Towards an AVO Interoperability Prototype

Mark Allen

Françoise Genova

CDS & the AVO Work Area 2 team:

C. Arviset (ESA)
P. Didelon (SAP/Terapix)
S. Garrington (Jodrell Bank)
R. Mann (ROE)

A. Micol (ESO-ECF)
A. Richards (Jodrell Bank)
G. Rixon (Cambridge UK)
A. Wicenec (ESO)

+ C. Benoit (OCA Nice)
J. Lewis (Cambridge UK)

Outline

- AVO Interoperability prototype
  - Goals, Metadata and Interoperability
- Target archives
- Interoperability demonstration
  - Query by UCD, prototype wavelength query
  - Example: multi λ images + catalog overlays
- Practical recommendations for interoperability

AVO interoperability prototype

Goals:

- Federate a set of archives into CDS interoperability service
  - ➔ Early science usage
  - ➢ **New VO functionalities**
  - ➢ Standards (UCDs, VOTable ✶ see contributions from Ochsenbein, Derriere)
  - ➢ Build set of recommendations for archive providers
  - ➢ Evaluate interoperability tools

Metadata

- Building blocks for interoperability
  - UCDs, keywords, units
- UCDs encode semantics
  - i.e. meaning of contents, not just a label
  - Hierarchical tree structure
  - Efficient searching
- Combine relevant information (Table-joins)

Basic interoperability goals

- Seamless interoperability at:
  - Coordinates level
    - overlays, mosaics
  - Units level : combining measurements
    - Custom merged datasets *data fusion*
- Building blocks for Concept level
    - *Data mining*

Why  &  ?

- Existing interoperating system
  - Semi-centralised meta-data
  - Links to distributed archival data
  - Units and UCDs already defined for every column of every table and archive in Vizier
- Evaluation of metadata definitions
- Develop and test high level meta-data concepts [in parallel with development of distributed metadata systems]

Target Archives

- MERLIN
- EIS (ESO)
- VLT
- NTT
- HST/ECF
- Wide field UK
  - e.g. INT
- XMM
- ISO
- CFHT 12k

Representative of SPACE/GROUND-BASED, and wide range of wavelength

Available for science usage NOW

- MERLIN
- EIS (ESO)
- ISO

soon

- XMM (log incl.)
- INT

+ already implemented:

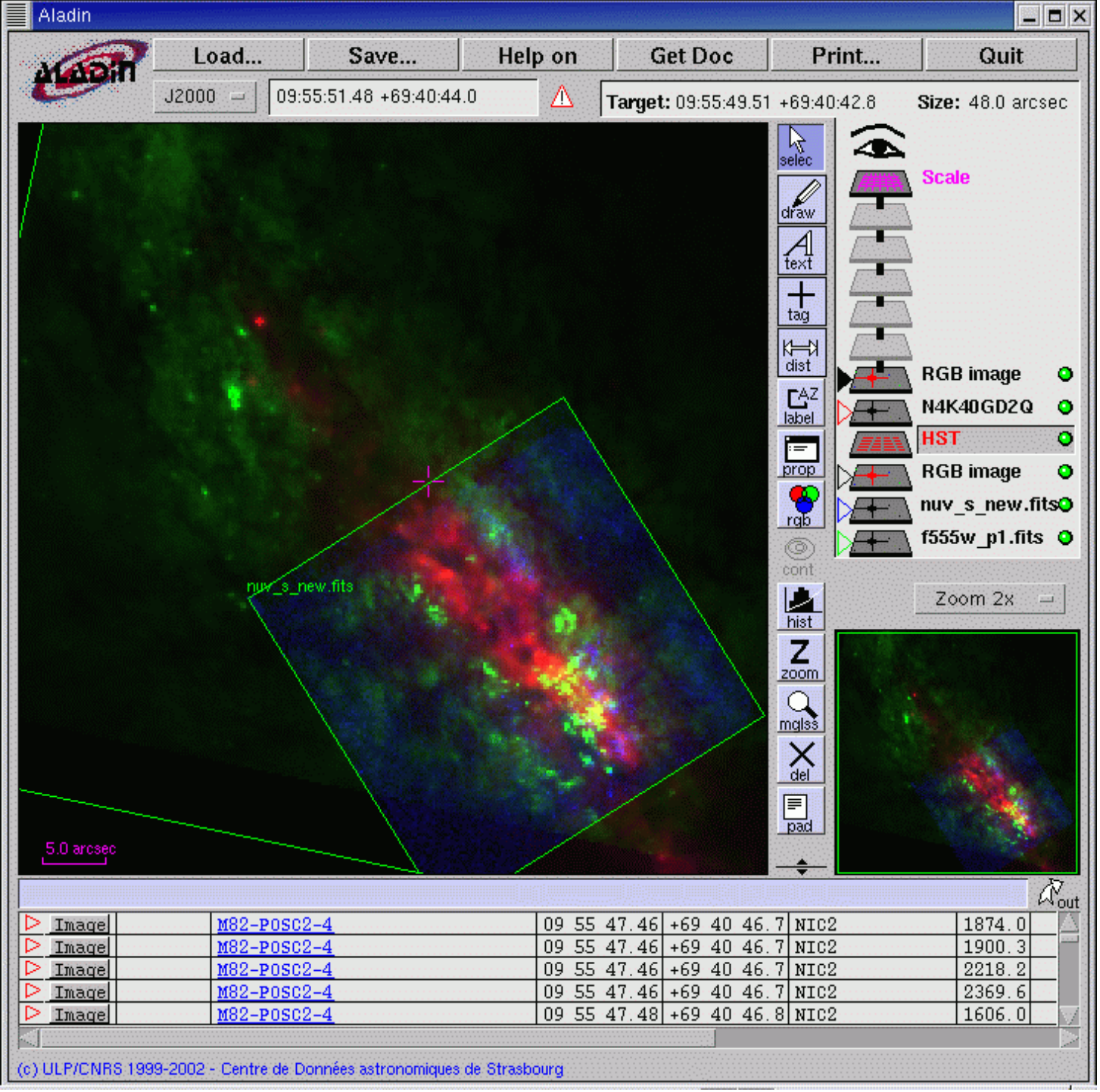
- HST
- Chandra
- CFHT
- VLA: NVSS
- 2MASS
- DSS GSC, UNSO

