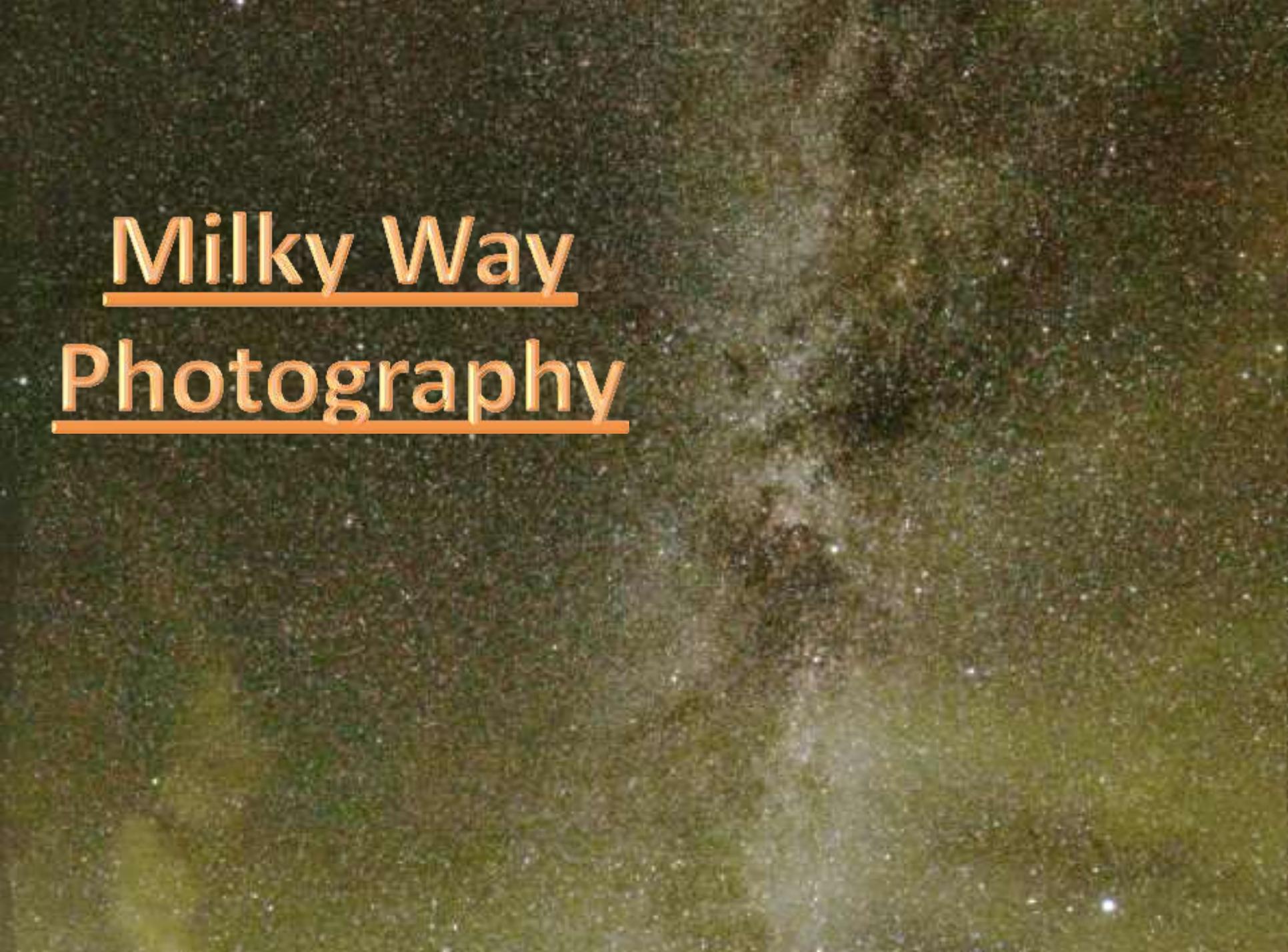


Simple Milky Way and
Supermoon imaging
with a DSLR and tripod.

David Murton

A photograph of the Milky Way galaxy, showing a dense band of stars and dust stretching across the sky. The stars are concentrated in a bright, whiteish-yellow band that curves from the upper right towards the lower left. The background is a dark, deep greenish-brown color, with scattered individual stars of various colors and sizes.

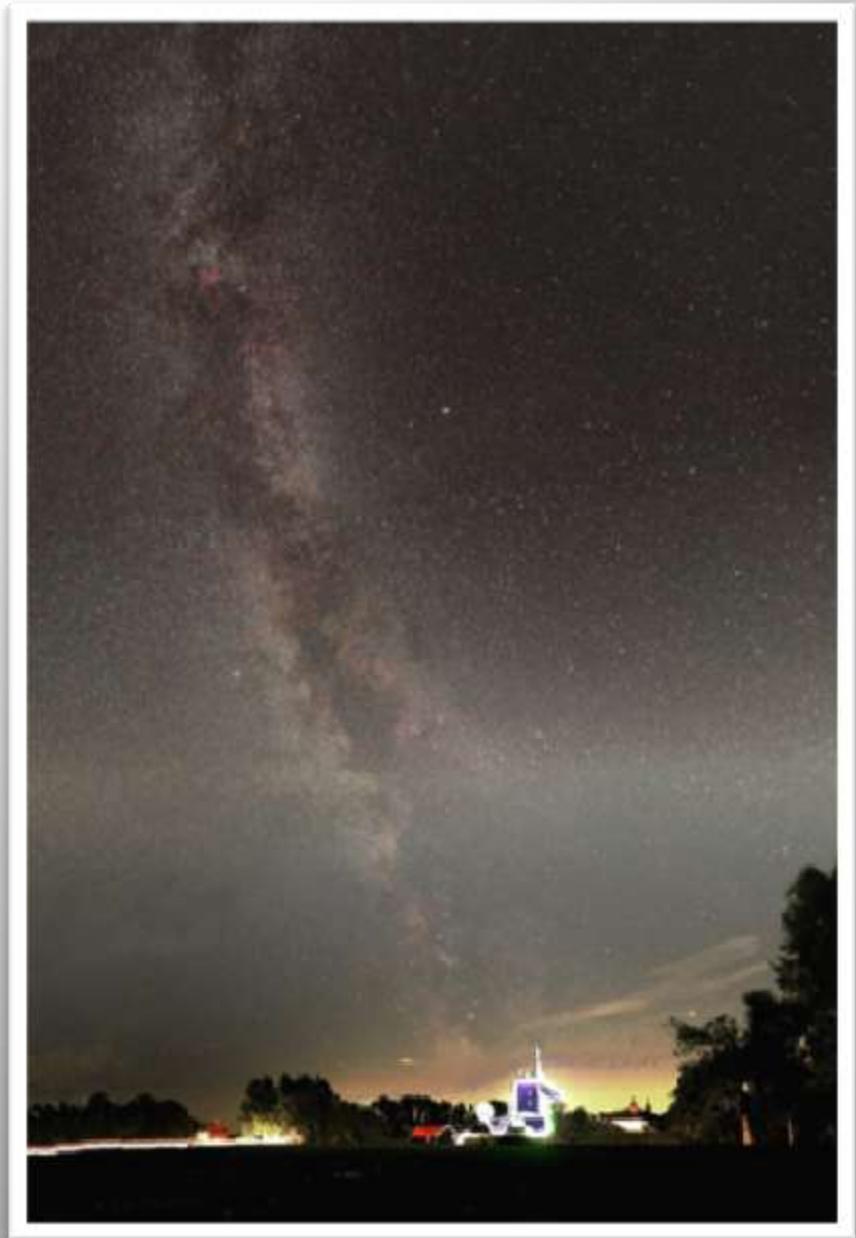
Milky Way Photography

The Milky Way

- The Milky Way is one of nature's greatest spectacles.
- It looks like a band of white light stretching overhead but has never been seen by many people who live under streetlights.
- It is formed from the light of millions of stars in our galaxy (the Milky Way) which are too far away to be seen individually.
- With modern digital cameras, it is surprisingly easy to take photos of and I hope to show you how.

