

# *Catskills Astronomy Club News*

9/1/04

Jay Pasachoff is scheduled to give a talk at SCCC on Sept 30. The tentative time is 5:30. His talk is entitled: "The Transit of Venus and the Black Drop Mystery." Jay Pasachoff is a professor of astronomy at [Williams College](#) in Williamstown, Massachusetts.

Burgess Optical Day was held at Highpoint Scientific in Montague, NJ. Here are some comments about it from Mark Rosengarten.

Well, I got there at just after 10 AM and the crew was setting up a Meade LX90 with a new sub-angstrom filter from Thousand Oaks that they want to start selling. The scopes did not cooperate from the start, and pretty much the only solar viewing that was done was through my PST and Evan Miller's PST and Orion ED-80 with a Baader filter and a new Burgess binoviewer with two Burgess 20 mm eyepieces.. Just as well...it was scorchingly hot and humid. Here's a story that will really boggle you. A guy and his wife went over to Evan's setup. The wife looked through the scope and said that she couldn't see anything. The guy said "Must be this lens cap! Hang on!" He was about to grab hold of the Baader solar filter and pull it free, liquefying his beloved's brains when Evan came to the rescue. I don't think we need any more admonition than that to NEVER leave our scopes unattended at public events.

Burgess has a large number of goodies set up for us. A new line of waterproof binoculars, including two with ED glass (8 X 42 and 10 X 42) for UNDER \$200!!! They were simply gorgeous. Nice field and very little color. Let's just say that I saw purple fringes but no one else did. They also had a very lightweight magnesium tripod there with two dovetail quick-release heads, a 1/4-20 screw installed on the head with a second 3/8" screw stored under the mount head. It can support up to 20 pounds, and I have decided to get one for my TV-76 and my C5. Two dovetail plates makes that a snap! Anyone want a Bogen 3036 with a Telepod head? They also have a slow-mo head coming out soon for the mount. I want, I want! They also showcased a 127mm achro refractor (very sharp) and a scope that made my jaw hit the ground. It's a 93mm doublet apo with a fluorite element (Thomas Back designed the lenses), F/6.3, Crayford focuser with ball bearings. solid tube rings with lots of attachment points, swivel tube for positioning the eyepiece located between the body and the focus mechanism, a 2" William Optics Dielectric diagonal and a full set of four wide-angle eyepieces...and aluminum carry case for the scope (beautiful!). How much would you pay for this? \$3000? \$2000? NOPE! The whole package is going to be \$900. HUH? Mr. Burgess himself told me that they have a 60mm triplet apo in the works with all the hardware that will be less than \$400 that will make the TV60 look "like a Tasco". They also had a bunch of other evil schemes all aimed at depriving us of our hard-earned cash soon...but at the prices he is offering this stuff at, it won't be that painful. Oh, and they also had a

38mm 2" 6-element widefield eyepiece that blows the doors off of most eyepieces I have looked through for \$69. I was told that a lot of scope makers are telling overseas suppliers to cut Burgess off or they won't do business with them anymore. These scopes could topple many a manufacturer of super-expensive refractors, and they are fighting tooth and nail against it.

I left, somewhat out of breath, at 3:15. I managed to make it out of there without spending a dime. It was a close call. If some of the stuff had been there, in stock, right then, I would have come home a pauper.

Mark

The observation sessions scheduled for August 7<sup>th</sup> and 14<sup>th</sup> were canceled due to poor weather.

The solar observation session scheduled for August 21<sup>st</sup> has been rescheduled for September 4<sup>th</sup>. It will be held at Walnut Mountain Park from 1 to 4 PM.

The observation sessions for September are on the 11th and 18th. ***Our club will be hosting a scout group on the 18<sup>th</sup>. Club members are encouraged to come to the session to show our young guests some "heavenly wonders".***

Anyone interested in submitting an astronomical observation or photograph for the newsletter, please contact John at [kocis@verizon.net](mailto:kocis@verizon.net).

Each month the photo section of our newsletter will highlight the telescopes and equipment of club members. If you have a photo of your scope or equipment and a brief description of it that you would like to contribute please send it to John at [kocis@verizon.net](mailto:kocis@verizon.net).

The club has selection of astronomy books, a Macintosh computer with astronomy software, and a Meade eight inch reflector for members to borrow. Please contact John at 791-5240 or [kocis@verizon.net](mailto:kocis@verizon.net) if you are interested in borrowing any of these.

### ***Astronomy News:***

Here are some articles from various NASA sources that might be of interest.

