Data Access Layer standards: current status

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DAL landscape

- DALI [VOTABLE]
- TAP ADQL
- ObsTAP ([Obscore])

- ConeSearch SIAV1 SSA1.1 SIAV2.0

- AccessData DataLink

- ??????

Protocol families in two words

- TAP = generic and interoperable relational DBMS interface. ADQL -→ extended SQL forn Astronomy. IVOA Recommendations since 2008 and 2010
- « Simple » access protocols (ConeSerach, SIA, SSA …) : mainly Parameter query interface for catalogues, images, cubes, spectra
- ObsTAp is dataset discovery based on a TAP service (2011)
- Newcomers : DataLink (2015) AccessData (Working Draft)

Revisions

- After a few years of implementations and feedback TAP and ADQL are currently under revision
- SIA very old (2002) -→ need a major upgrade + data extraction (= AccessData)

Multi-dimensional Data Acces

minimal requirements from CSP:

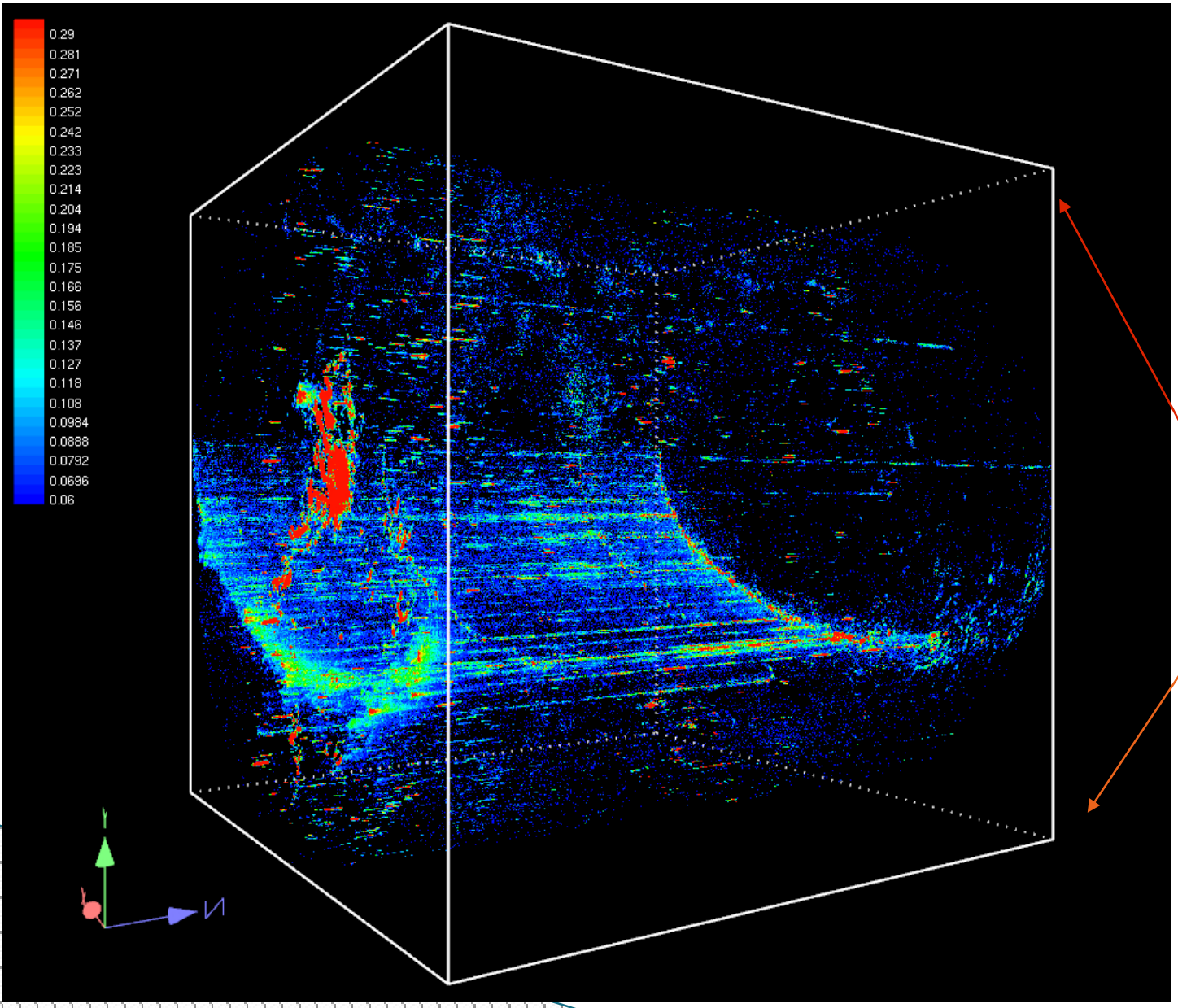
* Data Discovery (Query)
  * A service shall be able to receive queries regarding its data collection(s) from a client, with the client placing one or more of the following constraints:
    * RA,Dec
    * Frequency/wavelength
    * Polarization states
    * Spatial size
    * Angular resolution
    * Integration time
    * Time of observation
  * A service shall return to the client a list of observations, and the corresponding metadata for each observation, meeting the user-imposed constraints. In the event that the user places no constraints, the entire list of observations, and the corresponding metadata for each data set, shall be returned. In the event that no data meet the user's constraints, the service shall indicate the absence of any matches.

Multi-dimensional Data Acces

minimal requirements from CSP:

* Data Access
  * Once a user has the list of observations that satisfy the constraints, they select all or a subset of the observations and:
    * Download the complete science data for each of the selected observations (the service shall return the complete multi-dimensional science data and metadata for each selected observation) or;
    * Download simple cutouts of the science data for each of the selected observations (the service shall be able to extract and return a user-specified subset of the complete multi-dimensional science data and metadata for each selected observation).
* Simple Cutout
  * For a simple cutout, the user-specified subset is restricted to be a contiguous interval within each dimension of the multi-dimensional science data. The user should *not* be allowed to specify subsets with "gaps" or resampling or anything like that.
    * Spatial: a circle (a coordinate and a radius)
    * Energy: one interval (from energy1 to energy2)
    * Time: one interval (from time1 to time2)
    * Polarization: a list

STEP 1 : Discovery



Radio data cube

Green and red Axes
- *Spatial dimensions*

Blue Axis :
- *Wavelength dimension*

STEP 2:

