FIRST LIGHT

Journal of the South Bay Astronomical Society - May 2003
on line at www.geocities.com/sbas_elcamino

Monthly General Meeting: Friday, May 2nd, 7:30 PM

Guest Speaker: Mr. John Hoot (JPL Ambassador)

"Amateur Research in Astronomy"

Mt. Wilson Observatory Trip May 3rd

Our Mt. Wilson Observatory Trip to use the 60inch telescope is coming up! All 25 attendees have paid reservations for Saturday, **May 3rd**. The Observatory has advised that we need to carpool due to the limited parking area at the site. We will meet at the gate by 7:00 PM to be escorted to the parking area and the observatory escort must lead cars out through the gate, in groups, when leaving periodically. Wear good shoes for using the stepladder and dress warmly for the cold temperatures (gloves & a warm hat are advisable). Bring a lounge chair or sleeping bag to relax in, and food, snacks & water to last while you're there. You can bring your camera if you want to take handheld photos and don't forget your **red** flashlight!

If anyone needs to cancel, please contact me as soon as possible as we may be able to fill vacant spots by calling people on the "waiting list". For the Mt. Palomar tour, we only had 22 attendees present for the available 30 slots. I had to originally turn away people who were on the waiting list because I thought we were full. In the future, I would ask that people be more courteous to their fellow club members and give plenty of notice if they are not going to make it so openings can be filled.

- Greg Benecke

Mt. Palomar Observatory Tour Reports

Our visit to the Mt Palomar Observatory was very rewarding. Despite the long drive (2.5 to 3 hrs- depending on the route) it was well worth it. Although we had 30 people, the maximum allowable, sign up only 26 showed up. We had several on the waiting list – so perhaps we'll do it again. The ride up the mountain was interesting. We passed many orange groves, ranches and three Indian casinos. I hope the light pollution doesn't ruin the seeing for the observatory. At about the 2,000 feet elevation, a sign that read "Chains Required" got our attention. Although it had snowed during the week, Saturday was a beautifully clear day and all the snow was relegated to the side of the road. In the parking lot at 5,550 feet there were still piles of snow and families with kids were having fun building snow men and throwing snow balls. It was a bit nippy on top and we all donned jackets and hats.

Our guides were Scott Kardel and Sam Metchev, both from Cal Tech. Sam was the primary guide and he filled us in on some of the history of the telescope. It was the brain child of George Ellory Hale as were the big ones at Mt Wilson. He attempted to cast the mirror from plate glass but failed. Next the job went to Corning Glass who had just come out with their Pyrex brand of heat resistant glass. After two attempts and an interruption of the cooling cycle by a major flood, the mirror blank was completed. It was shipped to Cal Tech where, over a period of 13 years, it was ground (4 ¾ tons of glass were removed) and figured. It was aluminized in '48 and installed in '49. The most amazing thing about this visit was being able to go inside the dome and get so close to this famous instrument.

It is difficult to convey the enormity of it, and though it weighs 530 tons, its bearing system is so smooth that only a 1/12 H.P. motor is used for tracking. The pier for the telescope goes 30 feet down into bedrock. The inside of the dome is kept at nighttime temperature, so it was even colder inside than outside. The telescope can be configured as an f3.3 at prime focus, f17 at Cassegrain, and f30 at the Coude' focus. As a finale they rotated the dome for us, so we got a 360 degree

view of it, and then we went out on the catwalk for a panoramic view of the rest of the facility. Then after a look inside the visitors gallery, we started the long drive home. It was an inspiring day. Thanks to Greg for organizing it!

- Joe Fierstein

From left to right independent of row: Lowell Joynt, Steve Schrier, Linda Schrier, Joe Fierstein, Jeremy Chafe, Ray Grace, Jane Grace, Deanne Chafe, Sheila Titlebaum, Barry Titlebaum, Jamie Chafe, Ann Koons, Dan Trimble, Harry Koons, Bill Eisele, Jerry Weiss, Ron Rennie, Joyce Weiss, Costas Vogiatzis, Julie Trotter, Jean Rennie, and Greg Benecke.

