VISTA DATA FLOW SYSTEM (VDFS)

for VISTA & WFCAM data

WSA User Interface Document

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Contents

1 SCOPE

This document describes the interface and underlying software that will sit between the data held in the WSA and the end user. In this context a user might be a member of UKIDSS, an astronomer outside the consortium or to a lesser extent a member of the public. However this document is aimed at software engineers and astronomers with knowledge of database access and web services.

The Science Requirements Analysis Document (ADO1), specifically sections 3.4 and 4, lays out the conditions for user access to the WSA. Here we mainly concentrate on how the V1.0 specified functionality for accessing survey data will be implemented.

2 INTRODUCTION

The WSA website will be the primary point of contact for users and Section 3 gives a summary of its construction and content.

Users of the WSA will mainly be interested in access to the stored pixel data (FITS images) and/or the generated object catalogues. The way the data are held in the archive and the different software required to process user requests lead us to consider these two types of access in separate sections.

Section 4 discusses the user interface to the pixel data splitting it up into the different ways in which users will be able to extract image data and the underlying software required. The section also gives details of relevant experience in serving pixel data.

The user interface providing access to the object catalogue data is similarly broken down and the subject of Section 5. Links to prototypes demonstrating some of the planned functionality are provided.

Ensuring the archive interface conforms to emerging Virtual Observatory standards and housekeeping issues are briefly discussed in Sections 6 and 7.

Section 8 lists the documentation that will be provided to assist the user.

3 WSA WEBSITE

Initial access to information on the WSA and to the data will be via the website maintained by the WFAU.

3.1 Construction

An Apache web server running under Linux and offering up CGI will host the WSA website. Tomcat will also be installed providing Java servlet functionality. All the site's pages and forms will be validated as HTML 4.01 compliant using the W3C validation service. This should ensure they work with a wide range of browsers on common operating systems. Specifically they will be tested using Microsoft Internet Explorer 5 under Windows and Netscape 4.76 running on Unix/Linux. Cascading Style Sheets (CSS) will also be used to build the website with this content again being W3C validated. Initially Javascript will not be used though if the functionality it offers in, for example, writing dynamic access forms outweighs potential problems with browser compatibility this might be re-visited.

3.2 Content summary

The WSA website will consist of

- introductory pages
- information on the various surveys, their progress and what is held in the WSA
- web forms enabling the user to access the data and pages describing other access points (see Sections 4 and 5)
- documentation and help pages (see Section 8)
- links to relevant resources (e.g. WFCAM, UKIDSS etc).

4 PIXEL DATA

As detailed in document VDF-WFA-WSA-007 the WSA will store the pixel data in multi-extension FITS files in a flat file system. Tables in the SQL database will hold the meta data extracted from each image and will also record the path/filename of the corresponding FITS file. The SQL database resides on a separate machine (Windows 2000 PC) that is networked to the web server. The FITS files are on disks also visible to the web server.

Different ways for accessing the pixel data are described below with a schematic representation given in Fig 1. The functionality offered by them will meet the specified requirements of V1.0, with Sections 4.3 and 4.4 covering some aspects of V2.0.

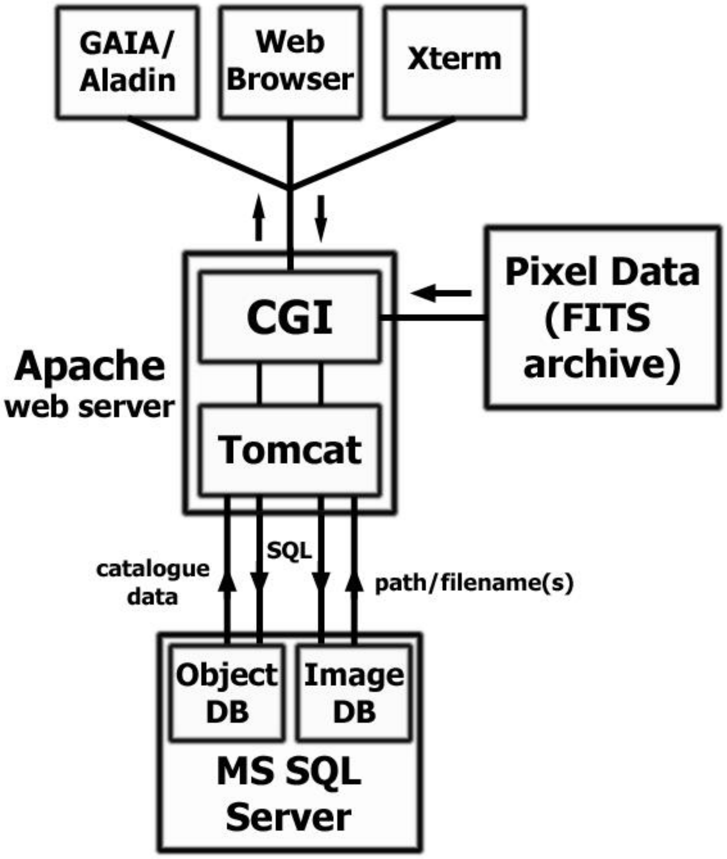


Figure 1: *Schematic overview of pixel data access*

The primary access route for users will be via web forms on the WSA website. Password protected versions of the forms will restrict access to the data not yet classed as world readable, i.e. the SQL queries discussed below will be constructed so as to only return and/or pass on image data based on the level of user. The CGI scripts actioned by the forms will be written in Perl as it offers a good way of wrapping up the steps required to perform the extractions. Speed and efficiency is more important in the low level manipulation of the binary data and this will be carried out using C/C++.

4.1 Small image extraction - pixel form 1 (PF1)

This form will enable users to extract an image from a SINGLE extension to a stored FITS file. The maximum size extracted will therefore be limited by the area covered by the extension accessed.

Boxes and menus on the form will allow the user to specify the celestial coordinates of the extraction (decimal degrees or sexagesimal), the coordinate system (J2000, B1950, Galactic, SDSS), the size of the area to extract (x,y in arcmin), the waveband, and type of image to use (unstacked, DXS, UDS, difference images) and whether or not to return a GIF/JPG image in addition to a link to the extracted FITS file. There will also be an option to attach a default object catalogue as a binary table extension to the FITS file.

When submitted this form will action a Perl CGI script on the server. A summary of the tasks the script will perform is given below and the associated workflow is shown in Fig 2.

- parse the inputted parameters using the CGI.pm module and check they are valid. If problems are detected output message to browser and exit;
- convert inputted coordinates/system to RA and Dec (J2000 decimal degrees). Will need to find or write code to convert SDSS eta/lambda to RA/DEC.
- check RA and DEC are valid i.e. $0 \leq RA \leq 360$ and $-40 < DEC < +60$, if not output message to browser and exit.
- construct the SQL query string needed to select the path/filename and extension number of the best placed archived FITS image from the relevant database table
- execute SQL query by calling out to Java servlet using LWP module (or directly using the DBI and DBD::SYBASE modules)
- capture result, if successful this will be one line giving a path (and extension number) to a multi-extension FITS file that exists on disk, if not output message and exit.
- pass path/filename, extension number, requested size and output filename (unique name) to image extraction software (system call C/C++ code). The C/C++ code will use the built in WCS of the input image to extract the largest area possible up to the specified size generating a FITS image whose pixels have not been re-sampled. If some of requested area falls outside the supplied image the extracted image will be offset so as to increase the area extracted and a note made in the logfile.
- output logfile of extraction software
- test that output file has been created, if not output message and exit.
- if requested generate GIF/JPG image from extracted FITS image and output image to browser.
- if an object catalogue has also been requested construct the SQL query string needed to extract objects from the relevant database table. Call out to Java servlet to execute this query and append the returned FITS binary table to the image file.
- Output link to gzipped FITS file. Exit