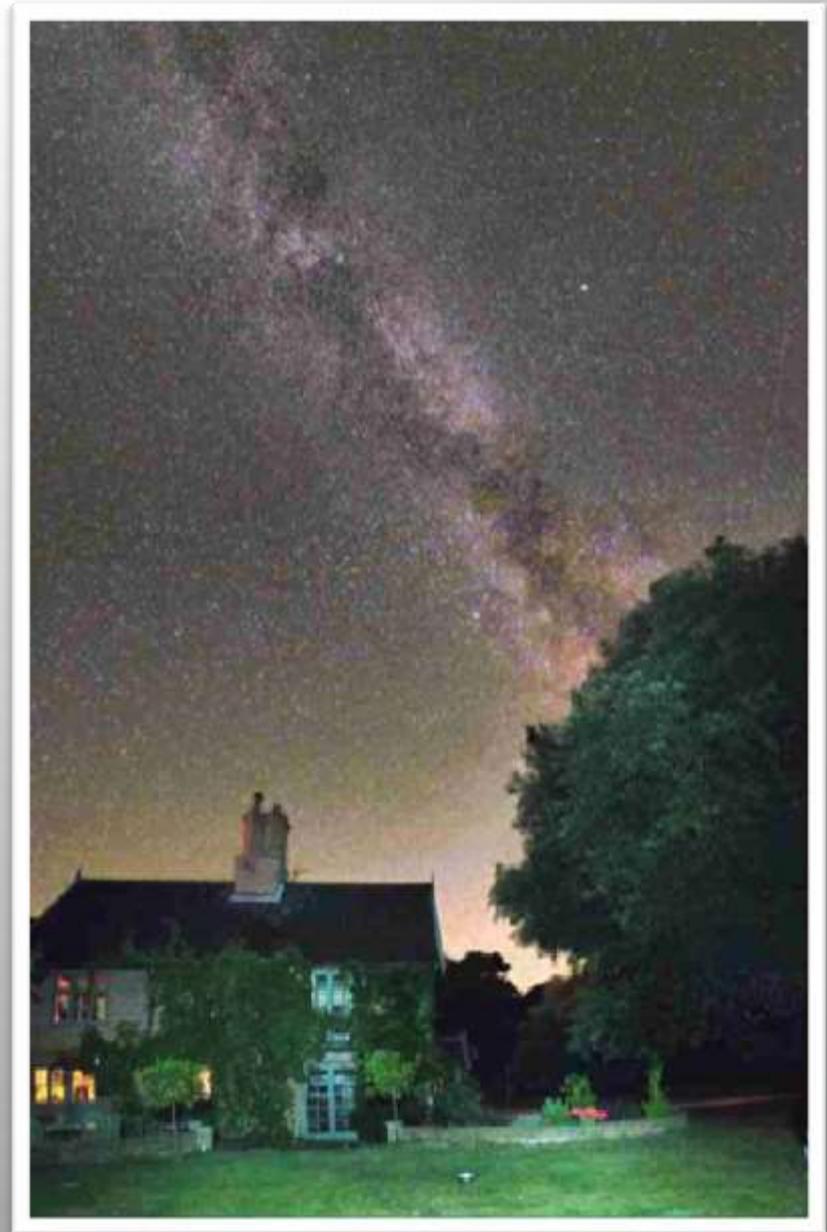
Basics

- Suitable for DSLR cameras only
- Auto mode is not an option!
- Best in Summer/Autumn on a moonless night
- North /South aspect
- Southerly view best
- Get away from light pollution
- Needs a tripod or similar
- Use a remote shutter release or the camera's self timer



Essentials

- Focus is everything!
 - Autofocus in daylight then select manual focus and tape up focusing ring.
- Use the widest angle lens possible
 - Wider view and less star trailing.
- Open lens aperture as far as possible.
(or one stop closed if lens is fast enough).
- Exposure times of 20 to 30 seconds depending on the lens focal length.
- Set ISO to 1600 or 3200
- Turn off long exposure noise reduction if you intend to process the images.



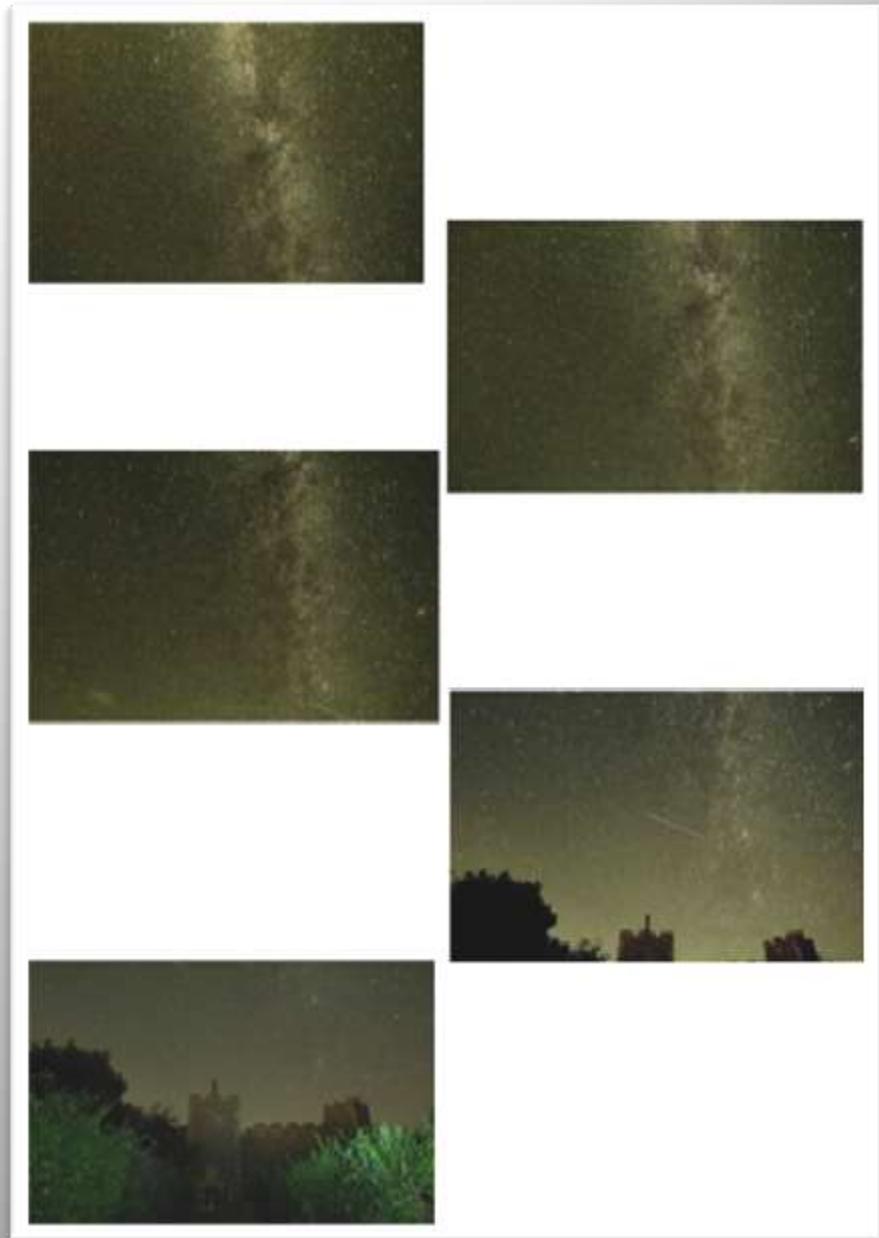
Composition

- Best to include a foreground object.
- Foreground can be “painted” with a torch or a flash gun.



Mosiacs

- Multiple pictures can be taken and joined in a mosaic using software such as Microsoft ICE to get a wider field of view.
- Use a tripod with a panning head.
- Allow plenty of overlap between frames. (at least 25%)
- Can be joined vertically and horizontally (or both!)





Stitch

Camera motion:
Rotating Motion

Crop

Reset crop Automatic crop

Left: 93 Top: 83
Right: 6910 Bottom: 5878
Width: 6817 Height: 5795

Export

Format: JPEG Image

Options: Quality: 80

Create JPEG thumbnail

100 pixels in longest dimension

Scale: 100 %

Width: 6817 pixels

Height: 5795 pixels

Total: 39.5 megapixels

Export to disk...