Our tour of the Hale 200 inch telescope at Mt. Palomar was guided by Stan Medchev, a doctoral student at Cal Tech who was studying brown dwarves. Stan's talk began at a huge concrete doughnut just outside the dome that was used as a mirror substitute for initial balancing of the telescope mechanism as the construction was done ahead of the availability of the mirror. We were then taken in to the base of the dome structure where it could be seen that the foundation of the dome and the foundation of the telescope support structure were physically separate for vibration isolation. Stored in this area was also a vacuum chamber used to re-aluminize the smaller mirrors used in the scope, which is done every two years.

Up a few flights of stairs and we were in the main dome area where the 200 inch scope is housed. Big does not begin to describe the enormity of the structure. We were allowed relatively free mobility to look around under the scope, which was pointed at the zenith for access to the instrumentation package under the main mirror. Included in that package are adaptive optics that have dramatically improved the practical resolution of this old workhorse, which is operated eve night of the year except Christmas. Off to the side was the giant vacuum chamber that is used to re-coat the main mirror.

We then went up to the catwalk on the inside of the dome overlooking the main dome floor. Slowly, it appeared the telescope had begun to rotate inside the dome. Wait a minute, this is a polar aligned scope. I realized that it was not the scope that was rotating but it was the dome and the catwalk we were on. It was quite an initial sensory illusion. A door was opened so we could walk out on to the outside catwalk around the dome. It was almost like being on a giant slow merry-go-round as the scenery rotated by.

- Greg Benecke

Your SBAS Committee

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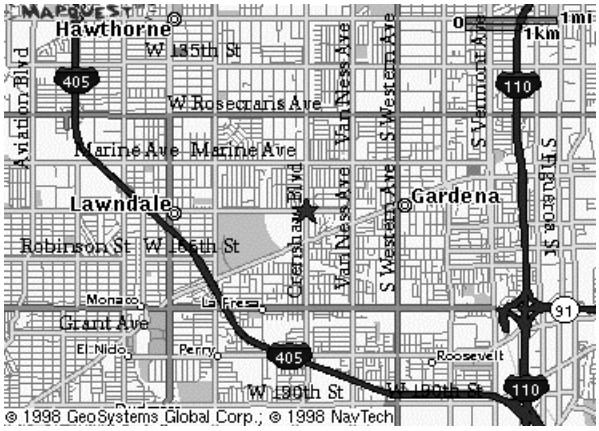
Monthly General Meetings



We normally meet on the first Friday of each month at 7:30 p.m. in the Planetarium at El Camino College. If the first Friday is on or close to a holiday, we usually defer the meeting until the second Friday of the month.

The Planetarium is on the south side of Manhattan Beach Blvd., one block west of Crenshaw Blvd. (near the center of the map at left). Click on the map to get a display that can be zoomed out for a regional view. The zoom display appears in a separate browser window, which can be closed to return to this page.

The domed roof of the planetarium is visible from the street. There is on-street parking, and we can often use campus parking: check inside to see if you need a FREE parking permit for your car. Park in northeast corner lot, temporarily, due to the construction project.

We enjoy the planetarium facilities through the courtesy of the El Camino College Administration, and have several faculty members of the Astronomy Department as members of our Club. Our meetings always include an informal opening, when new attendees are invited to introduce themselves and let us know about their interests in astronomy. Members share their latest news and observations at this time.

The rest of the evening is devoted to guest speakers, who range from amateur astronomers to professional astronomers to representatives from local aerospace companies to college professors. We are fortunate to have all these talented people in our area, willing to come and talk to us.

