PRIMEFOCUS
Tri-Valley Stargazers

September 2004

Meeting Info:

What
What is a Planet?

Who
Dr. Gibor Basri

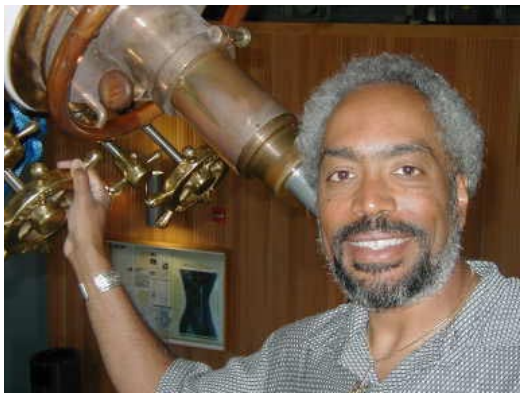
When
September 17, 2004
Conversation at 7:00 p.m.
Lecture at 7:30 p.m.

Where
Unitarian Universalist
Church in Livermore
1893 N. Vasco Road

Inside

September Meeting

What is a Planet?
Dr. Gibor Basri, UC Berkeley



Dr. Basri with Rachel, Chabot Space and Science Center's 20" refractor.

Although we live on a planet, and have known about some planets for thousands of years, it turns out there is no modern definiton of the word "planet" which encompasses all the discoveries about our planetary system, other planetary systems, and other "planet-like" objects out there. The latest such discovery was earlier this year: the new object "Sedna". Controversies have arisen in the past few years because of this, including the question of whether Pluto is "really" a planet, and the discovery of "free-floating planets" that are not near any stars. The discovery of brown dwarfs serves to further muddy the waters at the high mass limit. Prof. Basri discusses these discoveries, the nature of the controversy, and suggests one way in which it might be resolved.

Dr. Basri received his BSc in Physics from Stanford and a PhD in Astrophysics from the University of Colorado, Boulder. His thesis was on stellar activity under the direction of Prof. Jeffrey Linsky, and he was an early user of the IUE satellite. An award of a Chancellor's Postdoctoral Fellowship then brought him to Berkeley, where he has been ever since.

Gibor joined the faculty of the Berkeley Astronomy Deptartment in 1982, received tenure in 1988, and became a full professor in 1994. Dr. Basri has worked on high energy observations of stellar activity, and on newly forming stars. He's also studied star formation, T Tauri stars, and brown dwarfs.

He is involved in science education and encouraging the participation of minorities in science. One such effort is service on the Board of the Chabot Space and Science Center. In Dec. 2001, NASA selected the Kepler mission as one of its next Discovery missions. This mission has as its goal the discovery of extrasolar terrestrial planets, and the characterization of all planets in inner solar systems. Gibor is a Co-investigator on the mission; his main task is to understand the "noise" that stellar variability introduces into the photometric detection of extrasolar planetary transits (and to help extract the vast amount of stellar science that will be a bonus of the mission).

News & Notes

Welcome

TVS welcomes our newest members—**Daryl Bothwell**, **Karen & Steve Clendenin**, **Ron Markham**, and **Richard Rodrigues**.

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 September 5th deadline is for the September issue).

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

Money Matters

At the July Board meeting, Treasurer **Gary Steinhour** gave us the account balances (as of August 21, 2004) of TVS's accounts:

Checking	$1,710.17	
CD #1	$3,942.22	matures 11/17/04
CD #2	$2,429.22	matures 08/27/04
CD #3	$1,072.67	matures 10/16/04

New Comets Discovered

The end of August brought with it the annoucement of two new comets.

C/2004 Q2 (Machholz) was discovered August 27th by Don Machholz using his 10-inch reflector. This is Don's 10th comet discovery. The comet is at 10th magnitude in Eridanus and is moving less than a degree per day in a southeastward direction. It is headed towards the Sun and in a couple of months will be as far south as -30° declination. Then it will start to head northward. Preliminary data suggests this comet will get brighter and may be visible to the naked eye after Christmas. In early January it will pass by the Pleiades. It will reach perihelion on January 24th.

C/2004 Q1 (Tucker) was discovered August 23rd by Roy Tucker on CCD images taken with his 35cm reflector. The comet is at 12th magnitude in Cetus and should get brighter (at least magnitude 11) as it moves into Andromeda. Perihelion is expected on December 10th.

