MONTHLY OBSERVER'S CHALLENGE

Las Vegas Astronomical Society

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Report #118

NGC 1003 Galaxy in Perseus

"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 that's interested, and if you're able to contribute notes, and/or drawings, we'll be happy to include them in our monthly summary. We also accept digital imaging. 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 the astronomer 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 Observers Challenge. We're not excluding those with an interest in astrophotography, either. Your 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.

NGC 1003 Galaxy in Perseus

NGC 1003, also known as UGC 2137 & PGC 10052, is an almost edge-on spiral galaxy located in the constellation Perseus. It was discovered by William Herschel in 1784. It lies about 28 million light-years away and shines at ~mag. 11.5 - 12, or thereabouts, depending on the source.

Within the field of a moderately wide-field EP and large enough aperture, given excellent sky conditions, one might also be able to spot a pair of nearby tiny and faint galaxies. One is CGCG 539-72, which is an extremely small and faint smudge, shining at a dim mag. 15.7,

though it's surely a bit brighter than that visually. A bit further out is UGC 2126, a mag. 14.9 fuzz ball. These two bonus galaxies will really challenge your observational skills!

Observations/Drawings/Photos

Derek Lowe: Observer from Massachusetts

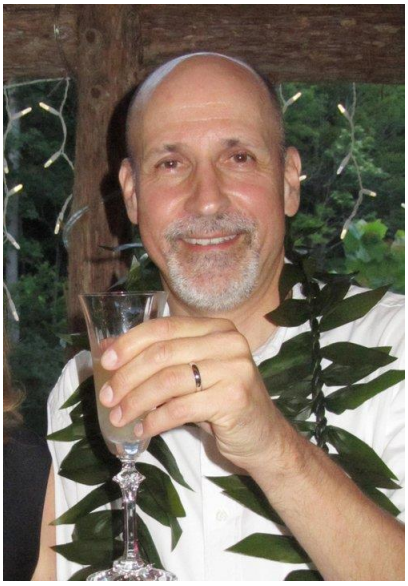
NOTE: We want to welcome new participant Derek Lowe to the Challenge!

I finally got a chance to take a look at NGC 1003 last night through an 18-inch f/4.2 Dobsonian. The galaxy was not really visible at 70× (32mm EP & coma corrector), but at 435× (5mm EP & coma corrector) it was obvious. The bright mag. 9.9 field star interfered with getting a good view, and it was rather close to try to set it out of the FOV. The galaxy was most of the way between that one and a mag 12.9 star, and took up a good part of the FOV at that magnification as a diffuse oval. There was a slight brightening toward the oval core, but nothing noticeably concentrated or stellar, and overall the brightness across the disc was quite even until the outer rim. I tried for more details, but wasn't able to pull much out, partly because of that field star, and partly because it was cold out there!

Ed Fraini: Observer from Texas

I first observed NGC 1003 on December 1, 2018 with perfect sky conditions. The night was clear and crisp, but with more than expected humidity. Both transparency and seeing were well above average, with the NELM reaching 4.9 as measured by 12 Per, which was almost steady. I made this observation with the 12-inch f/5 scope that's permanently mounted in the Houston Astronomical Society Observatory. The instrument is a fork mounted Newtonian that was custom built by members of the Society in the early 80's, and it's superb. My observation spanned approximately 20 minutes, commencing at 03:15 GMT (morning of Dec 2). Upon acquisition of the field of view at 96×, the stacked pair of four mag. 10.7 to 11.5 stars to the north definitely caught my eye. They formed perfect parallel lines running to the north and were separated by about 1.5 arc minutes. A trapezoid formed because the northwest of the four was slightly more advanced to the north. The galaxy was framed to the east with an equilateral triangle with each leg spanning approximately ten arc seconds. This triangle had a fourth star just inside and bisecting the southern leg. Just opposite on the other side of the galaxy was another large triangle that was anchored very close to the galaxy itself. Under those observing conditions, I should've noted the edge star on the north side of the galaxy, but even at 180×, it wasn't visible. As for NGC 1003, it appeared as a grain of rice, quite high in opacity with clean edges. It seemed to be a bit sharper on the western end. I observed no mottling or any characteristics of galaxy structure. Charts indicate other DSS objects in the field, but I noted none in this observing session. This galaxy is a lovely object to have captured in my logs. As stated, the trapezoid will be the critical memory jogger for locating the field for NGC 1003.

