

Double stars with the Virtual Observatory. A Pro-Am project

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CENTRO DE ASTROBIOLOGÍA
ASOCIADO AL NASA ASTROBIOLOGY INSTITUTE



CSIC



EXCELENCIA
MARÍA DE
MAEZTU



Ingredients (I): WDS

THE ASTRONOMICAL JOURNAL, 122:3466–3471, 2001 December
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THE 2001 US NAVAL OBSERVATORY DOUBLE STAR CD-ROM. I. THE WASHINGTON DOUBLE STAR CATALOG

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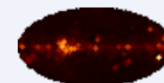
Send to VO tools



- ▶ Show the target form
- ▶ Show constraint information

The 2 columns in **color** are computed by VizieR, and are **not part of the original data** (note that the **computed coordinates** are computed from the positions **and** the proper motions given in the table)

[B/wds/wds](#) [The Washington Visual Double Star Catalog \(Mason+ 2001-2014\)](#) [2001AJ...122.3466M](#) [ReadMe+ftp](#)
[Post annotation](#) The Washington Double Star Catalog (main part) (148475 rows)

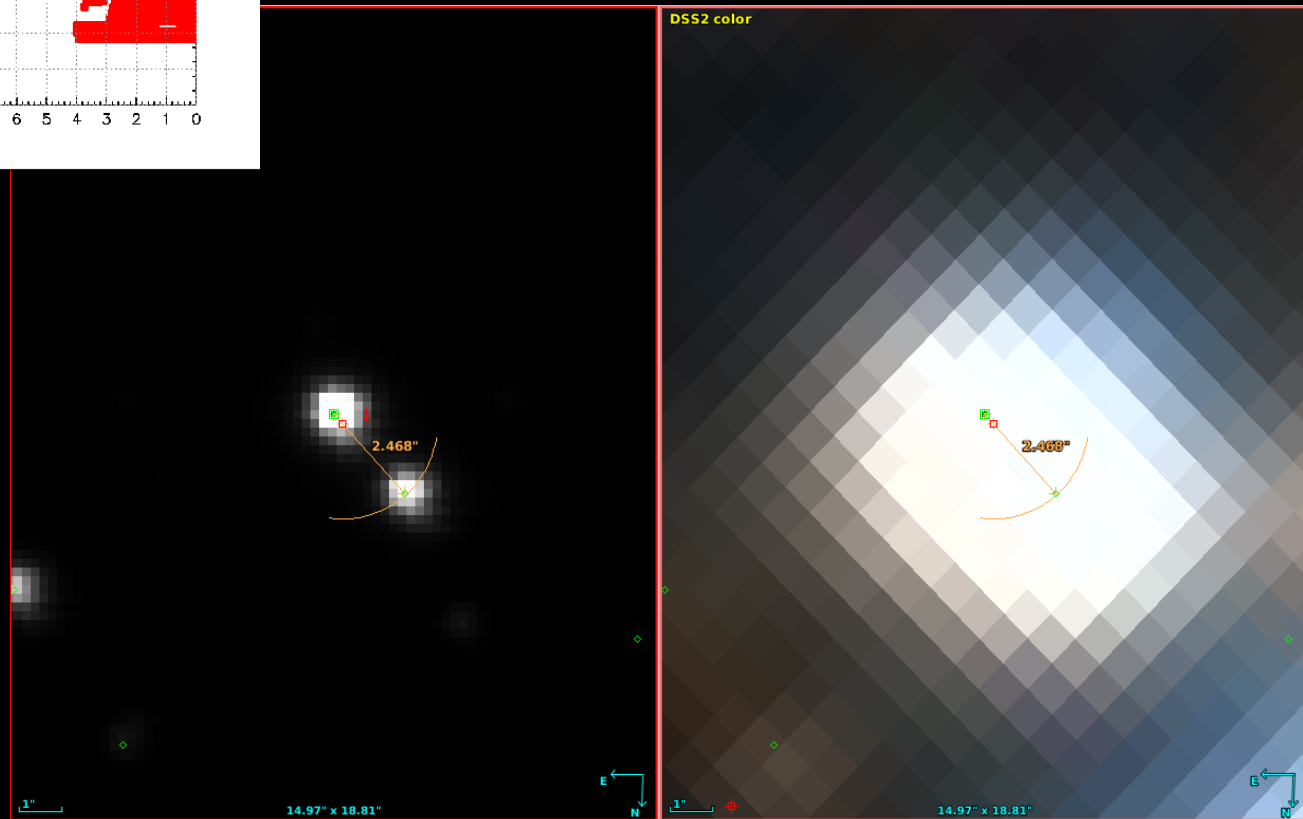
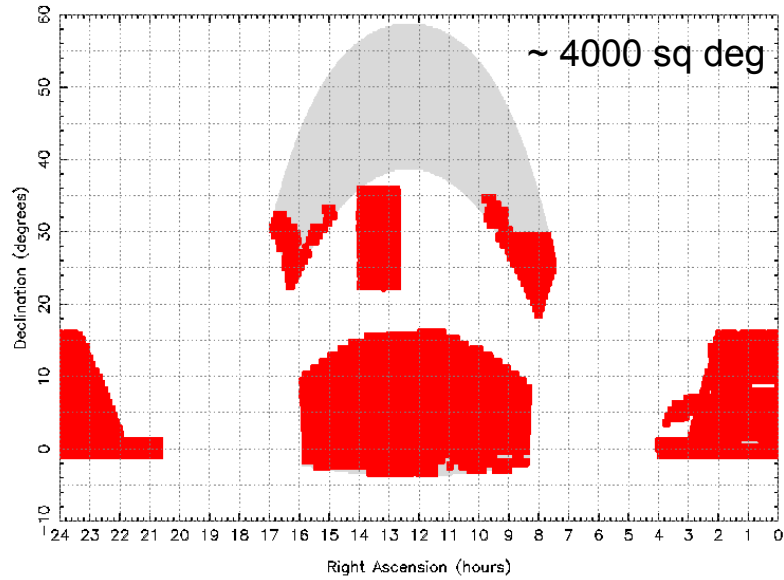


