



# SVAS OBSERVER

Sacramento Valley Astronomical Society  
Founded in 1945

Vol.69 No.7\* November, 2012

## Scheduled Events

**November 10,** Star Party at HGO

**November 16th,** General Meeting

**Speakers: Lonnie Robinson & Bill Thomas**

### ***Mirror Testing Goes Digital***

Lonnie will talk about Foucault testing and it's problems. Bill will present his new digital cam-



era mirror testing method, the ***Slit Image Test!*** There will be a practical demonstration following the talk. Join us for a fun ATM evening!

**December 15th,** Star Party At HGO  
Weather Permitting?

**December 21st,** General Meeting

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The holidays are upon us, and we are winding up yet another great year for Astronomy and the SVAS. Now it's time to concentrate on bringing family and friends together for Thanksgiving, Christmas, and the new Year.

The SVAS Officers and Board members want to wish you a very special holiday season! We have thoroughly enjoyed working with everyone, and experienced one successful event after another! Looking foreword to an even better 2013 with your support!

**Merry Xmas and Stellar New Year!**

# Heidi Poppelreiter at NASA



by **Lonnie Robinson**



Nick Poppelreiter, the proud father of Heidi Poppelreiter, sent me this great picture of her receiving the NASA "Early Career Achievement Medal". I immediately thought you might enjoy a short update on her long success.

This medal represents "unusual and significant performance during the first 10 years of an individual's early career". "Performance characterized by unusual initiative or a creative achievement that clearly demonstrates a significant contribution in the individuals discipline area that directly contributes to NASA's mission and goals". Way to go Heidi!



SVAS VP Walt Heiges is quoted in a 2008 SVAS Members Yahoo group as saying: "SVAS member, Nick Poppelreiter, has every reason to be a proud dad today. His daughter is about to be a part of history. Some may remember Heidi as the recipient of an SVAS scholarship several years ago (2001). Our part was very small but I will always feel we had a big part in her education and current job with NASA.

She went on to become a part of the NASA program and I am very proud of what she has accomplished". Walt's response was in answer to Heidi's letter describing her part in coordinating the maiden voyage and rendezvous of the European Space Agency's ATV (Automated Transfer Vehicle) with the International Space Station. Four Mission control Centers and 13 countries were involved with the ATV's design & operation.

I saved a SVAS Observer newsletter article from November 2006 and another similar one called Achievers from the Sacramento Bee dated January 2007. They described Heidi being "hired by NASA to work in Mission Control as a flight controller for the International Space Station at Johnson Space center in Houston". She attended California State university, Sacramento, for 2 1/2 years as a Physics and Astronomy student before moving on to Purdue University in March of 2004. It went on to describe how she graduated from Purdue University with a BS in science degree in aeronautical and astronautical engineering, and was working on a masters degree in physics and planetary science. The very best part of the Bee article mentioned Alonzo's Pizza Depot as her favorite pizza, and how she worked there part time. I kidding, but more on that subject in just a moment.



The next article I have is from the CSUS newsletter dated summer 2011. They stated; "Heidi Poppelreiter is a driving force behind the International Space Station. Literally." "I make sure the visiting vehicles are safe as they come close to and dock with the space station" Heidi said. Great article, it went on to describe her foundation education achieved at Sac State Physics department, preparing her for the next chapter at Purdue University.

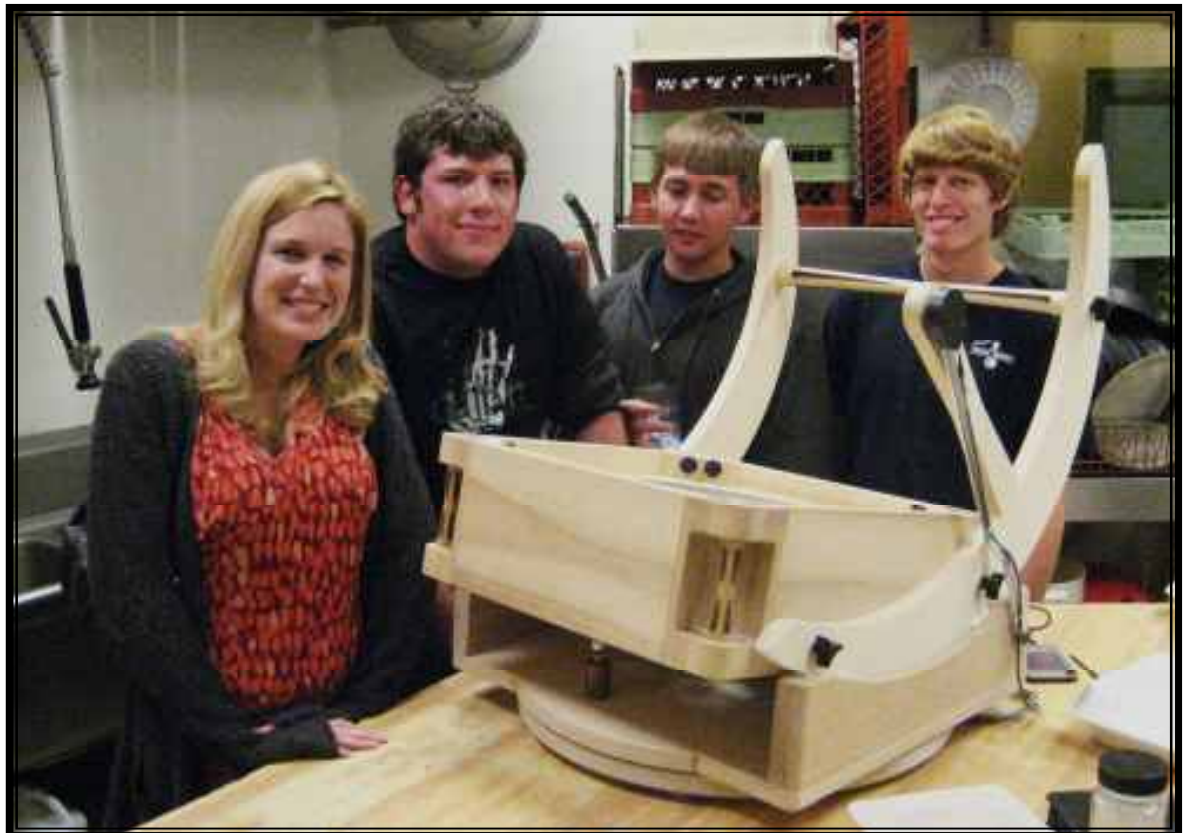
Now for the untold story I promised. Heidi is my Astronomy friend, that's what I called her while she worked part time with us at Alonzo's Pizza Depot while attending college at Sac State here in Sacramento, CA. Notice how I get my business name out there a lot? Sorry, I just can't help myself. She got the job instantly after mentioning she was a member of the SVAS! Now is my chance to criticize her performance as a pizza maker, but I would only have great things to say. We were very privileged to have such talent helping with the day to day duties of running a res-



