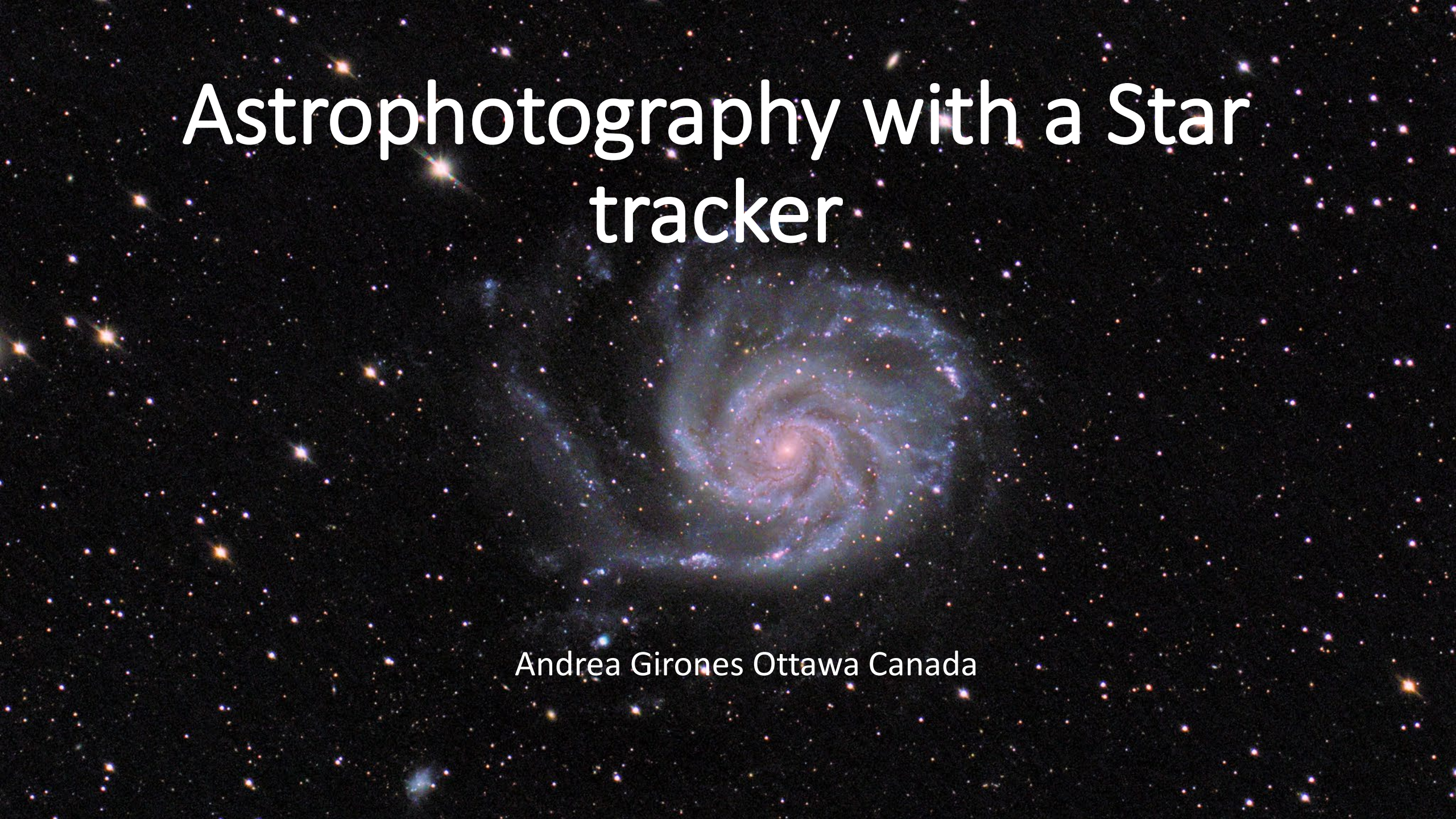
Astrophotography with a Star tracker



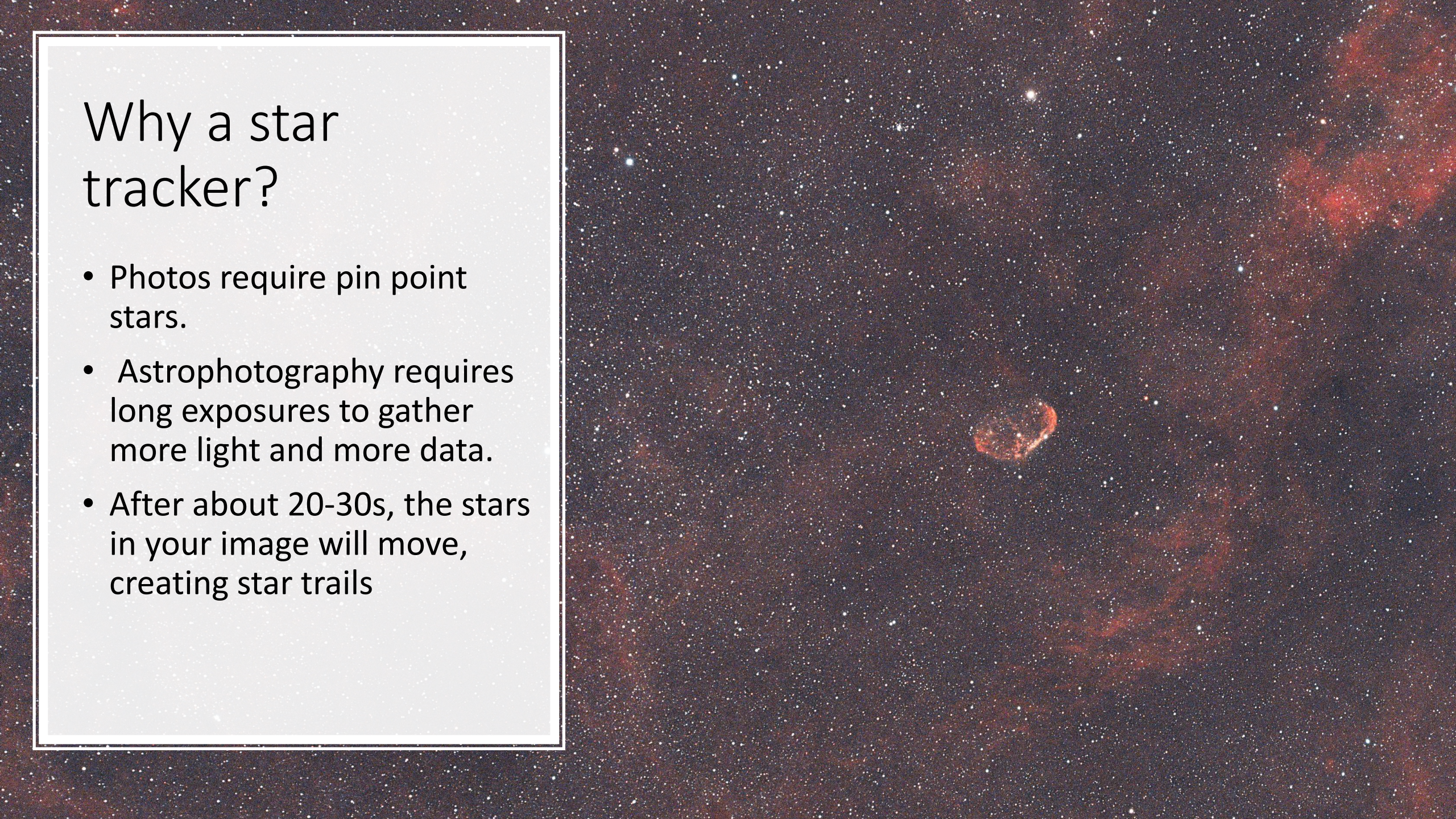
Andrea Girones Ottawa Canada

Seeing beautiful images around the Internet?

- TRACKING / STACKING is likely involved.
- A star tracker will track the motion of the sky and allow you to take longer exposures
- Free stacking software also likely involved
- Use camera equipment you already have (a DSLR or Mirrorless camera and camera lenses)

Why a star tracker?

