

# MONTHLY OBSERVER'S CHALLENGE

*Compiled by:*

*Roger Ivester, North Carolina*

*&*

*Sue French, New York*

**February 2023**

**Report #169**

**The Flame Nebula: NGC 2024 in Orion**

*Sharing Observations and Bringing Amateur Astronomers Together*

## **Introduction**

The purpose of the Observer's Challenge is to encourage the pursuit of visual observing. It's open to everyone who's interested, and if you're able to contribute notes and/or drawings, we'll be happy to include them in our monthly summary. Visual astronomy depends on what's seen through the eyepiece. Not only does it satisfy an innate curiosity, but it allows the visual observer to discover the beauty and the wonderment of the night sky. Before photography, all observations depended on what astronomers saw in the eyepiece, and how they recorded their observations. This was done through notes and drawings, and that's the tradition we're stressing in the Observer's Challenge. And for folks with an interest in astrophotography, your digital images and notes are just as welcome. The hope is that you'll read through these reports and become inspired to take more time at the eyepiece, study each object, and look for those subtle details that you might never have noticed before.

### **This month's target:**

William Herschel discovered this fetching nebula with his 18.7-inch, speculum-metal reflector on 1 January, 1786. His handwritten journal for that night reads: *A wonderful milky nebulosity, divided in three or 4 large patches including a dark space, the whole cannot take up less than half a degree; but I suppose it to be much more extensive.*

Professor Courtney Seligman's nifty website gives the following physical information on the nebula:

Apparent size 30 by 30 arcmin. The "Flame" nebula, near the bright star Alnitak on the eastern side of the "belt" of Orion. Although the apparent closeness of Alnitak to the nebula suggests that its radiation is what lights up the nebula (Alnitak is a hundred thousand times brighter than the Sun, and two thirds of its "light" is ultraviolet radiation that is far more capable than visible light of causing such nebulae to glow), it is actually a foreground object, being only about 800 light years away, while the nebula is about 1500 light years distant. The actual energy source for the nebula is a group of OB stars hidden within its interior in visible light images, which have formed very recently (and in fact other such stars are probably forming within the nebula at the present time, as there is evidence that stars closer to the center of the nebula formed later than those in its outer regions). <http://cseligman.com/text/atlas/ngc20.htm#2024>

The website's front page is: <http://cseligman.com/index.htm>

**Uwe Glahn:** Observer from Germany



Object: NGC 2024 "Flame Nebula"

Telescope: 20" f/4.5 Newton

Magnification: 132×

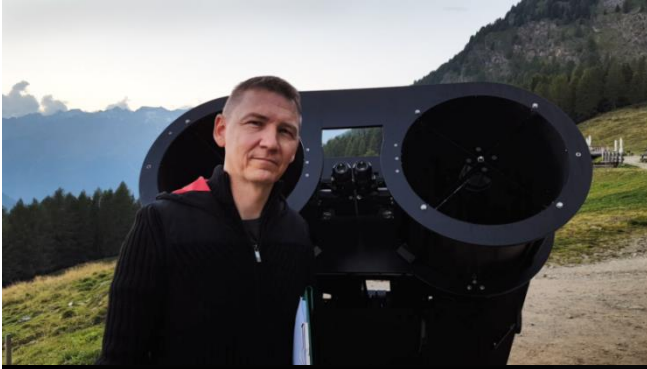
NELM fst 7m+

Seeing: V

Location: Puntagorda 1280m (La Palma)



**Peter Vercauteren:** Observer from Italy



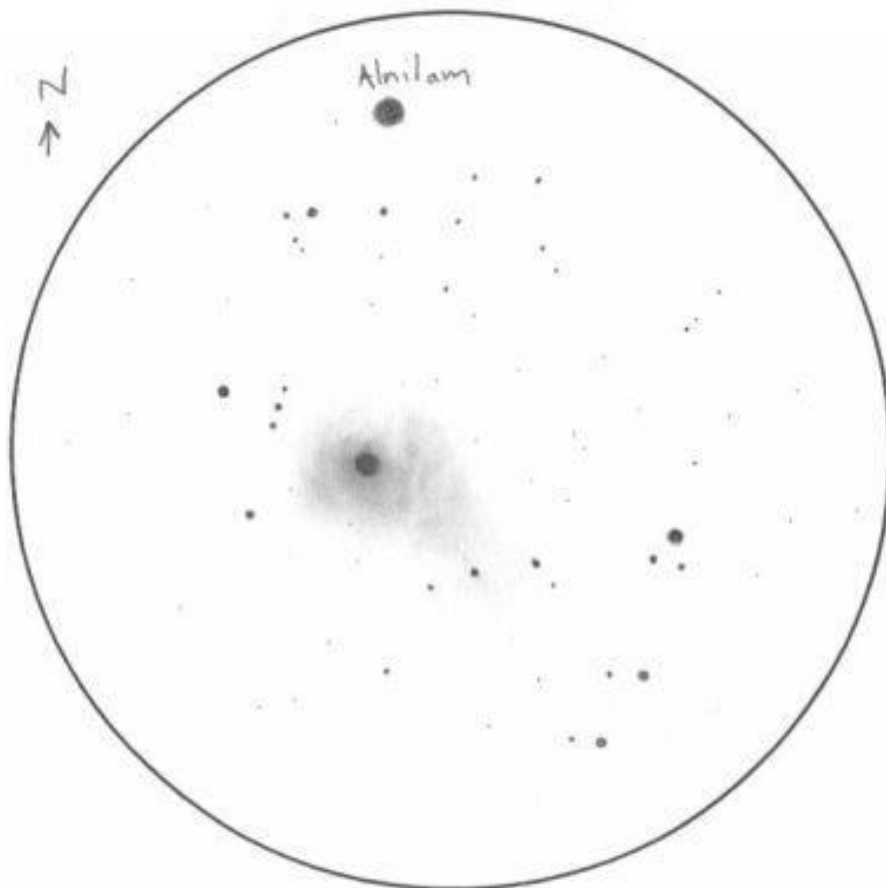
Alnitak is the left star of Orion's belt and lies at the heart of an interesting region of our sky. To the left lies IC434 which includes the famous Horsehead nebula (not in view). The Flame Nebula (NGC2024) lies to the right.