James Dire: Observer from Illinois



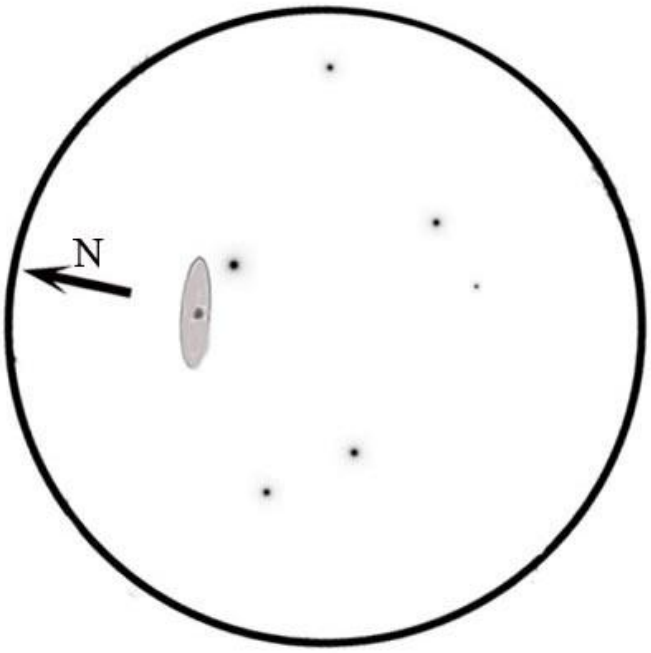
NGC 1003 is a mag. 11.5 spiral galaxy in the constellation Perseus. The galaxy is 3.5 X 0.8 arcminutes in size with the long axis running nearly east-west. It's is located approximately 2° south and slightly west of the star cluster M34. The galaxy is slightly west of the midpoint between M34 and the mag. 8.5 galaxy NGC 1023.

I viewed it in early December on a moonless evening using a 24-inch f/4.16 Newtonian. The seeing was excellent. However, the transparency was poor due to high cirrus clouds. The clouds along with light pollution from nearby Peoria, Illinois made seeing the galaxy challenging.

I found NGC 1003 by finding M34 in the 50mm finder scope and panning south to NGC 1023. I then returned the finder scope to the midway point between M34 and NGC 1023. Looking in the main telescope, NGC 1003 was near the edge of the field of view using a 13mm 100° eyepiece.

The attached sketch shows the view in the 100° eyepiece. The nucleus of the galaxy appeared star-like, and I couldn't make out any structure in the spiral arms due to the thin clouds and light pollution. I needed to use averted vision to see the disk of the galaxy.

The bright star near the southwest edge of the galaxy is SAO38196, mag. 9.9. All of the stars plotted are brighter than mag. 12.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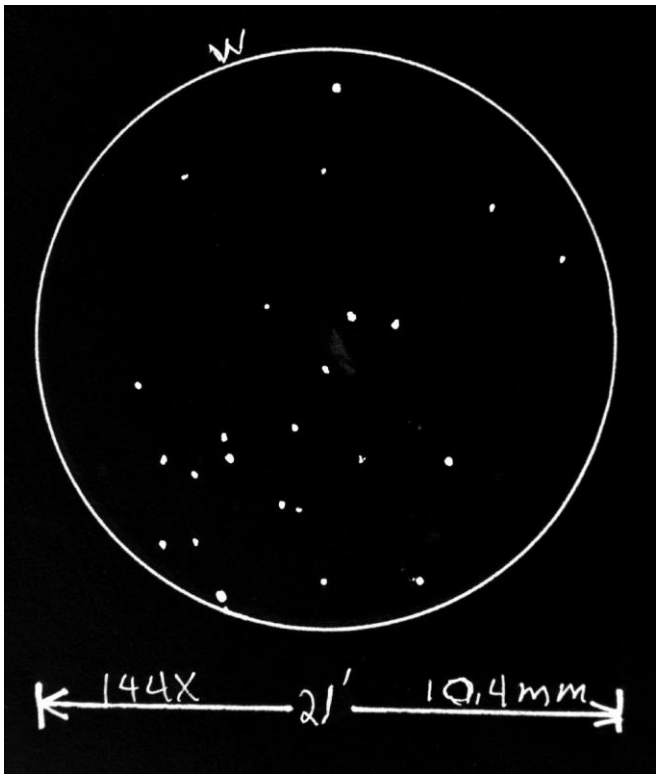
Kenneth Drake: Observer from Texas

