

# Overview

# CDS activities

- Reference, added-value services
  - The basis of CDS service to the community
- Technological watch, R&D
  - One key of long term sustainability
- Virtual Observatory
  - Leadership, interoperability standards & VO tools
  - European projects
- Participation in projects
- User support, knowledge dissemination, expertise
- *Science*

# Scientific activities at CDS

- Active participation of active scientists is one of the keys of success and sustainability: high-level scientific expertise is mandatory to
  - Ensure the quality of content
  - Ensure the relevance of the content and services on the long term, taking into account the constant evolution of astronomy and of users' needs
- The founding fathers were stellar astronomers, now a palette of expertise to cover the different topics of astronomy and multi-wavelength aspects

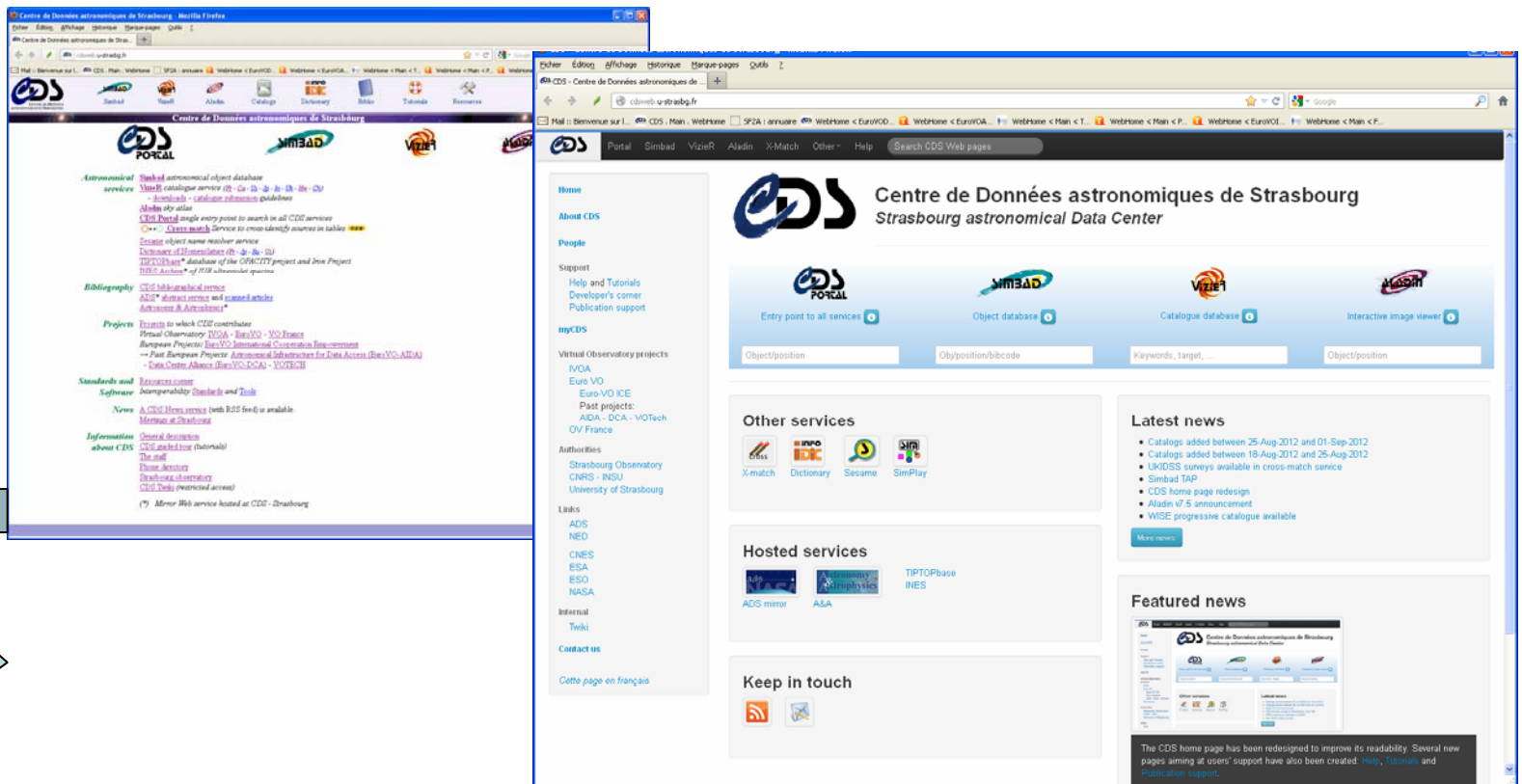
# CDS staff & organization

- An integrated team of scientists, « documentalistes » (information scientists) and software engineers
- Symbiosis between the different types of activities
- Relies on the Observatory general services for support activities (computer and network system, administration, logistics)

# Recent Highlights

# The most visible one!

## *CDS Web site refurbishing*



# Evaluation by AERES

- Included in the evaluation of the UMR 7550 Observatoire Astronomique de Strasbourg
- CDS Strategy as prepared by the discussions at the SC meeting in June 2011
- Definitive results not yet public but very positive evaluation of CDS
  - Extremely wide visibility, obtained with a relatively small team
  - Very small number of key people/long term project which requires long learning/core business very specialized/adequate replacement of key people must be planned long ahead

# CDS strategy



# High level strategy drivers

- Maintain the services at the highest possible level in terms of content and functionalities
- Add functions to the core services in line with our expertise, the users' needs and R&D results
