

25/03/2005



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## Plan

- Introduction
- Les principaux services du CDS:



- Le CDS dans l'Observatoire Virtuel
- **Démo**

## Le CDS – plus de 30 ans d'histoire

- **1972**: création du Centre de Données Stellaires.
  - Données électroniques
  - Expertise sur les données
  - Centre international
  - Objectif: recherche
- **1983**: extension aux galaxies et autres objets non-stellaires: Centre de Données astronomiques de Strasbourg

*Collecter, homogénéiser, distribuer, préserver l'information astronomique pour l'ensemble de la communauté.*

## Le CDS – plus de 30 ans d'histoire

- **1993/94**: révolution du WWW
- **2001**: le CDS participe aux projets d'observatoire virtuel
- Le CDS aujourd'hui:
  - Collaboration INSU/ULP
  - Equipe d'environ 25 personnes à Strasbourg + OP, IAP, OMP, GRAAL (dont temps partiel):
    - chercheurs
    - documentalistes
    - informaticiens
  - Nombreuses collaborations
  - Plusieurs dizaines de milliers de requêtes/jour

## Centre de données (1)

- Pourquoi se soucier de préserver les données en astronomie?
  - Les instruments sont de plus en plus puissants, à quoi bon garder les "vieilles" données?
- Mission indispensable de préservation:
  - base de temps pour étudier les phénomènes variables: variations de luminosité ou de positions, parfois avec des périodes très longues (siècle)
  - statistiques
  - re-exploitation: gain de temps et d'argent (observatoire virtuel: archive=télescope)



## Centre de données (2)

- Astronomie multi-longueur d'ondes
  - processus physiques, utilisation par des non-spécialistes
- Grands relevés
  - complexité et volumes augmentent
- WWW
  - accès direct aux données réparties en différents endroits



## Centre de données (3)

- Quelles données en astronomie?
  - bases de compilation (SIMBAD/NED)
  - observations (images de référence, grands relevés, archives d'observations sol/spatiales)
  - spectres
  - catalogues (d'observation, de compilation)
  - bibliographie (journaux, ADS, prépublications)
  - pages jaunes, logiciels
  - données personnelles
- Evolution exponentielle de la quantité de données disponibles



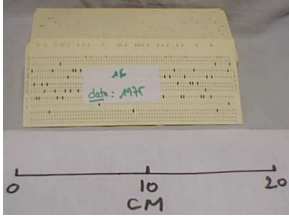
## Volumes de données

- 1801, Uranographia: 17,200 étoiles;
- 1924–1936, HD: 272,150 étoiles;
- 1989, IRAS: 500,000 sources;
- 1997, Tycho: 1,000,000 sources;
- 1997, USNO-A1 488,006,860 sources;
- 2003, USNO-B1 1,045,913,669 sources.
- + de 5000 références bibliographiques par an
- 400/500 nouveaux catalogues (dont publication électronique de tables de journaux)
- relevés du ciel modernes: plusieurs Tb d'images

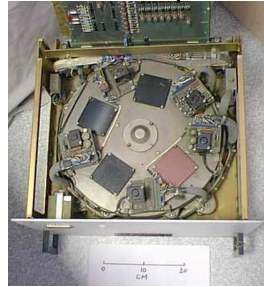


## Stockage des données

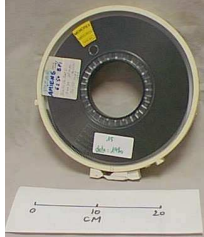
1975 – Carte perforée



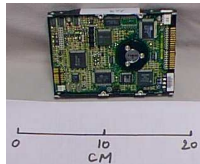
1974 – Disque dur 400ko



1980 – Bande magnétique



2005 – DD 200Go CDrom 700Mo



## Centre de données (4)

- Un centre de données, ce n'est pas simplement un gros entrepôt de stockage
- Un travail de validation est indispensable
- Les données doivent être accompagnées de **metadonnées** de qualité, pour décrire
  - leur nature
  - leur provenance
  - les traitements éventuels subis
  - la qualité
  - ...

## Activités du CDS (1)

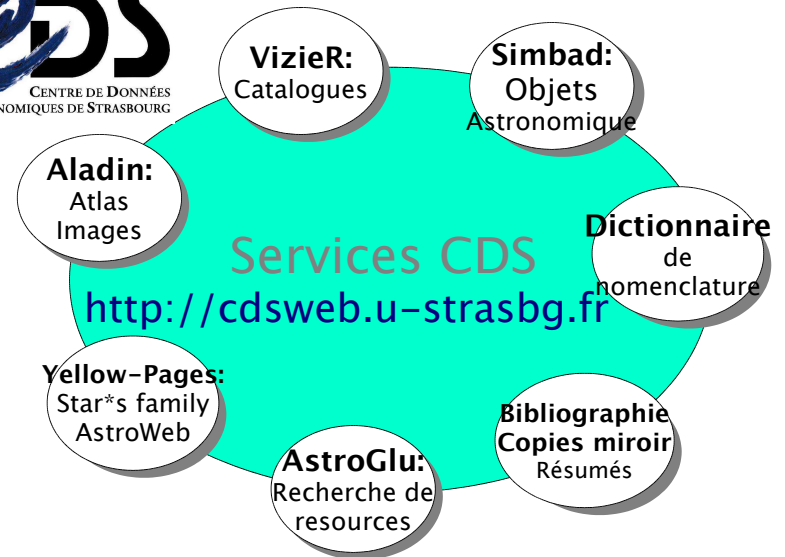
- Services de référence à forte valeur ajoutée (pour communauté astronomique)
- Participation à des projets
- Veille technologique, R&D / actions pluridisciplinaires
- Observatoire virtuel
  - services de référence
  - standards et outils
  - pivot de l'organisation nationale (Action spécifique OV-France)

## Activités du CDS (2)

- Collecte sélective et distribution de données astronomiques (tables, logs, relevés, extraits des publications, images de référence):
  - mettre en valeur ces données par des évaluations et des comparaisons critiques;
  - distribuer les résultats dans la communauté astronomique;
  - conduire des recherches utilisant ces données.

## Activités du CDS (3)

- Développement de bases de données, et interfaces d'accès
- Accords internationaux (ESA, NASA, AAS)
- Copies miroir (journaux, BD biblio)
- Support utilisateurs (*question@simbad*)
- Diffusion des connaissances
- Evolution des services
  - travail continu sur le contenu (+5000 références et 400 catalogues/an) et les fonctionnalités
  - maintenance des services
  - validation des contenus



## Principaux services du CDS



Objets astronomiques identifications, bibliographie, mesures



Fédérateur d'informations catalogues, tables publiées, logs d'observations, relevés



Intégrateur d'informations images, bases de données, catalogues, archives, données de l'utilisateur





15600 requetes/jour en 2003

Identification, données de base, bibliographies et mesures a partir:

- des articles publiés
- de catalogues sélectionnés

Dictionnaire de nomenclature (collab GEPI)  
Cross-identification **systematique**

Contenu (mise à jour quotidienne):

- Bibliographie (90 journaux, collaborations Obs. Paris, IAP, ...)
- Entrée de catalogues (couverture multi longueur d'ondes, grands projets) – souvent en collaboration avec spécialistes
- Collab. ch. OMP, GRAAL

# SIMBAD = Set of Identifications, Measurements and Bibliography for Astronomical Data.

Queries	Documentation	Information
<a href="#">by identifier</a>	<a href="#">Presentation</a>	<a href="#">Registration</a>
<a href="#">by coordinates</a>	<a href="#">Main functionalities</a>	<a href="#">Acknowledgment</a>
<a href="#">by reference code</a>	<a href="#">Release history</a>	
<a href="#">by list (file)</a>	<a href="#">User's guide</a>	
<a href="#">by criteria</a>	<a href="#">Nomenclature Dicti</a>	
<a href="#">by mail</a>		
<a href="#">Simbad mirror at CfA</a>		

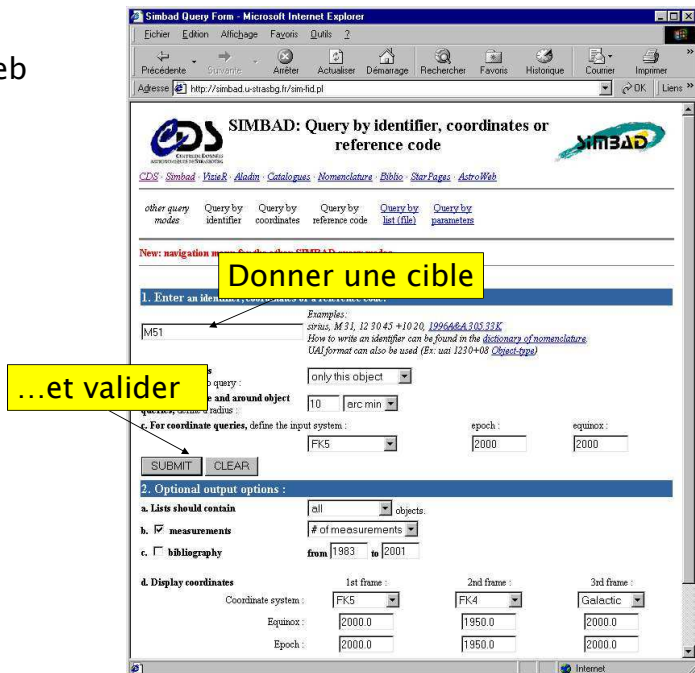
Statistics
Simbad contains today (22-Mar-2005) :
3,451,748 objects
9,213,275 identifiers
154,845 bibliographical references
4,654,798 citations of objects in papers

Content
The SIMBAD astronomical database provides basic data, cross-identifications and bibliography for astronomical objects outside the solar system.
SIMBAD can be queried by object name, coordinates, other criteria (filters), and lists of objects.
Links to some other on-line services are also provided.

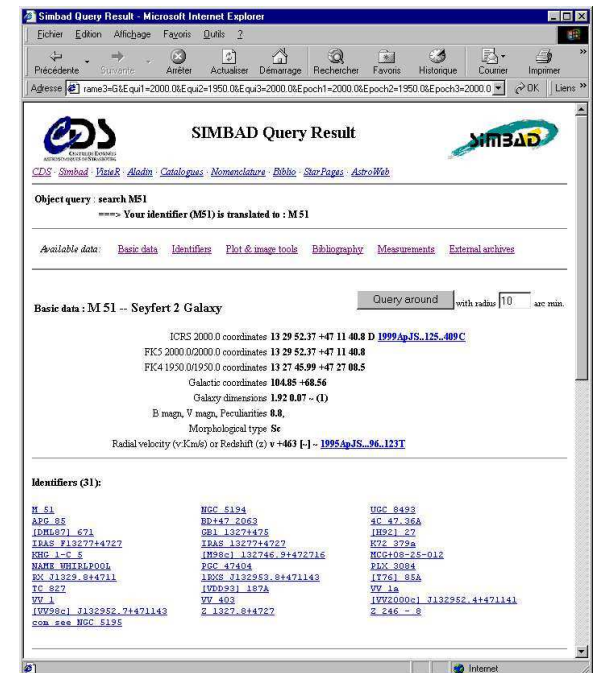
Statistics
Simbad contains today (29-Jan-2004) :
3,237,779 objects
8,507,382 identifiers
143,823 bibliographical references
4,332,364 citations of objects in papers

## Interface Web SIMBAD



## Résultat...

## Données Identificateurs





## Résultat...

Liens vers images  
et cartes de  
champ

Références  
bibliographiques

Mesures

Liens vers archives  
externes et  
catalogues  
VizieR

# SIMBAD

- La syntaxe des identificateurs est contrôlée par le dictionnaire de nomenclature
- Service associé : Name Resolver
  - associe une coordonnée à un identificateur
  - utilisé par de nombreuses applications
- Il existe des liens entre SIMBAD et les services bibliographiques (ADS), VizieR, Aladin...

Nomenclature of Celestial Objects (Result 1) - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

**EDS** **info** **idic**

**Dictionary of Nomenclature of Celestial Objects**

CDS · Simbad · VizieR · Aladin · Catalogues · Nomenclature · Biblio · Tutorial · Developer's corner

(Last CDS update: 11-Mar-2005)

Result of query: info cat: HD 183123\$

Details on Acronym: HD

**HD** = (HDE) (H. Draper)

**Write:** <<HD NNNNNN>> N=359083

**Note:** 1918-1924, Ann. Astr. Obs. Harvard College, Vol. 91-99. Reprinted by Bell and Howell. Corrected version available on magnetic tape and microfiche at CDS Strasbourg. Continued by HDE, all are 'HD NNNNNN' in Simbad. (Nos 1-225300) = HD \*, (Nos 225301-359083) = HDE \*.

**Object:** \* (SIMBAD class: Star)

Stat. in SIMBAD: The main part, not Extenson.

**Ref:** =1918AnHar...91.....C  
by CANNON A.J., PICKERING E.C.  
Ann. Astron. Obs. Harvard Coll., 91 (1918)  
Corrected version available on magnetic tape and microfiche at CDS Strasbourg Henry Draper Catalogue.

