

Sonoma Skies

Newsletter of the Sonoma County Astronomical Society
A nonprofit scientific and educational organization

www.sonomaskies.org



February 2008

Volume XXXI No. 2

Striking Sparks Awards February 8

The Striking Sparks applications have been received and the judges have selected the 2008 winners. Here they are!

Elliott Dellorco from Sun Ridge

Frank Demma from Grant

Noah Dove from Sun Ridge

Maxwell Hyde from Grant

Michael Masters from Gold Ridge

Quincy Zlotnick from Gravenstein Union School District

The awards will be presented at Apple Blossom Elementary School in Sebastopol on February 8, 2008. Please join us for this special event.

Many thanks to our gracious sponsors: AANC, Arrow Electric, the Frank Hejtmanek Annual Fund, Michael Kran, Keith Payea, and John Whitehouse.

We encourage the Sonoma County students to keep coming to the Young Astronomer meetings and the Robert Ferguson Observatory to learn more about astronomy and to participate in the SCAS meetings when possible.



SCAS Special Event!

“SEEING IN THE DARK” WITH TIMOTHY FERRIS

Saturday, February 23, Santa Rosa Junior College

We are pleased to host author Timothy Ferris for a special showing of his PBS special “Seeing in the Dark.” The event will take place in Newman Hall at Santa Rosa Junior College on February 23 at 7:30 PM. A question and answer session will follow the film. More details to come via email. Hope to see you there!

Space Ecology: The Final Frontier of Environmentalism

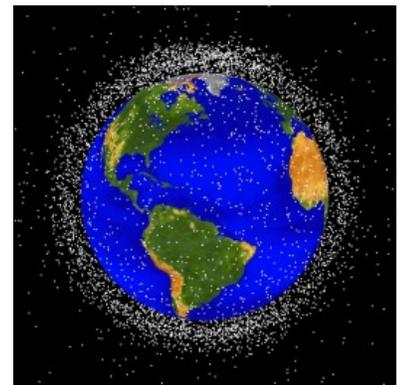
Lynda Williams, Physics Instructor, SRJC
SCAS February 13 Meeting, 7:30 PM
at Proctor Terrace School

Fifty years after Sputnik launched the space age, humans are turning space into yet another junk yard, with millions of pieces of man-made debris orbiting the Earth, putting targets both in space and on the ground at risk.

One year after China blew up its own satellite on orbit, the world is coming to grips with the urgent need to establish international rules for space debris regulation and mitigation in order to prevent an environmental catastrophe in space. Lynda will survey the current situation and speculate on possible future space debris scenarios created by the deployment of space-based weapons, the private space industry and geo-engineering solutions to climate change. As Lynda likes to say: What the world needs now, before it is too late, is an environmental movement in heaven: Space Ecology.

By day, Lynda Williams is a physics instructor at Santa Rosa Junior College in California, and by night, she performs original science musicals for both scientists and the general public. KC Cole of the LA Times wrote of Lynda: “Every scientist dreams of seducing people with the beauty and wonder of the natural world. But few take it as far as Lynda Williams—the Physics Chanteuse—who puts her microphone where her mouth is.”

Lynda has been a space enthusiast and amateur astronomer since getting a Newtonian telescope at the age of 12. She has a BA in Math and an MS in Physics, and her areas of interest are Cosmology and environmentalism. Lynda has produced and performed planetarium shows at both SRJC and SF State and has been active in space issues related to ecology and peace for many years. For more information check out Lynda’s websites: www.sciantainment.com and www.space-ecology.com



Young Astronomers See page 6

Sonoma County Astronomical Society (SCAS)

Membership Information

Meetings: 7:30 PM on the second Wednesday of each month, in the Multipurpose Room of Proctor Terrace Elementary School, 1711 Bryden Lane at Fourth Street, Santa Rosa, unless otherwise announced in this publication. The public is invited.

Dues: \$25, renewable June 1 of each year. New members joining between December 1 and May 31 pay partial-year dues of \$12.50.

Star Parties: See the Events section for dates and times.

Rental Telescope: Members are eligible to borrow the club's 80mm refractor with tripod. Contact any Board member listed below.

