



VISTA Science Archive Quality Control and User-Interface requirements

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Need for QC

- Identify issues with ingest or pipeline
- Minimise/flag contamination
- Ensure data are good enough for science goals
- Survey uniformity



VSA QC & UI requirements:



Quality control

- Implemented for WSA, starting point for VSA
- Bad multiframes/detectors identified and assigned a deprecation code (flagged).
- Re-processed frames: old version deprecated during curation
- SQL scripts run by WFAU, done for each release cycle
 - Semi-automatic; identify problems with metadata and pipeline
 - More manual investigation of science criteria: eg seeing, ellipticity, sky-level, zero-point and their impact on depth
 - For open-time projects basic QC scripts are run automatically
- Eyeball by UKIDSS PIs
- Synoptic QC – photometry of intermediate stacks wrt deepStack
- Flagged multiframes (deprecated > 0) are kept in archive but not present in released databases.
- Feedback to CASU/UKIDSS/UKIRT



List of deprecation codes

Flag	Meaning
1	Stack frames that have no catalogue or other frameTypes deprecated at ingest (e.g. because a reprocessed frame supercedes it)
2	Dead detector frames
3	Undefined and or non-sensible critical image metadata attributes
4	Sky subtraction not OK (via pipeline sky sub scale factor) NB. not used from October 2005 onwards
5	Incorrect combination of expTime,numExp,numInTs for survey specific projects
6	Incorrect frame complements within groups/nights (for incomplete MSBs)
7	Undefined values of critical catalogue attributes for stacks
8	Seeing=0.0 for a stack
9	High value of sky that compromises the depth, or otherwise invalid sky level (e.g. sky < 0)
10	Seeing outside specified maximum
11	Photometric zeropoint too bright
12	Average stellar ellipticity too high (> 0.25)
13	Depth (as calculated from sky noise and 5sigma detection in fixed aperture) is too shallow compared to overall histogram distribution (i.e. shallower than ~0.5mag wrt the modal value) OR sky noise is too high given the sky level
14	AperCor3 outlying in aperCor3 versus seeing distribution
15	Pipeline MAGZPT inconsistent between image PHDU, extension HDUs and/or catalogue extension HDUs (from attributes photZP, photZPExt and photZPCat)
16	Difference in detector sky level wrt to mean of all 4 detectors is outlying in the distribution of the same.
18	Provenance indicates that a constituent frame of a combined frame product includes a deprecated frame.
19	Inconsistent provenance for a stack or leaf product indicating something wrong with the image product (usually screwed up FITS keywords confusing the pipeline)
20	Detector number counts indicate some problem (loads of crud images)
21	5-sigma depth of detector frame more than 0.4mag brighter than modal value for a given filter/project/exposure time
22	Basic astrometry check (pixel size and/or aspect ratio) indicates something is wrong with the image
26	Deprecated because frame is flagged as ignored in pipeline processing
27	Deprecated because frame is flagged as part of a summit-rejected MSB
40	Science (*stack) frame is not part of a survey (e.g. high latitude sky frames in the GPS)



List of deprecation codes (cont)

60	Eyeball check deprecation - trailed
61	Eyeball check deprecation - multiple bad channels
62	Eyeball check deprecation - Moon ghost
63	Eyeball check deprecation - Sky subtraction problem
64	Eyeball check deprecation - Disaster (catchall category for the indescribable)
65	Eyeball check deprecation - Empty detector frame
66	Eyeball check deprecation - Flat field problem
67	Eyeball check deprecation - Malfunction in crosstalk correction
70	Eyeball check deprecation, but this is the best that can be done so should not be reobserved (e.g. very bright star in FOV)
80	Deprecated because observation (MSB,object,filter) has been repeated later (shallow surveys only). The latest duplicate in each case is kept
81	Deprecated because observation (MSB,object,filter) has been repeated in a later Semester (shallow surveys only). The deepest duplicate in each case is kept
99	Manually deprecated because of some DFS issue (e.g. pipeline screw-up)
100	Multiframe deprecated because all detectors have been previously deprecated (and the MF not already deprecated)
101	MultiframeDetectors deprecated because parent Multiframe is deprecated (and the MFD not already deprecated)
102	*Detection deprecated because parent MFD deprecated
103	MultiframeDetector of a stack deprecated because all constituent frames of the same detector are deprecated
110	Intermediate stack frame photometry found to be poor wrt run of all stacks in a deep field
111	Stack replaced by a filtered version
127	Unwanted frame ingested.
≥128	Frame deprecated because reprocessing supercedes it



