



SVAS

Vol. 71 No. 1* Jan-Feb, 2014

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OBSERVER

Sacramento Valley Astronomical Society
Founded in 1945

Happy 2014! Let's all work together to make the SVAS experience even better this year. It takes everyone getting involved to make great things happen. Choose your favorite club activity, and jump in with both feet! Do you enjoy outreach, and sharing the stars with the public? Would you rather just attend star parties at Blue Canyon? How about building telescopes? The SVAS has it all, so come join the fun and make it great.

Elections are just around the corner. This could be the most important meeting to attend all year, and it would be great to see each and every member there! Choose who you want to represent your club, better yet, volunteer and campaign for yourself. We always need more Board Members. Change for the better is up to you!

Many thanks to Ross Gorman and Walt Heiges. We are in great hands with their leadership. It takes their insight and good judgment to keep the SVAS running smoothly.



Happy New Year!

Observer Editor

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SVAS Event Calendar



January 1 New Moon



January 4th Blue Canyon, weather permitting. Prairie City is our alternate site, but please contact Tim Tingey to plan in advance before attending.



January 17, General Meeting, Friday at 8:00pm

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



January 30 New Moon, none in Feb!



February 1st Blue Canyon, weather permitting. Prairie City is our alternate site, but please contact Tim Tingey to plan in advance before attending.



February 21
General Meeting
Friday at 8:00pm

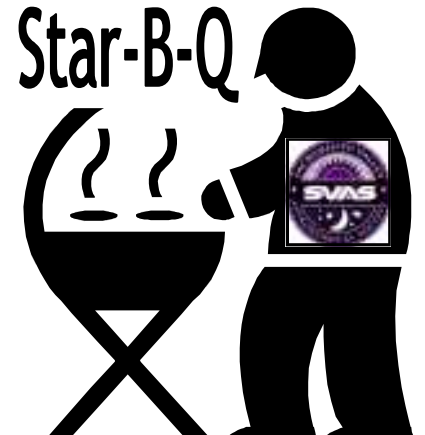
Sacramento City College, Mohr Hall Room 3, 3835 Freeport Boulevard, Sacramento, CA.

Star Party Schedule for 2014

January 4th	
Feb 1st	
Mar 1st	
Mar 29th	
April 26th	
May 31st	
June 28th	
July 25th, 26th, Star-B-Q	
Aug 23rd	
Sept 27th	
Oct 25th	
Nov 22	
Dec 20th	

Star-B-Q 2014!

We believe in plenty of advance notice, so next years Star-B-Q will be held July 26, 2014. Hopefully missing major holidays and other events, GSSP is scheduled for June 26-29, 2014. We are already working on raffle prizes and plan on assembling the shade canopies and tables earlier to get things going smoothly.



Messier Marathon



by Tim Tingey



M-1 Crab Nebula

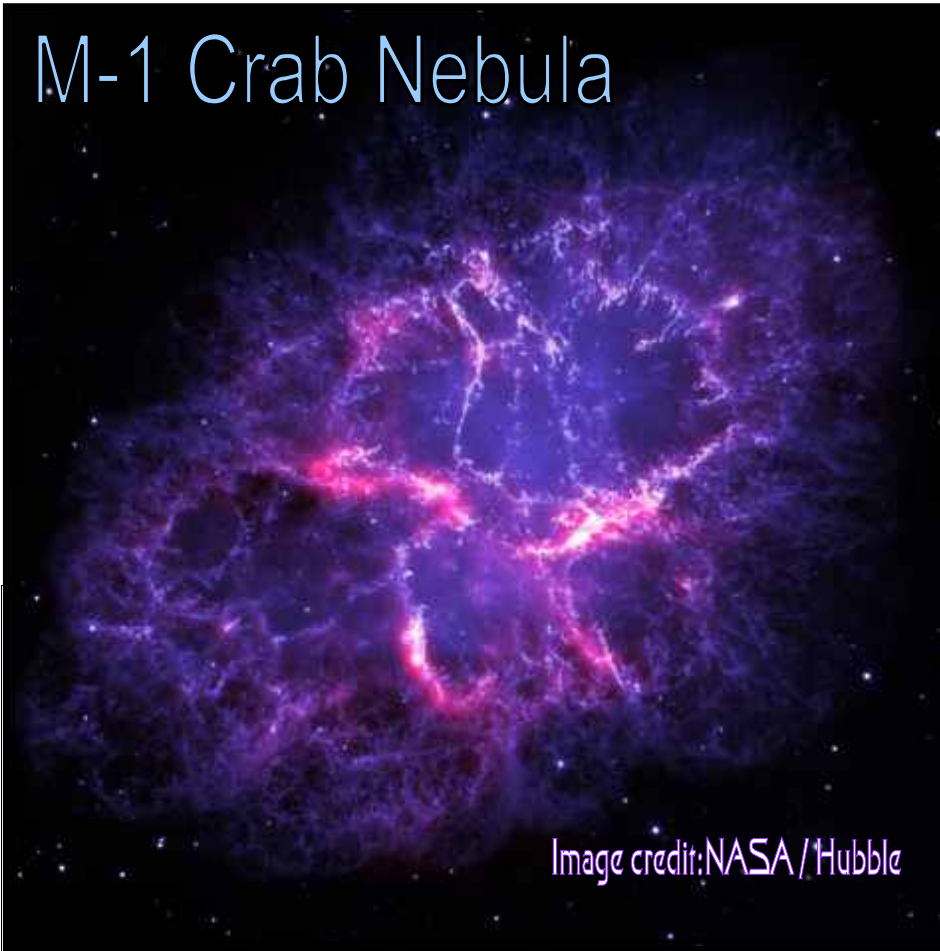


Image credit: NASA/Hubble

If only we could visually see **M-1, the Crab Nebula**, like this Hubble image! I find it difficult at best to visually see a lot of the detail. Start with this Messier beauty in Taurus, to begin your Messier Marathon quest this month. No more excuses, let's get going! Stay tuned for the next newsletter in February, Tim and I will attempt to work out an observing guide, and schedule some Messier get-to-gathers for the springtime observing season.

