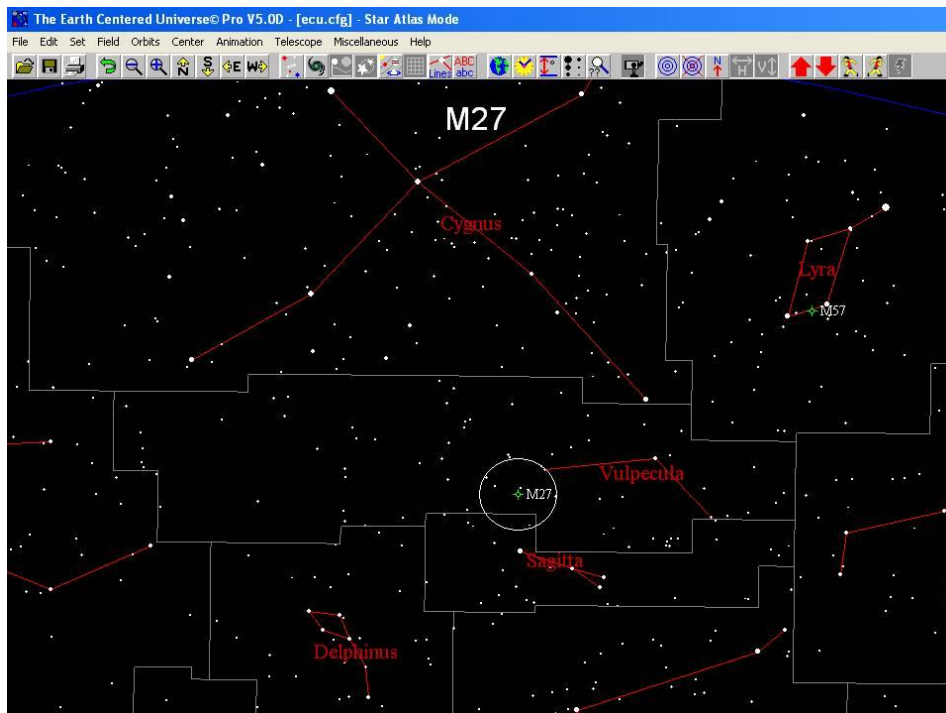


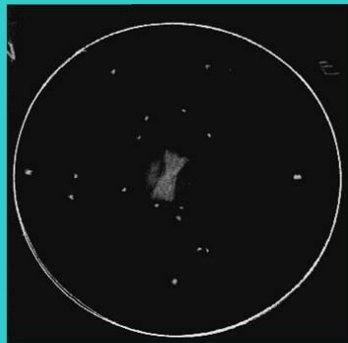
## Planetary Nebula: From Messier to Abell (Chart Addendum)

### Messier Planetary Nebulae:

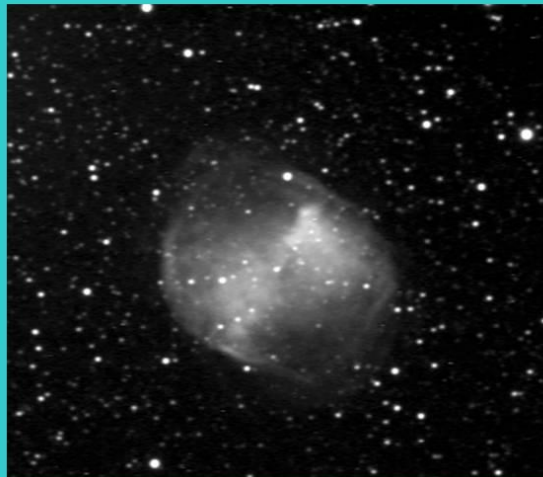
**M27** known as the “Dumbbell Nebula”, is located in the summer constellation of Vulpecula, 'The Fox'. Discovered in 1764, it was first planetary nebula ever observed, and is one of the brightest and most impressive, easily visible in binoculars. M27 is about 1360 light years distant, and is estimated to be close to 14,600 years old, and about 3 light-years in size. On summer evenings, it is well placed, almost directly overhead, and can be naked-eye from a dark sky location. Due to its high surface brightness, M27 can even be observable thru a small telescope or binoculars during Full Moon. Its central white dwarf star shines at 12.9+ magnitude and is easily visible at the center of the dumbbell shaped nebula in small telescopes. Distinct structural features can be observed within M27, including bright, sharply defined arcs coming off of either end of the dumbbell, along with striations between the main arcs and the center of the nebula. UHC and OIII filters will enhance the contrast of internal features of the nebula.



M27



10" Dob Reflector f5.4  
27mm 52x



8" SCT f6.3, StellaCam-3 120 seconds

**M57** Located in the summer constellation of Lyra, 'The Lyre (Harp)', and is known as the 'Ring Nebula'. It was second planetary nebula discovered by Messier (in 1779, about 15 yrs after M27), and is easy to locate and can be observed with small telescopes, even in suburban skies. It is about 2300 light years distant, and about 6000 years old, and is estimated to have a diameter of about a half-light year, and is expanding at about 12 miles per second. With its high surface brightness, the Ring is one of the best celestial showpieces of the summer sky! While the nebula itself is easy to observe, the central star at 15.4+ magnitude, can be quite difficult to glimpse. Interestingly, 3-D modeling of the structure of M57 shows that it actually is similar in shape to M27. The differences in shape are a matter of viewing angle perspective. For the Ring, we are looking down the axis of one of its ends. For M27, we are looking at it toward the side, about a 90 degrees rotation.

The Earth Centered Universe® Pro V5.0D - [ecu.cfg] - Star Atlas Mode

M57

Cygnus

Vulpecula

Sagitta

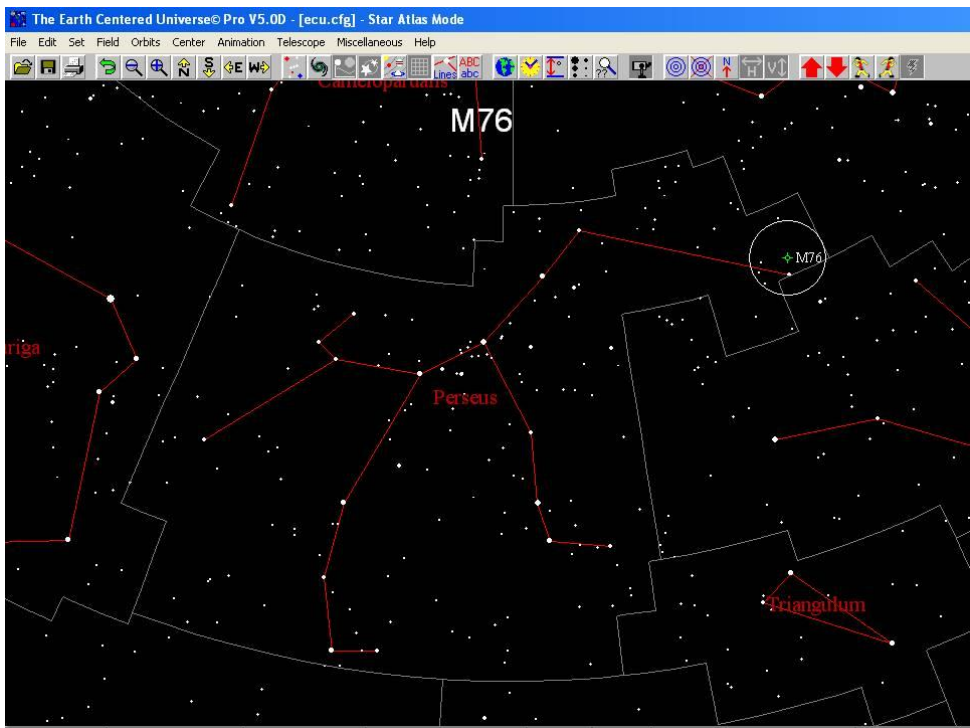
M27

M57

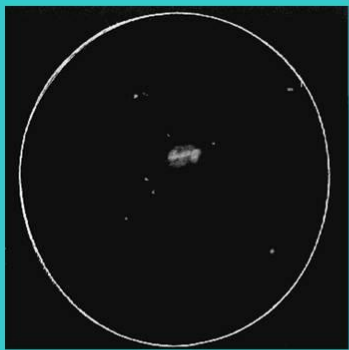
10" Dob Reflector f5.4  
8mm 79x

8" SCT f6.3, StellaCam-3 30 seconds

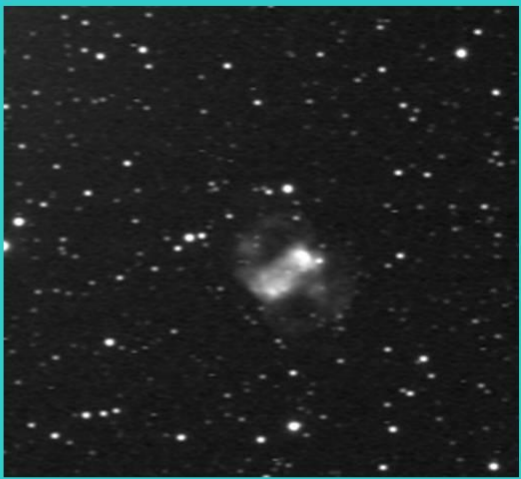
**M76** Located in the fall constellation of Perseus, 'The Hero', and is known as the 'Little Dumbbell Nebula'. Discovered in 1780 by Messier's observing partner, Pierre Mechain, it is about 2500 light years distant, and about 6000 years old, and about 1.5 light-years in size. Before it was determined that M76 was a planetary nebula (in 1918), it was once considered to be two separate emission nebula and given two NGC numbers - 650 & 651. Visually, it is not difficult to find, and resembles its larger namesake in medium size telescopes.



