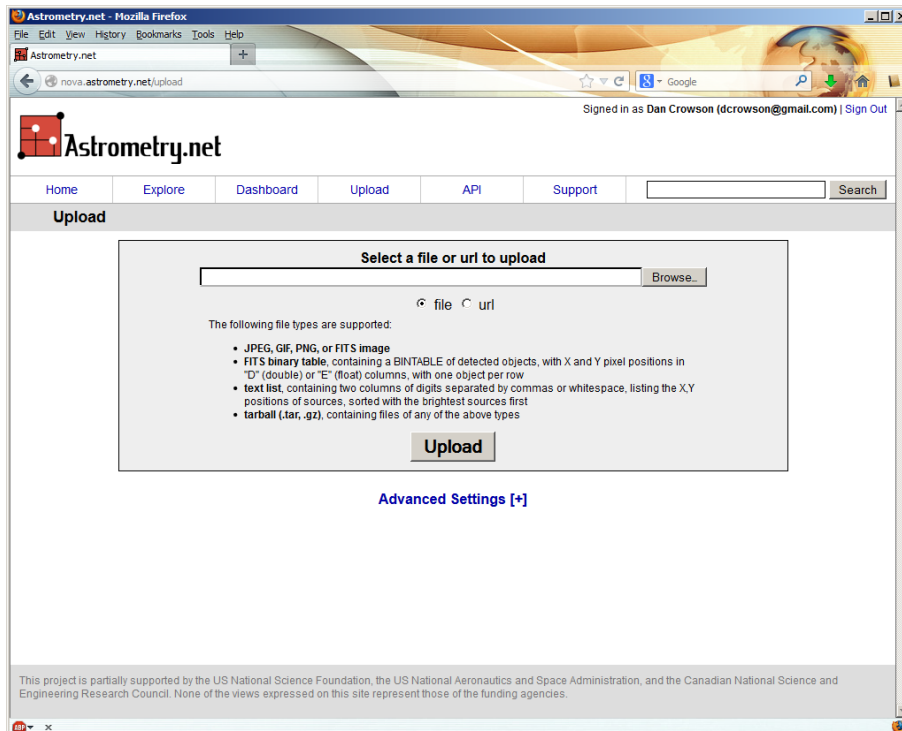


How to Identify objects in your images using plate-solving and the Aladin Sky Atlas

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While you probably select a single or group of targets to image, you will find that your result can have hundreds or even thousands of faint galaxies and other objects. The easiest way I know of to identify them is to use a plate-solving program and the Aladin Sky Atlas. This tutorial will show you how to do this using free software. Note that you must have an active connection to the Internet for Aladin to work.

1. Download the Aladin Sky Atlas. I personally like the older v6 but v7.5 is available and can be used.
 - Version 6.005 – http://www.crowson.com/Aladin/Aladin_6.005.zip
 - Version 7.533 – http://www.crowson.com/Aladin/Aladin_7.533.zip
 - Official Site - <http://aladin.u-strasbg.fr/java/nph-aladin.pl?frame=downloading>
 - You may also use the online version - <http://aladin.u-strasbg.fr/java/nph-aladin.pl>
2. Solve your image to a [FITS](#) file with world coordinate system (WCS) keys in the header. I typically use an image that is the result of processing out of a paint program such as gimp or Adobe PhotoShop. Since these are usually [TIFF](#) or [JPEG](#) files, the easiest way to generate the FITS image with WCS coordinates is to use the online Astrometry.net blind plate-solving tool.
 - <http://nova.astrometry.net/>
 - I suggest logging in. You can use an [OpenID](#) provider such as your Google or Yahoo account



- Hit the **Browse** button to select your file
- Hit the **Advanced Settings (+)** link – from here you can change options such as whether your images are visible to other people
- Hit **Upload** to submit your image
- The screen will update until there is a **Success** or **Failure**

Submission 46351

Submitter: [Dan Crowson \(67\)](#)
Date Submitted: 2013-06-20T09:50:10Z
Filename: NGC 6819 - RGB.jpg

