March/April 2018

★BUFFALO ASTRONOMICAL ASSOCIATION★

THE SPECTRUM

How to Choose a Telescope

JAMES WEBB TELESCOPE NEWS

HOW LONG IS ONE DAY?

NASA HUBBLE E-BOOK

NASA MOBILE APPLICATIONS

The Official Newsletter of the Buffalo Astronomical Association

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ABOUT THE COVER

Here is an image of the Cone nebula region imaged by Mike Israel from the Beaver meadow Observatory using his NP101 and ZWO cooled 071 One Shot Camera.

Join or Renew your BAA membership in 3 easy steps

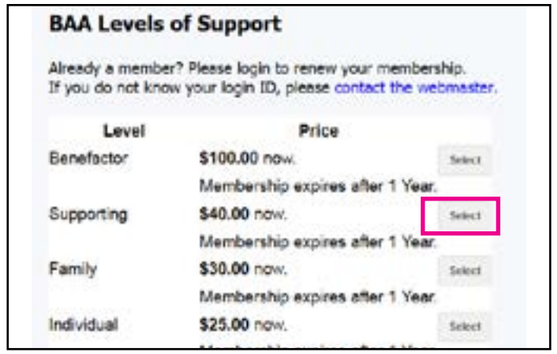
Visit http://www.buffaloastronomy.com

Non-members can sign up by clicking on “Join the BAA”
Current members can renew by clicking on “Membership renewal”(you will be asked to login)

#1

New Members can choose a membership level

#2



existing members can choose to renew current level or choose a new level.

Confirm your Membership Level and checkout

#3

FIND US ONLINE

Help Support The BAA by choosing the BAA as your charitable donation within Amazon. Every little bit helps!

amazonsmile
You Shop. Amazon Gives.

Find us on Facebook

Instagram

Follow Us On twitter

Online at
www.buffaloastronomy.com

CALENDAR

March 9	7:30 pm	General Meeting
March 17, 18	9am to 3pm	Maple Harvest Festival.
March 17, 18	6pm to 5am	Messier Marathon
March 17		New Moon
April 7	8pm	Public Night @ BMO
April 13	7:30pm	General Meeting
April 21	8pm	Public Night @ BMO
April 27	6pm	Dinner Meeting @ Rizotto Restaurant
April 28	11am - 4pm	Astronomy day @ BM
May 5	8pm	Public Night @ BMO
May 11	7:30pm	General Meeting
May 12	8pm	Wilson Star Search

SEND CALENDAR EVENTS TO
Mike Humphrey thespectrum@buffaloastronomy.com
FOR THE LATEST INFORMATION ON CLUB EVENTS,
visit http://www.buffaloastronomy.com/events

MEMBERSHIP APPLICATION

You can join (or renew) at the organization web site, http://www.buffaloastronomy.com.
Click the 'Join BAA' Tab. To Join by mail Send funds to address shown along with the following information: Name, Address, Phone Number, Special Interests in Astronomy, Do you own a Telescope? (If so, what kind?), and where you first heard of The BAA.

BAA MEETINGS

All meetings are held at the Buffalo State College classroom building. For directions to the location and more information see the last page.

GENERAL MEETING
7:30 P.M. room C122
Classroom Building

STELLAR NURSERY MEETING (Kids under 10)
7:00 P.M. room C122
Classroom Building

"TUESDAY" NIGHT IMAGERS MEETING
AS POSTED by Dan Marcus via E-mail @ BMO

GENERAL MEMBERSHIP MEETING

The Buffalo Astronomical Association holds its regular monthly General Membership Meeting on the second Friday of each month.

BOARD OF DIRECTORS MEETING

The Board of Directors Meeting is held on dates and at locations scheduled by the board. Information provided to The Spectrum will be published. The meetings are open to all members of the Society in good standing. Attendance is encouraged.

BAA Directory

CLUB OFFICERS

PRESIDENT
Mike Anzalone
VICE PRESIDENT
Mike Humphrey
SECRETARY
Neal Ginsberg
TREASURER
DaRand Land

AT-LARGE-DIRECTORS
Noah Erhart
Taylor Cramer
Steve Smith

COLLEGE OF FELLOWS
Rowland Rupp

BMS RESEARCH ASSOCIATE
Alan Friedman

OBSERVATORY DIRECTORS
Dan Marcus
Gene Timothy

SPECTRUM EDITOR
Mike Humprey

WEBMASTER
Gene Timothy

AD-HOC OUTREACH COMMITTEE
Jim Lehman
Tom Heyer

MEMBERSHIP CHAIR
Dennis Bartkowiak

Observatory Fundraising Update

3/2/2018
by Ernie Jacobs

Early in February, the board voted to hold a fundraising event for upgrades to the Beaver Meadow Observatory. We will be giving away an 8" Dobsonian Telescope package plus a 1-year family membership to the BAA. In order for this effort to be successful, we will need to not only sell tickets to our members but also more importantly, sell tickets outside the club. We hope to take advantage of events where we engage with the public like our monthly Public Nights, Astronomy Day at the Museum, and Astronomy at the Pointe (Wilkeson Pointe). The ticket price will be $10 per ticket. The goal is to have everything ready to go for our first Public Night at BMO on Saturday April 7th.

The Telescope:

We looked at several of the latest offerings from Orion, Apertura (HighPoint Scientific), and Sky-Watcher USA. Orion and Apertura had the most completive packages and both vendors offered us a slight discount. As of the writing of this update, it looks as though the Orion Skyline 8" Dobsonian package will be the best deal. This package includes an 8" Newtonian on a Dobsonian base, 2" Dual Speed Focuser, 2" 30 mm Erfle eyepiece, 1.25" 9 mm Sirius Plossl eyepiece, 8 x 50 Right Angle Finder Scope, Laser Collimator, cooling fan and eyepiece rack. We will add to this a 1.25" 25 mm Sirius Plossl eyepiece, Shorty 2X Barlow Lens, a copy of the book Turn Left at Orion, and a 1-year family membership to the BAA. This is an exciting package and should have broad appeal both within and outside the club.