A comet that was discovered in 2003, C/2003 K4 (LINEAR), might become as bright as mag 5 or 7 in the coming months. This comet already sports a tail about the length of the full Moon. It will be closest to Earth on December 23rd. Look for it in mid-November low in the predawn skies in the constellation Hydra. At that time, the magnitude is estimated to be 5.15.

Comet Machholz

Date (0h UT)	R.A. h m	Dec. ° ′	Mag.	Const
Sept. 12	04 35.5	-23 56	10.5	Eri
Sept. 17	04 41.3	-24 31	10.3	Eri
Sept. 22	04 46.7	-25 08	10.0	Eri
Sept. 27	04 51.9	-25 47	9.8	Eri
Oct. 2	04 56.6	-26 27	9.6	Lep
Oct. 7	05 00.8	-27 07	9.3	Cae
Oct. 12	05 04.6	-27 47	9.1	Cae
Oct. 17	05 07.7	-28 25	8.8	Col
Oct. 22	05 10.2	-29 01	8.6	Col
Oct. 27	05 11.9	-29 32	8.3	Col
Nov. 2	05 12.8	-30 01	8.0	Col
Nov. 7	05 12.5	-30 15	7.7	Col
Nov. 12	05 11.1	-30 17	7.4	Col
Nov. 17	05 08.5	-30 02	7.1	Col
Nov. 22	05 04.7	-29 24	6.7	Cae
Nov. 27	04 59.6	-28 16	6.4	Cae
Dec. 3	04 51.6	-26 04	6.0	Eri
Dec. 8	04 43.5	-23 18	5.7	Eri
Dec. 13	04 34.2	-19 26	5.3	Eri
Dec. 18	04 23.8	-14 11	5.0	Eri
Dec. 23	04 12.5	-07 20	4.7	Eri
Dec. 28	04 00.7	+01 12	4.4	Tau

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Newsletter header image: N44F in Dorado

This Hubble picture is of an HII region in the Large Magellanic Cloud about 160,000 light-years away. The yellow area is a gas cavity created by the stellar wind and intense UV radiation from the star in the middle of the cavity.

This nebula is one of a handful of known interstellar bubbles. Most form around massive stars and clusters of stars. They are rarely seen around isolated stars like this one.

The interior wall has several finger-like columns of cool dust and gas, ranging in height from four to eight light-years.

Image Credit: NASA, ESA, Y. Nazé (Univ. of Liège, Belgium) and Y.-H. Chu (Univ. fo Illinois, Urbana)

Calendar of Events

September 18, 6:00 p.m.
What: *NOVA: Origins Community Day*
Who: Chabot Staff
Where: Chabot Space & Science Center
Cost: General Admission

A day-long celebration of NOVA's new mini-series, Origins, which premieres 9/28 on KQED. Special hands-on activities include comparing animal skulls and testing the magnetic properties of rocks. Chabot will have scientists with diverse backgrounds on hand to answer all your questions. Don't miss the fun, the free Sky charts, and a special Galaxy Explorer Play, *Fossil Time: the Dating Game.*

October 15-16
What: *Starry Nights Festival*
Who: Hi-Desert Nature Museum
Where: Yucca Valley, CA
Cost: Free

Schedule of Events
Friday, October 15, 2004

5:00 p.m. — Dr, Dicken Everson, *Cosmology & Myth: An Astronomical Basis for Understanding World View*

6:00-7:00 p.m.: Twilight Reception at the Hi-Desert Nature Museum

7:00-10:00 p.m.: Star Gazing at Machris Park (free shuttle service)

Saturday, October 16, 2004:

11:00 a.m.: International Dark Sky Association, *Saving Our Stars from Light Pollution*

12:00 p.m.: Wally Pacholka, *Scenic Images of Our Night Skies*

1:00 p.m.: Alex McConahay, *The Transit of Venus and Why We Do Astronomy*

2:00 p.m.: Dr. Gary Peterson: *Collisions of Comets and Planets*

3:00 p.m.: Dr. Tim Hunter, *The Caldwell Objects in Color*

4:15 p.m.: David Levy, *A Nightwatchman's Journey: My Adventures as a Stargazer and Comet Hunter*

Astronomers wishing to bring their own telescope should RSVP to ensure a prime viewing location! RSVP to museum@yucca-valley.org or call (760) 369-7212

http://www.yucca-valley.org/visitors/museum/Starry%20Nights/Starry%20Nights.htm

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.