taurant. Every so often we get a special crew of young people who grew up together and end up working with us at the same time. This was such a crew. Heidi, Brandon Pierce, his brother Tyler Pierce, Jill Walker, were great longtime friends of Heidi's. Things just clicked. The rest of the employees picked up on the camaraderie, and soon they all worked as a single unit making our restaurant great! I knew Heidi had special talent when she was the only one of my crew to seriously listen and take interest in my rambling descrip-

tions about how to grind and figure telescope mirrors, let alone the day to day discussions of my adventures in building a Dobsonian Telescope. I found Heidi to be one of the nicest and down to earth (no pun intended) people I've met, not what you would expect from such an intellect! We enjoyed some really fun times working and great Xmas Parties playing Dominoes and Chess.

I tell all my employees when they leave, that there will always be a job





waiting for them just in case they flunk out of school. In that sense, I played a major role in Heidi's success by instilling a nightmarish fear in the back of her mind that she could be washing dishes and making pizza the rest of her life! Just kidding, but you never know?

Keep up the good work Heidi! You always talked of being an astronaut, don't ever give up your dream. I'll be patiently watching the news for the announcement. I only hope you don't take that one way trip to Mars, we need you here on this rock!

All The Best in the coming New Year!





# Star Party Report

## September at HGO

by Lonnie Robinson

We had a terrific turnout, at the September Star Party, with two complete rows of cars and telescopes, and the seeing and transparency had a rare reunion! Perry P. Porter spent the day working on the observatories roof flashing, so he left early to get some rest. HGO is now completely painted and really looks great! Rich Sandler took over the responsibility of keeping HGO open for the night, supplying power for the photographers, and locking up Sunday morning. Rich and I planned a future evening to get HGO's 16" Richie polar aligned again. The alignment was altered with all the corrections we made getting the optical axis orthogonal with the mount, so it would work accurately with the encoders. It was simply looking out the



tube a bit sideways, and polar aligned that way. Now we need to rotate it back to Polaris again.

I built a 16" DOB not only to find the fainter Galaxies, but mostly to see the brighter ones much better. Ursa Major was heading for the horizon early, so I checked out M51 first. I was amazed with the steady air and clarity which allowed the wispy arms to display their delicate structure. I never tire of soaking in the beauty of this Galaxy! A short hop to M101 over the dippers handle, and it showed up bright and clear also. We discussed the nickname "Pinwheel" shared with Triangulum Galaxy M33. M101 looks very much like M33 with a face on view, but it's about 5 times more distant making it visually about 1/3 the size of M33 and it's equally difficult to define. M81 and 82 are usually second on my list of favorites. Even though they were low to the horizon, they are always showstoppers in the same field of view of a low power wide angle eyepiece. Andromeda is my all time favorite bar none! Bill Thomas and I could see the dust lanes very clearly. Next we checked out the ring nebula in Lyra, always looking for that elusive central star which I'm yet to see XX###\$\$! The dou-

# Bill Thomas

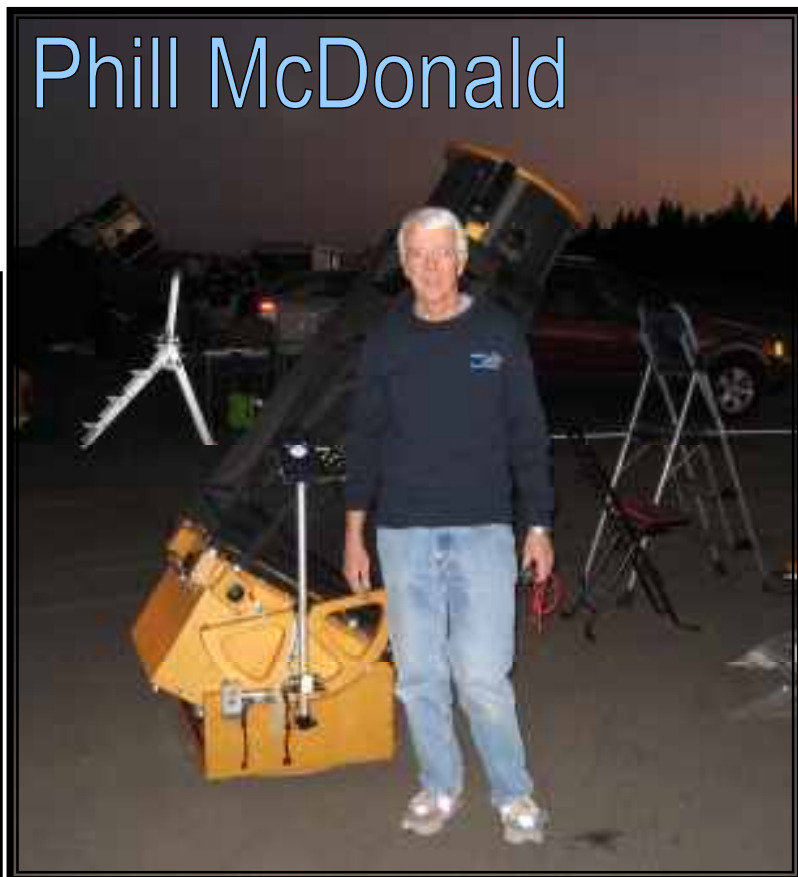


ble double in Lyra was rock steady allowing the pairs to easily split. Other favorite doubles I visited were Gamma Andromeda, Cor Caroli, and of course Albireo in Cygnus. We had a great view of the Pack Man nebula in Cassiopeia through Phil's Dob. Later on around 2:00am I viewed NGC 253, the Sculptor Galaxy. I'm sure it would be my absolute first selection if I traveled towards the equator, if I could accept Centaurs A being second.

