



# SVAS

## newsletter

Sacramento Valley Astronomical Society | founded in 1945

Vol. 56 no. 12 | December, 1998

## Piggyback Astro-photography

**P**iggyback astrophotography is the mounting of the camera on a telescope or other type of motorized platform that accurately tracks the movement of the stars. It is great for imaging Milky Way Panoramas, Star Fields, and whole Constellations due to the wide field of the camera lens.

The equipment needed include a camera with a shutter that can be held open indefinitely, a cable release with a locking mechanism to keep the shutter open, and a way to mount the camera on the telescope.

Normal camera lenses are used, ranging from wide-angle 20mm to 35mm lens through a 50 mm lens for constellations and star clouds, to 135mm to 500mm focal length lens for finely detailed images. Large areas of the sky can be imaged in this way. For example, a typical 50mm lens covers an area of 38 degrees by 26 degrees, and gives a magnification approximately equal to that of unaided vision. Try to avoid zoom lenses, because they operate at high focal ratios, thereby requiring longer exposures for the same results.

The procedure is simple: Aim the telescope at the desired target, frame it in the viewfinder as desired, set the focus at infinity, and keep the shutter open as long as the sky conditions will allow. For lenses of 50mm focal length or less, set the f-stop one or two f-stops less than wide-open to prevent edge-of-field aberrations. The length of exposure depends primarily on sky conditions, with dark skies allowing longer exposures. Exposures range from

thirty seconds to an hour or more. The Astrophoto Program from the Astronomical Society of Southern New England is very useful in determining exposure lengths (<http://www.ultranet.com/~assne/>).

To ensure sharp focus, check to make sure that the star images, as seen through the viewfinder, are as small as possible (The infinity mark may not be absolutely correct). In addition, tighten the take-up spool to be sure that the film is tight across the film plane, to prevent uneven star images across the film plane.

Guiding is generally easy with piggyback astrophotography, because the short focal lengths used are forgiving of guiding errors. The longer the focal length of the lens, and the less accurately polar aligned, the more guiding is needed. Guiding accurately requires using an illuminated reticle eyepiece, possibly in combination with a barlow lens, that gives at least 20 power for each fifty millimeters of lens focal length (e.g., 20x for a 50mm lens, 54x for a 135mm lens, etc).

A black card is sometimes held in front of the camera to avoid jiggles in the star image from opening the shutter. It is also used to protect your exposure from stray aircraft lights, etc. Between exposures, check the camera lens for condensation, because moisture is a very effective lens cap!

For urban astrophotography, a Deep Sky filter from Lumicon can be used to block the light pollution, but requires exposures that are two to three times longer, because it reduces the amount of incoming light.

Possible targets for piggyback astrophotography include any of the bright nebulae in Sagittarius, the Virgo cluster, the Andromeda galaxy, the Veil Nebula in Cygnus, or the Sword and Belt of Orion (Horsehead Nebula and Orion Nebula),

among others. Constellations that are interesting subjects for piggyback astrophotography include Ursa Major, Orion, Lyra, Cygnus, and Taurus, but are not limited to these. A fast lens and ISO 400 to 800 film is good for beginning pictures.

Specifically recommended films include the professional grade print films: Fuji Super G+ 400, Fuji Super G+ 800, Kodak Ektapress PJ 800, Kodak Royal Gold 1000, and Kodak PMZ 1000. Recommended slide films are: Kodak Ektachrome P 1600 Professional and Kodak Ektachrome Elite II 100.

