CACHE VALLEY ASTRONOMICAL SOCIETY

Cache Valley Clear Skies

The Journal of the Cache Valley Astronomical Society

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Meeting Announcement

Our April meeting will be **held Wednesday, April 24th at 7 pm in *Room 824* of the main BTC Campus.** Enter on the east side of the building located at 1301 North 600 West. Our speaker will be Dr. Stacy Palen, Director of the WSU Ott Planetarium. Her topic will be "Nebulas".

Upcoming Star Parties

We have been invited to help with a STAR PARTY at the Smithfield Library on Wed. April 10th, starting about 7:30. It is our first star party of the year. Hope to see you there!!

Special Announcement

We have one more opportunity to help with a STEM FAIR at Lincoln Elementary on April 11th, from 6-8 pm. If you can help out, please get in touch with Dell Vance or Bruce Horrocks.

The President's Corner
By Dell Vance, CVAS President

March has been a pretty good month for some clear skies, particularly for early morning observations. We have also had a good month for outreach efforts. We have a total of 5 telescopes already placed in Libraries and have received donations for another one from Campbell Scientific. This is keeping us busy and that is great. Be sure to

see the table in the Newsletter showing the status of libraries in the Cache Valley. We have also been working with the School District on supporting their STEM (Science, Technology, Engineering, and Math) Fairs. This is a good opportunity to work with students and help them see the potential of astronomy.

We had John Vanderford, NASA Director of Outreach (retired), as our speaker for March. He teamed up with his friend, Duke Johnson, Associate Director, Education and Exhibits Manager of the Clarke Planetarium in SLC, to give very interesting information on meteors and meteorites. They had examples of meteorites from various locations. They also talked about the large Meteorite that exploded above Russia a few years ago. It had the force of 40 bombs dropped on Hiroshima. The velocity of 40,000 miles/hour and the size were important factor in the force when it broke up. It was a very good presentation. We had about 27 – 30 people there.

This month Dr. Stacy Palen, Director of the Weber State University Ott Planetarium, will present information on Nebulas. I understand it is a favorite topic of Dr. Palen. It should be a great program. Nebulas are always fascinating to me.

I have been working on developing my skills in astrophotography and remote operation of my telescope. I have been drawing on the knowledge of several of our members to help me in this. I hope each of you recognize that we have a tremendous amount of experience in CVAS. I am always amazed at this resource and how willing members are to share their expertise. With my observatory I am getting some good views of galaxies that were beyond my reach before. Here is a photo of M65 and M66. These galaxies are about 35 to 36 million light years away. This photo was taken without autoguiding. I am just starting on that project. Hopefully, these will be even better with autoguiding.

I want to encourage you to always work on improving your astronomy skills and use the resources of CVAS. It is very satisfying to see what you can do. Remember to include your family members and friends in your efforts. It is amazing to see what interest there is in our community for astronomy.

Thanks again for your great support.

Clear Skies!

Newsletter Guidelines

It has been suggested by the CVAS Executive Committee that we come up with some guidelines for article submissions for our newsletter.

- We would like all submissions to be sent to Wendell by the 27th of each month. Just send him an email with the article as an attachment (wendellw57@comcast.net).
- Please submit your articles as a "Word" document.
- If you have pictures or sky maps that go with your article, please place them in the text where you would like them to be, but also send them as separate attachments in the email.
- Please try to keep them at a reasonable length (500 to 800 words or so).
- Preferred font is Times New Roman
- Perfect spelling and grammar are optional.

Your thoughts and suggestions are always appreciated. After all, this newsletter is for you. Thanks for all of your help in making our newsletter GREAT!! (The editor)

Three Key Numbers

By Bruce Horrocks

While many people avoid math and dread having to solve a story problem, I have always enjoyed the certainty and predictability that mathematics provides us, especially when it comes to astronomy and photography. Put these two hobbies together and without some basic mathematics, the combination of these two could be problematic and very frustrating. There are just three basic terms to discuss that may help you better understand how to enjoy astrophotography and these are:

1) Aperture,
2) Focal Length, and
3) Focal Ratio.

