Volume 25 Issue 3

March 2011

The Observer

East Valley Astronomy Club

From the Desk of the President

by Steven Aggas

Next month, at the April General Assembly meeting, we'll be conducting the auction of items authorized by the January General Assembly meeting vote of the members present as outlined in the club's Constitution and Bylaws. I've made it far enough in advance that we should be able to get the word out in all of the club's communication lines so as to not miss anyone who might be interested. We've published pictures in the January newsletter and shown the items at the January meeting. The newsletter can be found on the club's website in the archive section if you are interested in bidding. Now all I need is someone who talks really, really fast in a monotone voice to act as the auctioneer…

For those who use Heavens-Above website to know when the ISS or space shuttle will pass above the horizon there is another orbiting craft that has attracted interest, ok, and some disdain. The NanoSail-D satellite is a solar sail device with a ten square meter Mylar sail, capable of reflecting a bright beam of light towards Earth. That's not its main purpose, just happenstance much like the Iridium fleet of satellites. It is, however, the very first low orbit solar sail, ever… The sail subtends an apparent one arc second in the sky. The group that worked on this project is having a photo contest with cash prizes and any and all photos are welcome. Even if yours does not win all images are welcome and encouraged because even fuzzy images are useful to monitor the condition of the spacecraft. It's expected to re-enter sometime in April to May, 2011.

At this month's General Assembly meeting we will have Bernard Miller giving us a presentation on his remote observatory. More and more amateurs are setting up remote systems in dark locations. Come see how, and where, you too could get your scope under pristine skies. So mark March 18th on your calendars to hear Bernard describe his system.

I would also like

Continued on page 12

The Backyard Astronomer

A Beginner's Guide to Eyepieces *by Bill Dellinges*

In response to questions about eyepieces (aka *oculars*) from people who have recently purchased a telescope, I would like to offer some advice and recommendations in the form of this eyepiece primer.

An eyepiece (EP) magnifies the image produced by the telescope's lens (in a refractor) or mirror (in a reflector). Beginners often incorrectly refer to EP's as *lenses*. The smaller lens on top of the EP is called the eye lens. The bigger lens near the bottom is the field lens. An EP will usually have a number stamped on it – its focal length (FL) in millimeters such as "32mm." To derive the power or magnification it will produce, divide the telescope's FL by the EP's FL (in millimeters). For example: let's take a 2000mm Celestron 8" and use a 32mm EP. Then, 2000/32 = ~63x. Note that the smaller the number on the EP, the more power it will produce. Conversely, the bigger the number, the lower the power

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Upcoming Events:

Deep Sky Observing Night - March 5

Public Star Party - March 11

General Meeting - March 18

Local Star Party - March 26

Check out all of the upcoming club events in the Calendars on page 8

Inside this Issue:

The Backyard Astronomer

Continued from page 1 the EP produces.

What should you look for in an EP?

1) Good optical performance providing a clear image with minimal coma (blurring near the field edges) and the lenses in the EP don't rattle when shaken.

2) Fully muli-coated coatings (FMC) = anti-reflection coatings on every surface of each lens in the EP, not just "coated" or "fully coated"). No internal reflections.

3) A decent apparent field and eye relief of at least 20mm for those who must wear glasses when observing (more on this below).

4) A rubber grip around the EP to prevent dropping; a rubber fold-down eyecup or the increasingly popular twist-up adjustable eye relief feature.

Low end EP's will usually have one or more of these features missing. You can expect a $50-$100 EP to usually meet the above criteria. One of today's most popular designs is the Plossl. But even these EP's show very poor eye relief in focal length's below 25mm due to the fact that the eye lens gets smaller as the EP FL diminishes. An eyeglass wearer may want to consider using a Barlow lens on a longer FL EP with a big eye lens to achieve high powers (a Barlow doubles the power of any EP). A Barlow lens should be in every gazer's EP case.

The apparent field of an EP is the viewing angle you see looking into it. That is, the angle from the left edge of the field to the right edge. In the past, this angle ranged from about 45º to 52º. This number will not usually be on the EP, but listed in its specs in catalogs. Anything less than about 50º gives you the impression of viewing through a straw, a bad thing. Newer designs in EP's provide a more pleasing 55º-70º with a few offering up to 84º. In fact, Televue (famous for the legendary 82º Nagler EP) just introduced their Ethos EP with an apparent field of 110º! But that will cost you $600! Realistically, EP's with apparent fields of around 55º- 65º are fine for general observing. To enhance viewing extended large objects, wide field EP's with apparent fields of 65º-84º are a pleasure to use.

Real field vs. apparent field: Real field is how much of a piece of sky your scope will take in using a given EP. To get this, divide the EP's apparent field by your power. Example: A Celestron 8" telescope with a 32mm EP. We found above this gives us 63x (2000/32 = 63x). So, if the EP has an apparent field of 52º, then 52º/63x = 0.825º of real field, a little bigger than the full moon (0.5º). This is about as big a real field that a 1 ¼" EP can produce in the popular Schmidt-Cassegrain telescopes.

EP's come in two sizes. The standard 1 ¼" size and the larger 2" barrel. Note that 2" EP's will require a larger 2" diagonal! The size refers to the outside diameter of the shiny chrome part of the EP. Is bigger necessarily better? It depends. The advantage of a 2" EP is that it can provide larger fields of view than a 1 ¼" EP, which is desirable when viewing deep sky objects like star clusters, nebulae, and galaxies.

Now that we have the basics behind us, what EP's do I recommend? This depends on your experience and pocketbook. These days there are tons of EP's out there to choose from. You'll find low end, mid-range, and top end price ranges. Since this primer is aimed primarily at beginners, let's stick to reasonably priced equipment. I think one line that's a good buy is Celestron's X-Cel LX series offered in FL's of 2.3mm to 25mm priced at $75 each. This line has FMC EP's with rubber grips, twist-up eyecups and a 60º apparent field. They offer 20mm of eye relief through all FL's - a new feature on some recently produced EP's and enough for eyeglass wearers to see the full field – a welcome innovation. These EP's have built-in Barlows to achieve their long eye relief.