— Joe Riddle



*Photo Joe Riddle*

<i>Date</i>	07/19/98
<i>Location</i>	Red Lake, CA
<i>Time</i>	0830 UT
<i>Object</i>	Andromeda Galaxy (M31, M32, M110)
<i>Equipment</i>	135 mm Telephoto Lens at f2.8 on Olympus OM-1
<i>Duration</i>	20 Minutes
<i>Film</i>	Fuji Super G+ 800 ISO

# President's Perspective



As the observing season winds down for most, the SVAS enters a busy time of year for management. This is the time of year when our thoughts turn to organizing the events of next season. Astronomy Day, the Star-B-que, raffle prizes to solicit, and calendar dates to set are just a few of the many things to organize, plan, and execute. In addition to these many yearly activities, we have a new and important item to deal with - the addition of a new "wing" to the Henry Grieb Observatory. The project is funded by a 42,000 dollar grant from the Cable Data Corporation and will consist of a remotely-accessible automated observatory for use in education and research programs around the world.

When the club agreed to enter into the project last year, it defined a new course for itself. The SVAS has unavoidably committed itself to moving away from a "loose" organization of amateur astronomers to something much bigger. Although we will provide for our members in the same fashion as always (perhaps even better), we are entering the realm of organizations that contain the likes of the Astronomical Society of the Pacific. We will now be actively supporting K-12 and collegiate level education. The new facility even lends itself to the possibility of astronomical research projects such as Near Earth Asteroid searches, Super Nova searches, and Variable and Binary star research.

This new step brings much opportunity to the club's future, as well as increased responsibility, the need for better organization and additional manpower. The SVAS must put forth a new effort so that this new course can successfully be navigated. At this time I am calling for a "re-engineering" of the club, in which we will assess our new needs and implement

the necessary changes and efforts. I would also like to call upon the club membership to step forward and help with these needs. If we can organize a sufficient amount of help to run the SVAS, each individual's efforts are fun, easy and minimal. If you would like to volunteer your help or just find out what might be involved in helping, please call me at 457-9115.

Happy Holidays

— Cary W. Chleborad

## Robert J. Mathews Observatory

You may have heard rumors of another telescope being installed at Henry Grieb Observatory. You might have even noticed a bit of extra concrete at the northern end of HGO. The monumental hunk of concrete pedestal extending 8 feet above the ground represents the base of a new addition to our family. It will be known as "**Robert J. Mathews Observatory**" or R.J.M.O. About 18 months ago, Glenn Reagan approached the Board with his plan to search for an observatory site. The SVAS joined with CSUS on a project to develop a site and purchase equipment for a robotic telescope. This *robo-scope* would link with other scopes to create a network of telescopes through "Hands On Universe" (HOU). Tom Smithson (CSUS), Glenn Reagan (ARC), Harold Nations (Sierra), and myself were the original team to address the problems of building such an observatory.

First, we were notified of the possibility that there was an observatory for sale. The four of us took a trip to Vallejo and found the ASH Dome. The dome was purchased for half the cost of a new one. The disassembly and transportation of the dome was accomplished by Glenn Reagan (Phase #1) and Larry Harrison (Phase #2). With the help of Matt Jennings (a.k.a. — Mr. Starparty), we located and purchased the Meade LX200 12" at significant savings. The wedge, filter wheel, camera, software, and computer were soon to follow. Blueprints were drawn for the addition to HGO. I was able to locate a contractor to build the forms and pour the concrete. Cary Chleborad and I discussed the plans

and the future of RJMO. Some modifications were necessary, if we were to adapt a larger scope in the future. Other experts were added to the mix and a more complete team was assembled. Phil Mattingly (Nightwatch) will be helping to adapt a round dome to a square building and to add his expertise since he has already built two domes next to ours. There have been several others added for various support functions and the list is still growing. CSUS and the original grant have run the full course. SVAS is now in the position to take this project to completion. All the money originally marked for the project has been expended and it is now up to us. We need to develop a plan to complete the project.