- Take into account the change in scale of CDS activities due to the increase of publication volume and to the advent of many very large surveys

# Strategic axes identified in 2011 (1)

- Axes driven by the evolution of astronomy
  - Accompany the very large survey era
  - Put our expertise at the service of Gaia usage by the community
  - Construction of Spectral Energy Distribution
  - Data cubes and polarimetry
- Technological evolution: web 2.0/3.0

# Strategic axes identified in 2011 (2)

- CDS VO strategy
  - VO implementation in the services
  - Continue to update the VO framework (standards & tools)
  - Dissemination of VO knowledge in the community
  - Find a framework to pursue outreach towards education
- Possible new role in the fast evolving landscape of scientific data curation

# Summary of results since the last Council meeting

# Very large surveys at CDS

*Takes advantage of the usage of HEALPix*

- Operation of the new method for survey ingestion in VizieR
- Release of the CDS cross-match service
- Implementation of a new method of ingestion of very large catalogues in VizieR
- Applications: Gaia (catalogues), CFHT-LS (images & catalogues)
- R&D on multi-criteria access

VizieR, Aladin  
& Cross-match service  
talks  
R&D talk

# Gaia

- CDS offers to provide access at least to Gaia catalogues, first restricted to the project and as soon as possible open to the community
- Demonstration of expertise on the Gaia Model using the new ingestion method: fast ingestion, fast access, fast cross-match

# SEDs

- Huge work to implement photometric references in VizieR
- SEDs in VizieR in prototype form
- Can be visualized in VO tools
- Relevant VO standards being defined

Francois' & Mark's  
talks

# CDS in VO

- VO implementation in the services
  - Table Access Protocol on SIMBAD (July 2012) and VizieR ( $\beta$ -version available)
  - Photometry in VizieR
- Continue to update the VO framework
  - Role in IVOA and in standardization process, Aladin as VO portal
- Dissemination in the community
- Find a framework to pursue outreach towards education

