

# *Advanced Aladin*

## Enrique Solano



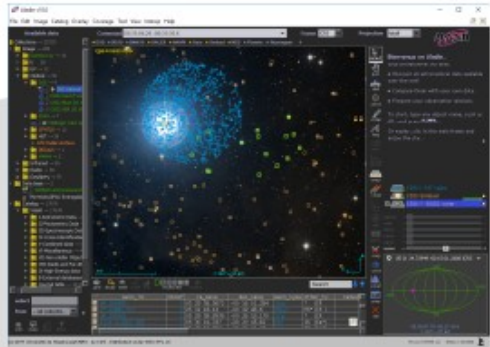
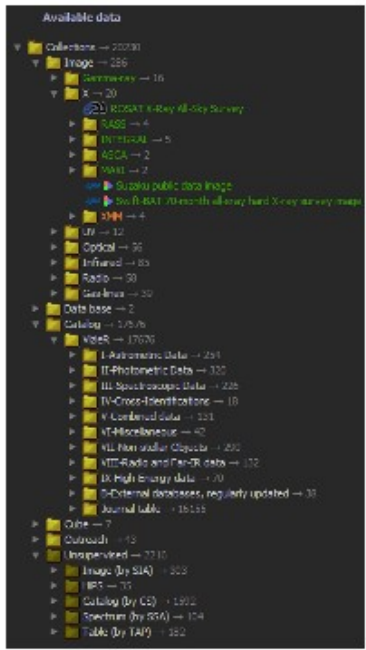
Astronomy ESFRI & Research Infrastructure Cluster  
ASTERICS - 653477



# What's new in release V10 ?

## Discovery data tree

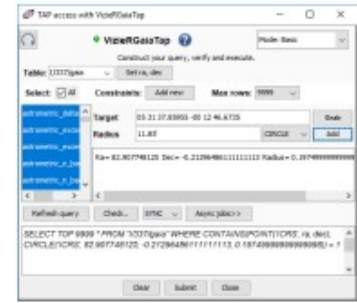
Integrated access to all CDS and other VO collections (>20,000 data sets)...



**New look & feel**  
Modern and compact layout...

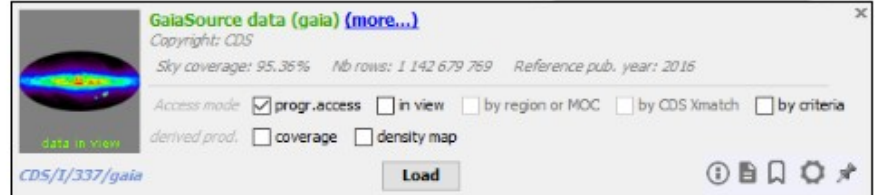


**Multi-protocol support**  
HiPS, MOC, CS, SIA, SSA, TAP...



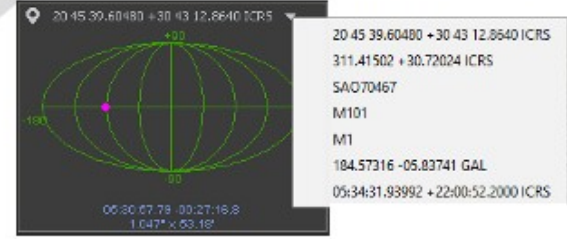
## Access selector

Choose among all available access modes and derived products ...



## Target history controller

Come back to a previous target, command...



# New look & feel

The screenshot displays the Aladin v10.0 software interface. At the top, there is a menu bar with options: File, Edit, Image, Catalog, Overlay, Coverage, Tool, View, Interop, and Help. Below the menu bar, the main window features a dark background with a central image of a galaxy. The text in the center reads: "Aladin Sky Atlas - v10.0", "ALADIN", and "CDS". Below this, it states: "Aladin is developed by Pierre Fernique, Thomas Boch, Anaïs Oberto, François Bonnarel and Chaitra. (c) 2018 Université de Strasbourg/CNRS - developed by CDS, distributed under GPLv3".

On the left side, there is a sidebar with a tree view showing "Available data → 21301" and a list of collections: "Image → 341", "Data base → 4", "Catalog → 19684", "Cube → 9", "Ancillary → 12", "Outreach → 43", "Others → 1204", and "Problematic → 4".