I had a great evening parked between Bill Thomas with his flawless hand crafted 12.5" mirror and DOB, and Phill McDonald and his awesome 16" f/4.8 Galaxy mirror with Servo Cat go to controllers. Phill used Orion's Star Seeker WiFi wireless control module to direct his

Servo Cat with the new iPad touch screen running a SkySafari app. It ran flawlessly taking touch commands and directing the scope precisely to each object. It was very interesting using your fingers to zoom and move the screen around! Talking mirror making with

# Phill McDonald



# Greg Blandin



Bill and Servo Cat with Phill, it just doesn't get any better!! Later on Greg Blandin stopped by. I missed him setting up his absolutely ingeniously designed 16", all aluminum ultralight DOB, with his own creation of an all aluminum equatorial platform. Greg is very knowledgeable on motor control wiring and metal fabrication.

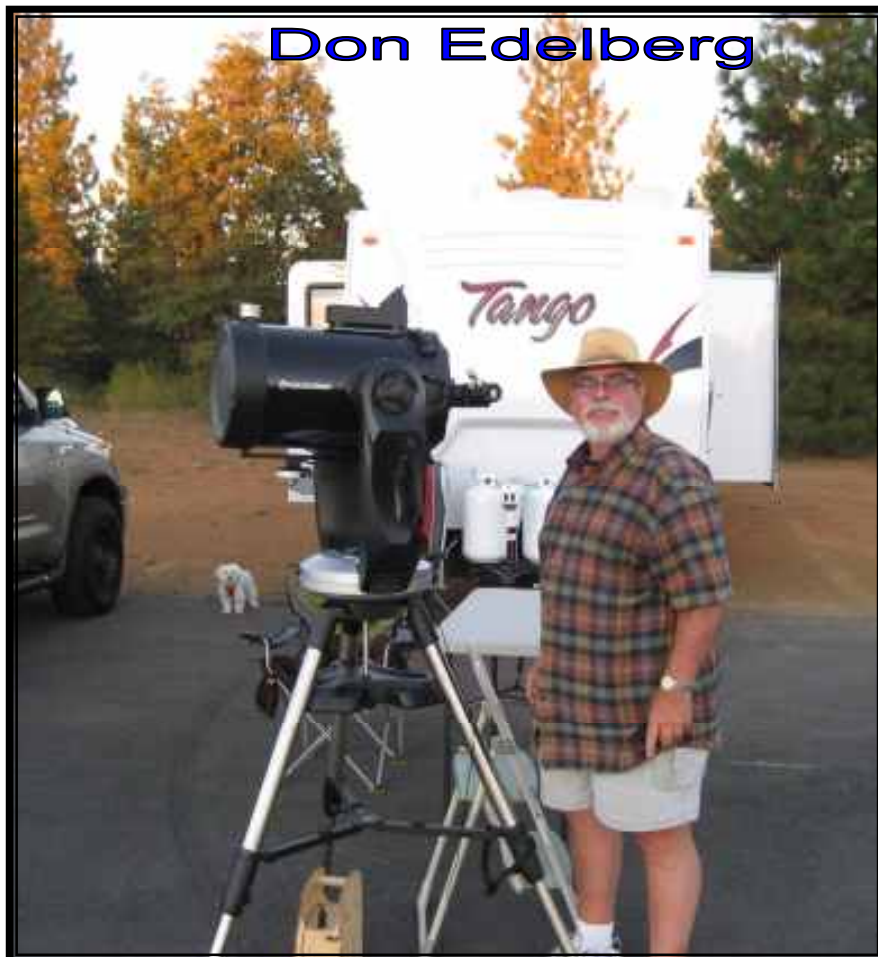




I kept watching for Ramona Glasgow and Mary Youngblood to drive in for their scheduled flute music under the stars. I kept watching and waiting... As the evening progressed into morning, there was a faint but very identifiable sound of the flute drifting across the tarmac. How did I miss them? Checking it out I found Tom Braun across the tarmac playing a flute recording ever so quietly on his sound system. Sorry Ramona and Mary couldn't make it, they were greatly missed! Perhaps next year!

I was a quite tired from a long busy day, so I packed up and left around 4am for the one hour drive home to my own bed.

I had a really fun evening talking with friends, sharing our views, and evaluating equipment!





# October at HGO

by Davin Enigl



We arrived at Blue Canyon in October 2012 (but it could be any October on a dark night) and set up our telescope at 7 p.m. -- which is an hour and forty minutes earlier than in September (it's getting darker earlier until the 20th to 23rd of December). This night we will use Stephen O'Meara's *The Secret Deep* as one of our guides. After aligning our ten-inch telescope, we quickly found M13 in the West. This is a great globular star cluster in Hercules, and M13 is clearly labeled on our planisphere. Convenient.

We looked at the planisphere again South and Southwest to find Delphinus "the dolphin". From here we used O'Meara's guide or Bobroff's *AstroAtlas* to move to NGC 6891 (N6891), O'Meara's "Secret Deep" 95, (HGO also has the three "Millennium" star map books for our use). SD95 is a very rare triple-shelled planetary nebula exploding star - very small even at 170x. Still, the sky looks clear and we anticipate good deep sky seeing tonight. The C46 (Caldwell 46) cluster is nearby but tonight it looks like an elliptical galaxy -- very compact with a bright core. SD96, nearby in Cygnus, is the Diamond Ring nebula N6894 -- easy to see why it's called that. Near gamma Cygnus, we try to find N6810, SD99, the Inchworm open cluster, and the SD97, IC1318(a) nebula, but they were not seen on this night.

So we moved back to the dolphin, to N6905, SD98, the Caged Spirit nebula (aka Blue Flash). This may be the most spectacular object of the night. It's a nebula from an exploding star between two other stars. Very rare. Probably the only one like it. A dot, an oval, and a dot -- \*O\*. Very interesting. Up higher is the constellation Sagitta. Halfway between the stars Gamma and Delta is M71, a star cluster often overlooked because the more famous M27, the Dumbbell nebula, is just above (North) in Vulpecula. We could have stayed here a long time just looking at objects on Bobroff's page B-5, M56, M57, Ring nebula, to the lower left, the M2 and M15 clusters, and many NGCs. But we must move on. N7129, the Cosmic Reflection Rosebud is calling. It's SD103, a cloud around several stars in the middle of the square box of Cepheus high above in the North.