Egroup URL: Connect with other members about going observing, observing reports and chat about astronomy and news items from AANC and *Sky & Telescope*. Hosted by Robert Leyland at r.leyland@verizon.net. Any SCAS member is welcome to join. Visit <http://groups.yahoo.com/group/scas> and click the "Join" button, or send an email to scas-subscribe@yahoogroups.com

Discount Subscriptions: For *Sky & Telescope*, new subscribers may send a check for \$32.95 payable to "SCAS", with your complete mailing address, directly to: Larry McCune, 544 Thyme Place, San Rafael, CA 94903. Once you have received the discount rate, you may renew your subscription by sending your personal check with the renewal notice directly to Sky Publishing. Discount subscriptions to *Astronomy* Magazine occur annually in October. Check *Sonoma Skies* for details.

Library: SCAS Librarian David Simons hosts a library of astronomy books that may be checked out by members at SCAS meetings, to be returned at the next meeting. Videotaped lectures on astronomy may be rented for \$3 per month.

Sonoma Skies is the monthly newsletter of the Sonoma County Astronomical Society (SCAS). Subscription is included as part of membership. Articles and member announcements are welcome and are published on a first come, first served basis, space permitting, and may be edited. **The deadline for submissions is 10 days prior to the end of each month.** Mail to: Editor, SCAS, P.O. Box 183, Santa Rosa, CA 95402, or email publications@sonomaskies.org

SCAS Elected Board

President: John Whitehouse 539-5549 jmw@sonic.net

Vice-President & Program Director: Len Nelson 763-8007
lennelsn@comcast.net

Treasurer: Larry McCune, (415)492-1426 llmccune@comcast.net

Secretary: Jerry McBride, jerry-mcbride@comcast.net

Membership Director: Walt Bodley 823-5268
membership@sonomaskies.org

Director of Community Activities: Lynn Anderson 433-1154
astroman@sonic.net

Publications Director: Cecelia Yarnell 569-9663
publications@sonomaskies.org

SCAS Appointed Positions

Young Astronomers Advisor: Gary Jordan 829-5288
SieraMolly@comcast.net

Striking Sparks Program Coordinator: Larry McCune
(415)492-1426 llmccune@comcast.net

Amateur Telescope Making: Steve Follett 542-1561
sfollett@sonic.net

Librarian: David Simons 537-6632 davidsimons@planetatm.com

Visit us on the web at:
www.sonomaskies.org

February Observing Notes

- 2/1 Crescent Moon near Antares, 5:30 AM
Venus very near Jupiter, 6:00 AM, low in SE
- 2/4 Crescent Moon near Venus & Jupiter, 6:30 PM. 7% crescent moon, alt/az 8/133 at 0645. Moon "below" Venus/Jupiter, nearer horizon
- 2/6 New Moon, 7:30 PM
- 2/15 Moon near Mars, 12:00 Midnight
- 2/18 Occultation of M44, 8:00 PM. The partial occultation of Praesepe lasts about 6 hours, from 2000 to 0200, peaking just after 2300. At 2308: m6.4 39 Tauri disappears behind dark limb. This could be a nice photography opportunity.
- 2/20 Moon very near Regulus, 4:00 PM. Daylight conjunction. Watch for close pairing during eclipse.
- 2/20 **Total Lunar Eclipse.** Eclipse begins before moonrise. We on the West Coast are well placed for a spectacular view during convenient evening hours:
1746 Rise
1753 Sunset
1851 End Nautical Twilight
1900 Start Totality [Alt/Az: 14/88]
1922 End Astronomical Twilight
1950 End Totality [Alt/Az: 23/95]
2107 Exit Umbra [Alt/Az: 37/109]
2213 Exit Penumbra [Alt/Az: 48/125]
Watch for Regulus very near moon, and nearby Jupiter also, during eclipse.
- 2/21 Moon near Saturn, 4:00 AM
- 2/21 Mercury in E thru 3/6. Low apparition: 6° alt @ 01615. Near Venus: starts N (left) of Venus and migrates up and to the right.
- 2/23 Zodiacal Light in West, 7:30 PM. Zodiacal Light viewable in west after astronomical twilight in very dark locations for next two weeks.
- 2/24 Saturn Opposition, 2:00 AM, Magnitude 0.2; Disk 20.1"; in Leo.
- 2/26 Mercury near Venus: 0615 alt/az 7/118 (Mercury); 6/119 (Venus)

—Most of above courtesy of Jack Welch

COMING TO SCAS IN 2008

Mar. 12: "Adaptive Optics in Astronomy" with Scott Severson,, Assistant Professor, Sonoma State Physics & Astronomy Dept.