Marc's, Gilles'  
and Mark's talks

Caroline's talk



# CDS services

# The CDS hub

## Astronomical objects



identification, bibliography,  
data, measurements

## Federation of tabular data

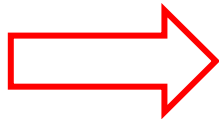


catalogues, published tables  
observation logs, surveys

## Integration, visualisation, manipulation



images, databases, catalogues,  
surveys, archives, *user data*



*Cross-identification service (November 2011)*



# Highlights (1)

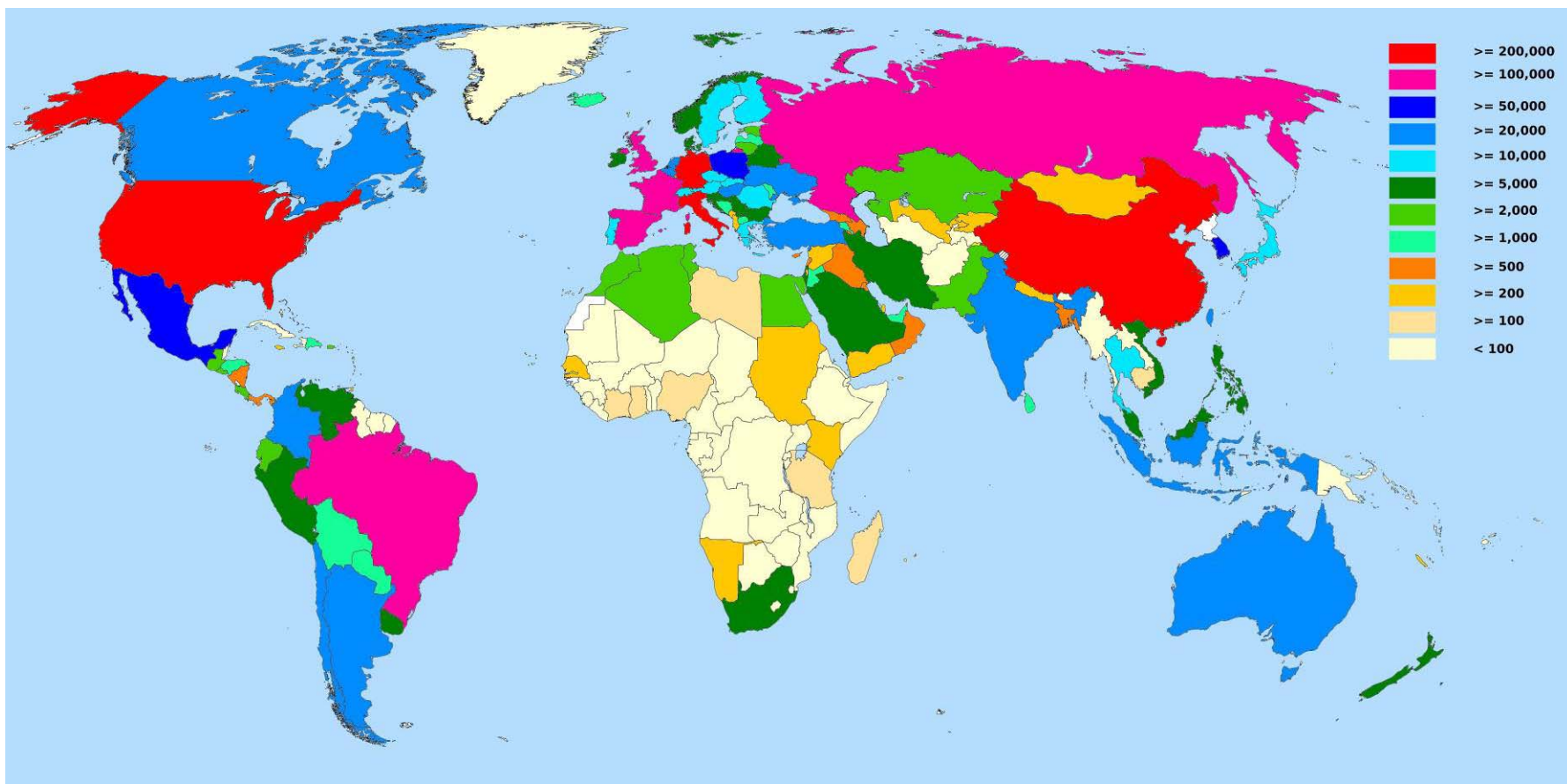
Marc's talk  
Demo

- The reference database for identification and bibliography of astronomical objects, providing a homogenized view across astronomy subdisciplines
  - The current version of the software (the fourth major upgrade since 1972) has been operational since 2006
- Several specific operations to improve content (Tycho2, IRAS faint warm sources, WDS)
- SIMBAD available in the TAP VO standard
- Evolutions announced last year, in progress
  - New web interface
  - Better on-line help and user's guide
  - Query optimization



