

Publishing astronomical data: an ESO perspective



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Asterics

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ESO Science Archive made better

Project to modernise the access to the ESO science archive

Staged approach

Release 1:

Enough new functionality to have positive impact on user experience, though limited, for fast deployment

Emphasis on reduced data

Announced next week (cross your fingers please)

More releases to come (2019, 2020)



ESO Science Archive made better

Web application (we call it: *science portal*)

<http://archive.eso.org/scienceportal>

Programmatic and Tool Access:

<http://archive.eso.org/programmatic>



ESO Science Portal

Web application (Angular, Aladin Lite, ElasticSearch):

- full sky view
- searches by scientific parameters
resolving power, SNR, spatial resolution, etc.
- aggregations
histograms/facets of scientific params
- including sky aggregations
Using ESO AstroES Lucene plugin
- previews
JPG, PDF, HiPS for each(!) image,
smart zoom&pan spectral preview (JSON)
- footprints

Only reduced data in release 1, raw data in a next release



ESO Science Portal: main view

The screenshot displays the ESO Science Portal interface. At the top, the search coordinates are 13 32 1.603 -29 55 41.30 with a field of view (FoV) of 8.3°. The interface shows 157 search results, with 3 items selected. A green box highlights a specific region in the star field. The left sidebar contains filters for 'Data Subtype' (with 'IMAGE (TILE)' selected) and 'Spectral Range' (with 'NIR' selected). Below the star field, a table shows search results for 157 items, with 3 items selected for sky selection.

Actions	Data Ty	Spec.Ri	Filt.	Spec.Ri	Sensitiv	Obs.Da	FoV	Sky Re	Collecti	Instrum	T.Exp.T.	#OBS	Pl.	Prograr	Object	Pub.Da
	IMAGE (1	974-1067	Y	10	20.731	2014-02-	1.92°	1.458"	VHS	VIRCAM	360 s	single	MCMAH	179.A-20	Str22	2016-11-
	IMAGE (1	1166-130	J	7	20.348	2014-02-	1.92°	1.24"	VHS	VIRCAM	180 s	single	MCMAH	179.A-20	Str22	2016-11-
	IMAGE (1	1992-230	Ks	6	19.565	2014-02-	1.92°	1.324"	VHS	VIRCAM	180 s	single	MCMAH	179.A-20	Str22	2016-11-

<http://archive.eso.org/scienceportal>



ESO Science Portal: dataset details

Dataset: ADP2016-10-06T13:40:02.485

H FITS Header | Direct Download | Dataset Download | Printable Preview | Data Documentation

Position

Object	Str22
RA (J2000)	13:44:50.91
DEC (J2000)	-31:22:02.37
Galactic longitude	316.11159
Galactic latitude	30.13377
Sky Coverage	1.8 deg ²
Field of View	1.92°
Sky Resolution	1.458"
Pixel Scale	0.3413"

Data

Data Type	IMAGE (TILE)
Sensitivity (AB mag at 5 σ)	20.731
Data Level	2

Energy

Filter Band	Y
Spectral Range	974-1067 nm
Spectral Resolution (R)	10

J2000 13 45 15.575 -31 20 43.76 FoV: 14.06'

ALADIN

<http://archive.eso.org/scienceportal>



ESO Science Portal: dataset details

Dataset: ADP.2013-09-27T11:48:57.407

H FITS Header | Direct Download | Dataset Download | Printable Preview | Data Documentation

Position

Object	HD-120709
RA (J2000)	13:51:49.57
DEC (J2000)	-32:59:39.70
Galactic longitude	317.28201
Galactic latitude	28.18906

Data

Data Type	SPECTRUM
Signal-to-Noise Ratio	302.9
Data Level	2

Energy

Spectral Range	472.7-683.5 nm
Spectral Resolution (R)	74450

Time

Start of Observation	2008-04-03 06:50:45
End of Observation	2008-04-03 06:50:55
MJD Range	54559.28524-54559.28536

Wavelength: 6497.583
Flux: 1.651e+5
SNR: 126.994

The figure displays three vertically stacked plots. The top plot shows the flux in $\text{erg/cm}^2/\text{s}/\text{Angstrom}$ versus wavelength in Angstroms, with a prominent absorption line at approximately 6563 Angstroms. The middle plot shows the Signal-to-Noise Ratio (SNR) versus wavelength, with a corresponding dip at the absorption line. The bottom plot shows a zoomed-in view of the spectrum from 4750 to 6750 Angstroms, with a blue line representing the flux and a grey shaded area representing the noise floor.

<http://archive.eso.org/scienceportal>



VO in the Science Portal

NoSQL database (read: Non-ADQL queries)

VO components used:


- **SAMP** (to export **ObsCore** votable)
- **STC-S** footprints
- **HiPS**
- **Datalink** used internally to expand a dataset into its components (science file + ancillary files)
- VO-aware tool used as a component:
 - **Aladin Lite / CDS**



Programmatic and Tool access

Release 1: direct database & VO access

Two TAP servers:

- ***tap_obs***: TAP server for observational data
Powerful spatial queries (ADQL on SQLServer) + ObsCore
- ***tap_cat***: TAP for catalogs provided by ESO observers
Limited spatial queries (cone searches),
Tables with more than 4E9 records (ADQL on SYBASE IQ)
-  ***taplib*** (ADQL, TAP, and UWS) by Grégory Mantelet (ARI)
ADQL for SQLServer and SYBASE IQ by V.Forchi (ESO)

SSAP server to easily access the 1d spectra

-  <https://github.com/vforchi/SSAPServer> (ESO)

DataLink to easily find and access: ancillary files,
provenance and derived files, previews, etc.



VO Interfaces

How to present VO interfaces to the user community?

- usability!

Presented at: <http://archive.eso.org/programmatic>

That page can be used either to gain:

- Direct Database Access (new for ESO!)
- Direct Data Access (new for ESO!)

or to learn:

- ADQL queries (modifiable examples, validation)
- URLs to query or access data, previews, services
- Script it all with pyvo (wish list: astroquery)



Programmatic and Tool access

<http://archive.eso.org/programmatic>

1. Query a TAP service

aka Direct database access

2. Script your access

3. Configure tools

4. Learn dataset actions

5. IVOA standards & Software



Programmatic and Tool access

Next releases: 2019, 2020

- TAP UPLOAD
 - Requires:
 - DB space for users
 - authentication
- SSAP UPLOAD
- Cut-outs (SODA)
- DataLink for calibration files (ESO's calSelector)



ESO ARCHIVE COMMUNITY FORUM

User is king!

We invite for feedback at...

The *ESO Archive Community Forum* is a platform for sharing ideas and methods, asking questions and sending feedback and suggestions on how to improve and use the new [ESO Archive Science Portal](#) and on how to gain [Programmatic and tool access](#) to the archive.

- <https://esocommunity.userecho.com/>



Registration of VO services/protocols

How to register your services

- copy existing similar resource
- edit its parts(1): title, shortName, identifier, curation/, content/
- edit its parts(2): capability/
- edit its parts(3): tableset/
- upload it using "Add new resource"

Next time there are changes:

- either edit it online (error-prone), or
- re-edit the part that has changed,
- upload it using "Create new version from file"