State of the IVOA

Virtual IVOA Interop Meeting, May 2020

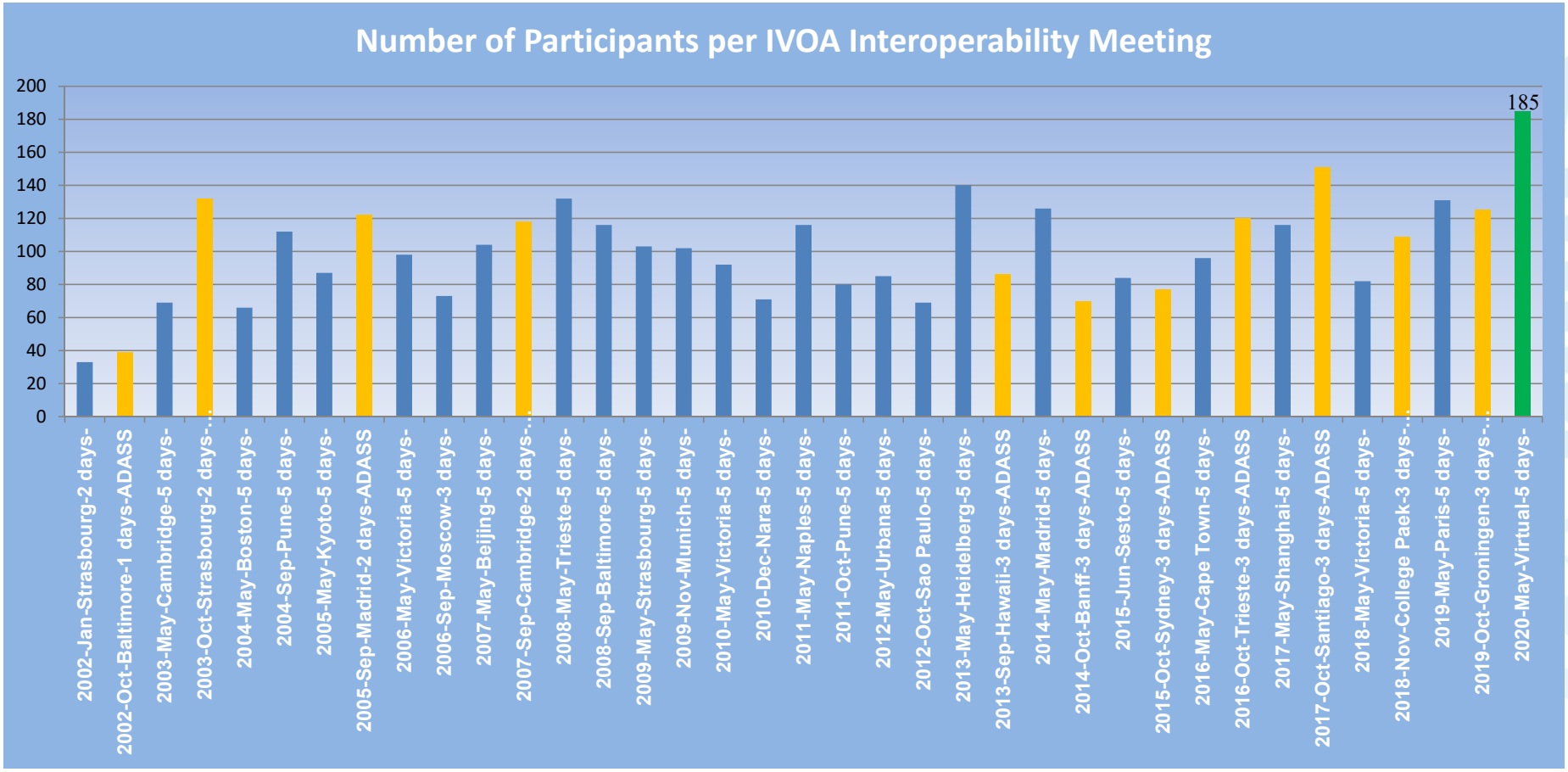
Chenzhou Cui

Chair of the IVOA Executive Committee

Chinese Virtual Observatory

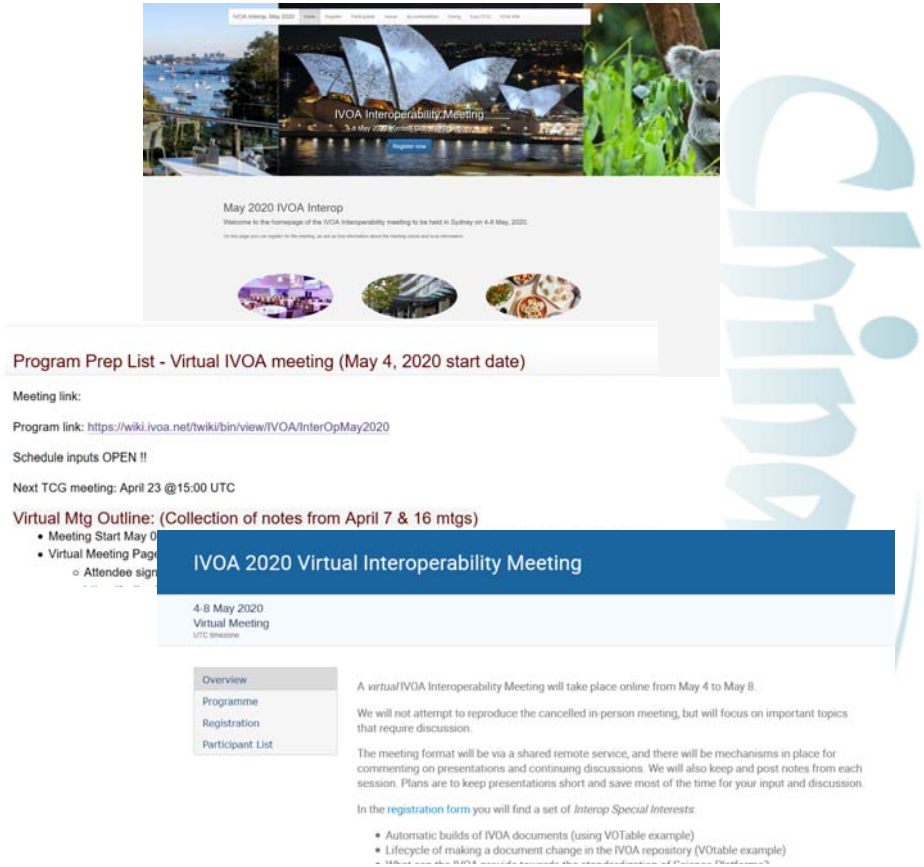
NAOC, CAS

Participation



Special Acknowledgements

- Technical Coordination Group (TCG)
  - Janet Evans, Patrick Dowler
  - Giuliano Taffoni, Marco Molinaro
  - WG/IG Chairs and Vice Chairs
- Originally Planned Sydney Meeting OC
  - Simon O'Toole, ASVO
  - OC Sponsors
- Exec members
- The whole IVOA community



The Idea of VO

Vision of the VO:

- The Web is *transparent*. The goal of the Virtual Observatory is to achieve the same feeling for astronomical data - that it is all available to explore in a single transparent system.
- Like the World Wide Web, the VO is not a fixed system, but rather a *way of doing things.*
- Astronomical datasets, tools, services should work seamlessly together.
