



AOP Supernova Search Project

Blink tutorial

Introduction

This tutorial details the procedure to follow to blink two images and if found, report a supernova candidate to the AOP team.

Requirements

1. A PC, an internet connection and an email account
2. Astrometrica
3. FITS images – a target image and a comparison image

Summary steps

1. Install Astrometrica
2. Setup Astrometrica configuration files
3. Open two FITS images and compare by blinking
4. If a supernova candidate is found, plate solve the image and identify the position of the candidate
5. Report the data to the AOP team

1.0 Install Astrometrica

- 1.1 Go to the following website: <http://www.astrometrica.at/>
- 1.2 In the left hand menu, choose the "downloads" link
- 1.3 Of the three download choices, choose the first, titled "Version 4.4.1.364 Installation Package (Installation only - no update, 5883 kB)"
- 1.4 Install the software in a location of your choice.

2.0 Setup Astrometrica configuration files

- 2.1 Start Astrometrica (do not worry if you get an error regarding missing files - they are not required)
- 2.2 From the menu, choose File | Settings
- 2.3 Complete the first tab (Observing Site) as follows:

Program Settings - Astrometrica.cfg

Observing Site | CCD | Program | Environment | Internet

Location

MPC Code

Longitude ° East West

Latitude ° North South

Height m

Details

Contact

E-Mail

Include Contact Details in MPCReport

Observer

Measurer

Telescope Code

Open Save Save As OK Cancel

2.4 Complete the second tab (CCD) as follows:

The screenshot shows the 'Program Settings - Astrometrica.cfg' dialog box with the 'CCD' tab selected. The dialog is divided into several sections:

- Scale and Orientation:**
 - Focal Length: 3886.0 mm ± 1.0 %
 - Position Angle: 180.0 ° ± 10.0 °
 - Pointing ±: 5.0 '
 - Flip Horizontal:
 - Flip Vertical:
 - Auto-Save FITS with WCS
- Time in File Header:**
 - Start of Exposure
 - Middle of Exposure
 - End of Exposure
 - Offset: 0.00 h from UT
 - Precision: 1.00 Seconds
 - Skip checking of Time after Loading
- CCD Chip:**
 - Pixel Width: 24.0 μm
 - Pixel Height: 24.0 μm
 - Saturation: 60000
- Color Band:**
 - Blue (B)
 - Visual (V)
 - Red (R)
- Exposure from FITS:**
 - Minutes
 - Seconds
 - Milliseconds

At the bottom of the dialog are buttons for 'Open', 'Save', 'Save As', 'OK', and 'Cancel'.

2.5 Complete the third tab (Program) as follows:

Program Settings - Astrometrica.cfg

Observing Site | CCD | **Program** | Environment | Internet

Object Detection

Aperture Radius Pixels

Detection Limit σ

Minimum FWHM Pixels

PSF-Fit RMS

Search Radius Pixels

Star Catalog

Uppr Limit mag

Lower Limit mag

Reference Star Matching

Number of Stars

Search Radius Pixels

Plate Constants

Linear Fit

Quadratic Fit

Cubic Fit

Image Alignment

Number of Stars

Alignment Area Pixels

Residuals

Astrometric Limit "