- Photos require pin point stars.
- Astrophotography requires long exposures to gather more light and more data.
- After about 20-30s, the stars in your image will move, creating star trails




180s untracked

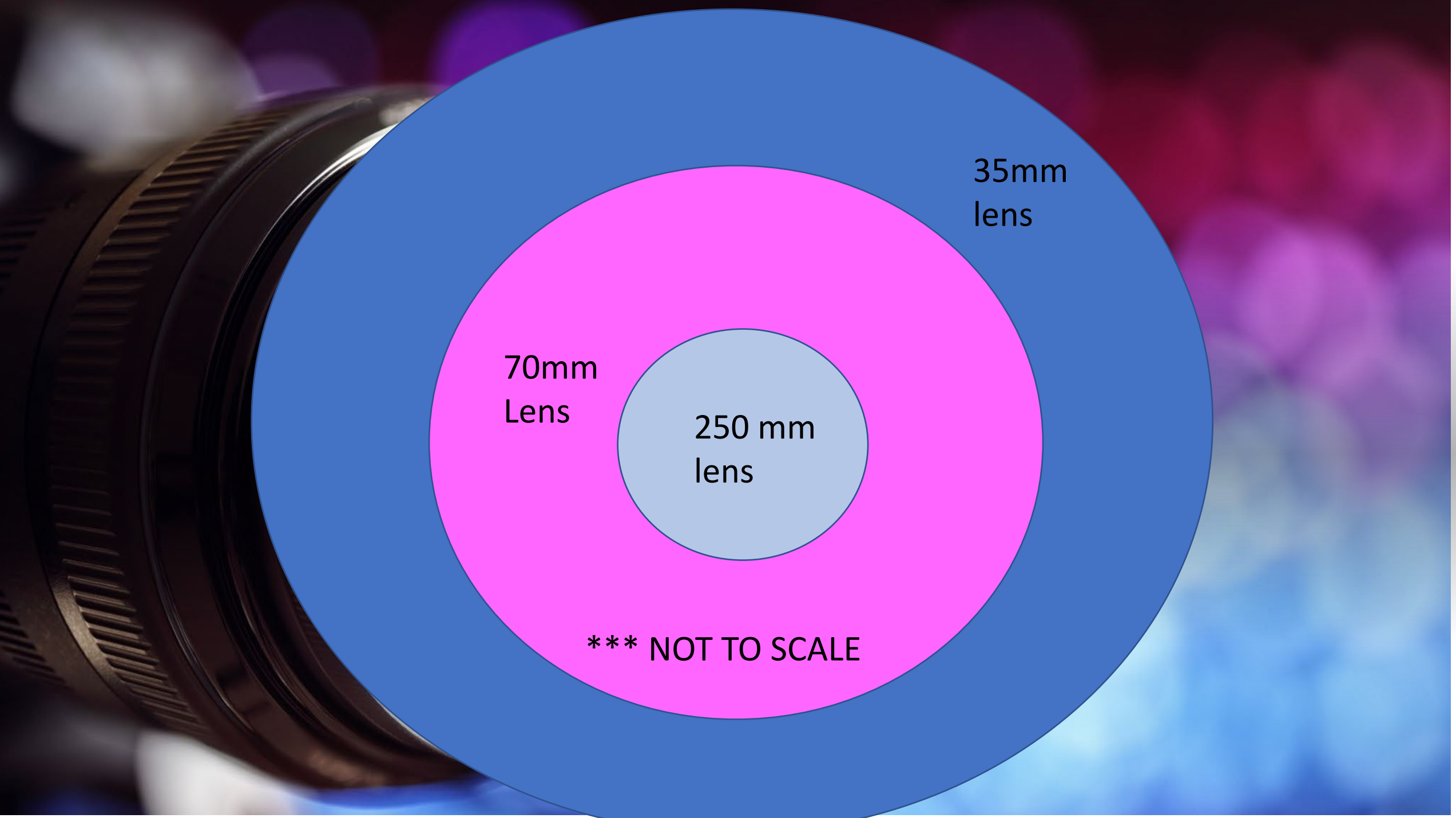

Tracking star
movement
10 x 180s
seconds
stacked with
post processing

Enter the star tracker

Skywatcher Star adventurer
iOptron Sky Guider
Move Shoot Move

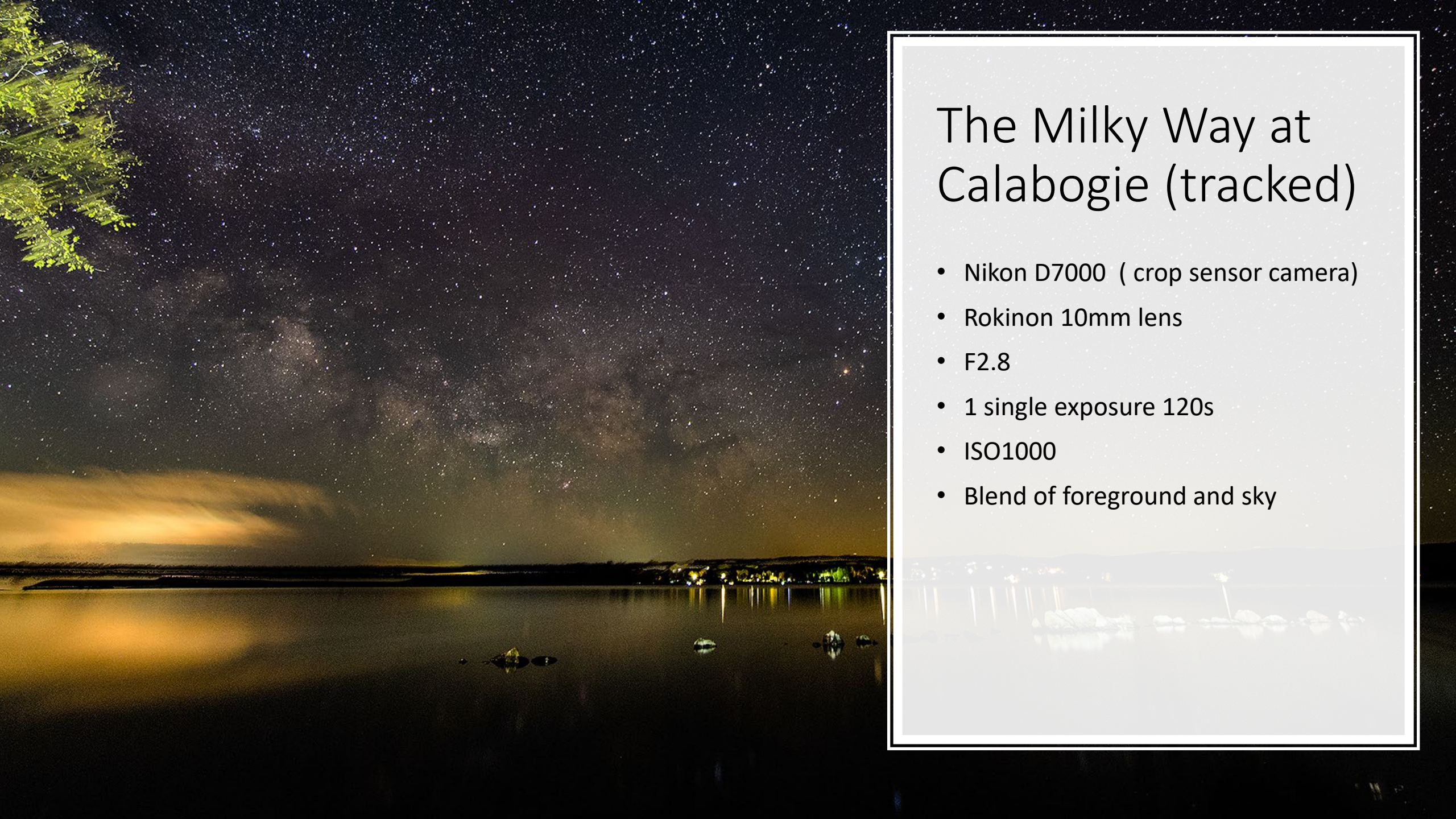
Step One – Assess your current camera equipment

- Your camera needs to be able to do long exposures
- You will need to access manual focus and manual aperture.
- You will need to have an internal or external intervalometer to program a series of shots such as
  - 20 x 180s
  - 60 x 60s
  - 200 x 30 s
- Different lens have different field of view


35mm
lens
70mm
Lens
250 mm
lens
*** NOT TO SCALE

The Milky Way

- Nikon D7000 (crop sensor camera)
- Rokinon 10mm lens
- F2.8
- 1 single exposure 20s
- ISO 3200



The Milky Way at Calabogie (tracked)

