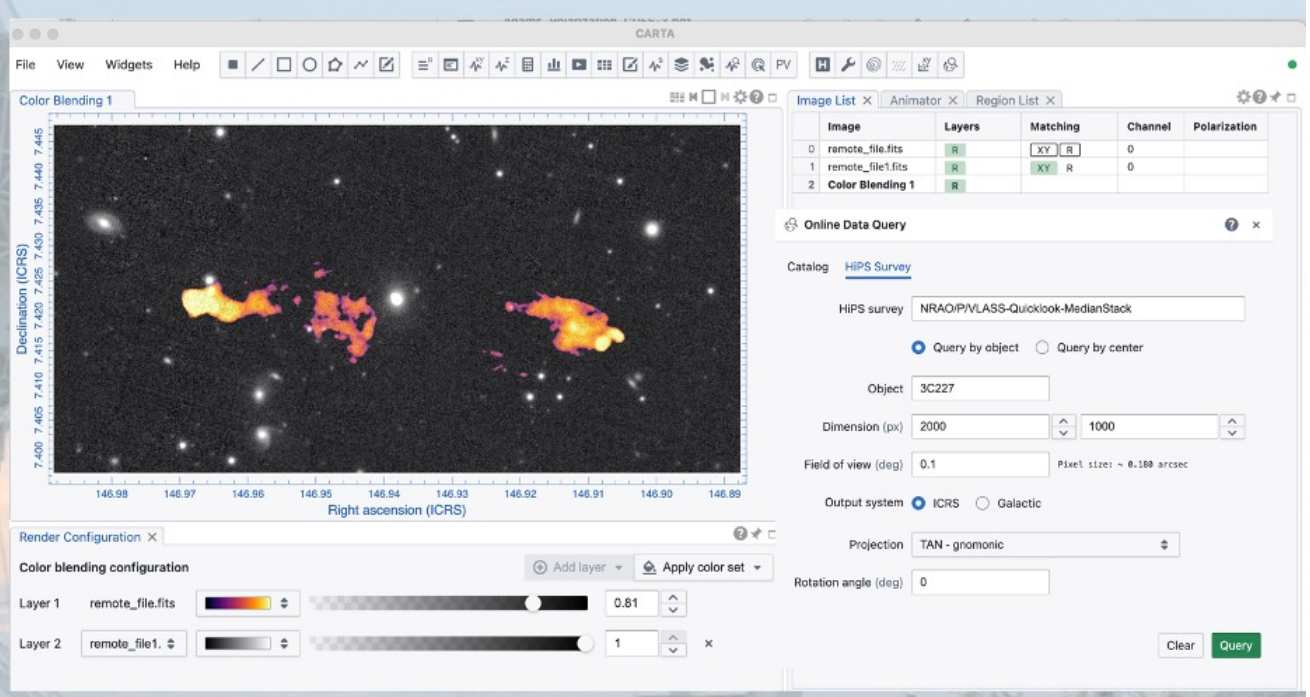
- Our TAP service (based on the CADC TAP service) has had major upgrades
  - Introduced a kafka-based "bridge" system between TAP and the database back end. This has been Invaluable to regulate user query volumes (eg apply per-user limits for concurrent queries in flight)
  - Added support for TAP Upload to our Qserv-backed TAP service
  - Added VOParquet support for catalog results - managing performance at this scale is an issue, with the VOTable serialization taking longer than the query takes to execute

VO Updates from Rubin (3/3)

- Added DataOrigin to our SIAv2 service
- We continue to upstream to the community, with over 10 pyvo merged PRs, and a number of related packages, such as to astropy's votable support.

NRAO

- VLA Sky Survey images (3 epoch median stack) registered with CDS.
- HiPS viewing capability added to the CARTA viewer.