Meanwhile, we noticed on the planisphere that the Square of Pegasus is getting about as high as it ever gets. Therefore it's time to stop and turn our attention high and South to Stephan's Quintet, N7317, 18, 19 and 20. To do this we first find the upper right corner of the square. Find the Beta and Mu stars, then point to the Nu star (close to Beta and Mu) and follow it up the same length as Mu to Nu . . . Bang! We found C30, the Deer Lick Group of galaxies -- the main bright galaxy is N7331 and it's three close-by dim galaxies N7335, N7336 and N7337. Then, using our Newtonian telescope with its upside-down view, we looked for "Arp319" Stephan's Quintet aka Hickson 92 (see Harrington's *Cosmic Challenge* #106 and #144). It's three lengths of N7331 down and to the left at a 45 degree angle from the plane of N7331. It's not that hard to find. Plus if we got lost, there are four small pointer stars in a row halfway between N7331 and N7317 et al., to guide us straight to Stephan's Quintet. We looked to see a triangular flower blossom of N7317, N7319 and N7220, aka Caldwell 30. N7318 is too dim at A-13.9 and B-14.3 to see in a ten-inch scope. Ten-inch scopes "can" see down to 14.1, . . . but practically, we usually see down to only 13.7 magnitude.

We wanted to see Stephan's Quintet in a bigger telescope that can see down (at least) to 14.3 magnitude (N7318A and B). So, we walked over to HGO at 1:30 a.m. to use the SVAS's RC-16-inch which can see down to 15.1. This "Ritchey-Chrétien" (RC, a specialized Cassagrain reflector) has just been drift-aligned and the "push to" encoders re-calibrated by diligent members. "Push to" telescope is positioned by good old human "elbow grease"



where digital setting circles in the telescope's mount are wired to a computer. The computer's star map shows, visually, where we are, . . . and where we want to push to.

We imputed N7331 into the push to computer's search and the computer showed us which way to push the telescope. Then we looked up and left of N7331, and there was Stephan's Quintet. The RC-16 has optics that are different than a Newtonian, so we see the objects as a mirror image, reversed (right side up, not up side down). Next we pushed to N7479, C44 a barred spiral galaxy just South of Alpha Pegasus. Then pushed to C43, N7814 the Electric Arc galaxy to the right (West) of Gamma Pegasus. Also, N14 is halfway between those two. It's part of the Arp 235 peculiar galaxy group. You'll need this big (or bigger) telescope and about 200x for N14. It has a dumbbell-shaped core at magnitude 12.0.

While we're at it, there was a comet (168P/Hergenrother, October 2012) 3/4 of the way to the left on the top line of the Pegasus square from the Beta to the Alpha star. The bright beautiful fan-shaped comet has an elongated core and wisps of steam out-gassing from it.

To test the RC-16's push to system, we found the dark galaxy N891's group including N1023, a bright lenticular galaxy. We then found M77, N936 a Seyfert galaxy - large spiral arms and an exploding core. Next was the unusual SD7, Darth Vader's Starfighter galaxy -- yes, it really looks like that. All are seen quickly and easily with the push to system. It looks like our RC-16 is going to be really fun now that it has been renovated. It



also has been newly collimated which meant we needed to remove and rehang the mirror. Plus the RC-16, as we call it, has a new Feather Touch 3" focuser with micro-fine adjustments added a couple years ago.

After the successful tests, we returned to our own ten-inch telescope. Can we find N891 with out a go to or push to computer? If we look at the nearest bright star South of the Andromeda galaxy (Beta-And), follow it down to the left, we will see two more bright stars (Gamma-And and Beta Triangulum) - that's the top part of a diamond shaped star hopping guide we use for N891. Then looking for the bottom half, South, the most bright star is Algol, to complete the diamond. Finally, following up (North) the left-hand side (East), 3/4 of the way to the end star in Andromeda. middle of the diamond, and . . . there is N891. This is the easiest way to find N891 that I know of -- thanks to a tip from fellow member. Star parties are where we pick up tips like this. Mostly we do not find such advice in books. We need to go to a start party and ask questions, plus use the guide books and computer programs. It all helps.

Around Midnight, it's always good to checkout N253, C65, the Great Sculptor galaxy (aka Silver Coin). Nearby are N247, C62, the Milkweed Seed galaxy with it's massive complex halo objects (MACHOs) and the N288 cluster just South of Beta Cetus looking towards the Alpha Sculptor star. Below (South) of that is N134, the Giant Squid galaxy, SD2. Cetus, Sculptor, Fornax, and Eridanus lead us up to Orion in a semi-circular observation plan (looking South over the next four hours). Here we checked out M77 (a Seyfert), N246, N247, N253, N288, N300, N1316, N1365 (another Seyfert), N1399 (Fornax galaxy cluster), N1380, then moved up (North) to the Eridanus N1535 cluster. After that, the sky is dominated by Orion. Irresistible.

So, after that four-hour semi-circular tour, about 4 a.m. we looked at our last objects. They were in Orion. The Trapezium in the Great Orion Nebula has three out of the normal four stars tonight. We add a Hydrogen Beta filter and turned to the left most star in the Belt of Orion (Alnitak). Here we saw a massive ridge of nebulous gas between a bright lower star (Alnitak) and a medium bright star on the left. In between we viewed a black notch cut out of the bright nebulous ridge. It's was the Horsehead dark nebula, B33.

Most of the objects we saw on this night were from the Caldwell, Messier, NGC or Secret Deep catalogs. We missed seeing Cetus' SD3, N488, the Whirligig galaxy, Orion's SD19, N1788, Cosmic Bat (aka Foxfire Nebula) and SD25, N2022, the Kissing Crescents nebula. At 5:10 a.m. we finished and got some sleep.



# Observing Guide for November

by Davin Enigl

The darkest night of the month, is the best observing night. Recommended guides are the Herald-"Bobroff" *AstroAtlas* and *Stellarium* (computer program), or the equivalents. Also, the two Kepple and Sanner's *Night Sky Observer's Guides* (NSOG), the "Tirion" *Sky Atlas*, the three "Millennium" star maps and the three *Uranometria*, (available in HGO), Harrington's *Cosmic Challenge*, and Stephen O'Meara's "*Messier*", "*Caldwell*", "*Hidden Treasures*" and "*Secret Deep*" guide books. A planisphere is needed to find constellations by time and day of the month, using a rotating star map. We also need to travel to the SVAS' dark site: the Henry Grieb Observatory at Blue Canyon.

