# State of the IVOA

Christophe Arviset
Chair of the IVOA Executive Committee

IVOA Interop Meeting Opening Session
Sesto, Italy, 15/06/2015

1. News from the IVOA in general

2. News from the CSP – Mark Allen

3. "Random", non-exhaustive news from VO projects

4. IVOA upcoming challenges

5. Next Interops

# News from the IVOA

1. IVOA Newsletter to be released in June 2015
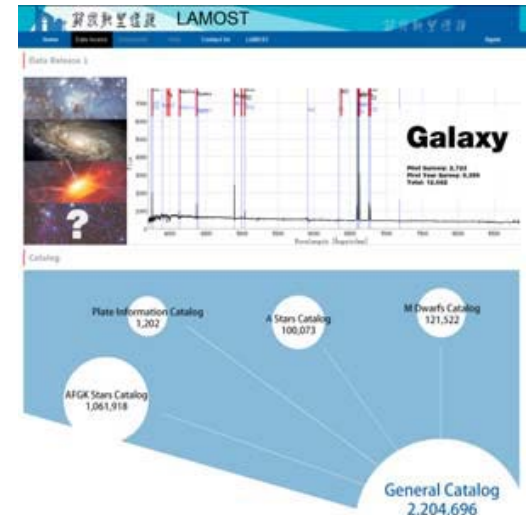   a. Various VO applications releases

New VOSA release

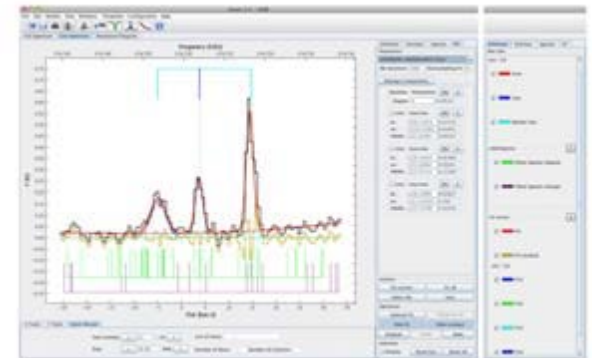LAMOST DR1 Public Release

TAP access to 3XMM-DR5

Iris 2.1 beta release

CASSIS Spectral Tool updates

# Astronomy and Computing, Special issue: the VO II

1. Astronomy and Computing, Volume 11, Part B, (June 2015)

   a. The Virtual Observatory: II

2. The development, deployment, and impact of the virtual observatory, Part II, Hanisch et al
3. Data modeling for the virtual observatory, Louys
4. SAMP, the Simple Application Messaging Protocol: Letting applications talk to each other, Taylor et al
5. Reprint of: Client interfaces to the Virtual Observatory Registry, Demleitner et al.
6. VO-compliant workflows and science gateways, Castelli et al.
7. Feeding an astrophysical database via distributed computing resources: The case of BaSTI, Taffoni et al.
8. Binary star DataBase BDB development: Structure, algorithms, and VO standards implementation, Kovaleva et al.
9. AstroStat—A VO tool for statistical analysis, Kembhavi et al.
10. The Auroral Planetary Imaging and Spectroscopy (APIS) service, Lamy et al.
11. An integrated visualization environment for the VO: Current status and future directions, Sciacca et al.
12. Mobile applications and Virtual Observatory, Schaaff et al.
13. Observatory/data centre partnerships and the VO-centric archive: The JCMT Science Archive experience, Economou et al.
14. VObs.it, the Italian contribution to the international Virtual Observatory—History, activities, strategy, Pasian
15. Euro-VO—Coordination of virtual observatory activities in Europe, Genova et al.
16. The Virtual Astronomical Observatory: Re-engineering access to astronomical data, Hanisch et al.

17. http://www.sciencedirect.com/science/journal/22131337/11/part/PB

# New Operations Interest Group

1. Forum for the discussion of operational issues in the VO with the aim to promote the robust, effective use of the VO
   a. http://wiki.ivoa.net/twiki/bin/view/IVOA/IvoaOps
2. Ops IG Charter available at
   a. Publicizing and promoting forums for operations discussions
   b. Discussion of operational practices within the IVOA
   c. Develop nominal  implementation strategies
   d. Periodic reports to executive
   e. Reviewing validators
   f. wiki.ivoa.net/internal/IVOA/IvoaOps/IVOAOpsCharter-v20150327.docx

