PRIMEFOCUS
Tri-Valley Stargazers

November 2007

Meeting Info:

What
I've Discovered Three Asteroids-Not! But They're Still Cool. . .

Who
Ken Sperber

When
November 16, 2007
Doors open at 7:00 p.m.
Lecture at 7:30 p.m.

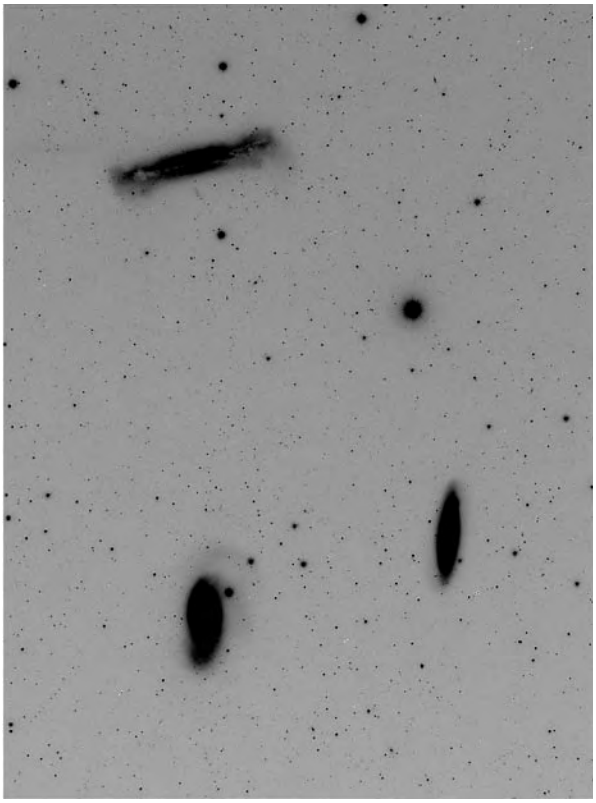
Where
Unitarian Universalist Church in Livermore
1893 N. Vasco Road

Inside

November Meeting

I've Discovered Three Asteroids—Not! But They're Still Cool. . .
Ken Sperber

What does imaging the trio-in-Leo have to do with Phobos and Deimos, the moons of Mars? Come to this month's TVS presentation to find out. My journey through these seemingly disconnected astronomical objects began when I spent two consecutive nights imaging M65, M66, and NGC3628. This proved to be a much more interesting project than I dreamed. In reviewing an inverted black and white version of the luminance images (see photo below) I noted faint outer components to all three of the galaxies. However, much to my surprise, I also found not just one, but three curious objects that exhibited linear paths across the field of view. Though my initial quest was to simply determine if these objects had been previously cataloged, I became interested in learning more about asteroids. In my presentation, I'll talk briefly about CCD image processing, and then my crude, but effective, approach to astrometry to identify the asteroids I captured on my images. I'll also describe some characteristics of solar system asteroids, including the different families, and I'll describe past and present missions to observe and sample these diverse bodies.



M65, M66, and NGC3628 imaged with a Takahashi FS-102 and an ST-2000XM on 16-17 March, 2007. This inverted black & white image shows faint galactic halos, and three asteroids. *Photo: Ken Sperber*

News & Notes

2007 TVS Meeting Dates

The following lists the TVS meeting dates for the next few months. The lecture meetings are on the third Friday of the month, with the Board meetings on the Monday following the lecture meeting. The *Prime Focus* deadline applies to that month's issue (e.g., the January 6th deadline is for the January issue).

Lecture Meeting	**Board Meeting**	***Prime Focus* Deadline**
Nov 16	Nov 19	Nov 4
Dec 21	Dec 17	Dec 9
Jan 18	Jan 21	Jan 6

Money Matters

At our October board meeting, Treasurer **David Feindel** reported the TVS account balances as of October 18.

Checking	$3,393.90	
CD #1	$3,656.36	matures 11/17/07
CD #2	$2,578.13	matures 11/27/07

The 2008 TVS budget was presented. After some discussion, the Board voted to approve the budget.

November TVS Election

Before the start of our November speaker's presentation, we'll be taking a little time to conduct our annual election. All officer and board member positions are up for vote. The club highly encourages any members interested in any of the positions (President, Vice-President, Secretary, Treasurer, Board Member) to nominate themselves. All club officer and board positions require attending the majority of the board meetings (we meet at a Round Table Pizza place in Livermore on the Mondays following the lecture meetings).

