

Cache Valley Clear Skies

The Journal of the Cache Valley Astronomical Society



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www.cvas-utahskies.org

**Total Solar Eclipse Countdown:
250 days (as of December 14th)**



Total Solar Eclipse Image courtesy NASA

Meeting Announcement

Our monthly meeting will be held on Wednesday, December 14th in the Bonneville Room at the Logan Library at 7:00pm. Please note that we intentionally chose the 2nd Wednesday this month so that the meeting would not be so close to Christmas.

Our featured speaker will again be Dr. Hollis R. Johnson, Emeritus Professor of Astronomy from Indiana University and father of club member Lyle Johnson. Dr. Johnson will be speaking to us again about the timely subject of “The Star of Bethlehem”.

It is always a real treat to be able to hear from Dr. Johnson and this meeting will be a lot of fun.

The Bino support workshop is tentatively set for January 10th. Keep listening for further details.

The President's Corner By Dell Vance, CVAS President



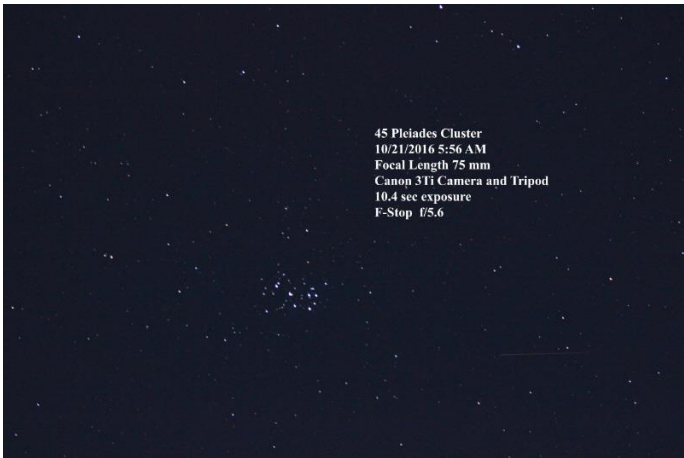
Wow, the season is upon us and things are moving along at a high rate. In November David Hansen, gave a great presentation on buying your first telescope. This is a common question we are asked

about and Dave gave some good information to the group. It would have been a good meeting for your friends. It was lightly attended, but we did have some new folks there.

This month we will have Dr. Johnson presenting information about the Star of Bethlehem. This is always a thought provoking topic. We expect to see a good crowd there, so be sure to get there early to get a good seat. This is another great topic to invite your friends to. They say that “Word of mouth is the best advertising!” If you haven’t sent Lyle’s Johnson poster out to your friends, we encourage you to do so. Be sure to invite them to come.

At the Executive Committee Meeting it was decided to shoot for Tuesday, January 10, 2017 for the binocular support frame workshop. We will be giving out more information on how to get to Ned’s shop and the time we plan to meet. It sounds like this will be a “Stellar Event”. There are many of us that signed up for the workshop and others that are interested in getting the final product. If you haven’t signed up and are interested, be sure to let Ned and the Executive Committee know so we can get you on the list. About the only observing I plan to do until probably March is with binoculars, so I am anxious to upgrade my current support frame with the new and improved design that Ned Millar and Byron Ray have been working on. I personally like the idea of having a frame that folds up so it is easier to transport and store (my wife thinks this is a great idea as well).

Here are a couple of photos that I took of the Pleiades (M45 or Subaru if you like the Japanese word) in October. They demonstrate what you can easily see with a pair of binoculars. One is with a focal length of 75 mm and the other with a focal length of 180 mm. With the naked eye I can see about 5 to 6 stars. With the 75 mm focal length I can pick out about 25 stars. With the 180 mm focal length I can see about 50 stars clearly. So even during the winter I can see opportunities to make quick observations and get amazing views of the skies above us. Maybe even take my camera and tripod out for quick shots. I can easily do the 10 to 15 minute observations even in temperatures below 0° F.



M45, Pleiades - 75 mm Focal Length. Courtesy Dell Vance



M45, Pleiades - 180mm Focal Length. Courtesy Dell Vance

We hope to see you at the December Meeting, but even if we don’t, we wish each of you a very Merry Christmas and a Happy/Prosperous New Year. Be sure to get out and see the Universe.

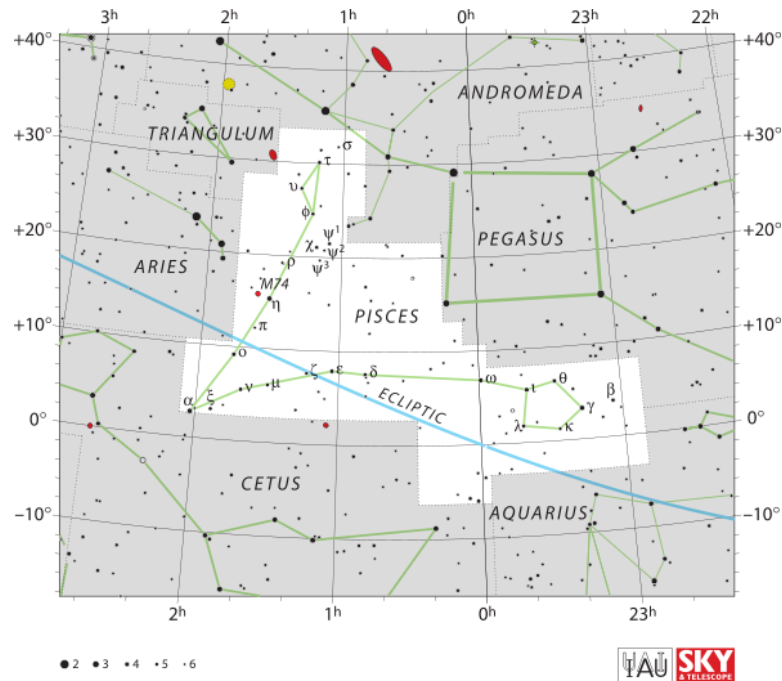
Clear Skies!

CVAS Loaner Telescope

CVAS provides a 10 inch Dobsonian telescope to club members.

Contact Brad Kropp to make arrangements to use this telescope.

Brad can be contacted by email at brad.kropp@usu.edu.



IAU and Sky & Tel - Roger Sinnott & Rick Fienberg

Spotlight on Pisces, the Fishes

By Dale Hooper

Admittedly, Pisces is not one of the brighter constellations. But it is a zodiac constellation and is currently the “keeper” of the planet Uranus. It is also the home to a good number very nice double and multiple stars. It also contains quite a few decent galaxies including Messier 74.

On the star map you can locate Pisces under the great square of Pegasus and Andromeda. The cirlet or western most fish has always been the easiest part of this constellation for me to identify.

Objects which rank at least three stars in *The Night Sky Observer's Guide* (Pisces is in Volume 2) have been included.

As usual, the table is organized according to increasing Right Ascension values.

Object	R.A.	Dec.
NGC 7541 (Galaxy mag 11.7)	23h14.7m	+04°32'
NGC 7562 (Galaxy mag 11.6)	23h16.0m	+06°41'
NGC 7611 (Galaxy mag 12.5)	23h19.6m	+08°04'
NGC 7619 (Galaxy mag 11.1)	23h20.2m	+08°12'
NGC 7626 (Galaxy mag 11.1)	23h20.7m	+08°13'
35 Piscium (Double star)	00h15.0m	+08°49'
38 Piscium (Multiple star)	00h17.4m	+08°53'
42 Piscium (Double star)	00h22.4m	+13°29'
NGC 128 (Galaxy mag 11.8)	00h29.2m	+02°51'
51 Piscium (Double star)	00h32.4m	+06°57'
NGC 194 (Galaxy mag 12.2)	00h39.3m	+03°02'
55 Piscium (Double star)	00h39.9m	+21°26'
65 Piscium (Double star)	00h49.9m	+27°28'
74 Piscium (Double star)	01h05.6m	+21°28'
77 Piscium (Double star)	01h05.8m	+04°55'
86 Piscium (Double star)	01h13.7m	+07°35'
NGC 488 (Galaxy mag 10.3)	01h21.8m	+05°15'
NGC 520 (Galaxy mag 11.4)	01h24.6m	+03°48'
NGC 524 (Galaxy mag 10.2)	01h24.8m	+09°32'
Messier 74 (Galaxy mag 9.4)	01h36.7m	+15°47'
NGC 660 (Galaxy mag 11.2)	01h43.0m	+13°38'
NGC 718 (Galaxy mag 11.7)	01h53.2m	+04°12'
α Piscium (Double star)	02h02.0m	+02°46'

CVAS Minutes – Nov 2016

Layne Pedersen conducted the meeting. Tom announced that the club website has a gallery page for astrophotos. Email Tom Westre and he can help get you started with adding your photos. It was mentioned that even smart phones with the right adapter can be used to start on astrophotography.

Dale Hooper discussed the current objects that can be seen in the sky.

The time was then turned over to Dave Hansen for a presentation on choosing a first telescope. Dave discussed the different types of telescopes to choose from. He highlighted the best uses for each type of scope.

Upcoming Star Parties

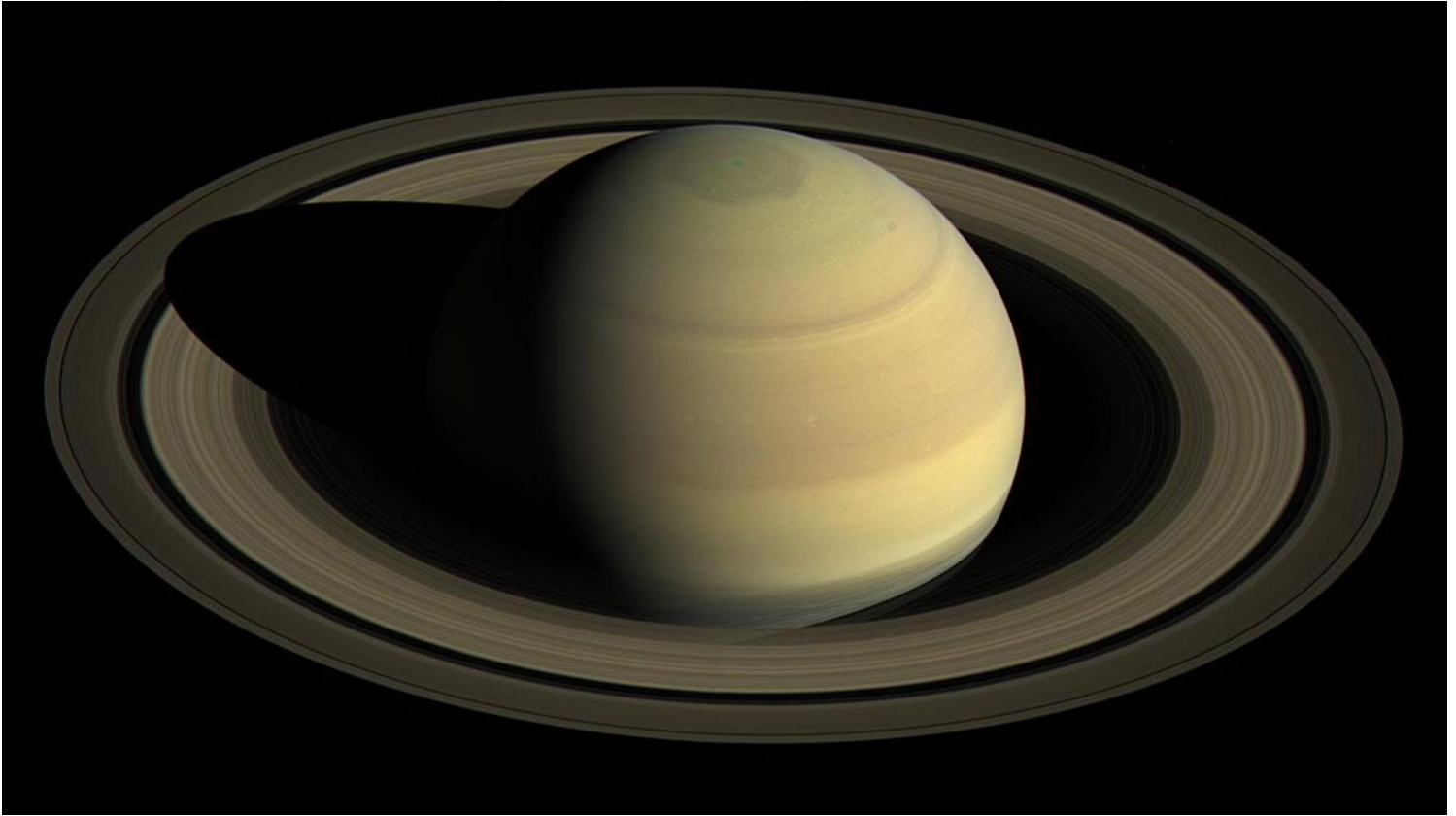
** Tentative End of Star Parties for 2016 **

