

IVOA Newsletter - May 2013

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IVOA Newsletter Editors: Mark G. Allen, Deborah Baines, Sarah Emery Bunn, Chenzou Cui, Mark Taylor, & Ivan Zolotukhin.



The International Virtual Observatory Alliance (IVOA) was formed in June 2002 with a mission to facilitate the international coordination and collaboration necessary for the development and deployment of the tools, systems and organizational structures necessary to enable the international utilization of astronomical archives as an integrated and interoperating virtual observatory. The IVOA now comprises 19 VO programs from Argentina, Armenia, Australia, Brazil, Canada, China, Europe, France, Germany, Hungary, India, Italy, Japan, Russia, Spain, Ukraine, the United Kingdom, and the United States and an inter-governmental organization (ESA). Membership is open to other national and international programs according to the IVOA Guidelines for Participation. You can read more about the IVOA and what we do at <http://ivoa.net/about/>.

What is the VO?

The Virtual Observatory (VO) aims to provide a research environment that will open up new possibilities for scientific research based on data discovery, efficient data access, and interoperability. The vision is of global astronomy archives connected via the VO to form a multiwavelength digital sky that can be searched, visualized, and analyzed in new and innovative ways. VO projects worldwide working toward this vision are already providing science capabilities with new tools and services. This newsletter, aimed at astronomers, highlights VO tools and technologies for doing astronomy research, recent papers, and upcoming events.

IVOA NEWS

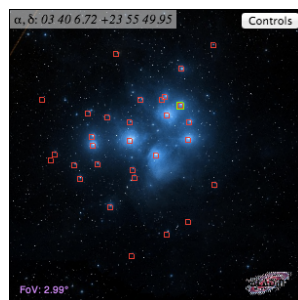
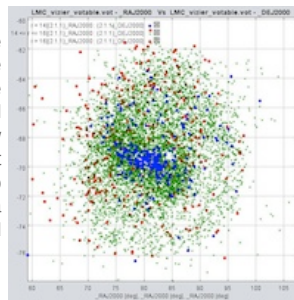
New IVOA website! The IVOA is pleased to announce a shiny new version of our website (<http://www.ivoa.net>). As well as an attractive new design and general wash and brush-up, the idea was to improve the navigational structure. Different types of visitors can follow different paths. Very general information about the IVOA as an organization can be found in the "About" section. Scientists who want to find out what the VO is about, and how to use VO tools to do science, should use the "Astronomers" section - in this section there is also a page about the VO for students and the general public. Technical types, for example, applications writers, or data center staff who want to deploy services, can find much more nitty gritty detail in the "Deployers" section. Last but not least, people who are actually participating in IVOA standards development and discussion can get straight to their favourite working group mailing lists and so on, in the "Members" section. We hope you enjoy the new look!

VO APPLICATIONS AND IMPLEMENTATION HIGHLIGHTS

VOPlot

VOPlot is a tool for visualizing astronomical data, and acts on data available in VOTABLE, ASCII and FITS formats. VOPlot has undergone considerable improvements in the past couple of years and incremental versions have been released regularly. The latest version features Table Access Protocol (TAP), allowing users to query TAP compatible catalogs. The helpset is now bundled within VOPlot. Minor ticks have been included within the plot properties. Users can view the points with a greater precision, in order to pinpoint the point location. A new functionality makes it possible to draw a line between any two points in the graph. An updated user guide is released with v1.8.

More information: <http://vo.iucaa.ernet.in/~vo/voplot.htm>



Aladin lite: a simple visualizer for the browser

CDS is releasing the first version of Aladin lite, a light version of Aladin running in the browser and geared towards simple visualization of a sky region. The first version allows one to visualize image surveys (JPEG multi-resolution HEALPix all-sky surveys) and superimpose tabular (VOTable) and footprints (STC-S) data. Aladin lite is powered by the HTML5 canvas technology, supported on many platforms including desktop browsers, tablets, and smartphones. It is intended to replace the Aladin Java applet technology. The full-featured Aladin Java version will still be developed and will be oriented for standalone usage only. Aladin lite is easily embeddable on any web page (a few dozen KB) and can also be controlled through a Javascript API.

