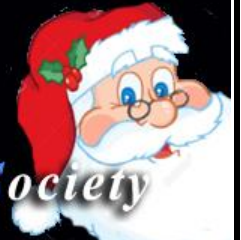




Night Visions

December 2022



Newsletter of the **Baton Rouge Astronomical Society**

NASA's Orion spacecraft hits the halfway point of its historic moon mission, see [Page 16](#) for details.

Monthly Meeting December 12th at 7:00 PM, in person

Christmas Party Pot-Luck. Club will provide Jambalya and beverages, others may bring a dish to share.
(Monthly meetings are held on 2nd Mondays of the month, at Highland Road Park Observatory)

PRESENTATION: Christmas Potluck and Elections

What's In This Issue?



President's Message
BRAS Calendar
Monthly Meeting Minutes
Business Meeting Minutes
Outreach Report
Light Pollution Committee
Globe At Night
ALCON 2023

Article: "Artemis Mission"



HRPO EVENTS

OBSERVING NOTES – Fornax Chemica (Fornax) –The Chemical Forge

Like this newsletter? See PAST ISSUES online back to 2009
Baton Rouge Astronomical Society Facebook Page
BRAS YouTube Channel – Monthly Speakers via Jitsi



President's Message

- ❖ December already – where has the year gone? Current officers are up for re-election at the Christmas Party. BRAS will supply the main meat entrée, along with the drinks and ice. Family welcome. Bring a side dish if you can. As to voting, if you can't attend in person you can vote via proxy (form is in the Documents folder on our website) and send by NOON on December 12th to president@brastro.org
- ❖ **The CEA (Cooperative Endeavor Agreement)** between BREC, BRAS, and LSU-PA for the operation of HRPO is moving along. All partners have submitted their proposals, and here's hoping the agreement will be signed by summer.
- ❖ **The BRAS Member Kit** is now finished and should be available in 2023. All BRAS documents (Policies, By-Laws, etc.) will be available on-line in the Member Only section of the BRAS Forums.
- ❖ **The Library Telescope for the Livingston Parish Library System** has been received. When modifications are completed, a date will be set for a formal donation to the library.
- ❖ **The 2022 Survey** has had only 2 responses. Please fill out the survey and return it to me.
- ❖ **The AL is updating their By-Laws.** BRAS, as a member club, has 1 vote – yea or nay – and we need to send the ballot in by the middle of January. The current By-Laws can be found on the AL website's home page on the left "Navigation" bar. One copy of the changed document is available for anyone to read and can be found in my mailbox at the Observatory. Do not remove it, please.
- ❖ **BRAS is looking to Archive** our important legal/historical/memorable documents considering what, how, and where to be kept. Thanks to various donors, I maintain a hard copy of all newsletters, including the first original mimeographed notice that was posted at the old Goodwood Library. Michele and I are working on an index of them all. If you would like to help with any aspect of this project, let me know.
- ❖ **The 2023 ALCon** is just 8 more months away and there is still a lot of work to be done – we need more members to get on board if we are to have a successful event.
- ❖ We aim to have the **Radio-Telescope at HRPO operational** again in 2023. **The 16-inch telescope**, in the smaller dome, with the articulating eyepiece for handicap access will also be operational again in 2023. HRPO is scheduled to get a generator for when power is lost. A new larger **HRPO storage building**, to replace the older one behind the building, is promised but there is no timeline yet.

Clear Skies, and Happy Holidays,

John R. Nagle

December Calendar of Upcoming Meetings

Light Pollution Committee: No meeting in December.

Monthly Member Meeting – 7 pm Monday, December 12th at the Observatory, **Christmas Party Pot-Luck**

Monthly Business Meeting: 7 pm Wednesday, December 26th (Members Only), in person and via Jitsi

MOON (Members Only Observing Night) Sometime in February or March.

ALCon 2023 ("Astronomical Gumbo") Committee Meeting

Two meetings: TBA Sunday, December ?, 2022, 7 PM and Sunday December ?, 2022, 7 PM, both online.

P.S. Survey is on last page, and downloadable here:

http://www.brastro.org/Documents/BRAS_Survey_for_2022.pdf



Monthly Meeting Minutes – November 10th

- Welcome by the president, John Nagle.
- There was no lecture this month due to difficulties in finding speakers.
- There was discussion about the **nomination of officers** as next month all positions except for Treasurer (currently Trey Anding) will be voted on. Right now, John Nagle is president, Joel Tewes is vice president, and Roz Readinger is secretary.
- There was a question about the **dark sky site**. The people owning the property are around 90 years old. There is also an issue with more activity and more light pollution in that neighborhood. Research is being done to figure out if we need to find a new site and, if so, where.
- **Outreach** will be happening at the Hilltop Arboretum this Thursday with John, Scott C., and Ben. There will also be **White Light Night** outreach in Mid City this Friday night from 5 – 10 pm. John reminded everyone about the ICCBR group that meets the second Tuesday of every month at Hunan's. Our membership in this nonprofit organization allows us to possibly tap it for volunteers for next year's ALCON event. Regularly scheduled future events for outreach are **Sidewalk Astronomy** at Perkins Rowe Tuesday, Dec. 6th from 6 – 9 pm and Makers Market Saturday, Dec. 17th from 5 – 10 pm.
- John announced that this Friday would be **MOON Night** (sunset to midnight) at HRPO.
- John reminded everyone that it would be 3 to 4 years before we would get back to **Rockefeller** (our winter star gaze) due to storm damage along the coast from the previous year's storms.
- John updated the club about the purchase of the **magnetic car signs** used for outreach occasions. These will be 3 pairs of blue and white signs with the club logo. We will take the lowest of the 3 bids that we obtained.
- The **114 table top telescope for the Livingston Parish Library** has been ordered. We discussed possibly ordering telescopes for Ascension and Pointe Coupee parish libraries in the future, but someone noted that Ascension Parish Library already has a telescope that's currently broken. Don Weinell lives close to the library and is going to follow up on this matter.
- John has been researching fixes for the **radio telescope at HRPO**. Although he doesn't have the official okay from LSU yet, the understanding is that if the cost for getting it going can be kept to around \$2,000 or below, he should be able to get it



Election of new officers at December Meeting

2022 Officers:

President: John Nagle
president@brastro.org

VP: Joel Tewes
vice-president@brastro.org

Secretary: Roz Readinger
secretary@brastro.org

Treasurer: Trey Anding
treasurer@brastro.org

BRAS Liaison for BREC:

Chris Kersey

BRAS Liaison for LSU:

Greg Guzik

Committees/Coordinators:

al_awards@brastro.org

Merrill Hess

lightpollution@brastro.org

??????

newsletter@brastro.org

Michele Fry

observing@brastro.org

John Nagle

outreach@brastro.org

Ben Toman

public_relations@brastro.org

Scott Cadwallader

webmaster@brastro.org

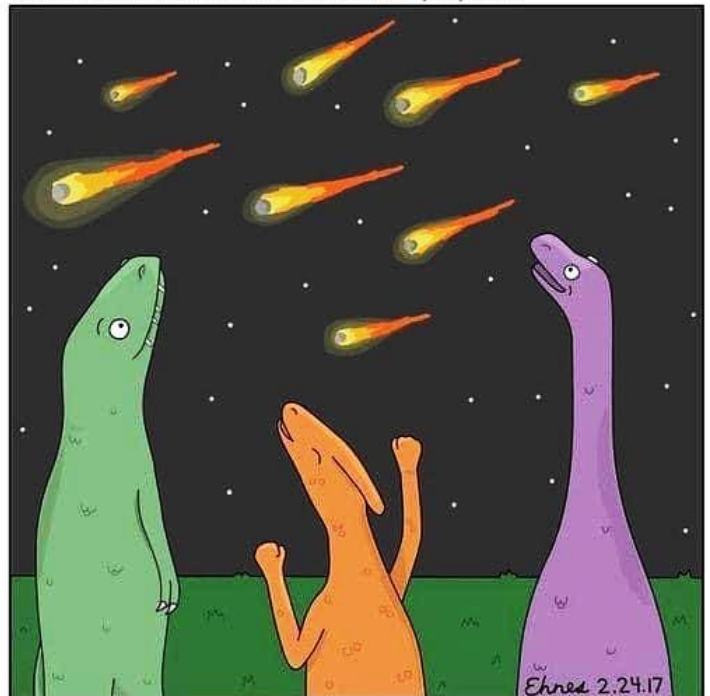
Frederick Barnett

done. He's hoping to complete it for ALCON next summer with an announcement anticipated during the anniversary event.