[start AladinLite](#) [plot the output](#) [query using TAP/SQL](#)

Full	<u>RAJ2000</u> "h:m:s"	<u>DEJ2000</u> "d:m:s"	WDS	Disc	Comp	Obs1 yr	Obs2 yr	Nobs	pa1 deg	pa2 deg	sep1 arcsec	sep2 arcsec	mag1 mag	mag2 mag	SpType	pml mas
28	00 00 13.7700	+16 40 56.600	00003+1642	HJ 318		1825	2016	12	90	61	12.0	25.90	9.56	12.88	G5	
49	00 00 29.2700	+67 13 00.400	00005+6713	HJ 1924		1828	2016	15	225	225	6.0	8.20	10.83	11.05	B	
39	00 00 23.6300	+50 44 20.300	00004+5044	HJ 1923		1828	2015	13	276	279	6.0	11.50	11.65	12.14		
36	00 00 22.4200	+73 04 56.100	00004+7305	HJ 3231	AC	1831	2015	10	301	296	25.0	44.80	11.11	11.86		
35	00 00 22.4200	+73 04 56.100	00004+7305	HJ 3231	AB	1831	2015	6	278	282	8.0	23.40	11.11	14.00		
43	00 00 25.4900	+08 30 07.900	00004+0830	BU 732	AB	1878	2015	13	152	152	6.1	6.00	10.05	12.20	K0	
19	00 00 12.1400	+01 46 17.200	00002+0146	WEI 45		1879	2015	25	89	83	1.8	1.80	10.09	10.52	G0	
4	00 00 01.2000	+38 51 33.400	00000+3852	BU 860		1881	2015	14	107	108	6.7	6.60	6.62	11.40	B9	
30	00 00 16.7300	-02 56 52.100	00003-0257	DVG 8		1893	1999	3	351	355	7.0	7.70	9.70	11.20		
44	00 00 25.4900	+08 30 07.900	00004+0830	BU 732	AC	1897	2003	11	143	143	152.2	153.10	10.05	8.47	F2	
38	00 00 24.7800	+60 25 31.200	00004+6026	STI1248		1898	2015	14	43	48	12.9	12.30	10.37	10.78	K	
1	00 00 06.6400	+75 28 59.800	00000+7530	A 1248		1904	1982	5	246	235	0.8	0.60	10.27	11.50	A7IV	
27	00 00 20.4100	+56 51 11.400	00003+5651	CTT 1		1906	2015	11	90	93	49.4	46.10	8.59	11.39	A2	
18	00 00 10.0300	+28 54 32.600	00002+2855	TVB 17		1906	2015	4	320	322	11.7	11.40	12.51	12.42		
8	00 00 06.8400	+54 00 00.200	00001+5400	ES 704		1908	2015	8	119	116	5.5	4.40	9.50	11.50		