Monthly Planning Meetings

Committee members (and anyone else with an interest in Society activities) meet each month, usually on the Monday following the general meeting. Meetings are sometimes rescheduled due to travel and other circumstances. Exact date and time of each month's meeting will be announced in the schedule of events in *FIRST LIGHT* each month, and should also be verified with a committee member by any member or visitor wishing to attend. All are welcome!

We will meet on Monday, May 5th at 7:30 PM at the offices of Microcosm, Inc., 401 Coral Circle in El Segundo. Taking the 405 Fwy. north from Torrance, exit at El Segundo Blvd. and turn left. Take El Segundo Blvd. to Douglas and turn left. Take Douglas to Coral Circle and turn right. Follow Coral Circle around the bend to the left and then straight ahead. Microcosm occupies the crook of the next curve to the left and the company name is on the upper part of the building.

SBAS Membership Benefits

"Welcome" to our newest SBAS Members: Christopher Talbott, Harold Shimizu and Jo & Brian Labor.

Contact John Collins for magazine subscriptions at club rates: "Sky & Telescope" $29.95 and "Astronomy" $29.00! Make your check payable to SBAS and mail the payment and your subscription / renewal form directly to SBAS, c/o Microcosm, Inc. at 401 Coral Circle, El Segundo, CA 90245-4622.

Part of your SBAS membership dues goes toward membership in the Astronomical League. All paid members should be receiving the "Reflector", the league's newsletter, four times a year. As a member organization, we can participate in a number of award programs they offer. These are based on completing various observing challenges. Check out the Astronomical League website at **www.astroleague.org**

NexStar 8 Available to SBAS Members

All members in good standing (with at least six months of continuous membership) can borrow the club's Nexstar8 for up to 7 days. The fee of $5 for a weekend, or $10 for an entire week, is nonrefundable and will be added to the club's Accessories Fund "Wish List" for future purchases. A fully refundable deposit of $200 cash or check is required. Loss or damage is the responsibility of the borrower. A copy of the complete South Bay Astronomical Society Nexstar 8 Borrowing Rules and Agreement is available upon request. The **Accessories Fund "Wish List"** – Member contributions of any amount or donations will be appreciated, as will any suggestions for new purchases!

SBAS Website News

SBAS members websites can be linked to the Photo Gallery section in the SBAS website. We also have plenty of storage for photos taken by club members who don't have their own websites and would like to submit their work to: **www.geocities.com/sbas_elcamino**

-Alex Athas

Talbert Middle School Star Party

A colleague of mine, Scott Davis, asked if I could help him do a star party at Talbert Middle School near his home in Huntington Beach. I mentioned it at the April club meeting and Mike Rivas also said he was interested in supporting it. It was scheduled for Monday night April 7th. Mike brought his 12 inch Meade, I had my Nexstar 11 and Scott brought his 30 year old 8 inch Bausch & Laum telescope.

The weather was very clear and the viewing conditions were excellent as we arrived and got set up at about 6:00 PM. The moon was visible overhead well before sundown. I followed Mike Weasner's suggestions and did a dummy alignment prior to sundown, making sure I was well aligned with true north. I did a goto on the moon and sure enough, it was nearly dead center in the scope! Swung the scope to Jupiter and Saturn and showed some early arriving students that planets can be seen even in daylight if you know where to look. We were lucky to have Jupiter's Great Red Spot in view that night and I put my Deep Yellow filter in and was able to see it quite well.

Scott did a brief demonstration to the students about the size of the universe. Scaling the solar system down to the size of the playground, he placed various students at different distances to demonstrate how big our solar system is. The students were really amazed to find out that, on that scale, the nearest star would be in San Francisco! The students demonstrated an avid interest in science and astronomy and asked many good questions. While many were impressed with the abilities of our GOTO telescopes, some were equally entranced with the simpler manual finds that Scott could do with his scope. After a bit of demonstration, one young student was thrilled and demonstrated to her classmates how easy it was to find objects.