+ soon TNG, IRAM

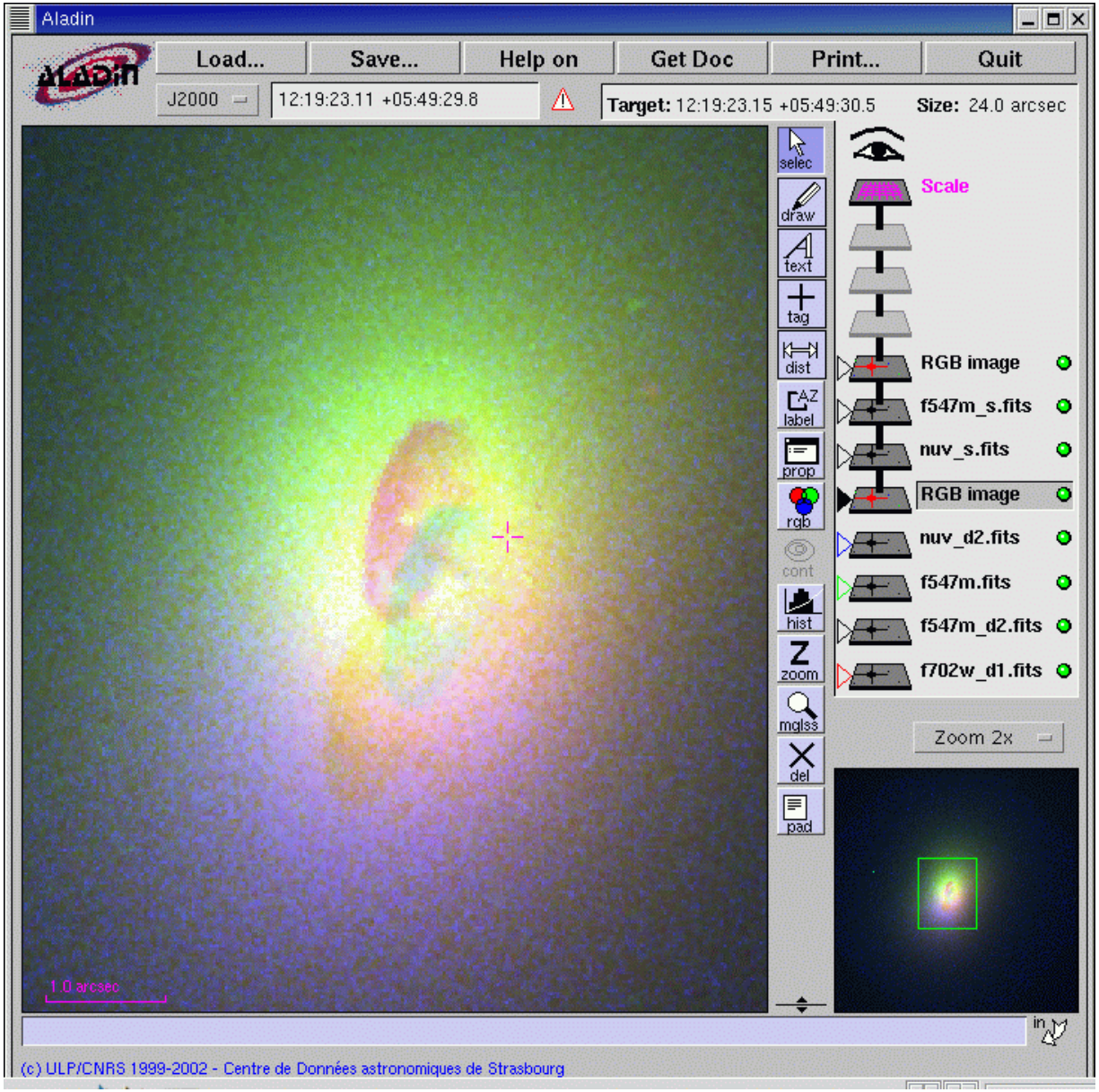
- +... + ...