Status/To Do:

- Purchase Scope – Due Date: 3/16
- Decide on Additional Prizes – Due Date: 3/23
- Finalize Drawing Date – Due Date: 3/23
- Print Tickets – Due Date: 4/1
- Begin Ticket Distribution to Members – Due Date: 4/7

Conclusion:

This is a great opportunity for the club to raise money specifically for the Observatory. The observatory is a major benefit of belonging to the club and a significant way we engage with our community. Let us work together to make this effort a great success!

Clear Skies!

Ernie

CHECK THE WEBSITE

BUFFALOASTRONOMY.COM

The BAA website not only has news and information about our association, but also a variety of features to manage your membership and connect with other club members. Current members can post photos, trade gear, pay dues, manage discount magazine subscriptions, swap stories in the forum, and more. Questions about the site? Need a hand to get your account set up? Contact webmaster@buffaloastronomy.com

Membership Update

94 current members as of 3/4/2018
25 are Supporting
35 are Family
21 are Individual
13 are Student/Senior

if you have not renewed your membership and would like to do so please visit the Website

BEAVER MEADOW AUDUBON

Interim Director @ Beaver Meadow Audubon

Loren Smith the long time Director at the North Java Beaver Meadow Audubon nature Center has been promoted to a new position close to NYC, with this the acting Director is now Lauren Makeyenko. The BAA wished Loren all the best in his new position and thanks him for his support and involvement of the BAA. This has not affected the BAA proposed Observatory Upgrade in anyway. The Audubon Centers board is currently reviewing the proposal. WE hope to have the proposal approved at their next Board Meeting

ASTRONOMY DAY 2018

to be held on April 28th @ Buffalo Museum Of Science

The annual Astronomy Day is right around the corner and will be once again held at the Buffalo Museum of Science on Saturday April 27th, 2018. Volunteers are needed to man various tables promoting the BAA and its outreach efforts. The BAA observatory Directors will be holding a Table for the Observatory Expansion and Fundraising efforts. If you would like to volunteer please contact Mike Humphreys.

Treasury Update

Account Balances (as of 2/7/2018)
$1,549.26 - PayPal
$22,020.18 - KeyBank-Money Market
$2,927.10 - KeyBank-Checking
$26,496.54 - Total

MARCH GENERAL MEETING

JOIN US FOR THE JANUARY GENERAL MEETING

Our March General Meeting is right around the corner and will be held on March 9th at Buffalo State College Classroom C122 @ 7pm or somewhere around there, as you know meeting never start on-time so don't worry if you are running late. So come out and join us! Visitors are always welcome.

APRIL GENERAL MEETING

JOIN US FOR THE April GENERAL MEETING

Our April Meeting will be held at Rizotta Italian Eatery on April 27th at 6pm. Note this is a change from past years as this will be held on a FRIDAY instead of the usual SATURDAY. Check the Website for Speaker Announcement, Ticket Details and availability.

NEAF 2018

JOIN US FOR NEAF 2018

The North East Astronomy Forum will be held at Rockland Community College in Suffern NY on April 21st and 22nd. IF you are looking for deals on a new telescope or eyepiece or just want to see the latest technology available in the market a group of us will be heading down. Some of us will be staying overnight in order to see the talks on both Saturday and Sunday. Be sure to check out Anthony DaVoli's table where he sells ADM accessories and Gene Timothy will be setting up a table for the Magazine Practical Astrophotography. See Dan or Gene for more information if you would like to make the trip.

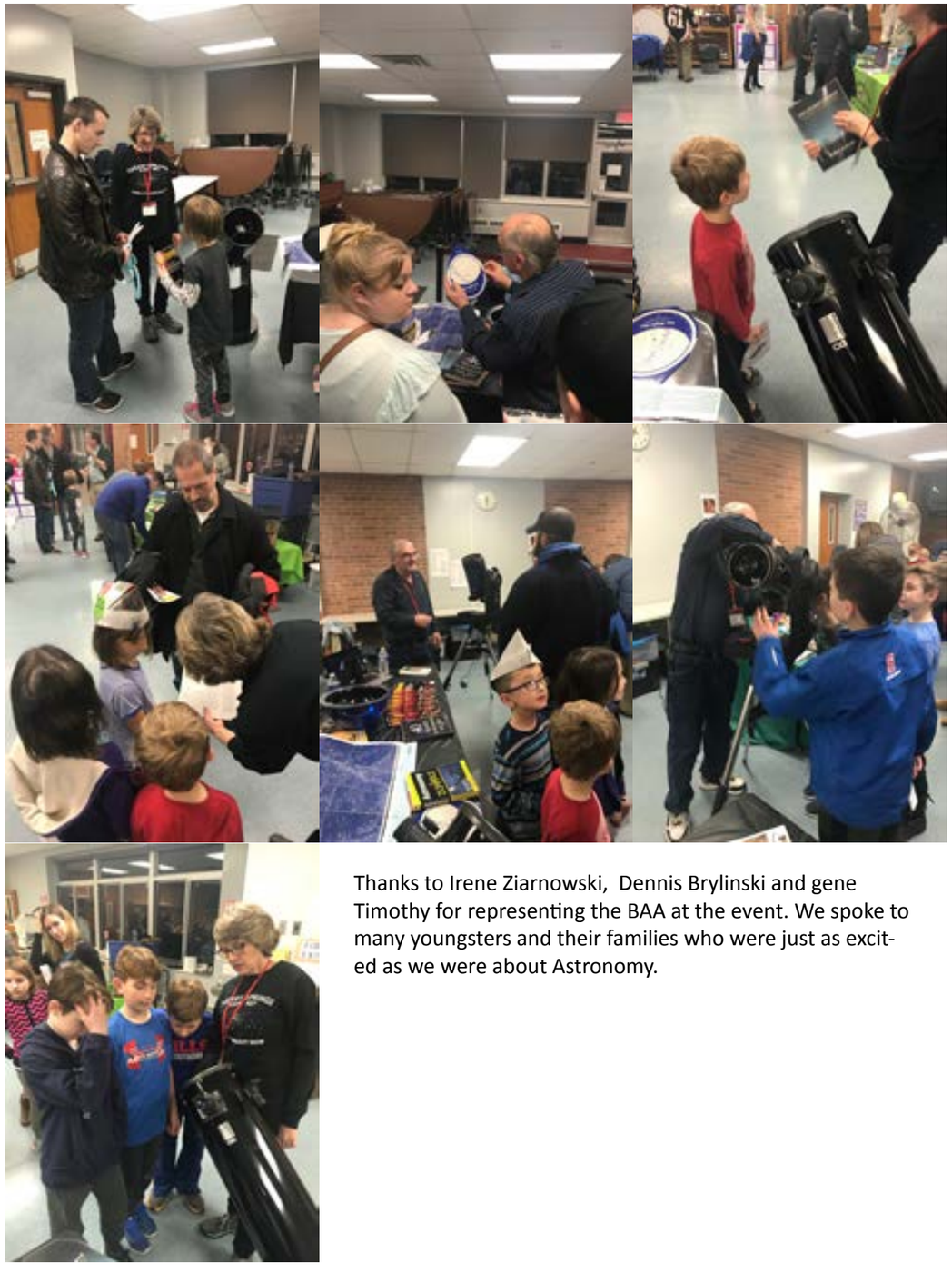
Annual Dinner Banquet
Stardate 8 March 2008