At the bottom left, there is a "select" field and a "from" dropdown menu set to "-- all collectio...". Below this are icons for "exp.", "sort", "view", "scan", and "filter".

At the bottom right, there is a vertical toolbar with icons for "select", "pan", "dist", "phot", "draw", "tag", "moc", "spect", "filter", "cross", "xy", "rgb", "assoc", "crop", "cont", "epoch", "pixel size", "dens.", "opac.", "prop", "zoom", and "del".

At the bottom center, there are icons for "grid", "study", "wink", "north", "hdr", "multiview", and "match".

At the bottom right, there is a status bar showing "0 sel / 0 src OMB" and a small icon.

# Simbad & VizieR info

The screenshot displays the Aladin v10.0 software interface. The main window shows a star field in DSS2 color. A star is highlighted with a red crosshair and a tooltip that reads:   
\* 42 Cnc  
Type: \*inCl  
Mag : 7.04  
by Simbad

The interface includes a menu bar (File, Edit, Image, Catalog, Overlay, Coverage, Tool, View, Interop, Help), a toolbar with various icons, and a sidebar on the left with a tree view of collections. The top right corner features the Aladin logo and a welcome message: "Welcome to Aladin, your professional sky atlas." Below this, there are instructions on how to use the software: "Discover all astronomical data available over the net!", "Compare them with your own data.", and "Prepare your observation missions." A search box is also present with the text: "To start, type any object name, such as M1, and press ENTER..." and "Or easier, clic in the main frame and enjoy the sky...".

At the bottom of the window, there is a status bar with the text: "(c) 2018 Université de Strasbourg/CNRS - developed by CDS, distributed under GPLv3" and "0 sel / 0 src 310Mb".

# CDS X-match

The screenshot displays the Aladin v10.0 interface. At the top, the title bar reads "Aladin v10.0". Below it is a menu bar with options: File, Edit, Image, Catalog, Overlay, Coverage, Tool, View, Interop, Help. The main window is divided into several sections:

- Left Panel:** A list of available data collections. The first item is "2MASS-PSC - 2MASS All-Sky Catalog of Point Sources", which is selected. Other items include VPHAS+, IPHAS2, SDSS-DR6, VVV, WVV, SDSS-DR8, WISE Preliminary Data Release, SDSS-DR4, SDSS-DR3, DENIS2, SDSS-DR5, SDSS-DR7, UKIDSS-DR9 LAS, GLIMPSE Source Catalog, UKIDSS-DR8 LAS, VST\_ATLAS, 2MASSI, APASS, GALEX-DR5, KIDS-ESO-DR3, VIKING2, The CFHTLS Survey, UKIDSS-DR7, PTR, 2MASS 6X Point Source Working Database, IRSF Magellanic Clouds Point Source Catalog, SAGE LMC and SMC IRAC Source Catalog, KIDS-ESO-DR2, VIKING1, VMC, TCS-CAIN, DENIS database first release, TASS Mark IV patches, XMM-OM Serendipitous Source Survey Catalogue, c2d Spitzer final data release, Spitzer IRAC survey, DENIS Catalogue, and AKARI/IRC mid-IR all-sky Survey.
- Top Center:** Command field showing "13.75 +19:44:55.8 x", Frame set to "ICRS", and Projection set to "Spheric".
- Top Right:** A toolbar with icons for select, pan, dist, phot, draw, tag, moc, spect, filter, cross, x-y, rgb, assoc, crop, cont, epoch, pixel, dens., prop, zoom, and del.
- Center:** A large circular field of view showing a star field. The field is overlaid with various catalog data points, including blue arrows and green squares. A central bright star is visible. The field is labeled "DSS2 color" and has a size of "10.68° x 11.77°".
- Bottom Center:** A search bar with the text "Adjust the visible" and a "Search" button.
- Bottom Left:** A table with columns: angDist, \_RAJ2000, \_DEJ2000, \_V, RAJ2000, DEJ2000, and objID. The table contains several rows of data, including coordinates and object IDs.
- Bottom Right:** A small inset window showing a celestial map with a red dot indicating the current field's position. The coordinates are "08 40 22.21920 +19 44 55.81177" and the size is "10.68° x 11.77°".