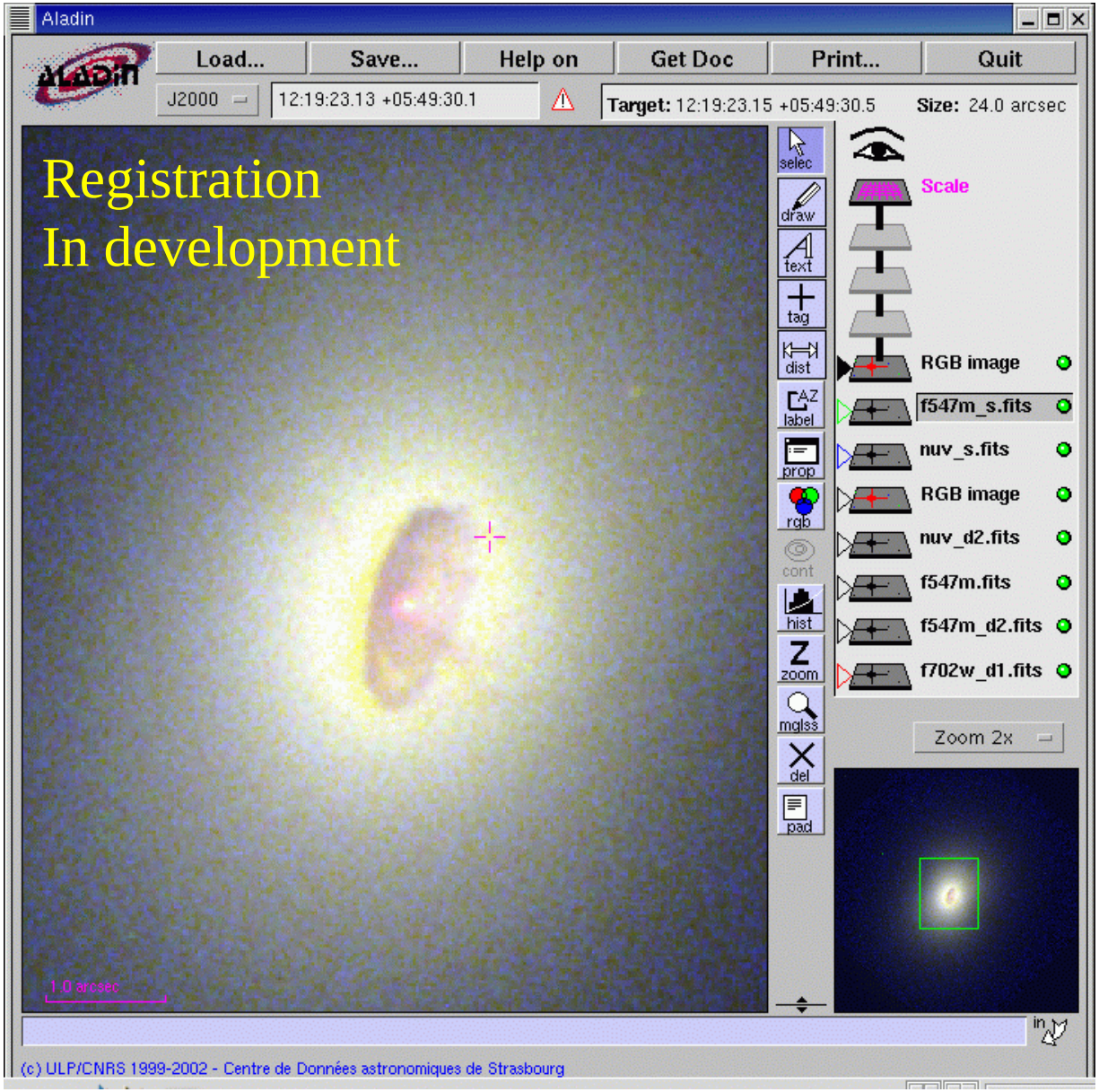
Archive/Catalog integration

- Driver for new developments in interoperability tools
  - e.g. ALADIN for radio images
  - Astrometric registration
- UCD tool development
  - Ways to use the semantics, e.g. search by UCD and UCD wavelength map for photometry searches



HST archive +
user images


Aladin
Load...
Save...
Help on
Get Doc
Print...
Quit
J2000
12:19:23.11 +05:49:29.8
Target: 12:19:23.15 +05:49:30.5
Size: 24.0 arcsec
selec
draw
text
tag
dist
label
prop
rgb
cont
hist
zoom
mglss
del
pad
Scale
RGB image
f547m_s.fits
nuv_s.fits
RGB image
nuv_d2.fits
f547m.fits
f547m_d2.fits
f702w_d1.fits
Zoom 2x
1.0 arcsec
in
(c) ULP/CNRS 1999-2002 - Centre de Données astronomiques de Strasbourg


Aladin
Load...
Save...
Help on
Get Doc
Print...
Quit
J2000
12:19:23.13 +05:49:30.1
Target: 12:19:23.15 +05:49:30.5
Size: 24.0 arcsec
Registration
In development
selec
draw
text
tag
dist
label
prop
rgb
cont
hist
zoom
mglss
del
pad
Scale
RGB image
f547m_s.fits
nuv_s.fits
RGB image
nuv_d2.fits
f547m.fits
f547m_d2.fits
f702w_d1.fits
Zoom 2x
1.0 arcsec
in
(c) ULP/CNRS 1999-2002 - Centre de Données astronomiques de Strasbourg

Search by UCD

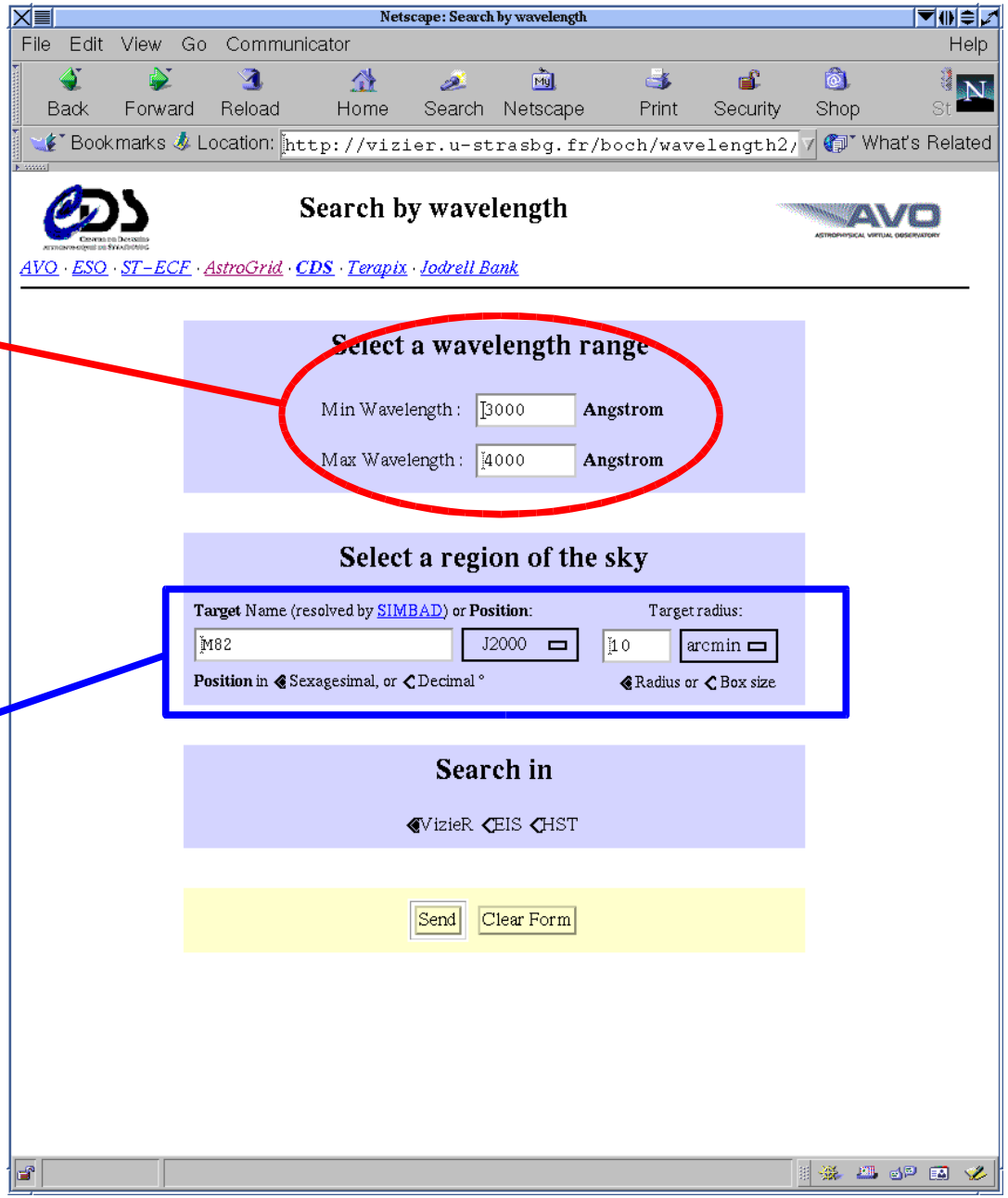
- To address common features of science scenario questions posed for prototype VOs
- e.g. Find B-band photometry...
  - in a particular region of the sky, or
  - ... of a particular type of object
- Possible via: wavelength map of UCDs and CDS database tools