M76

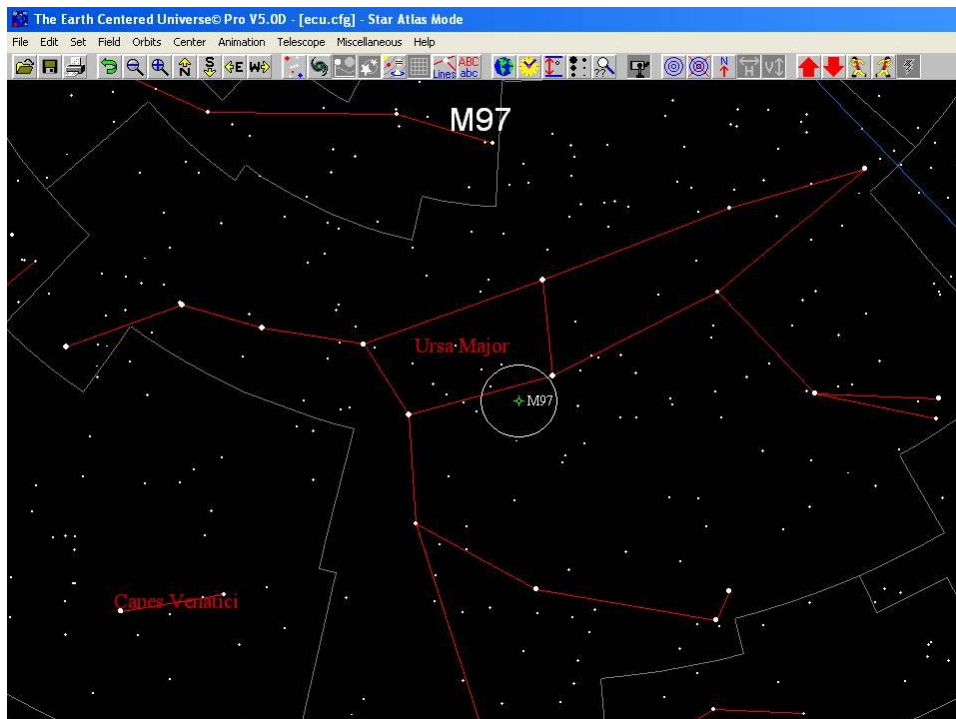


13.1" Dob Reflector f4.5  
12.5mm 91x

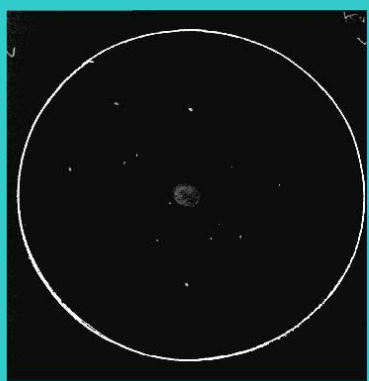


8" SCT f6.3, StellaCam-3 120 seconds

**M97** Located in the circumpolar constellation of Ursa Major 'The Great Bear', and is known as the 'Owl Nebula'. The last planetary nebula on Messier's "Not a Comet" list was discovered in 1781 by Pierre Mechain. The 'Owl' got its name based on a sketch made in 1848 by the 3<sup>rd</sup> Earl of Rosse, William Parsons, using his 72" reflector. It is about 2000 light years distant, and about 8000 years old. M97 is located near the bright dipper bowl star - Merak (Beta Ursa Majoris), would normally make this planetary easy to find, but the nebula is fairly faint and requires a medium sized telescope to see visually.



M97



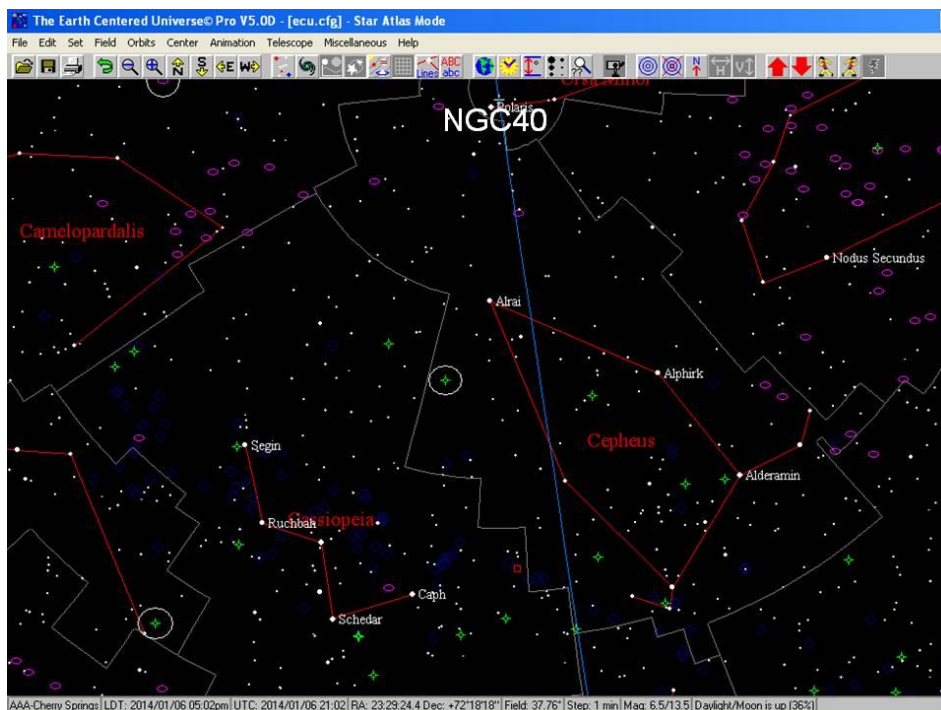
8" Dob Reflector f4.5  
16mm 57x



6" RC f5, StellaCam-3 @ 90 seconds

### Herschel Planetary Nebula Examples:

**NGC40** Located in the fall constellation of Cepheus, the King, the “Bow-Tie Nebula” was discovered by Herschel in 1788. It is about 3500 light years distant and about 1 light-year in diameter. NGC40 is bright blue-green oval-shaped 10.7<sup>th</sup> mag+ planetary nebula, in which small to medium telescopes will show the 11<sup>th</sup> central star, and bright structural arcs.



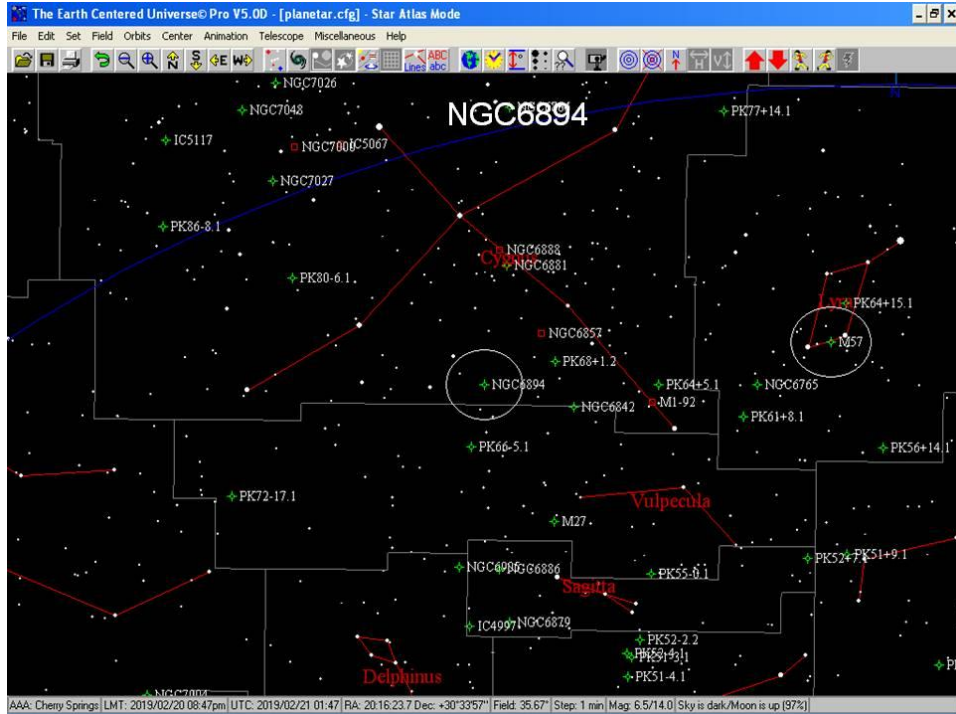
NGC-40 located in Cepheus (Bow-Tie Nebula)

6" RC f5 (SC-3 @ 15 seconds)

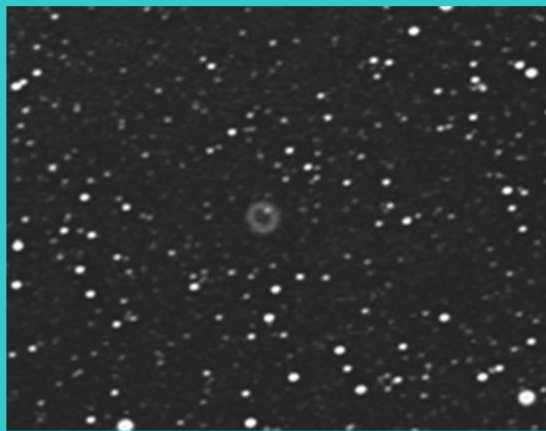




**NGC6894** Located in the summer constellation of Cygnus, was discovered by Herschel in 1784. The 12<sup>th</sup> mag+ dim ring shaped planetary is located about 5000 light-years with a dim central star of 17.6<sup>th</sup> mag+. Best visible in medium to large telescopes from a dark location.

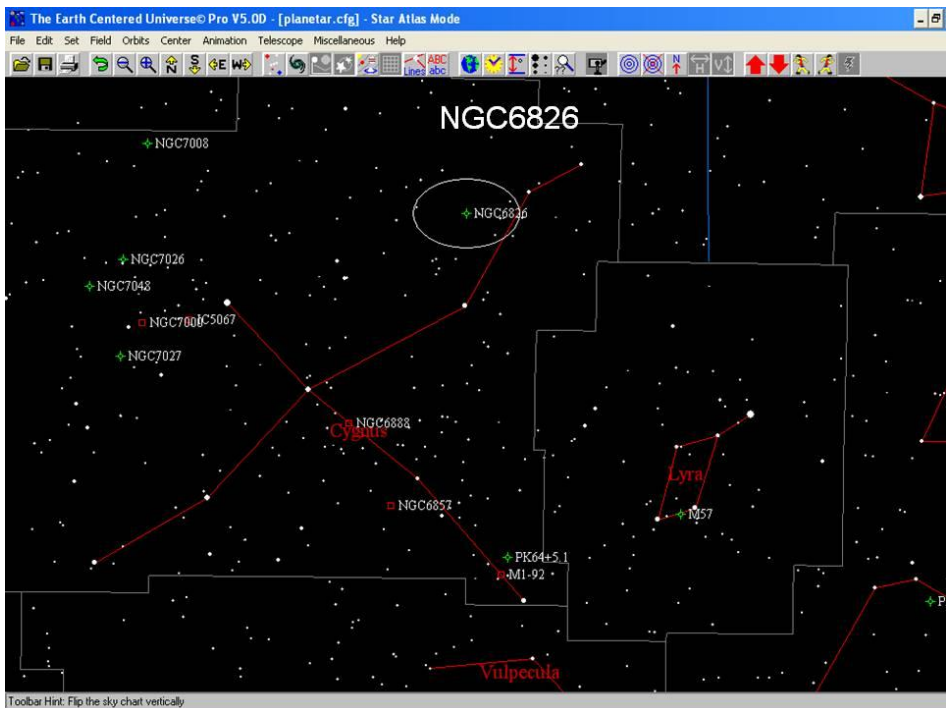


**NGC6894** Located in the summer constellation of Cygnus

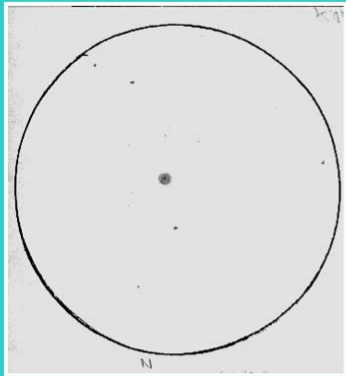


8" SCT f6.3, StellaCam-3 @ 30 seconds

**NGC6826** Located in the summer constellation of Cygnus, the “Blinking Planetary” was discovered by Herschel in 1793. The 10<sup>th</sup> mag+ planetary is located about 3200 light-years with a bright central star of 8.9<sup>th</sup> mag+, making it an easy target for small telescopes. Visually, when observing the bright central star directly, the nebula tend to vanish, but using averted vision causes the nebula to blink into view.