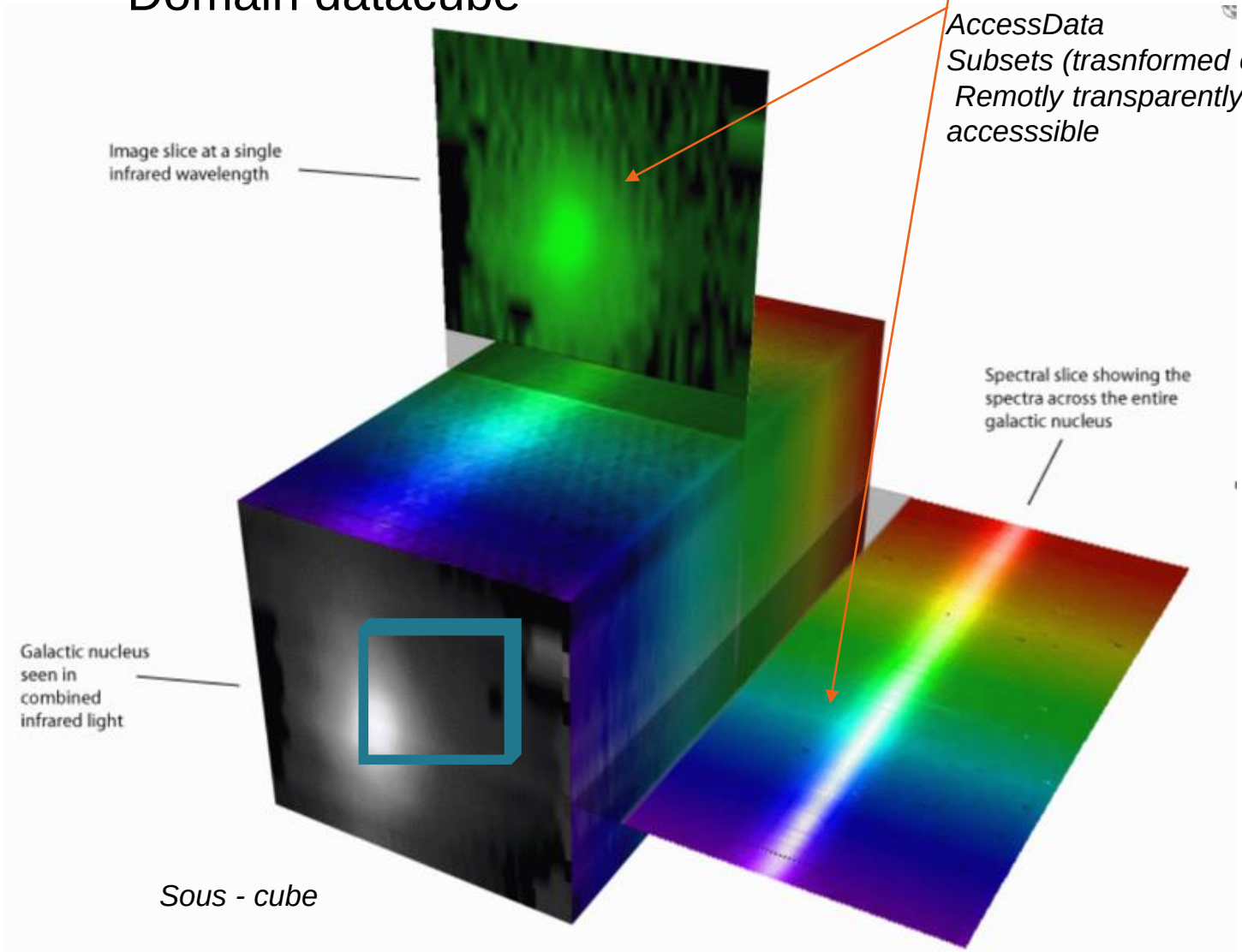
Description :

- *Axes type*
- *Extension*
- *Typical value*
- *Date*
- *Data producer,*
- *Data curator*

« Integral Field Unit » optical Domain datacube

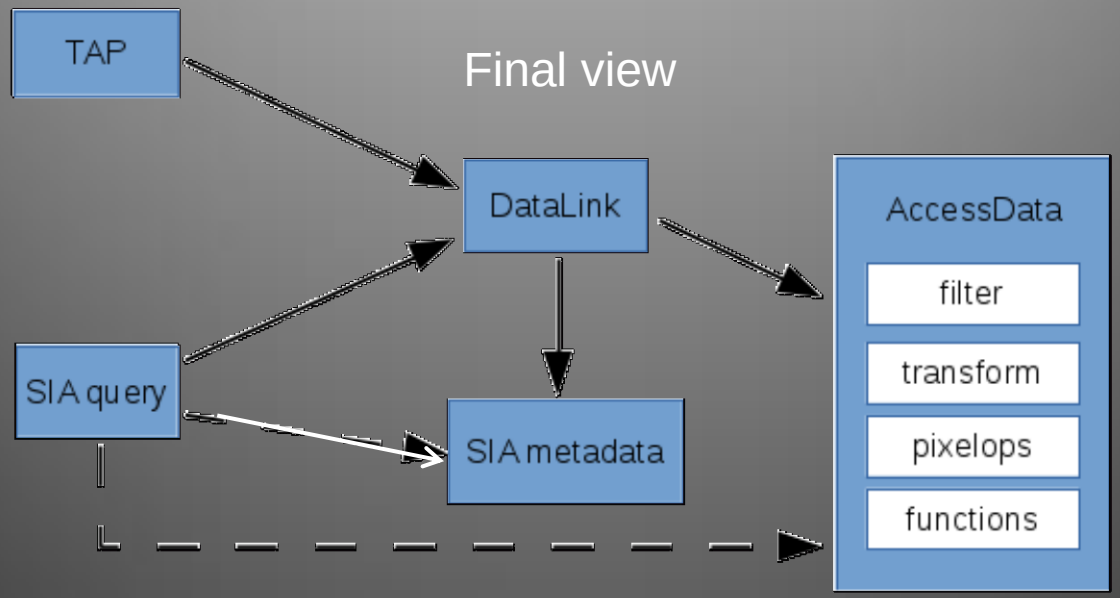
STEP 3

AccessData
Subsets (trasnformed or not)
Remotly transparently accesssible

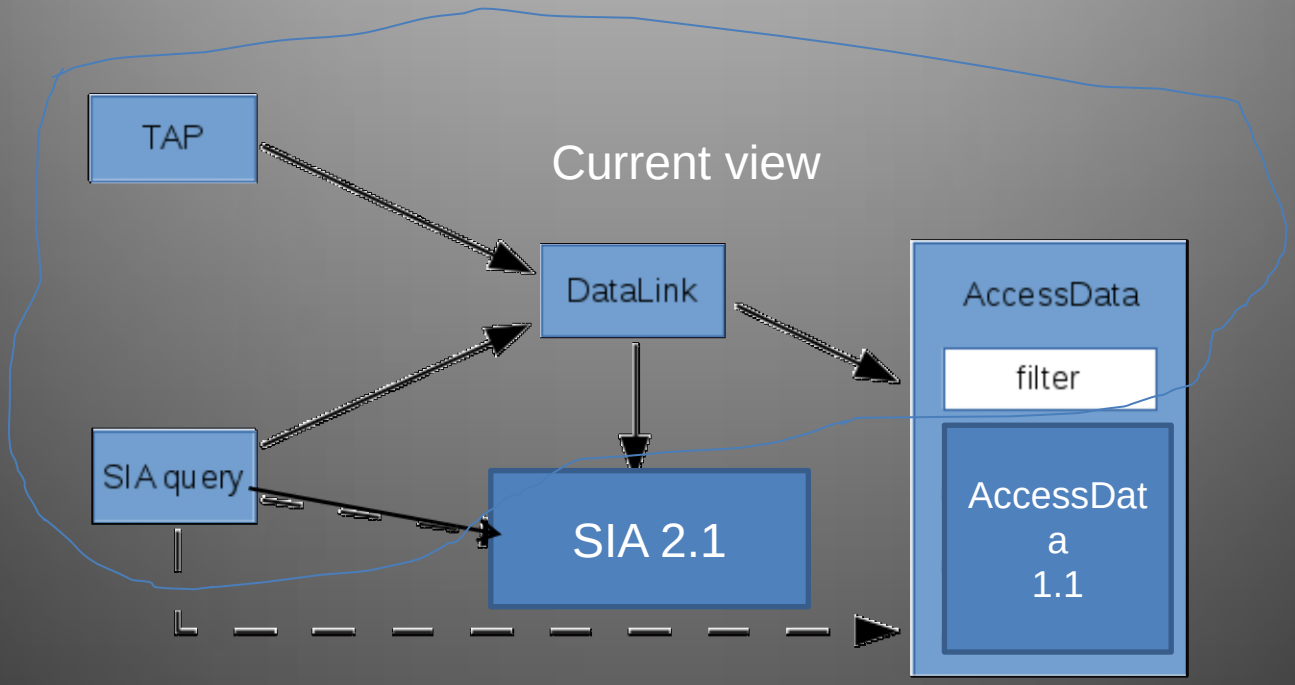


Sous - cube

Multidimensional data
protocol Caravane



Multidimensional data protocol Caravane



Cube Access scenario: basic
(first version of protocols, october 2015)

- I) Scenario : find out cube services from registry

Obstap (generic, ADQL)
or SIAV2 (cube-oriented, parameterQuery)