Upcoming Events

02 Dec	Pioneer 11 flies past Jupiter (1974)
03 Dec	Pioneer 10, first flyby of Jupiter (1973)
07 Dec	Pearl Harbor Remembrance Day First Quarter Moon Galileo arrives at Jupiter (1995)
12 Dec	Aldebaran 0.5° south of Moon Geminid meteors
13 Dec	Full Moon Geminid meteors
14 Dec	Tycho Brahe born (1546) Mariner 2, first successful planetary flyby – Venus (1962) Geminid meteors
15 Dec	Venera 7, first craft to soft land on Venus (1970)
18 Dec	Regulus 1.0° north of Moon
20 Dec	Last quarter Moon
21 Dec	Winter Solstice Apollo 8 launched, first manned craft to leave Earth's gravity (1968)
22 Dec	Jupiter 2° south of Moon
23 Dec	Giovanni Cassini discovers Rhea, moon of Saturn (1672)

25 Dec	Christmas Day Isaac Newton born (1642)
27 Dec	Johannes Kepler born (1571)
29 Dec	New Moon
31 Dec	New Year's Eve Mars appears within 0.1° of Neptune. This is the closest conjunction of these two planets in over 700 years.

NASA Saturn Mission Prepares for 'Ring-Grazing Orbits'



Cassini will soon begin a series of 20 orbits that fly high above and below Saturn's poles, plunging just past the outer edge of the main rings. Image credit: NASA/JPL-Caltech/Space Science Institute

First Phase in Dramatic Endgame for Long-Lived Cassini Spacecraft

A thrilling ride is about to begin for NASA's Cassini spacecraft. Engineers have been pumping up the spacecraft's orbit around Saturn [this year](#) to increase its tilt with respect to the planet's equator and rings. And on Nov. 30, following a gravitational nudge from Saturn's moon Titan, Cassini will enter the first phase of the mission's dramatic endgame.

Launched in 1997, Cassini has been touring the Saturn system since arriving there in 2004 for an up-close study of the planet, its rings and moons. During its journey, Cassini has made numerous dramatic discoveries, including a global ocean within Enceladus and liquid methane seas on Titan.

Between Nov. 30 and April 22, Cassini will circle high over and under the poles of Saturn, diving every seven days -- a total of 20 times -- through the unexplored region at the outer edge of the main rings.

"We're calling this phase of the mission Cassini's Ring-Grazing Orbits, because we'll be skimming past the outer edge of the rings," said Linda Spilker, Cassini project scientist at NASA's Jet Propulsion Laboratory, Pasadena, California. "In addition, we have two instruments that can sample particles and gases as we cross the ringplane, so in a sense Cassini is also 'grazing' on the rings."

On many of these passes, Cassini's instruments will attempt to directly sample ring particles and molecules of faint gases that are found close to the rings. During the first two orbits, the spacecraft will pass directly through an extremely faint ring produced by tiny meteors striking the two small moons Janus and Epimetheus. Ring crossings in March and April will send the spacecraft through the dusty outer reaches of the F ring.

