

# Using Equatorial Tracking Platforms

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# ASTROPHOTOGRAPHY

# Tonight's Topics

- This is a Great Time to get started in astrophotography! ✨
- My Tracking Platforms & Gear
- Easy Polar Alignment
- Planning your Targets
- General Camera Tips & Adapters
- Shooting with a Camera Lens
- Shooting with a Telescope
- Processing your Images



# iOptron Tracking Platforms

(lots of options)

Portable Skytracker (7lbs)



SmartEQ (11lbs)



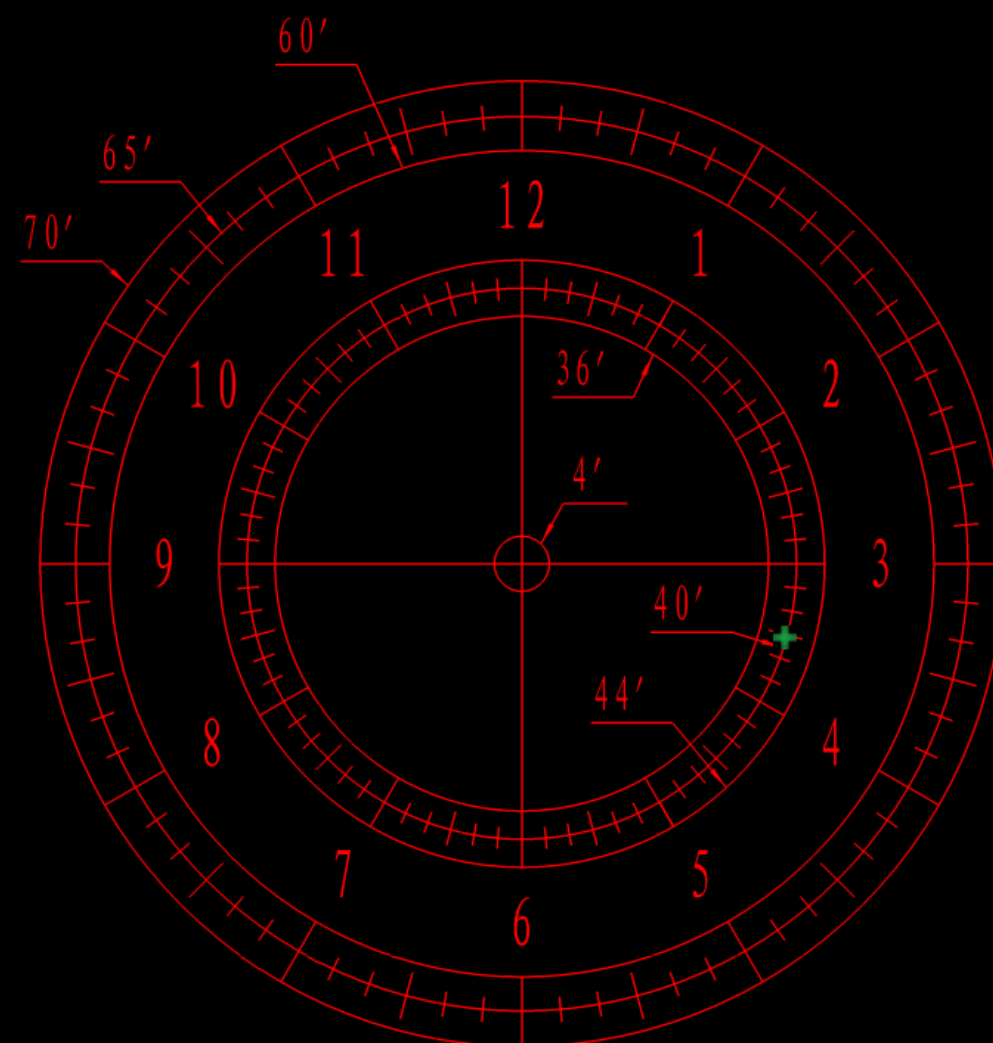
iEQ30 Pro (30lbs)



# iOptron Easy Polar Alignment for Equatorial Mounts



Local Time: 2016-03-06 20:43:54  
Longitude: 079°42'26" W  
Latitude: 43°29'45" N  
Barometric Pressure: 99736 Pa  
Elevation: 0155 m  
Position of Polaris: 03h 30.9m  
Radius: 39.8 min





**E-P5 m43 Mirrorless Camera**

**Camera Eyepiece  
T-Adapter**

**Dovetail  
Bar**

**Reducer/Flattener**

**Prime Focus**







**Inserts into 1.25"  
eyepiece diagonal**

**Cable Release**



# Setup and test your gear indoors!

Its a good idea to check the balance, cables, power and operation before heading to a remote site. This is the TV-85 sitting on the iEQ30 PRO and powered by the rechargeable iOptron Powerweight which is also a 7lb counterweight.