The President presides over the lecture and board meetings. The Vice President takes over when the President is not available. The Treasurer takes care of all the financial matters (club dues, paying bills, etc.). The Secretary takes the minutes of the board meeting and handles all club correspondence (which is minimal).

We also have plenty of room available on the Board of Directors, and could use more input from club members in that capacity. Board members get to vote on items presented at the meeting.

Also, some of the volunteer positions could use new volunteers to take on the job responsibilities. We're looking for a Program Director and someone to handle the Hospitality position.

The Program Director is in charge of finding speakers for the monthly meetings. We need 10 speakers a year (the other two months of the year are our potluck dinners). The Bay Area has many potential speaker pools, from LLNL, LLBL, NASA, SETI, and the Universities.

The Hospitality position requires bringing the refreshments to the meeting and making coffee and tea, as well as coordinating the summer and holiday potlucks.

TVS conducts star parties for any teacher, school, or group that requests our presence. Our star party coordinator, Rich Campbell, can't always be at every star party, so we'd like to have one or two back-ups that would be able to do a little slide show, or do a Night Sky Network activity for the group. We have an assortment of Night Sky activities for members to use for public outreach events.

Please consider helping out in whatever way you can, and don't be afraid to add your name to the nomination list.

Magazine Subscription Changes

The club, as one of its benefits, gives members access to discounted rates on subscriptions to *Sky & Telescope* and *Astronomy* magazines. In the past, subscriptions or renewals to both magazines needed to be submitted to TVS, and then the club Treasurer forwarded them to their respective publishers.

S&T, with their recent change in ownership, has changed their policy. Members now get a renewal notice in the mail, with the discounted rate shown. Fill it out, and return it to *S&T*, and you're set. The publisher will contact the club once a year to verify your membership. This saves the Treasurer some labor (yea!). *Astronomy* magazine will continue to follow the procedure for subscribing or renewing through the club. Rates this year are $32.95 for a 1-year subscription to *S&T*, and $34/$60 for a 1- or 2-year subscription to *Astronomy*. Members with questions, should contact David Feindel, the Treasurer.

RASC Handbooks & Calendars

TVS had put in its order for a limited supply of RASC (Royal Astronomical Society of Canada) Handbooks and Calendars. The Handbook is a useful book filled with all kinds of astronomical data. The calendar features photos taken by amateur astronomers.

We will have them available for purchase at our Potluck meeting on December 21st. The Handbooks are $21, Calendars $13. Cash or checks (made out to Tri-Valley Stargazers) accepted.

Newsletter header image: Arp 87

The pair, known collectively as Arp 87, is one of hundreds of interacting and merging galaxies known in our nearby universe.

Arp 87 is in the constellation Leo, the Lion, approximately 300 million light-years away from Earth. These observations were taken in February 2007 with Hubble's Wide Field Planetary Camera 2. *Credit: NASA, ESA, and the Hubble Heritage Team (STScI/AURA)*

Calendar of Events

November 13, 7:00 p.m.
What: *New Horizons at Jupiter (and some Saturn news)*
Who: Jeff Moore (NASA Ames)
Where: Smithwick Theater, Foothill College
Cost: Free. Parking $2 (in quarters)

In February, NASA's New Horizons spacecraft swung by the giant planet Jupiter on its way to Pluto. Its instruments recorded images and other data about Jupiter's wild weather (including observations of an infant storm 2/3 the size of Earth), its ring, and its giant moons. Dr. Moore will show the wonderful new photos of the Jupiter system and discuss some of the discoveries made by New Horizons.

He will also talk about one of the most exciting discoveries of the Cassini mission around Saturn—the new understanding and exploration of water geysers on the moon Enceladus.

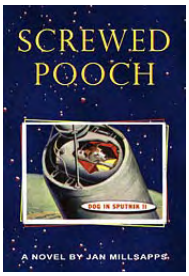
Jeff Moore is Research Scientist at NASA's Ames Research Center, specializing in the evolution of the surfaces of planets and icy moons (including Mars and the moons of Jupiter.) He is the leader of the Imaging Node for the New Horizons mission.