# Highlights (2)

- Sorting of references linked to objects
  - SIMBAD keeps track of all papers in which an object has been cited
    - A powerful tool but which is difficult to use when many references are linked to an object*
  - Sorting of references by their degree of relevance to the object : a functionality requested by users for a long time
  - Location of name in the paper is a significant parameter (title, abstract, keyword, etc)
  - A long time to gather the required elements
    - Semi-automated recognition of object names (DJIN tool) keeps track of WHERE the name appears in a paper
    - Routine DJIN usage for several years in building SIMBAD bibliography
    - Tag of object names in ALL titles and keywords
  - The function is prototyped and will soon be made available in SIMBAD



18 months of SIMBAD usage (IP addresses)



# Highlights

Francois/Gilles' talk

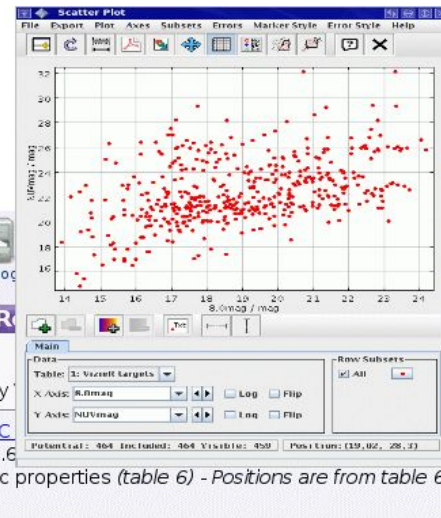
- The reference database for tabular data from astronomical catalogues and tables published in scientific papers (CDS is the data curator)
  - Tables and their description, which links physical and astronomical content).
  - Specific system for very large catalogues ( $10^9$  objects) for efficient queries by position
- New procedure allowing ingestion of very large catalogues
- Soon available in TAP VO standard ... but not easy!
- SEDs soon available

Search filters:
 

- Open Star:  Open Star
- Expired:  Expired
- Deix:  Deix

Navigation:
 

- Simbad
- VizieR
- Aladin
- Catalog



Search Criteria

**Save in CDSportal**

Keywords: Back

J/ApJ/193/13

Tables:
 

- J/ApJ/193/13
- catalog
- ..table1

Constraints:
 

- NUVmag !=
- u'mag < 21

Preferences:
 

- max: 9999
- HTML Table
- All columns
- Compute

Mirrors: CDS, France

Show the target form  
 Show constraint information

The 3 columns in **color** are computed by

[J/ApJ/193/13/catalog](#) [Spitzer/IRAC](#)  
[Post annotation](#) The IRAC-3.6 photometric properties (table 6) - Positions are from table 6 (76936 rows)