Upload Settings
Parity: try both simultaneously
Scale Units: width of the field (in degrees)
Scale Type: bounds
Scale Lower Bound: 0.1
Scale Upper Bound: 180.0
Downsample Factor: 2

[Go to results page](#)
Job 69771:
Success

[Source extraction image \(fullsize\)](#)
[Log file tail \[-\]](#)
(full)

Weighted RMS error of correspondences: 0.970591 arcsec
23 reference sources within the image.
RoR: 39356.3
Test stars in RoR: 1997 of 1997
Good bins: 108 / 108; effA 2.12182e+06 of 2.12182e+06
Ref stars in RoR: 23 of 23
Logodds: 187.56
23 matches, 48 distractors, 0 conflicts (at best log-odds); 1997 field sources,
23 matches, 1974 distractors, 0 conflicts (all sources)
Hit/miss: ++++++-----+-----+-----+-----+-----+-----+-----+-----+-----
Tweak2: final WCS:
Found tag-along columns from field: FLUX BACKGROUND

- Click on the **Go To results page** link once available

Astrometry.net - Mozilla Firefox

File Edit View History Bookmarks Tools Help

Astrometry.net

nova.astrometry.net/user_images/57380#annotated

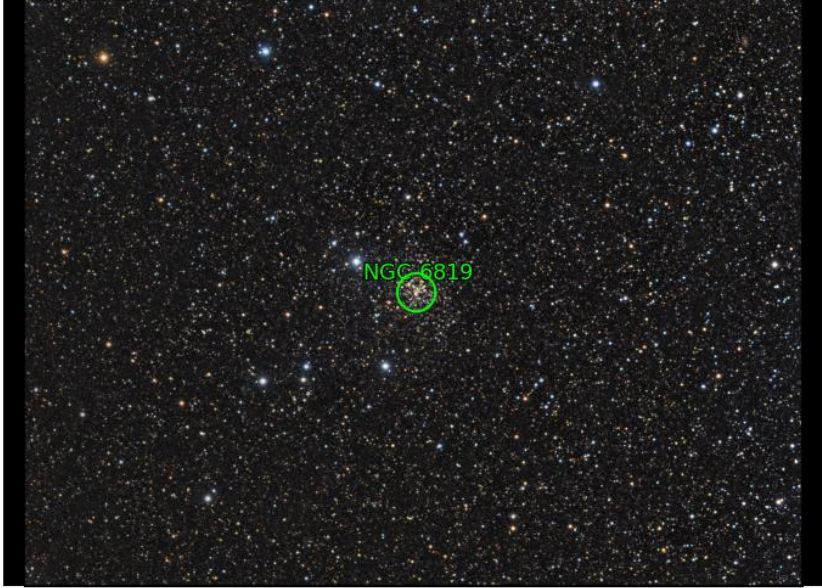
Google

Astrometry.net

Home Explore Dashboard Upload API Support Search

Images > NGC 6819 - RGB.jpg

Edit Image



Submitted by Dan Crowson (67)
on 2013-06-20T09:50:10Z
as "NGC 6819 - RGB.jpg" (Submission 46351)
under Attribution-NonCommercial-NoDerivs 3.0 Unported

publicly visible: [yes](#) | [no](#)

Job Status

Job 69771:
Success

Calibration

Center (RA, Dec): (295.330, 40.183)
Center (RA, hms): 19^h 41^m 19.133^s
Center (Dec, dms): +40° 10' 59.268"
Size: 1.71 x 1.29 deg
Radius: 1.072 deg
Pixel scale: 3.67 arcsec/pixel
Orientation: Up is 178 degrees E of N
WCS file: [wcs.fits](#)
New FITS image: [new-image.fits](#)
KMZ (Google Sky): [image.kmz](#)