Publish to Web...

[What's this?](#)

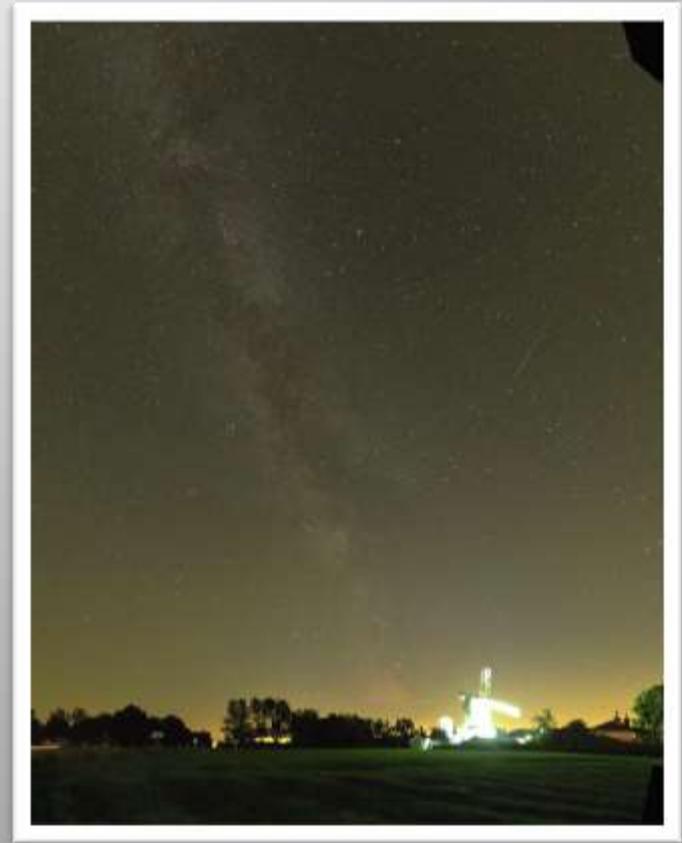
Camera motion type: rotating motion. Projection: vertical cylinder. Stitched 5 of 6 images. Spans 90.3° horizontally, 97.4° vertically.

Exit

Single frame

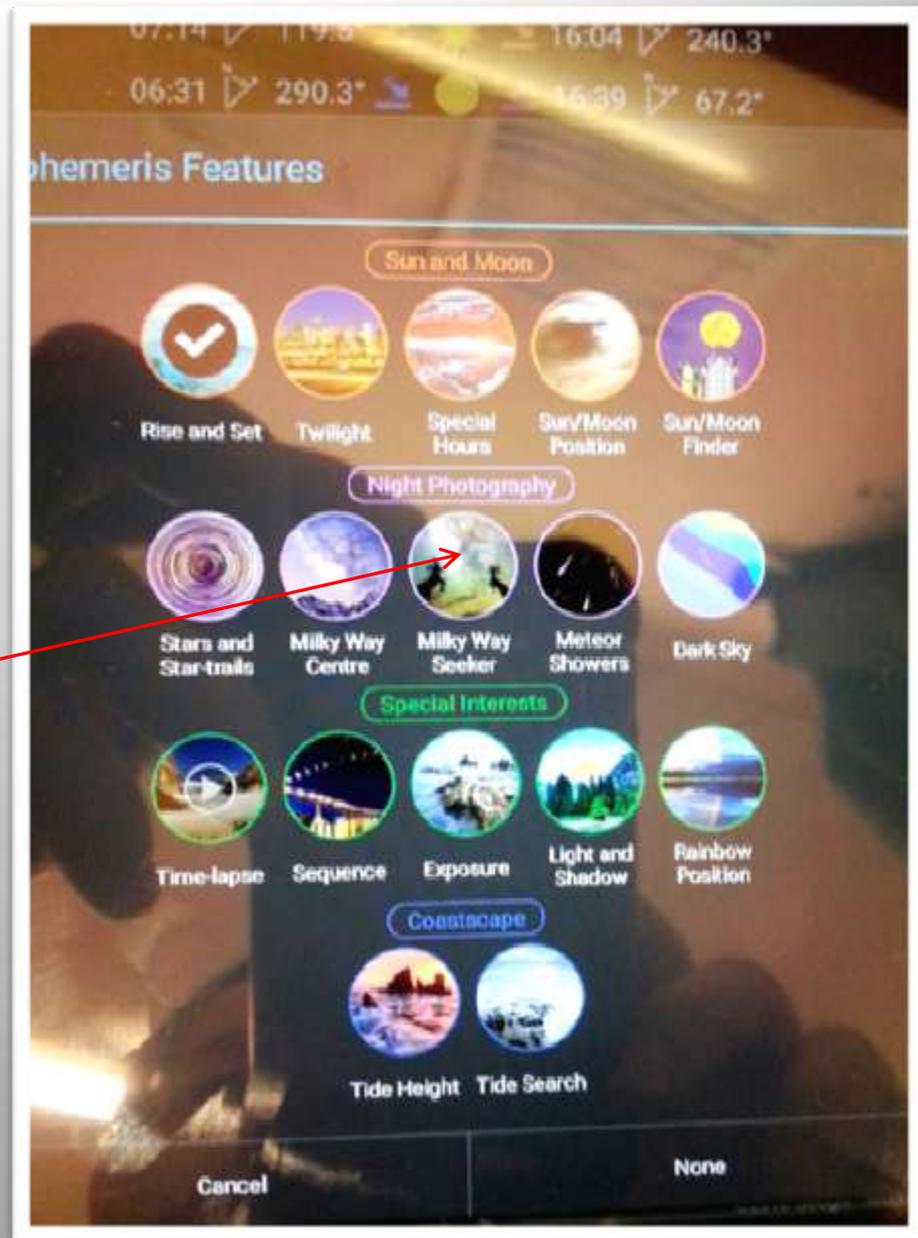


Stitch of 5 frames



Planning

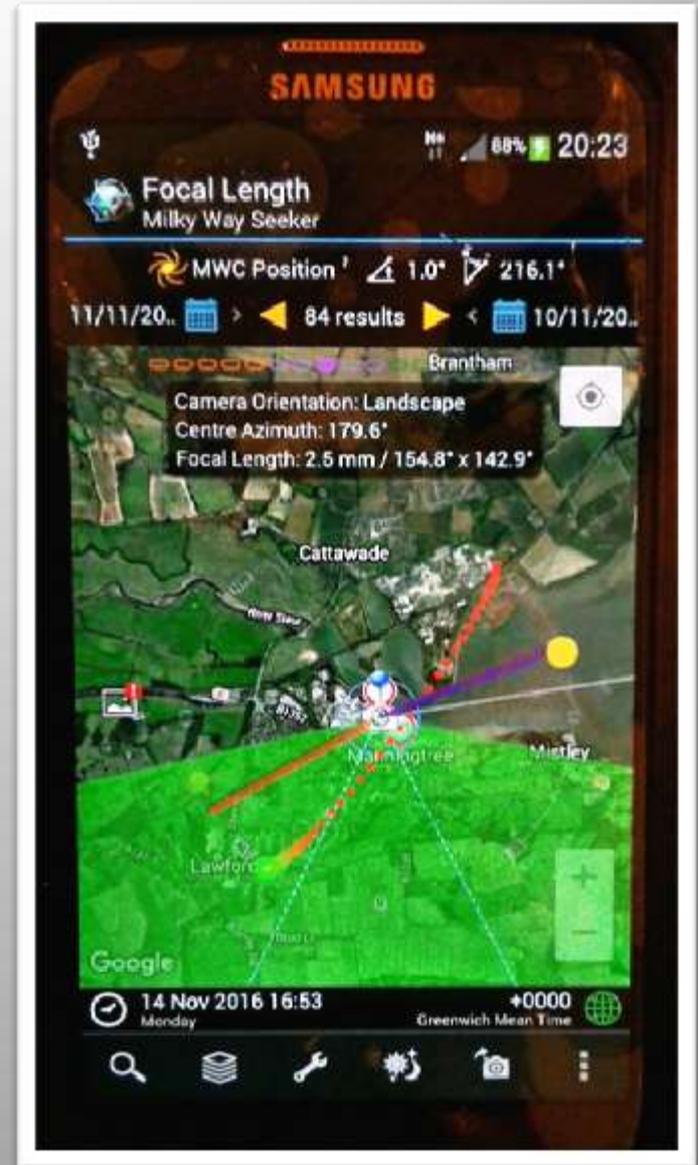
- If possible plan your shots beforehand.
- I use a phone/tablet application called “Planit! for Photographers”.
- This shows the position and orientation of the Milky Way at any given time and location.
- Uses Google maps and street view with overlays for the milky ways position.