Full	<a href="#">RAJ2000</a>	<a href="#">DEJ2000</a>	<a href="#">[BPG2011]</a>	<a href="#">Ndet</a>	<a href="#">Q</a>	<a href="#">St</a>	<a href="#">SED</a>	<a href="#">zsp</a>	<a href="#">q</a>	<a href="#">FUVmag</a>	<a href="#">NUVmag</a>	<a href="#">u'mag</a>	<a href="#">Bmag</a>	<a href="#">S-Rmag</a>
	"h:m:s"	"d:m:s"								mag	mag	mag	mag	mag
<a href="#">1</a>	14 20 12.49	+53 07 29.7	<a href="#">000003</a>	21	3	0	SED			20.889	20.254	19.006	18.006	16.619
<a href="#">2</a>	14 22 32.04	+53 15 56.0	<a href="#">002141</a>	6	0	0	SED			26.358	26.874	-32.768	28.006	28.052
<a href="#">3</a>	14 21 40.33	+53 05 31.4	<a href="#">003350</a>	18	1	5	SED							
<a href="#">4</a>	14 21 07.38	+52 54 30.3	<a href="#">004590</a>	20	0	4	SED							
<a href="#">5</a>	14 21 07.20	+52 54 31.9	<a href="#">004591</a>	20	0	5	SED							
<a href="#">6</a>	14 20 08.68	+52 44 00.2	<a href="#">005366</a>	17	2	5	SED							
<a href="#">7</a>	14 18 44.98	+52 58 28.7	<a href="#">005468</a>	18	1	6	SED							
<a href="#">8</a>				0	0	0	SED							
<a href="#">9</a>				0	0	0	SED							
<a href="#">10</a>				0	0	0	SED							
<a href="#">11</a>				0	0	0	SED							
<a href="#">12</a>				0	0	0	SED							
<a href="#">13</a>				0	0	0	SED							
<a href="#">14</a>				0	0	0	SED							
<a href="#">15</a>				0	0	0	SED							
<a href="#">16</a>				0	0	0	SED							
<a href="#">17</a>				0	0	0	SED							
<a href="#">18</a>				0	0	0	SED							
<a href="#">19</a>				0	0	0	SED							
<a href="#">20</a>				0	0	0	SED							
<a href="#">21</a>				0	0	0	SED							
<a href="#">22</a>				0	0	0	SED							
<a href="#">23</a>				0	0	0	SED							
<a href="#">24</a>				0	0	0	SED							
<a href="#">25</a>				0	0	0	SED							
<a href="#">26</a>				0	0	0	SED							
<a href="#">27</a>				0	0	0	SED							
<a href="#">28</a>				0	0	0	SED							
<a href="#">29</a>				0	0	0	SED							
<a href="#">30</a>				0	0	0	SED							
<a href="#">31</a>				0	0	0	SED							
<a href="#">32</a>				0	0	0	SED							
<a href="#">33</a>				0	0	0	SED							
<a href="#">34</a>				0	0	0	SED							
<a href="#">35</a>				0	0	0	SED							
<a href="#">36</a>				0	0	0	SED							
<a href="#">37</a>				0	0	0	SED							
<a href="#">38</a>				0	0	0	SED							
<a href="#">39</a>				0	0	0	SED							
<a href="#">40</a>				0	0	0	SED							
<a href="#">41</a>				0	0	0	SED							

Aladin v7.0 - BETA VERSION (based on v7.017)

Filters: Edition Image Catalogue Graphical Outfit View Interop Aide

File Edit View Window Help

Alinsky opt - Alinsky IR - CLMPSE - DSS - Simbad - NED

0.9112 - 0.9908 (connu)

Team



# Highlights

Pierre's talk

- Reference software dedicated to the integration, visualisation and manipulation of images and catalogues provided by most astronomical data servers in the world (CDS, ESA, ESO, NASA, CADC, ...)
- Continuously evolving, many new functionalities (huge images, huge data cubes, photometry, image convolution, cross-match, usage in scripts, ...) – Version 7.5 released on July 3
- Used by ESA, STScI, NED, CADC to visualize images
- The VO image portal, able to interact with other VO tools such as TOPCAT
- Major recent evolution: usage of Healpix, which provides a hierarchical view of data with fast zooming capabilities –
  - 81 surveys/19 TB
  - « Make your own sky »



Aladin v7.0

Location  Clear Frame ICRSd

Allsky opt Allsky IR DSS Simbad NED PPMX 2MASS

SDSS colored Chandra/Hubble/Spitzer X-ray/Visible/Infrared Image of M82

8.067' x 8.977' 8.067' x 8.977' 10.74' x 8.72'