The Board has voted on the formation of a team to handle the business of building RJMO. Cary Chleborad will be lead as **Project Manager**. His function will be to manage and coordinate the daily operation and to keep the team informed when changes occur. He will also keep the Board of Directors updated with the progress of the project. His duties will be very similar to that of the President of SVAS. Harold Nations will assume the role of **Project Scientist**. His experience in the field of Astronomy and his knowledge of computerized imaging will greatly enhance that portion of the project. I will be the **Project Construction Coordinator**. I am an Inspector for the Sacramento Housing Authority and have a lot of experience in construction and the related costs. I will coordinate and oversee that effort. Last and certainly not least, Stuart Schulz will be the **Site Coordinator**. As the Observatory Director, Stuart has the knowledge of conditions at the site and those intangibles we have taken for granted over the years. He is a really good carpenter and he will be swinging the #1 hammer at the site.

We have much work ahead of us and this is a great turning point for us all. If there are any of you who have certain other skills to offer, please feel free to call me (684-3421). We will need help in many fields and any ideas will be heard. There is a wonderful opportunity to do something very important for education. Everyone has some special thing they do very well and we are looking for you. The future of this Society hangs in the balance and everyone needs to help bring about this change.

— Walt Heiges

# PERIGEE

by Jim Varney

## The Birth of a New Space Station

The long-awaited and much-delayed International Space Station (ISS) has finally begun construction with the launch of the first module, Zarya. By the time you read this a second module, Unity, will have been placed on orbit by Space Shuttle Endeavour.

How Visible Will the Space Station be from Sacramento?

There should be ample opportunities for interesting views of the ISS in Sacramento skies. The reason for this is that the orbit of ISS will be inclined 51.6 degrees to Earth's equator (in other words, the ISS will travel between 51.6 degrees North latitude and 51.6 degrees South latitude). With Sacramento's latitude being less than the inclination there will be passes directly overhead from time to time.

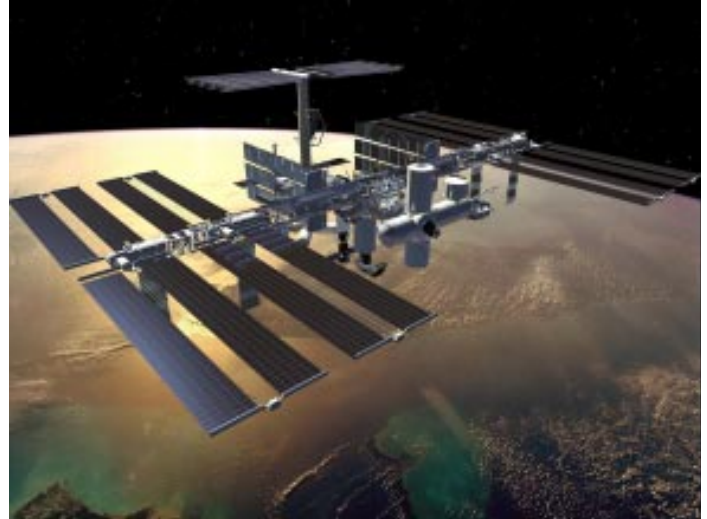
The periods of visibility will follow the same patterns that Mir does, which is also in a 51.6 degree orbit. The general rules of thumb for Space Station visibility will be:

- A handful of passes in the evening over several days.
- A handful of passes in the morning, about 3 - 4 weeks after the evening set.
- Roughly 6 to 10 weeks between evening/morning couplings.
- Overhead passes are always southwest to northeast or northwest to southeast.
- During summer, ISS can be seen making low elevation passes to the north, even at midnight; the sun illumination angles are favorable to the north. "ISS marathons" are possible around summer solstice with 5 visible passes in one night a possibility.

What will make viewing ISS interesting is the possibility of seeing other spacecraft rendezvous with ISS. During 1999 there are four Space Shuttle missions and one unmanned Proton mission planned. Chances are at a least a few sightings will feature either a docked Shuttle or, even better, either an approaching or departing spacecraft near ISS. I vividly remember seeing Mir and Progress just prior to docking two years ago; it is exciting to see two spacecrafts in the sky flying together as a moving "double star."