This month we'll list our target objects and show how to pre-plan an observing session. Which objects can we realistically see in November? How can we plan this?

First, we assume the best viewing time is from 10 p.m. to 5 a.m. and November 13th has no Moon. Then our viewing can be from at best the 12th, to the 18th -- seven nights. (This is due to Moon rise and set times. There is better viewing after the 13 New Moons per year, than before. This means we have  $13 \times 7 = 91$  days per year to choose from, not 365).

Second, we confine ourselves to the best viewing location in the sky, 45 degrees up, plus or minus 25 degrees.

Third, minimum views are up from -38 degrees on the celestial equator Declination (DEC). Forth, the Right Ascension (RA) range is 23 hours RA at 10 p.m. to 10 hours RA at 5 a.m. This can all be calculated from a planisphere.

We have now defined our arc across the sky over time and available dark nights. The NGC range for November is, early evening: N7200 "up" to N0000 and early morning: N0000 up to N3200. Between N3200 and N7200, we save for other months.

There are deep sky viewing websites (see <http://dso-browser.com/>) that will print out a list, by magnitude, for free. If we do this, a list of about 2200 objects will appear. Many will be Open Clusters. We can adjust the filters, without Open Clusters and still get 1900. Rather than doing this, it is much more fun to choose the objects from guide





books. We get a much deeper understanding by reading the descriptions. Tonight let's look in the guide book, Harrington's *Cosmic Challenge* (CC) and O'Meara's *Secret Deep* and one from O'Meara's *Hidden Treasures*.

1. CC34, N7293, Aquarius, planetary nebula (pn), 22:28hr RA, -20 50 DEC.
2. CC36a, N247, Sculptor, galaxy, 0:47, -20.
3. CC36b, N253, Sculptor, galaxy, 0:47, -25.
4. CC37, N288, Sculptor, galaxy cluster, 0:52, -26.
5. CC41, M1, Taurus, supernova, 5:34, +22.
6. CC42, M78, Orion, reflection nebula, 5:46, +3.
7. CC65, N300, Sculptor, galaxy, 0:59, -37.
8. CC68, N1360, Fornax, galaxy, 3:33, -26.
9. CC69, Taurus, Pleiades nebulosity, 3:46, +24.
10. CC70, N1535, Eridanus, pn, 4:14, -12.
11. CC91, Zeta Cancr, Cancer, quadruple star, 8:12, +17.
12. CC92, Leo Trio #2, N2968, N2964, N2970, Leo, galaxy group, 9:43, +32.
13. CC123, N2438, Puppis, the pn within M46, 7:41, -14.
14. CC133, Hickson 44, Leo Quartet, N3193, Leo, galaxy group, 10:18, +22.
15. SD3, N488, Pisces, galaxy, 1:21, +5.
16. SD8, N1084, Eridanus, 2:46, -7.
17. SD15, N1514, Taurus, Crystal Ball nebula, pn., 4:09, +30.
18. SD19, N1788, Orion, Cosmic Bat, Foxface nebula, reflection nebula, 5:06, -3.
19. SD25, N2023, Orion, Kissing Crescents nebula, pn, 5:42, +9.
20. O'Meara's *Hidden Treasures* 109, N7793, Sculptor, Bond's galaxy, 23:57, -32.



# Astro AP Photography

by Wayne Lord



## Chapter 1) Introduction to Astro-Photography (AP) by Wayne Lord

So, you want to take pictures? The first thing to decide is what you are going to shoot for. Many people spend a lifetime studying the moon, and that is a worthy endeavor as there is a lot of real estate to see. The moon is nice and bright, and goes through phases that make studying the terminator an interesting activity. Lunar exposures are usually very short, fractions of a second, so can be done with almost any telescope, even a Dobsonian. You may actually have to stop down the light in an 8-inch reflector or larger due to too much light overexposing your images. You can devise or purchase adapters for various point-and-shoot cameras, iPads, iPhones, etc. to allow you to take photos of the moon. The planets are a bit harder. They are dimmer, and generally require a lot of magnification to be more than a tiny dot in an image. That means longer exposures and probably tracking to get decent images, although you might get lucky occasionally without doing so. Many people who image the planets use either webcams or DSLRs to shoot video and then select a number of the best frames to stack via software to arrive at a final image. Viewing planets is highly affected by "seeing". Our atmosphere is moving, with sometimes very high winds aloft. Whenever you look at stars and see them twinkle, you know the seeing isn't very good. Taking many images and selecting only the better ones allows you to weed out the ones affected by the seeing and pick only those with steady, un-diffracted views. But, if you want to target those deep-space objects that are so colorfully displayed on many websites, including the HSTs, be prepared with a fat wallet and lots of patience! I will use my own experience to illustrate this statement.

My father was a graduate of the California Institute of Technology, and met my mother while studying Electrical Engineering there. After their wedding in 1928, their anniversary trip was a train ride that ended in Schenectady, New York, where Dad had a job at General Electric Company. All four of us siblings were born there, but with many relatives and ties to the Los Angeles area, we made trips west for visits about every three years. Dad was all for making our trips interesting and educational and on one of our visits around 1949 or 1950, took us to visit both the Mount Wilson and the Cal Tech owned Mount Palomar observatories where we saw the 60" Hubble, the 100" Hooker, and the newly installed 200" Hale telescopes. I remember being fascinated by the colorful images on display and thought that it would be nice to one day be able to take pictures of the wonderful things in our sky.



Fast forward 40+ years and I was living in Orangevale, had a wife and two young daughters and a pretty good income from my job at McClellan AFB. My long suppressed astronomy desire reasserted itself and, after studying the astronomy magazines, decided to go for a Coulter Optics 10-inch Odyssey Compact telescope. At the time I did not yet realize the need for long expo-



tures in taking pictures of deep-space objects (DSOs) and thought I would soon be fulfilling my dream. But first I had to be able to find them, so spent some time with a field guide and other books finding out what was out there. When I got the telescope, I eagerly started searching the skies. The moon was easy to find and I spent some time looking at it, and even tried to take some pictures using what I later learned was eyepiece projection. Ticklish work, and since this was before digital cameras were readily available, I exposed some film that did not turn out well. Challenging myself, I tried to find the Andromeda Nebula and eventually managed to see a faint, fuzzy ball that looked nothing like the pictures in my books. Nevertheless, it was my first visual view of a real galaxy. Taking pictures of it was out of the question, however, since it was so faint. I did get a T-adaptor that allowed me to use my 35mm camera in place of an eyepiece and was finally able to get some decent images of the moon, but nothing else worked and the Dobsonian mount for the 10-inch was too easy to jiggle and move, especially with the weight of the camera on the forward end.

