

PRIMEFOCUS

Tri-Valley Stargazers

October 2004



Meeting Info:

What

Astronomy Travels

Who

TVS Members

When

October 15, 2004
Conversation at 7:00 p.m.
Lecture at 7:30 p.m.

Where

Unitarian Universalist
Church in Livermore
1893 N. Vasco Road

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October Meeting

Astronomy Travels

TVS Members

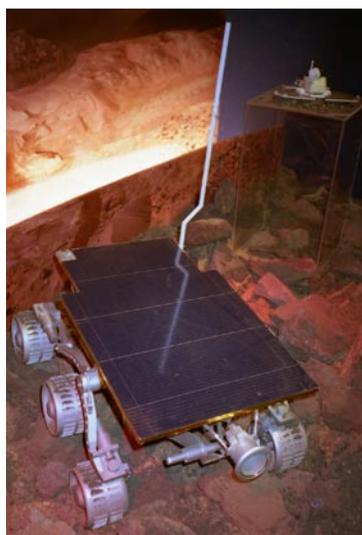
Have you been eyeing the ads in *Sky & Telescope* or *Astronomy* magazine for eclipse trips? Maybe thought of taking a little trip to one of those astronomy B&Bs in the southwest, or an observatory somewhere? Our October meeting is all about astronomy related trips that members have taken—and that you can take. Some sites are relatively close, others require a long plane ride.

Bob McKoon will tell us about a trip he took to the Trivandrum Observatory in South India, and the circa 1860 transit telescope he got to see while there. He'll also tell us about his recent trip to Prague (including a stop at the Štefánik Observatory—http://www.observatory.cz/intra/intro_en.php).

Debbie Dyke will talk about the trip she and her friends took a couple of years ago to visit the Griffith Observatory, the Jet Propulsion Laboratory, Hale Solar Laboratory, and Mt. Wilson.

Rich Campbell will show us what Chile is like, and tell us about his visit to the Cerro Tololo Inter-American Observatory (CTIO).

If time permits, Rich will also present a segment of the Night Sky Network.



Replica of the Mars Rover Sojourner at the JPL Visitor Center.



CTIO 4-meter Blanco telescope, silhouetted against the Magellanic Clouds (at left) and the Milky Way, as seen from Cerro Tololo in Chile.

Photo by: Roger Smith/NOAO/AURA/NSF

News & Notes

Welcome

TVS welcomes our newest members—**David Furbush**, **David Laffie**, and **Rowland Stenrud**.

2004 TVS Meeting Dates

Below are the TVS meeting dates for the rest of the year. 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 December 5th deadline is for the December issue).

Lecture Meeting	Board Meeting	Prime Focus Deadline
Oct. 15	Oct. 18	Oct. 3
Nov. 19	Nov. 22	Nov. 7
Dec. 17	Dec. 20	Dec. 5

Money Matters

At the September Board meeting, Treasurer **Gary Steinhour** gave us the account balances (as of September 19, 2004) of TVS's accounts:

Checking	\$1,561.01	
CD #1	\$3,442.22	matures 11/17/04
CD #2	\$2,432.89	matures 11/27/04
CD #3	\$1,072.67	matures 10/16/04

TVS Elections

As November approaches you'll hear more and more about the upcoming elections. The TVS elections, that is. Every year TVS holds its elections in November. Members attending the November meeting get a chance to cast their votes for President, Vice-President, Treasurer, Secretary, and Board Members.

Seeking re-election are the President (Chuck Grant) and Vice-President (Rich Campbell). Our current Treasurer (Gary Steinhour) and Secretary (Maggie Halberg) are stepping down from their posts so we are in need of some volunteers to take over those positions.

If you're interested in the Treasurer position, here's a list of the duties:

- Maintain accurate records of checking and CD accounts, financial assets and liabilities, and transactions
- Make payments of authorized expenditures and financial obligations
- File annual tax forms (note: TVS doesn't pay any taxes, but we still need to send in the forms)
- Present annual budget report to TVS board of directors
- Send in member subscriptions for Sky & Telescope and Astronomy magazines

- Also functions as Membership Chairperson
- Maintain established membership data base
- Send monthly updates of mail labels and new members to newsletter editor
- Send out Prime Focus e-mail notification to members
- Prepare a monthly Treasurer/Membership report for TVS board meetings
- Send quarterly updates of membership roster to the Astronomical League (for Reflector Magazine mailings)
- Pick up club mail (for timely processing of membership applications and renewals)
- Procure and sell RASC Handbooks and Calendars
- Attendance at General and Board Meetings is a high priority

The Secretary's list of duties include:

- Writes up the minutes from the monthly board meeting
- Handles the very limited amount of correspondence related to board activities
- Acts as the liaison with the Unitarian Church
- Amount of time required, in addition to attendance at the board meetings, is one to two hours per month.

If you are interested in either position, or wish to become a board member, contact any officer or board member.

2005 RASC Handbooks & Calendars

The 2005 Royal Astronomical Society of Canada calendars and Observer's Handbooks have arrived!

TVS will be selling the Handbooks for \$18.00, a savings of \$5.95 from the list price. The calendars are \$10, a savings of \$3.95. They will be available for purchase at the October meeting and following meetings until they are all gone. They both sold out quickly last year, so get your copy now as they may not last very long.

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Newsletter header image: NGC 6543 - the Cat's Eye Nebula

The Cat's Eye, in the constellation Draco, is about 3,000 light years away from us.

Though the Cat's Eye Nebula was one of the first planetary nebulae to be discovered, it is one of the most complex of such nebulae seen. A planetary nebula forms when Sun-like stars gently eject their outer gaseous layers that then form bright nebulae with amazing and confounding shapes.

Observations suggest the star ejected its mass in a series of pulses at 1,500-year intervals. These convulsions created dust shells, each of which contain as much mass as all of the planets in our solar system combined (still only one percent of the Sun's mass). These concentric shells make a layered, onion-skin structure around the dying star.

Image Credit: NASA, ESA, HEIC, and The Hubble Heritage Team (STScI/AURA)

Calendar of Events

October 16, 7:30 p.m.

What: *Exploring the Meaning of Life*

Who: Dr. Emma Bakes (SETI Institute/NASA-Ames)

Where: Mt. Tam

Cost: Free

There is evidence for the universal formation of life throughout the cosmos.

Also, on October 23, 5:00 p.m., Mary Ellen Hill will present her story *We are the Stars That Sing: The Story of the Universe* as part of the Future Storytelling series.

Check out the Mt Tamalpais Interpretive Association web site: www.mttam.net or call 415-455-5370 for more information.

October 18, 7:30 p.m.

What: *In the Heat of the Night: Exploring the Invisible Universe*

Who: Dr. Michelle Thaller (CA Institute of Technology)

Where: Jewish Community Center, San Francisco

Cost: \$4 (non-refundable tickets)

The Spitzer Space Telescope is returning spectacular images of what the Universe looks like when viewed in infrared light. It sees through dense clouds of gas and dust to unveil clues about star formation, newly forming planetary systems, the black hole in the middle of the Milky Way, and much more.

For information call the Dean Lecture Info Line at 415-321-8593. Parking across the street in the UCSF Laurel Heights campus parking lot for \$1.25 per night. <http://www.calacademy.org/planetarium/dean.html>

October 27, 7:45-10:45 p.m.

What: *Total Lunar Eclipse*

Who: Chabot Staff

Where: Chabot Space & Science Center

Cost: \$10 Adults, \$7 Youth, Students & Seniors, \$5 Chabot Members. Lecture \$6 Adults, \$5 Youth, Students & Seniors. Tickets are available at Chabot's Box Office (510/336-7373)

Enjoy the last lunar eclipse of the year on Chabot's Observatory deck. Admission includes access to all of the exhibits and telescope viewing. Learn about the history and lore of lunar eclipses in a lecture in the Ask Jeeves planetarium at 8 pm. (Separate ticket required.)

November 1, 7:30 p.m.

What: *Lord of the Rings: The Cassini Mission to Saturn*

Who: Dr. Kevin Grazier (NASA Jet Propulsion Lab)

Where: Jewish Community Center, San Francisco

Cost: \$4 (non-refundable tickets)

On June 30, the largest and most sophisticated spacecraft ever sent into deep space entered orbit around Saturn after nearly a seven-year journey. This was the first step of a four-year nominal mission during which Cassini will explore Saturn, its rings, satellites, and magnetic environment, while the Huygens probe will make it situ measurements of the satellite Titan.

For information call the Dean Lecture Info Line at 415-321-8593. Parking across the street in the UCSF Laurel Heights campus parking lot for \$1.25 per night. <http://www.calacademy.org/planetarium/dean.html>

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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

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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 (tvst@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.

First Light: Beginners' Astronomy

by Richard Campbell

The Wow Signal

As promised, more 'wow' for your astronomy nights: They say aperture rules. They say aperture rules for a reason. Why? Because it rules! Did I say it rules? There, I said it again...

The number one way to improve your viewing satisfaction is to increase the light gathering area, or *aperture* of your telescope. With a Newtonian or Cassegrain telescope that means a bigger mirror. With a refractor it means a bigger lens. Your typical telescope has a 3 to 4 inch mirror or lens. This allows you to see copious detail on the moon and planets, and the beginnings of deep sky detail. I was skeptical when I first heard this, but it really hit home when I saw the spiral galaxy M51 close up, through a 12-inch reflector. I had seen it through a 6-inch telescope as a diffuse puff of smoke with super-faint extensions above and below the core. But through the 12 it was transformed—the puffs became spiral arms that were *directly visible* with hints of darkened cloud and knots of brightness. A tiny star-like point at the 12-o'clock position was revealed as a companion galaxy. Similarly, the star cluster M13 was magnificent in the 6-inch, yet to see diamond-like points *all the way to the center* it took the 12-inch. Smaller globulars were, well, almost there in the 6...and unmistakable in the 12.

If aperture truly rules, then how come most amateur scopes aren't that big? Three reasons: Expensive, big, and sometimes inconvenient. Most 12-inch telescopes are well over \$2,000, difficult for one person to carry, and require at least an hour to cool to ambient temperature to deliver sharp views. The 12's light gathering power is often hard to discern from the suburbs—it requires travel to a dark sky site...a 1-hour car journey, camping...battery power...a little expedition. Fun when you have the time!

If you're rushed, take heart, your 3-10 inch has enough aperture for the bright objects visible from the city. So you have a *city scope* for planets, double stars and the moon, and a *dark sky scope* for galaxies, planetary nebulae and faint star fields.

How big will amateur aperture get? Imagine an amateur with a 22-inch mirror telescope that stands 8 feet tall. It's monster lightbucket, surprisingly common at California star parties. The same local astronomer has a 7-inch MakNewt from Russia, a 4-inch refractor from Japan, and a 6-inch city Dobsonian.

It makes sense: if you have many lenses for your camera, why not many telescopes for your eye?

News & Notes *continued*

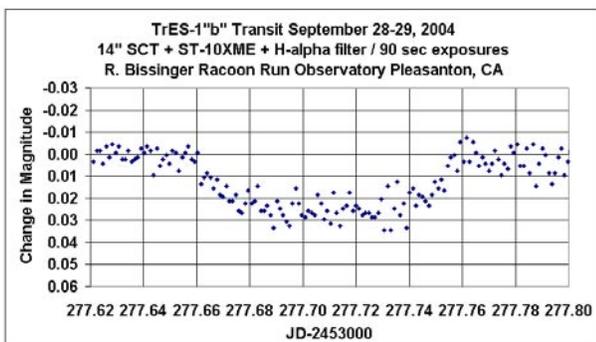
Sky Publishing is pleased to announce a limited time offer of a 15% discount on books and products sold through our catalog and on our online store at SkyandTelescope.com. This offer is made exclusively to astronomy club members and replaces our previous discount program.

Here's how the discount works:

1. Go online to SkyandTelescope.com and make your purchases. Continue to the checkout process and at step 1 fill in the promotion code field with CLUB04H. Your discount will automatically be applied.
2. Call 800-253-0245 and tell the customer service representative you would like to take advantage of the special club discount offer. Mention the promotion code of CLUB04P to qualify for the discount.

Hurry, this offer is good until October 31, 2004.

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Recently it was announced that another extrasolar planet was found to be transiting its parent star. Designated TrES—"b", the extra-solar planet is about 75% the mass of Jupiter and orbits a magnitude 11.79 star every 3 days. The planetary system lies in the constellation Lyra about 6 degrees southeast of Vega. The parent star is identified by its Guide Star Catalogue number: GSC 02652-01324, RA=19:04:09.8, Dec=+36:37:57 (J2000).

The discovery was made using a worldwide network of commercial 4" lenses and CCD cameras. The transit of TrES-1 "b" is easily observable using amateur telescopes and CCD cameras as is the transit of another planet in Pegasus designated HD209458 "b". The diagram is a light curve of the TrES-1 "b" transit showing a ~2% decrease in the star's light output. *Diagrams by: Ron Bissinger*

Astronomical Insights

by David Feindel

My idea for a hardware comparison test is cancelled. Through various machinations, I had wound up with three diagonals—a prism, a Meade 2" UHTC, and a TV 2" Everbrite. I thought it would be interesting to compare them. But in doing some research on the web, several others had already done this comparison, with uniform conclusions. Any mirror diagonal trumps a prism diagonal (even with an f/10 SCT, due to incoming angle of incidence of light rays); any 2" trumps a 1.25" (likelihood of smoother optics in the central FOV); a dielectric trumps an aluminum mirror (longevity); and the visible optical differences between 2" dielectric diagonals are tiny. So I voted that workmanship and compression rings won, and sold the first two. All without a formal shootout.

The observing project this month was/is Cassiopeia. It's nicely positioned in my eastern horizon, about 45° above the horizon by 10 p.m. The starting point was Dr. Clay Sherrod's Autostar Tour (one of the advantages of goto scopes). His highlights: Shedar, Achird, Iota Cas, Lambda Cas, and Sigma Cas for doubles, R Cas for a variable star, and M52, M103, N185, N457, N559, N637, N663, IC1805, IC1848, H1, N7789, and N7790 for open clusters. Consulting Burnham's *Celestial Handbook*, Houston's *Deep-Sky Wonders*, and Harrington's *Touring the Universe*, I added Gamma Cas and Nu Cas as stellar targets, and N129, 133, 146, 147, 654, 663 for open clusters, and N7635 for a as a bright nebula. The doubles were fairly easy with the exception of Gamma Cas and Sigma Cas. The fact that I couldn't split either is not a surprise; both are tough targets for 8" scopes. Gamma has >6 magnitudes difference with a separation of 2.3"; Lambda has only 0.2 magnitudes difference, but the separation is 0.5"—below the edge of Dawes' Limit for an 8" scope. I couldn't get even an elongation for either of them on any of the three nights I tried at any magnification.

The open cluster objects were much easier to find, but taken as a whole, much less impressive. M52, the Scorpion Cluster, is now a favorite of mine, and M103 wasn't bad, after that, most of the rest were, shall we say, uninspiring. At first, I thought it was just not having a large enough field of view to frame them, but even the small ones, such as N7635, didn't look "interesting", despite trying a range of magnifications to cover its 3' size. Perhaps it's a lack of contrast due to the nature of SCTs and/or a >40% illuminated moon in the sky? I'll be trying these again in a few weeks when the sky is darker and compare my observations.

This month's read is *Isaac Newton* by James Gleick. A confession—I haven't finished it yet. I'm just getting to the part that he starts his life-long feud with Robert Hooke. But it didn't answer my earlier question definitively about how large his first reflector is; it referred to it as a 6" telescope. But if the 6" meant its tube length

(which I believe was the way telescopes were referred to back then), then the 10-12" length of the model I saw doesn't fit. It clearly doesn't describe the aperture. Perhaps the distance from the surface of the mirror to the secondary?

News & Notes *continued*

Lunar Eclipse

On October 27th, the Bay Area will witness a total Lunar eclipse in progress while the Moon rises in the east. Below is the pertinent info.

Event	Time	Altitude
Penumbral Eclipse Begins	5:05 p.m.	(below horizon)
Moon Rise	6:08 p.m.	0°
Partial Eclipse Begins	6:14 p.m.	0° 11.2'
Total Eclipse Begins	7:23 p.m.	13° 16.8'
Greatest Eclipse	8:04 p.m.	21° 12.7'
Total Eclipse Ends	8:44 p.m.	28° 58.1'
Partial Eclipse Ends	9:53 p.m.	42° 6.1'
Penumbral Eclipse Ends	11:02 p.m.	54° 11.9'

Better take a good look at this eclipse, as the next one to be visible in the Bay Area will be on August 28, 2007 very early in the morning.

Halloween Treats

This year Halloween falls on a Sunday, and with Daylight Savings Time ending earlier that morning, Trick-or-Treaters will be knocking on your door as the skies are getting dark. What better treat to give them than a look through your scope!

So what's up that night?

In the East, look for the Andromeda Galaxy (M31) and the Double Cluster in Perseus. The Waning Gibbous Moon will rise at 7:25.

To the South, the center of our galaxy gives you plenty of things to look at. Open clusters M6 and M7 in Scorpius, the Trifid Nebula (M20), Lagoon Nebula (M8), The Swan or Omega Nebula (M17), and the Eagle Nebula (M16) in Sagittarius are all visible, depending on your light pollution levels.

The West has two globular clusters in Hercules—The Great Cluster in Hercules (M13) and M92.

North holds the Mizar and Alcor in the Big Dipper and the two galaxies M81 and M82.

Looking straight up you'll find the globular cluster M15, the Dumbbell Nebula (M27) in Vulpecula, and the Ring Nebula (M57) in Lyra.

Plenty of goodies to share with your visiting ghouls.

What's Up *by Debbie Dyke*

All times Pacific Daylight Time unless otherwise noted.

October

- 7 Thurs 1959 First photo of the “dark side” of the Moon taken by the Soviet Luna 3.
- 8 Fri 1873 Elindr Hertzprung (the ‘H’ in the HR Diagram) born.
- 9 Sat 1604 A supernova appears between Jupiter and Saturn. Kepler notices it on the 17th and studies it.
- 11 Mon Columbus Day.
- 12 Tues For the next two weeks look for the Zodiacal Light in the East before morning twilight.
- 13 Wed New Moon 7:48 p.m.
- 14 Thurs 1947 Chuck Yeager breaks the sound barrier in an X-1 rocket powered jet.
- 15 Fri **Tri-Valley Stargazers general meeting.** 7:30 p.m. at the Unitarian Universalist Church, 1893 N. Vasco Road, Livermore.
Start of Ramadan.
- 17 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.
Moon at perigee (228,010 mi/367,758 km) 5:00 p.m.
- 18 Mon **Tri-Valley Stargazers Board meeting.** 7:00 p.m. at the Round Table Pizza in Livermore.
- 20 Wed **First Quarter Moon** 2:59 p.m.
Orionid meteors peak at 8:00 p.m.
- 22 Fri 4000 BC The world was created, according to James Ussher, archbishop of Ireland.
1975 Venera 9 becomes first spacecraft to return images of the surface of Venus.
- 24 Sun Neptune stationary 3:00 a.m.
3936 BC According to Johannes Hevelius, the world was created on this date at 6:00 p.m.
- 27 Mon **Full Moon - Total Lunar Eclipse** (the Hunter’s Moon) 8:07 p.m.
- 29 Wed The Moon is 3° from the Pleiades (M45) in the evening.
- 31 Fri **Daylight Savings Time ends 2 a.m.**
Halloween.
1992 The Vatican absolves Galileo of all heresy charges.

November

- 2 Tues Moon at apogee (251,098 mi/404,998 km) 10:00 a.m. PST
1885 Harlow Shapley born.
1917 First light for Mt. Wilson’s 100-inch Hooker telescope.
- 3 Wed 1957 First dog in space (Laika). She is put to sleep 10 days later while still in orbit aboard Sputnik 2.
- 4 Thurs S. Taurid meteors peak at 8:00 p.m. PST
Last Quarter Moon 9:53 p.m. PST
- 5 Fri Double shadow transit on Jupiter starts at 3:28 a.m. PST
Venus just 45' N of Jupiter (34° W) 5:00 a.m. PST
- 7 Sun 1991 The 10-meter Keck Telescope dedicated on Mauna Kea, Hawai’i.
- 8 Mon Saturn stationary 3:00 a.m. PST
1656 Edmond Halley born.
- 9 Tues Jupiter 1° S of the Moon 6:00 a.m. PST. Venus is close by at 5° N of the Moon.
1934 Carl Sagan born.
- 10 Wed In the morning, Venus, Jupiter, Mars, and the crescent Moon are grouped together.
Mars 7° N of the Moon in the East at dawn.

**Hunting Gravitational Waves:
Space Technology 7**

by Patrick L. Barry and Dr. Tony Phillips

Among the mind-blowing implications of Einstein's general theory of relativity, direct verification is still missing for at least one: gravitational waves. When massive objects like black holes move, they ought to create distortions in space-time, and these distortions should spread and propagate as waves—waves in the fabric of space-time itself.