Observer Editor

NASA news release:

This image shows a composite view of the Crab nebula, an iconic supernova remnant in our Milky Way galaxy, as viewed by the Herschel Space Observatory and the Hubble Space Telescope. Herschel is a European Space Agency (ESA) mission with important NASA contributions, and Hubble is a NASA mission with important ESA contributions.

A wispy and filamentary cloud of gas and

dust, the Crab nebula is the remnant of a supernova explosion that was observed by Chinese astronomers in the year 1054.

The image combines Hubble's view of the nebula at visible wavelengths, obtained using three different filters sensitive to the emission from oxygen and sulphur ions and is shown here in blue. Herschel's far-infrared image reveals the emission from dust in the nebula and is shown here in red.

While studying the dust content of the Crab nebula with Herschel, a team of astronomers have detected emission lines from argon hydride, a molecular ion containing the noble gas argon. This is the first detection of a noble-gas based compound in space.

The Herschel image is based on data taken with the Photoconductor Array Camera and Spectrometer (PACS) instrument at a wavelength of 70 microns; the Hubble image is based on archival data from the Wide Field and Planetary Camera 2 (WFPC2).

Image credit: ESA/Herschel/PACS/MESS Key Programme Supernova Remnant Team; NASA, ESA and Allison Loll/Jeff Hester (Arizona State University)



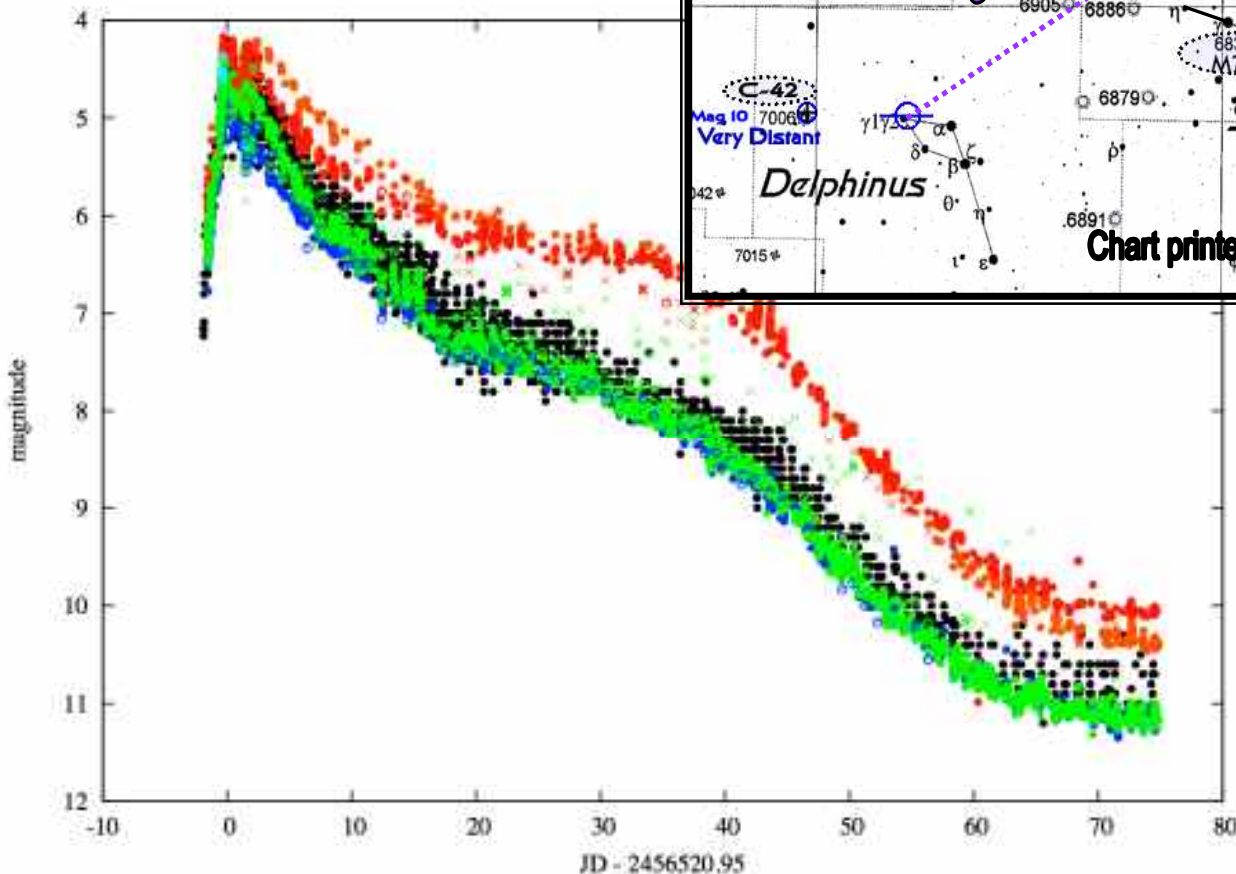
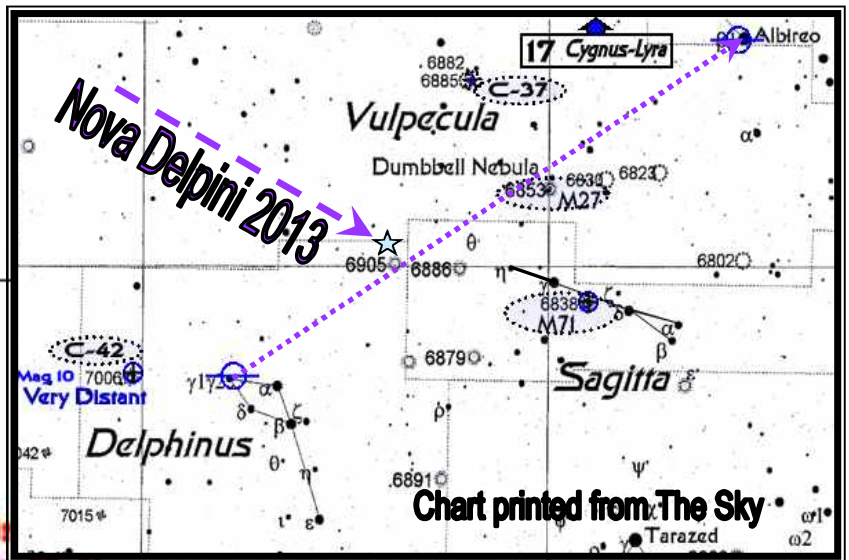
Nova V339 Delphinus Continues to Shine