"Maple Harvest Festival"
Stardate 28 March 2008

April Public Night @ the BMO
Stardate 2008 April 5

Lunar Eclipse. Buffalo Museum of Science
Stardate 20 September 2008

Eggert Elementary School Science Night



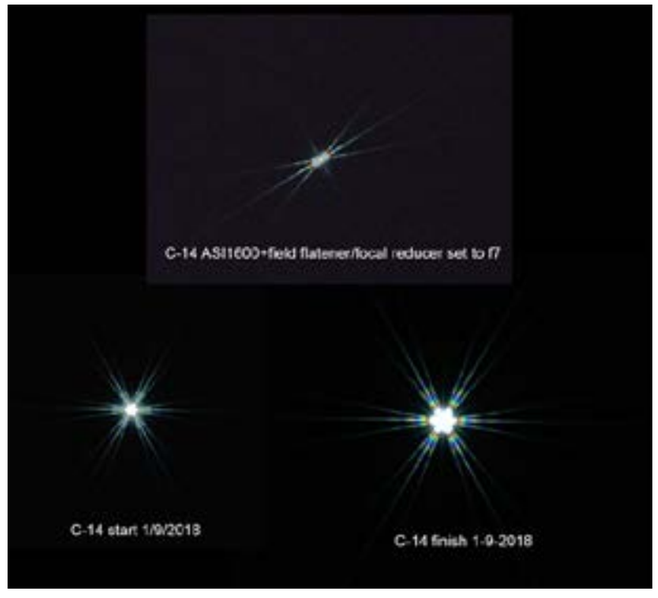
Thanks to Irene Ziarnowski, Dennis Brylinski and gene Timothy for representing the BAA at the event. We spoke to many youngsters and their families who were just as excited as we were about Astronomy.

By Dan Marcus and Gene Timothy

Observatory Report March 3rd, 2018

ATTENTION OBSERVATORY USERS: The roof rail covers are in place till March 2018! Please remove them before opening the roof and reinstall them when closing!! We are using bungee cords to keep them in place when they are covering the rails. We had problems last winter with the winds blowing them off (had to be some powerful wind, as the covers are heavy:-))
The latest Observatory news:

Thanks to ADM we now have a Tri-Bahtinov mask for the C-14. As explained in the last edition the Spectrum, this allowed us to better collimate the C-14 even with bad seeing. When we first put the mask on the C-14 we could immediately tell the collimation was slightly off. Here are the images taken of Capella on Jan 9, 2018. The images are with Mike Plotar's ASI1600 color camera using the clubs focal reducer set to f7. First we focused the system using a standard Bahtinov mask. Note: when you are at exact focus the center line bisects the V's. The upper image is at focus with the original Bahtinov mask before collimating the scope. We then replaced the Bahtinov mask with the Tri-Bahtinov mask and took another image. See the Bottom Left image. After some minor tweaking of the collimation screws on the C-14 we were able to achieve the results in the bottom right image. For those who have noticed that the Bahtinov mask did not always seem to get the best focus, now you can see why. If you have any questions about the Tri-Bahtinov mask please see me at the next meeting!
We also tried it without the focal reducer and collimation was still good. Since we still had a sucker hole available we hopped over to M37 to test out the new collimation. Since the hole was small we did not waste any time autoguiding, but instead just shot unguided exposures.
As you can see we have been having WAY too much fun at the Observatory in spite of the weather. You never know when it will clear up. On Feb 20 while hanging around taking -20c dark frames for later, it actually got clear enough for us to see the stars. Anthony Davoli happened to show up and we all worked on closed loop go-toing using TheSkyX . We did have some trouble with the clouds interfering, but it sure was fun to watch the scope slew to an object, take the objects picture and then do a platesolve, and move the scope so the object was perfectly centered in the field, automatically take a second image, to check to make sure it was where it was supposed to be, then beep to let us know it had completed the process. Should make taking images of the same object over multiple nights a breeze when we get all the parameters for the plates solve figured out. As usual there is lots to learn and lots of fun to be had at the Observatory if you can make it there.



OBSERVATORY REPORT

Notice the nice tight stars, so far I am much happier with the images taken with the C-14. When we get a chance we will test it out on the Moon or one of the Planets to see how well it performs for Planetary imaging. Since we were still having fun, we also tried comet Panstarrs without any autoguiding. The following week we added Hubble's Variable Nebula, as you can see I still have much to learn on processing- color is off as I did not set the Bayer Matrix properly in DeepSkyStacker :-(.

Maple Syrup Festival - The weekend of March 17/18 Beaver Meadow is having a Maple Syrup Festival. The Observatory will be open from 9am -4pm. I will need help with the daytime viewing and to talk to the general public.