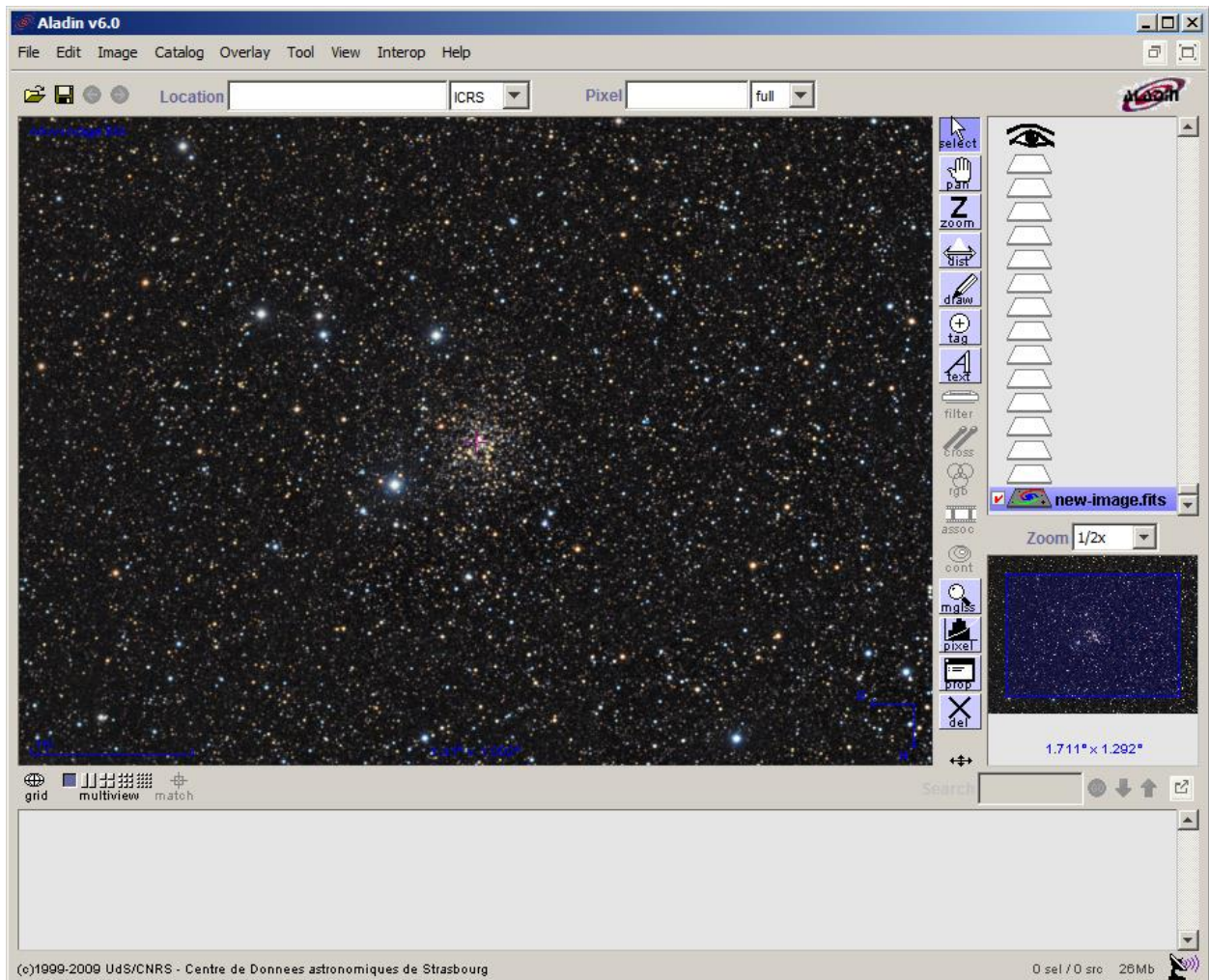
Nearby Images ([View All](#))

- Click on the New FITS image **new-image.fits** link on the right side
- Save the file – this is the FITS image with the embedded WCS coordinates

