



# SJAA EPHEMERIS

## SJAA Activities Calendar

Jim Van Nuland

### (late )December

- 23 Dark sky weekend. Sunset 4:55 p.m., 16% moon sets 8:05 p.m.
- 29 Houge Park star party. Sunset 4:59 p.m., 80% moon sets 3:28 a.m. Star party hours: 7:00 to 10:00

### January

- 6 **General meeting at Houge Park.** Our speaker is Bob Fies, talking about the process of aluminizing telescope mirrors. 8 p.m.
- 12 Houge Park star party. Sunset 5:11 p.m., 34% moon rise 2:21 a.m. Star party hours: 7:00 to 10:00
- 12 Astronomy Class at Houge Park. 7:30 p.m.
- 13 Dark sky weekend. Sunset 5:12 p.m., 25% moon rise 3:22 a.m.
- 20 Dark sky weekend. Sunset 5:19 p.m., 6% moon sets 7:20 p.m
- 26 Houge Park star party. Sunset 5:26 p.m., 64% moon sets 2:32 a.m. Star party hours: 7:00 to 10:00

### February

- 3 **General meeting at Houge Park.** John Dillon, historian, will discuss the search for the first telescope. 8 p.m.
- 9 Houge Park star party. Sunset 5:41 p.m., 52% moon rise 1:11 a.m. Star party hours: 7:00 to 10:00
- 9 Astronomy Class at Houge Park. The subject will be the moon. 7:30 p.m.
- 10 Dark sky weekend. Sunset 5:42 p.m., 42% moon rise 2:13 a.m.
- 17 Dark sky weekend. Sunset 5:50 p.m., <1% moon sets 6:11 p.m.
- 23 Houge Park star party. Sunset 5:56 p.m., 49% moon sets 1:34 a.m. Star party hours: 7:00 to 10:00

The Board of Directors meets at 6:00 p.m. preceding each general meeting. All are welcome.

**24 hour news and information hotline:  
(408) 559-1221**

### January General Meeting

## Bob Fies on Aluminizing Mirrors

Jan. 6 at 8 p.m. @ Houge Park

David Smith

So now you have your new mirror ground, polished, and figured. Now what does it take to get it aluminized? For many amateur telescope makers in the SF Bay area, the answer involves Bob Fies. Bob coats mirrors for John Dobson of the Sidewalk Astronomers, and for the Chabot Telescope Makers Workshop, as well as for individual customers. I once took a mirror to Bob and stayed to watch the whole process. It was an interesting time. The flash of aluminum vapor in the vacuum chamber seen through the porthole was especially fascinating.

Bob will be addressing us on January 6. He will step us through the process, including cleaning and prepping the mirror, installing the mirror and aluminum in the vacuum chamber, flashing the coating, and applying the protective overcoat. Related topics include care of the mirror, durability of coatings, and stripping for a recoat.

How did Bob get involved in the mirror coating business? I thought his reply to my query was worth repeating, so here it is:

*When I went to Carlmont HS in Belmont in the 50s the science teachers were very energetic. Those were the days when they had the Science Fair at the Academy of Science where the new planetarium had just been finished. One of the many projects at Carlmont was to grind and aluminize an 8 inch mirror for the school. The teachers had collected various bits and pieces for the project including a mercury diffusion pump which luckily we never got into operation.*

*The other influence at that time was the Peninsula Astronomical Society. That was before Foothill College and they met at the Center at the Park at Embarcadero and Middlefield Road in Palo Alto. Several 'National Aeronautics Administration' scientists from Moffet Naval Air Station attended along with Stanford professors. One of the people, Robert Jones was particularly involved in telescope making, even starting a business, Vega Instrument, to manufacture Maksutov telescopes. Marvin Van whose 16 inch telescope ended up in the dome at Foothill College was also a member.*