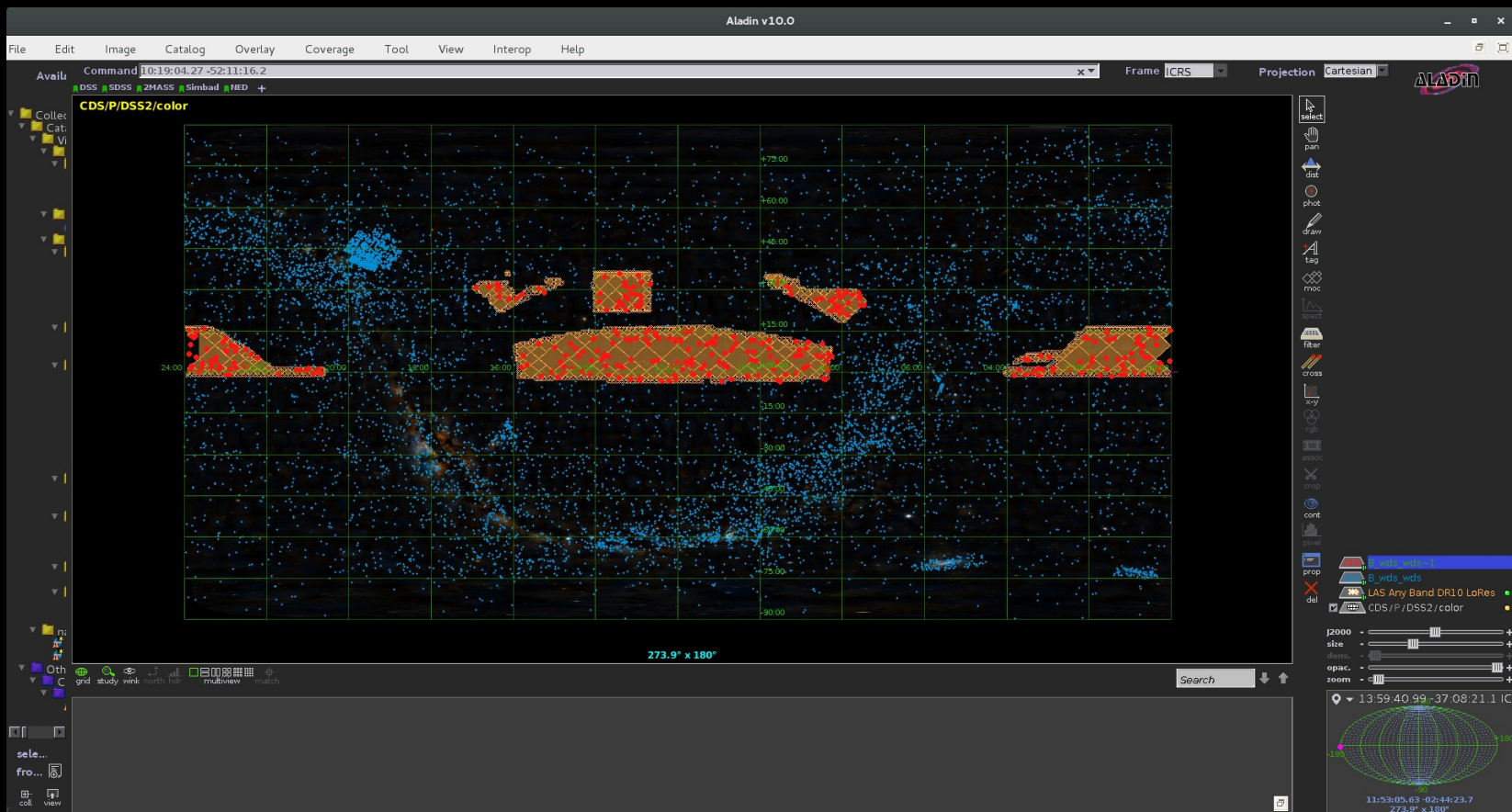
Ingredients (II): UKIDSS LAS DR10

LAS survey - Y J_1 H K filters



Building the Input Catalogue

- + Nobs = 1
- + Sep1 > 1"
- + Observed by UKIDSS LAS DR10.
- > ~ 1700 systems



Methodology

+ First step:

+ Launch Aladin

+ Download the script and the list of systems.

The screenshot displays the Aladin v10.0 software interface. The main window shows a 'Macros' dialog with a list of commands for downloading data and plotting. A secondary dialog, 'Type or load a list of parameters', is open, showing a table of system parameters.