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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 (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.

First Light: Beginners' Astronomy

by Richard Campbell

"What's the difference?"

When you first buy a telescope, by Jove, what a *huge array* of accessories are included! Diagonal, eyepiece, finderscope, collimating cap, software disc, mounting screws...It's hard to tell which ones *make the biggest difference* in your viewing experience. To find out, you can go to a public star party and ask around. Or, you could read on!

This month, let's focus on eyepieces:

All telescopes will come with at least one eyepiece, typically a 25mm Plossl. This eyepiece is designed to give you a large field of view, making it easy to find your target. If you're lucky, you might also get a 10mm eyepiece designed for high magnification views, making the planets and moon seem dramatically closer.

The thing is, sometimes 'the wide' isn't wide enough, and 'the closer' isn't close enough. The right eyepiece will improve your view dramatically. If your 25mm isn't wide enough, go for a *higher mm* eyepiece, say a 32mm. Then you can fit your target in the field of view. If your target seems too small, then go for a *lower mm* eyepiece, like a 7.5mm, to make it grander.

What many beginners aren't told is the difference *apparent field* can make in an eyepiece. The solid Plossl design is very clear, but its apparent field is rather narrow. Imagine looking through a rolled up newspaper. That's *narrow* apparent field. Now imagine the porthole of a ship, walking right up to the brass edge so it almost disappears, and looking outside. That's *wide* apparent field.

The Plossl design is between these two extremes. But for just a little more cost, you can enjoy a noticeably wider view. How? When you buy an extra eyepiece, check the apparent field in the specs. If it is 66 degrees or larger, it is wide. Classic examples are the Pentax XL series or the affordable Orion Expanse. If you save your AstroDollars, go *even wider* with an 82 degree A.F. Nagler design from TeleVue. This spacious window on the stars costs a bundle, but gives you the "spacewalk" experience where the borders of the eyepiece disappear and you feel as if you're flying among the stars. There *is* a way to get this 'wine taste on a beer budget' though, with the B+W optika 30mm, 80 degree A.F. eyepiece. I call mine the "Beer Nagler." Nagler-like views at 1/3 of the price. YUM!

To let you in on another yummy secret—for the moon and the planets, the Orthoscopic design can make a huge difference in resolving power, at minimal cost. Sure, the apparent field of view is narrow, but *in this case* it's OK, because during planetary observation, you're focused on the center of the field, not the edges. The clarity and high light transmission are inherent in the design, which uses a minimum of glass elements. It does require you to bring your pupil really close to the viewing window, but many feel it's comfortable enough for extended viewing. I swear by the University Optics 6mm Ortho, which costs just a little more than a stock eyepiece.

The right eyepiece can make the difference between, "Mmmmmm hmmmm yyyyyyeah.

That's nice," and "Good Lord! Would you look at THAT!"

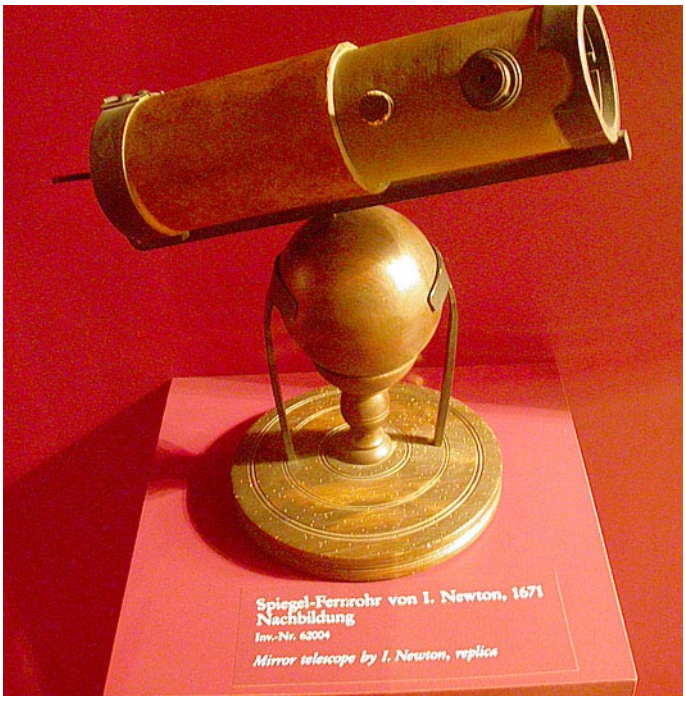
A view to the east from Tuolumne Meadows, towards Lambert Dome, elevation 8586 feet shortly before dawn, around 4:45am. Venus is the bright star, and Orion is rising just to her right. The shot was taken with a digital Canon 10D, 28mm lens, f/2.8, a composite of 2 - 30 second exposures aligned and combined using Registar. *Photo by: Ron Bissinger*