- II) Query from an ObsCore service

« select * from Obscore where dataproduct_type = cube »

- II bis) Query from a SIAV2 service

« http://.....?request=query&pos=circle 3.0 2.0 1.0 &band=0.001 0.003 »

Cube Access scenario: basic
(first version of protocols, october 2015)

- III) query response :

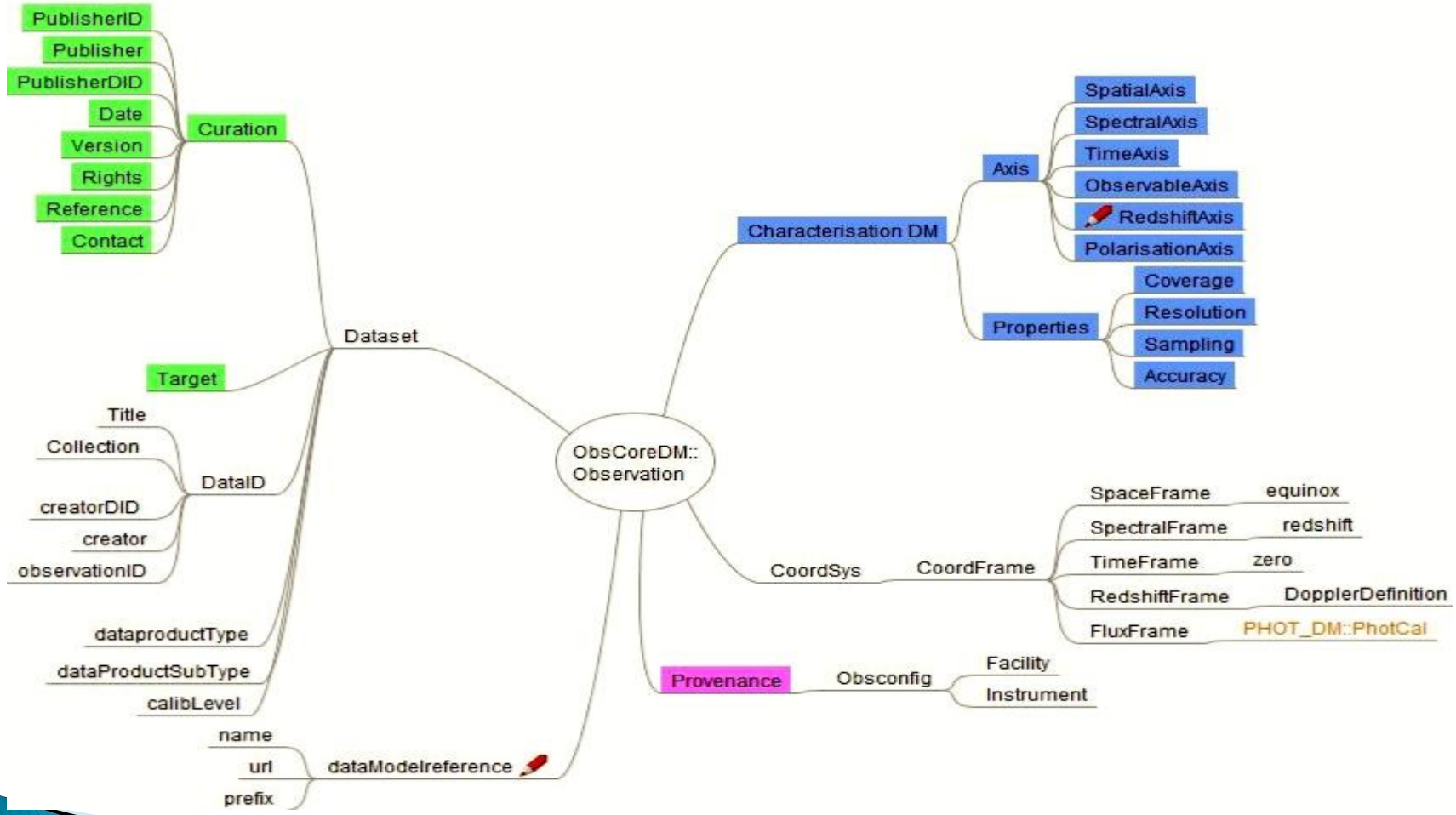
votable, ObsCore/consistent

- IV) DataLink :

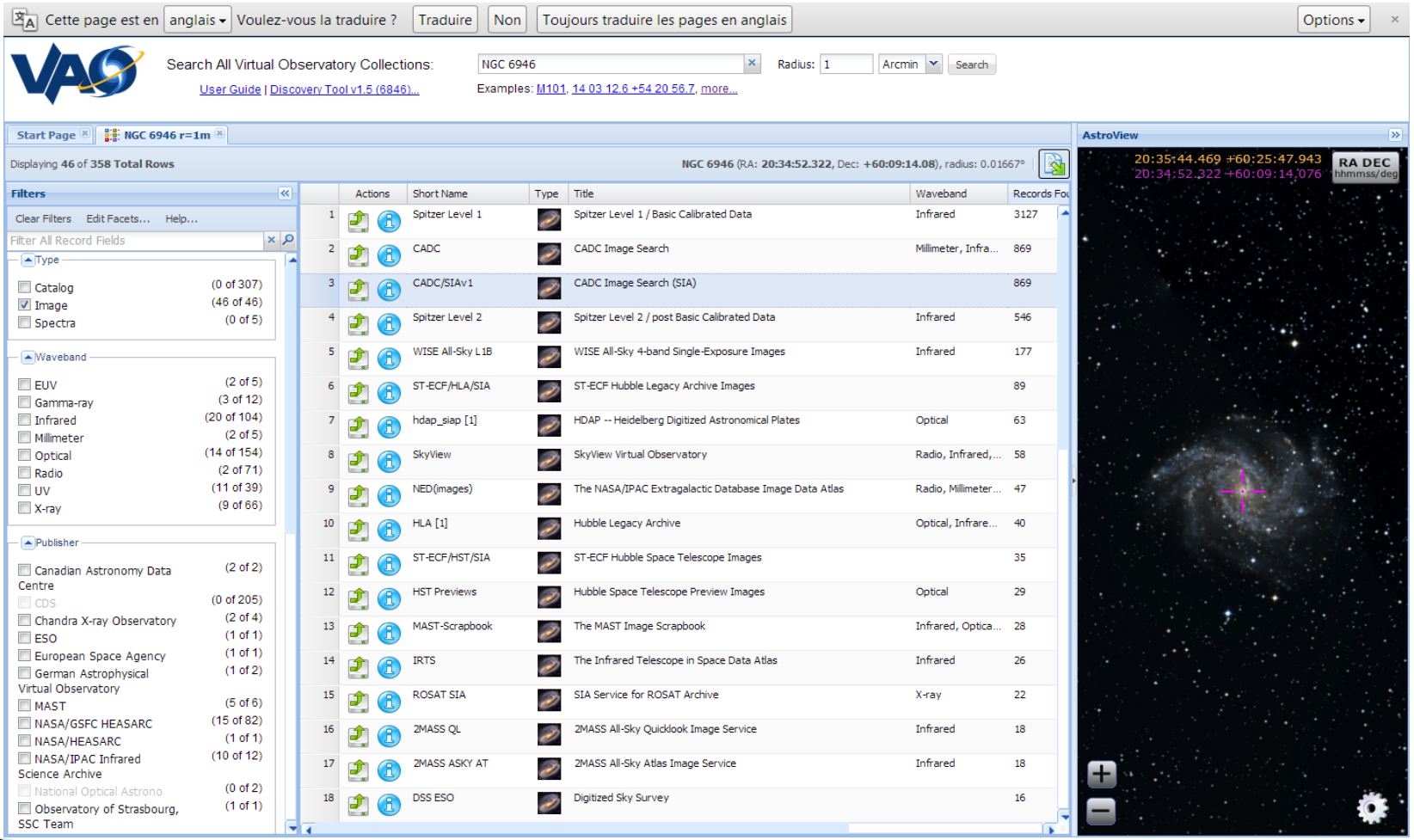
fixed links, metadata services, access data