by Bill Goff



This summer's bright nova in Delphinus, mentioned in an earlier newsletter, has created quite a sensation for amateur and professional observers. It was one of the brightest seen from Earth in many years. By the end of October, the AAVSO had cataloged 4,500 visual brightness estimates and over 50,000 instrument measurements of this target from nearly 500 observers! As a class, novae are binary systems with a white dwarf and G through M class dwarf companion. The white dwarf draws material off the outer shell of the smaller dwarf, which then circles the white dwarf in a whirlpool of gaseous disk. Eventually, the disk grows in size and begins to spill onto the white dwarf. This creates a runaway thermonuclear explosion of the white dwarf's outer surface which we see as a nova. The system eventually cools down, and sometimes takes tens of thousands of years to reoccur. Nova, dwarf nova, and type 1a supernova are all varying types of this mechanism.

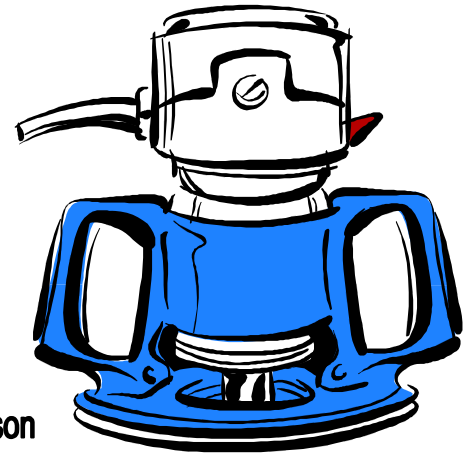
Nova Del(V339 Del) has revealed an interesting light curve. The colors represent different colors of light from the system. In the visual band (green dots) the nova reached about 4.5 magnitude, but is now about 11th mag.



The Mighty Router

Part 1 Choosing Your Router

by Lonnie Robinson



I have always been inspired by what shop tools can do, and instead of designing a project and picking the right tool to do the job, I seem to go backwards by first envisioning things a tool can do and then designing a project around that concept. One example is the thought process for creating the mirror box handles, altitude bearing cross brace, and the upper cage struts for my 16" Dobsonian. I purchased a fantastic book by Wood Magazine called "Router Tips, Jigs, & Techniques", and it described how to make spindles with decorative angled grooves. My first thoughts were how cool these spindles would look on a new telescope, and the whole scope design evolved around that concept.

The router is such an amazing tool, and it can do so much when building a Dobsonian telescope. First let's talk about choosing the best router, what you can do to make it even more functional, and later perhaps some fresh ideas for you new Dob project.

Most routers are available as a fixed base only, packaged together with a plunge base attachment, or the plunge base can be purchased separately. The plunge base adds a large margin of safety to most hand held routing, and I highly recommend it. For many years I accomplished the same tasks with a fixed base by simply using the loosened depth adjuster and rotating it to push the cutter into the project, or slowly inserting the spinning fixed depth cutter into the work piece. This is a very dangerous procedure if not securely holding the router, and you must pay attention to the always extended rotating cutter! I had no idea how very cool, safe, and convenient the plunge attachment is. It allows you to preset the cutting depth, and you can even use several available stops to gradually make deep cuts by rotating a graduated turret depth stop. It makes very minute adjustments a breeze with the micro adjustable depth stop. But most importantly, it is so much



PORTER CABLE



safer! To start a cut, place the retracted router bit over the material and slowly push the whole router and spinning cutter down into your project. Once the cutter is at the desired depth, flip a lever next to your thumb to securely hold it there until the cut is finished. Then simply release the lever and the cutter retracts back to a safe position. Multiple cuts, like making an address number placard, are

DeWALT



so much simpler. The fixed base can be safely used for many projects like trimming edges, but it is truly at home in a router table where it can be securely and safely mounted underneath. The cutter height can be adjusted from the table top. More on router tables later.

There's a large number of companies that make routers.

Sears Craftsman



My research brought only a few to the forefront, and Porter Cable seems to be the most desired, but it's very expensive. DeWALT (Black and Decker) isn't far behind. Decide what features you prefer, and look for them in your favorite brand. I found every feature I wanted in the Sears Craftsman, and at a sizable reduction in cost. For around \$125 you can buy the 1/2", 12 amp, 2.25hp, router packaged with a fixed and plunge base. The 1/2" shafts make cutters a lot more stable, especially in harder materials, and it is a necessary requirement for some of the larger diameter high speed cutters. It has a variable speed 25,000 rpm control, soft start (I really like this feature), LED lighted cutting area,

1/4" and 1/2" collets, shaft collet lock for easily changing cutters with one wrench (releasing the cutter collet lock nut a few extra turns actually pushes a stubborn cutter out), and last but not least a table top depth adjustment allowing the insertion of a long Allen wrench from above the router plate into a fitting on the router, to raise or lower the cutter while

measuring it's cutting depth. Check out the Craftsman, I'm sure you will be impressed with the quality and features. Please forgive me if I don't mention your favorite brand. There are so many high quality routers available out there, and I'm sure they all perform admirably.

