SVAS OBSERVER
Vol.71 No.3* May-June, 2014
Sacramento Valley Astronomical Society
Founded in 1945

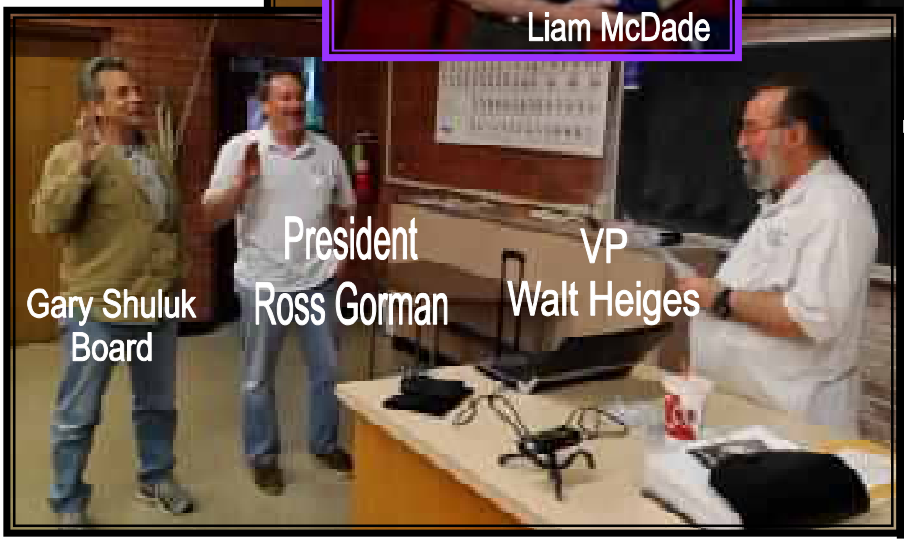
SVAS Elections for 2014

March was election month, and our new Secretary, Treasurer, and even year Board members were sworn in. Returning Board member Chuck Real will be sworn in at a later date. Liam McDade (former SVAS president) and Walt Heiges (VP) led the swearing in ceremony.

Wow, two years went by quickly when we are having so much fun! Lots to accomplish in 2014-15, so join us making the SVAS great! Attend our meetings, HGO star parties, outreach school star parties, special events like solar viewing, telescope workshops, and get involved with our great organization!!

Rich Sandler Board | **Kevin Normington** Treasurer | **Perry P. Porter** Board | **Lonnie Robinson** Board | **Walt Heiges** Vice Pres | **Ramona Glasgow** Secretary

Past President
Liam McDade



Gary Shuluk
Board

President
Ross Gorman

VP
Walt Heiges

Inside This Issue page

SVAS Event Calendar

May 28th New Moon

May 16th, General Meeting, Friday at 8:00pm

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

May 31st Blue Canyon, weather permitting. Prairie City is our alternate site, but please contact Tim Tingey or Perry P. Porter to plan in advance before attending. The porta potties should be delivered and operational.

June 27th General Meeting Friday at 8:00pm

Sacramento City College, Mohr Hall Room 3, 3835 Freeport Boulevard, Sacramento, CA. It's a week late this time!

June 27th New Moon

June 28th

Blue Canyon

Sun-Day held at Discovery Museum Sat & Sunday, June 21 & 22!

Star Party Schedule for 2014

May 31st
June 28th
July 25th,26th, Star-B-Q
Aug 23rd
Sept 27th
Oct 25th
Nov 22
Dec 20th

Star Parties

Blue Canyon

Walt Heiges
SVAS
Vice President

SUN-DAY will be held at the Discovery Museum 3615 Auburn Blvd, Sacramento Sat & Sunday, June 21 & 22! 12:00pm - 4:00pm Setup at 11:00am

916-808-3942
INFO@THEDISCOVERY.ORGhttp://
www.thediscovery.org/ http://

DISCOVERY MUSEUM
Science & Space Center

POWERHOUSE SCIENCE CENTER
Future Home of the Discovery Museum Science & Space Center
www.powerhousesciencecenter.

Pam Shivak, the coordinator of International SUN-DAY organization and I have been coordinating efforts to present this event. I have made the SVAS a participating partner with their event. She has announced our participation on their FB group and has put your logo on their web page with a link back to the SVAS group.

In exchange, we received free solar glasses. We ask you to visit their site, and I encourage our members to not only join the International SUN-DAY Facebook group, but Stephen Ramsden's CBSAP Facebook group as well. We look forward to you sharing your plans and pictures with the SUN-DAY group and I thank you again for your par-

ticipation. Sounds like it will be a great event to share with folks in the Sacramento Valley at the Discovery Museum.

Below are the links to the SUN-DAY and Facebook groups, where you will also find the EVENT where SVAS members can accept the invite and say they are GOING.

Come join us, we need your help! This will be a two day event, and we need enough members to cover shifts and breaks. Bring your solar scope, or not. Any help would be appreciated for this really fun event! Special thanks to the Discovery Museum, they will be coordinating their weekend to celebrate Solar and working with the SVAS volunteers.

http://solarastronomy.org/sunday.html
www.facebok.com/groups/InternationalSUNday/
www.facebook.com/groups/batessolarastronomyproject/

Charlie Bates Solar Astronomy Project

The Power of the Sun's Engines

By Dr. Ethan Siegel

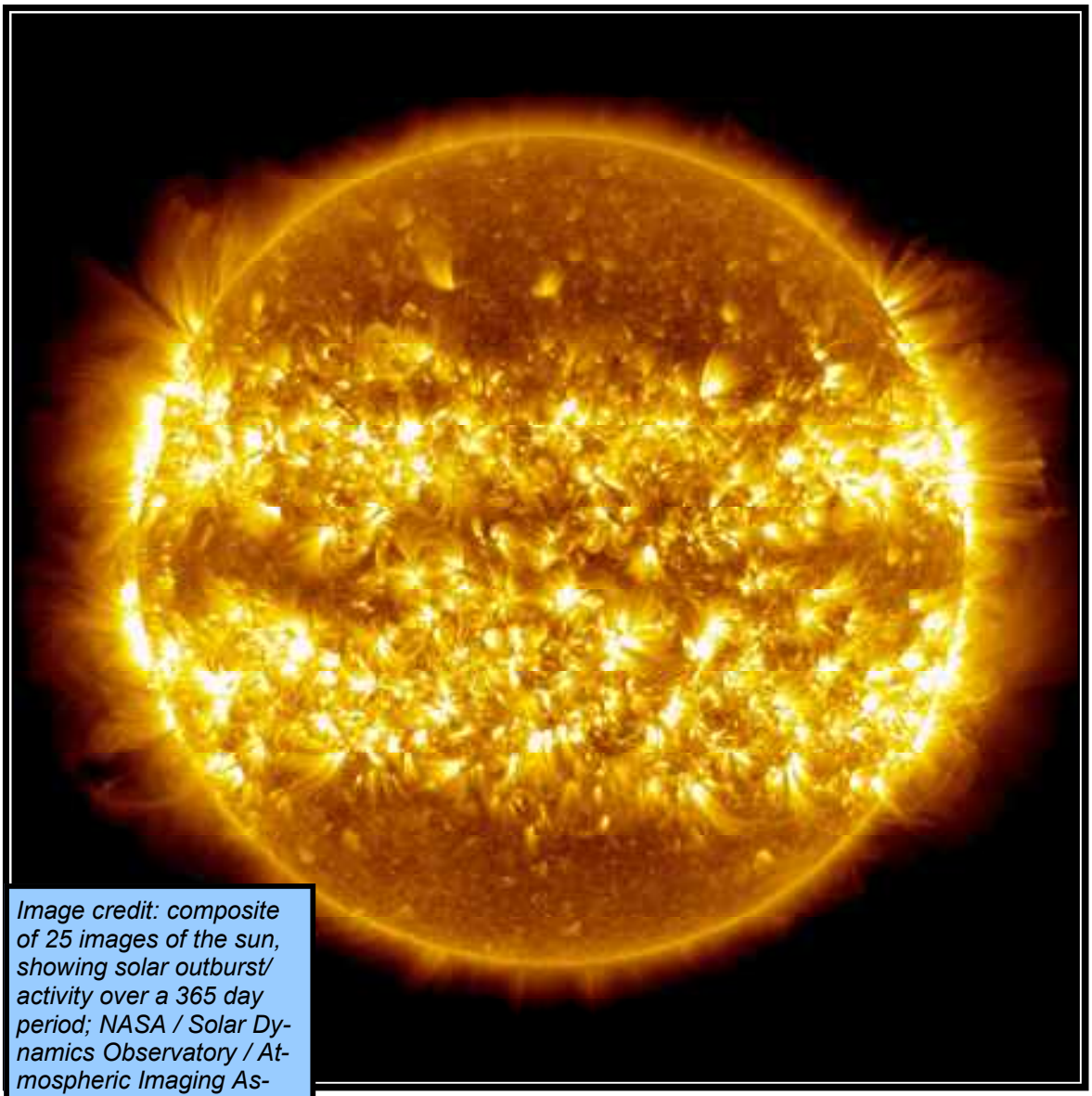


Image credit: composite of 25 images of the sun, showing solar outburst/ activity over a 365 day period; NASA / Solar Dynamics Observatory / Atmospheric Imaging Assembly / S. Wiessinger; post-processing by E. Siegel.

Here on Earth, the sun provides us with the vast majority of our energy, striking the top of the atmosphere with up to 1,000 Watts of power per square meter, albeit highly dependent on the sunlight's angle-of-incidence. But remember that the sun is a whopping 150 million kilometers away, and sends an equal amount of radiation in all directions; the Earth-facing direction is nothing special. Even considering sunspots, solar flares, and long-and-short term variations in solar irradiance, the sun's energy output is always constant to about one-part-in-1,000. All told, our parent star consistently outputs an estimated 4×10^{26} Watts of power; one *second* of the sun's emissions could power all the world's energy needs for over 700,000 years.