- IV bis) direct AccessData

ObsCore Heuristic Map



Discovery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Radius: 1 Arcmin Search
User Guide | Discovery Tool v1.5 (6846)...
Examples: M101, 14 03 12.6 +54 20 56.7, more...
Start Page
NGC 6946 r=1m
Displaying 46 of 358 Total Rows
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Filters
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Type
Catalog (0 of 307)
Image (46 of 46)
Spectra (0 of 5)
Waveband
EUV (2 of 5)
Gamma-ray (3 of 12)
Infrared (20 of 104)
Millimeter (2 of 5)
Optical (14 of 154)
Radio (2 of 71)
UV (11 of 39)
X-ray (9 of 66)
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CDS (0 of 205)
Chandra X-ray Observatory (2 of 4)
ESO (1 of 1)
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German Astrophysical Virtual Observatory (1 of 2)
MAST (5 of 6)
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Observatory of Strasbourg, SSC Team (1 of 1)
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1 Spitzer Level 1 Spitzer Level 1 / Basic Calibrated Data Infrared 3127
2 CADC CADC Image Search Millimeter, Infra... 869
3 CADC/SIAv1 CADC Image Search (SIA) 869
4 Spitzer Level 2 Spitzer Level 2 / post Basic Calibrated Data Infrared 546
5 WISE All-Sky L1B WISE All-Sky 4-band Single-Exposure Images Infrared 177
6 ST-ECF/HLA/SIA ST-ECF Hubble Legacy Archive Images 89
7 hdap_siap [1] HDAP -- Heidelberg Digitized Astronomical Plates Optical 63
8 SkyView SkyView Virtual Observatory Radio, Infrared,... 58
9 NED(images) The NASA/IPAC Extragalactic Database Image Data Atlas Radio, Millimeter... 47
10 HLA [1] Hubble Legacy Archive Optical, Infrare... 40
11 ST-ECF/HST/SIA ST-ECF Hubble Space Telescope Images 35
12 HST Previews Hubble Space Telescope Preview Images Optical 29
13 MAST-Scrapbook The MAST Image Scrapbook Infrared, Optica... 28
14 IRTS The Infrared Telescope in Space Data Atlas Infrared 26
15 ROSAT SIA SIA Service for ROSAT Archive X-ray 22
16 2MASS QL 2MASS All-Sky Quicklook Image Service Infrared 18
17 2MASS ASKY AT 2MASS All-Sky Atlas Image Service Infrared 18
18 DSS ESO Digitized Sky Survey 16
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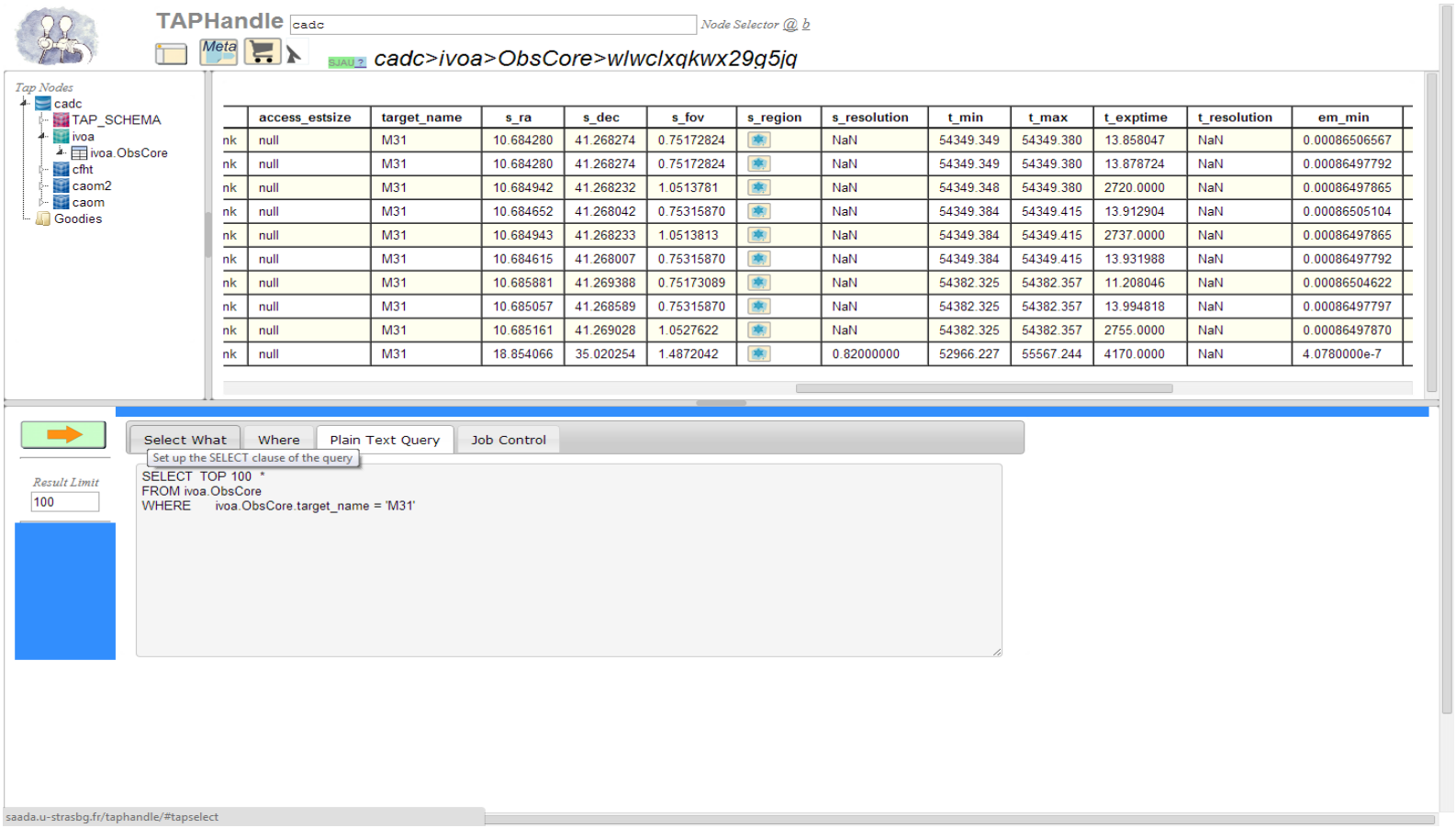
RA DEC
hhmmss/deg