Search by photometry

Select wavlength range

Interpreted by UCD wavelength map

Combine with object name or sky region



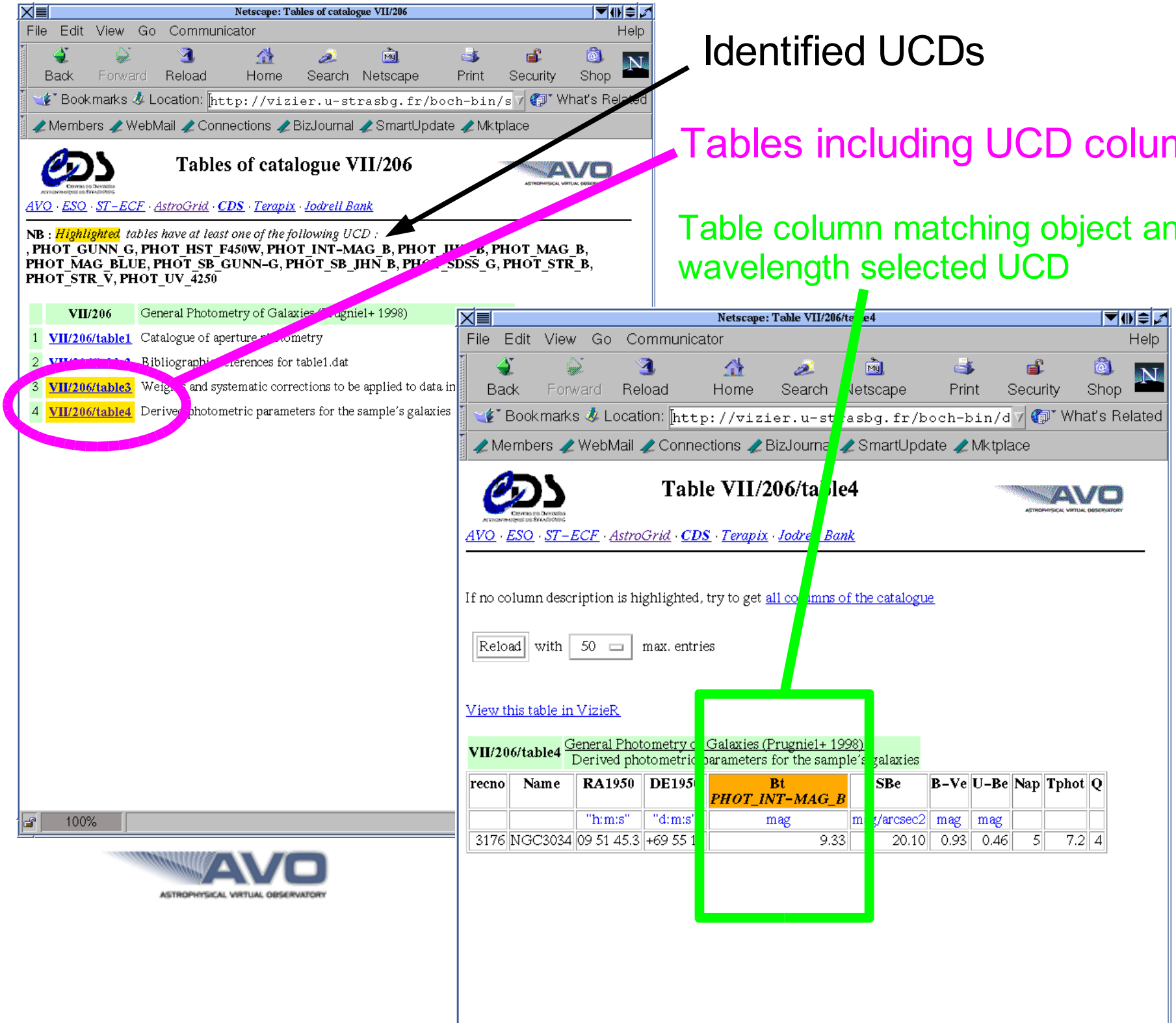
Catalogues matching your search

AVO · ESO · ST-ECF · AstroGrid · **CDS** · Terapix · Jodrell Bank

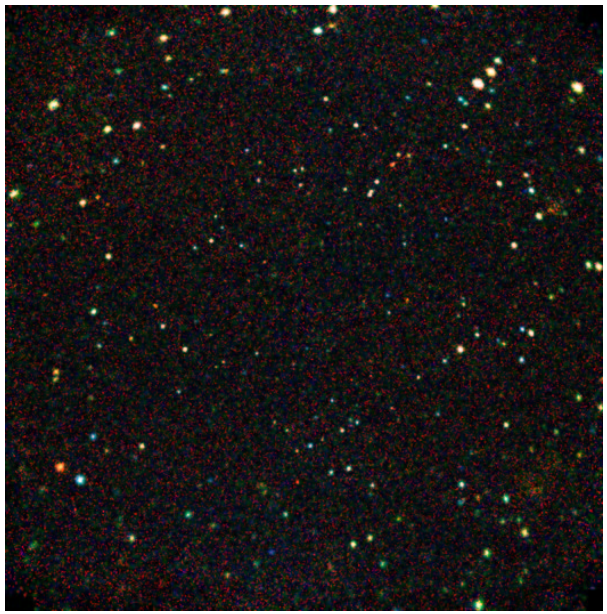
4 catalogues match your search

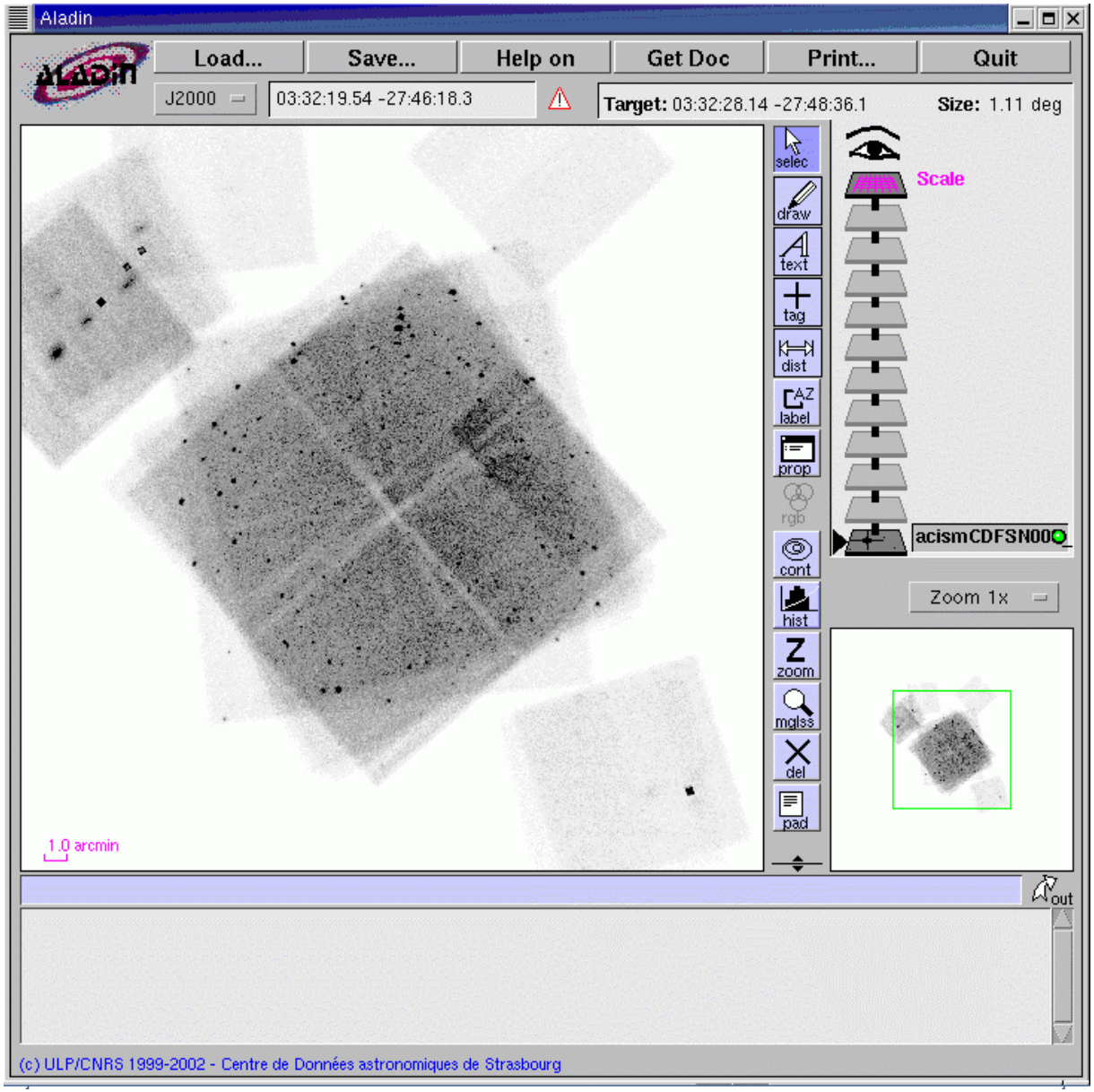
V/105	SKY2000 Catalog, Version 3 (Myers+ 2000)
VII/206	General Photometry of Galaxies (Prugniel+ 1998)
J/A+AS/109/341	UV properties of normal galaxies. II. (Rifatto+, 1995)
J/A+AS/114/527	UV properties of normal galaxies. III. (Rifatto+, 1995)