More Information: <http://aladin.u-strasbg.fr/AladinLite>

AstroStat

VO-India has recently released AstroStat, a tool that allows astronomers to use both simple and sophisticated statistical routines on large datasets. This tool uses a large public-domain statistical computing package called R. AstroStat has a visual interface that is easy to comprehend and results are presented in a well formatted manner with focus on important output parameters. It uses a third party R library 'ggplot2' to create publication



quality graphs. Help sections explaining all the routines in sufficient detail are built into AstroStat. A TAP client has been integrated into AstroStat to access data from TAP compatible catalogs. AstroStat is a significant improvement over a previous similar tool by VO-India for statistical analysis.
More information: <http://voi.iucaa.ernet.in/~voi/AstroStat.html>



Iris - Added capabilities for SED analysis

Iris, the VAO SED analysis tool, has been upgraded in v1.2 with visualization capabilities that include a SED segment browser, metadata filtering by boolean expression, and display of individual point metadata. A plug-in framework has been added so that users can extend Iris to perform their own specific tasks. The ASDC group has developed a plug-in that is packaged with Iris. This plug-in serves to provide data from the ASDC SED data holdings, and also provides an example of how users can develop their own plug-ins.

More information: <http://www.usvao.org/science-tools-services/iris-sed-analysis-tool/>

seleste

seleste is a tool that uses VO TAP standards and ADQL protocols to access archives that expose tabular data, and query them using a uniform interface. Compared to applications designed to query specific datasets at a specific location using pre-defined query forms, seleste allows ad-hoc queries against any discoverable archive through a common interface. The architecture includes an application with a graphical user interface, a set of command line tools, and a library that interoperates with VO services and applications. Catalogs already available include: the Chandra Source Catalog, SDSS, 2MASS, Hipparcos, and more. The results of seleste queries can be saved or passed on to another VO tool, such as Topcat.
More information:

More information: <http://cda.cfa.harvard.edu/seleste>



VO Invades Python!

The Virtual Astronomical Observatory (VAO) has been busy working to bring the power of the VO into Python, and two products are on their way. The first, VAOpy, is a python package that makes it possible to query archives for images, catalog sources, spectra, and spectral line data, all from a python script or interactive session. One can also discover archives and their services by querying the VO registry. This package is built on top of the widely used AstroPy python package. The VAO has just released a beta version and is actively seeking feedback on its API from python developers in the community.

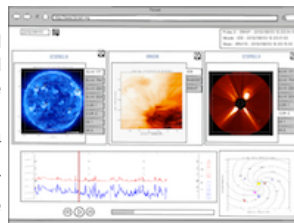
More information: <http://dev.usvao.org/vao/wiki/Products/VAOpy>

NEW PROJECTS

FOREST: a new heliophysics data system

FOREST is a project developing a quick-look semantic search virtual observatory for heliophysics, which allows integration, visualisation and searching of observations from multiple instruments and multiple spacecraft. It aims to support future missions such as Solar Orbiter. FOREST uses an RDF model to relate observations to metadata. The data model is based on IVOA recommendations such as the STC, Characterisation and Observation data models. A prototype of FOREST with an advanced web UI frontend and a GAVO Data Center Helper Suite backend is under development for ESA by Skytek Ltd. and Trinity College Dublin.

More information: <http://bit.ly/15HcFfV>



Australian All-Sky Virtual Observatory

The Australian VO informs us of The All-Sky Virtual Observatory project consisting of SkyMapper, which will provide an integrated and comprehensive environment for the hosting, analysis, and exploration of the SkyMapper Southern-Sky Survey. And TAO (Theoretical Astrophysical Observatory), which will provide access to several cosmological simulations, galaxy formation models and processing on Swinburne University's super-computer.

More Information: <http://www.asvo.org.au/about>

SOME RECENT PAPERS ABOUT VO-ENABLED SCIENCE

Featured Paper

Machine-assisted discovery of relationships in astronomy

Graham, Matthew J.; Djorgovski, S. G.; Mahabal, Ashish A.; Donalek, Ciro; Drake, Andrew J.