Discovery


TAPHandle
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Node Selector @ b
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cadc
TAP_SCHEMA
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ivoa.ObsCore
cfht
caom2
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access_estsize target_name s_ra s_dec s_fov s_region s_resolution t_min t_max t_exptime t_resolution em_min
nk null M31 10.684280 41.268274 0.75172824 NaN 54349.349 54349.380 13.858047 NaN 0.00086506567
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nk null M31 18.854066 35.020254 1.4872042 0.82000000 52966.227 55567.244 4170.0000 NaN 4.0780000e-7
Select What
Where
Plain Text Query
Job Control
Set up the SELECT clause of the query
Result Limit
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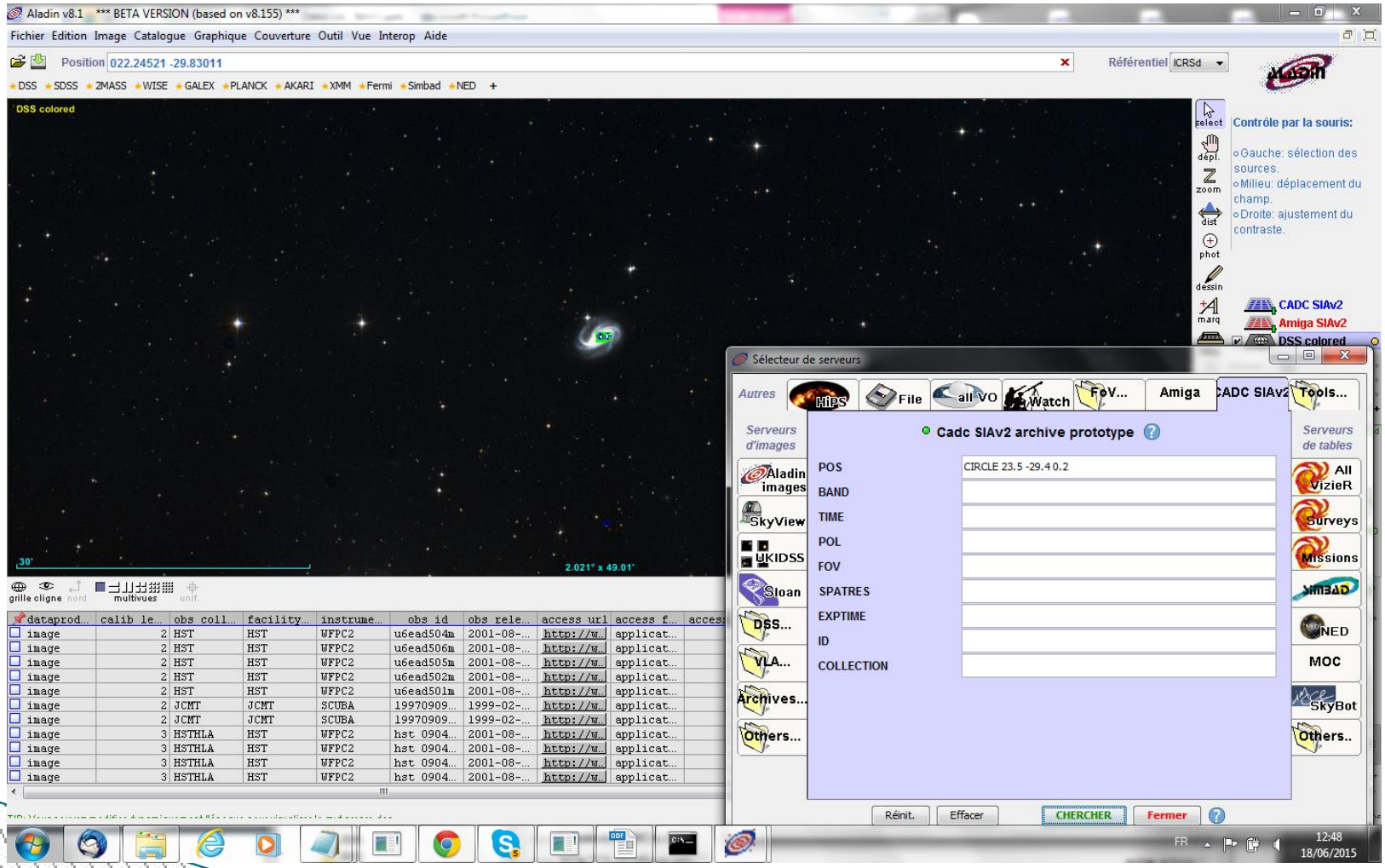
SELECT TOP 100 *
FROM ivoa.ObsCore
WHERE ivoa.ObsCore.target_name = 'M31'
saada.u-strasbg.fr/taphandle/#tapselect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DSS colored
Contrôle par la souris:
Gauche: sélection des sources.
Milieu: déplacement du champ.
Droite: ajustement du contraste.
CADC SIAv2
Amiga SIAv2
DSS colored
Sélecteur de serveurs
Autres
HiPS
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Watch
FoV...
Amiga
CADC SIAv2
Tools...
Serveurs d'images
Cadc SIAv2 archive prototype
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CIRCLE 23.5 -29.4 0.2
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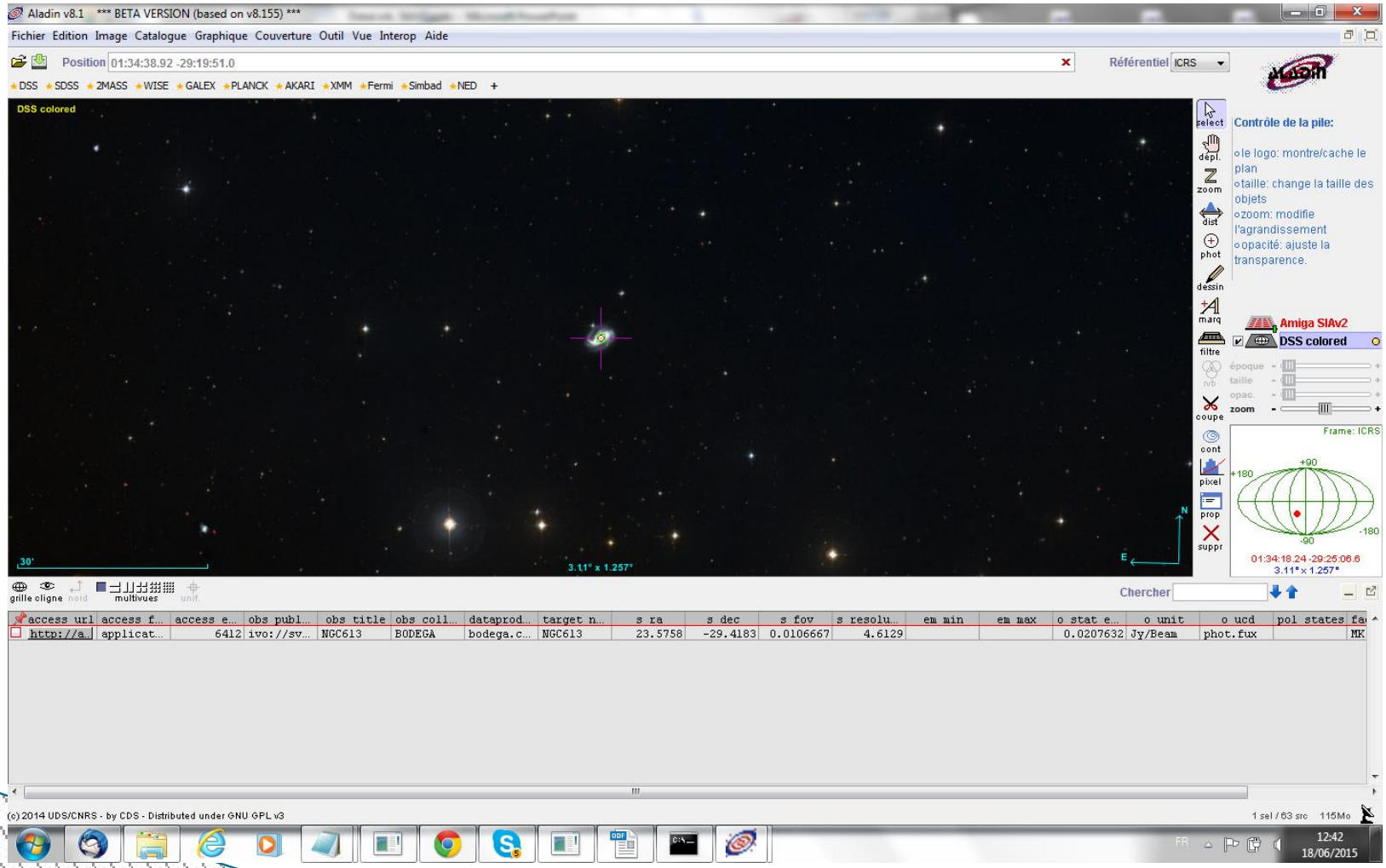
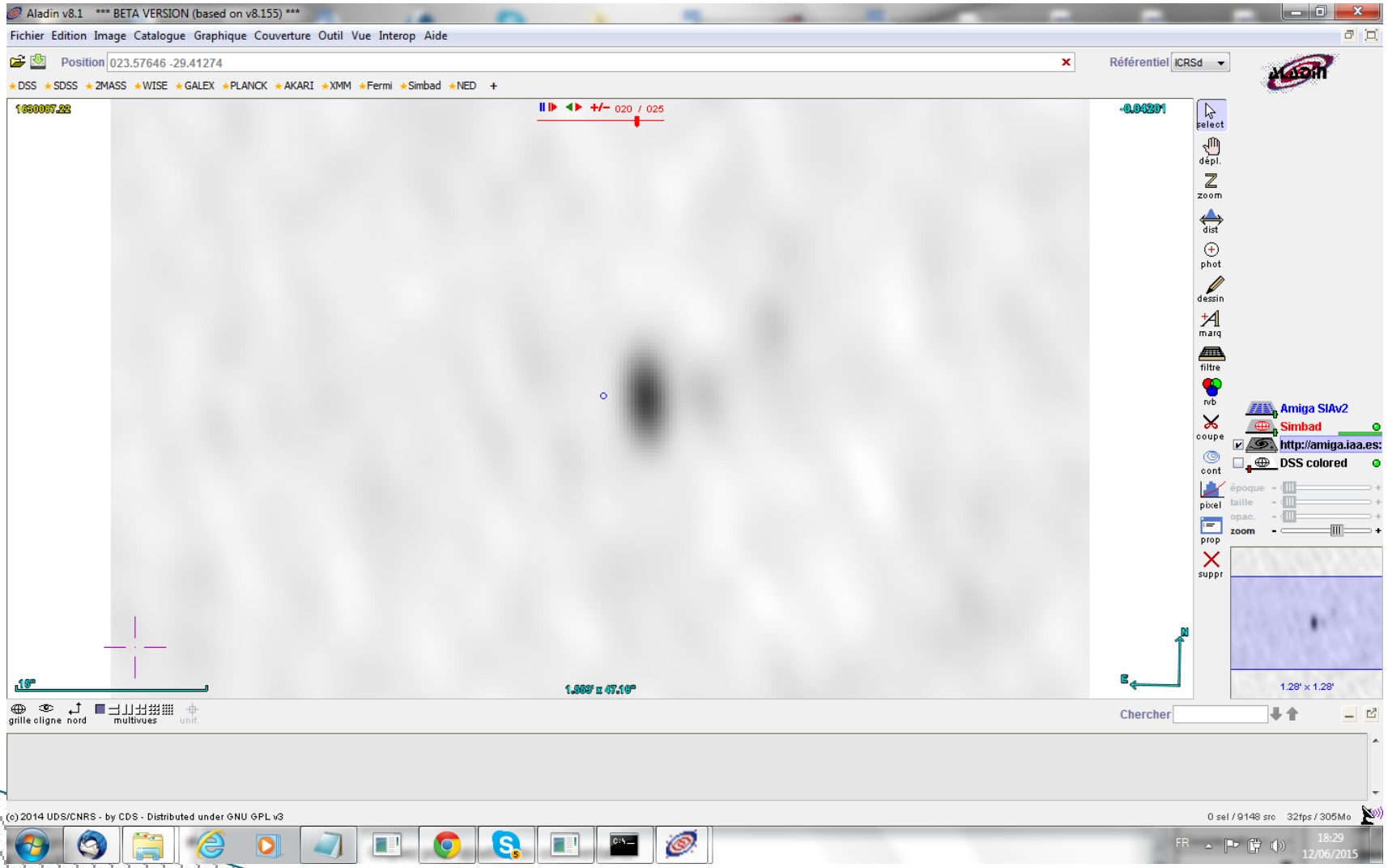
18/06/2015