◦ <<HD NNNNNN>> (Nos 1-225300)

**Ref:** =1925AnHar...100...17C  
by CANNON A.J.  
Ann. Astron. Obs. Harvard Coll., 100, 17 (1925)  
The Henry Draper extension.

◦ <<HD NNNNNN>> (Nos 225301-272150)

**Ref:** =1949AnHar...112.....1C  
by CANNON A.J., MAYALL M.W.  
Ann. Astron. Obs. Harvard Coll., 112, 1-295 (1949)  
The Annie J. Cannon Memorial Volume of the Henry Draper Extension.

◦ (The Henry Draper extension. II)

◦ <<HD NNNNNN>> (Nos 272151-359083)

**Ref:** =1991A&AS...88...277R

SIMBAD: query result (identifier) - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://simbad.u-strasbg.fr/simq.pl?ident=@10673.8&name=HD%20183123

**SIMBAD database :**

**Basic data and identifiers for the object**

Type: Star

ICRS 2000.0 = 19 25 29.7220 +50 04 14.926 A [8.39 6.07 175] 1997A&A...323L...49P  
FK5 1950.0 = 19 24 10.49 +49 58 13.9 A [47.74 35.03 176] 1997A&A...323L...49P  
FK4 1950 = 19 24 10.42 +49 58 13.9 A [47.74 35.03 175] 1997A&A...323L...49P

gal = 81.76 +15.37  
ml = 6.77 8.35 --- sp type = F8  
pm = -38.83 -31.68 A [ .94 .69 176] 1997A&A...323L...49P  
rv = +7.0 D [ .5] 2004A&A...418..989N  
plx = 4.54 A [.73] 1997A&A...323L...49P

HD 183123	AG+49 1539	BD+49 3003
GSC 03551-00132	HIC 95504	HIP 95504
PPM 37390	SAO 48428	TD1 24728
TYC 3551-132-1	uvby99 100193123	

Measurements:  
pos: 1 PM: 1 TD1: 1 SAO: 1 uvby1: 2 prV: 1

References: 13

[Aladin image : Preview, Interactive Viewer](#)

[Get details about this object in the Simbad database, if you have already an account, or see how to get a user account](#)

©ULP/CNRS - Centre de Données astronomiques de Strasbourg

http://simbad.u-strasbg.fr/Simbad

Simbad Query Result - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

Basic data: HD 183123 -- Star

ICRS 2000.0 coordinates: 19 25 29.7220 +50 04 14.926 [8.39 6.07 175] A 1997A&A...323L...49P  
FK5 2000/2000 coordinates: 19 25 29.72 +50 04 14.9 [8.39 6.07 175]  
FK4 1950/1950 coordinates: 19 24 10.42 +49 58 13.9 [47.74 35.03 175]

Proper motion (mas/yr) (error ellipse) -38.83 -31.68 [ .94 .69 176] A 1997A&A...323L...49P  
B magn. V magn. Peculiarities 8.77, 8.35  
Spectral type F8  
Radial velocity (v Km/s) or Redshift (z) v +7.0 [ .5] D 2004A&A...418..989N  
Parallax (mas) 4.54 [ .73] A 1997A&A...323L...49P

Identifiers (11):  
HD 183123 AG+49 1539 BD+49 3003  
GSC 03551-00132 HIC 95504 HIP 95504  
PPM 37390 SAO 48428 TD1 24728  
TYC 3551-132-1 uvby99 100193123

Plots and image tools:  
Aladin Preview Aladin Java Applet

References: 12 from 1983 to 2005

Measurements:  
pm (1) SAO (1) TD1 (1) prV (1) pos (1) entry(2)

External archives:  
Catalogue information from VizieR:  
HD 183123 AG+49 1539 BD+49 3003  
GSC 03551-00132 HIC 95504 HIP 95504  
PPM 37390 SAO 48428 TD1 24728  
TYC 3551-132-1 uvby99 100193123

CDS bibliographic service - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

**EDS** **CDS bibliographic service**

CDS · Simbad · VizieR · Aladin · Catalogues · Nomenclature · Biblio · Tutorial · Developer's corner

WALS QUERY FORM WORD QUERY FORM BIBCODE QUERY FORM HELP

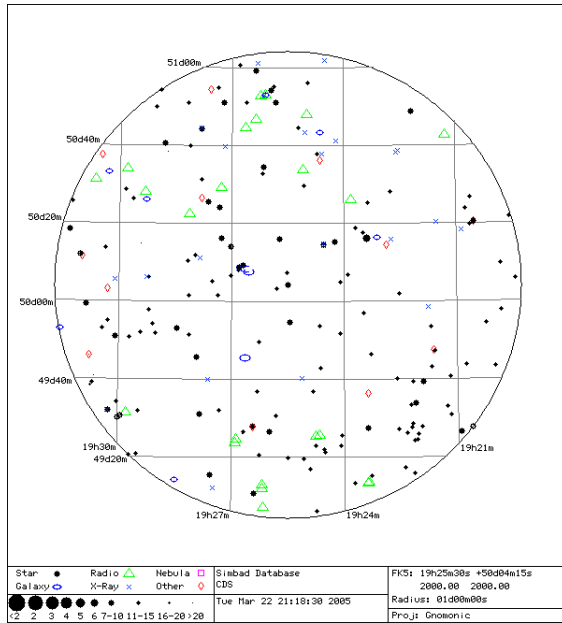
Click on a reference to retrieve the related data or select some references and press the Fetch references button.

Fetch references by: 5 Reset form

- 2004A&A...418..989N  
The Geneva-Copenhagen survey of the Solar neighbourhood. Ages, metallicities, and kinematic properties of ~14000 F and G dwarfs.  
NORDSTROEM B., MAYOR M., ANDERSEN J., HOLMBERG J., PONT E., JORGENSEN B.R., OLSEN E.H., UDRY S., MOWLAVI N.
- 2004CoSka...34...453  
Photometry of symbiotic stars. XI. EG And, Z And, BF Cyg, CH Cyg, CI Cyg, V1329 Cyg, TX CVn, AG Dra, RW Hya, AR Pav, AG Peg, AX Per, QW Sge, IV Vir and the LMXB V934 Her.  
SKOPAL A., PRIBULLA T., VANKO M., VELIC Z., SEMKOVA, WOLF M., JONES A.
- 2002MNRAS...335..503E  
The symbiotic star CH Cygni - II. The ejecta from the 1998-2000 active phase.  
EYRES S.P.S., BODE M.F., SKOPAL A., CROCKER M.M., DAVIS R.J., TAYLOR A.R., TEODORANI M., ERRICO L., VITTONI A.A., ELKIN V.G.
- 2000CoSka...30...293  
Photometry of symbiotic stars. IX. TX CVn, CH Cyg, AX Per and AR Pav.  
SKOPAL A., PRIBULLA T., WOLF M., SHUGAROV S.Y., JONES A.
- 2000IBVS.4823...1K  
Observations of two Hipparcos eclipsing variables.  
KURPINSKA-WINIARSKA M., OBLAK E., WINIARSKI M., KUNDERA T.
- 1998CoSka...28...51C  
Photometric study of the eclipsing binary EG Cep.  
CHOCOL D., PRIBULLA T., ROVITHIS-LIVANIOU H., ROVITHIS P., KRANIDIOTIS A.
- 1997IBVS.4456...1S  
Photometric peculiarities of CH Cyg during its recent, 1995-97, quiescent phase.  
SKOPAL A.
- 1996MNRAS...282..327S  
Multifrequency observations of the eclipsing symbiotic triple system CH Cyg during the 1992-94 active phase.  
SKOPAL A., BODE M.F., BRYCE M., CHOCOL D., DAVIS R.J., ERRICO L., EVANS A., EYRES S.P.S., HRIC L., IVISON R.J., KENNY H.T., KOMZIK R., MEABURN J., TAMURA S., TAYLOR A.R., URBAN Z., VITTONI A.A.
- 1995IBVS.4157...1S



# Carte de champ des objets SIMBAD



VizieR Detailed Page - Mozilla Firefox

The Hipparcos and Tycho Catalogues (ESA 1997) [\(Search\)](#)  
 The Hipparcos Main Catalogue HIP==95504

Note: Errors found in the Hipparcos catalogue are reported in the file [errata.htm](#)

Column	Value	Explain
_RAJ2000	19 25 29.722 "h m.s"	Right ascension (FK5) Equinox=J2000.0 Epoch=J2000.000, proper motions taken into account (computed by VizieR, not part of the original data)
_DEJ2000	+50 04 14.93 "d m.s"	Declination (FK5) Equinox=J2000.0 Epoch=J2000.000, proper motions taken into account (computed by VizieR, not part of the original data)
_RAJ1950	19 24 10.420 "h m.s"	Right ascension (FK4) Equinox=B1950.0 Epoch=J1950.000, proper motions taken into account (computed by VizieR, not part of the original data)
_DEB1950	+49 58 13.94 "d m.s"	Declination (FK4) Equinox=B1950.0 Epoch=J1950.000, proper motions taken into account (computed by VizieR, not part of the original data)
_Glon	081.76 deg	Galactic longitude Epoch=J2000.000, proper motions taken into account (computed by VizieR, not part of the original data)
_Glat	+15.37 deg	Galactic latitude Epoch=J2000.000, proper motions taken into account (computed by VizieR, not part of the original data)
HIP	95504	Identifier (HIP number) (H1)
Proxy		[HT] Proximity flag (H2) <a href="#">(Note)</a>
RAhms	19 25 29.76	Right ascension in h m s, ICRS (J1991.25) (H3)
DEdms	+50 04 15.2	Declination in deg "", ICRS (J1991.25) (H4)
Vmag	8.34 mag	Magnitude in Johnson V (H5)
VarFlag		[1,3] Coarse variability flag (H6) <a href="#">(Note)</a>
r_Vmag	H	[GHT] Source of magnitude (H7) <a href="#">(Note)</a>
RA(ICRS)	291.37398861 deg	alpha, degrees (ICRS, Epoch=J1991.25) (H8) <a href="#">(Note)</a>
DE(ICRS)	50.07088979 deg	delta, degrees (ICRS, Epoch=J1991.25) (H9) <a href="#">(Note)</a>
AstroRef		[*+A-Z] Reference flag for astrometry (H10) <a href="#">(Note)</a>
Plx	4.54 mas	Trigonometric parallax (H11)
pmRA	-38.83 mas/yr	Proper motion mu_alpha*cos(delta), ICRS(H12) (for J1991.25 epoch)
pmDE	-31.68 mas/yr	Proper motion mu_delta, ICRS (H13) (for J1991.25 epoch)
e_RAdeg	0.62 mas	Standard error in RA*cos(DEDeg) (H14) (at epoch J1991.25, for different epochs, the actual mean error must take into account the proper motion uncertainties)
e_DEdeg	0.69 mas	Standard error in DE (H15) (at epoch J1991.25, for different epochs, the actual mean error must take into account the proper motion uncertainties)
e_Plx	0.73 mas	Standard error in Plx (H16)

# (parenthèse sur le VO



# L'Observatoire Virtuel

- Un Observatoire Virtuel pour l'astronomie:
  - Fournir aux astronomes des outils pour trouver, combiner et exploiter toutes les données et services disponibles.
  - International Virtual Observatory Alliance (IVOA)
- Il faut une bonne INTEROPERABILITÉ entre les différents services
  - Définition de **standards** pour l'échange de données.
  - Traitement des **métadonnées** avec les données.

# International Virtual Observatory Alliance



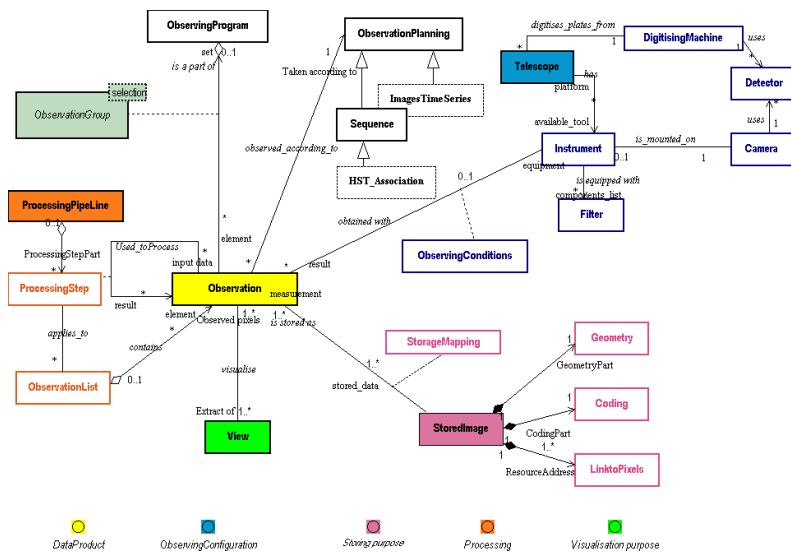
# Groupes de travail (WGs)

1. DM (Data Models)
2. WS (Web Services) & GRID
3. Registry
4. DAL (Data Access Layer)
5. VOQL (Query Language)
6. UCD (Unified Content Descriptors)
7. VOTable
8. Standards and processes

# (1) DM – objectifs

- Description abstraite de concepts et de leurs relations:
  - fixer les noms et le sens des concepts
  - structuration des concepts et interconnexions
- Production du WG:
  - White papers
  - Diagrammes UML
  - Schemas XML (serialisation)
- DM = sous-couche conceptuelle du VO

# (1) DM – Diagramme UML



# (1) DM – répercussions

- Sémantique pour les échanges de requêtes, métadonnées et données:
  - VOQL
  - DAL
- Description des ressources
  - registry
- Structuration des données
  - VOTable

# (2) WS & GRID

- Communication avec/entre les services:
  - HTTP GET/POST
    - humain-service (ex: formulaire web)
  - SOAP (Simple Object Access Protocol)
    - WSDL: auto-description
    - service-service (ex: SESAME Name Resolver)
  - GRID
    - SOAP + authentification, gestion d'etat, ...