RELEASE: 2004-209      August 25, 2004

### **Mars Odyssey Begins Overtime After Successful Mission**

NASA's Mars Odyssey orbiter begins working overtime today after completing a prime mission that discovered vast supplies of frozen water, ran a safety check for future astronauts, and mapped surface textures and minerals all over Mars, among other feats.

"Odyssey has accomplished all of its mission-success criteria," said Dr. Philip Varghese, project manager for Odyssey at NASA's Jet Propulsion Laboratory, Pasadena, Calif. The spacecraft has been examining Mars in detail since February 2002, more than a full Mars year of about 23 Earth months. NASA has approved an extended mission through September 2006.

"This extension gives us another martian year to build on what we have already learned," said JPL's Dr. Jeff Plaut, project scientist for Odyssey. "One goal is to look for climate change. During the prime mission we tracked dramatic seasonal changes, such as the comings and goings of polar ice, clouds and dust storms. Now, we have begun watching for year-to-year differences at the same time of year."

The extension will also continue Odyssey's support for other Mars missions. About 85 percent of images and other data from NASA's twin Mars rovers, Spirit and Opportunity, have reached Earth via communications relay by Odyssey, which receives transmissions from both rovers every day. The orbiter helped analyze potential landing sites for the rovers and is doing the same for NASA's Phoenix mission, scheduled to land on Mars in 2008. Plans call for Odyssey to aid NASA's Mars Reconnaissance Orbiter, due to reach Mars in March 2006, by monitoring atmospheric conditions during months when the newly arrived orbiter uses calculated dips into the atmosphere to alter its orbit into the desired shape.

Odyssey was launched April 7, 2001, and used the same dips into the atmosphere, known as aerobraking, to shape its orbit during the initial months after it reached Mars on Oct. 23, 2001. The spacecraft carries three research systems: a camera system made up of infrared and visible-light sensors; a spectrometer suite with a gamma ray spectrometer, a neutron spectrometer and a high-energy neutron detector; and a radiation environment detector.

Less than a month after the science mapping campaign began, the team announced a major discovery. The gamma ray and neutron instruments detected copious hydrogen just under Mars' surface in the planet's south polar region. Researchers interpret the hydrogen as frozen water -- enough within about a meter (3 feet) of the surface, if the ice were melted, to fill Lake Michigan a couple times.

Here are a few of Odyssey's other important accomplishments so far:

- As summer came to northern Mars and the north polar covering of frozen carbon dioxide shrank, Odyssey found abundant frozen water in the north, too.
- Infrared mapping showed that a mineral called olivine is widespread. This indicated the environment has been quite dry, because water exposure alters olivine into other minerals.
- Findings indicated the amount of frozen water in some relatively warm regions on Mars is too great to be in equilibrium with the atmosphere, suggesting that Mars may be

going through a period of climate change. Features visible near small, young gullies in some Odyssey images may be slowly melting snowpacks left over from a martian ice age.

-- The first experiment sent to Mars specifically in preparation for human missions found that radiation levels around Mars, from solar flares and cosmic rays, are two to three times higher than around Earth.

-- Odyssey's camera system obtained the most detailed complete global maps of Mars ever, with daytime and nighttime infrared images at a resolution of 100 meters (328 feet).

"We've accomplished everything we set out to do, and more," said JPL's Robert Mase, Odyssey mission manager. Although an unusually powerful solar flare in October 2003 knocked out the radiation environment instrument, Odyssey is otherwise in excellent health. The spacecraft has enough fuel onboard to keep operating through this decade and the next at current consumption rates. The mission extension, with a budget of \$35 million, essentially doubles the science payoff from Odyssey for less than one-eighth of the mission's original \$297 million cost.

JPL, a division of the California Institute of Technology, Pasadena, manages Mars Odyssey for NASA's Science Mission Directorate, Washington. Lockheed Martin Space Systems, Denver, built and operates the spacecraft. Investigators at Arizona State University, Tempe; University of Arizona, Tucson; NASA's Johnson Space Center, Houston; the Russian Aviation and Space Agency, Moscow; and Los Alamos National Laboratory, Los Alamos, N.M., built and operate Odyssey science instruments. For more information about Mars Odyssey on the Internet, visit: <http://mars.jpl.nasa.gov/odyssey> .

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News Release: 2004-202

August 16, 2004

### **Out From the Shadows: Two New Saturnian Moons**

With eyes sharper than any that have peered at Saturn before, the Cassini spacecraft has uncovered two moons, which may be the smallest bodies so far seen around the ringed planet.