Astronomical Insights

by David Feindel

I tried a new observing tactic this month. Maybe it was to actually get ahead of the S&T observing projects (why do we get the October issue in late August?), perhaps because I haven't seen Saturn in so long, or who knows why. But for whatever reason, I set the alarm for 3:30 a.m. one Saturday morning. I set the 'scope out the night before so it would be in thermal equilibrium. This early in the morning, there is noticeably less light pollution; the air is about as stable as the weather will let it get, and no distractions. Orion and M42 was there in all its glory, the Pleiades is nicely positioned high in the sky, and Saturn and Venus cleared my eastern horizon by 4:30 (blocked by trees to about 20 degrees, unfortunately). One puzzle was why M1 (the Crab Nebula) didn't show up very well; it was at about 45 degrees elevation, and seeing was at least 3/5. Perhaps moisture in the air? The use of either a UHC or O-III filter didn't help appreciably, either. Hummm… By 5:30, the drawback to my tactic became obvious; the eastern sky was growing lighter, astronomical dawn had begun, and quickly, only the planets and brightest stars were still visible.

There's also been one small addition to my hardware set. (Are you ever finished adding/changing/modifying your telescope and accessories?) I've replaced my stock Meade 8x50 finder with a Stellarvue right-angle-correct-image finder. Not only did the optical quality improve dramatically, but it is much faster to find things, and I don't have to put my body in unnatural positions to align the scope. Recommended.



A replica of Newton's 1671 scope. *Photo by: David Feindel*

This month's astronomy travel was to the Deutsches Museum in Munich, Germany. They have a very large display of astronomy-related items, including this replica of Isaac Newton's first reflector telescope. The model appears to be a 2.5-3.0" aperture scope, maybe f/5; unknown is whether this is a full-scale model or not. Does anyone know? Its hard to imagine that a revolution in telescope design is based on such a small scope! Also in the exhibit (maybe 20,000 square feet) were models of Uraniborg and the Herschels' observatory; numerous other 17th century telescopes; a forlorn 5" AP refractor sitting in a showcase, a 75-seat planetarium, and a working 12" Zeiss refractor (c. 1925) set up to observe the sun in H-alpha. Well worth visiting if you go to Munich.

News & Notes *continued*

October Meeting

We're looking for a few good members to help with our October meeting. We'd like to present an "Astronomy Travel" lecture, with members presenting slides, etc., about their astronomy related travel adventures. For example, if you traveled to some far-off land to view the Transit of Venus, we'd love for you to talk about your trip. Depending on the number of members willing to participate in this special Members' Night, time allotted for each presenter will be around 15 minutes.

If you wish to present your travelogue please let Debbie Dyke know so we can plan the evening accordingly. You may reach her at ddfam@pacbell.net or at 925-461-3003.

Editor's Note: Seeing Green

If you ever help with public star parties, do yourself a favor and invest in a green laser pointer. Although they are a bit pricey, with prices for some models ranging from $125 to $160, it is a phenomenal tool.

As a telescope volunteer at the Chabot Space and Science Center, I spend my weekend nights outside with the public. In the past, when trying to point out various objects in the sky, I would struggle to describe where to look.

"See that bright star over there? No, no, over *there*. No, here, can you see where I'm pointing?"

Sound familiar? Well, the green laser pointers have changed all that. You carefully aim the pointer then press the button. Voilà! The beam magically makes its way from the pointer all the way to the star. People standing within five feet of your position will be able to see the beam and know exactly where you are pointing. One caveat: these are very strong lasers and shouldn't be used as toys, pointed at people or planes flying overhead.