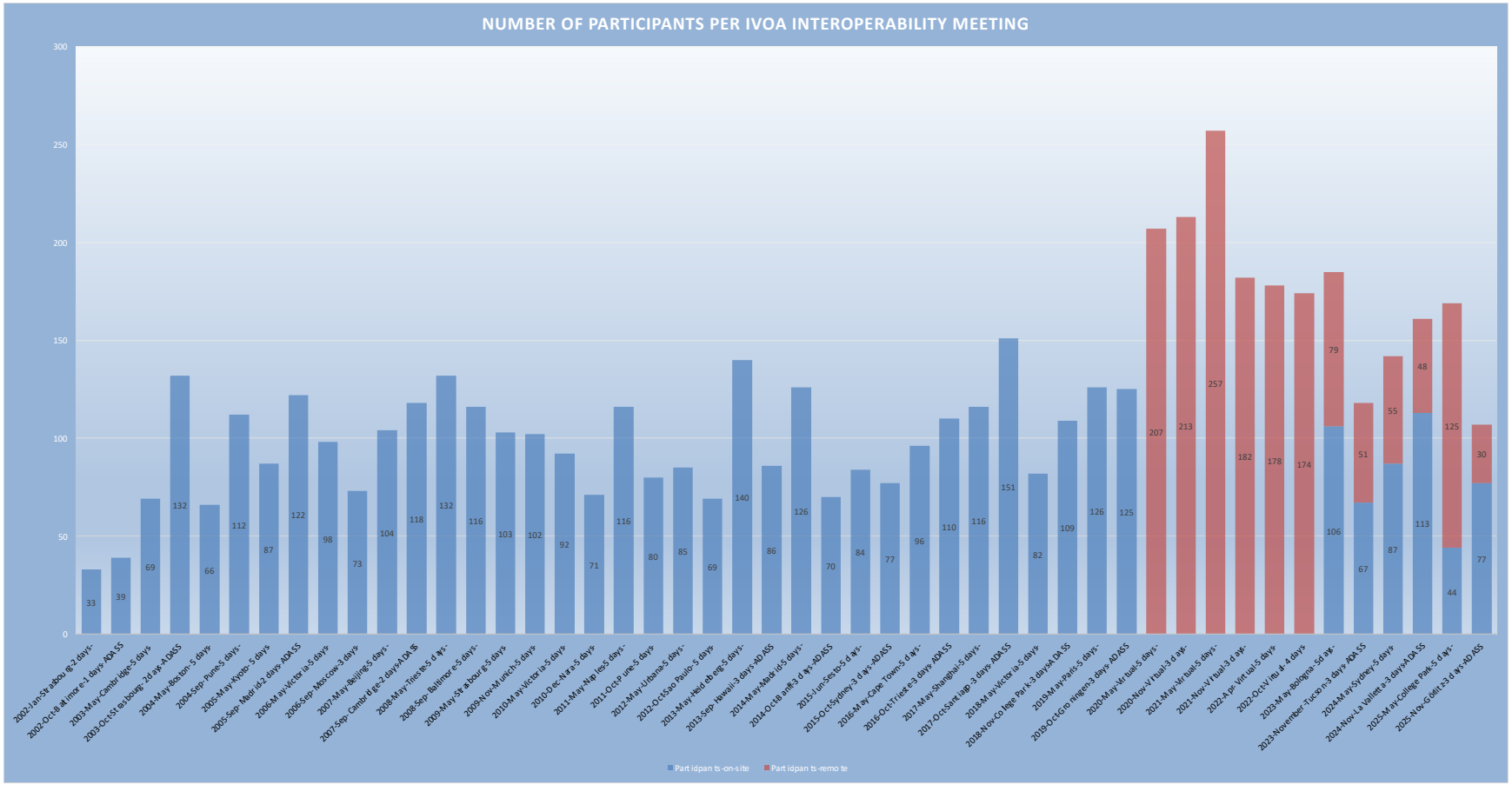


HIPS images from VLASS (color) and PanSTARRS (greyscale) viewed In the CARTA viewer. CARTA is a collaboration between NRAO, ASIAA (Taiwan), IDIA (South Africa) and the University of Alberta (Canada)

ADS Updates

- The ADS team has launched the Science Explorer platform covering all Earth and space science in addition to astronomy: https://scixplorer.org
  - Tracking of software, data mentions and citations
  - Tracking of grant acknowledgements
  - Labeling of astronomy papers with Unified Astronomy Thesaurus (https://astrothesaurus.org) concepts
- ADS is harvesting and indexing data links from the VO registry using the BibVO protocol. Do you want data links to your archives? Add a biblink-harvest endpoint to your registry entry
- ADS is planning on de-prioritizing (not abandoning) the use of bibcodes in the future. If you have concerns, please get in touch

Meeting attendance – 77 in person – 30 remote



IVOA Code of Conduct

It is the policy of the IVOA that its members and all participants in IVOA activities should experience an environment that is free from harassment. We want to promote a diverse and inclusive environment with respectful and courteous behaviour and therefore we expect all participants to adhere to the following guidelines:

- Behave professionally. Refrain from harassment in any form, including: sustained disruption of talks or other events; inappropriate physical contact or intimidation; potentially offensive comments related to for example: age, gender, sexual orientation, disability, physical appearance, race, nationality, politics or religion.
- Ensure that all communications are appropriate for a professional audience that may include people with different backgrounds. Sexual or sexist language and imagery are never appropriate.
- Be considerate and respectful to others.
- Critique ideas, not people.

This code of conduct applies to all IVOA community interactions online and offline, including mailing lists, forums, social media, conferences, meetings, associated social events, and one-to-one interactions.

Because of the wide international nature of the IVOA, it is important to realize that behaviour and language that are welcome/acceptable in one particular cultural environment may be unwelcome/offensive in another. Consequently, individuals must use discretion to ensure that their words and actions communicate respect for others.

Anyone who witnesses a deviation from these guidelines is asked to communicate confidentially to the Chair or Vice Chair or any member of the IVOA Executive Committee. The IVOA Executive will take the necessary corrective measures.

We thank you for helping us to make the IVOA a welcoming, diverse and respectful environment for all.

See online here https://www.ivoa.net/members/IVOA_Code_of_Conduct.pdf

Let's get to work!

Thanks to:

- **German Astrophysical Virtual Observatory, Heidelberg University, and Deutsches Zentrum für Astrophysik (DZA)** for organizing the meeting.
- Financial Support:
- Thanks to the **Marco and Tom and the WG/IG chairs** for organizing the program, which is key to making this meeting worth attending.
- And, about lowing those barriers, recall that this **meeting is in Hybrid mode** so keep attention to the remote participants.