3. 2 sessions already at this Interop

4. Tom McGlynn as interop IVOA Ops IG
   a. Formal IG chair / vice chair to be decided at Wed Exec meeting

# Renewal of some WGs/IGs chairs/vice-chairs

1. WGs/IGs chairs and vice-chairs terms are 3 years, plus the possibility of 1 year extension

2. Various terms come to an end
   a. Call for candidates were made over the last months
   b. Extendable
   c. No extension
   d. New Ops IG

3. Decision to be taken by Exec this Wednesday and announced on Friday

4. Discussion about KDD IG activities continuation

| | Chair | Vice-Chair |
|---|---|---|
| TCG | Séverin Gaudet | Matthew Graham |
| **Working Groups** | | |
| Applications | Pierre Fernique | Tom Donaldson |
| Data Access Layer | François Bonnarel | Marco Molinaro |
| Data Model | Jesus Salgado | Omar Laurino |
| Grid and Web Sevices | André Schaaff | Brian Major |
| Registry | Markus Demleitner | Pierre Le Sidaner |
| Semantics | Norman Gray | Mireille Louys |
| **Interest Groups** | | |
| Data Curation & Preservation | Françoise Genova | |
| Education | Massimo Ramella | Sudhanshu Barway |
| Knowledge Discovery in Databases | George Djorgovski | n/a |
| Operations | Tom McGlynn | |
| Theory | Franck Le Petit | Rick Wagner |
| Time Domain | John Swinbank | Mike Fitzpatrick |
| **IVOA Committees** | | |
| Exec | Christophe Arviset | Enrique Solano |
| Standard and Processes | Francoise Genova | n/a |
| Science Priorities | Mark Allen | n/a |

# IVOA documents in ADS

1. All IVOA (current) Recommendations have been put in ADS

2. Agreement to put some IVOA notes as well in ADS
   a. According to the Note definition, some IVOA Notes represent "solely" the point of view of their authors, not necessarily a consensus within the IVOA
   b. Some IVOA Notes have been endorsed by the Exec (eg IVOA Architecture, Roadmap, …)

3. Action agreed at the Exec
   a. IVOA Notes will have the IVOA as Publisher
      – Hence some "light" approval process for publishing into ADS is required
   b. Extract the IVOA Notes that "obviously" should go in ADS
   c. Understand the "topology" of the other Notes and be able to report to the Exec for an informed decision (in ADS or not in ADS)

1. The primary objective of this Committee is to identify research needs of the worldwide astronomy community that can benefit from VO related tools and services, and to take action within the context of the IVOA to assist in placing such tools and services into the research community.

   – From the CSP Terms of Reference

*Science Priority Areas*

# Multi-dimensional Data

Radio astronomy, Integral Field Spectroscopy, high energy, polarization, simulation, data mining datasets + ...

# Time Domain Astronomy

Time Series, light curves, transient event reports, +...

- Need to ensure that these are accessible and useable within the VO

# Multi-dimensional Data

1. Focus Sessions and interaction with projects played large role in defining requirements

2. TCG/WGs defined the set of standards needed for multi-d data to meet requirements

    a. ObsCoreDM 1.1, SIA 2.0 & 2.1, AccessData 1.0, Dataset DM 1.0 and CubeDM 1.0

3. First set of multi-d standards appears ~complete

    a. Docs look ready, we have reference implementations

4. **Critical to converge on those now!**

    a. Even if not perfect........ *Why?* ➜

# Converge now because:

1. Projects & external partners are waiting to implement, even if experimental. We say:

    a. *It's not perfect, but here is the IVOA first set of multi-d standards, work with us to improve it*

2. New arrangements mean big projects are now participants in defining VO infrastructure.

    a. (much more so than before, and also funded to do this)

3. Milestone of finishing what we started, allows moving to the next step

# Time Domain Astronomy

1. Focus Session (May 2013, Heidelberg) engaged time domain projects

2. Some follow up, e.g. VO at Time Domain meetings e.g. Hotwired

3. Specific IVOA actions less well defined
   a. Due to under-resourcing? TD IG sessions not well attended?

4. Re-evaluation, re-engagement needed ?

5. Happening already with new VO projects, and also 'Massive and Complex Data Focus Session', e.g. LSST

# CSP changes expected

1. Changed VO project landscape means changes in the way priorities are identified

    a. CSP needs to be aware of the science advisory bodies of VO projects (via Exec)

2. CSP Terms of reference (2010) – to be revised (Exec)

3. CSP membership – to be updated (Exec)

# Open CSP Session

1. Time Domain Astronomy (Swinbank)

2. Time Series in the VO (Solano)

3. Current and emerging priorities (Allen)

4. Open Discussion – please come

# "Random" News from VO projects (non exhaustive list) - 1

1. Argentina VO (NOVA): online server as the first Data Release of the Vista Variables in the Via Lactea Survey (VVV), including TAP and ADQL access. Project to digitize historical data (initially scans of photographic spectra) of the La Plata, San Juan, and Córdoba Observatories.