- The VO allows astronomers to interrogate multiple data centers in a seamless and transparent way, provides new powerful analysis and visualization tools within that system, and gives data centers a standard framework for publishing and delivering services using their data.

International Virtual Observatory Alliance

VO's vision is made possible by standardization of data and metadata, by standardization of data exchange methods, and by the use of a registry, which lists available services and what can be done with them.

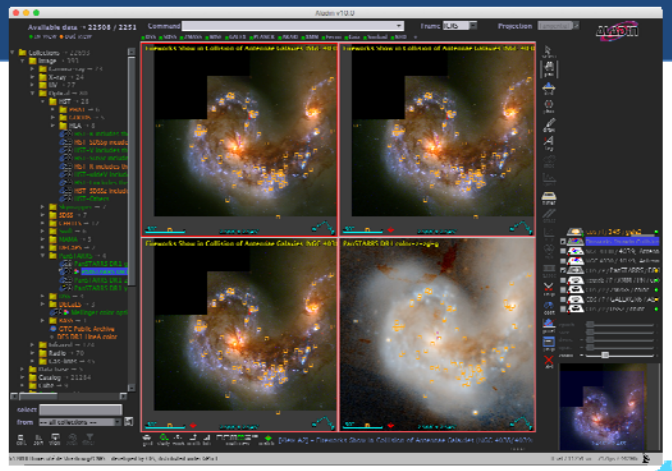
IVOA:

- An organisation that debates and agrees the technical standards that are needed to make the VO possible
- A focal point for VO aspirations, a framework for discussing and sharing VO ideas and technology
- Promoting and publicising the VO

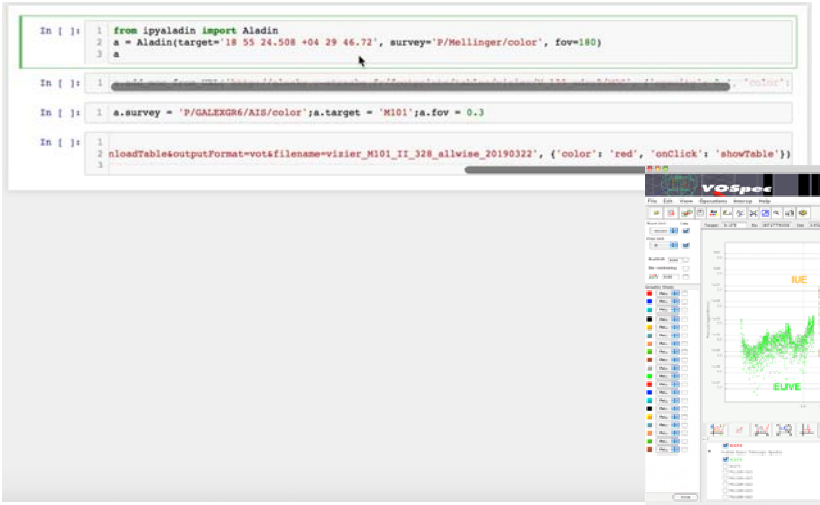
Basic Information about IVOA

- Created in 2002
- 21 member VO projects
  - Netherlands shows strong interests
- 6 Working Groups, 8 Interest Groups
- 2 Interoperability meetings per year
  - May (Virtual meeting this time)
  - Oct/Nov with ADASS
- *~ 46 interoperability standards*