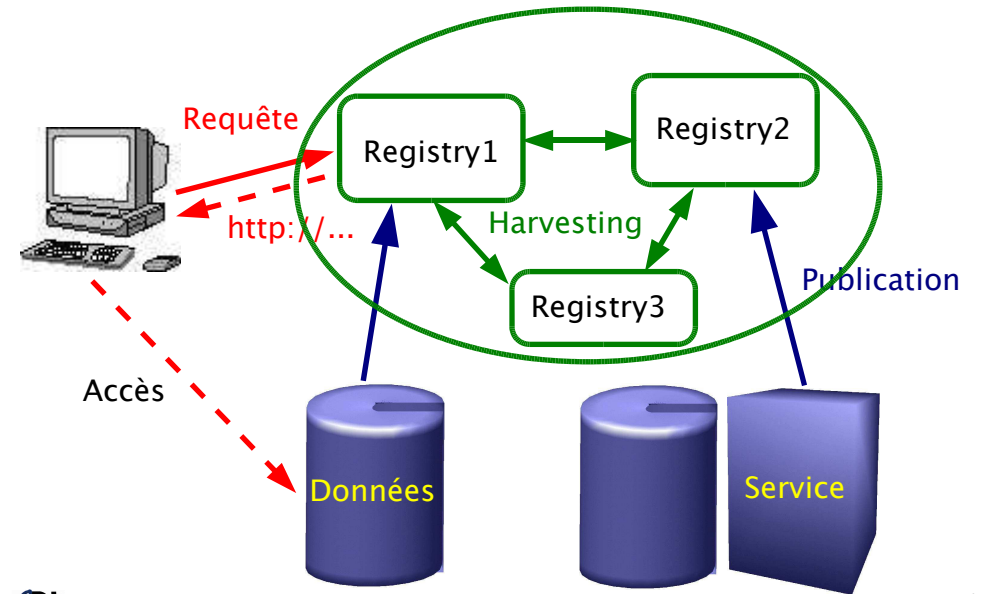
# (2) WS & GRID

- Chaque service choisit son mode de communication
- GRID: grille de calcul – grille de données
- Collaboration VO – GRID:
  - transférer les programmes plutôt que les données
  - réplication des données
  - authentification, autorisation
  - VOSpace (espace personnel de stockage, calcul...). ex: mySpace
  - construction de workflow (graphe de services)

### (3) Registry: principe

- Description des Ressources VO (données & services) par des **métadonnées**
  - schéma XML (*curation*, couverture)
  - inspiré de OAI (*library of Congress*)
  - identificateur unique ivo:// pour 1 ressource
- 3 actions:
  - publication (fournisseur de données ou de service)
  - harvesting (échange entre les registries)
  - requête (localisation des ressources par les astronomes)

### (3) Registry: fonctionnement



### (3) Registry: ressources

```
<?xml version="1.0" encoding="UTF-8" ?>
<xsd:schema xmlns:xsd="http://www.w3.org/2001/XMLSchema"
  xmlns="http://www.ivoa.net/xml/VOResource/v0.10"
  xmlns:vr="http://www.ivoa.net/xml/VOResource/v0.10"
  targetNamespace="http://www.ivoa.net/xml/VOResource/v0.10"
  elementFormDefault="qualified" attributeFormDefault="unqualified"
  version="0.10">
  <xsd:annotation>
    <xsd:include schemaLocation="VOResourceRelType-v0.10.xsd"/>
  </xsd:annotation>
  <xsd:complexType name="Resource">
    <xsd:annotation>
      <xsd:sequence>
        <xsd:element name="title" type="xsd:string"/>
        <xsd:element name="shortName" type="vr:ShortName" minOccurs="0"/>
        <xsd:element name="identifier" type="vr:IdentifierURI"/>
        <xsd:element name="curation" type="vr:Curation"/>
        <xsd:element name="content" type="vr:Content"/>
      </xsd:sequence>
        <xsd:attribute name="created" type="xsd:date"/>
        <xsd:attribute name="updated" type="xsd:date"/>
        <xsd:attribute name="status" default="active"/>
      </xsd:complexType>
    <xsd:simpleType name="AuthorityID"/>
    <xsd:simpleType name="Resourcekey"/>
    <xsd:simpleType name="IdentifierURI"/>
    <xsd:simpleType name="ShortName"/>
  </xsd:complexType name="Curation">
    <xsd:annotation>
      <xsd:sequence>
        <xsd:element name="publisher" type="vr:ResourceName"/>
        <xsd:element name="creator" type="vr:Creator" minOccurs="0"/>
        <xsd:element name="contributor" type="vr:ResourceName" minOccurs="0"
          maxOccurs="unbounded"/>
        <xsd:element name="date" type="vr:Date" minOccurs="0" maxOccurs="unbounded"/>
        <xsd:element name="version" type="xsd:string" minOccurs="0"/>
        <xsd:element name="contact" type="vr:Contact"/>
      </xsd:sequence>
    </xsd:complexType>
  </xsd:schema>
```

VOResource v0.10  
schema XML

Standard ouvert,  
défini en collaboration  
entre les différents  
acteurs, et validé au  
niveau de l'IVOA:  
approche différente  
de la norme ISO  
19115

### (3) Registry: harvesting

```
<?xml version="1.0" encoding="UTF-8" ?>
<xsd:schema xmlns:xsd="http://www.openarchives.org/OAI/2.0/http://www.openarchives.org/OAI/2.0/OAI-PMH.xsd"
  xmlns="http://www.ivoa.net/xml/VOResource/v0.10"
  xmlns:vr="http://www.ivoa.net/xml/VOResource/v0.10"
  targetNamespace="http://www.ivoa.net/xml/VOResource/v0.10"
  elementFormDefault="qualified" attributeFormDefault="unqualified"
  version="0.10">
  <xsd:annotation>
    <xsd:include schemaLocation="VOResourceRelType-v0.10.xsd"/>
  </xsd:annotation>
  <xsd:complexType name="Resource">
    <xsd:annotation>
      <xsd:sequence>
        <xsd:element name="title" type="xsd:string"/>
        <xsd:element name="shortName" type="vr:ShortName" minOccurs="0"/>
        <xsd:element name="identifier" type="vr:IdentifierURI"/>
        <xsd:element name="curation" type="vr:Curation"/>
        <xsd:element name="content" type="vr:Content"/>
      </xsd:sequence>
        <xsd:attribute name="created" type="xsd:date"/>
        <xsd:attribute name="updated" type="xsd:date"/>
        <xsd:attribute name="status" default="active"/>
      </xsd:complexType>
    <xsd:simpleType name="AuthorityID"/>
    <xsd:simpleType name="Resourcekey"/>
    <xsd:simpleType name="IdentifierURI"/>
    <xsd:simpleType name="ShortName"/>
  </xsd:complexType name="Curation">
    <xsd:annotation>
      <xsd:sequence>
        <xsd:element name="publisher" type="vr:ResourceName"/>
        <xsd:element name="creator" type="vr:Creator" minOccurs="0"/>
        <xsd:element name="contributor" type="vr:ResourceName" minOccurs="0"
          maxOccurs="unbounded"/>
        <xsd:element name="date" type="vr:Date" minOccurs="0" maxOccurs="unbounded"/>
        <xsd:element name="version" type="xsd:string" minOccurs="0"/>
        <xsd:element name="contact" type="vr:Contact"/>
      </xsd:sequence>
    </xsd:complexType>
  </xsd:schema>
```

Metadonnées  
requête OAI/PMH

We present a method to assess the reliability of the identification of EGRET sources with extragalactic radio sources. We verify that EGRET is detecting the blazar class of active galactic nuclei (AGNs). However many published identifications are found to be questionable. We provide a table of 42 blazars that we expect to be robust identifications of EGRET sources. This includes one previously unidentified EGRET source, the lensed AGN PKS 1830-210, near the direction of the Galactic center. We provide the best available positions for 16 more radio sources that are also potential identifications for previously

## (4/5) DAL / VOQL

- Protocoles d'accès aux données
- Services simples:
  - Cone Search – catalogues avec positions
  - SIAP – Simple **Image** Access Protocol
  - SSAP – Simple **Spectrum** Access Protocol: spectres 1D
- OpenSkyQuery et ADQL
  - requêtes SQL / XML
  - plan d'exécution distribué sur plusieurs serveurs (SkyNode)



## (6) UCD

- UCD = Unified Content Descriptors
- Description **sémantique** du contenu
- Origine "ancienne" (1997) liée à VizierR
  - UCD1
- Intérêt du VO pour un usage dans:
  - description des tables (VOTable)
  - registry
  - DAL (Cone Search)
- Passage à une forme plus souple: UCD1+



## (7) VOTable

- Format XML d'échange de données tabulaires
  - données et metadonnées dans un même fichier
- Adoption de VOTable 1.0 en avril 2002; actuellement: VOTable 1.1
- Standard le plus utilisé du VO! (outils: VOPlot, Aladin, Mirage, ...)
- Nombreuses bibliothèques pour lire/écrire du VOTable



### Exemple de VOTable 1.1:

**METADATA**

**DATA**

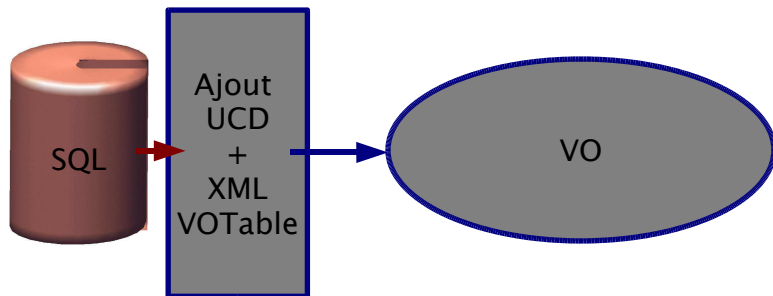
```
<?xml version="1.0"?>
<VOTABLE version="1.1" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation="http://www.ivoa.net/xml/VOTable/VOTable/v1.1">
  <COOSYS ID="J2000" equinox="J2000." epoch="J2000." system="eq_FK5"/>
  <RESOURCE name="myFavouriteGalaxies">
    <TABLE name="results">
      <DESCRIPTION>Velocities and Distance estimations</DESCRIPTION>
      <PARAM name="Telescope" datatype="float" ucd="phys.size;instr.tel"
unit="m" value="3.6"/>
      <FIELD name="RA" ID="col1" ucd="pos.eq.ra;meta.main" ref="J2000"
datatype="float" width="6" precision="2" unit="deg"/>
      <FIELD name="Dec" ID="col2" ucd="pos.eq.dec;meta.main" ref="J2000"
datatype="float" width="6" precision="2" unit="deg"/>
      <FIELD name="Name" ID="col3" ucd="meta.id;meta.main"
datatype="char" arraysize="8"/>
      <FIELD name="RVel" ID="col4" ucd="src.veloc.hc" datatype="int"
width="5" unit="km/s"/>
      <FIELD name="e_RVel" ID="col5" ucd="stat.error;src.veloc.hc"
datatype="int" width="3" unit="km/s"/>
      <FIELD name="R" ID="col6" ucd="phys.distance" datatype="float"
width="4" precision="1" unit="Mpc">
        <DESCRIPTION>Distance of Galaxy, assuming H=75km/s/Mpc</DESCRIPTION>
      </FIELD>
      <DATA>
        <TABLEDATA>
          <TR>
            <TD>010.68</TD><TD>+41.27</TD><TD>N 224</TD><TD>-297</TD><TD>5</TD><TD>0.7</TD>
          </TR>
            <TR>
            <TD>287.43</TD><TD>-63.85</TD><TD>N 6744</TD><TD>839</TD><TD>6</TD><TD>10.4</TD>
          </TR>
            <TR>
            <TD>023.48</TD><TD>+30.66</TD><TD>N 598</TD><TD>-182</TD><TD>3</TD><TD>0.7</TD>
          </TR>
        </TABLEDATA>
      </DATA>
    </TABLE>
  </RESOURCE>
</VOTABLE>
```





## Utilisation VOTable/UCD

- Il n'est pas nécessaire pour les fournisseurs de données de stocker les catalogues en VOTable, ni d'utiliser les UCD comme noms de colonnes
  - utilisation d'une "translation layer"



## Etat d'avancement

- Data Models: dépend des sujets
  - parfois très avancé (STC)
  - ou encore en discussion (Quantity)
- GRID et WS
  - HTTP largement utilisé
  - WS (SOAP) se répandent
  - GRID encore en projet
- Registry - ®
  - schéma VOResource v0.10 bien avancé
  - encore des points à régler (miroirs, ...)

