

The National Schools' Observatory and Institute of Physics present:

## Hunting Asteroids

### Main task – Hunting for Asteroids

Before starting the investigation, we need to get some pictures (or observations) of the night sky. In each image, stars and asteroids will look the same. However, as we know that stars do not move around (i.e. are fixed), the only way we can spot asteroids and planets is by taking another image a few minutes later and looking to see if anything has moved – in which case it cannot be a star. It's a bit like keeping the camera still and taking a picture of someone running past. In the second picture, the runner will have moved position.



The image on the left was taken 8 days before the one on the right, and shows how the position of the dwarf planet Pluto has changed during that time. Note that everything else in the picture has stayed in the same place.

### Getting the Images

To get the images we need, carefully follow these instructions:

- Make sure you are logged onto [www.schoolsobservatory.org/discover/activities/hunting\\_for\\_asteroids](http://www.schoolsobservatory.org/discover/activities/hunting_for_asteroids)
- Head to the 'Data Files' section at the bottom of the page
- For your first attempt, use the demonstration image set *ah-demo-1.fits*, *ah-demo-2.fits*, *ah-demo-3.fits* and *ah-demo-4.fits* as these images contain known asteroids for you to spot.
- Click on the file to download it, if you want to save it to a specific folder then right click on the image select 'Save Link As' from the options and a new pop-up box will appear asking where you want to save the image.
- Now follow the same instructions to save all the other images to the same place.

In order to look at or analyse the images, we need to open a special piece of software called *LTImage*. This can be downloaded for free from:  
<https://www.schoolsobservatory.org/obs/software/ltimage>

Once you have started *LTImage*, the screen below should appear in front of you. We can now load in the first of our images to look at.

Open the 'File' menu at the top left of the *LTImage* window and click on the words 'Open Data Image'.

Find where you saved your files and select the first image of the set, i.e. ah-demo-1.fits. It should soon appear in the main viewing area.

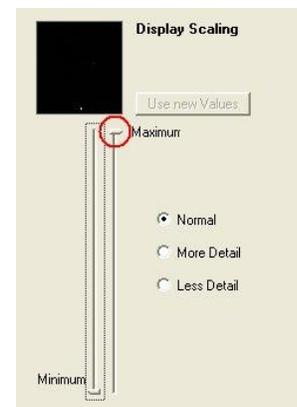


## Scaling the Image

Don't worry if the image looks dark, that's quite normal. However, we need to 'scale' the image if we are to see any more detail, such as asteroids.

We scale the image as follows –

- Open the main 'Display' menu (top of screen) and click on the word 'Scaling'. You will then notice that two sliders have appeared on the rightmost panel of the *LTImage* window, like those on the right.
- Move your mouse pointer over the bar at the top of the right-hand slider (circled).
- Press and hold down the left mouse button whilst slowly dragging the mouse down. The slider bar will follow and more detail will start to appear in the small preview window above.
- When you think you can see all the detail, release the left mouse button and then click on the 'Use new Values' button.



These scaling corrections should let you see much more detail, but you may need to try a couple of times before you get the right settings.

## Getting the other Images

We now need to load the next image into the second image store. The image stores allow us to load in and look at more than one image.

- We select the second image store by moving the mouse pointer to the circle next to the number 2 (bottom right of window) and left clicking.
- Select 'Open Data File' from the 'File' menu again and load in the second image file, i.e. ah-demo-2.fits
- Repeat this for the remaining images which have to go into image stores 3 and 4.



## Comparing the Images

We can now look for asteroids using a technique known as '**blinking**'. This involves looking carefully at the image whilst switching every second or so between the images, so that your eyes can detect any movement amongst the stars.

- Do this by holding the selecting one of the image windows in the bottom right pane and then using the arrow keys to move between them.

Remember that all the stars will remain in exactly the same place, but closer objects such as planets, asteroids or even satellites will appear to move from image to image.

- If you loaded in the demonstration image set, you should be able to pick out the known asteroids within them. Keep blinking the images until you do. You may want to change the time you take before switching to the next image.

When you are happy that you can find a moving object in the demonstration image set, look at the "*Download Asteroid Observations*" page on the website for new image sets to see if you can discover an unknown asteroid!

[https://www.schoolsobservatory.org/discover/projects/asteroidwatch/ast\\_download](https://www.schoolsobservatory.org/discover/projects/asteroidwatch/ast_download)