*So after a few grubby jobs I ended up in a good paying union job as a mechanic with Pan American Airways in 1964. At that time vacuum tubes were the main stay of electronics but there were people putting more than one transistor in 'discrete devices.'*

Continued on page 4

## To Chase a Very Small Dot

Ernie Piini

Finding and photographing the planet Mercury as it passes in front of the Sun was a challenge that I could not ignore. The weather forecasts for the week of November 5 thru 11, 2006, were for mostly clear skies, with the exception of November 8, the day of the Mercury transit, when all the weather men predicted rain. Sure enough, the day dawned overcast and gloomy; however, at 10:35 a.m. the Sun came out from behind the clouds and the rest of the day was perfect! This would be my second attempt, having photographed the Mercury transit from Canberra, Australia, in 1993.

It takes fairly high-powered equipment to photograph a small dot in front of the Sun. I set mine up in my driveway in San Jose (see photo). First there was my home-built 8-inch Newtonian telescope (f/5.6), with a Baader density -5 solar filter (reduces sunlight intensity by 100,000 times), with a Canon "Rebel" digital camera attached. Another system, alongside, consisted of my Canon GL-1 camcorder on top of a Takahashi mount—the same system I used for the 2004 Transit of Venus.

I was joined by my neighbor, Billy Mac, who brought his Berkut 70 mm x 25 power binoculars, which provided us with a clear view of a sunspot and the tiny image of the planet Mercury. Billy, much younger than I and with much keener eyesight, helped me find the itty-bitty spot in both my viewers. Throughout the event, we used the location of the sunspot to locate Mercury. Other amateurs joined our party, including Dick Nelson, who brought his camcorder setup, a homemade azimuth-elevation mount that tracked the movement of the Sun during the 4 hour, 56 minute transit.

I took 45 exposures with the digital camera and about the same number of video exposures with the camcorder. I downloaded the digital exposures into my eMac computer using the iPhoto

software application. This gave me the capability to enhance each photo and to magnify the area where the image appeared. Much to my enjoyment, every exposure clearly revealed Mercury in front of the Sun. I then used Adobe Photoshop 7 to crop and position the photos for printing. Unfortunately, my Canon GL-1 results were not as good as I liked. I have set them aside for later evaluation. To mark our initial success everyone present enjoyed a tailgate

two camcorders on tripods to record the images. I designed the heliostat and refractor, and Joe designed the projection screen housing.

The heliostat tracked the Sun across the sky. A telescope magnified its image and projected it onto the screen up to 12 inches in diameter. The image size of Mercury is only 10 arc-seconds wide—1/194th the apparent diameter of the Sun.



*The author with his home-built, 8-inch Newtonian reflector (f/5.6) used for the 2006 transit. Photo courtesy of Ernie Piini.*

In the afternoon, a very strong wind came up just as the transit began. The image jittered excessively, a dilemma overcome when we managed to record Mercury with our camcorders during those few still moments. The writer wishes to thank my editors, May Coon and Joe Heim, for their always gracious work.

*Ed.Note: See more pictures from Ernie in the online version of the Ephemeris.*

party during the noon break.

All exposures were taken using 1/1000- or 1/2000- second exposures, ISO = 100, camera set for maximum resolution of 6.3 Megapixels.

It is interesting to compare the size of the home-made equipment for this year's transit to the equipment Joe Shrock and I built for the November 6, 1993 Australian transit of Mercury. That system consisted of four major parts: 1.) a simple heliostat; 2.) a 5-inch double folded refractor with 72-inch focal length, and an eyepiece used to project the image onto a large screen; 3.) a projection screen; and 4.)

### Directions to Houge Park

Houge (rhymes with "Yogi") Park is in San Jose, near Campbell and Los Gatos. From Hwy. 17, take the Camden Avenue exit. Go east 0.4 miles, and turn right at the light, onto Bascom Avenue. At the next light, turn left onto Woodard Road. At the first stop sign, turn right onto Twilight Drive. Go three blocks, cross Sunrise Drive, then turn left into the park.