Messier Marathon- March 16, 17and 18- I will post on the E-groups - if clear we will be having a Messier Marathon at the Observatory. I may have troubles getting free on Fri the 16, but plan to stay late after the Maple Syrup Festival on Sat/Sun night if clear, so stay tuned to my Egroups postings as it is weather dependent plus if we get really good skies I will be planning a bring a dish to pass dinner- again only if it will be clear.

Loaner Scopes - The Observatory has several loaner scopes you can check out for 4 weeks at a time. We have a Celestron 8” on a tracking German Equatorial Mount and a 6” Dobson. If you wish to borrow one of these scope’s see Gene Timothy on a “Tues” night.

Astronomy Adventures: Who has a good astro adventure to go on?? Am searching for things to do. ISS transits, asteroid occultations, NEAF. WE NEED MORE fun. Please let me know of any adventures that are in the offering.

TELESCOPE LOANER PROGRAM (AVAILABLE TO MEMBERS ONLY)

One benefit of membership in the Buffalo Astronomical Association is access to the variety of telescopes that are part of the BAA Loaner Scope Program. This program allows members who don’t own or have access to a telescope to borrow one for touring the night sky. The program is coordinated by the Observatory Co-Directors. For more information contact them via the BAA website

OBSERVATORY RULES

1. All users of the Observatory are required to record their arrival Date along with any comments in the Observatory logbook.
2. On arrival check the logbook and notice boards for any reports of damage to or failure of equipment.
3. Members visiting the Observatory must ensure that the Observatory is left clean and tidy at all times. All trash must be removed upon departure. (If you brought it in – take it out.) Any cans or bottles with deposits must also be removed.
4. Smoking in the Observatory or on the grounds is not permitted.
5. No lights other than red lights are permitted to be used on the field surrounding the observatory when the moon is below the horizon or imagers are present.
6. Do not operate any observatory equipment until you have been trained and certified by the Observatory Directors and your name has been posted on the list of authorized users. (This includes the roll-off roof, roof rails, C14 and 20inch telescopes and all other equipment.)
7. Due care and diligence must be taken by all members when conducting themselves and guest parties around the Observatory site. Remember the BAA are guests at Beaver Meadow.
8. Members may bring family and friends to the Observatory as guests provided that:
   a. No personal profit or income is derived from the activity.
   b. They have checked for planned public events or maintenance work being carried out.
   c. Member is responsible for guest
9. Upon Departure ensure the locks are zeroed out before locking the various doors and/or cabinets. Ensure all doors are closed and locked before leaving.
10. Please do not drive cars on grass! The pathway to the observatory is for pedestrian use. Do not backup to the piers to unload equipment.

The Krug family birthday party for their son Ryan held at the Beaver Meadow Observatory

The Buffalo Astronomical Association Proudly Presents:

Astronomy Day 2018

Buffalo Museum of Science
1020 Humboldt Pkwy
Buffalo, N.Y. 14211
Saturday, April 28th 2018
11am - 4pm

Telescope Exhibits
Demonstrations

Astronomy AMA
Astrophotography
Solar Viewing (weather permitting)

Everyone of all ages and experience welcome. Come out and have fun learning about the stars, planets, and space.

All activities are included with museum admission and free for BMS members

For more information please go to: http://www.buffaloastronomy.com/

Earth Now: Hold the earth in your hands
NASA's Earth Now mobile app shows the latest data from the agency's Earth-observing satellite fleet on your phone or tablet. Track storms and weather with the "Visible Earth" vital sign, use "Carbon Monoxide" to hunt for forest fires and volcanic eruptions, and more. Tap a satellite to view its 3D model and access its related data. Learn more with the "Details" button or see trends by playing an animated data sequence.

Get the App
iOS
Android

Spacecraft 3D
Spacecraft 3D is an augmented reality (AR) application that lets you learn about and interact with a variety of spacecraft that explore our solar system, study Earth and observe the universe. Using a printed AR target and the camera on your mobile device, you can get up close to these robotic explorers, see how they move and learn about the engineering feats used to expand our knowledge and understanding of space. Spacecraft 3D will be continually updated to include more of the amazing spacecraft that act as our robotic eyes on the Earth, the solar system and beyond!

Get the App
iOS
Android

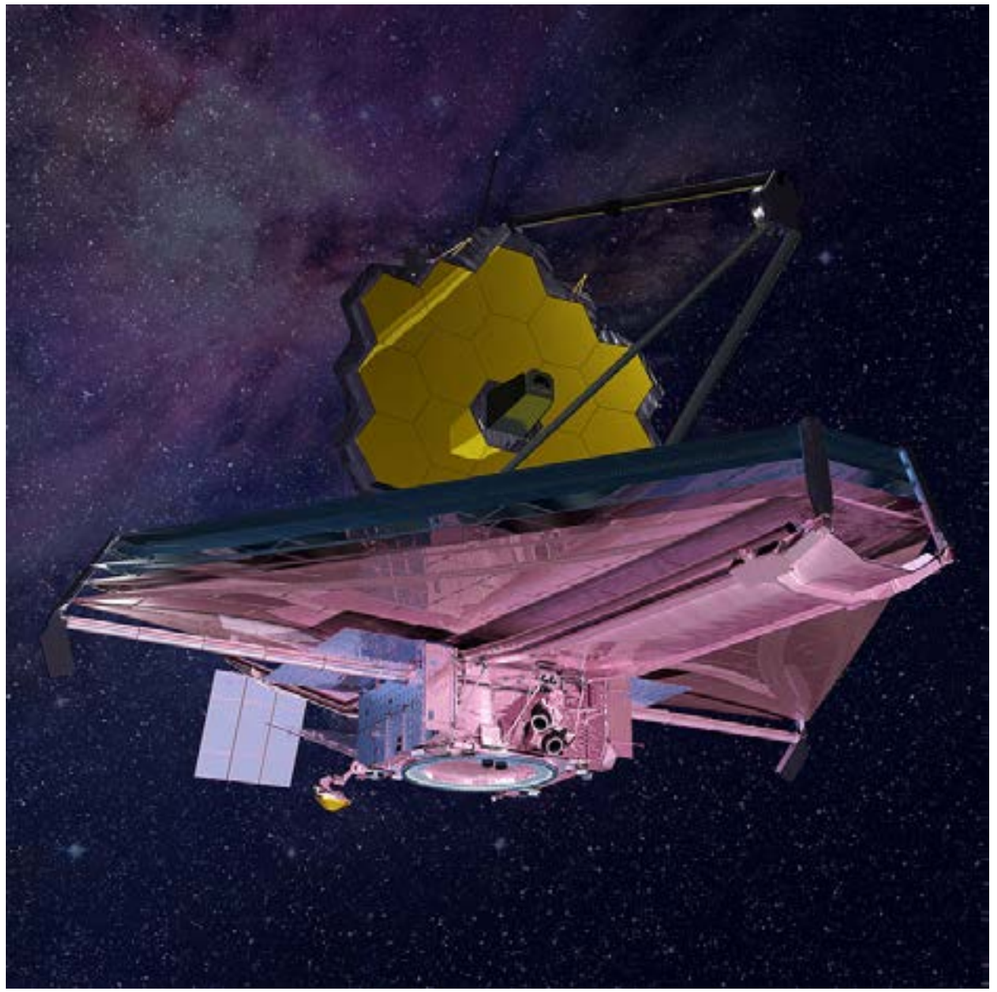
Deep Space Network Now
At three sites around the globe, NASA's Jet Propulsion Laboratory operates a network of large radio antennas called the Deep Space Network (DSN). The DSN is used to keep in contact with the spacecraft exploring our solar system and the universe beyond. This online tool will let you see what the DSN is up to right now. Which antennas are in use? Which spacecraft is talking to us? How quickly are data being received? How long does a signal take to get there and back?