At the bottom of the window, there is a status bar with the text: "(c) 2018 Université de Strasbourg/CNRS - developed by CDS, distributed under GPLv3" and "125 sel / 876 src 1078Mb".

# Image / Mosaic builder

The screenshot displays the Aladin v9.0 software interface, which is used for building image mosaics. The main window is divided into four quadrants, each showing a different view of the same astronomical field. The top-left and top-right quadrants show individual images with a red crosshair and a red arrow pointing to a specific feature. The bottom-left quadrant shows a zoomed-in view of the same feature. The bottom-right quadrant shows a mosaic of the field, with a red arrow pointing to the same feature. The interface includes a menu bar (File, Edit, Image, Catalog, Overlay, Coverage, Tool, View, Interop, Help), a location input field, a frame selector (set to ICRS), and a toolbar with various tools like select, pan, zoom, dist, phot, draw, tag, filter, x-y, rgb, crop, cont, pixel, prop, and del. A right-hand panel provides basic controls and a list of selected images (2MASS.J.980527N.J10230033). The status bar at the bottom shows the current view (View A2) and the selected image name. The footer indicates the software is distributed under GNU GPL v3.

Aladin v9.0

File Edit Image Catalog Overlay Coverage Tool View Interop Help

Location  Frame ICRS

DSS SDSS 2MASS WISE GALEX PLANCK AKARI XMM Fermi Gaia Simbad NED +

2MASS.J.980527N.J10230033

2MASS.J.980527N.J10230033-1

31.47' x 24'

31.47' x 24'

2MASS.J.980527N.J10230033

Mosaic

31.47' x 24'

31.47' x 24'

[View A2] - 2MASS.J.980527N.J10230033

Search

d) 2016 Unistra/CNRS - by CDS - Distributed under GNU GPL v3

0 sel / 0 src 310Mb

**Basic controls:**

- Type any object name or coordinates for moving on it.
- Select catalog sources for displaying associated data measurements.
- Display simultaneously several views via the "multiview" controller.

**Msc img**

- 2MASS.J.980527
- 2MASS.J.980527
- 2MASS.J.980527

epoch -  +

prop size -  +

dens. -  +

opac. -  +

zoom -  +

# Image / Arithmetic operation

The screenshot displays the Aladin software interface. The main window shows a grid of astronomical images for the object STScI POSS2UKSTU. The top row contains three images: 'Red' (6.169' x 4.231'), 'Blue' (6.104' x 4.178'), and 'Add' (13.21' x 6.566'). The bottom row contains 'Sub' (6.104' x 4.178') and 'Div' (9.156' x 6.267'). A central dialog box titled 'Arithmetic image generator' is open, prompting the user to specify two image planes and an operation. The dialog shows the following configuration:

- Plane: STScI POSS2UKSTU\_Blue 08:40:24.02376 +19:39:59[0] - "08 40 24.03391 +19 39 ..."
- Plane or Value: S2UKSTU\_Red 08:40:24.00000 +19:40:00[0] - "08 40 24.02376 +19 39 59.5774"
- Operation:  Division
- Pixel normalisation before operating:
- Resampling method (if required):  Closest pixel

The interface also includes a left sidebar with a list of available data (144 / 2), a top menu bar (File, Edit, Image, Catalog, Overlay, Coverage, Tool, View, Interop, Help), and a right sidebar with various tool icons and a layer list.