**NGC6826** Located in Cygnus, “Blinking Planetary”

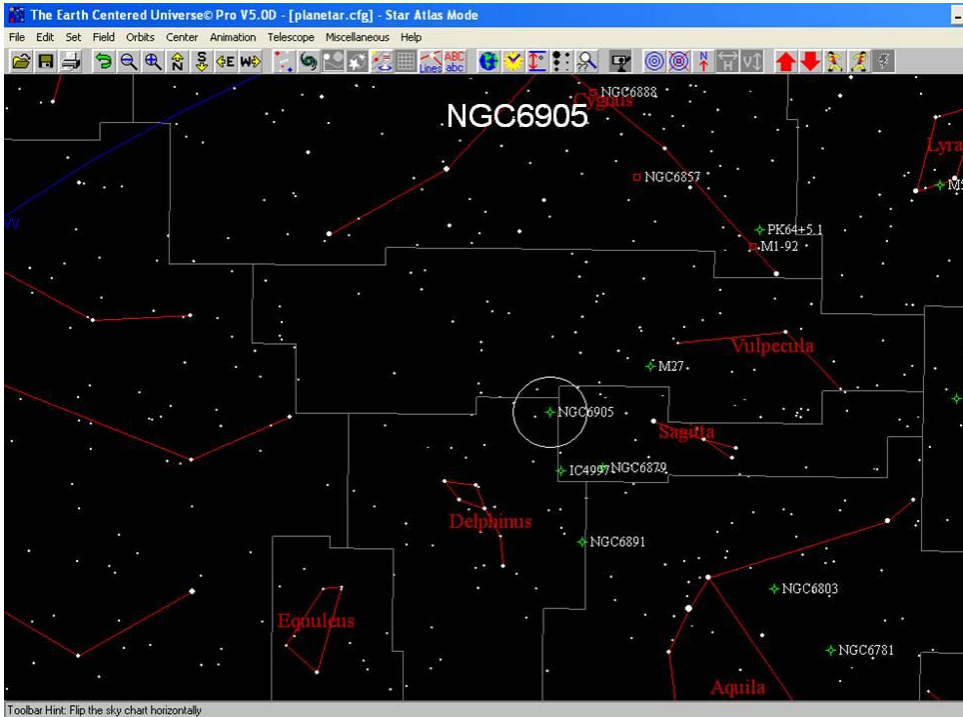


13" Dob Reflector f4.5 8mm (143x)

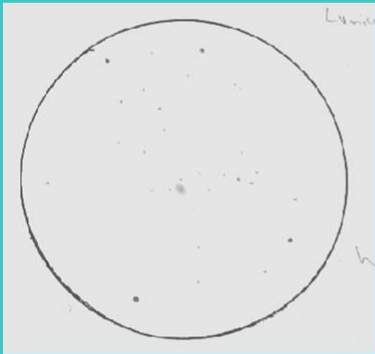


8" SCT f6.3, StellaCam-3 @ 8 seconds

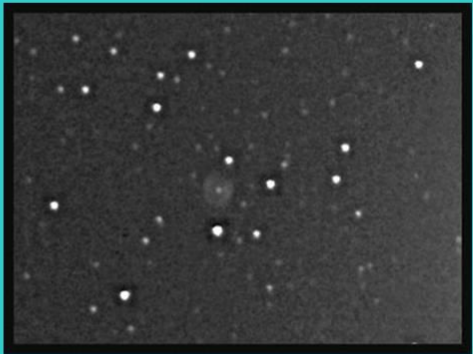
**NGC6905** Located in the summer constellation of Delphinus, was discovered by Herschel in 1784. The “Blue Flash Nebula” is an oval shaped 11<sup>th</sup> mag+ planetary, with a 13.5 mag+ central star at a distance of about 4200 light-years. Visually, the planetary is fairly bright in small to medium telescopes, and shows bluish color in larger telescopes.



**NGC6905** Located in Delphinus, “Blue Flash Nebula”



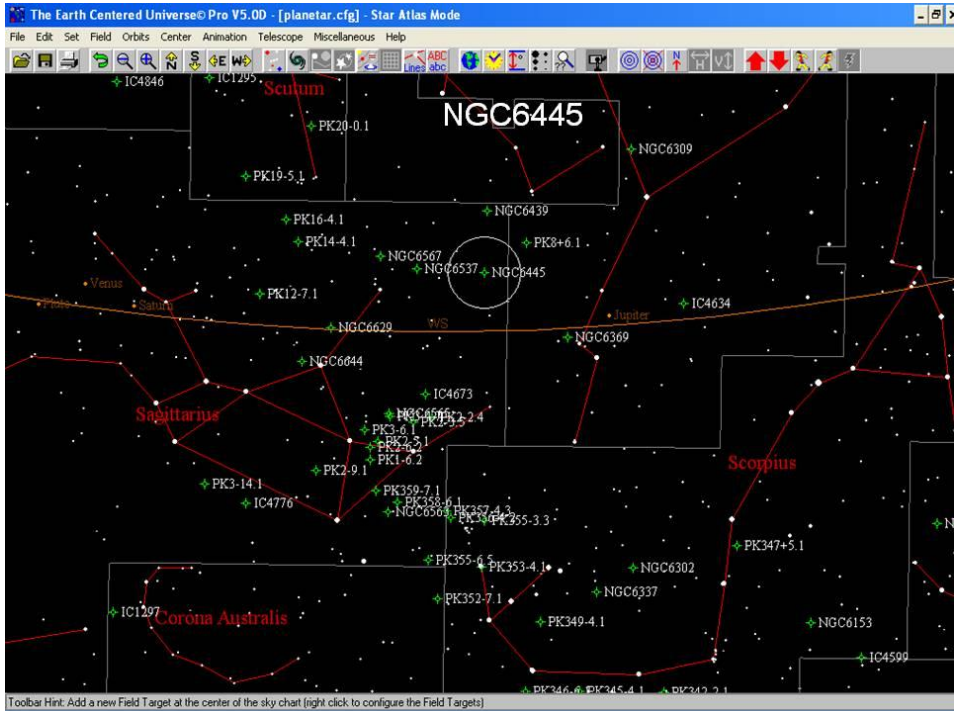
8" SCT f10, 24mm (85x)



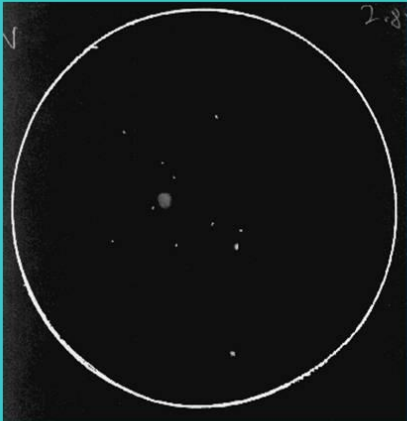
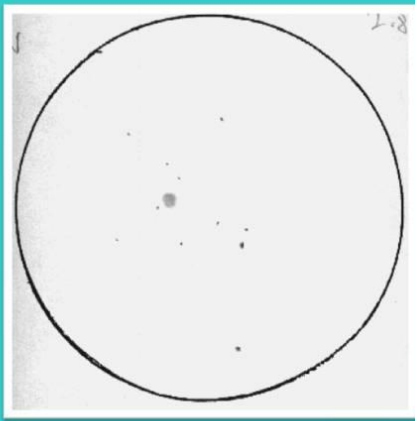
8" SCT f6.3, StellaCam-EX @ 2.5 seconds



**NGC6445** Located in the summer constellation of Sagittarius, discovered by Herschel in 1786. Nicknamed the “Little Gem” or “Box Nebula”, NGC6445 is about 3200 light years distant and a diameter of almost 4 light years across. Visually, it’s a small faint nebula with a rectangular disk, best suited for medium to large aperture telescopes, and a very, very faint 19<sup>th</sup> mag+ central star visible only in the large >24” telescopes.