The moons are approximately 3 kilometers (2 miles) and 4 kilometers (2.5 miles) across -- smaller than the city of Boulder, Colorado. The moons, located 194,000 kilometers (120,000 miles) and 211,000 kilometers (131,000 miles) from the planet's center, are between the orbits of two other saturnian moons, Mimas and Enceladus. They are provisionally named

S/2004 S1 and S/2004 S2. One of them, S/2004 S1, may be an object spotted in a single image taken by NASA's Voyager spacecraft 23 years ago, called at that time S/1981 S14.

"One of our major objectives in returning to Saturn was to survey the entire system for new bodies," said Dr. Carolyn Porco, imaging team leader, Space Science Institute, Boulder, Colo. Porco planned the imaging sequences. "So, it's really gratifying to know that among all the other fantastic discoveries we will make over the next four years, we can now add the confirmation of two new moons, skipping unnoticed around Saturn for billions of years until just now."

The moons were first seen by Dr. Sebastien Charnoz, a planetary dynamicist working with Dr. Andre Brahic, imaging team member at the University of Paris. "Discovering these faint satellites was an exciting experience, especially the feeling of being the first person to see a new body of our solar system," said Charnoz. "I had looked for such objects for weeks while at my office in Paris, but it was only once on holiday, using my laptop, that my code eventually detected them. This tells me I should take more holidays."

The smallest previously known moons around Saturn are about 20 kilometers (12 miles) across. Scientists expected that moons as small as S/2004 S1 and S/2004 S2 might be found within gaps in the rings and perhaps near the F ring, so they were surprised these small bodies are between two major moons. Small comets careening around the outer solar system would be expected to collide with small moons and break them to bits. The fact that these moons exist where they do might provide limits on the number of small comets in the outer solar system, a quantity essential for understanding the Kuiper Belt of comets beyond Neptune, and the cratering histories of the moons of the giant planets.

"A comet striking an inner moon of Saturn moves many times faster than a speeding bullet," said Dr. Luke Dones, an imaging team member from the Southwest Research Institute in Boulder, Colo. "If small, house-sized comets are common, these moons should have been blown apart many times by cometary impacts during the history of the solar system. The disrupted moon would form a ring, and then most of the material would eventually gather back together into a moon. However, if small comets are rare, as they seem to be in the Jupiter system, the

new moons might have survived since the early days of the solar system."

Moons surrounding the giant planets generally are not found where they originally formed because tidal forces from the planet can cause them to drift from their original locations. In drifting, they may sweep through locations where other moons disturb them, making their orbits eccentric or inclined relative to the planet's equator. One of the new moons might have undergone such an evolution.

Upcoming imaging sequences will scour the gaps in Saturn's rings in search of moons believed to be there. Meanwhile, Cassini scientists are eager to get a closer look, if at all possible, at their new finds. Porco said, "We are at this very moment looking to see what the best times are for retargeting. Hopefully, we haven't seen the last of them."

The Cassini-Huygens mission is a cooperative project of NASA, the European Space Agency and the Italian Space Agency. The Jet Propulsion Laboratory, a division of the California Institute of Technology in Pasadena, manages the Cassini-Huygens mission for NASA's Science Mission Directorate, Washington, D.C. The Cassini orbiter and its two onboard cameras were designed, developed and assembled at JPL. The imaging team is based at the Space Science Institute, Boulder, Colo.

For images and information about the Cassini-Huygens mission, visit <http://saturn.jpl.nasa.gov> and <http://www.nasa.gov/cassini> . Images are also available at the Cassini imaging team home page, <http://ciclops.org> .

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Image Advisory: 2004-195

August 9, 2004

### **Dying Star Goes Out With a Ring**

A new image from NASA's Spitzer Space Telescope shows the shimmering embers of a dying star, and in their midst a mysterious doughnut-shaped ring.

"Spitzer's infrared vision has revealed what could not be seen before - a massive ring of material that was expelled from the dying star," said Dr. Joseph Hora, a Spitzer scientist

at the Harvard-Smithsonian Center for Astrophysics, Cambridge, Mass. "The composition of the ring and how it formed are mysteries we hope to address with further Spitzer studies."

The new picture is available online at <http://photojournal.jpl.nasa.gov/catalog/PIA06755> .

The dying star is part of a "planetary nebula" called NGC 246. When a star like our own Sun begins to run out of fuel, its core shrinks and heats up, boiling off the star's outer layers. Leftover material shoots outward, expanding in shells around the star. This ejected material is then bombarded with ultraviolet light from the central star's fiery surface, producing huge, glowing clouds - planetary nebulas - that look like giant jellyfish in space.

These cosmic beauties last a relatively brief time, about a few thousand years, in the approximately 10-billion-year lifetime of a star. The name "planetary nebula" came from early astronomers who thought the rounded clouds looked like planets.

