CAPE FEAR Skies
Monthly Newsletter
**Cape Fear Astronomical Society**
Serving Wilmington, NC and Surrounding Areas
*Cape Fear Astronomical Society is a tax-exempt organization under Section 501(c)(3) of the Internal Revenue Code.*
***May 2021***

## President's Report

*by Jon Stewart-Taylor*

Evidence is mounting that outdoor transmission of COVID is very rare. The Governor has issued an announcement allowing unmasked outdoor gatherings by people who are fully vaccinated, and by unvaccinated people if distancing is maintained. Therefore, I believe Cape Fear Astro can hold club observing sessions unmasked. Members who are not yet fully vaccinated should still maintain distance. Other than that, we can proceed pretty much as we wish at private club sessions outdoors. I hope many of you will take advantage of our next scheduled observing sessions (weather be good).

This may have an effect on public viewing sessions as well. Fully vaccinated members should be able to host members of the public. Because evidence shows that transmission by vaccinated people is still possible (although much reduced), members should wear masks when allowing people to look through telescopes. Activities allowing distancing, such as laser-guided star tours and the scale solar system should not require masking outdoors.

Skip will be contacting Carolina Beach State Park for their plans for when and how to allow public sessions. Depending on what they say, we may be able to hold public sessions again as soon as mid-May or June.

The Governor's announcement also increased the number of people allowed in indoor groups, although still requiring distancing. Our normal meetings fill the meeting room less than 1/2 full, so if UNCW would allow us on campus, we could easily meet the distancing requirements. However, as of the middle of April, the campus was still experiencing new COVID cases, so it may be a while before they open up to us.

The Observatory SIG has made good progress on their plans to develop a safe, secure dark-sky observing site. They have installed some pads oriented to assist polar alignment, and have purchased a small building to store equipment and allow warming away from the wind. There are currently 12 observing spaces laid out. We'll present more about the observatory during the business portion of the May meeting.

Work on the New Astronomer's packet is continuing. If you have materials you believe would be helpful to New Astronomers, please send me email (stewarttaylortj@gmail.com). Attached documents, links to websites, videos, app recommendations, all are welcome.

**Due to the COVID-19 pandemic and NC Executive Orders:**

** **Meetings will be via Zoom.**
** **Member observing as noted, with masks or "social distancing".**
** **No CFAstro public events are planned.**

### May 2021

Date – Event – Time

**01 Club Observing – Location TBD; 08:00 PM**

03 Last Quarter Moon

05 Eta Aquarid meteors; ZHR 50; peak May 5; 2 days after last quarter moon

**07 Club Observing at Starfields; Shiloh Road Ivanhoe NC; 07:30 PM**

**08 Club Observing at Starfields; Shiloh Road Ivanhoe NC; 07:30 PM**

**09 Cape Fear Astro Monthly Meeting; 07:00 PM; via Zoom**

11 New Moon

16 Mars – Moon; Mars 1.5 degrees from moon; 50 deg from sun in evening sky

17 Mercury at easternmost elongation: 22 deg from sun in evening sky

19 First Quarter Moon

26 Full Moon

26 Total Lunar Eclipse: favors West coast of US

29 Mercury – Venus; Mercury ½ degree from Venus

Astro phenomena from
https://www.universalworkshop.com/astronomical-calendar-any-year/

# Eyepieces

Nomenclature – These are the basic parameters of an eyepiece:

**Focal Length** – The eyepiece focal length is marked on the eyepiece itself (except maybe vintage military and home-made ones).

**Apparent field of view (AFOV)** – This is the width on the field of view ine the eyepiece. Inexpensive eyepieces may have an AFOV of 40 degrees while very expensive ones may have an AFOV of 110 degrees. The 40 degree eyepiece will be like looking in a cardboard tube versus out a window.

**Eye relief** – This tells how far from the eye lens your eye needs to be for the best view. Very short eye relief means you eyelashes may brush against the lens. I wear glasses and 17mm is the eye relief I need as a minimum.

### Eyepiece Math

**Power (AKA Magnification)** – The power, often designated "X", is the telescope focal length divided by the eyepiece focal length.

**True Field of View (TFOV)** – This is the amount of sky you see in the eyepiece with a specific telescope and eyepiece. It is the AFOV divided by the Power.

**Exit Pupil:** This is the diameter of the light coming out of the eyepiece and is the telescope aperture divided by the Power.