- There was a brief discussion about the **streaming equipment** as Ben was not present to provide an update. Mention was also made about purchasing a **laptop to be used for Power Point presentations** and slide shows for outreach. There will be a vote at the business meeting at the end of the month for this.
- The **Cooperative Endeavor Agreement between BRAS, LSU, and BREC** was discussed. Merrill is still working on the BRAS portion. He has received a copy of what LSU has put together for their part. This is supposed to be a 10-year agreement between the parties.
- The **Globe-at-Night** site was down for 4 or 5 days, but someone checked and noted it was back up.
- John discussed plans for his **Observing Notes** which appear at the end of our newsletter. Instructions should be posted and available on the BRAS website in the new year. He is hoping to have the static information published in book form by 2024 or 2025.
- Steven discussed the status of **ALCON**. He's still looking for volunteers as there are tasks that need to get done in the next couple of months. He is also getting fundraising cranked up. A welcome party is scheduled for the first night of the convention (Wednesday) in the Nicholson Hall library; hopefully this will include viewing through the 10.5-inch Clark refractor which is currently being refurbished. Steven is still trying to get an event at the Planetarium scheduled for Thursday evening. Friday evening will be the Star-B-Que event out at HRPO. David Eicher will be the keynote speaker at Saturday's banquet; he will be speaking on galaxies. The event at LIGO is still being finalized; they are accepting only one busload (approximately 60 people) as they will be in the middle of a run during that time period (note to locals: You may want to sit this one out to give our visitors a chance to experience this). Briar Richard has agreed to be the photographer for the convention.
- Steven also discussed testing with low-cost security cameras to catch meteor and fireball events. He will post updates on this in the newsletter.
- Those who went to the **Deep South Regional Star Gaze** the last week in October said the best viewing was in the early part of the week until about Thursday.
- **Artemis I** is once again scheduled to launch, this time early Wednesday morning.
- Trey announced that **Calendars** were available for \$10 each and to see him if you wanted one. He is also collecting membership dues for next year.

Coffee, cupcakes, and cookies were available and a raffle was held for those present onsite.

The Best Medicine Cartoon by Izzy Ehnes



Sadly, the enthusiasm of the Dinosaur Astronomy Club was short lived.



Business Meeting Minutes – November 30th

(meeting is the last Wednesday of the month, in person, at HRPO)

1. **AL By-law changes** – Our club will need to register our single vote on the changes to the Astronomical League By-Laws by mid-January. The last time these were changed was in 2007. John has the hardcopy from the AL; he is going to leave it in the President’s mailbox at HRPO if anyone wants to access this. He’s going to check about setting up a link in the newsletter also. The club will need to come to a consensus on this by the January 9th meeting.
2. **CEA (Co-operative Endeavor Agreement)** – Merrill was not present but was available by phone if needed. John was going to send Chris K. a copy of the current version with remaining question(s) to be followed up on. Scott C., Steven, Joel, and Trey requested copies of this version.
3. **BRAS Member Kit** – This is basically done. There was discussion about how to handle the policies and the dark sky site letter and map. It was decided that the information that changes should be located online. There was discussion about related email; it was decided to create a new observing list. Scott C. will work on setting this up with a new Google account. There was discussion about PHP bulletin board timeouts; Chris K. will forward some information to John on this.
4. **Elections** – These will be held at the meeting on December 12th. Just prior to this happening the floor will be open for any additional nominations. Current officers have agreed to serve for an additional year if there are no new nominations.
5. **Pot-Luck Christmas Dinner** – Trey will handle the meat, Roz will handle the beverages, Scott C. will bring the ice. There was an issue with a broken table; Chris K. wanted BRAS to let him know if we needed another one for the meeting. We think we have enough paper supplies and tableware on hand from previous years.
6. **Library Telescope (Livingston Parish)** – This telescope was delivered to Trey yesterday. Scott C. said he will make the requisite modifications to it tomorrow if Trey brings it by HRPO. It was noted that Merrill wants to be included when BRAS makes the official donation of the telescope to the library.
7. **BRAS 2022 Survey** – Craig and John are the only ones who have filled out the survey so far.
8. **Magnetic Signs** – There has been no change on this issue; Trey will get back with Chris K. on this this week.
9. **Equipment** – Ben is still working on this. In the meantime, we have new microphones and James has an adapter cord for the current setup.

New Business

1. **Policies** – We discussed the policies when we discussed the BRAS Member Kit above. There was a discussion about new construction and maintenance at HRPO. The maintenance people currently have the cylinders for the big dome; they are removing the rust as well as looking for a missing foot on one of the cylinders. The status of surge protection and a new generator were discussed. Storage will be replaced by a 45-foot-long building; we’re asking for a related ramp to roll telescopes to the viewing pad. We will need storage fenced if we are going to install equipment to measure sky quality, etc. The pipe railing will be cleaned and painted after the first of the year. There was a discussion about highway signage for the observatory.

- 2. **Records** – John was asking about historical records for the club. We need to think about what we want to keep and where we want to keep them. BREC has some policies we might want to look at. John suggested he’s open to info and ideas for the next 3 months. Chris K. volunteered to type up suggestions. We will be looking to decide whether to go with paper or with online storage. Also, we are looking at rooms at the library or a historical foundation to store with as well as possibly using a perpetually rotating display.
- 3. **General** – John had received two renewals for membership that he was locking up in the cabinet for Trey. He had also received a box of astronomy related items from Craig for BRAS; there were some possible raffle items here. The air track from the observatory and related box were discussed; the suggestion was made to bring this up at the meeting.

Members attending this evening were John N., Chris K., Scott C., Steven T., Trey A., Joel T., and Roz R.

Submitted by Roz Readinger, Secretary

BRAS subreddit and a Discord server.

Our subreddit has been set up for us to reach out to the public. Please join us on there. <https://www.reddit.com/r/BRASastro/>

Our Discord server is for Members only, and requires the download of a free app. It's a fun place for us to hang out. To join the discord, email safey2007@gmail.com with the subject **BRAS Discord**.

To add a Flair next to your username, PM Amy Northrop.

.For Discord help, access [techsupport-faq](#), or message Amy orJustin: <https://discord.gg/6N8r8DDj>

It also has voice channels so that you can speak to people through Discord.

The best part about both of these is that you can access them on your phone with the free apps. Hope to see you there. ~ Amy Northrop



Outreach Report for November

Hi Everyone,

2022 was a pretty good year for us all around. It saw the return of in-person outreach events (thanks to lifting of COVID restrictions) for several of our regular spots, we met some new groups that enjoyed having us at their events and we had a couple new faces from our own club assisting with Outreach. We're already looking forward to 2023 and continuing to spread our love of the night sky throughout the community.

Wrapping up November, we had a decent **Sidewalk Astronomy night at Perkins Rowe** on a rescheduled Wednesday night. (*I forgot to get pictures!*) I know there were some planned outings to work with some local Boy Scouts as well that I just haven't heard about yet. Thanks to most of our regular volunteers (Scott, John, Coy, Roz, Chris and Craig) for your help out there. Again, we wouldn't be making the impact we do without your time and efforts.

We also had an excellent outreach with the **Louisiana Master Naturalist Society** at the Hilltop Arboretum. In a week of some poor weather, their meeting night ended up being beautifully clear so Scott and I were able to give them some great views of Saturn, Jupiter and some other night sky objects. That was followed by a presentation on the Winter Solstice which included some of Scott's astrophotography work. Everyone had a fantastic time and I'm sure we'll be keeping in touch with those folks.

Rounding out the year, we do have a couple more outreach opportunities coming up. We have an event in Lutchter this weekend and then we'll have our final **Sidewalk Astronomy of 2022 at Perkins Rowe** and we'll also have the final **Mid City Makers Market**. Be sure to take a look below for details. It would great to see you out there if you can make it!



Scott finishing up our presentation to the Louisiana Master Naturalists. (I think we should get that Sun costume!)

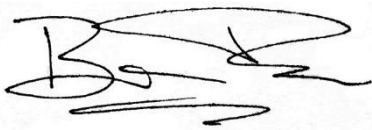


Craig shows off his H-Alpha scope at a LIGO outreach last year.

Finally, since it is almost New Year's resolution time, I (the Outreach guy) suggest you think about taking that next step in enjoying the hobby for which you joined this club. Come on out as a volunteer

and share your interest with the community and good times with fellow club members. You absolutely do NOT have to have any experience. It's a "learn as you go" kind of process. As I've always said before, you'd be amazed at how much you end up learning yourself just by participating. Someone asks you a question you don't know how to answer? Odds are someone else there DOES know and now YOU know! I guarantee that if you spend just one outreach session in between Chris R. and Craig, you'll go home knowing 10x more about this subject than you did before! (You may also end up getting home an hour or so later than you planned, but it will have been worth it, haha!!) Please let me know if you'd like to come help out at any time.

Clear Skies and Happy Holidays,
Ben Toman



Upcoming Events

Friday, December 2nd

7:30pm-9pm (?)

Lutcher Library

Sidewalk Astronomy type event for us

Tuesday, December 6th

6pm-9pm

Perkins Rowe Sidewalk Astronomy

Saturday, December 17th

5pm-9pm

Mid City Makers Market at Circa 1857 on Government St
Sidewalk Astronomy



2019's volunteer lineup at Perkins Rowe - Maybe this year YOU can be in it! ! L-R Coy, Krista, Scott C., Scott L., Chris, John, Roz and Stephen



LPC (Light Pollution Committee) Report

(NEW SCHEDULE thru December

: Meetings will be at 6 p.m. before the Monthly Meeting, which is held the 2nd Monday of each month. The public is welcome to join in.

Minutes for November 14, 2022

1. **Form letter** for new construction/projects was discussed.
2. **A policy for contacts about LP** will be developed. Recorded on a data base? Install software on BRAS computer for data base – master list with the form of contact and the response to the contact.
3. Discussed the **UDC (Unified Development Code** – ordinances) requirements for LP and it’s phrasing of the requirements.
4. Discussed an LP panel at ALCon 2023.
5. **Parks at Night** idea. Need to talk to Ben about frequency. The idea is to get BREC permission to go to various parks in the Baton Rouge area and conduct “sidewalk astronomy”.