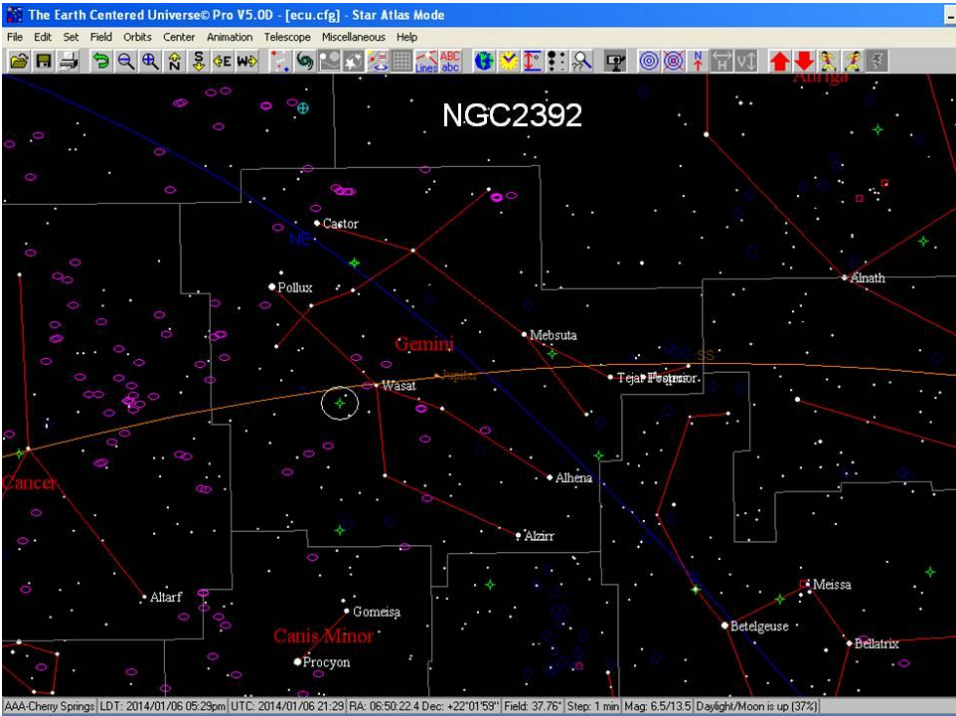


**NGC6445** Located in Sagittarius, the “Little Gem” or “Box Nebula”,

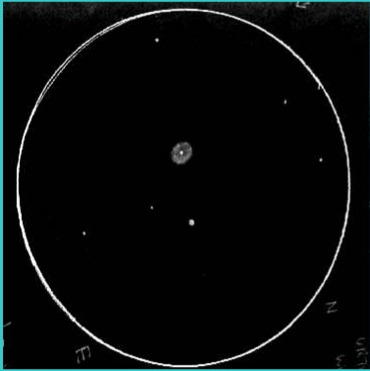


8" f4.5 Dob Reflector 16mm & 2.8x barlow (160x)

**NGC2392** Located in the winter constellation of Gemini the Twins, the “Eskimo Nebula” was discovered by Herschel in 1787. It is about 2930 light years distant. NGC2362 is a bright planetary nebula, in which even small to medium size telescopes will show the 10.5<sup>th</sup> magnitude central star and multiple shells of dark and light mottled zones.



NGC-2392 located in Gemini (Eskimo Nebula)

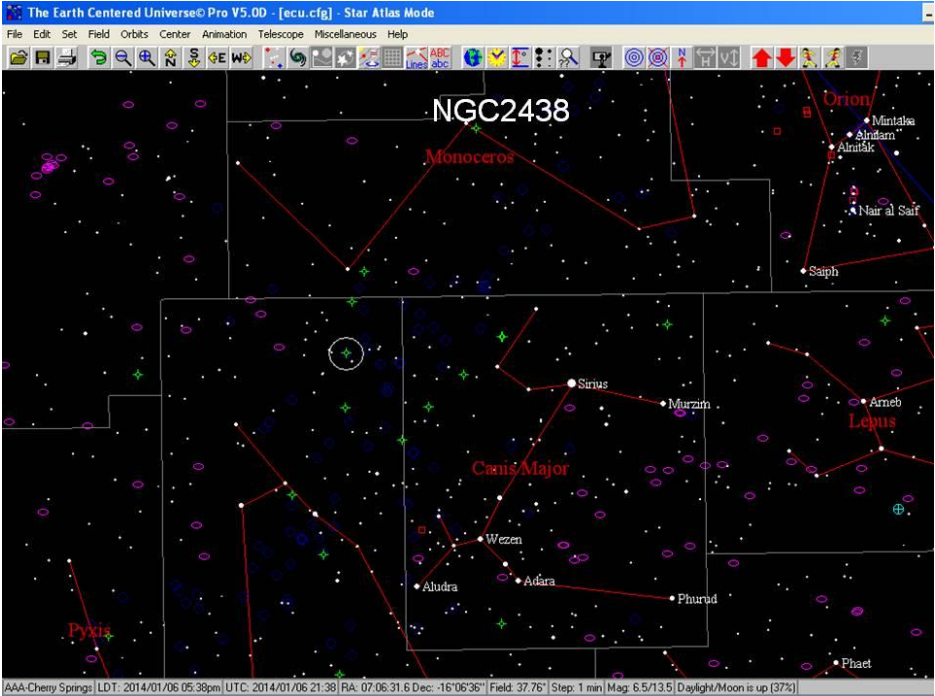


13" Dob Reflector f4.5  
28 mm & 2.8x barlow 102x



8" SCT f6.3 (SC-3 @ 45 seconds)

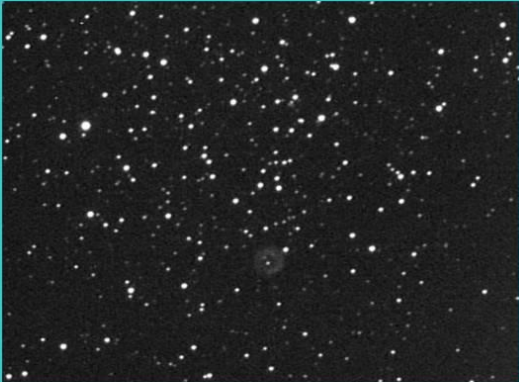
**NGC2438** Located in the winter constellation of Puppis, was discovered by Herschel in 1786. Appears as a foreground object in front of the open cluster M46. The 11<sup>th</sup> mag+ ring shaped planetary is located about 2900 light-years, with a diameter of about 1 light-year with a central star of 17.5<sup>th</sup> mag+. Visible in medium telescopes from suburban.



NGC-2438 located in Puppis (within M46)

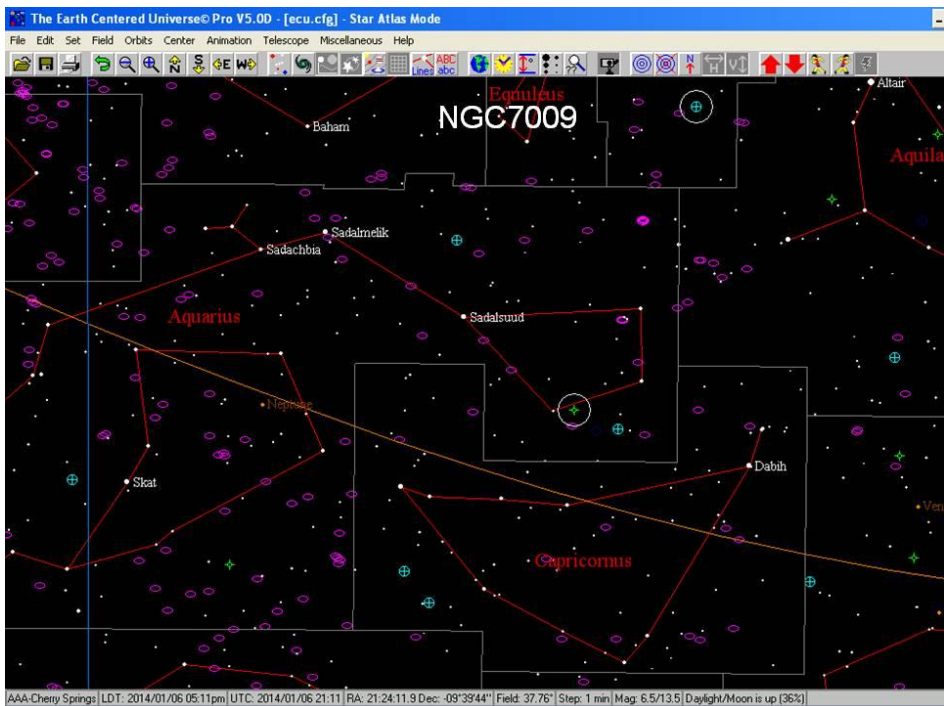


8" Dob Reflector f4.5 & 16 mm 57x



8" SCT f6.3 (SC-3 @ 20 seconds)

**NGC7009** Located in the fall constellation of Aquarius, the Water bearer, the “Saturn Nebula” was discovered by Herschel in 1782. It is about 3900 light years distant and about a ½ light-year in diameter. NGC7009 is bright oval-shaped 8<sup>th</sup> magnitude planetary nebula, in which medium to large size telescopes will show the two ‘ansae’ or handles coming off of either side which makes the object resemble the planet Saturn with its rings turned edge-on.



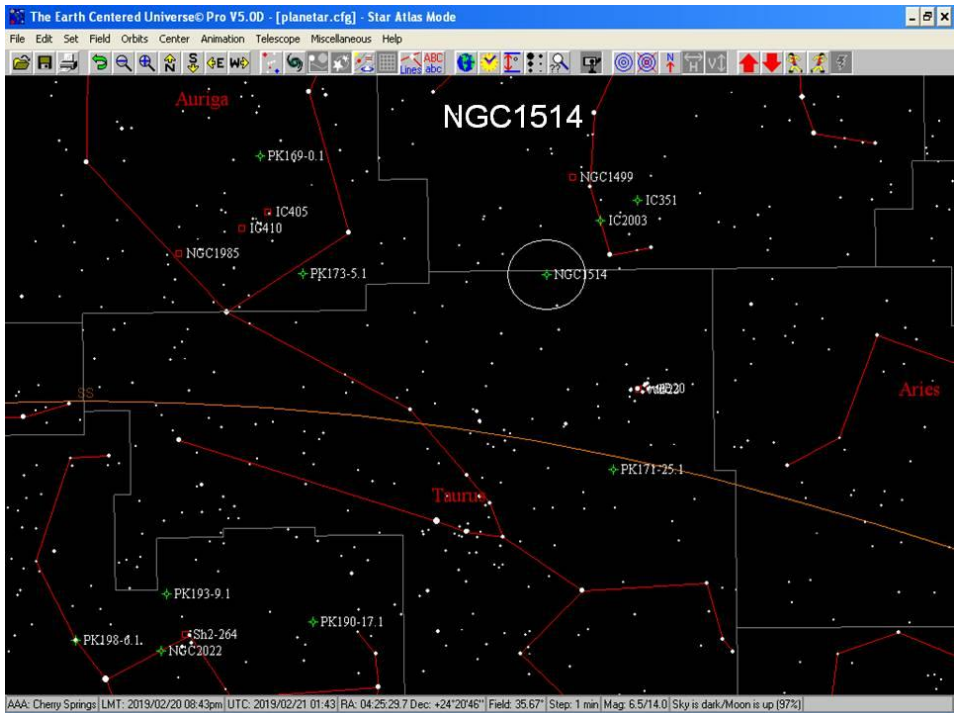
NGC-7009 located in Aquarius (Saturn Nebula)

8" SCT f6.3 (SC-3 @ 20 seconds)





**NGC1514** "Crystal Ball Nebula" - Located in the winter constellation of Taurus, discovered by William Herschel in 1790. This was William Herschel's first observation of a planetary gaseous shell with an obvious central star that convinced him that "true nebulosity" existed. A fairly easy 9<sup>th</sup> magnitude planetary to observe, it has a bright central star surrounded by a mottled haze. It is about 1960 light years distant.