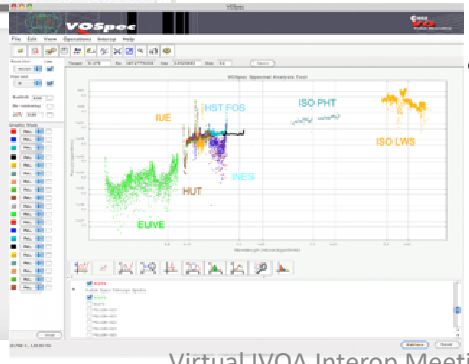
Interoperable applications and services



Aladin

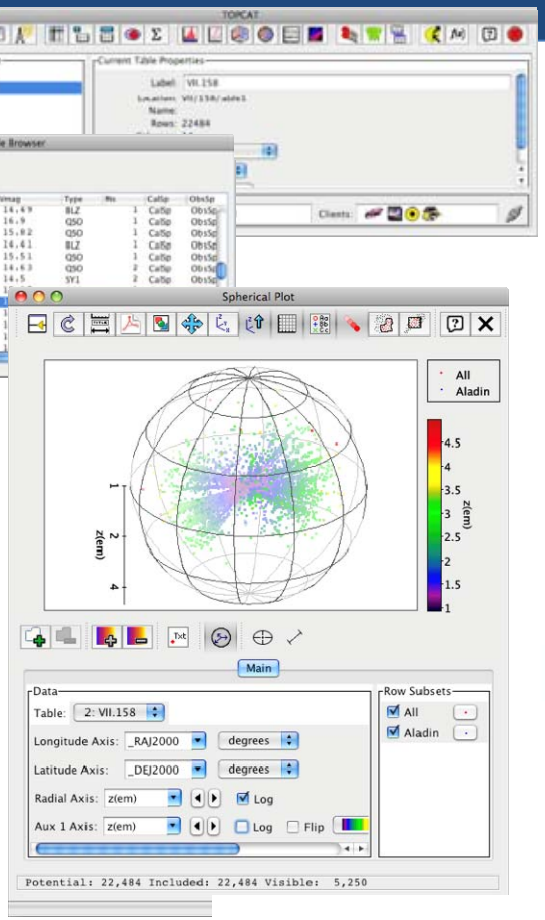


Notebooks



Spectral tools

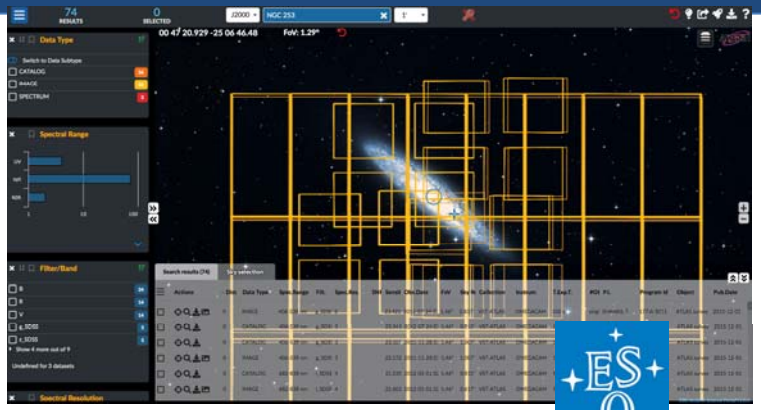
Your apps & programs



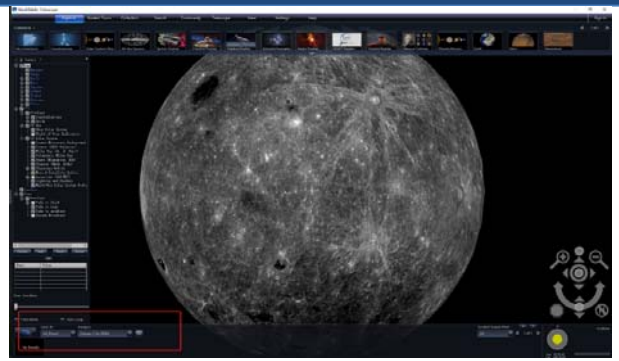
TOPCAT

Broadcast

VO embedded in astronomy services

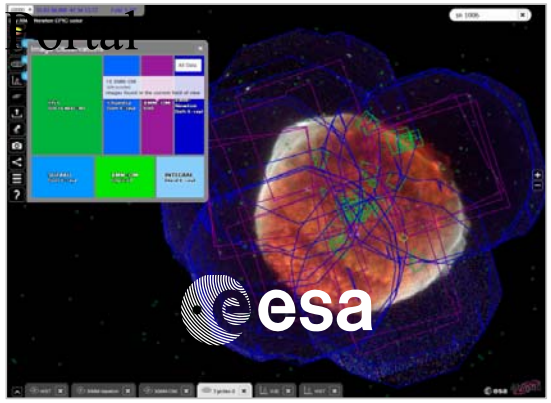


ESO Science

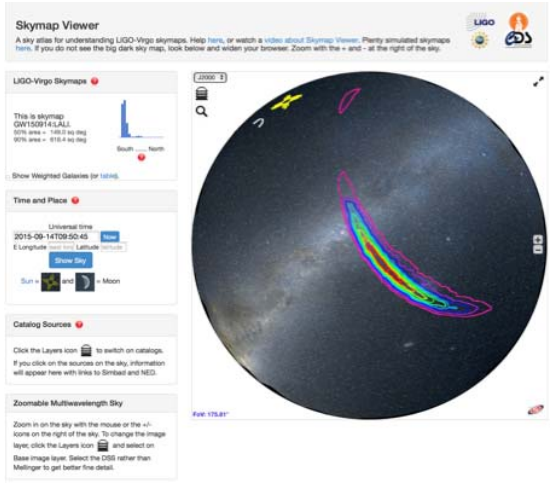


WWT

SVO Filter Profile service



ESA Sky



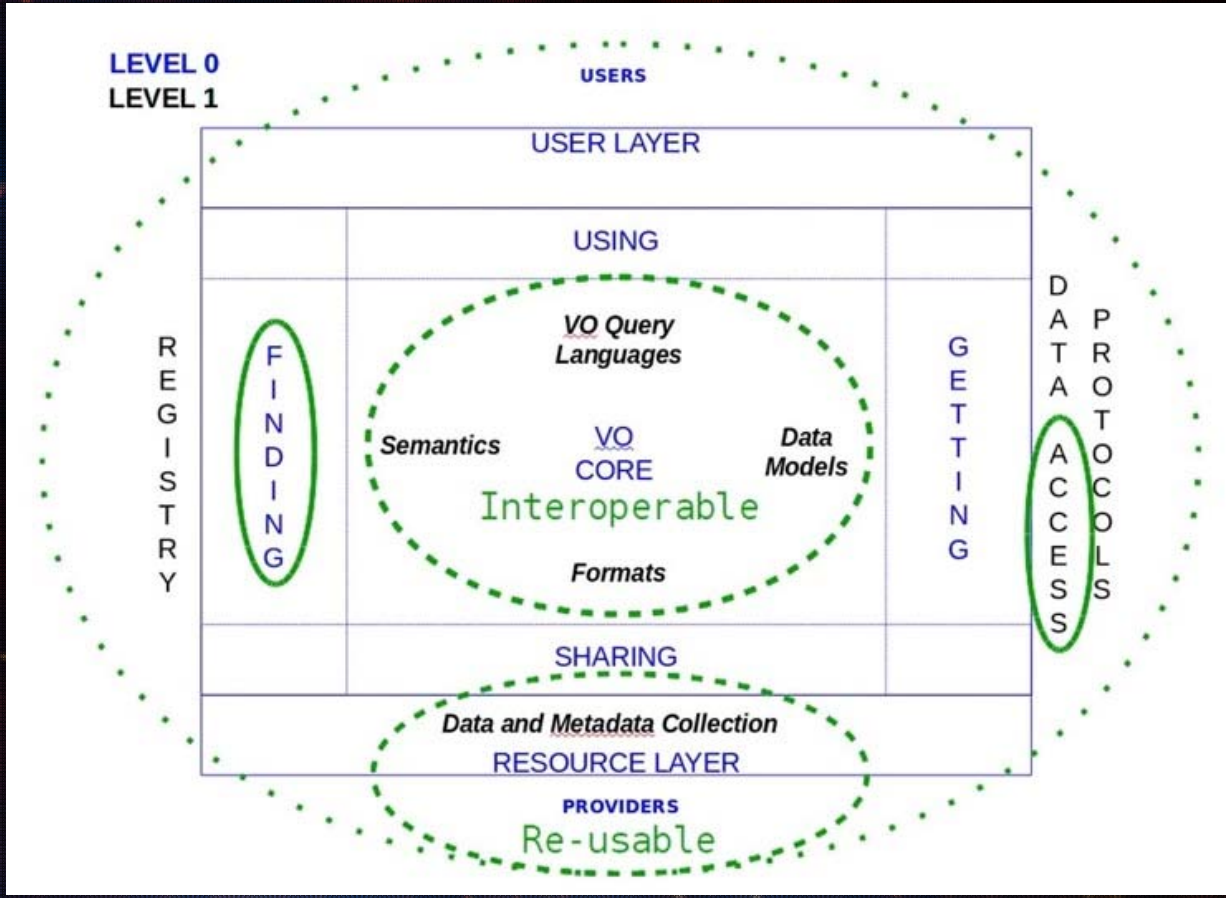
Grav. waves