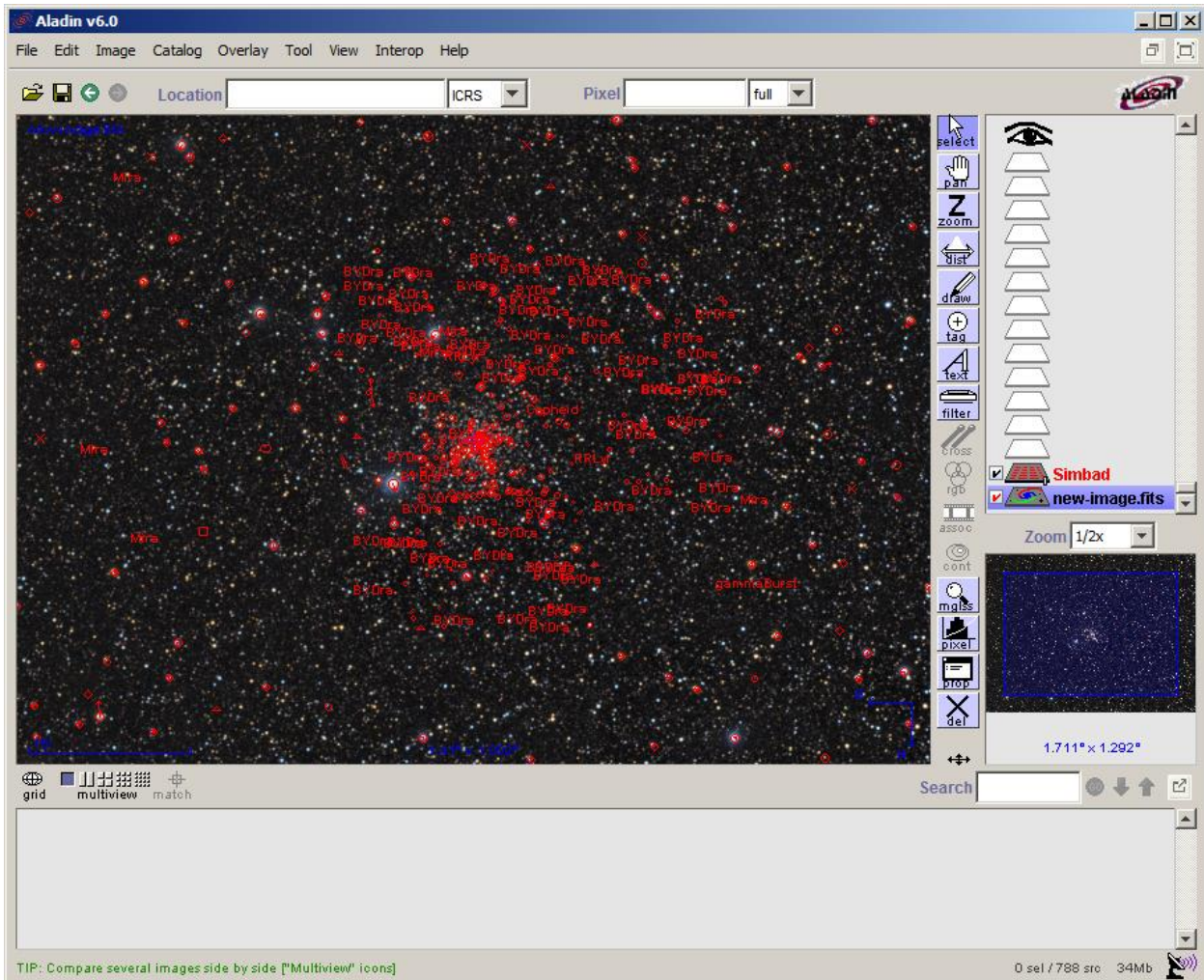
3. Use Aladin Sky Atlas 6.x to identify objects

(If you use version 7.x, go to step 4)