Macros Dialog Content:

```
rm all
sync
ukidss=get File(
ftp://ftp.cab.inta-csic.es/pub/users/mcortes/neglected_sep_0_50/$10)
sync
draw tag $1 $2
sync
$1 $2
sync
zoom 2x
sync
draw arc($1,$2,$6arcsec,$5,45)
sync
draw arc($1,$2,$6arcsec,$5,-45)
sync
# Cargamos las fuentes del WDS
WDS_1=get Vizier(B/wds) $1 $2
sync
set WDS_1 color=red
sync
set WDS_1 shape=square
# Cargamos el catalogo Gaia DR2
Gaia_DR2=get Vizier(I/345/gaia2) $1 $2
sync
set Gaia_DR2 color=green
sync
set Gaia_DR2 shape=rhomb
sync
#hide Gaia_DR2
#sync
```

Parameters Dialog Content:

\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	\$9	\$10
RA20...	DEC2...	WDS	Disc	pa1	sep1	Refer...	MJDTi...	Bandp...	image...
359.5...	15.571	2358...	TDS1...	108	1.0	http://...	5432...	J	ukidss...
358.3...	6.553...	2353...	TDT4...	134	2.2	http://...	5440...	J	ukidss...
358.2...	15.13...	2353...	LDS5...	60	3.0	http://...	5437...	J	ukidss...
357.6...	9.948...	2350...	BEU 24	74	1.5	http://...	5507...	J	ukidss...
357.6...	0.878...	2350...	DAM ...	137	6.1	http://...	5407...	J	ukidss...

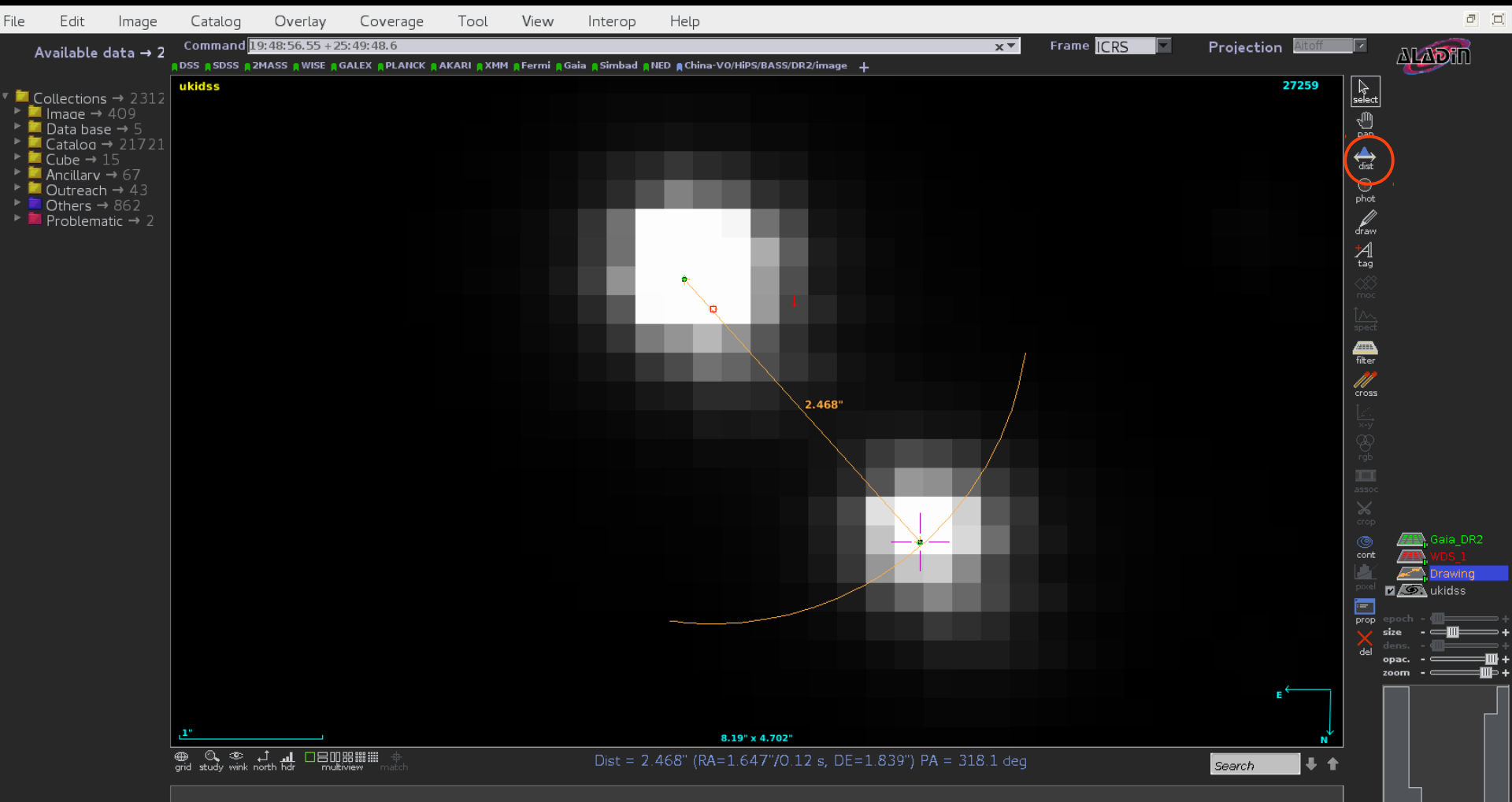
Parameters Dialog Controls:

- Buttons: Add column, Clear
- Buttons: Exec. current params, Exec. next params
- Buttons: Exec. all, Exec. all from current, Stop

Methodology

+ Second step:

- + Identification of the secondary component.
- + Confirmation of the position angle and distance



Methodology



I. Novalbos, E. Solano, M. Cortés, T. Tobal
Abril, 2019

<http://www.sea-astronomia.es/colaboracion-pro-am>

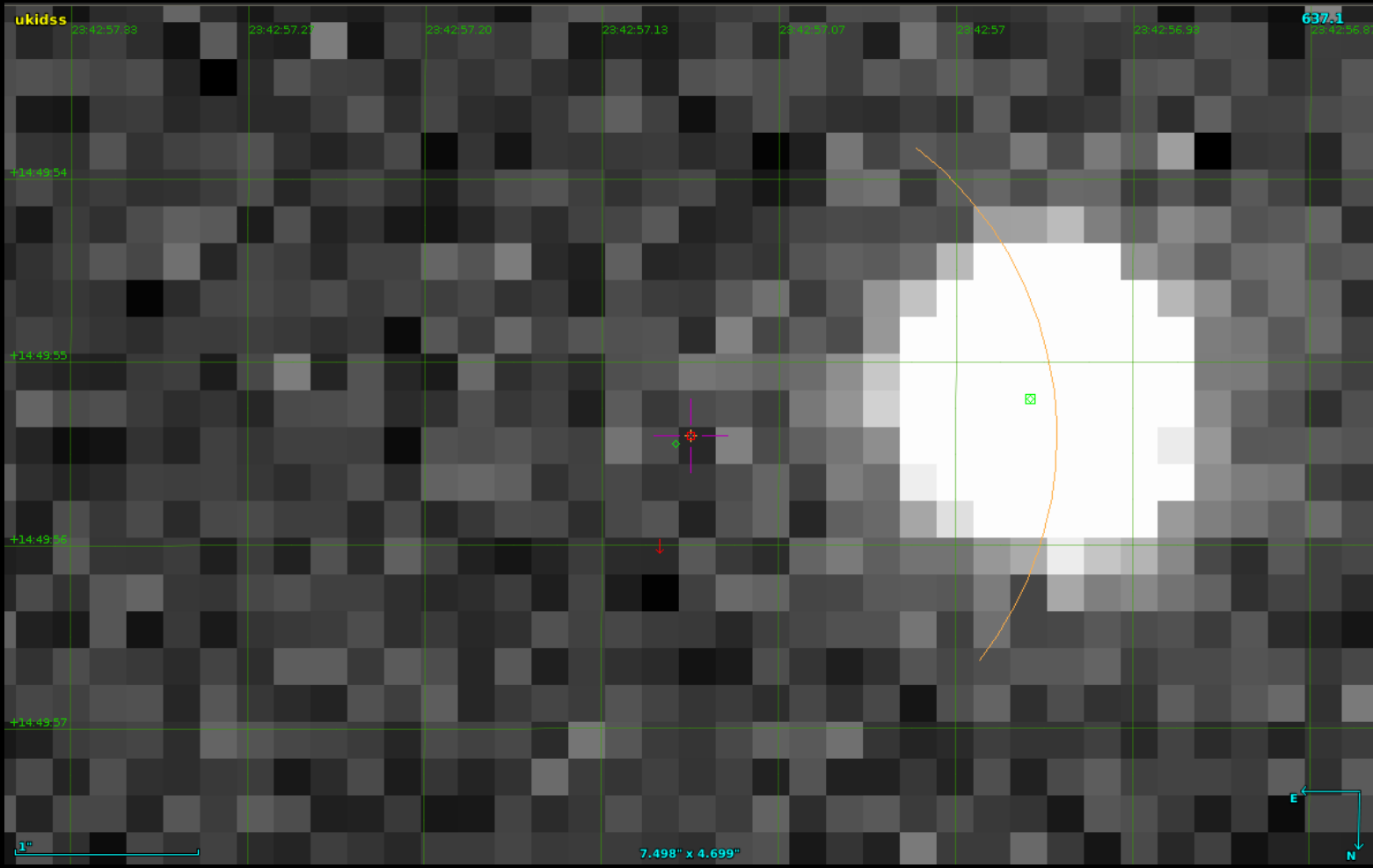
<http://svo.cab.inta-csic.es/docs/?pagename=Projects/Outreach>