## Etat d'avancement

- DAL
  - usage répandu: Cone Search, SIA, SSA
  - + récent: SkyNode
- ADQL / VOQL
  - problème complexe, plusieurs versions avec des niveaux de complexité variables
- UCD - quasi-®
  - liste de mots UCD1+ stabilisée
- VOTable - ®
  - VOTable 1.1 accepté et largement utilisé

fin de la  
parenthèse )



214.386166	-57.767818	16.926	15.777	99.999	0.09	0.19	9.99	17.067	15.508	99.999
214.535889	-57.767764	16.458	15.562	99.999	0.07	0.17	9.99	16.496	15.457	99.999
214.401036	-57.767685	14.974	14.391	99.999	0.04	0.11	9.99	15.021	14.549	99.999
214.569711	-57.767623	17.971	15.777	99.999	0.18	0.19	9.99	17.394	15.553	99.999
214.349915	-57.767576	16.975	99.999	99.999	0.10	9.99	9.99	16.840	99.999	99.999
214.550993	-57.767487	16.801	15.716	99.999	0.09	0.18	9.99	16.605	15.682	99.999
214.557370	-57.767406	99.999	16.525	13.594	9.99	0.27	0.22	99.999	15.544	12.905
214.404212	-57.767370	15.848	14.973	99.999	0.05	0.13	9.99	15.654	15.197	99.999
214.296113	-57.767262	15.161	13.266	99.999	0.04	0.08	9.99	15.055	13.271	99.999
214.238914	-57.767254	15.363	14.061	99.999	0.04	0.10	9.99	14.916	14.106	99.999
214.286765	-57.767228	15.694	13.984	99.999	0.05	0.09	9.99	15.784	14.019	99.999
214.595510	-57.767131	17.716	16.170	99.999	0.15	0.23	9.99	17.274	16.150	99.999
214.466317	-57.767040	15.975	13.680	12.353	0.06	0.09	0.12	15.998	13.686	12.836
214.503014	-57.767008	17.436	99.999	99.999	0.13	9.99	9.99	17.548	99.999	99.999
214.483010	-57.766971	99.999	16.015	99.999	9.99	0.21	9.99	99.999	16.370	99.999
214.470701	-57.766933	16.031	13.917	12.708	0.06	0.09	0.14	16.025	13.909	13.395
214.382021	-57.766657	18.085	99.999	99.999	0.19	9.99	9.99	19.044	99.999	99.999
214.261358	-57.766521	17.167	15.984	99.999	0.11	0.20	9.99	17.209	16.248	99.999
214.611797	-57.766361	17.103	15.149	99.999	0.10	0.14	9.99	16.741	14.812	99.999
214.267771	-57.766321	17.388	15.712	99.999	0.13	0.18	9.99	16.713	15.023	99.999
214.532274	-57.766314	16.179	14.323	13.036	0.06	0.11	0.16	16.099	14.255	13.102
214.565229	-57.766304	17.249	15.955	99.999	0.11	0.20	9.99	17.213	17.242	99.999
214.256734	-57.766279	16.455	14.660	13.244	0.07	0.12	0.18	16.426	14.683	12.860
214.499574	-57.766278	17.009	14.856	13.533	0.10	0.13	0.22	16.628	14.731	13.337
214.597738	-57.766200	17.174	99.999	99.999	0.11	9.99	9.99	16.903	99.999	99.999
214.316793	-57.766161	15.516	14.837	99.999	0.05	0.12	9.99	15.496	14.697	99.999
214.342976	-57.766060	99.999	15.804	99.999	9.99	0.19	9.99	99.999	15.705	99.999
214.278051	-57.766037	16.967	15.725	99.999	0.10	0.18	9.99	17.014	16.130	99.999
214.588047	-57.765921	15.941	13.637	12.239	0.06	0.09	0.12	15.858	13.620	12.295
214.426628	-57.765900	99.999	16.214	13.928	9.99	0.23	0.27	99.999	16.593	13.955
214.410201	-57.765870	15.641	14.798	99.999	0.05	0.12	9.99	15.604	14.415	99.999
214.517290	-57.765842	99.999	16.320	99.999	9.99	0.24	9.99	99.999	18.163	99.999
214.463607	-57.765814	17.931	15.866	99.999	0.17	0.19	9.99	17.819	15.194	99.999
214.554082	-57.765781	15.537	12.979	11.402	0.05	0.08	0.09	15.540	12.948	11.385
214.474225	-57.765746	18.131	99.999	99.999	0.20	9.99	9.99	18.831	99.999	99.999



15000 requetes/jour en 2003

- Collection de 4500 catalogues astro !
- Metadonnées calibrées, homogènes.
- Description standardisée (ReadMe).
- Partenariat avec les journaux (A&A depuis 1993).
- Acces aux grands relevés avec la même interface (USNO, GSC, DENIS, 2MASS, UCAC, ...).
- Nombreux miroirs (USA, Inde, Chine, Japon, ...).

**Description** VizieR provides access to the most complete library of published astronomical catalogues and data tables available on line, organized in a self-documented database. Query tools allow the user to select relevant data tables and to extract and format records matching given criteria. Specific care has been taken for optimizing access to some very large catalogues such as [Guide Star Catalogs](#), the [USNO-B1](#), or the [2MASS last release](#).

VizieR is a joint effort of [CDS](#) (Centre de Données astronomiques de Strasbourg) and [ESA-ESRIN](#) (Information Systems Division). VizieR has been available since 1996. Note that VizieR does not contain all available online catalogues; some catalogues are not suitable and some less frequently used catalogues have not yet been incorporated into the VizieR database. These last ones can be accessed by [FTP](#) from the [Astronomer's Bonus](#).

**Access to the service** [VizieR at CDS](#) - Strasbourg, France

[VizieR at ADAC](#) - Tokyo, Japan

[VizieR at CADC](#) - Canada

[VizieR at Cambridge](#) - UK

[VizieR at IUCAA](#) - Pune, India

[VizieR at INASAN](#) - Russia

[VizieR at Beijing Obs.](#) - China

[VizieR at CFA Harvard](#) - USA

[VizieR at JAC, Hawaii](#) - USA

**News** [Catalogues recently entered \(USNO-B1 NVSS\)](#)

[Catalogues with additional material \(images, spectra, time series...\)](#)

[Recent changes](#)

**Help, Documentation** [Introduction and Tutorial](#)

[Frequently Asked Questions](#)

[List of standard catalogue acronyms](#)

**Statistics** [4051 catalogues in VizieR](#)

[Catalogues most frequently used](#)

**Acknowledgement** If the access to catalogues with VizieR was helpful for your research work, the following acknowledgment would be appreciated: "This research has made use of the VizieR catalogue access tool, CDS, Strasbourg, France"

This service is maintained by [François Ochsenbein](#).

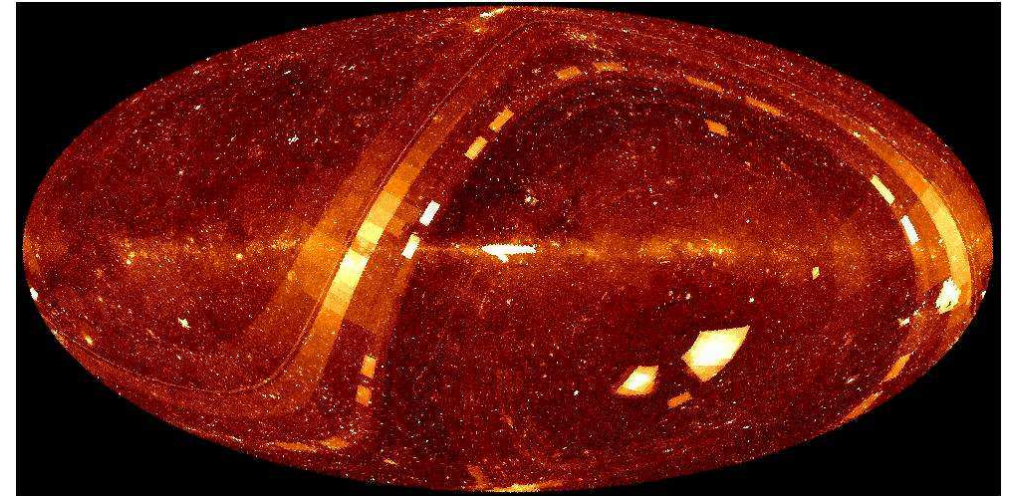


- 1994 : 680 catalogues – 3Go
- 2004 : 4000 catalogues – (210 Go, jusqu'à un milliard de sources pour l'USNOB1.0)

# VizieR

- Provenance des catalogues:
  - publication électronique de tables des journaux
  - numérisation de plaques photo
  - relevés récents avec détecteurs numériques
  - listes d'observations des archives (logs)
- Comment trouver le(s) catalogue(s) souhaités parmi les 4500?
  - requêtes multicritères: auteur, domaine spectral, type d'objet, mission, ...

# La mine de VizieR



**VizieR Service**

CDS · Simbad · VizieR · Aladin · Catalogues · Nomenclature · Biblio · StarPages · AstroWeb

UCAC2 Catalog · DENIS 2nd Release · 2MASS All-Sky Release

Direct access to Catalogues from Name or Designation (tips and examples)

Find catalogues or Data (tips and examples)

Find catalogues among 4035 available

Words matching author's name, word(s) from title, description, etc.

Select from Wavelength, Mission, and controlled Astronomical keywords:

Radio	ANS	AGN
IR	ASCA	Abundances
optical	BeppoSAX	Ages
UV	CGRO	Associations
EUV	COBE	Atomic_Data
X-ray	Chandra	BL_Lac_objects
Gamma-ray	Copernicus	Binaries:cataclysmic

Target Name (resolved by SIMBAD) or Position: J2000 Target radius: 10 arcmin

Position in Sexagesimal, or Decimal \* Radius or Box size

Search by Position across 3756 tables

Output preferences (usage)

Compute	Sort by	r	x,y	Position	Galactic	J2000	B1950
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

## Ex: Catalogue HIPPARCOS

Recherche par position ou nom

Contraintes sur colonnes

Possibilité de requêtes sur des listes d'objets.

VizieR Search Page - Microsoft Internet Explorer

1. I239hip\_main The Hipparcos Main Catalogue (118218 rows)

Known errors in Hipparcos catalogue are reported at the Hipparcos Web Site

(Other tables in this catalogue are listed below)

Query Setup (usage)

Maximum Entries per table: 50 Output layout: small ascii Output Order: + - ResetAll

Query by Position on the Sky (Adapt Form to use a List of targets)

Target Name (resolved by SIMBAD) or Position: J2000 Target dimension: 10 arcmin Submit Query

Position in Sexagesimal, or Decimal \* Radius or Box size

Output preferences for Position:

Compute	Sort by	r	x,y	Position	Galactic	J2000	B1950	r and x,y are the distance to the Target. Position is in the same coordinate system as Target.
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Query by Constraints applied on Columns

Show	Sort	Column	Constraint	Explain
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	HIP		Identifier (HIP number) (H1)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	RA(hms)	(cha)	Right ascension in h m s, ICRS (J1991.25) (H3)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	DE(dms)	(cha)	Declination in deg ' ", ICRS (J1991.25) (H4)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Vmag	mag	(M) Magnitude in Johnson V (H5)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	RA(ICRS)	deg	(M) alpha, degrees (ICRS, Epoch=J1991.25) (H3)(Note)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	DE(ICRS)	deg	(M) delta, degrees (ICRS, Epoch=J1991.25) (H9)(Note)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Pbx	mas	(M) Trigonometric parallax (H11)



Résultat :

HTML  
TSV  
VOTable  
ASCII

FullID	RA(J2000)	DE(J2000)	HIP	RA(hms)	DE(dms)	Vmag	RA(ICRS)	DE(ICRS)
1	17 30 22.73	+05 32 54.7	85665	17 30 22.71	+05 32 56.8	9.33	262.59462845	5.54912
2	01 47 44.83	+63 51 09.0	8362	01 47 44.06	+63 51 11.2	5.63	26.93360110	63.85310
3	20 45 09.53	-31 20 27.2	102409	20 45 09.34	-31 20 24.1	8.81	311.28891788	-31.34002
4	17 17 23.52	-07 52 35.1	84581	17 17 23.46	-07 52 36.6	11.09	259.34773232	-7.87683
5	14 42 21.57	+66 03 20.7	71898	14 42 22.01	+66 03 21.2	10.88	220.59172751	66.05588
6	06 37 10.79	+17 33 53.3	31635	06 37 11.27	+17 33 50.4	9.63	99.29694468	17.56399
7	09 44 29.83	-45 46 35.4	47780	09 44 30.22	-45 46 30.3	10.22	146.12593185	-45.77508
8	14 54 29.24	+16 06 03.8	72944	14 54 29.07	+16 06 04.9	10.11	223.62112279	16.10135
9	16 36 21.45	-02 19 28.5	81300	16 36 21.18	-02 19 25.8	5.77	249.08826456	-2.32383
10	17 35 13.62	-48 40 51.1	86057	17 35 13.54	-48 40 55.1	10.13	263.80642798	-48.68197
11	16 45 06.35	+4 33 30 33.0	82003	16 45 06 38	+4 33 30 29.0	8.10	251.27657770	33.50870

