



SVAS Vol.71 No.5* Sept-Oct, 2014
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OBSERVER
 Sacramento Valley Astronomical Society
 Founded in 1945

Star-B-Q 2014



We always have a great time at Star-B-Q! This year there were a couple forest fires in the area threatening the viewing, but we had a respectable turnout anyway. Reports from several members said Thursday's skies were the best they have seen in a long time! The Milky Way seemed much wider and brighter than usual, was one comment. Could it be that Sacramento was covered in smoke, effectively lowering the light pollution at Blue Canyon? Friday's views were good also, but as Murphy would have it the wind changed direction and the smoke and clouds drifted in for Saturday's Star-B-Q. The hazy sunlight, and strange colored hue, in the above photo says it all. We all kept looking up

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SVAS Event Calendar

Yosemite

August 29, 30, 31, Labor Day, Yosemite at Glacier Point

Don't miss this great opportunity to share you scope with world visitors, and pristine dark skies.

Contact Perry P. Porter for more info.



Sept 19th, General Meeting

Friday at 8:00pm

Sacramento City College, Mohr Hall Room 3, 3835 Freeport Boulevard, Sacramento, CA.



Sept 24th New Moon



Sept 27th Blue Canyon, weather permitting.



Sept 28th Citrus Heights Sunday FunDay at Rusch Park, 11:00am—3:00pm.



Oct 17th, General Meeting Friday at 8:00pm

Sacramento City College, Mohr Hall Room 3, 3835 Freeport Boulevard, Sacramento, CA.



Oct 23rd New Moon



Oct 25th Blue Canyon, weather permitting.

18th Annual
Citrus Heights
Sunday FunDay
September 28th
Rusch Park
11:00am - 3:00pm



Star Party Schedule for 2014

Sept 27th
Oct 25th
Nov 22
Dec 20th

Star Parties

Blue Canyon

18th Annual
Citrus Heights
Sunday Fun Day

September 28th, 11am-3pm

RUSCH PARK 7801 Auburn Blvd.
corner of Antelope Rd & Auburn Bl

FREE FAMILY EVENT

Family Entertainment!

Inflatables and Rides Music with 101.9 The Wolf & Hot 103.5
Pony Rides Rock Climbing Wall
Business and Craft Booths Tot and Kid Fun Zones

This is a really fun event, one that your whole family will enjoy. Bring your solar scope, or just drop by to lend a hand talking astronomy, with the public, at the SVAS booth. This is outreach at it's best at the beautiful Rusch Park, come help us show the public what a great time we have sharing Astronomy and help promote the SVAS. This event is attended by countless folks from all over the area.

Contact Walt Heiges for further details.



At the mailing of this newsletter Labor Day weekend will be upon you, and there may still be time to sign up for the SVAS trip to Yosemite. The Forrest Service continues to support astronomy



clubs sharing the skies with the park's visitors by offering us free park entrance and free camping! Such a deal, all we need to do is show up and do what we love to do,

sharing the heavens with visitors from all over the world. Yes, visitors come from all parts of the globe to see our spectacular park, the vistas from Glacier Point are absolutely breathtaking! Our reward, besides sharing the views, is having the pristine dark skies to ourselves later in the evening. Visitors subside in a couple hours, leaving us no city lights, no pollution, very high altitude, but so many galaxies and so little time. Join the fun representing the SVAS on this monumental weekend!

Check with Perry P. Porter or Ramona Glasgow for more details.