NGC2024 - IC434 (Alnitak region)  
Carù, 27 Dec 2013 - 21:30UTC  
18" f/4,45 PeterDob  
40mm Siebert VP Echelon 2" binoviewer  
24mm Explore Scientific 82° - No OCA - 85x  
No filter used

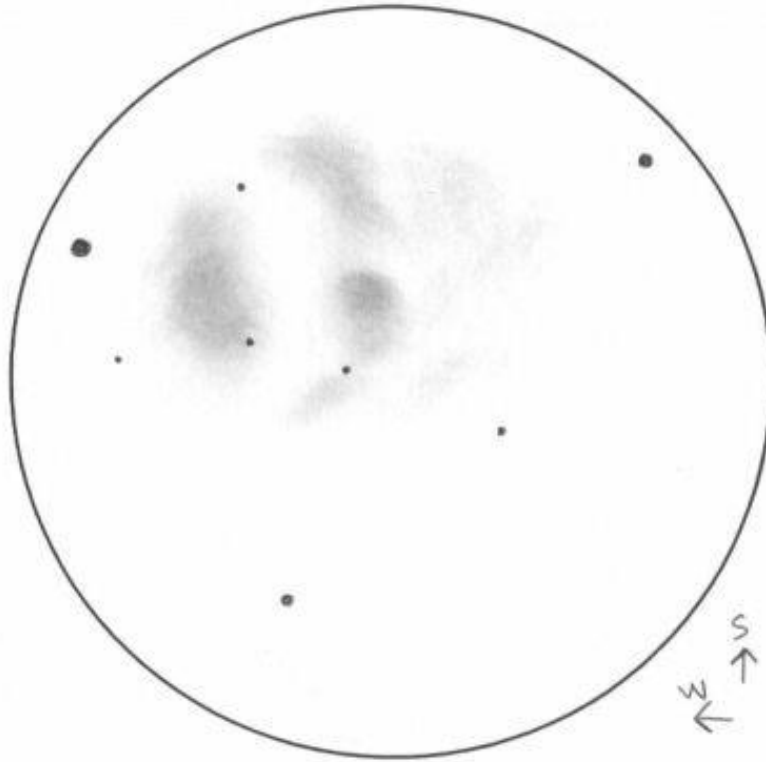
Peter Vercauteren  
[www.astronomydrawings.com](http://www.astronomydrawings.com)

**Jaakko Saloranta:** Observer from Finland



80mm f/5 refractor at 15× with O III filter  
Puerto Del Carmen, Lanzarote, Canary Islands

The Flame nebula lies just W of Alnitak, Zeta Orion. It is round, basically even brightness. Whole Zeta Orion area looks more or less nebulous, N side clear of any nebulosity. IC 434 is extremely faint wisp extending SW from Alnitak.



8-inch f/6 reflector at 60×  
Rajakylä, Vantaa, Finland

Nebulosity is divided into 3 different modules by a clear dark lane. W module is roundish, diffuse and brightest. Few very faint wisps visible in the E side of the nebula.

**Bertrand Laville: Observer from France**



<i>Date of sighting:</i>	Nov 15, 2017 01:30 UT
<i>Duration of observation:</i>	102 mins
<i>Viewing location:</i>	Observatory of the Baronnies Provençales
<i>Instrument :</i>	TN 635 Dobsonian Obsession
<i>Main eyepiece:</i>	Tele Vue Ethos 21mm
<i>Magnification:</i>	148×

You'll find more detailed descriptions of Bertrand's sketches at: <http://www.deepsky-drawings.com/>

**Magda Streicher: Observer from South Africa**



NGC 2024 (Flame Nebula) the dusty Companion, in the constellation Orion

RA: 05h 40m.27 Dec: +02° 51.27'

Size: 30'×30'

Telescope: 16-inch Schmidt-Cassegrain – Focal Length 4064mm (f/10)

Eyepieces employed: Super wide 40mm; Ultra-wide 17mm; and UW 14mm. All eyepieces are 2-inch format