What's Up *by Debbie Dyke*

All times Pacific Daylight Time unless otherwise noted.

September

9 Thurs Mercury greatest elongation W (18°) 7:00 a.m. Look for it in the predawn skies.
Mercury 42' S of Regulus in the East at daybreak.

10 Fri In the east before dawn, look for the waning crescent Moon, Venus, Saturn, Castor & Pollux. Mercury will be close to the horizon.

11 Sat 1816 Carl Zeiss born.

12 Sun 1758 Messier sees the Crab Nebula, making it the first item in his list of fuzzy comet-like objects.
1959 Luna 2 becomes first spacecraft to impact the Moon.

13 Mon For the next two weeks look for the Zodiacal light in the Eastern morning skies.

14 Tues **New Moon** 7:29 a.m.
1915 John Dobson born in China.

15 Wed Mars in conjunction with the Sun 5:00 a.m.

16 Thurs Rosh Hashanah begins at sundown. Hebrew year 5765.

17 Fri **Tri-Valley Stargazers general meeting**. 7:30 p.m. at the Unitarian Universalist Church, 1893 N. Vasco Road, Livermore.

18 Sat 1819 Léon Foucault (Mr. Pendulum) born.

19 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.

20 Mon **Tri-Valley Stargazers Board meeting**. 7:00 p.m. at the Round Table Pizza in Livermore.

21 Tues **First Quarter Moon** 8:54 a.m.
Jupiter in conjunction with the Sun 5:00 p.m.

22 Wed **Autumnal Equinox** 9:00 a.m.
Moon at perigee (229,145 mi/369,589 km) 2:00 p.m.

23 Thurs 1791 Johann Franz Encke born.
1846 Gale and d'Arrest discover Neptune near the locations predicated by Adams and Le Verrier.

25 Sat Yom Kippur begans at sunset.
Uranus 4° N of the Moon 8:00 p.m.

28 Tues **Full Moon** (Harvest Moon) 6:09 a.m.

29 Wed Asteroid 4179 Toutatis is to fly by Earth today.

30 Thurs 1880 Using an 11-inch Alvan Clark, Henry Draper takes the first photograph of the Orion Nebula.

October

1 Fri 1958 NASA established by an act of Congress.

2 Sat 1608 J. Lippershey patents the telescope.

3 Sun Venus just 10' S of Regulus in the early morning.

4 Mon 1957 Sputnik 1 is launced by the Soviet Union, becoming the first artificial satellite to orbit the Earth.

5 Tues Mercury in superior conjunction 12:00 p.m.
Moon at apogee (250,682 mi/404,326 km) 3:00 p.m.
1882 Robert Goddard born.

6 Wed **Last Quarter Moon** 3:12 a.m.
Jupiter at 0° declination 12:16 p.m.
1923 Edwin Hubble discovers a Cepheid Variable in the Andromeda Galaxy.
1995 Discovery of the first extrasolar planet (orbiting 51 Pegasi) announced.

NASA's Space Place

Resisting Retirement: Earth Observing 1

by Patrick L. Barry

The Hubble Space Telescope isn't the only satellite that scientists have fought to keep alive beyond its scheduled retirement. Scientists also went to bat for a satellite called EO-1, short for Earth Observing 1, back in 2001 when the end of its one-year mission was looming.

The motivation in both cases was similar: like Hubble, EO-1 represents a "quantum leap" over its predecessors. Losing EO-1 would have been a great loss for the scientific community. EO-1, which gazes back at Earth's surface instead of out at the stars, provides about 20 times more detail about the spectrum of light reflecting from the landscape below than other Earth-watching satellites, such as Landsat 7.

That spectral information is important, because as sunlight reflects off forests and crops and waterways, the caldron of chemicals within these objects leave their "fingerprints" in the light's spectrum of colors. Analyzing that spectrum is a powerful way for scientists to study the environment and assess its health, whether it's measuring nitrate fertilizers polluting a lake or a calcium deficiency stressing acres of wheat fields.

Landsat 7 measures only 8 points along the spectrum; in contrast, EO-1 measures 220 points (with wavelengths between 0.4 to 2.5 μm) thanks to the prototype Hyperion "hyperspectral" sensor onboard. That means that EO-1 can detect much more subtle fingerprints than Landsat and reveal a more complete picture of the chemicals that comprise the environment.