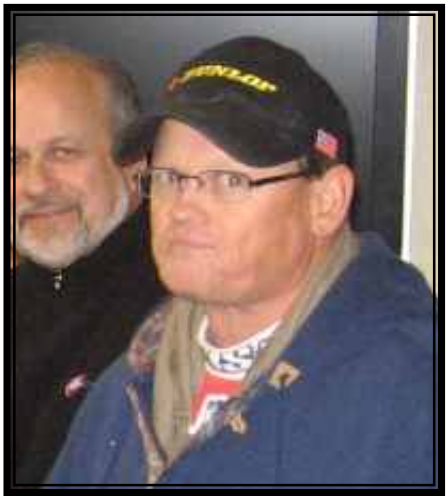
That's a literally astronomical amount of energy, and it comes about thanks to the hugeness of the sun. With a radius of 700,000 kilometers, it would take 109 Earths, lined up from end-to-end, just to go across the diameter of the sun once. Unlike our Earth, however, the sun is made up of around 70% hydrogen by mass, and it's the individual protons -— or the nuclei of hydrogen atoms — that fuse together, eventually becoming helium-4 and releasing a tremendous amount of energy. All told, for every four protons that wind up becoming helium-4, a tiny bit of mass — just 0.7% of the original amount — gets converted into energy by $E=mc^2$, and that's where the sun's power originates.

You'd be correct in thinking that fusing ~4×10^{38} protons-per-second gives off a tremendous amount of energy, but remember that nuclear fusion occurs in a *huge* region of the sun: about the innermost quarter (in radius) is where 99% of it is actively taking place. So there might be 4×10^{26} Watts of power put out, but that's spread out over 2.2×10^{25} cubic meters, meaning the sun's energy output *per-unit-volume* is just 18 W / m^3. Compare this to the average human being, whose basal metabolic rate is equivalent to around 100 Watts, yet takes up just 0.06 cubic meters of space. In other words, **you emit 100 times as much energy-per-unit-volume as the sun**! It's only because the sun is so large and massive that its power is so great.

It's this slow process, releasing huge amounts of energy *per reaction* over an incredibly large volume, that has powered life on our world throughout its entire history. It may not appear so impressive if you look at just a tiny region, but — at least for our sun — that huge size really adds up!

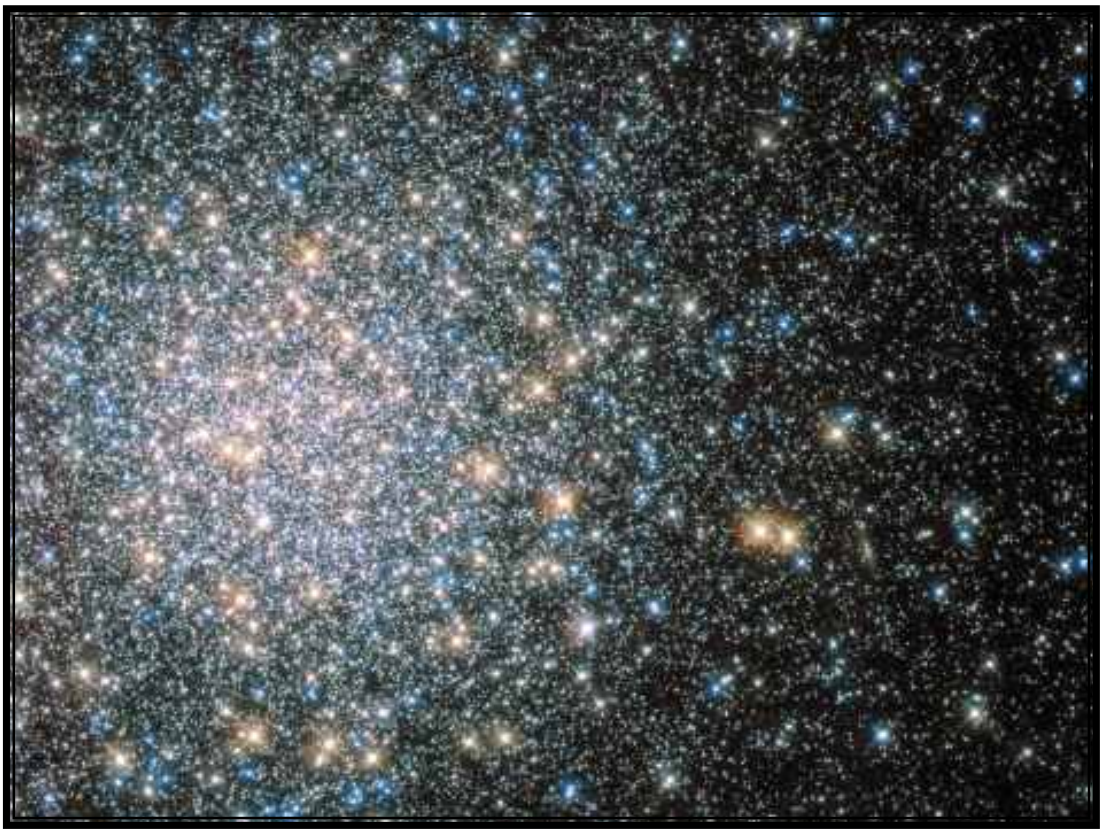
Messier Marathon

East SVAS West



Your Tour Guide, Tim Tingey

Messier 5, in Serpens, is in my top five list of favorite Globulars, which includes M13, the near and bright M22, M15, and the largely ignored M92 in Hercules! Rounding off my top 10 list are M3, M80, M12, M14, and M30 in Capricorn. Hubble puts my views to shame, but nevertheless they are very satisfying! What makes one globular better than another, what defies the statement that all Globs look alike, I'm glad you asked! Aside from the obvious brightness comparison, there is parameter structure, core density, and star resolution at the core. Try viewing several Globs, compare how dense the cores are, and observe how far away from the core the star streams appear to stretch. Are the streams loosely scattered almost like an octopus's arms, or do they gradually decrease in number towards the outer edge forming a smooth ball? How many stars can you resolve in the core? The more stars resolved towards the core, the more breathtaking the three dimensional views seem to be. M13 gives the impression one could reach out and immerse your hand into the core, spreading the stars like a flowing school of fish. Is the core so dense that only a bright unresolved mass can be seen? Armed with these thoughts, try choosing your personal favorites. Each Globular will reveal it's own special personality, not to mention you will bag many of the Messier objects to call your own! SVAS Editor



NASA: "Beautiful Nebula discovered between the Balance [Libra] & the Serpent [Serpens] ..." begins the description of the 5th entry in 18th century astronomer Charles Messier's famous catalog of nebulae and star clusters. Though it appeared to Messier to be fuzzy and round and without stars, Messier 5 (M5) is now known to be a globular star cluster, 100,000 stars or more, bound by gravity and packed into a region around 165 light-years in diameter. It lies some 25,000 light-years away. Roaming the halo of our galaxy, globular star clusters are ancient members of the Milky Way. M5 is one of the oldest globulars, its stars estimated to be nearly 13 billion years old. The beautiful star cluster is a popular target for Earthbound telescopes. Of course, deployed in low Earth orbit on April 25, 1990, the Hubble Space Telescope has also captured its own stunning close-up view that spans about 20 light-years near the central region of M5. Even close to its dense core at the left, the cluster's aging red and blue giant stars and rejuvenated blue stragglers stand out in yellow and blue hues in the sharp color image.

Image Credit: NASA, Hubble Space Telescope, ESA

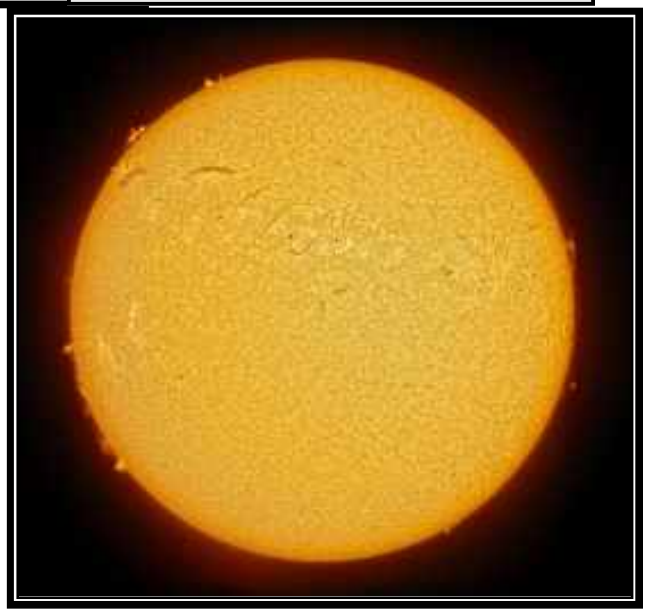
Nevada County Astronomers *present*

Astronomy Day 2014

Madelyn Helling Library
Saturday, May 17th noon to 3 pm
Everyone welcome - FREE!
Planetarium Shows in Star-lab Planetarium
Solar Viewing with Solar Telescopes
Telescope Making Demonstrations
Meteorite Display
Hands-on-Science
Planet Walk
Displays
Videos

NcA is extending a special invite to the SVAS

The sun taken through an amateur 60 mm H-α scope (Ken Crawford) Local astronomers will have solar telescopes available to view the sun.



Library will host Astronomy Day

The Nevada County Astronomy Club and the Madelyn Helling library will be hosting Astronomy Day activities on Saturday, May 17th, which is the week following the national Astronomy Day celebration due to scheduling conflicts. Astronomy Day has been observed every year since it was started in 1973 but this is the first time it will be observed locally. A number of activities and displays are planned for the local event.

