MONTHLY OBSERVER'S CHALLENGE

Compiled by:

Roger Ivester, North Carolina

&

Sue French, New York

December 2021

Report #155

NGC 16 Galaxy in Pegasus

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:

The historical identity of NGC 16 and some of its neighbors is a complicated mess. This month I will defer to the expert opinions of Harold Corwin at: http://haroldcorwin.net/ngcic/ngcnotes.all . I've added full names in brackets after abbreviated names on their first appearance. Other brackets are Dr. Corwin's. –Sue

NGC 16 = H IV 15 = h 4 = h 5. Here is a peculiar case where both WH [William Herschel] and JH [John Herschel] have enough problems in their observations that Wolfgang Steinicke has suggested that JH actually saw NGC 22 in one of his observations rather than the much brighter galaxy that his father found. Courtney Seligman brought this to my attention in April 2015; see his web page http://cseligman.com/text/atlas/ngc0.htm on the object for his take on the problems.

WH first saw this on 8 September 1784 and put it 2 minutes 6 seconds east of, and 1 degree 21 arcminutes south of alpha Andromedae. There is nothing there. But about 1 minute and 24 seconds west is found a galaxy more or less matching his description in CH's [Caroline Herschel's] fair copy: "Stellar, or rather like a faint star with a small chevelure and two burs [sic]. F, S." There are a couple of additional things to note. First, there is another star in the sweep, 85 Pegasi that gives a different RA zero point. Using that, the position for WH's object becomes just 1 minute 6 seconds west of the galaxy. This is strongly suggestive of a simple digit error in WH's observation.

The next observation was by JH on 5 September 1828. This pinned down the galaxy very well, but JH added a note in parentheses to his observation, "(?[query] if not IV 15)", well aware that his position was well off his father's.

JH went over the field again on 16 September of the same year, but recorded only an approximate position for the object, calling it "A star 15m with a burr AR [sic] from Cat." So, he accepted that he had seen the same object in this sweep that his father had, even to the extent of adopting the RA from his father's list. There is, of course, nothing in this position.

And this is where the trouble really sets in. JH enters the two observations in his own 1833 list as two separate objects, and copies both into the GC [General Catalogue]. d'A [d'Arrest] comments that he cannot find GC 12 = h 5 on three of the five nights that he observed an object which he called H IV 15 = h 4, not following JH's own list where he (JH) put IV 15 = h 5. JH has a rather peeved note in GC about this: "D'Arrest says, 'h. II. positio cert erronea,' but gives no indication of the correction required in R.A. or P.D."

Dreyer finally sorts it all out for the NGC by making IV 15 = h 4 = h 5, adopting something of a mean of JH's and d'A's positions, and adding a note, "h 5 was not seen by d'A [3 nights] and St[ephan] (XIII) [2 nights]; it is = h 4 as they were observed in different sweeps." In his 1912 edition of WH's complete scientific papers, he adds "IV 15 is = h 4, 1m 20s p[receding] H's place. Some error in recording the transit, probably of 1m; reductions correct."

So there matters stood until Wolfgang went over the field during his re-evaluation of WH's observations and decided that IV 15 = NGC 22. He also, in his re-evaluation of JH's observations, has h 5 identical to a star at 00 10 28.0, +27 42 00 (there are neither stars nor galaxies there). I have not yet had any correspondence with him about this; but given that WH's declination is off NGC 22 by 7 arcmin, and that a simple 1 minute of time RA error will explain the difference in position with NGC 16 -- well, I find myself agreeing with Dreyer on this one. –Harold Corwin

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In its Overview, the NASA/IPAC Extra Galactic Database (NED) currently gives a Preferred Redshift & Derived Quantities distance of 124 to 142 million light-years for the isolated edge-on lenticular galaxy NGC 16.

NGC 16 sits just 24 arcminutes east of the first two entries in the *New General Catalogue*. Although near on the sky, NGC 1and NGC 2 are background objects. NED gives a distance of 188 to 217 million light-years for NGC 1 and 323 to 347 million light-years for NGC 2.

V(V_T) visual magnitudes for the trio are:

NGC 1 12.9
NGC 2 14.2
NGC 16 12.0 –Sue

Bertrand Laville: Observer from France

NGC 16

Observing Conditions: SQM at zenith ~ 21.4, Transparency 1.5 (1 very good to 5 very bad). Light Pollution 1.5 (1 very good to 5 very bad). Seeing very good.

Observation location:	Chabottes, Southern Alps
Instrument:	Meade LX200, 254mm, f /10, go-to.

Meade SWA 13.8mm, Magnification: 185×

It is a luminous galaxy; easily seen with averted vision 100% of the time.

Extended halo.

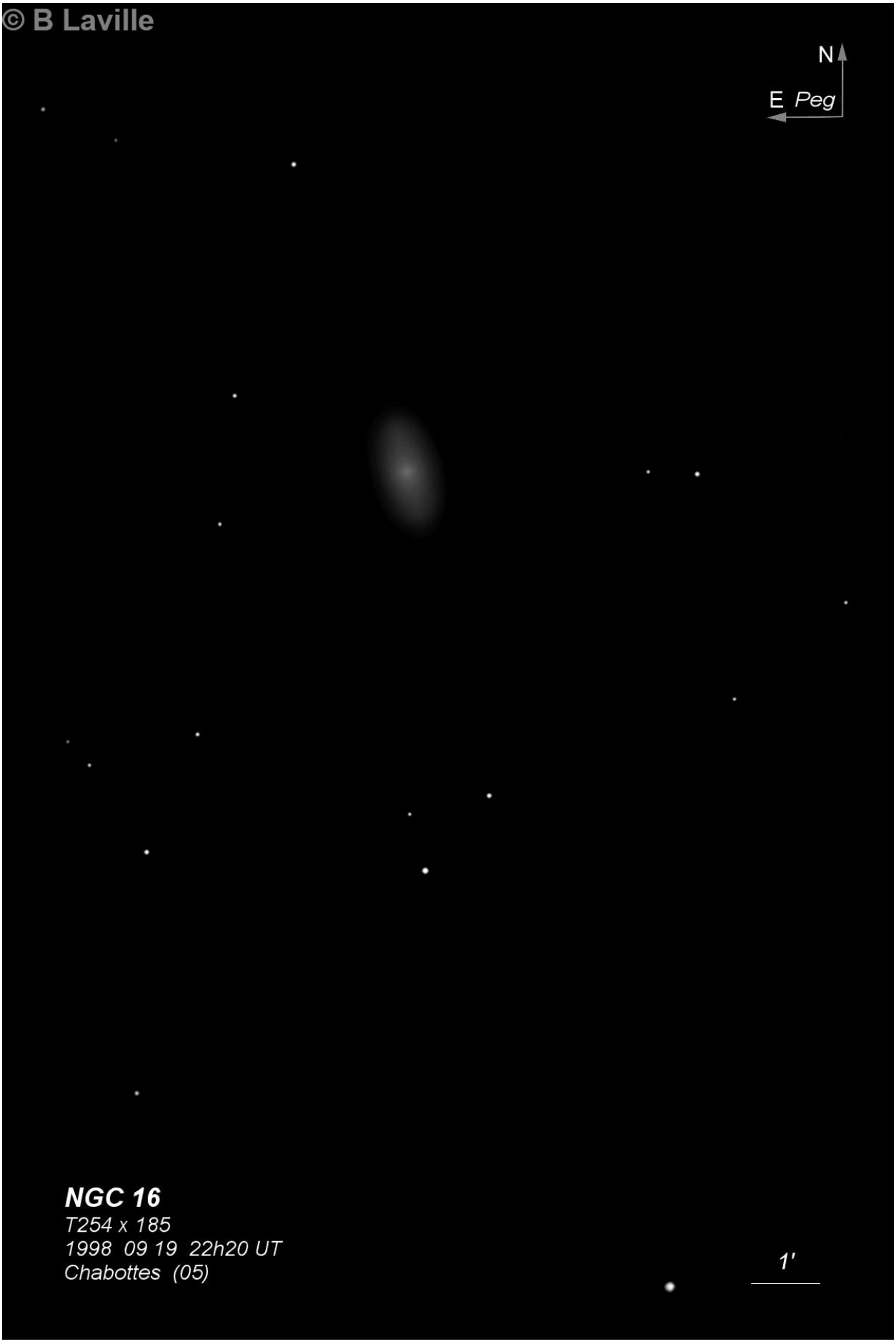
Ellipticity ratio: a / b ~ 3,

Size ~ 2′ × 0.8′.