# Image / RGB builder

The screenshot displays the Aladin v9.0 software interface. The title bar reads "Aladin v9.0". The menu bar includes "File", "Edit", "Image", "Catalog", "Overlay", "Coverage", "Tool", "View", "Interop", and "Help". Below the menu bar, there is a "Location" input field and a "Frame" dropdown menu set to "ICRS". A row of star catalog icons is visible: DSS, SDSS, 2MASS, WISE, GALEX, PLANCK, AKARI, XMM, Fermi, Gaia, Simbad, and NED. The main view is a 2x2 grid of panels. The top-left panel shows a grayscale image of a star with a diffraction pattern, labeled "ESO.R-MAMA.189" and "10.61' x 0.095'". The top-right panel shows a grayscale image of a star with a diffraction pattern, labeled "SERC.J.DSS1.189" and "13.37' x 10.2'". The bottom-left panel shows a grayscale image of a star with a diffraction pattern, labeled "2MASS.J.9911086.J10430127" and "7.067' x 6'". The bottom-right panel shows a color image labeled "RGB img" and "10.61' x 8.095'". A toolbar on the right side of the interface includes icons for "select", "pan", "zoom", "dist", "phot", "draw", "tag", "filter", "x-y", "rgb", "crop", "cont", "pixel", "epoch", "prop", "size", "dens.", "opac.", and "del". A legend on the right side shows the "RGB img" panel selected, with checkboxes for "2MASS.J.9911086.J10430127", "SERC.J.DSS1.189", and "ESO.R-MAMA.189". A search bar is located at the bottom right. The status bar at the bottom left reads "c) 2016 Unistra/CNRS - by CDS - Distributed under GNU GPL v3". The status bar at the bottom right reads "0 sel / 0 src 628Mb".



# File / Load instrument FoV

The screenshot displays the Aladin v9.0 interface. On the left, the 'Server selector' window is open, showing the 'Instrument fields of view' section. This section includes a table of instruments and their fields of view, with 'WFCINT' selected. The main window shows a star field with several red rectangular overlays representing the fields of view of the selected instrument. The interface includes various toolbars and a sidebar with icons for different server categories.

**Instrument fields of view table:**

Instrument	Tele...	Description	Author
CFH12K	CFHT	Large field camera	CFH
ESPADONS	CFHT	Echelle Spectropolarimetric device	CFH
MEGACAM	CFHT	Wide field imaging camera	CFH
MEGAPRIME	CFHT	Wide field imaging camera + quiders	CFH
WIRCAM	CFHT	Wide field IR camera	CFH
HST	HST	All Hubble Space Telescope FoVs	STScI/T...
WFCINT	INT	Isaac Newton Telescope Wide Field...	Luis Cor...
SOFI	NTT	ESO NTT single CCD camera	ESO-CDS
SuprimeCam	SUBARU	The Subaru Prime Focus Camera (Su...	CDS/S...
Schulman32	Schulma...	Schulman 32-inch Telescope	Adam Bl...
HSC	Subaru	Hyper-SuprimeCam	Herve B...
VIRcam	VISTA	Wide Field IR camera	Laurent ...
FORS1	VL T	ESO FOCal Reducer/low dispersion S...	ESO-CDS
FORS2	VL T	ESO FOCal Reducer/low dispersion S...	ESO-CDS
ISAAC	VL T	ESO infrared imager and spectrograph	ESO-CDS
VIMOS	VL T	ESO VIMOS mosaic camera	ESO
DECam	Victor M...	Dark Energy Camera with imaging (b...	Luis Cic...
WFI	WFI2.2m	ESO Wide Field Imager	ESO
PFIP	WHT	William Herschell Telescope mosaic ...	Luis Cor...
EPICMOS	XMM	Sensitive imaging (0.1 to 15 keV)	CDS
EPICpn	XMM	High resolution (<0.03ms)	CDS

# Tools / Remote tools/Tools / Sextractor

The screenshot displays the Aladin v9.0 interface. On the left, the 'Server selector' window is open, showing the 'S-extractor facility (v2.8.6)' configuration. The configuration includes fields for image reference, threshold, mag zero point, saturation, stellar FWHM, filter type, phot diameter, background type, background annulus, and display filter. The 'Display filter' is set to 'Object elongation'. Below the configuration is an 'INFO on this server' button and 'Reset', 'Clear', 'SUBMIT', and 'Close' buttons.