Apr. 9: "Star Maps: History, Artistry, and Cartography" with Nick Kanas

Astronomers Spot Evidence for Colliding Planet Embryos in Famous Star Cluster

Astronomers have found evidence for the formation of young rocky planets around the star HD 23514 located in the well-known Pleiades (Seven Sisters) star cluster that is easily visible in the current evening sky.

Using an infrared sensitive camera (MICHELLE) on the Gemini North Telescope, Joseph Rhee of UCLA and his collaborators have measured heat from hot dust surrounding a 100 million year old star in the bright star cluster. The star has properties very much like our Sun except that it is 45 times younger and is orbited by hundreds of thousands of times more dust than our Sun. The star is also one of the very few solar-type stars known to be orbited by warm dust particles.

These warm emissions betray catastrophic collisions in an evolving young planetary system around an adolescent-age solar type star. The emission appears to originate from dust located in the terrestrial planet zone between about 1/4 to two astronomical units (AUs) from the parent star HD 23514, a region corresponding to the orbits of Mercury and Mars in our solar system.

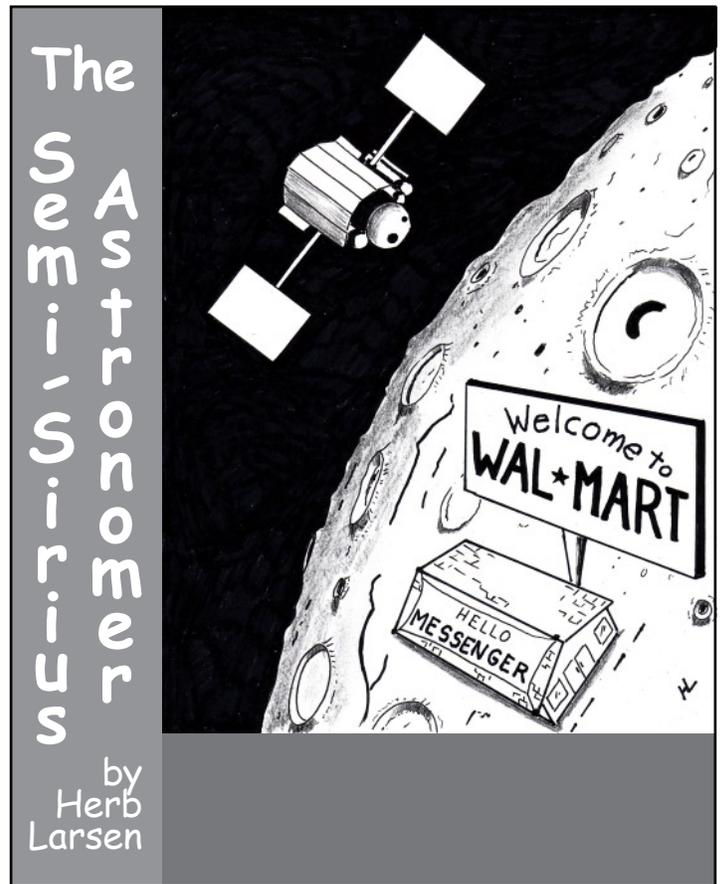
Rhee and team members Inseok Song of the Spitzer Science Center and Benjamin Zuckerman of UCLA interpret the presence of so much hot dust as a result of colliding planetary embryos leading to the conclusion that a recent collision occurred between relatively large rocky bodies. According to Zuckerman, this is thought to be similar to the encounter that produced the Earth-Moon system more than four billions ago. "Indeed, the collision that generated the Moon sent a comparable mass of debris into interplanetary orbits as is now observed in HD 23514," said Zuckerman.