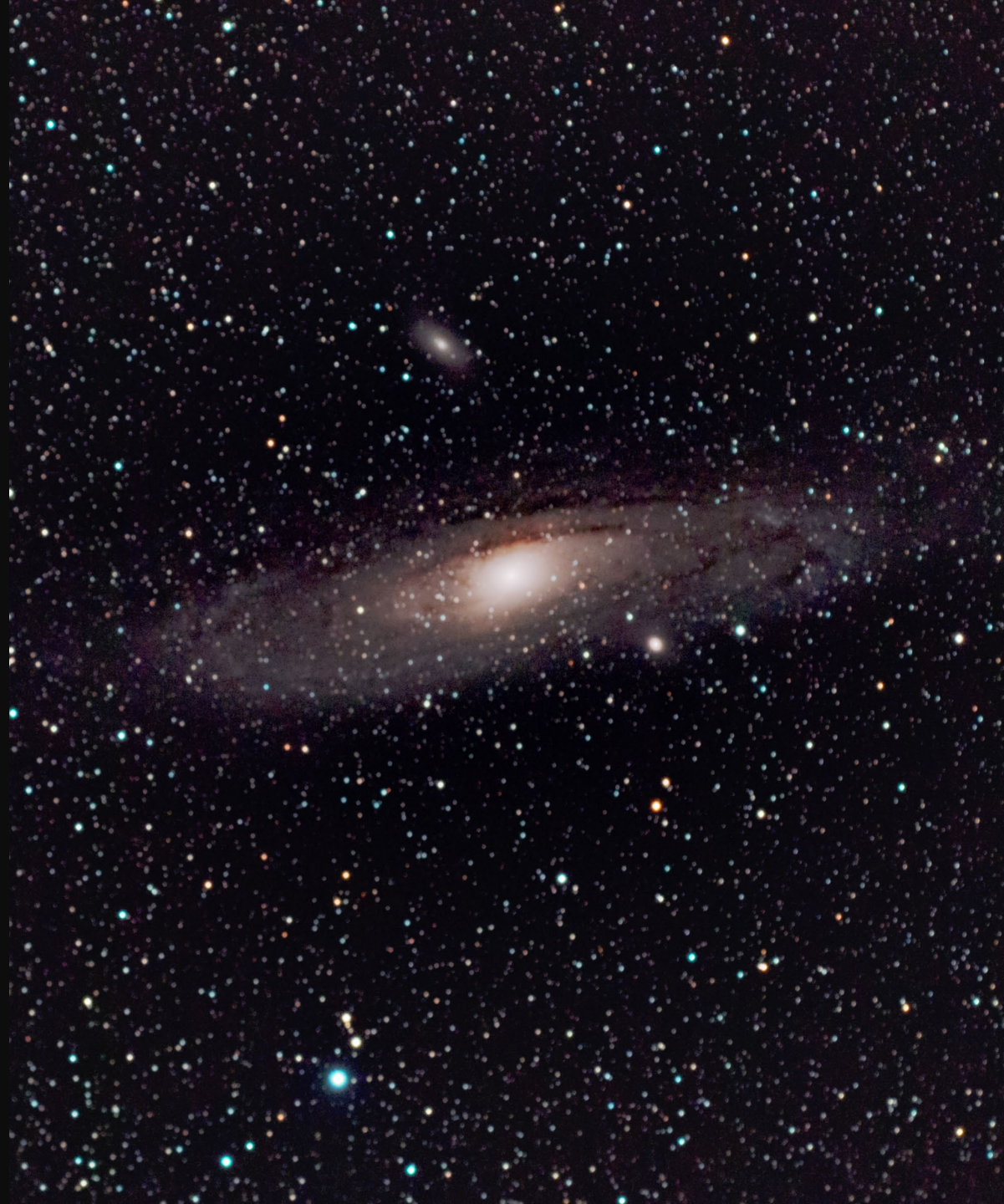
- Nikon D7000 (crop sensor camera)
- Rokinon 10mm lens
- F2.8
- 1 single exposure 120s
- ISO1000
- Blend of foreground and sky

The Orion Constelation

- Nikon D7000 (crop sensor camera)
- 50mm lens
- F2.8
- 10 x 60s tracked
- Stacked in Deep Sky Stacker

The Andromeda galaxy (M31)

- Nikon D7000 (crop sensor camera)
- 250mm Telescope
- 47 x 60s tracked
- ISO 1600
- Using the Star adventurer
- Stacked in Deep Sky Stacker
- Post processed in Photoshop