2. Armenian VO: "Astronomical Surveys and Big Data" meeting dedicated to 50th anniversary of Markarian Survey and 10th anniversary of Armenian Virtual Observatory (ArVO) will be held on Oct 5-9, 2015 in Byurakan, Armenia.

3. Australia-VO: Science infrastructure related funding for the fiscal years 2015/16 and 2016/17 will be used for All-Sky VO project (possibly with the multi-petabyte low-frequency radio astronomy dataset from the Murchison Widefield Array)

4. ChiVO: Chilean VO was officially launched on 24th of April 2015 to the community in a seminar held at Technical University Federico Santa María, Valparaíso, Chile

5. CVO: CVO members are contributing to the TCG and to the Apps, DAL, DM and GWS working groups. CVO has also deployed reference implementations of PRs for DataLink 1.0 and SIA 2.0 and prototype implementations of WDs for ObsCore 1.1, UWS 1.1, SSO 2.0, VOSpace 2.1, TAP 1.1, AccessData 1.0 and VOSI-tables 1.1.

# "Random" News from VO projects (non exhaustive list) - 2

1. ESA-VO: Refurbishing of the Euro-VO Registry (new DB and new GUI). Built-in VO services within Archives (ie Gaia, XMM-Newton, HST, Herschel, Planetary Science Archive, ...)

2. GAVO: DaCHS data publisher server software grew a set of proposed new ADQL features, support for a subset of SDM2, annotations in VOTables, and up-to-date datalink support

3. Euro-VO: ASTERICS European project started May 1st (15 M€ over 4 years) addresses the cross-cutting synergies and common challenges shared by the various Astronomy ESFRI facilities (SKA, CTA, KM3Net & E-ELT). ASTERICS will enable astronomers to have broad access to the data products of the ESFRI telescopes via a seamless interface to the Virtual Observatory framework. ASTERICS WP4 *Data Access, Discovery and Interoperability* (4.5 M€) gathers the Euro-VO teams and the ESFRI teams to address support for data providers, support for the astronomical community and the technical work on VO standards and tools.

4. Japan VO: A more user-friendly portal, JVO portal version 2, will be released very soon. The big wave, "Open Data / Open Science", has reached to Japan; thanks to the IVOA, JVO has been invited to give lectures to the Japanese government how to successfully share data.

# "Random" News from VO projects (non exhaustive list) - 3

1. OV France : French teams continue to be very active in the work on standards and applications, in particular on the DAL "Caravan" of high priority standards and on the completion of Theory standards. It also continues to build contacts between astronomy and 'nearby' disciplines. CDS leads ASTERICS WP4, and several French teams, representing CTA (LUTH), EGO/ET (APC) and KM3Net (CPPM), are also involved.

2. South Africa SA[3]: Expecting funding from 2016. VO Interface for MeerKAT well underway. IAU Office of Astronomy for Development (OAD) using VO tools to take astronomy to the developing world, Rwanda, Nepal & rural South Africa

3. SVO: Funds guaranteed for the period 2015-2019. Adaptation of tools (VOSA) to meet large projects' requirements (Gaia). Growing involvement of Spanish community in VO science.

4. VObs.it: Funding for fiscal year 2015 in line with previous years. Participation on European funded projects (ASTERICS, EGI-Engage). Organization of this interop and the Northern Fall 2016 on (Trieste)

# "Random" News from VO projects (non exhaustive list) - 4

1. VO-India is now fully funded by IUCAA, awaiting other sources of support (ie Data Driven Science project, one the aims of which will be to develop products suitable for big data (ie MeerKAT as a precursor to SKA work)). A novel feature is that part of the work will be with biologists. The idea is to enable biologists to use IVOA standards techniques and tools, tailored to their needs.

2. VO in the UK: effort co-ordinated through Euro-VO, many activities going on, ie building VO-aware data archives (Omega Cam science archive), collaborating with tropical forest monitoring scientists, looking at re-purposing VO software for their purposes.