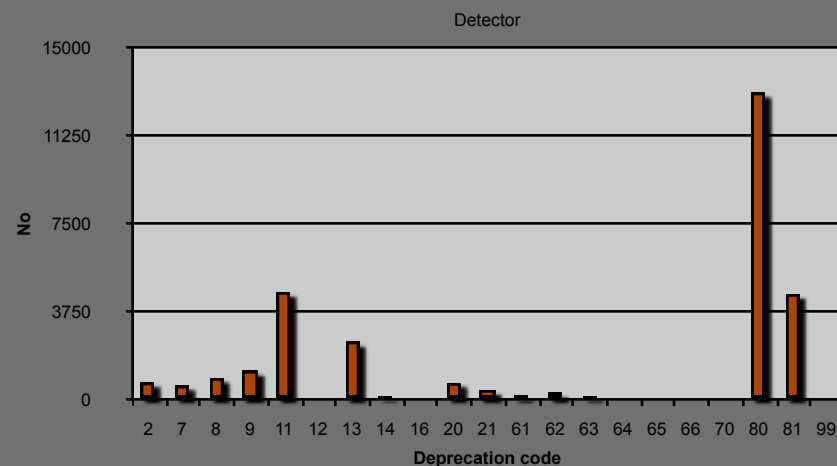
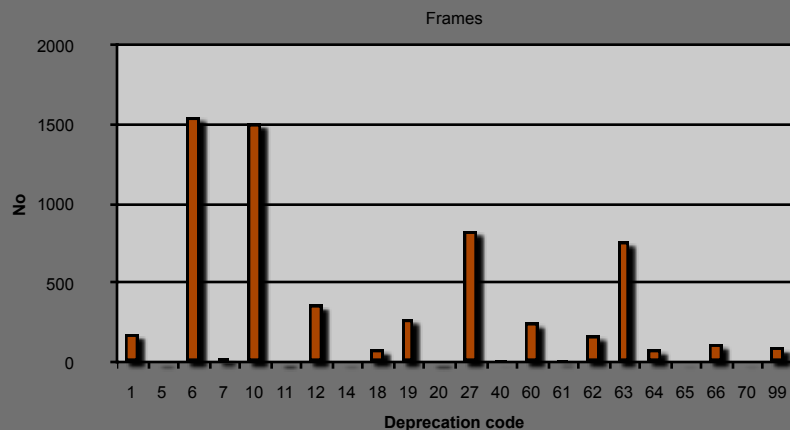
WSA QC

WSA deprecation stats on 202,092 stack frames,
808,305 detectors

detector		frames
un-deprecated stacks, code = 0:	76%	75%
deprecated stacks, code < 128:	6%	7%
deprecated stacks, code >= 128 (reprocessed):	18%	18%



WSA distribution of deprecation codes



6: incorrect complement of frames
10: seeing
27: summit rejected MSB
63: sky-subtraction problem

11: zero-point
13: depth
80: repeats within semester
81: repeats cross semester



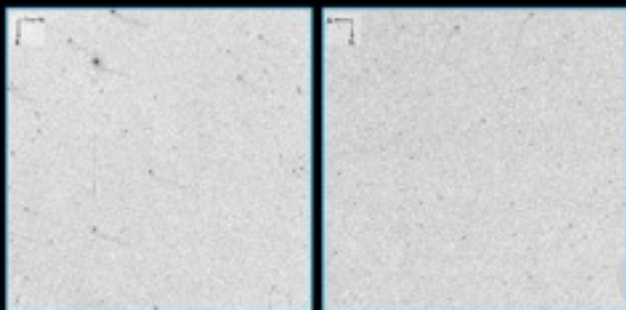
Eyeball examples

Displaying multiframe: w20050903_00862_st

[Download compressed image FITS file \(11.85 Mb\)](#)

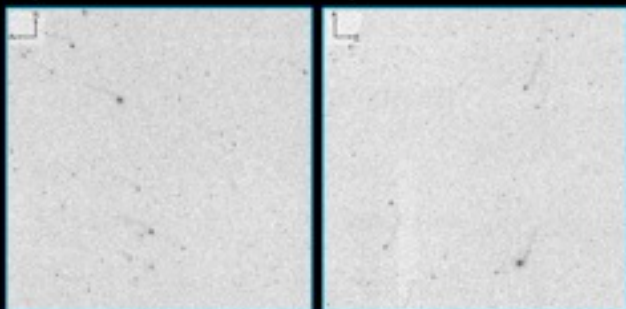
[Download uncompressed image FITS file](#) (Note: please download compressed file as uncompressed files are 3-5 times larger)

Compressed files can be uncompressed using [imcopy](#). Library jpegs images of multiframe are blocked down by a factor of 2 and then displayed below at a size of width=300 pixels. To see the full blocked down version click on the required image.



Image/detector: 1

Image/detector: 2



Image/detector: 3

Image/detector: 4

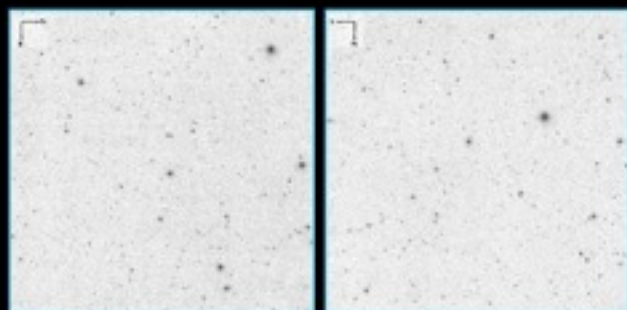
The multiframe images/detectors displayed above are shown in the order they appear in the FITS file and do not represent the order or orientation on the sky

