



The Eyepiece

Learning About Light Pollution & Dark Skies



Editor - Mike Jensen

Hi Everyone!

A comment from Don Bishop sparked the theme for this month's newsletter. Don and I were talking over a Zoom connection. Don was on an RV trip in Utah and remarked "The skies are so dark here it's hard to find Polaris among all the other stars."

I remembered being in Africa and thinking the same thing..."Where is something I recognize?" There were just so many stars! In the Astro SIG group we are constantly talking about dark skies, and comparing our skies to the ones in Big Cypress or some other dark sky area we've visited. We even asked each other "Does it

really make a difference? The answer is "You're darn tootin' it does!" Even going from my Bortle 4.5 backyard to the 2.5 in Big Cypress makes a HUGE difference. And even more so if you live in Ft. Myers who sports a Bortle 6 (I mean turn off some lights folks!)

If you want to see how much of a difference there is, come see my Astrophotography talk on July 6th. I'll show you some examples.

I made a point of checking the sky when I was in the city of Cairo, Egypt (city of 20 million) this past Spring. I checked Astrospheric and it was indeed a Bortle 9. I looked up from my 17th floor hotel room and could not see a star!

Anyway, speaking of my talk this month, I hope you can make it, or look at the replay. In this talk I'm hoping not only to showcase some of the work our SIG group does, but also tell you WHY we do it and how. We must be crazy!

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Solar Eclipse Presentation

Tom Segur will give a presentation detailing two solar eclipses occurring over the next ten months. A solar observing session will also follow the presentation. Event to be held on Aug. 5, 2023 9-10am at Harold Avenue Park in Port Charlotte.

Club Officers & Positions

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Monthly Meetings

Our monthly meetings are held on the **first Thursday of each month.**
The meetings begin at 7:00pm.

Each meeting is usually a combined live and Zoom meeting.

The in person meeting is held at:
Calusa Nature Center/Planetarium
3450 Ortiz Ave,
Fort Myers, FL 33905

Each meeting will have the same
Zoom link/meeting ID.

Below are the dates for the next six meetings of 2023:

July 6, 2023
August 3, 2023
Sept. 7, 2023
Oct. 5, 2023
Nov. 2, 2023
Dec. 7, 2023 Annual Bus. Mtg

Link to join Zoom meeting:
<https://widener.zoom.us/j/98623448643>

Meeting ID: 986 2344 8643

One tap mobile:
+13052241968,,98623448643#
US (or)
+13126266799,,98623448643#
US

SWFAS Bylaws Update You Need To Read This (Please)

Your board of Officers along with member Sandeep Dey have been diligently working on revising the club's bylaws over the last several months. The bylaws were significantly outdated and did not reflect how the club was actually doing business.

Well, we think we are ready to release them, have you read them, provide any input as needed and then vote on approval. We anticipate a vote in September.

Several hurdles have been needed to help with staying in integrity with Robert's Rule of Order and our changing club structure, the electronic age and the snowbird effect. The biggest change will be offering members the ability to vote by electronic resources. A form will be created on the website and members will be encouraged to vote there, or in person at a specified meeting, or by email. Only paid members will be eligible to vote. Also, the currently existing (previous) bylaws required a 2/3-member quorum. This is a number which we have never been able to achieve and should have been changed years ago. The new quorum (in accordance with Robert's Rule of Order will be 50% plus one of the paid members.

We need everyone in the club to VOTE on these Bylaws!

PLEASE, PLEASE take the time to read the [DRAFT bylaws at this link](#):

President's Report

It's the Dog Days of Summer. (You know this saying is based on Sirius!)

Please be careful and use mosquito repellent when out, Malaria is currently spreading in Florida and we have those pesky critters to blame.

Watch out for emails about the ByLaw updates that you will be receiving over the next month or so. We plan to have a vote in September on them and ask that as many of you as possible attend or zoom into the September meeting for that vote.

This month Mike is giving a talk on Astrophotography at the planetarium.

GUEST SPEAKER PRESENTATIONS SERIES

We are excited to announce the initiation of the new "SWFAS Guest Speaker Presentations" series of talks. These will cover astronomical science and space exploration along with practical astronomy and astrophotography talks by various subject matter experts. We are lining up prominent scientists and researchers to explain the science and technology behind the exciting discoveries being made in recent years in astronomy.

The following presentations are already scheduled and we will be firming up talks in 2023 on a month-to-month basis.:

July 6, 2023	Mike Jensen, NCW, presents an exciting, in cateful, frequently self exploring, fun and funny presentation on Astrophotography. Titled "WOW, You must have a really good camera!"
Aug 3, 2023	Roger Lascorz Guiu, IT & Communications Services Directorate, NASA The Artemis Mission
Sept. 7, 2023	Dr. Julie D. Stopar, Senior Staff Scientist, Regional Planetary Facility Lunar geology, LRO, and Artemis Planning
Oct. 5, 2023	Dr. Dave Coulter
Nov. 2, 2023	Dr. Matthew Greenhouse, Project Scientist JWST - NASA Goddard Space Flight Center

July 6, 2023



**Mike Jensen -
Wow!
You must have a
really good camera!**

Our very own Astro SIG leader leads us through a program in what it takes to be an astrophotographer. We must be crazy!

The Astronomical League Report



The Astronomical League

As a member of the Southwest Florida Astronomical Society you are automatically also a member of the Astronomical League, a nationwide affiliation of astronomy clubs. Membership in the AL provides a number of benefits for you including receipt of The Reflector, the AL's quarterly newsletter, use of the Book Service, through which you can buy astronomy related books at a 10% discount. You can also participate in the Astronomical League's Observing Clubs. The Observing Clubs offer encouragement and certificates of accomplishment for demonstrating observing skills with a variety of instruments and objects. These include the Messier Club, Binocular Messier Club, the Herschel 400 Club, the Deep Sky Binocular Club, and many others. To learn more about the Astronomical League and its benefits for you, visit <http://www.astroleague.org>

Reflector Magazine

The latest June 2023 copy of the Reflector magazine is available via the web at <https://www.astroleague.org/reflector>

ALCON 2023

The ALCON conference for 2023 will be held July 26 – 29 in Baton Rouge, LA. Details are available at:

What's Up with the Astro League March 2023 | The Astronomical League

Monthly highlight of the Astronomical League Observing Programs

(Article prepared by SWFAS Astronomical League Coordinator John MacLean)

Last month we concluded our survey of the League's Observing Programs with an overview of the new Spectroscopy Observing Program.



We are beginning the cycle anew with a discussion of the Carbon and Binary Star programs.

Seeing Red – The AL Carbon Star Program

Almost all carbon stars are red giants that have depleted the hydrogen in their cores. As the core is compressed and heated the helium atoms fuse to form carbon and oxygen. Convective currents are formed which dredge up carbon and oxygen into the star's outer layers and these form additional molecules in the outer atmosphere that scatters blue light enhancing the red appearance of the star. All carbon stars are variable with periods ranging from a few months to well over a year.

The Carbon Star Observing Program lists 100 targets that are visible throughout the year. Most of these are great targets even from heavily light polluted city backyards. Colors may range from yellow or orange to deep reds at minimum. The use of Go-To scopes is allowed but not encouraged as there is a good learning process in finding one's way around via star-hopping. The recommended minimum aperture is 8 inches although very many of these are easily accessible with much smaller aperture. If participating in the formal program, the transparency and seeing conditions must be documented along with a description of the star's color. A sketch showing other field stars must also

be submitted. The AL publishes a special "Guide to the Carbon Star Observing Program" which can be purchased from their online bookstore. Star charts are a must to locate the stars manually. The AAVSO site for variable star observing is invaluable and you will be able to use the AAVSO Variable Star Plotter (VSP) to print out detailed charts for any of the objects.

Seeing Double – The AL Double Star Programs

Double Stars are also inviting targets for less than pristine observing conditions. Separate programs are provided for Binoculars and Telescopes.

Binocular Double Star Observing Program

This program complements concurrent observations for the Messier Binocular and Deep Sky Binocular programs. Wide double star pairs are targeted and span the entire night sky and were chosen to enable the observer to enjoy some of the most interesting and spectacular night sky regions. A list of 120 of the finest binocular double and multiple star systems is provided from which any 50 may be chosen to qualify for the certificate and pin. The program is suitable for any binocular aperture 20 mm and above. Seeing and Transparency conditions must be documented along with a description. No sketch is required.

Double Star (Telescopic) Observing Program

This program is designed to introduce observers to 100 of the finest double and multiple star systems

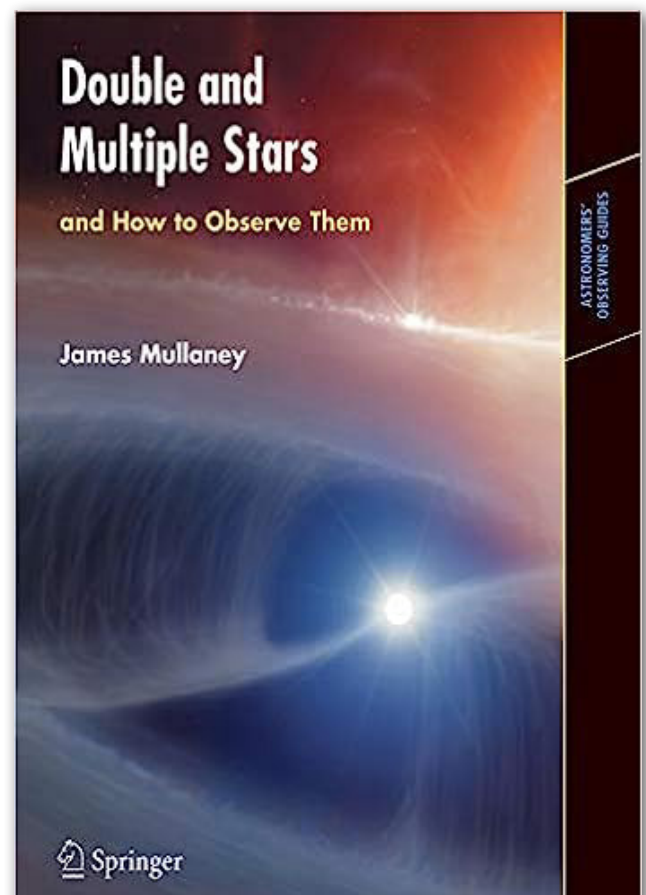
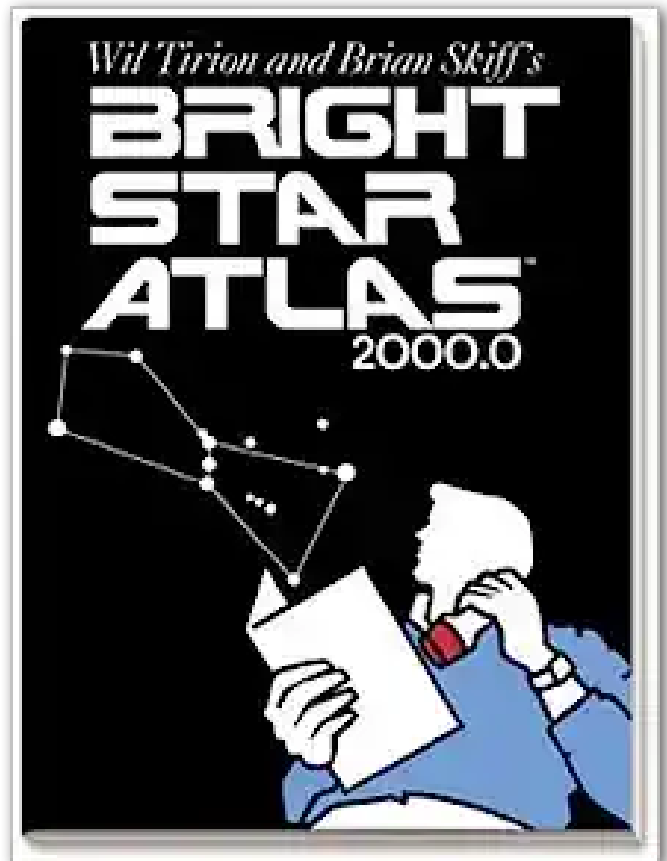
in the heavens. Small telescopes are fine for this program with a suggested minimum aperture of 3 inches. For formal submission, the Seeing and Transparency conditions must be documented and a simple sketch is required with the stars represented as dots. The dot size is used to represent magnitude and the distance between dots is used to represent separation. As is the case with carbon stars, the AL prefers star hopping to be used for object location but is fine with use of Go-To scopes as long as the observing requirements are fully met and documented.