Other EP lines offering eye relief of 20mm in all FL's are Orion's Epic series at $68, Vixen NLV series at about $150 each, Televue's Radian line at $250(!), and Pentax XW's at $300+(!!). Orion Telescopes carries the Ultrascopic line in 7.5 to 35mm EP's priced from $90 to $129. This is a typical price for a well made 1 ¼" EP. They are FMC and made in Japan, a rarity these days. They do however show smaller eye lenses as FL's decrease. Apparent field is 52 degrees (49º for the 35mm).

Televue, one of the top dogs in the field, offer their well respected Plossl line priced at $82 - $110 in FL's from 8mm to 40mm with apparent fields of 50º (43º for the 40mm) and FMC. Their 32mm is one of my favorite EP's, a real beauty with 22mm of eye relief. Televue Plossl's eye lenses decrease with shorter focal lengths like the Orion Ultrascopics. I found even their 25mm lacked enough eye relief to see the full field with glasses on. Nevertheless, Televue optics are first class.

If you don't wear glasses, short eye relief is not a problem. But decent eye relief in the shorter focal length EP's is nice if you can get it, glasses or not. By the way, an eyeglass wearer can always remove their glasses and refocus the telescope. This works as long as your correction doesn't include astigmatism. One situation where good eye relief comes in handy is at public star parties since many of the public wear glasses and it's convenient if they can leave them on while peering into your telescope - saves a lot of constant re-focusing too!

There are some very good EP's I haven't mentioned because of their high cost ($200+). But with the advent of Chinese imports, one can find some good buys out there. For inexpensive but serviceable EP's, check out companies like Guan Sheng (GSO), Burgess Optical, William Optics, Astro-Tech, Owl Astronomy, and Smart Astronomy.

So what EP's and FL's should you buy? Three of any brands above would be a good start. Note your scope FL and do the math above so that you get powers of around 50x, 100x, and 150x, thereabouts (yikes, a homework assignment!).

The lowest power should be a wide angle EP with at least a 65º apparent field. A tip: We saw above that telescope FL/EP FL = power. To find what FL EP you need to obtain a given power for a telescope, divide telescope FL by power desired. Example: You have a 2000mm telescope

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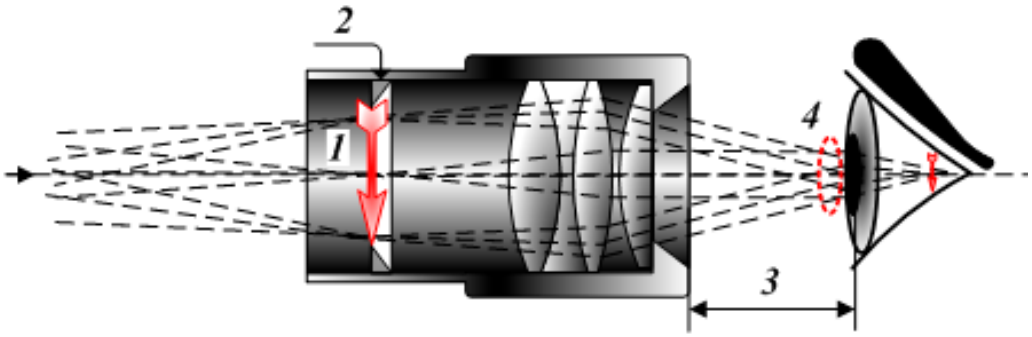
The Backyard Astronomer

Continued from page 2

and want 125x. So 2000/125x = 16mm. You want a 16mm EP, or something close to it.

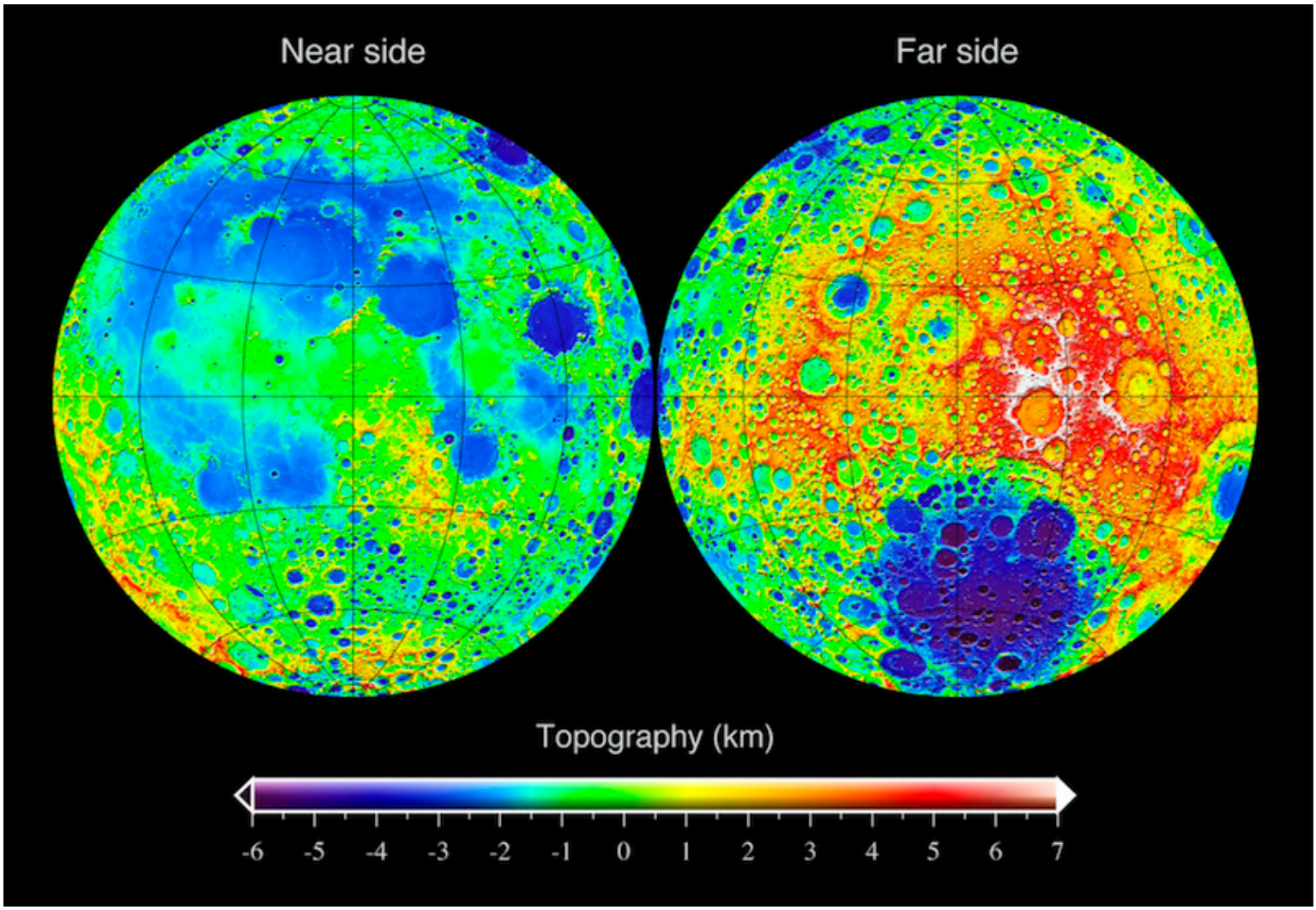
What about that Celestron eyepiece kit for $135 that includes 5 EP's, color filters, moon filter, 2x Barlow and case? My problem with this "kit" is the EP selection. They are low end EP's and the 32mm which should be your low power wide field EP has an apparent field of only 44º, ridiculously narrow. It might be OK for a neophyte, but down the line you'll be shopping for better EP's. Only the planetary filters and case are useful.