The astronomers analyzing the emission from countless microscopic dust particles propose that the most likely explanation is they were pulverized in the violent collision of planets or "planetary embryos." Song calls the dust particles the "building blocks of planets," which accumulate into comets and small asteroid-size bodies, and then clump together to form planetary embryos, and finally full-fledged planets. "In the process of creating rocky, terrestrial planets, some objects collide and grow into planets, while others shatter into dust; we are seeing that dust," Song said.

These new observations indicate that rocky terrestrial planets, perhaps like the Earth, Mars or Venus, appear to be forming or to have recently formed. "This is the first clear evidence for planet formation in the Pleiades, and the results we are presenting strongly suggest that terrestrial planets like those in our solar system are quite common," said Joseph Rhee, UCLA postdoctoral scholar in astronomy, and lead author of the research.

Astronomers report the findings in an upcoming issue of the *Astrophysical Journal*, published by the American Astronomical Society.

continued Page 7



SOCIAL AMENITIES

Many thanks to John Whitehouse for providing treats and coffee at the January meeting.

WELCOME NEW MEMBERS!

Welcome to new members Jerry McBride (our newly elected board secretary) of Cloverdale, Tony LeBlanc of Santa Rosa, and Bob Waltenspiel of Sebastopol.

Scope City

NEW MEMBER BONUS!

Scope City at 350 Bay Street, San Francisco, is offering a **\$25 merchandise discount to new members.**

Manager Sam Sweiss has supported SCAS and Striking Sparks and offers a huge selection of telescopes, accessories and more. Obtain a receipt from Walt Bodley, Membership Director, showing you have paid the \$25 SCAS membership dues. To arrange for your merchandise discount, contact Sam at 415/421-8800 or at sanfrancisco@scopecity.com

Events

ROBERT FERGUSON OBSERVATORY PUBLIC VIEWING

Saturday, February 9

Solar Viewing: 11:00 AM - 3:00 PM

Night Viewing begins 7:00 PM

Wednesday, February 20, Total Lunar Eclipse

Night Viewing begins 5:00 PM

The Observatory features three telescopes: A 14-inch SCT with CCD camera in the East wing, an 8-inch refractor under the dome and a 24-inch Dobsonian in the West wing. SCAS members may set up telescopes in the observatory parking lot to assist with public viewing. Auto access closes at dusk; late arrivals must carry equipment from the horse stable parking area.

Fees: No admission fee for the solar viewing, but donations are appreciated. The Park charges \$6 per vehicle for entry. A \$3 donation is requested from adults 18 and over for admission to the observatory during night viewing sessions.

NIGHT SKY SPRING SERIES

Session #2—Monday, Feb. 4

Session #3—Monday, Mar. 3

Classes held Mondays at 7PM. Each class includes a lecture on the constellations of the season, their history and mythology, and how to find objects within them. **Fees:** \$75 for the series of six presentations. (Single session fee is \$23). 10% discount for VMOA members. Classes are held at the Observatory. For information or to register: (707) 833-6979, <http://www.rfo.org> or nightsky@rfo.org

OBSERVING LAB

“Star Birth (Winter)”—Sunday, Feb. 3

“Diffuse Nebulae, Star Formation, and Open Clusters” - An intensive telescope observing session after a brief presentation on the night’s theme. Handouts/Observing Lists provided. Attendance limited to 6. Fee: \$30. [Rain check date: Wed., 2/6] Two sessions per year with different observing lists. Lab begins 6:30 PM. Raincheck date: Feb. 6. For reservations, email: nightsky@rfo.org

RESERVE THE FERGUSON OBSERVATORY!

Groups of up to 50 can be accommodated. Astronomer docents provide sky interpretation and operate telescopes, and you can stay up as late as you want! Make your reservation at least two weeks prior to your event. Best times for optimal sky gazing are any time more than a week away from a Full Moon.

In addition to \$111 charged by the RFO for use of the observatory facilities, the State Park System charges \$111 for use of the *Group Campground*. Because it is adjacent to the Observatory, the group camp must be reserved for private events. Total Cost: \$222. For information on how to reserve, visit www.rfo.org or contact George Loyer at gloyer@rfo.org.