CDS reference data services

VO is FAIR

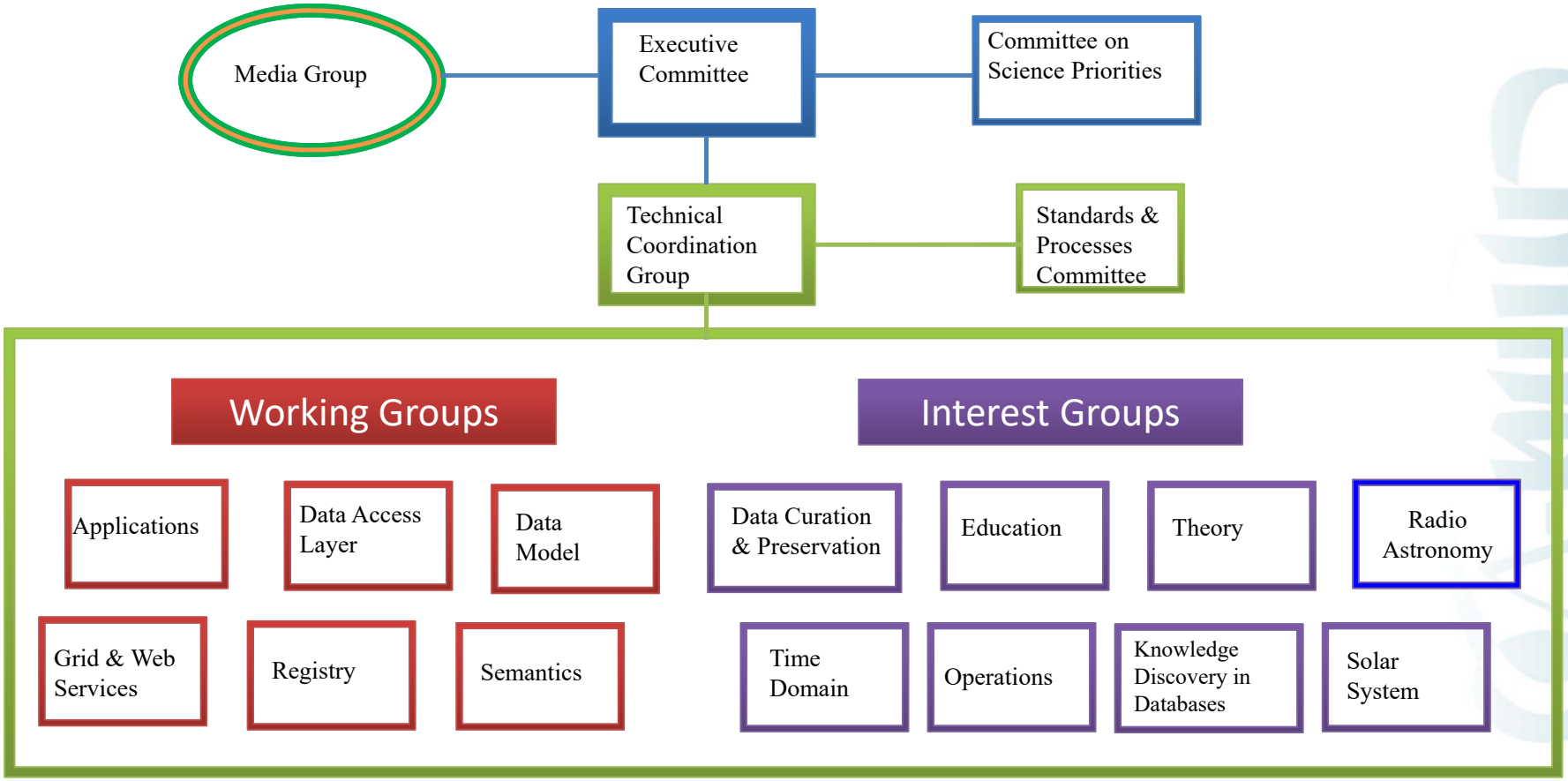
Making data:

Findable
Accessible
Interoperable
Reusable



Credit: X-ray: NASA/CXC/CfA/R. Tullmann et al.; Optical: NASA/AURA/STScI

IVOA Organization Chart



Radio Astronomy Interest Group

- Radio Astronomy Interest Group approved
  - define requirements for the representation of radio astronomy data in the VO through:
    - development of use cases for data discovery, access and visualization
    - identification of metadata concepts needed by radio astronomy
  - provide a well identified point of contact for radio projects with IVOA, and actively encourage their use of VO standards and protocols
  - The group will organize sessions focused on radio astronomy data at IVOA meetings
  - ALMA,NRAO,ASKAP,MWA,CIRADA,FAST,SKA,ASTRON,ESCAPE,MeerKAT,IDIA,INAF involved actively
- Chair: Mark Lacy (NRAO)
- Vice Chair: François Bonnarel (CDS)
  - *See the CSP presentation!*

Endorsed documents

- Code of Conduct (1.0)

- Provenance Data Model (1.0)