Location

Milky Way position



Moving On

- A lower ISO setting or a smaller lens aperture will help to give a better quality picture.
- However either of these will require longer exposures .
- This will make the stars trail into lines rather than spots of light as the earth's rotation makes them move across the sky.
- To prevent this you need some form of tracking mount that is aligned with the pole star and follows this rotation.
- However this will blur foreground objects so you will need separate exposures for this and blend them in during processing.



Processing

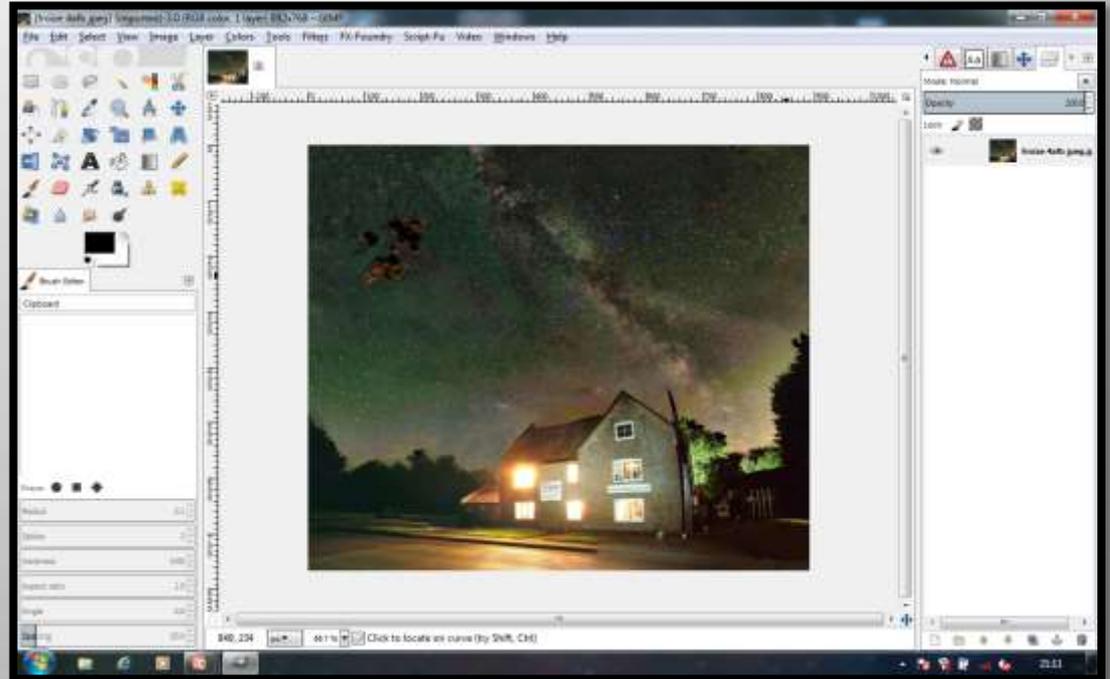
•Your images can be transformed with careful processing. Use a programme such as photoshop or the freeware GIMP which is very similar and is the one I use.

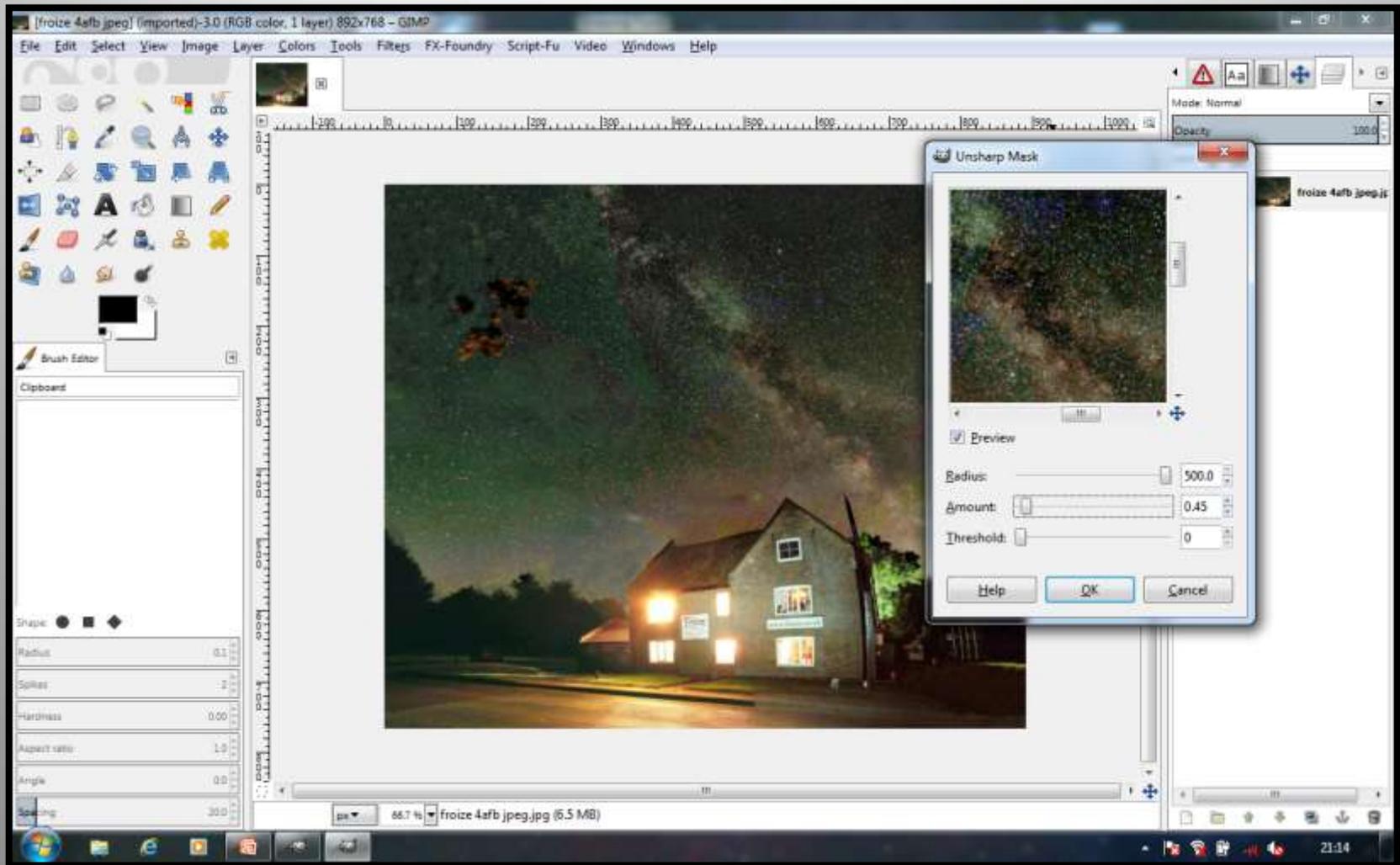
• Handy tools to apply include:

- Stretching using levels
- Selective stretching using curves
- Noise reduction
- Blurring using a Gaussian Blur
- Sharpening
- Colour Balance
- Selective editing
- Cloning to remove aircraft, etc
- Reducing colour cast from light pollution.

