



---

# Visibility data discovery and access prototype based on ObsTAP + DataLink

F.Bonnarel, M. Louys, A.Egner,  
K.Lutz. Y.Stein (CDS)



# Our GOAL

- Demonstrate how we can use existing standards to expose visibility data in the VO and highlight what is missing by :
- Try to expose a small collection of visibility data observations (measurement sets) in an ObsTAP service
- Solve the Observation / dataset issue
  - Visibility data observations are generally gathering several datasets
- Provide additional information useful for data selection by adding « ad hoc » columns in ObsCore table and various information via DataLink
- *Initiate a discussion on how we can standardize this additional information*



# Small MS collection

- Various measurement sets provided by Katharina Lutz and Yelena Stein ( post docs at CDS) and Alan Loh (Nançay)
  - 7 ATCA MS
    - Single and multi-fields : 1-2 Ghz, 4-5 Hhz, 6-7Ghz, 40-50 Ghz bands
  - 2 EVLA MS
    - Single and multi\_fields 1-2 Ghz band
  - 1 LOFAR MS
    - 50-60 Mhz band
  - 1 NENUFAR MS
    - 50-60 Mhz band



# Processed Metadata : listobs output

- For each measurement set we extract metadata using the casa « listobs » command
- Algorithm to split measurement sets into several datasets and extract ObsCore metadata for them developed by one of us (A.Egner) as an internship project.

```

=====
MeasurementSet Name: /home/klutz/Interns/Anais_Radio-Data-Archive/Measurement_Sets/Hi_data_narrow_channels.ms      MS Version 2
=====
Observer: TB,KL      Project: C2705
Observation: ATCA
Data records: 18900      Total elapsed time = 3229.86 seconds
Observed from 10-Sep-2015/02:13:20.0 to 10-Sep-2015/03:07:09.9 (UTC)

ObservationID = 0      ArrayID = 0
Date      Timerange (UTC)      Scan      FldId      FieldName      nRows      SpwIds      Average Interval(s)      ScanIntent
10-Sep-2015/02:13:20.0 - 02:53:29.9      0      0      eso208-g026      14460      [0,1,2,3]      [9.86, 9.86, 9.86, 9.86]
02:54:10.0 - 02:59:09.9      1      1      0823-500      1800      [0,1,2,3]      [9.86, 9.86, 9.86, 9.86]
02:59:50.0 - 03:07:09.9      2      0      eso208-g026      2640      [0,1,2,3]      [9.86, 9.86, 9.86, 9.86]
(nRows = Total number of rows per scan)

Fields: 2
ID      Code Name      RA      Decl      Epoch      SrcId      nRows
0      eso208-g026      07:35:21.099994      -50.02.34.99996      J2000      0      17100
1      0823-500      08:25:26.868994      -50.10.38.49003      J2000      1      1800

Spectral Windows: (4 unique spectral windows and 1 unique polarization setups)
SpwID      Name      #Chans      Frame      Ch0(MHz)      ChanWid(kHz)      TotBW(kHz)      CtrFreq(MHz)      Corrs
0      2049      TOPO      3124.000      -1000.000      2049000.0      2100.0000      XX XY YX YY
1      17409      TOPO      1410.500      -0.488      8500.5      1406.2500      XX XY YX YY
2      2049      TOPO      3124.000      -1000.000      2049000.0      2100.0000      XX XY YX YY
3      17409      TOPO      1410.500      -0.488      8500.5      1406.2500      XX XY YX YY

Sources: 2
ID      Name      SpwId      RestFreq(MHz)      SysVel(km/s)
0      eso208-g026      any      1420.40575      0
1      0823-500      any      1420.40575      0

Antennas: 6:
ID      Name      Station      Diam.      Long.      Lat.      Offset from array center (m)      ITRF Geocentric coordinates (m)
      East      North      Elevation      x      y      z
0      CA01      ANT1      22.0 m      +149.33.56.6      -30.08.43.7      1499.9977      0.7721      -1.6135      -4751674.967380      2791612.460760      -3200482.268996
1      CA02      ANT2      22.0 m      +149.33.50.3      -30.08.43.7      1331.6239      0.6974      -1.7741      -4751589.523380      2791757.543760      -3200482.252996
2      CA03      ANT3      22.0 m      +149.33.48.0      -30.08.43.7      1270.4069      0.6539      -1.8330      -4751558.449380      2791810.287760      -3200482.260996
3      CA04      ANT4      22.0 m      +149.33.32.6      -30.08.43.7      857.1470      0.4463      -2.2224      -4751348.704380      2792166.364760      -3200482.244996
4      CA05      ANT5      22.0 m      +149.33.28.0      -30.08.43.7      734.6957      0.3678      -2.3296      -4751286.549380      2792271.868760      -3200482.258996
5      CA06      ANT6      22.0 m      +149.31.08.2      -30.08.43.8      -2999.9964      -0.8846      -4.6136      -4749390.961380      2795489.734760      -3200482.194996

