



VO as a tool for the scientific exploitation of Gaia data

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The Virtual Observatory and the ICTS

- VO is not an ICTS “*stricto sensu*” as it is not included in the official list.

BUT

- VO is an ICTS “*de facto*” as it meets most of the ICTS’s requirements:
 - VO is a virtual community-oriented research infrastructure.
 - VO is a service to carry out cutting edge research and development activities.
 - VO a key infrastructure for the interchange and preservation of data and knowledge.
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Meeting objectives

Objetivos:

Reunir a los científicos involucrados en el desarrollo de la misión (preparación y explotación científica) con los agentes gestores de las ICTS para valorar:

- ▶ las necesidades de la comunidad española en Gaia
- ▶ las posibles aportaciones en el contexto actual y futuro de las ICTS españolas.

■ Lines of work

- Data validation
- Scientific analysis of complementary data
- Management of complementary data.

Data validation

- Ensure that Gaia data are usable and the errors are well known and within the expected limits.
- Comparison with previous, “controlled” datasets.
- Example: Proper motions
 - Many catalogues: Hipparcos, Tycho-2, PPMXL, SuperCosmos, UCAC-3, UKIDSS,...
 - Different
 - Wavelength and spatial coverage,...
 - Astrometric accuracy, photometric depth,...
 - How to discover the catalogues that can be of interest?
 - How to manage the information provided by these catalogues? → VO-tools