A few more years and the very early Kodak digital cameras were marketed. By today's standards the resolution was miserable, but they did take recognizable images under daylight conditions, and when I got the use of one for a weekend, I attempted eyepiece projection with it. I had the same problem, though, with only a very narrow "window" where the moon could be seen due to vignetting. By this time astronomers were using very expensive CCD cameras; the Hubble Space Telescope had been launched and repaired to the point where it was able to show us even more wonders of space. Technology was marching on!



Realizing the shortcomings of the 10-inch Dob regarding photography, I did more thorough research before my next telescope purchase). A friend (Nick Poppelreiter) gave me one of Orion's catalogs, which I pored through. Budgetary constraints, always an issue, led me to purchase Orion's SkyView Pro mount (20 pound weight limit) and the 127mm Maksutov-Cassegrain telescope (8.6 pounds for OTA) in October, 2004. At this point I also had a Canon EOS-10D DSLR and was able to take some images of everybody's favorite Orion Nebula. It is fortunate that it is so bright, as I was able to keep to short exposures since tracking was not that great. I also hadn't learned my way around the sky very well and had trouble finding anything I couldn't see visually or with binoculars. That led me to purchase Orion's add-on Intelliscope kit in December, 2005, that I hoped would give me better ability to find those faint fuzzies I was looking for. That same month I also received my Starshoot DeepSpace Color Imager (DSCI), Orion's original offering in CCD cameras. It took a long time for mine to come due to supply problems and the demand for it from many other customers wanting one. Now, I thought, I was finally ready to take some decent images!

While I was able to find more things to look at, and attempt to photograph, I still had a lot of problems with drift and possible other errors and was still limited to short exposures, 30-seconds or less, for most things. Even with the increased sensitivity of the CCD camera over the DSLR, that wasn't enough time to get much detail on faint objects. I also had some problems with the DSCI that finally led me to believe the camera was defective. Orion Tech Support agreed, so I sent it back in October, 2006, and received a replacement. In the meantime, I decided I needed more aperture than the little 5-inch Mak-Cas and purchased an 8-inch f/4.9 reflector. That got me more aperture as

desired, but at almost 17 pounds before adding a camera, finder, etc. it was really too much for the SVP mount. I was able to get some halfway decent images with it, but was worried about how well the light mount would hold up. Save up some more money for a better mount. I would have liked to get an Atlas mount, but since the Sirius mount had the same innards except for the motors and only ten pounds less capacity (30 pounds) and cost considerably less, I got it in May, 2008.



8-inch reflector  
optical assembly  
(about 40-inches long)

Since it is a GOTO scope, I was finally able to locate things pretty well. It took a while to master polar alignment and three-star alignments, but was a very big improvement over what I had been using.

I took another step forward in this long process in July, 2009, when I purchased Orion's Auto-guider camera and 50mm guide scope. Again there was a learning curve to get it to guide well, but after making adjustments to the PHD settings, I am finally getting reliable guiding for 5 to 10 minute exposures. I also purchased an 8-inch Astrograph, which is better suited to AP than the visually oriented 8-inch I was using, and is smaller and lighter weight.

In the next few chapters I intend to cover the following subjects:

- 2) Equipment needed for various types of Astrophotography
- 3) Types of cameras, uses, and pros and cons for each type
- 4) Sample workflow for an evening session, at home and away
- 5) Stacking – why and how
- 6) Processing software, from \$0 up, and how to use it (general overview)

I would like to invite other SVAS Astrophotographers to add their thoughts, comments and information. Contact the editor.





# Astro AP Photography

## September at HGO

by Inam Ali

My goal was to get into astrophotography right away. My journey started off with an email that I sent to a random SVAS member asking for information on how to get started, in terms of equipment. It turns out that the random person I sent the email to was in fact, astrophotographer Jason Gayman! Jason was extremely friendly and helpful, and pointed me in the right direction. Later on, I met Kevin Lucidi through Jason who, over the months, has offered much guidance and has been a source of answers to an abundance of questions. Later on, I had the pleasure of meeting Gary Shuluk, who offered up further knowledge and advice in this field. I'm fairly certain that without these three SVAS members, I wouldn't be at the level that I am currently.

My initial setup was an Orion 80mm refractor, a Celestron CG-5GT mount, and a Canon T1i DSLR camera. This was the setup that Jason recommended that I start with. Luckily, he noticed them on sale and informed me



M42 Orion Nebula

right away. I also acquired from Jason a 70mm scope for guiding, and a guiding camera, both of which are mounted to my refractor. The guide camera helps the mount track more precisely, which is a must have in order to do long exposures. Without it, the exposures are only limited to about 30 seconds before the stars start leaving streaks. With it, one can capture images for hours at a time.

For software while imaging at Blue Canyon, I use Starry Night to locate objects of inter-



Inam & Samira Ali

est. Starry Night also contains functionality to control the mount so that one can move the mount to objects in the sky using the laptop, rather than the hand controller. For camera control, I use a program called Backyard EOS which has a lot of functionality when setting up a DSLR camera to capture images. The program also helps with accurately focusing the telescope. One of the goals that I had set was to be able to control all aspects of imaging right from the laptop. This is achievable but it does cost more as extra software and cables are needed, but I have found that the convenience is certainly worth the cost. For image processing, I use ImagesPlus for combining all images together. After combining, I use Photoshop to process the images further to their final results. These two programs take quite a bit of practice to learn to use correctly, and a huge thank you to Jason, Kevin, and Gary for all of their input on processing.

As of April 2012, I have sold my original Celestron CG-5GT mount and have upgraded to the CGEM mount.



This mount is more precise and can hold a heavier telescope. The mount also has large knobs that are easier to adjust when setting up, vs. the smaller screws on the CG-5GT which were more difficult to adjust. The price jump from the CG-5GT to the CGEM was significant, but so far it has paid off.