3. Ukraine_VO: Organize a "Virtual Observatory and Intensive Data" session during the International Gamow Conference in August 2015

4. USVOA: US VO Alliance. Special Interest Group (SIG) of the AAS WG on Astronomical Software (WGAS), ensuring full participation of US astronomical community in the development and implementation of IVOA standards. USVOA activities supported by member projects (leads SAO, IPAC, NRAO)

5. More details per projects at: http://wiki.ivoa.net/twiki/bin/view/IVOA/IvoaExecMeetingFM58#Reports_from_the_Projects

# IVOA on-going challenges

1. Take-up by Data Centres
   a. How VO standards serve Data Centres' requirements ?
   b. Are ("non-VO") Data Centres implementing VO standards ?

2. Engagements of big projects
   a. How the VO can help the big projects ?
   b. Does IVOA need to be more pro-active towards big projects ?

3. VO Services Operations
   a. How to ensure reliability of VO ecosystem ?
   b. Newly created IVOA Ops IG

4. Needs for new / updated standards ?
   a. When do we "stop" producing new standards ?
   b. And start to "update" our current standards, make them easier to implement and operate ?

# IVOA and Big Data

1. Big data is the new "buzz" word

2. Big data is a reality in many astronomical projects

3. What's the IVOA answer to big data ?
   a. Are IVOA standards ready to cope ?

4. Focus session on massive and complex data
   a. Gaia
   b. Euclid
   c. LSST

# Next Interops

1. Agreement at Exec to keep ADASS and (northern) Fall Interop paired
   a. Preferably Interop *after* ADASS so many discussions can take place prior to the interop

2. Northern Fall 2015 - Sydney, Australia (after ADASS)
   a. Oct 30 – Nov 01 2015
   b. Web site and registration to come out soon

3. Northern Spring 2016 – South Africa
   a. May 08 -13 2016

4. Northern Fall 2016 - Trieste, Italy (after ADASS)
   a. Oct 21-23 2016

# Participants per Interop



Number of Participants per IVOA Interoperability Meeting
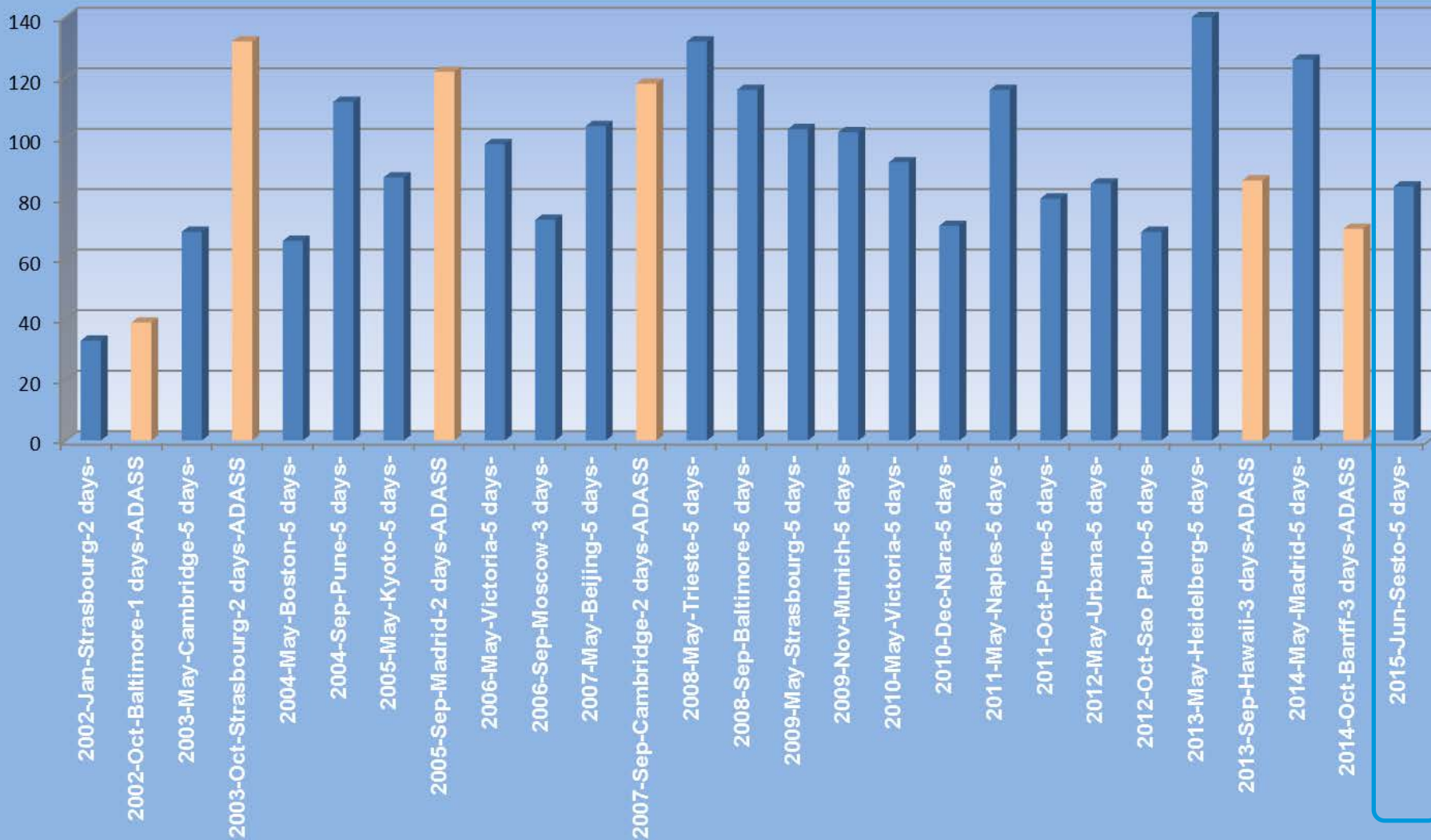
# Let's now go with it !