- Open Aladin.exe
- File – Open local file and select the solved FITS image from step two
 - o You may also just drag the solved FITS image onto Aladin



- File – Load Catalog – Simbad database
 - o You may also select the NED database which will give you a lot more results but I would suggest starting with Simbad



- Each of the red annotations is an object that you can select by highlighting with the mouse
 - o Note that you can select multiple objects including everything in the image

Aladin v6.0

File Edit Image Catalog Overlay Tool View Interop Help

Location: 19:40:06.11 +40:25:53.7 ICRS Pixel full

1.711" x 1.292"

MAIN ID	OTYPE	RA	DEC	COO ...	COO ...	C...	PMRA	PMDEC	B	V
<input type="checkbox"/> HD 225464	Star	19 42 23.2706	+40 09 21.319	36.48	34.29	89	-10.7	-18.9	11.14	10.14
<input type="checkbox"/> HD 225494	Star	19 42 46.0147	+40 08 32.541	27.48	24.73	0	2.8	-7.5	10.28	9.35
<input type="checkbox"/> GB6 B1940+4003	Radio	19 42 15.90	+40 11 03.0	14000	14000	5				
<input type="checkbox"/> 2MFGC 15077	Galaxy	19 42 21.980	+40 13 21.88							

TIP: Compare several images side by side ("Multiview" icons)

4 sel / 788 src 41Mb

- For more information on the object(s), click on the MAIN ID to pull up a more detailed SIMBAD web page

SIMBAD query result - Mozilla Firefox

simbad.u-strasbg.fr/simbad/sim-id?Ident=HD+225464&NbIdent=1

Portal Simbad Vizier Aladin X-Match Other Help

SIMBAD query result

other query Identifier Coordinate Criteria Reference Basic Script Output Help
 modes : query query query query query submission options

Object query : HD 225464 C.D.S. - SIMBAD4 rel 1.207 - 2013.07.02CEST20:58:14

Available data : [Basic data](#) • [Identifiers](#) • [Plot & images](#) • [Bibliography](#) • [Measurements](#) • [External archives](#) • [Notes](#) • [Annotations](#)

Basic data :
HD 225464 -- Star with radius arcmin

Other object types: * (HD,CSI,GSC,TYC) , IR (2MASS)

ICRS coord. (ep=J2000) : 19 42 23.2706 +40 09 21.319 (~) [36.48 34.29 89] B
[1998A&A...335L..65H](#)

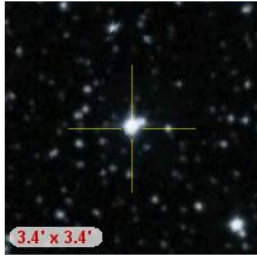
FK5 coord. (ep=J2000 eq=2000) : 19 42 23.271 +40 09 21.32 (~) [36.48 34.29 0] B
[1998A&A...335L..65H](#)

FK4 coord. (ep=B1950 eq=1950) : 19 40 40.36 +40 02 12.7 (~) [87.93 87.04 0] B
[1998A&A...335L..65H](#)

Gal coord. (ep=J2000) : 074.0511 +08.2837 (~) [36.48 34.29 0] B
[1998A&A...335L..65H](#)

Proper motions *mas/yr* [error ellipse]: -10.7 -18.9 [1.6 1.6 32] B [2000A&A...355L..27H](#)