Photometric Limit mag

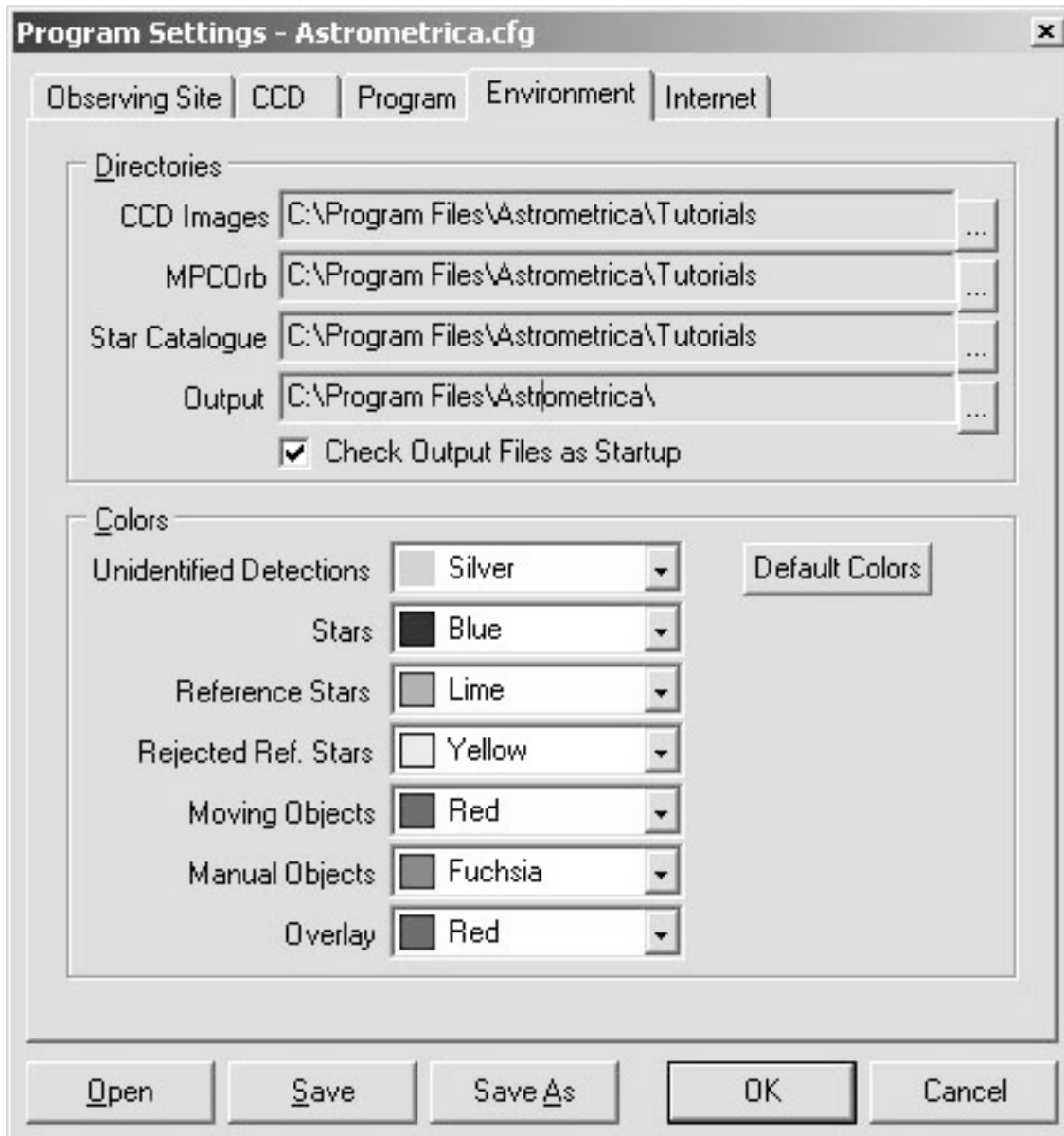
MPC Report

Include Magnitude

Position to 0.001s/0.01"