The lecture is co-sponsored by the NASA Ames Research Center, the Foothill College Astronomy Program, the SETI Institute, and the Astronomical Society of the Pacific, as part of the Silicon Valley Astronomy Lectures in the Smithwick Theater, Foothill College, El Monte Road and Freeway 280, in the Los Altos Hills.

Call the series hot-line at 650-949-7888 for more information and driving directions.

Past Silicon Valley Astronomy Lectures are now available in MP3 format at: http://www.astrosociety.org/education/podcast/index.html.

November 17, 6:45 - 7:45 p.m.
What: *Laika's Night*
Who: You
Where: Chabot Space & Science Center, Oakland
Cost: Free with General Admission
For reservations, call 510-336-7373



Join us for a talk by Jan Millsapps, author of *Screwed Pooch*, a novel that sheds light on Laika (the Russian space dog) as the first space pioneer and examines her role in the early space race. Followed by Q&A session. Arrive early and make an evening of it! Enjoy our new exhibit, *Beyond Blastoff: Surviving in Space* and see a live Planetarium show.

November 18, 12:00 p.m. - Late Afternoon
What: *SJAA Fall Swap Meet*
Who: Bay Area Amateur Astronomers
Where: Houge Park, San Jose
Cost: Free

If you missed your chance at buying astro stuff at the San Jose Astronomical Association's spring auction, you'll have another opportunity at their fall swap meet. As the saying goes, this event is when all the astronomical gear moves from one garage to another. More info about the event will be posted on the SJAA web site: www.sjaa.net.

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Officers

President:
Chuck Grant
cg@fx4m.com
925-422-7278

Vice-President:
Rich Campbell
r_photon@yahoo.com

Treasurer:
David Feindel
feindel1@comcast.net

Secretary:
David Woolsey
fatdawg@comcast.net

Board of Directors

Alane Alchorn, Jim Alves, Debbie Dyke, Gert Gottschalk, Stan Isakson, Mike Rushford, John Swenson.

Volunteer Positions

Librarian:
Jim Alves
Ajaengr@yahoo.com
209-833-9623

Newsletter Editor:
Debbie Dyke
astrodeb@comcast.net
925-461-3003

Program Director: unfilled

Loaner Scope Manager:
John Swenson
johnswenson1@comcast.net

Webmaster:
Chuck Grant

Observatory Director/ Key Master:
Chuck Grant

School Star Party Chair:
Rich Campbell
r_photon@yahoo.com

Public Star Party Chair:
Rich Campbell

Historian:
Debbie Dyke

Mentor:
Mike Rushford
rushford@eyes-on-the-skies.org

Addresses

Mailing:
Tri-Valley Stargazers
P.O. Box 2476
Livermore, CA 94551

Lecture Meeting:
Unitarian Universalist Church
1893 N. Vasco Road, Livermore

Board & Discussion Meetings:
Round Table Pizza
1024 E. Stanley Blvd., Livermore

Web & E-mail

www.trivalleystargazers.org
tvs@trivalleystargazers.org

Eyes on the Skies

Eyes on the Skies is a robotic solar telescope run by Mike Rushford (rushford@eyes-on-the-skies.org). You may access it by visiting www.eyes-on-the-skies.org.

TVS E-Group

So how do you join the TVS e-group you ask? Just send an e-mail message to the TVS e-mail address (tvs@trivalleystargazers.org) asking to join the group. Make sure you specify the e-mail address you want to use to read and post to the group.

Calendar of Events *continued*

November 20, 7:15 - 9:00 p.m.
What: *MDAS Swap Meet*
Who: Bay Area Amateur Astronomers
Where: Concord Police Association Facility, Concord
Cost: Free

If you couldn't make it to SJAA's swap meet on the 18th, there's still a chance to get your Christmas shopping done (for yourself, of course!). The Mt. Diablo Astronomical Society is holding their annual swap meet. Good deals are sure to be had by all. www.mdas.net

November 26, 7:30 p.m.
What: *Meteorites and the Asteroids They Came From: Are Asteroids Fluffy?*
Who: Guy Consolmagno (Vatican Observatory)
Where: Kanbar Hall, Jewish Community Center
Cost: $4.00

Spaceprobe, radar and telescopic measurements have led to reliable determination of asteroid densities. When compared to the densities of the meteorites, a new understanding is emerging of how asteroids are put together—with implications both for the origin of planets and for future human encounters with Near Earth Objects.