Open in browser

ABOUT

the James Webb Space Telescope

+



Webb Spacecraft. More views of the spacecraft. Explore the interactive 3d spacecraft model (new window) (requires flash).

the premier observatory of the next decade

The James Webb Space Telescope (sometimes called JWST or Webb) will be a large infrared telescope with a 6.5-meter primary mirror. The telescope will be launched on an Ariane 5 rocket from French

Guiana in Spring 2019.

Webb will be the premier observatory of the next decade, serving thousands of astronomers worldwide. It will study every phase in the history of our Universe, ranging from the first luminous glows after the Big Bang, to the formation of solar systems capable of supporting life on planets like Earth, to the evolution of our own Solar System.

Webb was formerly known as the "Next Generation Space Telescope" (NGST); it was renamed in Sept. 2002 after a former NASA administrator, James Webb.

international collaboration

Webb is an international collaboration between NASA, the European Space Agency (ESA), and the Canadian Space Agency (CSA). The NASA Goddard Space Flight Center is managing the development effort. The main industrial partner is Northrop Grumman; the Space Telescope Science Institute will operate Webb after launch.

innovative technologies

Several innovative technologies have been developed for Webb. These include a primary mirror made of 18 separate segments that unfold and adjust to shape after launch. The mirrors are made of ultra-lightweight beryllium. Webb's biggest feature is a tennis court sized five-layer sunshield that attenuates heat from the Sun more than a million times. The telescope's four instruments - cameras and spectrometers - have detectors that are able to record extremely faint signals. One instrument (NIRSpec) has programmable microshutters, which enable observation up to 100 objects simultaneously. Webb also has a cryocooler for cooling the mid-infrared detectors of another instrument (MIRI) to a very cold 7 K so they can work.

Conjunctions of the Planets: 2018

Conjunctions, or planetary alignments, occur when two or more planets appear very close together to trace a line or triangle. The following is a list of conjunctions that will occur in March and April. While the April 2nd alignment should be easy to observe, the March conjunctions may be challenging. Good Luck!

2018

Date	Time UTC	Planet	Angle distance	Planet	Elongation to Sun
March 5, 2018	18:28:59	Mercury	1°24' north of	Venus	13.4° East
March 18, 2018	01:16:29	Mercury	3°53' north of	Venus	16.4° East
March 29, 2018	0:13:21	Venus	4' south of	Uranus	19° East
April 2, 2018	11:53:07	Mars	1°16' south of	Saturn	93.7° West

Choose a First Telescope

Photo Credit: Pablo Nelson/Astronomical Society of the PacificA volunteer prepares a Dobsonian telescope with a solar shield to observe a partial eclipse of the Sun in San Francisco on October 23, 2014. Dobsonian telescopes are often the best choice for a first telescope due to their simplicity and ease of setup.

A telescope is a great gift for the budding astronomer in your life (or, of course, for yourself!). While it may be tempting to go for an ultra cheap impulse buy spotted while shopping at a local store, or to splurge on the other end and buy a super expensive, deluxe computerized model found online, we urge you to hold off on a major purchase without first doing a bit of research. You might even be able to try out a few potential telescopes with the help of your local astronomy club before making your final decision.

Right off, the best way to start observing the night sky is with your own unaided eyes! These tips will assume you have already started stargazing and want a better peek at the Moon, planets, and stars. A good telescope doesn't work like a video game cheat code that instantly turns you into an expert astronomer, not even with a computerized setup that claims to instantly slew to any one of thousands of targets. You still need to practice your stargazing skills, and a good first telescope or pair of binoculars will help you do just that, while expanding your skillset and giving you the confidence to search for more and more celestial sights.

Photo Credit: Jo Ellen Sutter/Fort Bend Astronomy ClubThe Moon makes a perfect first target for a new telescope owner. Here, a visitor takes a peek at the FBAC's Astronomy on Wheels Popup Supermoon Watch Party at the San Montego Apartments

A first telescope should be easy to use and still be of a high enough quality and power to provide years of use-while not being terribly expensive. Those requirements give a surprising winner for many novice stargazers: a good pair of binoculars!