From Hwy. 85, take the Bascom Avenue exit. Go north, and turn right at the first traffic light, onto White Oaks Road. At the first stop sign, turn left onto Twilight Drive. You will now be passing the park. Turn right at the first driveway, into the parking lot.

## Ringing in the New Year

Akkana Peck

Saturn dominates the night sky throughout as the New Year begins. Rising a bit after sunset, the ringed planet is visible all night.

Saturn will vary its ring tilt quite a bit this year, starting at about 12.6 degrees this month, increasing to a maximum of 15.4 in April then shrinking to 6.6 in December. It reaches opposition on Feb. 10 and continues to be visible until early August.

Evening twilight as the year opens is dominated by brilliant Venus, joined later in the month by Mercury. Most of the other planets are too close to the sun to observe right now, peeking cautiously into the morning sky and awaiting their chances later in the year.

Here's a preview of some other shallow sky events of 2007:

There are two lunar eclipses in 2007. The first one, on March 3, is only barely visible here: the moon will already be out of the umbra (the central part of the Earth's shadow) by the time it rises, and the darkening of the moon in the penumbra is so subtle that it's not likely we'll be able to see anything when the moon is still down on the horizon.

But the second eclipse, on August 28, will give us a much better view. This will be the first since 2000 in which the moon passes through the center of the earth's shadow, making (in theory, anyway) a darker than usual eclipsed moon, and an unusually long eclipse (totality lasts an hour and a half). Here on the west coast we'll be able to see the whole event -- in states farther east, the moon will set before the eclipse is over.

The moon makes lots of close passes with planets (Saturn, Uranus and Mercury) and with bright stars, but mostly we don't get to see any actual occultations from here. Boo!

2007 gives us another Mars opposition, on the day before Christmas -- but Mars will still be relatively far away and small. Between the small size and our typical December weather, this probably won't be as impressive an opposition as the last few have been. It only gets to 15.9", compared with 20.2 in 2005 and 25.1 in 2003.

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**“So there's lots to see in the upcoming year – but start off by ringing in the new year with a good look at the ringed planet.”**

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But don't give up hope -- there's good news too. Mars will be much farther north this time, which means that at opposition it will soar to 80 degrees above the horizon. Even a small planet, when it gets that high in the sky, can show quite a bit of detail, so if we get lucky on the weather 2007 might be a pretty good Mars opposition after all.

Meanwhile, it's not looking good for Mars Global Surveyor. The spacecraft, which has sent back so many useful images of the red planet, was last heard from on November 5, reporting problems with one of its solar panels. Searches using both ground based telescopes and other Mars spacecraft have proved futile, and MGS is feared lost. It's still possible that the surveyor could make a miraculous recovery, but as more time passes it's looking less and less likely.

Jupiter starts the year in the morning sky, moving toward its opposition in early June; it will be visible in the until December. Farther out in the solar system, Neptune will reach opposition in mid August, Uranus in early September, and Pluto in mid-June.

What about comets?

We start the year with two comets visible, but neither one is very bright. 2006 HR30 (P/Siding Spring) reaches perihelion in early January and might reach 10th magnitude. 29P/Schwassmann-Wachmann will be visible in Taurus during the first few months of the year. This comet has unpredictable outbursts, so it's hard to say how bright it will be -- perhaps no brighter than 12th magnitude. In August, it will reappear in the morning sky in Auriga.

A few other periodic comets we can look forward to this year include 2P/Encke, expected to reach binocular brightness in late March and early April; 96P/Machholz, visible in the morning sky in late April but probably never getting brighter than 9th magnitude (discovered by our own comet hunter extraordinaire, Don Machholz); and 8P/Tuttle, which should become visible in binoculars or perhaps even to the naked eye at the very end of the year. It may get even brighter in 2008.