```



# A few hints on the choice we made

- A dataset is defined as a **subset** of **contiguous or overlapping SpectralWindows** of **same Channel Width** for a given **Field**
- `obs_id`, `facility_name`, `instrument_name` built or extracted from generic measurement set information (Observer, project, Observation name, etc..)

---

```
Observer: TB,KL      Project: C2705
Observation: ATCA
Data records: 18900      Total elapsed time = 3229.86 seconds
Observed from 10-Sep-2015/02:13:20.0 to 10-Sep-2015/03:07:09.9 (UTC)
```



# A few hints on the choice we made

- target\_name , s\_ra, s\_dec, obs\_publisher\_did extracted from the field table for each datasets we create :

```
Fields: 2
-----
ID      Code Name          RA              Decl             Epoch            SrcId            nRows
0       eso208-g026  07:35:21.099994 -50.02.34.99996 J2000            0                17100
1       0823-500    08:25:26.868994 -50.10.38.49003 J2000            1                1800
```

- f\_min, f\_max, em\_min, em\_max, em\_res\_power, em\_xel, pol\_states, pol\_xel, s\_fov, s\_region extracted from the SpectralW indow table

```
Spectral Windows: (4 unique spectral windows and 1 unique polarization setups)
SpwID  Name      #Chans  Frame  Ch0(MHz)  ChanWid(kHz)  TotBW(kHz)  CtrFreq(MHz)  Corrs
0       2049     TOPO    3124.000 -1000.000  2049000.0   2100.0000    XX XY YX YY
1       17409    TOPO    1410.500 -0.488    8500.5     1406.2500    XX XY YX YY
2       2049     TOPO    3124.000 -1000.000  2049000.0   2100.0000    XX XY YX YY
3       17409    TOPO    1410.500 -0.488    8500.5     1406.2500    XX XY YX YY
```

s\_fov is estimated as  $1.02 * (\text{central lambda} / \text{Antenna Diameter}) * (180 / \pi)$   
(f\_min, f\_max non ObsCore columns)



# A few hints on the choice we made

- t\_min, t\_max, t\_exptime extracted from « scan table »

Date	Timerange (UTC)	Scan	FldId	FieldName	nRows	SpwIds	Average Interval(s)	ScanIntent
10-Sep-2015	02:13:20.0 - 02:53:29.9	0	0	eso208-g026	14460	[0,1,2,3]	[9.86, 9.86, 9.86, 9.86]	
	02:54:10.0 - 02:59:09.9	1	1	0823-500	1800	[0,1,2,3]	[9.86, 9.86, 9.86, 9.86]	
	02:59:50.0 - 03:07:09.9	2	0	eso208-g026	2640	[0,1,2,3]	[9.86, 9.86, 9.86, 9.86]	

(nRows = Total number of rows per scan)

- Antenna diameter from Antenna table (common value)
- Still unsolved :
  - s\_resolution, s\_xel1,s\_xel2
  - t\_resolution, t\_xel
  - obs\_collection



# Visibility data ObsTAP CDS prototype

- A service with 374 different datasets from 11 observations
- `access_url` gives a DataLink response VOTable providing links to
  - Full listobs result file
  - MS zip file
  - Various plots (uv coverage, antennae, etc...)





# Prototype queried via TOPCAT

« select \* from ivoa.obscore where em\_min > 1 »

The screenshot displays the TOPCAT interface with a query window and a table browser window.

**Query Window:**

- Query Language: ADQL-2.0
- Max Rows: 1000000 (default)
- Uploads: unavailable
- ADQL Text:
 

```
select * from ivoa.obscore where em_min > 1
```
- Mode: Synchronous