Binoculars, it turns out, are an excellent first instrument for many stargazers due to their ease of use and versatility. Binoculars can be used not just for stargazing but for bird watching and other outdoor activities and can be easily packed away while traveling. Binoculars can easily fit onto carry-on for airline travel, which is an impossible feat for most telescopes! A good pair of anything from 7x35 to 10x50 binoculars will give you great views of the Moon, open star clusters like the Pleiades, the brighter, larger galaxies like Andromeda (from dark skies), large nebula like Orion, and even peeks at Jupiter's moons and some globular clusters once your observing skills improve. Try not to get anything much more powerful than a 10x50 pair, as larger binoculars with more power often have narrower fields of vision, are heavier, and the increased magnification makes the handheld "jiggle" much harder to keep steady-unless you buy binoculars with image stabilization, or mount them to a tripod. For many objects, binoculars are even the preferred method for viewing them due to their large field of view compared to a telescope. Most telescopes are unable to keep the entirety of the Pleiades or Andromeda Galaxy in their field of view, for example. Binoculars are also a great investment for more advanced observing, as later on they are useful

for spotting objects to observe in more detail with a telescope.

A good pick for a starter telescope retains much of the same requirements as a pair of binoculars: small-ish in size, sturdy, and easy to handle. Many astronomers will recommend avoiding a computerized, "GOTO" scope until you have learned the sky a bit better, as these systems still require you know the sky fairly well during their initial setup by pointing to several stars and asking if those are indeed the correct stars, then having you fine-tuning their aim and focus; something a beginner may find intimidating or impossible during setup.

That's why a small manual telescope often works best for most beginning stargazers! For many, a small reflector telescope on a tabletop or Dobsonian mount (rather than tripod) works out best due to the bare-bones nature of the setup. With a small Dobsonian telescope, you can pick it up, bring it out to your yard, set it down and immediately start observing (though you might want it to cool down a little bit first). Most models in the range of 4.5-8 inches (the size of their light-gathering mirrors) will cost anywhere between $200-$500 and include the telescope tube, the mount or base, a finderscope or red dot finder to help in aiming the telescope, and a couple of good starter eyepieces. An example of a Dobsonian mounted telescope is at the top of this article; they are often compared to "cannons" or "light buckets" because of their appearance. A good recommended size for a first reflecting telescope with this type of mount usually ranges between a 4.5 inch to 6 inch mirror. Those sizes usually give good to great views of the heavens while keeping costs, weight, and size down to easy to manage levels.

Photo Credit: Daniel Acker/Chesmont Astronomical SocietyA visitor gets a first peek at the Moon at the Chesmont Astronomical Society's InOMN event at Marsh Creek State Park.

The classic "refractor" telescope on a tripod is often what most people think of when a telescope is mentioned-liek in the image above. These telescopes use lenses rather than mirrors to gather light, and require very little maintenance compared to reflector type telescopes, which may require a bit of adjustment, or collimation, of their mirrors every now and again. Refractors tend to be larger and more expensive than similarly powerful reflectors, however, and are often aimed at the higher end of the market, and so for many folks would not make a good first telescope simply out of cost or size. However, if you find a good deal on a refractor, it can indeed make an excellent starter scope. Just don't buy a cheap one at a local store advertizing amazing magnifications of 600x. Those are, to be honest, bad telescopes-truly a deal to good to be true!

We hope this helps you in your search for a first astronomical instrument!There are many other great guides to finding your first scope or pair of binoculars. Some of them can be found at the EarthSky, Sky & Telescope, StarDate, Cloudy Nights, and many more. A fair warning: it is easy to get a bit overwhelmed in the wealth of information found in all of the astronomy resources found online. Offline, real-world advice and experience is still the best for something you will be spending a lot of time with! The best place to go for advice is with your local experts in a nearby astronomy club. You can find a club or star party near you on the Night Sky Network's very own Clubs & Events page. You can attend a local star party and see different types of telescopes and binoculars in action. Some clubs even have a telescope loaner program. Just like with a car, you could take a potential model of telescope out for a "test drive" before deciding to buy.

Good luck, and may you have clear skies this holiday season!

How long is one day on other planets?

When you think of a day, you normally think of one cycle of daytime to nighttime. That is called a solar day. On Earth, a solar day is around 24 hours. However, Earth's orbit is elliptical, meaning it's not a perfect circle. That means some solar days on Earth are a few minutes longer than 24 hours and some are a few minutes shorter. Another way to measure a day is to count the amount of time it takes for a planet to completely spin around and make one full rotation. This is called a sidereal day. On Earth, a sidereal day is almost exactly 23 hours and 56 minutes.

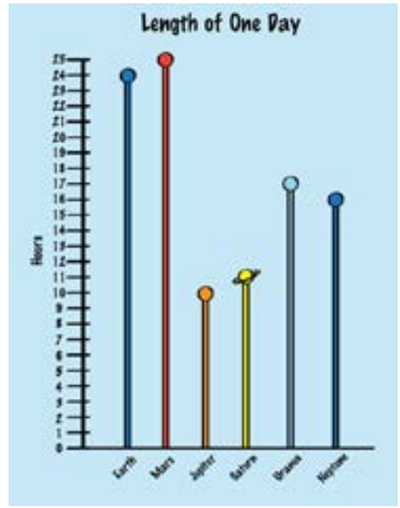
We know how long an Earth day is, but how about the other planets in our solar system? How long does it take for those planets to spin one full rotation?

On Mercury a day lasts 1,408 hours, and on Venus it lasts 5,832 hours. On Earth and Mars it's very similar. Earth takes 24 hours to complete one spin, and Mars takes 25 hours. The gas giants rotate really fast. Jupiter takes just 10 hours to complete one rotation. Saturn takes 11 hours, Uranus takes 17 hours, and Neptune takes 16 hours.

Reading that paragraph took a while, and it's hard to find all the numbers. Let's see how it looks if we put it in a table.