Adding interest to viewing ISS will be watching it increase in brightness as each module and solar panel are added. Zarya and Unity are larger than most satellites but smaller than Shuttle or Mir, so something on the order of 1st magnitude to start with. In 2004 when the "City in Space" is complete, it will be remarkably bright, most definitely in the negative magnitudes range.

Telescopes will have no difficulty discerning some structure at low power. If you observe ISS at a range of 500 miles it will



appear to subtend 28 seconds of arc - a little larger than Saturn. The trick, of course, will be moving your telescope fast enough to track it as it moves through the sky.

### Space Station Facts

Upon completion, the International Space Station will:

- have a mass equivalent to 1.1 million pounds if it were on Earth;
- measure 361 feet from end to end;
- have an interior working volume about the same as a 747 jumbo jet;
- be powered by solar cells with an area of one-half acre;
- have systems run by 52 computers that are fed by 2,000 sensors;
- be constructed after 34 visits by the Space Shuttle and 9 Russian unmanned launches

### 1999 Space Station Schedule

Month	Mission	Activity
May	Shuttle STS-96	Attach SPACEHAB module, Russian crane
July	Progress rocket	Service Module (life support and docking)
August	Shuttle STS-101	Cargo, tools, etc. (duct tape?)
October	Shuttle STS-92	Truss, gyros, US television equipment
December	Shuttle STS-97	Solar arrays(Big!), truss, radiators

All of this activity hopefully will provide us with some interesting viewing opportunities to catch a glimpse of the "City in Space" as it is constructed in the sky.

# COMET COMMENTS

by Don Machholz

Comet Williams, presently our brightest comet, enters the morning sky. In the evening sky Comet Meunier-Dupouy passes by Periodic Comet Howell (still in outburst) on November 29 and Periodic Comet Giacobini-Zinner two weeks later. Finally Comet LINEAR (C/1998 M5) steadily brightens while Comet LINEAR (1998 U5) passes by earth at a distance of only 45 million miles in mid-November. Watch this one for a possible outburst.

C/1998 T1 (LINEAR): Picked up on October 2 by the Lincoln Laboratory Near Earth Asteroid Research Team, it was first thought to be an asteroid. This comet is presently magnitude 15 but is still nearly a year from perihelion, and in a retrograde orbit. It should be visible in binoculars next summer as it passes 50 million miles south of us.

C/1998 S1 (LINEAR-Mueller): Jean Mueller at Palomar found this three weeks after the LINEAR picked it up as an asteroid. The comet was closest to the sun at 2.5 AU last summer and remains faint. The orbital period is 9.1 years.

C/1998 U1 (LINEAR): Found on Oct. 18, this comet remains faint at a distant perihelion distance of 4.0 AU.

C/1998 U2 (Mueller): Found on Oct. 22, this faint comet remains between Mars and Jupiter with a period of 8.8 yrs.

C/1998 U3 (Jager): Amateur Michael Jager of Austria used a 10-inch Schmidt and film to pick this up on Oct. 23. It is now at its

brightest (magnitude 12) and will soon be dimming.

C/1998 U4 (Spahr): Timothy Spahr of Arizona used a 16" Schmidt with a CCD when he found this on Oct. 27 as part of the Catalina Sky Survey. It remains faint at magnitude 16 with an orbital period of 13 yrs.

C/1998 U5 (LINEAR): This comet was found Oct. 30, has a high retrograde orbit, and is visible in our northern sky.

**COMET HUNTING NOTES:** Williams, Jager and Tucker are all now eligible for the Wilson Comet award. Each amateur used a different method to find "their" comets: visual, photographic and CCD.

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## CosmoQuote

Cosmosquote is a cipher puzzle. The following is a quotation about astronomy or cosmology. Each letter in each word of the quote has had another letter substituted for it. A letter is never substituted for itself. At the end of the quote, the author's name is given.