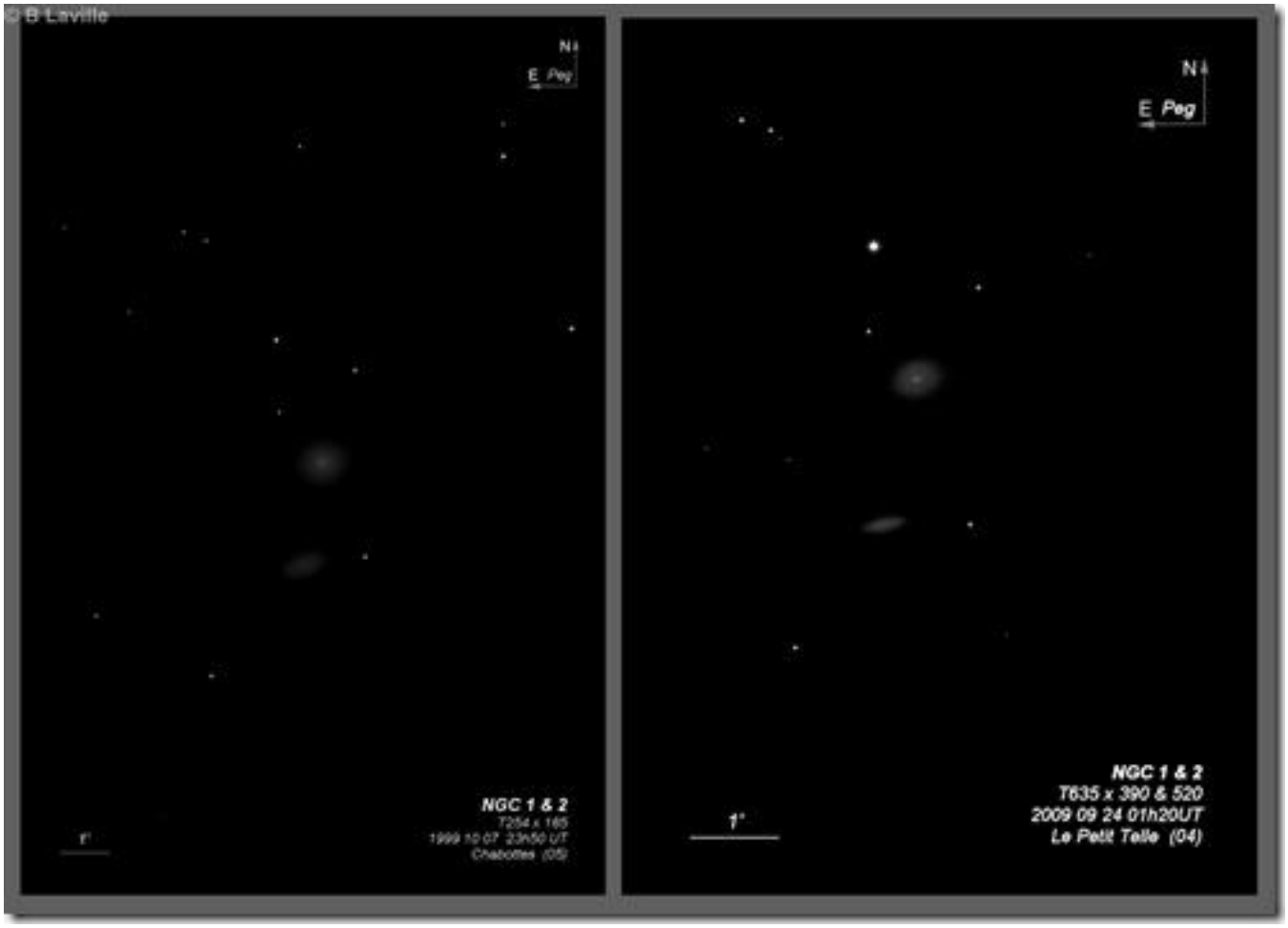
The center is marked, V3. — Direct vision (from 1 obvious to 3 limit)

The whole is in a rather poor field of stars.

Sketch follows.


© B Laville
N
E
Peg
NGC 16
T254 x 185
1998 09 19 22h20 UT
Chabottes (05)
1'

NGC 1 and NGC 2



Sketch on the left:

Observing conditions: SQM at zenith 21.5. NELM (UMi) 6.6. Transparency very good. Light Pollution 1.5 (1 very good to 5 very bad). Excellent viewing conditions.

Observation location:	Chabottes, Southern Alps
Instrument:	Meade LX200, 254mm, f /10, go-to.

185× Meade SWA 13.8 mm

NGC 1 is seen at the limits of direct vision, practically round with a diameter of ~ 1′, central condensation marked and concentrated.

NGC 2 In the same field, NGC 2 is seen with averted vision VI3-VI4 (from 1 seen 100% of the time to 5 seen <10% of the time), intermittently, but absolutely certain. Ellipticity ratio a / b ~ 1.5, a ~ 1′, i.e. as much as NGC 1, Size ~ 60″ × 40″

Perfectly positioned in relation to the 4 stars of Guide7, BEFORE, and verified AFTER on Guide7. The observation conditions considered to be excellent are validated by the fact that the weakest of the 4 nearby stars, taken as a reference star, is of magnitude 14.5 at GSC, 14.08V with Nomad, and m14.9V with A2.

No perceived central condensation, but curiously, recognized orientation (note 06 06 2002: in PA 120 °).

[Note 2020 10 (!): The fact that I perceived the two galaxies with the same aspect ratio and the same dimensions shows that I did not perceive the outer turns of NGC 1, while I perceived the halo better of NGC 2, though less extensive, most likely because NGC 1 is almost seen from the front, while NGC 2 is seen much more in profile.]

Sketch on the right:

Observing conditions: SQM at zenith 21.36. Lensed 2nd generation SQML at zenith 21.26. NELM (UMi) 6.4. Seen less than 10% of the time with averted vision. Transparency 3 (1 very good to 5 very bad). Light Pollution 2.5 (1 very good to 5 very bad). Seeing 3 (1 very good to 5 very bad).

Observation location:	Puimoisson le PetitTelle, Southern French Alps
Instrument:	TN 635mm Dobson Obsession

41 minutes is the total duration of the observation of NGC 1 and NGC 2

390× Ethos 8mm: I expected a duo of starlike objects, and these are just two very modest galaxies, very small, in a field poor (but bright) in stars.

520× Ethos 6mm: The image is better because it is enlarged, to analyze galaxies.

NGC 1 has an elongated, luminous central condensation. Ellipticity ratio a / b ~ 3. Size ~ 1.33′ ×1.50′ in position angle ~ 95°, with a quasi-stellar center. With distant averted vision, we distinguish the halo that surrounds the central condensation but very weakly, L1-L2 Brightness (absolute scale: 1 low limit to 10 fully saturated) at a size of ~ 60″×40″.

NGC 2 has a "classic" appearance: elongated, a / b ~ 3, with a similarly oriented central condensation and a regular gradient. No stellar core. Size ~ 50″×15″.

The observation is only interesting from an anecdotal point of view, because of the numbers 1 and 2.