Double Star Resources

The AL suggests the following resources for more information on double stars:
 Bright Star Atlas 2000.0 (Tirion)
 The Cambridge Double Star Atlas (Mullaney, Tirion)

Double and Multiple Stars and How to Observe Them (Springer, 2005)

Observing and Measuring Visual Double Stars (Argyle)



The Night Sky Network



This article is distributed by NASA Night Sky Network. The Night Sky Network program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit nightsky.jpl.nasa.gov to find local clubs, events, and more!



Find A Ball of Stars Linda Shore, Ed.D

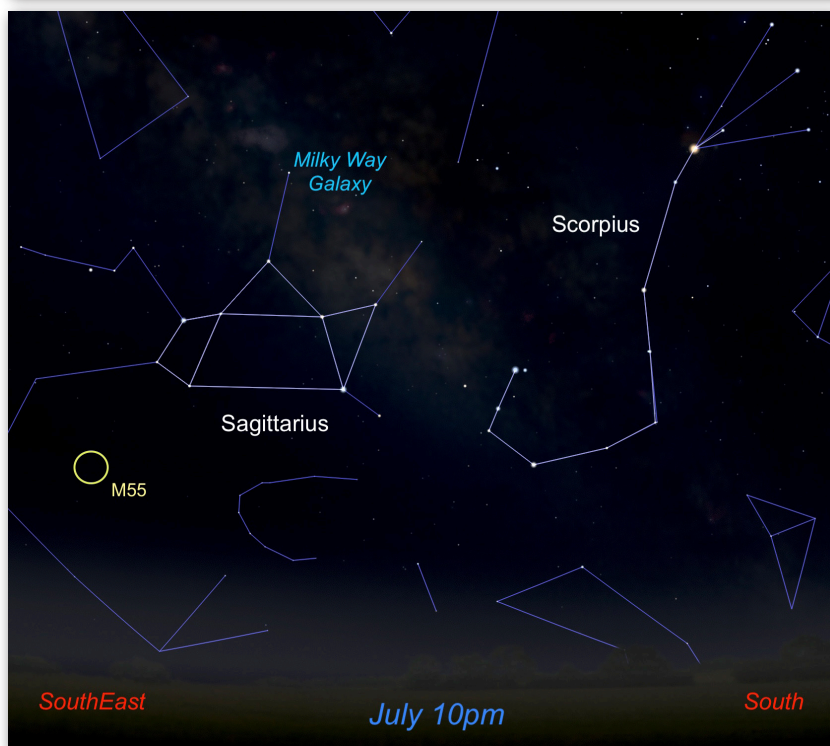
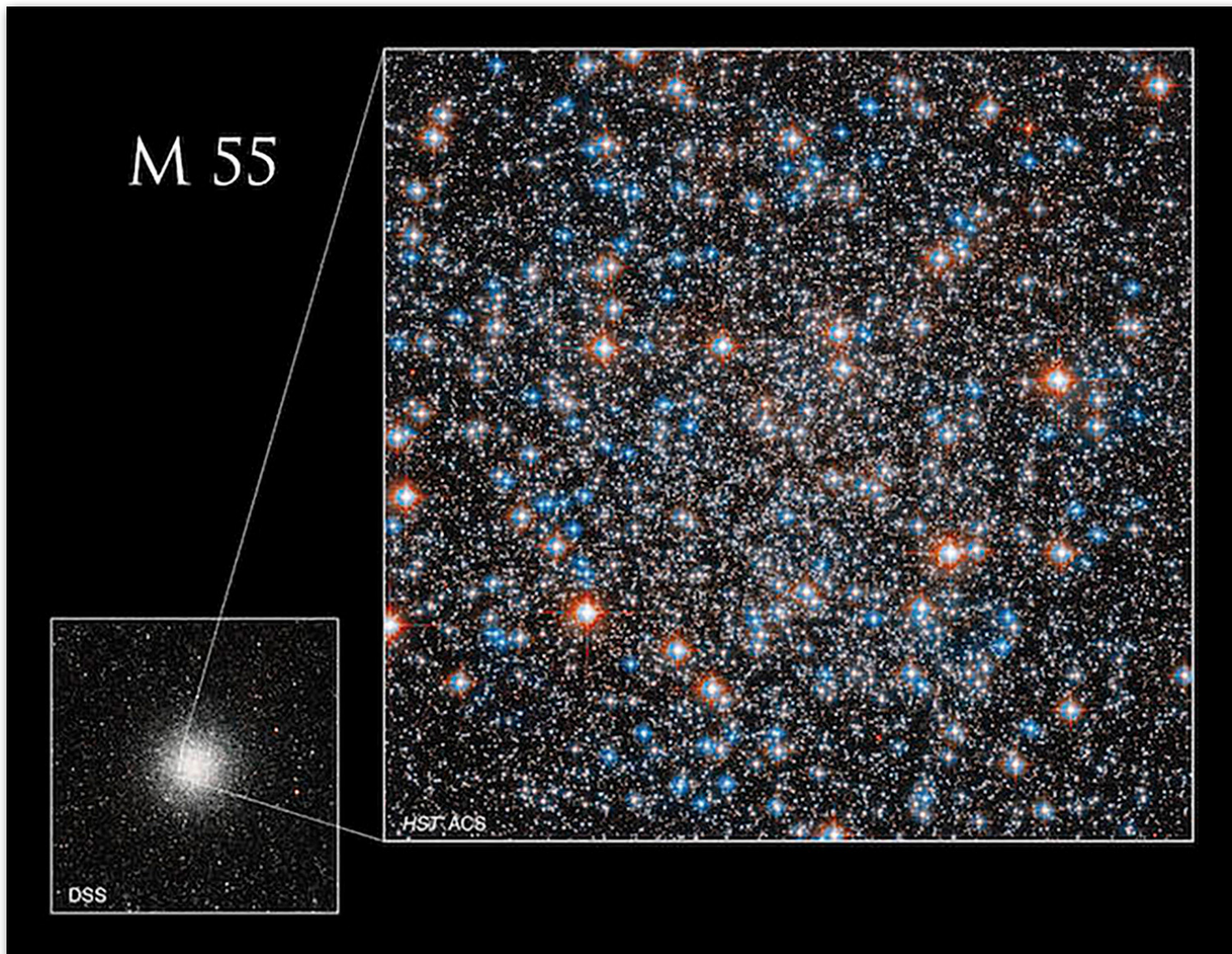
French astronomer Charles Messier cataloged over 100 fuzzy spots in the night sky in the 18th century while searching for comets – smudges that didn't move past the background stars so couldn't be comets. Too faint to be clearly seen using telescopes of the era, these objects were later identified as nebulae, distant galaxies, and star clusters as optics improved. Messier traveled the world to make his observations, assembling the descriptions and locations of all the objects he found in his Catalog of Nebulae and Star Clusters. Messier's work was critical to astronomers who came after him who relied on his catalog to study these little mysteries in the night sky, and not mistake them for comets.

Most easily spotted from the Southern Hemisphere, this "faint fuzzy" was first cataloged by another French astronomer, Nicholas Louis de Lacaille in 1752 from Southern Africa. After searching many years in vain through the atmospheric haze and light pollution of Paris, Charles Messier finally added it to his catalog in July of 1778. Identified as **Messier 55** (M55), this large, diffuse object can be hard to distinguish unless it's well above the horizon and viewed far from city lights.

But July is great month for getting your own glimpse of M55 – especially if you live in the southern half of the US (or south of 39°N latitude). Also known as the "Summer Rose Star," M55 will reach its highest point in northern hemisphere skies in mid-July. Looking towards the south with a pair of binoculars well after sunset, search for a dim (mag 6.3) cluster of stars below the handle of the "teapot" of the constellation Sagittarius. This loose collection of stars appears about 2/3 as large as the full Moon. A small telescope may resolve the individual stars, but M55 lacks the dense core of stars found in most globular clusters. With binoculars, let your eyes wander the "steam" coming from the teapot-shaped Sagittarius (actually the plane of the Milky Way Galaxy) to find many more nebulae and clusters.

As optics improved, this fuzzy patch was discovered to be a globular cluster of over 100,000 stars that formed more than 12 billion years ago, early in the history of the Universe. Located 20,000 light years from Earth, this ball of ancient stars has a diameter of 100 light years. Recently, NASA released a magnificent image of M55 from the Hubble Space Telescope, revealing just a small portion of the larger cluster. This is an image that Charles Messier could only dream of and would have marveled at! By observing high above the Earth's atmosphere, Hubble reveals stars inside the cluster impossible to resolve from ground-based telescopes. The spectacular colors in this image correspond to the surface temperatures of the stars; red stars being cooler than the white ones; white stars being cooler than the blue ones. These stars help us learn more about the early Universe. Discover even more: <https://www.nasa.gov/feature/goddard/2023/hubble-messier-55>

The Hubble Space Telescope has captured magnificent images of most of Messier's objects. Explore them all: <https://www.nasa.gov/content/goddard/hubble-s-messier-catalog/>



The large image shows just the central portion of M55 taken by the Hubble Space Telescope. Above Earth's atmosphere, this magnificent view resolves many individual stars in this cluster. How many can you count through binoculars or a backyard telescope?

Original Image and Credits: NASA, ESA, A. Sarajedini (Florida Atlantic University), and M. Libralato (STS-cl, ESA, JWST); Smaller image: Digital Sky Survey; Image Processing: Gladys Kober

Look to the south in July and August to see the teapot asterism of Sagittarius. Below the handle you'll see a faint smudge of M55 through binoculars. More "faint fuzzies" can be found in the steam of the Milky Way, appearing to rise up from the kettle.