Find a nice dark sky if possible



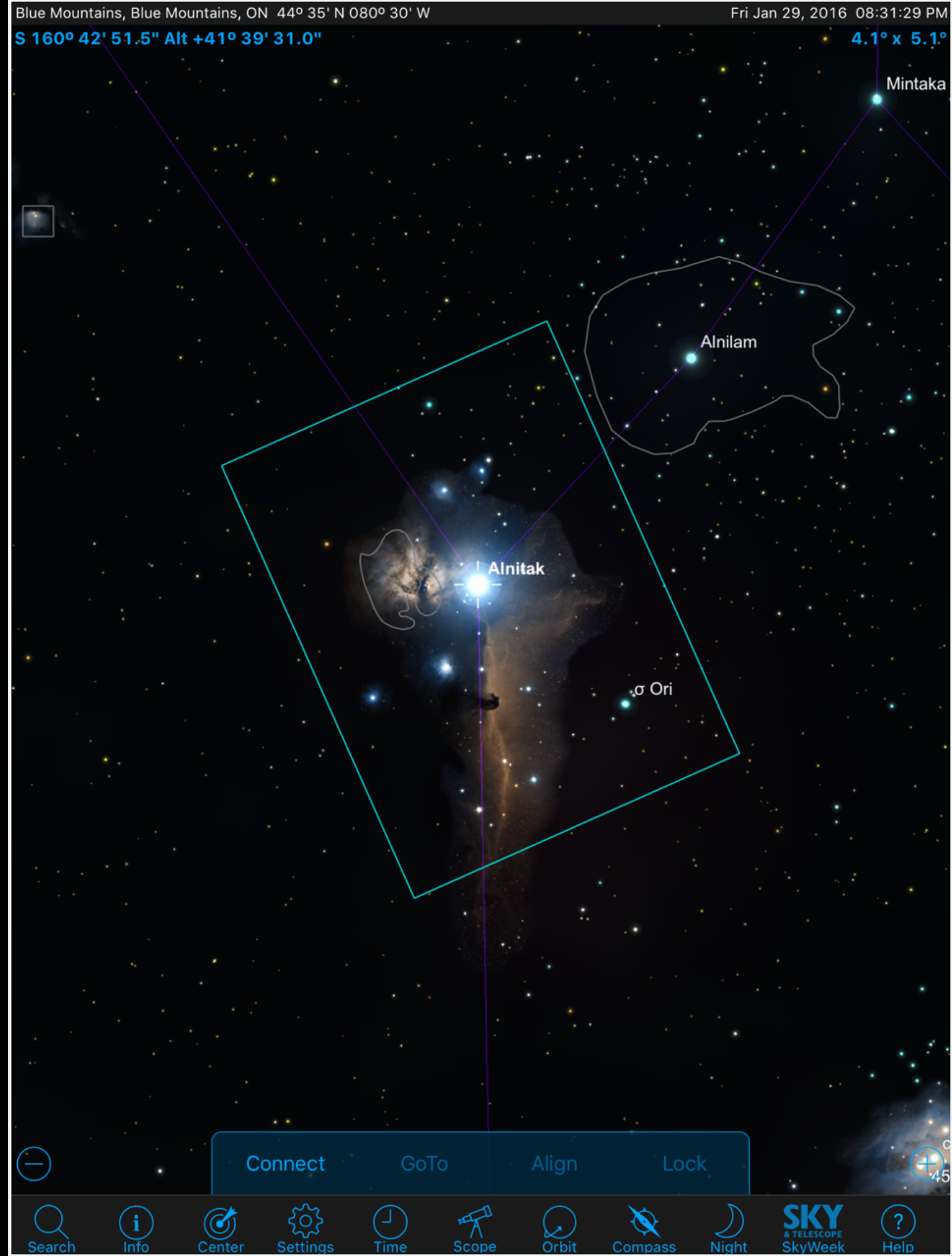
# DSLR Shooting Tips

- use a fast f1.4 to f2.8 lens and try 30-60 second exposures
- use 1000 to 6400 iso or higher for stars and deep sky objects
- shoot in RAW mode when available
- use live view , zoom in 10x to focus
- set to manual focus and exposure
- use mirror lockup / anti-shock
- use a cable release or self timer
- set the white balance to sunlight
- turn on automatic noise reduction for long exposures
- use a focal reducer/field flattener with a refractor



# Planning Targets

Sky Safari 4 Pro helps plan how a particular camera & scope or lens will cover a target. Add all of your equipment and then select any combination. The FOV indicator can be rotated. Zoom in on the target to see what will be captured in the frame. Great planning tool.