Good conditions finally prevailed, so I took advantage of a 34° dew point, no wind and an SQM of 20.19. I didn't immediately pick up the mag. 12 NGC galaxy until over 100× in my 13-inch. It was an unseen ghost until I used 117×, but I saw it best with averted vision at 144× as a 20"×90" faint smudge extending in P.A. 90". The rich star field assisted locating it. Especially interesting was the asterism 7' to the NNE, consisting of 3 pairs of 11-12 mag. stars. My stellar mag. limit was ~13.8.



Doug Paul: Observer from Massachusetts

I initially shot NGC 1003 with an f/5.6 lens in the middle of October, but reshot it at the end of October with an f/2.8 lens (142mm aperture), which produced a better image. The night was cold with an NELM of ~4.5.

There was no moon, and the target was at an elevation of ~82°.

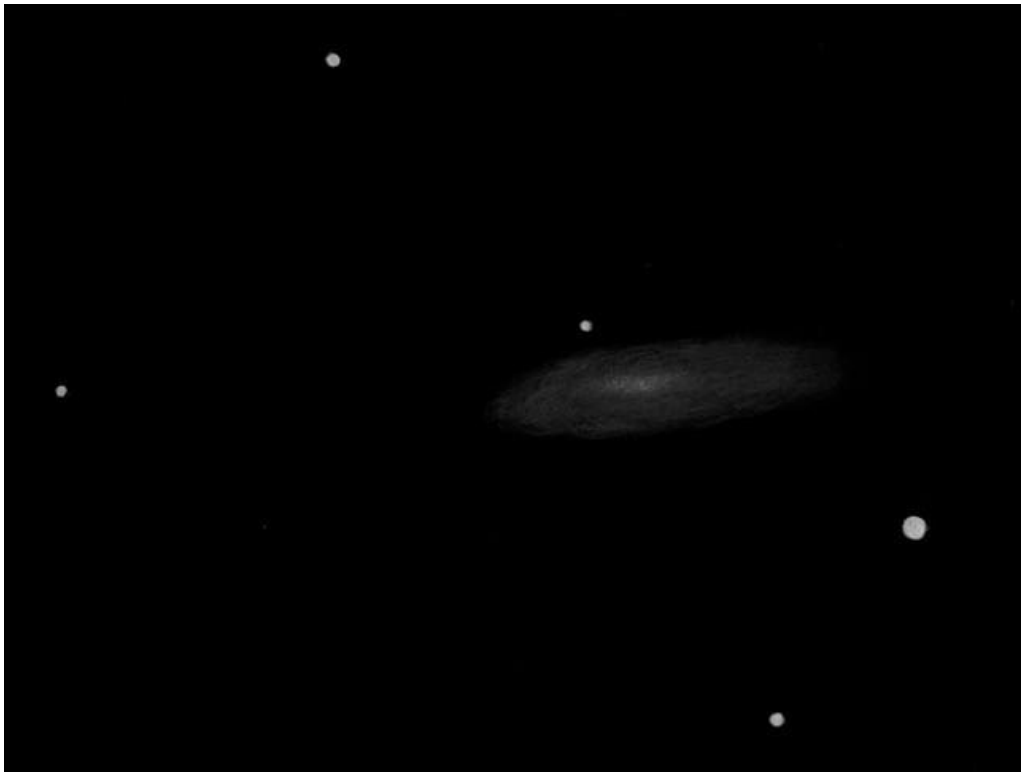
I calibrated the setting circles on Almach and jumped over to NGC 1003. The galaxy was faint, but visible in the aiming shot. I re-aimed to put M34 at the N edge of the FOV and a bright star (Per 12) along the W edge which guaranteed that the NGC 1003 (i.e. the target galaxy) would be near the center of the FOV.