Displaying multiframe: w20051123_01762_st

[Download compressed image FITS file \(10.73 Mb\)](#)

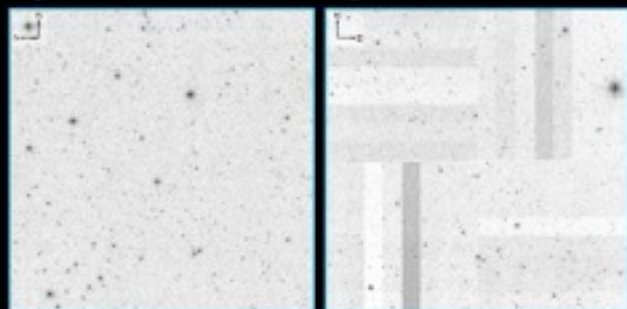
[Download uncompressed image FITS file](#) (Note: please download compressed file as uncompressed files are 3-5 times larger)

Compressed files can be uncompressed using [imcopy](#). Library jpegs images of multiframe are blocked down by a factor of 2 and then displayed below at a size of width=300 pixels. To see the full blocked down version click on the required image.



Image/detector: 1

Image/detector: 2



Image/detector: 3

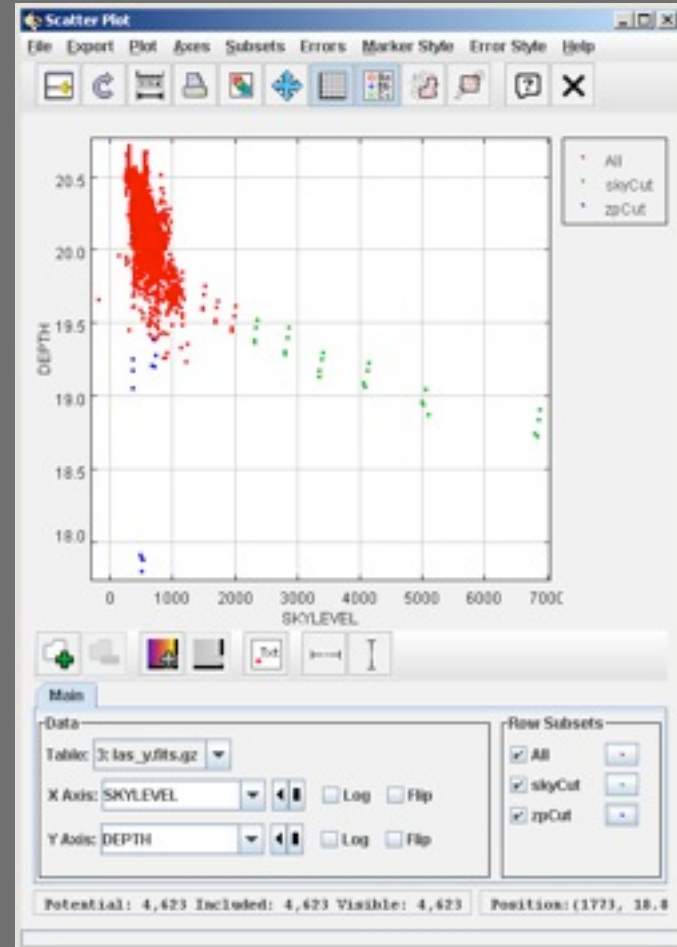
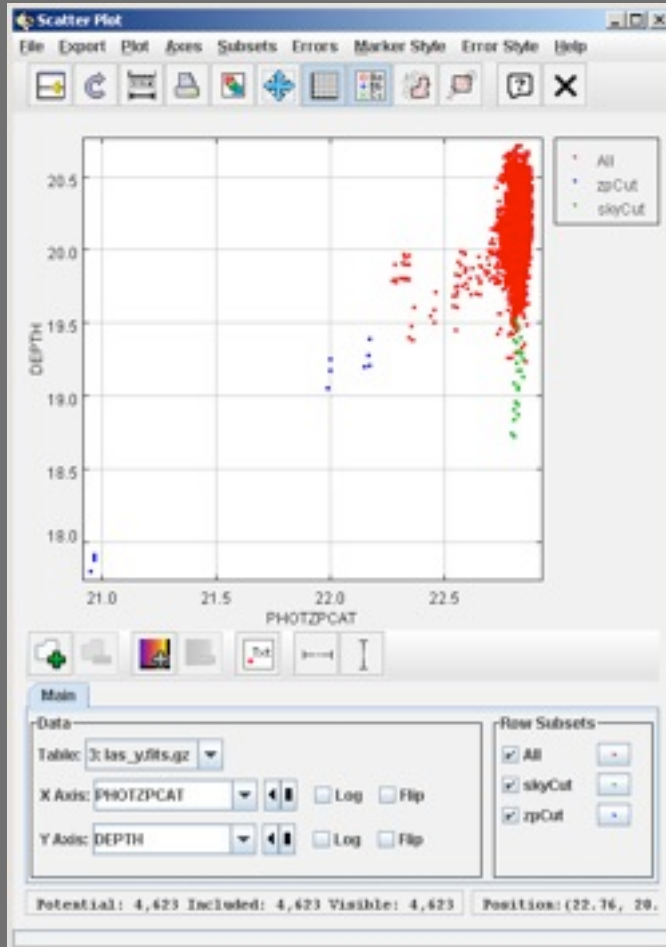
Image/detector: 4