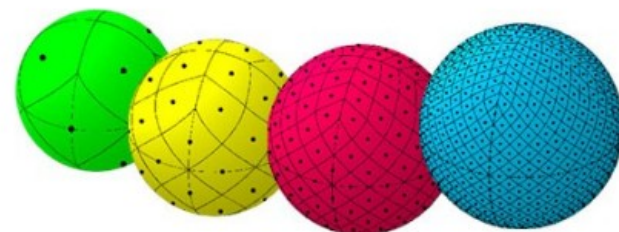
The main window shows a star field image with a central crosshair. The 'Location' field is set to '2MASS J.000130N\_J0006023E'. The 'Frame' is set to 'ICRS'. The image shows several stars, with a central star highlighted by a crosshair. The coordinates of the central star are 7.067° x 5.986°.

At the bottom, a table of star data is visible:

NUMBER	MAG ISO	MAGERR ISO	MAG ISOCOR	MAGERR I...	MAG APER	MAGERR A...	MAG AUTO	MAGERR A...	MAG BEST	MAGERR B...	X IMAGE	Y IMAGE	ALPHA J2...	DELTA
28	-4.7090	0.0423	-5.2878	0.1162	-4.8140	0.0423	-5.5304	0.0570	-5.5304	0.0570	246.060	530.517	230.5967...	+29.

At the bottom right, there is a search bar and a zoom control. The status bar at the bottom indicates '© 2016 Unistra/CNRS - by CDS - Distributed under GNU GPL v3' and '2 sel / 67 src 383MB'.

- **Multi-object coverage (MOC):** Method for describing sky regions
- Based on **Healpix** (list of HEALPIX cells stored in a FITS binary table)
  - Equal-area cells & isolatitude → Speed.



Window Help

VizieR Server  
Server: <http://vizier.u-strasbg.fr/>

Row Selection  
 Cone Selection  
 Object Name:  Resolve  
 RA:  degrees (J2000)  
 Dec:  degrees (J2000)  
 Radius:  degrees  
 All Rows  
 Maximum Row Count: 100000

Column Selection  
Output Columns: standard

Catalogue Selection  
 By Category | By Keyword | Surveys | Missions  
 Keywords: mikolaitis  
 Sub-Table Details  Include Obsolete Tables  
 Search Catalogues Cancel Search

Δ Name	Popularity	Density	Description
J/A+A/572/A33	736	0	Abundances from Gaia-ESO Survey (Mikolaitis)
J/A+A/573/A55	215	0	Gaia-ESO Survey: Tr 20, NGC4815, NGC670
J/A+A/582/A81	1293	0	Gaia FGK benchmark stars: abundances (Jordi et al.)
J/A+A/595/A18	109	0	Lithium abundances in AMBRE stars (Guigou et al.)

OK

File Edit Image Catalog Overlay Coverage Tool View Interop Help

Location  Frame ICRS

\*DSS \*SDSS \*2MASS \*WISE \*GALEX \*PLANCK \*AKARI \*XMM \*Fermi \*Gaia \*Simbad \*NED +

J/A+A\_572\_A33.tbl

266° x 180°

RAJ2000	DEJ2000	ID	CName	Name	A(M...)	A(A...)	A(S...)	A(C...)	A(C...)	A(T...)	A(T...)	A(C...)	A(N...)	A(Y2)	RA	DE
9.84683	-47.09661	LINK	00392324-4705478	G 2 br 7...	7.43	6.21	7.33	6.22	6.07	4.74	4.82	4.9	5.66	NaN	9.84683	-47.09661
9.91021	-47.12958	LINK	00393845-4707465	G 2 r 71...	7.03	5.93	6.9	5.62	5.81	NaN	4.31	4.87	5.32	NaN	9.91021	-47.12958

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9 sel / 1915 src 160Mb

# MOC

How to know the area in common between two surveys?

*Load the coverage (MOC) of the current survey*

The screenshot shows the Aladin software interface. The main window displays a 3D visualization of the sky with two overlapping survey coverage areas (MOC) in blue and orange. The interface includes a file explorer on the left, a toolbar on the right, and a status bar at the bottom. The status bar shows the current time as 02:59:59.04 +00:00:48.0 and the current zoom level as 0.45.00000 +00.00933 ICRS. The toolbar on the right includes icons for select, pan, dist, phot, draw, tag, moc, filter, cross, key, rgb, aspect, crop, prop, size, dens., opac., and zoom. The file explorer on the left shows a tree view of data collections, with 'CDS/P/DECaLS/DR3/color' selected. The status bar at the bottom indicates the current zoom level and the current time.