You can purchase tickets online at http://www.calacademy.org/lectures/tickets or buy them at the door. For more information, call 415-321-8000.

The Dean Lectures have temporarily moved to the San Francisco Jewish Community Center at 3200 California Street (at Presidio Avenue) during the reconstruction of the Academy.

Parking is available across the street in the UCSF Laurel Heights campus parking lot for $1.25 per night. Parking in the JCC garage is $1.25 per half-hour. The #1 California, #3 Jackson, #4 Sutter, and #43 Masonic MUNI lines stop directly in front of the building. The #38 Geary and #24 Divisadero buses stop only a few blocks away.

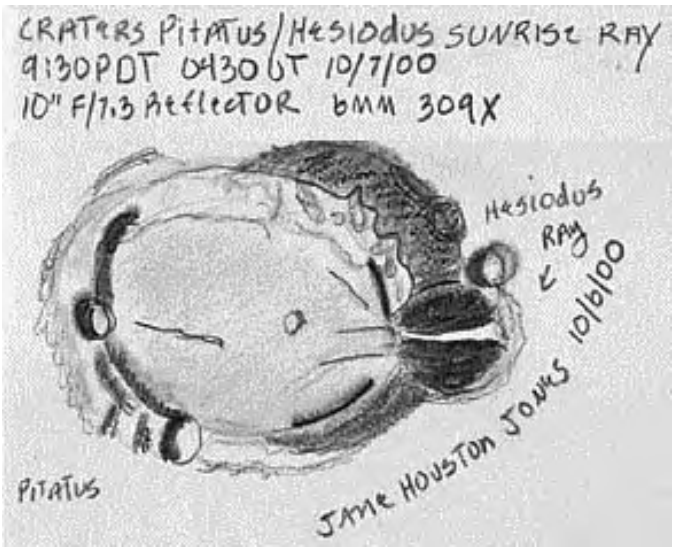
Astro Events

Lunar Rays

by Jane Houston Jones

Lunar sunrise and sunset rays are shafts of light which shine through gaps or notches in crater walls and mountains to illuminate the lunar surface. They occur only at very low angles of light–during lunar sunrise or sunset. Sunrise and sunset rays can range from thin parallel to triangular illuminations. Don't confuse them with impact craters, which are the debris blasted out by crater forming impacts on Copernicus and other young craters.

One of these rays, the Hesiodus Sunrise Ray, is a favorite



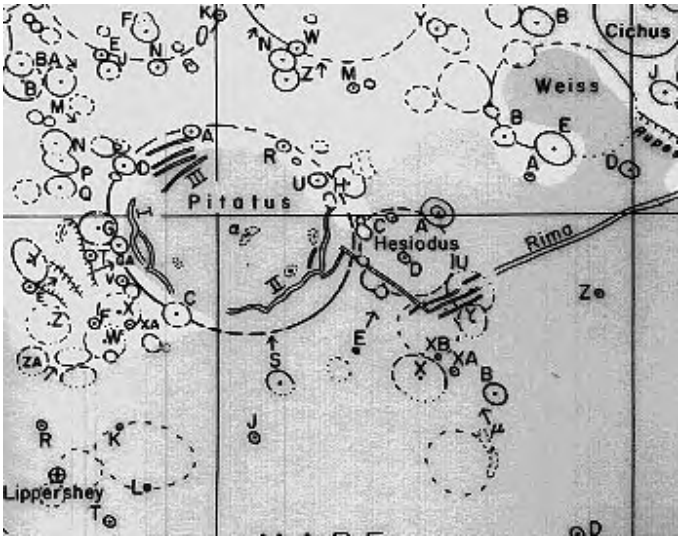
Jane's sketch of the Hesiodus Ray from October 2000.

of mine. It's easy to find the crater, which is just south of Rupes Recta, or the Straight Wall. Lunar ray spotting gained popularity about 10 years ago thanks to an article about the Hesiodus light ray in the July 1996 issue of *Sky & Telescope*. A gap in the neighboring crater Pitatus provides an opening for the shaft of light to cross the floor of this crater at various times throughout the year. Since that time, many amateur astronomers have calculated when the sunrise or sunset will strike a crumpled or broken crater wall and create these short-lived light shows.