The evening wound down around 9:00 and we finished up by helping Scott check the collimation on his scope. After 30 years and much traveling, it had never been collimated. Surprisingly, the collimation wasn't really very bad at all. We tweaked it a little bit and improved it but with some dew on the corrector plate it was a little hard to see how much better the image was. It was a great night for everyone!

- Ken Munson

3rd Annual SBAS Messier Marathon Report

The SBAS held its 3rd Annual Messier Marathon on March 29, 2003, at the Redrock Inyokern Road site. Steve Lindsey (10" SCT) and Dan Trimble (14" SCT) were there for a night of astrophotography (check out their latest photos using the SBAS website links!) and Tony Sandate stayed until about midnight looking through his binoculars and the various scopes. Craig Gates (Nexstar 11) and his friend Ray Schneider spent a casual evening observing. Bill Eisele worked a true marathon by starhopping with his 13" Dob, bagging 43 objects for the night. Greg Decosta was out for his first time with the SBAS at Redrock Inyokern Road, but this was clearly not his first time under the stars as he bagged 104 objects starhopping with his 10" Dob. Jim Edwards was accompanied by his mother Elly and his vintage C8 SCT. Unfortunately, I did not get his total number of objects. Having done very well the previous two years using my setting circles, I decided to concentrate on starhopping. I was able to get 43 that way and an additional 5 with setting circles. Starhopping is truly work, and on my fork mounted C8 Deluxe, required some very contorted positions to site objects in Ursa Major. This eventually led to back spasms which forced me to give up. I never thought of astronomy as a physically demanding pursuit, but this sure was.

- ***Greg Benecke***

Observing From Angeles Crest Highway

Due to providing support in my daughters' Girl Scout activities on Saturday afternoon, it was not possible for me to join the brave souls who headed out to the Inyokern Road site for the Messier Marathon. I didn't get packed up and on the road until nearly sundown, heading towards my old spot on the Angeles Crest Highway at the 3-Trails trailhead parking lot. At 6,000 feet it had always been a good place to go when I was first learning to use my Nexstar 5. Thinking that I would be alone there, I was surprised to find another astronomer that had already set up his telescope. John Fisanotti of La Crescenta had arrived around 5:00 and set up his 12.5 inch Dobsonian. He's a member of an astronomy club in the Santa Clarita area called The Local Group. He also owns two other scopes, a 10-inch Meade GPS and an older refractor. As I set up, the wind was only a slight breeze and the sky was very clear. The viewing turned out to be less than ideal, to say the least. While doing my alignment, I could see the stars, one minute as a nice point of light, the next it would expand into a big fuzzball. I thought it was just the scope but the stars continued to do that well after midnight. The wind began to pick up at 9:00 and by 10:00 it was blowing very fiercely. The temperature was 50 degrees but the wind made it feel more like 20 or 30 degrees. Of course, the image in the telescope bounced all over the place making good observations impossible.

John gave me a quick demonstration of his Dobsonian. He had a device (made by Lumicon) attached to the mount that could translate the position in az and el into RA and Dec. It had a number of databases in it similar to the Nexstar. He showed me how he could select an object from the database and it would tell him which direction and how far to move the scope to bring it into view. He was pretty good at using it. He'd found a faint nebula in the south called Thor's Helmet (NGC 2359). That's pretty good considering he had to find it looking south through the light dome of LA. I found it with my N11, too. The OIII filter made it very visible. I attempted to do my own miniature Messier Marathon, managing to find 68 of the objects. I discovered that the N11 has an error in the location of M40, being about a degree off. I could see it was pointing in the right direction but I knew M40 was not in the field of view. Fortunately, the Messier List that I have had the RA/Dec. When I entered those coordinates, M40 was perfectly centered. Once again, it demonstrates that while GOTO technology is very wonderful (and I really love it), it doesn't excuse the observer from being responsible for knowing what he's looking for. Another treat of the evening was the asteroid Vesta. Just in the range of naked eye visibility, it makes a very easy target even in binoculars.