Uwe Glahn: Observer from Germany

Objects: NGC 1 and NGC 2

Telescope: 27″ f/4.2 Newton

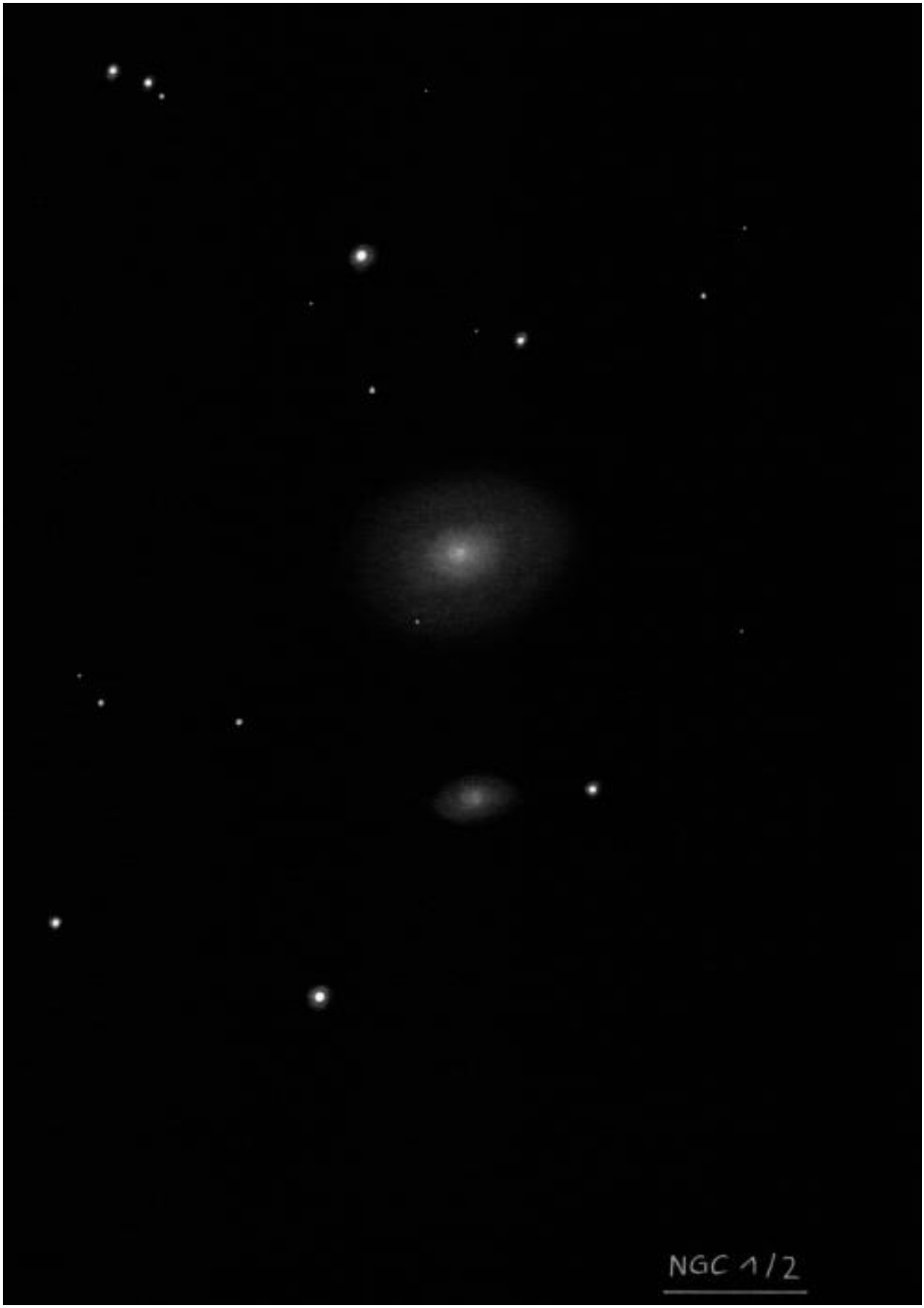
Magnification: 293×

NELM: fst 7m0+

Seeing: V

Location: Fuscher Törl

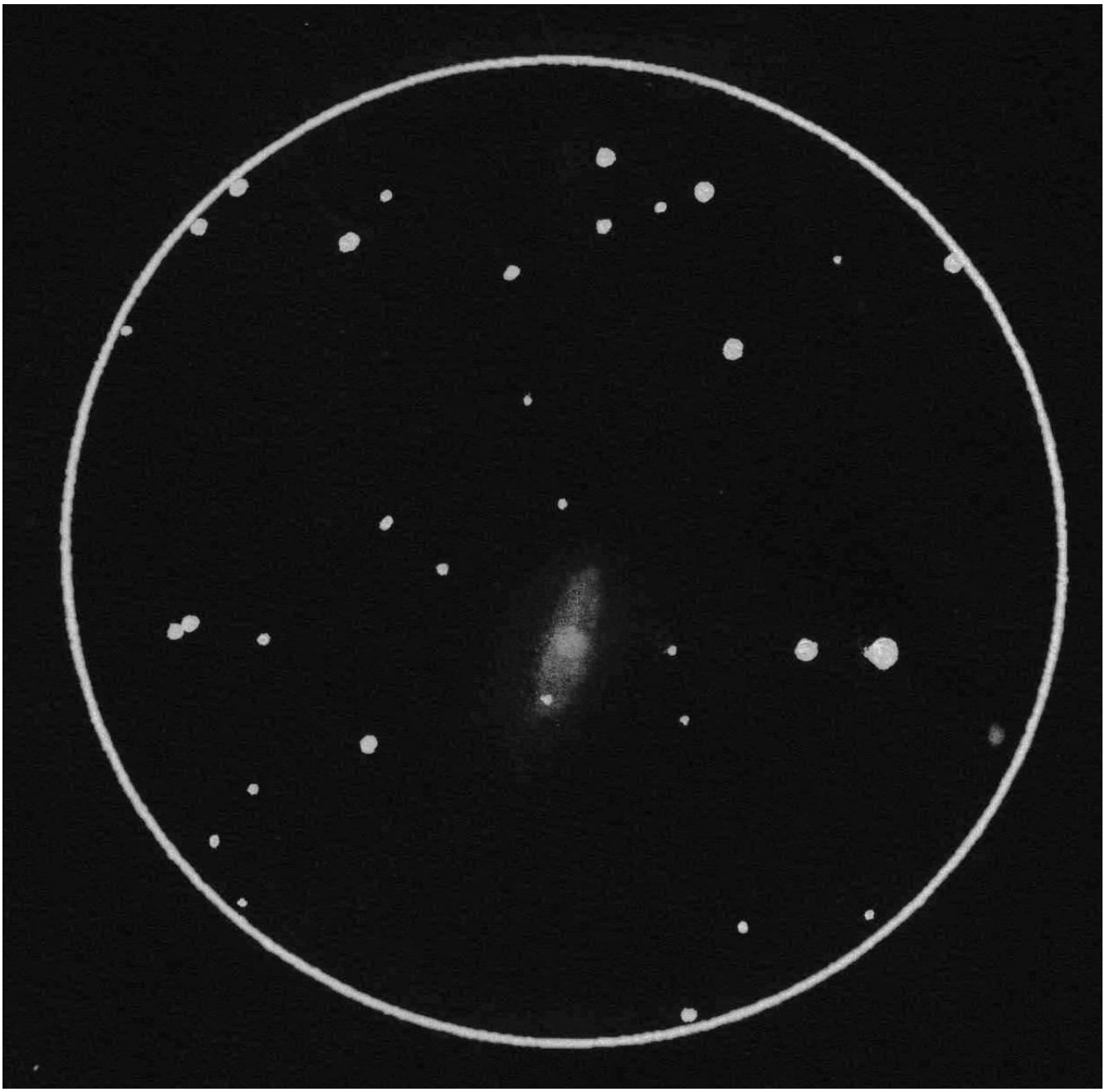
You can see more of Uwe's sketches at: http://www.deepsky-visuell.de/