Image of the Hesiodus ray taken by Robin Casady

Hesiodus is a crater 28 miles in diameter to the west of Pitatus, with a pass into the latter and with gaps in its north wall. Pitatus is a magnificent lagoon-like ring, 50 miles in diameter, on the southern shore of Mare Nubium. The light of the rising Sun shines westward through the two crater's common gap and bisects Hesiodus. Two weeks later, the eastward shining light of the setting Sun bisects Pitatus. Several times a year the geometry of Earth, Sun and Moon allow the light path to pass exactly through the low spot creating the ray.

On October 19, 2007 I had mostly been showing people the Straight Wall, Plato, Cassini and Mons Huygens during our monthly sidewalk astronomy night.



A map of the Pitatus and Hesiodus region from *Lunar Quadrant Maps,* produced by the Lunar and Planetary Lab at the University of Arizona.

My eye drifted from the Straight Wall to Pitatus and Hesiodus. The center of Pitatus was bathed in sunlight, which cast a shadow on its central peak. The crater floor looked convex or dome-like to me. And guess what, the Hesiodus Ray, a narrow triangular shaft of light, illuminated the dark floor of Hesiodus.

You'll find predictions for about 75 rays, including the Hesiodus and Pitatus Rays, on the Robinson Lunar Observatory web site. http://www.lunar-occultations.com/rlo/rays/rays.htm.

There are many opportunities to see each of these two fleeting shafts of light next year. The first dates listed are January 16 and 31, 2008, calculated at the geographic center of the US.

Now get out and catch some rays!

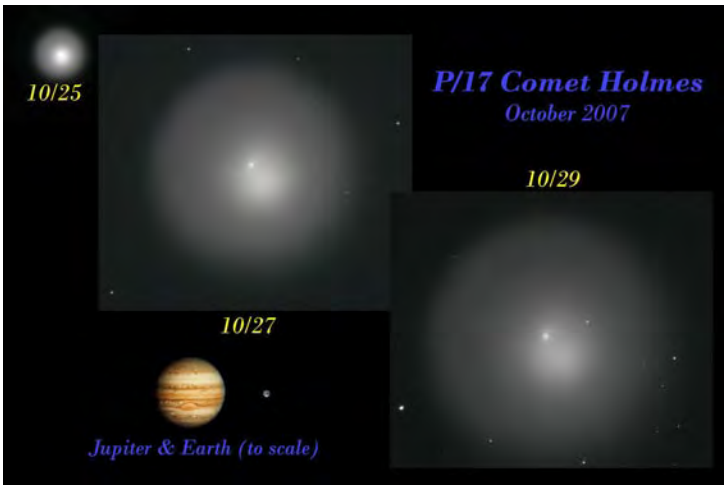
Comet Holmes

On the morning of October 24, in the Canary Islands, Comet Holmes was seen to brighten unexpectedly. Within 24 hours, the comet went from magnitude 17 to 2.8, a phenomenal increase in brightness of a million times. This caught everyone's attention.

The comet was originally discovered in 1892 by Edwin Holmes. At that time, the comet suddenly brightened, making its position known to Holmes. Observers from around the world, including Lick Observatory, recorded their observations. It then faded to obscurity. Until now. Here are just a few of the many pictures taken of this unusual comet.

Holmes on October 27, 2007. Image taken eyepiece projection with a 36" cassegrain and 18mm eyepiece. *Photo: Debbie Dyke*

Holmes on November 4, 2007, as imaged through an Orion 120ST and a DSI Pro. *Photo: Bill Drelling*



Holmes, as seen on October 25, 27, and 29, with Jupiter and the Earth to scale. *Photo: Conrad Jung*

What's Up *by Debbie Dyke*

All times Pacific Standard Time.

November

9 Fri **New Moon**. 3:03 p.m.
Ceres at opposition. 1:00 a.m. Look for Ceres in the constellation Cetus.
Moon at apogee (252,136 miles). 5:00 a.m.

11 Sun Mercury at greatest heliocentric latitude north.
Veterans Day.

12 Mon N. Taurid meteors peak. 1:00 p.m.
1782 John Goodricke discovers the variability of Algol.

16 Fri **Tri-Valley Stargazers general meeting**. 7:30 p.m. at the Unitarian Universalist Church, 1893 N. Vasco Road, Livermore.
1974 Arecibo radio telescope sends a 3-minute message towards M13—it should arrive in about 24,000 years.