Due to the wind, John had given up on using his telescope shortly after 10, packed it away and was using binoculars. He found it about the same time as I swung my telescope to it. It was a really neat sight that night as it formed a nice triangle with nearby stars. There was also a very faint galaxy, NGC 4578 in the field of view. At magnitude 11.4 that makes the dimmest object I've ever seen from this site! John decided to close up and head home around midnight. I bravely decided to stick it out. The wind was getting stronger so I moved my car around to provide some blockage, which helped a little. I stuck it out till after 1:00 AM when I heard a thump on the car. A pinecone, blown from somewhere, had smacked into a side window! At that point, I decided to call it quits. I didn't want a pinecone or tree branch to hit the scope. All in all, not a great night but at least I finally got the new telescope a little further away from the city lights.

- Ken Munson

The Sky's the Limit: Grand Finale for Twin-Telescope Survey

The celestial harvest from astronomy's most thorough high-resolution digital survey of the entire sky, completed by twin infrared telescopes, is now online for scientists to scrutinize and the entire world to savor. An atlas of about 5 million pictures from the grand finale of this milestone in modern astronomy is available at:
http://www.ipac.caltech.edu/2mass/gallery

The survey was conducted at infrared wavelengths, which are longer than the red light our eyes can see. Infrared wavelengths penetrate dust better than visible light, making them an effective tool for detecting dust-obscured objects both inside and outside of our Milky Way. "For the first time in history, we can, in effect, step outside our galaxy and see it in detail, as it would appear from above," Skrutskie said. "We can also see the texture in the distribution of galaxies outside the Milky Way. Before this survey, astronomers tried to connect the dots, but nearly one-third of the galaxies were obscured by dust. Now, we can connect all the dots."

"The idea of a survey is an old human activity, but the Two Micron All-Sky Survey has a modern twist," said Project Manager Rae Stiening at the University of Massachusetts. "Just as English admiralty sent Captain Cook and others to map the world, this new survey has mapped the nearby universe." The project used two dedicated 1.3-meter (51-inch) telescopes, one at Fred Lawrence Whipple Observatory, Mount Hopkins, Ariz., the other at the Cerro Tololo Inter-American Observatory in Chile. Operations began in Arizona in June 1997 and in Chile in March 1998. Since observations concluded in February 2001, scientists have been processing and validating data to complete the analysis of the entire sky. The atlas was compiled from 120 million images containing 14 trillion pixels, or data measurements. The survey produced catalogues brimming with nearly half a billion objects. The bonanza of astronomical discoveries already made by the survey includes:

- Hundreds of brown dwarfs, or cool, failed stars; enabling scientists to define new classes of stars
- Maps of the Milky Way's structure and dust distribution, and large-scale structure in the nearby universe, inside and outside our Milky Way
- Observations of galaxies hidden behind the disc of the Milky Way
- Details about the Large Magellanic Cloud, a satellite galaxy of the Milky Way
- Numerous dust-obscured galaxies and quasars in the distant universe
- The largest database ever of location, brightness, color and position of asteroids

For the next two years, scientists will conduct an extended Two Micron All-Sky Survey mission, reviewing and delivering more content of the raw data to the public. They will also process and release more observations made during the survey, including images of the entire Large and Small Magellanic clouds. "A lot of great stuff that will be discovered with this survey hasn't been conceived of yet," Stiening said. "The best is yet to come."

- NASA News Release

Galaxy Evolution Explorer Looks Back in Time

NASA's Galaxy Evolution Explorer will carry a telescope into Earth orbit that will observe a million galaxies across 10 billion years of cosmic history to help astronomers determine when the stars we see today had their origins. Galaxy Evolution Explorer is set to launch no earlier than April 28, 2003, from Cape Canaveral Air Force Station, Fla. A Pegasus XL rocket, released by an L-1011 jet aircraft, will launch the satellite. The aircraft will climb to approximately 39,000 feet and release the launch vehicle and payload. The science mission will start after an initial month of in-orbit testing.