## Augmented Reality Tools

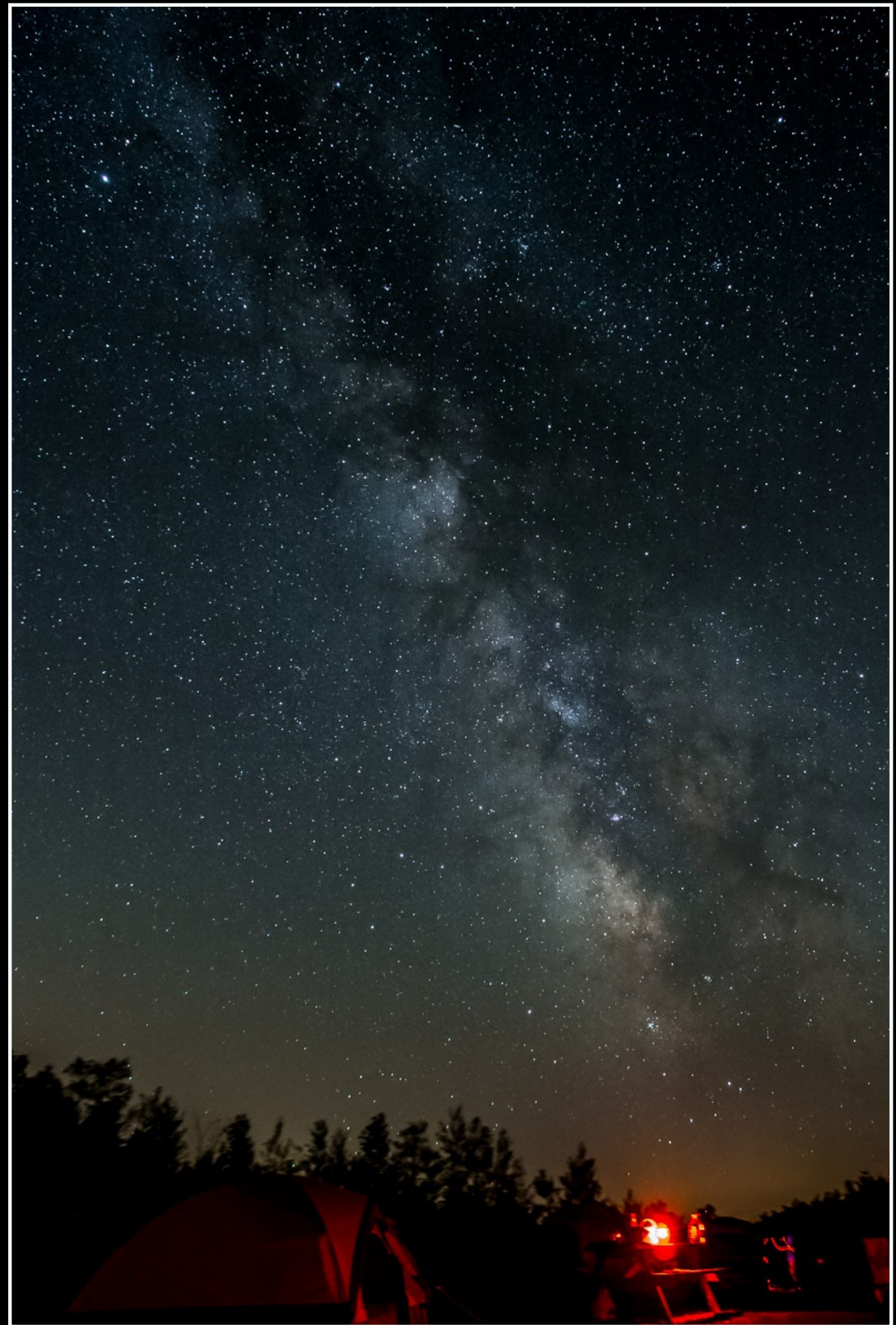


The iOS Spyglass app is a great daytime planning tool. I used it to figure out whether I was able to see Pluto from my backyard.