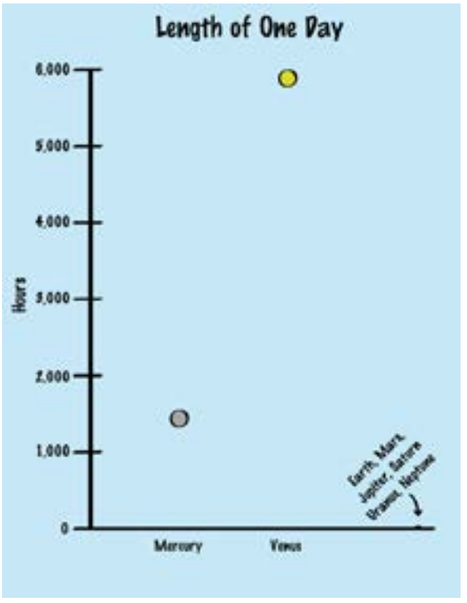
Planet	Day length
Mercury	1408 hours
Venus	5832 hours
Earth	24 hours
Mars	25 hours
Jupiter	10 hours
Saturn	11 hours
Uranus	17 hours
Neptune	16 hours

That's a little bit better. We can look up and down at the numbers and can compare them more easily. But wouldn't it be nice if we could see how big those differ-



Now we can easily see which planet has the longest day, the shortest day, and everything in between. This is much easier that reading a list of numbers, don't you think?

But what do we do about Mercury and Venus? Their days are thousands of hours long. How do we make a graph for those?



NASA's New Hubble E-Book Series Dives into the Solar System and Beyond

Hubble Focus
Credits: NASA's Goddard Space Flight Center
Download the EPUB 3 file.

NASA's Hubble Space Telescope team has unveiled a new e-book titled "Hubble Focus: Our Amazing Solar System." It kicks off a series of e-books that will showcase the telescope's recent contributions to many different fields of astronomy.

Download:
ePub format (108 MB)
PDF format (80 MB)

Tip: Use an EPUB reader that supports embedded video to best enjoy this e-book.

Past books have taken readers into Hubble's history and given a wide overview of the telescope and its mission. The Hubble Focus e-book series will be more topic-specific and emphasize current scientific investigations. Within the past decade, Hubble has seen asteroid collisions, the disintegration of an icy comet and countless other encounters. Many of these observations were unexpected and help scientists understand how the solar system is changing, said Jennifer Wiseman, senior project scientist for the Hubble Space Telescope. "Many intriguing observations explored in these e-books were never planned," she said. "That's what makes these books especially captivating, because we're talking about discoveries in recent years that we never dreamed were possible when Hubble launched." The first e-book is a stunning collection of high-resolution photos and interactive videos from the space telescope, with chapters covering topics ranging from weather on other planets to potentially habitable moons. One focal point lies in the story of how Hubble's role studying planets, moons, asteroids and comets has led and complemented the efforts of spacecraft and landers dispatched throughout the solar system. In just one example, the Hubble telescope performed initial observations of the Pluto system and discovered four previously unknown moons. This information helped scientists plan the course and observations for NASA's New Horizons mission to study Pluto and its satellites. Now, the New Horizons spacecraft is on its way past Pluto and deeper into the Kuiper Belt where it will observe a faraway object also recently discovered by Hubble.

Check out NASA's Cassini ebook "The Saturn System: Through the Eyes of Cassini" https://www.nasa.gov/connect/ebooks/the-saturn-system.html

"Hubble has a new and unique perspective studying these planetary bodies because we can see them as a whole," Wiseman said. "Hubble has been used to study global storms on Mars and on the outer planets. It has even detected evidence for plumes of water vapor being expelled from the cracks in the ice of Jupiter's moon Europa, which paves the way for future probes to study the nature of Europa's under-ice ocean." Wiseman said that the next installments in the Hubble Focus series are already in preparation and will cover all sorts of scientific areas Hubble has explored including galaxies, exoplanets and even the evolution of the universe.

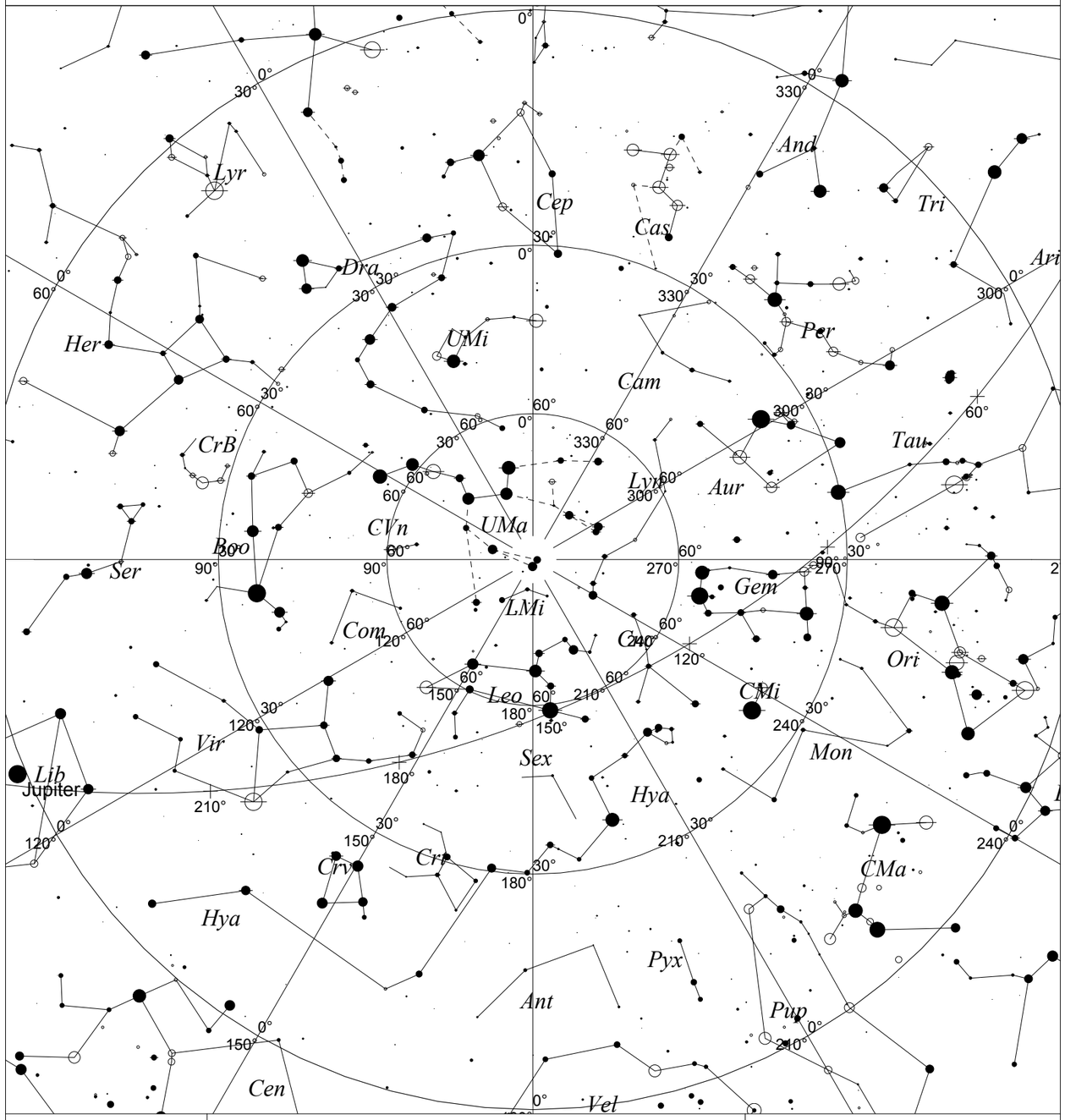
For more information about Hubble, visit:

www.nasa.gov/hubble

Cone Nebula Mike Israel @ BMO

M42 by Dennis Bartkowiak @ BMO

March 16, 2018 23:00:00



STARS

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SYMBOLS

● Multiple star	⬚ Dark nebula	△ Radio source
○ Variable star	⊕ Globular cluster	✕ X-ray source
Comet	◌ Open cluster	○ Other object
⬭ Galaxy	⊕ Planetary nebula	
□ Bright nebula	⊘ Quasar	

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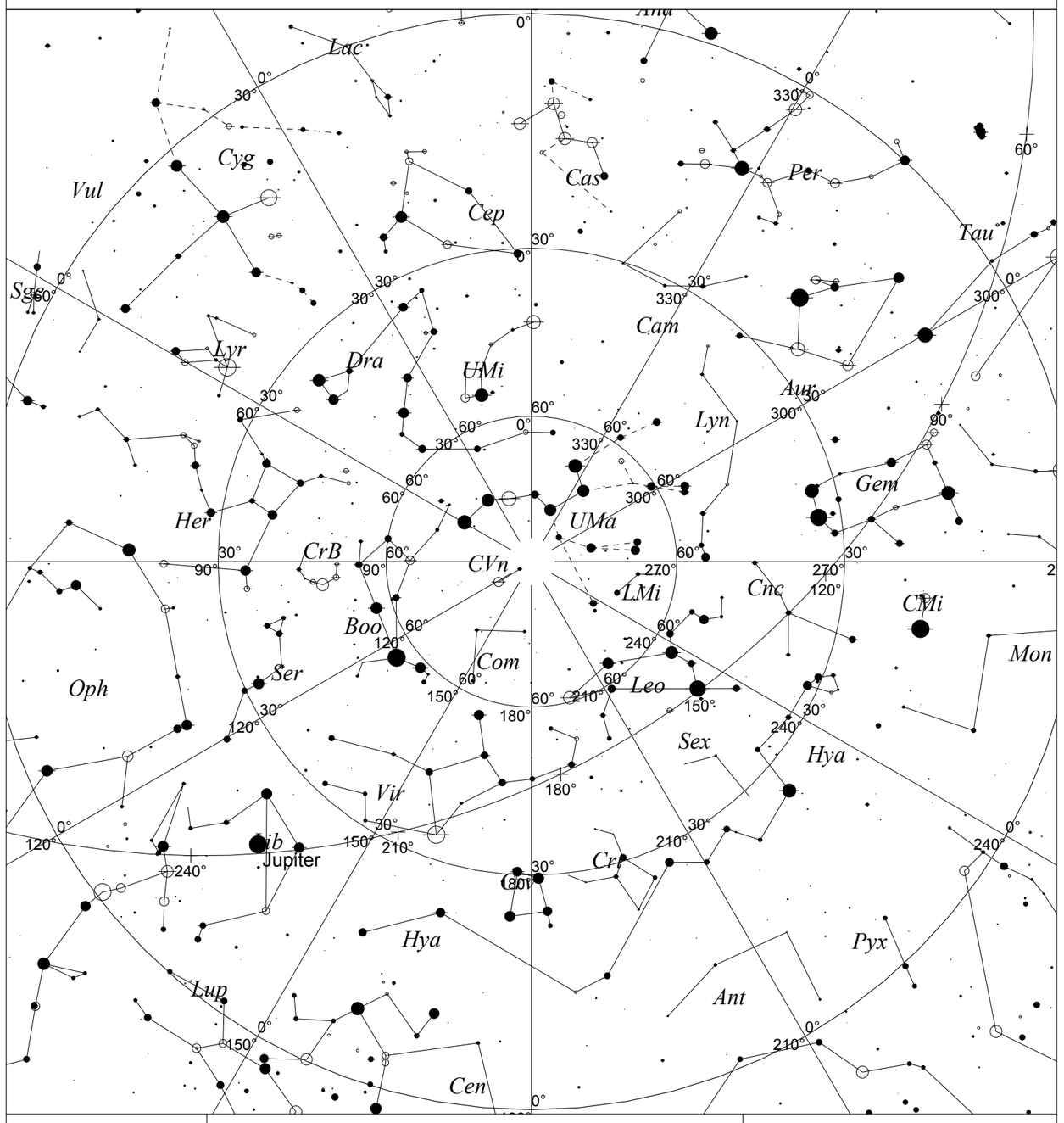

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THE BUFFALO ASTRONOMICAL ASSOCIATION

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- A monthly kids meeting, site orientation meeting, and general meeting with speakers of interest. Access to meeting videos on the BAA web site. - Opportunities to participate in programs that promote astronomy to the general public (such as Star Parties)
- Meet other amateurs and share experiences, learn techniques, and swap stories.

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