The multiframe images/detectors displayed above are shown in the order they appear in the FITS file and do not represent the order or orientation on the sky

VSA QC & UI requirements:



QC plots (zero-point vs depth & sky-level vs depth)



VSA QC & UI requirements:



Catalogues



Objects flagged in detection tables: ppErrBits



Deblended



Bad pixel(s) in default aperture



Close to saturated



Possible crosstalk artefact/contamination



Lies within a dither offset of the stacked frame boundary



??



VSA QC requirements



Base on WSA model



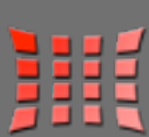
Adapt scripts and liaise with PIs



Need input on seeing, ellipticity depth etc



Eyeballing?



User-interface:

<http://surveys.roe.ac.uk/wsa> & <http://surveys.roe.ac.uk/vsa>

- WSA UI base for VSA UI
- Web-site provides documentation
- ESO-UKIDSS users have logins
- Web based forms query released SQL databases
- Databases also accessible through AstroGrid/VO
- Logged in users can access proprietary databases
- Catalogue and pixel data accessible

VSA QC & UI requirements:




Website documentation

Includes:

 Data overview

 Monitor pages (status of ingest)

 Schema browser (detailed description of database contents)

 SQL cookbook

 Q & A

 Release history

 Known issues



Access rights

- For WSA, released DBs are proprietary for 18 months
- Users login to a community
- Communities maintained by community contacts at each institute
- User's login session used to present list of accessible DBs
- Model for VSA?



Pixel data

Archive listing: given inputs, lists matching ingested frames and returns meta-data and links to jpegs and FITS files (accesses released databases and daily synced version of load server). QC eyeballing.

Image cut-outs: GetImage & MultiGetImage, FITS/jpegs

Colour images

AstroGrid SIAP

The screenshot shows the 'Archive Listing' form on the WFCAM Science Archive website. The form is used to search for and retrieve data from the archive. It includes a navigation menu on the left with links like 'WFCAM Home', 'Data Overview', and 'Analysis services'. The main form area contains several input fields and dropdown menus for specifying search criteria. A dropdown menu for 'Database release to use:' is currently open, showing options like 'UKOSSDR1PLUS' and 'UKOSSDR2PLUS'. The form also includes fields for 'Frame type', 'Filter/wavelength', 'Minimum RA of base position', 'Maximum RA of base position', 'Minimum Dec of base position', 'Maximum Dec of base position', 'Start Date', 'End Date', 'Deprecation', 'MultiframeID number', 'List MultiframeID numbers', 'FramesID number', and 'Rows per page'. There are 'Get It' and 'Reset' buttons at the bottom of the form.

VSA QC & UI requirements:



Archive listing

VSA Image List **WFAU**

Archive Listing

Searching:
 Survey: VHS: VISTA Hemisphere Survey
 Minimum RA: 0.0 hours Maximum RA: 24.0 hours
 Minimum Dec: -90.0 degrees Maximum Dec: 90.0 degrees

Using database: VSA

View column link shows jpeg images of multiframe in a new window plus links to download file(s)
 Download column link download the [FITS compressed](#) FITS image file. Use View column link to retrieve uncompressed images.
 Car column link download the FITS catalogue file.

Links to wget scripts will appear at the end of this page.