From its orbit high above Earth, the spacecraft will sweep the skies for up to 28 months using state-of-the-art ultraviolet detectors. Looking in the ultraviolet will single out galaxies dominated by young, hot, short-lived stars that give off a great deal of energy at that wavelength. These galaxies are actively creating stars, therefore providing a window into the history and causes of galactic star formation. "The Galaxy Evolution Explorer is crucial to understanding how galaxies, the basic structures of our universe, form and function," said Dr. Anne Kinney, director of astronomy and physics in the Office of Space Science at NASA Headquarters, Washington, D.C. "Its ultraviolet observations will round out the knowledge we gain from observations in infrared and other wavelengths."

Astronomers believe the universe originated approximately 13.7 billion years ago in the cataclysmic "Big Bang." Galaxies, the basic building blocks of the universe, began to appear as the fireball of hydrogen and helium gas expanded and cooled. Recent observations suggest star formation peaked eight to 10 billion years ago. This mission is specifically designed to investigate whether this occurred and why. The centerpiece of the satellite is a 50-centimeter-diameter (19.7-inch) telescope. It is equipped with sensors that will gather continuous images of galaxies in the ultraviolet to study their shape, brightness and size.

Ultraviolet light, the type of invisible energy responsible for sunburn, is at the higher end of the electromagnetic spectrum, just above visible light in frequency, but below X-rays and gamma rays. A device called a spectrometer will break down the light into component colors, just as a prism separates white light into a rainbow. These measurements will enable scientists to determine the distances of galaxies, and thus, their places in cosmic history. Combined with precise measurements of the ultraviolet brightness of galaxies, astronomers will be able to determine the rate at which stars are forming within those galaxies.

"This mission will provide the first comprehensive map of a universe of galaxies under construction and bring us closer to understanding how they, and our own Milky Way, were built," said Dr. Christopher Martin, the mission's principal investigator and an astrophysics professor at the California Institute of Technology in Pasadena. Scientists will use data from the mission to learn when carbon, oxygen and other chemical elements were created inside blazing stars. Most of the elements found in the human body originated in stars. We are literally made of stardust. The mission will also conduct the first ultraviolet surveys of the entire sky beyond our own galaxy, including the first wide-area spectroscopic surveys. Rich in objects from galaxies to quasars to white dwarf stars, this vast data archive will serve as a resource for the entire astronomical community.

For information about the mission and NASA's Explorers Program on the Internet, visit **http://www.srl.caltech.edu/galex** and **http://explorers.gsfc.nasa.gov**

- NASA News Release

JPL OPEN HOUSE MAY 17-18

NASA's Jet Propulsion Laboratory in Pasadena, Calif., will hold an open house on Saturday and Sunday, May 17 and 18, from 9 AM to 5 PM, taking visitors on a virtual ride through the solar system with this year's theme, "Journey To The Planets and Beyond." This fun-filled, family event has a little of everything for space enthusiasts and non-space buffs, from virtual hang gliding lessons to a chance to build your own spacecraft and have your picture taken in infrared light. Visitors will have the opportunity to meet with scientists and engineers, who will staff booths to answer questions about current and future missions.

Structured around the themes of technology, Earth, Mars, solar system, and the universe, visitors will see and learn more about how missions come together. Watch student-built robots compete, or see an android head and robotic arm come to life. Learn about the devices scientists use to explore our planet, from the ground below to the outer reaches of Earth's atmosphere or follow the water to Mars through a tour of the laboratory designed for test-driving robotic vehicles destined for Mars. Explore the planets as you walk through a scale model of the solar system. See spacecraft models or touch an iron meteorite. Learn how we communicate with the spacecraft currently exploring the solar system and see the world's lightest solid. See "Ring World," a multimedia presentation on the Cassini mission to Saturn, soon to be shown in planetariums around the globe.