Image created with assistance from Stellarium: stellarium.org

ABOUT THE ASTRO SIG

Every month we get together on a Zoom call with a pretty loose agenda and manage to have an absolute blast talking about Astrophotography. I hope you'll join us if you're interested in Astrophotography.

IMAGING TRIPS TO BIG CYPRESS

Big Cypress National Park is about a 75 minute drive from Ft. Myers and it is probably one of the darkest areas in the state of Florida. We have a great place to set up and frequently meet astrophotographers and observers from other parts of the state.

The best way to stay tuned in to our impromptu field trips is to get on our Astro SIG Google Groups email list. [Contact Mike Jensen.](#)

Astro Sig Schedule 2023

All Meetings at 6:30pm

August 15th
September 19th
October 17th
November 21st
December 19th

The Astrophotography SIG

Our Astro SIG group is really growing in strength. From a meeting perspective, we are small, but our email list is about 40 and of those about 10 consistently contribute images for use on our website and in the newsletter. I truly believe that some of our images are unequalled in quality.

Many of our group are out imaging almost every possible night and reporting the results on our email group.

I am especially proud at the way our group shares lessons learned and methods taken to get the best out of their gear and the best images. Please see our images beginning on the next page.

ASTRO SIG MEETING ZOOM LINK

<https://us02web.zoom.us/j/81077794455?pwd=eGpxalRET1BPckdEcmt-JQ290WU5jdz09>

Meeting ID: 810 7779 4455
Passcode: Phot@SIG23

DID YOU KNOW?

The number of images an "everyday" astrophotographer captures in a year ranges from about 10 - 30/40.

In a Bortle 4.5 (Rural Areas) to Bortle 6 (most of Ft. Myers) area it takes about twice as long to capture the light from a celestial object that you might capture in an area like Big Cypress which is a Bortle 2.5.

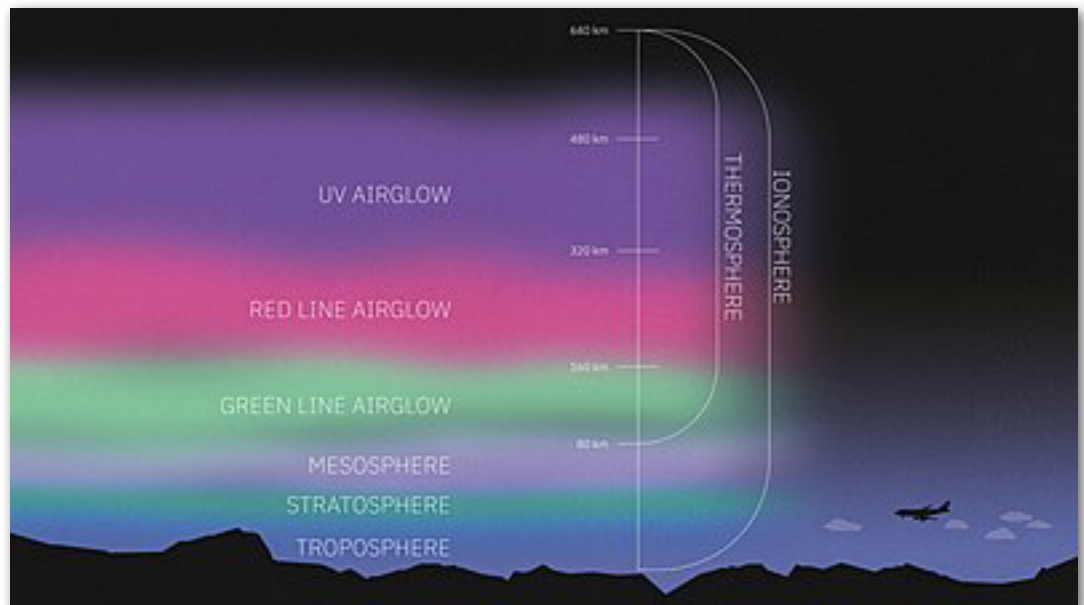


The Bortle Scale

The Bortle scale is a nine-level numeric scale that measures the night sky's brightness of a particular location. It quantifies the astronomical observability of celestial objects and the interference caused by light pollution. John E. Bortle created the scale and published it in the February 2001 edition of *Sky & Telescope* magazine to help amateur astronomers evaluate the darkness of an observing site, and secondarily, to compare the darkness of observing sites. The scale ranges from Class 1, the darkest skies available on Earth, through to Class 9, inner-city skies. It gives several criteria for each level beyond naked-eye limiting magnitude (NELM).[1] The accuracy and utility of the scale have been questioned in recent research.[2] The table below summarizes Bortle's descriptions of the classes. Some classes can have very drastic differences from the one next to it, e.g, Bortle 4 to 5.

Class 1 Title: Excellent dark-sky site

- The zodiacal light is visible and colorful
- The gegenschein is visible (The backscatter of sunlight by interplanetary dust causes this optical phenomenon, also called counter-glow.)
- The zodiacal band is visible
- Airglow is readily visible (Airglow is a faint emission of light by a planetary atmosphere. In the case of Earth's atmosphere, this optical phenomenon causes the night sky never to be completely dark, even after the effects of starlight and diffused sunlight from the far side are removed.)
- The Scorpius and Sagittarius regions of the Milky Way cast obvious shadows
- Many constellations, particularly fainter ones, are barely recognizable amid the large number of stars
- Many Messier and globular clusters are naked-eye objects
- M33 (the Triangulum Galaxy) is a direct vision naked-eye object
- Limiting magnitude with 12.5 in (32 cm) reflector is 17.5 (with effort)
- Venus and Jupiter affect dark adaptation



Class 2 Title: Typical truly dark site

- The zodiacal light is distinctly yellowish and bright enough to cast shadows at dusk and dawn
- Airglow may be weakly visible near horizon
- Clouds are only visible as dark holes against the sky
- Surroundings are barely visible silhouetted against the sky
- The summer Milky Way is highly structured
- Many Messier objects and globular clusters are naked-eye objects
- M33 is easily seen with naked eye
- Limiting magnitude with 12.5" reflector is 16.5



Class 3 Title: Rural sky

- The zodiacal light is striking in spring and autumn, and color is still visible
- Some light pollution evident at the horizon
- Clouds are illuminated near the horizon, dark overhead
- Nearer surroundings are vaguely visible
- The summer Milky Way still appears complex
- M15, M4, M5, and M22 are naked-eye objects
- M33 is easily visible with averted vision
- Limiting magnitude with 12.5" reflector is 16

**Big Cypress Imaging Area - Bortle 2.5-3****Class 4 Title: Brighter Rural sky**

- The zodiacal light is still visible, but does not extend halfway to the zenith at dusk or dawn
- Light pollution domes visible in several directions
- Clouds are illuminated in the directions of the light sources, dark overhead
- Surroundings are clearly visible, even at a distance
- The Milky Way well above the horizon is still impressive, but lacks detail
- M33 is a difficult averted vision object, only visible when high in the sky
- Limiting magnitude with 12.5" reflector is 15.5

**Looking West. Taken from Babcock Webb Wildlife Mgmt Area. I-75-Exit 158****Class 4.5 Title: Semi-Suburban/Transition sky**

- Clouds have a grayish glow at zenith and appear bright in the direction of one or more prominent city light domes
- The Milky Way is only vaguely visible – 10–15 degrees above the horizon. However the Great Rift, when overhead and with good transparency, is still obvious.
- Although the views of bright globular clusters through 10" aperture and larger are striking, the outer regions of galaxies are difficult or impossible to see.
- Limiting magnitude with 12.5" reflector is 15.2

Class 5 Title: Suburban sky

- Only hints of zodiacal light are seen on the best nights in autumn and spring
- Light pollution is visible in most, if not all, directions
- Clouds are noticeably brighter than the sky
- The Milky Way is invisible near the horizon, and looks washed out overhead. The winter Milky Way, even directly overhead, is fairly subtle.
- When it is half moon (first/last quarter) in a dark location the sky appears like this, but with the difference that the sky appears dark blue
- Limiting magnitude with 12.5" reflector is 15

**Class 6 Title: Bright suburban sky**

- The zodiacal light is invisible
- Light pollution makes the sky within 35° of the horizon glow grayish white
- Clouds anywhere in the sky appear fairly bright
- Even high clouds (cirrus) appear brighter than the sky background
- Surroundings are easily visible
- The Milky Way is only visible near the zenith
- M33 is not visible, M31 is modestly apparent
- Limiting magnitude with 12.5" reflector is 14.5

Class 7 Title: Suburban/Urban transition sky

- Light pollution makes the entire sky light gray
- Strong light sources are evident in all directions
- Clouds are brightly lit
- The Milky Way is nearly or totally invisible
- M31 and M44 may be glimpsed, but with no detail
- Through a telescope, the brightest Messier objects are pale ghosts of their true selves
- When it is full moon in a dark location the sky appears like this, but with the difference that the sky appears blue
- Limiting magnitude with 12.5" reflector is 14

Class 8 Title: City sky

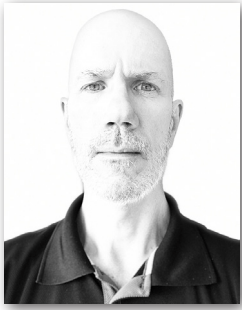
- The sky is light gray or orange – one can easily read
- Stars forming familiar constellation patterns may be weak or invisible
- M31 and M44 are barely glimpsed by an experienced observer on good nights
- Even with a telescope, only bright Messier objects can be detected
- Limiting magnitude with 12.5" reflector is 13

**Class 9 Title: Inner City sky**

- The sky is brilliantly lit
- Many stars forming constellations are invisible and many fainter constellations are invisible
- Aside from the Pleiades, no Messier object is visible to the naked eye
- The only objects to observe are the Moon, the planets, bright satellites, and a few of the brightest star clusters

Astrophotography: The First Eighteen Months

by John Udart



Reflecting on the past eighteen months, I would say it has been one of the best times of my life. Granted, being a kid was fantastic, undoubtedly ranking as the pinnacle of my existence thus far. However, as a child, one lacks the privileges of good credit, a stable job, or round-the-clock internet access—all of which, as I later discovered, are quite essential when pursuing a hobby as an adult. Before 2022, my hobby was a terrestrial photographer, accumulating two decades of experience capturing a vast range of styles, from landscapes and wildlife to fine art and fashion, embracing everything from portraits to candid moments and everything in between. Life was great, until it wasn't.

The predicament I gradually became painfully aware of was that, somewhere along the way, I had grown bored. So bored, in fact, that the last time I recall embarking on a photo shoot was early in 2019. I could attribute this to the great quality of smartphone photography nowadays (which, admittedly, I do), or to the demanding 50-hour workweeks (another valid culprit), or even to the fact that I'm growing older and less inclined to venture into the unknown (a notion I'm still contemplating). Regardless, the undeniable truth was that I had fallen into a rut—a rut that had persisted for three long years with no end in sight. Or so I thought. They say even the most arid regions of the Earth eventually receive rain, and my rain arrived in late December 2021 in the form of a YouTube video.