Star-B-Q 2014

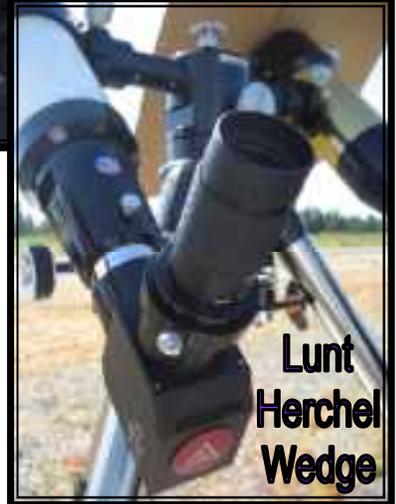
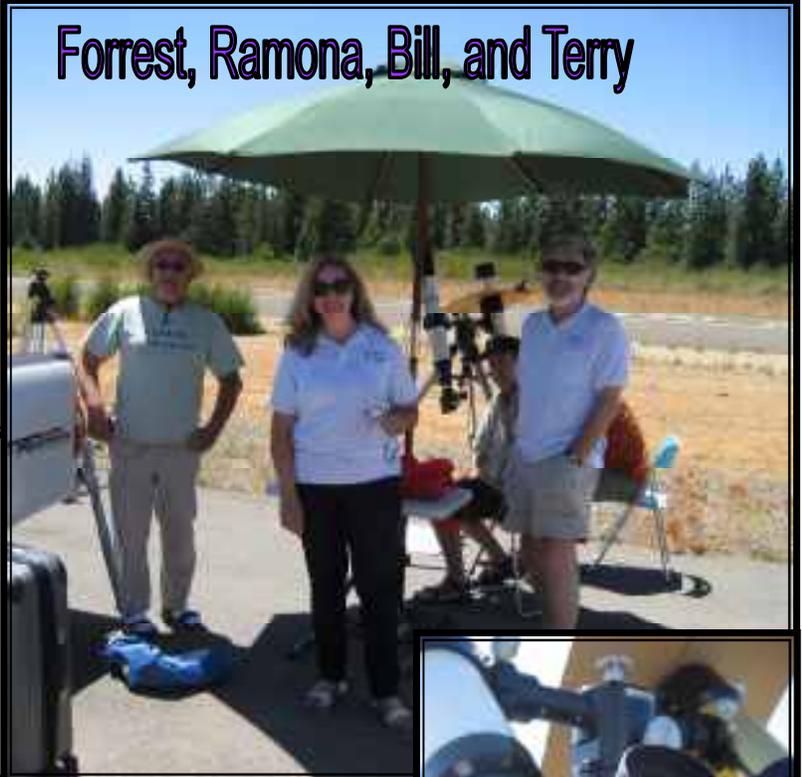
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in hopes the sky would clear, and it tried all evening. Even when the clouds cleared the clarity was very poor!

Astronomers are a optimistic bunch, and we forged ahead viewing what we could through the smokey skies. The above photo is our Sun at sunset. It could pass for a Martian sunset! It was great to see

Forrest, Ramona, Bill, and Terry



Lunt Herchel Wedge



Walt, Dave, and Paul

Forrest Lockhart and Bill Hagbery representing the solar viewers. They brought along a Herchel Wedge

used for solar viewing, it only reflects 4.6% of the Sun's light into the eyepiece, and refracts the rest out the rear of the diagonal. It offers up very good views of sunspots because the wedge doesn't reject many of the light frequencies typically blocked by most solar filters. Looking on is Ramona Glasgow

Star-B-Q



and Terry Sandbek. We gave Forrest a new membership form, he promised to seriously consider joining the SVAS again. We need you Forrest!! The next photo, Walt Heiges, Dave Buchla, and Paul Redmon discuss the afternoon events. The RV behind them is Greg Blandon's, I missed getting a photo of him this year! Greg makes some beautiful all aluminum equatorial platforms. Check out his platforms at Alvin Huey's web site:
<http://www.faintfuzzies.com/CrossBow.html>.



Matt Jennings



Chuck, Robert, & Paul



Star-B-Q Couldn't be Star-B-Q without the Barbeque! The next photo show's it in all its glory, Perry P. Porter is the lead chef cooking everyone's steak, chicken, and hotdogs to perfection! Ramona has things under control sitting in the directors chair, also waving is Steve McGough. Paul Redmon and Chuck Real in the foreground and Robert Speer in the rear. Walt is getting the raffle ready to go, Adam is also helping. Matt Jennings is sitting under his canopy chair. We had a great discussion between Chuck Real and Robert Speer comparing Mallincam and Astro Video Systems new cameras. <http://www.astro->

video.com/ Their cameras claim to work cooler, faster, and are a lot cheaper than Mallincam. Check them out. Bill Thomas attended a bit later in the evening, but because of sky conditions left early.

We all had a great time, how could we miss when among Astro friends! Plan on joining us next year!





Rusch Park Campout



Rusch Park, in Citrus Heights, sponsors a yearly campout, and it is very popular with all ages. What a great place to pitch a tent, enjoy the swimming pool, horseshoe pits, tennis courts, restrooms, and of course the SVAS telescopes. Like I mentioned earlier, it's been a tough year for clear skies and it was clear until just before dark. The ensuing high clouds were just enough to prevent viewing anything but Mars, Saturn, and a few bright globulars. The lines of viewers were long, making viewing anything else but those objects tough anyway. Everyone loves Saturn, a huge number seeing it for the first time!