1. Thanks to Marco, Gabriella and Fabio, VObs.it for organizing this interop !

2. Thanks to Matthew for putting the programme together

3. Looking forward for a fruitful and constructive week …

Program for June 2015 Interop in Sesto/Sexten (Bolzano/Bozen, Italy) (as of June 14 2015)

Backlink to event web site.

A map of the meeting rooms at Haus Sexten is available at page bottom.
Participant's List can be found here.
Updated Logistics and Accomodation information can be found here (latest update: 14 June).

* FINAL VERSION *

| Session | Time | Room | Session | Notes |
|---|---|---|---|---|
| **Sunday June 14 2015** | | | | |
| | 09:30–15:30 | Sport & Kurhotel at Bad Moos | TCG Meeting | TCG |
| | 11:30 and 15:30 | **Coffee Break** | | |
| | 16:00–18:00 | Sport & Kurhotel at Bad Moos | IVOA Exec Meeting | Exec + WG/IG Chairs/Vice-chairs |
| | 18:00–19:00 | Sport & Kurhotel at Bad Moos | Welcome cocktail | All |
| **Monday June 15 2015** | | | | |
| | 08:30/08:45 | Bus leaves Bad Moos | | |
| 1 | 09:00–09:20 | Großer Saal | Welcome and Logistics | Fabio Pasian |
| | 09:20–10:00 | Großer Saal | State of the IVOA | Christophe Arviset |
| | 10:00–10:30 | Großer Saal | Europlanet H2020 | Baptiste Cecconi |
| | 10:30–11:00 | **Break** | | |
| 2 | 11:00–11:20 | Großer Saal | State of the TCG | Séverin Gaudet |
| | 11:20–12:30 | Großer Saal | Charge to Working Groups | WG/IG Chairs |
| | 12:30–14:00 | **Lunch** | | |
| 3 | 14:00–15:30 | Großer Saal | Apps I | Apps |
| | | Grüner Saal | Theory | Theory |
| | 15:30–16:00 | **Break** | | |
| 4 | 16:00–17:30 | Großer Saal | Registry I | Reg |
| | | Grüner Saal | DM I | DM |
| | 17:40/17:55 | Bus leaves Haus Sexten | | |
| **Tuesday June 16 2015** | | | | |
| | 08:30/08:45 | Bus leaves Bad Moos | | |
| 5 | 09:00–10:30 | Großer Saal | Focus session on massive and complex data<br>Wil O'Mullane (GAIA): Gaia satellite status, data access and the VO<br>Fabio Pasian (EUCLID)<br>John Swinbank (LSST) | ?? (Session Chair) |
| | 10:30–11:00 | **Break** / Group Photo | | |
| 6 | 11:00–12:30 | Großer Saal | Focus session on massive and complex data<br>(panel discussion) | ?? (Session Chair) |
| | 12:30–14:00 | **Lunch** | | |
| 7 | 14:00–15:30 | Großer Saal | Registry/DAL/Apps | Reg/DAL/Apps |
| | 15:30–16:00 | **Break** | | |
| 8 | 16:00–17:30 | Großer Saal | DAL I | DAL |
| | | Grüner Saal | GWS I | GWS |
| | 17:40/17:55 | Bus leaves Haus Sexten | | |