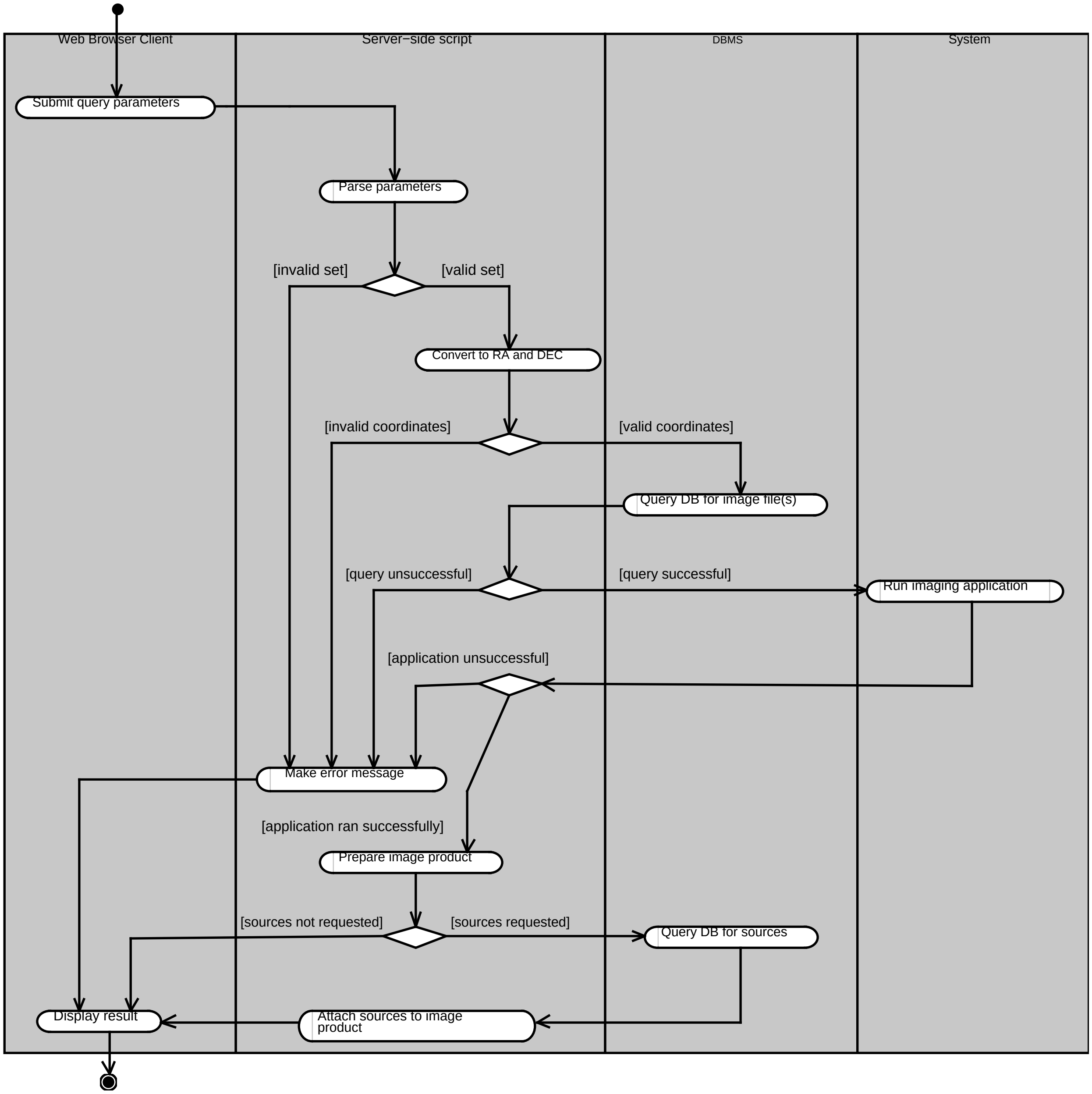


Figure 2: *UML activity diagram showing the flow of events and control in the extraction of a small image by the user. This workflow involves processes carried out by the web browser client, the server-side CGI script, the database manager system, and the operating system. The roles of these players are depicted by separating out the activity diagram into the "swimlanes" as shown.*

It is anticipated that small image extractions will be completed in real time (under 30 seconds). They will be run at higher priority than the background processes described later.

4.2 Batch small image extraction - pixel form 2 (PF2)

Uploading a file of coordinates to this multi-part form will provide the user with a batch mode front end to the functionality offered in Section 4.1. Users will be asked to supply the path of the upload file, the coordinate system used, size of extraction, waveband, whether they want catalogue data attached and a valid email address. Users will also be able to request postscript gray-scale plots of the extracted images.

A limit will need to be placed on the total amount of pixel data that can be extracted. Batch access to the SuperCOSMOS Sky Surveys (SSS) is restricted to a total of 1000 sq. arcmin.

The Perl CGI script actioned by this form will carry out similar steps to those described above in Section 4.1 as it loops through the input file. Output will be written to a logfile and if a given image can not be extracted the script will skip to the next one. After initial checking of the input parameters the actual extractions will be run in the background with a message being returned to the browser informing the user that an email will be sent to them when the script has finished.

If requested the postscript finders will be generated prior to the individual FITS being tarred up and gzipped. On completion an email will be sent to the user giving links to their results.

4.3 Large image extraction - pixel form 3 (PF3)

This form will enable users to construct an image from multiple CCD frames covering an area of sky up to 0.8 degree across. However the underlying mosaicing software will be able to generate arbitrarily large areas (a V2.0 requirement).

The inputted parameters will be the same as PF1 (Section 4.1) but with the addition of a text box to set the pixel size (arcsec) of the returned image and a box to enter the user's email address.

This form will again action a CGI script. The main difference in the processing steps outlined in Section 4.1 is that the initial SQL query constructed and sent to the image database table will return the path/filenames of all images held that overlap with the area of sky requested. This list of files together with the size and resolution requested for the output image will in turn be passed to a Perl mosaicing script (see below) that will mosaic the files together into a single image. As a large amount of pixel re-sampling can be involved the main work will be done in the background with the user being notified by email on completion.

Mosaicing Script - each image passed to the script will be re-mapped to another FITS image whose WCS system is defined by the pixel size and area of sky requested. Once all images have been processed they will then be merged down into a single FITS image. See Section 5 of the WSA Data Flow Document (VDF-WFA-WSA-005) for more detail.

4.4 Stacked image generation - pixel form 4 (PF4)

The functionality described in this section is a V2.0 requirement. It is included here as there are similarities to the procedures detailed in the previous section.

After submitting user inputted values for position and waveband this form will dynamically action the creation of another form that allows the user to select which frames they wish to use in the construction of a stacked image.

Following the parsing of the input parameters (first 3 steps of Section 4.1) the Perl CGI script actioned here constructs and submits an SQL query that returns a list of images that cover the requested area. The script then generates a web form that is returned to the browser. This form will list all the images and allow the user to tick check-boxes alongside each one. An email address will also be required.

When submitted this form in turn actions another Perl CGI script which receives the list of selected files and passes them to the Stacking Script. Again the intensive processing is done as a background task with an email notification being sent on completion. The stacking procedure is described in Section 5 of the WSA Data Flow Document (VDF-WFA-WSA-005).

4.5 Browsable access to pixel data

The WSA website will have tables and charts displaying the contents of the archive. These pages will be generated automatically by periodically running Perl scripts that perform SQL queries on the various image database tables. The pages will be split up into the various surveys and further sub-divided on sky position if the tables get too large. The tables themselves will contain links to the stored image FITS files, the associated catalogue FITS files and the compressed atlas images (JPGs).

The links to the data will be dynamic in that direct access to the files will not be permitted so the link will run a CGI script that copies the requested file to a publicly accessible area on the server and returns that link.

Public (world accessible) versions of these pages will show all archive contents but the links to unreleased data will be grayed out (not active) and marked as currently unavailable.

4.6 Other access to pixel data

The functionality offered in Section 4.1 will be made compatible with the GAIA (based on SkyCAT) and Aladin tools. The underlying Perl CGI script will be very similar, (or indeed possibly the same but with different options being executed). The main difference being that the generated FITS image is piped directly back to the querying tool.

The same functionality will also be offered in the form of C-code that users can download, compile and run from the command line. The code will submit an HTTP request to a CGI script and retrieve the results. Again the underlying CGI script will be very similar to that of Section 4.1. Users will be able to create their own batch extractions by wrapping the supplied code up in a script. An example command line invocation would be:

```
geturl ”ra=10:11:12.1&dec=+40:50:10&x=1&y=1&waveband=J&objcat=no” > myfile.fits
```

The methods outlined in this section will only access data classed as world readable.

4.7 Demonstrations of pixel access

Currently there is no demonstration available that makes use of mocked up SQL tables of existing FITS images.

However the online SuperCOSMOS Sky Surveys (SSS) particularly

http://www-wfau.roe.ac.uk/sss/pixel.html

and

http://www-wfau.roe.ac.uk/sss/batchfile.html

perform much the same functionality described in Sections 4.1 and 4.2 albeit without the SQL query stage.

Access to SSS data has been made available from within GAIA (under Data-Servers > Browse Catalog Directories... and open/expand SuperCOSMOS catalogues) and Aladin (under load > image servers > others).

The geturl code and functionality described in Section 4.6 has been supplied to the 6dF observers who routinely use it to generate SSS finders for checking target objects (3000-10000 extractions per week).

Screenshots of some of the access methods described above are provided in the Appendix (Section 9).