NGC 246 is located 1,800 light-years away in the Cetus constellation of our galaxy. Previous observations of this object by visible-light telescopes showed a glistening orb of gas and dust surrounding a central, compact star.

By cutting through the envelope of dust with its infrared eyes, Spitzer provides a more transparent view through and behind the nebula. "What we have seen with Spitzer is totally unexpected," said Hora. "Although previous observations showed the nebula had a patchy appearance, Spitzer has revealed a ring component of this dying star, possibly consisting of hydrogen molecules."

In the new false-color picture, the ring appears clumpy and red and off-center from the central star, while fluorescent, or ionized, gases are green. The central star is the left white spot in the middle of the cloud.

Ultimately, these data will help astronomers better understand how planetary nebulas take shape, and how they nourish new generations of stars. A scientific paper on this and other planetary nebulas observed by Spitzer will be published on Sept. 1 in *The Astrophysical Journal Supplement*, along with 75 other papers reporting Spitzer early mission results.

Launched August 25, 2003, the Spitzer Space Telescope is the fourth of NASA's Great Observatories, a program that also includes the Hubble Space Telescope, the Chandra X-ray Observatory and the Compton Gamma Ray Observatory. Spitzer is also part of NASA's Origins Program, which seeks to answer the questions: Where did we come from? Are we alone?

The Jet Propulsion Laboratory, Pasadena, Calif., manages the Spitzer Space Telescope mission for NASA's Science Mission Directorate, Washington, D.C. Science operations are conducted at the Spitzer Science Center at the California Institute of Technology in Pasadena. JPL is a division of Caltech. Spitzer's infrared array camera, which took the

new picture of NGC 246, was built by NASA Goddard Space Flight Center, Greenbelt, Md. The camera's development was led by Dr. Giovanni Fazio of Harvard-Smithsonian Center for Astrophysics.

Additional information about the Spitzer Space Telescope is available at <http://www.spitzer.caltech.edu>.

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News Release: 2004-204 August 18, 2004

### **Bedrock in Mars' Gusev Crater Hints at Watery Past**

Now that NASA's Mars Exploration Rover Spirit is finally examining bedrock in the "Columbia Hills," it is finding evidence that water thoroughly altered some rocks in Mars' Gusev Crater.

Spirit and its twin, Opportunity, completed successful three-month primary missions on Mars in April and are returning bonus results during extended missions. They remain in good health though beginning to show signs of wear.

On Opportunity, a tool for exposing the insides of rocks stopped working Sunday, but engineers are optimistic that the most likely diagnosis is a problem that can be fixed soon. "It looks like there's a pebble trapped between the cutting heads of the rock abrasion tool," said Chris Salvo, rover mission manager at NASA's Jet Propulsion Laboratory, Pasadena, Calif. "We think we can treat it by turning the heads in reverse, but we are still evaluating the best approach to remedy the situation. There are several options available to us."

Opportunity originally landed right beside exposed bedrock and promptly found evidence there for an ancient body of saltwater. On the other hand, it took Spirit half a year of driving across a martian plain to reach bedrock in Gusev Crater. Now, Spirit's initial inspection of an outcrop called "Clovis" on a hill about 9 meters (30 feet) above the plain suggests that water may once have been active at Gusev.

"We have evidence that interaction with liquid water changed the composition of this rock," said Dr. Steve Squyres of Cornell University, Ithaca, N.Y., principal investigator for the science instruments on both rovers. "This is different from the rocks out on the plain, where we saw coatings and veins apparently due to effects of a small amount of water. Here, we have a more thorough, deeper alteration, suggesting much more water."

Squyres said, "To really understand the conditions that altered Clovis, we'd like to know what it was like before the alteration. We have the 'after.' Now we want the 'before.' If we're lucky, there may be rocks nearby that will give us that."

Dr. Doug Ming, a rover science team member from NASA's Johnson Space Center, Houston, said indications of water affecting Clovis come from analyzing the rock's surface and interior with Spirit's alpha particle X-ray spectrometer and finding relatively high levels of bromine, sulfur and chlorine inside the rock. He said, "This is also a very soft rock, not like the basaltic rocks seen back on the plains of Gusev Crater. It appears to be highly altered."

Rover team members described the golf-cart-sized robots' status and recent findings in a briefing at JPL today.

Opportunity has completed a transect through layers of rock exposed in the southern inner slope of stadium-sized "Endurance Crater." The rocks examined range from outcrops near the rim down through progressively older and older layers to the lowest accessible outcrop, called "Axel Heiberg" after a Canadian Arctic island. "We found different compositions in different layers," said Dr. Ralf Gellert, of Max-Planck-Institut für Chemie, Mainz, Germany. Chlorine concentration increased up to threefold in middle layers. Magnesium and sulfur declined nearly in parallel with each other in older layers, suggesting those two elements may have been dissolved and removed by water.