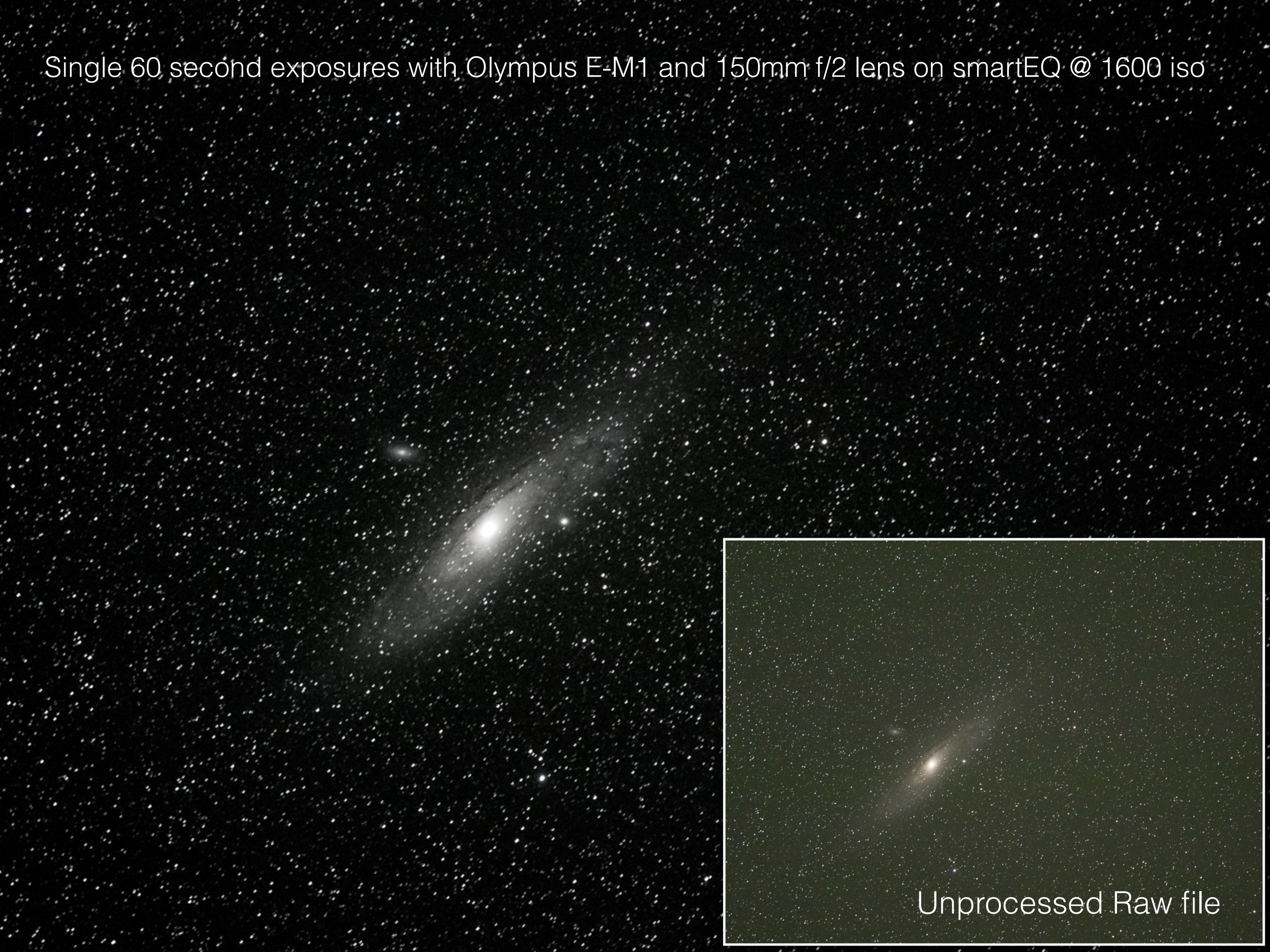
# Starfest Milkyway

Taken with Olympus E-M1 and 12-40mm f2.8 PRO lens at 12mm. Tracking was provided by iOptron smartEQ mount. Single 60 second raw photo @ ISO 1600 f3.5 processed in Lightroom.





Single 60 second exposures with Olympus E-M1 and 150mm f/2 lens on smartEQ @ 1600 iso



Unprocessed Raw file





Single 30 second exposures with Olympus E-M1 and 8mm f/1.8 PRO fisheye on SkyTracker @ 1600 iso f/2





Perseid meteor shower 2015. Composite of four 30 second exposures with Olympus E-M1 and 7.5mm f/3.5 fisheye on SkyTracker @ 1600 iso. Imported into Photoshop as layers and blended.





Night sky over Lora Bay. Composite of four 20-60 second exposures with Olympus E-M1 and 7-14mm f/2.8 PRO on SkyTracker @ 400-3200 iso. Imported into Photoshop as layers and blended.