begin row 1

View	Img	Car	multiframeID	frameType	shotype	raBase	decBase	shortname	exptime	dateObs	project	numDetectors	vistaRcnNo
View	Img	Car	13603	stack	OBJECT	+0.8229720	-8.8261300	J-5.000000	2009-11-04 00:29:14.7	VHS	16	1	
View	Img	Car	13607	stack	OBJECT	+0.8229720	-8.8429300	J-5.000000	2009-11-04 00:30:58.4	VHS	16	3	
View	Img	Car	13611	stack	OBJECT	+0.8290780	-8.8261200	J-5.000000	2009-11-04 00:32:47.1	VHS	16	5	
View	Img	Car	13615	stack	OBJECT	+0.8290780	-8.8429300	J-5.000000	2009-11-04 00:34:33.1	VHS	16	7	
View	Img	Car	13619	stack	OBJECT	+0.8350350	-8.8261300	J-5.000000	2009-11-04 00:36:20.7	VHS	16	9	
View	Img	Car	13623	stack	OBJECT	+0.8350350	-8.8429400	J-5.000000	2009-11-04 00:38:04.9	VHS	16	11	
View	Img	Car	13627	stack	OBJECT	+0.8229720	-8.8261300	H-5.000000	2009-11-04 00:40:13.1	VHS	16	13	
View	Img	Car	13631	stack	OBJECT	+0.8229720	-8.8429300	H-5.000000	2009-11-04 00:41:54.5	VHS	16	15	
View	Img	Car	13635	stack	OBJECT	+0.8290780	-8.8261200	H-5.000000	2009-11-04 00:43:36.0	VHS	16	17	
View	Img	Car	13639	stack	OBJECT	+0.8290780	-8.8429300	H-5.000000	2009-11-04 00:45:20.1	VHS	16	19	
View	Img	Car	13643	stack	OBJECT	+0.8350350	-8.8261300	H-5.000000	2009-11-04 00:47:04.0	VHS	16	21	
View	Img	Car	13647	stack	OBJECT	+0.8350350	-8.8429400	H-5.000000	2009-11-04 00:48:42.4	VHS	16	23	
View	Img	Car	13651	stack	OBJECT	+0.8229720	-8.8261300	Ks-5.000000	2009-11-04 00:50:47.4	VHS	16	25	
View	Img	Car	13655	stack	OBJECT	+0.8229720	-8.8429300	Ks-5.000000	2009-11-04 00:52:34.9	VHS	16	27	
View	Img	Car	13659	stack	OBJECT	+0.8290780	-8.8261200	Ks-5.000000	2009-11-04 00:54:18.7	VHS	16	29	
View	Img	Car	13663	stack	OBJECT	+0.8290780	-8.8429300	Ks-5.000000	2009-11-04 00:56:04.7	VHS	16	31	
View	Img	Car	13667	stack	OBJECT	+0.8350350	-8.8261300	Ks-5.000000	2009-11-04 00:57:50.3	VHS	16	33	
View	Img	Car	13671	stack	OBJECT	+0.8350350	-8.8429400	Ks-5.000000	2009-11-04 00:59:29.8	VHS	16	35	
View	Img	Car	13675	stack	OBJECT	+0.8096720	-8.8261300	J-5.000000	2009-11-04 01:01:58.8	VHS	16	37	
View	Img	Car	13679	stack	OBJECT	+0.8096720	-8.8429300	J-5.000000	2009-11-04 01:03:33.0	VHS	16	39	
View	Img	Car	13683	stack	OBJECT	+0.8096720	-8.8261200	J-5.000000	2009-11-04 01:05:17.3	VHS	16	41	
View	Img	Car	13687	stack	OBJECT	+0.8096720	-8.8429300	J-5.000000	2009-11-04 01:07:06.4	VHS	16	43	
View	Img	Car	13691	stack	OBJECT	+0.1016850	-8.8261300	J-5.000000	2009-11-04 01:08:45.4	VHS	16	45	

Displaying multiframe: 13627 v20091103_00105_st

[Download compressed Image FITS file \(55.11 Mb\)](#)
[Download uncompressed Image FITS file \(Note: please download compressed file as uncompressed files are 3-5 times larger\)](#)
[Download Catalogue FITS file \(3.24 Mb\)](#)

Compressed files can be uncompressed using [imcopy](#). Library jpeg images of multiframe are blocked down by a factor of 4 and then displayed below at a size of width=200 pixels. To see the full blocked down version click on the required image.

VSA QC & UI requirements:



Image cut-outs

Single position: GetImage

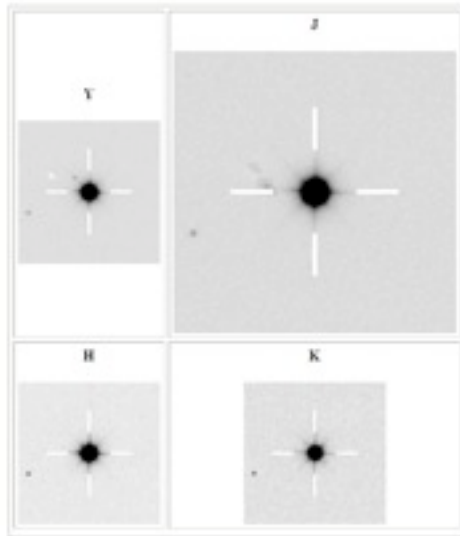
List of positions: MultiGetImage

GetImage cut-out results

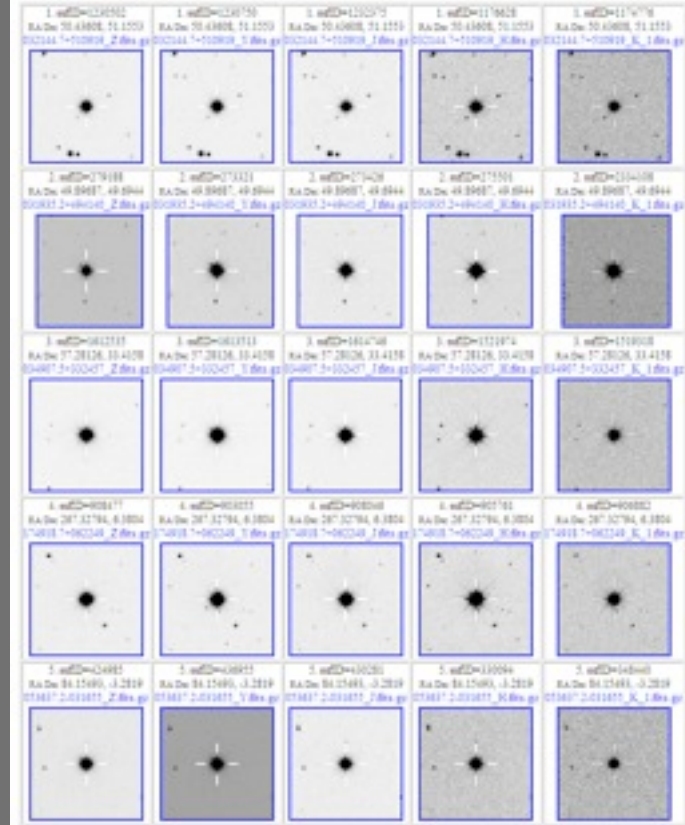
J2000 coords: RA: 178.0640927 Dec: 0.247909
 Programme: UKIDSS Large Area Survey, LAS
 Filter: all
 Processing ...
 Connecting to database: UKIDSSDR6PLUS