5 OBJECT CATALOGUE DATA

Object catalogue data are stored in SQL server database tables on a Windows machine networked to the web server. The basic recipe for access is described below:

- Java servlet running under Tomcat on web server parses and checks parameters supplied by user (use javax.servlet class)
- servlet carries out any necessary coordinate manipulation/conversion (use CDS.astro and/or JSky classes)
- servlet constructs SQL query based on inputted parameters and required function.
- servlet connects to SQL server using JDBC and submits query (use java.sql class and Microsoft JDBC drivers)
- SQL server performs query and returns results
- servlet reads results and parses data into desired output format (use nom.tam.fits classes for writing FITS tables)
- servlet outputs results to user either as html, links to files or directly as stream.

The processes listed above are also shown in the form of a sequence diagram in Fig 3.

Note that the intensive part of any query is carried out by SQL server. Much of the differences in functionality of the access methods described below lie in the construction of the SQL query, the code for executing the query is largely generic and re-usable.

The amount of data returned by a query and written to file will need to be restricted. Experience with the SSS showed 1,000,000 records (10 UK Schmidt fields) to be a sensible limit for that system.

The implementation of V1.0 functionality is described below. Again the primary access method will be via web forms. UKIDSS data not yet classed as world readable will be password protected with the unrestricted forms only able to connect to the world readable database. The other access methods that will be offered are also discussed. Most of these methods will by default access the latest merged UKIDSS survey tables.

5.1 Radial Search - Object Form 1 (OF1)

This form will enable a user to extract objects within a specified distance of a supplied position (RA/DEC, Galactic, SDSS lambda/eta) or object name. Other options passed from the form to the servlet will be: which UKIDSS survey to search (or all), which parameters to extract (all, subset or user specified), any additional constraints (used to form SQL WHERE clause), an option to sort the output on a supplied parameter(s), the format of the output data (HTML, delimited ascii file, binary FITS table, VOTable).

The actioned servlet will first convert the inputted coordinates or resolve the inputted name (using SIMBAD or NED) to an RA and DEC in J2000 decimal degrees. An SQL query will then be formed

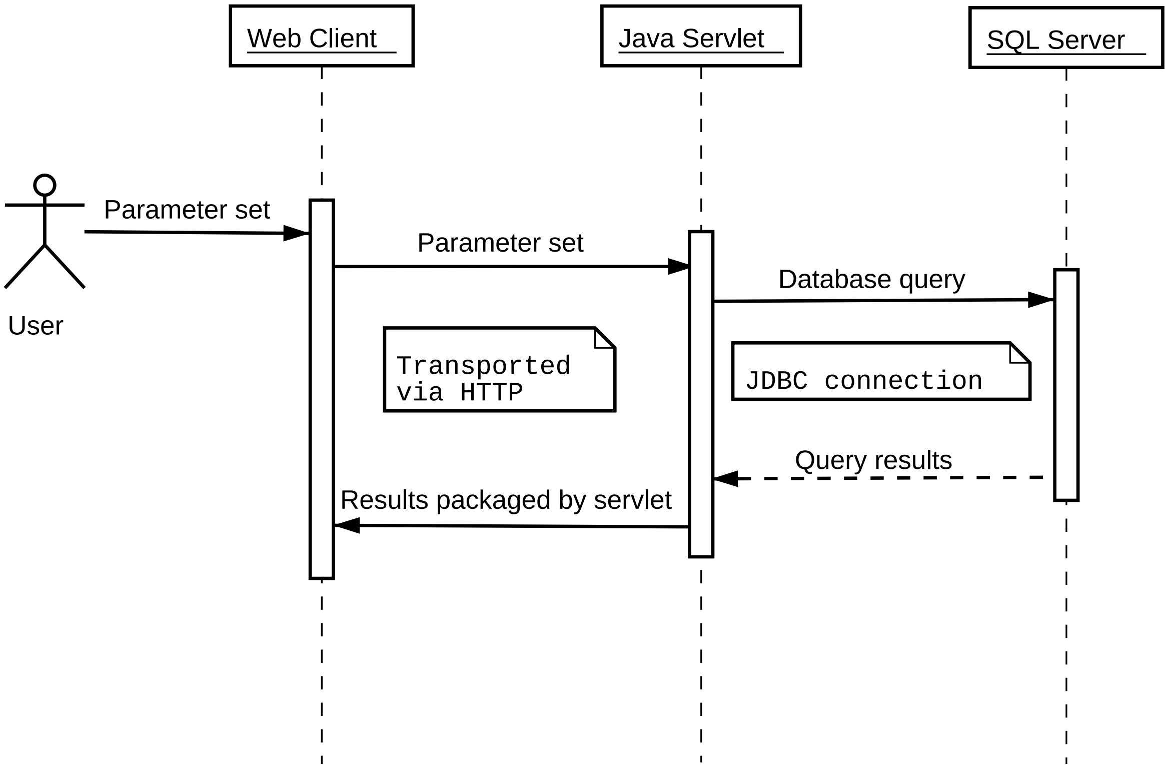


Figure 3: *Sequence diagram representation of user access to object catalogue data.*

around an SQL function (based on fGetNearbyObj from SDSS Skyserver) that efficiently searches through the table using the HTM index.

e.g.

```
SELECT UKIDSS_TABLE.* (or subset, or inputted parameters)
FROM UKIDSS_TABLE u, fGetNearbyObj(RA,DEC,radius) n
WHERE u.objID=n.objID AND (inputted where clause)
ORDER BY (inputted parameter(s))
```

The servlet will submit the query as a separate thread, with the main thread keeping the browser connection active and checking that it hasn't been stopped by the user.

On completion the query thread parses and formats the returned rows, writes the data to file if requested and prints any HTML table output and links to files to the browser window.

If requested, ellipse finder plots (GIF/JPG) will be produced for small area extractions (up to 10 arcmin) and output to the browser.

5.2 Rectangular Search - Object Form 2 (OF2)

Similar to the radial search but this time an SQL function is used that extracts objects bounded by limits in RA and DEC. If the user specifies a coordinate system other than RA and DEC (J2000) the rectangle extracted is such that it encloses the one requested in the inputted coordinate system. Extra objects returned by the query can be removed by the servlet though doing this at the SQL stage (e.g. by writing SQL functions to perform coordinate transforms) will also be investigated .

5.3 SQL query - Object Form 3 (OF3)

There will be two versions of this form. The first will use drop down menus and text boxes to guide the user in building an SQL query for execution by the servlet. Users will be able to choose/input values to construct the SELECT, FROM, WHERE and ORDER BY clauses of SQL. An option will enable the querying of a second table joined with the primary table. The secondary table can be one of the non-WFCAM based tables held in the archive e.g. SSS or SDSS. Joins will be made via the neighbours table for a given combination.

The second version is based around a text box into which users with knowledge of SQL and the contents of the WSA (which will be documented) can directly input their SQL query.

Output options for both versions will be as OF1.

5.4 Cross-matching a catalogue - Object Form 4 (OF4)

This multipart form offers the user the ability to upload a list of coordinates (parsed using the O'Reilly servlet classes) and match them against tables held in the database.

Users will specify the pairing radius and whether they want just the nearest object or all matching objects extracted.

Unlike the previous object catalogue forms several SQL statements will be executed by the servlet. The first of these creates a temporary database table, that table is then populated with the contents of the upload file. Finally the requested database table and temporary table are paired. The temporary table is automatically dropped when the JDBC connection is closed. This method is a lot more efficient than issuing a query for each object whilst looping through the user's file.

5.5 Browsable access to catalogue data

As detailed in Section 4.5 the WSA pages will provide a browsable way to reach links to the object catalogues which are stored as FITS binary tables (generated from and associated with a given FITS image file by the CASU standard source extraction tool).

5.6 Other access to catalogue data

The functionality offered in Sections 5.1 and 5.2 will be made compatible with the GAIA and Aladin tools. Some of the options available on the web form will be hard-wired to sensible defaults for this implementation (e.g. the parameters returned) as the interface, especially with GAIA, is not fully configurable.

As described in Section 4.6 command line C-code will also be provided to the user allowing direct (non-browser) radial and rectangular queries.

Again the methods outlined in this section will only access data classed as world readable.

5.7 Demonstrations of catalogue access

The core functionality described in Sections 5.1 and 5.4 are demonstrated in the prototypes at

http://www-wfau.roe.ac.uk/6dfgs/wsa/radial.html

and

http://www-wfau.roe.ac.uk/6dfgs/wsa/xmatch.html

respectively.

These forms access the PhotoPrimary table of the SDSS EDR held at WFAU on a basic PC. This table contains over 10 million records.