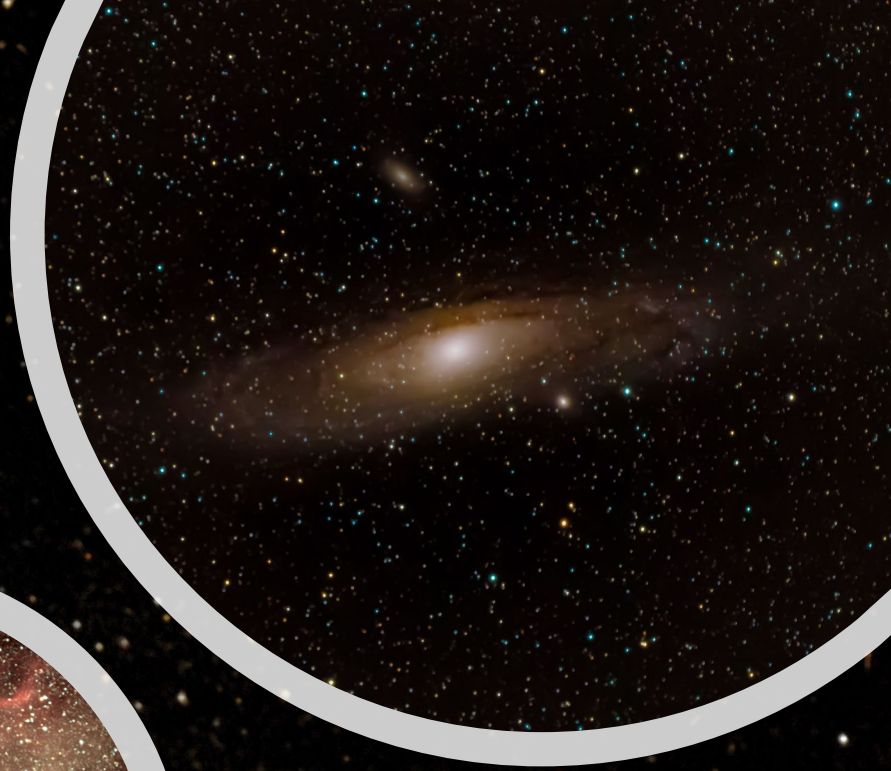


Step Two Select your target

- Pick a big bright nebula to start. In the summer Milky way there are many big bright objects
- Use websites like Stellarium and Telescopius to plan your image and find out how to star hop to your target
- This is critical to finding your target at night though a camera viewfinder
- Link to telescopius.com

Good Targets for Beginners -Summer

- The Andromeda Galaxy M31
- The North American Nebula NGC7000
- The Lagoon nebula M8
- The Veil Nebula NGC 6990