**NGC1514** "Crystal Ball Nebula" - Located in Taurus,

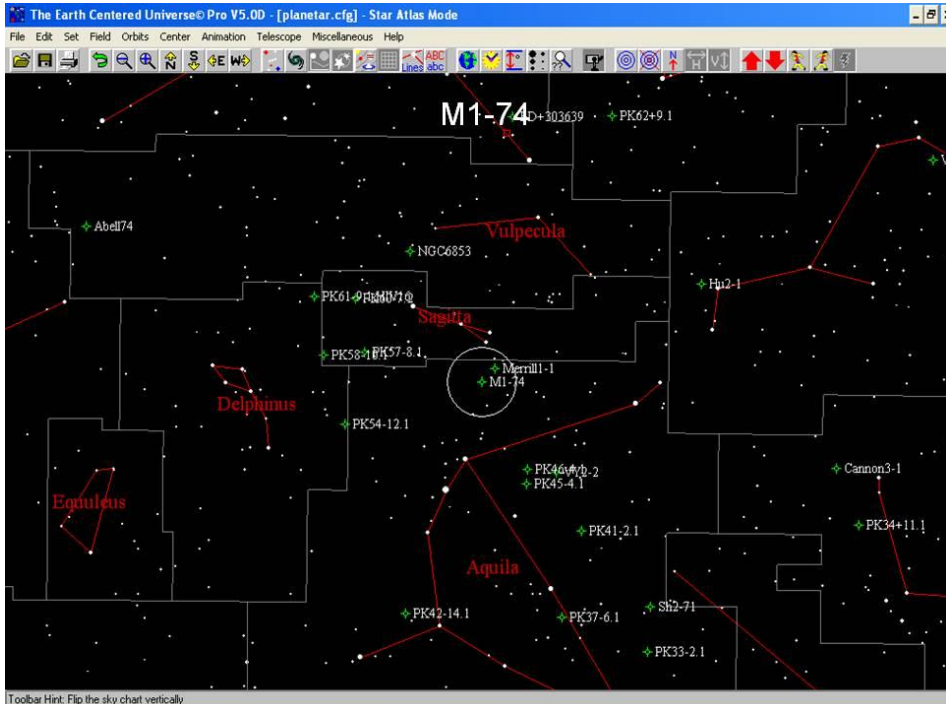


8" SCT f6.3, StellaCam-3 @ 60 seconds)



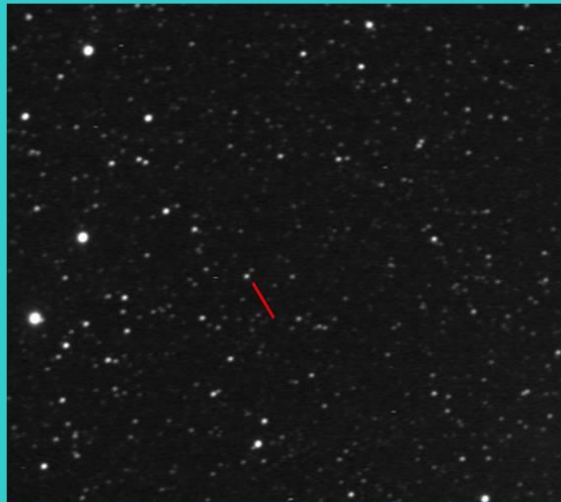
**Minkowski Planetary Nebula Examples:**