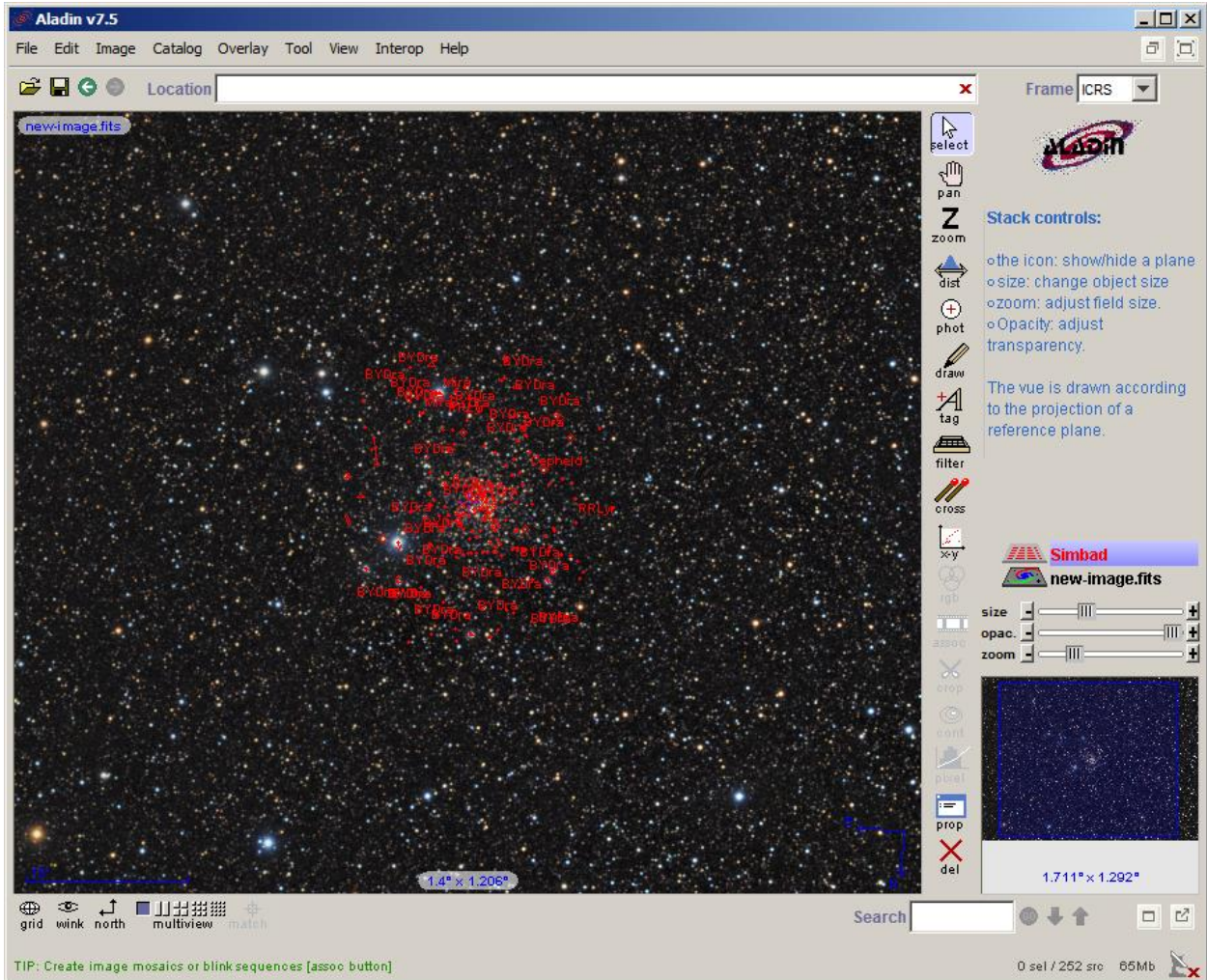
Fluxes (S) :
 B 11.14 [0.07] D [2000A&A...355L..27H](#)
 V 10.14 [0.04] D [2000A&A...355L..27H](#)
 J 8.194 [0.032] C [2003yCat.2246....0C](#)
 H 7.623 [0.031] C [2003yCat.2246....0C](#)
 K 7.808 [0.020] C [2003yCat.2246....0C](#)