Some interesting solar system space missions launching in 2007 include Dawn, launching in mid-June, which will study the asteroids Ceres and Vesta up close, and the Mars lander Phoenix, in early August, which will study soils of the Martian arctic looking for clues to the planet's water history. The new Herschel infrared space telescope is also scheduled to launch some time in 2007. And the New Horizons mission, which launched last year, will have a close encounter with Jupiter in February, where it will pick up some gravity assist to slingshot it out toward its planned Pluto encounter eight years later.

So there's lots to see in the upcoming year – but start off by ringing in the new year with a good look at the ringed planet.

Bob Fies to speak on Jan. 6  
Continued from page 1

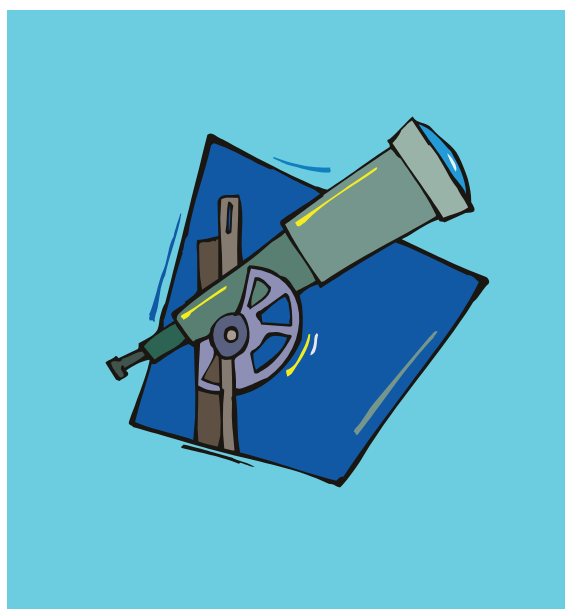
## The Last 30 Days In Astronomy

So at about 1966 I decided to build a vacuum system to experiment with. I was thinking of making capacitors or transistors or thin film magnetic memory and also providing a way to coat telescope mirrors. At that time they were using things like silane and arsine gas to 'dope' transistors and I didn't want to have that stuff in my parent's house. So I tried a bit of ZnS / cryolite dielectric optical filters but the sulfur made the aluminum coatings come out dark. It was at about that time that Mr. Dobson showed up with a bunch of 8 1/2 and 9 1/2 porthole mirrors to be aluminized. His great enthusiasm overcame my lethargy at that time and I more or less gave up on other vacuum projects and concentrated on mirror aluminizing. At that time all mirrors jobs were new mirrors as there were not a lot of used mirrors around as there are now.

So over the years I continued coating as a side line until Pan Am went bankrupt in 1991. At that time the mirror coating became more of a profession for me and a serious enterprise. Eric, one of the young sidewalk astronomers that was then at Stanford, persuaded me that I must be on the internet. The internet has turned out to be the perfect way to allow potential customers to find my service.

So that's the history of 'Aluminum Coating'.

Bob's web site is at <http://home.covad.net/~alcoat/index.htm>.



This column will list the latest news in Astronomy that have occurred in the last month. In this month it means between Nov. 10 and Dec. 10, 2006. We include space exploration, planetary sciences, and anything else that seems even a bit relevant.

NOV-22-2006 **MGS on the Fritz** The Mars Global Surveyor has apparently stopped working. On Nov. 21, NASA announced that several attempts to communicate with the spacecraft have failed. Another attempt to communicate via the Mars rovers was attempted on Nov. 22 and it also failed. <http://www.jpl.nasa.gov/news/news.cfm?release=2006-139>

NOV-30-2006 **Meade sued for the RC.** Meade Instruments is being sued by Star Instruments, RCOS and another plaintiff for claiming that Meade's new telescope lines, the LX200R and RCX400, are advanced Richey-Chrétien. When Meade announced the telescopes they said they would probably be sued if they said the new scopes were not using the RC design. It might be a case of "sued if you do, sued if you don't". <http://skytonight.com/news/wires?id=100827758&c=y>