Monthly Notices of the Royal Astronomical Society 2013 accepted

High-volume feature-rich data sets are becoming the bread-and-butter of 21st century astronomy but present significant challenges to scientific discovery. In particular, identifying scientifically significant relationships between sets of parameters is non-trivial. Similar problems in biological and geosciences have led to the development of systems which can explore large parameter spaces and identify potentially interesting sets of associations. In this paper, we describe the application of automated discovery systems of relationships to astronomical data sets, focusing on an evolutionary programming technique and an information-theory technique. We demonstrate their use with classical astronomical relationships - the Hertzsprung-Russell diagram and the Fundamental Plane of elliptical galaxies. We also show how they work with the issue of binary classification which is relevant to the next generation of large synoptic sky surveys, such as the Large Synoptic Survey Telescope (LSST). We find that comparable results to more familiar techniques, such as decision trees, are achievable. Finally, we consider the reality of the relationships discovered and how this can be used for feature selection and extraction.

Refereed Publications

The Hopkins Ultraviolet Telescope: The Final Archive

Dixon, William V.; Blair, William P.; Kruk, Jeffrey W.; Romelfanger, Mary L

To appear in *Publications of the Astronomical Society of the Pacific* 2013

Proper motions of young stars in Chamaeleon. I. A Virtual Observatory study of spectroscopically confirmed members

Lopez Martí, B.; Jimenez Esteban, F.; Bayo, A.; Barrado, D.; Solano, E.; Rodrigo, C.

A&A 2013, 551, 46L

Automated rapid follow-up of Swift gamma-ray burst alerts at 15 GHz with the AMI Large Array

Staley, T. D.; Titterton, D. J.; Fender, R. P.; Swinbank, J. D.; van der Horst, A. J.; Rowlinson, A.;

Scaife, A. M. M.; Grainge, K. J. B.; Pooley, G. G.

Monthly Notices of the Royal Astronomical Society 2014, 428, 3114

Precovery of near-Earth asteroids by a citizen-science project of the Spanish Virtual Observatory

E. Solano, C. Rodrigo, R. Pulido, B. Carry

Accepted in *Astron. Nachr*

The Millennium Run Observatory: first light

Overzier, R.; Lemson, G.; Angulo, R. E.; Bertin, E.; Blaizot, J.; Henriques, B. M. B.; Marleau, G.-D.;

White, S. D. M.

Monthly Notices of the Royal Astronomical Society 2013, 428, 778

Query driven visualization of astronomical catalogs

Buddelmeijer, Hugo; Valentijn, Edwin A.

Experimental Astronomy, Volume 35, Issue 1-2, pp. 283-300

A Virtual Observatory Census to Address Dwarfs Origins. AVOCADO - I. Science goals, sample selection and analysis tools

Sánchez-Janssen, R.; Amorín, R.; García-Vargas, M.; Gomes, J. M.; Huertas-Company, M.; Jiménez-

Esteban, F.; Mollá, M.; Papaderos, P.; Pérez-Montero, E.; Rodrigo, C.; Sánchez Almeida, J.; Solano, E.

2013, *A&A* accepted

Building a VO-compliant Radio Astronomical Data Model for Single-dish radio telescopes (RADAMS)

Santander-Vela, Juan de Dios; García, Emilio; Leon, Stephane; Espigares, Victor; Ruiz, José Enrique; Verdes-

Montenegro, Lourdes; Solano, Enrique

Experimental Astronomy, Volume 34, Issue 3, pp.623-652

The first planet detected in the WTS: an inflated hot Jupiter in a 3.35 d orbit around a late F star

Cappetta, M.; Saglia, R. P.; Birkby, J. L.; Koppenhoefer, J.; Pinfield, D. J.; Hodgkin, S. T.; Cruz, P.; et al.

Monthly Notices of the Royal Astronomical Society, Volume 427, Issue 3, pp. 1877-1890.

Red supergiants around the obscured open cluster Stephenson 2

Negueruela, I.; Marco, A.; González-Fernández, C.; Jiménez-Esteban, F.; Clark, J. S.; Garcia, M.; Solano, E.

Astronomy & Astrophysics, Volume 547, id.A15 19 pp.

Efficient Catalog Matching with Dropout Detection

Fan, Dongwei; Budavári, Tamás; Szalay, Alexander S.; Cui, Chenzhou; Zhao, Yongheng

Publications of the Astronomical Society of the Pacific, Volume 125, issue 924, pp.218-223

Discovery of a Binary Brown Dwarf at 2 pc from the Sun

Luhman, K. L.