According to outreach coordinator David Buchla, the purpose of Astronomy Day is to showcase astronomy as a fun and educational hobby, and to bring it to the public. It isn't necessary to have a telescope to appreciate the night sky and to want to learn more about it. The club holds regular meetings on topics of general interest, and schedules various events to bring astronomy to schools and the public. Local astronomers are Happy to share their interest in astronomy with others.

Featured at the Nevada county celebration of Astronomy Day are regular planetarium shows that will focus on identifying constellations and binocular objects in the summer sky. The shows are hosted by long time astronomer Larry Harrison, who has given literally hundreds of shows to schools and community groups. The star-lab planetarium produces a realistic and stunning view of the unspoiled night sky as can be seen in a dark environment.

Also featured are solar scopes for viewing the sun. Activity on the sun is fairly high at the present time and solar scopes will be set up (weather permitting) to show the sun in both white light and hydrogen-alpha light. In white light, sunspots can be observed. In hydrogen-alpha light, the prominences and details on the sun's surface can be observed. Prominences, which are cooler than the solar corona, emit light that is caused by electron transitions in the hydrogen atom. Special filters in the scope block all of the light from the sun except this narrow band of light, revealing details unseen in ordinary telescopes.

A demonstration of mirror grinding will be done by two expert mirror makers outside. They will describe basic mirror tests to assure a mirror will perform as expected. Together they have made a number of telescopes and can answer questions on how to make a high performance telescope within a reasonable budget.

School Star Party Report

Westlake School

I just retired, so I thought I would discover for myself what all the fuss is about with outreach school star parties. I must admit I haven't been very enthused about them in the past, always wanting to support inreach (member activities and HGO) instead. It was thoroughly enjoyable, watching all those curious youngsters, parents, and teachers, take in what could have been their first views of the heavens in real time. They were blown away simply viewing the Moon or Jupiter. It's a good thing, because the Moon was full and the parameter lights around the school were all shining brightly effectively obscuring all the good stuff. There were lots of folks already there when I arrived, and these photos were taken shortly afterword. The pix only show perhaps a quarter of attendees that came after dark, lining up 15 deep at our scopes. The lines kept coming until around 8:30. Everyone was so appreciative of the SVAS presence and the telescopes. Check out a couple letters on the next page, chosen from a stack of letters, sent to Perry P. Porter from students at last months outreach. They are very representative of the enormous interest these kids have for the heavens, and how truly grateful they are for the opportunity see it for themselves.

I enjoyed every minute, talking to the kids, talking to the parents and teachers, and sharing my views of the sky! It's such great fun I want to encourage everyone to give it a try! It definitely won't be my last outreach. Lonnie Robinson

2/4/14

Dear Mr. Porter

Thank you for showing us Jupiter and the cloud. I'm sorry that you had to sit there 6 hours. I liked Jupiter a lot. The teliscope was huge! It was good that nobody brok it because I think it costs 4,000 dollars. :(:-)

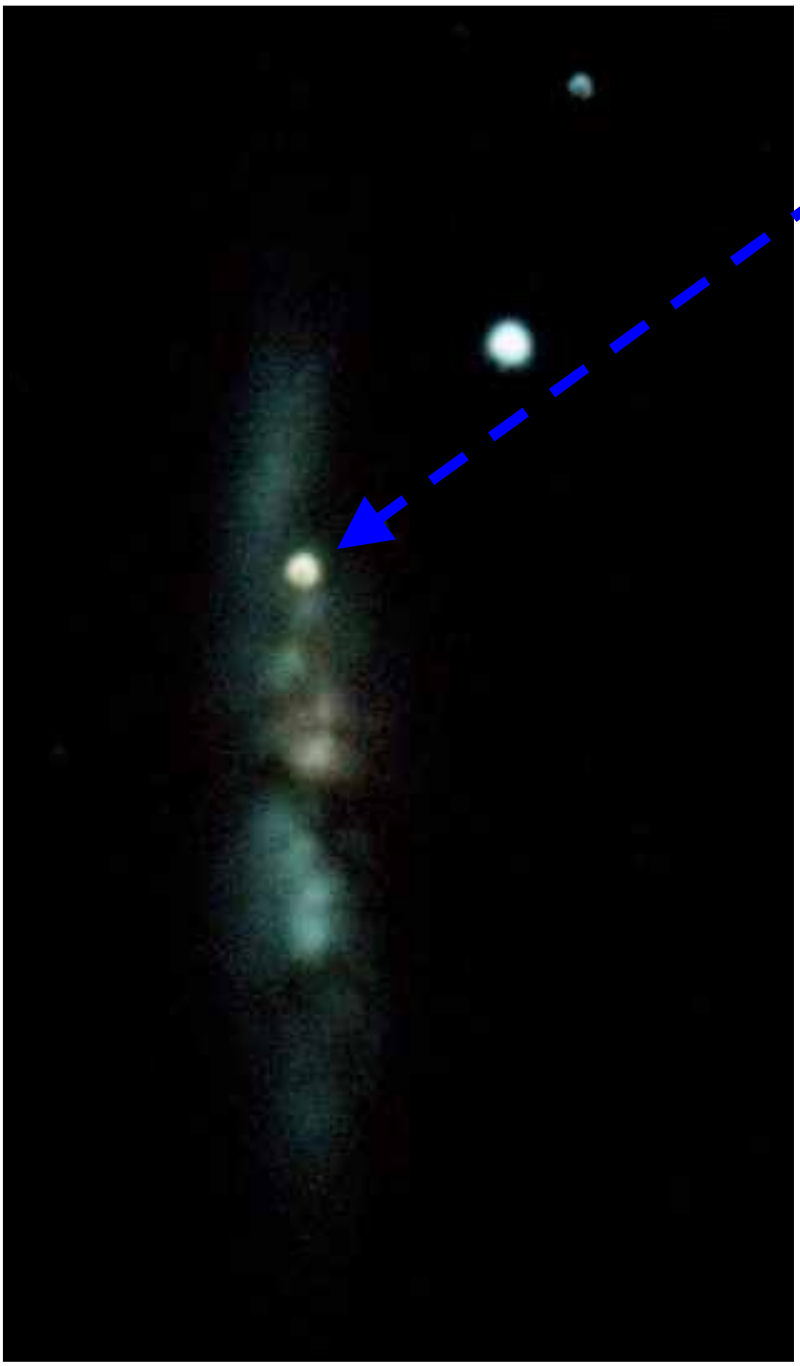
Happy Valentine day

Dear Mister Porter,

Thank you for giving your time away by doing the star gazing. I saw Jupiter and orian nebula through the telescope. I had lots of fun doing that!

There is a Supernova in my M82 photo!

by John Goeschi



On February 23 I decided to try out my "new 1976" motor home-camper and went to New Hogan Lake, Acorn Campground. There are a couple of sites, 101 & 102 that are fairly clear of trees. In addition to some visual observations, I planned to do some astro-photography as it got darker.

New Hogan is fairly dark with a moderate light dome from Stockton to the West, and lesser light from Sacramento to the North-West. The darkest sky is toward the North-East, so it seemed logical to shoot something like M81 and M82. I shot twenty 30 sec frames of each along with some dark frames, did a little bit more observing and called it a night.

The next day, when I got home I processed the frames with Nebulosity, and when I looked at the final picture of M82 I saw what I thought was a star in front of the galaxy. I didn't remember such a star, and confirmed this by looking at several pictures on the web. Then I remembered that there was a new supernova, but hadn't realized it was in M82. So by "dumb luck" I ended up with a fairly good shot. As you will see on the "information" picture, supernova SN 2014 – J (which is just 11.5 million Light Years away!) was about magnitude 12 or 12.5 in late February. It had been about 10.4 visual magnitude at its peak in January, essentially the same as the adjacent star GSC 4383 1099 which is only 57 Light Years away. I have not found the exact figures, but SN 2014 J must be emitting billions of times more light than star 1099.

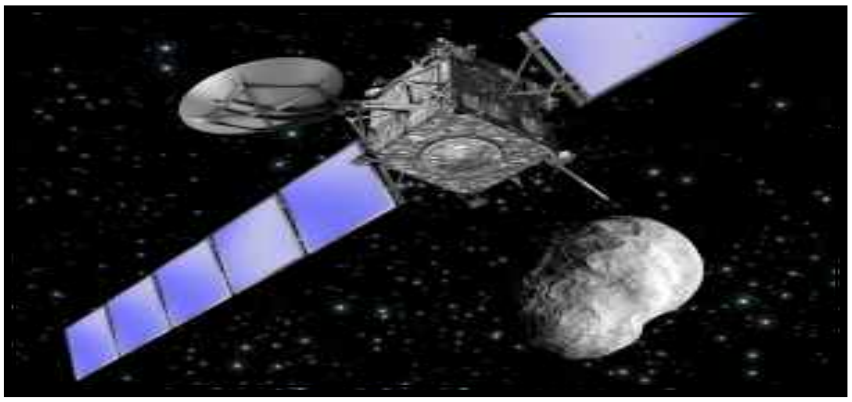
It is interesting to realize that this event occurred about 12 million years ago and will be visible for only a few months. This is a "split second" in astrological time, so I bless my "dumb luck" to have "unblinked" at the right time. The pictures were taken through my Celestron $9^{1/4}$ in. scope with a Canon T2i camera at prime focus, and using an Orion Sky-Glow Astrophotography filter. It was guided with the Orion short 80 mm scope and Star Shoot Autoguider, using Stark Labs PHD guiding software.

Comet Corner

The Rosetta Spacecraft

Science News
Great Photos
Sky Alerts
EarthSky

Reprinted with permission earthsky.org



Space engineers report that they have now received a signal from the Rosetta spacecraft, which has been sleeping for more than two years. Launched from the Guiana Space Centre in French Guiana in March, 2004, Rosetta is on a 10-year mission to Comet 67P/Churyumov-Gerasimenko. The spacecraft was placed in a hibernation mode in June, 2011. The wake-up procedure began at 4 a.m. CST (10:00 UTC) this morning with four *alarm clocks* on board Rosetta set to go off, triggering a series of changes aboard the spacecraft that would result in its antenna pointing toward Earth and sending a signal our way. That signal has now been received. Rosetta will send a Lander to explore the comet.