Observing coordinates: S -23°18.5 E: 28°29.9

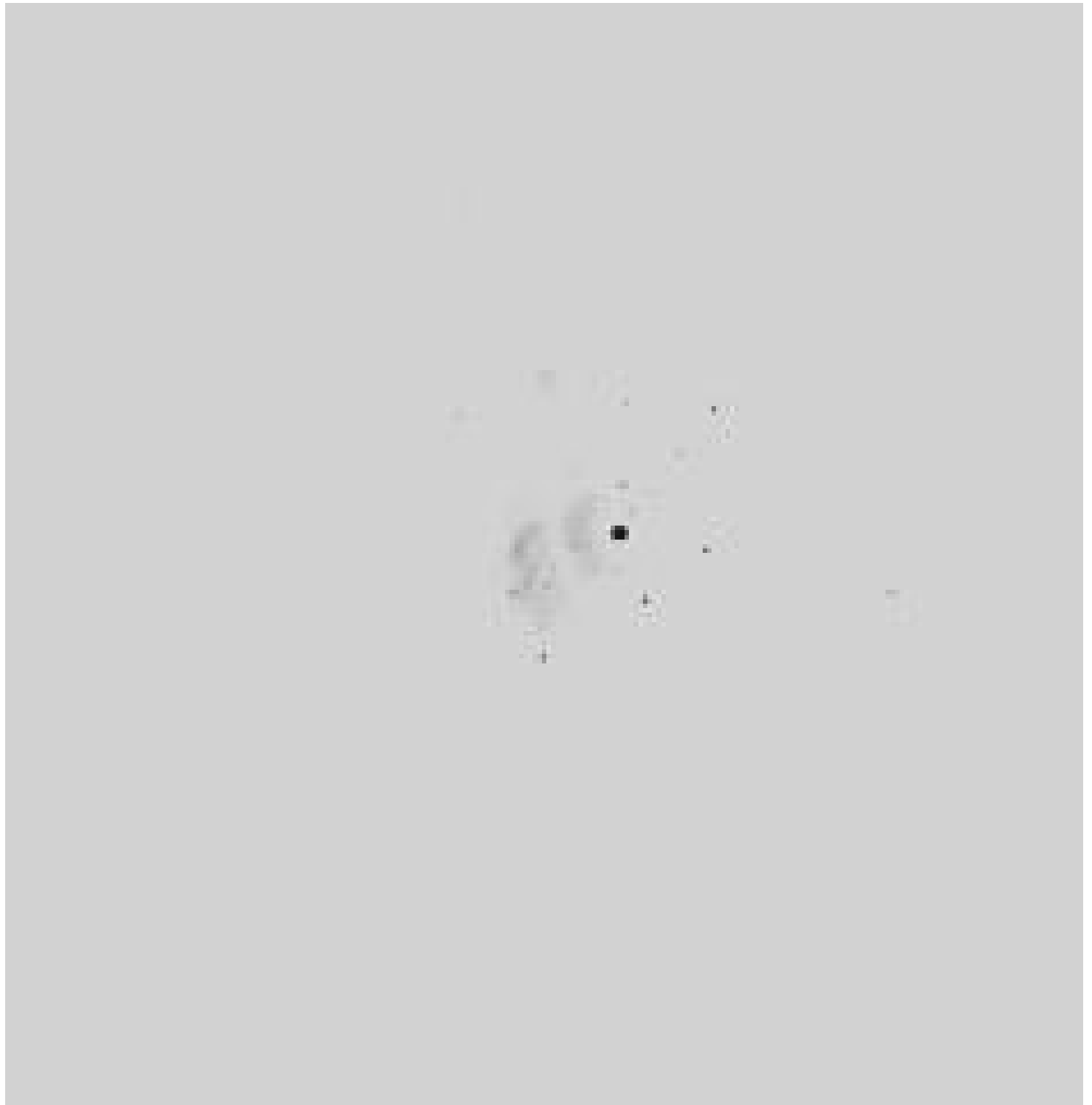
The star Zeta Orionis highlights the emission nebula NGC 2024, better known as the flame nebula, which is situated towards the east of this magnitude 1.9 star.

However, due to the stars overwhelming brightness it was “surprising easy” to observe with a careful eye. The nebula is relatively large at 30'x30' with a prominent dark north-south lane which “clearly” cuts through

the nebula. The eastern part being the largest. And with higher magnification a slight curve could be pick up towards the southern broken end, and a dark inlet towards the east.

Using higher magnification brings flimsy inlays filtering into the eastern nebulosity. With the use of an O-III filter I was amazed by the finer detail with brighter parts and stringy dark threads that brings joy to my curious eyes.

Faint pin-point stars are embedded against the nebulosity complete a sighting of one of the most beautiful objects in Orion.





**Mircea Pteancu: Observer from Arad, Romania**



Mircea Pteancu of Arad, Romania  
Affiliated with Hungarian Astronomical Assoc., Romanian Society for Cultural Astronomy,  
“Galaxis” Astronomy Club, moderator on *astronomy.ro* forum.  
<https://observoergosum.blogspot.com/>  
<https://www.astronomy.ro/forum>

Unfortunately I had only one occasion with a sky good enough to see NGC 2024, known as the Flame Nebula.