International Virtual Observatory Alliance

IVOA Documents

IVOA Provenance Data Model
Version 1.0

IVOA Recommendation 11 April 2020

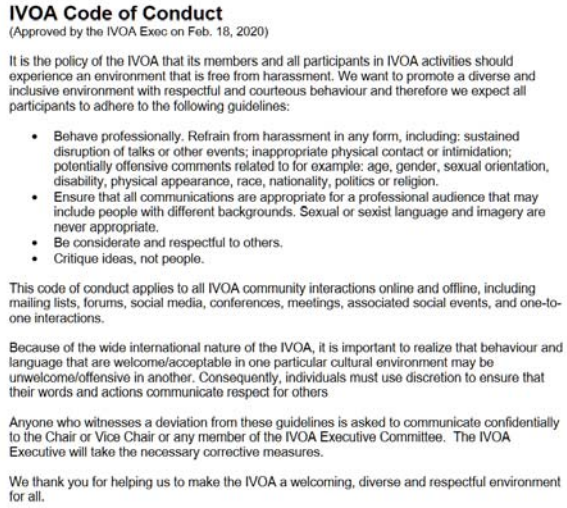
Interest/Working Group:
http://www.ivoa.net/twiki/bin/view/IVOA/IvoaDataModel
Author(s):
Mathieu Servillat, Kristin Riebe, Catherine Boisson, François Bonnarel, Anastasia Galkin, Mireille Louys, Markus Nullmeier, Nicolas Renault-Tinacci, Michèle Sanguillon, Ole Streicher
Editor(s):
Mathieu Servillat

Abstract

This document describes how provenance information can be modeled, stored and exchanged within the astronomical community in a standardized way. We follow the definition of provenance as
"provenance is information about entities, activities, and people involved in producing a piece of data or thing, which can be used to form assessments about its quality, reliability or trustworthiness
astronomy is important to enable any scientist to trace back the origin of a dataset (e.g. an image, spectrum, catalog or single points in a spectral energy distribution diagram or a light curve), a doc
or a device (e.g. a camera, a telescope), learn about the people and organizations involved in a project and assess the reliability, quality as well as the usefulness of the dataset, document or device f

Status of this document

This document has been produced by the Data Model Working Group.
It has been reviewed by IVOA Members and other interested parties, and has been endorsed by the IVOA Executive Committee as an IVOA Recommendation. It is a stable document and may be use
normative reference from another document. IVOA's role in making the Recommendation is to draw attention to the specification and to promote its widespread deployment. This enhances the fun
Astronomical Community.



IVOA Code of Conduct
(Approved by the IVOA Exec on Feb. 18, 2020)

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.

IVOA Web and Wiki pages

- Web assets and wiki pages are all hosted in Trieste, Italy (Vobs.it) now.
- Thank IUCAA for the support in the last years
- Plans for new web site design have been made by the IVOA Media Group
  - Progress now dependent on resources

WG/IG Chair and Vice Chair renew

- KDD IG
  - Chair: Matthew Graham
  - Vice Chair: *Open*
- Theory IG
  - Chair: Gerard Lemson
  - Vice Chair: *Open*
- Education IG
  - Chair: Chenzhou Cui (1 yr ext.)
  - Vice Chair: Hendrik Heinl (1 yr ext.)
- Time Domain IG
  - Chair: Ada Nebot (1 yr ext.)
  - Vice Chair: *Open*

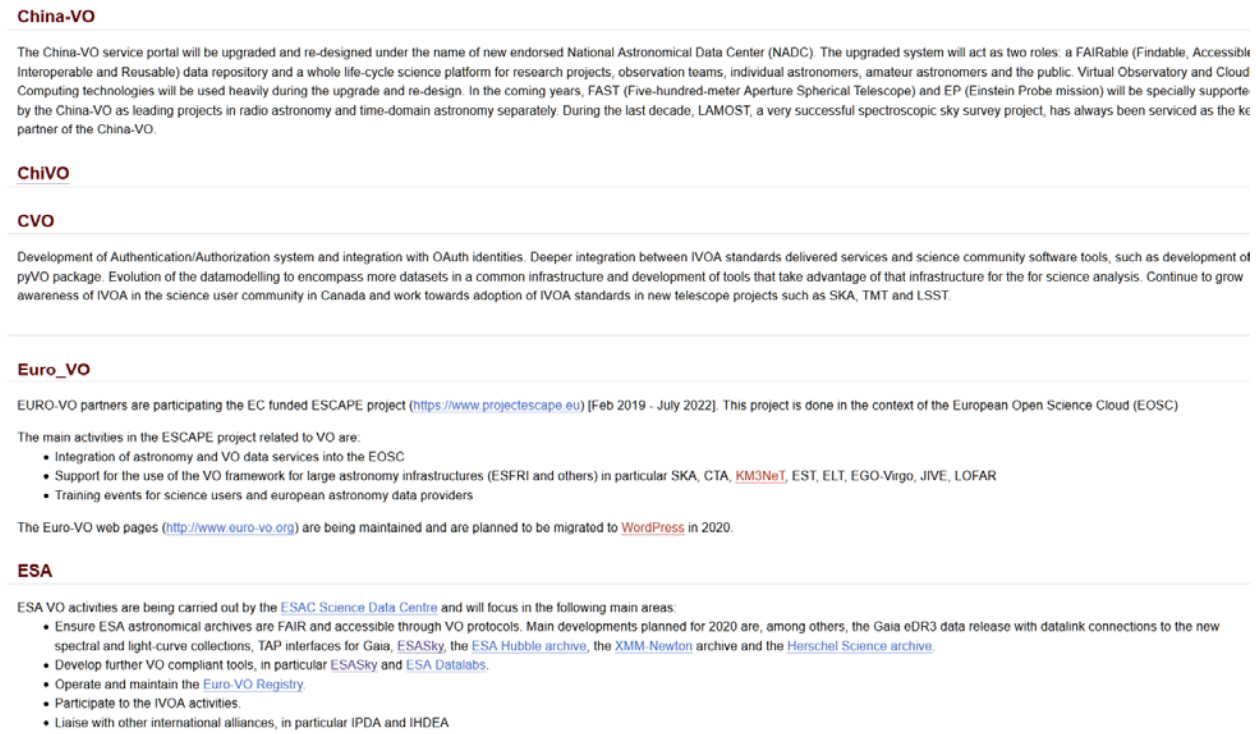
An enormous thanks to the Chairs and Vice Chairs at the end of their terms:

Kai Polsterer (KDD IG)
Carlos Rodrigov (Theory IG)
Dave Morris (Time Domain IG)

IVOA Roadmap - 2020

- China-VO
- CVO
- Euro-VO
- ESA

https://wiki.ivoa.net/twiki/bin/view/IVOA/RoadMap



China-VO

The China-VO service portal will be upgraded and re-designed under the name of new endorsed National Astronomical Data Center (NADC). The upgraded system will act as two roles: a FAIRable (Findable, Accessible Interoperable and Reusable) data repository and a whole life-cycle science platform for research projects, observation teams, individual astronomers, amateur astronomers and the public. Virtual Observatory and Cloud Computing technologies will be used heavily during the upgrade and re-design. In the coming years, FAST (Five-hundred-meter Aperture Spherical Telescope) and EP (Einstein Probe mission) will be specially supported by the China-VO as leading projects in radio astronomy and time-domain astronomy separately. During the last decade, LAMOST, a very successful spectroscopic sky survey project, has always been serviced as the key partner of the China-VO.

ChiVO

CVO

Development of Authentication/Authorization system and integration with OAuth identities. Deeper integration between IVOA standards delivered services and science community software tools, such as development of pyVO package. Evolution of the datamodelling to encompass more datasets in a common infrastructure and development of tools that take advantage of that infrastructure for the for science analysis. Continue to grow awareness of IVOA in the science user community in Canada and work towards adoption of IVOA standards in new telescope projects such as SKA, TMT and LSST.

Euro_VO

EURO-VO partners are participating the EC funded ESCAPE project (https://www.projectescape.eu) [Feb 2019 - July 2022]. This project is done in the context of the European Open Science Cloud (EOSC)

The main activities in the ESCAPE project related to VO are:

- Integration of astronomy and VO data services into the EOSC
- Support for the use of the VO framework for large astronomy infrastructures (ESFRI and others) in particular SKA, CTA, KM3NeT, EST, ELT, EGO-Virgo, JIVE, LOFAR
- Training events for science users and european astronomy data providers

The Euro-VO web pages (http://www.euro-vo.org) are being maintained and are planned to be migrated to WordPress in 2020.

ESA

ESA VO activities are being carried out by the ESAC Science Data Centre and will focus in the following main areas:

- Ensure ESA astronomical archives are FAIR and accessible through VO protocols. Main developments planned for 2020 are, among others, the Gaia eDR3 data release with datalink connections to the new spectral and light-curve collections, TAP interfaces for Gaia, ESASky, the ESA Hubble archive, the XMM-Newton archive and the Herschel Science archive.
- Develop further VO compliant tools, in particular ESASky and ESA Datalabs.
- Operate and maintain the Euro-VO Registry.
- Participate to the IVOA activities.
- Liaise with other international alliances, in particular IPDA and IHDEA

Highlights from IVOA Members

USVOA/NAVO

- Submitted renewal proposal to NASA on Feb 3 2020.
- Oral defense on March 12 2020
- Awaiting final results from NASA

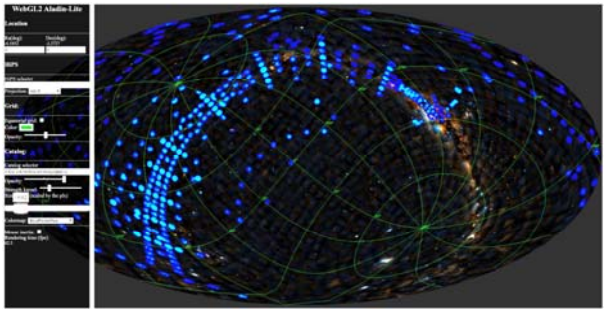
Euro-VO Activities

- Activities being pursued within the EC funded **ESCAPE** Project
  - In the work package: **CEVO "C**onnecting ESFRI to the **E**OSC via **VO"**
- Euro-VO partners working with large Astronomy, Astroparticle Physics and Solar Physics partners
- ESCAPE is bringing VO into the European Open Science Cloud (EOSC)