**M 1-74** Located in the summer constellation of Aquila - Mag+12.9

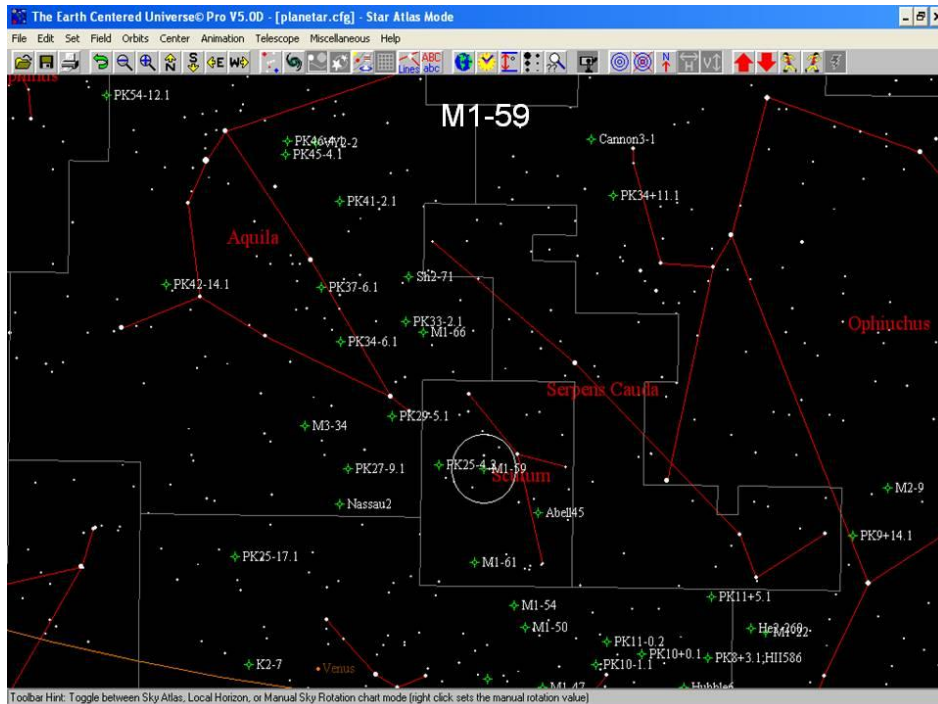


**M 1-74** Located in the summer constellation of Aquila

8" SCT f6.3, StellaCam-3 @ 20 seconds



**M 1-59** Located in the summer constellation of Scutum – Mag+13.3

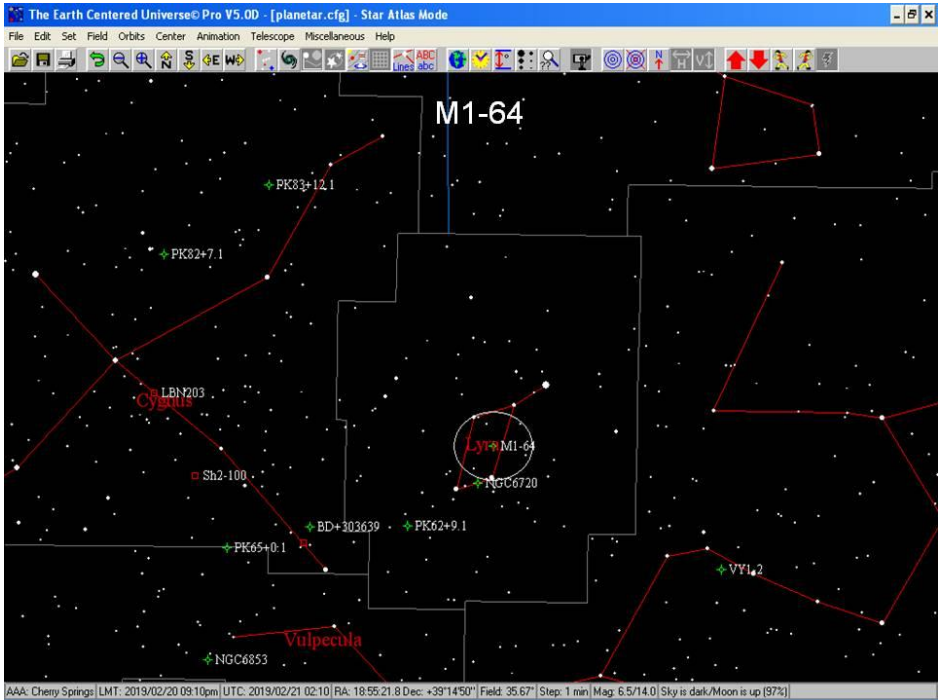


**M 1-59** Located in the summer constellation of Scutum

8" SCT f6.3, StellaCam-3 @ 20 seconds



**M 1-64** Located in the summer constellation of Lyra – Mag+13.3

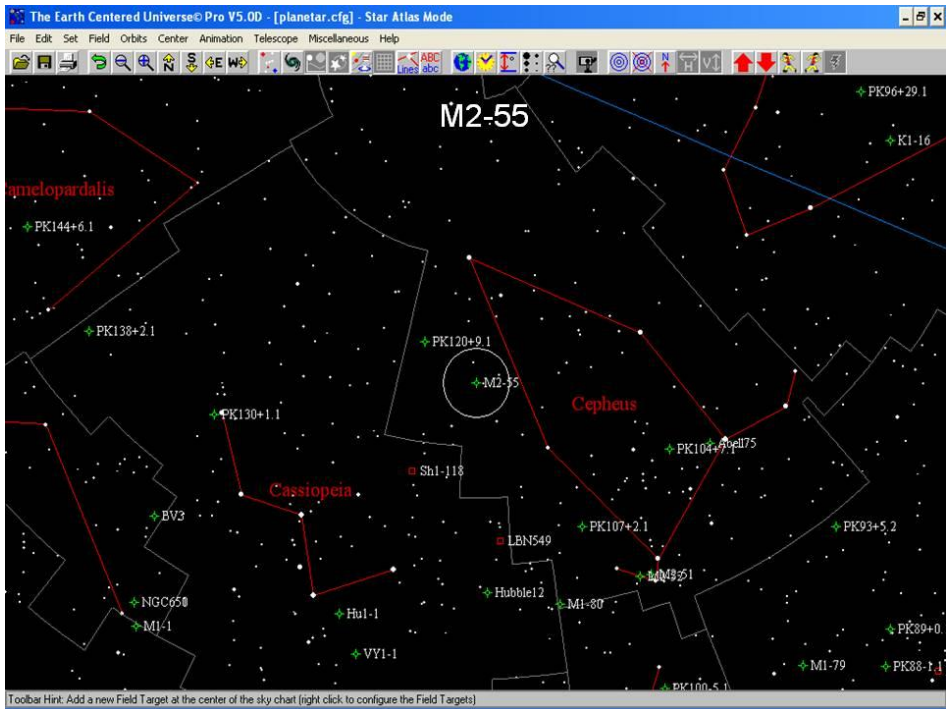


**M 1-64** Located in the summer constellation of Lyra

8" SCT f6.3, StellaCam-3 @ 25 seconds



**M 2-55** Located in the fall constellation of Cepheus – Mag+14.3



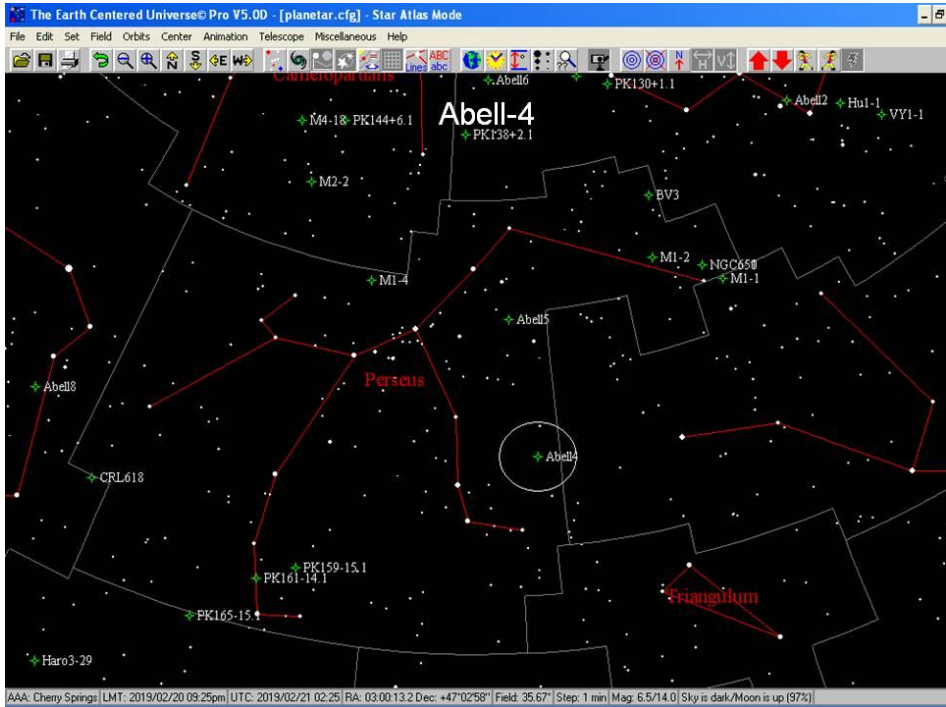
**M 2-55** Located in the fall constellation of Cepheus

8" SCT f6.3, StellaCam-3 @ 35 seconds



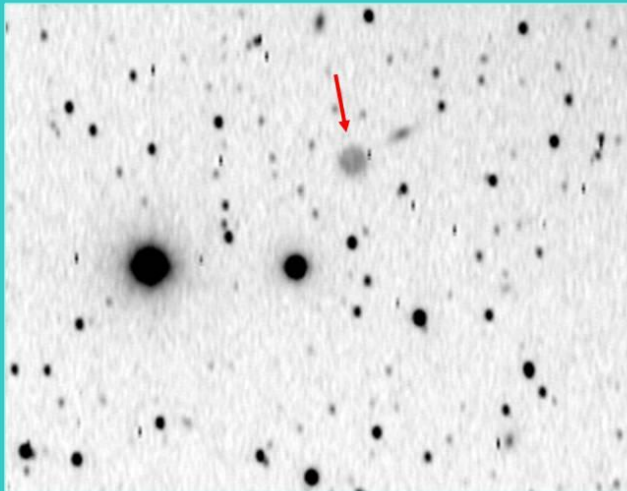
**Abell Planetary Nebula Examples:**

**Abell 4** Located in the fall constellation of Perseus – Mag+16.7 (Galaxy CGCG539-91)



**Abell-4** Located in the fall constellation of Perseus

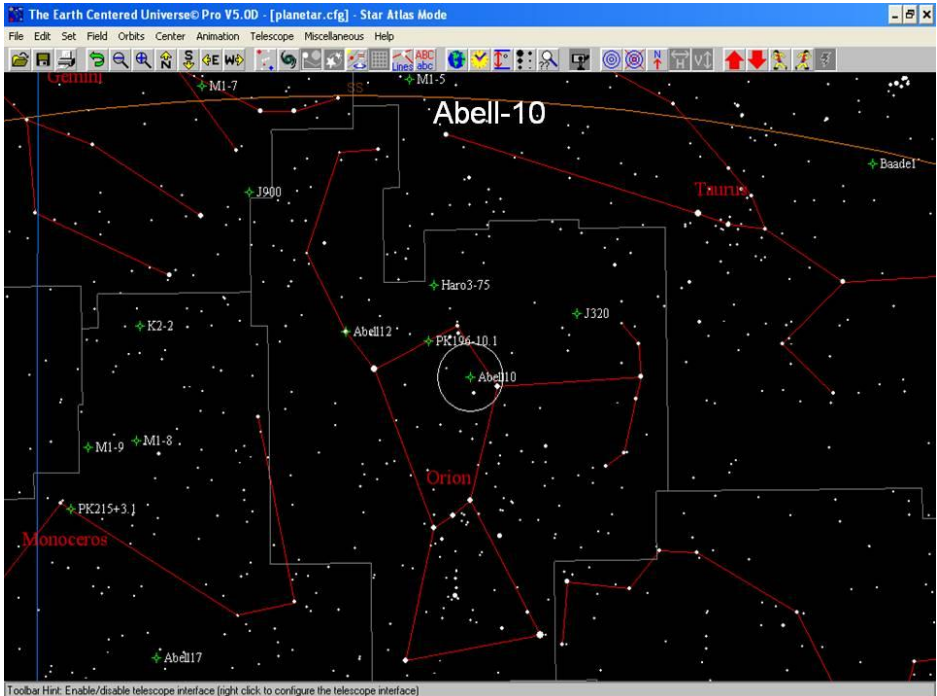
8" SCT f6.3, StellaCam-3 @ 3 minutes, no filter