I was able to spot two dark lanes dividing the very dim nebulosity in three parts, with my 250mm Dobsonian telescope, and with the employ of a UHC filter.

My observation occurred from a dark site with Bortle 4 sky, but my time was too short to make a drawing.

On other occasions the sky was not clear enough for such an object.

Larry McHenry: Observer from Pittsburgh, Pennsylvania

<http://stellar-journeys.org>



Emission nebula NGC 2024 is located in the winter constellation of Orion – ‘The Hunter’.

The HII object, (Sh2-227), known as the “Flame Nebula”, (and also as the “Maple Leaf Nebula” by our northern friends), is about 1,354 light-years distant, and is about 6 light-years in diameter, and estimated to be several million years old. The glowing nebula is ionized by UV light from the nearby bright “O” class blue supergiant star Zeta Orionis, known as “Alnitak” one of Orion’s three belt stars.

Similar to M42, the “Great Orion Nebula”, NGC 2024 is also an interstellar star factory, with a young star cluster containing several hundred stars embedded within the nebula. NGC 2024 is part of the giant Orion Molecular Cloud that contains nearly every bright, dark, and reflection nebula and star cluster visible within the constellation.

NGC2024 was discovered on the night of January 1st, 1786 by William Herschel using his 20-ft reflector, at his home in Slough. Herschel described the object as: “*Wonderful black space included in remarkable milky nebulosity, divided in 3 or 4 large patches,,,*”.

**Video-Capture/EAA: Images Follow.**

10/30/2020, from Big Woodchuck Observatory backyard in Pittsburgh, PA, using a 60mm refractor @ f/4 on a GEM mount, with a CMOS color camera and narrowband filter, 30-second guided exposure, live-stacked for 40 minutes.



11/03/2021, from Calhoun County Park in West Virginia, using an 8-inch SCT optical tube @ f/6.3 on a GEM mount, with a CMOS color camera and broadband filter, 60-second guided exposure, live-stacked for 15 minutes.



**John Bishop:** Observer from Massachusetts



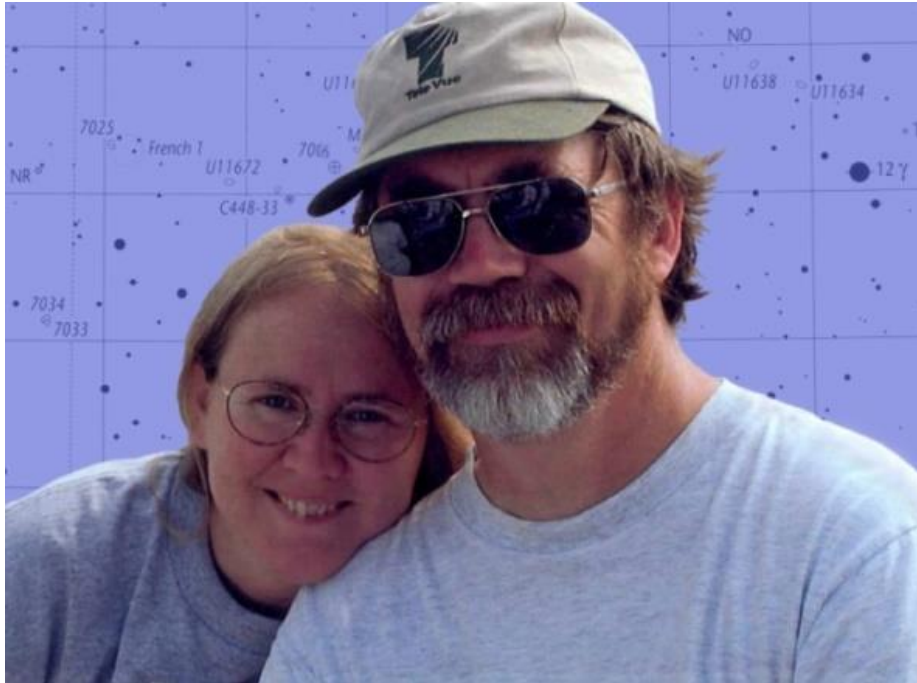
On February 15, 2023, I observed NGC 2024, an emission nebula in Orion. I used my usual 8.25-inch f/11.5 Dall-Kirkham reflector, on a motor driven equatorial mount, without go-to. Observations were made from the ATMoB Clubhouse in Westford, Massachusetts. The sky was clear, except, as forecast, thin clouds rolled in at mid-evening for an hour or so. Transparency and seeing were fair. Temperatures were unseasonably mild during the day, but dropped into the thirties (degrees F.) during the evening.

Finding NGC 2024's location was easy enough, but actually seeing the nebula was not. It lies very close to Zeta Orionis, aka Alnitak, the easternmost star in Orion's belt. To start with, the glare from Alnitak overpowered the field. When I moved the bright star out of the FOV, I could see a subtle, uneven brightening in the area of the nebula. Averted vision was helpful.