The radial form uses the CDS Sesame Java class and web service to resolve an input name to J2000 coordinates using Simbad.

Xmatching an uploaded file of 1000 records takes some 40-90 seconds.

The initial access to the 6dF Galaxy Redshift Survey offers similar functionality to that described in Section 5.3 see

http://www-wfau.roe.ac.uk/6dFGS/form.html

and

http://www-wfau.roe.ac.uk/6dFGS/SQL.html

Screenshots of some of the examples described above are provided in the Appendix (Section 9).

6 VIRTUAL OBSERVATORY CONSIDERATIONS

VOTable format will be one of the output options for the V1.0 object catalogue access. In moving towards V2.0 specified functionality the pixel and object catalogue access will be offered as XML/SOAP driven web services that will be published on the Astrogrid registry. Tools and standards are starting to emerge and will be adopted as they are finalised.

7 HOUSEKEEPING

Temporary output files generated by user requests will be written to a publicly (HTTP) accessible area of the file system. A cron job will run daily and delete any of these files more than 48 hours old.

Log files of user access will be archived and used to monitor and generate statistics on the WSA usage (hits, queries, data volume served).

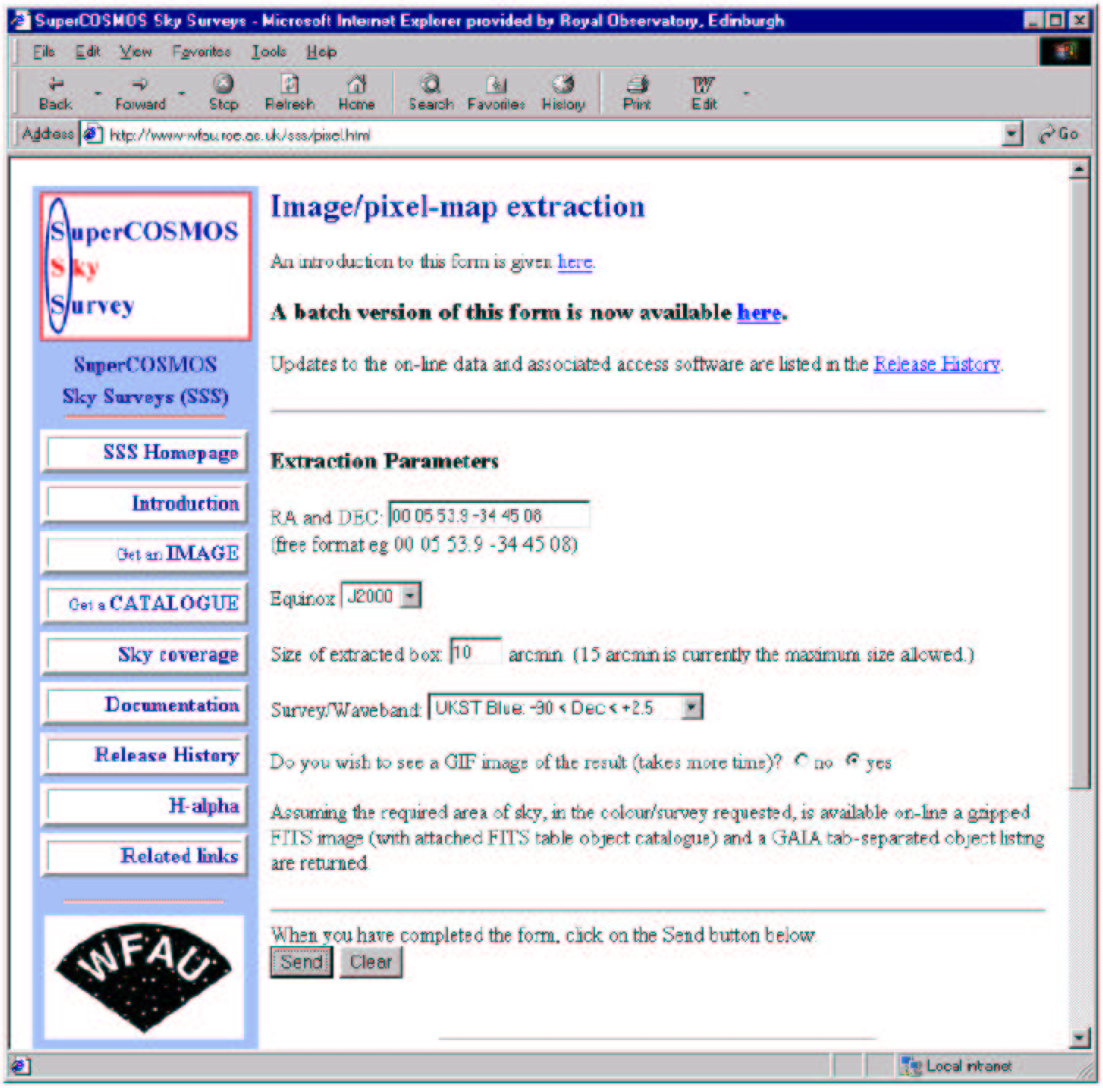
8 USER DOCUMENTATION

The WSA website will have extensive online documentation to help the user including:

- Information specific to each access method
- Links to explanations of options/input on web forms
- Example usage and queries (e.g use cases ”how do I extract ... ” and filled in forms)
- Detailed description of database contents e.g. tables, parameters (type, range), functions, constraints
- SQL tutorial
- FAQ
- E-mail contact for support and feedback

9 APPENDIX

This section shows screenshots of some of the ways users can access the SSS and 6dFGS data held at WFAU. Pictures of a web form demonstrating catalogue matching with an SQL database (SDSS EDR held at WFAU) are also provided. See Sections 4.7 and 5.7 for more details.


SuperCOSMOS Sky Surveys - Microsoft Internet Explorer provided by Royal Observatory, Edinburgh
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History Print Edit
Address
Go
SuperCOSMOS Sky Survey
SuperCOSMOS Sky Surveys (SSS)
SSS Homepage
Introduction
Get an IMAGE
Get a CATALOGUE
Sky coverage
Documentation
Release History
H-alpha
Related links
WFAU
Local intranet

Address: http://www-wfau.roe.ac.uk/sss/pixel.html

Image/pixel-map extraction

An introduction to this form is given here.

A batch version of this form is now available here.

Updates to the on-line data and associated access software are listed in the Release History.

Extraction Parameters

RA and DEC: 00 05 53.9 -34 45 08
(free format eg 00 05 53.9 -34 45 08)

Equinox: J2000

Size of extracted box: 10 arcmin (15 arcmin is currently the maximum size allowed.)

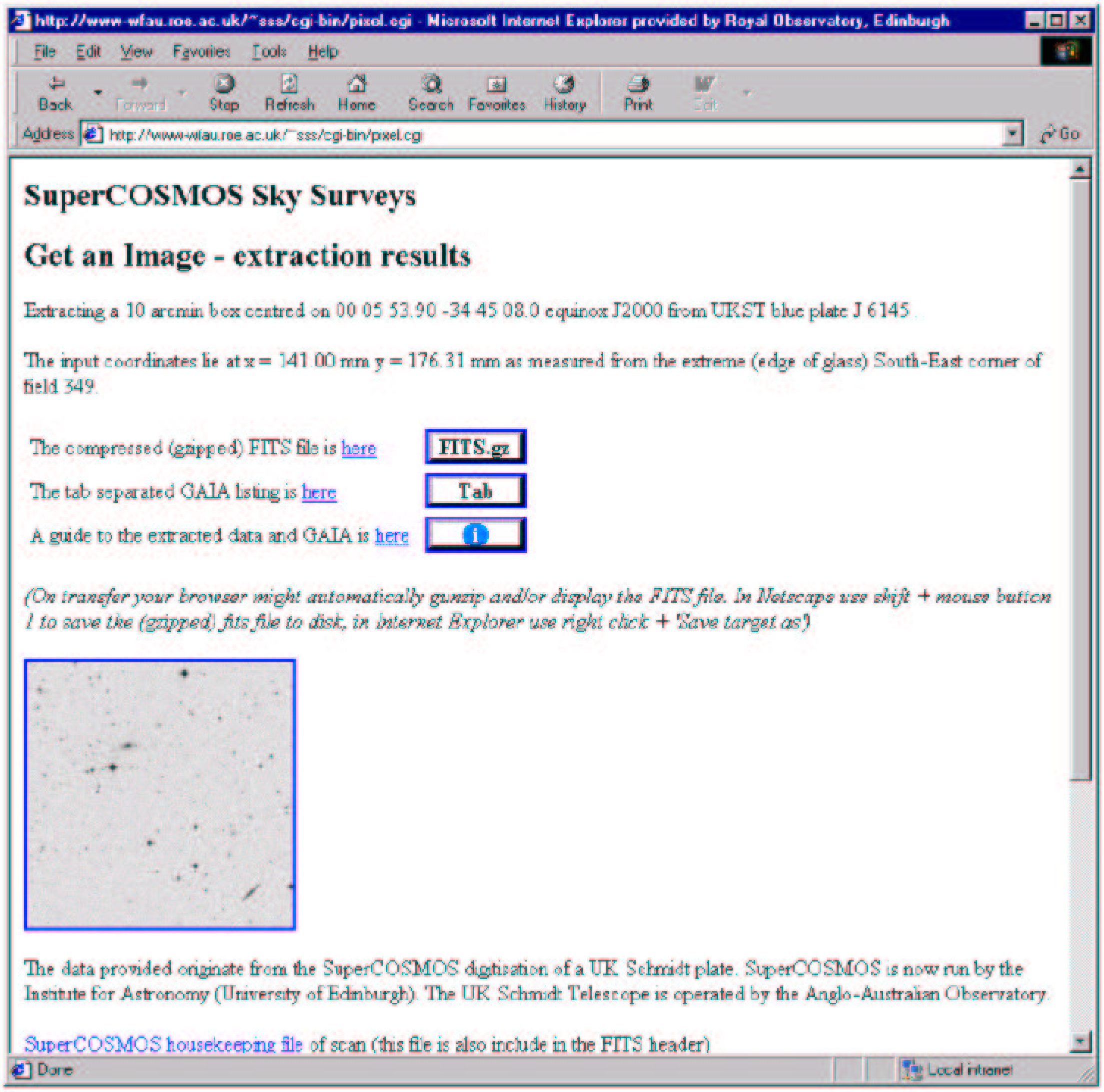
Survey/Waveband: UKST Blue: -90 < Dec < +2.5