*Discussion: The eye's pupil, when fully dark adapted, expands to let in more light. 7mm is the value used for a young person. It may be less for older people and will be less if there is any ambient light.*

### Example: – A 10" f4.7 Scope

**Aperture:** 10 inches ≈ 250mm

**Focal Length:** = 47 inches ≈ 1200mm

### Sample Eyepiece 1:

1.25" barrel; 32mm; 50º AFOV

**Power:** 1200 / 32 = 37.5X

**TFOV:** 50º / 37.5 = 1.33º

**Exit Pupil:** 250mm / 37.5 = 6.7mm (<7mm OK)

*More Discussion: If asked, " What is the lowest magnification I can use at a 7mm exit pupil?" you can see it is about 35X for a 10" scope. Generically, then, you can use 3.5X per inch of aperture as the limit!*

### Sample Eyepiece 2:

2" barrel; 32mm; 72º AFOV

Except for TFOV, the munbers are the same.

**TFOV:** 72º / 37.5 = 1.9º note that this is twice the *area* of the sky**!** You need a 2" eyepiece for this.

### Sample Eyepiece 3 + 5X Barlow:

1.25" barrel; 8mm; 72º AFOV

**Power:** 1200 * 5 / 8 = 750X

**TFOV:** 72º / 750 = 0.1º

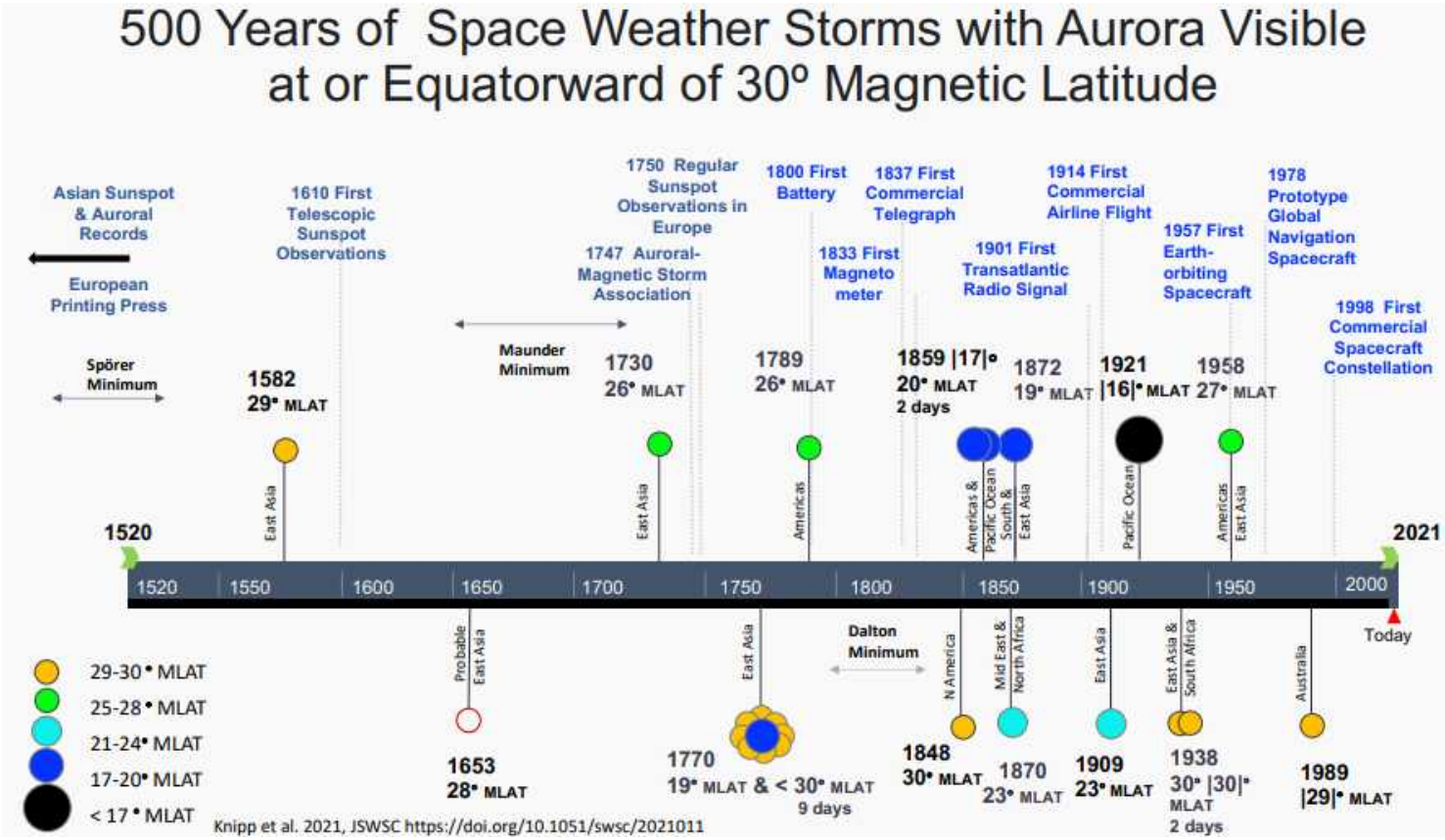
**Exit Pupil:** 250mm / 750 = 0.33mm (TOO SMALL!)