The thumbnail caught my attention with the words: "NO Tracker NO Telescope NO Problem" accompanied by a happy face. The title below proclaimed: "Orion Nebula WITHOUT a Star Tracker or Telescope, Start to Finish, DSLR Astrophotography." Initially, I nearly dismissed it as clickbait, but I am glad that I didn't. If I had, I wouldn't be writing these words right now. That single video marked the inception of a rekindled passion for photography within me. A seismic shift occurred, steering me away from the typical and mundane terrestrial subjects towards the infinite, extraterrestrial wonders of the night sky.

My inaugural astrophotography endeavor centered around capturing the ethereal beauty of the Orion Nebula. Armed with my trusty Canon T3i and a 300mm lens, I carefully set up my equipment on a tripod in early January 2022. After taking the necessary light sub-exposures and calibration frames, I processed the data using a free program. The resulting image, while admittedly grainy and slightly out of focus, held an allure unlike anything I had ever photographed before. It depicted an object situated an astounding 1500 light-years away, floating gracefully in the vastness of space. The sheer realization of this achievement left me absolutely ecstatic!



About a week after that photo, I joined the Southwest Florida Astronomical Society. Mike had established a Special Interest Group (SIG) email platform where astrophotographers freely exchanged their experiences and provided assistance to one another. It was within this community that I found camaraderie and invaluable guidance. Mike even graciously extended an offer for me to use his Sky-Watcher Star Adventurer 2i, which enabled tracking in the Right Ascension and facilitated longer exposure times. The resulting images I cap-



Rig 1 - Star Adventurer Sky Tracker

tured were nothing short of amazing. With that, I officially assumed the title of astrophotographer.

The subsequent five months proved to be an extraordinary period of growth and learning. Each clear night presented an opportunity to expand my knowledge and refine my craft. As summer approached, I aimed my lens at the captivating M81 and M82, two galaxies located a remarkable 12 million light-years from Earth. The allure of these celestial wonders had me firmly ensnared—I yearned for more.

As the transition from May to June unfolded, the arrival of the rainy season was here. It wasn't the rain



Rig 2 - EQ6R w Dedicated Camera

itself that bothered me; I recognized its importance for nurturing crops and maintaining the lushness of my lawn. No, it was the persistent presence of clouds that posed a constant challenge to astronomers and astrophotographers worldwide. Unless I relocated to Chile or Arizona, I had no choice but to patiently wait out this downtime like everyone else. To make the most of this period, I delved into an extensive reading and research spree, familiarizing myself with the vast array of mounts, telescopes, cameras, and accessories available in the market. I eagerly studied their interplay, considering factors such as image size, resolution, and aperture. Admittedly, the prices of some of these equipment options were exorbitant. In a conscientious effort to ensure that my ambition didn't outstrip my resources, I set a budget and remained committed to it. Well, mostly.

From October to December, I methodically acquired the essential components of a dedicated astrophotography rig—a mount, telescope, camera, guide camera and a few other accessories. Armed with this new gear, I set out in early January 2023, once again directing my lens toward the heavens to capture the celestial wonders that awaited me. The experiences that unfolded before me were ineffable, defying adequate description.



The first image I captured this year was of the Orion Nebula. This time, however, the resolution and focus were significantly improved, revealing its true colors in all their majestic splendor. In February, my lens was fortunate enough to capture a fleeting celestial visitor—a rare comet named C-2022 E3 (ZTF)—as

it streaked past Earth, never to grace our skies again in this lifetime. March gifted me with an exceptionally cloudless month, transforming it into a celestial photographer's dream.



I seized the opportunity and dedicated ample time to imaging the Rosette Nebula, and the resulting images were nothing short of extraordinary. This resplendent nebula filled the entire frame of my camera, earning its place as one of the finest images I have ever captured.

However, April and May proved to be somewhat disheartening months, with a disappointingly abundant cloud cover obscuring the night skies. Nonetheless, I managed to seize a few precious nights to train my lens on the distant galaxies of M81 and M82. These companion galaxies, located a staggering 12 million light-years away from our humble planet, unfolded their cosmic beauty before my eyes. Additionally, I directed my lens towards a star cluster known as M3, nestled within the constellation Canes Venatici, residing approximately 32,000 light-years away from our own galaxy. This cluster, comprising around 500,000 stars, offered a captivating glimpse into the vastness of deep space—a true treasure trove of celestial diamonds.



C49 - The Rosette Nebula

As for my recent endeavor, I focused my attention on capturing the Pinwheel Galaxy. An astronomer had recently discovered a supernova occurring within one of the galaxy's spiral arms on May 19. Determined not to miss this once-in-a-decade event, I seized the opportunity to image it on May 28th and 29th. The sight of the supernova was simply awe-inspiring. The realization that this cataclysmic event had taken place a mind-boggling 21 million years ago compelled me to pause and reflect upon the fleeting nature of our existence on Earth and the profound wonders and complexities of the universe surrounding us.



I am immensely grateful to the Southwest Florida Astronomical Society and the SIG group for opening my eyes to the unfathomable beauty beyond our atmosphere. They have revealed sights unattainable through earthly photography,



M101 - The Pinwheel Galaxy with SN (Supernova) 2023

Editor's Note: I'm so grateful to John for writing this. John's first 18 months were very similar to my own. The big thing I'd like to point out is that John works full time and pretty much does most of his astrophotography on the weekends. So imagine this (retired people). You know how much we stress over the Summer cloud filled skies. Think about how stressing and frustrating this would be if you caught the fire of capturing the night skies and had to limit yourself to doing it only on the clear weekends of the month when the moon wasn't out. Ugh!

There are many of us in the SIG group who have only been at this for a few years. It's a great example of what you can do and learn if you apply yourself and stay connected to like minded people. This is one of the reasons I started the SIG group. ~ Mike Jensen



M81/82 Galaxies by John Udart

Light Pollution Impacts Over 80% of Worlds Population

One third of humanity cannot see the Milky Way at night due to the luminescent glow of artificial light, say scientists who created a new world atlas of light pollution.

Artificial light pollutes the night sky for more than 80 per cent of the world's population, researchers said. The atlas, created by Fabio Falchi and colleagues at the Light Pollution Science and Technology Institute in Italy, displays population and land-based light pollution statistics for all countries, showing the magnitude of the problem for each and facilitating easy comparison of national and global levels of light pollution.

The atlas will be an important tool for studying artificial light as an environmental pollutant with potential health and ecological consequences, researchers said.

It also sets a precise point against which to compare future increases or decreases in global light pollution. Light pollution is no longer merely an annoyance for astronomers. The artificial brightening of the night sky is profoundly altering a fundamental human experience - the opportunity for each person to view and ponder the sky above in evening hours.

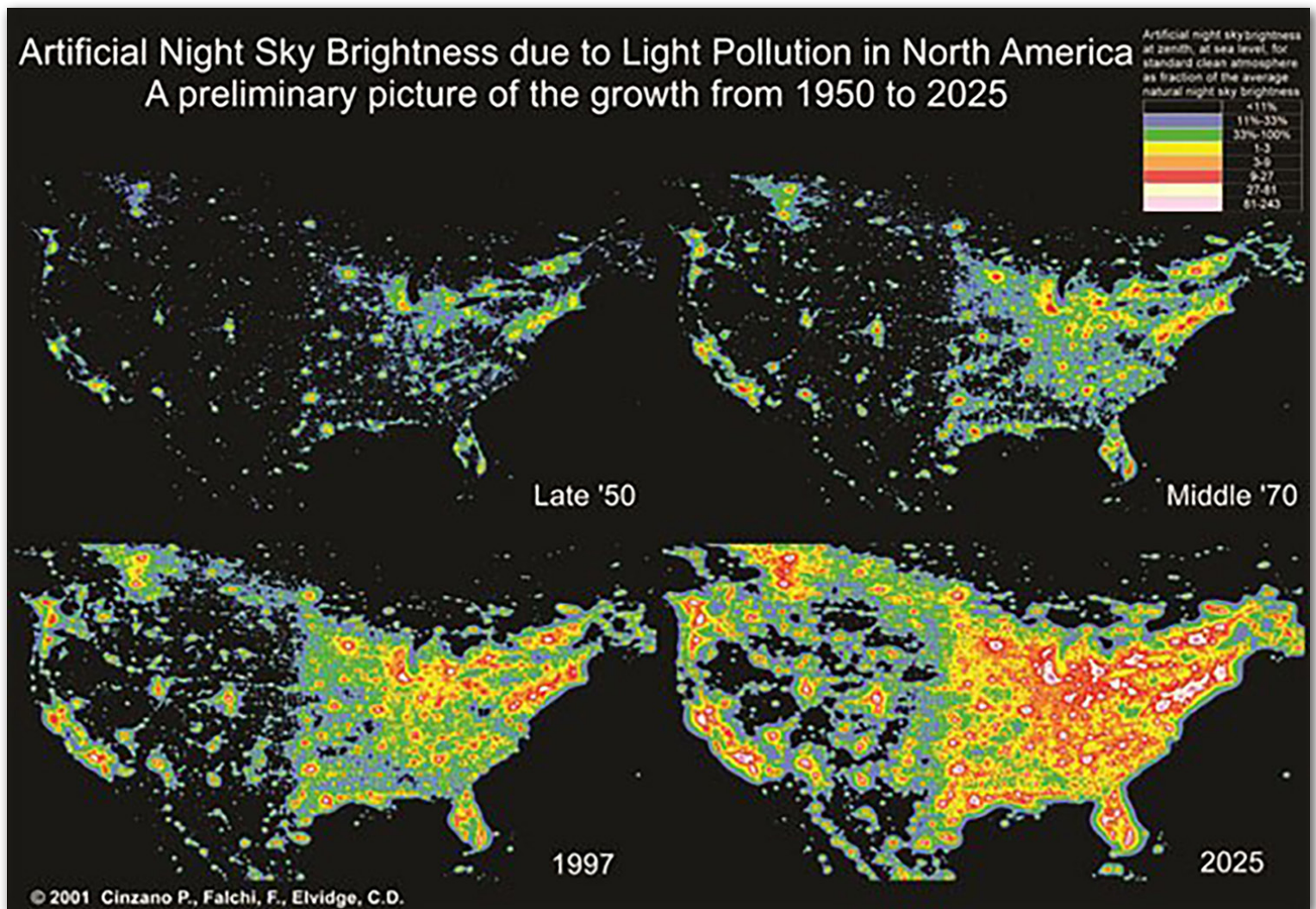
Even small increases in night sky brightness degrade this experience, researchers said. Despite its global pres-

ence and potential environmental risk, light pollution has received relatively little attention. Unlike other pollutants, such as noise levels in the oceans, artificial light levels are poorly quantified. Over a decade ago, Falchi and colleagues created the first world atlas of artificial night sky brightness.