Magnitude to 0.01mag

2.6 Complete the fourth tab (Environment) as follows:



2.7 Complete the fifth tab (Internet) as follows:

Program Settings - Astrometrica.cfg

Observing Site | CCD | Program | Environment | Internet

E-Mail

Mail Server Port

Login

Password

Mail Address

Send CC to

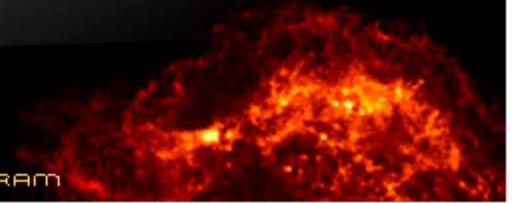
Proxy Server

Proxy Server Port

Open Save Save As OK Cancel

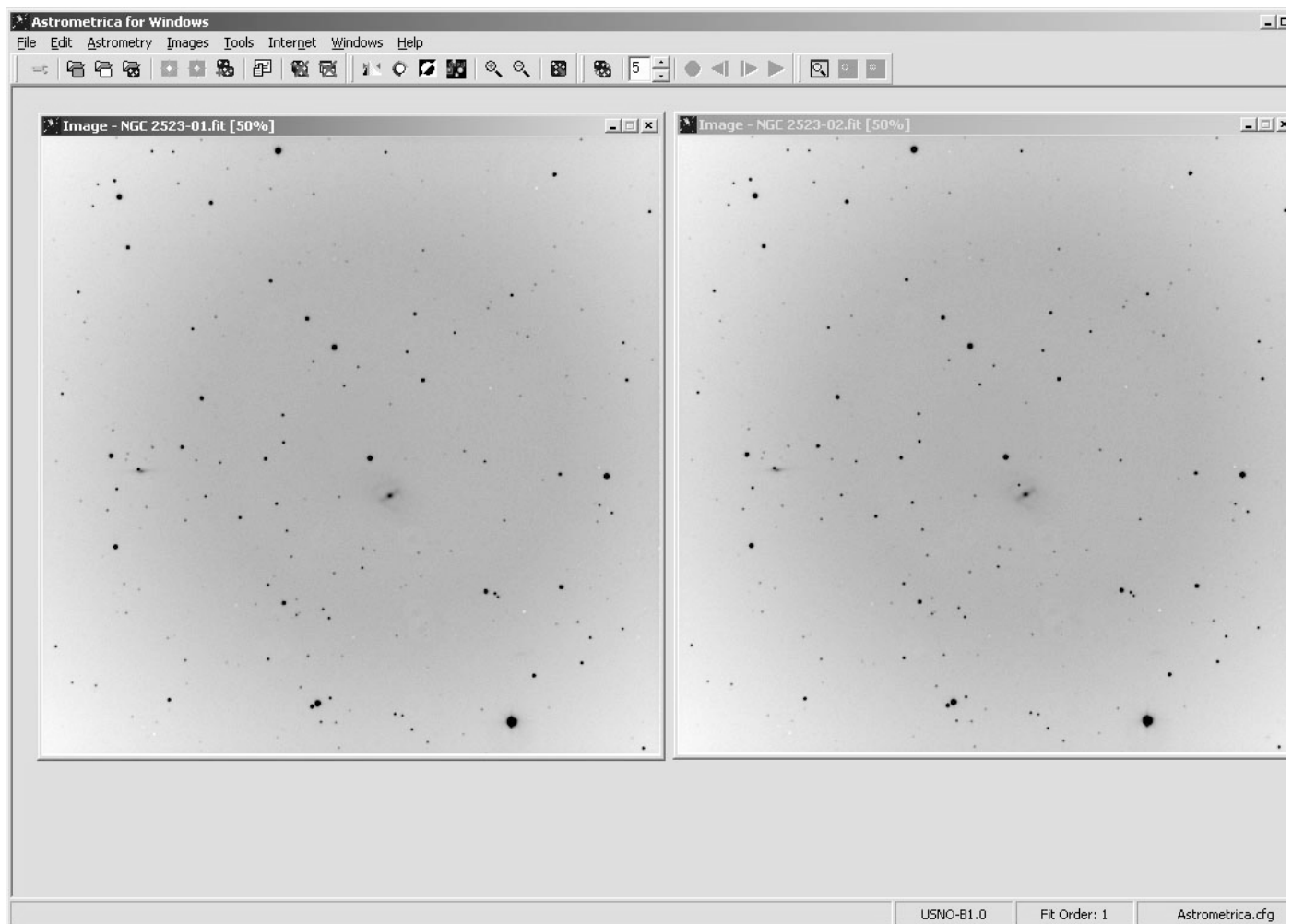
2.8 Choose "Save" to save these settings.