AND

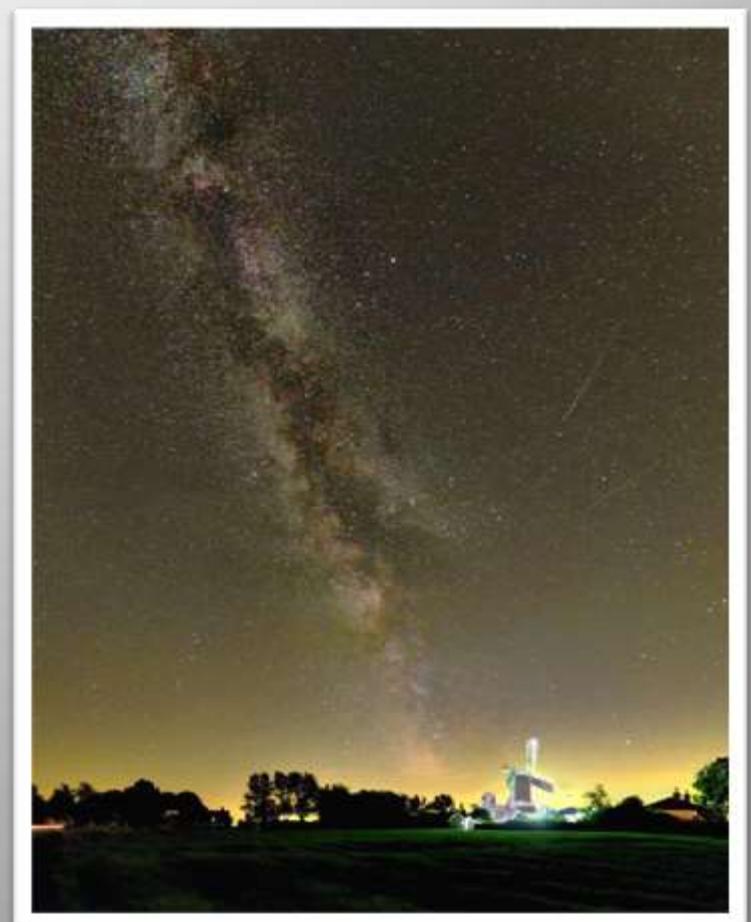
•The wonderful unsharp mask tool.





Which can turn this

Into this!



Remember!

- Always shoot at least in RAW format to get the full amount of data to process. When stretching images you need the greatest BIT depth possible to give the maximum number of tones to stretch.
- Use a tripod / beanbag or some other form of camera rest.
- Use a remote control or use the cameras self timer to open the shutter.
- Experiment with ISO settings, apertures and shutter speeds as they all affect the brightness of the image and are inter-related
- Use the “high ISO noise reduction” function on the camera if you don’t intend to stack pictures or process RAW files.

Remember focus is everything!

- Modern lenses nearly all go past infinity. If you can, focus on something using autofocus when it is light then de-select it and tape up the focus ring (but beware of some zoom lenses which rotate the focusing ring when zooming).
- If focusing at night, use magnified live view for focusing, but don't leave it on too long, as the sensor will heat up and may interfere with the image. If using exposures of between 1:10 and 10 seconds however, live view will help to prevent mirror vibration if you don't have a mirror lock on the camera.)
- Autofocus will not work at night.
- Stopping the lens down one stop from fully open helps to give a sharper image and increases chances of being in focus.

*Set the colour temperature at 4000k or less to minimise orange light pollution colour cast. (Try incandescent or fluorescent light pre-sets) or use a light pollution filter.

- Always carry spare batteries.
- Cold weather gives less digital noise from the sensor, but, uses up batteries quicker.
- All digital cameras record EXIF data along with the picture.
- If you have a tracking mount, Long, low ISO exposures are generally better than short, high ISO ones. (Less digital noise).
- Always cover the viewfinder when taking long exposures using the
 - rubber cover attached to the strap.

- Use the “400 rule” ($400/\text{focal length of lens}$) to check the maximum exposure time to prevent trailing, (however see below)
- Stars move faster nearer the horizon than they do overhead.
- The maximum exposure time to avoid stars trailing using a wide angle (18mm) lens is 30 seconds. The longer the focal length the shorter the possible exposure.
- Any lens longer than 20mm will really require a tracking mount to give acceptable results.
- Watch out for condensation on the lens. This can be prevented by heat (dew heaters or hand warmers) or air circulation (portable hair dryer or fan).

- Try to include some foreground objects to make the picture more interesting.
- Foreground objects can be “painted” in using the flash or a torch.
- Photos can be taken as one long exposure, or “stacked” from several using suitable software.
- If stacking frames, either take separate dark frames or get the camera to take one automatically to prevent coloured “hot pixels” and “glow” from the sensor.
- Experiment with the software supplied with the camera (digital photo professional for Canon), or download GIMP (freeware) and have a go at improving the images.

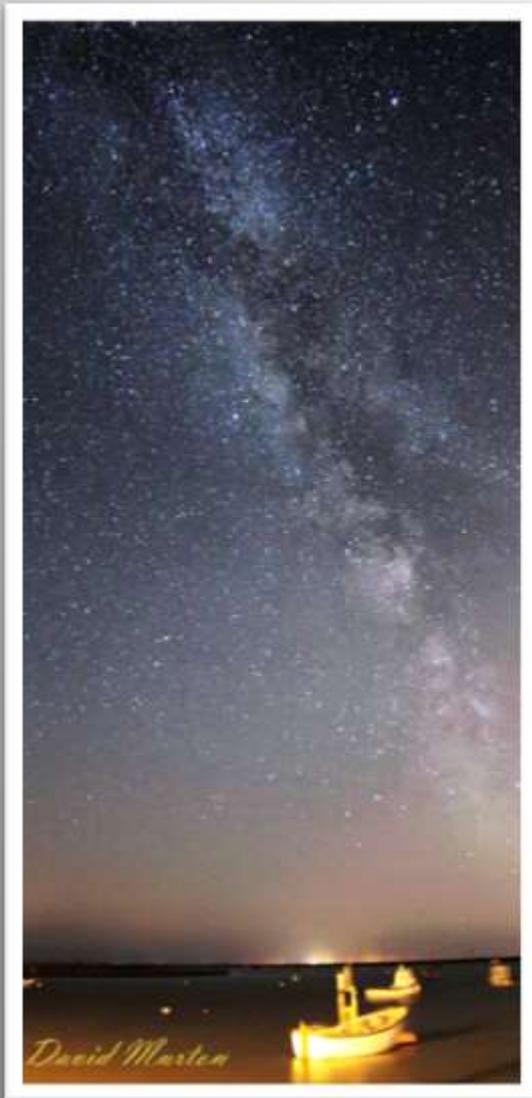
* Good settings to start.

- Widest angle lens
- Aperture 1 stop in from fully open
- ISO 3600 / 1800
- Exposure 20 to 30 seconds.