Do you wish to see a GIF image of the result (takes more time)? ○ no ● yes

Assuming the required area of sky, in the colour/survey requested, is available on-line a gzipped FITS image (with attached FITS table object catalogue) and a GAIA tab-separated object listing are returned.

When you have completed the form, click on the Send button below.
Send Clear

Figure 4: *Screenshot of the SSS pixel web form.*


http://www-wfau.roe.ac.uk/~sss/cgi-bin/pixel.cgi - Microsoft Internet Explorer provided by Royal Observatory, Edinburgh
File
Edit
View
Favorites
Tools
Help
Back
Forward
Stop
Refresh
Home
Search
Favorites
History
Print
Edit
Address
http://www-wfau.roe.ac.uk/~sss/cgi-bin/pixel.cgi
Go
Done
Local intranet

SuperCOSMOS Sky Surveys

Get an Image - extraction results

Extracting a 10 arcmin box centred on 00 05 53.90 -34 45 08.0 equinox J2000 from UKST blue plate J 6145.

The input coordinates lie at x = 141.00 mm y = 176.31 mm as measured from the extreme (edge of glass) South-East corner of field 349.

The compressed (gzipped) FITS file is here FITS.gz

The tab separated GAIA listing is here Tab

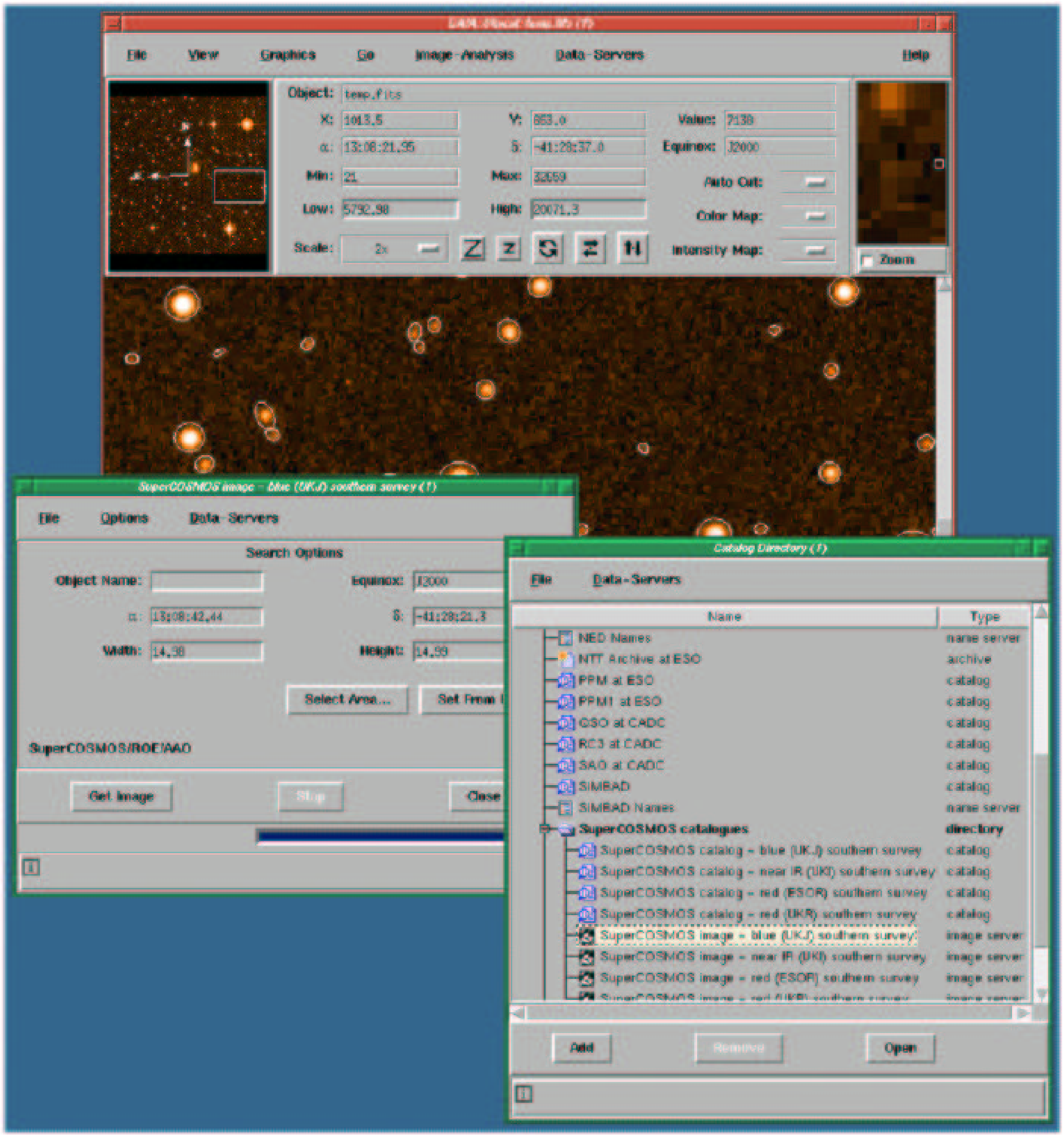
A guide to the extracted data and GAIA is here

(On transfer your browser might automatically gunzip and/or display the FITS file. In Netscape use shift + mouse button 1 to save the (gzipped) fits file to disk, in Internet Explorer use right click + 'Save target as')

The data provided originate from the SuperCOSMOS digitisation of a UK Schmidt plate. SuperCOSMOS is now run by the Institute for Astronomy (University of Edinburgh). The UK Schmidt Telescope is operated by the Anglo-Australian Observatory.