Canon 80D*, 400mm, f/2.8, ISO 800, 73×30sec = 36.5 min, 100% scale Orientation: North up. * unmodified, no filters.

Sue French: Observer from New York

I went out on December 4, 2018 to observe NGC 1003, which was my first clear, moonless night since October 30th. Apparently, the weather gods have a wry sense of humor, since this was my wedding anniversary. We took out my homemade 254/1494mm Newtonian (10-inch f/5.8). The seeing was fair, the transparency good, and the ground was covered with snow. The night was slightly breezy and the temperature 19ºF. At 68×, NGC 1003 is a faintly visible oval near a mag. 10 star to its west-southwest. At 187×, the galaxy is nearly uniform in brightness, and a faint star appears along its northern flank. The galaxy looks more flocculent at 299×, and a slightly brighter region rests between the two flanking stars. The sketch was done at this magnification.

We also looked at Comet 46P Wirtanen through Alan's 15×50 image-stabilized binoculars.



Chris Elledge: Observer from Massachusetts

On November 3, 2018, @11:30pm EST, I used a 10-inch f/5 reflector to observe NGC 1003 from the ATMoB Clubhouse. Sky conditions were: Bortle Scale 6. NELM 5.0. Transparency good. Seeing poor.

NGC 1003 was easily located due to its proximity to 12 Persei, which was just visible naked eye with averted vision. Placing 12 Persei and its neighboring double star HD16772 on the SE edge of a 1.9° FOV, placed NGC 1003 right in the center of the view. Unfortunately, it was not visible at this power (35mm, 36×).

At 127× (10mm, 0.6° FOV), there was a triangle of mag. 11 stars to the east (TYC 2849-1178-1, TYC 2849-1416-1, and TYC 2836-0126-1). Drawing a line from 1416 through 0126 lead to mag. 10 star BD +40 564. Just above BD +40 564 was a faint mag. 13 star, GAIA 335416707933642496. NGC 1003 lay just to the south of this star. I struggled to see anything there, but I thought there was a light patch just to the south of the mag. 13 star.

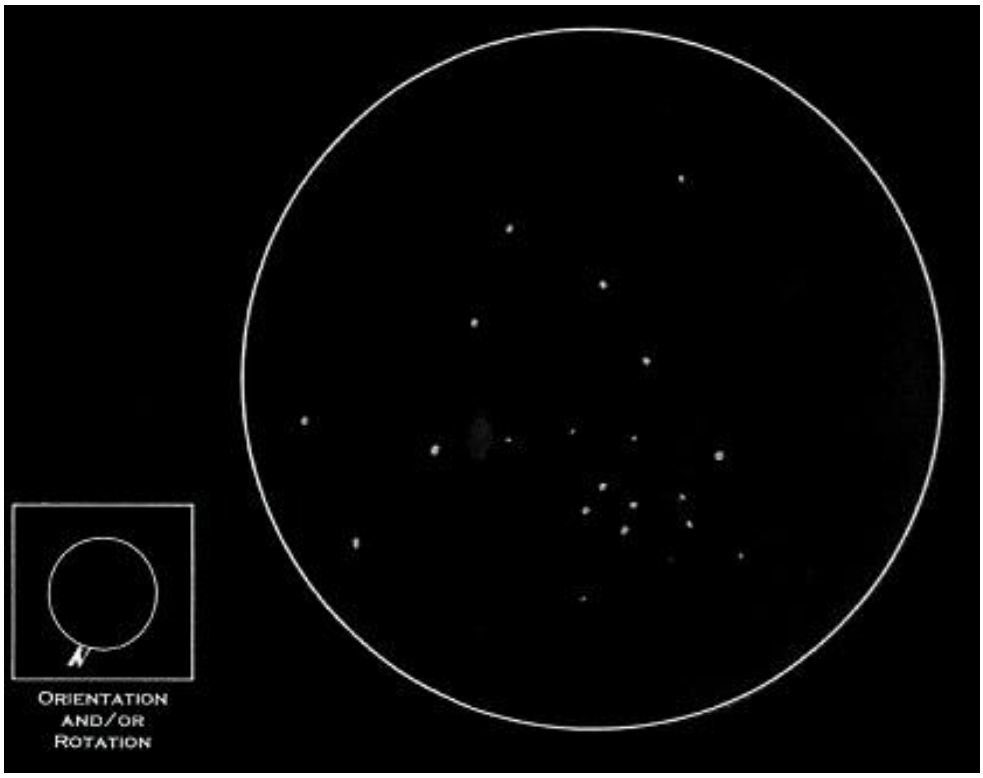
At 270× (4.7mm, 0.3° FOV), NGC 1003 continued to appear as nothing more than lighter patch of sky alongside GAIA 335416707933642496. The patch seemed to have a slight elongation in the east-west direction.