17 Sat **First Quarter Moon**. 2:32 p.m.
Leonid meteors peak. 8:00 p.m
1970 Luna 17 lands on the Moon and sends Lunokhod 1 (a wheeled vehicle) to ramble along the surface.

18 Sun **Tri-Valley Stargazers discussion meeting**. 2:00 p.m. at the Round Table Pizza on 1024 E. Stanley Blvd., Livermore. Discuss astro stuff with your fellow members.
The Moon is 3° from Uranus. 9:30 p.m.

19 Mon **Tri-Valley Stargazers Board meeting**. 7:00 p.m. at the Round Table Pizza in Livermore.
Comet Holmes 17.75' from Mirfak. 8:00 p.m

20 Tue 1889 Edwin Powell Hubble born.
1998 The first section of the International Space Station is launched from Baikonur.

22 Thur **Thanksgiving Day**.
1682 Edmond Halley sees the comet that will later bear his name.

23 Fri Moon at perigee (221,460 miles). 4:00 p.m. Expect large tides
1885 First photo of a meteor shower.

24 Sat **Full Moon**. 6:30 a.m.
The Full Moon occults part of the Pleiades (M45). 4:00 a.m.

26 Mon The Moon passes just over 1° from Mars. 8:30 p.m.

28 Wed The Moon passes just over 3° from the Beehive Cluster (M44). 10:00 p.m.
Venus 4° north of Spica. 2:00 pm.
1967 Jocelyn Bell discovers pulsars.

30 Fri Venus at perihelion.
Regulus 3° from the Moon. 5:30 a.m.

December

1 Sat **Last Quarter Moon**. 4:44 a.m.
The Moon passes less than 3° from Saturn in the very early morning hours.

2 Sun 1993 Hubble Space Telescope gets corrective optics.

4 Tue 1901 No uncertaintity about it, Werner Heisenberg was born on this day.
Hanukkah begins at sundown.

5 Wed Venus 7° from the very thin crescent Moon. 5:00 a.m.

6 Thur Moon at apogee (251,865 miles). 9:00 am.

The Red (Hot?) Planet

by Patrick L. Barry

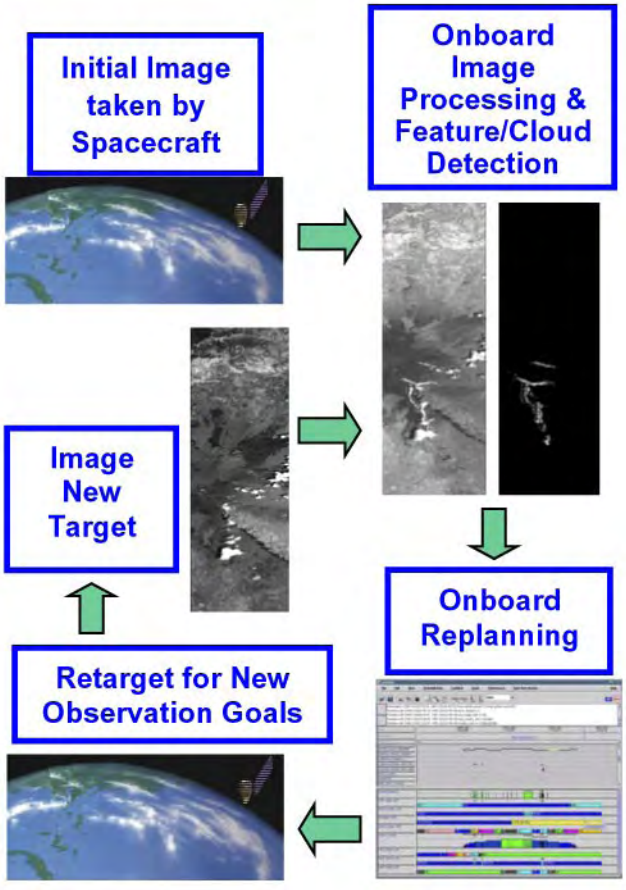
Don't let Mars's cold, quiet demeanor fool you. For much of its history, the Red Planet has been a fiery world.

Dozens of volcanoes that dot the planet's surface stand as monuments to the eruptions that once reddened Mars's skies with plumes of glowing lava. But the planet has settled down in its old age, and these volcanoes have been dormant for hundreds of millions of years.