You'll find you'll use the lowest power most often because they yield the largest real field and you need that to fit large galaxies, clusters, and nebulae into your EP. High power is usually reserved for close up looks at the moon, planets, and splitting tight double stars.



1 Real image 2 - Field diaphragm 3 - Eye relief 4 - Exit pupil

For an excellent treatise on the subject of EP's (and other astronomical equipment), I highly recommend Terence Dickinson's The Backyard Astronomer's Guide, Firefly Books, 2008 (Third ed.), ~$50. Good luck shopping!



The topography of the Moon referenced to a sphere with a radius of 1737.4 kilometers. Data were obtained from the Lunar Orbiter Laser Altimeter (LOLA) that was flown on the mission Lunar Reconnaissance Orbiter (LRO). The color coded topography is displayed in two Lambert equal area images projected on the near and far side hemispheres.

Image courtesy of Mark A. Wieczorek

SDO Sundog Mystery

by Dr. Tony Phillips

NASA's Solar Dynamics Observatory (SDO), best known for cutting-edge images of the sun, has made a discovery right here on Earth.

"It's a new form of ice halo," says atmospheric optics expert Les Cowley of England. "We saw it for the first time at the launch of SDO - and it is teaching us new things about how shock waves interact with clouds."

Ice halos are rings and arcs of light that appear in the sky when sunlight shines through ice crystals in the air. A familiar example is the sundog - a rainbow-colored splash often seen to the left or right of the morning sun. Sundogs are formed by plate-shaped ice crystals drifting down from the sky like leaves fluttering from trees.

Last year, SDO destroyed a sundog - and that's how the new halo was discovered.

SDO lifted off from Cape Canaveral on Feb. 11, 2010. It was a beautiful morning with only a handful of wispy cirrus clouds crisscrossing the wintry-blue sky. As the countdown timer ticked to zero, a sundog formed over the launch pad.

SDO had a close encounter with a sundog. "The shock waves were amazing, fantastical!" says high school student Amelia Phillips who watched the event alongside friend and photographer Anna Herbst of Bishop, California. "We were shouting and jumping up and down when SDO destroyed the sundog."

"When the rocket penetrated the cirrus, shock waves rippled through the cloud and destroyed the alignment of the ice crystals," explains Cowley. "This extinguished the sundog."

A luminous column of white light follows SDO into the sky. The sundog's destruction was understood. The events that followed, however, were not.

"A luminous column of white light appeared next to the Atlas V and followed the rocket up into the sky," says Cowley. "We'd never seen anything like it."

Cowley and colleague Robert Greenler set to work figuring out what the mystery-column was. Somehow, shock waves from the rocket must have scrambled the ice crystals to produce the 'rocket halo.' But how? Computer models of sunlight shining through ice crystals tilted in every possible direction failed to explain the SDO event.

Then came the epiphany: The crystals weren't randomly scrambled, Cowley and Greenler realized. On the contrary, the plate-shaped hexagons were organized by the shock waves as a dancing army of microscopic spinning tops.