**This month's hints:** A four-letter word beginning and ending in the same letter in which the middle two letters are different from one another is almost always "that". A single letter is always either "T" or "A".

The answer is on page 7.

TEYBY LVL AEY JIVDYBOY WFUY

XBFU? EFT ZIL TEM LVL VA

SYQVI? TVRR VA WFUY AF ZI YIL,

ZIL VX OF, EFT? AEOYO ZBY

NJYOAVFIO AEZA ZBY FX

VIAYBYOA AF JO ZRR.

OAYGEYI EZTPVIQ

## EPHEMERIDES

### 88P/Howell

Date(00UT)	R.A. (2000)	Dec	EI	Sky	Mag
12-08	20h56.4m	-20°57'	55°	E	11.2
12-13	21h12.0m	-19°46'	54°	E	11.3
12-18	21h27.1m	-18°32'	53°	E	11.4
12-23	21h41.8m	-17°15'	51°	E	11.6
12-28	21h56.0m	-15°57'	50°	E	11.7
01-02	22h09.7m	-14°37'	48°	E	11.8

### C/1997 J2 (Meunier-Dupouy)

Date(00UT)	R.A. (2000)	Dec	EI	Sky	Mag
12-08	21h17.3m	-17°08'	61°	E	13.3
12-13	21h20.7m	-17°33'	56°	E	13.3
12-18	21h24.3m	-17°56'	52°	E	13.4
12-23	21h28.1m	-18°16'	48°	E	13.5
12-28	21h32.0m	-18°34'	43°	E	13.6
01-02	21h36.0m	-18°50'	39°	E	13.6

### 21P/Giacobini-Zinner

Date(00UT)	R.A. (2000)	Dec	EI	Sky	Mag
12-08	22h01.1m	-20°48'	70°	E	9.1
12-13	22h28.9m	-22°09'	70°	E	9.2
12-18	22h56.4m	-23°08'	71°	E	9.4
12-23	23h23.3m	-23°44'	72°	E	9.6
12-28	23h49.4m	-23°59'	73°	E	9.9
01-02	00h14.3m	-23°55'	74°	E	10.1

### C/1998 M5 (LINEAR)

Date(00UT)	R.A. (2000)	Dec	EI	Sky	Mag
12-08	18h46.9m	+36°58'	65°	E	9.8
12-13	18h48.3m	+37°33'	64°	E	9.6
12-18	18h50.1m	+38°18'	64°	E	9.6
12-23	18h52.1m	+39°12'	64°	E	9.5
12-28	18h54.5m	+40°17'	64°	E	9.5
01-02	18h57.1m	+41°34'	65°	E	9.4

### C/1998 U5 (LINEAR)

Date(00UT)	R.A. (2000)	Dec	EI	Sky	Mag
12-08	21h35.4m	+28°51'	84°	E	11.6
12-13	21h25.6m	+25°03'	77°	E	11.9
12-18	21h19.3m	+22°16'	70°	E	12.2
12-23	21h15.1m	+20°10'	64°	E	12.4
12-28	21h12.2m	+18°32'	58°	E	12.6
01-02	21h10.1m	+17°16'	53°	E	12.9

### C/1998 P1 (Williams)

Date(00UT)	R.A. (2000)	Dec	EI	Sky	Mag
12-08	13h15.6m	-15°13'	53°	M	9.2
12-13	13h12.0m	-13°33'	59°	M	9.2
12-18	13h07.4m	-11°39'	66°	M	9.3
12-23	13h01.8m	-09°29'	73°	M	9.3
12-28	12h54.6m	-06°57'	81°	M	9.3
01-02	12h45.7m	-03°59'	89°	M	9.3