Let me say a few words about

router safety. Overall this is a very safe tool, but it can cause a lot of damage very quickly! When making cuts, remember to keep the cutter rotation advancing against and into the feed direction. If the cutter rotates into the material the same direction as the feed, it can grab and climb away from you with amazing speed and power. Don't forget this feed direction is reversed when the router is mounted under a table. Use both hands to securely hold the router, because it has the power to twist your arm and launch itself away if it grabs! Please make sure you disconnect the power when making bit changes! Watch the cutter speed limit, bigger diameter cutters must turn slower. Wear eye and ear protection, the router can cause ear damage with it's high pitched scream. Sorry to preach, but a few cautions could make your day so much better!

Stay tuned for future chapters. Woodworking and Dobsonian telescopes really go together, especially during the overcast winter months with more time to work on unfinished projects. Friends tell me my Dob will only be used in the dark and no one will see it, so why make it look really sharp with rounded corners, near perfect joints, and a flawless finish? Astronomers work hard to dark adapt their eyes, and suspect their keen eyesight in the dark can detect fine workmanship or not. Like so many hobbies, a lot of time is spent on other activities such as meetings, Bar B Qs, and setting up early for a star party. During those times it's a great feeling to know your scope looks it's best, and handcrafted with pride.

I will be discussing router tables next, should you build your own or buy? Then let's discuss choosing router bits, a couple cool trammel attachments you can make to cut large and small circles, freehand cutting guides, and a special plate to add a jigsaw to the router table. After that we will discuss how these attachments, some specialized jigs, and pattern cutting, can make life easier constructing the specialized parts for your Dobsonian.





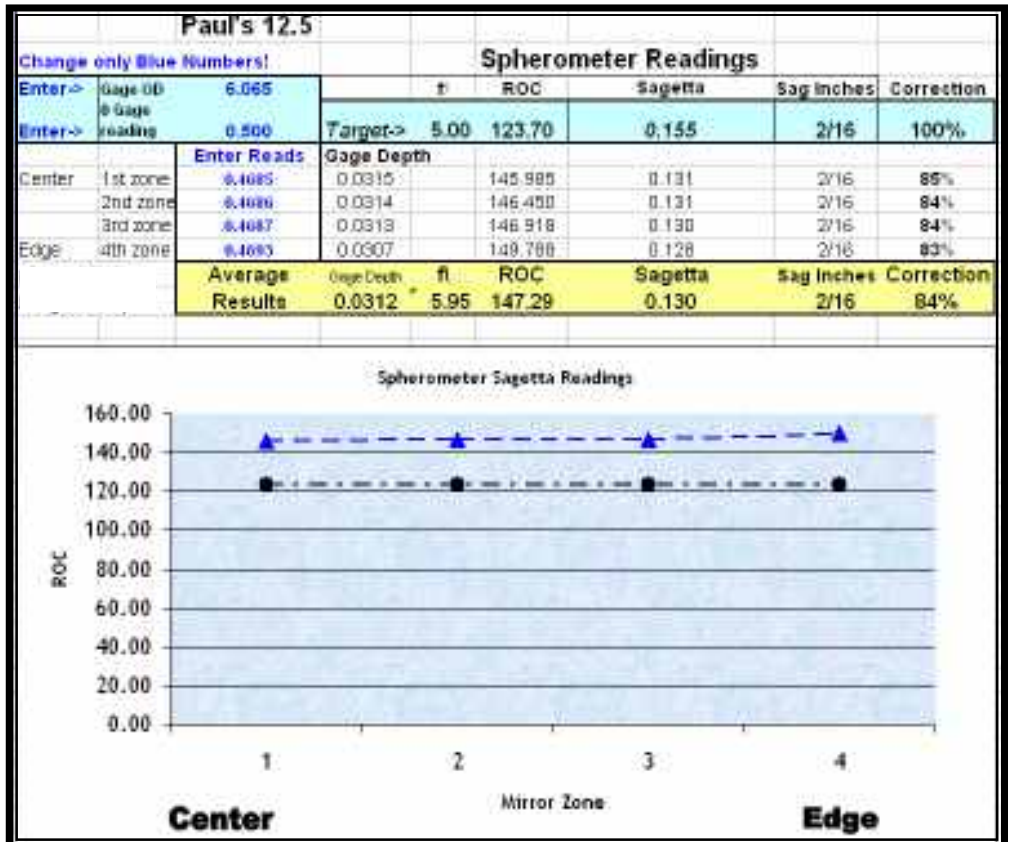
by Lonnie Robinson



Progress has been slow on Paul's 12.5" mirror blank. Using a steel tool, that had been used on another mirror, seemed to cease cutting at about f/7? It never did wear completely in to the new mirror's curve. We added a layer of Tap Plastics marine epoxy to the tool, using the mirror as a form. Then we epoxied glass tiles to the tool and decreased the effective cutting diameter from 7.5" to about 6.5", in hopes it would fit the faster curve better. It worked really well bringing down the curve very quickly and smoothly to f/5.95. When we reach our new goal of f/5 (Paul decided to keep the eyepiece height low enough not to need a stool), we will make a new 75% size plaster tool cast to the mirror curve and add glass tiles from Lowes. This tool will be used for the rest of rough and fine grinding through 9 micron. I swore I'd never hog out another mirror and here I am at it again!

It's so much easier to order your blank with the curve pre-generated with the back and edge rough ground. It's worth every penny! It's a real challenge to center an out of round blank on the turntable to +/-0.10.

To the right is the Excel spreadsheet we are using to plot our progress. The graph's blue line represents where we are, and the black line is our goal. Targets at the top are the numbers we are trying for, and the yellow area is the average results so far. Taking four readings with a round spherometer from the center out to the very edge shows the accuracy of our progress, especially during the rough grinding phase. It will alert us to any zone going long or short for any reason, and we can then adjust the lap motion and position to compensate. It's so important to completely establish the perfect sphere with the coarse grits before moving on. The finer smoothing grits can't make up for large errors created during the rough stage. Stay tuned, more progress reports to come.