The Astrophysical Journal Letters, Volume 767, Issue 1, article id. L1, 6 id. (2013)

Tera-scale astronomical data analysis and visualization

Hassan, A. H.; Fluke, C. J.; Barnes, D. G.; Kilborn, V. A.

Monthly Notices of the Royal Astronomical Society, Volume 429, Issue 3, p.2442-2455

The UV and X-ray activity of the M dwarfs within 10 pc of the Sun

Stelzer, B.; Marino, A.; Micela, G.; López-Santiago, J.; Liefke, C.

Monthly Notices of the Royal Astronomical Society, Advance Access. 17 pp.

Innocent Bystanders: Carbon Stars from the Sloan Digital Sky Survey

Green, Paul

The Astrophysical Journal, Volume 765, Issue 1, article id. 12, 19 pp. (2013).

Stacking Star Clusters in M51: Searching for Faint X-Ray Binaries

Vulic, N.; Barmby, P.; Gallagher, S. C

The Astrophysical Journal, Volume 763, Issue 2, article id. 96, 12 pp. (2013).

The VISTA Science Archive

Cross, N. J. G.; Collins, R. S.; Mann, R. G.; Read, M. A.; Sutorius, E. T. W.; Blake, R. P.; Holliman, M.; Hambly, N. C.; Emerson, J. P.; Lawrence, A.; Noddle, K. T.
Astronomy & Astrophysics, Volume 548, id.A119, 21 pp.

EasyLife: The Data Reduction and Survey Handling System for VIPERS

Garilli, B.; Paioro, L.; Scodreggio, M.; Franzetti, P.; Fumana, M.; Guzzo, L.
Publications of the Astronomical Society of the Pacific, Volume 124, issue 921, pp.1232-1243

The local luminosity function of star-forming galaxies derived from the Planck Early Release Compact Source Catalogue

Negrello, M.; Clemens, M.; Gonzalez-Nuevo, J.; De Zotti, G. and 17 coauthors
Monthly Notices of the Royal Astronomical Society, Volume 429, Issue 2, p.1309-1323

More Ways to Find VO-related Publications

All ADS links mentioning the "virtual observatory" in the abstract

All refereed publications mentioning the "virtual observatory" in the abstract

VO CALENDAR

12-17 May, 2013 - IVOA Interoperability Meeting

Heidelberg, Germany

The IVOA Interop Meetings are aimed at making significant progress in defining standards and sharing best practices in the development of the world wide Virtual Observatory initiatives.

10-11 June, 2013 - CoSADIE Astronomical Data Center Forum 2013

Heidelberg, Germany

The CoSADIE data center forum will bring together VO engineers and data providers to foster an interchange of ideas and requirements. Data providers are cordially invited to give talks on their perspective, while VO staff will introduce key technologies and software to make data publishing in astronomy easier, more effective, more sustainable and more user-friendly.

16-18 September, 2013 - Astronomy 5

Cambridge, MA

.Astronomy is a three-day conference, unconference and hack day: all about astronomy online. .Astronomy aims to bring together an international community of astronomy researchers, developers, educators, and communicators to showcase, generate ideas for, and collaborate on innovative web-based projects, from research tools and data analysis to outreach and education.

26-28 September, 2013 - IVOA Interoperability Meeting

Waikoloa, Hawaii, USA

The IVOA Interop Meetings are aimed at making significant progress in defining standards and sharing best practices in the development of the world wide Virtual Observatory initiatives. The fall interop will be held just prior to the ADASS Conference (September 26-28), in the same venue. ADASS participants are welcome to extend their Hawaiian sojourn a few days and learn what the VO has to offer.

29 Sept - 3 October 2013 - ADASS

Waikoloa, Hawaii, USA

The **Astronomical Data Analysis Software and Systems (ADASS)** conference provides a forum for scientists and programmers concerned with algorithms, software and software systems employed in the acquisition, reduction, analysis, and dissemination of astronomical data.

For Astronomers



Getting Started / Using the VO
VO Glossary / VO Applications
IVOA newsletter / VO for Students
& Public



For Deployers/Developers



Intro to VO Concepts /
IVOA Standards / Guide to
Publishing in the VO / Technical
Glossary



For Members



IVOA Calendar / Working Groups/
Twiki / Documents in Progress /
Mailing Lists / IVOA Roadmap