**Table Browser for 1: TAP\_1\_ivoa.obscore**

datapro...	calib_l...	obs_co...	obs_id	obs_publisher_did	access_url	access_format	target_name	s_dec	s_ra	s_fov	s_region	t_min	
1	visibility	1	TBD	LC2_034_LOFAR_unknown_1	ivo://CDS/tap/visibility#LC2_034_LOFAR_unknown_1_BEAM_0_1	https://aladin.u...	application/x...	BEAM_0	40,7339	299,8682	3,7655	CIRCLE ICRS 299.8682 40.73...	56866,43653
2	visibility	1	TBD	MSCreate_LOFAR_MSCreate_1	ivo://CDS/tap/visibility#MSCreate_LOFAR_MSCreate_1_BEAM_0_1	https://aladin.u...	application/x...	BEAM_0	90,	0,	15,7736	CIRCLE ICRS 0.0 90.0 7.8868	58927,01189
3	visibility	1	TBD	MSCreate_LOFAR_MSCreate_1	ivo://CDS/tap/visibility#MSCreate_LOFAR_MSCreate_1_BEAM_0_2	https://aladin.u...	application/x...	BEAM_0	90,	0,	15,5926	CIRCLE ICRS 0.0 90.0 7.7963	58927,01189
4	visibility	1	TBD	MSCreate_LOFAR_MSCreate_1	ivo://CDS/tap/visibility#MSCreate_LOFAR_MSCreate_1_BEAM_0_3	https://aladin.u...	application/x...	BEAM_0	90,	0,	15,4157	CIRCLE ICRS 0.0 90.0 7.70785	58927,01189
5	visibility	1	TBD	MSCreate_LOFAR_MSCreate_1	ivo://CDS/tap/visibility#MSCreate_LOFAR_MSCreate_1_BEAM_0_4	https://aladin.u...	application/x...	BEAM_0	90,	0,	15,1861	CIRCLE ICRS 0.0 90.0 7.59305	58927,01189
6	visibility	1	TBD	MSCreate_LOFAR_MSCreate_1	ivo://CDS/tap/visibility#MSCreate_LOFAR_MSCreate_1_BEAM_0_5	https://aladin.u...	application/x...	BEAM_0	90,	0,	15,0183	CIRCLE ICRS 0.0 90.0 7.50915	58927,01189
7	visibility	1	TBD	MSCreate_LOFAR_MSCreate_1	ivo://CDS/tap/visibility#MSCreate_LOFAR_MSCreate_1_BEAM_0_6	https://aladin.u...	application/x...	BEAM_0	90,	0,	14,8542	CIRCLE ICRS 0.0 90.0 7.4271	58927,01189
8	visibility	1	TBD	MSCreate_LOFAR_MSCreate_1	ivo://CDS/tap/visibility#MSCreate_LOFAR_MSCreate_1_BEAM_0_7	https://aladin.u...	application/x...	BEAM_0	90,	0,	14,6936	CIRCLE ICRS 0.0 90.0 7.3468	58927,01189
9	visibility	1	TBD	MSCreate_LOFAR_MSCreate_1	ivo://CDS/tap/visibility#MSCreate_LOFAR_MSCreate_1_BEAM_0_8	https://aladin.u...	application/x...	BEAM_0	90,	0,	14,5364	CIRCLE ICRS 0.0 90.0 7.2682	58927,01189
10	visibility	1	TBD	MSCreate_LOFAR_MSCreate_1	ivo://CDS/tap/visibility#MSCreate_LOFAR_MSCreate_1_BEAM_0_9	https://aladin.u...	application/x...	BEAM_0	90,	0,	14,3321	CIRCLE ICRS 0.0 90.0 7.16605	58927,01189
11	visibility	1	TBD	MSCreate_LOFAR_MSCreate_1	ivo://CDS/tap/visibility#MSCreate_LOFAR_MSCreate_1_BEAM_0_10	https://aladin.u...	application/x...	BEAM_0	90,	0,	14,1825	CIRCLE ICRS 0.0 90.0 7.09125	58927,01189

Total: 11 Visible: 11 Selected: 0

# Prototype queried via TOPCAT

« select \* from ivoa.obscore where obs\_id like '%ATCA%' »

The image shows a screenshot of the TOPCAT software interface. The main window displays a query: `select * from ivoa.obscore where obs_id like '%ATCA%'`. Below the query, a table browser shows the results of the query, listing 17 rows of data. The table has columns for obs\_id, obs\_publisher\_id, access\_urls, target\_name, s\_dec, s\_ra, s\_fov, s\_region, t\_min, t\_max, t\_exptime, and t\_resol.