Mike McCabe: Observer from Massachusetts

The LVAS Observer's Challenge object for December 2018 was diffuse spiral galaxy NGC 1003 in the constellation Perseus. Boasting a mag. of about 11.9, and apparent dimensions of about 4'× 2', I was thinking I was in for another serious observing challenge to close out 2018. On top of that, the weather pattern that we'd been enduring for the latter third of 2018 – fully from September on through December – was so bad for observing that we were lucky to get even part of a night to see something, never mind multiple nights on which to work the sky. Sometimes though, you just get lucky.

Lucky I got. On the evening of the November 29, 2018, we were presented with a clear sky with fair seeing conditions, and slightly better than fair transparency conditions, when I sat down to have a go at observing NGC 1003. I was using my 10-inch f/5 Newtonian reflector, and it was an easy star hop from any of the bright stars around Algol, to the area of the galaxy.

NGC 1003 showed itself almost immediately as a faint smudge in the eyepiece at low power and using averted vision. As I worked through the eyepieces to establish the best magnification for viewing this object, the galaxy became more evident. I eventually settled on 104×, where I could also use direct vision to see this little gem. I was easily able to detect the E/W orientation of the elongation. To say that this was a satisfying observation is an understatement. I was elated to have successfully viewed it on the first try, and I thought it was an awesome way to close out another year of LVAS Observer's Challenges, some of which were very challenging over the course. Happy New Year, fellow observers, and best of luck with your 2019 observing challenges!


N
Orientation
and/or
Rotation

Richard Nugent: Observer from Massachusetts

Star hopping to NGC 1003 was relatively easy. On the line between M34 and 12 Per, I found (2/3° from 12 Per) the mag. 8 star SAO 38228. From there, I moved 25' west to find a small trapezoid of mag. 11th-12th stars. A mag. 9.9 star (SAO 38196) was 7' SW, and there I found NGC 1003. At least that was the general location. The galaxy is listed as mag. 11.5 with a surface brightness of about mag. 14.4. I found it to be nearly impossible to see from my NELM 4.8 skies above Framingham, MA.

I observed the area with my 20-inch scope using a variety of eyepieces. The galaxy was nearly overhead but I could only detect a slight hint of its presence. Had I not known the galaxy was there, I would've certainly missed it. It was invisible in my 10-inch scope.

I sometimes use the observing planner *Eye & Telescope v. 3* for its predictions of an object's perceptibility using my telescopes from my observing locations. However, to avoid bias, I usually consult the program after my observations. For Framingham, using my telescopes, the program suggested for NGC 1003: "Observation challenges the limits of vision; small prospect of success."

During an observing session at the mag. 5.3 NELM site used by the *Amateur Telescope Makers of Boston*, the galaxy was visible using Steve Clougherty's 18-inch scope. Under these conditions, the galaxy was easy to see and appeared as a soft, elongated glow. The view was very pleasing!

The bottom line? As always, for faint, extended objects like NGC 1003, a dark observing site will increase the likelihood of a successful observation!