Cone Search

Columns Registry

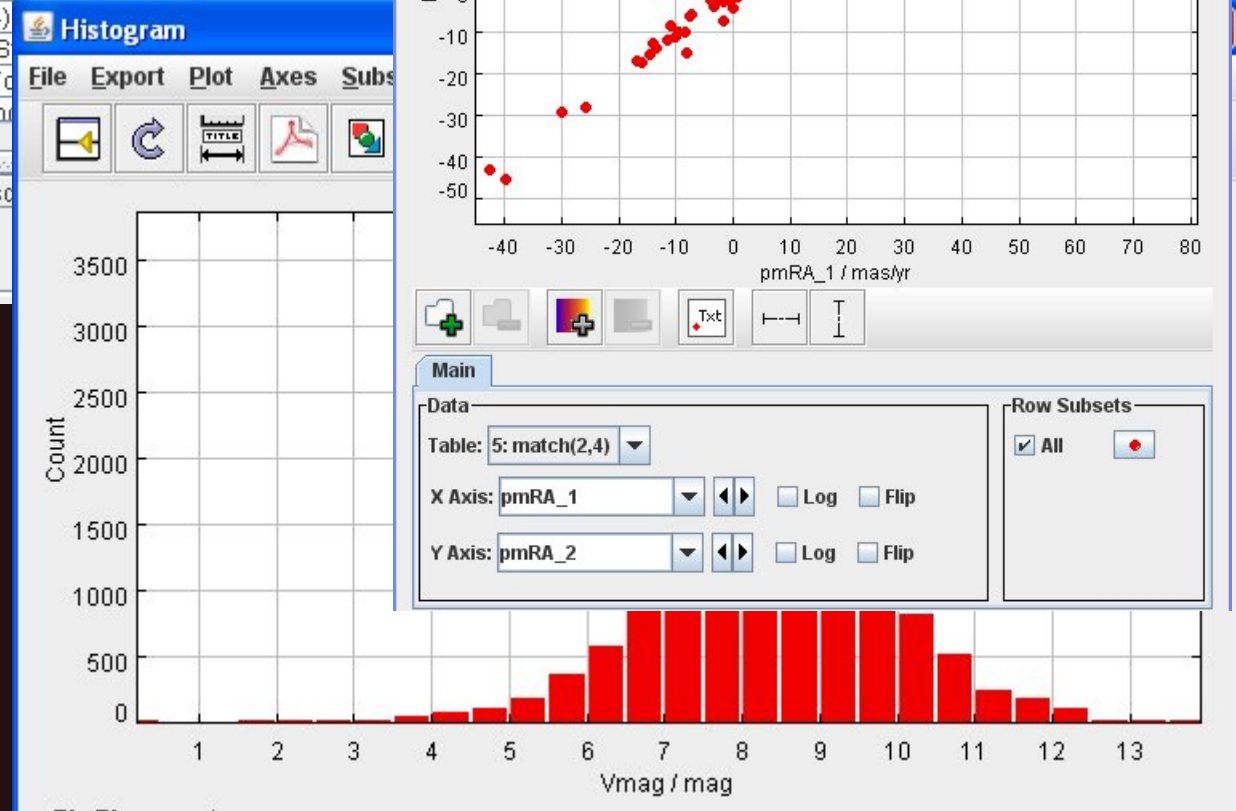
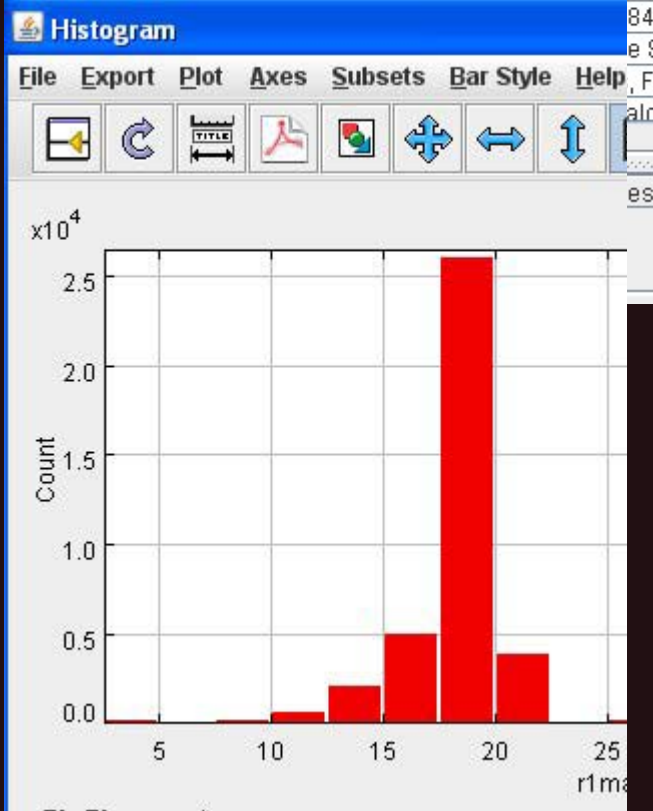
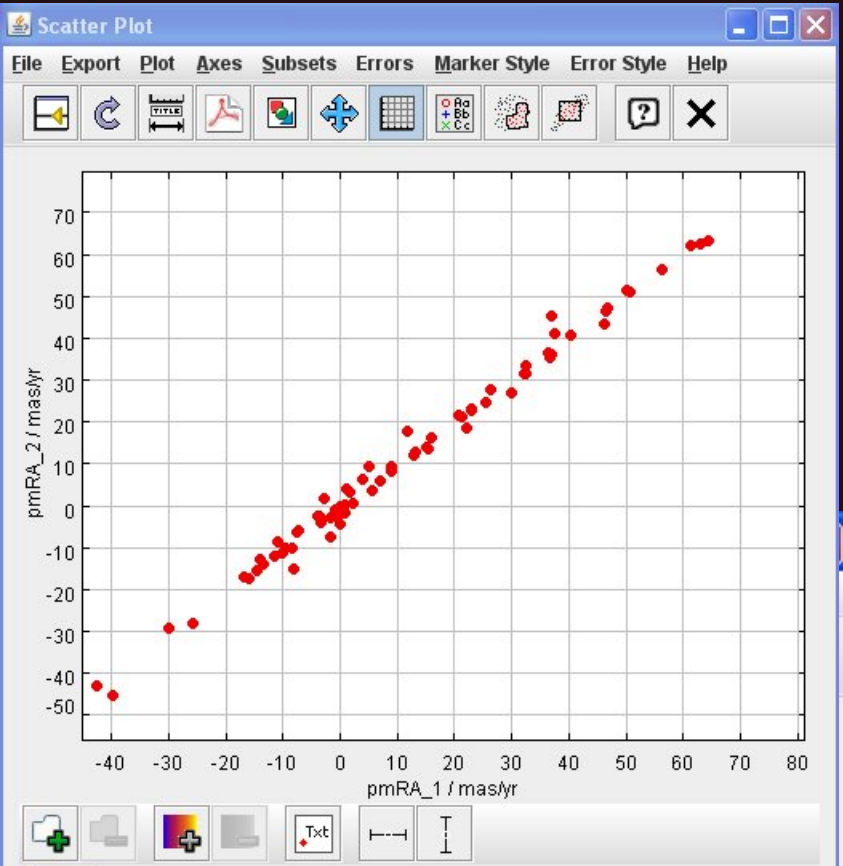
Available Cone Search Services