NGC 1/2

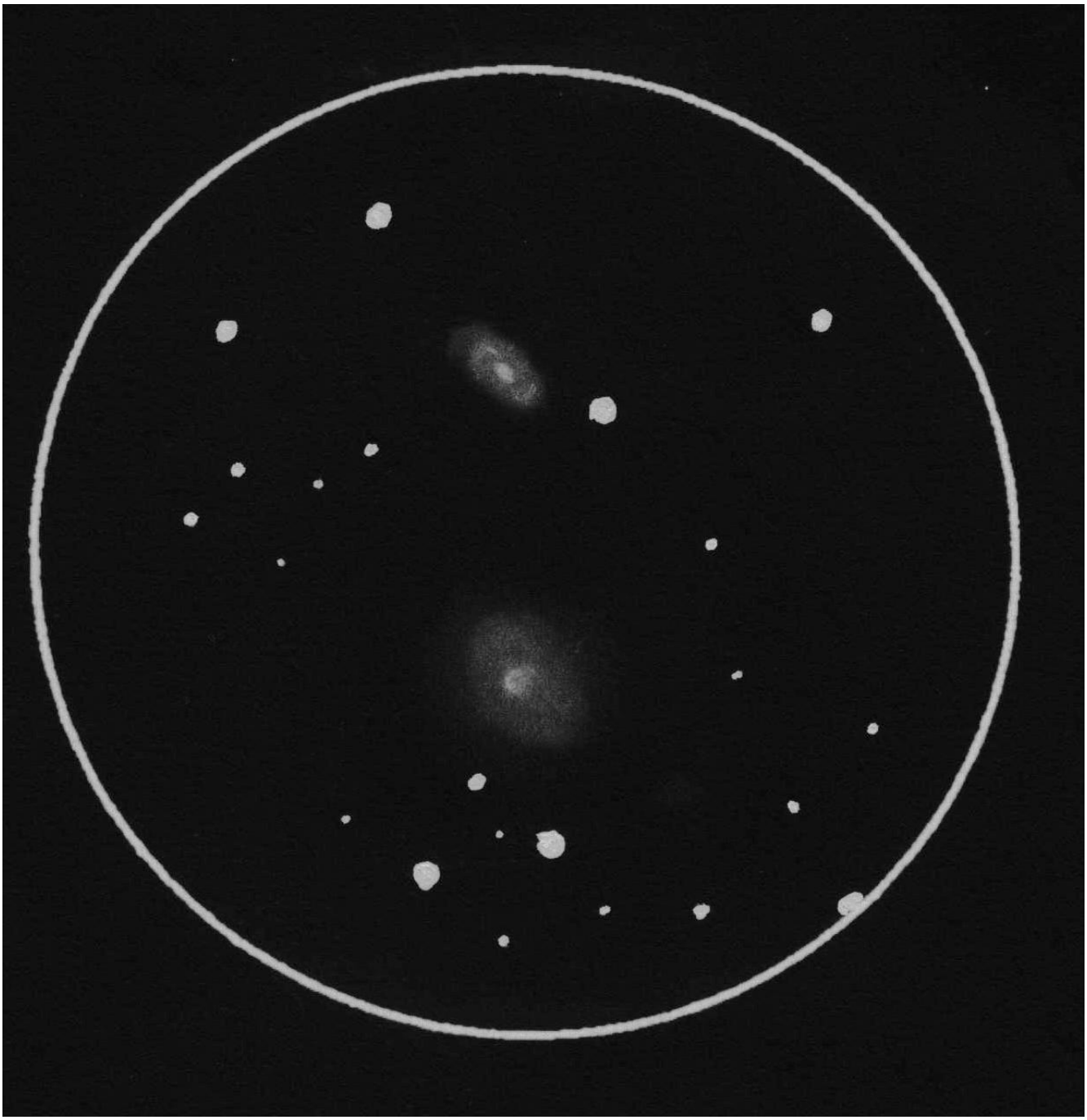
Dale Holt: Observer from England, 30 miles north of London

The set up for these sketches was my usual 505mm F/3.7 mirror, Watec 120N+ cooled video camera, sketches made from CRT b&w monitor screen using black pen for stars and pencil and blending stump for the deep sky objects, then inverted in 'Paint.'

NGC 16



NGC 1&2



Chris Elledge: Observer from Massachusetts

On November 5th @10:50pm EDT, I used the ATMoB 25-inch f/3.5 reflector to observe NGC 16 from the ATMoB Clubhouse. Sky conditions were: Bortle Scale 6; NELM 4.5 near NGC 16; Transparency: Good; Seeing: Fair.

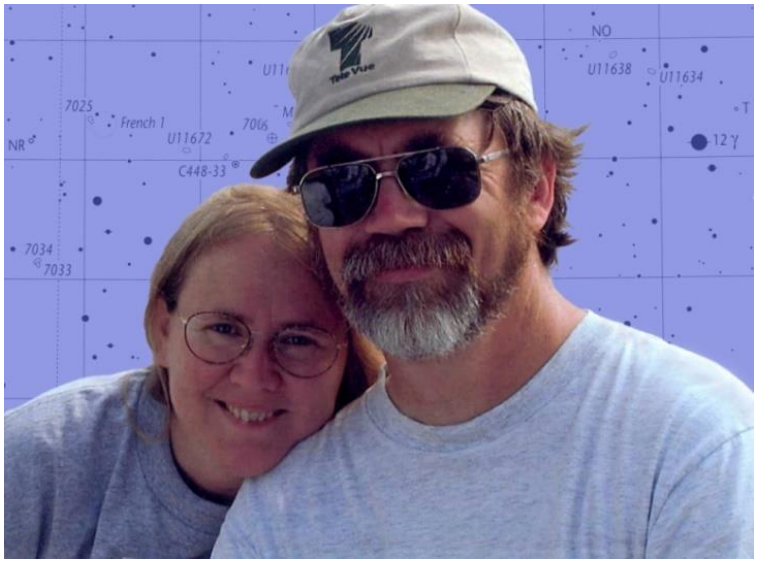
I placed Alpheratz between the outer two circles of the Telrad on the North side. This set the star on the North edge of the finder's 3°FoV. The cross hairs of the finder sit just to the South of a grouping of stars.

At 63× (35mm, 1.1°FoV) there's a trapezoid of mag. 7 to 10 stars in the NE field of view (HD 744, HD 755, HD 589, & J867). It's almost a parallelogram. The Easternmost stars of the trapezoid point to the SW passing just to the SE of where NGC 16 is located. I saw a small faint diffuse object that didn't look like a star where I expected it to be. There are a few faint mag. 13 stars just to its West.

At 202× (11mm, 0.4°FoV) NGC 16 is easier to see. With averted vision there is a diffuse area elongated North-South around a brighter central core. It's a fairly small object. The long axis stretches to about an arc-minute. I'm not able to see it with direct vision.

At 473× (4.7mm, 0.17°FoV) it is very faint, but the core is still visible with averted vision. There is a very small faint patch in the sky around the core that shows some of the North-South elongation.

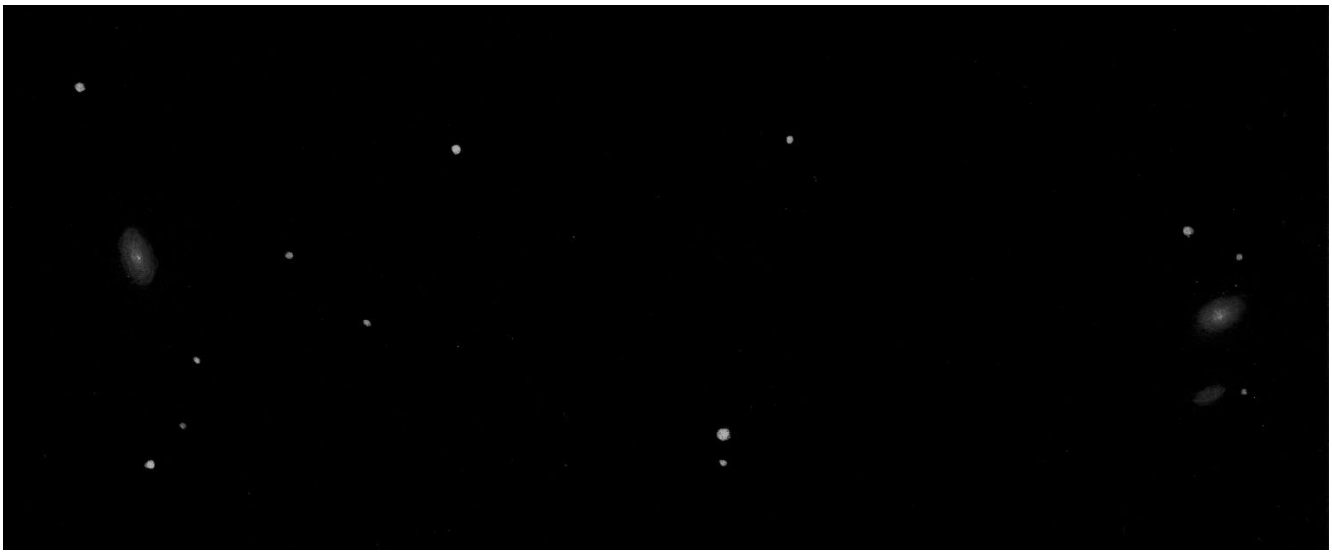
Sue French: Observer from New York



I've observed NGC 16 several times over the years. It was easy spot with my 130-mm refractor at 63×, and at 117× its oval form was tipped east of north with a tiny bright center. It looked roughly 1¼′ long and half as wide. With my 10-inch reflector at 213×, I estimated the galaxy's size at about 1½′×50″. It sported a considerably brighter core and stellar nucleus.