**Table Browser for 2: TAP\_2\_ivoa.obscore**

	obs_id	obs_publisher_id	access...	acce...	access...	target_name	s_dec	s_ra	s_fov	s_region	t_min	t_max	t_exptime	t_resol
1	C2705_ATCA_TB.KL_1	ivo://CDS/tap/visibility#C2705_ATCA_TB.KL_1_eso208-g026_1	https...	appl...		eso208-g026	-50,0431	113,8379	0,3793	CIRCLE ICRS 113.8379 -50.0431 0.18965	57275,79572	57275,8331	2849,8	
2	C2705_ATCA_TB.KL_1	ivo://CDS/tap/visibility#C2705_ATCA_TB.KL_1_eso208-g026_2	https...	appl...		eso208-g026	-50,0431	113,8379	0,5663	CIRCLE ICRS 113.8379 -50.0431 0.28315	57275,79572	57275,8331	2849,8	
3	C2705_ATCA_TB.KL_1	ivo://CDS/tap/visibility#C2705_ATCA_TB.KL_1_0823-500_1	https...	appl...		0823-500	-50,1774	126,362	0,3793	CIRCLE ICRS 126.362 -50.1774 0.18965	57275,82407	57275,82755	299,9	
4	C2705_ATCA_TB.KL_1	ivo://CDS/tap/visibility#C2705_ATCA_TB.KL_1_0823-500_2	https...	appl...		0823-500	-50,1774	126,362	0,5663	CIRCLE ICRS 126.362 -50.1774 0.28315	57275,82407	57275,82755	299,9	
5	C2921_ATCA_Wang_1	ivo://CDS/tap/visibility#C2921_ATCA_Wang_1_ngc4930_1	https...	appl...		ngc4930	-41,4116	196,0219	0,3793	CIRCLE ICRS 196.0219 -41.4116 0.18965	57017,57542	57017,59428	1409,8	
6	C2921_ATCA_Wang_1	ivo://CDS/tap/visibility#C2921_ATCA_Wang_1_ngc4930_2	https...	appl...		ngc4930	-41,4116	196,0219	0,5706	CIRCLE ICRS 196.0219 -41.4116 0.2853	57017,57542	57017,59428	1409,8	
7	C2921_ATCA_Wang_1	ivo://CDS/tap/visibility#C2921_ATCA_Wang_1_1243-412_1	https...	appl...		1243-412	-41,4793	191,4902	0,3793	CIRCLE ICRS 191.4902 -41.4793 0.18965	57017,58178	57017,58386	179,9	
8	C2921_ATCA_Wang_1	ivo://CDS/tap/visibility#C2921_ATCA_Wang_1_1243-412_2	https...	appl...		1243-412	-41,4793	191,4902	0,5706	CIRCLE ICRS 191.4902 -41.4793 0.2853	57017,58178	57017,58386	179,9	
9	C3145_ATCA_sb.mv_1	ivo://CDS/tap/visibility#C3145_ATCA_sb.mv_1_b03_532_1	https...	appl...		b03_532	-32,2607	264,07	0,0184	CIRCLE ICRS 264.07 -32.2607 0.0092	58945,64653	58945,6466	5,9	
10	C3145_ATCA_sb.mv_1	ivo://CDS/tap/visibility#C3145_ATCA_sb.mv_1_b03_532_2	https...	appl...		b03_532	-32,2607	264,07	0,0189	CIRCLE ICRS 264.07 -32.2607 0.00945	58945,64653	58945,6466	5,9	
11	C3145_ATCA_sb.mv_1	ivo://CDS/tap/visibility#C3145_ATCA_sb.mv_1_b03_532_3	https...	appl...		b03_532	-32,2607	264,07	0,0187	CIRCLE ICRS 264.07 -32.2607 0.00935	58945,64653	58945,6466	5,9	
12	C3145_ATCA_sb.mv_1	ivo://CDS/tap/visibility#C3145_ATCA_sb.mv_1_b03_532_4	https...	appl...		b03_532	-32,2607	264,07	0,0186	CIRCLE ICRS 264.07 -32.2607 0.0093	58945,64653	58945,6466	5,9	
13	C3145_ATCA_sb.mv_1	ivo://CDS/tap/visibility#C3145_ATCA_sb.mv_1_b03_532_5	https...	appl...		b03_532	-32,2607	264,07	0,0185	CIRCLE ICRS 264.07 -32.2607 0.00925	58945,64653	58945,6466	5,9	
14	C3145_ATCA_sb.mv_1	ivo://CDS/tap/visibility#C3145_ATCA_sb.mv_1_b03_532_6	https...	appl...		b03_532	-32,2607	264,07	0,0185	CIRCLE ICRS 264.07 -32.2607 0.00925	58945,64653	58945,6466	5,9	
15	C3145_ATCA_sb.mv_1	ivo://CDS/tap/visibility#C3145_ATCA_sb.mv_1_b03_532_7	https...	appl...		b03_532	-32,2607	264,07	0,0183	CIRCLE ICRS 264.07 -32.2607 0.00915	58945,64653	58945,6466	5,9	
16	C3145_ATCA_sb.mv_1	ivo://CDS/tap/visibility#C3145_ATCA_sb.mv_1_b03_532_8	https...	appl...		b03_532	-32,2607	264,07	0,0181	CIRCLE ICRS 264.07 -32.2607 0.00905	58945,64653	58945,6466	5,9	
17	C3145_ATCA_sb.mv_1	ivo://CDS/tap/visibility#C3145_ATCA_sb.mv_1_b03_532_9	https...	appl...		b03_532	-32,2607	264,07	0,0164	CIRCLE ICRS 264.07 -32.2607 0.0082	58945,64653	58945,6466	5,9	