# VizieR

- Catalogues de référence astrométriques:
  - VLBI / ICRF
  - Hipparcos, Tycho
  - 2MASS, USNO
- Nombreux liens vers des données complémentaires (à Strasbourg ou distantes)
- Nombreux formats de sortie possibles, y compris visualisation par VOPlot (développé par VO-India)
- Certains catalogues augmentent régulièrement

Catalogues and files available at CDS

Version of 19-Mar-2006

- B. Copies of external databases regularly updated. (16 catalogues)
- I. Astrometric Data (249 catalogues)
- II. Photometric Data (230 catalogues)
- III. Spectroscopic Data (204 catalogues)
- IV. Cross-Identifications (24 catalogues)
- V. Combined data (107 catalogues)
- VI. Miscellaneous (91 catalogues)
- VII. Non-stellar Objects (206 catalogues)
- VIII. Radio and Far-IR data (74 catalogues)
- IX. High-Energy data (28 catalogues)
- Tables from *Astronomy and Astrophysics* (1461 catalogues)
- Tables from *Astronomy and Astrophysics Supplement Series* (1168 catalogues)
- Tables from *Astronomical Journal* (861 catalogues)
- Tables from *Astronomicheskii Zhurnal (Russian)* (83 catalogues)
- Tables from *Astrophysical Journal* (453 catalogues)
- Tables from *Astrophysical Journal Supplement Series* (498 catalogues)
- Tables from *Monthly Notices of the Royal Astronomical Society* (364 catalogues)
- Tables from *Publications of the Astronomical Society of the Pacific* (108 catalogues)
- Tables from *Pisma v Astronomicheskii Zhurnal (Astronomy Letters)* (77 catalogues)
- Tables from *publications from other journals* (191 catalogues)
- Catalogues ordered by their *Usual Name* (1064 catalogues)
- Catalogues with *Additional Material*

CDS Catalogues. I. Astrometric Data

Click on a catalogue name or number to move to the corresponding VizieR page (**boldface names**), or to a summary description when the catalogue is not available through VizieR.

- (I/295) Absolute Proper motions of 59766 stars (Bobylev+, 2004) (**PUL2**)
- (I/294) The UCAC2 Bright Star Supplement (Urban+, 2004) (**UCAC2-BSS, UCAC2**)
- (I/293) NPM2 Cross-identifications (Klemola+ 2004) (**NPM2**)
- (I/292) Pulkovo Visual Double Star Catalogue (Kiselev+, 2003)
- (I/291) XZ Catalog of Zodiacal Stars (XZ80Q) (Herald, 2003) (**XZ80Q, XZ**)
- (I/290) Pulkovo catalogue of 58483 stars (Pul-3) (Khruetskaya+, 2004) (**Pul-3**)
- (I/289) UCAC2 Catalogue (Zacharias+ 2004) (**UCAC2**)
- (I/288) SPM Catalog 3.3 (Girard+, 2004) (**SPM3.1**)
- (I/285) The Astrometric Catalogue ARIHIP (Wielen+ 2001) (**ARIHIP**)
- (I/285) The GPM catalog (Rybka+, 1997-2001) (**GPM**)
- (I/284) The USNO-B1.0 Catalog (Monet+ 2003) (**USNO-B1.0, USNOB1, USNO-B1, USNO-B, USNOB, USNO**)
- (I/283A) Lick NPM2 Catalog (Hanson+ 2003) (**NPM2**)
- (I/282) The CMT CCD Drift Scan Survey (Evans+, 2002) (**CMC, CMC12**)
- (I/281) WDS 2001.0 (Mason+ 2001) (**WDS, WDS 20001**)
- (I/280A) All-sky Compiled Catalogue of 2.5 million stars (Kharchenko 2001) (**ASCC-2.5, ASCC**)
- (I/279) Revised Luyten Half-Second Catalogue (Bakos+ 2002) (**LHS**)
- (I/278) Catalog of stars in M3 (von Zeipel, 1908) (**vZ**)
- (I/277) SPM Catalog 2.0 (Platais+ 1998) (**SPM2, SPM**)
- (I/276) Tycho Double Star Catalogue (TDSC) (Fabricius+ 2002) (**TDSC**)
- (I/275) The AC 2000.2 Catalogue (Urban+ 2001) (**AC2000.2**)
- (I/274) CCDM (Catalog of Components of Double Multiple stars (Dommanget+ 2002) (**CCDM,I/269**)
- (I/273A) Extragalactic Reference Link Catalog (ERLcat) (de Vegt+, 2001) (**ERLcat**)
- (I/272) M2000: Bordeaux Carte du Ciel zone +11<Dec+18 (Rapaport+, 2001) (**M2000**)
- (I/271) The Guide Star Catalog, Version 2.2 (GSC2.2) (STScI, 2001) (**GSC2.2, GSC2, GSC**)
- (I/270) Catalog of Positions of IR Stellar Sources (CPIRSS) (Hindsley+ 1994) (**CPIRSS**)
- (I/268) UCAC1 Catalogue (Zacharias+ 2000) (**UCAC1**) (*obsolete*)
- (I/267) The APM-North Catalogue (McMahon+, 2000) (**APM**)
- (I/266) Proper motions of fundamental stars (PMFS) (Gontcharov+, 2001) (**PMFS**)
- (I/265) Second Cape Photographic Catalogue (CPC2) (Zacharias+, 1999) (**CPC2**)
- (I/264) Sixth Catalogue of Fundamental Stars (FK6) (Wielen+ 2000) (**FK6**)
- (I/263) ACR catalog around Celestial Equator (Strom+ 1998) (**ACR**)



VizieR Search Page - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

I/251 VLBI International Celestial Reference Frame (ICRF) (Ma+, 1997) (ReadMe) [Similar Catalogues]

- I/251/rsc95r01 [C]ICRF RSC(WGRF)95 R 01 all sources (608 rows)
- I/251/rsc95r02 [C]ICRF RSC(WGRF)95 R 02 subset (253 rows)

Query Setup (usage)

Maximum Entries per table: 50 Output layout: HTML Table Output Order: + - Reset All

Query by Position on the Sky (Adapt Form to use a List of targets)

Target Name (resolved by SIMBAD) or Position: Clear J2000 Target dimension: 10 arcmin Submit Query

Position in Sexagesimal or Decimal \* Radius or Box size

Output preferences for Position:

Compute r x,y Position Galactic J2000 B1950 r and x,y are the distance to the Target; Position is in the same coordinate system as Target.

Sort by

Query by Constraints applied on Columns (Not all columns present in the form!)

Show	Sort (Table#)	Column	Constraint	Explain
<input checked="" type="checkbox"/>	(ALL)	ICRF	(char)	ICRF designation (Note)
<input checked="" type="checkbox"/>	(ALL)	IERS	(char)	IERS designation (Note)
<input checked="" type="checkbox"/>	(1)	c	(char)	[DCO] Defining / Candidate / Other category of source (Note)
<input checked="" type="checkbox"/>	(1)	Hip	(char)	[*] Link to Hipparcos reference frame (Note)
<input checked="" type="checkbox"/>	(ALL)	RAJ2000	"h:m:s"	Right Ascension (J2000) hours
<input checked="" type="checkbox"/>	(ALL)	DEJ2000	"d:m:s"	Declination (J2000) degrees
<input checked="" type="checkbox"/>	(1)	Ep	d	Mean date of observation (JD)
<input checked="" type="checkbox"/>	(2)	status	(char)	[DL ] Status of source (Note)

ALL cols Reset All Clear B Submit Query

Adapt Form (usage) Columns with UCDS: ALL Default columns Customized set of columns

Allow LISTS from file: None LIST of Targets LIST of Constraints on one parameter

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CDS catalogues - Mozilla Firefox

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CDS Catalogues with additional Material

CDS · Simbad · VizieR · Aladin · Catalogues · Nomenclature · Biblio · Tutorial · Developer's corner

Click on a catalogue name or number to move to the corresponding VizieR page

### 1 Catalogues with cube

(VII/114) Massachusetts-Stony Brook Galactic Plane CO Survey (Clemens+ 1986)  
 (VII/66) IRAM observations in pre-star forming regions (Falgarone+ 1998-2001)  
 (IA+A/426/81) Kinematic analysis of the Minispiral (Paumard+, 2004)

### 2 Catalogues with image

(II/243) The ISOGAL Point Source Catalogue - IGPSC (Omont+ 2003)  
 (II/253) Chandra Deep Field South: multi-colour data (Wolf+, 2004)  
 (VI/76) Simulation Atlas of Tidal Features in Galaxies (Howard+ 1993)  
 (VI/111) ISO Observation Log (ISO Data Centre, 2004)  
 (VI/112) Optical Imaging of 57 spiral galaxies (Knapen+ 2004)  
 (VII/240) Millennium Galaxy Catalogue (Liske+, 2003)  
 (VIII/6) 1400-MHz Sky Survey, Maps Covering Dec -5 to +82 (Condon+ 1985-86)  
 (VIII/28) Bell Laboratories H I Survey (Stark+ 1992)  
 (VIII/59) the FIRST Survey, version 1999Jul (White+ 1999)  
 (VIII/65) 1.4GHz NRAO VLA Sky Survey (NVSS) (Condon+ 1998)  
 (VIII/70A) Sydney University Molonglo Sky Survey (SUMSS) (Mauch+ 2003)  
 (VIII/71) The FIRST Survey Catalog, Version 03Apr11 (Becker+ 2003)  
 (B/hst) HST Archived Exposures Catalog (STScI, 2005)  
 (B/chandra) The Chandra Archive Log (CXC, 2002)  
 (B/xmm) XMM-Newton Observation Log (XMM-Newton Science Operation Center, 2002)  
 (B/merlin) The MERLIN Archive (MERLIN 1992-)  
 (IAPIS/110/213) Morphological Types in 10 Distant Rich Clusters (Small+ 1997)  
 (IA+A/368/797) Soft X-ray properties of Seyfert galaxies (Pfeiferkorn+, 2001)  
 (IA+A/371/79) NGC 5548 UBVRi phot. and Halfpa, Hbeta fluxes (Dietrich+, 2001)  
 (IA+A/378/30) ROSAT-BSC galaxy identifications (Zimmermann+, 2001)

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### 3 Catalogues with model

(VI/102) Geneva stellar evolution tracks and isochrones (Lejeune+, 2001)  
 (VI/113) Evolutionary models of Population II stars (Carluo+, 2004)  
 (IA+A/424/919) Stellar models grids. Z=0.02, M=0.8 to 125 (Claret, 2004)  
 (IA+AS/125/229) A standard stellar library (Lejeune+ 1997)

### 4 Catalogues with spectrum (or SED, line profile)

(II/47) Scanner Abundance in late-type evolved stars (Spinrad+ 1969)  
 (III/45) Infrared Spectra for 32 Stars (Johnson+ 1970)  
 (III/86) SKYLAB S-019 Far-UV Objective-Prism Spectrophotometry (Henize+ 1979)  
 (III/114) Spectra of Late-Type Standards. 2.0-2.5 Microns (Kleinmann+ 1986)  
 (III/126) Spectrophotometry of 1588 stars (Burnashev 1985)  
 (III/143) Spectrophotometry of Wolf-Rayet Stars (Torres-Dodgen+ 1988)  
 (III/153) An Atlas of Near Infrared Stellar Spectra (Arnaud+ 1989)  
 (III/157) An Ultraviolet Atlas of Quasar and Blazar Spectra (Kinney+, 1991)  
 (III/166) A New Library of Optical Spectra (Silva + 1992)  
 (III/169A) Photometric Atlas of Procyon for 314-747 nm (Griffin+ 1979)  
 (III/174) High Resolution Atlas of Symbiotic Stars (Van Winckel+ 1993-1994)  
 (III/179) Southern MK Standards 5800-10200A (Danks+ 1994)  
 (III/181) Near Infrared Spectra of Normal Stars (Torres-Dodgen+ 1993)  
 (III/196) Near-IR stellar spectra from 1.428 to 2.5 um (Lancon+ 1998)  
 (III/197) IRAS Low Resolution Spectra (IRAS team, 1987)  
 (III/201) Pulkovo Spectrophotometric Catalog (Aleksieva+ 1997)  
 (III/207) Moscow Spectrophotometric Catalog (MSC) (Glushneva+ 1998)  
 (III/208) Sternberg Spectrophotometric Catalog (Glushneva+ 1998)  
 (III/211) Keck/HIRES Sky Line Atlas (Osterbrock+ 1997)  
 (III/217) Atlas of 840-880nm spectral region (Andrillat+ 1995-1997)  
 (III/218) ELODIE archive (Prugniel+, 2001)  
 (III/219) Spectral Library of Galaxies, Clusters and Stars (Santos+, 2002)  
 (III/232) STELIB: A library of stellar spectra at R 2000 (Le Borgne+, 2003)  
 (III/238) Synthetic spectra in the near-IR (Munari+, 2000-2001)  
 (VI/103) The Hopkins Ultraviolet Telescope (HUT) (GSFC, 1990-95)  
 (VI/105) Wisconsin Ultraviolet Photo-Polarimeter Experiment (WUPPE, 1990-1995)  
 (VI/107) Tubingen Ultraviolet Echelle Spectrometer (TUES, 1993-1996)

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VizieR Result Page - Mozilla Firefox

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Result of VizieR Search within 10° of 00 05 +00 80(J2000) (no other constraint specified) ordered by increasing \_r

Max. Entries: 200 Output layout: HTML Table ALL columns ReSubmit B

B/hst/hst HST Archived Exposures Catalog (STScI, 2005) (ReadMe) Merged log of HST Observations

To get all details for a row, just click on the row number in the leftmost 'Full' column. The 3 columns in color are computed by VizieR, and are not part of the original data.