SRJC PLANETARIUM

“Friendly Moon, Lucky Us”

January 25 to March 2

Other than the Sun, the Moon is the most noticeable object in our sky. Where did it come from? why does it appear as it does? And, what does it mean to us? We answer these questions and more as we learn about our nearest neighbor in space.

Shows are held at Santa Rosa Campus, Lark Hall, Room 2001, on Fridays and Saturdays at 7:00 PM and 8:30 PM, Sundays at 1:30 PM and 3:00 PM during the Fall and Spring semesters. Admission is \$5 General; \$3 Students and Seniors (60+).

Tickets are sold at the door only, beginning 30 minutes before show time. A parking permit is required and is included in the Planetarium admission price. Pick it up at the planetarium when you pay admission. Please arrive early enough to place your permit on your vehicle’s dashboard before the show starts.

Info: 527-4372, <http://www.santarosa.edu/planetarium/>



Morrison Planetarium Dean Lecture Series

Feb. 25, 7:30 PM: “Visualizing the Infrared Universe: The Imagery of NASA’s Spitzer Space Telescope”—Dr. Robert Hurt, California Institute of Technology

Astronomy is arguably the most visual of sciences, even when it transcends the limits of mere human vision. Astronomers are but observers, reconstructing events long ago and far away by collecting light across the entire spectrum. NASA’s Spitzer Space Telescope presents interesting challenges in visualization. How do you represent data from beyond the visible spectrum that can be seen and admired, but also understood? What role does art play in communicating the science of the universe?

Location: Kanbar Hall, Jewish Community Center, 3200 California Street (at Presidio). Parking in the UCSF Laurel Heights campus parking lot is \$1.25/night. Parking in the JCC garage is \$1.25 per half-hour. Tickets \$4 at the door or by email. Contact: 415/321-8000.

<http://www.calacademy.org/planetarium/dean.php>

SSU OBSERVATORY PUBLIC VIEWING

Feb. 9, 7-9 PM: Orion Nebula, The Other Orion, The Crab

Observatory located inside the stadium area at the SE corner of campus (E. Cotati Ave. and Petaluma Hill Rd., two miles east of US 101). Follow signs to campus. Parking Lot F is most convenient. Call 707/664-2267 if it appears weather may force cancellation. <http://www.phys-astro.sonoma.edu/observatory/pvn.html>

Events

2008 GOLDEN STATE STAR PARTY

July 2-6

The 2008 Golden State Star Party is open for registration.

This year's event will be held in Adin California, located in eastern Lassen County, one of the darkest regions of our State. Join us from July 2-6 on wide open ranch-land with spectacular 360 degree horizons and an unpolluted night sky. Take advantage of our early registration discount and get signed up for California's premier star party.

Registering early helps us plan GSSP, allows us to identify volunteers and special needs early on, and most importantly allows us to build an on-line community well in advance of the event. If you know you are going to join us, let us know by registering.

Off-site accommodations and services are also available in the nearby towns of Adin and Bieber. Astronomers will have the convenience of leaving their equipment set up for the duration of the event. TAC has a long history of excellent Star Parties, but this year's summer event promises to be the best ever.

For more information, registration, and to post questions or comments to our blog, visit:

<http://www.goldenstatestarparty.org>

GSSP is a non-profit event, organized and staffed by volunteer amateur astronomers from The Astronomy Connection of Northern California, Southern California, and Sacramento.

Clear Skies! Hope to see you at GSSP 2008!

—The GSSP 2008 Organizing Committee

SONOMA STATE UNIVERSITY SERIES “WHAT PHYSICISTS DO”

Mondays at 4:00 PM

Darwin Hall Room 103 (Coffee at 3:30 PM)

Feb. 4—Massive Sky Surveys of the Next Decade

Dr. David Wittman of the University of California, Davis will describe how systematic imaging of the sky to much fainter levels than ever before is expected to reveal everything from 200-meter rocks in Earth-crossing orbits to very distant galaxies.

Feb. 11—The Tunguska Event 100 Years Later: Finding Near Earth Objects Before They Find Us

Dr. Donald K. Yeomans of Caltech's Jet Propulsion Laboratory will discuss the daily bombardment of Earth by asteroid fragments and the ongoing NASA programs to understand and track Earth's nearest neighbors.