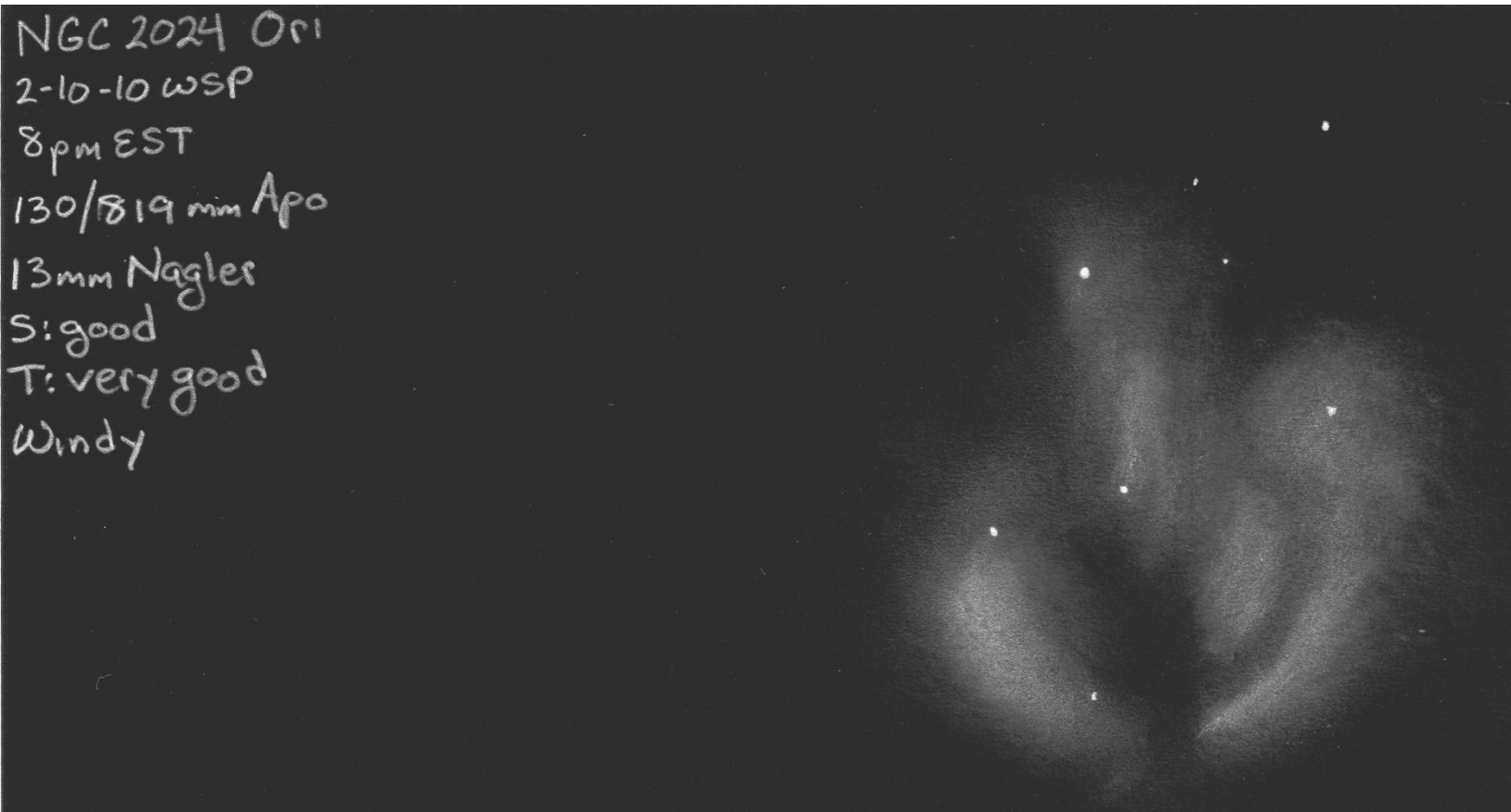
A fellow observer confirmed that he saw the brightening in my scope. I tried UHC and OIII filters, at various magnifications. The best view, limited as it was, was with the UHC filter at 80 $\times$ . It wasn't much. I saw a bright patch, closer to Alnitak, with faint brightening extending away from the star. The object was large, but faint and diffuse, with no definite boundary.

I had not observed this object before, and I have probably passed over it in the past, not realizing it was there. For my scope and seeing conditions, NGC 2024 was a faint and difficult visual object.

**Sue French: Observer from New York**



NGC 2024 Ori  
2-10-10 WSP  
8pm EST  
130/819 mm Apo  
13mm Nagler  
S: good  
T: very good  
Windy



This sketch was made at the Winter Star Party in the Florida Keys. The image is mirror-reversed as seen through the telescope. North is up, and East is to the right.

**Glenn Chapple: Observer from Massachusetts**



**NGC 2024 “Flame Nebula” Emission Nebula in Orion (Magnitude "7.2 (O'Meara)", Size 30'×30')**

Our February Observer’s Challenge, the emission nebula NGC 2024 (the Flame Nebula) in Orion, tests our visual skills in two ways. A 7<sup>th</sup>-magnitude object, as estimated by Stephen James O’Meara, its light is spread over an area the size of the full moon. Worse yet, the Flame is hidden by the glare from the nearby bright star zeta ( $\zeta$ ) Orionis (Alnitak).