NOV-30-2006 **30 year old Viking landers imaged from new orbiter.** The Mars Reconnaissance Orbiter has imaged the Viking landers and the Spirit rover. The Vikings landed in 1976. <http://www.jpl.nasa.gov/news/news.cfm?release=2006-142>

DEC-05-2006 **Water found on Mars.** Maybe. Some photos from the Mars Global Surveyor compared the same location 7 years apart and show changes that are indicative of water on the surface. The changed surface is lighter in color. This would seem to eliminate dust devils or new impacts because they generally result in darker surface features. But look for other possible explanations to be proposed. <http://www.jpl.nasa.gov/news/news.cfm?release=2006-145>

DEC-05-2006 **NASA to set up lunar polar camp.** NASA has announced plans to have a permanently inhabited lunar settlement by 2024 which will be located near the lunar south pole. <http://skytonight.com/news/wires?id=100977580&c=y>

DEC-06-2006 **Arecibo fading away.** It appears that research at the Arecibo radio telescope will be sharply cut back as the facility faces its first layoffs in its 43 year history. <http://skytonight.com/news/wires?id=101024257&c=y>

DEC-09-2006 **STS-116** The latest space shuttle mission, STS-116, was successfully launched on Dec. 9. There are 5 launches planned for 2007 and, if that number is achieved, the odds for a Hubble servicing mission in 2008 is increased. <http://www.spaceflightnow.com/shuttle/sts116/status.html>

DEC-10-2006 **Black Hole Snacking Detected.** A black hole has been caught in the act of eating a star according to an article dated Dec. 10. Such an event at a relatively dormant black hole is expected to occur once every 10,000 years. <http://www.jpl.nasa.gov/news/news.cfm?release=2006-144>

## Martian Devils

Tony Phillips

Admit it. Whenever you see a new picture of Mars beamed back by Spirit or Opportunity, you scan the rocks to check for things peeking out of the shadows. A pair of quivering green antennas, perhaps, or a little furry creature crouched on five legs...? Looking for Martians is such a guilty pleasure.

Well, you can imagine the thrill in 2004 when scientists were checking some of those pictures and they did see something leap out. It skittered across the rocky floor of Gusev Crater and quickly disappeared. But it wasn't a Martian; Spirit had photographed a dust devil!

Dust devils are tornadoes of dust. On a planet like Mars which is literally covered with dust, and where it never rains, dust devils are an important form of weather. Some Martian dust devils grow almost as tall as Mt. Everest, and researchers suspect they're crackling with static electricity—a form of “Martian lightning.”

NASA is keen to learn more. How strong are the winds? Do dust devils carry a charge? When does “devil

season” begin—and end? Astronauts are going to want to know the answers before they set foot on the red planet.

The problem is, these dusty twisters can be devilishly difficult to catch. Most images of Martian dust devils have been taken by accident, while the rovers were looking for other things. This catch-as-catch-can approach limits what researchers can learn.

No more! The two rovers have just gotten a boost of artificial intelligence to help them recognize and photograph dust devils. It comes in the form of new software, uploaded in July and activated in September 2006.

“This software is based on techniques developed and tested as part of the NASA New Millennium Program's Space Technology 6 project. Testing was done in Earth orbit onboard the EO-1 (Earth Observing-1) satellite,” says Steve Chien, supervisor of JPL's Artificial Intelligence Group. Scientists using EO-1 data were especially interested in dynamic events such as volcanoes erupting or sea ice breaking apart. So Chien and colleagues programmed the satellite to notice change. It worked beautifully: “We