In the new study, they updated their original work by creating another, more precise atlas that incorporates new tools and uses new data from a high-resolution satellite. The atlas shows that 99 per cent of the US and Europe live under light polluted skies. The researchers considered “polluted” to be the level of brightness at which artificial light substantially obscures astronomical observations.

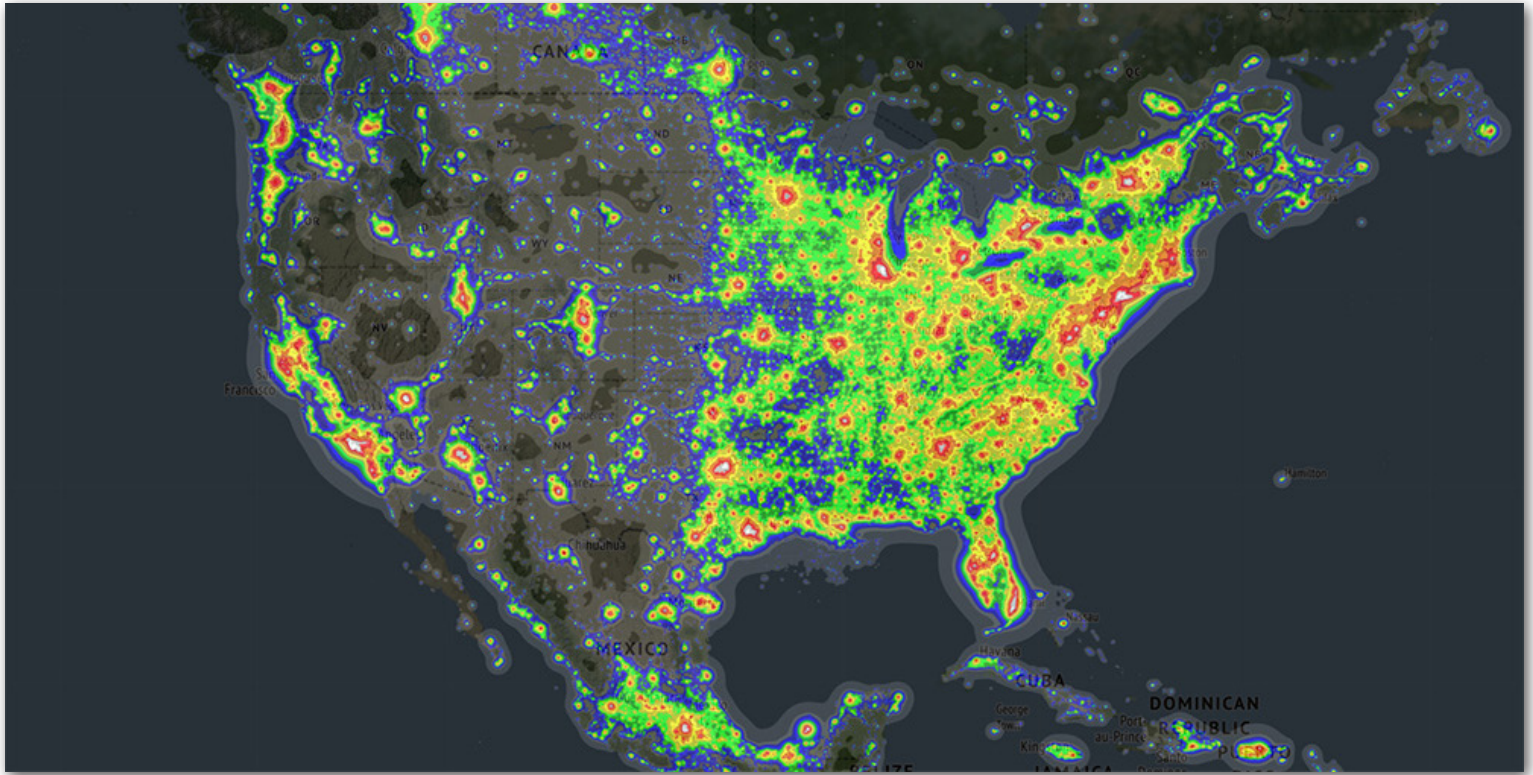
The atlas also unveils that in some places with high levels of light pollution, such as Singapore, people never experience conditions resembling true night because it is masked by artificial twilight; in such places, most of the population lives under skies so bright that their eyes cannot fully adapt to night vision. On the other hand, countries with populations least affected by light pollution are Chad, the Central African Republic, and Madagascar.

More than three quarters of inhabitants in these places live under pristine, ink-black night sky conditions. The study was published in the journal *Science Advances*.

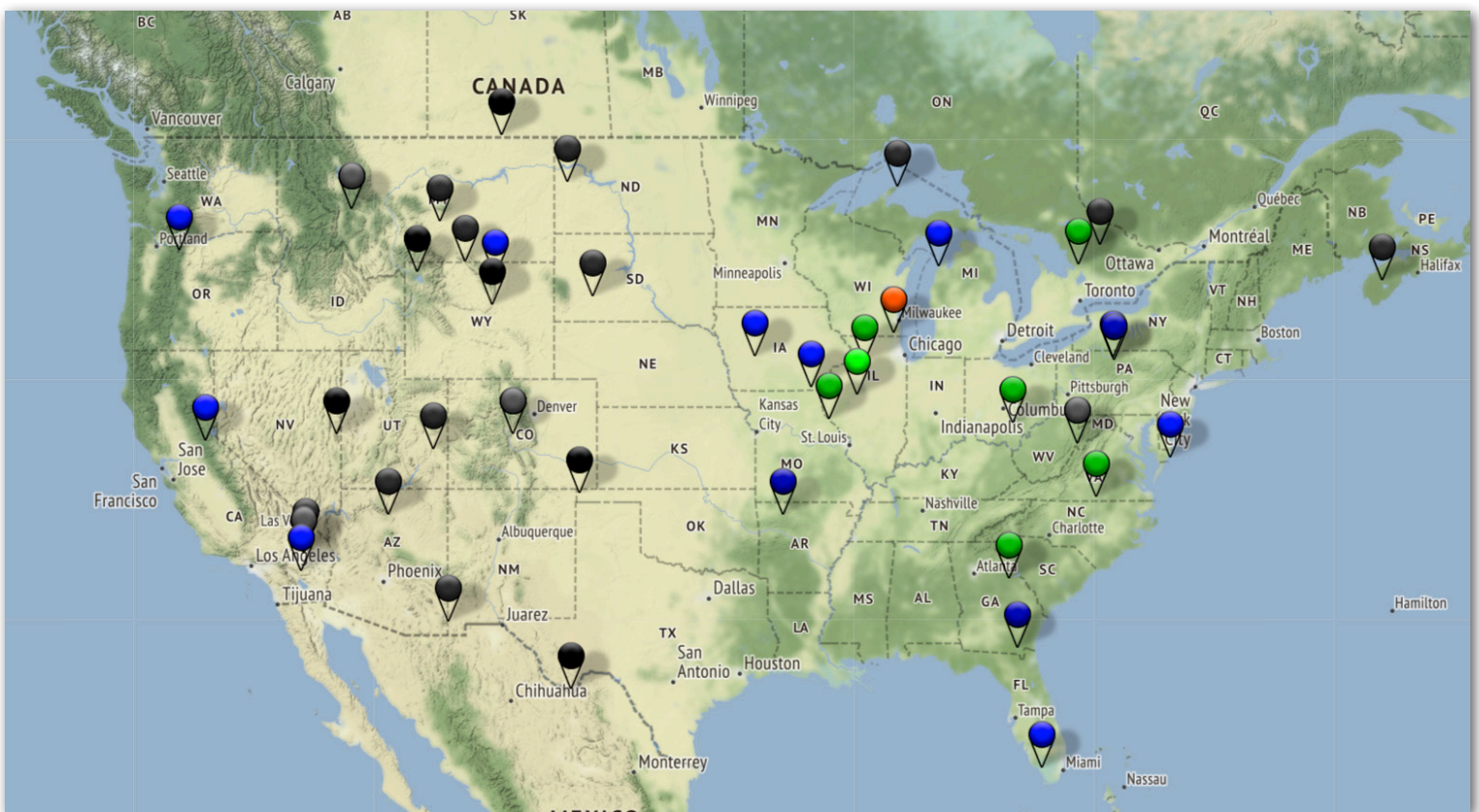


Where Do You Go For Real Dark Skies?

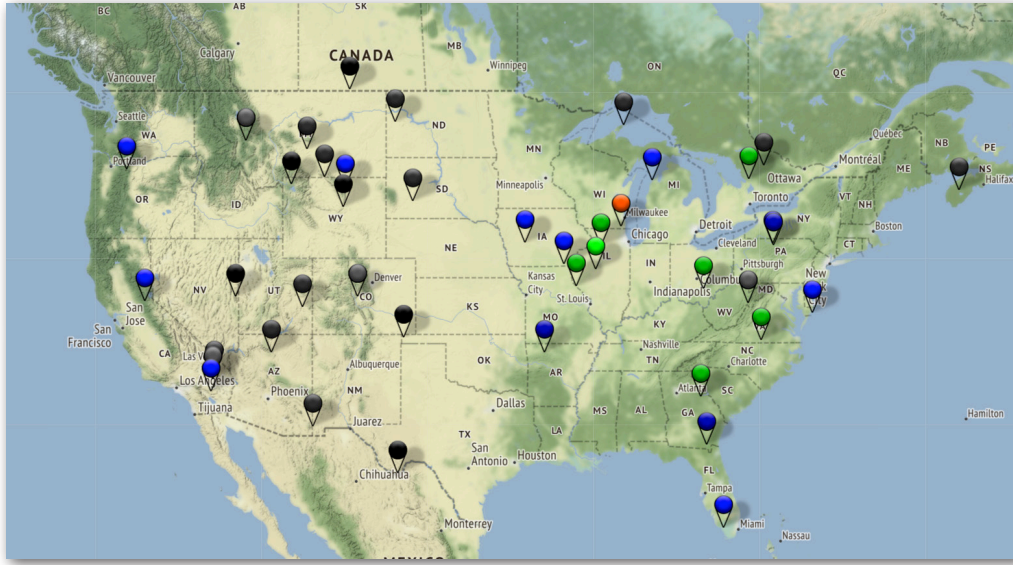
In the map below you will see the impact of light pollution on the night sky in the United States. These maps can be found at <https://darksitefinder.com/>



Below is a map of the designated dark sky areas in the United States, each designated with a colored pin. If you click on the pin it will tell you more about the location. <https://darksitefinder.com/maps/world.html#5/35.861/-95.411>



Designated Dark Skies Areas



Let's explore the difference in the pin colors on this map. This should be very telling.

Kejimikujik National Park, Nova Scotia, Canada

Color Zone: Dark Gray
Is Camping Allowed? Yes
Entrance Fee? \$6

Description: The darkest skies in Nova Scotia are found here. The park offers guided astronomy programs in the summer and even rents out "dark sky kits." The area is accessible by ferry from Maine.