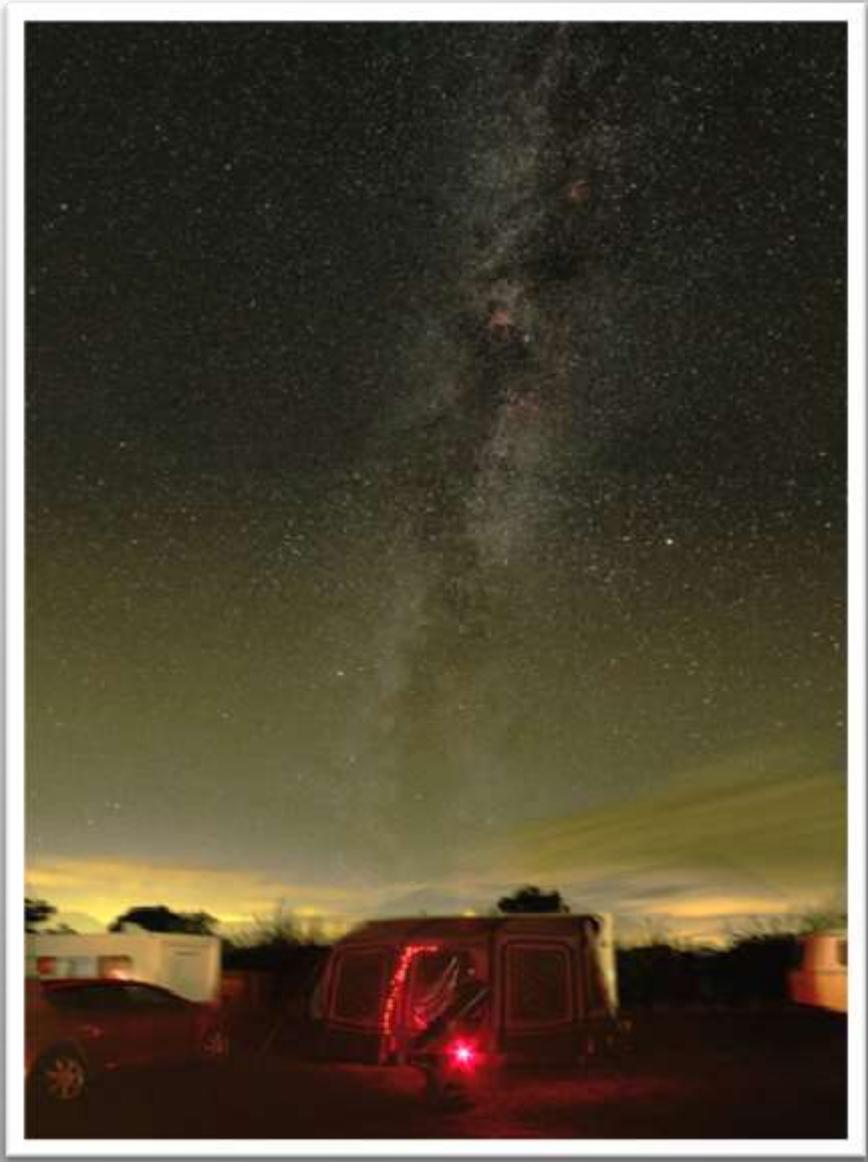
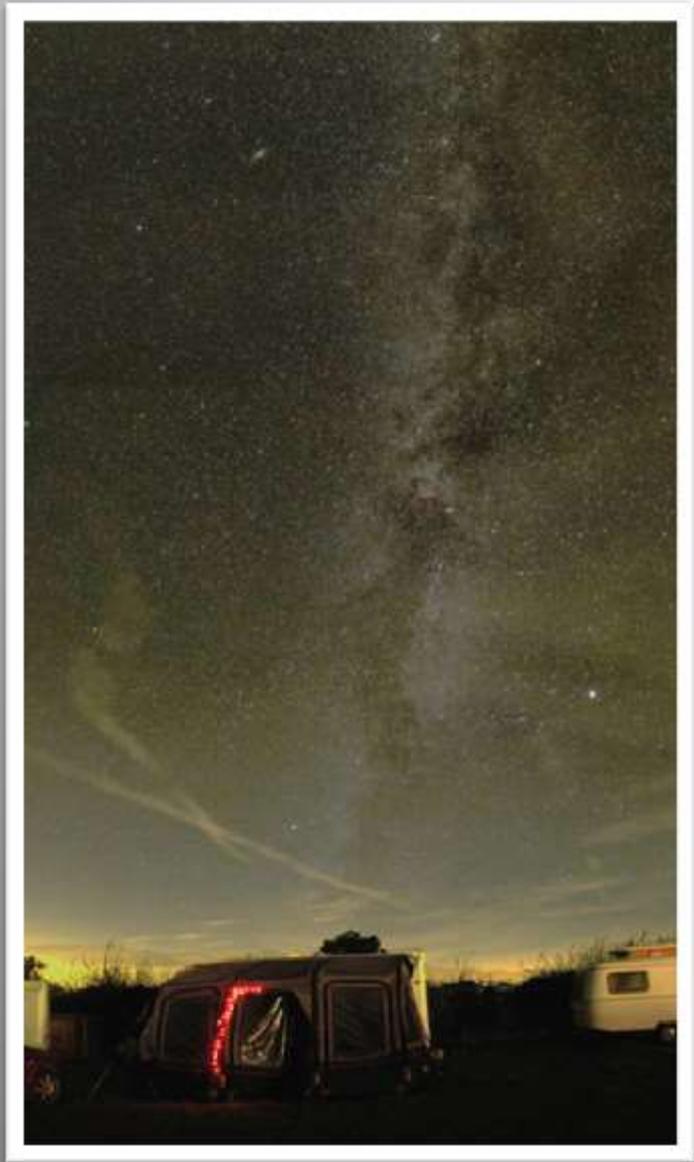
If you want to expand your horizons try making a barn door tracker (instructions on our website).

Lens wise the 14mm Samyang is fantastic value for money (£220-£250 second hand) and is used by many photographers for those wonderful Milky Way shots you see.