2.9 You have now completed the Astrometrica setup



3.0 Open two FITS images and compare by blinking

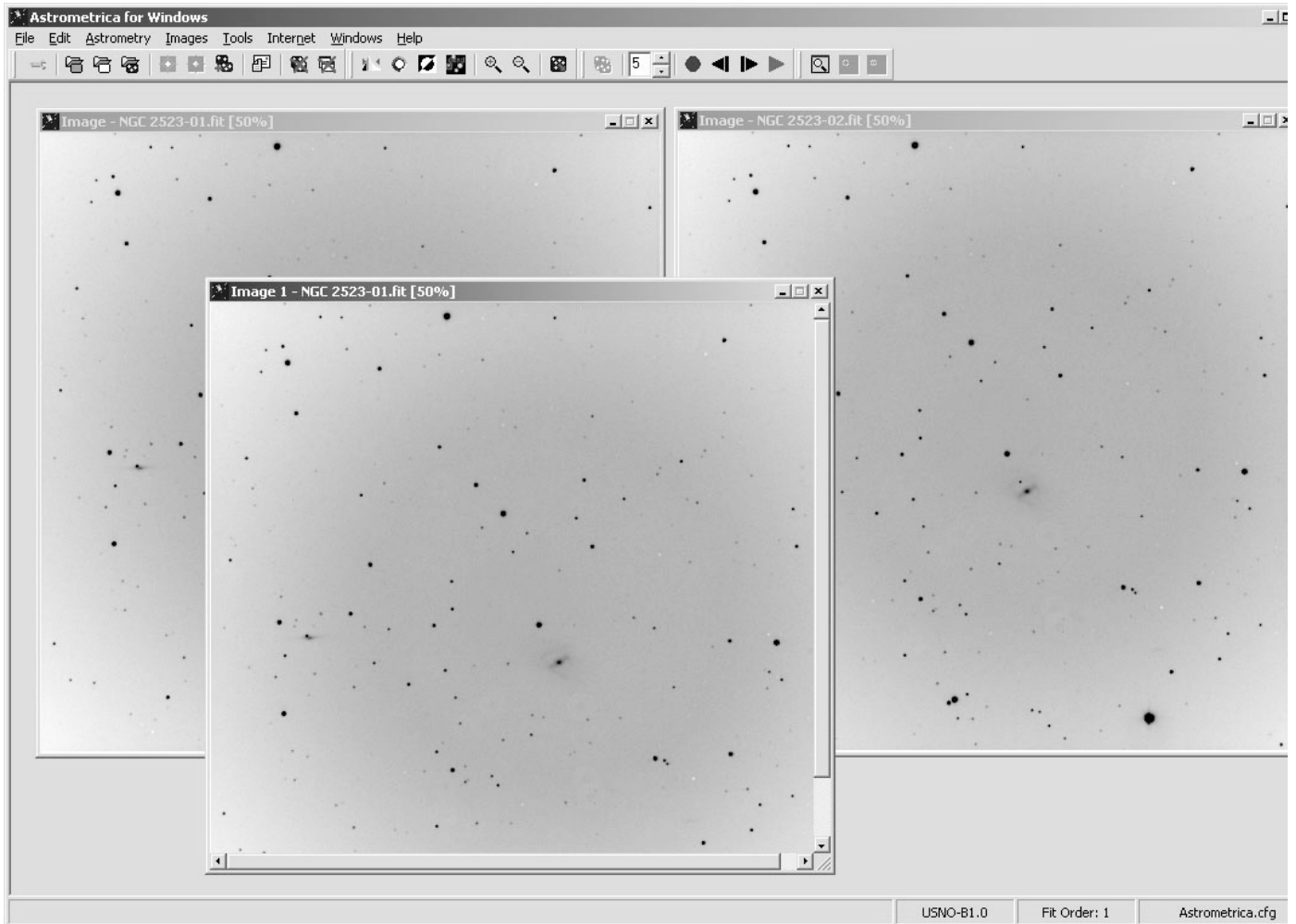
- 3.1 Start Astrometrica
- 3.2 Choose "continue" in the evaluation dialogue box
- 3.3 Choose File | Load images
- 3.4 Navigate to the two images you want to open
- 3.5 The first should be a comparison image
- 3.6 The second should be a target image (this should be imaged at a later date/time than the comparison)
- 3.7 Open both images
- 3.8 Astrometrica will automatically open the images in a negative format and will choose the levels automatically. There is no need for you to do anything to the images.
- 3.9 You should see this:



3.10 Choose Tools | Blink Images



3.11 Astrometrica automatically aligns the images and begins to blink them in a third window:



3.12 You can alter the speed of blinking from 1 (slowest) to 10 (fastest) using the scroll arrows next to the number, just beneath the Astrometrica menu.