Link	multiframeID	frametype	obstype	filterid	shortname	dateObs	extNum
obsc	2321537	stack	OBJECT 2	Y		2008-04-15 09:29:51.8 5	
obsc	2321547	leystack	OBJECT 3	J		2008-04-15 09:52:55.4 5	
obsc	2319378	stack	OBJECT 4	H		2008-03-25 10:53:51.0 5	
obsc	2319398	stack	OBJECT 5	K		2008-03-25 11:08:14.1 5	

4 rows returned



UKIDSS Galactic Clusters Survey, GCS.ZYJHK_1
 page 1 of Summary 3 2



page 1 of Summary 3 2

VSA QC & UI requirements:

Colour image

- Specify position, size & resolution and filters for RGB
- Uses SWarp to mosaic detectors
- Returns jpeg and Google KML file



Colour Image Service

RA: 185.37989 Dec: 14.59603 Size: 10.0 x 10.0 arcmin Red:K Green:H Blue:Y

Download links for FITS files: [R file](#) [G file](#) [B file](#)

Download link for Google Sky KML archive file: [kml file](#)

Dimensions of jpeg: 1499 x 1499
Images with one dimension > 500 pixels are displayed as thumbnails below.
For large images we suggest you right click to download rather than opening them in a browser

Adjust image? minLevel: maxLevel: sigma: clip:

minL=12, maxL=28240, sigma=20 clip=no

VSA QC & UI requirements:



Catalogue data

- ☐ Cone search of main science tables
- ☐ Menu driven SQL query builder
- ☐ Freeform SQL query
- ☐ CrossID of list of objects
- ☐ Cone searches and ADQL/SQL queries in AstroGrid

WFCAM Science Archive

Home | Overview | Browser | Access | Login | Cookbook | nonSurvey

Status: Logged in as: User: nrs2002 - Community: no access

The current version of DR6 does not contain UDS detection/source data and so new UDS mosaic. Users wishing to access UDS data should use the DR5Optics database.

SQL by Menu Step 2

In this section you should select the parameters you wish to extract from the DR6DR61 SQL Query Reference table and/or apply constraints to [Indexed Variables](#) are highlighted, searches making use of indexed quantities will execute faster.

You must select or enter at least one parameter.

Select:

sourceID	cuEventID	frameSetID	ra	dec	sigRa
sigDec	epoch	muRa	muDec	sigMuRa	sigMuDec
ch2	nFrames	cx	cy	ca	MemID
l	b	tanltda	eta	prOrSec	ymc_1Pm
ymc_1PmEn	L_1mPm	L_1mPmEn	hmPm	hmPmEn	ymc_1Est
ymc_1EstEn	L_1mEst	L_1mEstEn	hmEst	hmEstEn	mergedClassStat
mergedClass	pStar	pGalaxy	pHose	pSaturated	vDV
yY	aj	ak	ak	ymMag	yHmMagEn
yPetroMag	yPetroMagEn	yPmMag	yPmMagEn	ySerMag2D	ySerMag2DEn
yAperMag3	yAperMag3En	yAperMag1	yAperMag1En	yAperMag1	yAperMag1En
yGauss	yE3	yPA	yCrMts	yDelend	yClass
yClassStat	yppCrMts	ySerNum	yObjID	yC	yCta
L_1HmMag	L_1HmMagEn	L_1PmMag	L_1PmMagEn	L_1PmMag	L_1PmMagEn
L_1SerMag2D	L_1SerMag2DEn	L_1AperMag3	L_1AperMag3En	L_1AperMag1	L_1AperMag1En
L_1AperMag5	L_1AperMag5En	L_1Gauss	L_1E3	L_1PA	L_1CrMts
L_1Delend	L_1Class	L_1ClassStat	L_1ppCrMts	L_1SerNum	L_1ObjID
L_1C	L_1Cta	L_1HmMag	L_1PmMagEn	L_1PmMag	L_1PmMagEn
L_1HmMag	L_1PmMagEn	L_1SerMag2D	L_1SerMag2DEn	L_1AperMag1	L_1AperMag1En

VSA QC & UI requirements:

SQL queries

- Powerful and flexible
- Table views simplify some queries
- Queries can be joined with other major datasets (SDSS, 2MASS)
- Results in FITS / ASCII / VOTable

Freeform SQL Query

This form allows you to submit an SQL query to the WSA database ([notes and tips](#)).