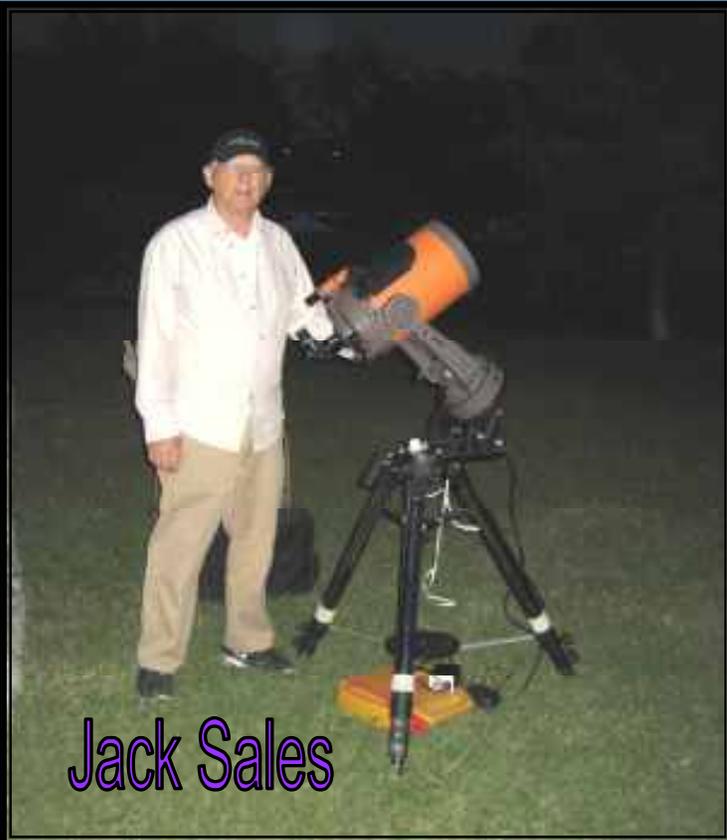
Kevin, Walt & Adam

I warned everyone about my photo flash about to go off, attempting to get a group picture of all the visitors. It didn't seem to matter much with all the white light flashlights being used by the campers. Kevin Normington, Walt Heiges, and Adam were already there when I arrived, Perry P. Porter, Jack and Beverly Sales drove in just a bit later.

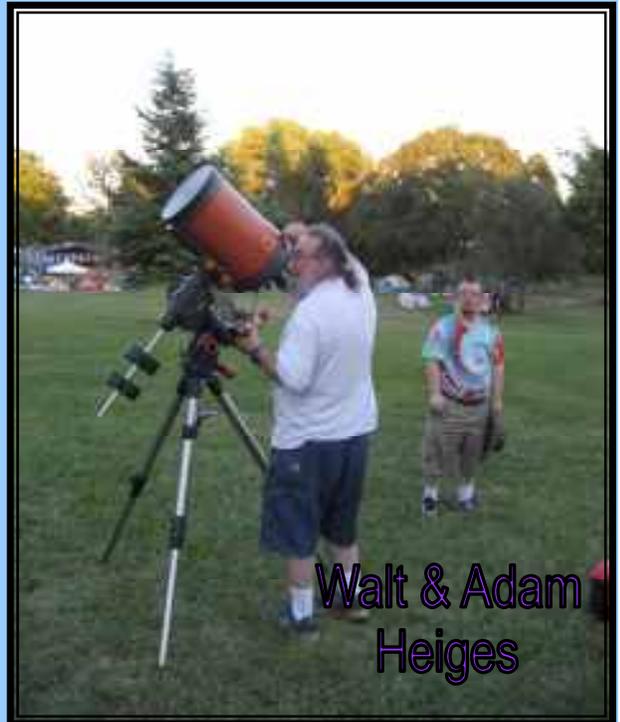
We had a great visit with our members, but once darkness arrived it was down to business with no time to talk. A very successful outing for the SVAS, and by attending this event the park organizers extend a free booth to us for Sunday FunDay. Plan on attending that great SVAS Solar event September 28th!



Kevin Normington



Jack Sales



Walt & Adam Heiges

Super Moon & Wilson

Tom Hanks' Wilson (the Soccer Ball in Castaway) was resurrected again at Rusch Park, July 12th, by Kevin Normington. Kevin was counting paces back and forth across the grass, and finally got out his wheeled measuring device to accurately measure the exact distances to duplicate the Super Moon size difference compared to Wilson.



Kevin Normington

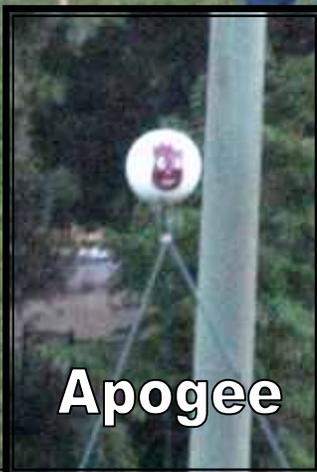
Standing at the perigee sign Wilson would visually appear the same size as the Super Moon, and taking a few steps backwards would demonstrate the more distant and smaller apogee Moon.

Thanks Kevin, Great fun!!