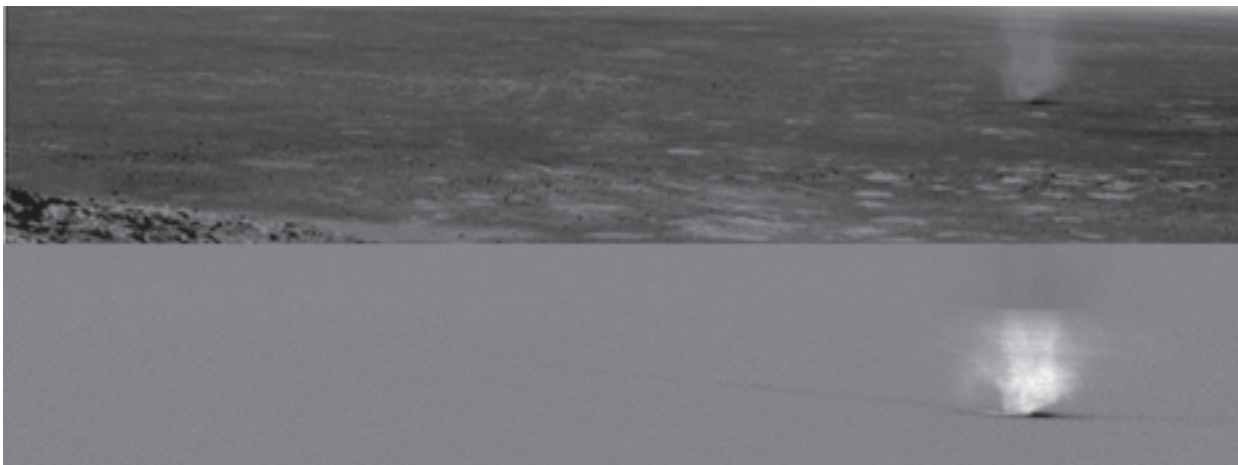
measured a 100-fold increase in science results for transient events.”

Now that the techniques have been tested in Earth orbit, they are ready to help Spirit and Opportunity catch dust devils—or anything else that moves—on Mars.

“If we saw Martians, that would be great,” laughs Chien. Even scientists have their guilty pleasures.

Find out more about the Space Technology 6 “Autonomous Sciencecraft” technology experiment at [nmp.nasa.gov/st6/TECHNOLOGY/sciencecraft\\_tech.html](http://nmp.nasa.gov/st6/TECHNOLOGY/sciencecraft_tech.html), and the use of the technology on the Mars Rovers at [nmp.nasa.gov/TECHNOLOGY/infusion.html](http://nmp.nasa.gov/TECHNOLOGY/infusion.html). Kids can visit [spaceplace.nasa.gov/en/kids/nmp\\_action.shtml](http://spaceplace.nasa.gov/en/kids/nmp_action.shtml) and do a New Millennium Program-like test at home to see if a familiar material would work well in space

*This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.*



The top half of this image is part of a series of images of a passing dust devil on Mars caught by Spirit. In the bottom half, the image has been filtered to remove everything that did not change from one image to the other. Notice the faint track left by the dust devil. Credit NASA/JPL/Mark T. Lemmon, Univ. of Arizona Lunar and Planetary Laboratory.



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### Ephemeris Staff

**Editors** Paul & Mary Kohlmler  
 (408) 848-9701

**Circulation**  
 (Volunteers needed.)

**Printing** Accuprint (408) 287-7200

### School Star Party Chairman

Jim Van Nuland (408) 371-1307

### Telescope Loaner Program

Mike Koop (408) 446-0310

### Web Page

Paul Kohlmler pkohlml@best.com

### SJAA Email Addresses

Board of Directors board@sjaa.net  
 Membership ?'s membership@sjaa.net  
 Chat List chat@sjaa.net  
 Ephemeris ephemeris@sjaa.net  
 Circulation circulation@sjaa.net  
 Telescope Loaners loaner@sjaa.net  
 Members Email Lists:  
<http://www.sjaa.net/mailman/listinfo>

#### Publication Statement

SJAA *Ephemeris*, newsletter of the San Jose Astronomical Association, is published monthly.