The Flame Nebula was discovered by William Herschel on the night of January 1, 1786. He cataloged it as a Class V object (Very large nebulae) and wrote, “Wonderful black space included in remarkable milky nebulosity, divided in 3 or 4 large patches; cannot take up less than a half degree, but I suppose it to be much more extensive”.

You won’t need its 2000.0 coordinates, RA 5<sup>h</sup>41<sup>m</sup>54<sup>s</sup> and Dec -0°51’0.0” to find the Flame Nebula. It’s just 15 arc-minutes ENE of Alnitak, the most southeasterly of Orion’s three Belt stars. Seeing it visually requires moving Alnitak out of the field of view. Although a large-aperture scope is recommended, the Flame can be seen with small aperture instruments and medium magnifications, especially if skies are transparent and an O-III filter is used. O’Meara has glimpsed it with 7×50 binoculars, suggesting that Alnitak be blocked by a distant rooftop or sharp-edged structure.

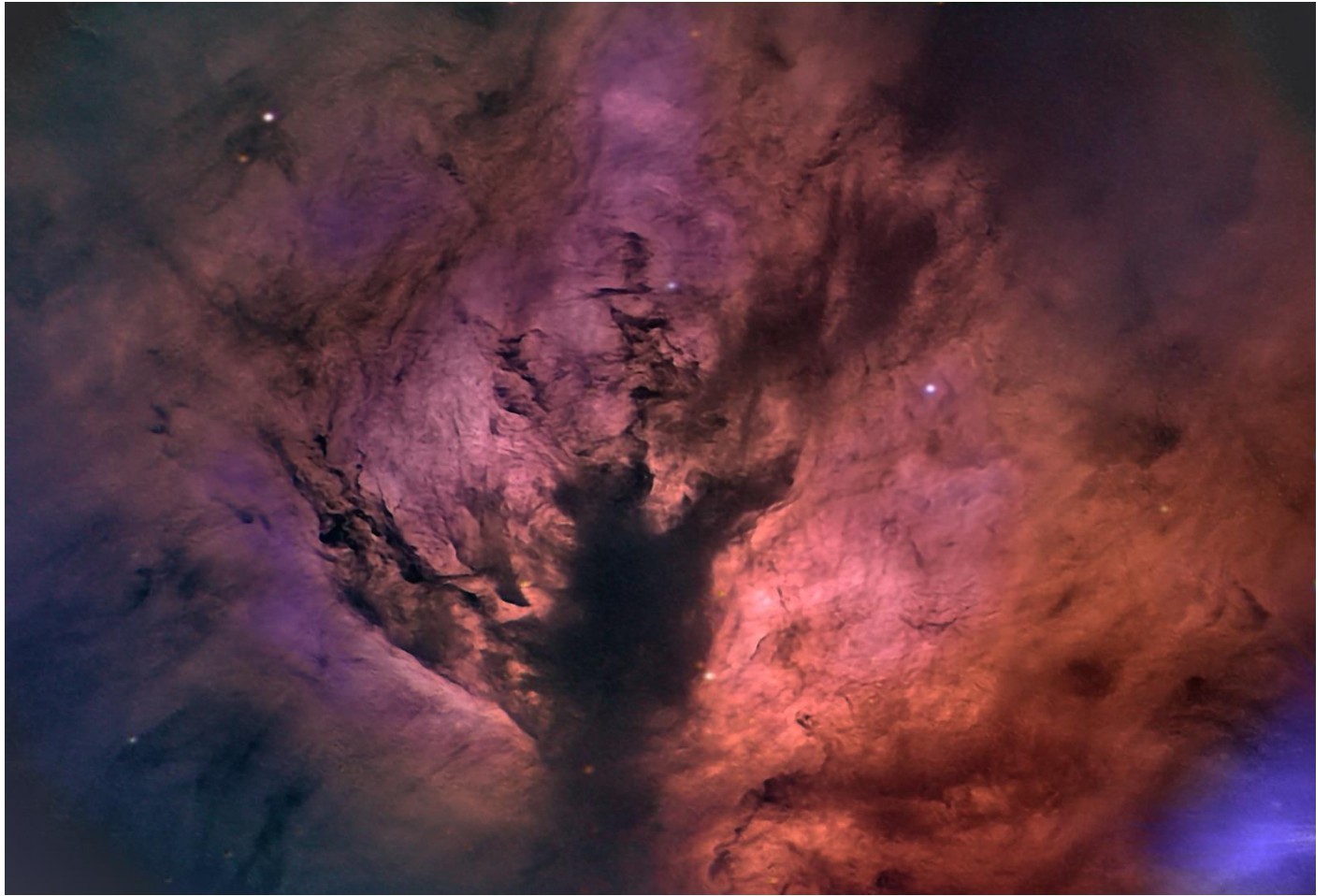
Once you’ve (hopefully!) managed to capture the Flame Nebula, it’s time to turn to another challenge - that pesky star Alnitak. At a visual magnitude of +2.0, it’s the brightest spectral class O star in the sky. A hot blue supergiant, it’s 20-30 times more massive than the sun and some 10,000 times more luminous. Alnitak has a visual companion – a blue-white giant of magnitude 3.7 situated some 2.4 arc-seconds to its SSE (Position Angle 166°). The pair may be split with a 3-inch scope and magnifying power of 150×, provided the seeing is steady. A third member, of 9<sup>th</sup> magnitude, lies 59 arc-seconds to the northeast.

