

BASIC ASTROPHOTOGRAPHY.

A Beginners guide to Astrophotography, showing what can be achieved with basic techniques and equipment.



Andy Gibbs, Orwell Astronomical Society Ipswich.

NGC 6888 The Crescent Nebula.

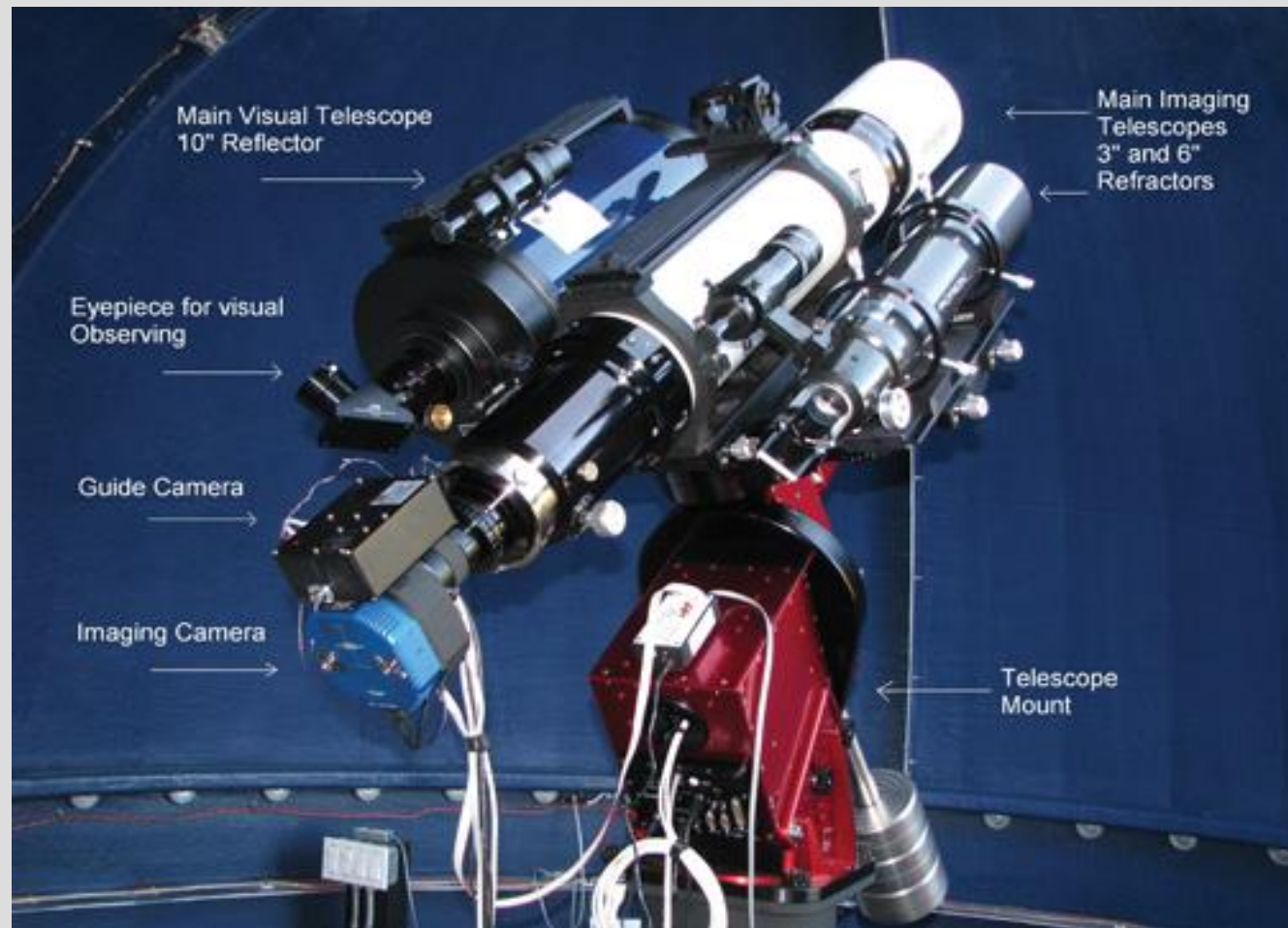


Advanced Astrophotography.

The image of the Crescent Nebula looks fantastic, but it takes a lot of work with expensive equipment to achieve such results.

A total of 22.8 hours of exposures were used to produce this image, using expensive telescopes, cameras and mount. A good knowledge of imaging editing software is also required to produce this result.