Galaxy CGCG539-91

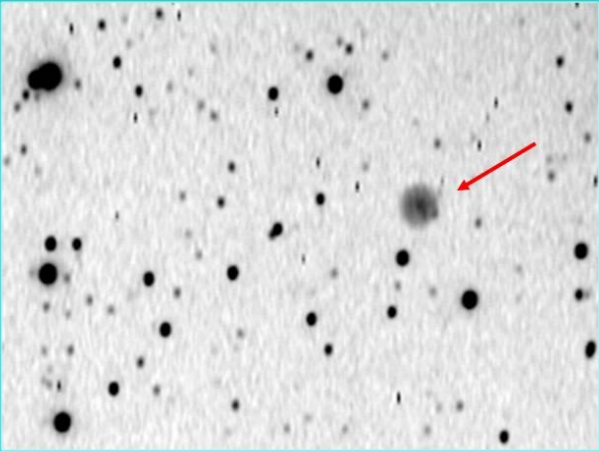


**Abell 10** Located in the winter constellation of Orion – Mag+15.2

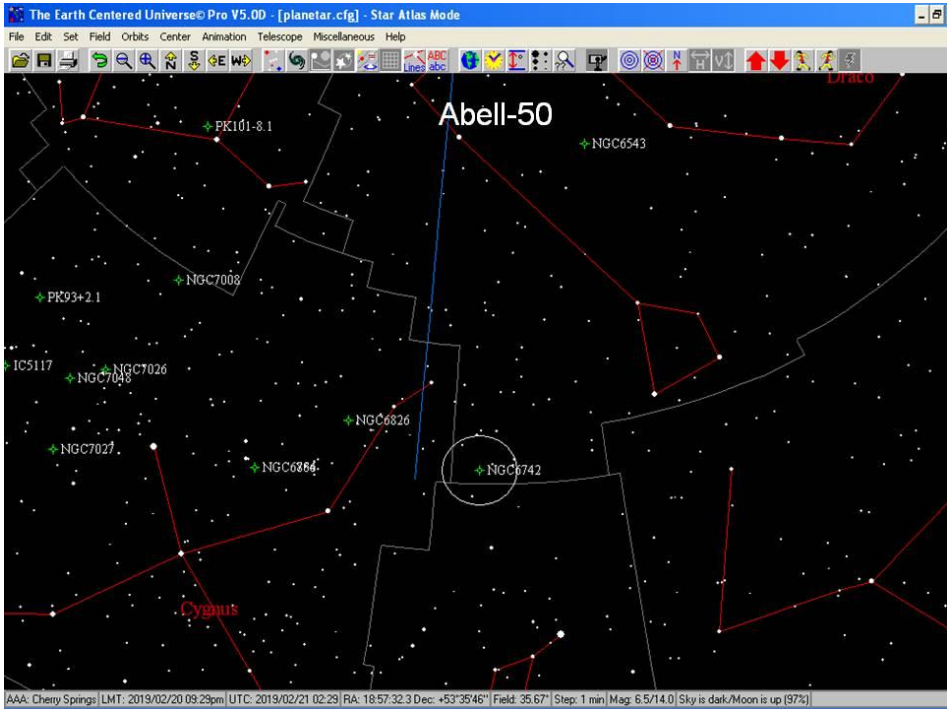


**Abell-10** Located in the winter constellation of Orion

8" SCT f6.3, StellaCam-3 @ 3 minutes, no filter

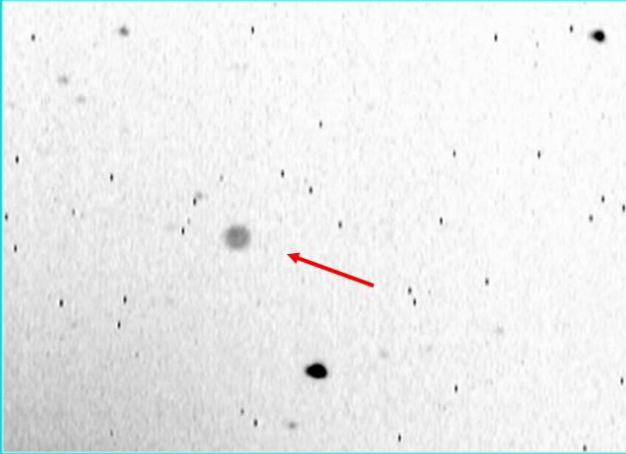


**Abell 50 (NGC6742)** Located in the fall constellation of Draco - Mag+13.4

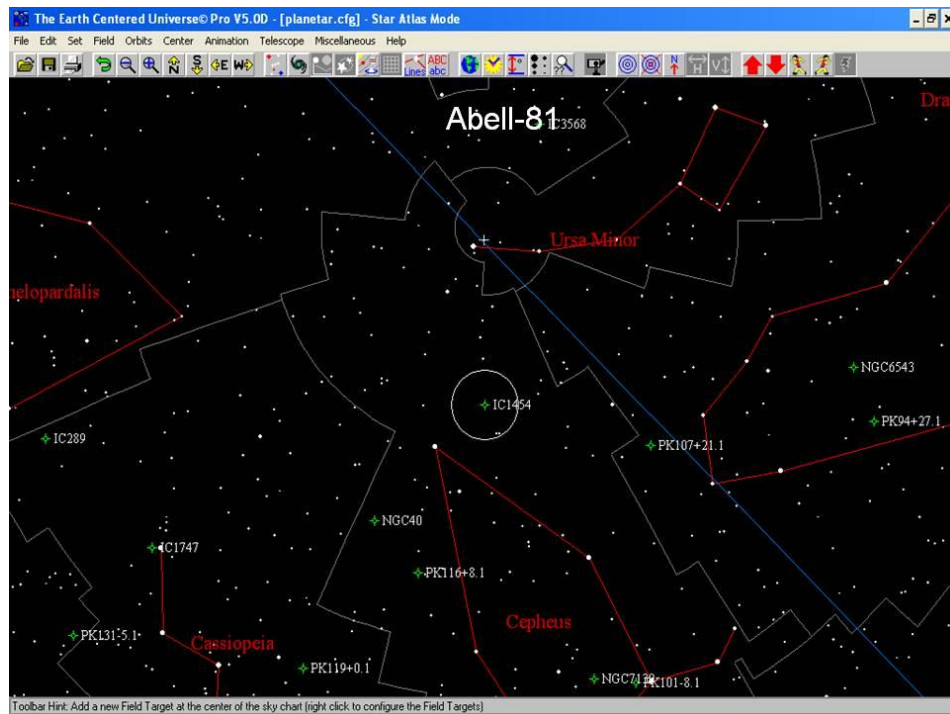


**Abell-50 (NGC6742)** Located in the fall constellation of Draco

8" SCT f6.3, StellaCam-3 @ 3 minutes, O-III filter

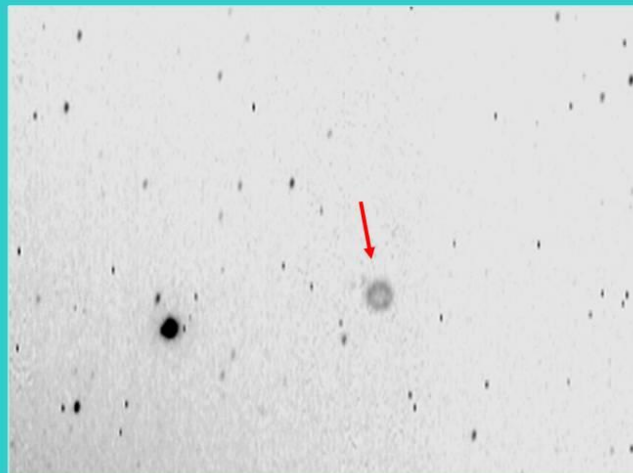


**Abell 81 (IC1454) Located in the fall constellation of Cepheus – Mag+14.8**

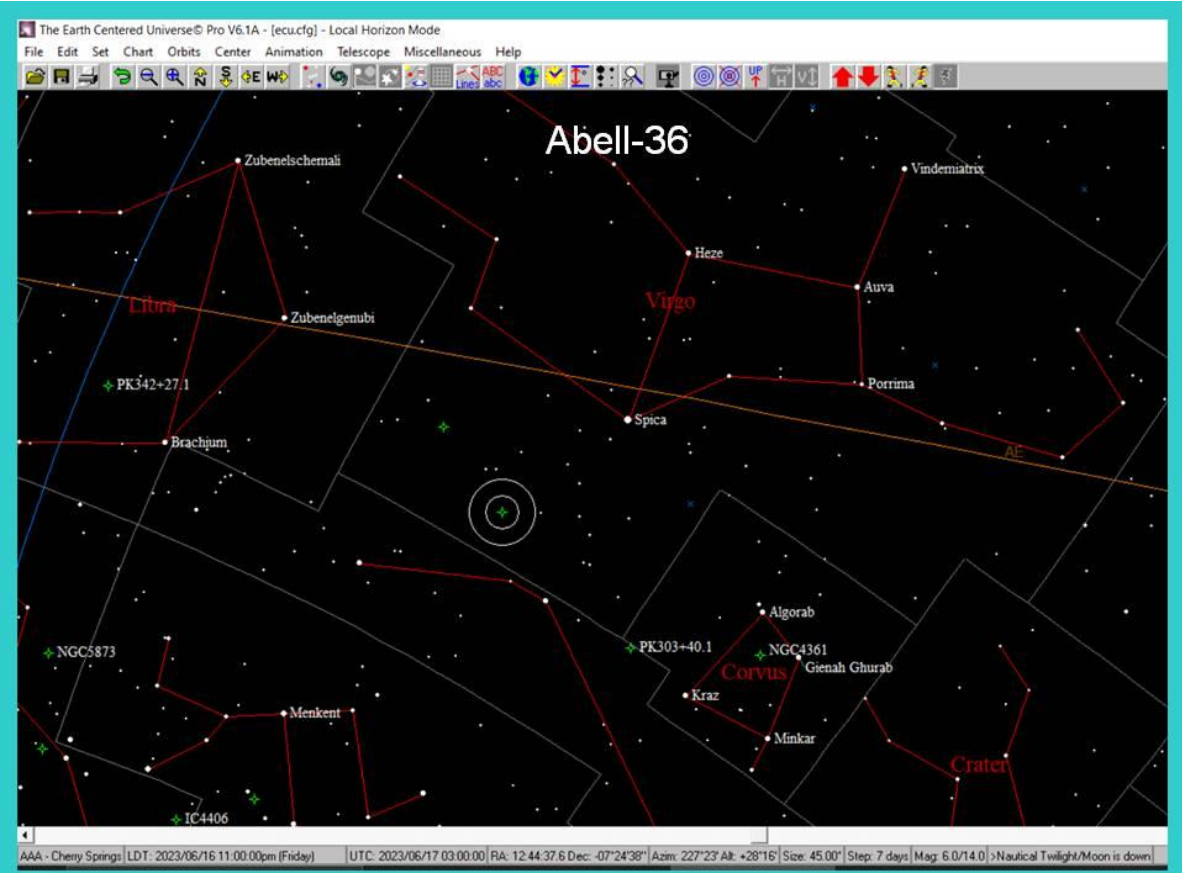


**Abell-81** Located in the fall constellation of Cepheus

8" SCT f6.3, StellaCam-3 @ 3 minutes, O-III filter



**Abell 36** Located in the constellation of Virgo – Mag+13

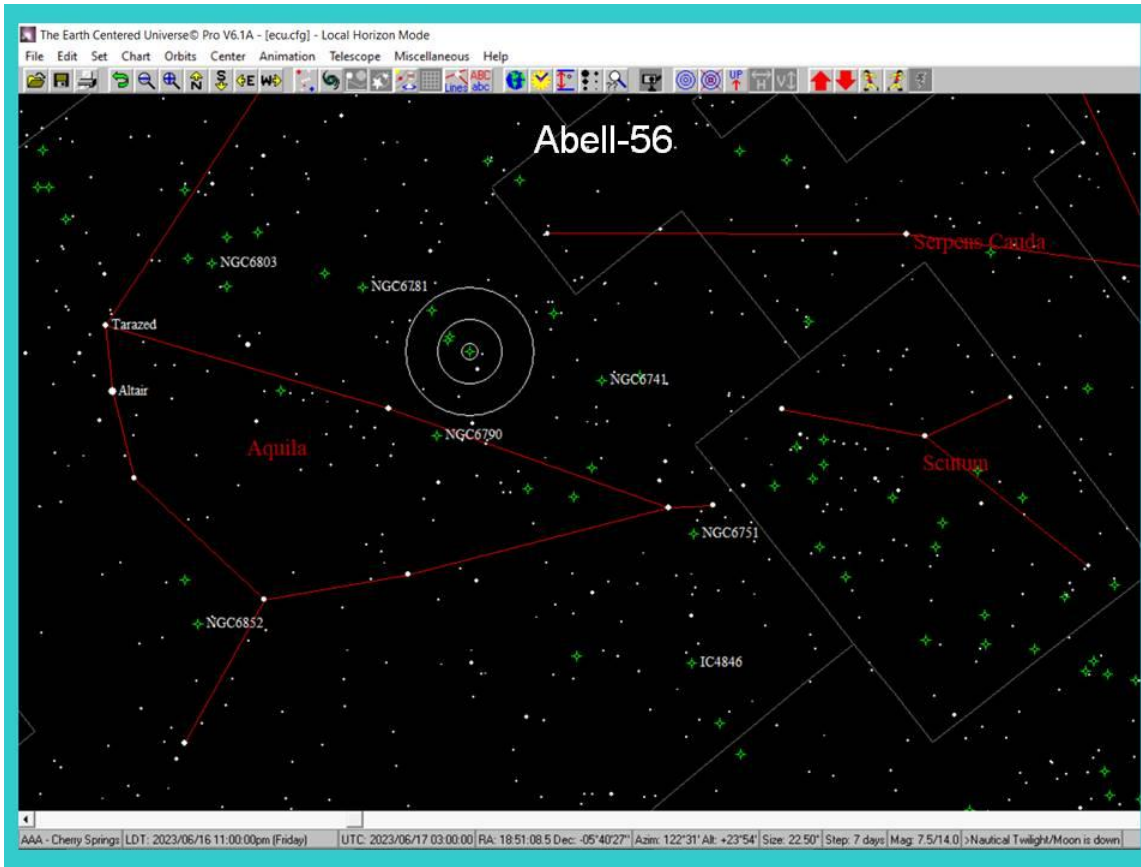


**Abell-36** Located in the Spring constellation of Virgo  
8" SCT f6.3, ZWO ASI294MC & L-eNhance narrowband filter  
180 second exposure livestacked for 15 minutes