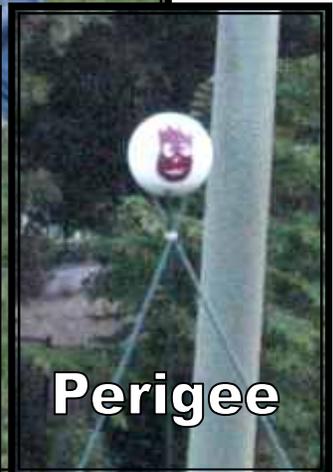
Wilson



Walt Heiges



Apogee



Perigee

Super Moon Comparison Photos



Micro Moon over Super Moon Image Credit: Stefano Sciarpetti

Did you see the big, bright, beautiful Full Moon last Wednesday night? That was actually a Micro! On that night, the smallest Full Moon of 2014 reached its full phase only a few hours from lunar apogee, the time of its the most distant point from Earth in the Moon's elliptical orbit. Of course, last year on the night of June 22, a Full Super Moon was near perigee, the closest point in its orbit. The relative apparent size of January 15's Micro Moon is compared to the June 22 Super Moon in the above composite image digitally superimposing telescope images from Perugia, Italy. The difference in apparent size represents a difference in distance of just under 50,000 kilometers between apogee and perigee, given the Moon's average distance of about 385,000 kilometers. How long do you have to wait to see another Full Micro Moon? Until March 5, 2015, when the lunar full phase will again occur within a few hours of lunar apogee. NASA

Black Butte Lake Star Party

September 19-24

You're Invited! Please RSVP

It has been a very busy summer advocating for dark skies up and down California but now we can finally turn our attention to astronomy and start planning for our 6th annual star party at Black Butte Lake, Buckhorn Camp ground.

We first came to Black Butte in February 2007, we found a site out of the wind and when night came we were amazed at how dark it was. Of course I had a telescope and we observed for two nights. During the day we checked out the group camp and immediately felt it was ideal for observing. However, we had no idea how we could afford it on our own. We returned to the regular camp ground a number of times with others who were equally enthusiastic. Those first times camping and observing, in the regular campground, gained the support of the park rangers. Now seven years later we have most of the lighting at Black Butte replaced with dark sky friendly fixtures. The group camp gained a new restroom and shower in 2010, and our group of observers has grown.



GPS- 39d 48' 41.8", 122d 22' 23.7"



Black Butte Lake and Buckhorn Recreation Area is 12 miles west of Orland on I-5, which is 100 miles north of Sacramento. The campground is open all year with 65 campsites, a select few are good for observing. Sites 58 through 63 are good as well as 39 through 45, some sites are more open than others. This part of the campground is not used as heavily as other parts so it is more desirable for observing. Due to the location it is very hot during the summer so we try to visit in the spring and fall.

Because we hold this event in the fall and/or the spring, the weather can be an issue. That is why I always call this a Camp and Star event. We always have a camp fire to start the evening, and if the weather is bad we have a good time camping.

Each year we try to invite new people so the word gets out that

Black Butte is a good place to camp and observe.

We always invite members of SVAS to join us, but it is not a public star party. So give Bev or me a call with any questions you may have, and RSVP at 916-726-7405. The dates for this fall are September 19-23. Even if you can't stay overnight, you are welcome to visit for the day, park fees apply.

More information and costs can be found at our web site:

<http://www.jimstar11.com/bblsp.html>

by Jack and Beverly Sales



Total Lunar Eclipse Oct 8th

Partial Solar Eclipse Oct 23rd



Wednesday, Oct 8th.

- 1:14am Approximate beginning of penumbral entrance.
- 2:14am First **umbral** contact .
- 3:24am **Total phase** begins.
- 3:54am **Midpoint / deepest eclipse.**
- 4:24am **Totality ends.**
- 5:35am The Moon **leaves the umbra.**
- 6:35am The **penumbral phase ends.**

by Ralph Merletti



A total eclipse of the Moon, the second in a series of four consecutive total lunar eclipses visible in full or in part from California during these two years (2014 - 2015) will occur during the **early morning hours of Wednesday, Oct. 8th**. The Moon will move through the northern portion of Earth's shadow, beginning with a penumbral entrance at approx. 1:14am PDT. First umbral contact will be at 2:14am, and the total phase begins at 3:24am. Midpoint/deepest eclipse is at 3:54am, and totality ends at 4:24am. The Moon leaves the umbra at 5:35am, and the penumbral phase ends at 6:35am PDT. Local TV stations in the Sacramento area may be showing live progress of the decreasing part of the eclipse during their morning news broadcasts. At the beginning of totality, the portion of the Earth's (sunset) rim casting the shadow includes part of Siberia, Mongolia and China... while the portion of Earth's (sunrise) rim casting the shadow at the end of totality includes part of Quebec in Canada, and part of the U.S. East Coast.