New

- 1 **LP Training.** Training for BRAS members and the Public to be conducted after the LPC meeting before the BRAS general meeting. Discussed what training and materials to be used in the training.
2. Observatory Executive Committee has recommended the “**Good Lighting Award**” be started again and to be an annual award. An annual date would need to be set.

4 members present at meeting.

John Nagle, LPC Chair Pro-Tem

Globe At Night

The target for the Globe at Night program is
Pegasus from November 16th through November 25th.

If you would like to participate in this citizen science program, you can find instructions at
<https://www.globeatnight.org>

P.S. The “Loss of the Night” app can be used for information and for reporting your observations.

2023 Astronomical League Convention Update!

HELP! We Need Sponsors!!!

From now on, we will be doing planning and work by way of subcommittees, making use of small group meetings, e-mail, phone, etc, without the need to have the full committee meeting. We have. a lot to get done. If you like to help, please EMAIL Steven M. Tilley steveareno225@gmail.com

We are looking for Sponsors, please check with the ALCon 2023 committee before, so we do not re-ask anyone.

The 2023 ALCON Sponsorship Levels

Level	Price	Benefits
Galaxy	Above \$5000	Same as "Solar System" plus a 10-minute presentation[time slots are limited] during the conference.
Solar System	\$2000 to \$5000	Same as "Star" plus a large logo displayed on all conference signs and all slides used in the conference room between speakers. One full page for sponsor information in the Convention Program.
Star	\$1000 to \$1999	Same as "Planet" plus small Logo displayed on all conference signs and on schedule display. 1/4 page in Conference Program for logo and sponsor information
Planet	\$500 to \$999	Same as "Moon" plus Name displayed on Conference Hall display during breaks.1/8 page in Conference Program for logo and sponsor
Moon	\$100 to \$499	Name listed in Conference program and can provide items for inclusion in attendee bags.

After you sign someone up, let us know and have them send a check made out to "Astronomical League" with **ALCon 2023** in the memo line, to the attention of

Carroll Iorg (AL President)
Astronomical League
9201 Ward Parkway, Suite #100
Kansas City, MO 64114

THERE'S A NEW LIGHT IN THE NIGHT SKY!

submitted by Craig Benton

Astronomers report that the **BlueWalker 3** communications satellite has suddenly brightened nearly 50-fold, a sign that it is unfurling its giant antenna in low Earth orbit. Some astronomers worry that BlueWalker 3 might become one of the brightest objects in the night sky. So far it is about as bright as a 1st magnitude star. Full story with observing tips @ [Spaceweather.com](https://www.spaceweather.com)



BlueWalker 3 over Fort Davis, Texas, on Nov. 12th. Credit: Gary Dowdle

SPACE WEATHER ALERTS

Instant solar flare alerts: The sun is starting to flare again.

Sign up for [Space Weather Alerts](#) to receive text messages when explosions are underway.

Basic plan \$49.95/year

Alerts include: Coronal Mass Ejections (CME), Geomagnetic Storms Predicted (class G1-G4), Planetary K-index (K5-K9, K4 for Pro Plan), Solar Flare alerts (X-Ray Flux levels and Scales), Solar wind speed alerts (500, 600, 700 and over 800 km/s), B Sub Z South-pointing episodes, Cracks in Earth's magnetic field.

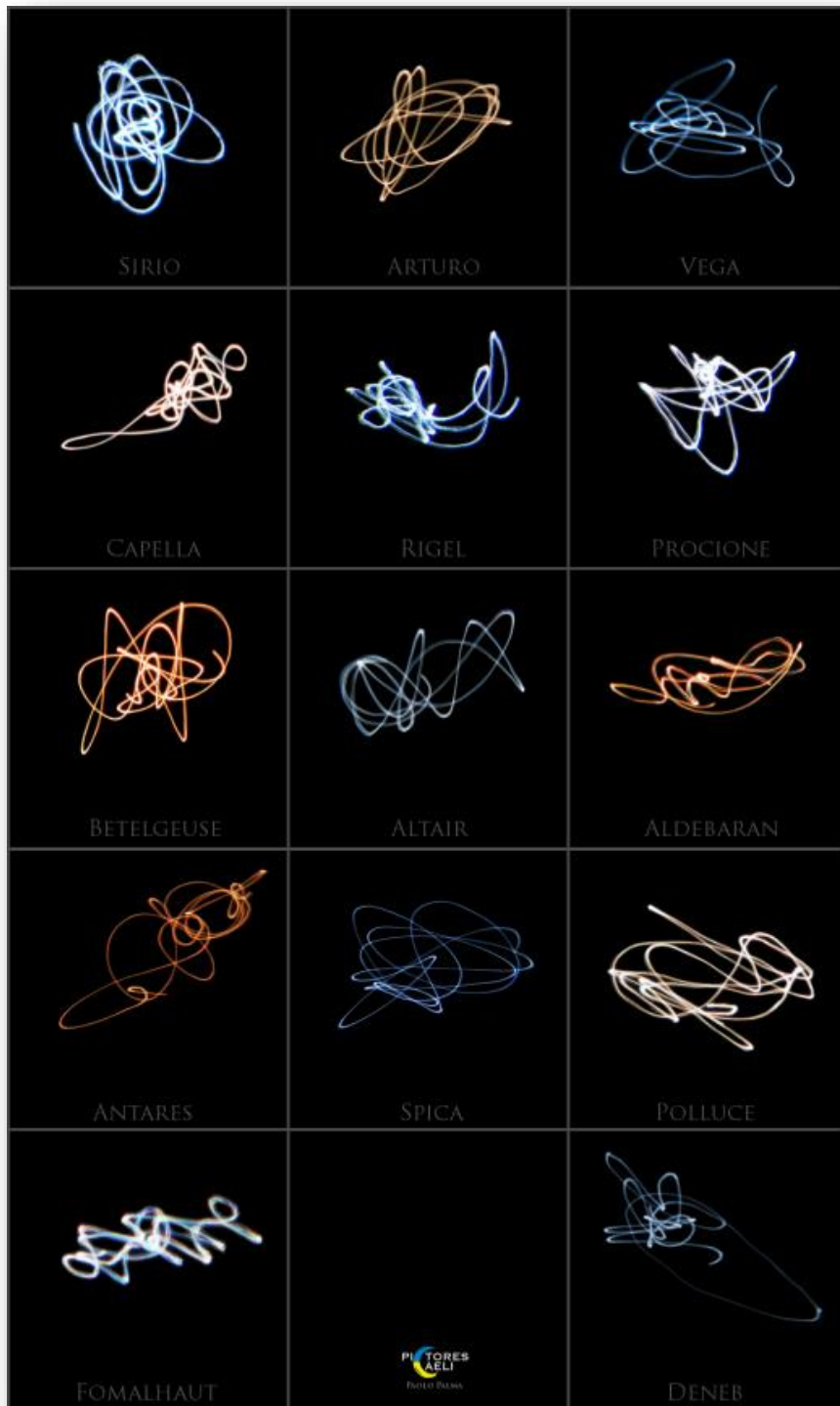
WHAT HAPPENS WHEN YOU TAP YOUR TELESCOPE?

FROM SPACE WEATHER (LINK)

It's an old astronomer's trick. If you want to make the color of a star really *pop*, tap your telescope. The resulting smear of light looks extra colorful. Amateur astronomer Paolo Palma of Naples, Italy, tried this for 14 bright stars and this is what he saw:

"Here is a mosaic of the colors of the brightest stars visible from Italy," says Palma. "I took them during this year by deliberately shocking the telescope. As the Italian poet [Filippo Zamboni](#) said, in this way the colors of the stars seem to come out of nowhere!" Turns out it's an old *poet's* trick, too.

"The photographic parameters are the same for all shots and they have not undergone any extra processing to enhance their colors," he adds. Stars have different colors because they are different temperatures. The hottest stars are blue, with temperatures around 25,000 K. Red is the color of the coldest stars, which have surface temperatures of approximately 3,000 K. Palma captured almost the entire range.





**Messages
from
HRPO**

Highland Road Park Observatory



2022 HRPO DONATION DRIVE

1 October to 31 December / Goal: \$1500.

Our annual fundraising drive has been successful for many years. The agreement (as always) is for the public to give us Drive money, as long as we say what we're going to buy, and it is for public program use!

The **“wish list”** is on our website at <https://hrpo.lsu.edu/programs/drive.html>

There are **three ways to donate**:

- (1) Give at HRPO. We can write you a receipt. Only cash or check in person, please.
- (2) Mail a check to the [BREC Foundation](#), stipulating “HRPO” in the memo line of your check.
- (3) Donate online. Contact the BREC Foundation at (225) 226-7381 to receive instructions for stipulating online donations for HRPO.



FRIDAY NIGHT LECTURE SERIES

7:30pm / For ages fourteen and older. / No admission fee.

2 December = “Apollo 17 Fiftieth Anniversary” BRAS member Tom Northrop returns! Our final in-person trip to the Moon is remembered as the newest test-run is in progress. The lecture will be followed by an Artemis update.

16 December = “The Arrival of Apophis” In the spring of 2029, a lot of lucky Earthlings will be able to view a quite bright pass of a 300+-meter rock. Are Baton Rougeans part of that lucky group?