I also looked at NGC 1 and NGC 2 with the 10-inch scope. In fact, NGC 16 kept drifting into the field of view when observing them. NGC 1 appeared faint and very small at 68× and was much easier to view with averted vision. At 115× NGC 1 was an easy target, brightening toward its center, and with averted vision NGC 2 was visible south of NGC 1. At 166× NGC 1 sported a tiny faint nucleus and looked slightly oval ESE-WNW, while NGC 2 was visible with direct vision, looking very small, very faint, and uniform in brightness. At 213× NGC 2 revealed a slightly brighter, relatively large core.

Fast forward to this year: On two nights in early November, I tried to sketch the trio of galaxies as seen through the 10-inch reflector. My eyes and skies not being what they once were, I could not see the amount of detail that I could years before. So I took out my 15-inch reflector instead and made the sketch below using a magnification of 216×. North is up and east is to the right.



Glenn Chaple: Observer from Massachusetts

NGC 16 – Lenticular Galaxy in Pegasus (Magnitude 12.0, Size 1.8' by 1.0')

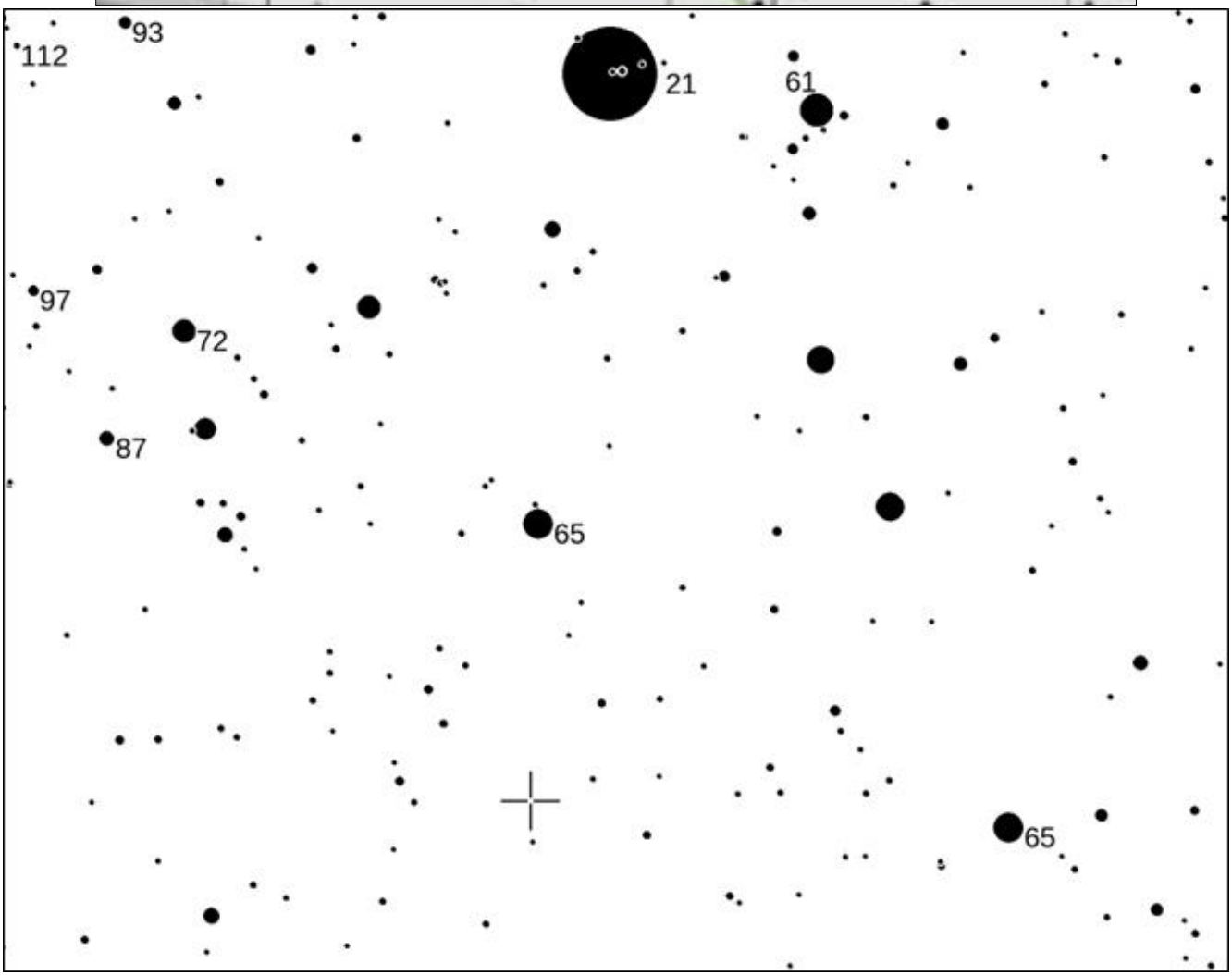
Our December Observer's Challenge takes us to the northeast corner of Pegasus and a lenticular galaxy some 123 million light-years away (SIMBAD data). Discovered by William Herschel on September 8, 1784. its appearance ("A faint star with small chevelure [hazy luminescence] and 2 burs") led Sir William to enter it into his Catalogue of Nebulae and Clusters of Stars as a Class IV (Planetary Nebulae) object.

With a visual magnitude of 12.0, NGC 16 will challenge medium aperture scopes, especially if observed from an area beset by slight to moderate light pollution. I looked for it with a 10-inch f/5 reflecting telescope on an evening when the magnitude limit was around 5. At 140X, I was able to make out little more than a faint star (the galaxy's nucleus). Visual observers in dark-sky locations or working with larger instruments may be able to make out a surrounding oval haze.

The 2000.0 celestial coordinates for NGC 16 are: RA $00^h\ 09^m\ 04.3^s$, DEC +27° 43′ 45″, a little over a degree south of the 2nd-magnitude star Alpheratz (alpha [α] Andromedae). The accompanying finder chart should enable star-hoppers to find their way from Alpheratz to NGC 16.

Charts follow.