Mario Motta: Observer from Massachusetts

NGC 1003 imaged with SBIG 100E camera and 32-inch f/6.

I couldn't use many subs, and had some tracking issues. I needed to work on my declination axle motor-to-worm coupling. The tracking seemed to bounce a bit N-S, and stars were a bit bloated. Definitely not my best effort. The time was about forty minutes for a total of five minute subs only.

Jay Thompson: Observer from Nevada

I observed NGC 1003 from the dark skies of Meadview, AZ using a 17-inch reflector. At 95×, it was apparent as an elongated haze. Upping the magnification to 227×, it showed up as an elongated streak following a bright star that was also slightly to the south of the galaxy.

EDITOR'S NOTE: The following object was on the original Challenge list but was replaced after subsequent consideration. From Jay's description, you can see why.

The original object for this month was Struve 186. The description given for Struve 186 was:

Mags. 6.79/6.84 – Separation: 0.688? –Position Angle: 72.8º

I observed it from my backyard in Henderson, NV with a 16-inch f/10 SCT. It was very difficult, and required a good focus. It took 406× to hint at its double nature, but it was difficult to confirm. It really took still higher magnification to pull out the star into two distinct little points.

When viewing the double at 711×, I had to look through the glare and scintillation. At moments of good seeing, the star split into two equal points, oriented in a roughly east-west direction. I could see the two components very close together for a second or so at a time. The double star also had a definite yellow cast to it, consistent with their G0 classification. Struve 186 was a real challenge!

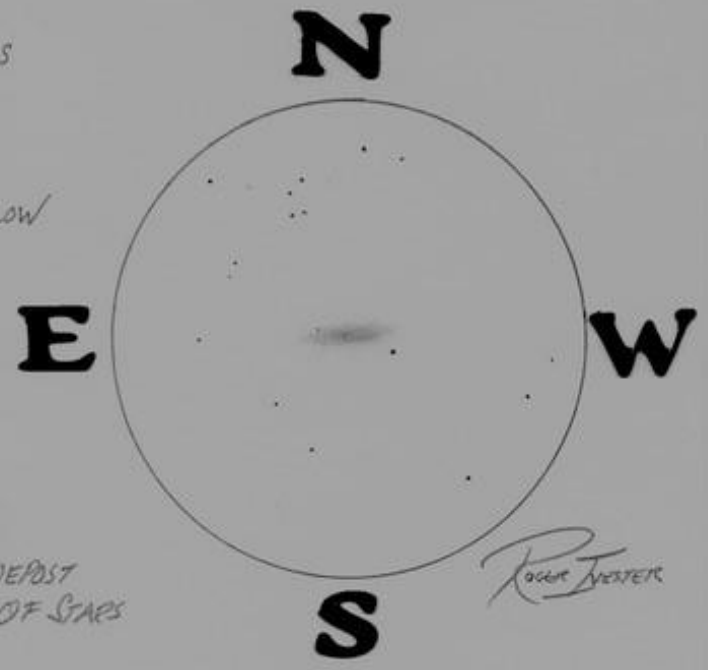
Roger Ivester: Observer from North Carolina

I observed NGC 1003 with a 10-inch reflector on November 27, 2018. The galaxy was faint and difficult from my 5.0 NELM back yard at 114×, which is the magnification I used for my sketch. The galaxy was elongated and oriented E-W with a stellar nucleus. A faint star lay on the NE tip, almost in the halo and a bright mag. 10.5 star was to the WSW.

A guidepost to locate this galaxy is an asterism, which I call a "mini-trapezium," located to the NNE from the core. I could see the galaxy fairly easily with direct vision.

NGC 1003 - Galaxy - Perseus
Date: November 27, 2018
Telescope: 10-Inch Reflector
Magnification: 114x
Eyepiece: 20 Er + 2.0x Barlow
Field Of View: 0.50° - 30'

Faint And Difficult From
5.0 Nelm. E-W Slash
With A Stellar Nucleus.
A Faint Star In The NE
Tip, And A Bright 10.5 Mag
Star Just Below The WSW
Edge Of The Galaxy. A Guidepost
To Locate Is A "Trapezium" Of Stars
To The North.