On the afternoon of this upcoming **October 23rd (Thursday)** there will be a **partial solar eclipse** widely visible across most of North America. The maximum magnitude of 81% of the apparent solar diameter will occur in Canadian arctic islands with the Sun on the horizon, in the early afternoon there. The central path will be out in space



hundreds of miles above Earth's north polar region, most likely annular. In Sacramento, the eclipse begins at 1:52pm PDT, the middle is at 3:16pm with a maximum magnitude of 52% of the apparent solar diameter, and a maximum obscuration of 41% of the apparent solar area. At this time the Sun will 29 degrees above the horizon. It will be an impressive "bite radius," but we won't need a bigger boat... oops!, I mean a bigger scope! Look in the shadows of tree leaves for a lot of "cookie bite" pinhole crescent images! Will you be able to notice the overall dimming of the sky and landscape caused by the 41% reduction / 59% remainder of normal sunlight? The Moon leaves the solar disk at 4:32pm PDT. What will SVAS be planning for the public? A good idea for individuals would be to pick out a school of your choice to show the eclipse. Make arrangements well in advance with the principal and other staff members, as to safety and logistics. The maximum eclipse occurs just as many students are leaving school for the day, so let's plan ahead to make sure that everyone has a chance for a safe, exciting and enjoyable scientific/astronomical experience. Rainfall records for the previous 13 years

taken at my residence show that rain has fallen on Oct 23rd only in 2004 and 2010, but be prepared for anything in this changeable transition season between summer and winter weather patterns. For most of us this will be the final warm-up before the **great coast-to-coast USA total solar eclipse of August 21, 2017!**



NGC7000-North America Nebula (left)
& Pelican Nebula (right)

I was at Blue Canyon last month and still managed to get a shot even though some clouds came through and torched almost all my color data but I worked some magic. I attached the wide field of ngc7000/pelican for your enjoyment. (Yes at least 50% of the color data was lost) amazing really.

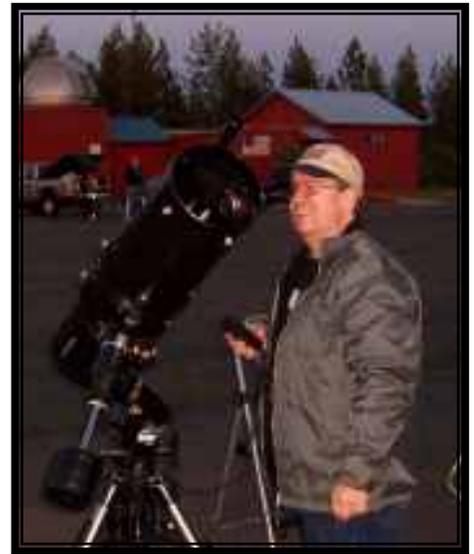
Clear skies,

Kevin Lucidi

Astro AP Photography



by Wayne Lord



"I have been working for a while now on integrating automatic plate solving and telescope pointing using a program called AstroTortilla. In order to accurately point a telescope at a faint object in light polluted skies, some method must be used to position the telescope to get the deep sky object in the field of view of the camera. What AstroTortilla does is take control of the main camera, do a plate solve on a relatively short image capture (10 seconds to one minute, depending on star brightness), figure out where the telescope is pointing and then commands a slew (via EQMOD) to the correct position. It then takes a second exposure, plate solves it again to make sure the object is in the field of view. If not, further iterations are accomplished. The following is my log of one session where things worked right, but there have been numerous others where I wasn't so fortunate. Both EQMOD (the mount control program), Cartes du Ciel (the planetarium program), and AstroTortilla (the "wrapper" program) are Open Source, free programs."

Other than being a bit rusty on the whole process, everything worked OK with last night's imaging. After syncing on Vega, Spica, Arcturus and back to Vega, I slewed to M13 and it was bright enough to see in the PHD (Push Here Dummy, a free auto guiding program) display (2-second exposure) so it was no problem to get it centered up for imaging. The PHD graph



also behaved, not throwing any strange spikes as it had the last time. I came inside while it was exposing, although the temperature was really pleasant out in the back yard, but the insects were certainly out. Took five-minute darks after it was done, figuring I would also use them for the next target, M57. CdC did its business, but I couldn't spot the ring in a 1-minute exposure, so I fired up AstroTortilla and set it doing its thing. I had made a change in its settings, forcing it to use 1x1 binning instead of 2x2 binning. It definitely took longer to solve, but the big thing is that it DID solve, made a correction to the mount's position, and then solved again at the new location. This time I was able to faintly see the Ring just below and right of the PHD crosshairs, so when I took a 1-minute test exposure on the main camera, it was there. Just a bit off-center, but close enough to start imaging. Once again PHD behaved and the graph quickly settled down right around the zero line. It's great when everything comes together and behaves like it should.