Registry: http://registry.astrogrid.org/astrogrid-registry/services/RegistryQueryv1_0

Keywords: proper motion

Cancel Query

shortName	title
I/209A	Catalogue of 2700 double stars (Couteau, 1995)
I/210	Mean Positions and proper motions of 995 FK4Sup stars (Schwan+
I/212	Proper motions in NGC 3680 (Kozhurina-Platais+, 1995)
I/213	Carlsberg Meridian Catalog, Vol. 8 (CMC8, 1994)



Complementary data

- In many fields, Gaia will have to be complemented with spectroscopic data.
 - Gaia-ESO survey: Open clusters and halo and disk stars. (Negueruela et al.)
 - Red clump stars (Carrera et al.)
 - FGK stars (Montes)
 - Massive stars (Simón-Díaz et al.)
 - Low-mass objects (Caballero)
 - Asteroids (Duffard et al., de León et al.)
 - Outliers (Manteiga et al.)

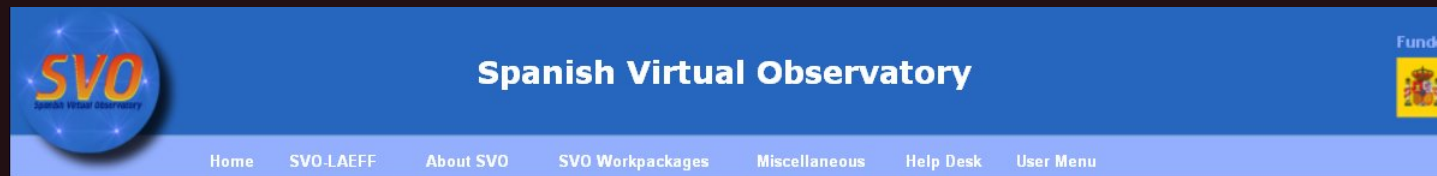
Virtual Observatory as a discovery and analysis tool

Management of complementary data

- If you really want an easy and efficient data interchange with other astronomical resources, the VO is the best course to follow.
 - Make your analysis easier.
 - Good advertisement of your work (when the datasets become public).

How to articulate all these potential VO contributions?

- **SVO charter: “Provide technical and scientific support at VO activities in Spain”.**



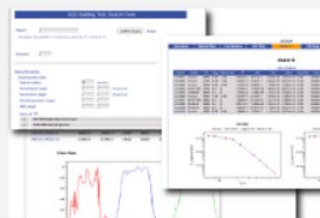
<http://svo.cab.inta-csic.es>

The SVO



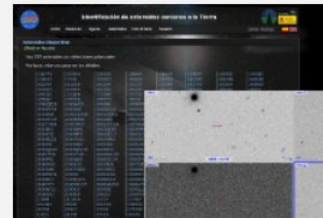
The Spanish Virtual Observatory (SVO) officially started in June 2004. Its purpose is to provide an efficient coordination among the different national initiatives in the framework of the Virtual Observatory and to achieve an effective integration of all the expertise in this research domain.

Services



- VOSA
- VOSED
- TESELA
- Filter Profile Service

Outreach



This is an educational programme whose main goal is to offer students, amateur astronomers and the public in general the possibility of identifying in astronomical archives asteroids that may hit the Earth.