The Flame Nebula is located about 1400 light years away. It has a diameter of approximately 6 light-years.

**Mario Motta:** Observer from Massachusetts





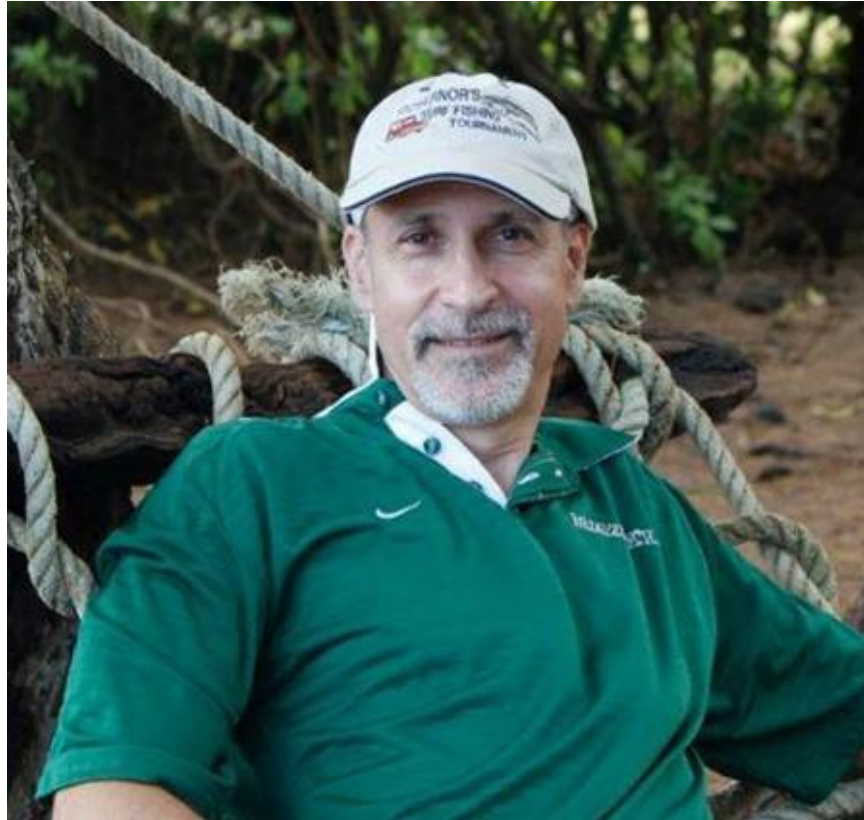


NGC 2024, taken with my 32-inch f/6.5 telescope in Gloucester, MA, using my ZWO ASI6200 camera.

For this object which is mostly a reflection nebula, I used Red/Blue/Green filters, but also H alpha as the Luminance, which gave nice added detail as there is some emission in Ha. No significant O3 or S2 emission to be had in NB imaging here.

Total of 3 hours imaging in all. Combined and processed in PixInsight, including the new BlurXterminator, giving crisp detail. My field of view is 24×16 arc minutes.

**James Dire:** Observer from Illinois



NGC 2024 is an emission nebula in Orion that contains myriad dark dust lanes. It is commonly known as the Flame Nebula, but sometimes called the Christmas Tree Nebula or the Tank Track Nebula. The nebula is part of the Orion Molecular Complex that also contains the Horsehead Nebula (IC 434).

NGC 2024 lies 900 light-years away. It spans a 30-arcminute area. There are approximately a dozen stars embedded in the nebula. The nebula's gases are excited by radiation coming from the star Alnitak (Zeta Orionis), the easternmost star in Orion's Belt.

Alnitak is a triple star system. The brightest component is a magnitude 1.74 blue supergiant. The secondary component is a magnitude 3.7 blue giant star. The two stars are separated by 2.3 arc seconds, or 680 AU. The third star is a 4<sup>th</sup>-magnitude star orbiting a mere 11 AU from the primary.

My first image of the Flame Nebula is a wide field shot containing NGC 2024, IC 434 and the star Alnitak. This was captured using a 70mm f/6 Apo with a 0.8× focal reducer/field flattener and a SBIG STF-8300 CCD camera. The exposure was 110 minutes.

The second image of the Flame Nebula was taken with a 132mm f/6.5 Apo using a 0.8× focal reducer/field flattener with an SBIG ST-2000XCM CCD camera. The image was shot through a Optilong L-Enhance filter which only passes hydrogen alpha, hydrogen beta and oxygen III wavelengths. The exposure was 120 minutes.

My third and final image of NGC 2024 was captured with an 8-inch f/8 Ritchey-Chrétien Cassegrain telescope using a 0.8× focal reducer/field flattener with a SBIG ST-4000XCM CCD camera (unfiltered). The exposure was 120 minutes. This image picked up the most detail in the nebula and the greatest number of stars. Most of the stars are foreground objects, but some are inside the nebula.