Rosetta is currently over 500 million miles (800 million kilometers) away.

Rosetta will study Comet 67P/Churyumov-Gerasimenko – called “67P” for short, by astronomers – up close as it enters the inner solar system. If all goes well, it will be the first spacecraft to orbit a comet’s nucleus and the first lander to do a controlled touchdown on the surface of a comet. The comet is just a few kilometers across.

Space engineers believe Rosetta’s navigation camera could glimpse the comet from a distance of 100,000 kilometers by March, 2014. After course correction in May, the probe will be set to rendezvous with 67P/Churyumov-Gerasimenko in August, enter an orbit around the comet and accompany it as it heads towards the sun over the following months.

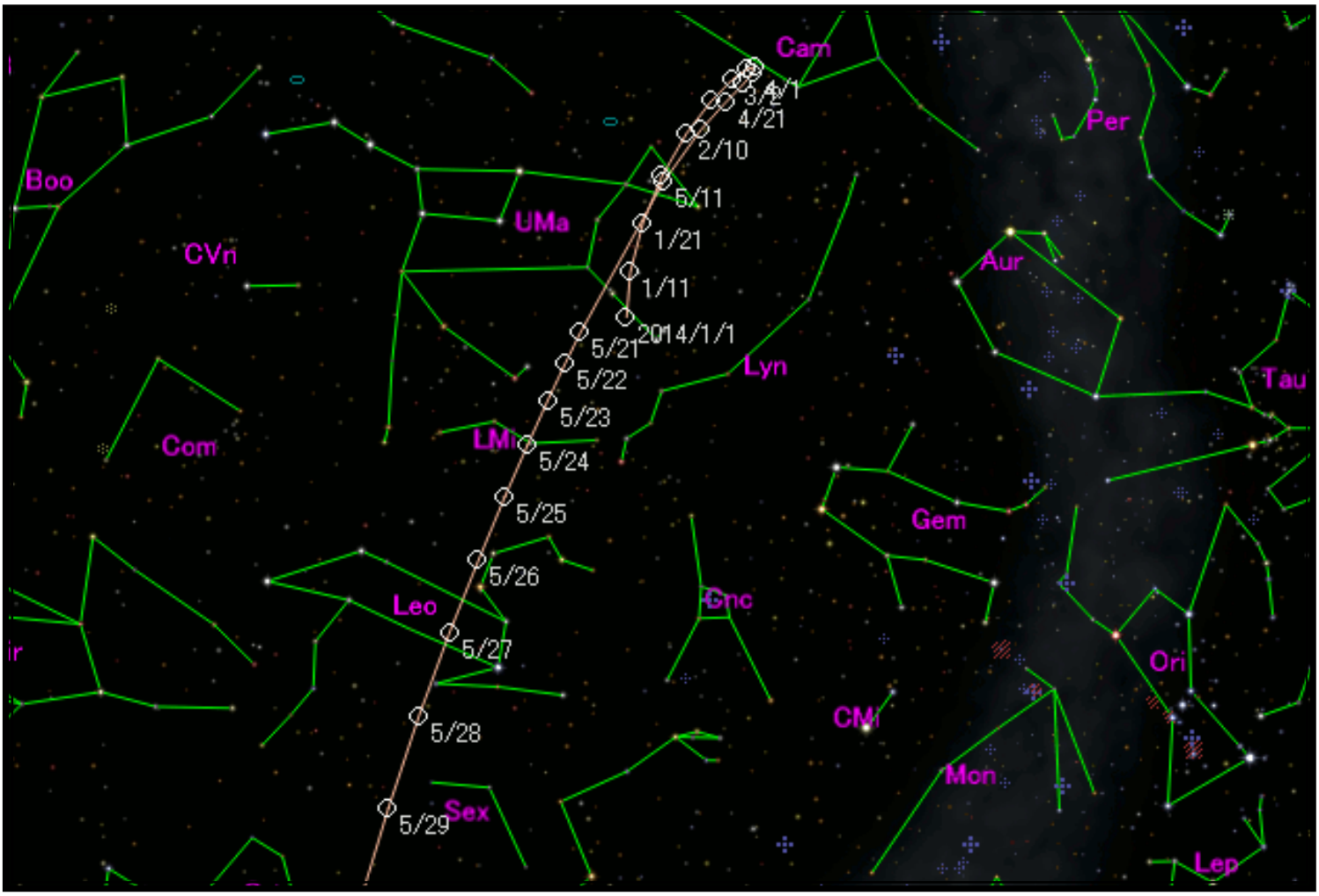
Why is this craft named Rosetta? The idea is that comets provide a window back in time to the formation of the solar system, just as the Rosetta Stone let us look back in time on Earth.

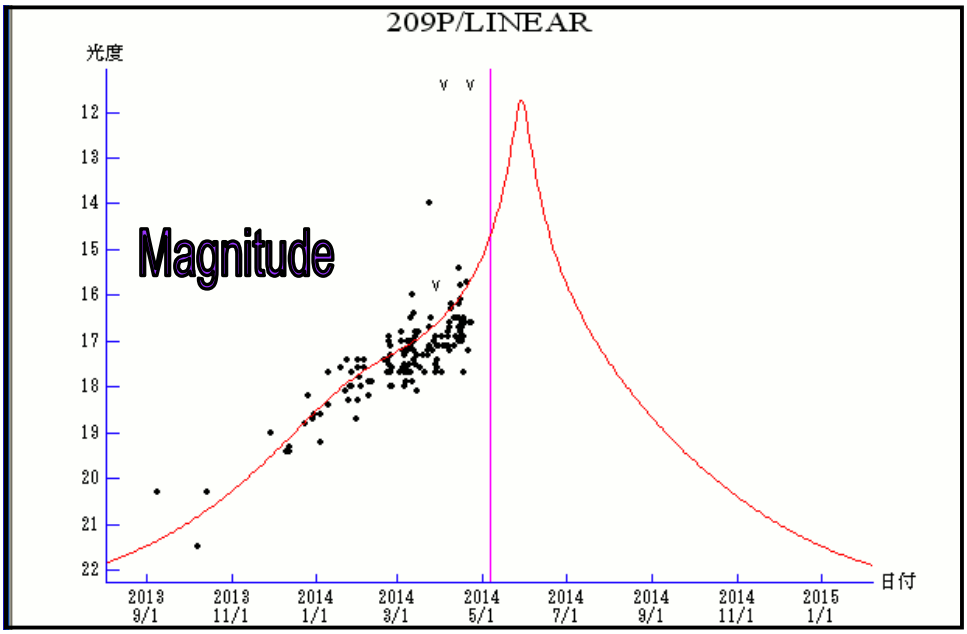
Comet 67P/Churyumov-Gerasimenko, here we come! Bottom line: Rosetta spacecraft is awake!

Follow the Rosetta mission at @ESA_Rosetta on Twitter.

Comet 209P/Linear

Keep and eye on Comet Linear in May, it's hoped to peak at magnitude 10.9 on May 29, 2014.
It's location on May 3rd is: RA 8hr 25.37min, Dec 67deg 50.2 min.





A Blast from the Past: Black #2

By Jeff Baldwin
ATM Chairman, SAS

I have been asking old friends if they had any pictures of my old 12.5" *f*/8 G.E.M. Newtonian telescope, which was "Black #2." Finally, Grant McKinney sent me two old slides. They brought back horrible memories! Not because the telescope was so bad - it wasn't - but because of the back breaking monster it was. Back when I was young and extremely strong, I built a long telescope thinking it would be so cool. It *was* cool.

Visually it was an impressive telescope considering it was the early 80s. It was always the longest [not the largest] telescope at the Table Mountain Star Party in central Washington, so in my mind I was The King. Of course I had to get there first, spend a day setting up the 350 pound horse….and I was the last one out, tearing down and loading this thing. It wouldn't be until Black #4 that I again had so much weight in a scope, and luckily, my friends stuck it out at the beginning and at the end to help me unload, set up, tear down and load this beast. Thank you guys, you know who you are.

Looking through Black #2 was OK: the images were extremely sharp, such as with globular clusters and planets. Nebulae and galaxies were OK, but this wasn't the scope's best area. My plans were to do my Herschels with this thing. As it turns out, you aren't interested in a monster scope to do a difficult observing list. What you are after is a *good system*. A good system includes a telescope that is fun to use, hits the objects you are interested in and, most of all, can be set up and torn down by yourself without destroying your back for the rest of your life. Black #2 was not that scope. I nailed a few Herschels with it, then decided this wasn't the scope I was going to do them with. The parts for this scope came from previous projects, and were used again in later projects. The scope no longer exists.

Also shown in another photo is the hillbilly transportation system I got to these star parties with. Keep in mind that this site is at 6500 feet in central Washington, accessed via a nasty mountain dirt road. My load made it there and back, but somebody should have pulled me over and given me a ticket for being an idiot. Fred's "on-the-roof" system works much better, he has a long telescope too. Dobsonians are so much better than GEM Newts. What were we thinking?????

In these photos is also The Red Giant. It is a 16” f/5 that the Spokane Astronomical Society put together. It has superb optics, weighed a million pounds, and required multiple people to haul and set up. One version of it even had it on its own trailer and the doghouse was clasped to the trailer, which had to be removed by pallbearers, at least four. What part of “Dobs are easier” weren’t we getting?