Feb. 25—The Evolution of Galaxies in Different Environments

Dr. Jacqueline van Gorkom of Columbia University will show observations and simulations that suggest that the evolution of a galaxy may be seriously affected by its environment.

Contact <http://phys-astro.sonoma.edu/wpd/>

FEBRUARY'S STAR PARTIES

Schools are back in session and Daylight Savings Time is fast approaching. February is a busy time for school star parties.

First up is Monte Rio Elementary on Friday, February 8, 7:00 PM. Currently, Merlin and myself are pledged to be there. We could use one or two more volunteers to bring telescopes to this event. However, this is also the SPARKS Telescopes award night.

The next night, Saturday, February 9, 6:30 PM (also an RFO night) is scheduled for Sunridge School out of Sebastopol. This event will take place west of Healdsburg just off of Dry Creek Road. This is a small class of 22 students plus parents and teachers. They plan on “camping out” on the private property of the home owner. We could use at least one more volunteer.

The following week has us setting up at Windsor Creek Elementary on Tuesday, February 12. Windsor Creek is having their annual Third Grade Solar System Project presentation night. This event often brings our 400-600 students, parents, and siblings. Currently we have three volunteers and we could use at least four more. The solar system displays begin at 6:00, so we should be set up before then, otherwise we will be competing with the parents just getting into the parking lot....

During the last week of February we have two more schools scheduled for star parties. Tuesday, February 26 is at Sequoia Elementary in the Rincon Valley area of Santa Rosa. This event is fairly well covered, but the more the merrier. On Leap Year Day (Feb. 29) we are scheduled to be at Rohnert Park's Evergreen Elementary. This is another school that brings out a big crowd of eager telescope viewers. We have five volunteers so far, but this event could use at least eight telescopes. Since this is on a Friday night we are likely expect the public to really come out and stay up later since this will not be a “school night”.

Looking ahead to March, we will again try to put on a star party at Healdsburg's Fitch Mountain Elementary on Friday, March 7. (the last Friday before DST). This is a PTA-sponsored event and we can expect many families to attend, so we will need many telescope volunteers.

Should you find that you have time to volunteer at one or more of these events, please contact Lynn Anderson at astroman@sonic.net.

NICK KANAS' STAR MAPS PRESENTATION AT BOOK PASSAGE

Feb. 2, 7PM—Nick Kanas, our speaker for the April meeting, will be giving a powerpoint presentation related to his new book *Star Maps: History, Artistry, and Cartography* in the Gallery of the Book Passage Book Store. The talk will trace the history of celestial cartography and relate it to the changing ideas of our place in the universe. Book Passage is located at 51 Tamal Vista Blvd. in Corte Madera in Marin.

Young Astronomers



Striking Sparks Award Night

*YA Meeting Friday, February 8, 7:30 PM
Apple Blossom School, Sebastopol*

Attention Young Astronomers! The next YA meeting will be Striking Sparks Award night! Please join us for the celebration at 7:30 PM on Friday, February 8 at Apple Blossom School in Sebastopol, as the Sonoma County Astronomical Society awards telescopes to this year's Striking Sparks Telescope Contest winners. Greet the newest YA members and their families, and welcome them into the exciting world of astronomical observation.

Along with the awards ceremony, mini orientation sessions will show Sparks winners (as well as meeting attendees) how to transport and set up their telescopes, the proper care of eyepieces, and how to use a planisphere.

As always, be sure to bring your telescope for a star party in the upper parking lot after the meeting, weather permitting. We look forward to seeing you February 8th!

IS TIME TRAVEL POSSIBLE?

Every science fiction fan has pondered the weird implications of time travel. Can you travel into the future and find out the winning Super Lotto number--then come back and buy a ticket? Would doing so be cheating the laws of physics (to say nothing of ethics)? Astrophysicist Marc Rayman toys with such ideas in this Space Place Musings Podcast.

Go to <http://spaceplace.jpl.nasa.gov/en/educators/podcast/> to subscribe to these Podcasts. Or listen now to this and the previous Podcasts on your computer or read the transcripts.