Database release to use:

Upload SQL query from file into this form:

or enter SQL statement:

```
SELECT zAperMag3-jAperMag3 AS zmj, zAperMag3 AS z
FROM gscPointSource
WHERE
/* Positional cuts for the Sigma Orionis in the
Orion Nebula Cluster (in degrees for both) */
ra BETWEEN +84.00 AND +85.00 AND
dec BETWEEN -2.85 AND -2.30 AND
/* Magnitude cuts to avoid saturated sources */
zAperMag3 > 11.5 AND
jAperMag3 > 11.5 AND
iAperMag3 > 11.0 AND
hAperMag3 > 11.3 AND
k1AperMag3 > 9.9 AND
/* Magnitude/color cuts to select out the member
members */
zAperMag3 < 3.0*(jAperMag3-jAperMag3) + 12.0 AND
jAperMag3-jAperMag3 > 0.3
```

ensure one of the file formats is selected below if you want to save your results.

WSA Database - SQL Query Results

Data file generating queries can take a bit longer to execute as they write to a file ALL rows returned by the query.

A web link to your generated output file will appear at the bottom of this page.

Connecting to UKIDSSDR6PLUS database
QUERY STARTED: Thu Jan 21 22:20:35 GMT 2010 [1 active, 5137 total]

Please keep this browser window open and wait for your results or further information to appear below ...

timeout: 3600

Connected to database

Submitted query: SELECT zAperMag3-jAperMag3 AS zmj, zAperMag3 AS z FROM gscPointSource WHERE /* Positional cuts for the Sigma Orionis in the Orion Nebula Cluster (in degrees for both): */ ra BETWEEN +84.00 AND +85.00 AND dec BETWEEN -2.85 AND -2.30 AND /* Magnitude cuts to avoid saturated sources: */ zAperMag3 > 11.5 AND jAperMag3 > 11.5 AND iAperMag3 > 11.0 AND hAperMag3 > 11.3 AND k1AperMag3 > 9.9

*** OK

	zmj	z
1	+0.884647	+17.481388
2	+1.321213	+19.469225
3	+0.954549	+18.431257
4	+1.063080	+19.178596
5	+0.521610	+17.668072
6	+0.508320	+18.239601
7	+0.432016	+18.772482
8	+1.039431	+19.810425
9	+0.502993	+16.177141
10	+0.769297	+18.745730

(Query returned 5457 result rows, only the first 10 rows are shown in the displayed table.)

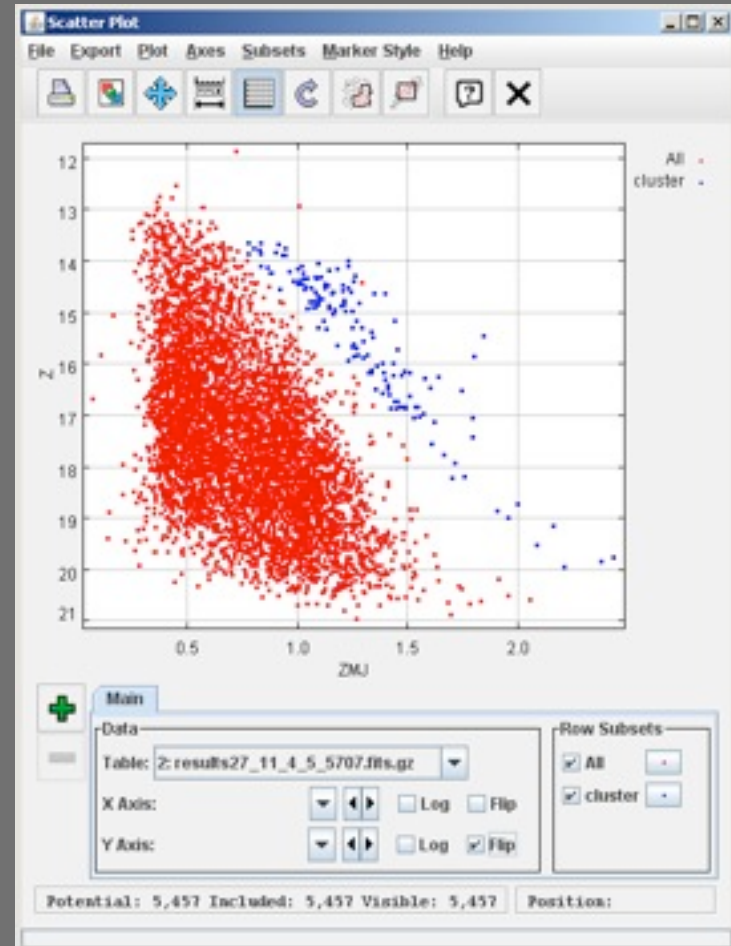
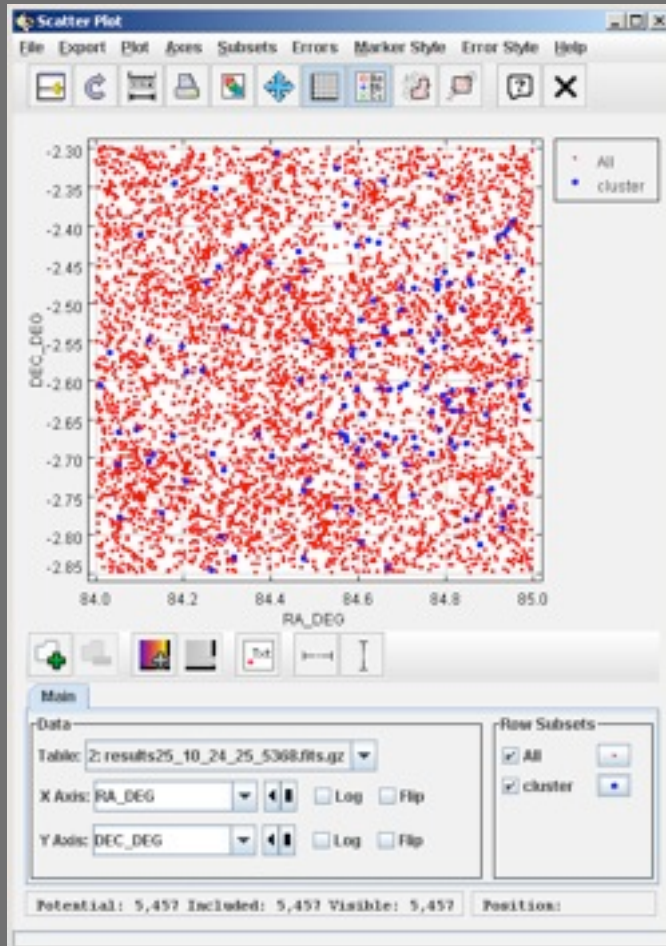
[Download Results File](#), your results in a gzipped FITS file (Contains 5457 rows, 37.4 KB)