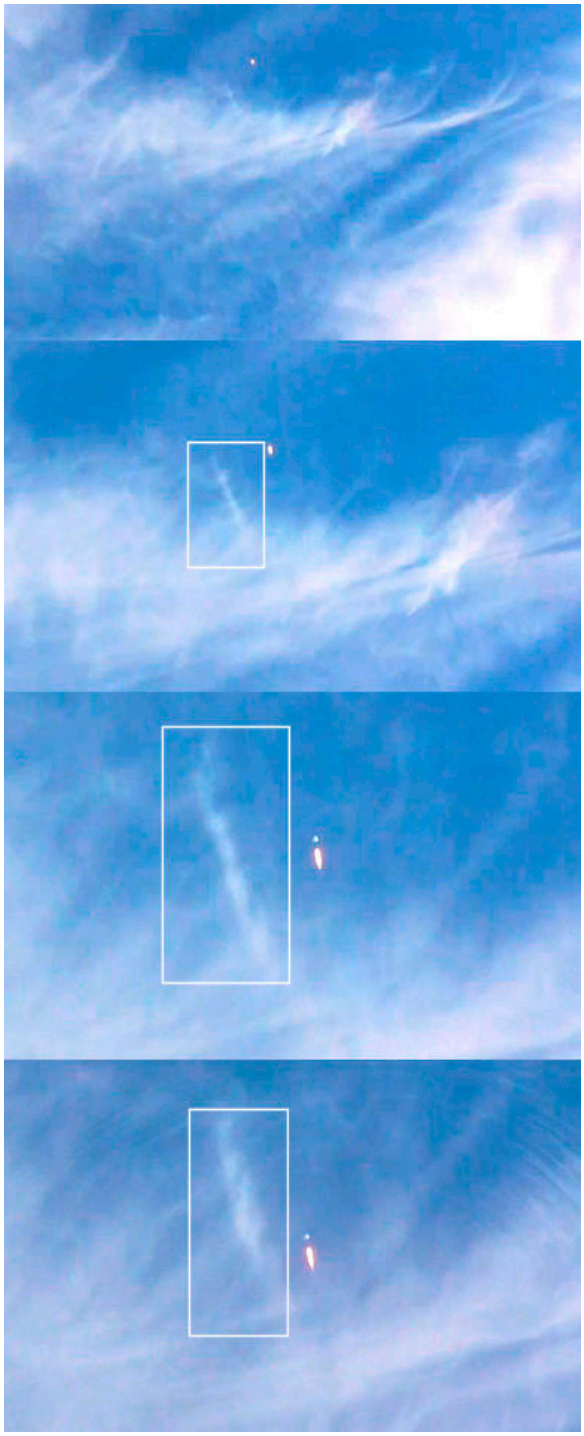
Cowley explains their successful model: "The crystals are tilted between 8 and 12 degrees. Then they gyrate so that the main crystal axis describes a conical motion. Toy tops and gyroscopes do it. The earth does it once every 26000 years. The motion is ordered and precise."

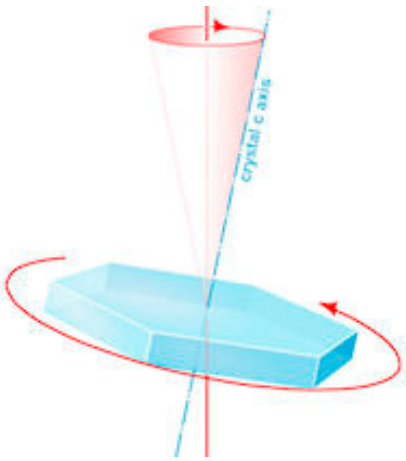
Bottom line: Blasting a rocket through a cirrus cloud can produce a surprising degree of order. "This could be the start of a new research field - halo dynamics," he adds.

The simulations show that the white column beside SDO was only a fraction of a larger oval that would have appeared if the crystals and shock waves had been more wide-ranging.

"We'd love to see it again and more completely," says Cowley.

"If you ever get a once-in-a-lifetime opportunity to be at a rocket launch," he advises with a laugh, "forget about the rocket! Look out instead for halos."





According to Cowley and Greenler, spinning and gyrating plate-shaped crystals are responsible for the mystery halo.

March Guest Speaker: Bernard Miller

EVAC member Bernard Miller is an Application Engineer at Synopsys, Inc., a maker of Design Automation Software for use in designing, developing, simulating, and fabricating Application Specific Integrated Circuits (ASICs). Bernard has been in his present position for the last fifteen years and prior to that was a design engineer and consultant at Hughes Aircraft, GE Aerospace, Zycad Corporation, and Intel.

Bernard became interested in astronomy about three years ago after helping his son with an astronomy assignment at school.

After a year of learning the basics and observing at the local star parties and the AASP and Messier Marathon, he caught the astrophotography bug and has been doing that for the last two plus years.

He soon grew tired of lugging 200 pounds of equipment around the state of Arizona and decided to build a permanent observatory last summer.

Bernard's presentation will focus on his search and the various options considered for his observatory. He will then discuss the detailed equipment and software necessary to setup and operate a remote observatory.

2011 All-Arizona Messier Marathon

Saturday, April 2nd, 2011

The site is new for the 2011 Marathon, and is the same site used last fall for the All-Arizona Star Party: The Hovatter Airstrip. The site is located approximately 100 miles west of central Phoenix. It is accessible by all vehicles via exit #53 on I-10. For those having GPS the coordinates are: 33° 34′ 50″ North, 113° 35′ 53″ West, elevation: 1,378 feet (420 meters).
You are also invited to come out and enjoy extra night of observing prior to the marathon. This is NO April Fool's joke. This year the day before the marathon (Friday, April 1st) has been set aside for you to observe from your own list at the new Hovatter Airstrip site. Reminder, this is not the marathon - just an extra night of dark sky observing amongst friends.
Complete details here: http://www.saguaroastro.org/content/messier2011.htm

○ New Moon on March 4 at 13:46

◐ First Quarter Moon on March 12 at 16:45

● Full Moon on March 19 at 11:11

◑ Last Quarter Moon on March 26 at 05:08

Custom Observing Chair

This chair was built for me by a local craftsman and is of the highest quality. Its construction utilizes no hardware. The seat height ranges from 18" to 40" and is extremely stable. The chair disassembles for easy transportation.

Here is your opportunity to own a truly unique observing chair. It cost me $350, but I'll let a lucky observer have it for only $225.