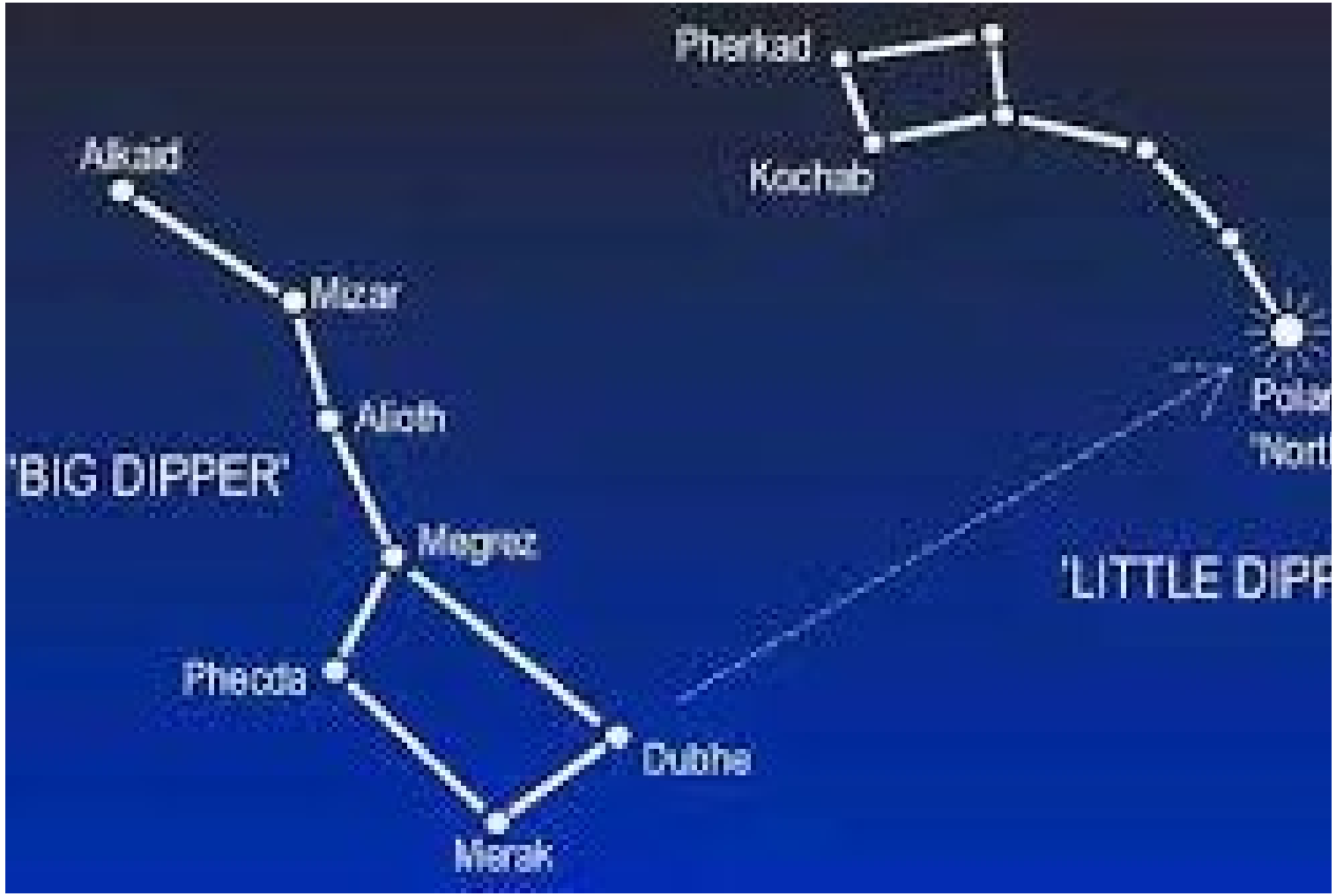


Good targets for beginners - Winter

- The Orion Nebula M42
- The Horshead Nebula IC434
- The Pleiades M45
- The Heart nebula IC1848

Step Three- Assemble the Star tracker & gear

- Star tracker motor
- Equatorial wedge- to polar align to the north star according to your latitude
- Ball head attachment or a bracket with a counterweight
- Intervalometer



Polar Alignment and finding your target

Step Four- Go outside. Polar Align your tracker. Find your target

- You must POLAR ALIGN the Star tracker
- FIND POLARIS, align it in your polar scope.
- Rotate your camera to your target.
- Take high ISO images to locate target
- This can take a LONG time. Possibly the hardest part with a star tracker.
- Turn on the tracker!!
- Then set your intervalometer, check every 5 shots or so.
- Click for video

Capturing the images is only the Beginning

- Next you must STACK the images using free software such a Deep Sky Stacker and Sequator
- You must process the images and STRETCH the histogram to reveal details in the darker parts of your image. You can use Lightroom, Photoshop,
- Usually have to adjust COLOUR as most cameras are biased to the green.
- There are MANY image processing tutorials

Further resources – Spend LOTS of time on Youtube

Peter Zelinka

Alyn Wallace

Further resources – Spend LOTS of time on Youtube

- Trevor Jones or “Astrobackyard”
  - Uses his DSLRs with telescopes
  - Urban astronomer
  - Canadian
- Dylan O’Donnell-Image Processing
- Image processing and techniques

Next step- Attach the camera to a telescope

- Telescopes tend to perform better than lenses
- Designed for low light situation
- Less chromatic (colour) aberration
- Flat field (less vignette)
- Sharp stars in corners
- Different mounting options, ability to rotate camera
- Easy to mount an AUTOGUIDER
- (most star trackers can guide in one axis RA)

Deep sky imaging

- Small refractor telescope
- Guide camera on top
- Astro camera (although you can use a DSLR as well)
- ASIAIR- controlled the camera and the guiding and later the telescope itself
- Much wider field of view than larger scopes
- Easier to guide and have good stars
- SECOND VIDEO go to Andrea's youtube channel


Wishing you all clear skies
Instagram
Andrea.Girones
Visit the RASC-Ottawa
Centre Facebook page for
Star tracker videos