ANDROMEDA
7331
π
Alpheratz
η
Scheat
"Great Square of Pegasus"
μ
λ
χ
PEGASUS
γ Algenib
Markab
α


112
93
21
61
97
72
87
65
65

Larry McHenry: Observer from Pittsburgh, Pennsylvania

December: NGC 16 – Galaxy – **Pegasus**; Mag. V = 12.0; sfc. br. 12.5; Size 1.8′ x 1.0′; RA: 00h 09m Dec. +27º 44′

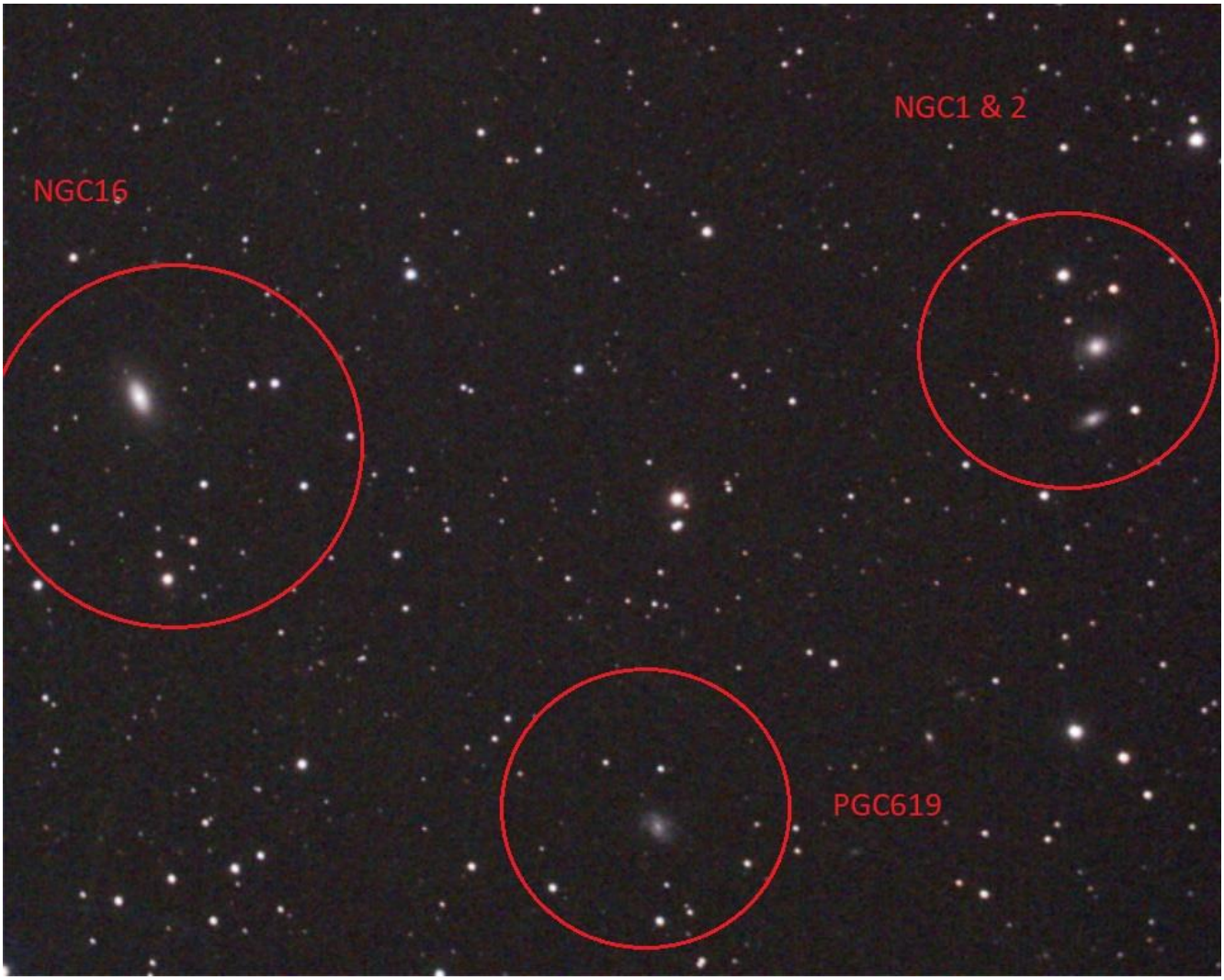
NGC 16 (galaxy): Located in B

he fall constellation of Pegasus, 'The Winged Horse', is the small oval-shaped +12th-mag lenticular (S0) galaxy NGC 16. The little galaxy displays a bright, bar-shaped central core embedded in the center of an inclined oval, which itself is surrounded by a light haze of unresolved starlight. Using the camera's maximum FOV, I could also pull in the nearby faint spirals NGC 1 and 2, along with PGC 619. NGC 16 was first observed on September 8th 1784 by William Herschel and is about 146 Mly distant and around 81,000 light-years in diameter.

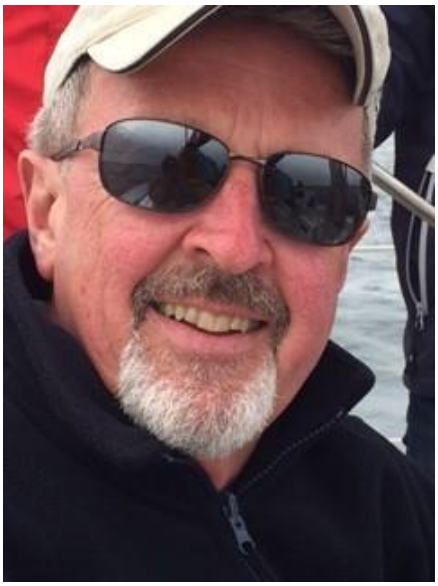
Video-Capture/EAA:

11/05/2021: from Calhoun County Park, WV. Using an 8-inch SCT optical tube @ f6.3 on a GEM mount with a CMOS color camera and broadband filter @ 60-second guided exposure, livestacked for 15 minutes.

Images follow.


NGC1 & 2
NGC16
PGC619

John Bishop: Observer from Massachusetts



The December object is NGC 16, a lenticular galaxy located in Pegasus. I observed it for the first time on November 27, 2021, from the ATMoB Clubhouse in Westford, Massachusetts. December was a no-go month for me for observing, so it was fortunate that I caught this object in November.

I observed with my 8.25 inch f/11.5 reflector, at magnification of 48× to 192×. It is a portable setup, with an equatorial mount. I did not use any filters. As reported for this date last month, the sky was clear; seeing and transparency were good for this location, situated some 40 miles northwest of Boston. The site does have some washing out on the eastern and southern horizons. Temperature was 25 degrees Fahrenheit at 11:30 pm.

NGC 16 was relatively easy to find. It lies near Alpheratz, a.k.a. Alpha (α) Andromedae. Four faint stars form a backward "L" shaped asterism immediately west and south of Alpheratz. NGC 16 lies just west of a line from Alpheratz through the easternmost end star of the L, about 1½ degrees south of Alpheratz. (Of course, just to keep the synapses nimble, this is all reversed and upside down in my straight through finder, but reversed in my main eyepiece).

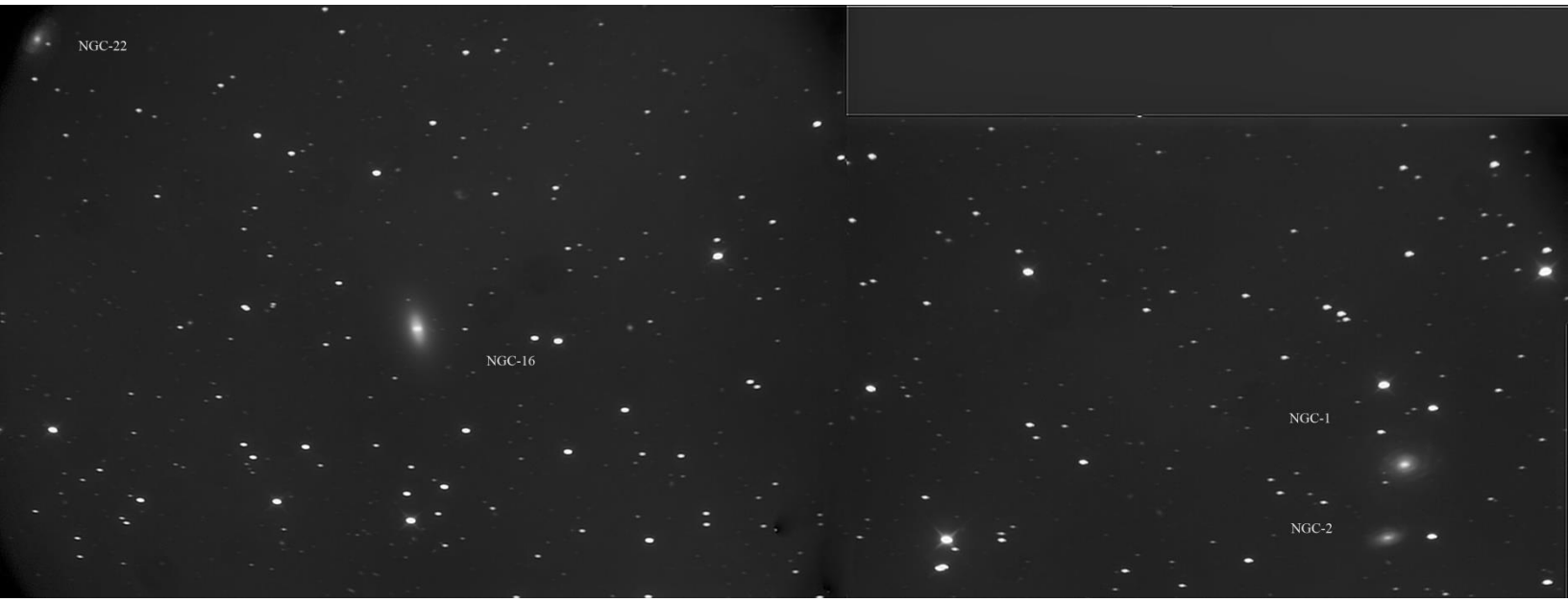
The galaxy, which has a reported surface brightness of magnitude 12.8, was not immediately visible in the eyepiece. Averted vision, and time at the eyepiece, were required to see it.. At low power, it appeared as a small, faint patch. At higher magnification, the galaxy was faint and small, possibly elongated, with a bright center, surrounded by a halo.