Contact Peter: news@evaconline.org

Upcoming Meetings

March 18
April 15
May 20
June 17
July 15
August 19

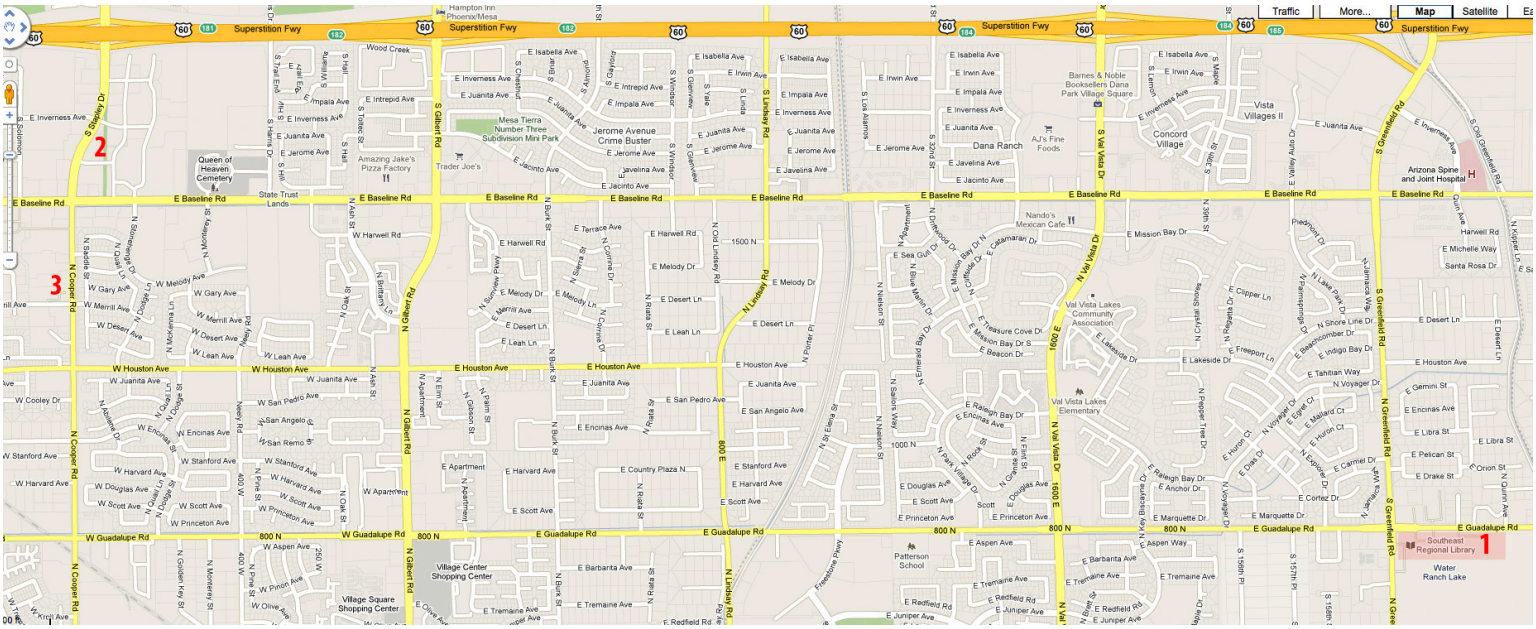
The monthly general meeting is your chance to find out what other club members are up to, learn about upcoming club events and listen to presentations by professional and well-known amateur astronomers.

Our meetings are held on the third Friday of each month at the Southeast Regional Library in Gilbert. The library is located at 775 N. Greenfield Road; on the southeast corner of Greenfield and Guadalupe Roads. Meetings begin at 7:30 pm.

All are welcome to attend the pre-meeting dinner at 5:30 pm. We meet at Old Country Buffet, located at 1855 S. Stapley Drive in Mesa. The restaurant is in the plaza on the northeast corner of Stapley and Baseline Roads, just south of US60.

Likewise, all are invited to meet for coffee and more astro talk after the meeting at Denny's on Cooper (Stapley), between Baseline and Guadalupe Roads.

Visitors are always welcome!



2 **Old Country Buffet**
1855 S. Stapley Drive
Mesa, Az. 85204

1 **Southeast Regional Library**
775 N. Greenfield Road
Gilbert, Az. 85234

3 **Denny's**
1368 N. Cooper
Gilbert, Az. 85233

March 2011

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

March 1 - Taft Elementary School Star Party

March 2 - John Bosco Elementary School Star Party

March 3 - Sousa Elementary School Star Party

March 5 - Deep Sky Observing Night. Head out to your favorite dark sky site and observe!

March 11 - Public Star Party & SkyWatch at Riparian Preserve

March 18 - General Meeting at SE Library

March 26 - Local Star Party at Boyce Thompson

April 2011

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

April 2 - All-Arizona Messier Marathon

April 7 - Roosevelt Elementary School Star Party

April 8 - Public Star Party & SkyWatch at Riparian Preserve

April 14 - St. Mary Basha Elementary School Star Party

April 15 - General Meeting at SE Library

April 19 - Pomeroy Elementary School Star Party

April 23 - Local Star Party at Boyce Thompson Arboretum

April 29 - Evening Under the Stars at McDowell Sonoran Conservancy

April 30 - Deep Sky Observing Night. Head out to your favorite dark sky site and observe!

East Valley Astronomy Club -- 2011 Membership Form

Please complete this form and return it to the club Treasurer at the next meeting or mail it to EVAC, PO Box 2202, Mesa, Az, 85214-2202. Please include a check or money order made payable to EVAC for the appropriate amount.

IMPORTANT: All memberships expire on December 31 of each year.

Select one of the following:

☐ New Member ☐ Renewal ☐ Change of Address

New Member Dues (dues are prorated, select according to the month you are joining the club):

☐ **$30.00 Individual** January through March

☐ **$35.00 Family** January through March

☐ **$15.00 Individual** July through September

☐ **$17.50 Family** July through September

☐ **$22.50 Individual** April through June

☐ **$26.25 Family** April through June

☐ **$37.50 Individual** October through December

☐ **$43.75 Family** October through December

Includes dues for the following year

Renewal (current members only):

☐ **$30.00 Individual** ☐ **$35.00 Family**

Name Badges:

☐ **$10.00** Each (including postage) Quantity: _____

Name to imprint: _____

Total amount enclosed: _____

Please make check or money order payable to EVAC

☐ Payment was remitted separately using PayPal ☐ Payment was remitted separately using my financial institution's online bill payment feature

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Name: _____ Phone: _____

Address: _____ Email: _____

☐ Publish email address on website

City, State, Zip: _____ URL: _____

How would you like to receive your monthly newsletter? (choose one option):

☐ Electronic delivery (PDF) *Included with membership* ☐ US Mail **Please add $10 to the total payment**

Areas of Interest (check all that apply):

☐ General Observing ☐ Cosmology

☐ Lunar Observing ☐ Telescope Making

☐ Planetary Observing ☐ Astrophotography

☐ Deep Sky Observing ☐ Other

Please describe your astronomy equipment:

Would you be interested in attending a beginner's workshop? ☐ Yes ☐ No

How did you discover East Valley Astronomy Club? _____

PO Box 2202
Mesa, AZ 85214-2202
www.evaconline.org

All members are required to have a liability release form (waiver) on file. Please complete one and forward to the Treasurer with your membership application or renewal.