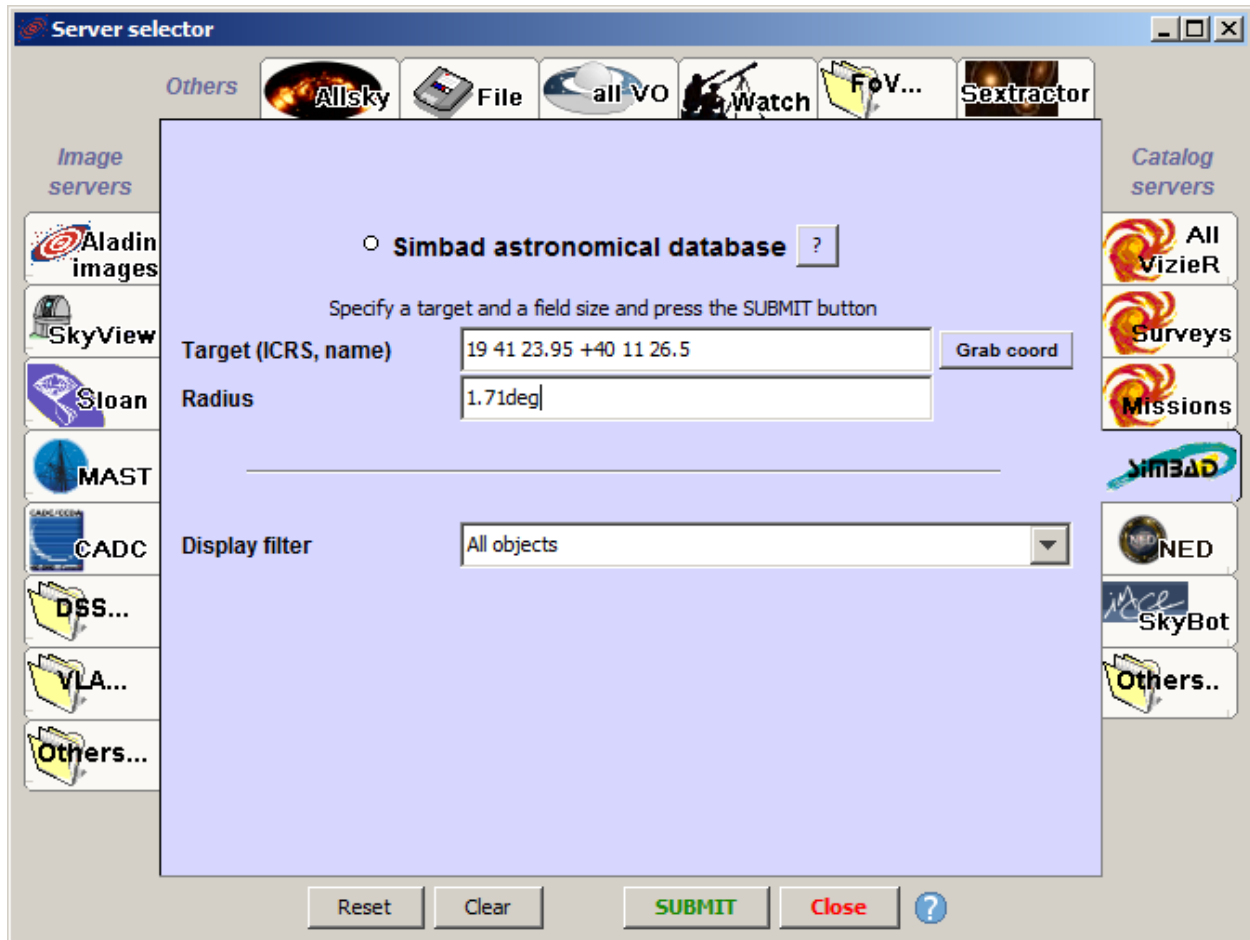
4. Use Aladin Sky Atlas 7.x to identify objects

(If you use version 6.x, go to step 3)

- Open Aladin.exe
- File – Open local file and select the solved FITS image from step two
 - o You may also just drag the solved FITS image onto Aladin



- File – Load Catalog – Simbad database
 - o You may also select the NED database which will give you a lot more results but I would suggest starting with Simbad
- 7.x requires you to add a Radius
 - o Use the larger number under the thumbnail image on the bottom right (1.71 deg for this example)



- Hit **SUBMIT**
- Hit **Close**

- Each of the red annotations is an object that you can select by highlighting with the mouse
 - o Note that you can select multiple objects including everything in the image

The screenshot shows the Aladin v7.5 software interface. The main window displays a star field with numerous red annotations. The interface includes a menu bar (File, Edit, Image, Catalog, Overlay, Tool, View, Interop, Help), a search bar, and various tool icons for selection, zooming, and editing. A table at the bottom lists selected objects with their main IDs, types, and coordinates.