Full	r	RAJ2000	DEJ2000	Target	wave	ObsDate	Sp	lm	lm1
	deg	"h:m:s"	"d:m:s"		nm	s			
1	0.744114	00 05 47.55	+02 03 02.2	Q0003+0146	0.0	1994-07-21T21:25			
2	0.744114	00 05 47.55	+02 03 02.2	Q0003+0146	194.2	1994-07-21T21:33	S		
3	1.173886	00 02 21.11	+00 21 50.1	HCLQ0002+0021	595.5	2000-09-20T01:00	I		
4	1.173980	00 02 21.12	+00 21 49.5	HCLQ0002+0021	595.5	2000-09-20T00:56	I		
5	1.173980	00 02 21.12	+00 21 49.5	HCLQ0002+0021	774.0	2000-09-20T01:08	I		
6	1.174094	00 02 21.14	+00 21 48.8	HCLQ0002+0021	595.5	2000-09-20T01:03	I		
7	1.422909	00 06 22.92	-00 02 49.2	GSC4663-00565	671.4	1994-11-25T11:13	I	I	
8	1.422909	00 06 22.92	-00 02 49.2	GSC4663-00565	671.4	1994-11-25T11:15	I	I	
9	1.422909	00 06 22.92	-00 02 49.2	GSC4663-00565	671.4	1994-11-25T11:17	I	I	
10	1.423034	00 06 22.99	-00 02 49.4	GSC4663-00565	671.4	1994-11-25T10:55	I	I	
11	1.423034	00 06 22.99	-00 02 49.4	GSC4663-00565	671.4	1994-11-25T10:57	I	I	
12	1.423034	00 06 22.99	-00 02 49.4	GSC4663-00565	671.4	1994-11-25T10:59	I	I	
13	1.423158	00 06 22.90	-00 02 50.2	GSC4663-00565	671.4	1994-11-25T11:04	I	I	

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(I/Azh/76/604) Spectrophotometry of S and carbon stars (Tereshchenko, 1999)  
 (I/Azh/78/1135) Spectrophotometric standards near DE=+40deg (Tereshchenko, 2001)  
 (I/Azh/79/249) Equatorial spectrophotometric standards (Tereshchenko, 2002)

### 5 Catalogues with timeSerie

(I/239) The Hipparcos and Tycho Catalogues (ESA 1997)  
 (II/162) CCD search for Cepheids in Crux and Centaurus (Caldwell+, 1991)  
 (II/171) Photoelectric observations of Cepheids in UBVR(I)c (Berdnikov, 1997)  
 (II/242) Differential V photometry of V350 Peg (Vidal-Sainz+, 2003)  
 (II/247) Variable Stars in the Large Magellanic Clouds (MACHO, 2001)  
 (III/185) Search for Jupiter-Mass Companions (Walker+, 1995)  
 (III/229) Radial Velocities of Cepheids (Gorynya+ 1992-98)  
 (I/ApIS/137/209) BVic photoelectric obs. of southern Cepheids (Berdnikov+, 2001)  
 (I/A+A/242/401) Walraven photometry of WX Hyi (Kuulkers+ 1991)  
 (I/A+A/265/77) VBLUW Observations of TT Ari (Hollander+ 1992)  
 (I/A+A/343/847) Geneva Photometry of Eta Car (van Genderen+ 1999)  
 (I/A+A/345/505) UBVI magnitudes of NGC 869 B-type pulsators (Krzyszinski+, 1999)  
 (I/A+A/349/619) UBVR light curves of AA Tau in 1995 (Bouvier+, 1999)  
 (I/A+A/354/881) Radial velocities of Praesepe & Hyades Am stars (Debernardi+ 2000)  
 (I/A+A/369/862) VI light curves of the variable stars in M92 (Kopacki, 2001)  
 (I/A+A/371/579) Empirical relations for cluster RR Lyrae (Kovacs+, 2001)  
 (I/A+A/373/899) New variables in M22 globular cluster (Kaluzny+, 2001)  
 (I/A+A/374/204) V392 Car light curve (Debernardi+, 2001)  
 (I/A+A/375/130) New PMS spectroscopic binaries in Orion (Covino+ 2001)  
 (I/A+A/375/909) RR Lyrae stars in the Sgr dwarf (Cseresnyes 2001)  
 (I/A+A/376/561) Rc light curves of 7 variables in M37 (Kiss+, 2001)  
 (I/A+A/386/237) UBVR(I)c photometry of 7 symbiotic stars (Munar+, 2002)  
 (I/A+A/387/850) Radial velocities of eclipsing binaries (Imbert, 2002)  
 (I/A+A/389/149) EROS II periodic stars towards Galactic spiral arm (Deruet+, 2002)  
 (I/A+A/390/717) Solar Velocities of the Sun in 1989-99 (IRIS+) (Salabert+, 2002)  
 (I/A+A/390/1023) uvby photometry of 4 CP stars (Adelman+, 2002)  
 (I/A+A/394/505) UBv photometry of LQ Hya (Berdyugina+, 2002)  
 (I/A+A/394/617) UBVR(I)c photometry of R Corona Borealis (Yudin+, 2002)  
 (I/A+A/394/943) V light curve of V567 Oph (Kiss+, 2002)  
 (I/A+A/395/11) BV(RI)c photometry of ON 231 during outburst (Tosti+, 2002)  
 (I/A+A/395/587) GR Tau BV light curves (Zhang+, 2002)

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Tokyo, Japan · IUCAA, India · CADC, Canada · Cambridge, UK · CFA/Harvard, USA · UKIRT-Hawaii, USA · INASAN, Russia · Beijing Obs., China

II/242 Differential V photometry of V350 Peg (Vidal-Sainz+, 2003) [ReadMe] [Objects] [Similar Catalogues]

1. II/242/V350peg Photometric V data for V350 Peg (Plot of the Light Curve) (16191 rows)

Query Setup (usage)

Maximum Entries per table: 9999 Output layout: HTML Table Output Order: + - Reset All

Query by Constraints applied on Columns

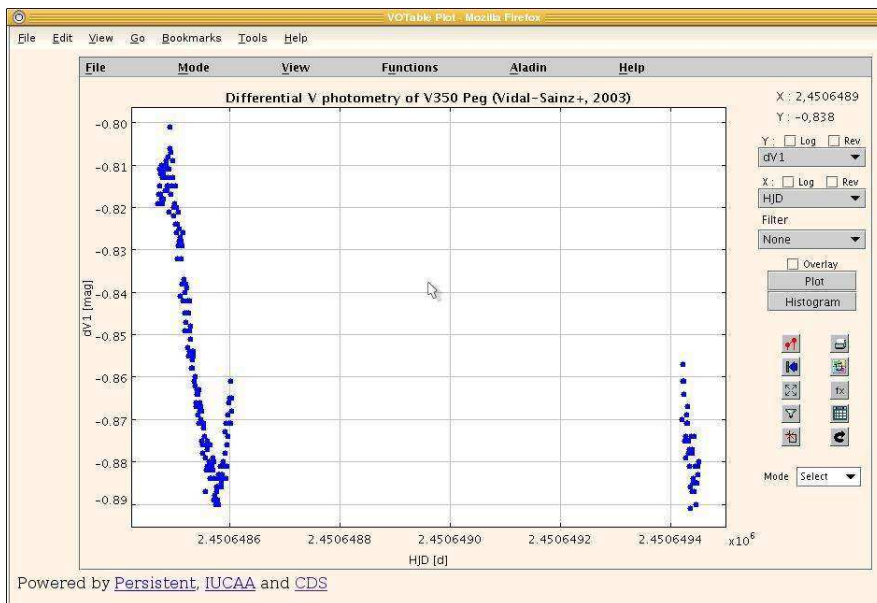
Show Sort Constraint Explain

Show	Sort	Constraint	Explain
<input type="checkbox"/>	<input type="checkbox"/>	reco	Record
<input type="checkbox"/>	<input type="checkbox"/>	HJD	Helio
<input type="checkbox"/>	<input type="checkbox"/>	dV1	mag
<input type="checkbox"/>	<input type="checkbox"/>	dV2	mag
<input type="checkbox"/>	<input type="checkbox"/>	OBS	(char) Observ

Adapt Form (usage) Columns with UCDS: ALL Default columns LIST of Targets

VizieR Service at Centre de Données astronomiques de Strasbourg

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Tokyo, Japan · IUCAA, India · CADC, Canada · Cambridge, UK · CFA/Harvard, USA · UKIRT-Hawaii, USA · INASAN, Russia · Beijing Obs., China

B/astorb Orbits of Minor Planets and Comets (Bowell+ 2005) [ReadMe] [Similar Catalogues]

1. B/astorb/astorb The catalog of Orbits (279081 rows)  
This is a copy of the Asteroid Observing Services from the Asteroid Database at Lowell Observatory

2. B/astorb/comets The catalog of Comets (408 rows)

Query Setup (usage)

Maximum Entries per table: 50 Output layout: HTML Table Output Order: + - Reset All

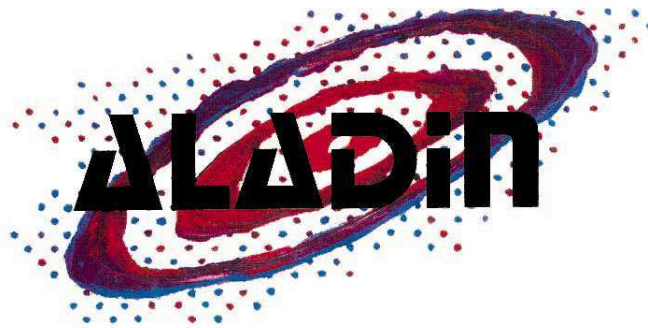
Query by Constraints applied on Columns (Not all columns present in the form!)