San Jose Astronomical Association,  
 P.O. Box 28243  
 San Jose, CA 95159-8243

#### Submit

Submit articles for publication in the SJAA *Ephemeris*. Send articles to the editors via e-mail to [ephemeris@sjaa.net](mailto:ephemeris@sjaa.net). **Deadline, 10th of previous month.**

## SJAA loaner scope status

All scopes are available to any SJAA member; contact Mike Koop by email ([koopm@best.com](mailto:koopm@best.com)) or by phone at work (408) 473-6315 or home (408) 446-0310 (Please leave message, phone screened).

### Available scopes

These are scopes that are available for immediate loan, stored at other SJAA members homes. If you are interested in borrowing one of these scopes, please contact Mike Koop for a scope pick up at any of the listed SJAA events.

# Scope	Description	Stored by
1	4.5" Tasco Newt/ EQ Mount	Annette Reyes
3	4" f/15 Quantum S/C	Hsin I. Huang
6	8" f/10 Celestron S/C	Karthik Ramamurthy
11	f/8 Orion XT6 Dob	West Valley College
13	f/8 Orion XT6 Dob	Rajiv Vora
14	8" f/8.5 Dob	Bill Kerns
15	8" f/9 Dobson	Mike Koop
19	6" f/8 Meade Newt/P Mount	Daryn Baker
23	6" f/8 Edmund Newt/EQ Mount	Wei Cheng
24	60mm f/15 Meade Refractor	Al Kestler
26	11" f/4 Dobson	Vivek Kumar
27	13" f/4.5 Dobson	Steve Houlihan
28	13" f/4.5 Dobson	Craig Scull
32	5.5" f/7.6 Dobson	Sandy Mohan
34	8" f/10 Dynamax S/C	Yuan-Tung Chin
35	8" f/6 Meade Newt/EQ Mount	Mike Horzewski
38	4.5" f/8.5 Meade Digital Newt	Tej Kohli
39	17" f/4.5 Truss Dobson	Steve Nelson
42	11x80 Binoculars	Ritesh Vishwakarma
43	4.5" f/8 Orion XT Dob	Gary Mitchell
44	4.5" f/8 Orion Skyview	Mantle Yu

### Scope loans

These are scopes that have been recently loaned out. If you are interested in borrowing one of these scopes, you will be placed on the waiting list until the scope becomes available after the due date.

# Scope	Description	Borrower	Due Date
7	12.5" f/7 Dobson	Craig Scull	1/19/07
10	Star Spectroscope	Greg Bradburn	12/15/06
12	8" f/6 Orion XT Dob	John Schulein	3/7/07
29	8" Celestron S/C Astrophoto	Rodney Moorehead	11/18/06
37	4" Celestron Fluorite Refractor	David Smith	2/4/07

### Extended scope loans

These are scopes that have had their loan period extended. If you are interested in borrowing one of these scopes, we will contact the current borrower and try to work out a reasonable transfer time for both parties.

# Scope	Description	Borrower	Due Date
2	6" f/9 Dob	John Paul De Silva	?
8	14" f/5 Truss Dobson	Charles Santori	1/2/07
9	C-11 f/10 Compustar	Bill Maney	Indefinite
16	60mm H-Alpha Solar Scope	Mike Koop	Repair
21	10" Dobson	Michael Dajewski	Repair
33	10" Deep Space Explorer	Art Kalb	12/30/06
36	Celestron 8" f/6 Skyhopper	Kristi Whitfield	12/16/06
40	Super C8+	Srinath Krishnan	1/15/07
41	18" Sky Designs Dob	Kevin Roberts	12/17/06

**Waiting list:** No Waiting!

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**New**     **Renewal** (Name only if no corrections)

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<http://ephemeris.sjaa.net> Questions?

Send e-mail to [membership@sjaa.net](mailto:membership@sjaa.net)

### Membership Type:

- Regular — \$20
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- Junior (under 18) — \$10
- Junior with Sky & Telescope — \$43

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