23 December = “Comet After Comet” Their origins, and the possible bright apparitions of the next two years will be outlined.



EVENING SKY VIEWING

No admission fee. For all ages.

Fridays (2, 16 and 23 December) from 8:30pm to 10pm

Saturdays (3, 10 and 17 December) from 7:30pm to 10pm

HRPO houses a 50-cm reflector, a 40-cm reflector and several smaller telescopes to bring the majesty of the night sky to the public. Trained operators, sharing duties via a rotating roster, work throughout the year in shifts. Each operator has a pre-planned list of objects to highlight. However, requests will be taken if there is time and if all present have viewed the previous target.



SCIENCE ACADEMY

Saturdays from 10am to 12pm.

*for Cadets aged eight to twelve *\$5 per Cadet per week (\$6 if out-of-parish)*

four Cadet minimum and sixteen Cadets maximum per session

3 December = “Mars”

10 December = “Mercury”

17 December = “Soaring on the Space Shuttle VI”

31 December = “Distances in Space”



MARTIAN OPPOSITION

Wednesday 7 December from 8pm to 12am / No admission fee. For all ages.

This is the closest Earth will be to the Red Planet will be to Earth for over a decade! Come visit with your family. Weather permitting we'll also attempt viewing of the Full Moon and Jupiter.



SOLAR VIEWING

Saturday 10 December from 12pm to 2pm / No admission fee. For all ages.

Weather permitting, viewing of the Sun's image in three different manners—transferred onto a white surface, directly with safely-filtered optical light, and directly in safely-filtered hydrogen-alpha wavelength—will take place for two hours. Protective clothing and sunscreen are recommended.



AMATEUR ASTRONOMY COURSES

Saturdays from 3pm to 7pm / \$15 per in-parish registrant; \$18 per out-of-parish registrant. / Must be eighteen or older.

These exciting one-day classes are tailor-made to instruct the patron in the use of a personal telescope or binocular for skygazing, or the basics of the unaided-eye Baton Rouge sky. Sign up for one or more!

[Learn Your Sky](#) [10 December]

This class is an introduction to the unaided-eye Baton Rouge sky. We'll even go outside for some practice, weather permitting. Also included will be an overview of all major sky events for the next twelve months. *This one-day course focuses specifically on the unaided-eye Baton Rouge sky. [Limit thirty registrants. All registrants must be over eighteen; children are not allowed. Three adults needed for registration by 7 December.]*



GEMINID METEOR SHOWER

Tuesday 13 December from 9pm to 1am / No admission fee. For all ages.

The Geminid meteors, in addition to being part of one of the most reliable showers of the year, are quite intriguing and were first noticed in the 1860s. For this *one* night the public is welcome to join us for sky viewing. Due to the light pollution problem here in East Baton Rouge Parish, it is feasible to attempt viewing of this major shower only during its peak time. The waxing gibbous Moon will be up. Patrons *must* follow the rules and regulations below if they expect to stay on park property.



MERCURIAN ELONGATION

Wednesday 21 December from 4:45pm to 6:15pm / No admission Fee. For all ages.

At the Burbank Soccer Complex

Periodically Mercury reaches its greatest angular separation in the sky (elongation) from the Sun. This is the safest way to view Mercury by amateurs. The planet will appear as a “half-Mercury”. Venus, Jupiter and Saturn will also be seen.



WINTER SPACE EXPLORATION CAMP

Wednesday 28 December and Thursday 29 December (8am to 5pm daily)

**for Explorers ages 9 to 13*

**\$55 per in-parish Explorer / *\$66 per out-of-parish Explorer*

Explorers will build and fly a single-stage chemical rocket, while learning about the upcoming missions to the Moon and Mars, and the latest news about the brightening comet! All materials are supplied; Explorers will need a sack lunch and drink that does not require refrigeration. Explorers will also need to bring a hat and sunscreen. Parents may register in person at the HRPO or online at [Webtrac](#) (the activity number is 531180).



HIGHLAND ROAD PARK OBSERVATORY **25TH ANNIVERSARY**

Friday 30 December from 3:30pm to 9:30pm / For ages eight and older. No admission fee.

The first public night was in 1997. Several asteroid discoveries, public nights, camps, Science Academy awards, STEM-based activities and games, eclipses, transits, occultations and conjunctions later HRPO personnel are planning to serve the public for twenty-five more years!



STEM EXPANSION: “The Future of Science”

Saturday 31 December from 3:30pm to 7:30pm

For ages twelve to sixteen. / \$15 each per in-parish registrant; \$18 each per out-of-parish registrant. Advanced registration via WebTrac required [activity #531993].

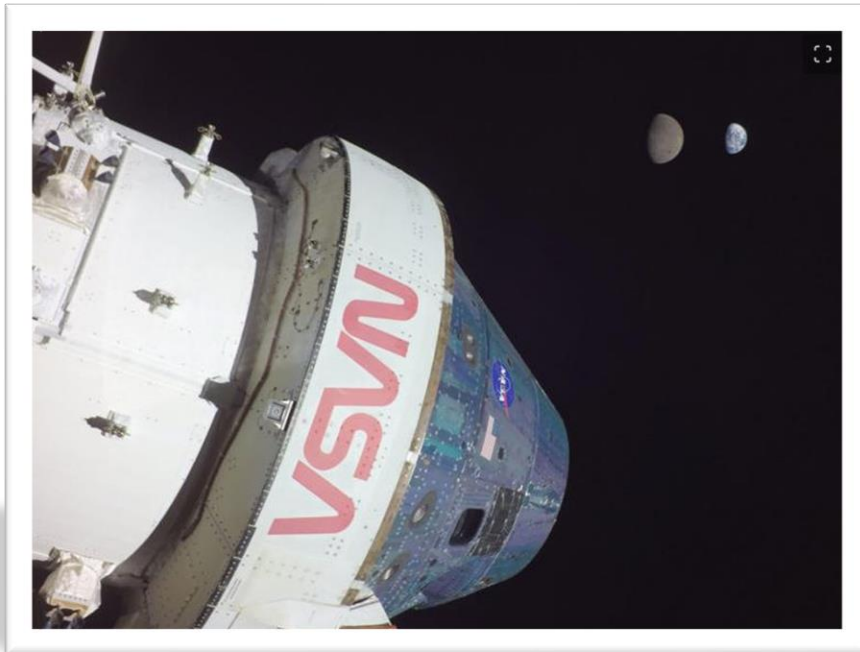
This program offers advanced topics, topic extensions and all-new games and activities to an older crowd. Certificates will be earned, and a section of archived experiments, some not seen in over fifteen years (and some *never* performed on site) take place. There are also giveaways and door prizes.

NASA'S ORION SPACECRAFT CIRCLES AROUND THE BACKSIDE OF THE MOON

Article summary: Monday, Nov. 28, 2022 marked the half way point, flight day 13, of the nearly 26-day-long Artemis 1 mission, which sent an uncrewed Orion toward the moon atop a Space Launch System (SLS) megarocket. This NASA photo shows artemis on the back side of the moon, with the moon and earth in near alignment.

Orion took a long and looping trip to the moon, finally arriving in a distant retrograde orbit on Friday (Nov. 25). On Monday, the spacecraft reached the maximum distance from Earth that it will attain in the mission — **268,563 miles (432,210 kilometers)**

No spacecraft designed to carry humans has ever gotten so far from home. The previous record, **248,655 miles (400,171 km)** was set in 1970 by NASA's Apollo 13 mission, which was supposed to land on the moon but had to loop around the body after suffering a serious problem in flight.