Photos taken Wednesday, June 15, 2014

M57, The Ring Nebula



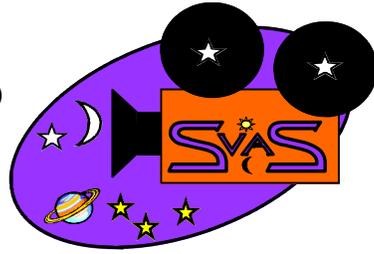
Ring Holds a Delicate Flower

NASA's Spitzer Space Telescope finds a delicate flower in the Ring Nebula, as shown in this image. The outer shell of this planetary nebula looks surprisingly similar to the delicate petals of a camellia blossom. (A planetary nebula is a shell of material ejected from a dying star.) Located about 2,000 light years from Earth in the constellation Lyra, the Ring Nebula is also known as Messier Object 57 and NGC 6720. It is one of the best examples of a planetary nebula and a favorite target of amateur astronomers.

The "ring" is a thick cylinder of glowing gas and dust around the doomed star. As the star begins to run out of fuel, its core becomes smaller and hotter, boiling off its outer layers. Spitzer's infrared array camera detected this material expelled from the withering star. Previous images of the Ring Nebula taken by visible-light telescopes usually showed just the inner glowing loop of gas around the star. The outer regions are especially prominent in this new image because Spitzer sees the infrared light from hydrogen molecules. The molecules emit the infrared light that they have absorbed ultraviolet radiation from the star or have been heated by the wind from the star.

Image credit: NASA/JPL-Caltech/Harvard-Smithsonian CfA

Adventures in VAstronomy Video



Part 1, Compromise

by Dan & Crystal Deeble



M51 Captured at Loon Lake

Not long after we bought our super-sized Orion XX16g Dobsonian, my wife Crystal and I found ourselves in a pickle. We were seeing these amazing, mind-blowing objects through the eyepiece but the experience wasn't complete – namely, they were all grey! The pictures we've become accustomed to in magazines of M51 exploding with vivid shades of violet and the bright reds and greens of the Ring Nebula were replaced with just shades of grey that

left us feeling like we were seeing just a shadow of these amazing structures. The detail was amazing to be sure, but the lack of color was both unexpected and disappointing. Where was all the color?

Humans made an evolutionary trade off long ago and gave up some of our ability to see in low-light conditions, but gained the ability to see in color. Our eyes have two primary light receptors – rod cells and cone cells. The rod cells are extremely sensitive to light and give us the ability to see in dark conditions, but they can only perceive it in shades of grey. Cone cells are much less sensitive to light, but are able to transmit color information to our brain. When observing an object in our own solar system, the light from the (relatively) nearby sun is reflected off that object and strikes our eye with enough intensity to stimulate both the rod and cone cells, allowing us to see the planets in color. When an object is hundreds or thousands of light years away though, the light reaching us is dramatically reduced. Some large telescopes (16"+) can gather enough light to reveal faint hints of color in particularly bright objects like the Orion Nebula, but this is usually limited to the red end of the spectrum and lacking the levels of saturation one would normally desire. Through the eyepiece, incoming light is typically only sufficient to trigger a response from the rod cells and thus, the majority of our universe is only observable with the human eye in shades of grey. Unlike the human eye, CCD (*charge-coupled device*) and CMOS (*Complementary metal-oxide-semiconductor*) imaging chips don't have this limitation. Because of the nature of how these devices 'collect' photons, they are able to register color information in extremely low-light conditions. The longer you leave the shutter open, the more photons it collects and a more intense image is recorded. Viola! Problem solved, right? Not quite... Only a finite number of 'pixels' can be packed into a single imaging chip and by dedicating those pixels to detect the color information of each wavelength, you end up lowering the overall resolution of the entire chip. So, a 1 mega-pixel grey-scale chip will have a higher effective imaging resolution than a 1 mega-pixel color chip. As if that weren't enough, generally speaking, CCD sensors are more sensitive and have less 'noise' than CMOS sensors, but are more expensive and their sensitivity makes them more susceptible to 'amp glow'. The tradeoff may or may not be significant depending on what you want to image.