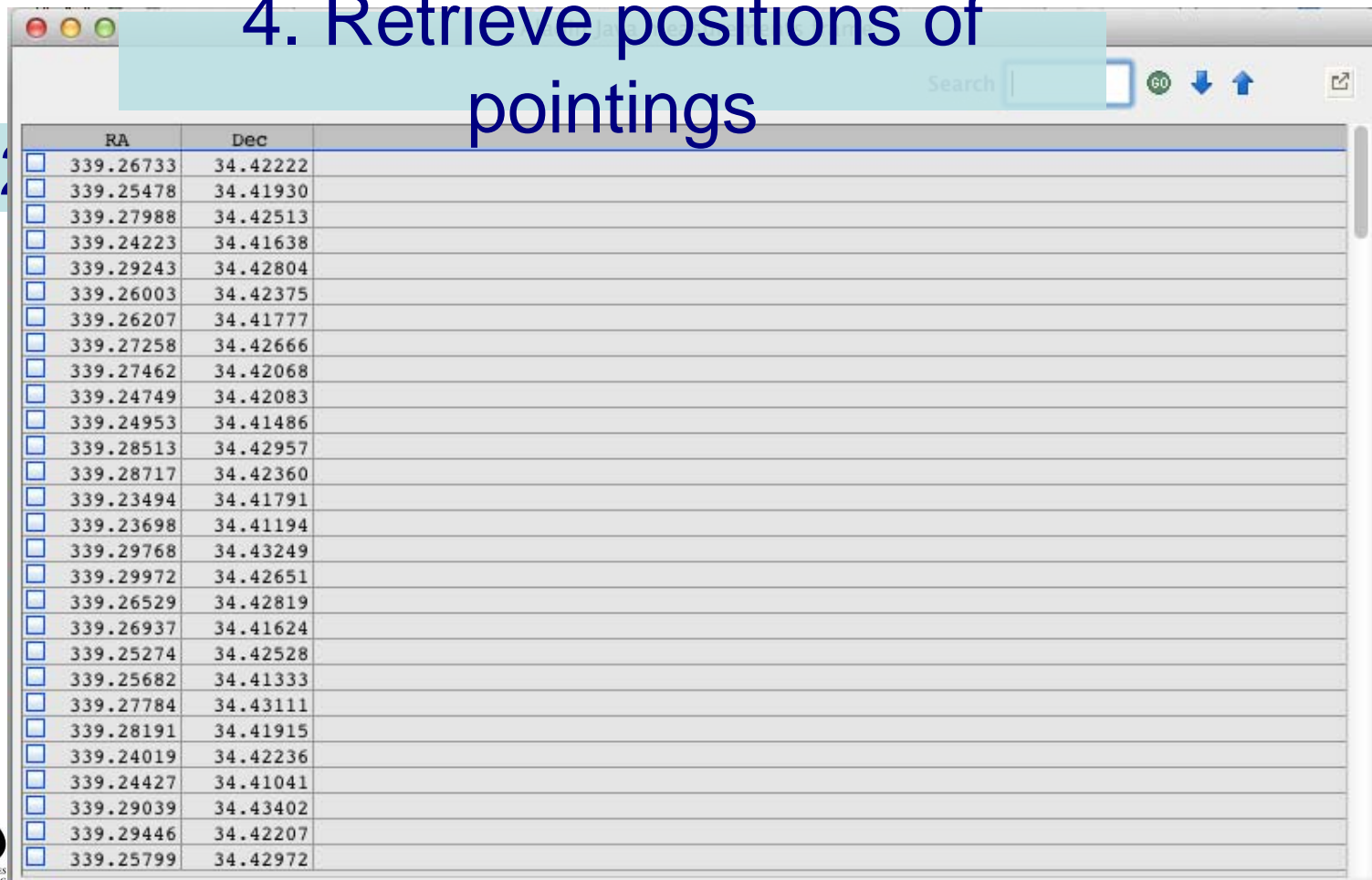
grid north multiview match [View A1] - SDSS colored Search

(c) 2010 UDS/CNRS - by CDS - Distributed under GNU GPL v3 0 sel / 1082 src 823Mb

# ALMA footprints

*New feature in Aladin to help with ALMA observation proposals*

## 4. Retrieve positions of pointings



	RA	Dec
<input type="checkbox"/>	339.26733	34.42222
<input type="checkbox"/>	339.25478	34.41930
<input type="checkbox"/>	339.27988	34.42513
<input type="checkbox"/>	339.24223	34.41638
<input type="checkbox"/>	339.29243	34.42804
<input type="checkbox"/>	339.26003	34.42375
<input type="checkbox"/>	339.26207	34.41777
<input type="checkbox"/>	339.27258	34.42666
<input type="checkbox"/>	339.27462	34.42068
<input type="checkbox"/>	339.24749	34.42083
<input type="checkbox"/>	339.24953	34.41486
<input type="checkbox"/>	339.28513	34.42957
<input type="checkbox"/>	339.28717	34.42360
<input type="checkbox"/>	339.23494	34.41791
<input type="checkbox"/>	339.23698	34.41194
<input type="checkbox"/>	339.29768	34.43249
<input type="checkbox"/>	339.29972	34.42651
<input type="checkbox"/>	339.26529	34.42819
<input type="checkbox"/>	339.26937	34.41624
<input type="checkbox"/>	339.25274	34.42528
<input type="checkbox"/>	339.25682	34.41333
<input type="checkbox"/>	339.27784	34.43111
<input type="checkbox"/>	339.28191	34.41915
<input type="checkbox"/>	339.24019	34.42236
<input type="checkbox"/>	339.24427	34.41041
<input type="checkbox"/>	339.29039	34.43402
<input type="checkbox"/>	339.29446	34.42207
<input type="checkbox"/>	339.25799	34.42972