Currently, I am borrowing Jason's 6 inch AT6RC reflector. With it, I am able to capture objects at higher magnification vs. my 80mm refractor. The images that I captured at September's Star Party at Blue Canyon were captured using the AT6RC along with my CGEM mount. I captured three items in September: Pinwheel Galaxy, Phantom Galaxy, and the Orion Nebula. Pinwheel and Phantom Galaxies were imaged about 10 times each, with each exposure lasting 10 minutes, so that's 100 minutes, or 1 hour and 40 minutes for each galaxy. The Orion Nebula was imaged about 8 times, with each exposure lasting 5 minutes, for a total of 40 minutes. I initially had a tendency to put quantity over quality, in that I try to capture many objects per night (up to five or six objects!). Ultimately, I learned it's best

to stick with one, two, or three objects per night and focus on acquiring as many exposures as possible on them, which vastly improves quality.

My next step is to upgrade from my DSLR camera to a color CCD camera. This is a huge step in the field and one that is necessary if I'd like to begin imaging fainter objects in the sky, or greatly improve the objects that I'm currently able to image with a DSLR. My goal is to have a CCD camera by next summer. Kevin Lucidi has been extremely helpful with this next upgrade as he is very familiar with CCD cameras.

Astrophotography has been more challenging than I originally ever believed. The image processing aspect of it is enough to intimidate many individuals, but it can be mastered once you have enough practice and a set workflow in place. Capturing images can be challenging at times since there are many factors that can ruin a long exposure, such as satellite/meteor trails, bad weather, and guiding issues. It can even be frustrating at times, but with enough patience and persistence, the results are certainly worth the effort!





# HGO Gets a Much Needed Coat of Paint

by Perry Preston Porter



Over the Summer, lots of SVAS member volunteers helped paint the exterior of HGO. As per the SUP (Special Use Permit) issued by the Forrest Service, we were required to change the color, "something closer to an earth tone" they said. Kodiak Brown was the choice of the SVAS Board. Even though the color is brown, it's a "GREEN" paint. *Kelly Moore* (the paint company) has a line of about one dozen base colors that are pre-mixed from recycled paint. Helps the Earth and it was about four bucks cheaper per gallon. The Manager at the *Kelly Moore* store at Stockton Blvd and

Mack Road (yes this is a plug for him) took another 25% off the price because we are a non-profit organization. If you are a regular visitor to Blue Canyon/HGO then you had a chance to watch the work as it progressed. The first walls to be painted were those supporting the dome, and the connecting hallway between the dome and HGO. The ramp and front door were also painted at this time. All this back-breaking work was done with rollers and brushes. The Friday and Saturday morning before Star\*B\*Q, the front of HGO was painted, and the volunteers again used brushes and rollers. More than half the observatory was now painted, but that left the back wall and the dauntingly tall south facing wall with the seam for the roll-off roof. One part of HGO that I had not planned on painting was the eaves of the rolling roof. It was never exposed to the sun and trying to paint over-head while standing on a ladder with a brush would have taken perhaps fifty hours or more. As it turned out it was my lucky day. A SVAS member (I did not use names in this article because I don't remember all the names of everyone that helped, and I don't want to slight anyone) came up and volunteered to bring his commercial air-less paint unit if I would meet him on a weekday. It turns out the ladders we had wouldn't reach the peak of the south wall. We thought about rolling the roof back about 5ft, and then use a ladder on the observing deck to paint the top of the wall and eaves. Even when using an air-less unit there is paint over-spray. Paint floating around the observatory and scopes wasn't something we wanted!!! Nix, rolling the roof back.



What do you get when you combine, two ladders, duct tape (aka, duck tape, or racers tape), three heavy duty ratcheting cargo tie-downs, and then just for grins one super duty ratcheting cargo tie-down? My "2012 *Darwin Awards*" entry. I'm just kidding about the "*Darwin Award*" of course, but what I created was one very heavy-duty "MacGyver" ladder that would reach the roof peak, and high eaves, enabling us to complete the painting of HGO.



SVAS Observatory Director    ppp

# Drift Aligning HGO's 16" Ritchie



by Lonnie Robinson

Last Monday, (Oct 1st) Perry P. Porter, Richard Sandler, and I met at HGO to figure out how to drift align the 16" Ritchie Chrétien. I checked the Mathis Instruments web site for help, but I still wasn't sure how to move the scope mount in azimuth. The newer scopes have Azimuth fine adjustment screws, but ours is a model 500 (designed in 1982) without those adjusters. Perry and I arrived about 3:00pm so we would have plenty of daylight to figure it all out. We found four setscrews located beneath the pier mounting plate



and no other possibilities. You can see the set screws around the pier in the factory photo at right.



After loosening the setscrews, we tried to move the mount in Azimuth with no success. WD40 to the rescue with a liberal application around the base mount, it finally gave way to a considerable amount of pressure applied to the forks. There is evidently a slip mounting tube, inserted into the pier, from the bottom of the mount. We had a difficult time moving it just a fraction of an inch at a time, but that was

all we needed. I rechecked the collimation and tweaked it a bit to make sure we were on the exact optical axis before drift aligning on a star. The collimation is tricky on the Ritchie since a laser will only set the cant alignment of the focuser to the optical axis centered on the secondary, and align the secondary mirror back to the focuser. That leaves the main mirror? I have found the best way is to use a Cheshire and simply center the main mirror after the basic focuser to secondary collimation is complete. Now we only needed to wait for darkness to drift align.

Photographers need precise tracking so the stars won't leave trails on the photos. Our Ritchie is missing the electronic declination adjustment motor, so the closer to perfect alignment the better. It has an adjustable right ascension controller, so minor RA tracking adjustments can be made while taking photos.





Darkness set in and we spotted Vega directly overhead. Drift alignment is easy once the procedure is mastered. There are two alignment positions that must be checked, the first is with the forks positioned vertical and sighting on a Easterly star close to the celestial equator. In this Easterly position, north or south drift is caused by inaccurate altitude adjustment of the base and not the azimuth. The second position is with the forks horizontal and sighting on a star at the Meridian (North to South center line passing through the Zenith) and near the celestial equator. Any drift north or south in this position is caused by the azimuth adjustment of the base. We are only checking for the stars movement up and down (north and south), not the side to side (east west) drift movement which is controlled by the RA tracking speed controller.

