



# WFAU Operations Royal Observatory, Edinburgh

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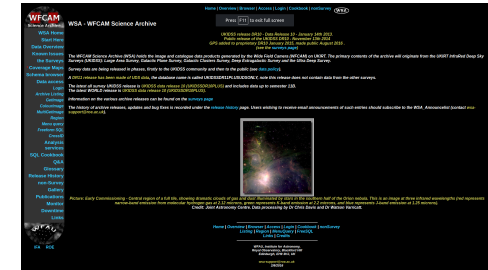


# WFAU (Wide-field Astronomy Unit) Archives

- **WSA:** WFCAM Science Archive: Holds the image and catalogue data products generated by the Wide Field Camera (WFCAM) on UKIRT

The main surveys are the UKIDSS surveys, 5 large surveys under a single consortium.

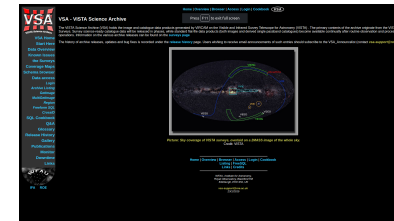
- Many small programmes ranging from a few frames to a few thousand frames.
- i.e. UKIRT Hemisphere Survey - the rest of the Northern Hemisphere that wasn't observed by UKIDSS



- **VSA:** VISTA Science Archive. Near-infrared imaging on VISTA-VIRCAM. 5 main ESO Public Surveys, similar to the UKIDSS surveys, some smaller PI programmes. New round of ESO Public Surveys just starting.

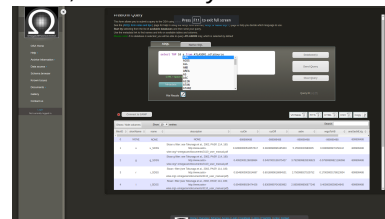
- **OSA:** Optical imaging surveys on VST-OmegaCam. We are archiving ATLAS and VPHAS+.

- **GES:** Optical spectroscopic survey using VLT-FLAMES.



- **VISTA Variables in Via Lactea (VVV).** This observes ~1 billion stars, over 70 epochs  
Largest single survey, last release ~ = 50TB SQL database.

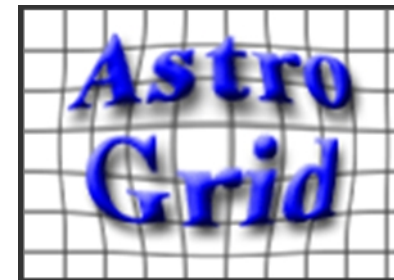
- **VIKING**, another VISTA survey is part of a group of surveys KiDS (on VST, archived by AstroWISE in the Netherlands) and GAMA - a spectroscopic survey on the AAT using AAOmega.





## Existing WFAU VO Services

- **SSAP Services**
  - 6dF
- **Cone Search and TAP Services** (mirrors of external datasets)(deployed using Astrogrid DSA)
  - Denis, First, Galexgr6, Glimpse, IRAS, MGC, ROSAT, Twomass, TwoMPZ, WISE, XMM, SDSS DR3, DR5, DR7, DR8, DR9
- **Cone Search and TAP Services** (WFAU Curated)(deployed using Astrogrid DSA)
  - 6df, 6df DR3, Atlas DR1
  - SuperCOSMOS Science Archive
  - UKIDSS DR1, DR2, DR3, DR4, DR5, DR6, DR7, DR8, DR9, DR10
  - VHS DR1, DR2, DR3
  - VIDEO DR2, DR3, DR4
  - VIKING DR2, DR3, DR4
  - VMC DR1, DR2, DR3
  - VVV DR1, DR2
- **SIAP Services** (deployed using ESA DAL toolkit)
  - Atlas DR1
  - UKIDSS DR1, DR2, DR3, DR4, DR5, DR6, DR7, DR8, DR9, DR10
  - VHS Pawprint (for ESA crowd-science space debris identification website)
  - VISTA Surveys (All latest releases of VHS, VMC, VIDEO, VIKING, VVV)



# VO Use in our Archives

- ADQL, VOTable, SAMP, TAP & TAP\_SCHEMA

The screenshot shows the OmegaCAM Science Archive interface. At the top, there is a navigation menu with links like 'OSA Home', 'Help', 'Archive Information', 'Data access', 'Schema browser', 'Known Issues', 'Documents', 'Gallery', and 'Contact us'. The main area is titled 'Freeform Query' and contains a text input field for a query. A dropdown menu is open, showing a list of database tables: 'ATLASDR1.atlaSource', 'ABS', 'ACDS', 'ALL', 'AND', 'AREA', 'AS', 'ASC', 'ASIN', 'ATAN', and 'ATAN2'. Below the query form, there are buttons for 'Database(s)', 'Send Query', and 'Clear Query'. The results are displayed in a table with columns for filterID, shortName, name, description, cutOn, cutOff, aebv, veigaToAB, and oneSecMLVg. The table contains 5 rows of data, including filters like 'u', 'g', 'r', and 'i'.