Astrophotography is about compromise and the best way to address that is to figure out what it is you hope to achieve with a camera. Do you want to capture images that you can blow up and hang on your wall? Record a log of the images you've observed for personal reference? Hook your camera to a television to share the experience 'live' with others? You'll also be very dependent on the type of telescope you own. Generally speaking, equatorial mounts are ideally suited to long exposure deep sky photography, whereas alt-az mounts are better suited to shorter exposures of objects within the solar system. In this series, we'll share with you how we navigated these decisions, the various types of imaging technology on the market along with their strengths and weaknesses, and tips to overcome (or at least minimize) the downsides of each so that you can capture and share with others the unbelievable beauty hidden within the night sky.

Stay tuned for part II

EQUATORIAL PLATFORMS

Tracking for DOBS by Tom Osypowski

A big Dob on an Equatorial Platform is the ultimate



observing machine. You have aperture, portability, ease of use and precision TRACKING. We manufacture both wooden and metal models of

Platforms for Dobs from 6"- 36" in size. They are perfect for high power observing, group viewing and for astro-imaging.



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16" Meade Lightbridge & Servo Cat

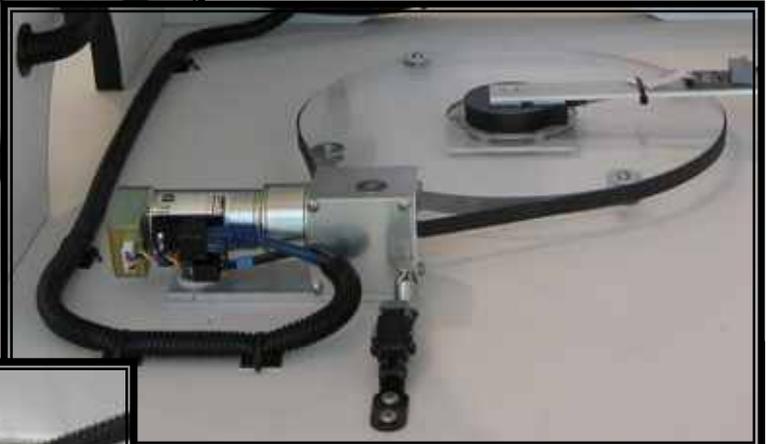
by Duane Balch

I want to share one of the cleanest Servo Cat installations I've seen, by Duane Balch. Just look at the detailed wiring harness, and the clear plastic belt drive gears. This is the first belt drive Servo Cat I've seen, they have all been

driven by a spring loaded cable and very large RA and Dec gears. Servo Cat really has it together! Notice the controller stalk, mounted to the mirror box, in the lower photo. It handily holds the Argo Navis computer and Servo Cat hand pad.

Great Job Duane!

Lonnie Robinson



America's Next Rocket

NASA's Space Launch System, or SLS, will be the most powerful rocket in history. The flexible, evolvable design of this advanced, heavy-lift launch vehicle will meet a variety of crew and cargo mission needs.

In addition to carrying the Orion spacecraft, SLS will transfer important cargo, equipment and science experiments to deep space, providing the nation with a safe, affordable and sustainable means to expand our reach in the solar system. It will allow astronauts aboard Orion to explore multiple deep-space destinations including an asteroid and ultimately Mars.

The first configuration of the SLS launch vehicle will have a 70-metric-ton (77-ton) lift capacity and carry an uncrewed Orion spacecraft beyond low-Earth orbit to test the performance of the integrated system. As the SLS is evolved, it will be the most powerful rocket ever built and provide an unprecedented lift capability of 130 metric tons (143 tons) to enable missions even farther into our solar system.

Image Credit: NASA



SLS



Droughts, Floods and the Earth's Gravity by the GRACE of NASA

By Dr. Ethan Siegel

When you think about gravitation here on Earth, you very likely think about how constant it is, at 9.8 m/s^2 (32 ft/s²). Only, that's not quite right. Depending on how thick the Earth's crust is, whether you're slightly closer to or farther from the Earth's center, or what the density of the material beneath you is, you'll experience slight variations in Earth's gravity as large as 0.2%, something you'd need to account for if you were a pendulum-clock-maker.

But surprisingly, the amount of *water content* stored on land in the Earth actually changes the gravity field of where you are by a significant, measurable amount. Over land, water is stored in lakes, rivers, aquifers, soil moisture, snow and glaciers. Even a change of just a few centimeters in the water table of an area can be clearly discerned by our best space-borne mission: NASA's twin Gravity Recovery and Climate Experiment (GRACE) satellites.

Since its 2002 launch, GRACE has seen the water-table-equivalent of the United States (and the rest of the world) change significantly over that time. Groundwater supplies are vital for agriculture and provide half of the world's drinking water. Yet GRACE has seen California's central valley and the southern high plains rapidly deplete their groundwater reserves, endangering a significant portion of the nation's food supply. Meanwhile, the upper Missouri River Basin—recently home to severe flooding—continues to see its water table rise.