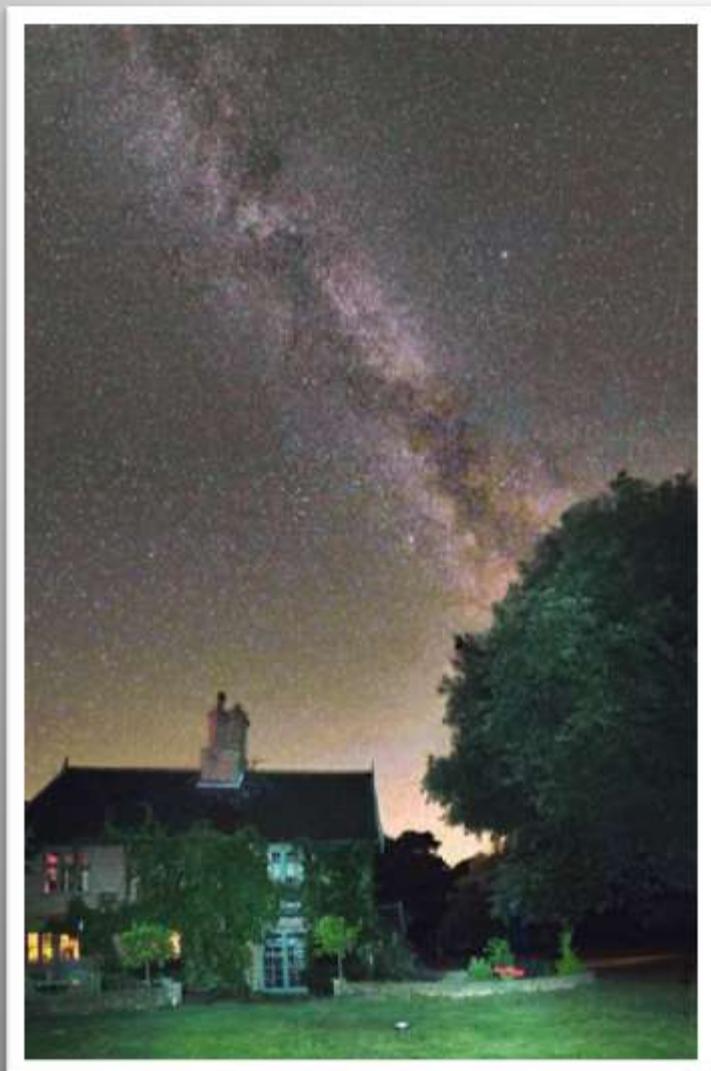
A few more examples

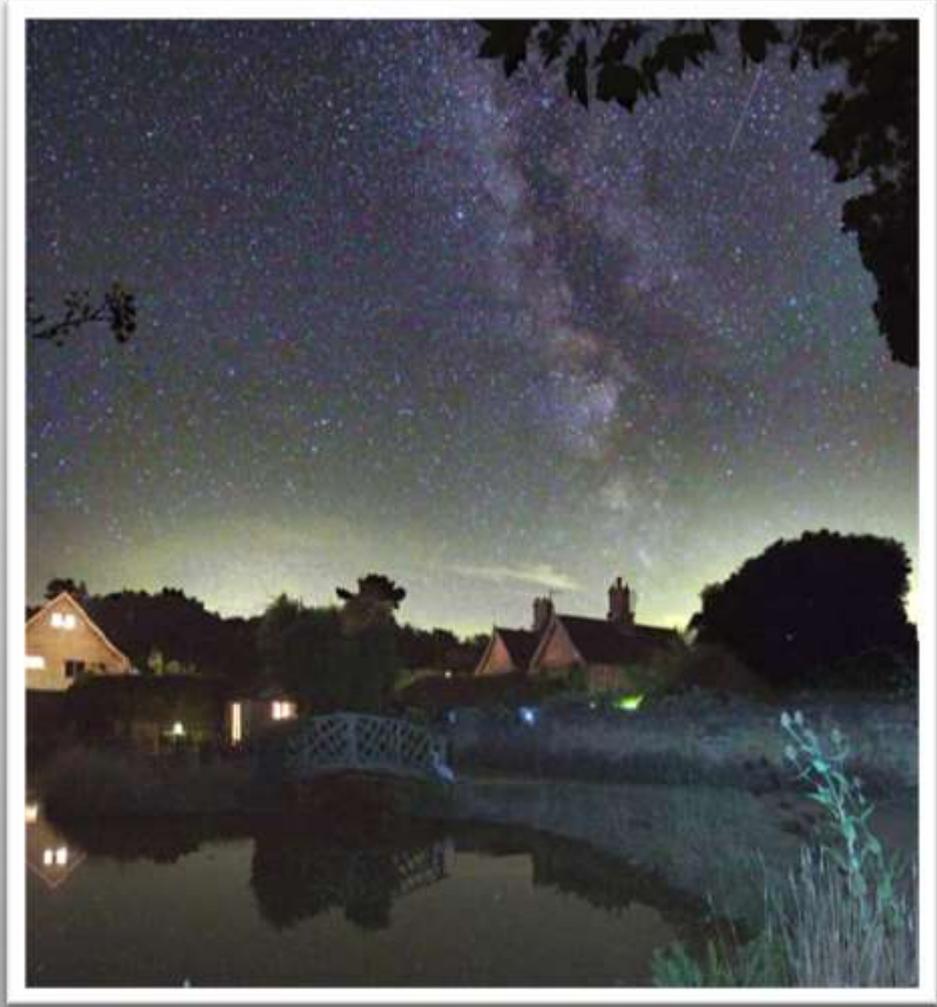
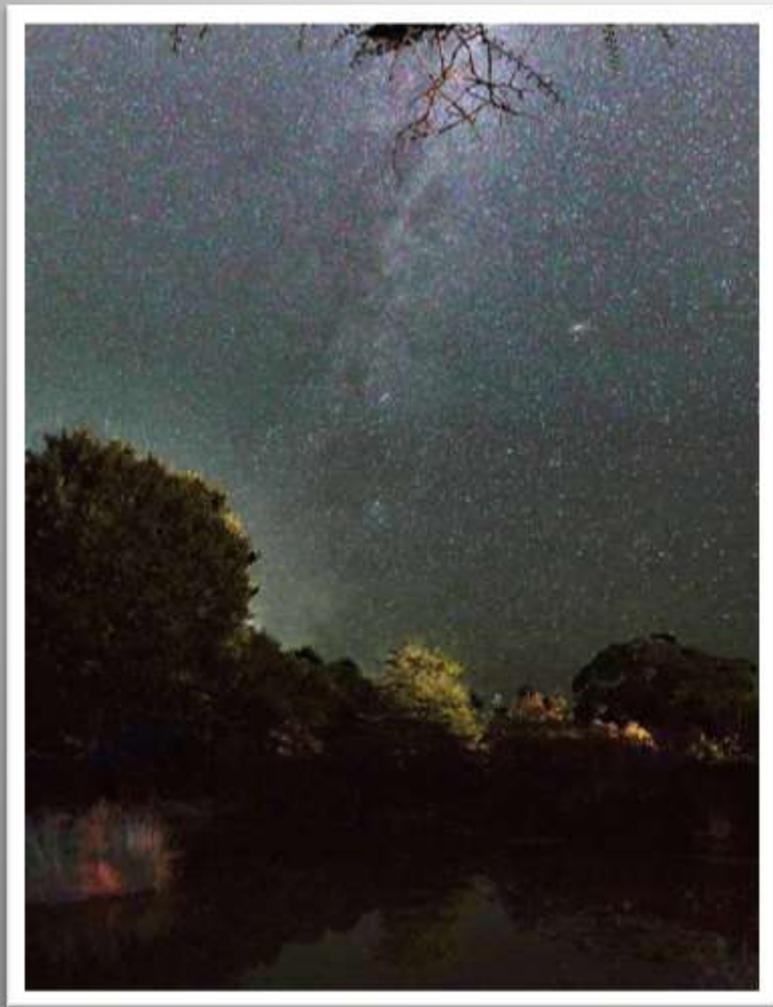






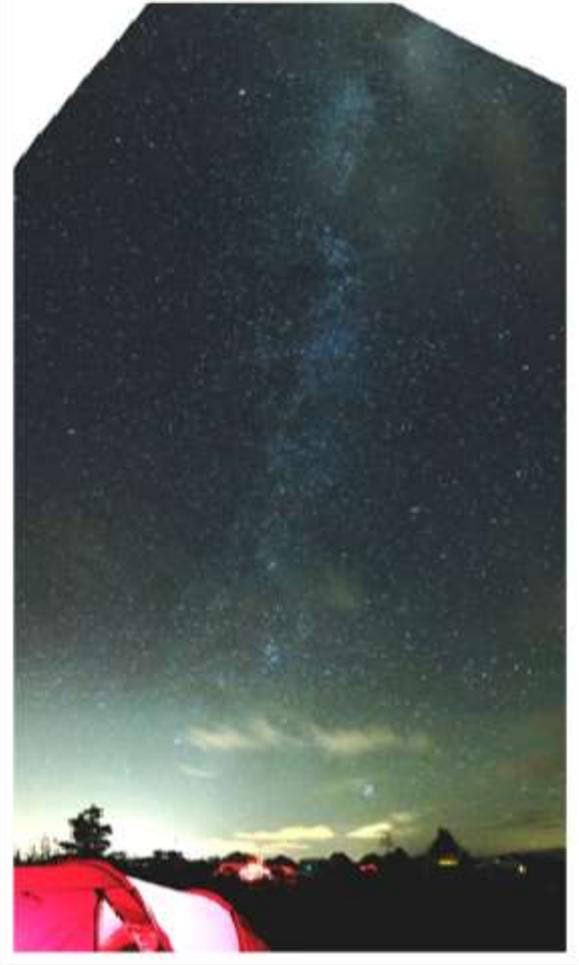








David Murton





SuperMoons!

What is a SuperMoon?

- Although the press hype up “SuperMoons” they are not actually noticeably larger than normal ones.
- When the moon is close to the horizon it appears to be larger than when it is high in the sky.
- This is an illusion that has never been fully explained, but is thought to revolve around it being seen behind terrestrial objects.
- However it is possible to recreate the effect with a camera.