Small, gray stone spheres nicknamed "blueberries" are plentiful in Endurance just as they were at Opportunity's smaller landing-site crater, "Eagle." Pictures from the rover's microscopic imager show a new variation on the blueberries throughout a reddish-tan slab called "Bylot" in the Axel Heiberg outcrop. "They're rougher textured, they vary more in size, and they're the color of the rock, instead of gray," said Zoe Learner, a science team collaborator from Cornell. "We've noticed that in some cases where these are eroding, you can see a regular blueberry or a berry fragment inside." One possibility is that a water-related process has added a coarser outer layer to the blueberries, she said, adding, "It's still really a mystery."

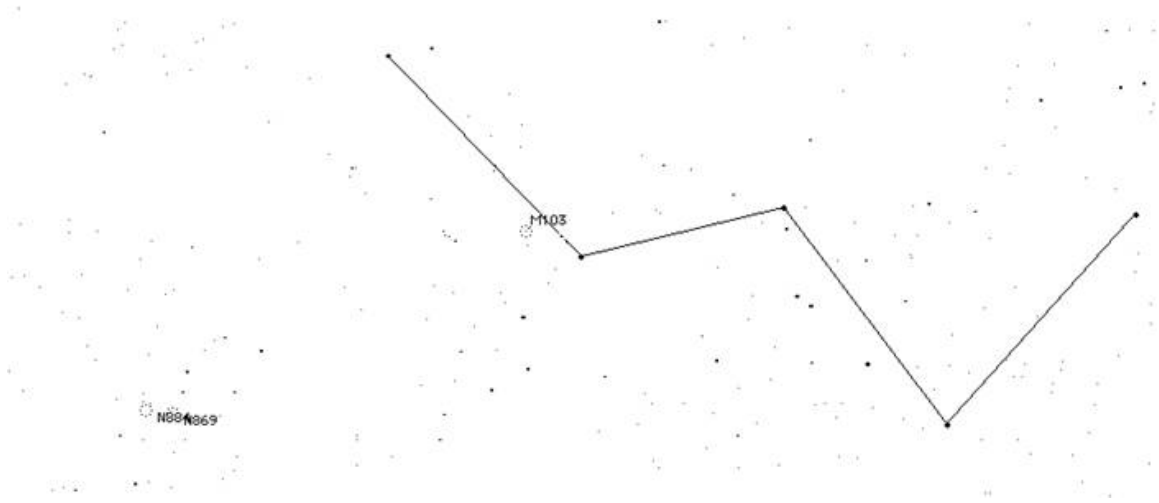
JPL, a division of the California Institute of Technology in Pasadena, manages the Mars Exploration Rover project for NASA's Science Mission Directorate, Washington. Images and additional information about the project are available from JPL at <http://marsrovers.jpl.nasa.gov> and from Cornell University at <http://athena.cornell.edu> .

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### ***Midevening Observing Highlights for September***

The Milky Way stretches across the sky from southwest to northeast. Cygnus can be found directly overhead. The Great Square of Pegasus is rising in the east. To the northeast of the Great Square the constellation of Andromeda can be seen and just above its center is M31, the Andromeda Galaxy. The Double Cluster (NGC 869 and NGC 884) in Perseus can be seen rising in the northeast. Sagittarius and Scorpius are in the southwest. The bright star Arcturus is setting in the west. The Big Dipper is low on the

northern horizon. The image below shows the location of the Double Cluster in relation to the constellation Cassiopeia. The open cluster M103 is also shown.



Full moon is on September 28<sup>th</sup> and new moon is on September 14<sup>th</sup>.

### *Member's Telescopes and Equipment*

John Kocijanski wrote a review of the Universal Astronomics Unistar Basic alt-azimuth mount for the Cloudy Nights website at <http://www.cloudynights.com/mounts2/uabasic.htm>. The picture below shows the mount



***BARLOW BOB'S CORNER***

Barlow Bob is a member of the Rockland Astronomy Club.

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**SSP AT SSP**

**The 2005 Second Annual NEAF Solar Star Party will continue at the Rockland Astronomy Club Summer Star Party and Family Camping Vacation. The Summer Star Party is held from From July 29 to August 7, 2005, at the private Shady Pines Campground, in Savoy, MA.**

**For further information check our web site  
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***NASA 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  $\mu\text{m}$ ) 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 de-orbited, 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](http://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](http://spaceplace.nasa.gov/eo1_1.htm).

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

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