[Launch File in Topcat](#) (requires Java 1.4 and Java Web Start, approx 3Mb download for Topcat application)

VSA QC & UI requirements:



Results in TOPCAT



VSA QC & UI requirements:

File Edit View History Result Interop Window Help

Search for: Cat. Objects Images Spectra Timed Data

At Position (RA,Dec) or Object Name: 137.460222, +32.443779

Search Radius (deg/arcsec): 0.010000

* Degrees Sexagesimal

Query Results - 1 resource

Flag	Results	Title
	1 UKIDSS DR3 SAMP Service	

Results Information Table Metadata

Icon	Name	Position
	UKIDSS DR3 SAMP Service Search	137.460222
	U UKIDSS SAMP	137.460222

File Edit View History Result Interop Window Help

Search for: Cat. Objects Images Spectra Timed Data

At Position (RA,Dec) or Object Name: 137.460222, +32.443779

Search Radius (deg/arcsec): 0.100000

* Degrees Sexagesimal

Query Results - 10 resources

Flag	Results	Title
	3765 UKIDSS DR3	
	0 UKIDSS DR3	
	0 UKIDSS DR3	
	0 UKIDSS DR3	
	0 UKIDSS DR3	
	0 UKIDSS DR3	
	0 UKIDSS DR3	
	0 UKIDSS DR3	
	0 UKIDSS DR3	
	3765 UKIDSS DR3	

Results Information Table Metadata

Icon	Name	Position
	UKIDSS DR3 Search Results.vot	

Process

Actions

- View
- Download
- Multi Query
- Send tables to Aladin

About

application/x-vorname+xml

File Edit Image Catalog Overlay Tool View Interop Help

Location: 09:10:12.85 +32:27:13.0 ICRS

Pixel: 1438 Full

U UKIDSS_143118

Zoom: 1/4x

multiFID	extNum	cuVentID	seqNum	filterID	spoFlux	spoMag	x	xErr	y	yErr
1292635	3	2966	346	3	7242.5176	17.32495	930.3063	0.07827252	2285.6765	0.07791714
1292635	3	2966	349	3	2548.1306	18.459122	8808.5159	0.20745601	2286.8406	0.20616001
1292635	3	2966	352	3	894.8570	19.595291	1286.4125	0.22714828	2328.7737	0.22617981
1292635	3	2966	375	3	6873.327	17.381758	3543.5161	0.033293	2553.303	0.033422
1292635	3	2966	381	3	3185.0981	18.21687	2009.4421	0.062306	2587.8013	0.062320

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VSA QC & UI requirements:



VSA UI requirements

- Build on WSA (most functionality already working for VSA, <http://surveys.roe.ac.uk/vsa>)

- Table views ?

- Potential enhancements / new services:

 - List-driven photometry (done in beta for WSA)

 - myDB

 - Improved query builder

 - Coverage / footprint service

 - ??? Discuss

- Need to prioritise any new requirements.



End

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VSA QC & UI requirements: