PRIMEFOCUS
Tri-Valley Stargazers

March 2006

Meeting Info:

What
Danger: Asteroid Crossing

Who
David Dearborn

When
March 17 2006
Conversation 7:00 p.m.
Lecture at 7:30 p.m.

Where
Unitarian Universalist
Church in Livermore
1893 N. Vasco Road

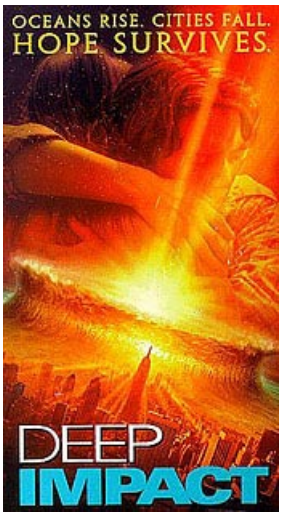
Inside

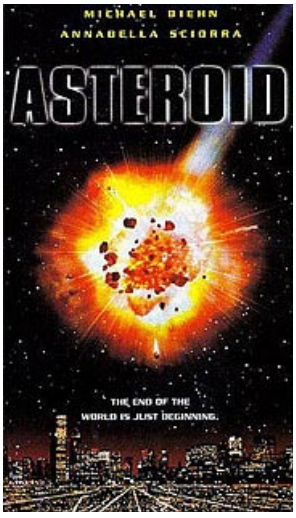
March Meeting

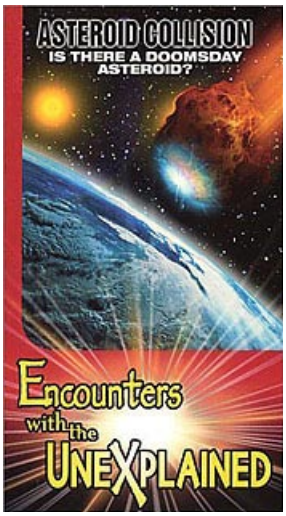
Danger: Asteroid Crossing
David Dearborn

Every couple of years, a celestial body impacts the earth with an energy near that of the Hiroshima bomb. Fortunately, that energy is usually deposited high (> 30 Km up) in the atmosphere, and causes little damage. On much longer timescales, impacts will occur with the potential to destroy regions, or whole civilizations.

This lecture will present an overview on efforts to define the impact threat, followed by a systematic development of the requirements to divert an object on an earth-impacting course. We then examine today's technologies for achieving perturbation magnitudes necessary to protect the planet.







Hollywood's take on what will happen if an asteroid gets too close to the Earth. How likely are we to have such a earth shattering impact? What can we do to prevent such a disaster, assuming Bruce Willis isn't available to save the day? Come to the meeting and find the real answers.

News & Notes

Welcome!

TVS welcomes our newest members, **Suhas Mutatkar**, **J.C. Park**, and **Eric Dueltgen**.

Money Matters

Treasurer **David Feindel** reports the TVS account balances (as of February 18, 2006):

Checking	$2,931.21	
CD #1	$3,508.90	matures 5/17/06
CD #2	$2,470.72	matures 2/27/06

2006 TVS Meeting Dates

Below are 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 May 7th deadline is for the May issue).

Lecture Meeting	**Board Meeting**	***Prime Focus* Deadline**
Mar. 17	Mar. 20	Mar. 5
Apr. 21	Apr. 24	Apr. 9
May 19	May 22	May 7
June 16	June 29	June 4

The Sidereal Mystery

by Dave Sworin

Read a few novels and watch a few shows and typically you won't find a reference to amateur astronomy, much less some technical detail only astronomers know about. It's not always true. Imagine my surprise while reading *The Case of the Buried Clock* by Erle Stanley Gardner, originally published in 1943, to read the words "sidereal time". The buried clock was about four (4) minutes per day too fast. With today's moon watches, atomic watches, and time zone watches, not to mention online ephemerides and goto telescopes, a sidereal clock isn't needed much. On the other hand even today's amateurs can yearn for a night outdoors by a cabin in the mountains where "The blazing stars seemed to hang just above the tops of the pine trees." I wouldn't run out and buy it just to read about the stars, but if you like Perry Mason mysteries anyway, and a dead body in the cabin doesn't bother you, a used paper back is the best buy.

Sidereal time is measured with respect to the apparent motion of the stars from the Earth. If you go outside at night, at the same sidereal time each night, you will see the same stars in the same location. Makes finding stars easier each successive night. Unfortunately, if you keep this up, it will be daylight when you go outside. Perhaps then you could consider looking at a different configuration of stars, ones a little later in sidereal time.

M95 (NGC3351) from a balcony in Fremont, using a 13" F4 Newtonian and ST10XME CCD camera. The view from the balcony only allows for about 2 hrs of observing time for this object at its declination. The light polluted skies over Fremont only allowed for 2 minute exposures. Combining 42 exposures in total yielded 84 minutes exposure time. The galaxy shines at 9.7 mag and is about 35 to 41 million light years away. Together with nearby M96, M95 is a member of the Leo I group of galaxies. *Photo by: Gert Gottschalk*

School Star Parties

Wednesday, March 15, from 6:30 to 8:00 p.m., the Croce Elementary School in Livermore will have their Space Day (and night). Clouds do NOT cancel. Contact Rich Campbell for more info - r_photon [at] yahoo [dot] com.

Wednesday, March 29th, is the Pleasanton School District's Science Fun Fair. We'll need at least two volunteers to man the booth (regardless of weather), and a bunch more outside for a star party of sorts (weather permitting). The Fun Fair draws close to 10,000 students, parents, and siblings. We do need a volunteer to act as the liaison to the Fun Fair coordinator, and to organize the TVS volunteers.

The San Jose Astronomical Association still could use some help with the Newark elementary school district's Family Science Night star parties.

Here are the remaining dates:

Tuesday, March 14 — Kennedy
Thursday, March 16 — Schilling
Thursday, March 23 — Musick
Tuesday, March 28 — Snow
Thursday, March 30 — Bunker

Set up is at 6:30 p.m. The event is from 7:00 to 8:00 p.m. If you are interested, or have questions, please contact Tom Collett at 510-818-4364 or tcollett@nusd.k12.ca.us.

On April 5th, we'll be doing a star party for the GATE students at Altamont Creek Elementary School. The time has yet to be confirmed. Clouds do NOT cancel.

Newsletter header image: M101 - The Pinwheel Galaxy
Hubble Space Telescope image of the face-on spiral galaxy M101. It is the largest and most detailed photo of a spiral galaxy that has ever been released from Hubble. The galaxy's portrait is actually composed of 51 individual exposures taken with Hubble's Advanced Camera for Surveys and the Wide Field and Planetary Camera 2 in March 1994, September 1994, June 1999, November 2002, and January 2003. The newly composed image also includes elements from images from ground-based photos.

Credit: NASA, ESA

Calendar of Events

March 29, 1:15 a.m. - 3:15 a.m.
What: *Total Solar Eclipse*
Who: You
Where: Chabot Space & Science Center, Oakland
Cost: $8 adult, $5 youth

Stay up late on the 28th or get up early on the 29th and view a live Webcast of the total solar eclipse, broadcast from Turkey. Hear a guest speaker talk about eclipses and provide commentary on the eclipse happening in Turkey.

April 1, 8:00 p.m.
What: *How Stars Are Made*
Who: Dr. Steve Stahler (UC Berkeley)
Where: Mt. Tamalpais
Cost: Free

Stars are the natural out come of processes that occur through out galaxies. Research has led to a good understanding of the basic evolutionary process, but deep mysteries still remain. www.mttam.net

April 9, 11:00 a.m. .
What: *SJAA XXVI Annual Auction & Swap*
Who: You
Where: Houge Park, San Jose
Cost: Free

All kinds of interesting items are found in the auction. Experienced observers often find equipment they need for their next observing project, from OIII filters to finders to star charts. Kevin Medlock will be the auctioneer this year. Those who have observed his performance in previous auctions have learned to appreciate his skillful evaluation of classical astronomical items on the spot.

All material must be registered by 12:30 p.m. to allow sufficient time to enter the items into the computer and to allow bidders time to view the auction material. Please limit yourself to four items maximum for the auction.

To reserve your spot in the auction, pre-register your items so that people know what you are bringing. The club reserves the right to accept only appropriate material for the auction.

The auction will begin at 1 p.m., and will run as long as needed. Seller may specify a minimum bid, which if not met, will return the item back to the seller with no commission applied. Seller pays 10% commission, with a cap of $50 for any one item. We do not handle charge cards. There is no fee for bidder cards.

After the auction, material for the swap meet will be allowed into the hall, about 3 p.m. The swap also allows people some additional haggling time for those items that didn't sell in the auction, or to sell those odds and ends items which were better off being in a swap.

Joe Sunseri of Earth and Sky Adventure Products will be there with many fine new and used items. At the swap, each buyer pays the seller. Sellers are to keep track of their sales, and pay a 10% commission. There are no table fees. All commissions from the auction and the swap are tax-deductible.

The SJAA offers free advertising if you pre-register your items for the auction. Please email the auction team at auction@sjaa.net with a description of the item and a picture if possible. All items submitted by 6 p.m. on Saturday, April 8th will be added to the auction website. For more about SJAA, visit www.sjaa.net.

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(acting secretary)

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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.

What's Up *by Debbie Dyke*

All times Pacific Standard unless otherwise noted.

March

5	Sun	Mercury at greatest heliocentric latitude north. 1979 Voyager 1 flies past Jupiter and captures first detailed images of it, its rings and moons. 1982 Venera 14 lands on Venus.
6	Mon	**First Quarter Moon**. 12:16 p.m. 1986 Vega 1 spacecraft encounters Comet Halley.
9	Thurs	1986 Vega 2 spacecraft encounters Comet Halley.
10	Fri	Saturn 6° south of the Moon. The Pleiades are in between the two. 9:00 p.m. 1977 James Elliot discovers the rings of Uranus.
11	Sat	Mercury in inferior conjunction. 7:00 p.m.
12	Sun	Moon at apogee (251,892 miles). 6:00 p.m.
13	Mon	1781 Wilhelm Herschel discovers Uranus using a 6-inch scope he built himself. 1855 Percival Lowell born.
14	Tues	**Full Moon**. 3:35 p.m. 1879 Albert Einstein born. 1986 Giotto spacecraft encounters Comet Halley.
16	Thurs	1750 Caroline Herschel born. 1926 Robert Goddard launches first liquid-fuel rocket.
17	Fri	Spica 0.3° south of the Moon. 2:00 a.m. St. Patrick's Day. **Tri-Valley Stargazers general meeting**. 7:30 p.m. at the Unitarian Universalist Church, 1893 N. Vasco Road, Livermore. Zodiacal Light visible in the west after evening twilight for the next two weeks.
18	Sat	1965 First walk in space by Cosmonaut Alexei Leonov from the Voskhod 2.
19	Sun	Jupiter 5° north of the Moon. 6:00 a.m. **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.
20	Mon	**Vernal Equinox**. Spring has sprung! 10:26 a.m. **Tri-Valley Stargazers Board meeting**. 7:00 p.m. at the Round Table Pizza in Livermore.
22	Wed	**Last Quarter Moon**. 11:10 a.m.
23	Thurs	1840 First photo of the Moon taken.
24	Fri	Mercury stationary. 4:00 a.m. Venus at greatest elongation west (47°). 11:00 p.m. 1993 Eugene and Carolyn Shoemaker and David Levy take a picture of what turns out to be comet Shoemaker-Levy 9.
25	Sat	Venus 9° north of the Moon. Try seeing if you can spot it! 6:00 a.m. 1655 Christiaan Huygens discovers Saturn's largest moon, Titan.
27	Mon	Moon at perigee (222,684 miles). 11:00 p.m. 1845 Wilhelm Rontgen born.
28	Tues	Double shadow transit on Jupiter. Io and Ganymede's shadows are already visible when Jupiter rises. Ganymede's shadow departs at 11:35 p.m., Io's at 12:05 a.m.
29	Wed	**New Moon**. 2:15 p.m. **Total Solar Eclipse** visible in the Mediterranean area. 1974 Mariner 10 makes first flyby of Mercury and sends pictures home.

Micro-sats with Macro-potential

by Patrick L. Barry

Future space telescopes might not consist of a single satellite such as Hubble, but a constellation of dozens or even hundreds of small satellites, or "micro-sats," operating in unison.

Such a swarm of little satellites could act as one enormous telescope with a mirror as large as the entire constellation, just as arrays of Earth-bound radio telescopes do. It could also last for a long time, because damage to one micro-sat wouldn't ruin the whole space telescope; the rest of the swarm could continue as if nothing had happened.

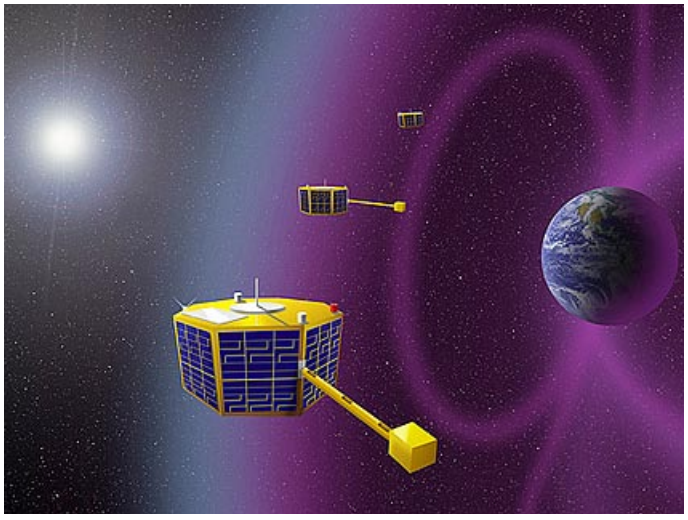
And that's just one example of the cool things that micro-sats could do. Plus, micro-sats are simply smaller and lighter than normal satellites, so they're much cheaper to launch into space.

In February, NASA plans to launch its first experimental micro-sat mission, called Space Technology 5. As part of the New Millennium Program, ST5 will test out the crucial technologies needed for micro-sats—such as miniature thrust and guidance systems—so that future missions can use those technologies dependably.

Measuring only 53 centimeters (20 inches) across and weighing a mere 25 kilograms (55 pounds), each of the three micro-sats for ST5 resembles a small television in size and weight. Normal satellites can be as large and heavy as a school bus.

"ST5 will also gather scientific data, helping scientists explore Earth's magnetic field and space weather," says James Slavin, Project Scientist for ST5.

Slavin suggests some other potential uses for micro-sats: A cluster of micro-sats between the Earth and the Sun—spread out in space like little sensor buoys floating in the ocean—could sample incoming waves of high-speed particles from an erupting solar flare, thus giving scientists hours of warning of the threat posed to city power grids and communications satellites.



The Space Technology 5 mission will test crucial micro-satellite technologies.

Or perhaps a string of micro-sats, flying single file in low-Earth orbit, could take a series of snapshots of violent thunderstorms as each micro-sat in the "train" passes over the storm. This technology would combine the continuous large-scale storm monitoring of geosynchronous weather satellites—which orbit far from the Earth at about 36,000 kilometers' altitude—with the up-close, highly detailed view of satellites only 400 kilometers overhead.

If ST5 is successful, these little satellites could end up playing a big role in future exploration.

The ST5 web site at nmp.jpl.nasa.gov/st5 has the details. Kids can have fun with ST5 at spaceplace.nasa.gov, by just typing ST5 in the site's Find It field.

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

Calendar of Events *continued*

April 10, 7:30 p.m.
What: *How Stars Are Made*
Who: Dr. Steve Stahler (UC Berkeley)
Where: Jewish Community Center, San Francisco
Cost: $4

All stars are born from large gas clouds that permeate space. These clouds collapse on themselves to form primitive objects that later mature to stars like our own Sun. Although we now understand the basic evolutionary process, deep mysteries remain in this active, exciting field.

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

All programs begin at 7:30 pm in Kanbar Hall at the Jewish Community Center of San Francisco, 3200 California Street. Tickets are $4 and are available in advance or at the door.

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.