Comet Corner

The Reclusive Comet ISON

Comet ISON was billed as the comet of the century. It was a huge mass of dirt and ice three miles wide, that was diverted towards our Sun traveling at 91,000 mph. It came from the Oort cloud which surrounds our solar system with a massive spherical shaped globe of ancient solar system debris. Although no one dared predict what would happen, it definitely raised everyone's hopes that it would put on a spectacular show! It was believed to be ISON's first pass towards the Sun, so there should have been plenty of fresh ice and gas to produce a spectacular tail. Composed of the stuff from the earliest formation of our solar system, it was a great chance to uncover just a few more clues about how it all evolved. NASA had everyone watching ISON, but it seemed to resist being scrutinized at every opportunity.

Comets usually don't brighten a lot until they reach the inner orbits of Jupiter and Mars. When they approach close enough to absorb some of the sun's heat, they begin to erupt spigots of gas and dust from the comet's interior. These eruptions are powerful enough to cover the comet in a dense haze that obscures the core. Most importantly, these eruptions can act like small rocket engines capable of changing the comets trajectory.

That's another good reason why we watch them so closely!

The Mars Curiosity's cameras were designed to look at the Martian surface, but were capable of looking up too. NASA directed Curiosity to try to image ISON as it passed by, unfortunately the Martian sky was just too hazy. The photo opp was passed on to the Mars Reconnaissance Orbiter with its ultra high resolution cameras. Because it was designed to look down also, they had to rotate the spacecraft upside down to image ISON. The camera has a very narrow field of view, so many images were needed in an area the comet was thought to be, and composed together. The comet was successfully imaged, however it wasn't as bright as initially hoped which dimin-

Comet ISON (C/2012 S1)

November 11th, 2013, 13:19UT

By Jason Gayman, Cameron Park, California, U.S.

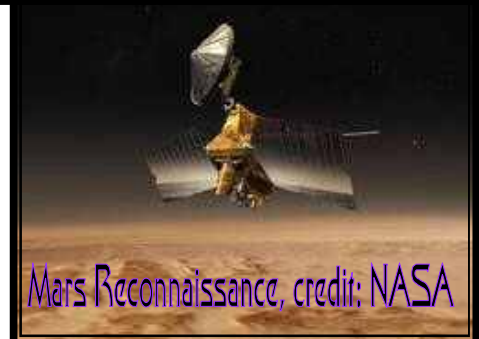
LRGB Composite, 60-sec Subs, 1.14 arcsec/pixel



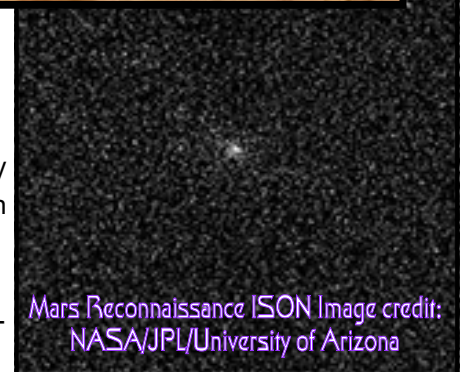
Comet ISON
by SVAS member
Jason Gayman



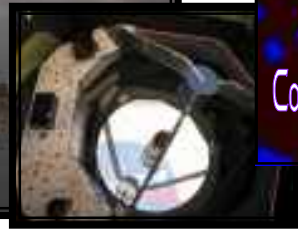
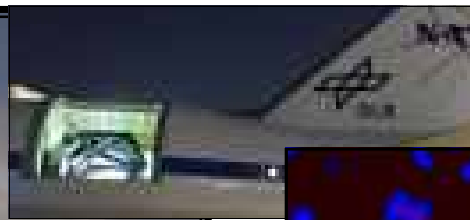
Mars Curiosity, credit: NASA



Mars Reconnaissance, credit: NASA



Mars Reconnaissance ISON Image credit:
NASA/JPL/University of Arizona



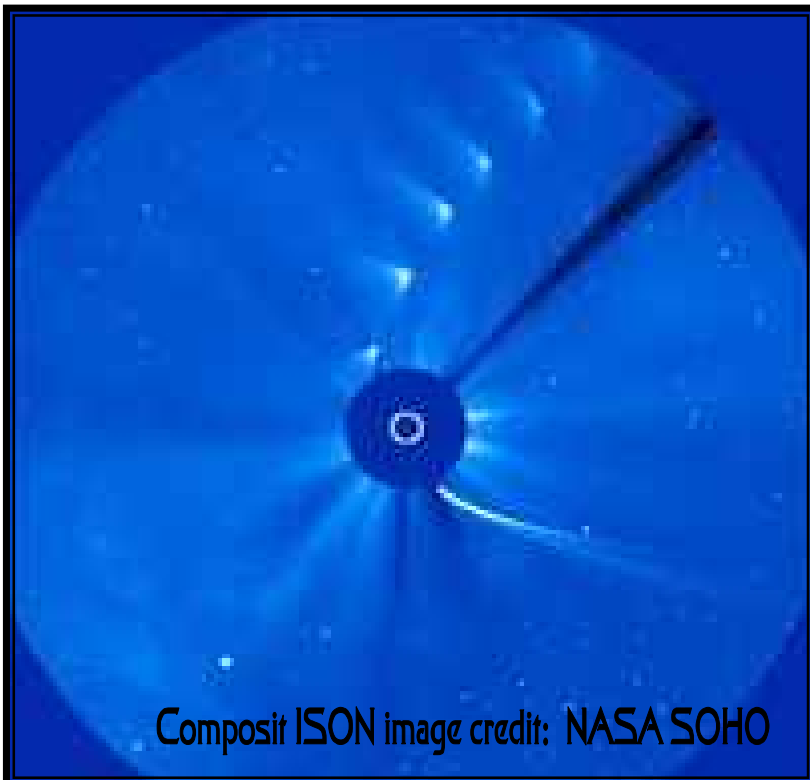
ished the possibility of a super comet.