# Prototype queried via TOPCAT

« select \* from ivoa.obscure where t\_min > 57200 and t\_max < 57300 »  
+ DataLink access to listobs result - 1

The screenshot displays the TOPCAT software interface with several windows open:

- Table Access Protocol (TAP) Query:** Shows metadata for 'TAP Service (26)' and 'ivoa (1)'. The 'ivoa.obscure' table is selected.
- TOPCAT(3): Activation Actions:** Shows a list of actions for 'TAP 3 ivoa.obscure'. The 'Load Table' action is selected.
- TOPCAT(4): Table List:** Shows a list of tables, with 'C2705\_ATCA\_TB,KL\_1.xml' selected.
- TOPCAT(5): Table Browser:** Shows a table with 2 rows and 10 columns. The first row is selected.

The query executed in the TAP Query window is:

```
select * from ivoa.obscure where t_min > 57200 and t_max < 57300
```

The results shown in the Table Browser for 'C2705\_ATCA\_TB,KL\_1.xml' are:

Seq	Row	Status	Message
1	1	OK	Table loaded from https://aladin.u-strasbg.fr/dl/C2705_ATCA_TB,KL_1.xml

The Table Browser for 'TAP 3 ivoa.obscure' shows the following data:

ID	access_url	service...	error_...	seman...	description	content_type	content_le...
1	https://aladin.u-strasbg.fr/dl/listobs_ATCA_C2705_HI_data_narrow_channels.txt			#this	ListObs for Measurement set ATCA_C2705_HI...	text/html	3330
2	https://aladin.u-strasbg.fr/dl/ATCA_C2705_HI_data_narrow_channels.ms.zip			#this	Full retrieval of Measurement set ATCA_C2705...	application/zip	249000000

The Table Browser for 'TAP 3 ivoa.obscure' shows the following data:

access_format	target_name	t_min	t_max	t_exptime	em_max	em_min	em_res_power	em_xel	o_ucd	pol_sta
application/x-votable+xml;content=datalink	eso208-g026	57275.79572	57275.8331	2849.8	0.27888	0.09596	2100,	2049	phot.flux;stat.Fourier	XX XY YX
application/x-votable+xml;content=datalink	eso208-g026	57275.79572	57275.8331	2849.8	0.21383	0.21254	2,881660E6	36867	phot.flux;stat.Fourier	XX XY YX
application/x-votable+xml;content=datalink	0823-500	57275.82407	57275.82755	299.9	0.27888	0.09596	2100,	2049	phot.flux;stat.Fourier	XX XY YX
application/x-votable+xml;content=datalink	0823-500	57275.82407	57275.82755	299.9	0.21383	0.21254	2,881660E6	36867	phot.flux;stat.Fourier	XX XY YX

# Prototype queried via TOPCAT

« select \* from ivoa.obscure where t\_min > 57200 and t\_max < 57300 »  
+ DataLink access to listobs result - 2

The screenshot displays the TOPCAT (Table Access Protocol Query) interface. The main window shows a query: `select * from ivoa.obscure where t_min > 57200 and t_max < 57300`. Below the query, the results are shown in a table format. The table has columns for ID, Code Name, RA, Decl, Epoch, SrcId, and nRows. The results are as follows:

ID	Code Name	RA	Decl	Epoch	SrcId	nRows
0	eso208-g026	07:35:21.099994	-50.02.34.99996	J2000	0	17100
1	0823-500	08:25:26.868994	-50.10.38.49003	J2000	1	1800

The interface also shows a metadata panel on the left with a tree view of the data source. A smaller window titled 'TOPCAT(5): Table Browser' is open, showing a table with columns for ID, access\_url, service, error, seman, description, content\_type, and content\_le. The results in this window are:

ID	access_url	service	error	seman	description	content_type	content_le
1	https://aladin.u-strasbg.fr/dl/listobs_ATCA_C2705_HI_data_narrow_channels.txt			#this	ListObs for Measurement set ATCA_C2705_HI...	text/html	3330
2	https://aladin.u-strasbg.fr/dl/ATCA_C2705_HI_data_narrow_channels.ms.zip			#this	Full retrieval of Measurement set ATCA_C2705...	application/zip	249000000

The browser window shows the content of the selected URL: `https://aladin.u-strasbg.fr/dl/listobs_ATCA_C2705_HI_data_narrow_channels.txt`. The page content includes the following information:

MeasurementSet Name: /home/klutz/Interns/Anais\_Radio-Data-Archive/Measurement\_Sets/ATCA\_C2705\_HI\_data\_narrow\_channels.ms MS Version 2

Observer: TB, KL Project: C2705

Observation: ATCA

Data records: 18900 Total elapsed time = 3229.86 seconds

Observed from 10-Sep-2015/02:13:20.0 to 10-Sep-2015/03:07:09.9 (UTC)

ObservationID = 0 ArrayID = 0

Date	Timerange (UTC)	Scan	FldId	FieldName	nRows	SpwIds	Average Interval(s)	ScanIntent
10-Sep-2015/02:13:20.0	02:53:29.9	0	0	eso208-g026	14460	[0,1,2,3]	[9.86, 9.86, 9.86, 9.86]	
	02:54:10.0	02:59:09.9	1	0823-500	1800	[0,1,2,3]	[9.86, 9.86, 9.86, 9.86]	
	02:59:50.0	03:07:09.9	2	eso208-g026	2640	[0,1,2,3]	[9.86, 9.86, 9.86, 9.86]	

(nRows = Total number of rows per scan)

Fields: 2

ID	Code Name	RA	Decl	Epoch	SrcId	nRows
0	eso208-g026	07:35:21.099994	-50.02.34.99996	J2000	0	17100
1	0823-500	08:25:26.868994	-50.10.38.49003	J2000	1	1800

Spectral Windows: (4 unique spectral windows and 1 unique polarization setups)

SpwID	Name	#Chans	Frame	Ch0(MHz)	ChanWid(kHz)	TotBW(kHz)	CtrFreq(MHz)	Corrs
0	2049	TOPO	3124.000	-1000.000	2049000.0	2100.0000	XX XY YX YY	
1	17409	TOPO	1410.500	-0.488	8500.5	1406.2500	XX XY YX YY	

# Prototype queried via Aladin

## Overall distribution of datasets

Aladin v10.0

Fichier Edition Image Catalogue Graphique Couverture Outil Vue Interop Aide

Données disponibles → 45 / 25018 Commande Référentiel **CRS** Projection **Aitoff**

DSS PanSTARRS SDSS 2MASS GALEX Gaia Simbad NED +

**NVSS**

- Catalog of pointlike radiosources fr
- Catalog of double radiosources fr
- AS → 4 / 734
- Ultra steep spectrum radio sources ca
- List of WN (WENSS-NVSS) USS sour
- List of TN (TEXAS-NVSS) USS sour
- Pulsars Identified from the NRAO VLA S
- NVSS sources around pulsar positio
- Pulsars > 5 mJy but not detected b
- BJ → 7 / 4298
- S-PASS & NVSS bright extragalactic ra
- Variable 1.4GHz radio sources from NV
- Observing times of NVSS sources (t
- Observing Times of FIRST Sources (
- Variable sources (table3)
- FIRST-NVSS-SDSS AGN sample: catalo
- Arecibo Methanol Maser Galactic Plan
- IRAS, MSX, and NVSS counterparts f
- New VLA Sky Survey (NVSS) Cat of IRA
- ubS → 4 / 1775
- NVGR - Identify giant radio sources f
- Delayed NVSS sources SEDs (Farne

Sélecteur de serveurs

Autres File FoV... Tools...

localhost Mode: Generic

Générez, vérifiez et exécutez votre requête.