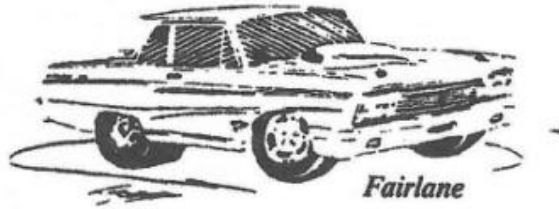




**Mike McCabe: Observer from Massachusetts**



**Observation and sketch follow.**



## Observer's Challenge, January 2023

NGC 1245, Open Cluster in Perseus

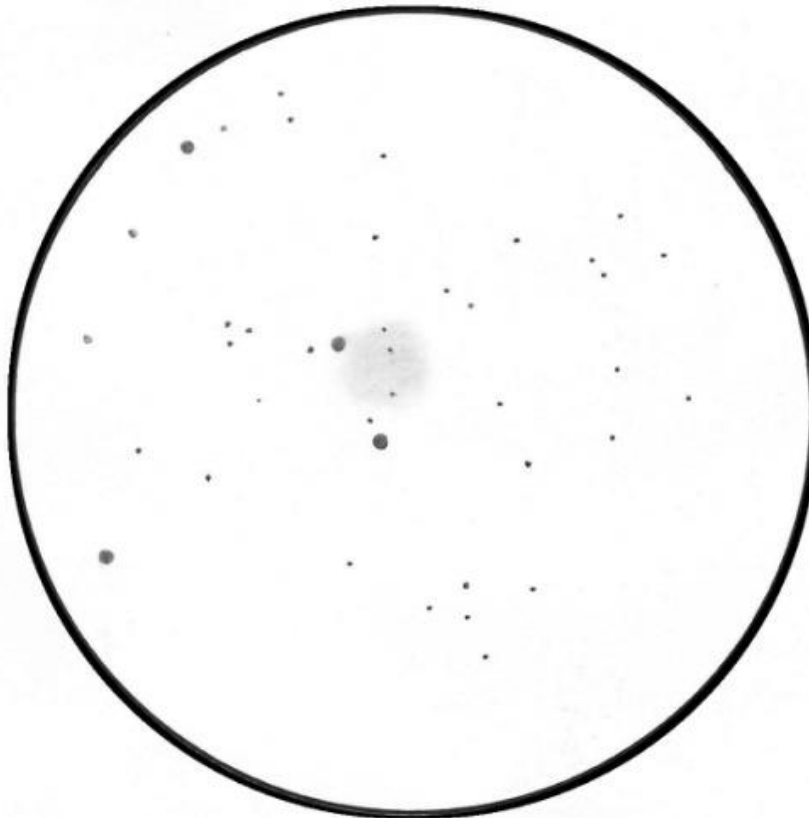
January 9th, 4" F/11 Refractor

January 18th, 10" F/5 Newtonian

*In the 4" telescope the cluster was readily evident as a distinct haze next to a pair of relatively bright stars in the field. Careful investigation with averted vision drew out three to four stars in the cluster itself, but it was the haziness of the unresolved stars that was most attractive. The best view was rendered at a power of 46x, while powers both above and below that only detracted from the quality of the image.*

*In the 10" scope the cluster revealed many more faint stars, but still retained the haziness that made this target attractive in the eyepiece. Higher powers pulled out more stars than in the 4", but the view was still prettier at low power in my opinion.*

*The cluster has the nickname 'Patrick Starfish', the origins of which I'm not familiar with. More pertinent facts include its discovery in December of 1786 by Sir. William Herschel, and that it is quite old for an open cluster at an estimated age of 1 billion years. Astronomers have also found evidence of mass segregation in the cluster.*



41.98n, -70.90w

**M.T.M.**

**Roger Ivester:** Observer from North Carolina



NGC 2024, nebula in Orion.

Date: February 18th 2023

Telescope: 10-inch f/4.5 equatorial reflector

Sketch Magnification: 104×

Field-of-View: 0.79°

Eyepiece Employed: 11mm 82° Apparent Field

Despite overlooking the town of Boiling Springs, I could see NGC 2024 fairly easily with the 10-inch. The nebula is large, very soft, mostly featureless, and elongated. I tried a UHC filter, but without an improved view, and still featureless...so I liked the view without the filter.

**Sketch Follows**



DATE: FEBRUARY 18, 2023  
TELESCOPE: 10-INCH F/4.5 ED REFLECTOR  
SKETCH MAGNIFICATION: 104X  
FOV: 0.79°  
EYEPIECE: 11mm 82° AF

DESPITE OVERLOOKING  
THE TOWN OF BOWLING SPGS,  
NGC 2024 WAS FAIRLY  
EASY TO SEE. THE NEBULA  
IS LARGE, VERY SOFT, AND  
MOSTLY FEATURELESS, ELONGATED.

TRIED UHC FILTER W/6 IMPROVED  
DETAIL.

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ROGER IVESTER

The following is the complete listing of all Observer's Challenge reports to-date.

<https://rogerivester.com/category/observers-challenge-reports-complete/>