If these waves do exist, they would offer astronomers a penetrating view of events such as the birth of the Universe and the spiraling collisions of giant black holes. The trick is building a gravitational wave detector, and that's not easy.

Ironically, the gravitational waves spawned by these exceedingly violent events are vanishingly feeble. Gravitational waves exert a varying tug on objects, but this tug is so weak that detecting it requires a device of extraordinary sensitivity and a way to shield that device from all other disturbances.

Enter Space Technology 7 (ST-7). This mission, a partnership between NASA's New Millennium Program and the European Space Agency (ESA), will place a satellite into a special orbit around the Sun where the pull of the Earth's and Sun's gravities balance. But even the minute outside forces that remain — such as pressure from sunlight — could interfere with a search for gravitational waves.

To make the satellite virtually disturbance-free, ST-7 will test an experimental technology that counteracts outside

forces. This system, called the Disturbance Reduction System (DRS), is so exquisitely sensitive that it can maintain the satellite's path within about a nanometer (millionth of a millimeter) of an undisturbed elliptical orbit.

DRS works by letting two small (4 cm) cubes float freely in the belly of the satellite. The satellite itself shields the cubes from outside forces, so the cubes will naturally follow an undisturbed orbit. The satellite can then adjust its own flight path to match that of the cubes using high-precision ion thrusters. Making the masses cube-shaped lets DRS sense deviations in all 6 directions (3 linear, 3 angular).

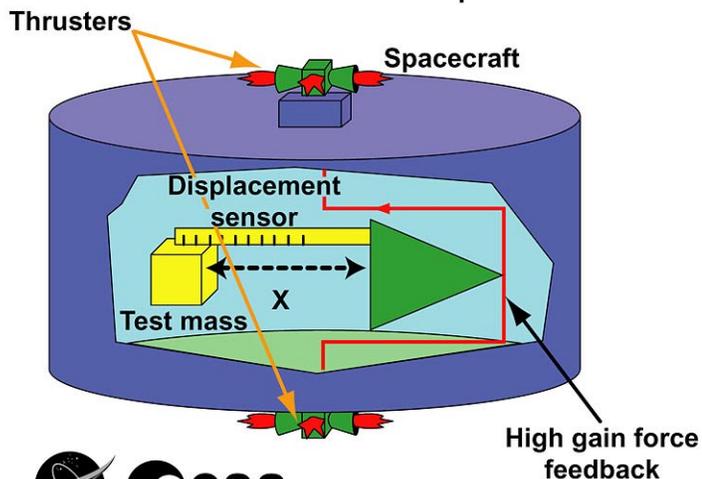
ST-7 is scheduled to fly in 2008, but it's a test mission; it won't search for gravitational waves. That final goal will be achieved by the NASA/ESA LISA mission (Laser Interferometer Space Antenna), which is expected to launch in 2011. LISA will use the DRS technology tested by ST-7 to create the ultra-stable satellite platforms it needs to successfully detect gravitational waves.

If ST-7 and LISA succeed, they'll confirm Einstein (again) and delight astronomers with a new tool for exploring the Universe.

Read more about ST-7 at <http://nmp.jpl.nasa.gov/st7>. For kids in a classroom setting, check out the "Dampen that Drift!" article at http://spaceplace.nasa.gov/en/educators/teachers_page2.shtml.

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

Drag-free: Keeping the spacecraft with the proof-mass



Space Technology 7 will test a technology to be used in detecting gravitational waves in space.

Astro Events



Asteroid 4179 Toutatis. It's moving to the southern hemisphere and will be out of reach very soon. The mount was running unguided so 30 second exposures had to do. Photo by Gert Gottschalk

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



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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.
_____ \$25 Basic. You will receive e-mail notification when the PDF version of *Prime Focus* is available for download off the TVS web site.
_____ \$30 Regular. You will receive a paper version of *Prime Focus* in the mail.
_____ \$32.95 One year subscription to *Sky & Telescope* magazine.
_____ \$29 One year subscription to *Astronomy* magazine.
_____ \$55 Two year subscription to *Astronomy* magazine.
_____ \$20 Hidden Hill Observatory (H2O) refundable key deposit (key property of TVS).
\$ _____ 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.