filterID	shortName	name	description	cutOn	cutOff	aebv	veigaToAB	oneSecMLVg
0	NONE	NONE	Sloan u filter: see Tokunaga et al., 2002, PASP, 114, 180; http://www.astronwise.org/~omegacam/documents/3110_user_manual.pdf	-999999488	-999999488	-999999488	-999999488	-999999488
1	u	u_SDSS	Sloan g filter: see Tokunaga et al., 2002, PASP, 114, 180; http://www.astronwise.org/~omegacam/documents/3110_user_manual.pdf	0.32690000534057617	0.3828999996185303	5.15500002068835	0.939999976158142	-999999488
2	g	g_SDSS	Sloan r filter: see Tokunaga et al., 2002, PASP, 114, 180; http://www.astronwise.org/~omegacam/documents/3110_user_manual.pdf	0.4092000126838684	0.5457000136375427	3.7929999826338623	-0.0799999821186066	-999999488
3	r	r_SDSS	Sloan i filter (see Tokunaga et al., 2002, PASP, 114, 180; http://www.astronwise.org/~omegacam/documents/3110_user_manual.pdf)	0.5546000003814697	0.6916999816894531	2.750999927520752	0.17000000178813934	-999999488
4	i	i_SDSS	Sloan i filter (see Tokunaga et al., 2002, PASP, 114, 180; http://www.astronwise.org/~omegacam/documents/3110_user_manual.pdf)	0.694999928474426	0.8309999704360862	2.0859999656677246	0.4000000055860465	-999999488