*Even More Discussion:*

*0.33mm is very small. Often, when you buy a nice shirt it is pinned to cardboard for appearance sake. Comparing one to a 0.9mm pencil lead, I judge it to be close to 0.5mm diameter – the limit used for planetary detail observing.*

*"The basic limit is imposed by the diffraction inherent in any telescope's aperture. Use a magnification of more than 50x per inch of aperture, even in perfect atmospheric seeing, and you're just magnifying diffraction fuzz. This means the minimum useful pupil size for any telescope is 0.5 mm." -* https://skyandtelescope.org/astronomy-equipment/a-pupil-primer/https://skyandtelescope.org/astronomy-equipment/a-pupil-primer/

NOTE: I hope you find this useful. Any mistakes are my own. This is my approach to understanding eyepieces at a somewhat basic level and it works for me. You may have your own. *-Karl*




*Above from spaceweather.com - Karl*

## For Astro Beginners

A few helpful (hopefully) tips for beginners:

**Flashlights**: 1 white light and 1 red light. I put the red in my right pocket and the white in my left. White is for packing up – check you didn't drop anything.

**Insect spray,** most of the time: You know why. Don't spray your optics, including your glasses.

**Clothes:** Bring warmer clothes than you think you will need. I wear long pants and long sleeve shirt in summer to keep the bugs off. Personally, I wear a heavy knit cap in winter to keep warm; a light one in summer for bug protection.

**Skymaps.com:** Each month you can download an all-sky map plus, on Page 2, sights to see that month.

**Star Maps:** There are lots of star maps available and as such, he "best" is rather subjective. First, see what is available in your local library. Then, as others what they use and why they like it. Book stores can also be a resource – you can see what they are like before buying, or not.

**Planetarium software**. Like star maps, your favorite is often a matter of personal taste. For a computer, do an internet search for programs. For a cell phone, you can do a similar search for apps. Note that some are free and others are not.

**EQUIPMENT POINTERS**

*Do not* shop at a department store for binoculars or telescopes. The sales person is not an astronomer and may never have looked through a telescope!

I just saw an ad for a 60mm refractor giving 600 power. The rule is 50X per inch for a quality scope. 60mm = 2.4" or 120X maximum. 600 is crazy!

The telescope mount is just as important as the telescope. A flimsy mount will shake in a slight wind and will shake when you try to focus – a frustrating situation.

*The above are a few ideas of mine that I hope will be of use if you are starting out in this excellent hobby.*