Liability Release Form

In consideration of attending any publicized Star Party hosted by the East Valley Astronomy Club (hereinafter referred to as "EVAC") I hereby affirm that I and my family agree to hold EVAC harmless from any claims, liabilities, losses, demands, causes of action, suits and expenses (including attorney fees), which may directly or indirectly be connected to EVAC and/or my presence on the premises of any EVAC Star Party and related areas.

I further agree to indemnify any party indicated above should such party suffer any claims, liabilities, losses, demands, causes of action, suits and expenses (including attorney fees), caused directly or indirectly by my negligent or intentional acts, or failure to act, or if such acts or failures to act are directly or indirectly caused by any person in my family or associates while participating in an EVAC Star Party.

My signature upon this form also indicates agreement and acceptance on behalf of all minor children (under 18 years of age) under my care in attendance.

EVAC only recognizes those who are members or invitees and who also have a signed Liability Release Form on file as participants at an EVAC Star Party.

Please print name here ***Date***

Please sign name here

PO Box 2202
Mesa, AZ 85214-2202
www.eastvalleyastronomy.org

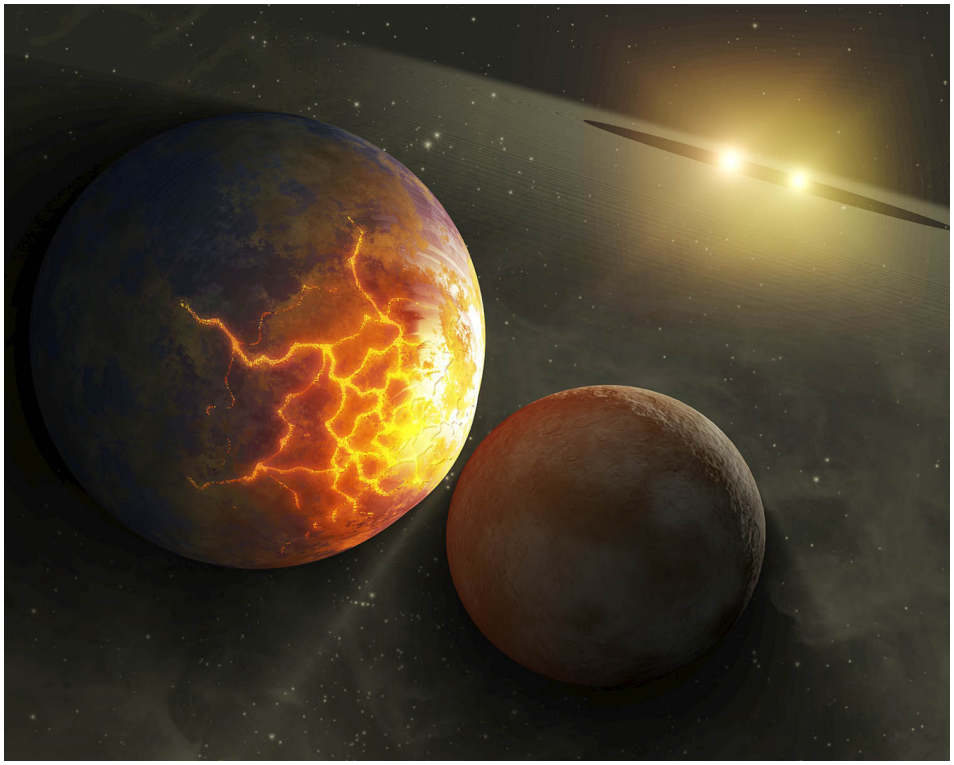
NASA's Space Place

Thank Goodness the Sun is Single

by Trudy E. Bell

It's a good thing the Sun is single. According to new research, Sun-like stars in close double-star systems "can be okay for a few billion years—but then they go bad," says Jeremy Drake of the Harvard-Smithsonian Astrophysical Observatory in Cambridge, Mass.

How bad? According to data from NASA's Spitzer Space Telescope, close binary stars can destroy their planets along with any life. Drake and four colleagues reported the results in the September 10, 2010, issue of The Astrophysical Journal Letters.



Planetary collisions such as shown in this artist's rendering could be quite common in binary star systems where the stars are very close.

Our Sun, about 864,000 miles across, rotates on its axis once in 24.5 days. "Three billion years ago, roughly when bacteria evolved on Earth, the Sun rotated in only 5 days," explains Drake. Its rotation rate has been gradually slowing because the solar wind gets tangled up in the solar magnetic field, and acts as a brake.

But some sun-like stars occur in close pairs only a few million miles apart. That's only about five times the diameter of each star—so close the stars are gravitationally distorted. They are actually elongated toward each other. They also interact tidally, keeping just one face toward the other, as the Moon does toward Earth.

Such a close binary is "a built-in time bomb," Drake declares. The continuous loss of mass from the two stars via solar wind carries away some of the double-star system's angular momentum, causing the two stars to spiral inward toward each other, orbiting faster and faster as the distance shrinks. When each star's rotation period on its axis is the same as its orbital period around the other, the pair effectively rotates as a single body in just 3 or 4 days.