Funded by the European Union's Horizon 2020 - Grant N° 824064

Euro-VO ESCAPE Status and Highlights

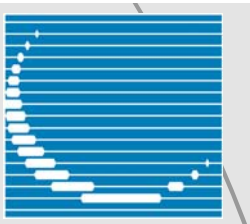
- **ESCAPE project 2019-2022 – coming up for mid-term review in 2020**
  - Defined VO priorities for European Astronomy/Astroparticle/Solar/GW IRs
  - VO registry in EUDAT B2FIND re-implemented and improved
  - Input provided to RDA *FAIR Data Maturity Model Working Group*
  - Progress on Deep Learning applied to ESO Science Archives data/services *(with WP3 ESCAPE)*
  - Tools/services; e.g: ASTRON services registered, WebGL Aladin Lite prototype, mocpy, +…
  - VO in Science Platforms *(coordinated with WP5 ESCAPE)*
  - AAI *(coordinated with WP2/3/5 ESCAPE)*



- **Recent Activities:**
  - Provenance meeting – CTA & KM3NeT synergies *(Nov 2019)*
  - ESA/ESO SCIOPS Conference – presentation of ESCAPE *(Nov 2019)*
  - EOSC Symposium *(Nov 2019)*
  - WP4 Technology Forum 1 *(Feb 2020)*
- **Upcoming:** VO school *(postponed)*, Data Provider Forum *(2021)*, EOSC events

Funded by the European Union's Horizon 2020 - Grant N° 824064

Canadian Virtual Observatory



Actively developing / contributing to **pyVO**

Adopting **astroquery.alma** to utilize **pyVO**

Deploying new '**Science Portal**' components – **ARCADE**

Migrating collections to **CAOM 2.4**

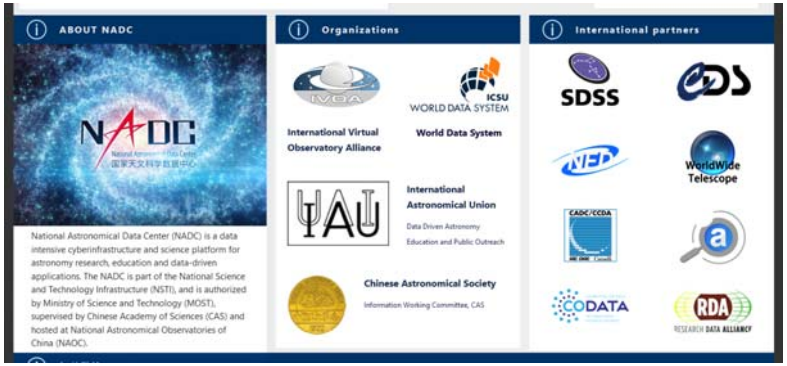
File system based **VOSpace** (**cavern**) operational.

User upload of proprietary catalog data into **CADC TAP 1.1** service – process has stabilized and in use – **YouCat**

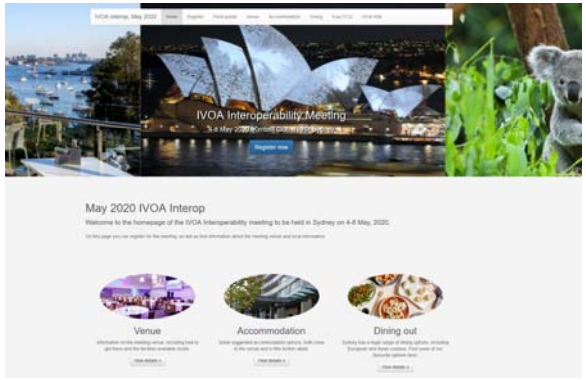
Authentication and **GMS** standards development.

China-VO Status

- NAOC – Alibaba Cloud Collaboration Agreement (II, 2020-2022) was signed
- Three papers submitted to *Astronomy and Computing (ASCOM)*
  - IVOA HiPS Implementation in the Framework of WorldWide Telescope. Y Xu, et al. *Accepted*.
  - Towards an Astronomical Science Platform: Experiences and Lessons Learned from China-VO. C Cui, et al. *Submitted to Science Platform Special Issue.*
  - A Redistribution Tool for Long-Term Archive of Astronomical Observation Data. C Yu, et al.
- National Astronomical Data Center (NADC) web portal is under upgrading
  - NADC Meetings was online on April 29, 2020



And now – to work !!



IVOA 2020 Virtual Interoperability Meeting

4-8 May 2020
Virtual Meeting
UTC timezone

- Overview
- Programme
- Registration
- Participant List

A *virtual* IVOA Interoperability Meeting will take place online from May 4 to May 8.

We will not attempt to reproduce the cancelled in-person meeting, but will focus on important topics that require discussion.

The meeting format will be via a shared remote service, and there will be mechanisms in place for commenting on presentations and continuing discussions. We will also keep and post notes from each session. Plans are to keep presentations short and save most of the time for your input and discussion.

In the registration form you will find a set of *Interop Special Interests*:

- Automatic builds of IVOA documents (using VOTable example)
- Lifecycle of making a document change in the IVOA repository (VOtable example)