SuperCOSMOS housekeeping file of scan (this file is also include in the FITS header)

Figure 5: *Screenshot of results from the SSS pixel web form.*



Object: temp.fits

X: 1013.5 Y: 863.0 Value: 7138

α: 13:08:21.35 δ: -41:28:37.0 Equinox: J2000

Min: 21 Max: 32659

Low: 5792.98 High: 20071.3

Scale: 2x

Object Name:

Equinox: J2000

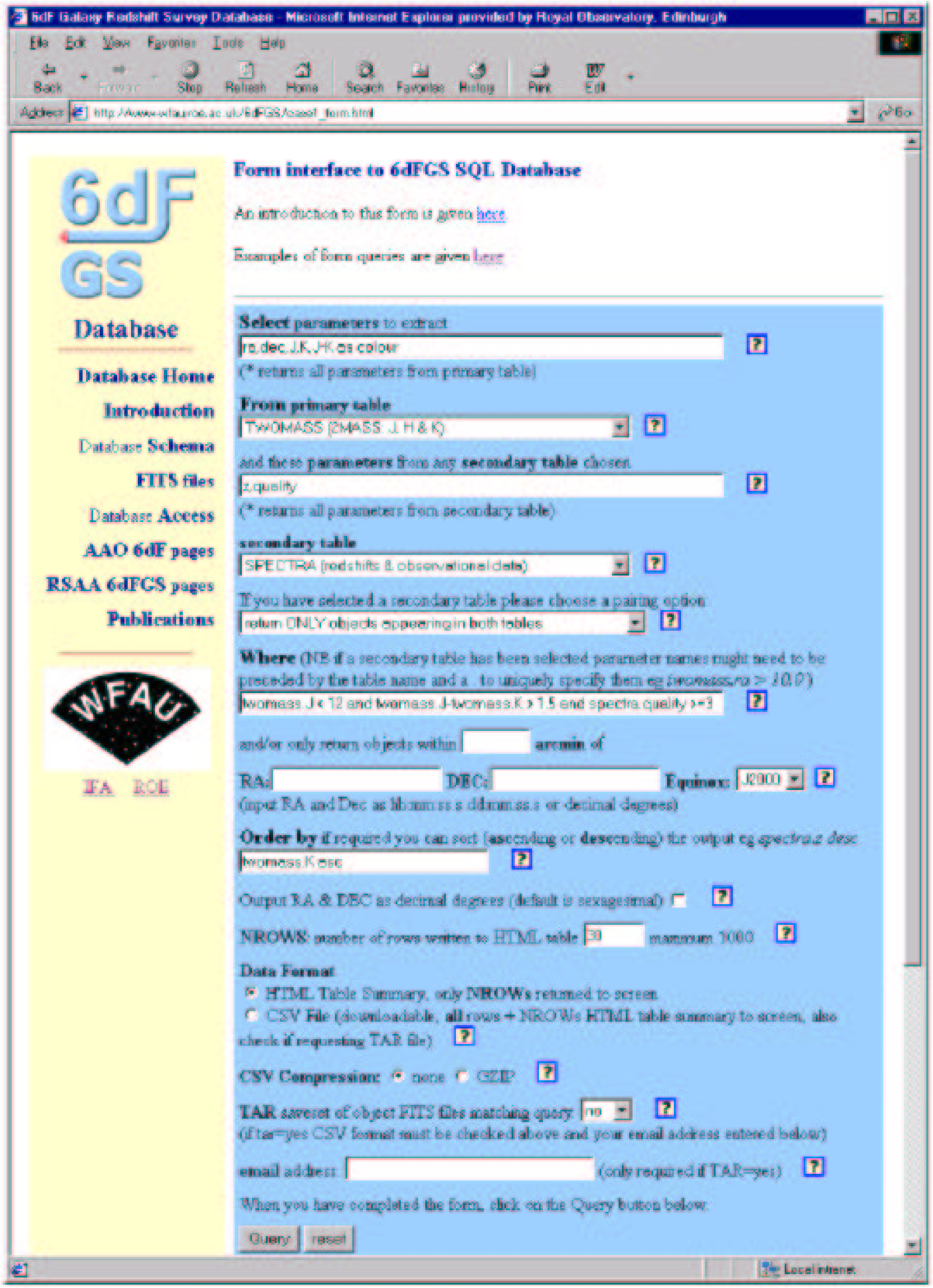
α: 13:08:42.44 δ: -41:28:21.3

Width: 14.38 Height: 14.59

SuperCOSMOS/ROE/AAO

Name	Type
NED Names	name server
NTT Archive at ESO	archive
PPM at ESO	catalog
PPM1 at ESO	catalog
GSO at CADC	catalog
RC3 at CADC	catalog
SAO at CADC	catalog
SIMBAD	catalog
SIMBAD Names	name server
SuperCOSMOS catalogues	**directory**
SuperCOSMOS catalog - blue (UKJ) southern survey	catalog
SuperCOSMOS catalog - near IR (UKI) southern survey	catalog
SuperCOSMOS catalog - red (ESOR) southern survey	catalog
SuperCOSMOS catalog - red (UKR) southern survey	catalog
SuperCOSMOS image - blue (UKJ) southern survey	image server
SuperCOSMOS image - near IR (UKI) southern survey	image server
SuperCOSMOS image - red (ESOR) southern survey	image server
SuperCOSMOS image - red (UKR) southern survey	image server

Figure 6: *Screenshot of GAIA accessing the SSS.*


6dF Galaxy Redshift Survey Database - Microsoft Internet Explorer provided by Royal Observatory, Edinburgh
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History Print Edit
Address http://www-wfau.roe.ac.uk/6dFGS/casat_form.html
Go
6dF GS
Database
Database Home
Introduction
Database Schema
FITS files
Database Access
AAO 6dF pages
RSAA 6dFGS pages
Publications
WFAU
IFA ROE
Local intranet

Form interface to 6dFGS SQL Database

An introduction to this form is given here

Examples of form queries are given here

Select parameters to extract
ra,dec,J,K,J-K as colour
(* returns all parameters from primary table)

From primary table
TWOMASS (2MASS: J, H & K)

and these **parameters** from any **secondary table** chosen
z,quality
(* returns all parameters from secondary table)

secondary table
SPECTRA (redshifts & observational data)

If you have selected a secondary table please choose a pairing option
return ONLY objects appearing in both tables

Where (NB if a secondary table has been selected parameter names might need to be preceded by the table name and a . to uniquely specify them eg *twomass.ra > 10.0*)
twomass.J < 12 and twomass.J-twomass.K > 1.5 and spectra.quality >=3

and/or only return objects within **arcmin** of

RA: **DEC:** **Equinox:** J2000
(input RA and Dec as hh:mm:ss.s dd:mm:ss.s or decimal degrees)

Order by if required you can sort (**ascending** or **descending**) the output eg *spectra.z desc*
twomass.K asc

Output RA & DEC as decimal degrees (default is sexagesimal) □

NROWS: number of rows written to HTML table 30 maximum 1000

Data Format
● HTML Table Summary, only **NROWs** returned to screen
○ CSV **File** (downloadable, **all** rows + NROWs HTML table summary to screen, also check if requesting TAR file)

CSV Compression: ● none ○ GZIP

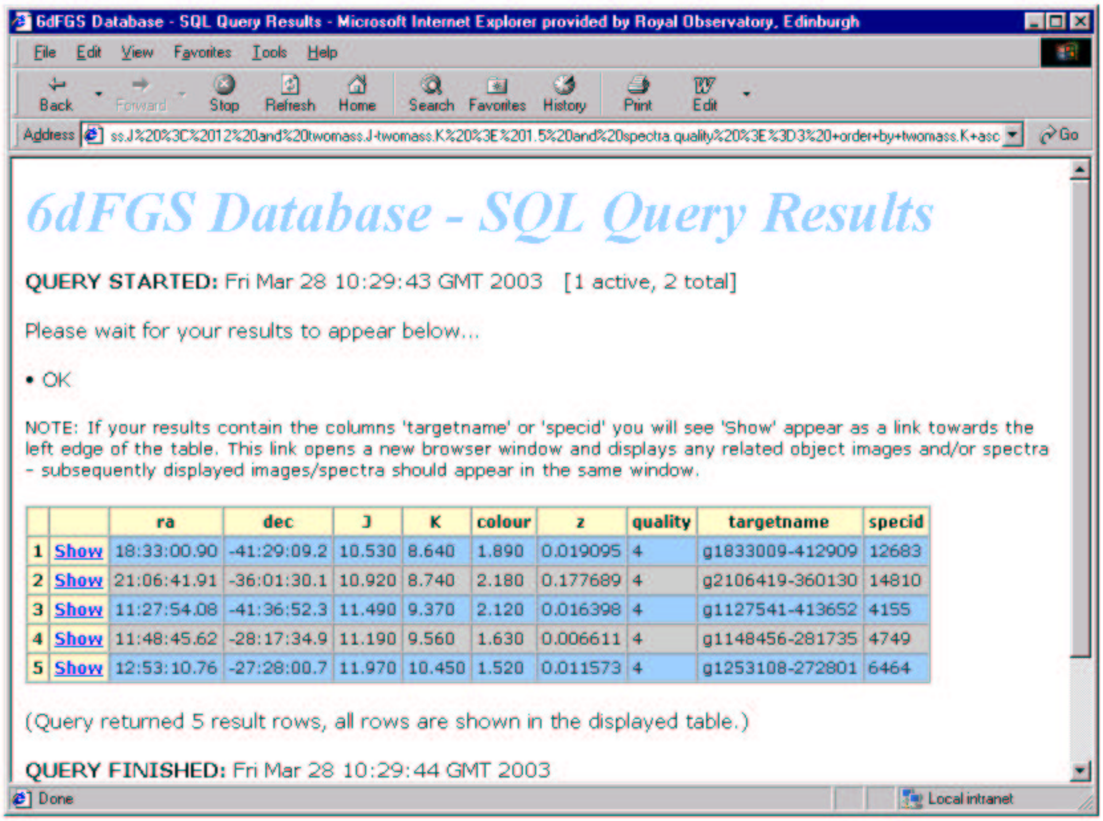
TAR tarset of object FITS files matching query no
(if tar=yes CSV format must be checked above and your email address entered below)

email address (only required if TAR=yes)

When you have completed the form, click on the Query button below.