# Technological watch R&D activities

# R&D strategy (1)

- A fundamental activity for medium/long term sustainability, to be maintained continuously in spite of the operational constraints
- Driven by the data centre needs (NOT technology driven)
- Deal with the evolution of astronomy and take advantage of the evolution of technology
- In-house activities, managed by permanent staff in general working with contractors or trainees
- A significant fraction of the time of engineers and « instrumentalistes »

# R&D strategy (2)

- Take advantage of projects
  - Since 2001, a series of European projects  
VO oriented R&D which has also strongly influenced  
the services
- Products
  - New services, new functionalities
  - VO standards and tools

R&D talk  
Mark's talk

# A few examples

- Can be a very long term activity: e.g. sorting of references in SIMBAD, starting point expertise in dealing with textual information + Dictionary of Nomenclature: *DJIN*
- Aladin + image expertise (LSIIT long term collaboration) + Planck (a new type of usage): *Aladin HEALPix*
- Long term expertise with catalogues + VizieR + large surveys: *cross-match, new ingestion method in VizieR*
- The rapid emergence of Web 2.0/3.0 : *annotations, CDS portal ('mashup'), mobile and multitouch devices... to be continued*

# European projects leadership

- *Euro-VO Data Centre Alliance*, FP6, Coordination Action, 2006-2008, total budget 1.7 M€
- *Euro-VO Astronomical Infrastructure for Data Access*, FP7, I3, 2008-2010, 2.7 M€
- *Euro-VO International Cooperation Empowerment*, FP7, Coordination Action, 2010-2012, 210 k€
- And now *Collaborative and Sustainable Data Infrastructure for Europe*, FP7, Coordination Action, 2012-2014, 475 k€
- Also participation in *VO-TECH*, FP6, Design Study, 2004-2009, and previously in FP5 *Astrophysical Virtual Observatory*

# Participation in other projects

- iCORDI *International Collaboration in Research Data Infrastructure*  
Ensure astronomy's presence in the discussions about the « Collaborative Data Infrastructure »
- Two « Space » scientific projects
  - Deep fields and cross-id methods
  - Dissemination of results



# European projects impact

- Major impact on CDS services
- Major tool to build European-wide cooperation and a common view on VO standards
- The European projects have enabled many of the VO standards and VO-enabled services and tools
- Excellent technical collaborations in particular with INAF on Semantics and Outreach, and with ESAC for the usage of Aladin in astronomical missions, including Herschel and Planck, but also SOHO (solar data)
- *Sustainability? CoSADIE assessment*

# Extension to more curation of scientific data

*Scientific data at the top of European and  
international agenda*

# Astronomy and CDS at the forefront

- Astronomy has been at the forefront for the sharing and widespread usage of data
- CDS has been one of the very early precursors and is one of the important actors
- The global landscape evolves very quickly and Agencies more and more enforce that *Data produced on public funds should in general be publicly available*
- There are projects to set up huge and generic data repositories but the physical storage of data is by far not the only question to address – data must be properly described and easily retrievable to be reused

# CDS response

- Our relevant expertise
  - Management of tables linked to publications (formal agreement for data publication with A&A plus ingestion of tables from other journals)
  - More and more « additional data » (currently 11% of VizieR catalogues and tables)
- A new dimension of the CDS service to the astronomical community?
- Assessment: we have the expertise. Possible partner: A&A. Scope and workload to be evaluated