Telescopes today have larger apertures, are of lighter weight, and use better systems. If it weren’t for that, there wouldn’t be as many astronomers because they’d all be doing something fun rather than working hard to get their astro-fix. The scopes are faster - harder to make but lower to observe through. Photographically, we are using 50” scopes that make photos as good as the 200” telescope used to do. The larger scopes are skeletonized rather than tubed. We are using light-weight materials rather than iron, welding, and worm-geared clock drives. We now use ServoCats and GoTo’s, computers that weigh nothing and fit anywhere. Photography was horrible, shooting with film, not knowing what you got until you developed the film days later. Or worse, the photo lab cutting your negatives down the middle. You were guiding with your eyeball and crosshair eyepieces. The exposures took HOURS. No fun. Astronomy is fun now.

OK Bret, you’re now officially a dinosaur with your 13 foot long telescope. I have to admit that Bret’s scope is a lot of fun, even though I get a nose bleed up his ladder. It’s worth the hike up, especially if you are interested in seeing a 15th magnitude galaxy or details in the brighter objects. *Clear Skies! …Jeff Baldwin*

Reprinted with permission from the Stockton Astronomical Societies (SAS) “Valley Skies newsletter”, April 2014.

SVAS ATM Connection

Nevada County Astronomers

Mirror Workshop

Hosted by Bill Thomas & Lonnie Robinson

Paul Redmon and I are finishing up the polish on his 12.5" f/5. I'm relatively new to machine spin grind and polish, and the surface looked perfect at the end of 9 micron with dead on spherometer reads. Polish was another story, lots of zones, center hill with a moat (like a castle moat), and generally looked horrible. Not something I'm use to with hand polishing. I was really turned off by very ziggy 75% zones when using medium Acculap Pitch, but a change to Gogolz 64, and another prepping spell with 12 and 9 micron, saved the day especially at just over 65 degrees. Gogolz seems to have a wider temperature tolerance. I also de-centered the squares about a quarter inch, with my Perfect Pitch mat, and it didn't seem to affect the spin at all and helped correct the zoning. Lesson learned, there is a low temperature point where the pitch turns brittle, chips, scratches, and generally won't conform to the curve causing zones. We raised the garage temp above 65deg, reduced the quill weight to 5 lbs, reduced the machine speed a bit, and thinned the CEO way down. At 5 hours polish the surface is looking much better! I'm following Jeff Baldwin's suggestions on edge control, running the polish lap overhang about 1/12th the mirror diameter (~1"), but so far it's still a bit turned down. It's slowly improving, suggesting when the edge gets polished out it will be correct and we will make sure before figuring. Bill Thomas runs the outer edge of a smaller lap, perhaps a 6", just inside a turned down edge until it rises, then briefly over it to smooth it back flat.

Bill is going to help us with the Zambuto method of machine figuring, and I have laps in one inch increments ready to go. Stay tuned, we are working towards achieving the famous Zambuto ultra smooth surface by mixing the CEO extremely thin, slowing the machine way down, and working the figure from the edge towards the center with progressively smaller laps. Come join the fun! Lonnie Robinson

Jason 2 Satellite

Artist's interpretation of the Jason 2 satellite. To do its job properly, satellites like Jason 2 require as accurate a terrestrial reference frame as possible. Image courtesy: NASA/JPL-Caltech.

Old Tool, New Use: GPS and the Terrestrial Reference Frame

By Alex H. Kasprak

Flying over 1300 kilometers above Earth, the Jason 2 satellite knows its distance from the ocean down to a matter of centimeters, allowing for the creation of detailed maps of the ocean's surface. This information is invaluable to oceanographers and climate scientists. By understanding the ocean's complex topography—its barely perceptible hills and troughs—these scientists can monitor the pace of sea level rise, unravel the intricacies of ocean currents, and project the effects of future climate change.

But these measurements would be useless if there were not some frame of reference to put them in context. A terrestrial reference frame, ratified by an international group of scientists, serves that purpose. "It's a lot like air," says JPL scientist Jan Weiss. "It's all around us and is vitally important, but people don't really think about it." Creating such a frame of reference is more of a challenge than you might think, though. No point on the surface of Earth is truly fixed.

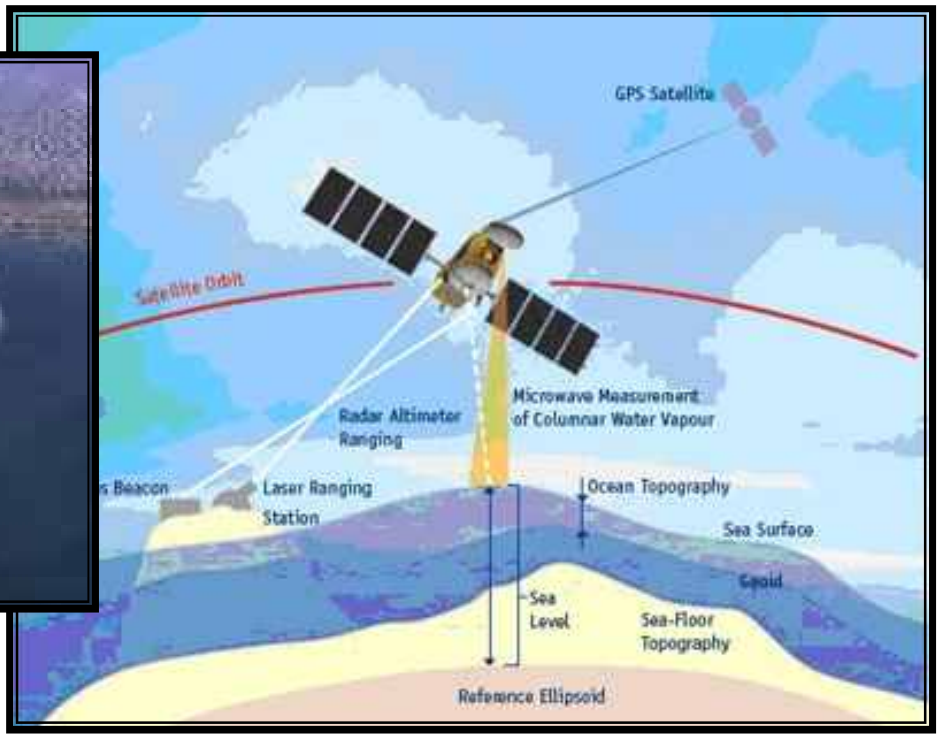
To create a terrestrial reference frame, you need to know the distance between as many points as possible. Two methods help achieve that goal. Very-long baseline interferometry uses multiple radio antennas to monitor the signal from something very far away in space, like a quasar. The distance between the antennas can be calculated based on tiny changes in the time it takes the signal to reach them. Satellite laser ranging, the second method, bounces lasers off of satellites and measures the two-way travel time to calculate distance between ground stations.

Weiss and his colleagues would like to add a third method into the mix—GPS. At the moment, GPS measurements are used only to tie together the points created by very long baseline interferometry and satellite laser ranging together, not to directly calculate a terrestrial reference frame.

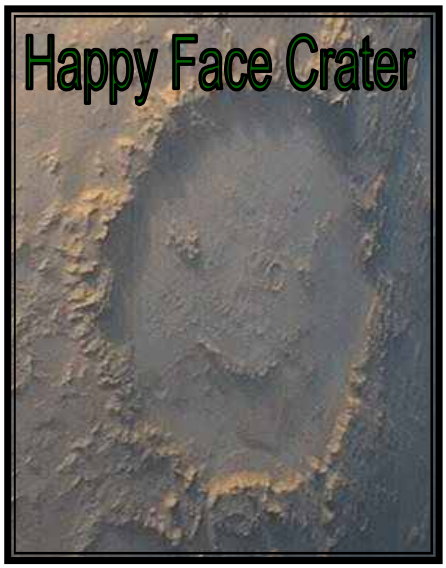
"There hasn't been a whole lot of serious effort to include GPS directly," says Weiss. His goal is to show that GPS can be used to create a terrestrial reference frame on its own. "The thing about GPS that's different from very-long baseline interferometry and satellite laser ranging is that you don't need complex and expensive infrastructure and can deploy many stations all around the world."

Feeding GPS data directly into the calculation of a terrestrial reference frame could lead to an even more accurate and cost effective way to reference points geospatially. This could be good news for missions like Jason 2. Slight errors in the terrestrial reference frame can create significant errors where precise measurements are required. GPS stations could prove to be a vital and untapped resource in the quest to create the most accurate terrestrial reference frame possible. "The thing about GPS," says Weiss, "is that you are just so data rich when compared to these other techniques."