Admission is free. No backpacks or ice chests are allowed, with the exception of small purses and diaper bags. More information is available at **http://www.jpl.nasa.gov/pso/oh.html** or call (818) 354-0112.

2003 RTMC Astronomy Expo May 23-25

The 35th Annual RTMC Astronomy Expo will be held Friday, May 23 through Sunday, May 25, Memorial Day weekend. The Riverside Telescope Makers Conference, Inc. holds this event at the YMCA Camp Oakes, five minutes southeast of Big Bear City on State Route 38 at Lake Williams Drive between mileposts 44 & 45 in the San Bernardino Mountains at 7,600 feet. The theme for 2003 is “Building Your Own Observatory”.

If you have questions about RTMC or would like to request additional registration materials, call (909) 948-2205, send email to Robert Stephens at **registrar@rtmc-inc.org** or register online at **http://www.rtmc-inc.org**

Schedule of Coming Events

2 May **Friday** **7:30 P.M.**	**Monthly General Meeting:** Our speaker for the evening is Mr. John Hoot, a JPL Ambassador, and his topic will be "Amateur Research in Astronomy".
3 May **Saturday** **Evening**	**Mt. Wilson Observatory Trip –** New Moon May 1st Our long awaited trip to the Mt. Wilson Observatory and observing with the 60" Telescope! Contact Greg Benecke if you have any questions or changes in attendance to report.
5 May **Monday** **7:30 P.M.**	**Monthly Planning Meeting** Refer to page 3 for location.
8 (JPL) **9 (PCC)** **May** **7:00 P.M.**	**Von Karman Auditorium Lecture Series** – FREE "Challenges in Mobility and Robotics for In Situ Science". The challenges of exploring extreme planetary surfaces with mobile robots. For more information call: (818) 354-0112
17-18 May **9 AM – 5 PM**	**JPL Open House** See page 7 for details.
24 May **Saturday** **Evening**	**In-Town Dark Sky Observing at Ridgecrest School** – Weather Permitting: If the weather conditions are marginal, contact Greg Benecke to confirm that he will be opening the gate! Take Hawthorne Blvd. south across Pacific Coast Hwy.; continue up the hill past Silver Spur and turn left at Highridge. Go one mile and turn left on Whitley Collins, up one block and turn left on Northbay Rd., the new parking lot is at the end on the left. Enter parking lot and turn left, the gate is at the east end (it should be open about 15 minutes before sunset) and a paved road leading into the playground where we have traditionally set up. If at all possible, drop your equipment off and park your car in the new parking lot (less than 200 feet away). If you are absolutely certain that your vehicle does not drip anything you can park with your equipment. ***Drive with care*** to avoid steel pillars supporting basketball nets…
23-25 May **Memorial** **Weekend**	**35th Annual RTMC Astronomy Expo** See page 5 for details.
31 May **Saturday** **Evening**	**Out-of-Town Dark Sky Observing** – New Moon Contact Greg Benecke to arrange site location.
6 June **Friday** **7:30 P.M.**	**Monthly General Meeting:** Speaker still to be arranged.
9 June **Monday** **7:30 P.M.**	**Monthly Planning Meeting** Location will be announced in the June newsletter.
21 June **Saturday** **Evening**	**In-Town Dark Sky Observing at Ridgecrest School** – Weather Permitting. Refer to May 24th entry for directions to the site & instructions on weather conditions.
28 June **Saturday** **Evening**	**Out-of-Town Dark Sky Observing** – New Moon on Sunday Contact Greg Benecke to arrange site location.

South Bay Astronomical Society

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General Meeting at El Camino College Planetarium:
Friday, May 2nd at 7:30 P.M.

Guest Speaker: Mr. John Hoot (JPL Ambassador)

"Amateur Research in Astronomy"

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South Bay Astronomical Society
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