Show	Sort	Table#	Column	Constraint	Explain
<input type="checkbox"/>	<input type="checkbox"/>	(1)	Planet	(char)	(n) [1,] Asteroid number (blank if unnumbered)
<input type="checkbox"/>	<input type="checkbox"/>	(ALL)	Name	(char)	Name or preliminary designation.
<input type="checkbox"/>	<input type="checkbox"/>	(1)	H	mag	Absolute magnitude H parameter (Note 1)
<input type="checkbox"/>	<input type="checkbox"/>	(1)	Diam	km	(n) IRAS diameter (see E.F.Tedesco, pp.1151-1181; catalog II/190)
<input type="checkbox"/>	<input type="checkbox"/>	(1)	Nobs		Number of observations used in orbit computation.
<input type="checkbox"/>	<input type="checkbox"/>	(ALL)	i	deg	Inclination (Note 3)
<input type="checkbox"/>	<input type="checkbox"/>	(ALL)	e		Eccentricity (Note 3)
<input type="checkbox"/>	<input type="checkbox"/>	(1)	a	AU	Semimajor axis (Note 3)
<input type="checkbox"/>	<input type="checkbox"/>	(1)	CEU	arcsec	(n) Current Ephemeris Uncertainty (Note 10)
<input type="checkbox"/>	<input type="checkbox"/>	(1)	mod	(char)	[a*] added or updated (Note 12)
<input type="checkbox"/>	<input type="checkbox"/>	(1)	modDate	"Y:M:D"	(n) Date of last modification (Note 12)
<input type="checkbox"/>	<input type="checkbox"/>	(2)	Cnote		Number of the associated "Note Cometaire" (Note 1)
<input type="checkbox"/>	<input type="checkbox"/>	(2)	Code	(char)	IAU code for the comet
<input type="checkbox"/>	<input type="checkbox"/>	(2)	TO	d	Date of perihelion (Note 3)

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2000 requetes/jour en 2003

- Le plus récent des 3 services: 1997
- Deux aspects:
  - serveur images
  - interface utilisateur (X-windows, puis Java)
- Trois niveaux d'utilisation:
  - Previewer (le plus simple)
  - Applet Java dans une page Web
  - Aladin Standalone : outil complet
- 2005: Aladin v3.0



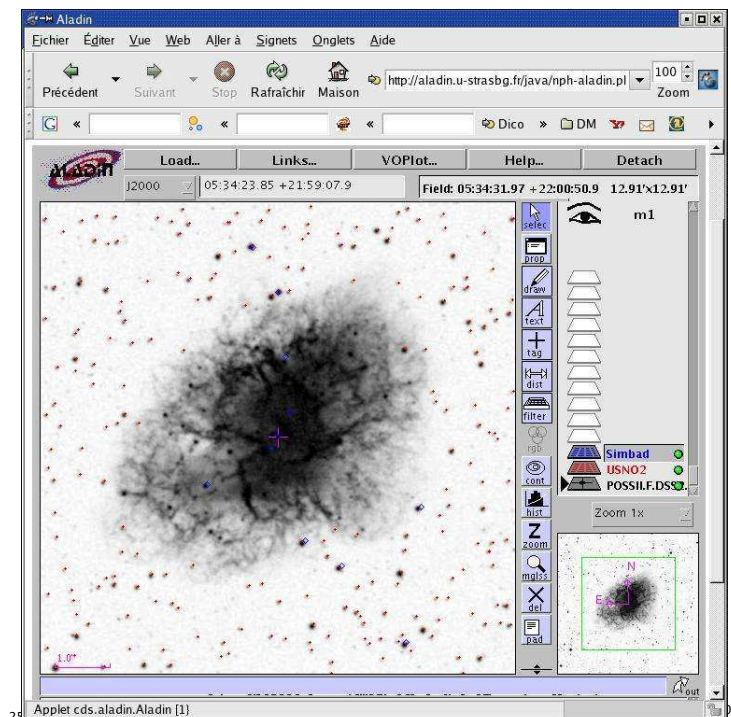
- Intégrateur de données
- Bases de données images à Strasbourg:
  - MAMA, DSS1, DSS2, 2MASS, EROS1
- Accès à des serveurs distants:
  - HST, VLA/FIRST, SuperCOSMOS, Skyview, SDSS, ...
- Accès aux données locales de l'utilisateur.
- Nombreuses fonctions:
  - superposition images, contours, catalogues, NED, SIMBAD, champs de vue, filtres...
  - calibration astrométrique, resampling, composition colorée, blinking, multi-vue, mode script, cross-match, diagrammes 2D (VOPlot)...

Atlas interactif du ciel.

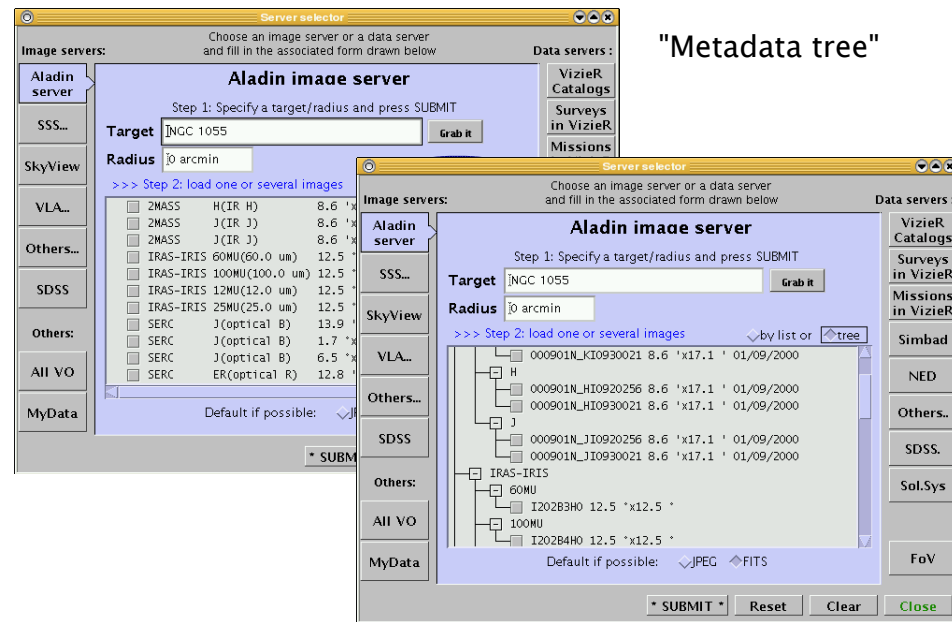
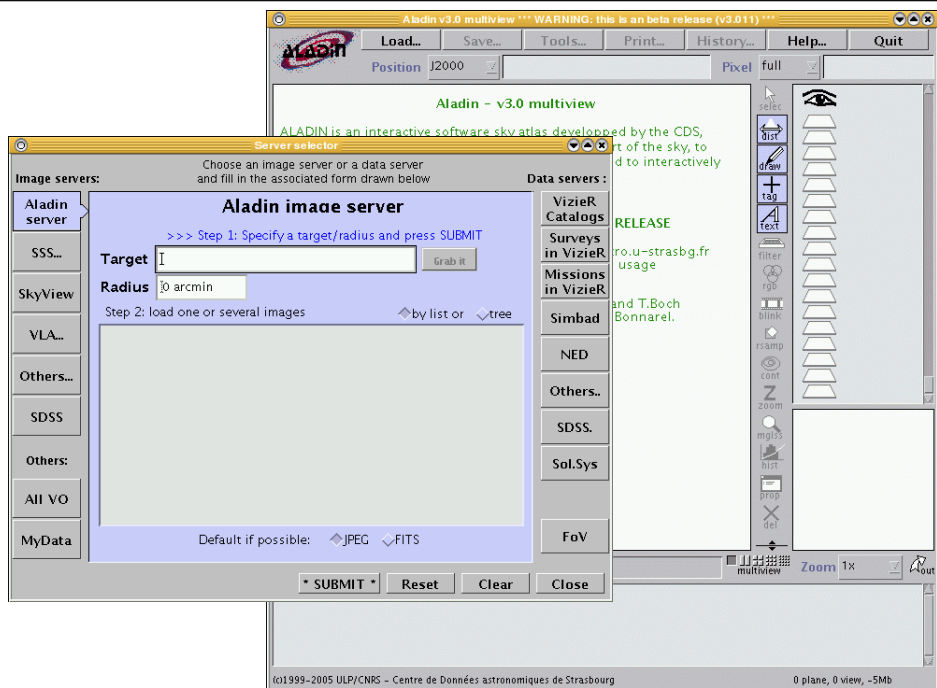
Intégrateur de données: images et catalogues locaux ou distants.

Gratuit !

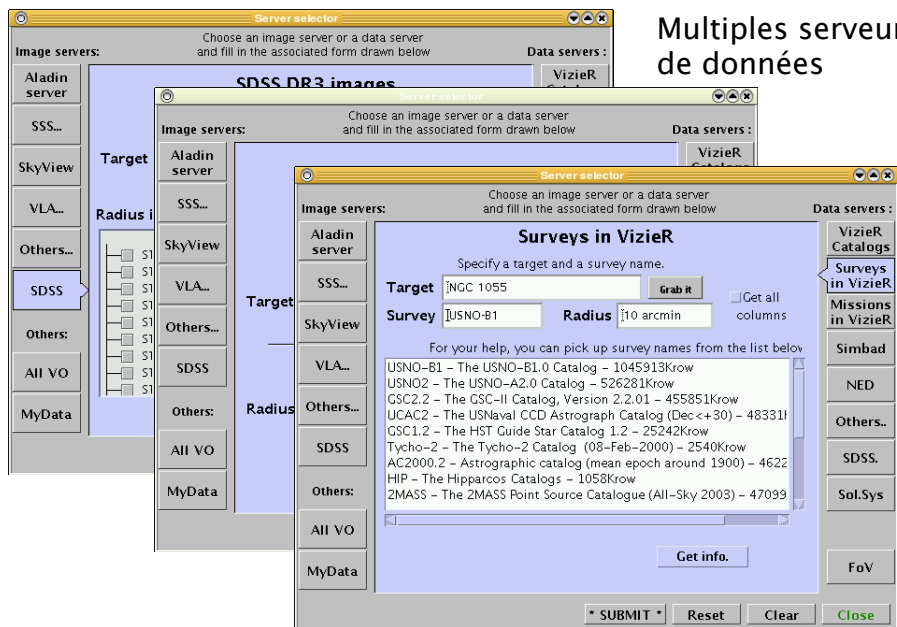
Base du prototype AVO.



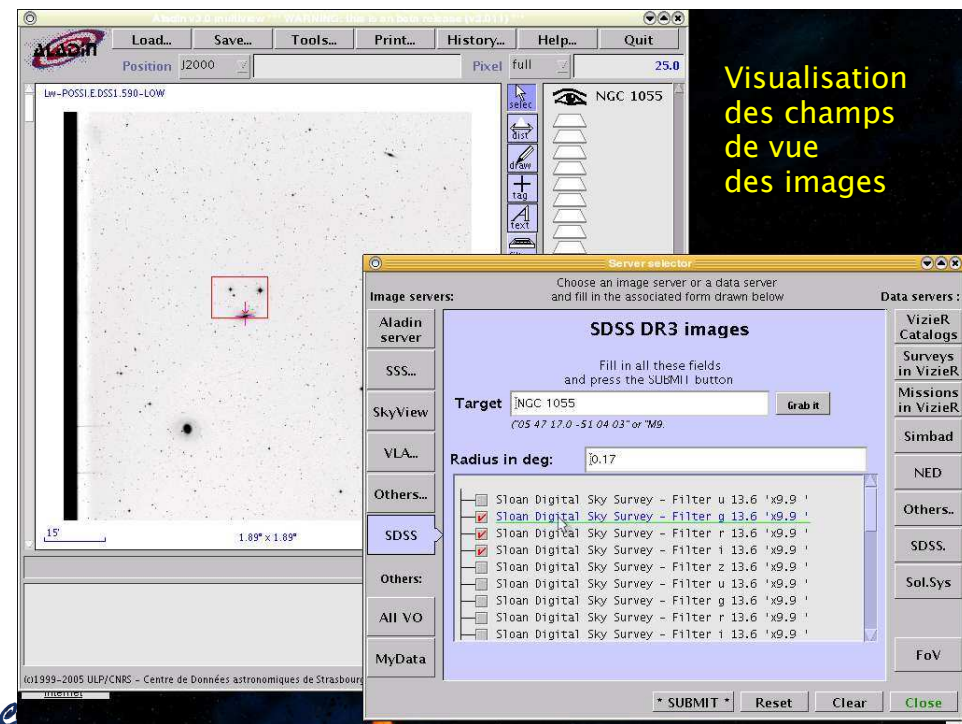




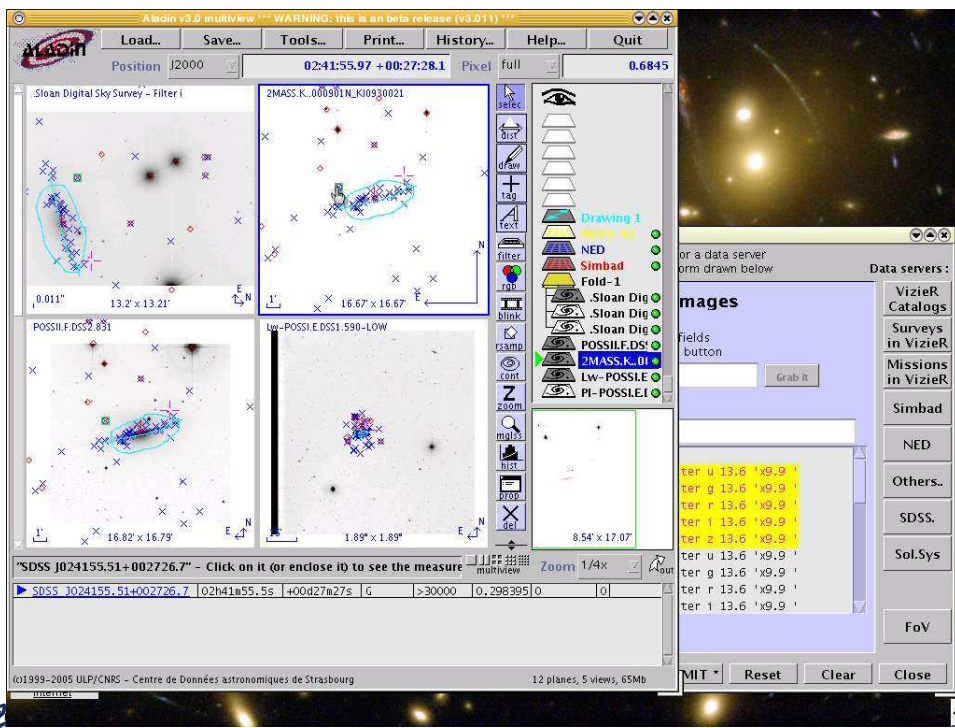
"Metadata tree"



Multiples serveurs de données

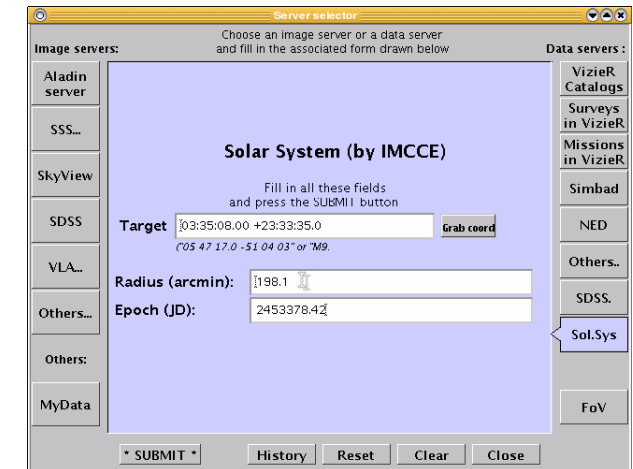


Visualisation des champs de vue des images



Nouveau ! (en construction)

Accès à une base d'éphémérides de l'IMCCE couvrant 70 ans (1949–2019) pour les positions des astéroïdes...