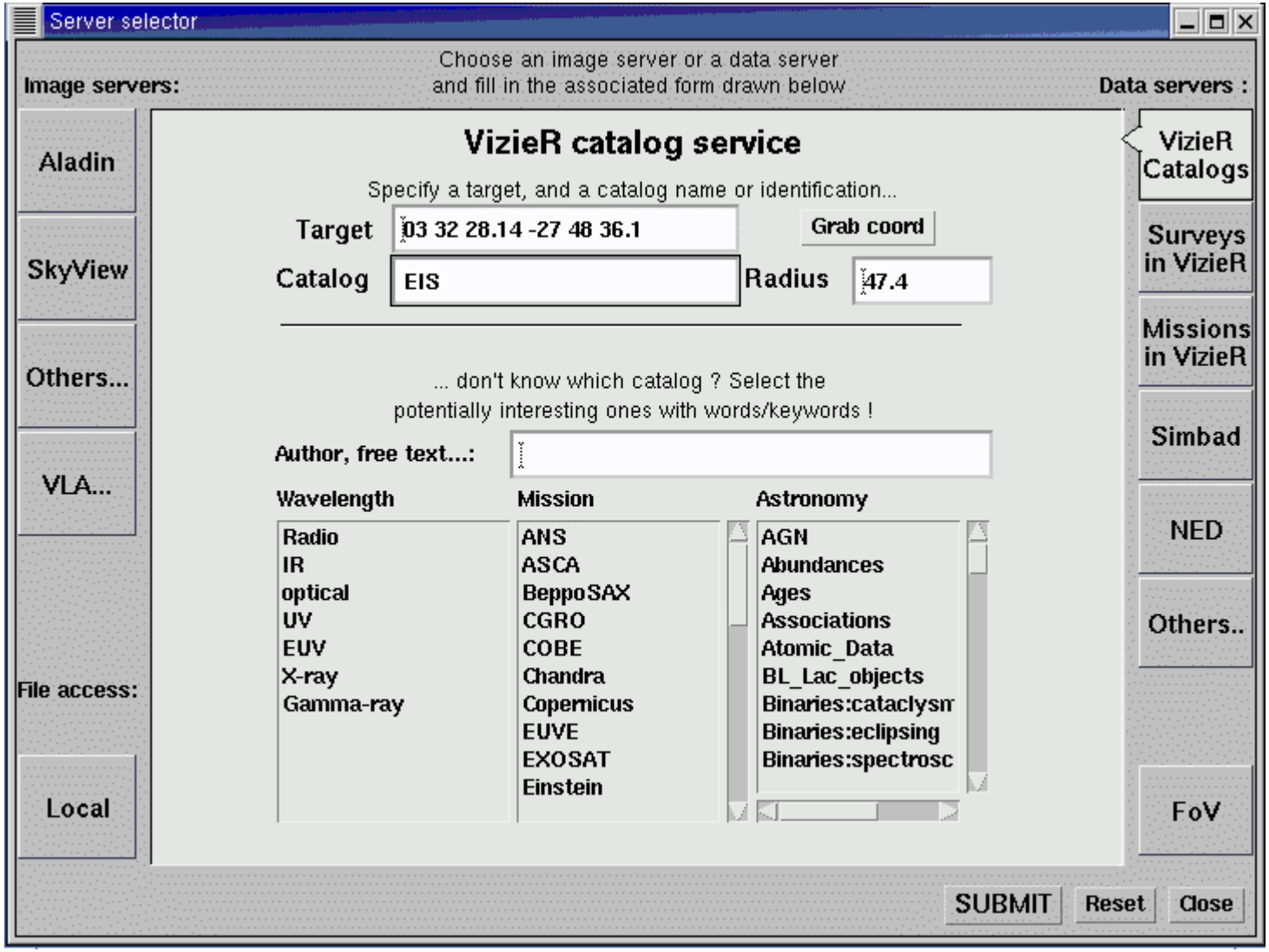
Search again

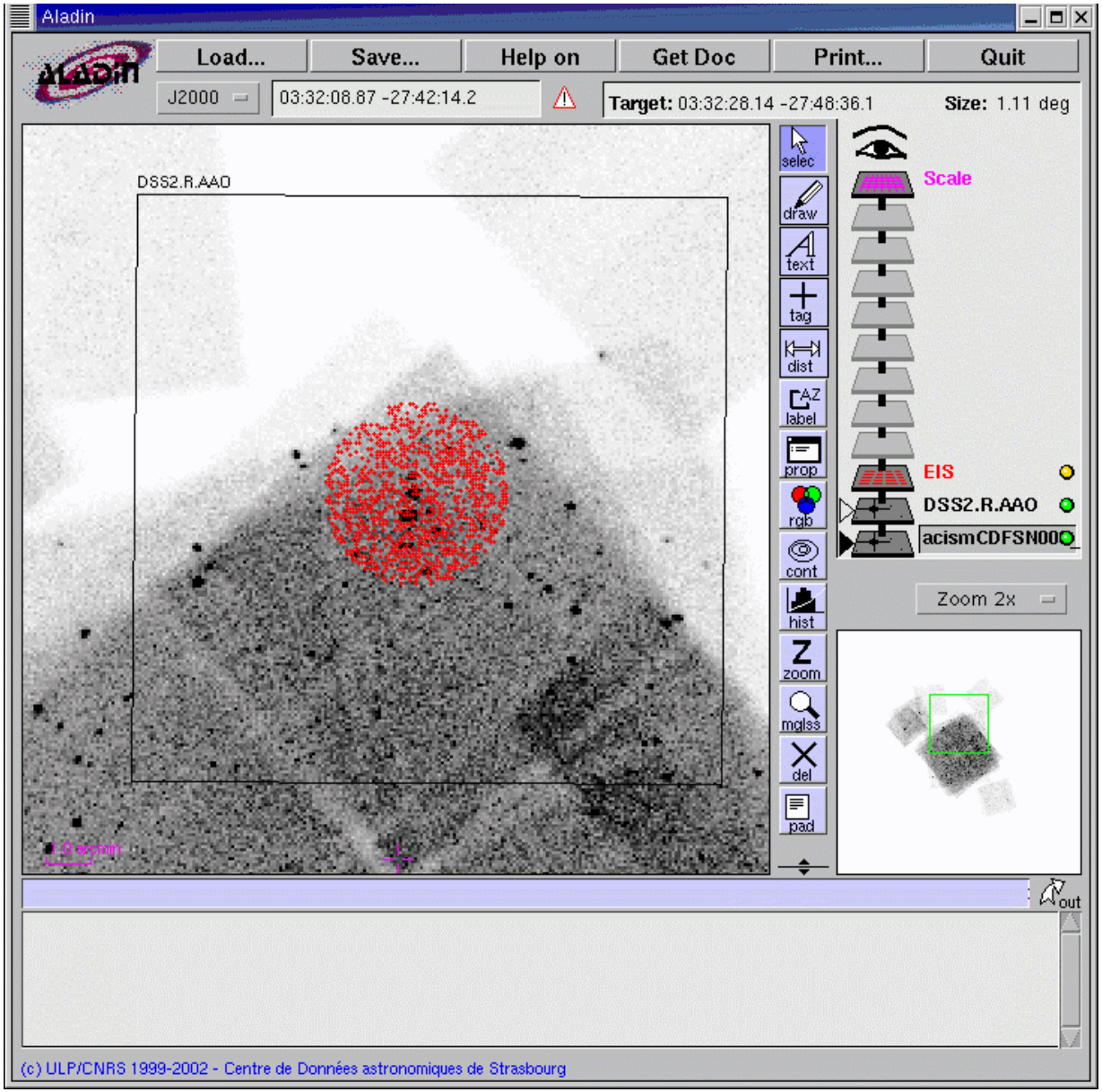

Identified UCDs
Tables including UCD column
Table column matching object and wavelength selected UCD
Netscape: Tables of catalogue VII/206
File Edit View Go Communicator Help
Back Forward Reload Home Search Netscape Print Security Shop
Bookmarks Location: http://vizier.u-strasbg.fr/boch-bin/s
What's Related
Members WebMail Connections BizJournal SmartUpdate Mktplace
Tables of catalogue VII/206
AVO · ESO · ST-ECF · AstroGrid · CDS · Terapix · Jodrell Bank
NB : Highlighted tables have at least one of the following UCD :
, PHOT_GUNN_G, PHOT_HST_F450W, PHOT_INT-MAG_B, PHOT_
B, PHOT_MAG_B,
PHOT_MAG_BLUE, PHOT_SB_GUNN-G, PHOT_SB_JHN_B, PH
SDSS_G, PHOT_STR_B,
PHOT_STR_V, PHOT_UV_4250
VII/206 General Photometry of Galaxies
ugniel+ 1998)
1 VII/206/table1 Catalogue of aperture
tometry
2 Bibliographi
erences for table1.dat
3 VII/206/table3 Weig
and systematic corrections to be applied to data in
4 VII/206/table4 Derive
photometric parameters for the sample's galaxies
100%
Netscape: Table VII/206/ta
e4
File Edit View Go Communicator Help
Back Forward Reload Home Search Netscape Print Security Shop
Bookmarks Location: http://vizier.u-st
asbg.fr/boch-bin/d
What's Related
Members WebMail Connections BizJourna
SmartUpdate Mktplace
Table VII/206/ta
le4
AVO · ESO · ST-ECF · AstroGrid · CDS · Terapix · Jodre
Bank
If no column description is highlighted, try to get all co
mns of the catalogue
Reload with 50 max. entries
View this table in VizieR
VII/206/table4 General Photometry o
Galaxies (Prugniel+ 1998)
Derived photometric
arameters for the sample's
galaxies
recno Name RA1950 DE195 Bt PHOT_INT-MAG_B SBe B-Ve U-Be Nap Tphot Q
"h:m:s" "d:m:s" mag m
/arcsec2 mag mag
3176 NGC3034 09 51 45.3 +69 55 1 9.33 20.10 0.93 0.46 5 7.2 4