YA INFORMATION

Meetings: 7:30 PM the second Friday of each month of the school year, at Apple Blossom School, 700 Water Trough Road, Sebastopol, in the Multipurpose Hall. Open to all Sonoma County students. Telescope viewing is held in the upper parking lot after the meeting. Directions: From Hwy. 116 in Sebastopol, go west onto Bodega Ave. Continue almost two miles to Water Trough Rd. Turn left and go about 1/3 mile to the school, on your right.

YA ELECTED OFFICERS

PRESIDENT: Open

VP/PROGRAM DIRECTOR: Geoffrey Knoll

RECORDER: Open

NEWSLETTER EDITOR: Max Eliazer, Maxxedout@comcast.net

LIBRARIAN: Open

ADULT ADVISOR: Gary Jordan 829-5288, Sieramolloy@comcast.net

Hubble Space Telescope: A New and Improved Lease on Life!

Not long ago, scientists were told that the Hubble Space Telescope's days would soon be over, with the astronomical workhorse falling into a gradual state of disrepair over the next few years. Faced with pressure to complete the International Space Station before the Space Shuttle fleet is permanently grounded in 2010, NASA cancelled any future Hubble maintenance / repair missions. However, after significant scientific, public, and congressional outcry, NASA found a way to fit one more Hubble mission into the Space Shuttle flight schedule. This summer, shuttle astronauts are scheduled to make a final repair mission to the HST, and what a repair mission it will be!

The Hubble servicing mission is scheduled to launch aboard the shuttle Atlantis on Aug. 7, 2008. This will be the fifth—and final—mission to upgrade and repair the aging telescope. In essence, the astronauts will significantly overhaul the HST, making it vastly more powerful than its current capabilities.



Said Alan Stern, associate administrator for NASA's science mission directorate, "We're not only going up to Hubble to refurbish it, but also to expand its grasp tremendously. We expect to make the very best discoveries of the entire two-decade-plus Hubble program with the new instruments to be installed."

General maintenance to be performed will include replacing failed gyroscopes, cracked thermal insulation, the fine guidance sensor, and each of Hubble's 16-year-old batteries. Astronauts will also repair the observatory's Space Telescope Imaging Spectrograph and the Advanced Camera for Surveys (ACS), both of which were never designed to be fixed in orbit. Astronauts will have to remove more than 111 tiny screws to repair the two units. This repair has never been tried before, but NASA is optimistic it can be completed successfully.

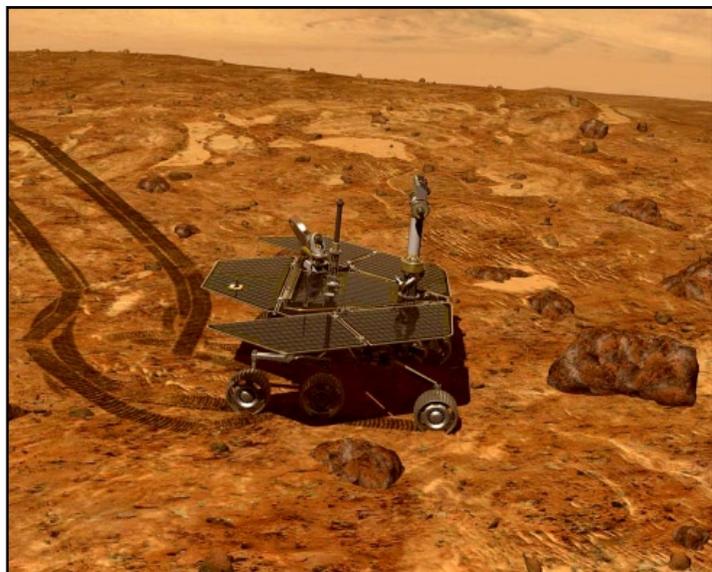
As if that's not enough, after these repairs are made, astronauts will add two new instruments to Hubble's observation platform—Wide Field Camera-3 and the Cosmic Origins Spectrograph. These will drastically boost Hubble's range of vision, meaning Hubble will be able to see at least 90 times more objects in deep space than when it was first deployed in 1990. And, with its ability to scan the universe at wavelengths ranging from the near-infrared, to the near-ultraviolet, the new Wide Field Camera-3 should allow Hubble to see objects that formed fewer than 800 million years after the beginning of the universe.