**Abell 56** Located in the constellation of Aquila – Mag+15.5

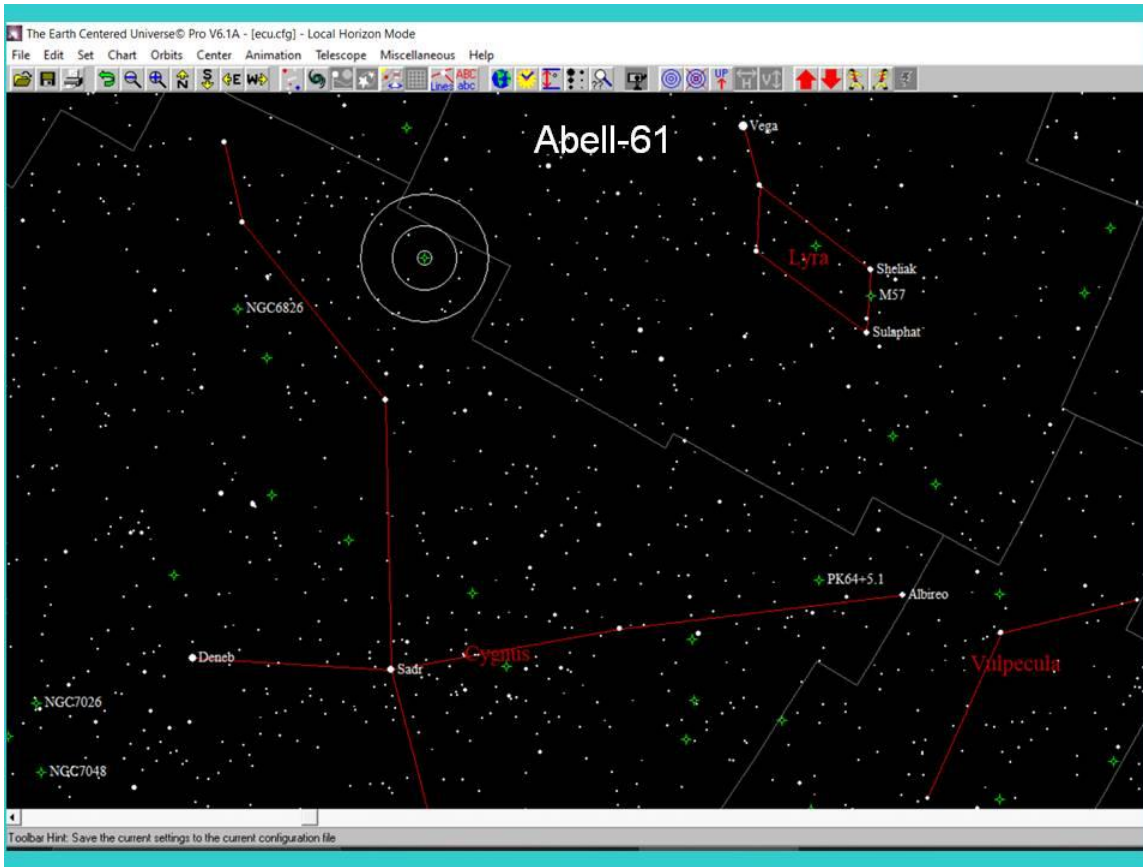


**Abell-56** Located in the Summer constellation of Aquila  
8" SCT f6.3, ZWO ASI294MC & L-eNhanche narrowband filter  
180 second exposure livestacked for 15 minutes





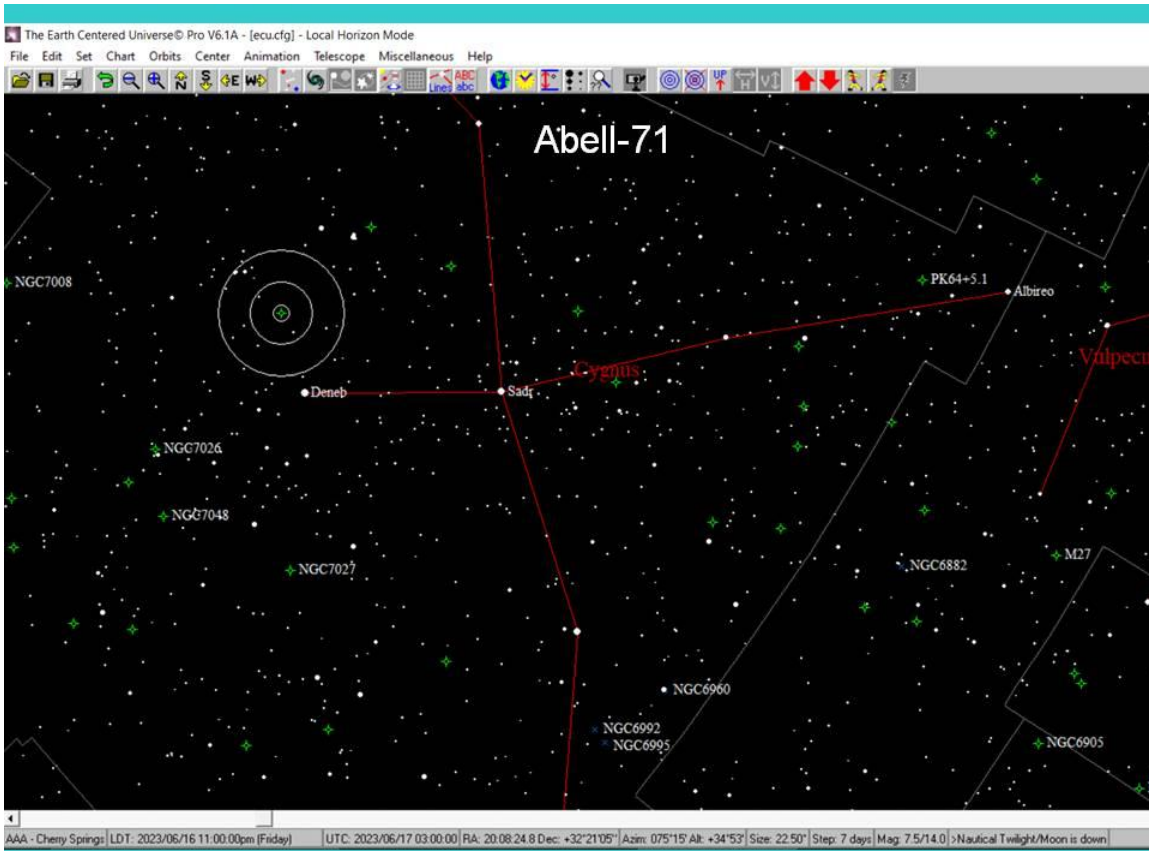
**Abell 61** Located in the constellation of Cygnus – Mag+14.4



**Abell-61** Located in the Summer constellation of Cygnus  
8" SCT f6.3, ZWO ASI294MC & L-eNhance narrowband filter  
180 second exposure livestacked for 15 minutes



**Abell 71** Located in the constellation of Cygnus – Mag+15.2

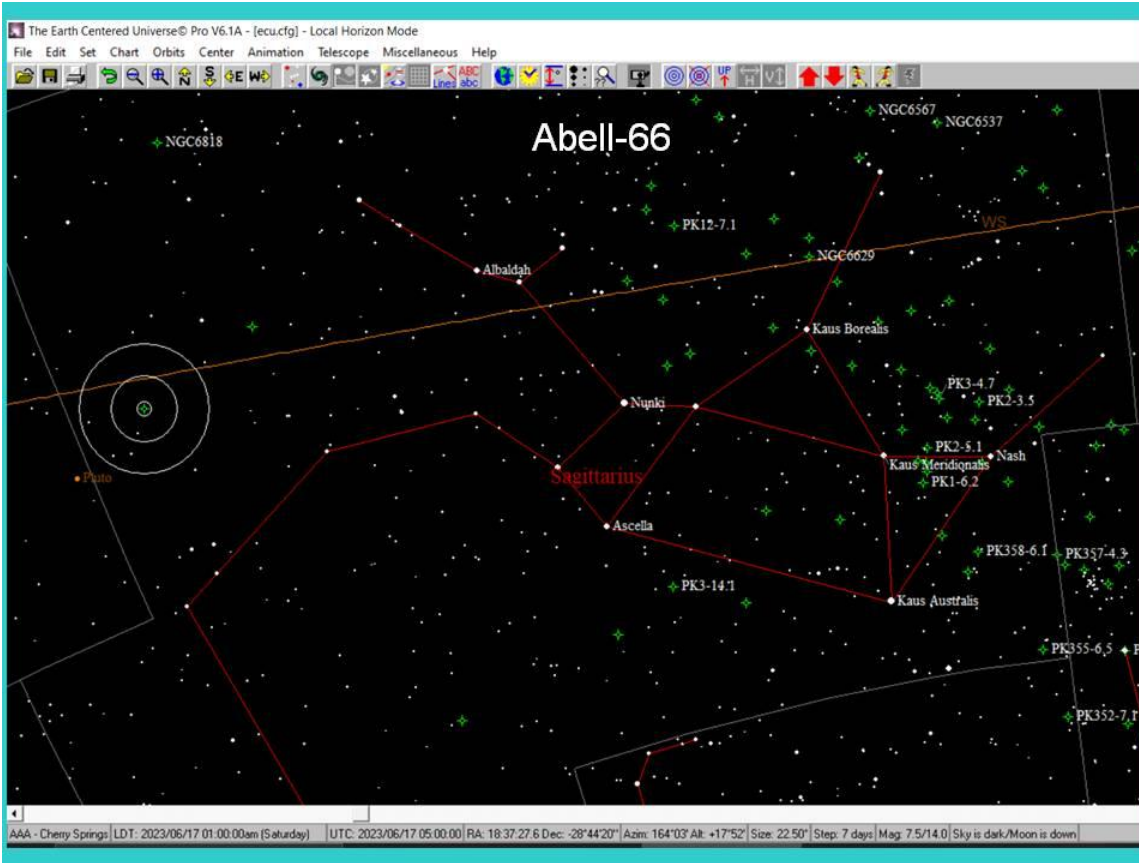


**Abell-71** Located in the Summer constellation of Cygnus  
8" SCT f6.3, ZWO ASI294MC & L-eNhanche narrowband filter  
180 second exposure livestacked for 15 minutes





## Abell 66 Located in the constellation of Sagittarius – Mag+14.9



**Abell-66** Located in the Summer constellation of Sagittarius  
8" SCT f6.3, ZWO ASI294MC & L-eNhance narrowband filter  
180 second exposure livestacked for 15 minutes



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**Planetarium Software:** "Earth Centered Universe" planetarium software by David Lane <http://www.nova-astro.com/>