NGC 1003 - Galaxy - Perseus
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Magnification: 114x
Eyepiece: 20 Er + 2.0x Barlow
Field Of View: 0.50° - 30'

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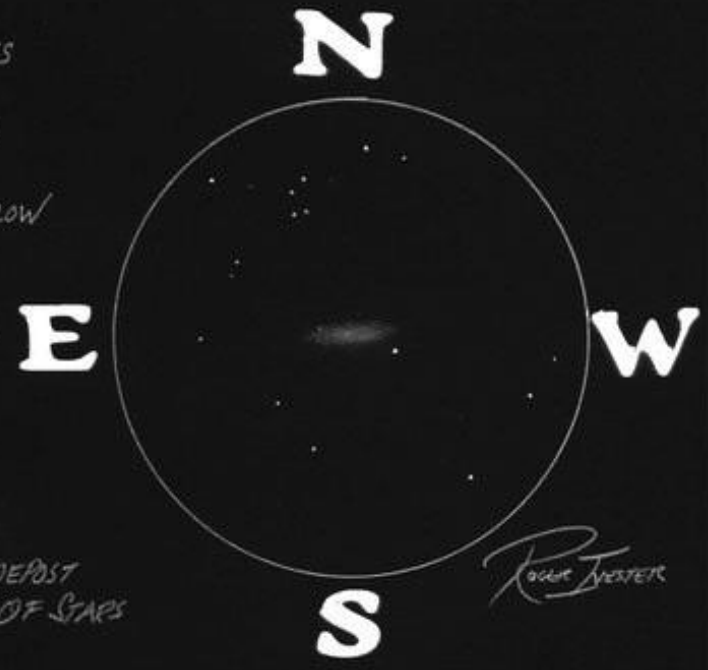

Fred Rayworth: LVAS AL Coordinator and Observer from Nevada

After looking through my notes, I was surprised to see that I've only observed this gem of a galaxy twice. The first time was way back on November 18, 2006 from the 21 mile marker on the North Shore Road at Lake Mead. This was probably due to construction at our "undisclosed location," or simply because everyone didn't want to drive the extra six miles. It was a failed experiment, as it turned out, but that's neither here nor there. At 2,500 feet, it was clear, cool and calm and stayed that way all night. However, despite being on a hill next to the road, we were constantly battered with headlights and people stopping.

Using my home built 16-inch f/6.4 at 82×, NGC 1003 was just a ghost of an oval. I noted no other details, given the transparency wasn't all that great and the constant barrage of headlights. I also never had a chance of seeing the other nearby galaxies, partially because of the sky conditions, plus the magnification was just a bit too low. Now, looking back on this observation, as dim as the galaxy appeared that night, there was no way I could've seen the other two companions, even if I knew exactly where to look.

The second and serious observation for the Challenge was at one of my favorite spots at Furnace Creek Resort in Death Valley at -190 feet. Out of two nights, this was the keeper. It turned out to be a gorgeous night though it started kind of meh, with high, thin clouds that finally dissipated once it got dark. There was an occasional breeze here and there, but nothing real bad. I didn't even have to put on a long-sleeved shirt until almost 23:00 (11 PM for you civilians).

Using my 16-inch f/4.5 at 102×, I saw a small, compact and flat smudge. It was bright, with a distinct, sort of grainy core. Next to it was a relatively bright star, mag. 9.7 GSC 2836:90.

Utilizing the capabilities of Megastar, I knew there were two faint companion galaxies. Though one seemed beyond the mag. limit of my scope, I knew how unreliable those brightness

ratings can be, and gave both of them a try. Sure enough, going for the hardest one first, I spotted CGCG 539-72. This tiny speck of a smudge gave away no details except that it was definitely non-stellar.

Wandering further away, I found the relatively easy to spot UGC 2126. It was still extremely faint, slightly oval, but almost round and like the CGCG galaxy. It showed no details except a slightly concentrated core.

The drawing is at 102× with an 82° field EP.