This object was faint. As other observers looked at it through my scope this night, I had to be sure to center the object (the scope was tracking, with a rough polar alignment) so that I could assure them it was there.

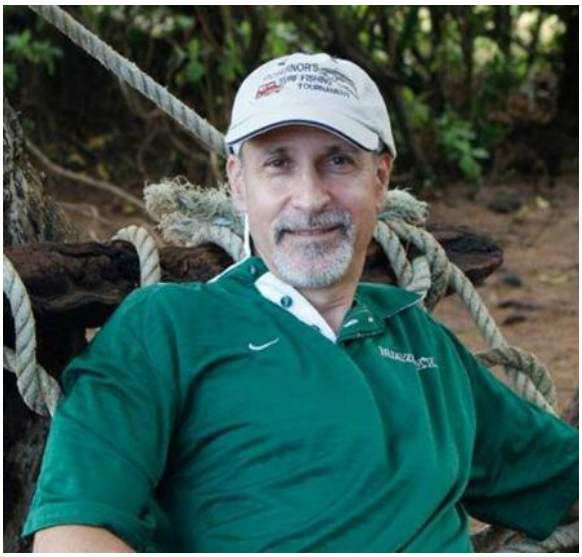
Mario Motta: Observer from Massachusetts

Small NGC 16 galaxy is centered, but I wanted to get the general field which was too large for my 32-inch reflector field-of-view, so I combined two sets of images into a mosaic, and labeled them.

To the right (west) is NGC 1 and NGC 2, then moving east is NGC 16 (the December object) and finally toward the left (East) and on the extreme edge is NGC 22. Taken with my 32- inch telescope in two sets, then combined. It was not the best night, but being November 3, and having had to be away the past few weeks, I thought it best to use and send in.



James Dire: Observer from Illinois



NGC 16 is a galaxy in the constellation Pegasus. The galaxy is located about two degrees south of the star Alpheratz, making it quite easy to find. NGC 16 shines at magnitude 12 and is 1.7×0.8 arcseconds in size.

NGC 16 is assigned the galaxy classification E-S0, which means it is a lenticular galaxy. It has the shape of a spiral galaxy without having spiral arms. In an 8-inch telescope the galaxy looks like an elongated smudge with no visible detail. Larger telescopes reveal a bright star-like core. The galaxy is 150 million light-years away and is receding from us at about one percent the speed of light.

On a recent autumn night with great seeing and transparency, I imaged NGC 16 with a wide-field view to capture it with myriad galaxies lying in the same field, four of which are in the New General Catalog (NGC). The telescope was a William Optics 132mm f/7 Apo. The imager was a SBIG ST-2000XCM CCD camera. The images here were created by combining 20 ten-minute exposures. The camera was self-guided on a Celestron CGEM II mount using MaximDL software for capture and guiding. One image below has labels showing some of the brighter galaxies in the field of view.

After NGC 16, the brightest galaxy in the field of view is NGC 1. The New General Catalog lists deep space objects by right ascension. So NGC 1 has the smallest right ascension of any object in the catalog: 00h 07m 15.9s (Epoch 2000). NGC 1 is a magnitude 12.8 spiral galaxy 1.6×1.1 arcsec in size. Some spiral structure can be seen in large amateur telescopes and is even captured in my wide-field image.

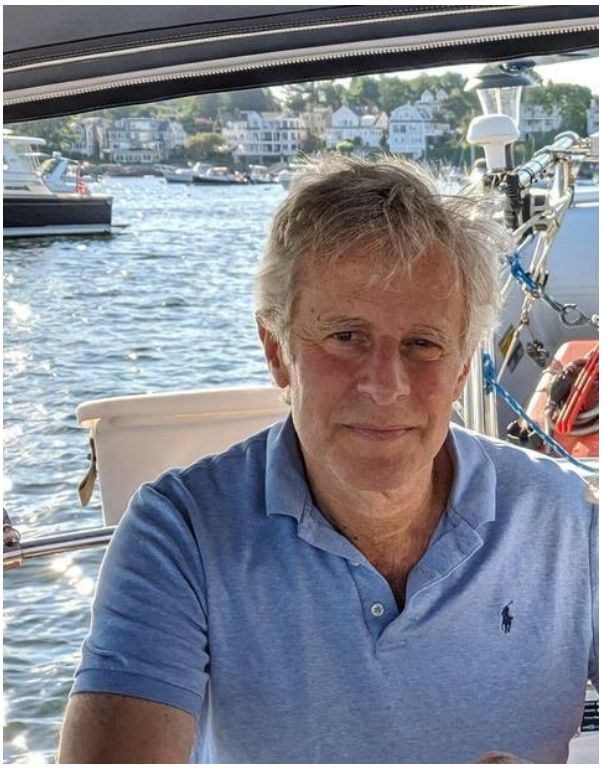
Just below NGC 1 is NGC 2, a magnitude 14 spiral galaxy measuring 0.9×0.5 arcsec in size. At 220 and 330 million light years, respectively, NGC 1 and NGC 2 are farther away from us than NGC 16. Whereas NGC 1 presents itself more face on, NGC 2 is more edge on.

The final NGC object on the image is NGC 22, a magnitude 14.8 spiral galaxy. NGC 22 is 1.2×0.7 arcsec in size. At magnitude 14.6, UGC 69 is the next brightest galaxy. UGC 69 is about the same angular size as NGC 1 and at the same distance. However, at nearly two magnitudes fainter, UGC 69 as well as NGC 22 are difficult to see in telescopes smaller than 14-inches. Despite the scale, some spiral structure is visible in my image for both of these faint galaxies.