– *Karl Adlon*

www.astroleague.org

# Astronomical League Update

*by Hank Lyon*
*Astronomical League Correspondent (ALCor)*
*hlyon8448@gmail.com*

| Ver. 20170608 | General Information about the Program | | | | | | | | | | | | | | | Information Required | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program | Required (R) / Acceptable (A) for Master Observer | Deadline for Submissions | Eyes | Binoculars | Telescope | Instrument Size | Partial Completion Option | Manual Observations Only | Recognition of Manual | Recognition of Visual | Recognition of Imaging | Purchase of Manual Required | Remote Telescopes Allowed | Number of Objects Required | Must be part of AL | Awardee's Name | Awardee's Address | Awardee's Club Affiliation | Awardee's Phone Number | Awardee's Email Address | Submitter's Information |
| Active Galactic Nuclei | X | | | | X | 13 in | | | | X | X | | X | 30 | X | X | X | X | X | X | X | X |
| Advanced Binocular Double Star | A | | | X | | 80 mm | | X | | | | | | 50 | X | X | X | X | X | X | X | X |
| Advanced Observer Award | | | | | X | | | | | | | | | 15 | X | X | X | X | X | X | X | X |
| Analemma Program | A | | X | | | | | X | | | | | | 4 | X | X | X | X | X | X | X | X |
| Arp Peculiar Galaxies - Northern Observing Program | A | | | | X | 12.5 in | | | | X | X | | X | 100 | X | X | X | X | X | X | X | X |
| Arp Peculiar Galaxies - Southern Observing Program | A | | | | X | 12.5 in | | | | X | X | | X | 100 | X | X | X | X | X | X | X | X |
| Asterism Observing Program | A | | X | X | X | 6 in | | X | | | | | | 100 | X | X | X | X | X | X | X | X |
| Asteroid Observing Program - Regular | | | | | X | 6 in | X | | | | | | | 25 | X | X | X | X | X | X | X | X |
| Asteroid Observing Program - Gold | A | | | | X | 6 in | | | | | | | | 100 | X | X | X | X | X | X | X | X |
| Beyond Polaris Observing Certificate | | | X | | | | | X | | | | | | | X | X | X | X | X | X | X | X |
| Binocular Double Star Observing Program | A | | X | X | | 20 mm | | X | | | | | | 50 | X | X | X | X | X | X | X | X |
| Binocular Messier Observing Program | R | | | X | | 20 mm | | X | | | | | | 50 | X | X | X | X | X | X | X | X |
| Binocular Variable Star Program | A | | | X | | 35 mm | | X | | | | | | 60 | | X | X | X | X | X | X | X |
| Bright Nebula Observing Program - Regular | A | | | X | X | 8 in | | | X | | | | X | 60 | X | X | X | X | X | X | X | X |
| Bright Nebula Observing Program - Advanced | A | | | X | X | 8 in | | | X | | | | X | 100 | X | X | X | X | X | X | X | X |

A couple of weeks ago, the AL confirmed that plans for this year's in-person Astronomical League Convention (ALCon 2021) in Albuquerque, NM have been canceled due to the continuing COVID pandemic; however, rather than miss conventions for both 2020 and 2021, a virtual format has been elected and plans are underway to conduct a virtual convention this August 19-21. As we've experienced during the pandemic, our collective ability to adapt to these challenging times has actually created opportunities that were previously unavailable. The virtual ALCon 2021 will provide an opportunity to "attend" for those that may have had constraints regarding travel or attendance at the convention in Albuquerque. Stay tuned as more information is released regarding this opportunity.

Continuing with our theme of exploring the AL Observing Programs in more detail, I'd like to provide you, or remind you as the case may be, of an additional resource that may be helpful in piquing curiosity or helping you narrow down which observing programs may be of interest to your particular astronomy focus. The excerpt below is from a PDF file accessible from the AL's Observing Program page.

This resource is particularly useful in that equipment requirements are provided, so at a glance you can easily match your interests with available equipment and gain some sense of effort needed by the number of objects required to complete the program. Also listed on the webpage are two additional resources which group programs by skill level (beginner, intermediate and advanced) and by equipment (naked-eye, binocular or telescope).

## The Veil Nebula - *by Karl Adlon*

A few details: Taken with a modified Canon 450D using a Televue Genesis refractor and 0.8 reducer for a focal length for 440mm. This is one of the few occasions in which everything worked as it should. Lesson: Learn and keep trying!



Editor’s Note: Used in this Newsletter, “Cape Fear Astronomical Society” may be abbreviated “CFAS” or “CFAstro”.

**CFAS Correspondence:**

Please contact the society at: CFAS, P.O. Box 7685, Wilmington, NC 28406

Members are welcome and encouraged to submit articles or other input for *“CAPE FEAR SKIES”*. Submit any and all interesting items for publication to Karl Adlon, Editor (email kmja79@yahoo.com).

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**CFAS Officers:**

Officers

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|---|---|
| President: | Jon Stewart-Taylor |
| Vice-Pres: | Skip Hagers |
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| Secretary: | Bill Cooper |
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**Dues:**

Dues for 2021 are $25 for Individual and $32 for Family Membership. Students dues are $5 per year. Mail to :CFAS, P.O. Box 7685, Wilmington, NC 28406

**Contact Us:**

You can contact CFAS at info@capefearastro.org

Our website is http://www.capefearastro.org/