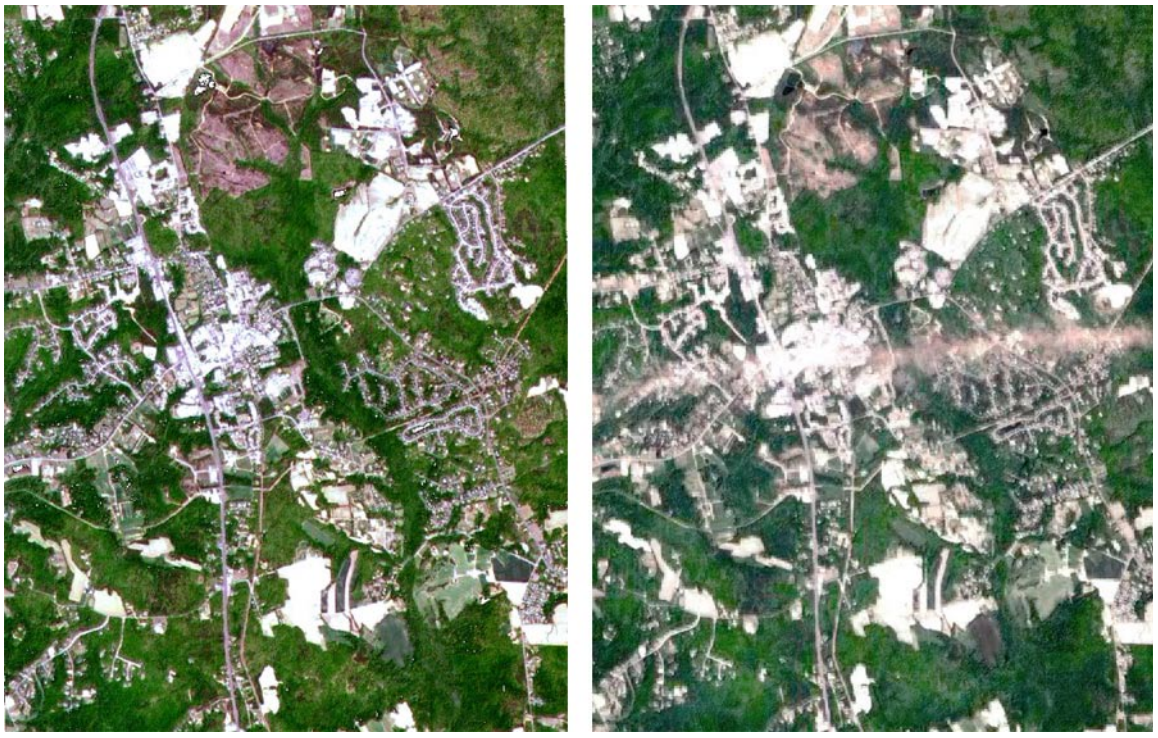
As a NASA New Millennium Program mission, the original purpose for EO-1 was just to "test drive" this next-generation Hyperion sensor and other cutting-edge satellite technologies, so that future satellites could use the technologies without the risk of flying them for the first time. It was never meant to be a science data-gathering mission.

But it has become one. "We were the only hyperspectral sensor flying in space, so it was advantageous to keep us up there," says Dr. Thomas Brakke, EO-1 Mission Deputy Scientist at NASA's Goddard Space Flight Center.

Now, almost three years after it was scheduled to be deorbited, EO-1 is still collecting valuable data about our planet's natural ecosystems. Scientists have begun more than a dozen environmental studies to take advantage of EO-1's extended mission. Topics range from mapping harmful invasive plant species to documenting the impacts of cattle grazing in Argentina to monitoring bush fires in Australia.

Not bad for a satellite in retirement.

Read about EO1 at eo1.gsfc.nasa.gov. See sample EO-1 images at http://eo1.usgs.gov/samples.php. Budding young astronomers can learn more at spaceplace.nasa.gov/eo1_1.htm.



These images, made from EO-1 data, are of La Plata, Maryland, before and after a tornado swept through May 1, 2002.

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

Tri-Valley Stargazers
P.O. Box 2476
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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.
_____ $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.