1- El proyecto REDVO

El objetivo principal de este proyecto es la identificación y medición de estrellas dobles visuales, con separaciones $>1''$ y para las cuales solo existe una medición histórica según consta en el Catálogo de Estrellas Dobles de Washington. Este proyecto hace uso de imágenes del survey [UKIDSS](#) Large Area Survey (LAS) Data Release 10, realizando la astrometría relativa sobre los pares identificados mediante el uso de una herramienta de Observatorio Virtual como [Aladin](#).

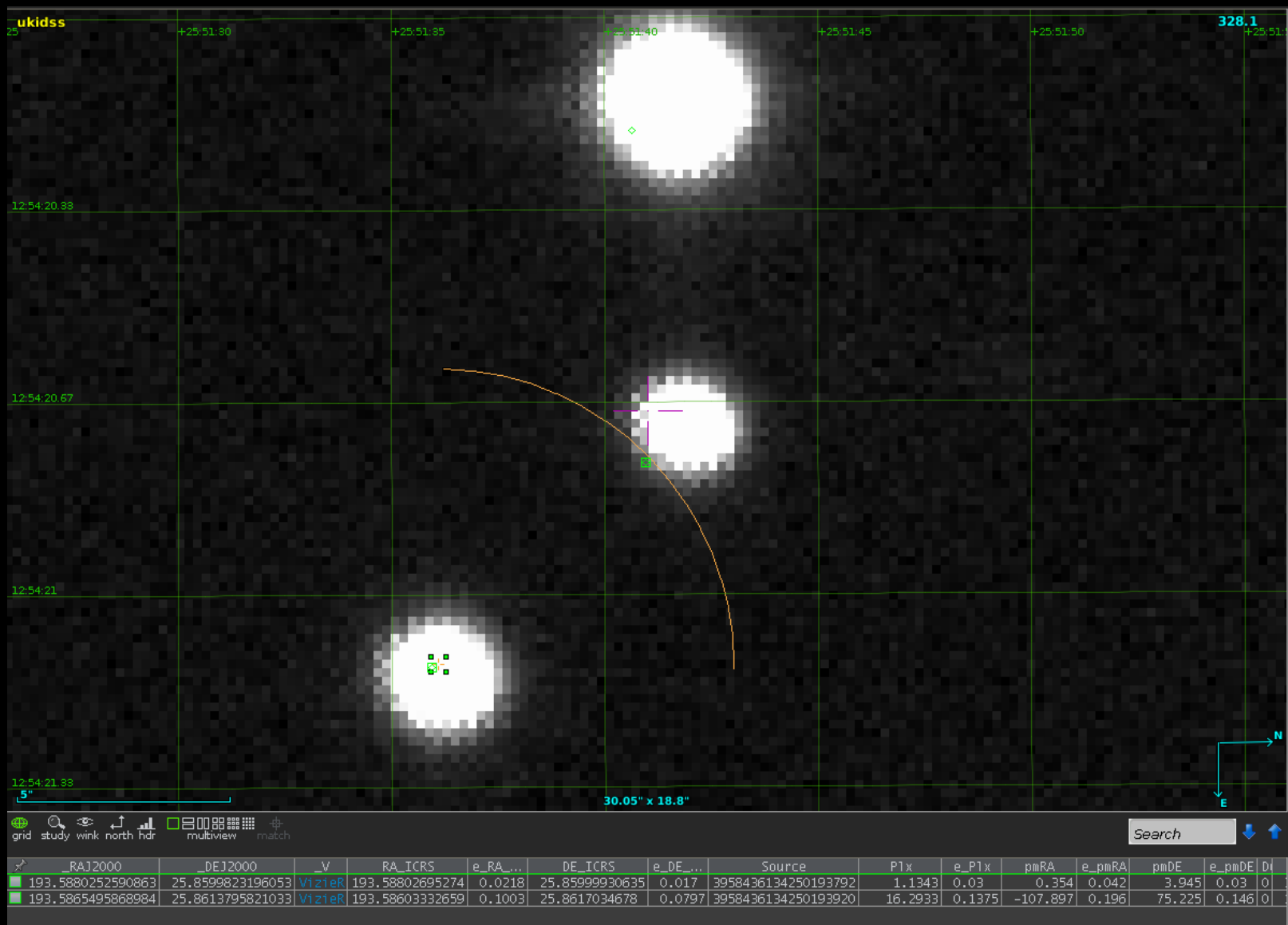
Goals

+ Improve astrometry (close binaries, wrong entries in WDS).