Table: **ivoa.obscore** Set ra, dec

Select:  All

Constraints: Add new Max rows:

dataproduct\_ty

calib\_level

obs\_collection

obs\_id

Target: 1 55 33.12996 -13 30 44.7733

Rayon: 180° CIRCLE Add

Refresh query Check.. SYNC Async jobs>>

```
SELECT * FROM ivoa.obscore
```

Réinit. Effacer **CHERCHER** Fermer

360° x 180°

id	obs_publ...	access_t...	access_e...	target_n...	s_dec	s_ra	s_fov	s_region	s_resolu...	s_xell	s_xb
te...	ivo://CD...	applicat...		BEAM_0	90.0	0.0	15.4157	FoV			
te...	ivo://CD...	applicat...		BEAM_0	90.0	0.0	15.1861	FoV			
te...	ivo://CD...	applicat...		BEAM_0	90.0	0.0	15.0183	FoV			
te...	ivo://CD...	applicat...		BEAM_0	90.0	0.0	14.8542	FoV			
te...	ivo://CD...	applicat...		BEAM_0	90.0	0.0	14.6936	FoV			
te...	ivo://CD...	applicat...		BEAM_0	90.0	0.0	14.5364	FoV			
te...	ivo://CD...	applicat...		BEAM_0	90.0	0.0	14.3321	FoV			
te...	ivo://CD...	applicat...		BEAM_0	90.0	0.0	14.1825	FoV			

Chercher

Imaginez votre oeil regardant à travers une pile de calques (ci-dessous).

Chaque calque représente une donnée: image, catalogues, graphiques...

Le panneau central affiche la combinaison de l'ensemble de ces calques.

Pour accéder à d'autres données utilisez l'arbre de découverte sur le panneau de gauche, ou glissez/déposez vos propres fichiers locaux.

select

dépl

dist

phot

dessin

marq

mob

aspect

filtre

corr.

x-y

r/v

as300

coupe

cont

http://localhost

pile

prop

taille

dens.

opac.

suppr

zoom

00 00 00.00000

00:00:00.00 +00:00:00.0

360° x 180°

374 sel / 374 src 42fms / 838Mo

# Prototype queried via Aladin EVLA MS field of view on top of NVSS

Aladin v10.0

Données disponibles → 45 / 25018  
in view out view

Commande [x] Référentiel ICRS Projection Altoff

Aladin

Imaginez votre œil regardant à travers une pile de calques (ci-dessous).  
Chaque calque représente une donnée: image, catalogues, graphiques...  
Le panneau central affiche la combinaison de l'ensemble de ces calques.  
Pour accéder à d'autres données utilisez l'arbre de découverte sur le panneau de gauche, ou glissez/déposez vos propres fichiers locaux.

Sélecteur de serveurs

localhost Mode: Generic  
Générez, vérifiez et exécutez votre requête.

Table: ivoa.obscore Set ra, dec

Select:  All  
Constraints: Add new Max rows:

Target: 1 58 38.51659+43 57 39.1430  
Rayon: 2.004° CIRCLE Add

Refresh query Check.. SYNC Async jobs>>

```
SELECT * FROM ivoa.obscore where facility_name = 'EVLA'
```

Reinit. Effacer **CHERCHER** Fermer

obs_publ...	access_f...	access_e...	target_n...	s_dec	s_ra	s_fov	s_region	s_resolu...	s_xel1	s_xe
ivo://CD...	applicat...		N4013	43.9466	179.6308	0.5097	FoV			
ivo://CD...	applicat...		N4013	43.9466	179.6308	0.3948	FoV			
ivo://CD...	applicat...		N4013	43.9466	179.6308	0.5097	FoV			
ivo://CD...	applicat...		N4013	43.9466	179.6308	0.3948	FoV			

Chercher

s\_region (2 items)

# Prototype queried via Aladin ASCA MS with DataLinks

The screenshot displays the Aladin v11.0 interface. A 'Sélecteur de serveurs' dialog box is open, showing a query for the 'ivoa.obscore' table. The query is: `SELECT * FROM ivoa.obscore where obs_id = 'C885_ATCA_cbruens_1'`. The main window shows a star field with a selected source. A table of results is visible at the bottom, and a context menu is open over it.

**Table Data:**

access_url	dataprod	calib_le	obs_coll	obs_id	obs_publ	access_f	access_e	target_n	s_dec	s_ra	s_fov	s_region	s_resolu	s_xel1	s_xel2	t_min	t_max
https://...	ivoa.obscore	1410MHz_1384MHz		C885_ATCA_cbruens_1				1094-638	-63.7127	294.8543	0.5771	FoV				52210.03	52210.04
https://...	ivoa.obscore	1410MHz_1384MHz		C885_ATCA_cbruens_1				1-638	-63.7127	294.8543	0.5648	FoV				52210.03	52210.04
https://...	ivoa.obscore	1410MHz_1384MHz		C885_ATCA_cbruens_1				2-712	-71.0765	43.1923	0.5771	FoV				52210.04	52210.05
https://...	ivoa.obscore	1410MHz_1384MHz		C885_ATCA_cbruens_1				2-712	-71.0765	43.1923	0.5648	FoV				52210.04	52210.05
https://...	ivoa.obscore	1410MHz_1384MHz		C885_ATCA_cbruens_1				14	-65.6099	15.7132	0.5771	FoV				52210.05	52210.06