3.13 You can also zoom in on the blinking image using the magnifying glass icon, again, just beneath the Astrometrica menu

3.14 If you see a new star-like object in the galaxy in the target image, this is a candidate supernova

3.15 Close all open images

4.0 Plate solve the image and identify the position of the candidate

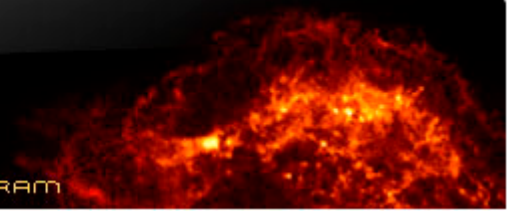
4.1 Choose File | Load images

4.2 Navigate to the image containing the candidate supernova

4.3 Open the image

4.4 Choose Astrometry | Data Reduction

4.5 In the Coordinates dialogue box that opens, there is nothing you need to fill in. Astrometrica automatically retrieves the center co-ordinates of the image from the FITS header. Simply choose the OK button.



4.6 You should see something similar to this (with only one image)

Astrometrica for Windows

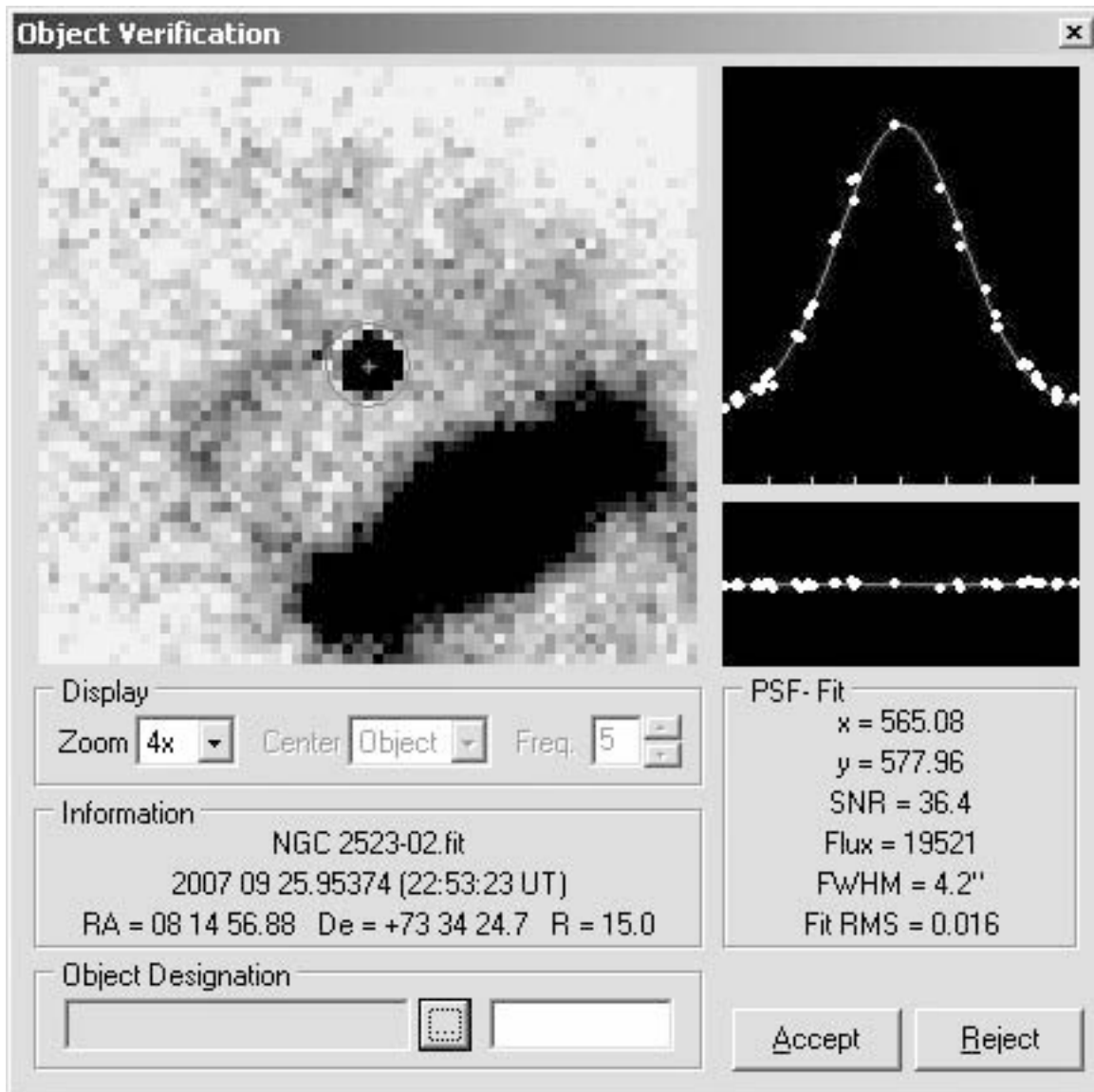
File Edit Astrometry Images Tools Internet Windows Help