Then, watch out! Such fast spinning intensifies the magnetic dynamo inside each star. The stars "generate bigger, stronger 'star spots' 5 to 10 percent the size of the star—so big they can be detected from Earth," Drake says. "The stars also interact magnetically very violently, shooting out monster flares."

Worst of all, the decreasing distance between the two stars "changes the gravitational resonances of the planetary system," Drake continued, destabilizing the orbits of any planets circling the pair. Planets may so strongly perturbed they are sent into collision paths. As they repeatedly slam into each other, they shatter into red-hot asteroid-sized bodies, killing any life. In as short as a century, the repeated collisions pulverize the planets into a ring of warm dust.

The infrared glow from this pulverized debris is what Spitzer has seen in some self-destructing star systems. Drake and his colleagues now want to examine a much bigger sample of binaries to see just how bad double star systems really are.

They're already sure of one thing: "We're glad the Sun is single!"

Read more about these findings at the NASA Spitzer site at www.spitzer.caltech.edu/news/1182-ssc2010-07-Pulverized-Planet-Dust-May-Lie-Around-Double-Stars .

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

If It's Clear...

by Fulton Wright, Jr.
Prescott Astronomy Club

March 2011

Celestial events (from Sky & Telescope magazine, Astronomy magazine, and anywhere else I can find information) customized for Prescott, Arizona. Remember, the Moon is ½ degree or 30 arcminutes in diameter. All times are Mountain Standard Time.

On Friday, March 4, it is new Moon so you have all night to hunt for faint fuzzies.

On Thursday, March 10, from 7:30 PM to 11:00 PM you can see the crescent Moon about 2 degrees from the Pleiades star cluster.

On Saturday, March 12, the Moon is at first quarter phase and sets at 2:03 AM (Sunday).

On Wednesday, March 16, from about 7:00 PM to 7:30 PM, you can see Jupiter (magnitude -2) with Mercury (magnitude -1) 2 degrees to its right. With binoculars look very low in the west. Mercury will be nearby Jupiter on the previous and following evenings, and be fairly visible for the following week.

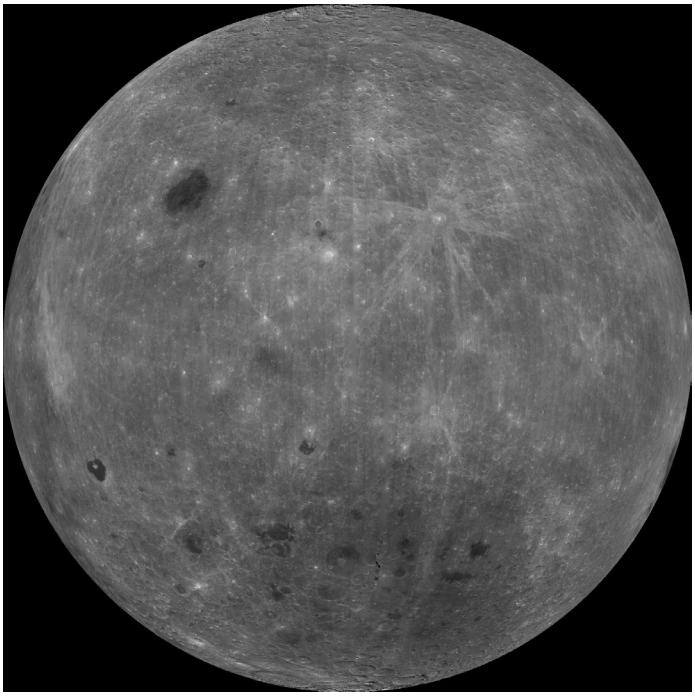
On Wednesday, March 16, for most of the night, you can see the planetary north-west part of the Moon at its best. Libration tips that part toward us. The next night is also good.

On Saturday, March 19, at 7:05 PM (25 minutes after sunset) the full Moon rises, spoiling any chance of observing faint fuzzies for the night.

On Sunday, March 20, at 6:40 PM, the Sun sets directly west because it is the first day of Spring. For the next six months the days will be longer than the nights and the sun will be north of the celestial equator.

On Sunday, March 20, after about 10:00 PM, you can see the planetary north-east part of the Moon at its best. Libration tips that part toward us. The next night is also good, but you will have to wait longer for the Moon to rise high enough for a good view.

On Saturday, March 26, at 1:40 AM, the last quarter Moon rises.



Far Side of the Moon

About 50,000 Clementine images were processed to produce four orthographic views of the Moon. Image PIA00304 (left) shows albedo variations (normalized brightness or reflectivity) of the surface at a wavelength of 750 nm (just longward of visible red). The image projection is centered at 0 degree latitude and 180 degrees longitude. Mare Moscoviense (dark albedo feature upper left of image center) and South Pole-Aitken Basin (dark feature at bottom) represent maria regions largely absent on the lunar farside. The Clementine altimeter showed Aitken Basin to consist of a topographic rim about 2500 km in diameter, an inner shelf ranging from 400 to 600 km in width, and an irregular depressed floor about 12 km in depth.

From the Desk of the President

Continued from page 1 once again mention SAC's upcoming Messier Marathon. It's going to be on April 2nd this year at the Hovatter Airstrip. See the SAC website for further details and a map!

Steven Aggas
EVAC President

NASA'S Shuttle Discovery Heads To Space Station On Its Final Mission

The final flight of space shuttle Discovery lifted off from NASA's Kennedy Space Center at 4:53 p.m. EST February 24 to deliver a new module and critical supplies to the International Space Station.

The STS-133 mission is delivering the Permanent Multipurpose Module (PMM), a facility created from the Multi-Purpose Logistics Module named Leonardo. The module can support microgravity experiments in areas such as fluid physics, materials science, biology and biotechnology. Inside the PMM is Robonaut 2, a dextrous robot that will become a permanent resident of the station. Discovery also is carrying critical spare components to the space station and the Express Logistics Carrier 4, an external platform that holds large equipment.