Aperture – This is the eyeball of the telescope. It is the opening that lets in all the light that just spent the last thousands of years getting here. It may be considered the most significant feature to describe a telescopes capacity. It defines the telescopes ability to gather light, and since the area of the aperture is defined by the square of the diameter, (remember pies are squared) the comparison of different apertures is exponential. Hence, a 200 mm telescope has 4 times the area of a 100 mm telescope. The problem with aperture is cost. High quality refractor telescope may cost around $1,000 per inch of aperture. The other factors are weight. Large aperture telescope can be big, heavy, and expensive.

Focal Length – This number is generally placed somewhere on every telescope and eyepiece I have ever seen. It is the distance required after the light enters the telescope to come to a focal point. It is usually expressed in millimeters and can be from 240mm for a short finder scope to 2800mm for a larger scope. For eyepieces this can be from 5mm to 40mm. Larger telescopes use creative ways to shorten this focal length into instruments that are more of a manageable size like the well-known Schmidt-Cassegrain styles.

Focal Ratio f/ – We are now to the best number of all, the focal ratio. This is simply the focal length divided by the aperture. For example, a telescope with a 2800mm focal length and a 280mm aperture will have focal ratio of 10. This number is often referred to as "fast" or "slow". The fast focal ratios are low numbers like 2 to 7. These telescopes will provide a larger field of view and are best for viewing large nebulas, star clusters, and galaxies. The slower focal ratios like 10 – 16 will provide generally more magnification and a narrow field of view and are best used for observing the moon and planets.

A key factor in astrophotography is knowing how to use the focal ratio. For exposure time it is best to square the numbers for comparison. Example, an f/2 compared to an f/10 would be comparing 4 to 100, which is a factor of 25. So, an exposure of an f/10 will need to be 25 times longer than an exposure with an f/2. However, when comparing image size and field of view it is simply the ratio of the 2 numbers, i.e. 10/2 = 5. So, in summary, at a f/2 your image will be 1/5 the size compared to a f/10, your field of view will be 5 times the size, and the image will appear 25 times brighter. Hope this all makes sense to you.

My first telescope was a Sears Discoverer model that had a 76mm aperture and a 1200mm focal length. It was long, long tube that was great for looking at the planets and the moon, but with such a large focal ratio, f/16 it had a very small field of view and would very difficult to use to take any pictures. If you are interested in taking images of objects, you may want to consider this in the type of scope you select.

NGC 2903 10 Minute Exposure by Bruce Horrocks

Spring galaxies

By Blaine Dickey

As the winter constellations begin to set in the west a new set of constellations come up in the east with a host of galaxies and form a band that stretches through the constellations Virgo, Coma Berenices, Leo, Canes Venatici, and into Ursa Major. This is a great opportunity to see many spirals, ellipticals, and edge on galaxies. Often you will be able to observe several galaxies in the same field of view. Generally dark skies are preferred to see them because of their low surface brightness. Hundreds of galaxies are within your reach with a modest telescope if you are willing to make the effort. There is nothing quite as awe inspiring as seeing these far off dim objects with your own eyes.

If you have some imaging equipment, you will be able to observe literally thousands of these island universes. The spiral arms, galaxy groupings, and the colors of these distant universes are revealed in a way that is impossible to view with your eyes alone and even with very large telescopes. I enjoy imaging galaxies because each is unique in that none of them look exactly alike. They are like portraits of persons, similar but distinguishable from each other. Here are three taken with my 12 inch Meade LX200R.

Figure 1 shows the spiral galaxy Messier 51 in Canes Venatici referred to as the Whirlpool galaxy. Here it is easy to see the spiral structure and a bridge of stars interacting with the small galaxy NGC 5195. It is about 28 million light years distant. It was not seen as a spiral until Lord Rosse saw it with a 6 foot reflector in 1845.

The next object in Figure 2 is Messier 64 also known as the Black eye galaxy because of the dark area surrounding its nucleus. At magnitude 8.5 this galaxy is visible in small to modest scopes. An interesting fact here is that the central part of this galaxy has been found to rotate in the opposite direction from its outer parts. This galaxy is relatively close at about 14 million light years distance.

The final object Messier 104 in figure 3 is also known as the Sombrero galaxy. You will notice an unusually large central bulge and a sharp dust lane giving it a likeness of a hat with a large rim. This galaxy is moving away from us at about 850 miles per second. The dust lane is visible in my 10 inch Dobsonian reflecting telescope.

Figure 1 – Messier 51 (Whirlpool Galaxy)

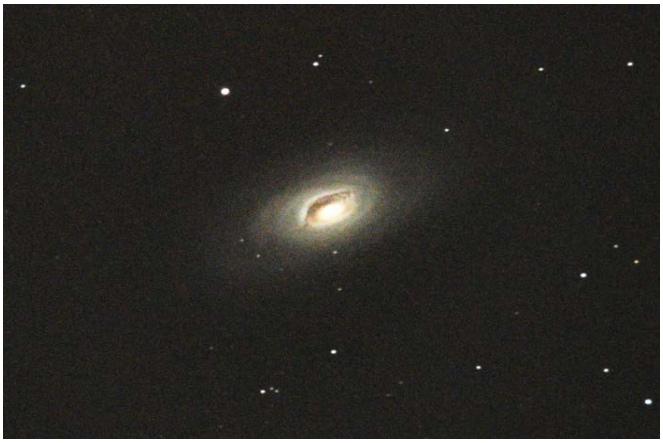


Figure 2 – Messier 64 (Black Eye Galaxy)

Figure 3 - Messier 104 (Sombrero Galaxy)

Observing Notes

By Lyle Johnson

Do you ever make notes about your observing experiences? During the past 30 years, I have jotted down notes or written journal-like entries after especially memorable observing sessions. For example, I made notes after I viewed famous Halley's Comet, astonishingly long Comet Hyakutake, and beautiful Comet Hale-Bopp. And I wrote a summary after I led my first star party for the public, at the American West Heritage Center. And after I had a chance to use a 24" Dobsonian telescope one night. And after I saw the Great Red Spot, the Veil Nebula, stars E and F in the Trapezium, and the Horsehead Nebula through a telescope for the first time. And after I experienced the total solar eclipse in 2017. And so forth.

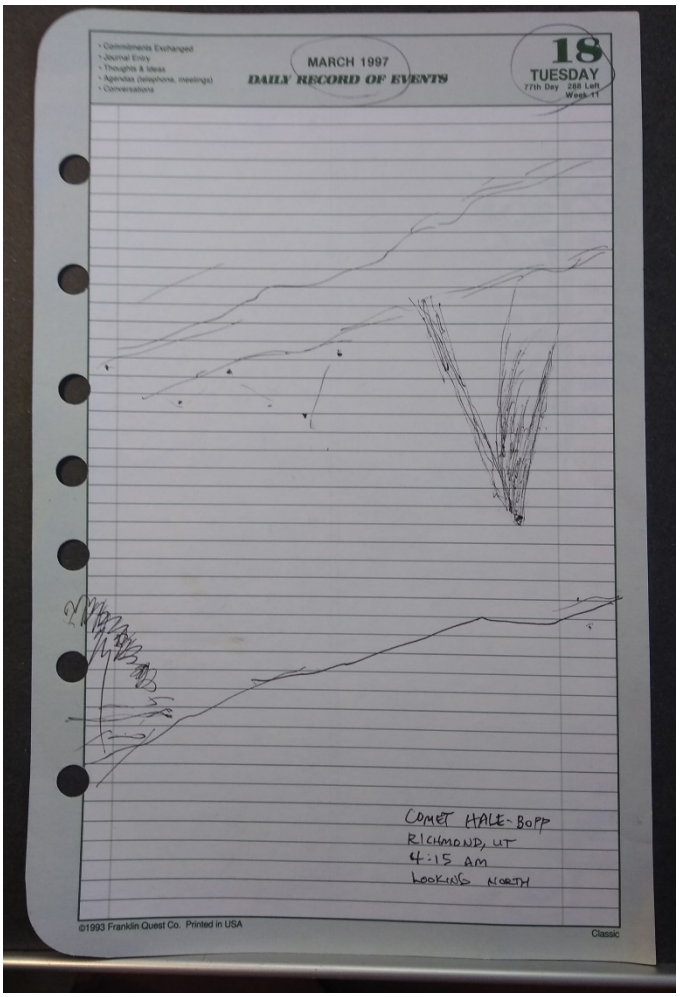
Sometimes I write a description of the event, sometimes I make a list of the objects that I observed and the equipment that I used, and sometimes I make a quick sketch of an interesting object. Following is an example of an event that I recorded.

March 30, 2011
At 11:30 p.m. I was asleep in bed when I was awakened by the sound of my phone ringing. I felt for my phone in the dark and mumbled "Hello?" A voice on the other end said simply, "Go outside." I replied, "Um … who is this?" The voice repeated, "Just go outside." I then recognized the voice—it belonged to a co-worker who seemed to be a sensible person. I pulled on a pair of pants and a sweatshirt, made my way downstairs, slipped into my sandals, and stepped outside into my backyard.

Looking around, I saw a green glow filling the entire northern sky, a red glow reaching high into the eastern sky, and a red patch in the western sky. The color in the northern sky was bright enough that I could see low clouds silhouetted against it.

After slowly turning around in awe for several minutes, I got into my car and drove away from Logan to escape as much light pollution as possible. During the following hour and a half, I watched as the glow in the east turned green, and rays and patches of green and red light appeared and disappeared overhead, in the west, and even toward the south. When I finally returned home at 1:20 a.m., a shimmering green curtain still spanned the northern horizon.

Entries like these are fun to reread years later and remind me of details that I probably would not remember. If you have not made some kind of record after favorite observing sessions, consider giving it a try!



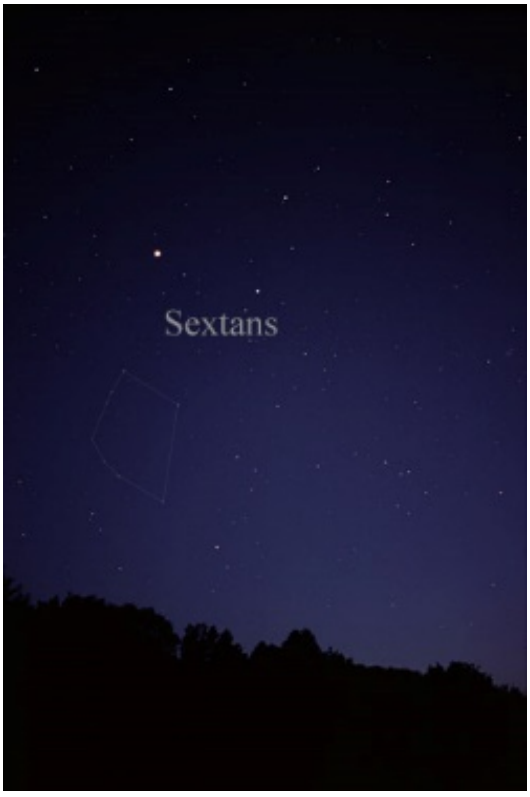
Sketch of Hale-Bopp made with numb fingers at 4:15 am in 1997

Spotlight on Sextans, the Sextant

By Dale Hooper

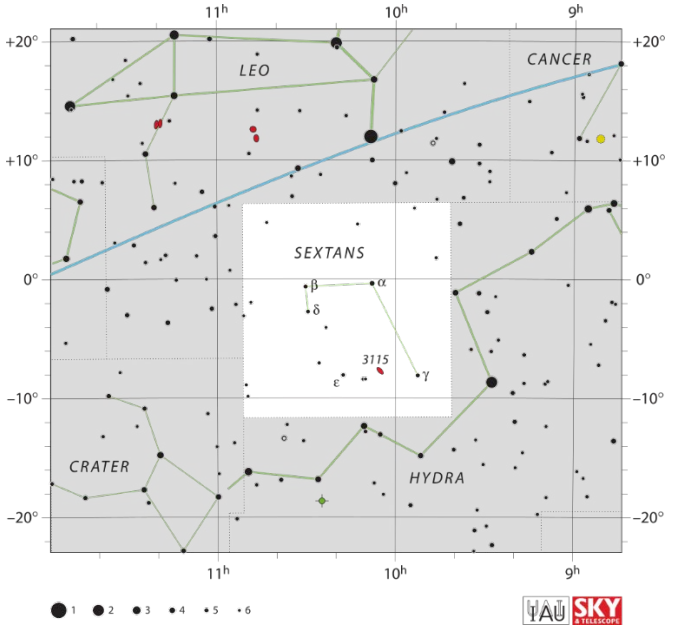
Sextans is certainly a minor constellation and it only has one star that is brighter than 5th magnitude. The Polish astronomer Johannes Hevelius named it after the large sextant that he used to measure star positions in his observatory. Just imagine what constellations we would have if he had access to CCD cameras or DSLR's.

Sextans is located below Leo and if you use the last two stars in the backward question mark of Leo (which includes Regulus) it points to Sextans. Given that it is in the vicinity of Leo provides us with a good guess that what we will find in Sextans are galaxies, and this is the case. Sextans also contains some nice double stars.



The constellation Sextans as it can be seen with the unaided eye. © T. Credner & S. Kohle, AlltheSky.com - used with permission

Objects which rank at least three stars in *The Night Sky Observer's Guide* (Sextans is in Volume 2) have been included. As usual, the table is organized according to increasing Right Ascension values.



IAU and Sky& Tel - Roger Sinnott & Rick Fienberg

Object	R.A.	Dec.
NGC 2967 (Galaxy mag 11.6)	09h42.1m	+00°20'
NGC 2974 (Galaxy mag 10.9)	09h42.6m	-03°42'
NGC2990 (Galaxy mag 12.7)	09h46.3m	+05°43'
NGC 3044 (Galaxy mag 11.9)	09h53.7m	+01°35'
NGC 3055 (Galaxy mag 12.1)	09h55.3m	+04°16'
NGC 3115 The Spindle Galaxy (Galaxy mag 8.9)	10h05.2m	-07°43'
NGC 3156 (Galaxy mag 12.3)	10h12.7m	+03°08'
NGC 3166 (Galaxy mag 10.4)	10h13.8m	+03°26'
NGC 3169 (Galaxy mag 10.2)	10h14.2m	+03°28'
NGC 3246 (Galaxy mag 12.7)	10h26.7m	+03°52'
Σ1441 (Double star)	10h31.0m	-07°38'
35 Sextantis (Double star)	10h43.3m	+04°45'
NGC 3423 (Galaxy mag 11.1)	10h51.2m	+05°50'

Best CVAS Images and Notes

By Tom Westre

Hi CVAS observers and imagers

This article highlights what you are observing and/or imaging. We encourage you to send in images and visual reports to share with our members.

I wish to thank Bruce Horrocks who submitted his observing report last month.

Spring is here and April holds hope for clearer skies and warmer temps. It's also the month when we look forward to galaxy season. In April the constellation Leo the Lion lies almost due south and is perfect position to view a number of galaxy clusters.

The Leo Triplet (M65, M66 and NGC 3628) are very popular and a good place to start.
I have two targets this month. These two targets are usually overlooked but worth the time to observe. One is easy, the second more of a challenge

Messier 105, NGC 3384, and NGC 3389.

These three galaxies are part of the Leo I Galaxy group. M105 at the top is largest member of the Leo I group. M 105 is magnitude 10.2, its distance is 37 million light years (Mly). NGC 3384 is magnitude 10.4 and is 35 Mly distance. NGC 3389 at the bottom is magnitude 11.8 and is farther away at 69 Mly and probably not part of the other two.

Figure 1 Image by Tom Westre

Abell 1367 Galaxy Cluster

Abell 1367 is my second target, and is known as the Leo Galaxy Cluster. This cluster of distant galaxies lies at a great distance of 330 million light years and consists of over 70 galaxies. My image of Abell 1367 was taken with an 8 inch SCT and a Canon T3i DSLR. The brightest galaxy is NGC 3842 at magnitude 12.78. The other galaxies range in magnitude from 13 to 14. The galaxy UCG 6697 is narrow on edge. Detailed images from larger telescopes and NASA show it to be large star formation galaxy. Massive new stars are being formed in this galaxy. This cluster is a challenge but to observe or image this galaxy group.

This cluster is a challenge, but to observe or image this galaxy group, whose light photons travelled 330 million years to create the image, is an awesome experience. We know the universe is a huge place and to see these galaxies which are some of the most distant object we amateurs can observe is an experience you cannot miss.

Clear Skies!!!!

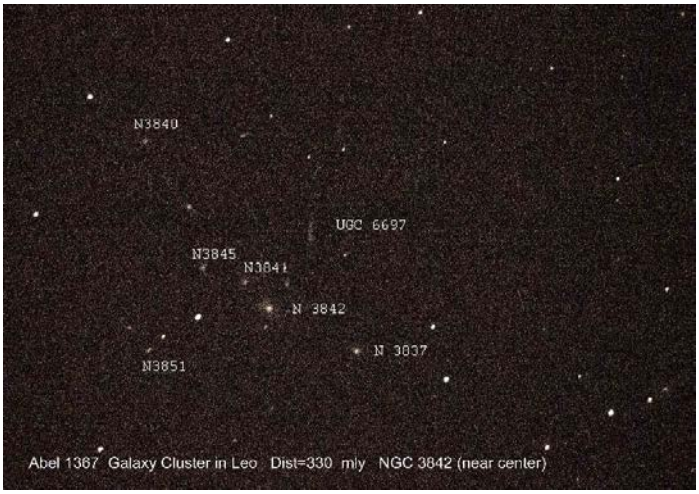


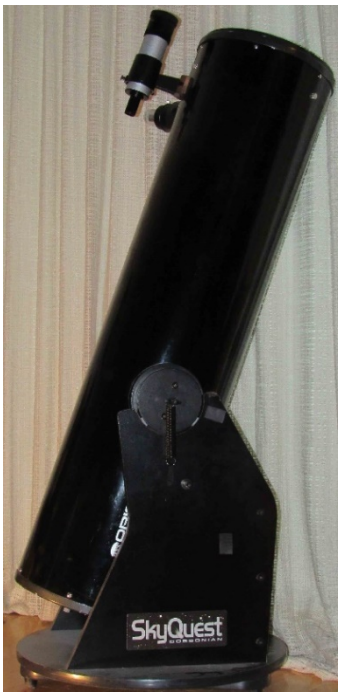
Figure 2 Image by Tom Westre

Upcoming Events and Anniversaries

Apr 02 - Mercury Passes 0.4 Degrees from Neptune
Apr 02 - 55th Anniversary (1964), Zond 1 Launch (USSR Venus Flyby Mission)
Apr 02 - 60th Anniversary (1959), Selection Of The Mercury 7 Astronauts
Apr 02-04 - Paris Space Week, Paris, France
Apr 05 - New Moon
Apr 05 - Judith Resnick's 70th Birthday (1949)
Apr 07 - Asteroid 144296 Steviewonder Closest Approach To Earth (1.052 AU)
Apr 07 - Asteroid 495181 Rogerwaters Closest Approach To Earth (2.380 AU)
Apr 07 - 60th Anniversary (1959), Radar Bounced Off Sun by Lincoln Laboratories
Apr 07 - James Glaisher's 210th Birthday (1809)
Apr 08 - Moon Near Pleiades
Apr 08 - 55th Anniversary (1964), Gemini 1 Launch (Unmanned)
Apr 09 - Moon near Mars
Apr 09 - James McDonnell's 120th Birthday (1899)
Apr 11 - Mercury At Its Greatest Western Elongation (28 Degrees)
Apr 11 - Bernhard Schmidt's 140th Birthday (1879)
Apr 12 - First Quarter Moon
Apr 12 - International Day of Human Space Flight
Apr 12 - Yuri's Night: World Space Party
Apr 14 - Christiaan Huygens' 390th Birthday (1629)
Apr 15 - Johannes Stark's 145th Birthday (1874)
Apr 17 - Giovanni Domenico Maraldi's 310th Birthday (1709)
Apr 19 - Full Moon
Apr 19 - Gertrude Bacon's 145th Birthday (1874)
Apr 20 - Vincenzo Cerulli's 160th Birthday (1859)
Apr 21 - Easter Sunday
Apr 22 - Earth Day
Apr 22 - Lyrids Meteor Shower Peak
Apr 22 - Immanuel Kant's 295th Birthday (1724)
Apr 23 - Moon near Jupiter
Apr 25 - Moon Occults Saturn
Apr 25 - Moon Occults Dwarf Planet Pluto