## ELEMENTS

Object:	Giacobini-Zinner	Meunier-Dupouy	Howell
Peri. Date:	1998 11 21.32107	1998 03 10.4965	1998 09 27.19738
Peri. Dist (AU):	1.0337095 AU	3.051186 AU	1.404878 AU
Arg/Peri (2000):	172.54569 deg.	122.6864 deg.	234.8593 deg.
Asc. Node (2000):	195.39930 deg.	148.8467 deg.	057.65738 deg.
Incl (2000):	031.85856 deg.	091.2706 deg.	004.39961 deg.
Eccen:	0.7064344	1.001019	0.5531119
Orbital Period:	6.61 years	Long Period	5.57 years
Ref:	NK 629	MPC 32410	MPC 31205
Epoch:	1998 11 21	1998 07 06	1999 08 10
Absol. Mag <sup>m</sup> / <sub>n</sub> :	9.0/6.0	4.0/4.0	7.7/4.0

Object:	Williams	LINEAR (M5)	LINEAR (U5)
Peri. Date:	1998 10 17.838	1999 01 24.5733	1998 12 21.7737
Peri. Dist (AU):	1.14674 AU	1.742213 AU	1.23192 AU
Arg/Peri (2000):	294.473 deg.	101.2873 deg.	051.4478 deg.
Asc. Node (2000):	156.379 deg.	333.3766 deg.	66.6606 deg.
Incl (2000):	145.730 deg.	082.2285 deg.	131.9990 deg.
Eccen:	1.0	1.0	1.0
Orbital Period:	Long Period	Long Period	Long Period.
Ref:	MPEC 32410	MPC 32410	IAU CIR. 7044
Epoch:	1998 10 17	1999 01 22	1998 12 22
Absol. Mag <sup>m</sup> / <sub>n</sub> :	6.5/4.0	5.5/4.0	11.0/4.0

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uses P.O. Box 575 in  
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Sacramento,  
CA 95851-0274.  
Thank you.**

**Don Machholz (530) 346-8963**

**DonM353259@aol.com.**

**Web Page: <http://members@aol.com/cometcom/index.html>**

## Merry Hill School Star Party

Jack Koobs (SVAS member) and myself went to Merry Hill school November 12 and put on an astronomy program. Jack is a teacher and did a great job in explaining what light years are and how Galileo discovered Jupiter. He also spoke about how far objects in the sky are. He also brought along the Mars globe that he won at the Star-BQ last year and talked about it, and showed the children the features on the planet.

I knew it was going over well by the questions Jack was getting. We also gave out telescopes to the kids. They had a great time putting them together and looking out the window. They just loved them. I did a video of the proceedings which I will give them.

Keep looking up!

— Stosh Groner



Stosh Groner (left) and Jack Koobs

## Classifieds

Like new! Uranometria 2000.0 Northern, Southern & Deep Sky Field Guide. \$60 complete set only. (530) 668-0171

For sale Meade 4500 reflector, 4.5 inch, equatorial mount - 3 years old. two lenses and moon filter, box for transporting. \$450 for all, or best offer. Call (916) 361-7866 or on the internet, [yunclin@ibm.net](mailto:yunclin@ibm.net).

## What's This? Meteor Viewing by Daylight ???!

After a DISAPPOINTING, foggy, cloudy Monday night on November 16th, 1998, I actually did get to see some of the Leonid meteors. But can you believe that the most I saw were during the daylight?! That's right, at the prompting of Don Macholz, I decided to venture out at lunch time on Tuesday afternoon between 1:00 PM and 1:30 PM (close to the predicted peak).

I found a bench outside at work where I could lay down and look up at the sky... don't tell them I was laying down on the job. Not really expecting to see too much, I waited. And then, low and behold, there goes a short streak across the sky. I ask myself, "Was that really a meteor?" I continue to watch...there is another one. There was not very much contrast between the sky and the meteors, so it took a lot of focus and concentration to make them out, but I could actually see them! They looked like short silver threads streaking the sky. No fireballs though, too bad. One of them looked like a photographer's flash going off straight at me. All in all, I saw at least a dozen.