Query reset

Figure 7: *Screenshot of a 6dFGS web form, the query constructed here is* **"find objects that appear in the 2MASS input catalogue that have been observed and that have a J magnitude < 12, a J-K colour > 1.5 and where the quality of the measured redshift is >= 3. Sort output such that brightest K mag appears first. Parameters to be returned are 2MASS RA and DEC, J, K, J-K colour and the observed redshift (z) and quality"**.


6dFGS Database - SQL Query Results - Microsoft Internet Explorer provided by Royal Observatory, Edinburgh
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History Print Edit
Address ss.J%20%3C%2012%20and%20twomass.J-twomass.K%20%3E%201.5%20and%20spectra.quality%20%3E%3D3%20+order+by+twomass.K+asc
Go
Done
Local intranet

6dFGS Database - SQL Query Results

QUERY STARTED: Fri Mar 28 10:29:43 GMT 2003 [1 active, 2 total]

Please wait for your results to appear below...

- OK

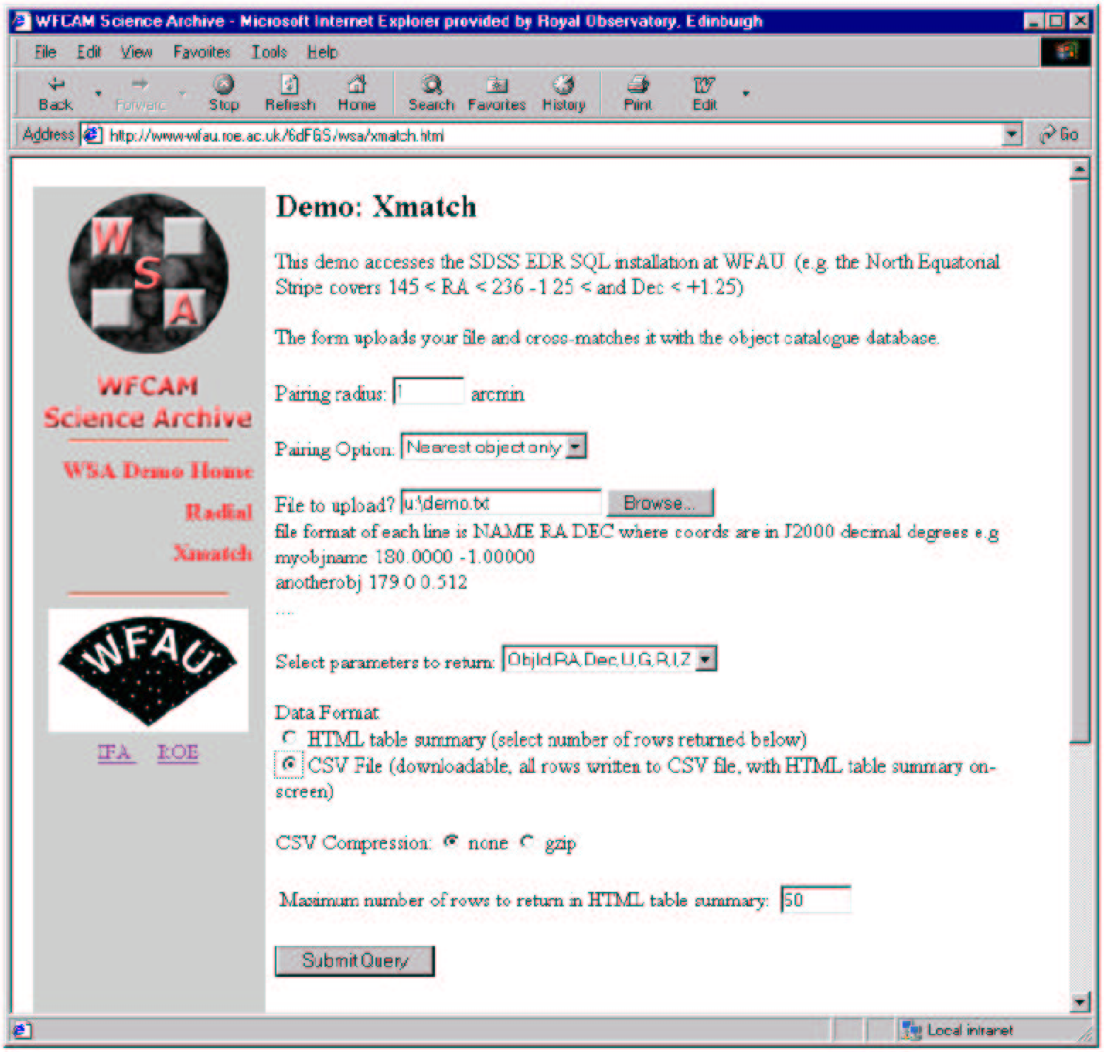
NOTE: If your results contain the columns 'targetname' or 'specid' you will see 'Show' appear as a link towards the left edge of the table. This link opens a new browser window and displays any related object images and/or spectra - subsequently displayed images/spectra should appear in the same window.

		ra	dec	J	K	colour	z	quality	targetname	specid
1	Show	18:33:00.90	-41:29:09.2	10.530	8.640	1.890	0.019095	4	g1833009-412909	12683
2	Show	21:06:41.91	-36:01:30.1	10.920	8.740	2.180	0.177689	4	g2106419-360130	14810
3	Show	11:27:54.08	-41:36:52.3	11.490	9.370	2.120	0.016398	4	g1127541-413652	4155
4	Show	11:48:45.62	-28:17:34.9	11.190	9.560	1.630	0.006611	4	g1148456-281735	4749
5	Show	12:53:10.76	-27:28:00.7	11.970	10.450	1.520	0.011573	4	g1253108-272801	6464

(Query returned 5 result rows, all rows are shown in the displayed table.)

QUERY FINISHED: Fri Mar 28 10:29:44 GMT 2003

Figure 8: *Screenshot of results from submitted 6dFGS form shown in Figure 7.*


WFCAM Science Archive - Microsoft Internet Explorer provided by Royal Observatory, Edinburgh
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History Print Edit
Address http://www-wfau.roe.ac.uk/6dFGS/wsa/xmatch.html
Go
WSA
WFCAM Science Archive
WSA Demo Home
Radial
Xmatch
WFAU
IFA ROE
Local intranet

Demo: Xmatch

This demo accesses the SDSS EDR SQL installation at WFAU (e.g. the North Equatorial Stripe covers 145 < RA < 236 -1.25 < and Dec < +1.25)

The form uploads your file and cross-matches it with the object catalogue database.

Pairing radius: 1 arcmin

Pairing Option: Nearest object only

File to upload? u:\demo.txt Browse...
file format of each line is NAME RA DEC where coords are in J2000 decimal degrees e.g
myobjname 180.0000 -1.00000
anotherobj 179.0 0.512
...