The type of equipment required to produce a similar image.



Back to the Real World!

Whilst we would all love to possess such equipment and to acquire the skills to process the images shown previously, not everybody is able to commit to the financial investment and time required.

My aim in this workshop is to show what can be achieved with basic equipment and investment, indeed the vast majority of us already own such equipment.

Hopefully, this will show that Astrophotography can be enjoyed by all, whatever level you wish to achieve.

Astrophotography with a Smartphone.



Smartphones are now equipped with reasonable cameras. For everyday photography and our holiday snaps, they can be all you need.

Astrophotography can present some additional challenges, for example the need to take long exposures and to perform in low light.

Imaging sensors are small compared to a Full Frame DSLR.

Comparison of Imaging Sensor Sizes.

Sensor Name	Medium Format	Full Frame	APS-H	APS-C	4/3	1"	1/1.63"	1/2.3"	1/3.2"
Sensor Size	53.7 x 40.2mm	36 x 23.9mm	27.9x18.6mm	23.6x15.8mm	17.3x13mm	13.2x8.8mm	8.38x5.59mm	6.15x4.62mm	4.54x3.42mm
Sensor Area	21.59 cm ²	8.6 cm ²	5.19 cm ²	3.73 cm ²	2.25 cm ²	1.16 cm ²	0.47 cm ²	0.28 cm ²	0.15 cm ²
Crop Factor	0.64	1.0	1.29	1.52	2.0	2.7	4.3	5.62	7.61
Image									
Example									

Keeping it Steady.



A tripod is essential when taking longer exposures. Also, to avoid camera shake, a remote shutter control or timer delay is required. The tripod shown costs less than £5.00.

Afocal Imaging.



Although it is possible to take images by holding the camera to the eyepiece, superior results will be obtained by using a Smartphone Adapter. These cost around £35.00.

Apps for Smartphones.



Nightcap Pro
For iOS. £1.99.



Camera FV-5 For Android. £2.49.

By default, Smartphone cameras do not have the ability to take long exposures or work well in low light. However, various apps are available to enable manual features like we have on DSLR cameras.

Screenshots.

Nightcap for iOS



Camera FV5 for Android



Pleiades, Piggybacked on my Scope.



Moon, Hand-Held Afocal.



M45 with iPhone and NightCap.



Meteor with iPhone and NightCap.



Milky Way with Android and FV5.



Milky Way Camera FV5 (Processed).



Aurora with iPhone.



Tycho with iPhone, Through a Telescope.



Jupiter with iPhone, Through a Telescope.