On Tuesday, November 17th, I went to the Auburn Dam Overlook since it was a beautiful clear sky. I arrived around 6:30 PM and stayed until 12:15 AM when the clouds came in. There were about 20 people looking up and bundled up, hoping for a view of the much anticipated storm of meteors. A few brought telescopes or cameras to pass the time and the rest of us had lots of time to visit. I personally only saw about three meteors this night, one being a small fireball. Others saw up to a dozen. We all had a good time, but the Leonids storm was not to materialize this year.

Perhaps, we still have another chance next year, which is the 33rd year in the cycle.

— Susan Strosahl

## The 1999 Astronomical Pocket Diary Available

You receive a request for a star party. Do find yourself checking your personal availability in one book, then checking the moon phase and other sky events in a different source? How much easier to have it all in one place!

The annual Astronomical Pocket Diary is a personal date book and almanac all in one. Published by Norbert Haley of New Zealand, this fascinating and practical little calendar is filled with astronomical and historical trivia. Moon information is given daily, solar system "flip book" diagrams and data weekly, special sky events like eclipses, meteor showers, conjunctions, etc. when they happen. All the sky information is calculated for your location. Check it out on the web: [www.rat.de/apd/apd.htm](http://www.rat.de/apd/apd.htm).

If you are in the San Francisco Bay Area, you can order copies of the 1999 diary locally, and \$5.00 of the price of each one will be a donation to the Mt Tamalpais Astronomy Programs co-sponsored by the Mt Tamalpais State Park, the SFAA and the MTIA. These special editions include the dates of Mt Tam star parties and programs in the Mt. Theater.

Use your diary to plan your observing sessions, or organize your life. They also make great gifts for anyone with an interest in the sky. Get a head start on holiday shopping by ordering your copies today.

Send \_\_\_\_\_ copies of the 1999 Astronomical Pocket Diary to:  
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**Mail to:** MTIA /Astronomy Programs  
 c/o Tinka Ross  
 89 Dominican Drive  
 San Rafael, CA 94901

# WHOM TO CALL

(916) SVAS-111 To save time, press:

- 1-Last minute changes & updates for SVAS events
- 4-General Meeting information & location
- 5-Star party information & location

SVAS Web Page: <http://www.calweb.com/~svas>

## 1998 SVAS OFFICERS:

### President

Cary Chleborad 457-9115

### Past President

Ray Gray 771-3712

### Vice President

Walt Heiges 684-3421

### Secretary

Marie Driskill 852-6647

### Treasurer

Mark Bonitata (530) 889-0889

## DIRECTORS

Dawn Baird 457-9115

Ross Gorman 721-6955

Mike Hardesty 635-7750

Chris Hulbe 967-3794

Joe Maloney (530) 885-6698

Sheri McFarland 961-9667

Joe Riddle 488-5634

Jeff Richeson 348-8448

Alysse Rocha 985-4825

Susan Strosahl 920-0247

## Observatory Director

Stuart Schulz 736-0449

## Public Star Parties

Susan Strosahl at 785-5556

## Newsletter

Sheri McFarland 961-9667

Anne-Marie Wheatley 530-676-0566

## Welcome Chairman

Stosh Groner 989-9281

## Telescope Making

Cary Chleborad 457-9115

## Junior Astronomers

Dawn Baird 457-9115

## WHERE TO MEET

General meetings are held on the third Friday of each month, 7:30 p.m. at **Sacramento State University (CSUS), Mendocino Hall, Room 1015, 6000 J Street, Sacramento, CA.**

### Visitors Welcome!

The SVAS Newsletter is published monthly by and for the membership of the Sacramento Valley Astronomical Society. Permission is granted to other amateur astronomy organizations to reproduce in whole or in part for internal non-profit use, provided credit is given to the SVAS Newsletter and to authors of the reproduced materials.