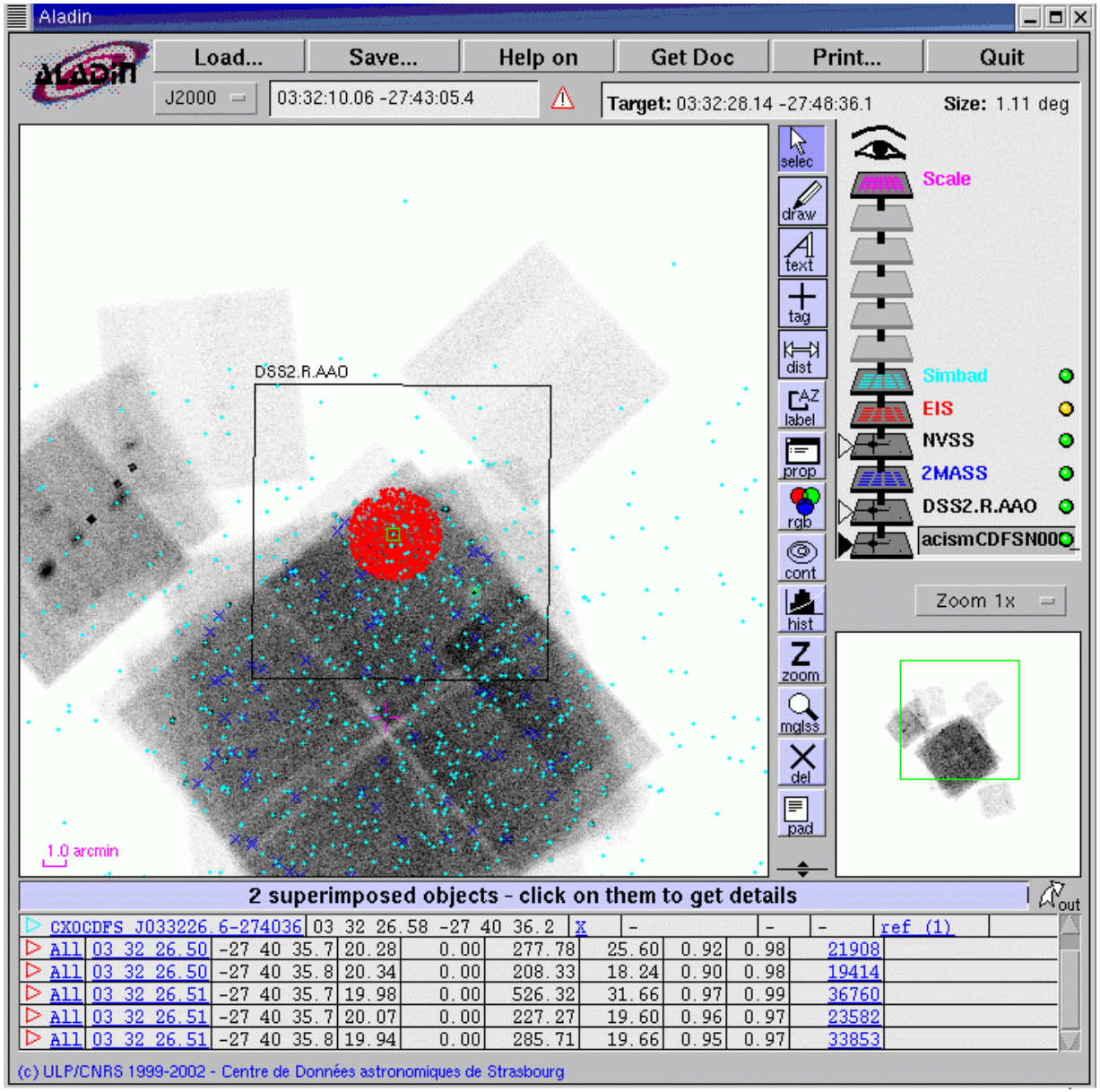
Chandra Deep Field South

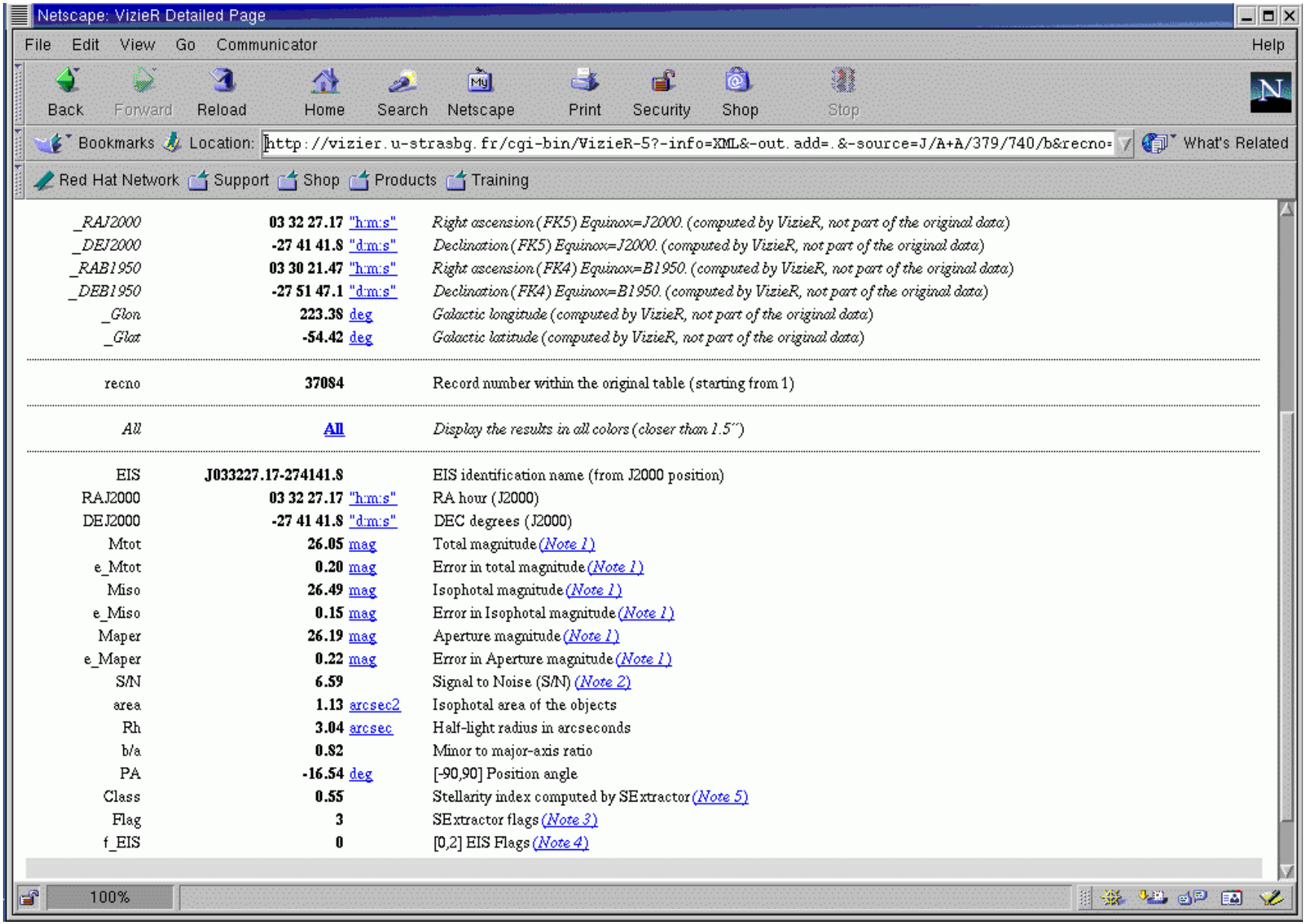





Server selector
Choose an image server or a data server
and fill in the associated form drawn below
Image servers:
Data servers :
Aladin
SkyView
Others...
VLA...
File access:
Local
VizieR catalog service
Specify a target, and a catalog name or identification...
Target
03 32 28.14 -27 48 36.1
Grab coord
Catalog
EIS
Radius
47.4
... don't know which catalog ? Select the
potentially interesting ones with words/keywords !
Author, free text...:
Wavelength
Radio
IR
optical
UV
EUV
X-ray
Gamma-ray
Mission
ANS
ASCA
BeppoSAX
CGRO
COBE
Chandra
Copernicus
EUVE
EXOSAT
Einstein
Astronomy
AGN
Abundances
Ages
Associations
Atomic_Data
BL_Lac_objects
Binaries:cataclysm
Binaries:eclipsing
Binaries:spectrosc
VizieR Catalogs
Surveys in VizieR
Missions in VizieR
Simbad
NED
Others..
FoV
SUBMIT
Reset
Close


Aladin
Load...
Save...
Help on
Get Doc
Print...
Quit
J2000
03:32:08.87 -27:42:14.2
Target: 03:32:28.14 -27:48:36.1
Size: 1.11 deg
DSS2.R.AAO
selec
draw
text
tag
dist
label
prop
rgb
cont
hist
zoom
mglss
del
pad
Scale
EIS
DSS2.R.AAO
acismCDFSN00
Zoom 2x
out
(c) ULP/CNRS 1999-2002 - Centre de Données astronomiques de Strasbourg


Aladin
Load...
Save...
Help on
Get Doc
Print...
Quit
J2000
03:32:10.06 -27:43:05.4
Target: 03:32:28.14 -27:48:36.1
Size: 1.11 deg
DSS2.R.AAO
1.0 arcmin
selec
draw
text
tag
dist
label
prop
rgb
cont
hist
zoom
mglss
del
pad
Scale
Simbad
EIS
NVSS
2MASS
DSS2.R.AAO
acismCDFSN00
Zoom 1x
2 superimposed objects - click on them to get details
CXOCDFS J033226.6-274036 03 32 26.58 -27 40 36.2 X - - - ref (1)
All 03 32 26.50 -27 40 35.7 20.28 0.00 277.78 25.60 0.92 0.98 21908
All 03 32 26.50 -27 40 35.8 20.34 0.00 208.33 18.24 0.90 0.98 19414
All 03 32 26.51 -27 40 35.7 19.98 0.00 526.32 31.66 0.97 0.99 36760
All 03 32 26.51 -27 40 35.7 20.07 0.00 227.27 19.60 0.96 0.97 23582
All 03 32 26.51 -27 40 35.8 19.94 0.00 285.71 19.66 0.95 0.97 33853
(c) ULP/CNRS 1999-2002 - Centre de Données astronomiques de Strasbourg


Netscape: VizieR Detailed Page
File Edit View Go Communicator Help
Back Forward Reload Home Search Netscape Print Security Shop Stop
Bookmarks Location: http://vizier.u-strasbg.fr/cgi-bin/VizieR-5?-info=XML&-out.add=.&-source=J/A+A/379/740/b&recno=
What's Related
Red Hat Network Support Shop Products Training
_RAJ2000 03 32 27.17 "h:m:s" Right ascension (FK5) Equinox=J2000. (computed by VizieR, not part of the original data)