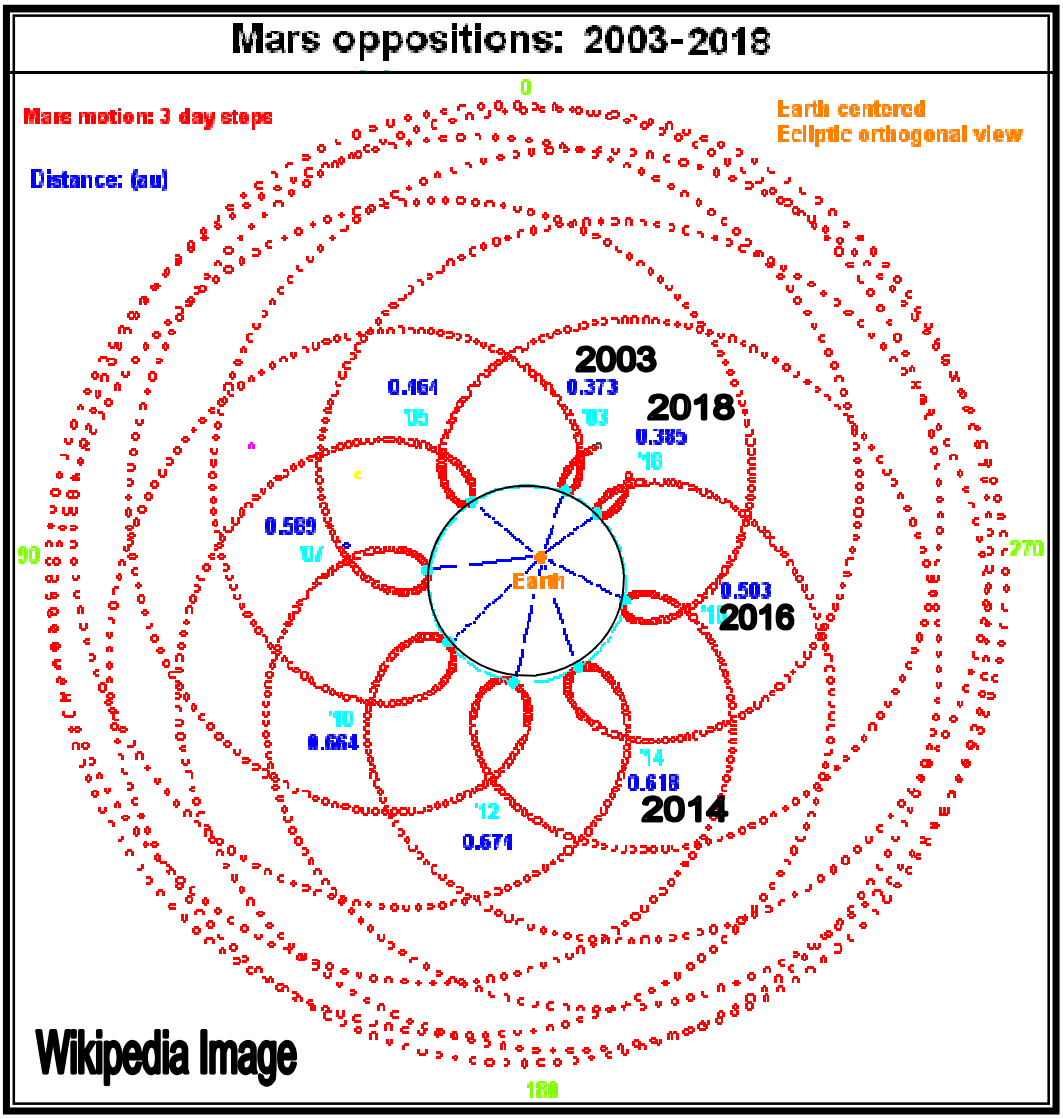
You can learn more about NASA's efforts to create an accurate terrestrial reference frame here: http://space-geodesy.nasa.gov/.



Greetings from Mars

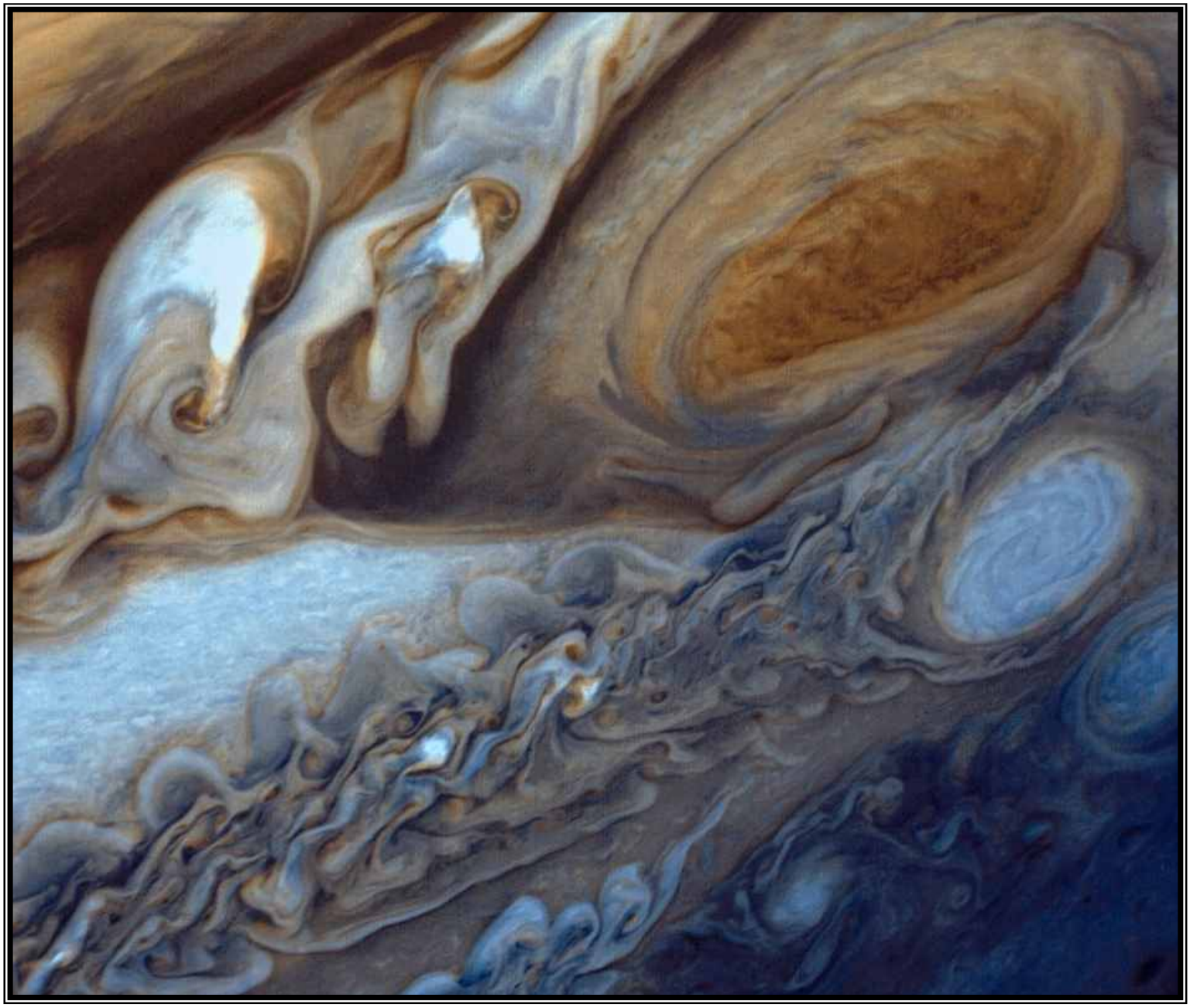


Don't forget to visit Mars in the coming weeks, it's as close as it will be for a few more years. Mars is now about .618 astronomical units (AU) from Earth, and in 2016 it will be .503 AU's. We are all looking foreword to 2018 when it will be .385 AU's from us. I like to compare it's general size to coins, and right now it's rather like a dime in the eyepiece or 14.8 arc seconds across. In 2018, Mars will display more like the size of a quarter giving very little change back, or about 25 arc seconds. Now we're talking! It's difficult even at a quarter size to see a lot of surface detail, because we must peer through a lot of dust storms on Mars and atmospheric turbulence here on Earth. The last close opposition in 2003 was spectacular in my opinion. I rolled my modest 8" Meade out in my backyard here in Sacramento, and was amazed at the views! I could see Hellas Basin just over Syrtis Major, Mare Sirenum following next from the easterly horizon. Sinus Meridiani showed up a few hours later. The canals were plainly visual (just kidding). All this while viewing Mars hanging just over my neighbors Sun heated roof and a full Moon rising, proof that viewing the planets is sometimes best through the steady, warm, light polluted air of the city.



I tried my best to see some Mars surface detail at Sac City College, this spring, through the observatories 16" Meade. Using my imaginary vision, yes "imaginary", I thought I could see some surface detail but not enough to identify it. The polar cap is usually visual during most any close approach. Don't miss Mars because of my low key visual impression, It's still a show-stopper of a planet! SVAS Editor

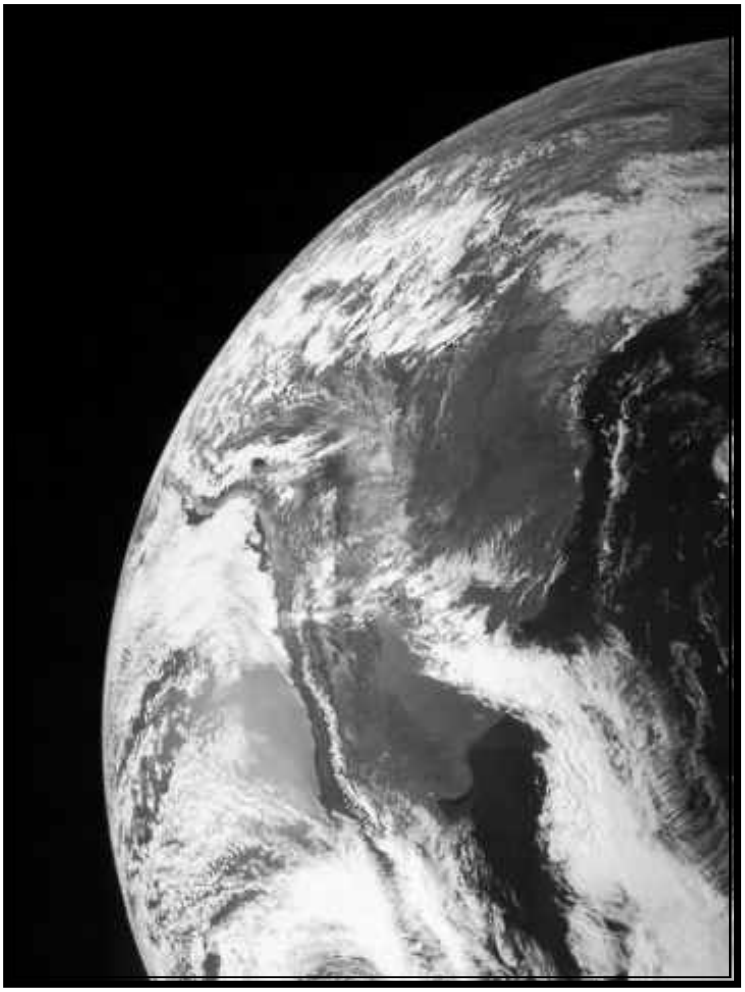
Voyager 1 Eyes Jupiter



At about 89,000 miles in diameter, Jupiter could swallow 1,000 Earths. It is the largest planet in the solar system and perhaps the most majestic. Vibrant bands of clouds carried by winds that can exceed 400 mph continuously circle the planet's atmosphere. Such winds sustain spinning anticyclones like the Great Red Spot -- a raging storm three and a half times the size of Earth located in Jupiter's southern hemisphere. In January and February 1979, NASA's Voyager 1 spacecraft zoomed toward Jupiter, capturing hundreds of images during its approach, including this close-up of swirling clouds around Jupiter's Great Red Spot. This image was assembled from three black and white negatives. The observations revealed many unique features of the planet that are still being explored to this day.