- Near Earth Asteroids Precovey

Archives

- Calar Alto Public Archive
- DSS-63
- GTC Public Archive
- The Youngest protostars
- COROT Public Archive
- GASPS
- INES System (IUE Archive)
- DUNES
- GAUDI System
- OMC Archive

Theoretical models

- Theoretical Stellar Spectra
- Evolutionary Synthesis Models
- Isochrones and evolutionary tracks
- Asteroseismology

Funded projects

- 2005
- 2006 – 2008
- 2009 – 2011
- 2012 – 2014



ObsVirtEsp

@ObsVirtEsp

El Observatorio Virtual Español (SV actividades de VO a nivel nacional. t archivos.astronómicos.

España <http://svo.cab.inta-csic.es>

A successful example: the Consolidator-GTC project

The image displays the Consolidator-GTC project interface, which includes a web browser window and the Aladin sky atlas software.

Web Browser Window: The browser shows the ASK Classification website. The URL is <http://sd.cab.inta-csic.es/ask/index.jsp>. The page features the ASK Classification logo and a description of the data server, which provides access to the results of the unsupervised classification of the final Sloan Digital Sky Survey data release (SDSS-DR7). The page also includes a search form and a help desk link.

Aladin sky atlas Software: The Aladin sky atlas window is open, showing a "Server selector" dialog box. The dialog box is titled "Server selector" and contains a list of servers. The "VO discovery tool" is active, and the "ASK Classification" server is selected. The target coordinates are 146.05 0.44, and the radius is 14'. The "ASK Classification" server is highlighted with a red box, and its details are shown: "ASK Classification: 52 objects 0.0° x 0.0°".

Aladin sky atlas Interface: The Aladin sky atlas window has a menu bar (File, Edit, Image, Catalog, Overlay, Tool, View, Interop, Help) and a toolbar. The "Server selector" dialog box is overlaid on the main window. The dialog box has a "Target" field with the value "146.05 0.44", a "Radius" field with the value "14'", and a "Grab coord" button. The "Servers" section has checkboxes for "Images", "Catalogs", and "Spectra", and a "Detailed list..." button. The list of servers includes "ARIHIP astrometric catalogue", "Galaxy Evolution Explorer", "ASK Classification", "superCOSMOS Science Archive (SSA) - Detection table: cone sea", "UKIDSS DR4 - UKIRT Infrared Deep Sky Survey Data Release 4 -", "UKIDSS DR4 - UKIRT Infrared Deep Sky Survey Data Release 4 -", and "2MASS All-Sky Quicklook Image Service". The "ASK Classification" server is selected, and its details are shown: "ASK Classification: 52 objects 0.0° x 0.0°". Below the list, there are buttons for "Reset", "Clear", "Help", "SUBMIT", and "Close".

System Tray: The system tray at the bottom of the Aladin window shows icons for "grid", "multView", and "m arch".

Footer: The footer of the Aladin window contains the text "TIP: In the crowded regions, move the catalog plane under the image plane" and "0 sel / 0 src 339Mb".

Science

- VO group's role:
 - Identify potential VO-science cases.
 - Feasibility assessment from the VO point of view.
 - VO support (even developing new VO tools)
 - Almost 30% of the VO refereed paper published since 2009 are from SVO.
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Science

