

Astrometric calibration using Aladin

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What's this about?

The Aladin Sky Atlas is a very powerful Virtual Observatory application enabling its users to visualise digitised astronomical images, to superimpose entries from astronomical catalogues or databases, and to interactively access related data and information from numerous astronomical databases and archives.

Most of this functionality depends on the image having an astrometrical calibration. If you do not know the sky region of an uncalibrated image, an automatic calibration tool like [Astrometry.net](http://astrometry.net) might be a good choice. If you know, however, the approximate location of an image on the celestial sphere, [Aladin](http://aladin.cesr.cnrs.fr) provides a fast and reliable method to calibrate it by using a reference image.

This tutorial explains step-by-step how to perform such an ad-hoc astrometric calibration using [Aladin](http://aladin.cesr.cnrs.fr).

Software: [Aladin](http://aladin.cesr.cnrs.fr)

Learn how to calibrate an image with Aladin


1. Load an uncalibrated image into Aladin:

- Launch [Aladin](http://aladin.cesr.cnrs.fr).
- Paste URL

`http://docs.g-vo.org/astropics/M57RingNebula.jpg`

into Aladin's **Location** field right near the to. This opens an uncalibrated image of the Ring Nebula (Messier 57). (Alternatively, you can open a **web browser** with `http://docs.g-vo.org/astropics/`, download the file `M57RingNebula.jpg` and access it via Aladin's menu: **File** → **Open local file...**).

2. Find a calibrated reference image:


- Click on  in the menu to open the **Server selector** window again. In the left column (“Image servers”), choose **Aladin images** and then type **M57** in the “Target” field and **15 arcmin** in the “Search cone” field. Press the **SUBMIT** button.
- A list of images is now presented to you; you’ll want to use an image that is spectrally not too far away from what you are trying to calibrate. Scrolling down a bit, you will see optical images from POSS. One of the images around 650 nm should be good here, for instance

POSSII F-DSS2(0.648 um) 13.0’x13.0’ 396...



Fairly far back in the row, you’ll notice the observation date; this plate is from 1992, so even the epoch difference shouldn’t be too bad.

- When you click on the row, the **Data Info Frame** is opened. Load the image into Aladin’s main window by pressing **LOAD** (or just double-click the row).

3. Calibrate your uncalibrated image:

- Split the main window into two sub-windows by using the second button from left of the “multiview” capability . Make Aladin display your uncalibrated image in the left and the calibrated image in the right sub-window (to do that, drag and drop the entries in the layer stack on the right into the panes).
- Click in your left panel (the uncalibrated one), then choose **Image** → **Astrometrical calibration...** in the menu. In the **Astrometrical calibration** window select the option **by matching stars**.
- If you are sure about corresponding stars in the two images, click on a star in the uncalibrated image followed by a click on the calibrated source. Repeat the game for at least five objects. For each mouse click, Aladin fills the table in the calibration board. Use your common sense and the human ability to form asterisms to guide your choice: Stars close to galaxies should be easy to pair up, or conspicuous triangles of stars of comparable brightness.
- When you feel good about your objects selected, press the **CREATE** button to finalise the calibration.

4. You are done:

- If you hover your mouse over the image on the left, you see that coordinates are indicated in the “Location” field above the main window (before there was a “No astrometrical reduction” here).
- Click on the “match” icon  (to the right of the “multiview” capability) to view the two images in the same orientation.
- If you want to save your freshly calibrated image on disk, click on  and select the option **Export some planes**.

Warning: if you have already overplotted a catalog over your calibrated image, Aladin will use the closest catalog object rather than the position you actually clicked. It’s not unlikely that’s actually what you want, but sometimes it’s not...