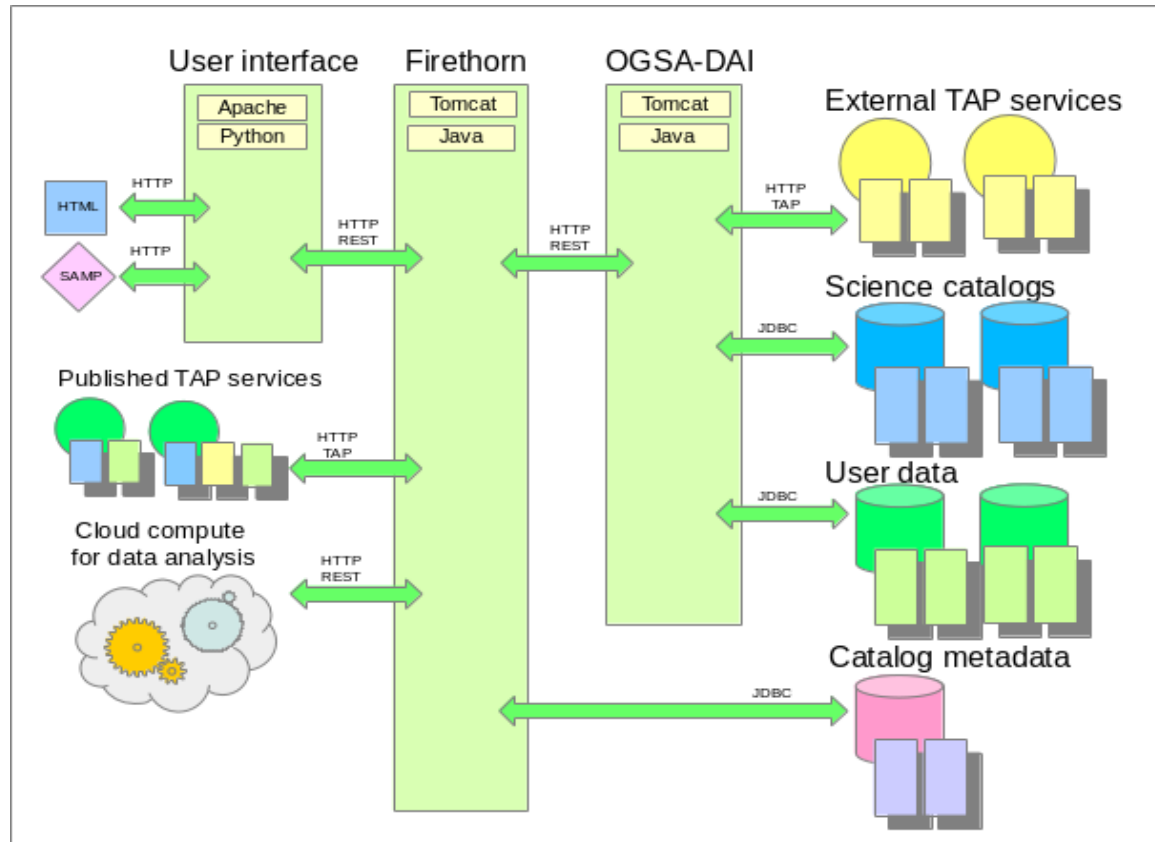


## New TAP Services

- Built as part of the Firethorn Project (Infrastructure for new VO services, DQP for combining data from external TAP services, MyDB User storage.. )
- Implemented using
  - ADQL Parser from CDS
  - SQL Server cluster at ROE
  - OGSA-DAI DQP service from EPCC
- Replace old AstroGrid DSA Services
- Docker for Development, Testing & Production
- Geometry Support & TAP Upload coming soon..

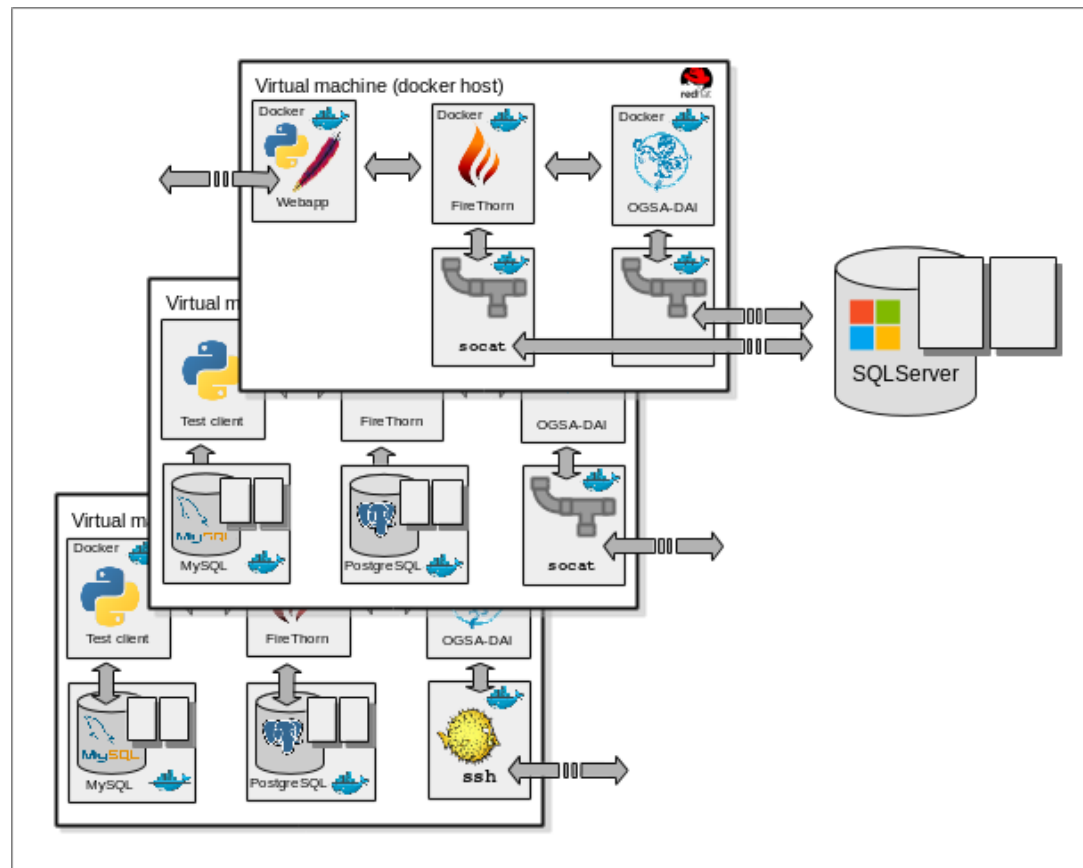


## System Design



## System Design

- Combination of Virtual Machines & Docker
- Science Data in SQL Server databases
- One Docker chain in a VM for each TAP service (osa, wsa, vsa...)
- Apache Proxy with reverse proxy, Virtual Host setup to distribute requests to the right VM
- Designed to have easily replaceable components, allowing quick upgrades and load balancing





## New TAP Services

- Single TAP Endpoint or One per archive?