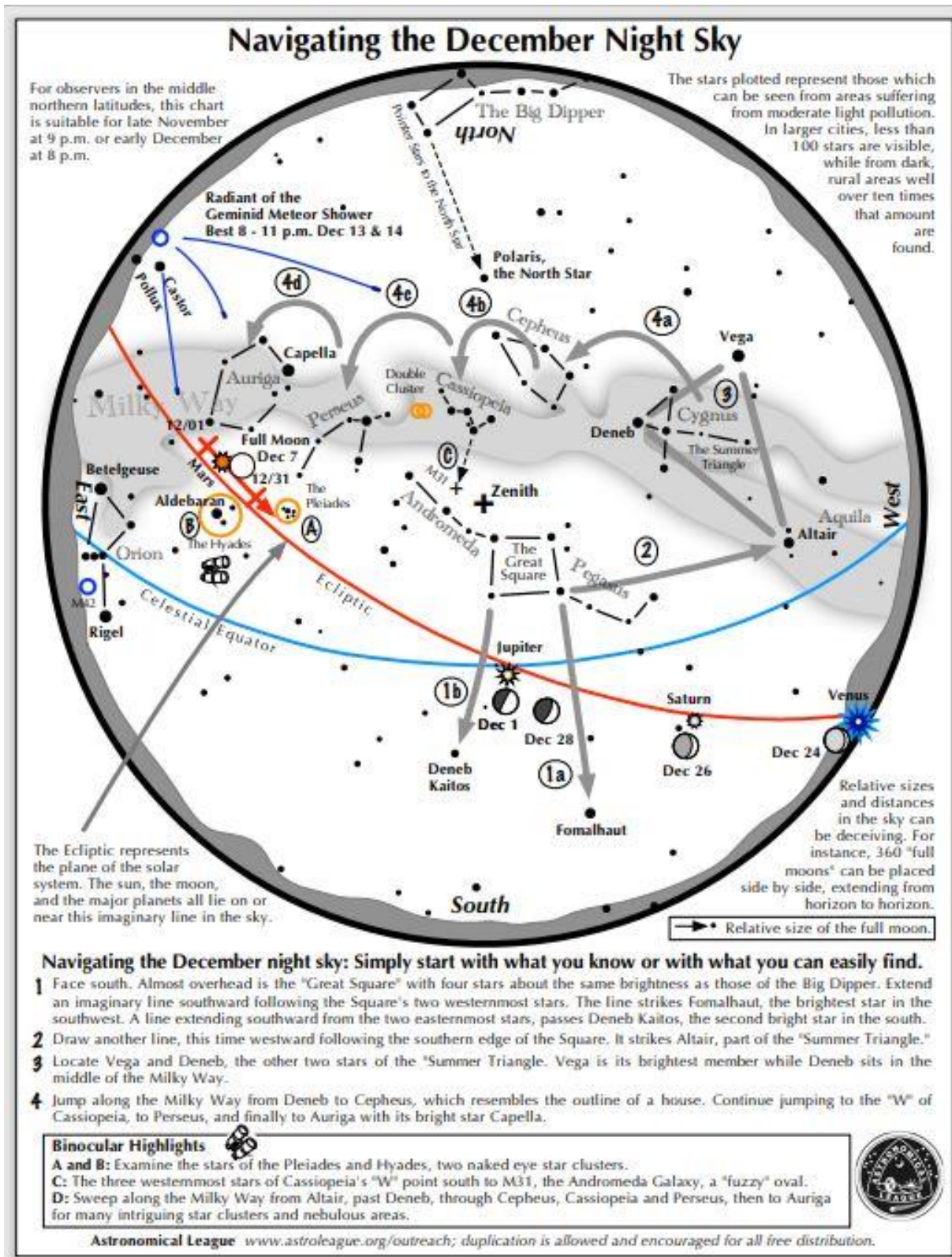
Orion will stay in lunar orbit until Thursday (Dec. 1), when it will fire its main engine to start the journey home. If all goes according to plan, the capsule will splash down in the Pacific Ocean on Dec. 11, bringing the Artemis 1 mission to a close.

To read the full article and watch a cool video, click this link:

[Artemis 1 Orion spacecraft hits halfway point of epic moon mission \(msn.com\)](https://www.msn.com/)

Here's this month's sky chart for our neck of the woods, provided by JPL

<https://nightsky.jpl.nasa.gov/docs/2022December.pdf>





OBSERVING NOTES **DECEMBER**

Fornax Chemica (Fornax) – The Chemical Forge Position: RA 03, Dec. -30°

Note: For six years I wrote these Observing Notes, featuring the 60 constellations we can see before midnight from Baton Rouge, containing objects above magnitude 10. For the next three years I expanded that information and put all my research in the same format, ending last April. Beginning with last May, Named Stars, Deep Sky and Other Stars are repeated here, for convenience. Monthly updates will be made to Sky Happenings and all that appears below that title.

Named Stars

Dalim (Alpha For), also called “Fornacis” (the archways of the outer city gates of Rome), mag. 3.85, 03 12 04.28 -28 59 20.8, is a binary star. The primary is a yellow-white sub-giant main sequence star at magnitude 3.91. The secondary star is a ‘blue straggler’ at magnitude 6.5 and a strong X-ray source. The orbital period is 314 years with a separation of 5.1”. Also known as **HD 20010**, **HIP 14879**, **Gould 72**, and **SAO 168373**.

Diya (WASP-72), mag. 9.6, 02 44 09.6 -30 10 09, has one **Jupiter** size planet in orbit with a period of 2.2 days.

Intan (**HD 20868**), mag. 9.92, 03 20 42.19 -33 43 48.4, is an orange dwarf star with one planet with the mass of twice that of **Jupiter** in a 380-day long orbit. Also known as HIP 15578.

Deep Sky:

NGC 1316, “Fornax A”, mag. 8.2, 03 23 39 -37 07 34, 12.1”x8.6” in size, is a radio galaxy and the 4th brightest radio source in the sky – its jets produce the radio lobes. Optically, the large elliptical galaxy has dust lanes near its core; visually quite large, slightly elongated, with a diffuse center; extended envelope with faint loops. It is interacting with **NGC 1317**. **NGC 1326** (magnitude 11.4) is 47’ to the north-northeast. **NGC 1316** is located 2° southwest of **Chi Fornacis**. It is a member of the **Fornax Galaxy Cluster** (anchoring the western end). Also known as **ESO 357-022**, **ESO 032047-3723.2**, **Arp 154**, **AM 320-372**, **MCG-6-08-005**, **FCC 021**, **PKS 320-037**, **Dunlop 548**, **Bennett 14**, and **IRAS 03208-3723**.

NGC 1399, mag. 8.8, 03 39 23 -35 22 32, 6.9’x6.5’ in size, is a very bright and pretty large galaxy with a bright nucleus. It is a member of the **Fornax Galaxy Cluster**. Located 2° east of **Chi Fornacis**.

NGC 1387 and **NGC 1379** lie due west. Just to the south is **NGC 1389** and just north is **NGC 1381**. **NGC 1404** is 13’ to the south-southeast. Also known as **ESO 350-045**, **ESO 033634-3536.7**, **MCG-6-09-012**, **FCC 213**, **PKS 0336-035**, and **Bennett 19**.

ESO 356-004, “The Fornax Dwarf Galaxy”, mag. 9.0, 02 40 00 -34 27 00, 60’x48’ in size, is part of the local group and is a satellite of the **Milky Way Galaxy**. It contains six globular clusters of which the largest is **NGC 1049** (discovered before the dwarf galaxy).

NGC 1049, mag. 9.0, 02 40 42-34 09 35, 2.5’x2.5’ in size. Also known as **ESO 356-003**, **MCG-6-06-017**, and **3 Hodge 3**.

NGC 1097, mag. 9.2, 02 47 19 -30 10 43, 9.3’x6.3’ in size, is a very bright, large, and very elongated galaxy; two main arms; has a small, extremely bright nucleus that produces spectral line emissions

from highly ionized gas; believed to have a super-massive black hole at its center. There are two satellite galaxies – **NGC 1097A** (a peculiar dwarf elliptical galaxy) and **NGC 1097B** (a dwarf irregular galaxy). Located 5.7° west-southwest of **Alpha Fornacis**. Also known as **UGCA 041, ESO 416-020, ESO 024411-3028.9, Arp 77, AM 244-302, MCG-5-07-024, Caldwell 87, H5-48, Bennett 10, PKS 244-304, and IRAS 02441-3029.**

NGC 1365, “The Fornax Propeller Galaxy”, mag. 9.3, 03 34 30 -36 03 47, 11.2’x6.2’ in size, is a very bright, very large, and quite elongated galaxy; extremely bright nucleus. It has two clearly discernible arms. It anchors the center of the **Fornax Galaxy Cluster** and is located 1° east-southeast of **Chi³ Fornacis**. Its bright nucleus indicates the presence of an active galactic nucleus – a galaxy with a super-massive black hole at its center. Also known as “**The Great Barred Spiral Galaxy**”, **ESO 350-017, ESO 033141-3880.4, VV 825, MCG-6-08-026, FCC 121, PKS 0331-363, and IRAS 03317-3618.**

NGC 1360, “The Robin’s Egg Nebulae”, mag. 9.4, 03 34 14 -25 47 39, 11”x11” in size, the center star (**CD26 01339**) is a **Wolf-Rayet** star at magnitude 10.98. Also known as **ESO 482-0097, AM 331-260, PKS 0331-260, PK 220-053, PNG 220.3-53.9, Bennett 15, and IRAS 03311-2601.**

NGC 1398, mag. 9.5, 03 39 51 -26 15 46, 7.1’x5.4’ in size; is quite bright, quite large, and round galaxy; large, bright nucleus; internal ring with a bar. **NGC 1360** is 1.3° to the west-southwest. Also known as **ESO 482-022, ESO 033645-2629.9, AM 336-263, MCG-4-09-040, Bennett 19a, and IRAS 03367-2629.**

NGC 1404, mag. 9.7, 03 38 31 -35 35 00, 4.8’x3.9’ in size.

NGC 1380, mag. 9.9, 03 37 22 -34 54 00, 4.6’x2.3’ in size, is a very bright, large, and elongated galaxy; very bright nucleus. It is a member of the **Fornax Galaxy Cluster**. Also known as **ESO 358-028, ESO 033432-3508.4, MCG-6-09-002, AM 334-350, FCC 167, Dunlop 574, Bennett 17, and IRAS 03345-3508.**

Fornax Galaxy Cluster is a relatively small, but it is the second richest galaxy cluster within 100 million light-years. It contains 58 member galaxies covering an area of about 6° across and is part of the larger **Fornax Wall**. The main galaxies are **NGC 1316, 1365, and 1399**. To find the cluster, move 62° south of the **Pleiades** (no joking, it really works!).

The Fornax Wall is a superstructure known as a galaxy filament or galaxy wall. It is a long filament of galaxies with a major axis longer than its minor one. The filament contains the **Fornax Galaxy Cluster** and the **Dorado Group** of galaxies. It is “parallel” to the **Sculptor Wall** and “perpendicular” to the **Grus Wall**.