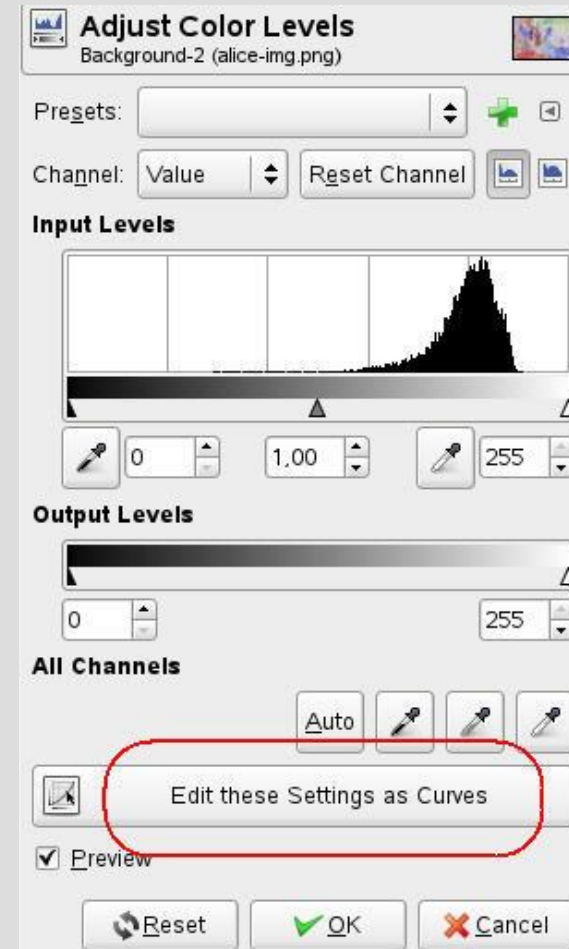
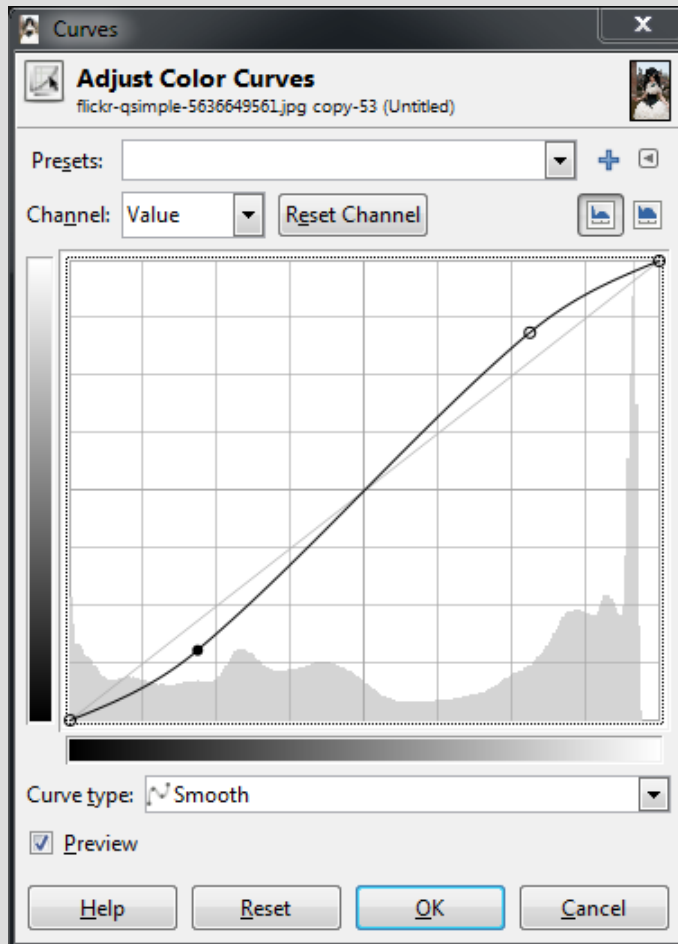
Saturn with iPhone, Through a Telescope.



M42 with iPhone and some Processing.



Basic Editing with Curves and Levels.



Compact Digital Cameras.



Compact Digital Cameras have been popular for a number of years. They are easy to use with their 'point and click' features, which take care of exposure, focusing and zoom, automatically. Whilst not ideally suited to Astrophotography, most of these cameras have a manual mode, (often called P Mode), where the ISO setting and exposure time can be adjusted manually.

Use a Tripod!



Most Compact Cameras have a tripod adapter. Use a tripod if you have one. If not, you could use a bean bag.

A 15 Second Exposure at ISO 800 Taken with a
Canon IXUS 185.



The Plough, with Light Pollution.



The Plough, (With Light Pollution Removed in GIMP).



Orion and Taurus.



Orion.



Know your Limitations!



Pleiades and Hyades.



DSLR Cameras.



DSLR cameras are the most versatile of Astroimaging equipment available to beginners. They are suitable for basic astrophotography with a standard kit lens as well as producing excellent, long exposure images when connected to a telescope. Prices start from under £300.00 new with a standard kit lens, or under 200.00 second hand.

Journal Pre-proof



All DSLR Cameras have a Manual Mode, allowing greater control over the cameras features. This allows you to manually control focus, exposure length, and aperture.

Remote Shutter Control/Intervalometer.



Will make life easier, allowing remote shutter control and the ability to program
The camera to take a series of exposures.

DSLR on Tripod.



A DSLR camera mounted on a tripod is capable of producing excellent Astro photos, even with a standard kit lens. Remember to set your camera to manual mode and to turn auto focus off. Depending on the amount of zoom, an exposure of up to 30 seconds can be taken before stars will start to trail.

Pleiades Rising.



Andromeda and Cassiopeia.



Plough.



Super Blue Moon.



Aurora at Alta, Norway.



DSLR on Driven Mount.



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Milky Way taken with DSLR on Tracking Mount.



Using a Tracking Mount will enable increased exposure times.

Piggyback.



Eyepiece Projection.



DSLR cameras are not ideal for imaging Planets. However, using Eyepiece Projection, reasonable results can be obtained.

Jupiter, Eyepiece Projection.



Clip-in Filters.

Starting from £59.00, these can help overcome the effects of light pollution. More expensive Narrowband filters can enhance images of emission nebula, for example.