NASA decided to launch a huge weather balloon, carrying a large infrared and ultraviolet telescope from Fort Sumner, New Mexico. As they were

connecting the telescope assembly to the balloon, the scope broke free

of the latch securing it. That should have been a warning clue that things were about to go wrong, but they adjusted the latch tension a bit tighter and sent it on it's way. No sooner had it launched, the telescope broke free again spoiling any chance of viewing ISON.

The NASA 747 jet called SOFIA, lifted off with it's huge 2.5 meter infrared telescope ready to capture ISON. The timing was just right, the telescope doors opened when at the proper altitude of 43,000 feet, and eureka there was the image of ISON on their monitors! Wait a minute, where did it go? After a few tense minutes, they discovered a main circuit breaker had blown and refused to reset. However, they were pleased with the few images they managed to save, surrendering one more clue indicating ISON was dust poor in both small and large dust grains. What's with comet ISON, perhaps it was just camera shy?



NASA also launched a small rocket from White Sands New Mexico, to try it's hand at imaging ISON. It was very successful capturing some great photos and data.

The next attempt was by the Kitt Peak Solar Observatory in Arizona, trying to capture the illusive ISON going around the Sun. You guessed it, they were also unsuccessful pulling the comet's image from the Sun's glare.

Finally, satellite images from SOHO, the Solar and Heliospheric Observatory, were quite successful catching ISON'S path around the Sun. Everyone held their breath as the comet reappeared from behind the Sun. ISON looked very dim, perhaps broken up by the Sun's heat, but all of a sudden it brightened up significantly! Hopes were sparked for a great finale, only to be dashed again as ISON soon faded into obscurity.

Perhaps the next comet will more gregarious, and put on the greatest show of this century.

Observer Editor.



The most volcanically active place is out-of-this-world!

By Dr. Ethan Siegel

Volcanoes are some of the most powerful and destructive natural phenomena, yet they're a vital part of shaping the planetary landscape of worlds small and large. Here on Earth, the largest of the rocky bodies in our Solar System, there's a tremendous source of heat coming from our planet's interior, from a mix of gravitational contraction and heavy, radioactive elements decaying. Our planet consistently outputs a tremendous amount of energy from this process, nearly three times the global power production from all sources of fuel. Because the surface-area-to-mass ratio of our planet (like all large rocky worlds) is small, that energy has a hard time escaping, building-up and releasing sporadically in catastrophic events: volcanoes and earthquakes!

Yet volcanoes occur on worlds that you might never expect, like the tiny moon Io, orbiting Jupiter. With just 1.5% the mass of Earth despite being more than one quarter of the Earth's diameter, Io seems like an unlikely candidate for volcanoes, as 4.5 billion years is more than enough time for it to have cooled