Yellowstone NP

Color Zone: Black
Is Camping Allowed? Yes, 12 campgrounds and 9 lodges
Entrance Fee? \$35

Description: Yellowstone is a large, high elevation national park *containing some of the darkest skies in the US*. Much of the park is forested, but some of the wide open areas include Swan Lake, Hayden Valley, Lamar Valley, and the Old Faithful parking lot. There are plenty of opportunities for nightscape photos around the geyser basins. Wildlife is abundant, be sure to carry bear spray. Also keep in mind that all park roads close in the winter, except for the road from Mammoth Hot Springs to Cooke City, MT.

Dead Horse State Park, Utah

Color Zone: Dark Gray
Is Camping Allowed? Yes, at Kayenta Campground
Entrance Fee? \$10
Description: With no towns around for many miles (other than Moab), the skies here are extremely dark. The incredible view from Dead Horse Point itself can't be beat for nightscape photos.

Richard Bong State Recreation Area, Wisconsin

Color Zone: Dark Orange
Is Camping Allowed? Yes, at Sunrise or Sunset Campgrounds
Entrance Fee? \$8-\$11

Description: While the skies here aren't exactly dark, it is the darkest place in between Chicago and Milwaukee. It's a quiet place to observe with no direct streetlights. The best spot is the lot by the observation platform. There is also an Astronomy Association that occasionally meets here.

Buffalo National River, Arkansas

Color Zone: Dark Blue
Is Camping Allowed? Yes
Entrance Fee? No

Description: Far away from any towns, the skies here are very dark. Some of the sky will be obstructed by cliffs and trees, depending on where you set up. But since it's so heavily forested in the Ozarks, it's difficult to find a better spot than the Steel Creek Campground. Another nearby spot that may be good for stargazing is the elk viewing area across from Lost Valley Rd.

Deerlick Astronomy Village, Georgia

Color Zone: Dark Green
Is Camping Allowed? Yes, membership required
Entrance Fee? Yes, membership required

Description: Deerlick Astronomy Village is a planned dark sky community, less than 2 hours east of Atlanta. Annual membership is required to use the observing field, with prices ranging from \$15-\$50.

Big Cypress -

Color Zone, Light Blue
Is Camping Allowed? Yes, at several campgrounds
Entrance Fee? No

Description: Big Cypress National Preserve is one of the darkest places in southern Florida. There is a large light dome from Miami to the east, but other than that the sky is very dark. There are several campgrounds to choose from, but Monument Lake probably has the least amount of trees blocking the sky. Watch out for alligators!

Is Light Pollution The Next Climate Change Problem?

New study highlights the need for urgent action to reverse runaway light pollution

Globe at Night community science project finds that light pollution is doubling globally every eight years.

From Dark Sky - <https://www.darksky.org/new-study-highlights-the-need-for-urgent-action-to-reverse-runaway-light-pollution/>

A new study published in [Science](#) reports that between 2011 and 2022, global sky brightness increased by an estimated 9.6% per year. The study is based upon data collected through the community science project, NOIRLab's Globe at Night. This rapid brightening of the night sky over large portions of the Earth has serious consequences for all living things. The authors conclude that "existing lighting policies are not preventing this increase, at least on continental and global scales." The startling increase in light pollution is a clear wake-up call for policymakers that decisive and immediate action is needed to address this urgent environmental threat.

Why is this finding surprising?

In the past few years, studies have estimated that light pollution was growing by approximately two percent per year. These studies use data from earth observation satellites. In other words, they measure the light escaping the atmosphere.

The new study, reported in *Science*, relies on people recording the number of stars they see on a clear, dark night. In other words, they assess night sky brightness from the ground looking up. These observations measure skyglow, the brightening of the night sky from countless lights. The satellites primarily measure light emitted vertically, either directly or via reflection. They are also blind to light in the bluer, short wavelength. The observations of the night sky from the ground also include light emitted horizontally – such as lit building facades, digital billboards, and light escaping windows. The human eye also sees the light across a broader spectrum. These observational factors are more causative of skyglow and useful predictors of biological impact.

"Since human eyes are more sensitive to these shorter wavelengths at nighttime, LED lights have a strong effect on our perception of sky brightness," said Kyba. "This could be one of the reasons behind the discrepancy between satellite measurements and the sky conditions reported by Globe at Night participants."

Why do the results matter?

Over the past 150 years, we have transformed the natural world. It is becoming increasingly clear that one of the most profound changes is the loss of darkness at night over much of the planet. As the study authors report, "the character of the night sky is now different from what it was when life and civilization developed." It is clear from this paper that the growth of light pollution is continuing, largely unchecked.

"At this rate of change, a child born in a location where 250 stars were visible would be able to see only about 100 by the time they turned 18," said Christopher Kyba, a researcher at the German Research Centre for Geosciences and lead author of the paper detailing these results.

Increasing sky brightness is a sign we are doing lighting wrong. It's a sign we are using energy inefficiently, wasting money, exacerbating climate change, and increasing environmental impacts. Scientists estimated that carbon dioxide, the primary contributor to climate change, is growing at 2% per year globally – doubling every 30 years. By comparison, light pollution is growing at 9.6% per year – doubling in less than eight years.

"The increase in skyglow over the past decade underscores the importance of redoubling our efforts and developing new strategies to protect dark skies," said Walker. "The Globe at Night dataset is indispensable in our ongoing evaluation of changes in skyglow, and we encourage everyone who can to get involved to help protect

the starry night sky.”

How was the study conducted?

Thousands of volunteers collect data on how many stars they can see yearly. Using a simple phone app, they compared the number of stars they saw in a well-known constellation to estimate the level of light pollution. Using more than 50,000 data points collected between 2011 and 2022, the scientists compared the data collected to a sky brightness model. The model estimated that globally, light pollution has been growing at 9.6% per year every year.

What are the implications of this study?

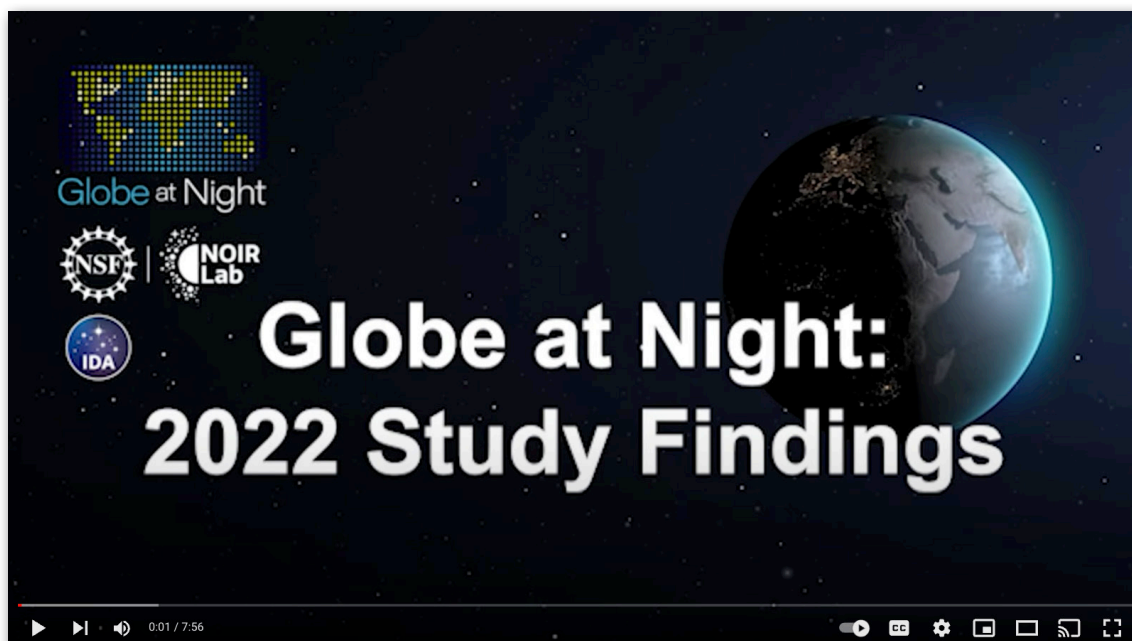
As noted in the main study, existing lighting policies have failed to prevent these increases, at least at a continental or global scale. In a companion [Perspectives](#) piece in *Science*, authors Fabio Falchi and Salvador Bara call for a new approach to slow, halt, and reverse this alarming trend. They conclude, “light pollution is an environmental problem and should be confronted and solved.” New approaches could include establishing regional lighting budgets and limits based on sky quality over parks, protected areas, and astronomical sites. In other words, taking a similar approach to how we regulate and control air and water pollution.

This is consistent with the approach we called for in our [European policy brief](#) released to support the Brno appeal to reduce light pollution in Europe.

Unlike many other forms of pollution, we can reduce light pollution using existing technology. Once addressed, the results are immediate, and the cost savings, in terms of ongoing energy savings, are significant. Critically, it does not mean turning off all the lights. By following the [Five Principles for Responsible Lighting](#), we can take immediate steps to reduce light pollution while enhancing light quality at night.

How can I help?

- Participate in the [Globe at Night](#) program to assess change in your community. By taking measurements consistently across a number of years, you can help scientists assess regional change.
- Join the [IDA global advocacy community](#) and get active in advancing responsible lighting policies in your community today.
- Sign up for [our newsletter](#) to receive regular updates from IDA, including tips on taking action around your home to be part of the solution.
- Share this blog post with your friends and family and encourage them to be part of the solution.