GRB 190114C was a notable gamma ray burst explosion from a galaxy 4.5 billion light-years away near the **Fornax** constellation that was initially detected in January of 2019. According to astronomers, “the brightest light ever seen from **Earth** (to date) – the biggest explosion in the universe since the **Big Bang**.”

Helmi Stream, is a stellar stream of the Milky Way galaxy. It started as a dwarf galaxy, now absorbed by the **Milky Way** as a stream. It was discovered in 1999 and is formed of old stars deficient in heavy elements and has a mass of 10 to 100 million solar masses. It was absorbed by the **Milky Way** some 6 to 9 billion years ago. The **Helmi Stream** discovery affirmed theories that the merging of galaxies played a significant role in creating the giant structures of the **Milky Way** galaxy.

UDFi-39546284 is a candidate proto-galaxy, although recent analysis has suggested it is likely to be a lower red-shift source.

UDFy-38135539 (HUDF.YD3) is identified as the 2nd most distant object in the universe at 13.1 billion light-years away from our **Sun**. It is the first galaxy to be observed from the re-ionization epoch (between 150 million and 1 billion years after the **Big Bang**).

Deep sky objects in Fornax: 73 NGC; 38 IC; 197 ESO; 59 ESO; 150 MCG; 32 IRAS; 9 GSC; 6 UGCA; 24 AM; 23 FCC; 2 Radio Galaxies; 3 Quasars; 9 Bennett; 1 Caldwell; 6 Dunlop; 8 Herschel; 7 PGC; 5 PKS; 1 PK; 1 PNG; 6 AGC; 2 SGC; 1 CGPG; 1 CD; 1 IZw; 3 VV; 2 Arp; 2 Al; 7 AS; 1 Void; 1 SGNE; 1 Hrr; 1 Klemola; 6 Fornax Globular Clusters; 1 Fornax Dwarf Galaxy; 1 Fornax A; 4 Ring Galaxies; and 1 Fornax System for a total of 683 objects.

Other Stars:

Lambda² Fornacis, mag. 5.78, 02 36 58.62 -34 34 38.4, is a star about 1.2 times the solar mass with a planet the size of **Neptune** in orbit with a period of 17.24 days. The planet was discovered by doppler spectroscopy in 2009. Also known as **HD 16417**, **HIP 12186**, **Gould 36**, and **SAO 193811**.

HD 17926, mag. 6.38, 02 51 56.16 -30 48 53.2, has three planets (discovered by **TESS**) in orbit with a faint, possible red dwarf companion at a separation of 8.4" or 270 au. The b planet has an orbital period of 3.59 days; the c planet – 5.97 days; and the d planet – 11.23 days. Also known as **CD31° 1148**, **GC 3443**, **HIP 13363**, **Gould 54**, **HR 858**, and **SAO 193951**.

HD 20782, mag. 7.38, 03 20 03.58 -28 51 14.7, is a yellow main sequence star and a wide binary with **HD 20781**. It has one planet in orbit. Also known as **HIP 15527**.

HD 13167, mag. 8.34, 02 08 13.8 -24 41 43, has one planet in orbit. Also known as **HIP 12716**.

HD 20781, mag. 8.44, 03 20 03 -28 47 02, is a yellow main sequence star and a wide binary with **HD 20782**. It has two planets in orbit. It is the first binary star discovered with both components having orbiting planets. Also known as **HIP 15526**.

HD 11231, mag. 8.6, 01 49 38.0 -34 27 33, has one planet in orbit. Also known as **HIP 8501**.

AK Fornacis, mag. 9.14, 03 29 23 -24 06 04, is a low-mass eclipsing spectroscopic binary star with a period of 3.98 days. Also known as **HD 21703**, and **HIP 16247**.

Stars of interest beyond magnitude 10:

LP944-20, mag. 18.69, 03 39 35.22 -35 25 44.09, is a brown dwarf star that contains much lithium in its atmosphere.

UDF 2457, mag. 25.0, 03 32 38.79 -27 48 10.0, is one of the most distant stars known in the **Milky Way** galaxy.

There is one asterism in Fornax – an arrowhead shape group of stars 1° west of **NGC 135** – at 03 27 00 -35 00 00, mag. 6.0, 30'x30' in size, composed of the stars **Chi¹**, **Chi²**, and **Chi³** Fornacis. Stars in Fornax: 28 Greek; 1 B; 9 h; 3 β; 1 See; 35 Lettered; 1 Stone; 1 S; 1 BrsO; 1 CorO; and 1 Jc for a total of 83.

Sky Happenings: December 2022

(what follows pertains ONLY to the current month. Material above is good year after year.)

- Dec. 1st - The **Moon** passes 3° south of **Neptune** at 7 AM CST,
The **Moon** passes 3° south of **Jupiter** at 7 PM CST.
- Dec. 4th - **Neptune** is stationary.
- Dec. 5th - The **Moon** passes 0.7° north of **Uranus** at 12 noon CST.
- Dec. 6th - Evening: The **Moon**, one day short of full, will be between the **Hyades** and the **Pleiades** in the east-southeast.
- Dec. 7th - The **Moon** passes 0.5° north of **Mars** at 10 PM CST – **Mars** will be occulted for most of the **US** (except **Alaska**, the **East Coast**, and the **Gulf Coast**) – for us, the **Moon** will be 3' north of **Mars** at a PA of 141° at an altitude of 54° high at 9:11 PM CST,
Full Moon occurs at 10:08 PM CST.
- Dec. 8th - **Mars** is at opposition at 12 AM (Midnight) CST.
- Dec. 10th - Evening: The waning gibbous **Moon**, **Castor**, and **Pollux** form a triangle as they rise in the northeast.
- Dec. 11th - **Pollux** is 1.8° north of the **Moon** at 2 AM CST,
The **Moon** is at apogee (252,195 miles or 405,888 km from **Earth**) at 6:28 PM CST.
- Dec. 14th - Morning: The **Geminid** meteor shower peaks with a waning gibbous **Moon** in the sky,
Morning: In the south, before sunrise, the **Moon** will be about 4° to the upper left of **Regulus**.
- Dec. 16th - **Last Quarter Moon** occurs at 2:56 PM CST.
- Dec. 18th - Morning: The waning crescent **Moon** will accompany **Spica** as they climb above the

southeast horizon with roughly 5° separation.

- Dec. 21st** - **Mercury** is at greatest eastern elongation (20°) at 9 AM CST, **Winter Solstice** occurs at 3:48 PM CST. This will be the longest night of the year in the **Northern Hemisphere**, **Mars** passes 8° north of **Aldebaran** at 10 PM CST.
- Dec. 22nd** - The **Ursid** meteor shower peaks at 4 PM CST.
- Dec. 23rd** - **New Moon** occurs at 4:17 AM CST (lunation 1237).
- Dec. 24th** - The **Moon** is at perigee (222,619 miles or 358,270 km from **Earth**) at 2:27 AM CST, The **Moon** passes 3° south of **Venus** at 5 AM CST, The **Moon** passes 4° south of **Mercury** at 1 PM CST, Dusk: In the southwest, the **Moon**, **Venus**, and **Mercury** are in a triangle near the horizon.
- Dec. 26th** - The **Moon** passes 4° south of **Saturn** at 10 AM CST, Dusk: The thin, waxing lunar crescent is about 5° to the left of **Saturn**.
- Dec. 28th** - The **Moon** passes 4° south of **Saturn** at 10 AM CST, Dusk: **Mercury** and **Venus** are less than 2° apart, very low in the southwest after sunset, **Mercury** is stationary at 9 PM CST.
- Dec. 29th** - **Mercury** passes 1.4° north of **Venus** at 3 AM CST, The **Moon** passes 2° south of **Jupiter** at 5 AM CST, **First Quarter Moon** occurs at 7:21 PM CST.
- Dec. 30th** - A double shadow transit on **Jupiter** starts at 4:27 AM CST.

Planets:

Mercury - **Mercury** and **Venus** has reappeared from behind the **Sun** and will start the month still deep in twilight, climbing higher each day. On December 1st, the duo will set within 38 minutes of the **Sun**.

Mercury will be at magnitude -0.6, and will be less than 1° high, standing 3° east of **Venus**. On the 8th, **Mercury** is 3.5° high 30 minutes after sunset. On the 21st, the planet will reach greatest eastern elongation (20°), shining at magnitude -0.6 at 8° above the horizon a half-hour after sunset. On the 24th, 30 minutes after sunset, the **Moon** is just under 5° from **Mercury** and 7° from **Venus** forming a triangle. On the 27th, the planet will be at magnitude 0.0. On the evening of the 28th, only 12.5° will separate the planet from **Venus**. By **New Year's Eve**, the planet is 4° west of **Venus** and has faded to magnitude 1.3.

Venus - **Venus** and **Mercury** will rise together, moving in tandem all month. On the 1st, the planet, at magnitude -3.9, will set within 38 minutes after sunset after achieving only 1° of altitude above the horizon. On the 8th, the planet is 1.5° high 30 minutes after sunset. On the 21st, the planet is 4.5° high and is 5° from **Mercury**. On the 24th, the crescent **Moon** will be just under 5° from **Mercury** and 7° from **Venus**, forming a triangle in the southwest 30 minutes after sunset. On the 28th, the two planets are only 1.5° apart. Through a telescope **Venus** will change very little during the month, with its illumination going from 99% to 96%, and it will span 10" all month.