Image - NGC 2523-01.fit [50%] Image - NGC 2523-02.fit [50%]

Data Reduction Results								
Image	Stars	Ref. Stars	Ref./Ast.	Fit Order	dRA	dDe	Ref./Phot.	dms
NGC 2523-01.fit	633	243	235	1	0.14"	0.16"	229	0.19r
NGC 2523-02.fit	633	243	235	1	0.14"	0.16"	229	0.19r

USNO-B1.0 Fit Order: 1 Astrometrica.cfg

- 4.7 Next, hover the mouse cursor (it should be a cross) over the candidate supernova and then left-click. If necessary, you can zoom in on the candidate prior to clicking it using the magnifying glass icon—you need to be as accurate as possible. This is what you should see:



- 4.8 You can further zoom in and out of the sectioned portion of the image using the Zoom drop-down box
4.9 In the text box at the bottom of the dialogue box, type in the name of your designation (use something like SN001 or similar) and click the "Accept" button.

5.0 Report the data to the AOP team

5.1 Choose File | View MPC Report File

5.2 You should see something like this:

The screenshot shows the Astrometrica software interface. A 'Send Mail' window is open, displaying the following email content:

```

To: mpc@cfa.harvard.edu
CC: dmcdona@eircom.net
Subject: Observations

COD J65
OBS D. McDonald
MEA D. McDonald
TEL 0.36-m f/11 Schmidt-Cassegrain + CCD
ACK MPCReport file updated 2007.11.21 21:26:10
AC2 dmcdona@eircom.net
NET USNO-B1.0
-----
SNO01 C2007 09 25.95374 08 14 56.88 +73 34 24.7 J65
-----
end
  
```

Below the email composition window, a 'Data Reduction Results' table is visible:

Image	Stars	Ref. Stars	Ref./Ast.	Fit Order	dRA	dDe	Ref./Phot.	dme
NGC 2523-01.fit	633	243	235	1	0.14"	0.16"	229	0.19r
NGC 2523-02.fit	633	243	235	1	0.14"	0.16"	229	0.19r

At the bottom of the interface, there are status bars for 'USNO-B1.0', 'Fit Order: 1', and 'Astrometrica.cfg'.

5.3 Simply copy the text and paste it into a new email – **do not hit the “send button”**

5.4 Send the email to dmcdona@eircom.net using the subject line “AOP Blink Test”

5.5 I will review the results and let you know how you got on.

If you have any difficulties with the procedure, please post up to the AOP section of the IFAS website (others may be able to help you) or if you get no joy, email or call me.

Dave McDonald

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