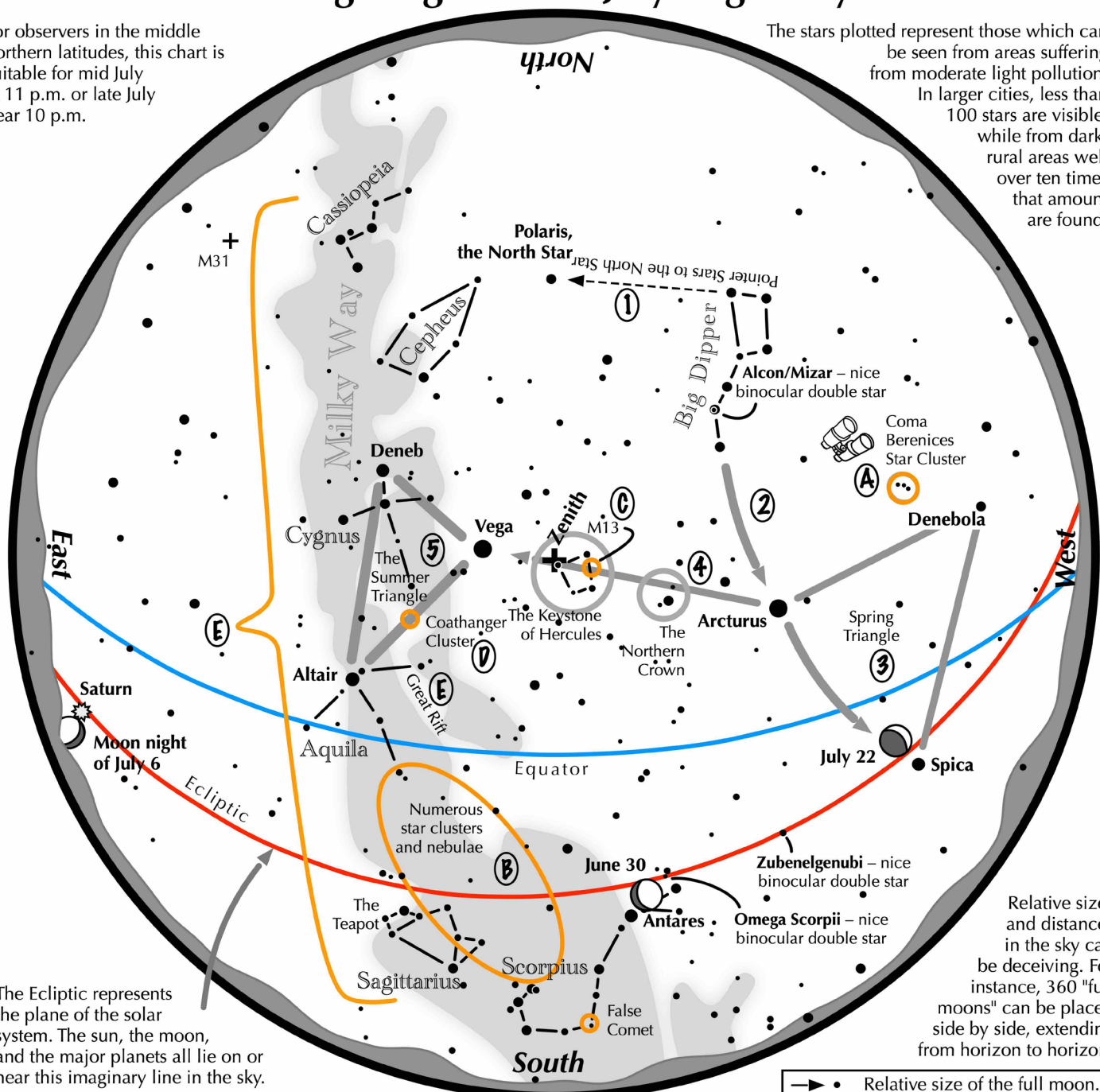


Sky Chart

Navigating the mid July Night Sky

For observers in the middle northern latitudes, this chart is suitable for mid July at 11 p.m. or late July near 10 p.m.

The stars plotted represent those which can be seen from areas suffering from moderate light pollution. In larger cities, less than 100 stars are visible, while from dark, rural areas well over ten times that amount are found.



The Ecliptic represents the plane of the solar system. The sun, the moon, and the major planets all lie on or near this imaginary line in the sky.

Relative sizes and distances in the sky can be deceiving. For instance, 360 "full moons" can be placed side by side, extending from horizon to horizon.

→ • Relative size of the full moon.

Navigating the mid July night sky: Simply start with what you know or with what you can easily find.

- 1 Extend a line north from the two stars at the tip of the Big Dipper's bowl. It passes by Polaris, the North Star.
- 2 Follow the arc of the Dipper's handle. It first intersects Arcturus, the brightest star in the July evening sky, then continues to Spica. Arcturus, Spica, and Denebola form the Spring Triangle, a large equilateral triangle.
- 3 To the northeast of Arcturus shines another star of similar brightness, Vega. Draw a line from Arcturus to Vega. It first meets "The Northern Crown," then the "Keystone of Hercules." A dark sky is needed to see these two dim stellar configurations.
- 4 High in the East lies the Summer Triangle stars of Vega, Altair, and Deneb.

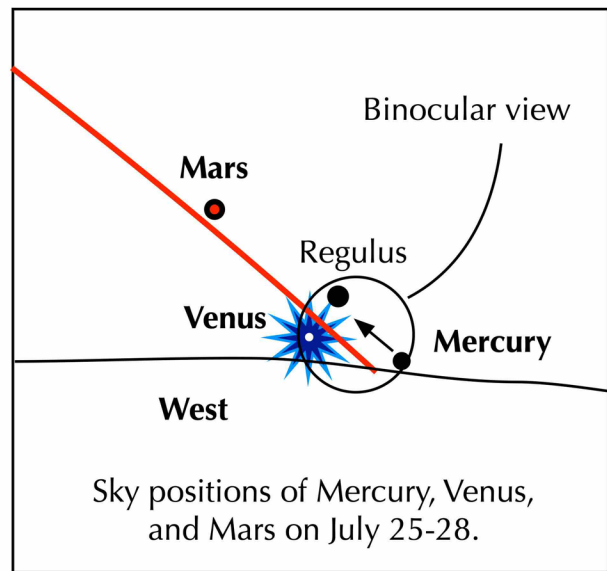
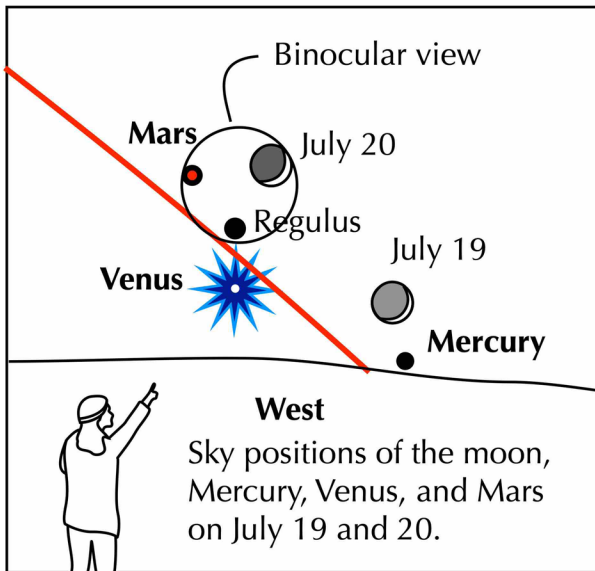
Binocular Highlights

- A: Between Denebola and the tip of the Big Dipper's handle, lie the stars of the Coma Berenices Star Cluster.
- B: Between the bright stars Antares and Altair, hides an area containing many star clusters and nebulae.
- C: On the western side of the Keystone glows the Great Hercules Cluster, containing nearly 1 million stars.
- D: 40% of the way between Altair and Vega, twinkles the "Coathanger," a group of stars outlining a coathanger.
- E: Sweep along the Milky Way for an astounding number of faint glows and dark bays, including the Great Rift.





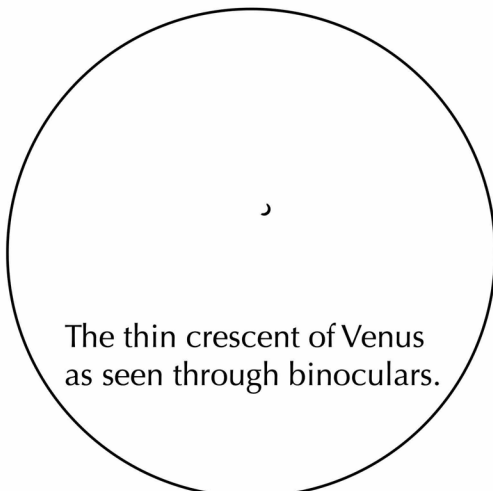
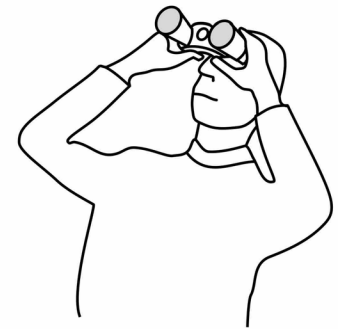
If you can see only one celestial show in the evening this July, see this one.



All the rocky planets, all at once!

On the evenings of July 19 and 20, look towards the west 30 minutes after sunset.

- Brilliant Venus will be seen as a tiny crescent in steadily held binoculars.
- On the first evening, the thin crescent moon, full with earthshine, hangs above Mercury. The little planet might be lost in the bright twilight.
- On July 20, the moon forms a triangle with Regulus and Mars. Venus sinks below them.

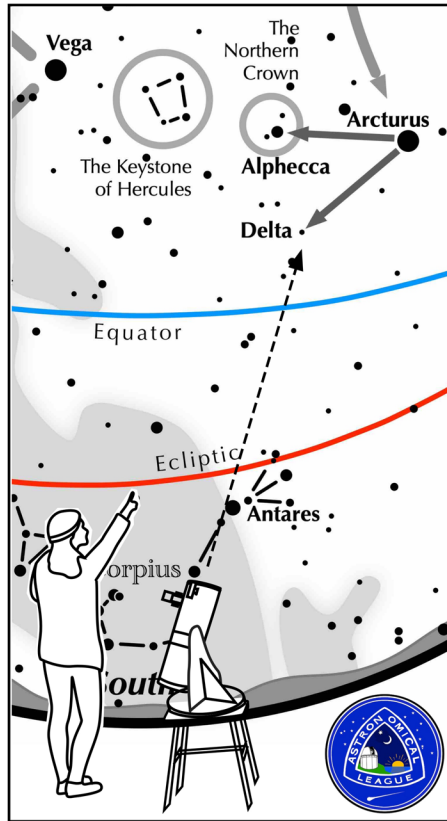


Mars, having lost its splendor from last fall, might be difficult to spot in the bright twilight. Binoculars will help.

• Mercury climbs somewhat higher over the remaining evenings in July. On July 28, it lies directly next to Regulus, which has dropped much closer to the horizon. Venus may lie too close to the horizon to be spotted. Because of their low altitude, very clear skies and a low horizon are needed to see this.

Double Star Challenge

ASTRONOMICAL LEAGUE Double Star Challenge



Other Suns: Delta Serpentis

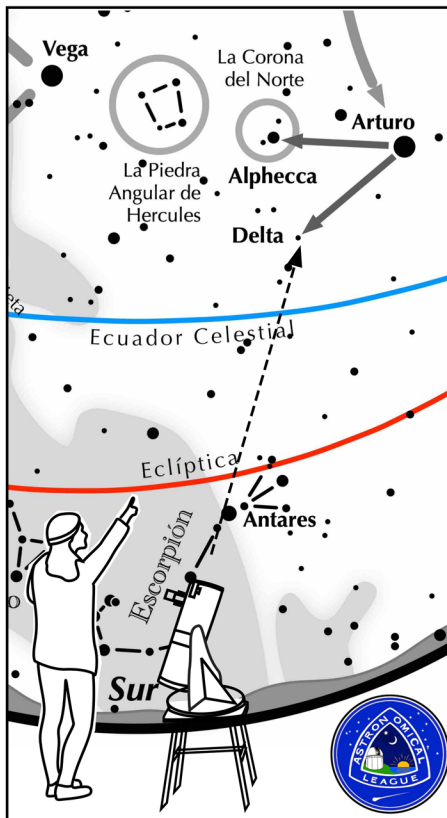
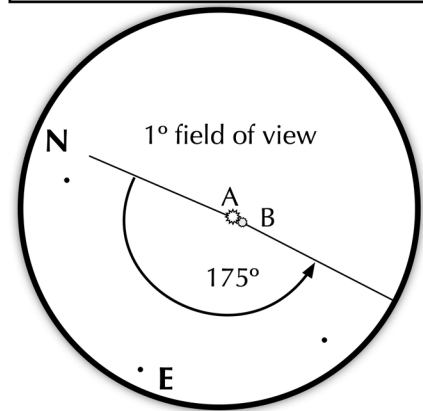
How to find Delta Serpentis on a July evening

Find bright Arcturus, nearly overhead. To its northeast is a similarly bright star, Vega. One-third the distance between the two is Alphecca. Delta Serpentis lies the same distance from Arcturus as Alphecca, but to the southeast.