Credit: NASA's Goddard Space Flight Center. Video and images courtesy of NASA/JPL

Juno Saying Goodby to Earth



On 9 Oct., 2013, Juno flew by Earth using the home planet's gravity to get a boost needed to reach Jupiter. **The JunoCam caught this image of Earth,** and other instruments were tested to ensure they work as designed during a close planetary encounter.

The Juno spacecraft was launched from NASA's Kennedy Space Center in Florida on 5 Aug. 2011. Juno's rocket, the Atlas 551, was only capable of giving Juno enough energy or speed to reach the asteroid belt, at which point the sun's gravity pulled Juno back toward the inner solar system. The Earth flyby gravity assist increases the spacecraft's speed to put it on course for arrival at Jupiter on 4 July 2016. Juno will, for the first time, see below Jupiter's dense cover of clouds. This is why the mission was named after the Roman goddess, who was Jupiter's wife, and who could also see through clouds.

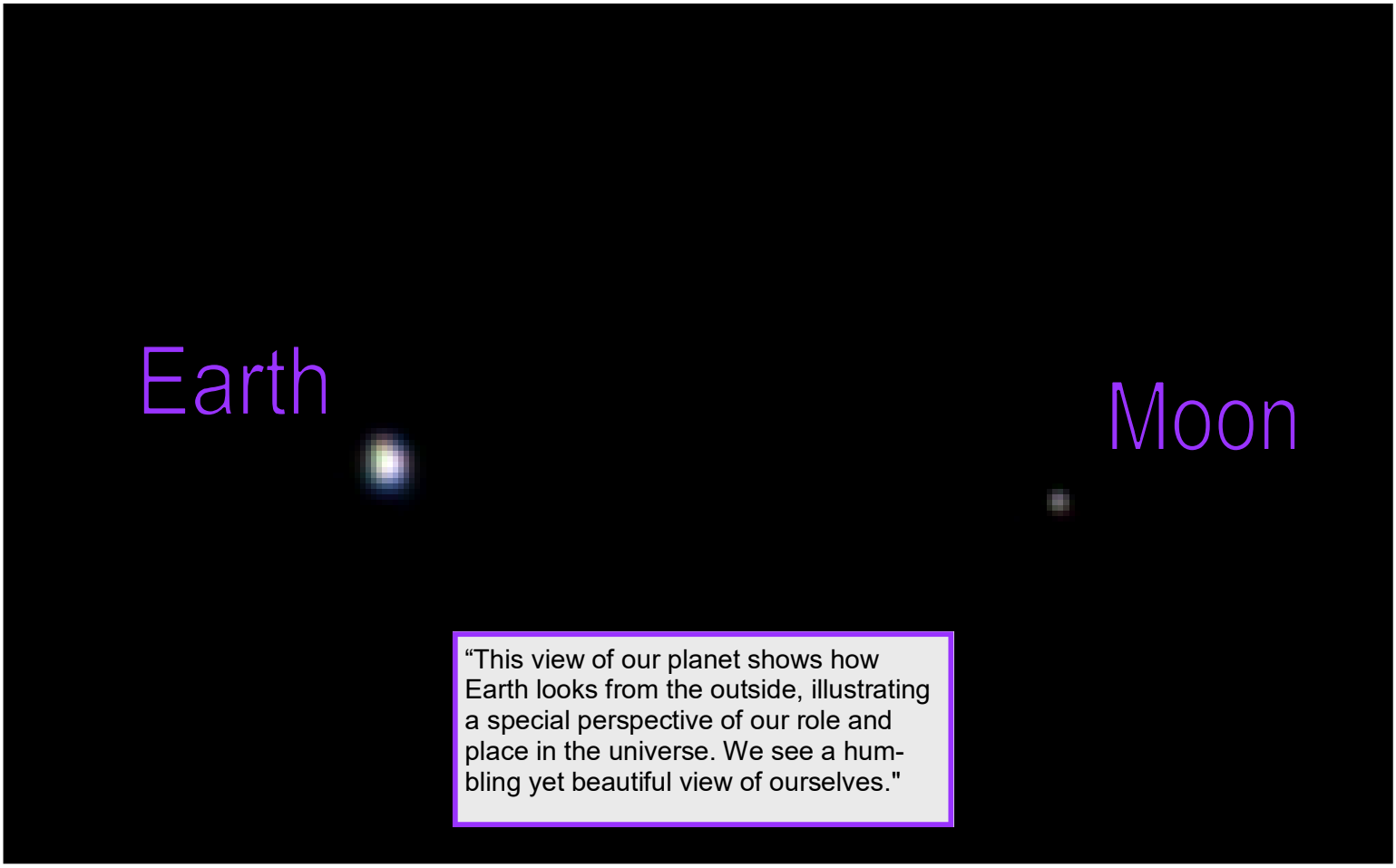
The spacecraft will orbit Jupiter 33 times, skimming to within 3,100 miles (5,000 kilometers) above the planet's cloud tops every 11 days, for approximately one year.

The orbiter will use massive solar panels to power its suite of science instruments. Juno will be the first solar-powered spacecraft designed to operate at such a great distance from the sun.

Juno will be the second spacecraft to orbit Jupiter. A total of eight spacecraft have studied Jupiter.

The Juno mission is the second spacecraft designed under NASA's New Frontiers Program. The first was the Pluto New Horizons mission, launched in January 2006 and scheduled to reach Pluto's moon Charon in 2015.

Credit: NASA/JPL-Caltech/Malin Space Science Systems



Juno Captures Earth And Moon
Date: 26 Aug 2011

On its way to the biggest planet in the solar system -- Jupiter, NASA's Juno spacecraft took time to capture its home planet and its natural satellite -- the moon.

"This is a remarkable sight people get to see all too rarely," said Scott Bolton, Juno principal investigator from the Southwest Research Institute in San Antonio. "This view of our planet shows how Earth looks from the outside, illustrating a special perspective of our role and place in the universe. We see a humbling yet beautiful view of ourselves."

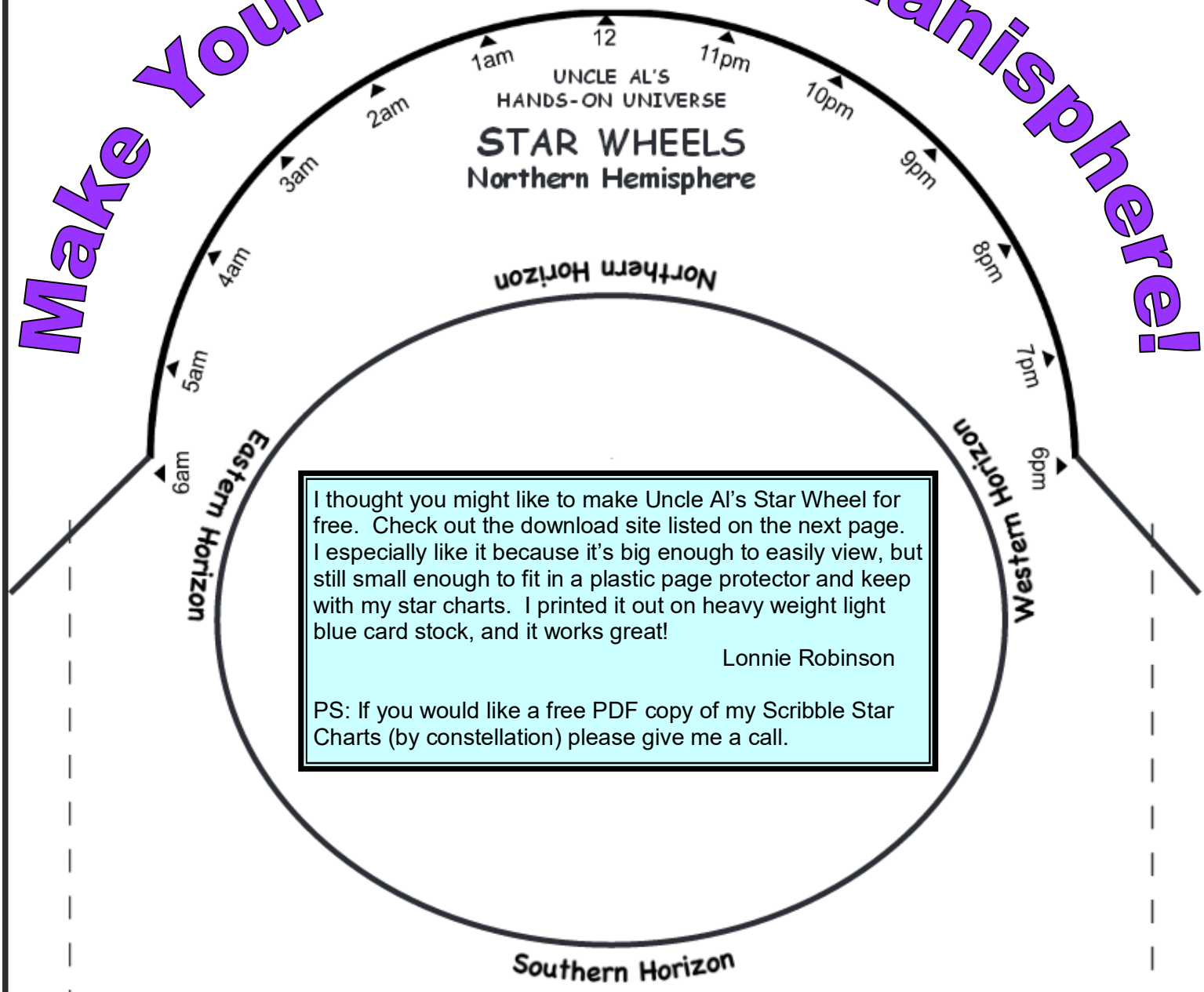
The image was taken by the spacecraft's camera, JunoCam, on Aug. 26 when the spacecraft was about 6 million miles (9.66 million kilometers) away. The image was taken as part of the mission team's checkout of the Juno spacecraft. The team is conducting its initial detailed checks on the spacecraft's instruments and subsystems after its launch on Aug. 5.