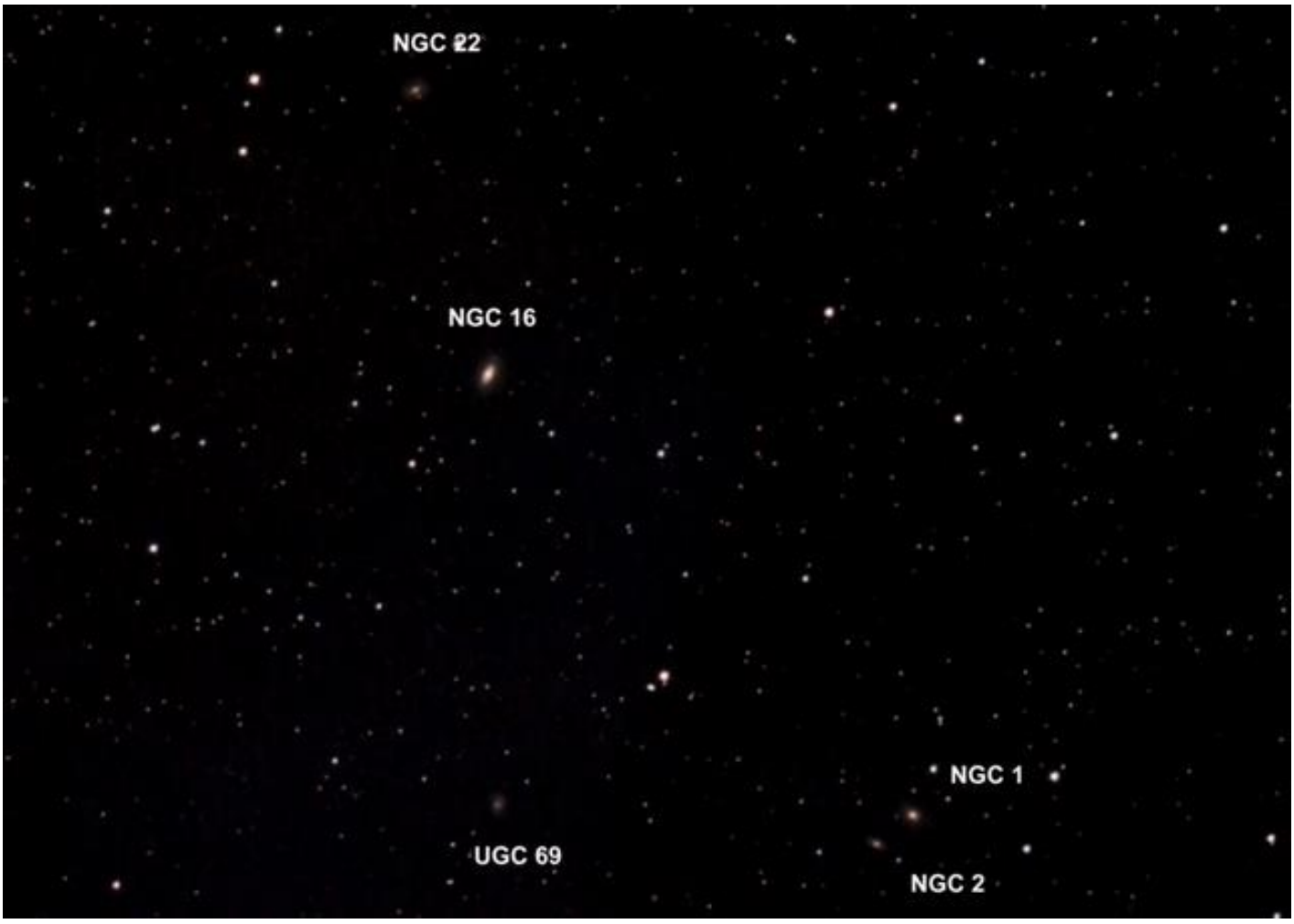
There are dozens of other galaxies in my image. Most appear as tiny, dim star-like dots. Some appear elongated giving away their galactic shape. Three I have labeled are PGC 1811465 (mag. 16.7), PGC 212478

(mag. 16.7), and PGC 182172 (mag.16.8). I was able to pick out galaxies down to magnitude 19 in the image.

Barry Yomtov: Observer from Massachusetts



With the small size of NGC 16, a lenticular galaxy of 1.8′ × 1.0′, my imaging targeted the wide field to include the nearby galaxies NGC 22, NGC 1, NGC 2 and UGC 69 as identified in the image. The following image was taken on December 12, 2021 with 89 exposures at 15 seconds for a total exposure time of 22 minutes with the RASA 11 f/2.2 optics



Anas Sawallha: Observer from Jordan

This month's challenge object was lenticular galaxy NGC 16 in Pegasus. This galaxy proved to be a tough target for me with my 5-inch telescope.

The first time I tried to observe NGC 16 was at the time of the Perseids peak in 12/8/2021 from a Bortle 4, zeroing in on the target with a manual mount and a star atlas, but was unable to see.

The second time I tried from a Bortle 2 sky in August and still could not see this very faint and elusive galaxy.

The third time in September 2021, from a Bortle 4 sky and that time I mounted my scope on a GoTo mount, but even then I could not see.

I tried to blame the seeing conditions, although they were good. So for the fourth time I went to my favorite location under excellent seeing conditions but alas, I gave up.

Roger Ivester: Observer from North Carolina

NGC 16 and NGC 1

Telescope: 10-inch Reflector

Eyepiece: 20mm + 2.0x Barlow

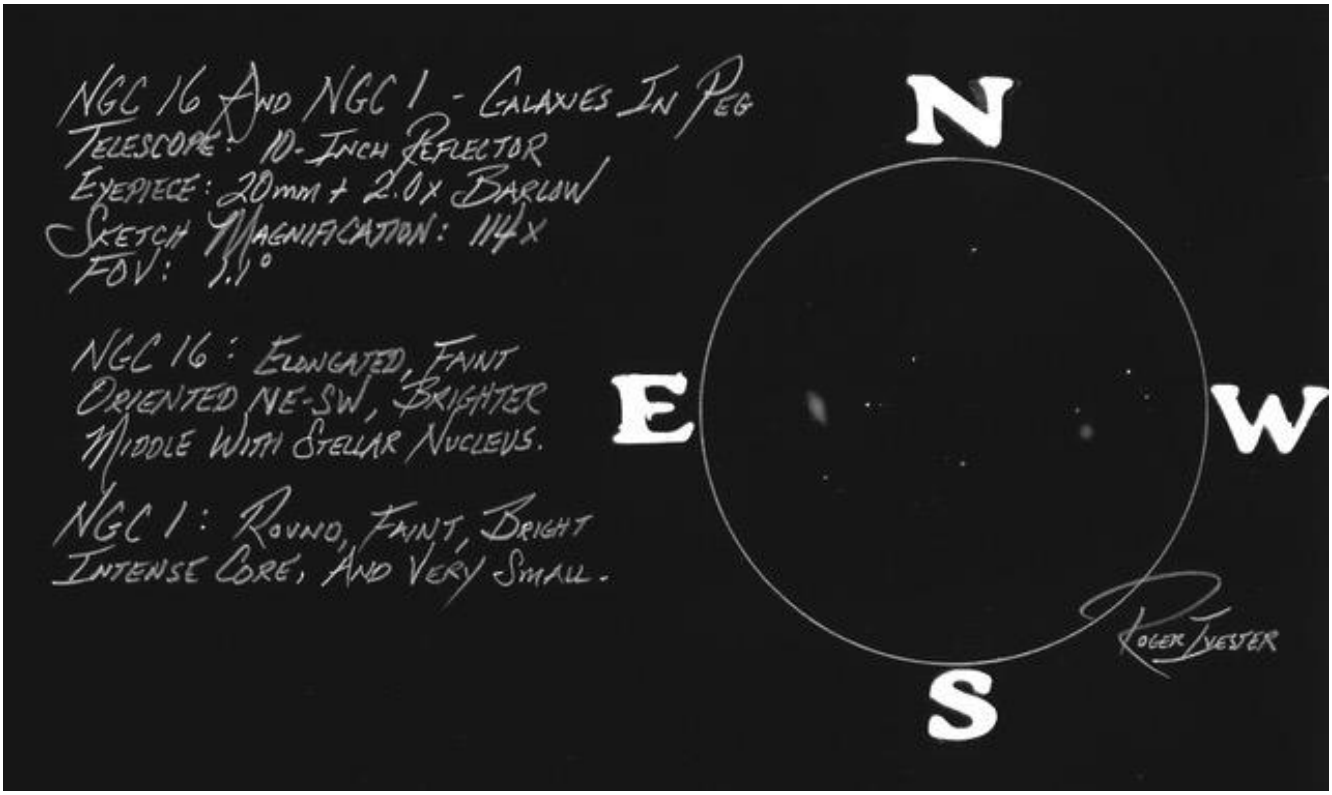
Sketch Magnification: 114x

FOV: 1.1º

NGC 16: Faint, elongated NE-SW, brighter middle, stellar nucleus with faint elongated halo.

NGC 1: Very faint and small, round, bright intense core.

Sketch follows.



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

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