MAIN ID	OTYPE	RA	DEC	COO ...	COO ...	C...	PMRA	PMDEC	B	V
<input type="checkbox"/> HD 225464	Star	19 42 23.2706	+40 09 21.319	36.48	34.29	89	-10.7	-18.9	11.14	10.14
<input type="checkbox"/> HD 225494	Star	19 42 46.0147	+40 08 32.541	27.48	24.73	0	2.8	-7.5	10.28	9.35
<input type="checkbox"/> GB6 B1940+4003	Radio	19 42 15.90	+40 11 03.0	14000	14000	5				
<input type="checkbox"/> 2MFGC 15077	Galaxy	19 42 21.980	+40 13 21.88							

(c) 2012 UDS/CNRS - by CDS - Distributed under GNU GPL v3 4 sel / 1323 src 51Mb

- For more information on the object(s), click on the MAIN ID to pull up a more detailed SIMBAD web page

SIMBAD query result

other query modes : [Identifier query](#) [Coordinate query](#) [Criteria query](#) [Reference query](#) [Basic query](#) [Script submission](#) [Output options](#) [Help](#)

Object query : HD 225464 C.D.S. - SIMBAD4 rel 1.207 - 2013.07.02CEST20:58:14

Available data : [Basic data](#) • [Identifiers](#) • [Plot & images](#) • [Bibliography](#) • [Measurements](#) • [External archives](#) • [Notes](#) • [Annotations](#)

Basic data :
HD 225464 -- Star query around with radius arcmin

Other object types: * (HD, CSI, GSC, TYC) , IR (2MASS)

ICRS coord. (ep=J2000) : 19 42 23.2706 +40 09 21.319 (~) [36.48 34.29 89] B
[1998A&A...335L..65H](#)


FK5 coord. (ep=J2000 eq=2000) : 19 42 23.271 +40 09 21.32 (~) [36.48 34.29 0] B
[1998A&A...335L..65H](#)

FK4 coord. (ep=B1950 eq=1950) : 19 40 40.36 +40 02 12.7 (~) [87.93 87.04 0] B
[1998A&A...335L..65H](#)

Gal coord. (ep=J2000) : 074.0511 +08.2837 (~) [36.48 34.29 0] B
[1998A&A...335L..65H](#)

Proper motions *mas/yr* [error ellipse]: -10.7 -18.9 [1.6 1.6 32] B [2000A&A...355L..27H](#)

Fluxes (5) :
 B 11.14 [0.07] D [2000A&A...355L..27H](#)
 V 10.14 [0.04] D [2000A&A...355L..27H](#)
 J 8.194 [0.032] C [2003yCat.2246....0C](#)
 H 7.623 [0.031] C [2003yCat.2246....0C](#)
 K 7.808 [0.020] C [2003yCat.2246....0C](#)



5. Tips and Tricks

- If you end up getting an error with <http://nova.astrometry.net> (such as file type not supported), try again later. This website tends to have issues at times.
- You can also find all of a type of object by selecting the whole image and then sorting on the **OTYPE** tab. You could also type in the OTYPE in the search box. This is good for looking for all galaxies, quasars, planetaries or other objects.
- Play with the Zoom. It is very useful for finding smaller objects or ones in very 'busy' fields.
- Aladin Sky Atlas can be used as a planetarium program without loading an image by just going to File – Load catalog – Simbad database. From here, type in an object name and field size.