Mars - **Mars** reaches opposition on December 8th and is visible all night all month long. The planet is in **Taurus**, and it will be 9.5° from **Aldebaran** at opposition, more than 70° high. The planet, at magnitude -1.9 in the first week of the month, will dim to -1.3 magnitude by the 31st. During the first week of the month the planet's disk will span 17" and will slim to 15" by the end of the month. In the hours around midnight the following features of **Mars** will face **Earth**: On the 1st - **Syrtris Major** and **Hellas**; on the 10th - **Mare Cimmerium** and **Elysium**; on the 17th - **Mare Sirenum** and **Olympus Mons**; on the 23rd - **Tharsis Ridge**, **Solis Lacus**, and **Valles Marineris**; and on the 30th - **Solis Lacus**, **Valles Marineris**, **Mare Erythraeum**, and **Sinus Meridiani**.

Jupiter - **Jupiter** is high in **Pisces** in the south after sunset. The planet will dim from magnitude -2.6 to -2.4 during the month as it moves east deeper into **Pisces** and away from **Aquarius**. The planet's disk will slim from 43" to 39". By mid-month, the planet will be setting around midnight local time. On December 1st, the **Moon** will be within 2.5° and on the 28th, when they meet again, they will be about 5.5° apart. There will be a double shadow transit on **Jupiter** on the night of December 29/30. The event starts with the transit ingress of **Ganymede** at 9:11 PM. **Ganymede** will egress transit at 12:07 AM CST, with its shadow starting ingress at 2:47 AM CST. **Io** will start transit ingress at 3:06 AM CST, with its shadow starting ingress at 4:27 AM CST (the start of the double shadow transit). **Io** will exit transit at 5:19 AM CST. **Ganymede's**

shadow will egress transit at 5:21 AM CST, followed by **Io's** shadow egressing transit at 6:38 AM CST.

Saturn – **Saturn** is over 30° high in the south at dusk in early December. The planet will set by 10 PM local time on the 1st, and by 8 PM by the 31st. The planet is in eastern **Capricornus**, starting the month at magnitude 0.7, dropping to 0.8 by the 23rd. its disk spans 16” and the rings span 36”. The apparent tilt of the rings to our line of sight will drop below 14° late in the month. **Titan**, the planet’s largest moon, is at magnitude 8.5. It will be located north of the planet on the 10th and 26th, and due south of the planet on the 2nd and 18th. **Iapetus**, at 11th magnitude, will reach inferior conjunction early on the 23rd. On the 22nd, it will pass in front of the rings and will appear dark against the brighter “B” ring. On the 23rd, **Iapetus** will pass briefly very close to **Tethys** starting at 5:23 PM CST with the pair appearing to merge in a telescope, one hour later, they are 3” apart.

Uranus – **Uranus** is in southern **Aries** at magnitude 5.7. The planet is visible all night and is highest 1 to 2 hours before local midnight. The planet will have a 4” wide, bluish disk. The planet is located 6° north-northeast of **Mu Ceti**. To find, start north of **Mu Ceti** to the 5th magnitude star **Sigma Arietis** – follow 3° farther along the same line by **Rho Arietis**. The planet will start the month between these two stars, moving slowly southwest and passing 1° due north of **Sigma Arietis** on the 13th, with **Pi Arietis** 1.5° northwest of the planet.

Neptune – **Neptune** is in **Aquarius**. In early December the planet will stand 6° west of **Jupiter**. By the 31st, it will be 8° west of **Jupiter**. The planet shines at magnitude 7.9 and will be between two 7th magnitude stars all month. The two stars are the easternmost pair of a parallelogram of four stars, each about 1° apart, located 5° northeast of **Phi Aquarii**. The planet sets by 1 AM local time on the 1st, and before 11 PM local time on the 31st. A telescope will reveal a dim bluish disk spanning 2”.

Moon – The Moon, on the 7th of December, will pass about 3’ north of Mars – most of the US will see an occultation, but not us.

Favorable Librations: Boss Crater – December 1st; Mare Australe – December 8th; Anderson Crater – December 15th; and mare Orientale – December 18th.

Greatest North Declination on the 10th (+27.4°)

South 19th (-27.4°)

Libration in Longitude: East Limb most exposed on the 3rd (+6.3°) and on the 31st (+7.4°)

West 19th (-7.3°)

Libration in Latitude: North Limb most exposed on the 26th (+6.6°)

South 13th (-6.7°)

Asteroids / Minor Planets – All asteroid positions are according to the *RASC Observer’s Handbook, 2022 USA Edition*, unless otherwise noted.

Asteroid **1 Ceres** – **Ceres’s** positions are as follows: On December 7th – 12 02.27 +10 48.2, at magnitude 8.5 in **Virgo**; on the 17th – 12 14.20 +10 14.1, at magnitude 8.4 in **Virgo**; and on the 27th – 12 24.79 +09 52.6, at magnitude 8.3 in **Virgo**.

Asteroid **2 Pallas** – **Pallas’s** positions are as follows: On December 7th – 07 123.23 -30 39.8, at magnitude 8.0 in **Canis Major**; on the 17th -07 07.11 -31 49.0, at magnitude 7.9 in **Canis Major**; and on the 27th – 06 59.75 -32 10.6, at magnitude 7.8 in **Canis Major**.

Asteroid **3 Juno** – **Juno’s** positions are as follows: On December 7th – 23 13.82 -11 28.7, at magnitude 9.3 in **Aquarius**; on the 17th – 23 27.13 -10 24.5, at magnitude 9.4 in **Aquarius**; and on the 27th – 23 41.95 -09 13.9, at magnitude 9.5 in **Aquarius**.

Asteroid **4 Vesta** – **Vesta’s** positions are as follows: On December 7th – 22 36.47 -16 20.0, at magnitude 7.9 in **Aquarius**; on the 17th – 22 49.245 -14 46.7, at magnitude 8.0 in **Aquarius**; and on the 27th – 23 02.86 -13 07.7, at magnitude 8.1 in **Aquarius**.

Asteroid **27 Euterpe** – **Euterpe’s** positions are as follows: On December 7th – 02 50.93 +14 36.0, at magnitude 9.5 in **Aries**; and on the 17th – 02 46.73 +14 32.5, at magnitude 9.7 in **Aries**.

Asteroid **30 Urania** – **Urania’s** position on December 7th is 04 08.83 +24 21.6, at magnitude 9.9 in **Taurus**.

Asteroid **115 Thyra** – **Thyra’s** position on December 7th is 02 51.34 +37 46.5, at magnitude 9.8 in **Perseus**.

Asteroid **324 Bamberga** – **Bamberga’s** positions are as follows: On December 7th –

03 09.14 +39 41.1, at magnitude 9.2 in **Perseus**; on the 17th – 03 05.51 +38 05.2, at magnitude 9.5 in **Perseus**; and on the 27th – 03 06.07 +36 31.5, at magnitude 9.8 in **Perseus**. **Bamberga's** positions, *by my estimates*, are as follows: On December 1st – about 0.8° north and a touch east of **Omega Persei**; on the 5th – about 0.3° northwest of **Omega Persei**; on the 10th – about 0.4° east-northeast of **Rho Persei**; on the 15th – about 0.5° south and a little east of **Rho Persei**; on the 20th – about 1.3° due south of **Rho Persei**; on the 25th – about 2° due south and a small touch east of **Rho Persei**; and on the 30th – about 2.6° due south and a little east of **Rho Persei**.

Asteroid **532 Herculina** – **Herculina's** position on December 7th is 04 39.1 +07 10.8, at magnitude 9.9 in **Taurus**.

Comets – All comet positions are according to **ALPO** unless otherwise noted.

Comet **2017 K2 (PANSTAARS)**, an evening comet – **K2's** positions are as follows: On December 10th – 17 29.0 -56 37.6, at magnitude 14.0 in **Ara**; **K2** will reach perihelion on the 19th at 1.8 au; on the 20th – 17 59.0 -60 29.7, at magnitude 16.0 in **Pavo**; and on the 30th – 18 39.0 -64 19.6, at magnitude 19.0 in **Pavo**.

Comet **C/2020 V2 (ZTF)** – **V2's** positions are as follows: On December 10th – 10 42.3 +79 29.2, at magnitude 9.6 in **Draco**; on the 20th – 08 09.8 +85 26.1, at magnitude 9.4 in **Cepheus**; and on the 30th – 02 42.6 +82 28.2, at magnitude 9.3 in **Cepheus**. **V2's** positions, *by my estimates*, are as follows: On December 1st – about 6.3° east and a bit south of **Y Draconis**; on the 5th – about 4.2° due east of **Y Draconis**; on the 10th – about 3° northeast of **Y Draconis**; on the 15th – about 6° north-northwest of **Y Draconis** or 6.2° south-southwest of **Polaris**; on the 20th – about 3.6° due south of **Polaris**; on the 25th – about 4.7° west-southwest of **Polaris** or about 4° due south and a touch west of **NGC 188**; and on the 30th – about 8.2° due west of **Polaris** or about 5° west-southwest of **NGC 188**.

Comet **C/20223 E3 (ZTF)**, a morning comet – **E3's** positions are as follows: On December 10th – 15 53.0 +25 42.2, at magnitude 8.6 in **Corona Borealis**; on the 20th – 15 53.7 +27 22.5, at magnitude 8.1 in **Corona Borealis**; and on the 30th – 15 53.3 +30 16.5, at magnitude 9.3 in **Corona Borealis**. **E3** will reach perihelion on January 13th at 1.11 au.