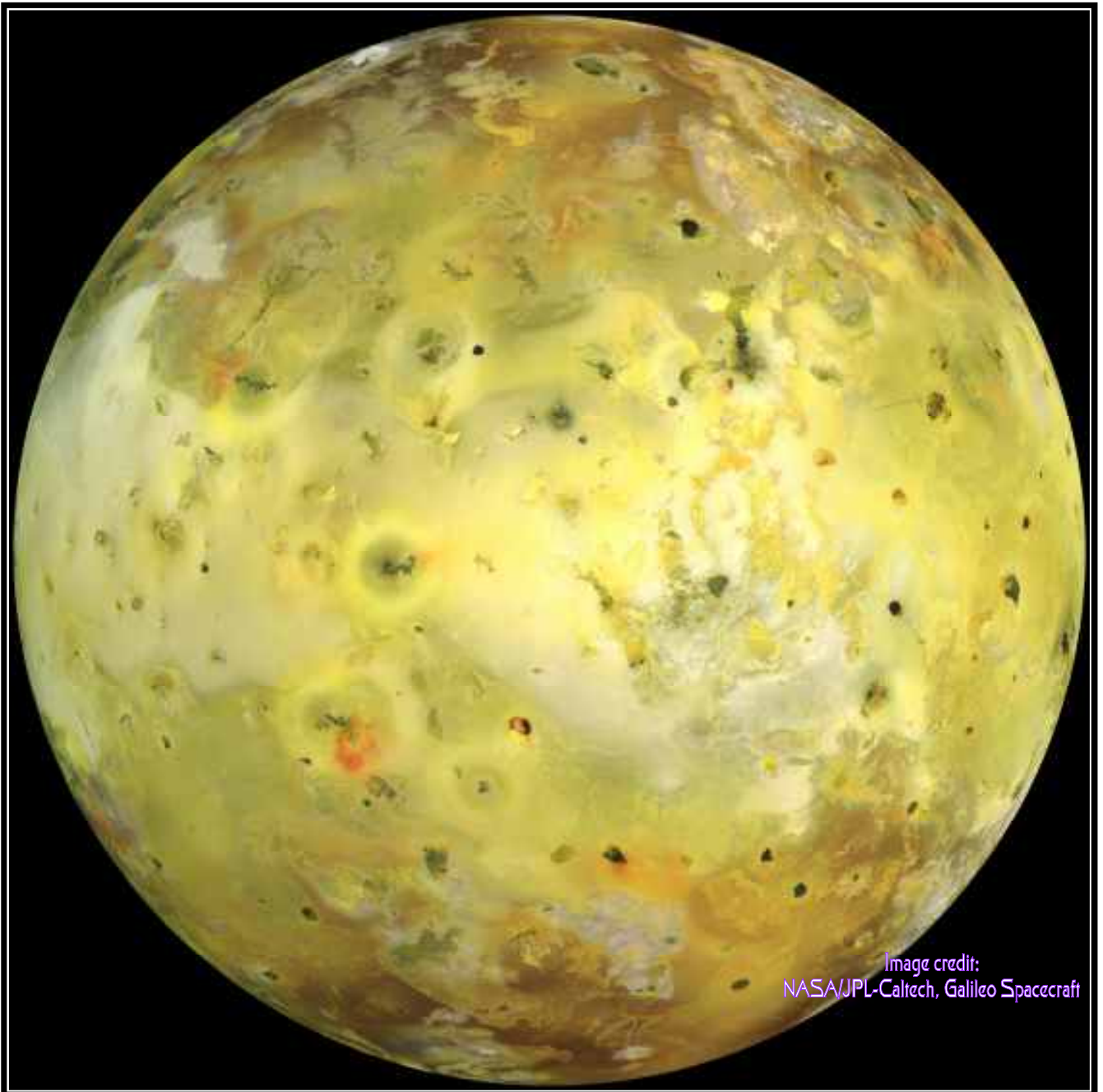


Image credit:
NASA/JPL-Caltech, Galileo Spacecraft

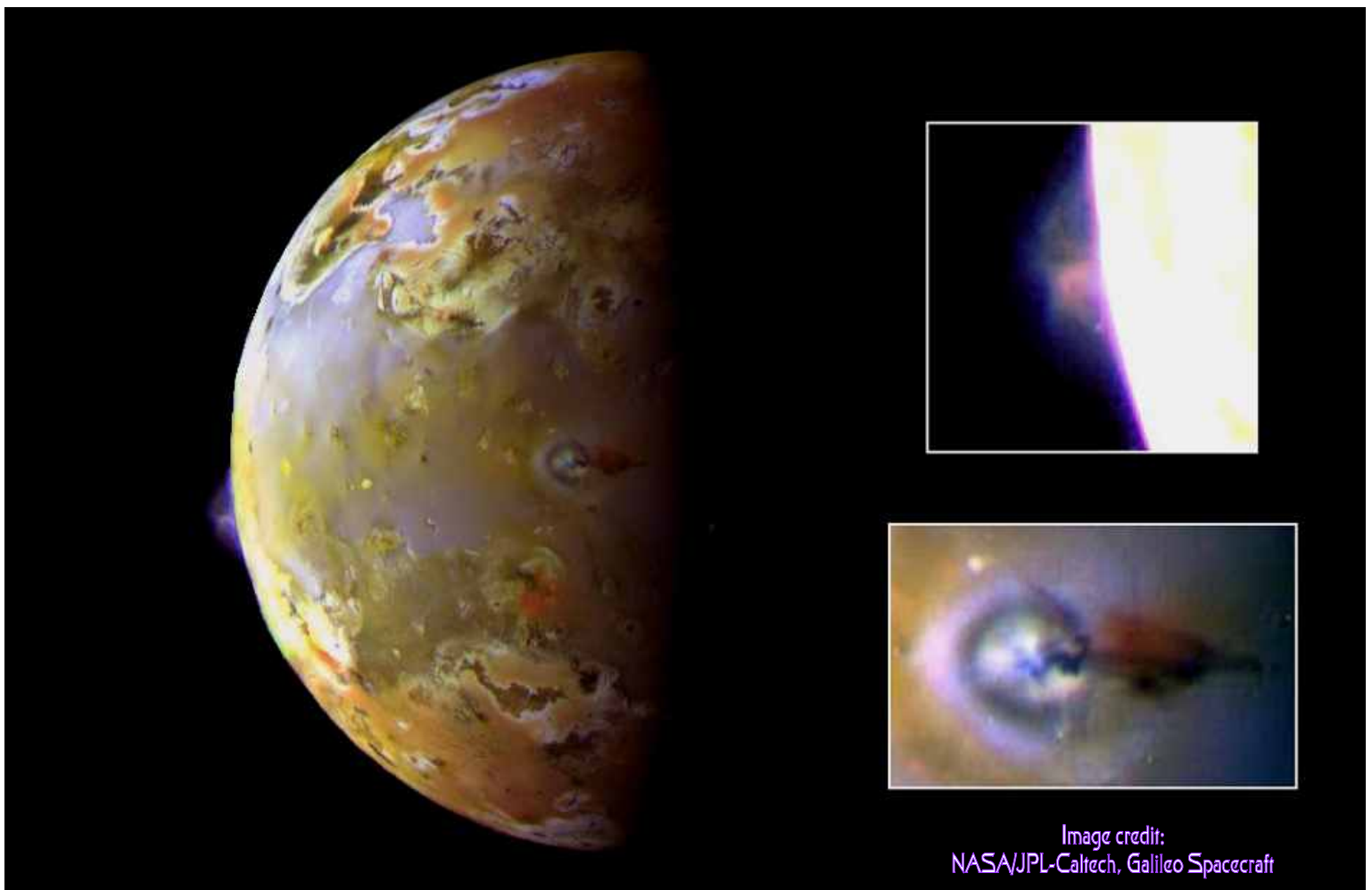
and become stable. Yet Io is anything but stable, as an abundance of volcanic eruptions were predicted before we ever got a chance to view it up close. When the Voyager 1 spacecraft visited, it found no impact craters on Io, but instead hundreds of volcanic calderas, including actual eruptions with plumes 300 kilometers high! Subsequently, Voyager 2, Galileo, and a myriad of telescope observations found that these eruptions change rapidly on Io's surface.