Aurora taken March 17, 2015 using SkyTracker on tripod from pier in Lora Bay Park.  
Olympus E-M1 with 12-40mm f2.8 PRO lens. Single 30 sec ISO 1000 12mm @ f2.8



# Stacking Images

- Helps reduce noise
- Shoot multiple short exposures
- Allows use of higher ISO >1600
- No guiding required (30-60 sec)
- Stack Raw files or Jpegs
- Use varying ISO or exposures to get the greatest level of detail
- Deep Sky Stacker, Registax (free for download)
- Photoshop CC, Nebulosity, Registar, ImagePlus, MaximDSLR
- Lots of great tutorials and how-to articles available on the web



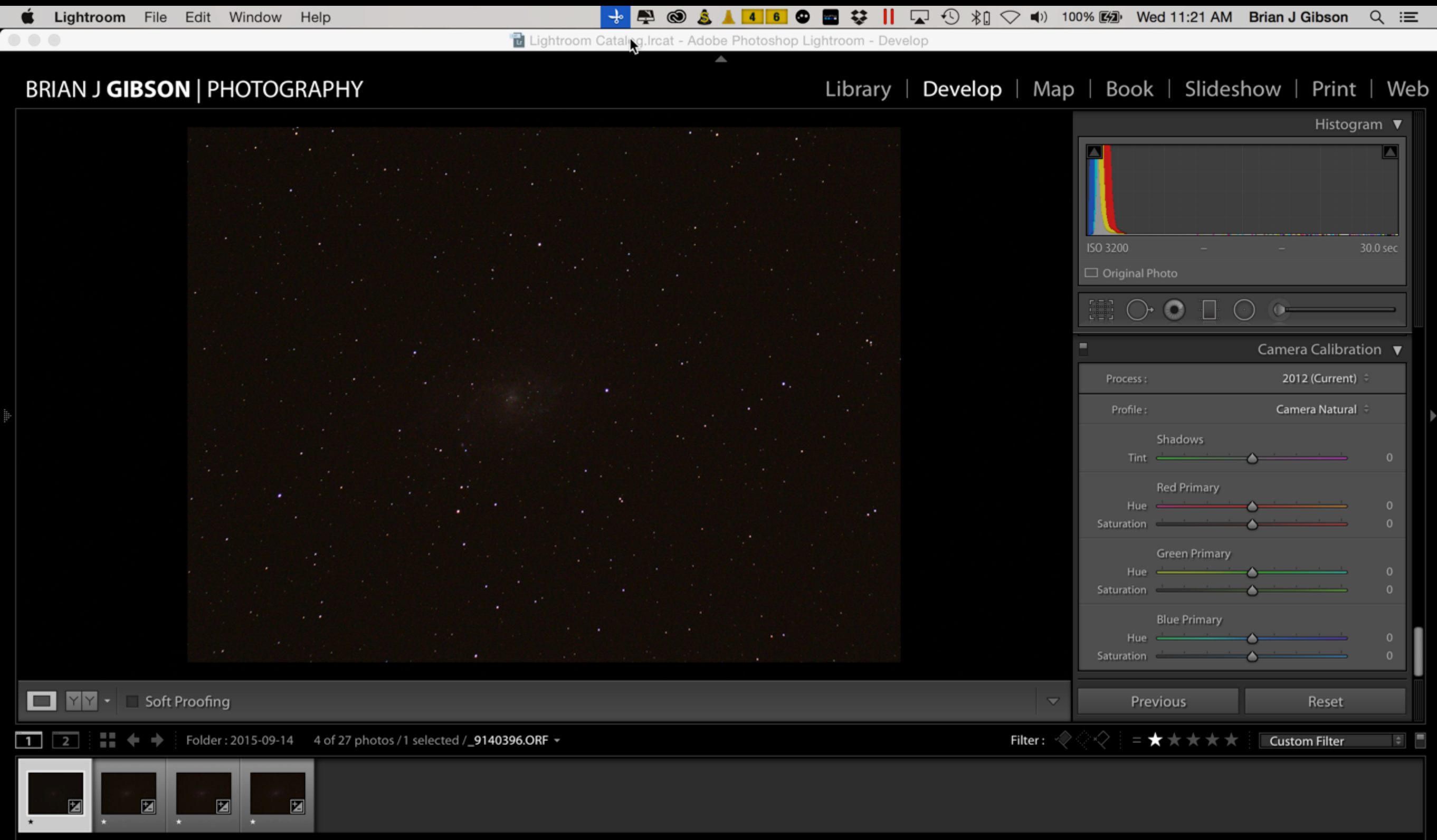


# My Process

- Select raw files in Lightroom CC
- Load into Photoshop CC as layers
- Manually align the layers
  - use 50% opacity to see layer below
  - use 200% zoom to magnify
  - use Free Transform to move upper layer
- Convert aligned layers into a Smart Object
- Set the Smart Object Stack Mode to Median Combine
- Flatten the image to make file smaller
- Save the file back to Lightroom CC as uncompressed TIFF
- Adjust white balance, levels, contrast, exposure, noise reduction... in Lightroom
- Export as JPEG in various resolutions for posting on web or printing