Five spacewalks are planned to complete all of the repairs and upgrades. This should result in about five extra years of science

for Hubble before its controlled deorbit sometime after 2020. (To prepare for the space telescope's eventual demise, spacewalkers will also attach a connecting port that will allow a robotic tug to dock with Hubble).

Space scientists are ecstatic about the added capabilities and added lifespan that this mission brings to the Hubble. Said one scientist, upon hearing the news of NASA's repair mission, "We were mourning the anticipated loss of an instrument that helped revolutionize our ability to see into the universe. Now, instead of planning a wake for Hubble a few years down the road, we get to celebrate its new capabilities and its new lease on life!"

—Adapted from an article by Tariq Malik at *Space.com*



Are these rocks of any scientific interest? With the new AEGIS software, the Mars Rovers, Spirit and Opportunity, will be able to judge for themselves whether a scene is worth a high-resolution image. (Artist's rendering.)

NASA SpacePlace

No Mars Rock Unturned

by Patrick L. Barry

Imagine someday taking a driving tour of the surface of Mars. You trail-blaze across a dusty valley floor, looking in amazement at the rocky, orange-brown hillsides and mountains all around. With each passing meter, you spy bizarre-looking rocks that no human has ever seen, and may never see again. Are they meteorites or bits of Martian crust? They beg to be photographed.

But on this tour, you can't whip out your camera and take on-the-spot close-ups of an especially interesting-looking rock. You have to wait for orders from headquarters back on Earth, and those orders won't arrive until tomorrow. By then, you probably will have passed the rock by. How frustrating!

That's essentially the predicament of the Spirit and Opportunity rovers, which are currently in their fourth year of exploring Mars. Mission scientists must wait overnight for the day's data to download from the rovers, and the rovers can't take high-res pictures of interesting rocks without explicit instructions to do so.

However, artificial intelligence software developed at JPL could soon turn the rovers into more-autonomous shutterbugs.

This software, called Autonomous Exploration for Gathering Increased Science (AEGIS), would search for interesting or unusual rocks using the rovers' low-resolution, black-and-white navigational cameras. Then, without waiting for instructions from Earth, AEGIS could direct the rovers' high-resolution cameras, spectrometers, and thermal imagers to gather data about the rocks of interest.

"Using AEGIS, the rovers could get science data that they would otherwise miss," says Rebecca Castaño, leader of the AEGIS project at JPL. The software builds on artificial intelligence technologies pioneered by NASA's Earth Observing-1 satellite (EO-1), one of a series of technology-testbed satellites developed by NASA's New Millennium Program.

AEGIS identifies a rock as being interesting in one of two ways. Mission scientists can program AEGIS to look for rocks with certain traits, such as smoothness or roughness, bright or dark surfaces, or shapes that are rounded or flat.

In addition, AEGIS can single out rocks simply because they look unusual, which often means the rocks could tell scientists something new about Mars's present and past.

The software has been thoroughly tested, Castaño says, and now it must be integrated and tested with other flight software, then uploaded to the rovers on Mars. Once installed, she hopes, Spirit and Opportunity will leave no good Mars rock unturned.

Check out other ways that the Mars Rovers have been upgraded with artificial intelligence software at <http://nmp.nasa.gov/TECHNOLOGY/infusion.html#sciencecraft>.

—Article provided by JPL/NASA

Pleiades (from Page 3)

The Pleiades star cluster, in the constellation of Taurus, is easily visible to the naked eye at this time of the year. The cluster is well-known in many cultures, and is cited in the Bible, noted Rhee: "Can you bind the beautiful Pleiades? Can you loose the cords of Orion?" (Job 38:31).

Although referred to as the seven sisters, "the cluster actually contains some 1,400 stars," said Inseok Song, a staff scientist at Caltech's Spitzer Science Center, former astronomer with the Gemini Observatory, and a co-author of the research. Located about 400 light years away, the Pleiades is one of the closest star clusters to Earth.

**Sonoma County
Astronomical Society**

P.O. Box 183
Santa Rosa, CA 95402



Sonoma Skies
February 2008

FEBRUARY 13

Lynda Williams, SRJC
**Space Ecology: The
Final Frontier of
Environmentalism**