- Moving from this:

<http://wfaudata.roe.ac.uk/atlasDR1-dsa>  
<http://wfaudata.roe.ac.uk/atlasDR2-dsa>  
<http://wfaudata.roe.ac.uk/atlasDR3-dsa>

<a href="http://wfau.roe.ac.uk/6df-dsa">//wfau.roe.ac.uk/6df-dsa</a>	6dF Galaxy Surv
<a href="http://wfau.roe.ac.uk/6dfdr3-dsa">//wfau.roe.ac.uk/6dfdr3-dsa</a>	6dF Galaxy Surv
<a href="http://wfau.roe.ac.uk/astrodabis-dsa">//wfau.roe.ac.uk/astrodabis-dsa</a>	AstroDAbis Not
<a href="http://wfau.roe.ac.uk/atlasDR1-dsa">//wfau.roe.ac.uk/atlasDR1-dsa</a>	ATLAS DR1 - VS
<a href="http://wfau.roe.ac.uk/denis-dsa">//wfau.roe.ac.uk/denis-dsa</a>	Deep Near Infra
<a href="http://wfau.roe.ac.uk/first-dsa">//wfau.roe.ac.uk/first-dsa</a>	FIRST Survey Ca
<a href="http://wfau.roe.ac.uk/galexgr6-dsa">//wfau.roe.ac.uk/galexgr6-dsa</a>	GALEX Release
<a href="http://wfau.roe.ac.uk/glimpse-dsa">//wfau.roe.ac.uk/glimpse-dsa</a>	GLIMPSE (Galac
<a href="http://wfau.roe.ac.uk/iras-dsa">//wfau.roe.ac.uk/iras-dsa</a>	Infrared Astron
<a href="http://wfau.roe.ac.uk/mgc-dsa">//wfau.roe.ac.uk/mgc-dsa</a>	Millennium Gala
<a href="http://wfau.roe.ac.uk/pssa-dsa">//wfau.roe.ac.uk/pssa-dsa</a>	Personal Super
<a href="http://wfau.roe.ac.uk/rosat-dsa">//wfau.roe.ac.uk/rosat-dsa</a>	Rontgen Satellit

- To this:

<http://tap.roe.ac.uk/osa> , with all OSA datasets. Including related datasets for which we have neighbour tables  
 One per archive: (<http://tap.roe.ac.uk/wsa>, <http://tap.roe.ac.uk/vsa>) rather than one per dataset

- Also considering single endpoint:  
<http://wfaudata.roe.ac.uk/tap>







## New TAP Services Testing/Validation

- Pyrothorn Testing suite
  - A python suite that we used to run through a list of previous user queries (~3000 queries) through our TAP service and compared results with a direct SQL Server query (<https://github.com/stvoutsin/pyrothorn>)
- Taplint validation (thanks M.Taylor!)  
Pass except for 1 warning:  
*"Not ISO-8601 content "0" from ../destruction"*
- Stress testing  
(Multithreaded Pyrothorn test querying the TAP service using sync & async)
- Plan to check validity with other resources (EuroVO registry, Heasarc..)





## Future Plans & Interests

- TAP Services
  - Replace existing services with new TAP
  - TAP Upload
  - ADQL Geometry support
  - Load Balancing, Proxies (HAProxy, Nginx, Træfik..)
- Replace Astrogrid ConeSearch services and Registry
- Euclid, GAIA, LSST (VOEvent Broker, Copies of Data releases for UK )
- MOC in queries, Code to data with IPython/Jupyter Notebooks





## Difficulties/Feedback

- Teaching users VO and its benefits
  - “Why does my MS SQL query not work?”
- Funding needed to support maintain and build new VO Services.
- Just an idea.. an alternative discussion forum to the mailing lists?
  - An “unofficial” place for new developers/users to bring up questions but also discuss standards progression etc.
  - Easier to follow discussions

LSST Community

Press F11 to exit full screen

Any opinions, statements (including statements about LSST and what it is) are those of the author and do not necessarily reflect the views of the LSST Project.

Please take a moment to review our [community guidelines](#).

all categories ▾ all tags ▾ Latest Categories

Topic	Category	Users	Replies	Views	Activity
🏠 Welcome to community.lsst.org	Meta		2	1.7k	Aug '15
2017_05_12 visualization meeting	Camera-DM Visualization		0	8	11h
Pinning conda packages installed with DM (lsst_apps and lsst_sims)	Support		3	31	21h
Installing lsst_sims from source fails stack-install	Support		11	78	2d
Build on existing coadds? coadd	Support		2	34	3d
Why is the numexpr python module not nomkl like numpy & scipy?	Support		0	33	4d
Lsst_sims version 2.3.5 available via 'eups distrib install'	Sims Announcements		2	46	4d
☑ Meas_base install (test) failure stack-install	Support		12	63	6d
Firefly - new release available	Camera-DM Visualization		0	32	7d
2017_05_05 visualization meeting	Camera-DM Visualization		0	34	7d
EPO Monthly Status Report for April 2017 epo-monthly-report	EPO		0	32	9d
GitHub authorisation and your other orgs square_git	Data Management		0	56	10d
Pending Footprints API change dm-dev	DM Notifications		2	80	10d

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