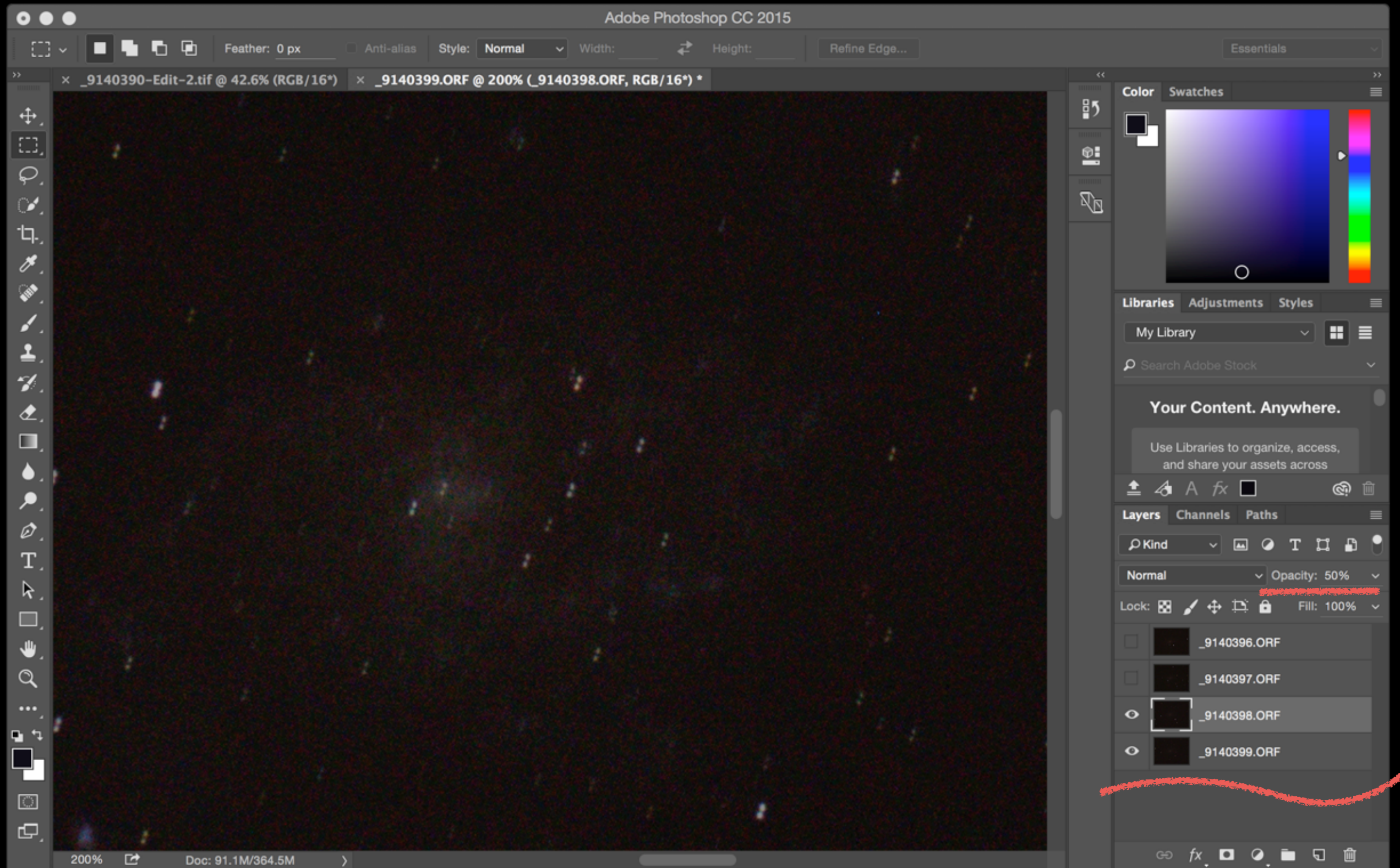






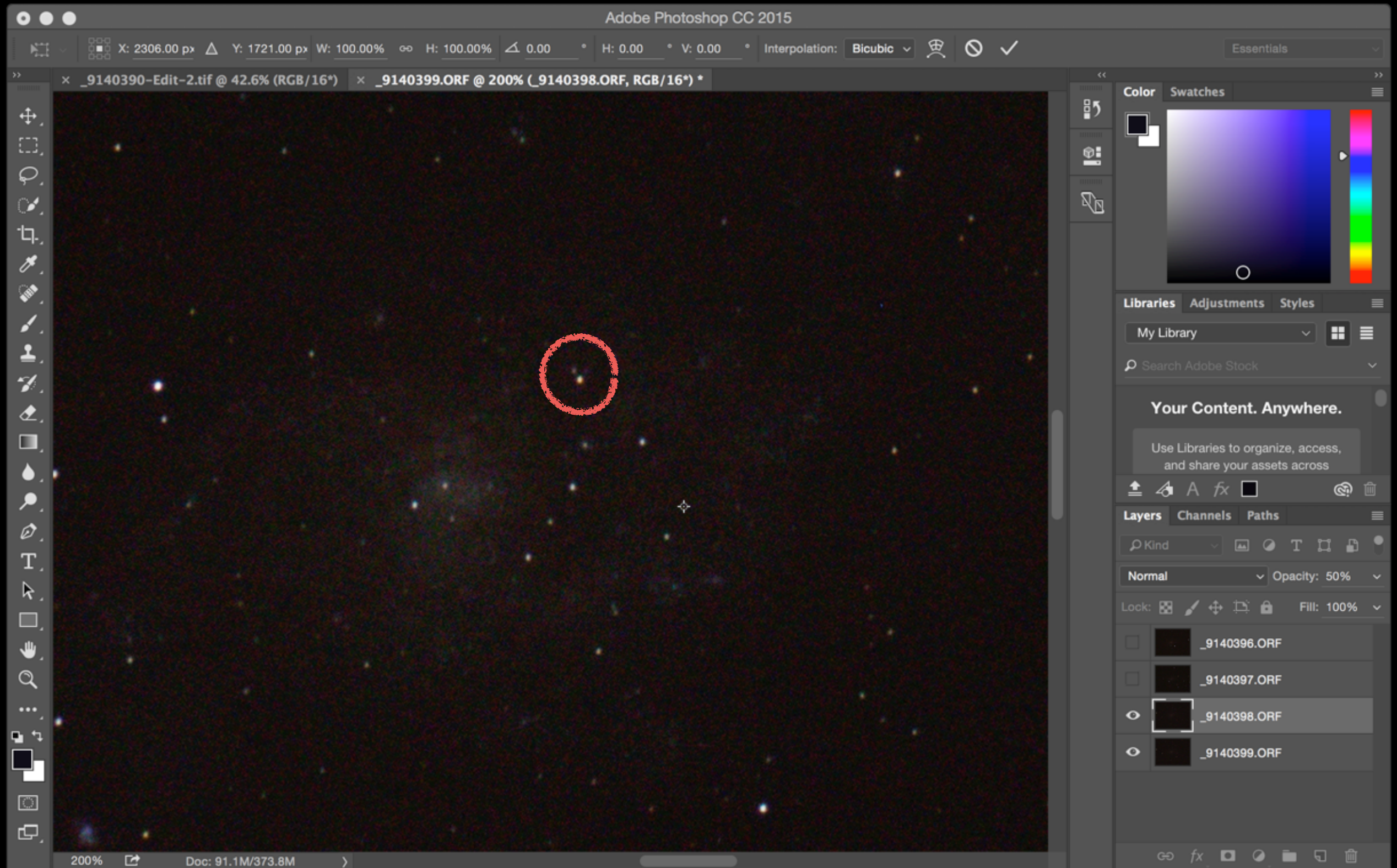
Select the individual raw files in Lightroom and then choose Edit —> open in Photoshop as layers