**Articles**—Manuscripts and letters are welcome preferably via email or 3.5" diskette, in Word or text format. Items may be mailed to Sheri McFarland, 10824 Fair Oaks Blvd. #260, Fair Oaks, CA 95628, or emailed to [sherim@jps.net](mailto:sherim@jps.net). **Deadline for the following month's newsletter is the Wednesday following the SVAS General Meeting.**

**Advertising**—Commercial non-personal advertising, business card through full page, is available. Contact Sheri McFarland at 961-9667 for information.

**Classified advertising** is free to members of SVAS. Submit ads monthly to the SVAS Newsletter at the above address.

## HGO

SVAS maintains the Henry Grieb Observatory (HGO) in the Sierras for members only.

Monthly star parties are also held at the site.

**For directions and regulations, please call Vice President Walt Heiges at 684-3421**

## CosmoQuote Answer:

— Stephen Hawking  
Where did the universe come from? How and why did it begin? Will it come to an end, and if so, how? These are questions that are of interest to us all.



# Membership Renewal/ New Member Application

**Yes! Please renew my membership, or make me a new member of the Sacramento Valley Astronomical Society.**

Renewal                       New Membership

**General, \$25** — Enjoy monthly meetings, informative monthly newsletters, and awe inspiring views of the universe at monthly star parties.

**Observatory, \$75** — Enjoy all the benefits of a general membership plus private use of the Henry Grieb Observatory (HGO). Must be a member for 6 months or longer, and must be approved by the Board of Directors.

1 year     2 years     3 years

### Tell us about yourself...

Name(s) \_\_\_\_\_

Address \_\_\_\_\_

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

Telephone ( \_\_\_\_\_ ) \_\_\_\_\_

E-Mail Address \_\_\_\_\_

Areas of interest:

Equipment owned:

I agree to abide by the terms and conditions\* governing use of the Henry Grieb Observatory property. I understand that failure to abide can result in revocation of use privileges and SVAS membership.

Signed \_\_\_\_\_ Date \_\_\_\_\_

\*A copy of the HGO Rules of Operation and Regulations will be available upon request to all members.

**Note:** The term of annual membership is March-to-March. Dues for persons joining in months later in the year than March are not pro-rated. New members joining in January or February will be advanced to March.



Enclose payment and mail to:  
**Sacramento Valley Astronomical Society**  
P. O. Box 15274  
Sacramento, CA 95851-0274



**Sacramento Valley  
Astronomical Society**  
P. O. Box 15274  
Sacramento, CA 95851-0274

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# SVAS Calendar of Events

Please call SVAS-111 to verify event locations, dates, and times.

## December

- 17— 7:00 pm. **Board Meeting**,  
Denny's at Watt & Auburn.
- 18— 7:30 pm. **637th General  
Meeting** at CSUS  
Mendocino Hall, Room  
1015. Ross Tessien  
(Physicist) will speak about  
new ideas in Physics and  
Astronomy.
- 19— **Star Party**, HGO (open only  
to members and their  
guests).

## January

- 14— 7:00 pm. **Board Meeting**,  
Denny's at Watt & Auburn.
- 15— 7:30 pm. **638th General  
Meeting** at CSUS  
Mendocino Hall, Room  
1015. Joe Riddle will present  
"Astrophotography- Part II.
- 16— **Star Party**, HGO (open only  
to members and their  
guests).

## February

- 18— 7:00 pm. **Board Meeting**,  
Denny's at Watt & Auburn.
- 19— 7:30 pm. **639th General  
Meeting** at CSUS  
Mendocino Hall, Room  
1015. Speaker TBA.
- 13— **Star Party**, HGO (open only  
to members and their  
guests).

**General Meetings are held on the 3rd Friday of the month  
at CSUS Mendocino Hall (next to bookstore) Room 1015**

**Star parties are held on the closest Saturday to the new moon at the Henry Grieb Observa-  
tory (HGO) and are open only to SVAS members and their guests. Snow on the ground at  
HGO means cancellation of the star party for all General Members.**