Apr 25 - Guglielmo Marconi's 145th Birthday (1874)
Apr 25 - Moon near Saturn
Apr 26 - Last Quarter Moon
Apr 28 - Francis Baily's 245th Birthday (1774)

CVAS Loaner Telescope

CVAS provides a 10 inch Dobsonian telescope to club members. Contact Garrett Smith to make arrangements to use this telescope. Garrett can be contacted by email at GarrettGillSmith@gmail.com.



CVAS on Utah Public Radio

Listen to CVAS on Utah Public Radio each Tuesday at 4:48 pm. Blaine Dickey and Tom Westre are writing weekly astronomy related scripts and recording the program at their station. We are pleased that the folks at UPR have invited us to present a weekly topic on astronomy. You can listen in Logan on 91.5 KUSU-FM, or 89.5 KUSR Logan, with translators 92.1 Brigham City, 89.3 Bear Lake. There are other translators from Soda Springs to St George. You can also listen anywhere on their live stream or download UPR's free app on your smartphone. Check this out at www.upr.org.

Library Loaner Telescope Program Status

Library	Telescope Donated By	Telescope Placed	Available for Checkout	Library Status
Logan Library	CVAS	6/10/2018	10/15/2018	Loaning out with Holds pending
Hyrum Library	CVAS	12/11/2018	2/1/2019	Loaning out Weather limited
Smithfield Library	Occipital, Inc	12/14/2018		Pending Board approval
North Logan Library	Utah NASA Space Grant Consortium	3/4/2019		Pending Board approval
Cache County Library (Providence)	INOVAR & CVAS Members	3/1/2019		Pending Board approval
Lewiston Library				
Richmond Library				
Preston Library				
Mendon Library	Campbell Scientific			On order
Newton Library				

CACHE VALLEY ASTRONOMICAL SOCIETY
MEMBERSHIP APPLICATION FORM

Member # _____

NAME:_____ _____ _____
First Middle Initial Last

Address:_____ _____ _____ _____
Street City State Zip Code

Home Phone: _____ **Cell Phone:**_____

Work Phone : _____ **Occupation** :_____

Email Address: _____

How did you learn about CVAS?

_____Website ____Star Party ____CVAS Member ____Other _____

Membership: $20 a year

Tell us about yourself: Do you have a special interest in astronomy? Do you have special skills? Are you willing to volunteer on CVAS projects or attend public outreach star parties? Astro equipment owned.

_____

_____

By signing this application, I acknowledge I have access to the CVAS website, cvas-utahskies.org , and the CVAS Constitution. I agree to abide by the constitution.

Signature: _____ Date:_____

Bring this form to the meeting or Mail Application to:

Brad Kropp, CVAS Treasurer
1573 E 1425 N
Logan, UT 84341

For any questions contact our Treasurer at brad.kropp@usu.edu or our Secretary Wendell Waters at wendellw57@comcast.net