		Project	Remaining Work load	Main Milestones	Summer 2011	Autumn 2011	Winter 2012	Spring 2012	Summer 2012	Autumn 2012
1	<input type="checkbox"/> 2012A&A...539A..86J Jiménez-Esteban, F. M.; Caballero, J. A.; Dorda, R.; Miles-Páez, P. A.; Solano, E.	A1.- TESELA	Heavy	USNO-B1 implementation publication		X				
				Presentation of the work in the IV Science with the GTC meeting		X				
2	<input type="checkbox"/> 2011MNRAS.417.3061C Cardiel, N.; Jiménez-Esteban, F. M.; Alacid, J. M.; Solano, E.; Aberasturi, M.	A2.- Ca Triplet	Medium	Search for blank fields			X			
				Catalogue paper submission				X		
3	<input type="checkbox"/> 2011A&A...529A.108L López Martí, B.; Jiménez-Esteban, F.; Solano, E.	A3.- Tycho2-2MASS	Heavy	Pseudo-spectra generation and RGBs identification	X					
				Fit CaT lines and stellar metallicity			X			
4	<input type="checkbox"/> 2011A&A...525A..29J Jiménez-Esteban, F. M.; Caballero, J. A.; Solano, E.	A4.- Debris Disks	Medium	Presentation of the work in the IV Science with the GTC meeting		X				
				Paper submission				X		
4	<input type="checkbox"/> 2011A&A...525A..29J Jiménez-Esteban, F. M.; Caballero, J. A.; Solano, E.	A5.- Cataclysmic Variables	Medium	2nd paper submission	X					
				Cross-match with SIMBAD and kinematic analysis		X				
4	<input type="checkbox"/> 2011A&A...525A..29J Jiménez-Esteban, F. M.; Caballero, J. A.; Solano, E.	B1.- Content of RSG	Light	3rd paper submission				X		
				GTC proposal			X			
4	<input type="checkbox"/> 2011A&A...525A..29J Jiménez-Esteban, F. M.; Caballero, J. A.; Solano, E.	B2.- IRAS16339-4717	Light	GTC data reduction/analysis					X	
				VOSA analysis	X					
4	<input type="checkbox"/> 2011A&A...525A..29J Jiménez-Esteban, F. M.; Caballero, J. A.; Solano, E.	C1.- AVOCADO	Light	Paper submission			X			
				Ask for Canaricam			X			
4	<input type="checkbox"/> 2011A&A...525A..29J Jiménez-Esteban, F. M.; Caballero, J. A.; Solano, E.	C1.- AVOCADO	Light	Reduction/Analysis of Canaricam data					X	
				Search of CVs candidates	X					
4	<input type="checkbox"/> 2011A&A...525A..29J Jiménez-Esteban, F. M.; Caballero, J. A.; Solano, E.	C1.- AVOCADO	Light	Observing time application		X				
				Reduction/Analysis of data					X	
4	<input type="checkbox"/> 2011A&A...525A..29J Jiménez-Esteban, F. M.; Caballero, J. A.; Solano, E.	C1.- AVOCADO	Light	1st paper submission	X					
				Observations with the AAT		X				
4	<input type="checkbox"/> 2011A&A...525A..29J Jiménez-Esteban, F. M.; Caballero, J. A.; Solano, E.	C1.- AVOCADO	Light	AAT Data Reduction		X				
				AAT Data Analysis			X			
4	<input type="checkbox"/> 2011A&A...525A..29J Jiménez-Esteban, F. M.; Caballero, J. A.; Solano, E.	C1.- AVOCADO	Light	AAT Paper submission					X	
				VLT data reduction	X					
4	<input type="checkbox"/> 2011A&A...525A..29J Jiménez-Esteban, F. M.; Caballero, J. A.; Solano, E.	C1.- AVOCADO	Light	VLT data analysis		X				
				VLT Paper submission				X		
4	<input type="checkbox"/> 2011A&A...525A..29J Jiménez-Esteban, F. M.; Caballero, J. A.; Solano, E.	C1.- AVOCADO	Light	1st paper submission	X					
				SEDs and morphological analysis		X				
4	<input type="checkbox"/> 2011A&A...525A..29J Jiménez-Esteban, F. M.; Caballero, J. A.; Solano, E.	C1.- AVOCADO	Light	2nd and 3rd papers submission			X			
				Spectra analysis				X		
4	<input type="checkbox"/> 2011A&A...525A..29J Jiménez-Esteban, F. M.; Caballero, J. A.; Solano, E.	C1.- AVOCADO	Light	4th paper submission					X	

Science. VO schools.

- **Goal:** Make astronomers familiar with VO-tools
- **Most effective way to interact with the community.**
- **SVO schools: 5 (2009-2011)**
 - Granada. Oct. 2009
 - Tenerife. Mar. 2010
 - Madrid. Jun. 2010
 - Barcelona. Oct. 2010
 - Madrid. Nov. 2011



- **Participants: 143**
- **Classified as**
Poor/satisfactory/good/very good/excellent
- **70% of the participants have used VO-tools after the schools.**

Summary

- Development of archive systems for complementary datasets.
 - Support in the use of VO tools.
 - Training (VO-schools).
 - Basic idea:
 - The type of collaborations that VO offers to the Gaia community has proved to be very fruitful in other similar projects like Consolider-GTC.
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