Where does the energy for all this come from? From the combined tidal forces exerted by Jupiter and the outer Jovian moons. On Earth, the gravity from the Sun and Moon causes the ocean tides to raise-and-lower by one-to-two meters, on average, far too small to cause any heating. Io has no oceans, yet the tidal forces acting on it cause the world itself to stretch and bend by an astonishing **100 meters** at a time! This causes not only cracking and fissures, but also heats up the interior of the planet, the same way that rapidly bending a piece of metal back-and-forth causes it to heat up internally. When a path to the surface opens up, that internal heat escapes through quiescent lava flows and catastrophic volcanic eruptions! The hottest spots on Io's surface reach 1,200 °C (2,000 °F); compared to the average surface temperature of 110 Kelvin (-163 °C / -261 °F), Io is home to the most extreme temperature differences from location-to-location outside of the Sun.

Just by orbiting where it does, Io gets distorted, heats up, and erupts, making it the most volcanically active world in the entire Solar System! Other moons around gas giants have spectacular eruptions, too (like Enceladus around Saturn), but no world has its surface shaped by volcanic activity quite like Jupiter's innermost moon, Io!

Learn more about Galileo's mission to Jupiter: <http://solarsystem.nasa.gov/galileo/>.

Kids can explore the many volcanoes of our solar system using the Space Place's Space Volcano Explorer: <http://spaceplace.nasa.gov/volcanoes>.



Greetings from Mars

Happy Face Crater

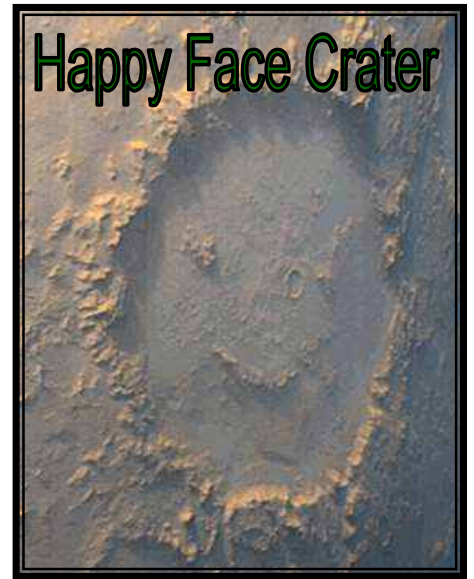
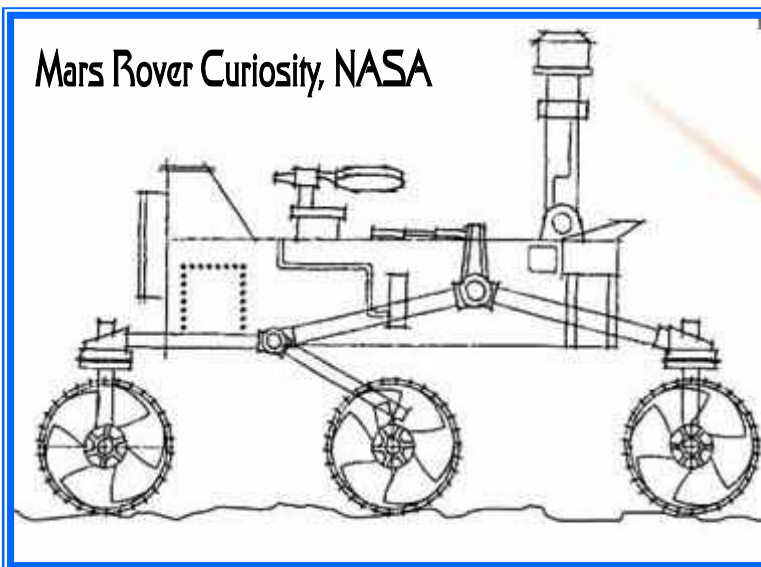


Image credits: NASA

Mars Rover Curiosity, NASA



This mosaic of images from Curiosity's Mast Camera (Mastcam) shows geological members of the Yellowknife Bay formation. The scene has the Sheepbed mudstone in the foreground and rises up through Gillespie Lake member to the Point Lake outcrop. These rocks record superimposed ancient lake and stream deposits that offered past environmental conditions favorable for microbial life (fresh water nearly neutral in acidity and very low salt content). Rocks here were exposed about 70 million years ago by removal of overlying layers due to erosion by the wind. The scene is a portion of a 111-image mosaic acquired during the 137th Martian day, or sol, of Curiosity's work on Mars (Dec. 24, 2012). The foothills of Mount Sharp are visible in the distance, upper left, south-

west of camera position. Related: > Annotated View of Yellowknife Bay Formation, With Drilling Sites > NASA Rover Results Include First Age Measurement on Mars and Help for Human Exploration Image Credit: NASA/JPL-Caltech/MSSS

SVAS Officers 2013

President *Ross Gorman* **Vice President** *Walt Heiges*

Secretary *Nerissa Adams* **Treasurer** *Kevin Normington* **Past President** *Liam McDaid*

SVAS Board of Directors

Perry Preston Porter *Ramona Glasgow* *Lonnie Robinson*

Richard Sandler *Tim Tingey* *Bill Marquardt*

Committees

Membership Resources	Ross Gorman / Nerissa Adams
Star-B-Q	Ross Gorman / Walt Heiges
Newsletter Editors	Walt Heiges
Speaker Seeker	Lonnie Robinson / Walt Heiges
SVAS Web Site	Liam McDaid
Outreach Director	Margaret Minnick
Community Star Parties	Walt Heiges / Perry P. Porter
Observatory Director	Perry Preston Porter
First Light Team	Perry Preston Porter
HGO Maintenance Director	Perry Preston Porter
Telescope Loaner Program	Stuart Schulz
Amateur Telescope Making	Tim Tingey
	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.

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SVAS Membership Application

Choose a Membership Level: New: ___ or Renew: ___

Student- (student ID required) \$24/yr or \$2/mo _____

Family or Individual- (one household) \$36/yr or \$3mo _____

Observatory- (membership+\$48+approvals) \$48/yr or \$4mo _____

Additional tax deductible contribution: Amt \$ _____

(Please prorate dues to July 1st renewal date) Total \$ _____

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



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.

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 _____