Delta Serpentis

A-B separation: 4 sec
 A magnitude: 4.2
 B magnitude: 5.2
 Position Angle: 175°
 A & B colors: white

Suggested magnification: >60x
 Suggested aperture: >3 inches



Otros Soles: Delta Serpentis

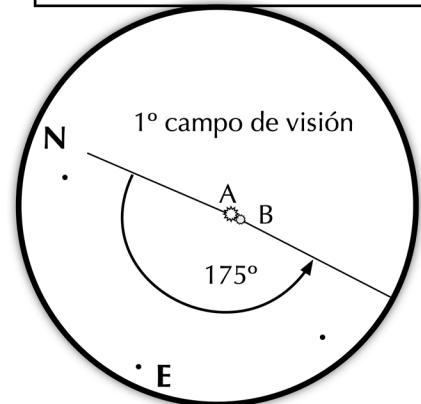
Cómo encontrar Delta Serpentis en una tarde de julio

Encuentra Arturo brillante, casi arriba. Al noreste hay una estrella igualmente brillante, Vega. Un tercio de la distancia entre los dos es Alphecca. Delta Serpentis se encuentra a la misma distancia de Arcturus que Alphecca, pero al sureste.

Delta Serpentis

A-B separación: 4 sec
 A magnitud: 4.2
 B magnitud: 5.2
 PA: 175°
 A & B color: blanca

Ampliación sugerida: >60x,
 Apertura sugerida: >75 mm



Planet Positions

Click on the graphic above to go to Time and Date for a great simulation of the rotation of the constellations and the rising/setting of the planets. The chart below is set for the date of our meeting but can be programmed for any date and time. The chart can also be found at [this link on Heavens Above](#).



Planet Summary

Year Month Day Time

	Mercury	Venus	Mars	Jupiter	Saturn	Uranus	Neptune	Pluto
Right ascension	8 ^h 46 ^m 16.0 ^s	9 ^h 55 ^m 23.6 ^s	10 ^h 21 ^m 17.9 ^s	2 ^h 37 ^m 7.5 ^s	22 ^h 34 ^m 34.3 ^s	3 ^h 18 ^m 31.2 ^s	23 ^h 52 ^m 3.5 ^s	20 ^h 6 ^m 41.8 ^s
Declination	19° 45' 5"	10° 31' 49"	11° 24' 6"	14° 6' 53"	-10° 46' 59"	17° 57' 13"	-2° 12' 56"	-22° 59' 8"
Range (AU)	1.238	0.394	2.297	5.188	9.021	20.115	29.456	33.799
Elongation from Sun	15.9°	34.5°	40.2°	71.5°	136.6°	60.9°	115.5°	173.3°
Brightness	-0.6	-4.4	1.8	-2.1	0.7	5.8	7.9	14.3
Equatorial Diameter	5.43"	42.38"	4.08"	38.00"	18.42"	3.50"	2.32"	0.10"
Phase Angle	47.0°	127.6°	23.3°	11.2°	4.1°	2.6°	1.8°	0.2°
Constellation	Cancer	Leo	Leo	Aries	Aquarius	Aries	Pisces	Sagittarius
Meridian transit	13:11	14:22	14:48	07:05	03:04	07:47	04:21	00:36
Rises	07:10	08:23	08:48	01:06	21:01	01:48	22:18	18:33
Sets	19:12	20:22	20:47	13:04	09:03	13:46	10:20	06:35
Altitude	-38.3°	-23.5°	-17.1°	-44.7°	13.9°	-52.8°	-5.2°	45.8°
Azimuth	295.5°	281.5°	281.9°	69.9°	101.1°	59.3°	92.2°	124.0°
Inferior Conjunction	2023-May-01 2023-Sep-06	2022-Jan-09 2023-Aug-13	-	-	-	-	-	-
Opposition	-	-	2022-Dec-08 2025-Jan-16	2022-Sep-26 2023-Nov-03	2022-Aug-14 2023-Aug-27	2022-Nov-09 2023-Nov-13	2022-Sep-16 2023-Sep-19	2022-Jul-20 2023-Jul-22
Superior Conjunction	2023-Jul-01 2023-Oct-20	2022-Oct-22 2024-Jun-04	2021-Oct-08 2023-Nov-18	2023-Apr-11 2024-May-18	2023-Feb-16 2024-Feb-28	2023-May-09 2024-May-13	2023-Mar-15 2024-Mar-17	2023-Jan-18 2024-Jan-20
Max. eastern elongation	2023-Apr-11 2023-Aug-10	2023-Jun-04 2025-Jan-10	-	-	-	-	-	-
Max. western elongation	2023-May-29 2023-Sep-22	2022-Mar-20 2023-Oct-23	-	-	-	-	-	-
Perihelion	2023-Jun-27 2023-Sep-23	2023-Apr-17 2023-Nov-28	2022-Jun-21 2024-May-08	2023-Jan-20 2034-Dec-05	2003-Jul-26 2032-Nov-28	1966-May-22 2050-Aug-17	1876-Aug-26 2042-Sep-03	1989-Sep-05 2237-Sep-15
Aphelion	2023-May-14 2023-Aug-10	2022-Dec-26 2023-Aug-07	2023-May-30 2025-Apr-16	2017-Feb-17 2028-Dec-28	2018-Apr-17 2047-Jul-15	2009-Feb-27 2092-Nov-23	1959-Jul-17 2125-Dec-01	1866-Jun-04 2114-Feb-19

Meeting Minutes

Southwest Florida Astronomical Society member minutes for
June 1, 2023 Calusa Nature Center Planetarium and Zoom meeting

President Risley called the meeting to order at 7:00 PM, he thanked Tom Klein for setting up the zoom computer and asked John MacLean to introduce tonight's speaker.

John MacLean introduced Dr. Desika Narayanan, Associate Professor of Astronomy at the University of Florida who will speak to 'Forming the Brightest Galaxies in the Universe'. Dr. Desika illustrated the physical properties of the Milky Way pointing out that 2 new stars are produced every year, that planets and stars make up 90.95%, gas and dust 5%-10% and a black hole in the center at -1%. He stated that the U of F is involved in building models for cosmological galaxy evolution and detailed the Big Bang theory. The Electromagnetic spectrum, sub millimeter galaxies, James Webb space telescope and the causes of brighter galaxies were included. Well received with multiple questions John thanked Dr. Desika and stated that Mike Jensen will be our next speaker for our July 6th meeting.

Brian asked for new attendees to introduce themselves; Don, Brian and Sue... Brian then asked Ave our social director to get with them before the end of the meeting. Brian advised that there were 11 attendees on zoom and 21 physically at the Planetarium making a total of 32 in attendance.

Review Outreach Events:

FSW Charlotte observing event was canceled by Tom Segur due to weather stating that unfortunately it was the last event of the season.

Upcoming Outreach Events:

July 5th Big Cypress Educator Training Observing event will be presented by our President Brian Risley, who advised that this event is NOT open to the public and only for those personally invited.

The Annual Astronomical League officers and By Laws slate was presented by Brain, moved by Dan Dannenhauer, seconded by Jeff Wax and voted upon unanimously by those in attendance.

Brain asked John MacLean to explain the Astronomical League annual dues. John stated that our Society has 113 members and that would then be \$575

that we would need to pay the League. Greg Walling motioned such with Linwood Ferguson seconding, motion passed unanimously.

President Risley proudly stated that Mike Jensen's monthly won Second place in the annual Newsletter competition.....all applauded Mike for his excellent monthly Newsletter.....Mike said he loves doing it and thanked those who have sent in photos and articles.

Brian Risley asked John MacLean to give an update of the current status of our By-Laws committee. John thanked those on his committee for the many meetings and work put in to establish a new set of By-Laws. John stated that the committee will email the new set of By-Laws to all members for review and a vote during the September meeting.

Officer and Committee Reports:

President: Brian proudly asked that Tom Segur, Tom Burkett and John MacLean come forward to receive their National Astronomical Pins and Awards for Outstanding volunteer work. Brain stated that Tom Segur and Tom Burkett have structured many Outreach events in Charlotte County and have spent many man hours instructing the public on Astronomical events. Brain then recognized John MacLean for his tireless efforts on many projects, Program Chairmanship, Treasurer and the anchor on our By-Laws reformation issue. All thanked and applauded these three deserving members.

Vice President: Mike again thanked everyone for their kind words regarding his 2nd place Newsletter Astronomical League contest. Mike further asked all members to review the new By-Laws and provide feedback.

Secretary: Dan D. Asked for a motion to approve the May 4, 2023 member meeting minutes. John MacLean moved the motion and Tom Klein seconded. Motion passed unanimously.

Treasurer: John advised that the Treasurer's report is on line in an effort to shorten the monthly meeting. John stated that the beginning balance was \$4,496.96 with an ending balance of \$4,565.51. Dan D motioned such, seconded by Bob Holland....motion passed unanimously.

Social Membership Director: Ava stated that she held a dinner at Applebee's before this evening's meeting wherein 8 members attended. Ava stated that she would like to have all attend a barbecue in the future, that she is meeting with

new attendees and that she wants to hold a Star Party in September. Ave said she will post all information in the monthly Newsletter.

Equipment Coordinator: Brain advised that Carol Stewart has donated her 41/4" Star Hopper and Celestron scopes. Brain said that he has two people interested and will give them these items. Carol is moving out of the area.

Program Coordinator: John MacLean advised that Mike Jensen will speak at our June 6th meeting on Overview of the Deep Sky Astrophotography Process. John also advised that he had speakers for August and September believing that the rest of the year will be filled with speakers also. President Risley thanked John for his hard work and all applauded.

FSW Moore OBS Director for Charlotte Events: Tom Segur stated that there will be a Solar viewing event on August 5 at Harold Avenue Park discussing Solar eclipse, flairs and observations of the Sun.

President Risley asked for any other issues.....Mike Jensen asked that Brain get with Heather of the Planetarium to make a Planetarium program for those in attendance at one of our meetings. Brain said they take about 30 minutes and will ask her about that issue. Mike Jensen then motioned for adjournment seconded by Ava Frankenberger.....passed unanimously.....

Dan Dannenhauer, Secretary