Juno covered the distance from Earth to the moon (about 250,000 miles or 402,000 kilometers) in less than one day's time. It will take the spacecraft another five years and 1,740 million miles (2,800 million kilometers) to complete the journey to Jupiter. The spacecraft will orbit the planet's poles 33 times and use its eight science instruments to probe beneath the gas giant's obscuring cloud cover to learn more about its origins, structure, atmosphere and magnetosphere, and look for a potential solid planetary core.

Credit: NASA/JPL-Caltech

Make Your Own Free Planisphere!

Star Wheel Holder



I thought you might like to make Uncle Al's Star Wheel for free. Check out the download site listed on the next page. I especially like it because it's big enough to easily view, but still small enough to fit in a plastic page protector and keep with my star charts. I printed it out on heavy weight light blue card stock, and it works great!

Lonnie Robinson

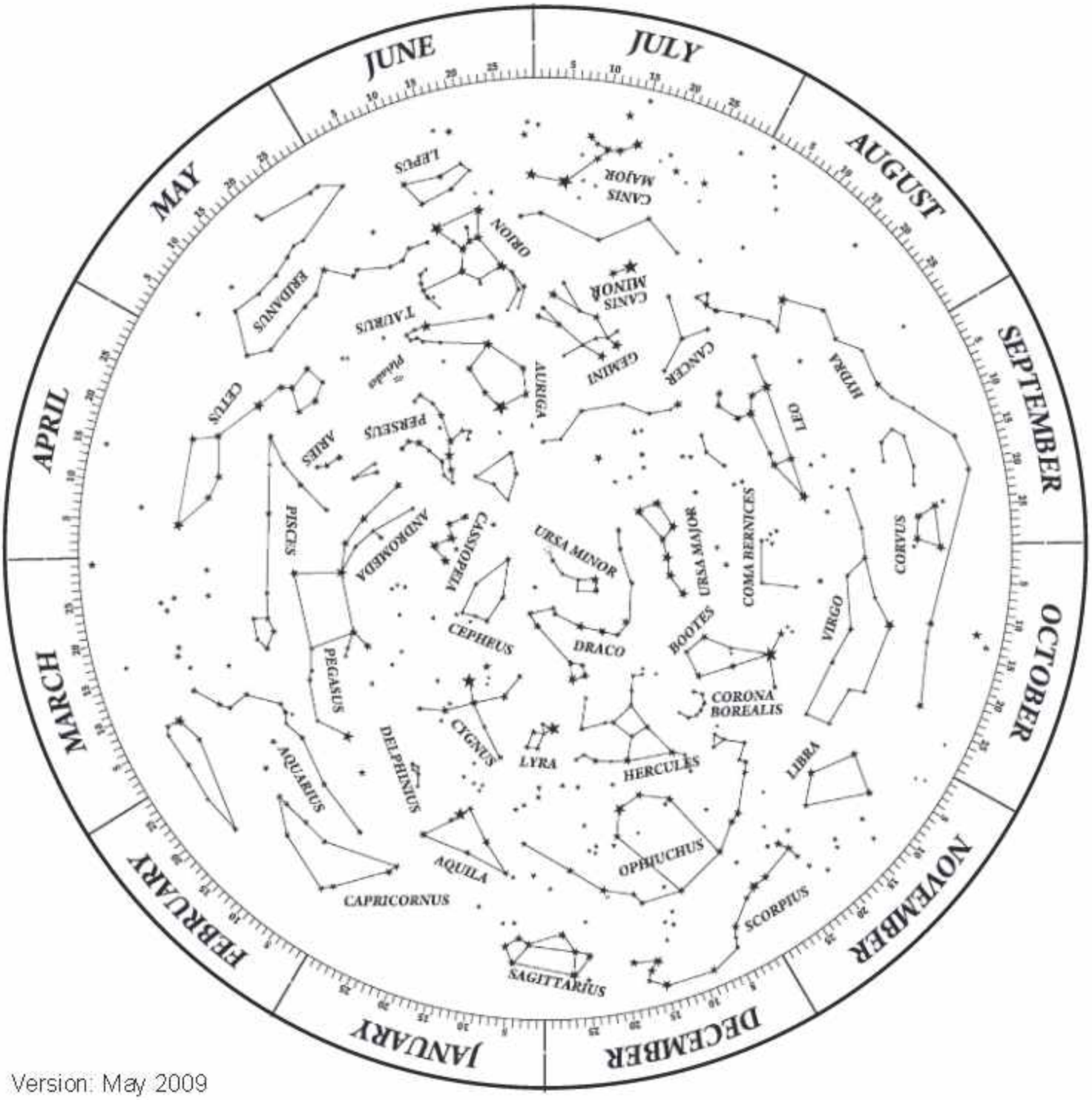
PS: If you would like a free PDF copy of my Scribble Star Charts (by constellation) please give me a call.

Version: May 2009

Instructions for Using Uncle Al's Star Wheels

1. Align your date and time, and then look up at the sky
2. Locate the constellation you want to find on the map.
3. Turn your map so the horizon it is closest to is at the bottom.
4. The star positions in the sky should match those on the wheel.

Uncle Al's Star Wheels are based on LHS Sky Challengers created by Budd Wentz and available through LHS Museum Store
510-642-1016 http://www.lhs.berkeley.edu/pass/ast110&111&121.html
Download Uncle Al's Sky Wheels from http://lhsberkeley.edu/hou/img/unclea1



Version: May 2009

INSTRUCTIONS FOR ASSEMBLING UNCLE AL'S STAR WHEELS

Step 1: Print out all pages either on heavy cardstock or paste them onto a file folder or any other sturdy piece of cardboard.

Step 2: Cut along the black outer circle of the Star Wheel and along the solid lines on the Star Wheel Holder. Remove the interior oval shape on the Star Wheel Holder.

Step 3: On the Star Wheel Holder, fold the cardboard along the dashed lines.

Step 4: Tape or staple along the edges of the Star Wheel Holder forming a pocket.

Step 5: Place the Star Wheel in the Star Wheel Holder.

Uncle Al's HOU Star Wheels are based on LHS Sky Challengers created by Budd Wentz and available through the LHS Discovery Corner Store 510-642-1016

http://lhs.berkeley.edu/pass/AST110&111&121.html

Download Uncle Al's Sky Wheels from http://lhs.berkeley.edu/starclock/skywheel.html

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First Light Team	Perry Preston Porter
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Amateur Telescope Making	Lonnie Robinson / Bill Thomas

Where We Meet

General Meetings the third Friday of each month beginning at 8:00pm.
Board Meetings begin at 6:30 on the same day. All members are welcome.
Star Parties on weekends nearest the new Moon.

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

WWW.SVAS.ORG

SVAS Observer

To Subscribe– First send in your membership application form below, with your dues, and upon approval by the Board of Directors the Observer newsletter (published bi-monthly beginning January) will be sent to your supplied email address in .pdf format. Second, request to join the SVAS Yahoo Group at http://groups-yahoo.com/group/svas-members. This group will keep you informed with the day to day current events and discussions.

Articles– Manuscripts and letters are welcome in MS Word, MS Publisher, or plain text format, and emailed to the SVAS Editor. Submission deadline is the 15th of the newsletter release month.

Advertising– Commercial, non-personal advertising, business card, and full page are available. Classified advertising is free to SVAS members.

SVAS Membership Application

Date___/ ___ /___ Membership (check one): New: ___ or Renew:___

Number of months until June (include June) #Months_____

For Student- (student ID req) multiply by $2 per month_____

Or for Family/ Individual– multiply by $3 per month_____

Observatory (+membership & approvals) multiply by $4 per month_____

Additional tax deductible contribution: Amt $ _____

July 1 is the annual renewal date Total Amount$_____

Name_____

Address_____

City _____ Zip_____ (Please Print)

Phone_____ (Email for newsletter mailing)

Email_____

Detach and mail SVAS Membership Application
with payment to: PO Box 15274
Sacramento, California. 95851-0274

Note: It may take the SVAS Board of Directors 30 or more days to process and approve this application.

By signing this application, I acknowledge I have accessed the SVAS website, read and understand the SVAS bylaws and the rules governing the USFS Special Use Permit. In doing so, I agree to abide by the respective "terms and conditions" of each as they relate to the SVAS, use of its property and its facilities. I further understand and acknowledge that failure to abide by these "terms and conditions" can result in revocation of use privileges and/or SVAS membership.

Required Signature

_____

Date_____

Observatory Membership Approvals

The benefits of a regular membership plus private use of the Henry Grieb Observatory (HGO) at Blue Canyon. You must be a regular member for six months or longer, be certified and approved by the Observatory Director, and then be approved by the SVAS Board of Directors.