AMIGA response for NGC 613

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Simbad
http://amiga.iaa.es:
DSS colored
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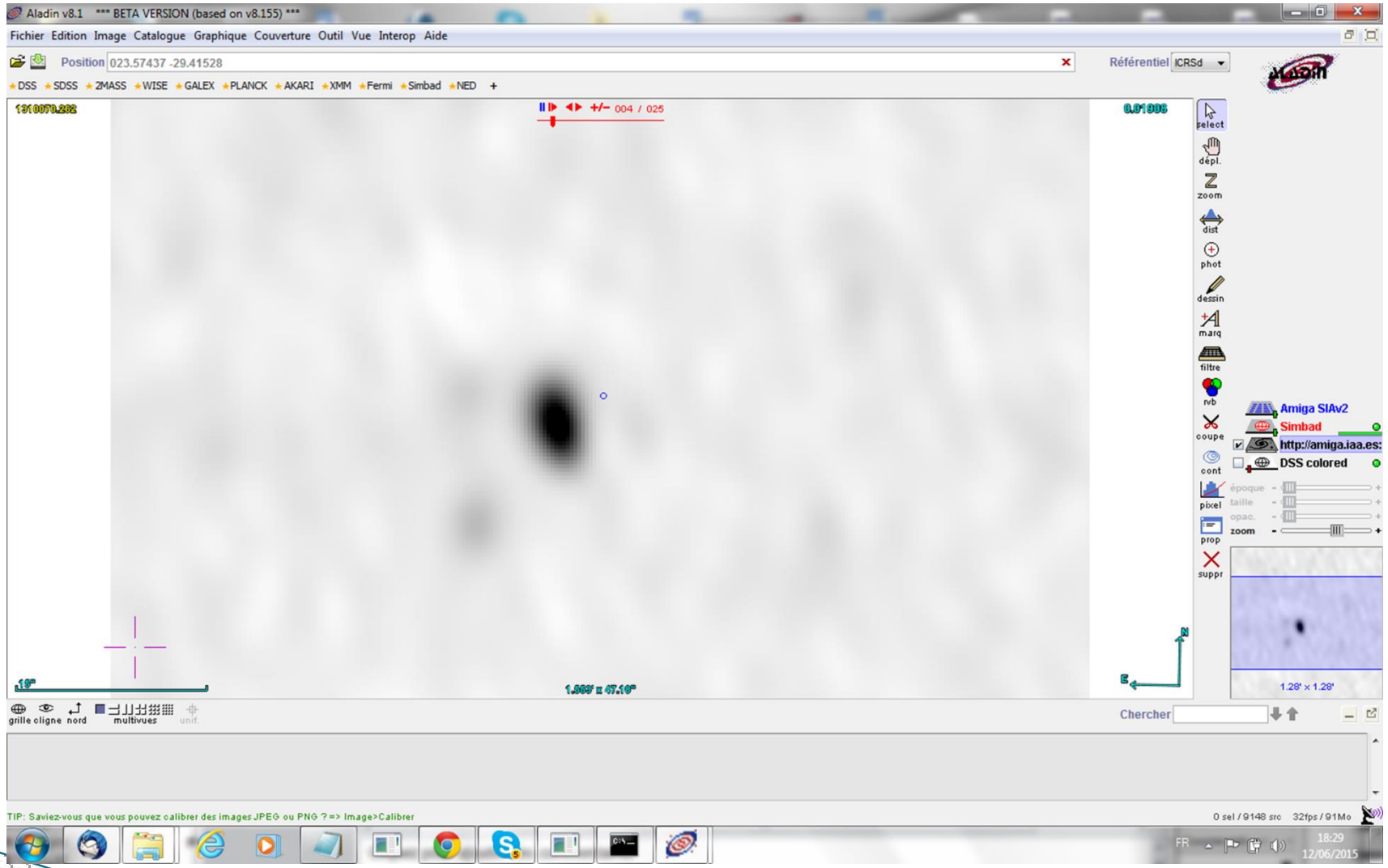
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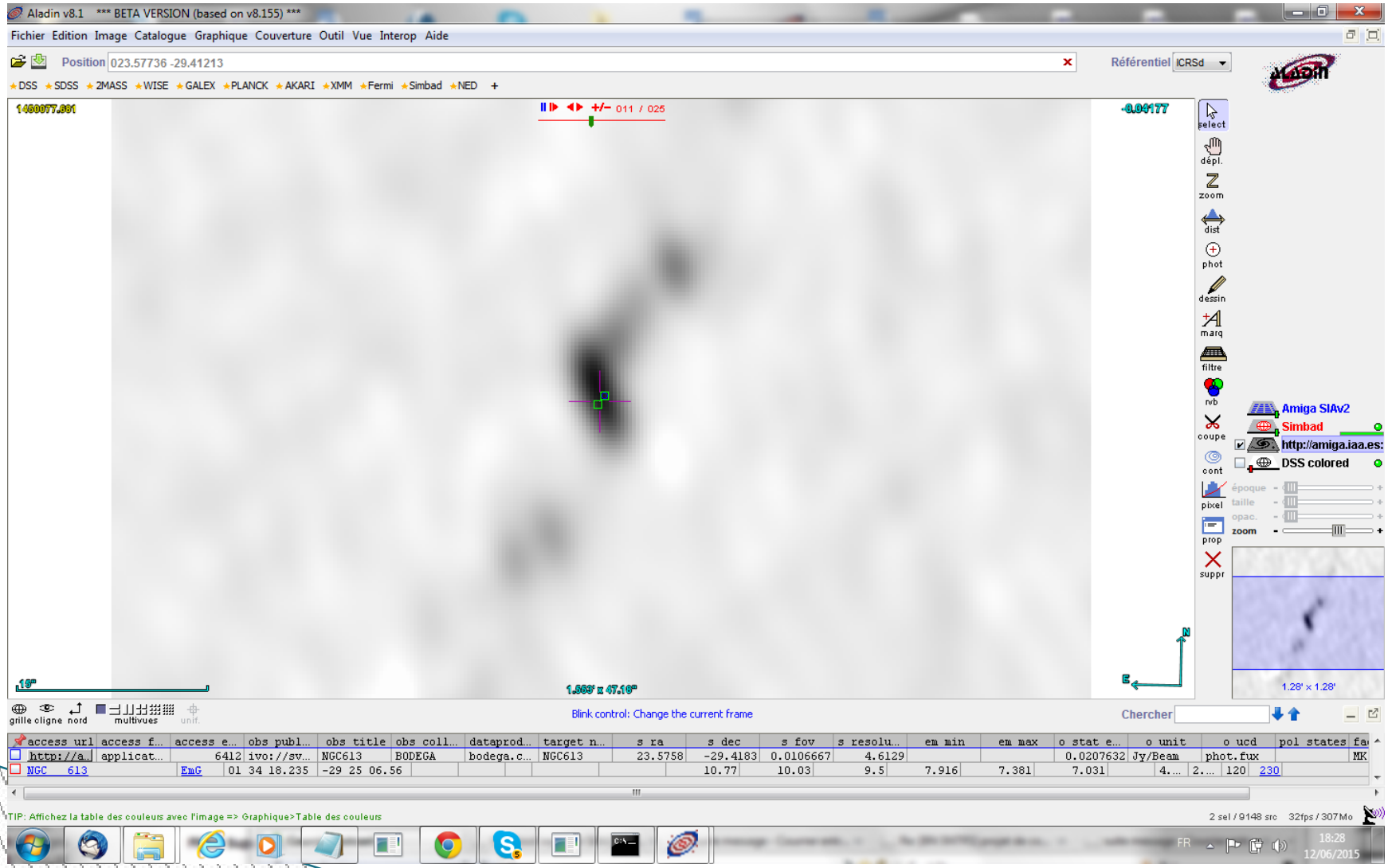
Amiga SIAv2
Simbad
http://amiga.iaa.es:
DSS colored
1.28' x 1.28'
Chercher
TIP: Saviez-vous que vous pouvez calibrer des images JPEG ou PNG ? => Image>Calibrer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NGC 613 EmG 01 34 18.235 -29 25 06.56 10.77 10.03 9.5 7.916 7.381 7.031 120 230
TIP: Affichez la table des couleurs avec l'image => Graphique>Table des couleurs
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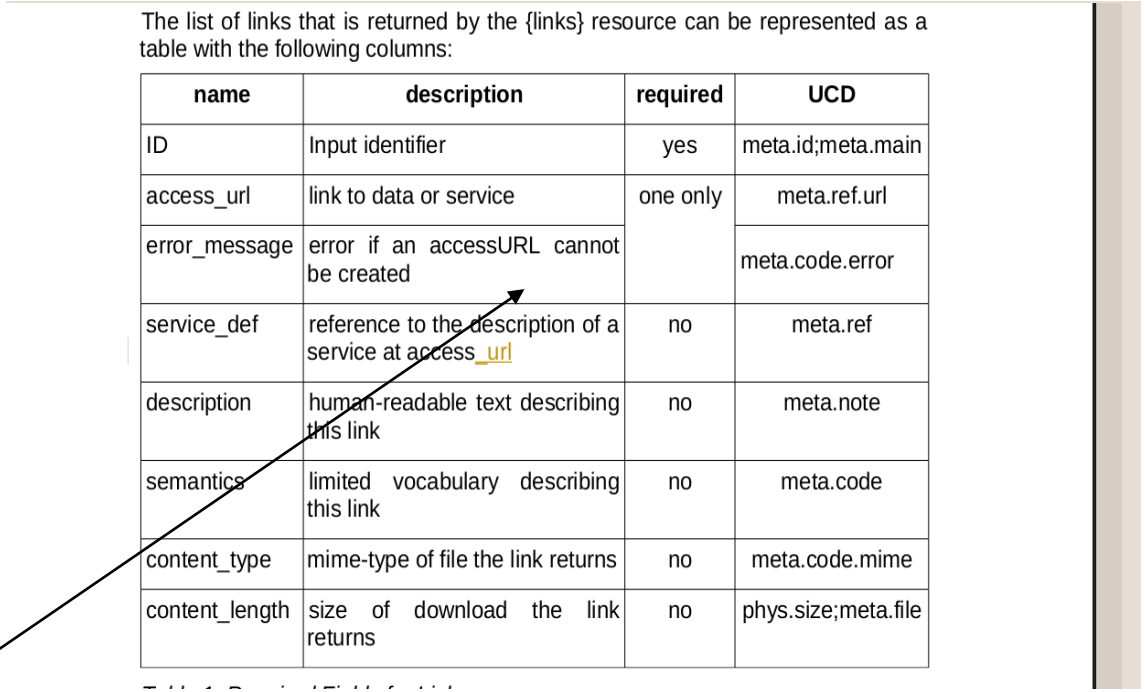
18:28
12/06/2015

DataLink

Two mechanisms to bound resources (others datasets, descriptions, services) to « discovered » datasets = resource descriptor and links services



The list of links that is returned by the {links} resource can be represented as a table with the following columns:

name	description	required	UCD
ID	Input identifier	yes	meta.id;meta.main
access_url	link to data or service	one only	meta.ref.url
error_message	error if an accessURL cannot be created		meta.code.error
service_def	reference to the description of a service at access_url	no	meta.ref
description	human-readable text describing this link	no	meta.note
semantics	limited vocabulary describing this link	no	meta.code
content_type	mime-type of file the link returns	no	meta.code.mime
content_length	size of download the link returns	no	phys.size;meta.file