Select parameters to return: ObjId,RA,Dec,U,G,R,I,Z

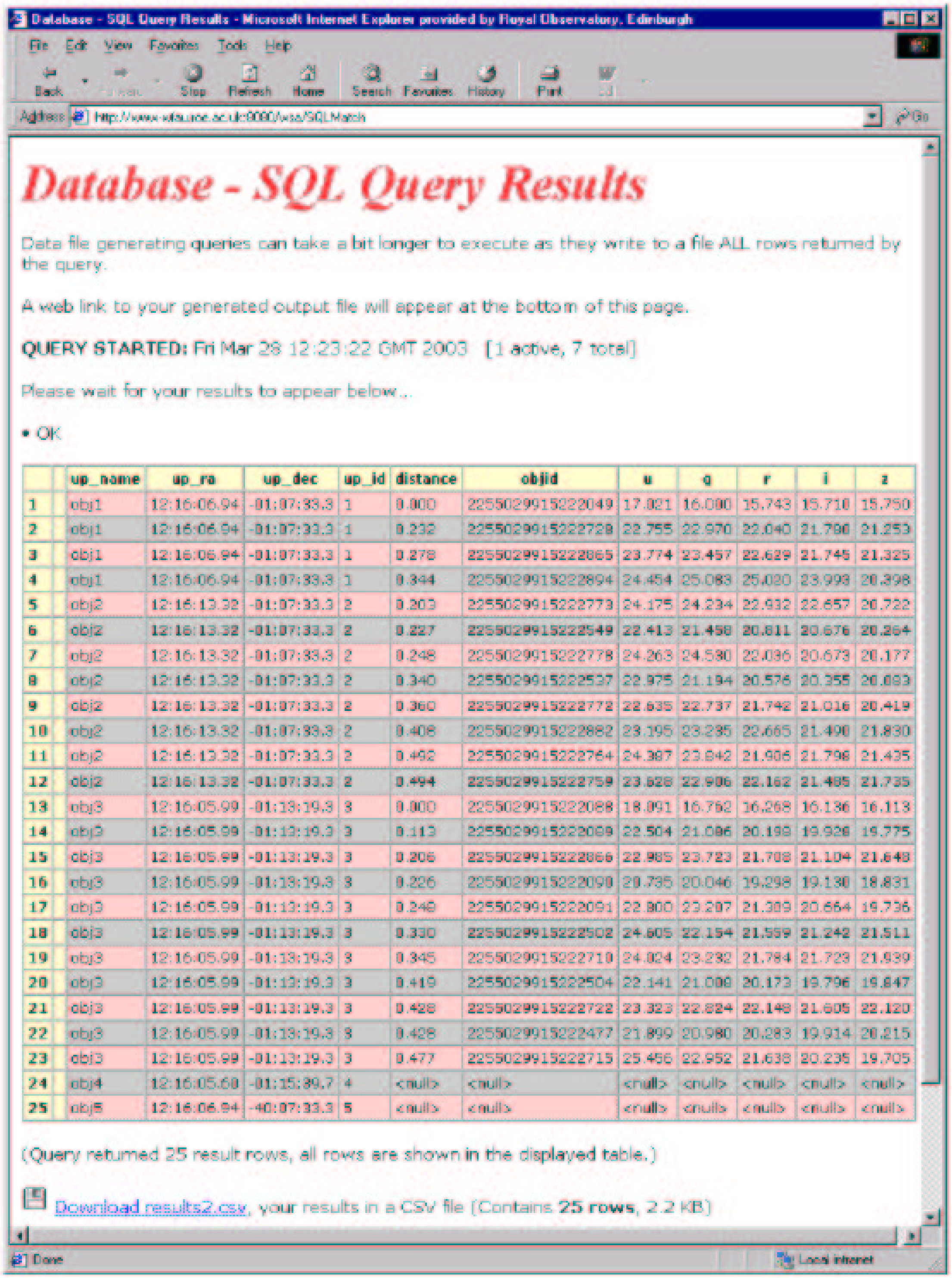
Data Format
○ HTML table summary (select number of rows returned below)
● CSV File (downloadable, all rows writen to CSV file, with HTML table summary on-screen)

CSV Compression: ● none ○ gzip

Maximum number of rows to return in HTML table summary: 50

Submit Query

Figure 9: *Screenshot of WSA demo of catalogue matching web form.*


Database - SQL Query Results - Microsoft Internet Explorer provided by Royal Observatory, Edinburgh
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History Print
Address http://www-wfau.roe.ac.uk:8080/wsa/SQLMatch
Go
Done
Local intranet

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.

QUERY STARTED: Fri Mar 28 12:23:22 GMT 2003 [1 active, 7 total]

Please wait for your results to appear below...

- OK

	up_name	up_ra	up_dec	up_id	distance	objid	u	g	r	i	z
1	obj1	12:16:06.94	-01:07:33.3	1	0.000	225502991522049	17.021	16.000	15.743	15.710	15.750
2	obj1	12:16:06.94	-01:07:33.3	1	0.232	225502991522728	22.755	22.970	22.040	21.798	21.253
3	obj1	12:16:06.94	-01:07:33.3	1	0.278	225502991522865	23.774	23.457	22.629	21.745	21.325
4	obj1	12:16:06.94	-01:07:33.3	1	0.344	225502991522894	24.454	25.083	25.020	23.993	20.398
5	obj2	12:16:13.32	-01:07:33.3	2	0.203	225502991522773	24.175	24.234	22.932	22.657	20.722
6	obj2	12:16:13.32	-01:07:33.3	2	0.227	225502991522549	22.413	21.458	20.811	20.676	20.264
7	obj2	12:16:13.32	-01:07:33.3	2	0.248	225502991522778	24.263	24.530	22.036	20.673	20.177
8	obj2	12:16:13.32	-01:07:33.3	2	0.340	225502991522537	22.975	21.194	20.576	20.355	20.093
9	obj2	12:16:13.32	-01:07:33.3	2	0.360	225502991522772	22.635	22.737	21.742	21.016	20.419
10	obj2	12:16:13.32	-01:07:33.3	2	0.408	225502991522882	23.195	23.235	22.665	21.490	21.830
11	obj2	12:16:13.32	-01:07:33.3	2	0.492	225502991522764	24.387	23.842	21.906	21.798	21.435
12	obj2	12:16:13.32	-01:07:33.3	2	0.494	225502991522759	23.628	22.906	22.162	21.485	21.735
13	obj3	12:16:05.99	-01:13:19.3	3	0.000	225502991522088	18.091	16.762	16.268	16.136	16.113
14	obj3	12:16:05.99	-01:13:19.3	3	0.113	225502991522089	22.504	21.086	20.198	19.928	19.775
15	obj3	12:16:05.99	-01:13:19.3	3	0.206	225502991522866	22.985	23.723	21.708	21.104	21.648
16	obj3	12:16:05.99	-01:13:19.3	3	0.226	225502991522090	20.735	20.046	19.298	19.130	18.831
17	obj3	12:16:05.99	-01:13:19.3	3	0.249	225502991522091	22.800	23.207	21.309	20.664	19.736
18	obj3	12:16:05.99	-01:13:19.3	3	0.330	225502991522502	24.605	22.154	21.559	21.242	21.511
19	obj3	12:16:05.99	-01:13:19.3	3	0.345	225502991522710	24.024	23.232	21.784	21.723	21.939
20	obj3	12:16:05.99	-01:13:19.3	3	0.419	225502991522504	22.141	21.008	20.173	19.796	19.847
21	obj3	12:16:05.99	-01:13:19.3	3	0.428	225502991522722	23.323	22.824	22.148	21.605	22.120
22	obj3	12:16:05.99	-01:13:19.3	3	0.428	225502991522477	21.899	20.980	20.283	19.914	20.215
23	obj3	12:16:05.99	-01:13:19.3	3	0.477	225502991522715	25.456	22.952	21.638	20.235	19.705
24	obj4	12:16:05.60	-01:15:39.7	4	<null>	<null>	<null>	<null>	<null>	<null>	<null>
25	obj5	12:16:06.94	-40:07:33.3	5	<null>	<null>	<null>	<null>	<null>	<null>	<null>

(Query returned 25 result rows, all rows are shown in the displayed table.)

Download results2.csv, your results in a CSV file (Contains **25 rows**, 2.2 KB)

Figure 10: *Screenshot of catalogue matching results.*

10 ACRONYMS & ABBREVIATIONS

6dF : Six-degree field
6dFGS : Six-degree field Galaxy Survey
ADnn : Applicable Document No nn
CGI : Common Gateway Interface
CASU : Cambridge Astronomical Survey Unit
DBD : Database Driver
DBI : Database Interface
DXS : Deep Extragalactic Survey
LWP : LibWWW-Perl
HTML : HyperText Markup Language
HTTP : Hypertext Transfer Protocol
SOAP : Simple Object Access Protocol
SQL : Structured Query Language
SSS : SuperCOSMOS Sky Surveys
UDS : Ultra Deep Survey
UKIDSS : UKIRT Infrared Deep Sky Survey
VISTA : Visible and Infrared Survey Telescope for Astronomy
VPO : VISTA Project Office
W3C : World-Wide Web Consortium
WFAU : Wide Field Astronomy Unit (Edinburgh)
XML : eXtensible Markup Language

11 APPLICABLE DOCUMENTS

AD01	Science Requirements Analysis Document	VDF-WFA-WSA-002 Issue: 1.0 2/04/03
AD02	Database Design Document	VDF-WFA-WFCAM-007 Issue 1.0 2/04/03
AD03	WSA Data Flow Document	VDF-WFA-WFCAM-005 Issue 1.0 2/04/03

12 CHANGE RECORD

Issue	**Date**	**Section(s) Affected**	**Description of Change/Change Request Reference/Remarks**
1.0	02/04/03	All	New document

13 NOTIFICATION LIST

The following people should be notified by email whenever a new version of this document has been issued:

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