Basics

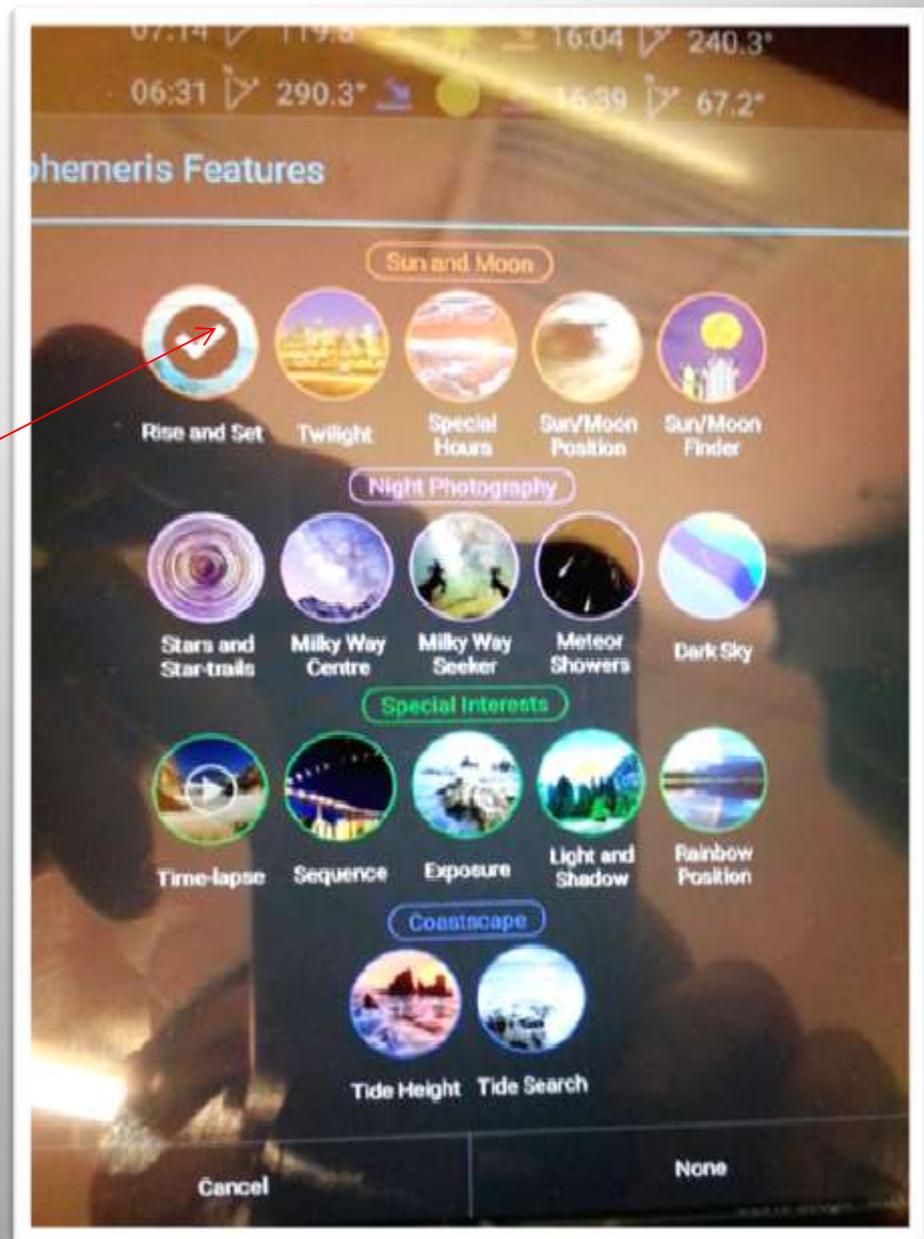
- Can be tried with DSLR or bridge cameras.
- Use the longest focal length lens as possible (or a telescope!)
- Try to include a terrestrial object in the foreground
- Have that object as far away as possible to exaggerate the effect
- Preferably have an illuminated foreground or ensure there is still some twilight in the sky as the moon will be very bright.

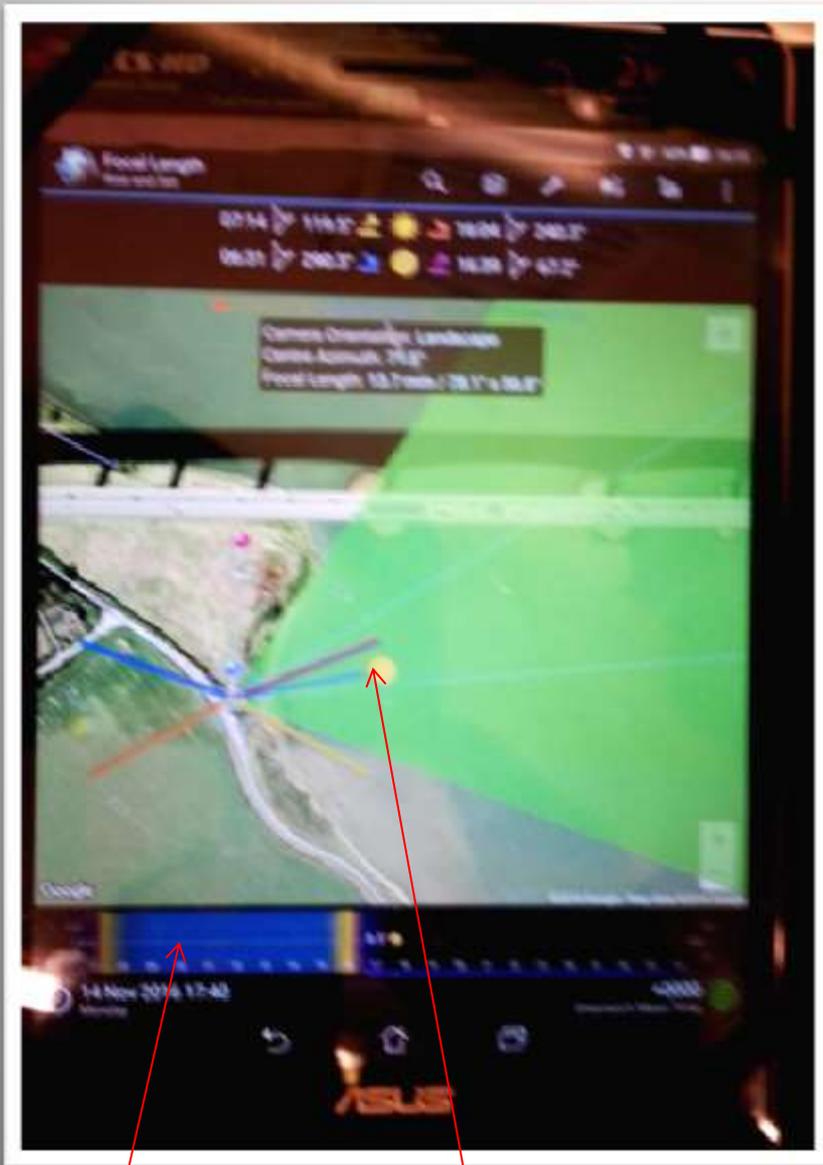


- The moon will move very quickly so only single shots are possible (no stacking)
- It is very easy to over expose the moon.
- If possible take separate shots exposed for the moon then the foreground and combine them when processing.
- Pictures can again be stitched if you are quick!



- Planit! Can again be used to plan your photo session.
- It can show when and where the moon will rise each night very accurately.
- Again uses Google maps plus street view.





Date and time slider

Moons position





Moons position
moves as time
slider is
adjusted

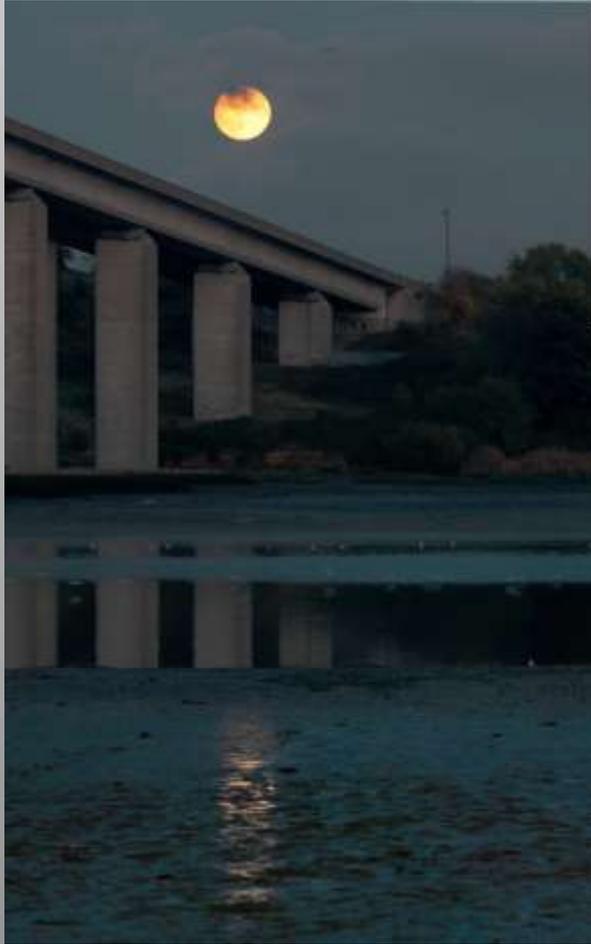
Examples











Wide angles can work too!

(again a mosaic of 16 frames using ICE)





The End!

Thank you for listening