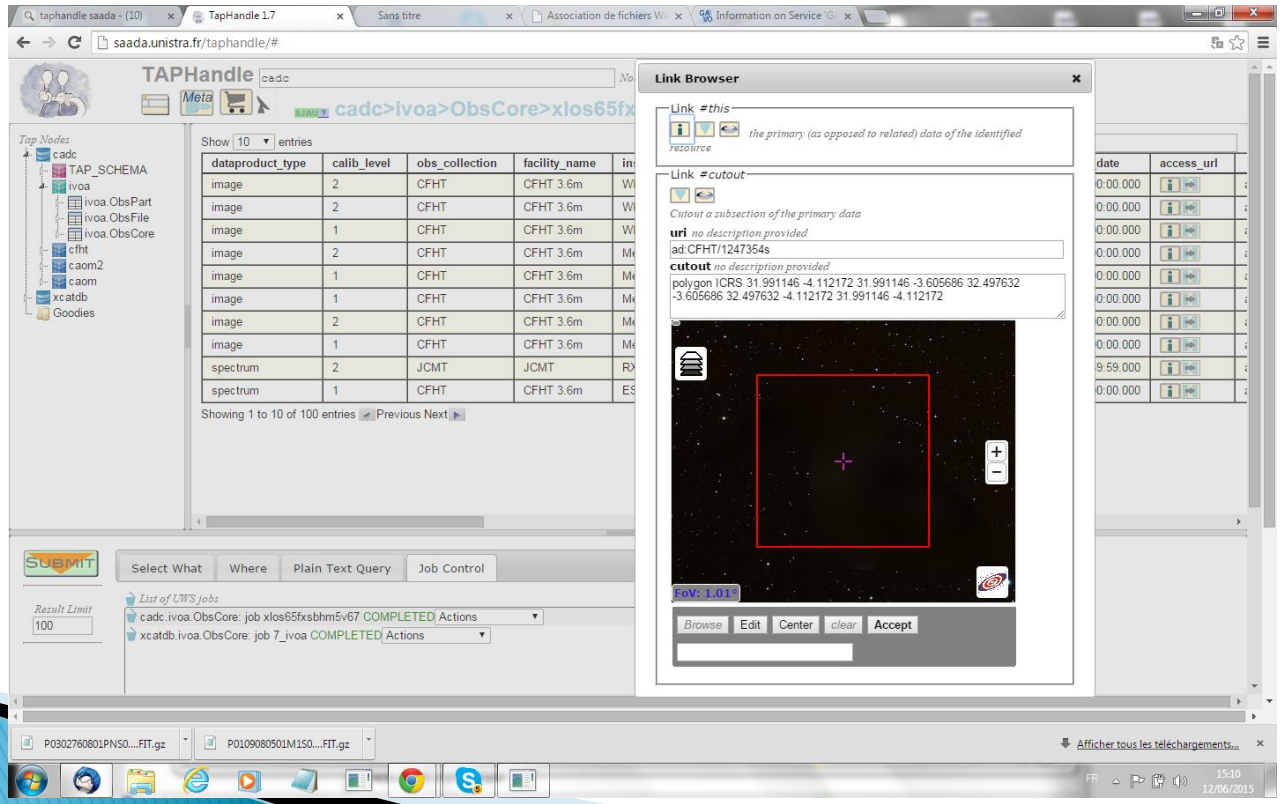
- Cube average (fixed links), accessdata, *(custom services)*

AccesData

- Cutout driven by parameters identical to Query
  - POS=CIRCLE 12 34 0.5
  - POS=RANGE 12.014.0 34.0 36.0
  - BAND=500 550
  - TIME= 55000.0 56000.0
  - POL=Q,POL=.....

DataLink and AccessData combination

- Client implementation : TapHandle :



Current protocol status

- TAP 1.1 and ADQL 2.1 are discussed Drafts
- DataLink 1.0 is a recommendation since June 2015
- SIAV2.0 is a proposed recommendation with a very long stay in TCG review phase.

Hopefully all main issues have been solved and it becomes a recommendation before Sydney

- AccesData 1.0 :

new version of WD before Sydney. Should be fast because it's very dependant on SIAV2. -→ recommendation well before May 2016 interop

- SimDAL (Theoretical data), VOTP (Voevent), Time Series , upgrade of DataLink/SIAV2/AccessData

Cube Access scenario
(open discussion)

- I) Scenario : find out cube services from registry.

Obstap / SIAV2

- II bis) Query from an ObsCore service

« select * from Obscore where dataproduct_type = cube »

- II) Query from a SIAV2 service

« http://.....?request=query&pos=...&band=.... »

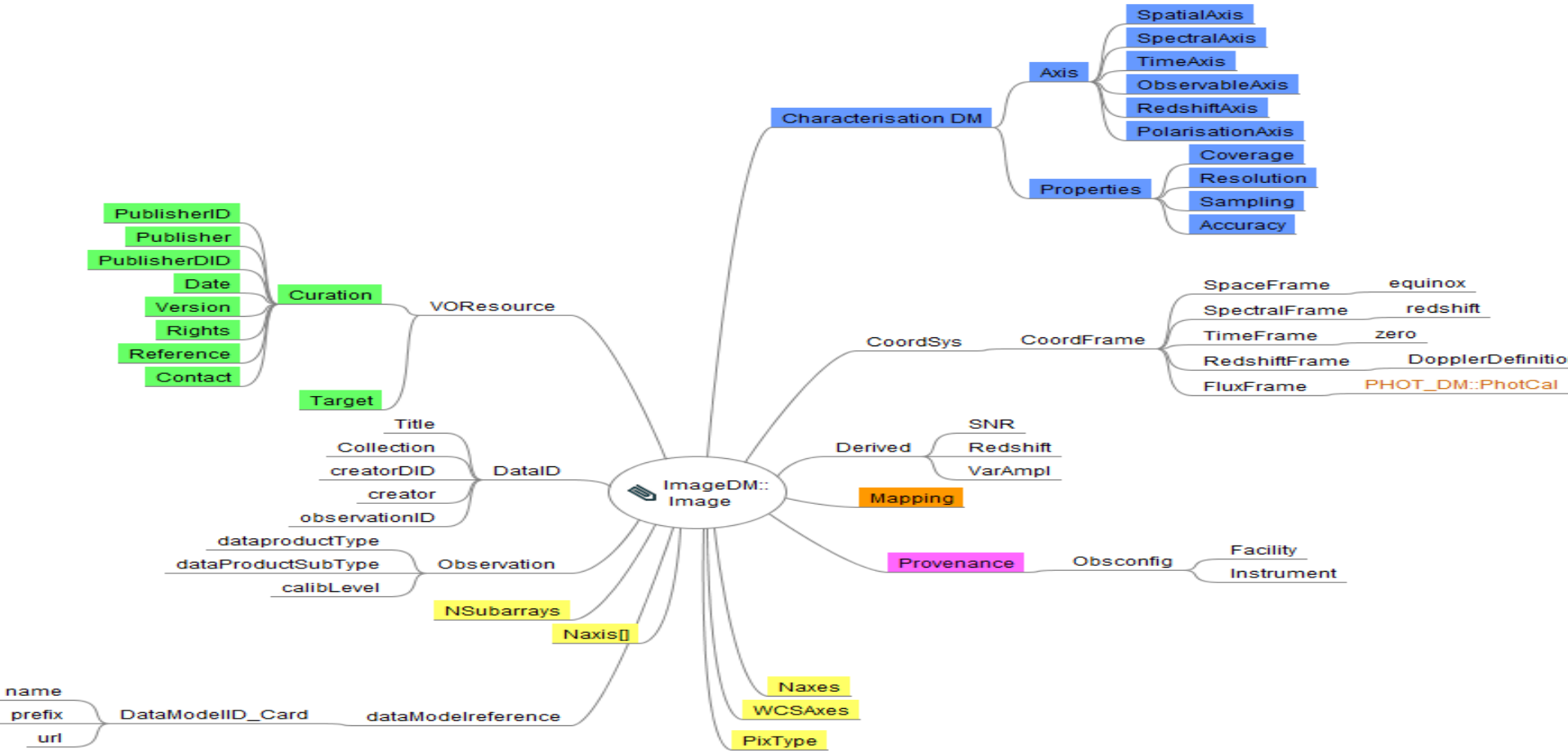
  - Stored datasets
  - Virtual datasets

Cube Access scenario
(second version of protocols, may 2015)

- IV) direct acces to Metadata (get WCS or other deta

Additional metadata, ImageDM consistent metadata (= ImageDM serialization)

- IV bis) datalink
- V) Accessdata :

cutout, resampling, regridding

ImageDataModel heuristic map