"With Discovery's mission, the United States once again reaches for new heights, pushes the boundaries of human achievement and contributes to our long-term future in space," NASA Administrator Charles Bolden said. "Discovery's crew - including the first-ever dexterous robot crew member, Robonaut 2 - will continue America's leadership in human and robotic spaceflight, and support important scientific and technical research aboard the space station."

STS-133 Commander Steve Lindsey will command the flight. He is joined on the mission by Pilot Eric Boe and Mission Specialists Alvin Drew, Steve Bowen, Michael Barratt and Nicole Stott. Bowen replaced Tim Kopra as mission specialist 2 following a bicycle injury on Jan. 15 that prohibited Kopra from supporting the launch window. Bowen last flew on Atlantis in May 2010 as part of the STS-132 crew. Flying on the STS-133 mission will make Bowen the first astronaut ever to fly on consecutive missions.

The shuttle crew is scheduled to dock to the station at 2:16 p.m. on Saturday, Feb. 26. The mission's two spacewalks will focus on outfitting the station and storing spare components outside the complex.

After completing the 11-day flight, the shuttle's first landing opportunity at Kennedy is scheduled for 12:44 p.m. on Monday, March 7.

STS-133 is the 133rd shuttle flight, the 39th flight for Discovery and the 35th shuttle mission dedicated to station assembly and maintenance.

Pictured are NASA astronauts Steve Lindsey (center right) and Eric Boe (center left), commander and pilot, respectively; along with astronauts (from the left) Alvin Drew, Nicole Stott, Michael Barratt and Steve Bowen, all mission specialists. Photo credit: NASA

The Deep Sky Object of the Month

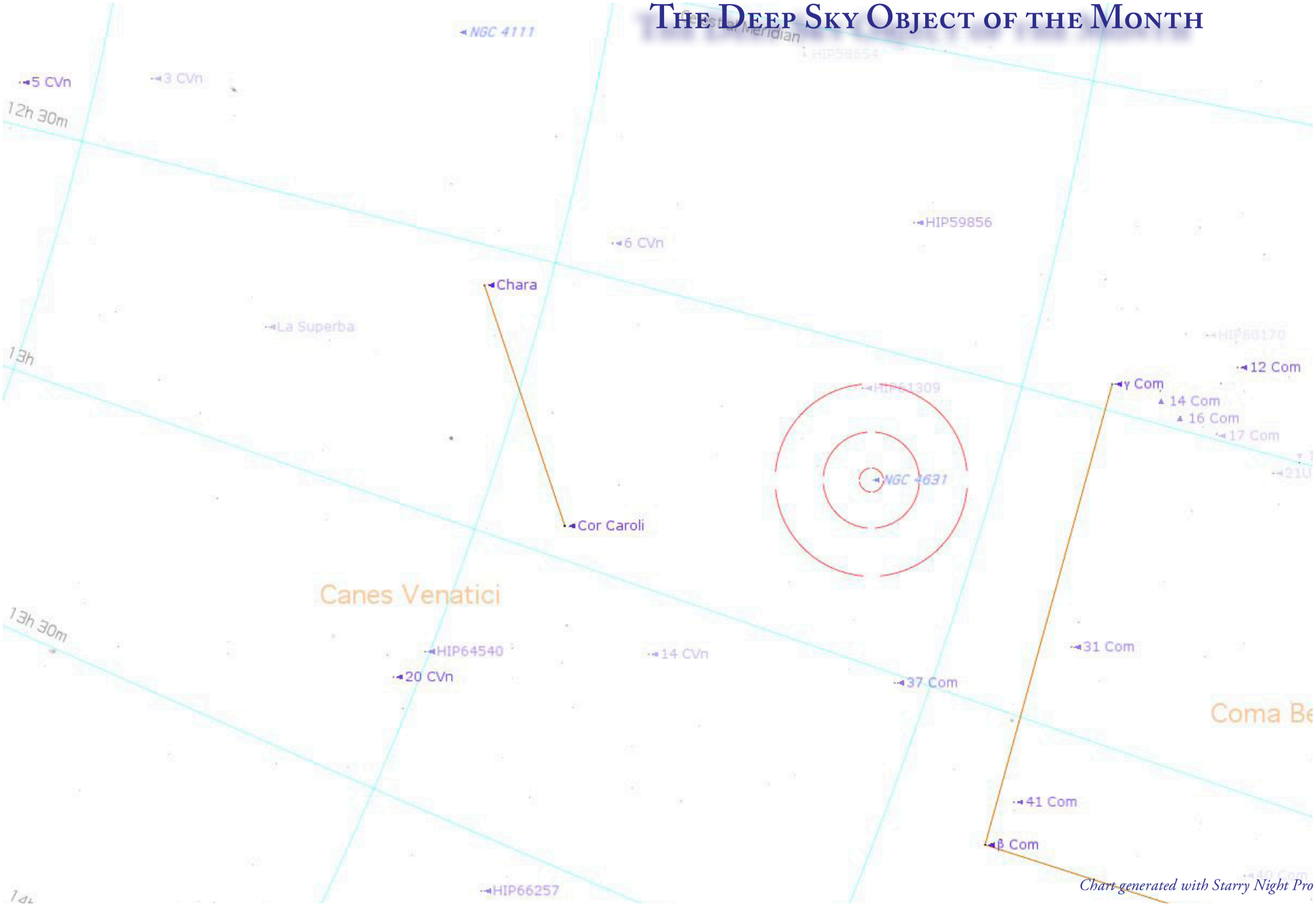


Chart generated with Starry Night Pro

NGC 4631 (Whale Galaxy) Edge-On Spiral Galaxy in Canes Venatici

RA: 12h 42m 07.7s Dec: +32° 32' 34" Magnitude: 9.50 B Size: 13.2' x 2.4'

As one of the many benefits to becoming an East Valley Astronomy Club member, we have an 8 inch Dobsonian reflector with eyepieces available for monthly check-out to current EVAC members. Have any questions, or interested?

Call or see David Hatch, EVAC Properties Manager
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