# Case #4: Aladin

How to know the area in common between two surveys?

*Logical operations*

The screenshot displays the Aladin v10.0 interface. The 'Coverage' menu is circled in red, with an arrow pointing to the text 'Logical operations'. The main window shows a 3D sky map with two overlapping survey footprints: a blue one and an orange one. A 'Properties' dialog box is open for the selected footprint, showing details like 'PlaneID', 'Color', and 'Coverage'. A 'MOC operations' dialog box is also open, prompting the user to specify one or two MOC planes and choose an operation (Union, Intersection, Subtraction, Difference, Complement). The 'Intersection' option is selected. The 'CREATE' button is visible at the bottom of the dialog.

# Case #4: Aladin

How to know the area in common between two surveys?

Filter a table by MOC

The screenshot displays the Aladin v10.0 software interface. The main window shows a sky map with a grid and various data points. The 'Coverage' menu item is highlighted with a red circle. The interface includes a menu bar (File, Edit, Image, Catalog, Overlay, Coverage, Tool, View, Interop, Help), a command line, and a list of available data sources on the left. The right side features a toolbar with icons for selection, pan, zoom, and other functions. The bottom right corner shows a search box and a small thumbnail of the current view.

# HIPS

- Hierarchical Progressive Survey
- Visualize a survey “*a la Google maps*”.
- Multi-scale view of images with capability to zoom and pan on any region.

Astronomy & Astrophysics manuscript no. Fernique\_Allen\_04May2015  
May 12, 2015

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## **Hierarchical progressive surveys**

**Multi-resolution HEALPix data structures for astronomical images, catalogues,  
and 3-dimensional data cubes**

P. Fernique<sup>1</sup>, M. G. Allen<sup>1</sup>, T. Boch<sup>1</sup>, A. Oberto<sup>1</sup>, F-X. Pineau<sup>1</sup>, D. Durand<sup>2</sup>, C. Bot<sup>1</sup>, L. Cambrésy<sup>1</sup>, S. Derriere<sup>1</sup>, F. Genova<sup>1</sup>, and F. Bonnarel<sup>1</sup>

# HIPS

The screenshot shows the Aladin v9.0 web interface. At the top, there is a menu bar with options: File, Edit, Image, Catalog, Overlay, Coverage, Tool, View, Interop, Help. Below the menu bar, there is a location input field containing "06:38:50.67 +08:47:22.4" and a "Frame" dropdown menu set to "ICRS". A toolbar on the right side contains various icons for navigation and data manipulation, including "select", "pan", "zoom", "dist", "phot", "draw", "tag", "filter", "x-y", "rgb", "crop", "DSS colored", "cont", "pixel", "prop", and "del". The main display area shows a star field with a green grid overlay. The grid lines are labeled with coordinates: longitude (08.00, 06.00, 04.00, 02.00, 00.00, -02.00, -04.00, -06.00, -08.00) and latitude (+75.00, +60.00, +45.00, +30.00, +15.00, +00.00, -15.00, -30.00, -45.00, -60.00, -75.00). A small red dot is visible in the center of the field. At the bottom of the interface, there is a search bar and a status bar with icons for "grid", "wink", "north", "hdr", "multiview", and "match".

File Edit Image Catalog Overlay Coverage Tool View Interop Help

Location 06:38:50.67 +08:47:22.4

Frame ICRS

DSS colored

select  
pan  
zoom  
dist  
phot  
draw  
tag  
filter  
x-y  
rgb  
crop  
DSS colored  
cont  
pixel  
prop  
del

epoch -  
size -  
dens. -  
opac. -  
zoom -

Frame: ICRS

+180  
+90  
-90  
-180

03:38:14.06 +19:28:33.8  
180° x 152.5°

grid wink north hdr multiview match

Search

- blinking green/orange ball: Aladin is still downloading additional data;
- orange ball: the display is ready, but there is better resolution data for this region;
- green ball: the display is ready with the better resolution data for this region;
- red ball: there is a problem (server error, missing data...)