Or have they? Some evidence indicates that lava may have flowed on Mars much more recently. Images of the Martian surface taken by orbiting probes show regions of solidified lava with surprisingly few impact craters, suggesting that the volcanic rock is perhaps only a million years old.

If so, could molten lava still occasionally flow on the surface of Mars today?

With the help of some artificial intelligence software, a heat-sensing instrument currently orbiting Mars aboard



Just as changing cloud patterns on Earth were identified using Earth Observing-1's Advanced Land Imager along with ScienceCraft software, the THEMIS instrument with ScienceCraft on the Mars Odyssey spacecraft can avoid transmitting useless images.

NASA's Mars Odyssey spacecraft could be just the tool for finding active lava flows.

"Discovering such flows would be a phenomenally exciting scientific finding," says Steve Chien, supervisor of the Artificial Intelligence Group at JPL. For example, volcanic activity could provide a source of heat, thus making it more likely that Martian microbes might be living in the frosty soil.

The instrument, called THEMIS (for Thermal Emission Imaging System), can "see" the heat emissions of the Martian surface in high resolution—each pixel in a THEMIS image represents only 100 meters on the ground. But THEMIS produces about five times more data than it can transmit back to Earth.

Scientists usually know ahead of time which THEMIS data they want to keep, but they can't plan ahead for unexpected events like lava flows. So Chien and his colleagues are customizing artificial intelligence software called ScienceCraft to empower THEMIS to identify important data on its own.

This decision-making ability of the ScienceCraft software was first tested in Earth orbit aboard a satellite called Earth Observing-1 by NASA's New Millennium Program. Earth Observing-1 had already completed its primary mission, and the ScienceCraft experiment was part of the New Millennium Program's Space Technology 6 mission.

On Odyssey, ScienceCraft will look for anomalous hotspots on the cold, night side of Mars and flag that data as important. "Then the satellite can look at it more closely on the next orbit," Chien explains.

Finding lava is considered a long shot, but since THEMIS is on all the time, "it makes sense to look," Chien says. Or better yet, have ScienceCraft look for you—it's the intelligent thing to do.

To learn more about the Autonomous ScienceCraft software and see an animation of how it works, visit http://ase.jpl.nasa.gov.

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

Space Place Addition: Solar Indigestion

We usually take our star for granted. We forget that it's not just a big, bright, warm light bulb crossing the sky each day for our comfort and convenience. On the contrary, the Sun has a very active (if not meaningful) life of its own. And it's not always in a good mood. When the Sun is having a tantrum, or, even worse, indigestion, we are included in its "suffering." Space weather includes the effects of solar activity on Earth's environment—and us. Find out more about what happens to Earth during bouts of "solar indigestion" at http://spaceplace.nasa.gov.

Tri-Valley Stargazers
P.O. Box 2476
Livermore, CA 94551

PRIMEFOCUS

Tri-Valley Stargazers Membership Application

Member agrees to hold Tri-Valley Stargazers, and any cooperating organizations or landowners, harmless from all claims of liability for any injury or loss sustained at a TVS function.

Name _____ Phone _____ e-mail _____

Address _____

Do not release my: _____ address, _____ phone, or _____ e-mail information to other TVS members.

Membership category:
_____ $5 Student.
_____ $30 Basic. You will receive e-mail notification when the PDF version of *Prime Focus* is available for download off the TVS web site.
_____ $40 Regular. You will receive a paper version of *Prime Focus* in the mail.
_____ $32.95 One year subscription to *Sky & Telescope* magazine.
_____ $34 One year subscription to *Astronomy* magazine.
_____ $60 Two year subscription to *Astronomy* magazine.
_____ $10 Hidden Hill Observatory (H2O) yearly access fee. You need to be a key holder to access the site.
_____ $20 H2O key holder fee. (A refundable key *deposit*—key property of TVS).
_____ $40 Patron Membership. Must be a member for at least a year and a key holder.
$_____ Tax deductible contribution to Tri-Valley Stargazers.

$_____ TOTAL – Return to: Tri-Valley Stargazers, P.O. Box 2476, Livermore, CA 94551

Membership information: Term is one calendar year, January through December. Student members must be less than 18 years old or still in high school.