Just a note to clear up all the names for tracking. Right Ascension and Declination go together, and they are used to describe the telescope movement on fork and equatorial mounts that corresponds to star charts longitude and latitude. Altitude and Azimuth are similar terms used for a Dobsonian type (AltAz) mount. In this case I used Azimuth to describe rotating the mount horizontally, in the pier, just like turning a Dobs base rocker cradle. Altitude describes raising and lowering the forks centerline by adjusting the mount up and down, relating to the north star. Hope that simplifies things?

East is for adjusting altitude, and the Meridian is for adjusting azimuth. **“AltitudE is Easy and aziMuth is Mad”** (Dennis di Cicco, Sky & Telescope 1987)! That means that if a easterly star drifts north or south after tracking a few minutes, the mounts **“Easy altitudE”** is adjusted about half the distance back and in the “same direction” that would move the star back to the eyepiece centerline. When tracking at the meridian, the **“Mad aziMuth”** adjustments are made moving the star further away from center in the same direction it drifted. Re-center the star and track again for a few minutes to check the results. Then repeat until all drift is corrected. Easy yes! It didn’t take us long to make significant tracking improvements. The only problem was the very coarse adjustments available on the mount. We marked the starting position so we knew how much the mount was moved each time. I finally got a feel for just how much physical effort it took to move the scope in azimuth, and the altitude adjustment wasn’t smooth either because of a cradle mismatch of the base and the mount. Tightening the mount bolts after adjustment would change alignment relating to how much torque we used. All things considered, everything went well and the Richie is now tracking reasonably well. The views are great after collimation and the encoder system is working fabulously too. This is truly a great scope and it belongs to you the membership. I hope you take the opportunity to run it through it’s paces soon!





# Directors Report

Nerissa Adams is back taking care of her SVAS duties as secretary and the membership committee! She has been working in San Francisco for several months, and straying there with friends. Hopefully, she will be able to help with welcoming new members, mailing membership cards, and keeping the membership lists up to date in Constant Contact. Nerissa brought cookies and water bottles to the Oct meeting. Of course we missed her more than the cookies! (Kidding)

Ross appointed two new SVAS Board members! Bill Marquardt and Tim Tingey. That's great news since it's been a struggle assembling enough Board members for a voting quorum. Also great news, our membership is now up to 142 members! It might allow for more Board positions next year so please think about joining us.



Bill Marquardt lives in Vacaville, and he attends most meetings and some Star Parties. He helped a lot in painting HGO this year!

Tim Tingey helped us last week tweaking the final drift alignment of HGO's 16" Richie. He took some pictures of Jupiter through the Richie. Sorry I don't have a picture of Tim, but I will soon.



The Star\*B\*Q raffle brought in \$1274.00 dollars and shirt sales were \$150.00 for a grand total of \$1424.00! Big thanks to everyone who bought tickets and shirts! It really helps pay all the clubs bills. Star\*B\*Q will be on the July 4th weekend next year so plan

ahead to attend. With your help, It will be absolutely great as usual!

Richard Sandler, our speaker seeker, has taken on the job of SVAS resources. He will be handling all the SVAS shirts and hats, so give him a call if you would like a new shirt!

We enjoyed a fantastic talk about "Dark Matter and Energy" by California State University Assistant Astronomy Professor Dr. Vera Margoniner, PhD., at the October meeting. She is very knowledgeable, and therefore able to describe things in simple terms we all understood. Stars, planets, galaxies, clusters of Galaxies, all exert gravitational forces on one another. Gravity is the stuff that holds everything in orbit, and the closer we are to the center of the gravitational force, the higher the gravity attraction which results in faster orbital speeds. Galaxies are like giant solar systems with all the suns orbiting around the galactic cores. It has been determined all the stuff we see in galaxies only accounts for about 15% or so of the mass needed to create the gravity required to maintain their orbital speeds and size. This applies to the universe as well. So what is the stuff holding us together? Dark Matter. What is it? We don't know, but it must be there and accounts for the missing 85% of the required mass to make things work! She talked about the lensing effect of faraway galaxy light being bent by gravity around nearer clusters of galaxies. By calculating the bend and knowing how much mass it would take to gravitationally bend the light, and then comparing how much mass we can see with the required mass is another way to prove the presence of Dark Matter. I found the lensing effect to be most interesting! Obviously figuring out how much Dark Matter there is will have a huge effect on determining the universes fate of forever expanding, staying the same size, or compressing back to the original Big Bang. Dr. Vera Margoniner promised us a return visit very soon to talk about other possibilities for Dark Matter. Don't miss her outstanding presentations! Happy Holidays!

The SVAS Board of Directors



# SVAS Officers 2012

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*Tim Tingey*   *Bill Marquardt*

## Committees

<b>Membership</b>	Ross Gorman / Nerissa Adams
<b>Resources</b>	Ross Gorman / Walt Heiges
<b>Star-B-Q</b>	Walt Heiges
<b>Newsletter</b>	Lonnie Robinson / Walt Heiges
<b>Web Site</b>	Margaret Minnick
<b>Outreach Director</b>	Walt Heiges / Perry Preston Porter
<b>Community Star Parties</b>	Perry Preston Porter
<b>Observatory Director</b>	Perry Preston Porter
<b>First Light Team</b>	Perry Preston Porter
<b>ATM - Amateur Telescope Making</b>	Lonnie Robinson / Bill Thomas
<b>Speaker Seeker - Resources</b>	Richard Sandler

## 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 (published bi-monthly) 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. Deadline is the 22nd of the month prior to the newsletter release.

**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 Membership Level:      New: \_\_\_\_\_ or Renew: \_\_\_\_\_

Student- (student ID required)      \$20/yr \_\_\_\_\_

Family or Individual- (one household)      \$35/yr \_\_\_\_\_

Observatory- (membership + \$40 + approvals)      \$40/yr \_\_\_\_\_

Supporting- (membership + contribution)      \$75/yr \_\_\_\_\_

Contributing- (membership + contribution)      \$150/yr \_\_\_\_\_

Additional tax deductible contribution:      Amt \$ \_\_\_\_\_

(Please Print)      Total \$ \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zip \_\_\_\_\_

Phone \_\_\_\_\_

Email \_\_\_\_\_ (For SVAS Newsletter)

Detach and mail  
with payment to:

**SVAS Membership Application**  
**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 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.

Signature \_\_\_\_\_

Date \_\_\_\_\_