**Context Menu:**

- ListObs for Measurement set obs\_source\_calib\_1410MHz\_1384MHz (size 3330 byte)
- Full retrieval Measurement set obs\_source\_calib\_1410MHz\_1384MHz (size 249000000 byte)
- uv coverage map Measurement set obs\_source\_calib\_1410MHz\_1384MHz (size 25000 byte)
- Antennae plot Measurement set obs\_source\_calib\_1410MHz\_1384MHz (size 26000 byte)
- amplitude versus time plot Measurement set obs\_source\_calib\_1410MHz\_1384MHz (size 25500 byte)
- phase versus time plot Measurement set obs\_source\_calib\_1410MHz\_1384MHz (size 26000 byte)

# Prototype queried via Aladin ASCA MS linked plots

The screenshot displays the Aladin software interface with the following components:

- Top Menu:** Fichier, Edition, Image, Catalogue, Graphique, Couverture, Outil, Vue, Interop, Aide.
- Commande:** Commande [x]
- Représentation:** Référentiel [CRS], Projection [Aitoff]
- Left Panel (Collections):** Données disponibles → 45 / 25018. Collections → 45 / 25018. Includes sub-collections like Image → 1 / 410, Radio → 1 / 61, NVSS - The NRAO VLA Sky Survey, Catalog → 43 / 23347, Vizier → 40 / 21905, VIII-Radio and Far-IR data → 1, IX-High-Energy data → 1 / 95, ROSAT All-Sky Bright Sources, 1RXS Correlation to NVSS, Journal table → 38 / 20264, A+A → 3 / 5662, The HRX-BL Lac sample, Objects from the RA, Radio-optically selected, Catalog of pointlike, Catalog of double radio, A+AS → 4 / 734, Ultra steep spectrum radio, List of WN (WENSS-N), List of TN (TEXAS-NV), Pulsars identified from the, NVSS sources around, Pulsars > 5 mJy but not, ApJ → 7 / 4298, S-PASS & NVSS bright emission, Variable 1.4GHz radio sources, Observing times of M, Observing Times of F, Variable sources (tat), FIRST-NVSS-SDSS AGN, Arecibo Methanol Maser, IRAS, MSX, and NVSS, New VLA Sky Survey (N, ApJS → 4 / 1775, NVGRC - Identify giant, Polarized NVSS source, RBSC-NVSS sample. I. (B, RBSC-NVSS Extragalactic, RBSC Galactic Identifications, MNRAS → 14 / 3275, MASH PNe detected in L, MASH PNe detected, Radio sources with ultra, The sample of 129 ultr, Combined NVSS-FIRST g, Combined NVSS-FIRST
- Top Right:** DSS, PanSTARRS, SDSS, 2MASS, GALEX, Gaia, Simbad, NED +
- Main Plot Area:**
  - Amp vs. Time:** A plot showing amplitude (Amp) on the y-axis (0 to 20) versus time. It displays a series of vertical spikes.
  - Vwave vs. Uwave:** A circular plot showing Vwave (Å) on the y-axis (-20000 to 20000) versus Uwave (Å) on the x-axis (-20000 to 20000). It features concentric rings of data points.
  - Antenna Positions for obs\_source\_calib\_1410MHz\_1384MHz.ms:** A scatter plot showing antenna positions in X (m) and Y (m) coordinates. Points are labeled with antenna IDs like CA01, CA02, CA03, CA04, CA05, CA06.
  - Phase vs. Time:** A plot showing phase in degrees on the y-axis (-200 to 200) versus time on the x-axis (06:00:00 to 20:00:00). It shows a series of vertical lines.
- Right Panel:** A toolbar with various icons for selection, deletion, zooming, and other plot manipulations.
- Bottom:** A search bar with the text "Chercher" and a dropdown menu. Below it, a status bar shows "[Plane @2] - http://localhost:8080/tap".



# Work coming next

- Add other MS (JIVE, LOFAR, ALMA???)
- Add other free metadata columns in ObsCore
  - uv characterisation, number of antennae,
- Add new descriptive metadata in DataLink
- Make an attempt of standardizing metadata  
= Characterisation and Provenance extension
- Collaborations ?