## Le CDS et l'Observatoire Virtuel

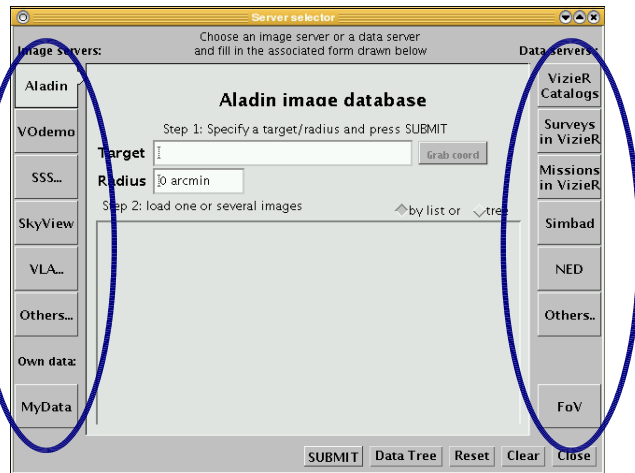
- De par son expérience, le CDS est un des acteurs principaux de la construction de l'Observatoire Virtuel (VO-France, AVO, IVOA).
- Il participe activement à la définition des formats d'échange et de description standard de l'astronomie de demain (VOTable, UCD).
- Il conseille les projets qui souhaitent intégrer leurs données à l'Observatoire Virtuel.

## Aladin: un portail du VO

- Accès au VO pour les astronomes:
  - découvrir les données et services disponibles
  - accès et interrogation
  - manipulation et analyse
  - publication, dissémination des résultats
- Le prototype du projet européen AVO reposait sur Aladin
- Des développements nouveaux faits pour AVO ont été intégrés depuis dans Aladin

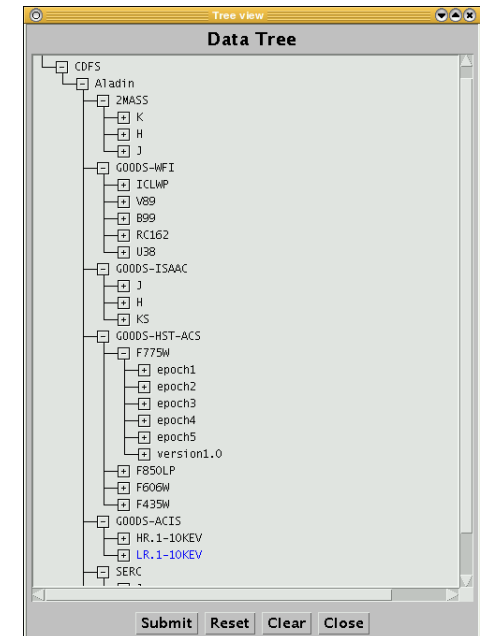
# ex: portail prototype AVO

- Accès aux données:



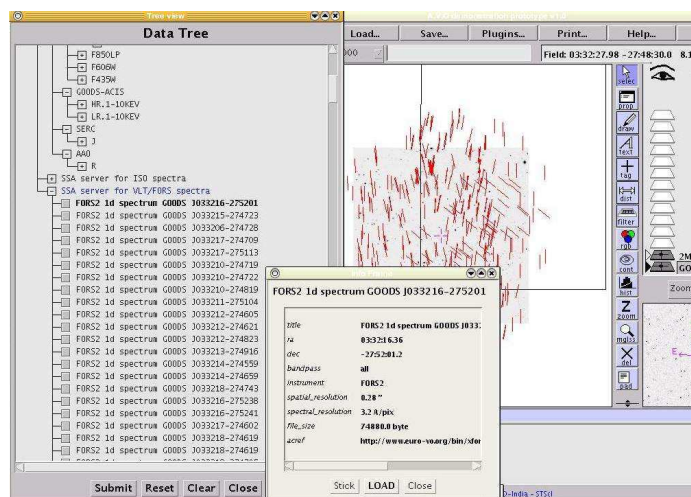
# ex: portail prototype AVO

- Accès images
  - DAL: SIA
  - le serveur image (ici Aladin) renvoie les metadonnées des images dans la région demandée
  - construction dynamique d'un 'metadata tree'



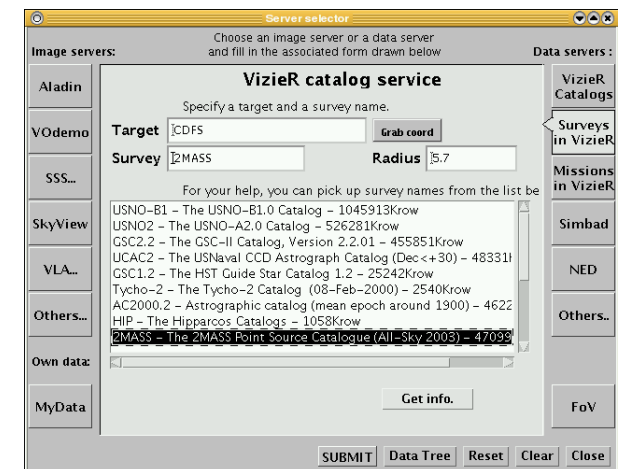
# ex: portail prototype AVO

- Accès spectres
  - DAL: SSA
  - ex: méta-données serveur ESO



# ex: portail prototype AVO

- Accès catalogues
  - Cone Search
  - ex: VizieR





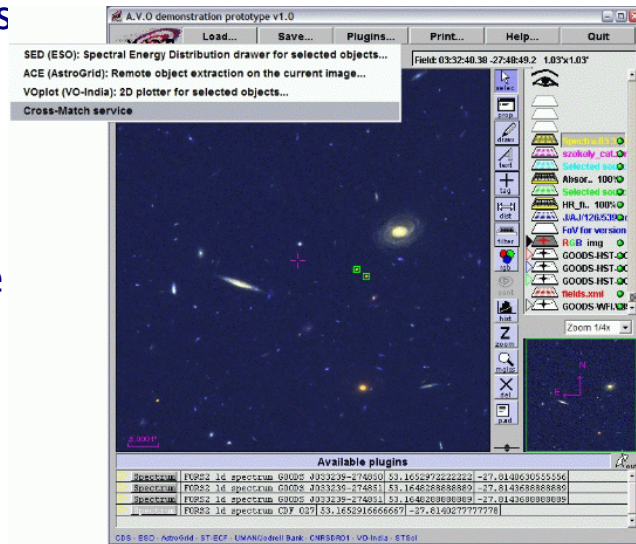
## ex: portail prototype AVO

- Accès services

- SExtractor
- Cross-match

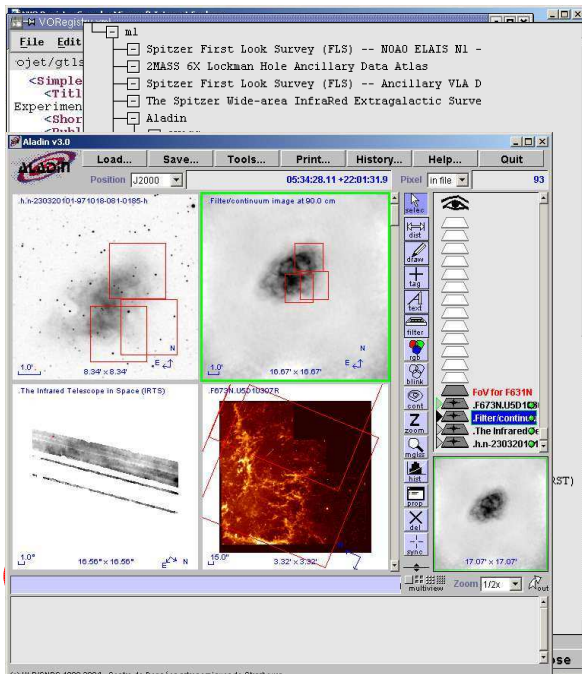
- Protocole HTTP, WS...

- FITS, VOTable



## Portail: bientôt...

- Liste des données et services construite dynamiquement à partir du contenu du registry...



1. Harvesting from STScI

2. Conversion and filtering into a GLU dic

3. GLU site synchronization

4. New Aladin form managing these VO GLU records...

- 5...to produce general metadata trees

- 6... to choose and manipulate images and catalogs..

## CDS: support aux projets

- Le CDS a déjà participé à de nombreux projets :
  - catalogues d'étoiles guides (EXOSAT, IRAS, Hipparcos, HST, ISO, SAX, ...)
  - accès aux archives (IUE)
  - contribution au SSC XMM
- Utilisation personnalisée des services
- Distribution de données
- Consultance, conseil, revues
- A venir: Planck/Herschel, COROT, ALMA...



## Utilisateurs et développeurs

- Outils utilisables dans le "developer's corner"
  - bibliothèques java (gestion des unités de mesure, conversion de coordonnées, ...)
  - accès par Web Services
- Pour les utilisateurs exigeants:
  - Aladin (v3.0 téléchargeable en avril)
  - Tutoriaux (pour expliquer des services de + en + complexes), démos
  - cdsclient: ensemble de routines accessibles en ligne de commande



## Aspects pluridisciplinaires

- Collaborations avec des laboratoires STIC (surtout dans le cadre d'actions incitatives)
  - IDHA (Images Distribuées Hétérogènes pour l'Astronomie) – techniques de manipulation / visualisation d'images multibandes
  - MDA (Masse de données en astronomie) – description sémantique de l'astronomie
- Physique atomique et moléculaire à intérêt astronomique



Centre de Données astronomiques de Strasbourg

<http://cdsweb.u-strasbg.fr/>

ADASS XIII: held in Strasbourg from 12th to 15th october 2003  
Visit the CDS Tutorial  
New: CDS contributions to the Astrophysical Virtual Observatory

**Astronomical databases**

- Simbad reference database (Fr - US)
- VizieR catalogue service (Fr - Canada - US - Japan - India - UK - Russia - China)
  - ftp access to catalogues: Astronomer's Bazaar - Submission guidelines
- Aladin sky atlas
- TOPbase database of the OPACITY project
- DENIS data release
- Dictionary of Nomenclature (Fr - Japan - Russia USA)
- INES Archive of IUE ultraviolet spectra

**Bibliography**

- CDS bibliographical service
- ADS\* abstract service and scanned articles
- Astronomy & Astrophysics - CDS site\*
- AJ\* - ApJ\* - PASP\* mirror site at CDS
- A&A, A&AS and PASP abstracts
- A&A document map - ApJ document map

**Projects, Standards, and Tools**

- Projects to which CDS contributes
- Astrophysical Virtual Observatory - (AVO)
- Astronomy Data Centers Executive Council - (ADEC)
- IDHA project
- MDA project
- Interoperability Standards and Tools for the Virtual Observatory
- GLU development site

**Software resources**

- Softwares and tools
- XML Web Services portal

[question@simbad.u-strasbg.fr](mailto:question@simbad.u-strasbg.fr)



## Quelques liens utiles (1)

- Site Web du CDS:
  - <http://cdsweb.u-strasbg.fr>
- SIMBAD:
  - <http://simbad.u-strasbg.fr/>
  - <http://simbad.u-strasbg.fr/sim-fid.pl>
- VizieR
  - <http://vizier.u-strasbg.fr/>
  - <http://vizier.u-strasbg.fr/viz-bin/VizieR>
- Aladin
  - <http://aladin.u-strasbg.fr/>



## Quelques liens utiles (2)

- Tutoriels CDS
  - <http://cdsweb.u-strasbg.fr/Tutorial/>
  - <http://aladin.u-strasbg.fr/java/aladin.pdf>
- IVOA
  - <http://www.ivoa.net/>
- Action Spécifique OV-France
  - <http://www.france-ov.org/>
- Tutoriel OV France (2004)
  - <http://www.france-ov.org/twiki/bin/view/ASOVFrance/Tutoriel2004>