Meteor Showers – There are three **Major (Class I)** meteor showers active in December: The **Leonids** – active from November 3 through December 2, peaked on November 18th; the **Geminids** – active from November 19 through December 24, peaks on December 14 with a maximum zenith hourly rate (mzhr) of 120; and the **Ursids** – active from December 13 through December 24, peaks on December 22 with a mzhr of 10.

There are 8 **Minor (Class II)** meteor showers active in December: The **Southern Taurids** – active from October 11 through December 8, peaked on November 5th; the **Northern Taurids** – active from October 13 through December 2, peaked on November 12th; the **November Orionids** – active from November 13 through December 12, peaked on November 30th; the **Sigma Hydrids** – active from November 22 through January 4, peaks on December 7 with a mzhr of 3; the **Puppis/Velids** – active from December 1 through December 15, peaks on December 7 with a mzhr of 10; the **Monocerotids** – active from November 23 through December 24, peaks on December 11th with a mzhr of 2; the **Coma Berenicids** – active from December 12 through December 23, peaks on December 15th with a mzhr of 5; and the **December Leonis Minorids** – active from December 1 through February 10, peaks on December 19th with a mzhr of 5.

There are 2 **Variable (Class III)** meteor showers active in December: The **December Phoenicids** – active from December 4 through December 6, peaks on December 5th; and the **Volantids** – active from December 27 through January 4, peaks on December 31st.

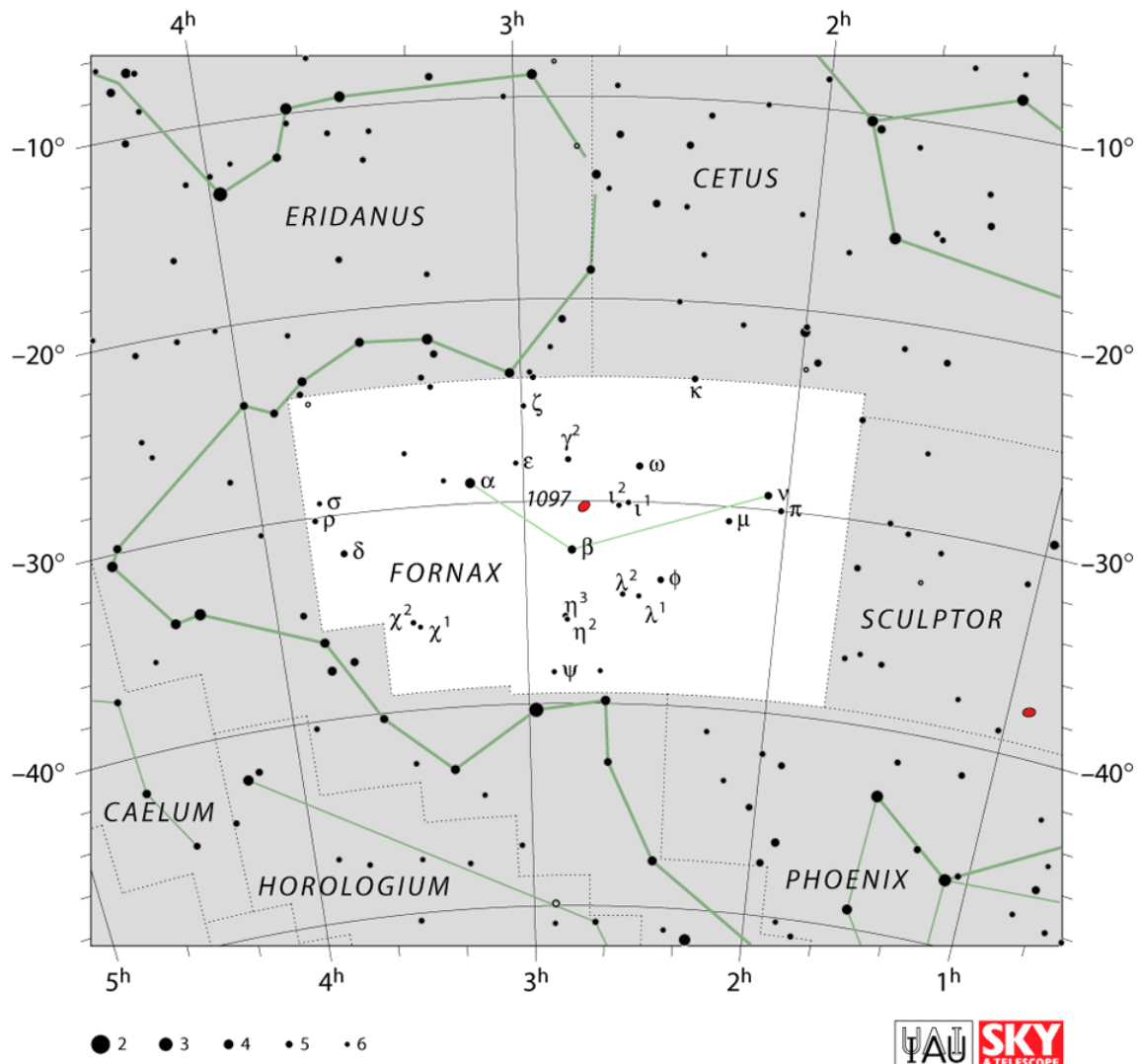
There are 14 **Weak (Class IV)** meteor showers (all have a mzhr of <2) active in December: The **Andromedids** – active from October 24 through December 2, peaked on November 6th; the **Omicron Eridanids** – active from October 23 through December 2, peaked on November 13th; the **November Sigma Ursae Majorids** – active from November 17 through December 2, peaked on November 24th; the **Theta Pyxidids** – active from November 28 through December 6, peaks on December 1st; the **Southern Chi Orionids** – active from November 14 through December 6, peaks on December 2nd; the **December Kappa Draconids** – active from November 29 through December 13, peaks on December 3rd; the **Psi Ursae Majorids** – active from November 29 through December 11, peaks on December 4th; the **December Phi Cassiopeids** – active from

November 28 through December 10, peaks on December 4th; the **December Rho Virginids** – active from November 29 through December 22, peaks on December 5th; the **December Chi Virginids** – active from November 26 through December 30, peaks on December 12th; the **Eta Hydrids** – active from November 26 through January 1, peaks on December 12th; the **Theta Pyxidids** – active from December 8 through January 8, peaks on December 18th; the **December Sigma Virginids** – active from November 26 through January 24, peaks on December 22nd; and the **cVelids** – active from December 26 through December 31, peaks on December 29th.

Mythology

Fornax Chemica (Fornax) – The Chemical Furnace

An obscure constellation introduced by the Frenchman Nicolas Louis de Lacille after his trip to the Cape of Good Hope to observe the southern stars in 1751-17562. Fornax represents a chemical furnace. Bode showed it on his atlas as Apparatus Chemicus. Fornax contains no stars brighter than fourth magnitude.



BRAS Survey for 2022

(This information will be used for club purposes only)

Last Name _____ First Name _____

Phone (Cell) _____ (H) _____ (W) _____

Best time to reach you _____

Email _____ Do you text? (circle one) Yes No

I. Astro experience level (circle one) 0-1 years 2-5 years 6-10 years 10+ years

II. What are your current astronomy-related interests? Check all that apply.

Observing Interests	Other Interests
<input type="checkbox"/> Naked eye <input type="checkbox"/> Binocular <input type="checkbox"/> Telescopic <input type="checkbox"/> Moon <input type="checkbox"/> Planets <input type="checkbox"/> Solar <input type="checkbox"/> Meteors/Comets <input type="checkbox"/> Deep Sky <input type="checkbox"/> No special interest/general viewing	<input type="checkbox"/> Art/graphics and drawing <input type="checkbox"/> Computers and Astronomy related programs <input type="checkbox"/> Astrophotography/CCD imaging <input type="checkbox"/> Radio Astronomy/shortwave <input type="checkbox"/> Outreach/Sidewalk Astronomy (showing the sky to the public) <input type="checkbox"/> Telescope Making <input type="checkbox"/> Credentialling thru AL's stepped learning programs (earning badges and certificates) <input type="checkbox"/> Introducing my kids to astronomy
Other _____	Other _____
_____	_____
_____	_____
What type of program(s) would you like to see presented at our monthly meetings?	

III. I am interested in helping with:

<input type="checkbox"/> Demonstrate Astronomical Equipment <input type="checkbox"/> Give a Club meeting Program <input type="checkbox"/> Public Observing Programs <input type="checkbox"/> Advertising/Public Relations/Articles	<input type="checkbox"/> Light Pollution Committee <input type="checkbox"/> HRPO events/Other Committees <input type="checkbox"/> Coordinate refreshments at meetings <input type="checkbox"/> Donate Items to the Club's Raffle Box
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Other ways you can help: _____

What special skills or knowledge do you have (programming, newsletter, website, handyman, networking)? _____

Please bring this to the next meeting, or drop it off at the Observatory, or send to:

Baton Rouge Astronomical Society, c/o Trey Anding, Treasurer, P. O. Box 83162, Baton Rouge, LA 70884

Or scan and send a pdf to president@brastro.org