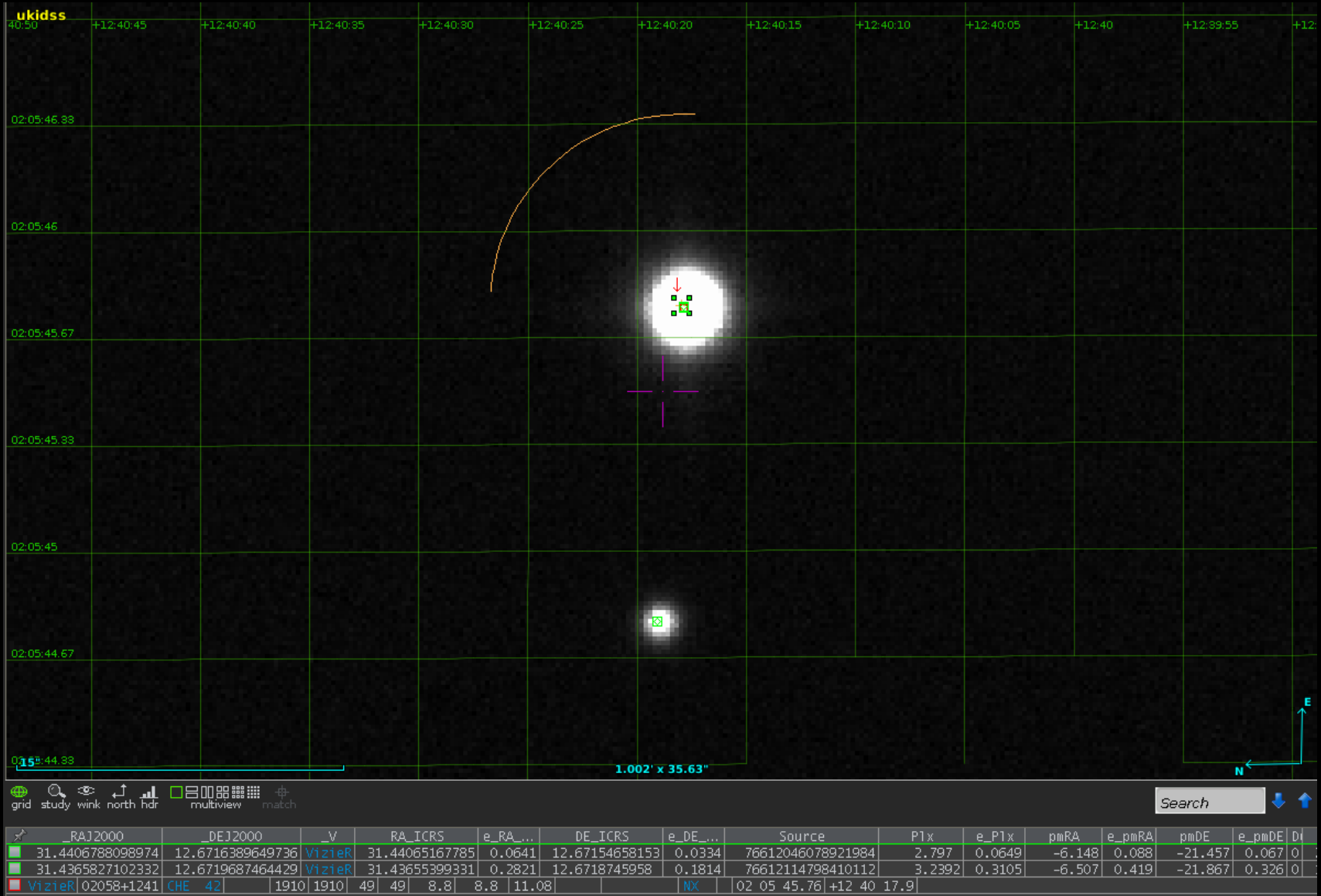
Goals

+ Identify binaries not physically bound



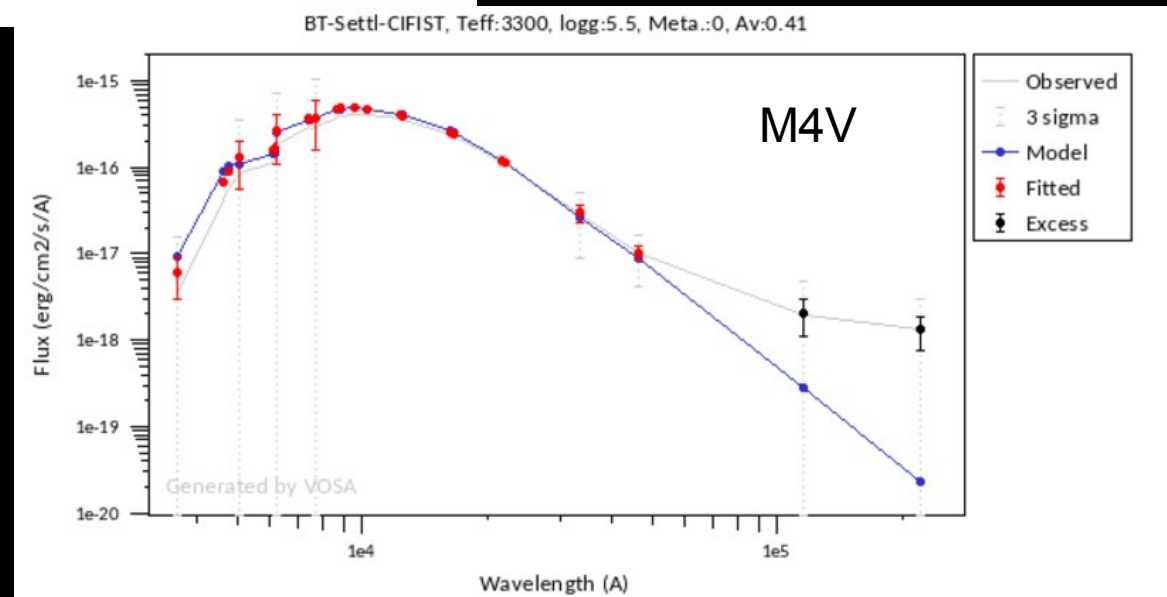
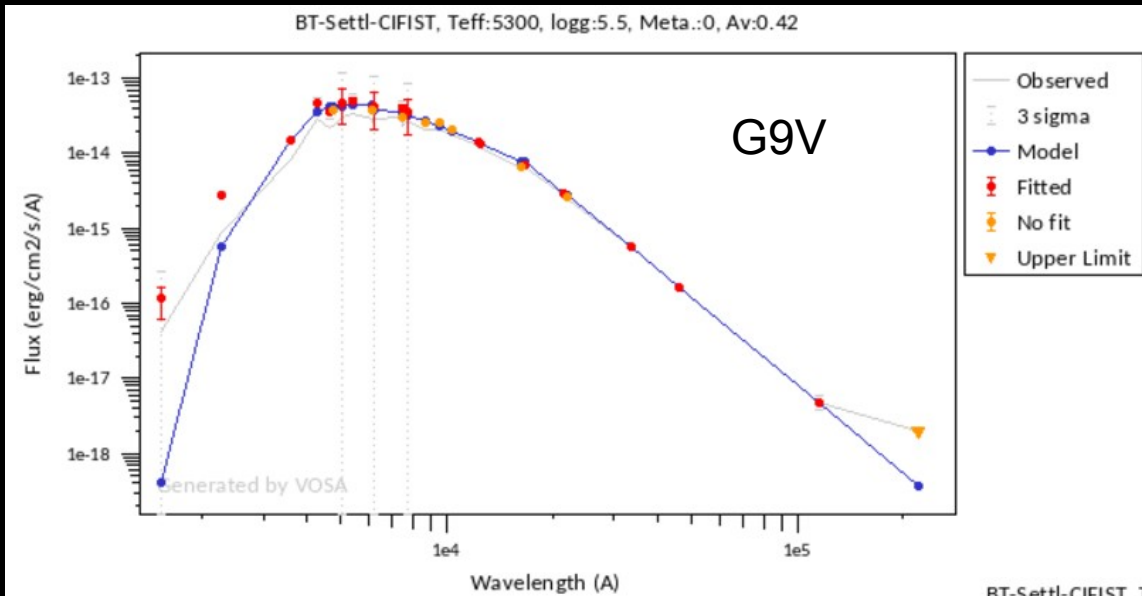
Goals

+ Parameters of physically bound pairs



Goals

+ Parameters of physically bound pairs



Future / Parallel work

+ Follow-up of bright objects using amateur observatories.