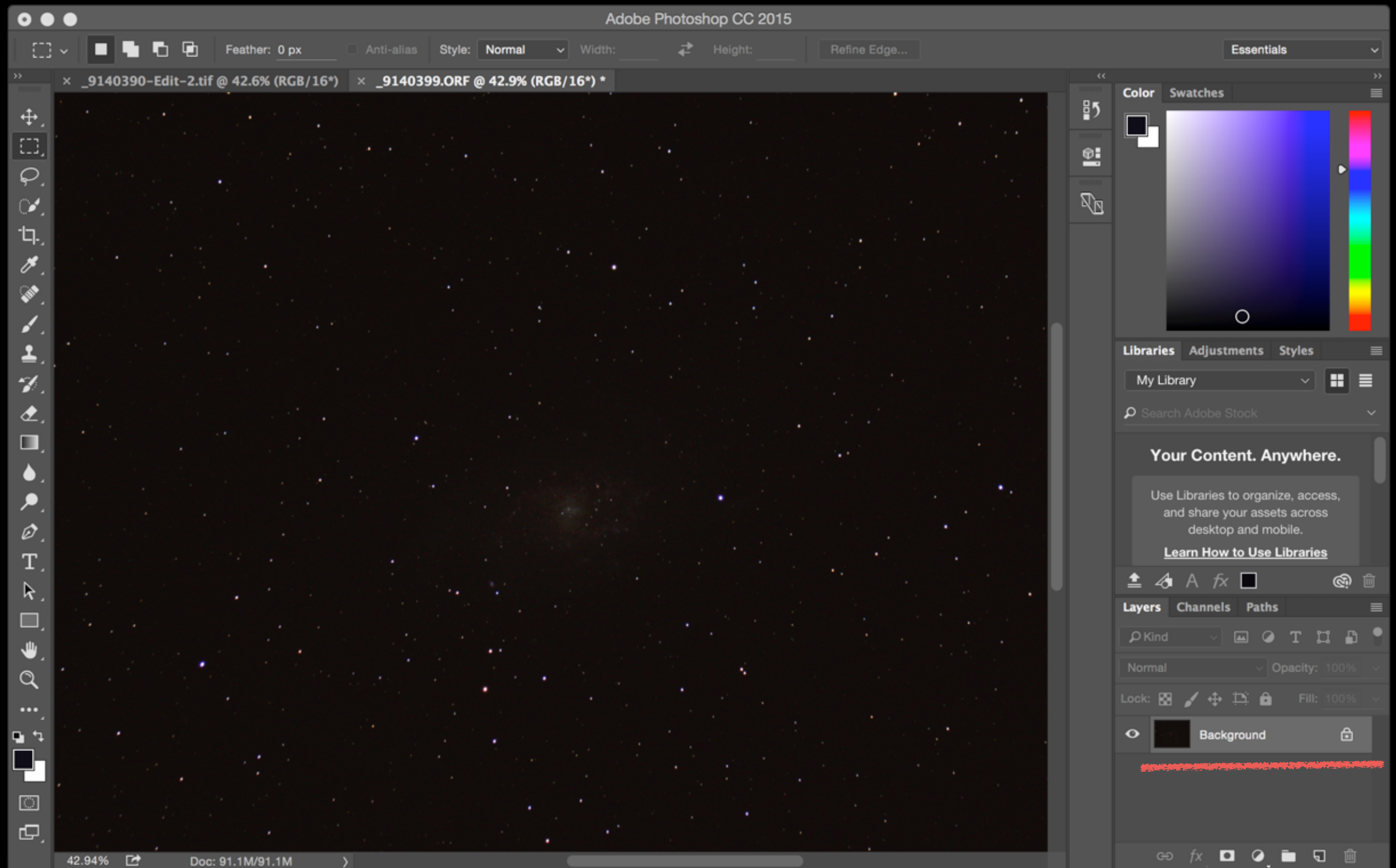
Set the view to 200% in Photoshop, select & reduce layer opacity to 50% on the second layer





Use Free Transform and arrow keys to align layers. Repeat for each remaining layer





Convert aligned layers to Smart Object, set Stack Mode to Median blend, flatten image & Save





M33 galaxy. Stack of four 30 second exposures with Olympus E-M1 and TV-85mm w/0.8x flattener mounted on iEQ30 PRO @ 3200 iso. Final saved tif image was tweaked in Lightroom CC and exported as jpeg.



## Orion Nebula (M42)

Taken with Olympus E-M1 on Televue 85mm Refractor at prime focus with 0.8X reducer/flattener. Tracking was provided by iOptron iEQ30 PRO mount. Stack of five 10 to 30 second raw photos @ ISO 6400 processed in Lightroom CC and merged in PhotoShop CC.





# Dumbbell Nebula (M27)

Taken with same  
setup as Orion  
Nebula (M42).





## Hercules Cluster (M13)

Taken with same  
setup as Orion  
Nebula (M42).







M31 M32 and M110. Stack of five 30 second exposures with Olympus E-M1 and TV-85mm w/0.8x flattener on iEQ30 PRO @ 3200 iso. Median combine in Photoshop CC.





Comet Catalina. Single 13 second exposure with Olympus E-M1 and 40-150mm f2.8 PRO lens  
on SkyTracker 150mm f/3.2 @ 3200 iso. Taken December 11, 2015 at 5:28 am