_DEJ2000 -27 41 41.8 "d:m:s" Declination (FK5) Equinox=J2000. (computed by VizieR, not part of the original data)
_RAB1950 03 30 21.47 "h:m:s" Right ascension (FK4) Equinox=B1950. (computed by VizieR, not part of the original data)
_DEB1950 -27 51 47.1 "d:m:s" Declination (FK4) Equinox=B1950. (computed by VizieR, not part of the original data)
_Glon 223.38 deg Galactic longitude (computed by VizieR, not part of the original data)
_Glat -54.42 deg Galactic latitude (computed by VizieR, not part of the original data)
recno 37084 Record number within the original table (starting from 1)
All All Display the results in all colors (closer than 1.5")
EIS J033227.17-274141.8 EIS identification name (from J2000 position)
RAJ2000 03 32 27.17 "h:m:s" RA hour (J2000)
DEJ2000 -27 41 41.8 "d:m:s" DEC degrees (J2000)
Mtot 26.05 mag Total magnitude (Note 1)
e_Mtot 0.20 mag Error in total magnitude (Note 1)
Miso 26.49 mag Isophotal magnitude (Note 1)
e_Miso 0.15 mag Error in Isophotal magnitude (Note 1)
Maper 26.19 mag Aperture magnitude (Note 1)
e_Maper 0.22 mag Error in Aperture magnitude (Note 1)
S/N 6.59 Signal to Noise (S/N) (Note 2)
area 1.13 arcsec2 Isophotal area of the objects
Rh 3.04 arcsec Half-light radius in arcseconds
b/a 0.82 Minor to major-axis ratio
PA -16.54 deg [-90,90] Position angle
Class 0.55 Stellarity index computed by SExtractor (Note 5)
Flag 3 SExtractor flags (Note 3)
f_EIS 0 [0,2] EIS Flags (Note 4)
100%

Archive/catalog implementations

- Systematic approach
- Archive holders know their data best
  - Best when archives participate in defining metadata
  - Human interaction required at this stage.
- Issues:
  - Access, proprietry periods
  - Maintenance -- update mechanisms

Interactions with archive providers

- Stimulating review of archive exposure mechanisms
- Metadata definitions
  - What information is required to decribe their data holdings?

Building practical recommendations for interoperability

- Metadata layer structure and functionality
  - Efficiencies of distributed/semi-centralized metadata
- Immediate practicalities:
  - Standards, UCDs, archive exposure
  - Detailed interoperability eg. Photometry
    - Make filter system characteristics accessible
      - Transmission curves can be integrated

Conclusions

- CDS interoperability test bed available for
  - Metadata development
  - Early science usage. ✶ Available now ✶
  - ✶ feedback welcome ✶
  - Efficient semi-centralized system for high level demo and testing - development in concert with distributed system architecture