"Even though we're flying closer to the F ring than we ever have, we'll still be more than 4,850 miles (7,800 kilometers) distant. There's very little concern over dust hazard at that range," said Earl Maize, Cassini project manager at JPL.

The F ring marks the outer boundary of the main ring system; Saturn has several other, much fainter rings that lie farther from the planet. The F ring is complex and constantly changing: Cassini images have shown structures like bright streamers, wispy filaments and dark channels that appear and develop over mere hours. The ring is also quite narrow -- only about 500 miles (800 kilometers) wide. At its core is a denser region about 30 miles (50 kilometers) wide.

So Many Sights to See

Cassini's ring-grazing orbits offer unprecedented opportunities to observe the menagerie of small moons that orbit in or near the edges of the rings, including best-ever looks at the moons Pandora, Atlas, Pan and Daphnis.

Grazing the edges of the rings also will provide some of the closest-ever studies of the outer portions of Saturn's main rings (the A, B and F rings). Some of Cassini's views will have a level of detail not seen since the spacecraft glided just above them during its arrival in 2004. The mission will begin imaging the rings in December along their entire width, resolving details smaller than 0.6 mile (1 kilometer) per pixel and building up Cassini's highest-quality complete scan of the rings' intricate structure.

The mission will continue investigating small-scale features in the A ring called "propellers," which reveal the presence of unseen moonlets. Because of their airplane propeller-like shapes, scientists have given some of the more persistent features informal names inspired by famous aviators, including "Earhart." Observing propellers at high resolution will likely reveal new details about their origin and structure.

And in March, while coasting through Saturn's shadow, Cassini will observe the rings backlit by the sun, in the hope of catching clouds of dust ejected by meteor impacts.

Preparing for the Finale

During these orbits, Cassini will pass as close as about 56,000 miles (90,000 kilometers) above Saturn's cloud tops. But even with all their exciting science, these orbits are merely a prelude to the planet-grazing passes that lie ahead. In April 2017, the spacecraft will begin its Grand Finale phase.

After nearly 20 years in space, the mission is [drawing near its end](#) because the spacecraft is running low on fuel. The Cassini team carefully designed the finale to conduct an extraordinary science investigation before sending the spacecraft into Saturn to protect its potentially habitable moons.

During its grand finale, Cassini will pass as close as 1,012 miles (1,628 kilometers) above the clouds as it dives repeatedly through the narrow gap between Saturn and its rings, before making its mission-ending plunge into the planet's atmosphere on Sept. 15. But before the spacecraft can leap over the rings to begin its finale, some preparatory work remains.

To begin with, Cassini is scheduled to perform a brief burn of its main engine during the first super-close approach to the rings on Dec. 4. This maneuver is important for fine-tuning the orbit and setting the correct course to enable the remainder of the mission.

"This will be the 183rd and last currently planned firing of our main engine. Although we could still decide to use the engine again, the plan is to complete the remaining maneuvers using thrusters," said Maize.

To further prepare, Cassini will observe Saturn's atmosphere during the ring-grazing phase of the mission to more precisely determine how far it extends above the planet. Scientists have observed Saturn's outermost atmosphere to expand and contract slightly with the seasons since Cassini's arrival. Given this variability, the forthcoming data will be important for helping mission engineers determine how close they can safely fly the spacecraft.

For details about Cassini's Ring-Grazing Orbits, including timing, closest approach distances and highlights, visit:

<https://saturn.jpl.nasa.gov/news/2966/ring-grazing-orbits>

The Cassini-Huygens mission is a cooperative project of NASA, ESA (European Space Agency) and the Italian Space Agency. NASA's Jet Propulsion Laboratory, a division of Caltech in Pasadena, manages the mission for NASA's Science Mission Directorate, Washington. JPL designed, developed and assembled the Cassini orbiter.

More information about Cassini:

<http://www.nasa.gov/cassini>

<http://saturn.jpl.nasa.gov>

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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:

Ned Miller, CVAS Treasurer
480 N 400 E
Providence, Utah 84332

For any questions contact our Treasurer at nedmiller2008@gmail.com or our Secretary Dale Hooper at dchooper5@gmail.com .