A Few images by Ian Hastie.

**All taken with Canon 1200D and Astronomik Clip-in CLS Filter
Samyang 14mm Lens.**

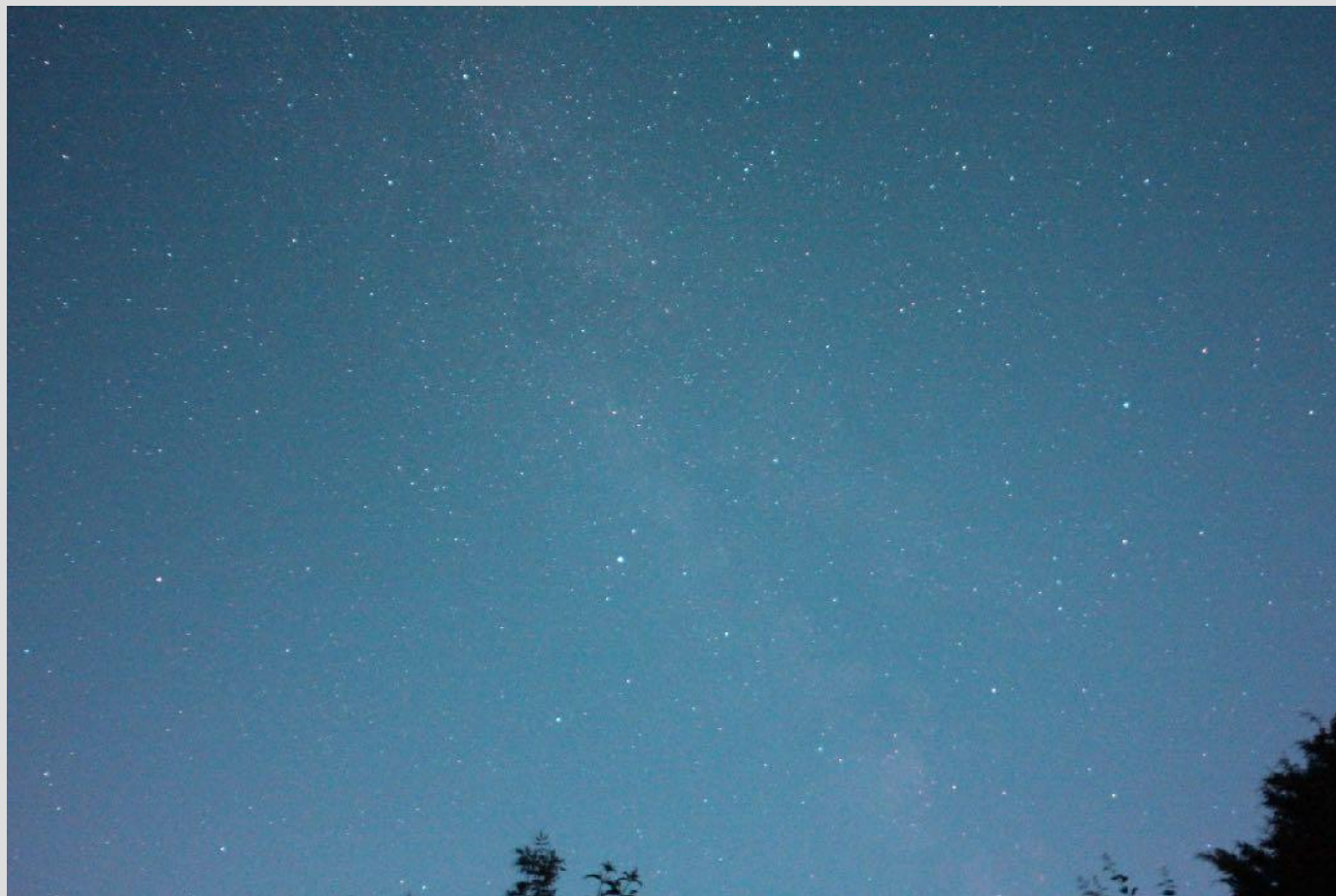
30 Seconds at ISO 3200



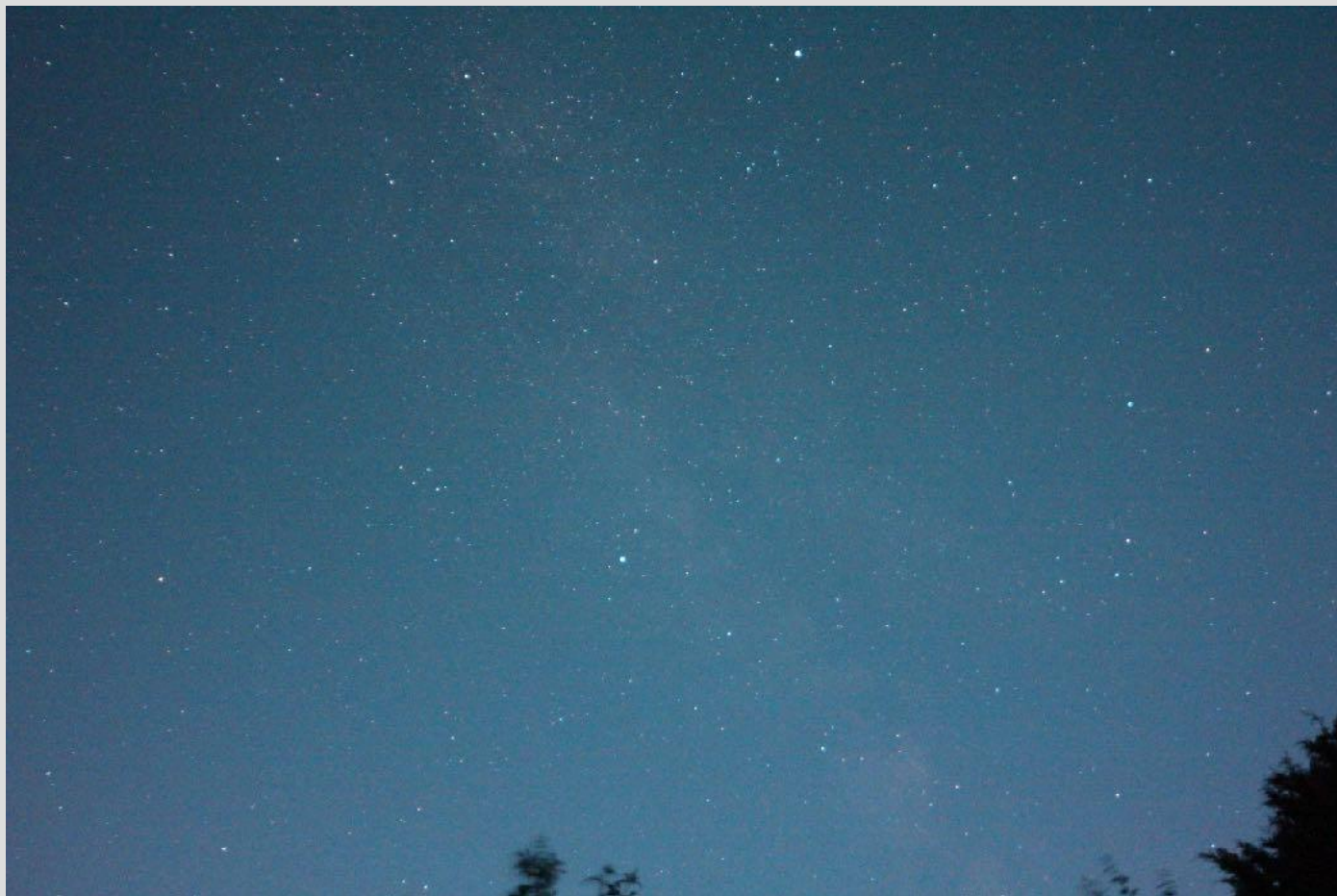
10 Seconds at ISO 6400.