NASA's GRACE satellites are the only pieces of equipment currently capable of making these global, precision measurements, providing our best knowledge for mitigating these terrestrial changes. Thanks to GRACE, we've been able to quantify the water loss of the Colorado River Basin (65 cubic kilometers), add months to the lead-time water managers have for flood prediction, and better predict the impacts of droughts worldwide. As NASA scientist Matthew Rodell says, "[W]ithout GRACE we would have no routine, global measurements of changes in groundwater availability. Other satellites can't do it, and ground-based monitoring is inadequate." Even though the GRACE satellites are nearing the end of their lives, the GRACE Follow-On satellites will be launched in 2017, providing us with this valuable data far into the future. Although the climate is surely changing, it's water availability, *not* sea level rise, that's the largest near-term danger, and the most important aspect we can work to understand!

Learn more about NASA's GRACE mission here: http://www.nasa.gov/mission_pages/Grace/

Kids can learn all about launching objects into Earth's orbit by shooting a (digital) cannonball on NASA's Space Place website. Check it out at: <http://spaceplace.nasa.gov/how-orbits-work/>

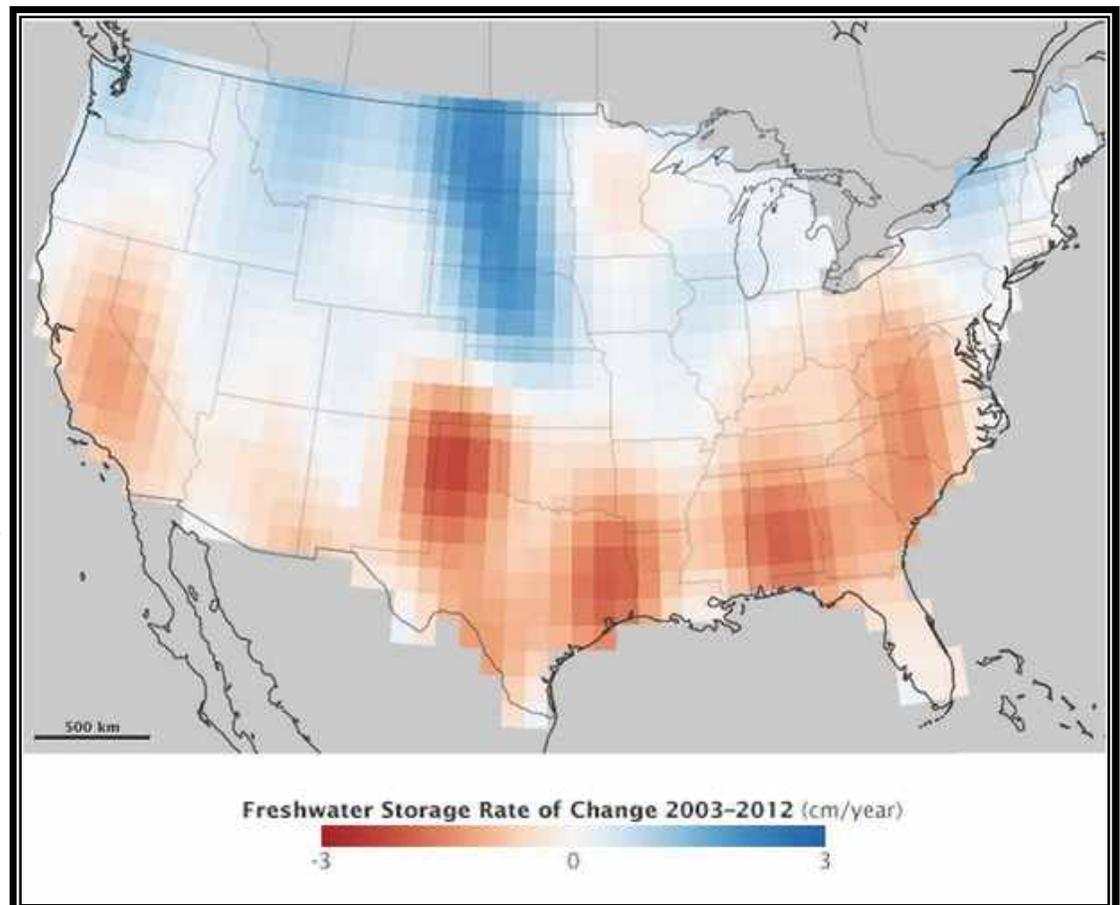


Image credit: NASA Earth Observatory image by Jesse Allen, using GRACE data provide courtesy of Jay Famigleitti, University of California Irvine and Matthew Rodell, NASA Goddard Space Flight Center. Caption by Holli Riebeek.