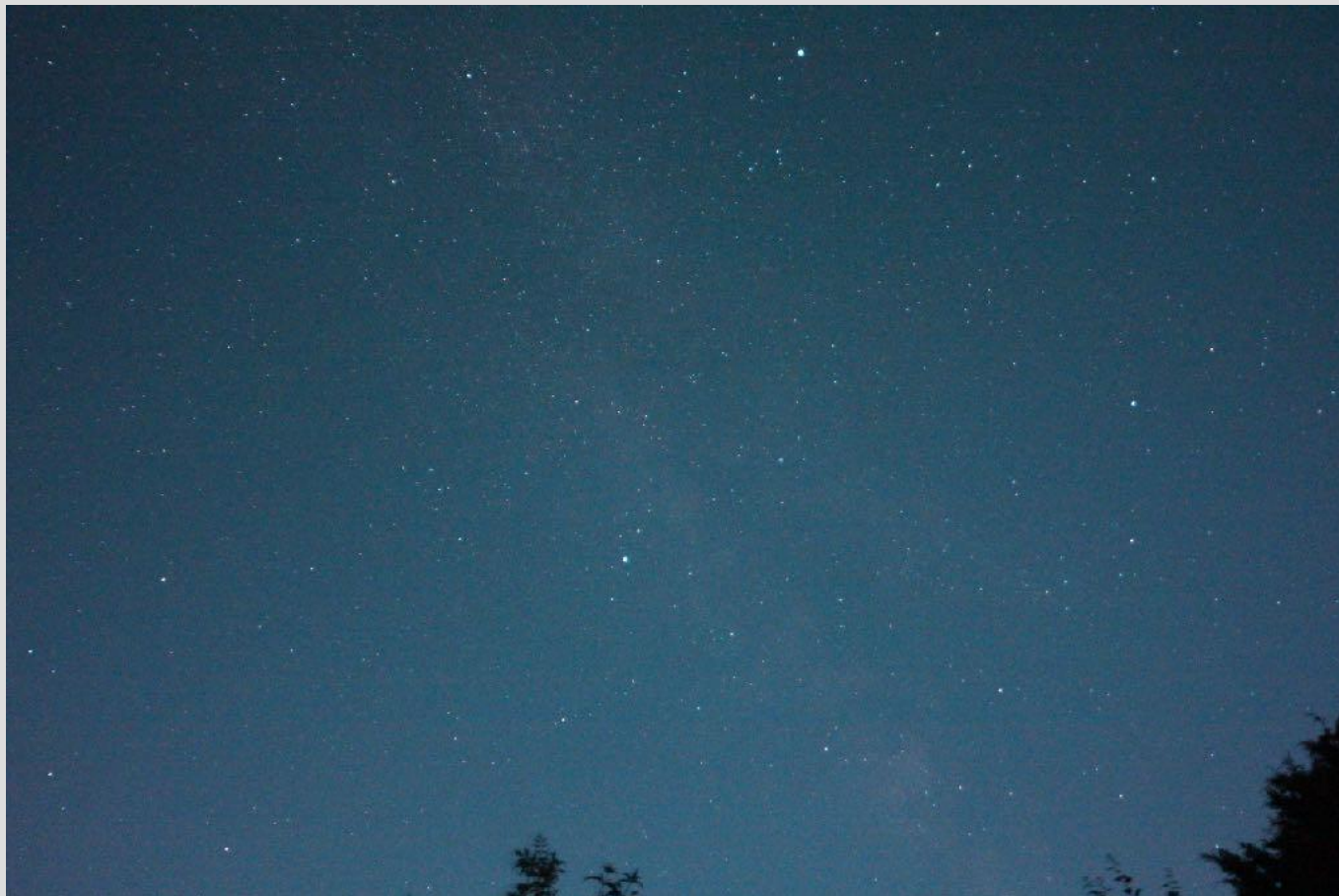
30 Seconds at ISO 6400.



20 Seconds at ISO 6400.



15 Seconds at ISO 6400.



Prime Focus.

By connecting the DSLR Camera to the Focuser, the Telescope becomes, in effect, a large lens.



Use a T-ring and T-adapter to connect your DSLR to a scope

M31 at Prime Focus.

M31 taken with a Canon 1200D DSLR through a 80mm Refractor and HEQ5 Mount. Two minutes at ISO 800.



M31 Processed.

5x 2 minute images, with added dark frames, stacked in Deep Sky Stacker and processed in Photoshop Elements.



Processing Software.

There is a range of software available for processing Astro images, some free, some not!

Stacking Software.

Deep Sky Stacker. – Free.

Registax. – Free.

AutoStakkert! – Free.

Image Editing Software.

GIMP. – Free.

Photoshop Elements. – about £80.00.

Photoshop Creative Cloud. – about £10.00 per month.

Pixinsight. – about 230 Euros, after 45 day free trial.

Send in your Images!

We are always looking for images to publish in our Newsletter or to display on our website. It is not a competition, participation is all that matters. Also, we would like images for our Facebook page.

Newsletter : - Martin Richmond-Hardy. news@oasi.org.uk

Website : - James Appleton. info@oasi.org.uk



Orwell Astronomical.

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Also, big thanks to John Wainwright and Ian Hastie, who provided the “props” used in this workshop.

End of Show, thank you for your time!

