



# **Club News**

**April, 2003**

**John Kocijanski, Editor**

**Jim McKeegan, President**

**John Kocijanski, Vice President**

**Brian Deis, Secretary**

**Bud Wertheim, Treasurer**

Brian Deis has set up his new Meade 16 inch SCT in his observatory in Chester. He has invited the membership to visit and view through his new scope on the club observation session scheduled for April 5<sup>th</sup>. A few members have expressed interest in this. Anyone who is interested please contact John at [kocis@catskill.net](mailto:kocis@catskill.net). Hopefully some members can car pool.

Gregg Erickson asked that this announcement be distributed to the club. It's not astronomy but may be of interest to our members.

On April 3, SCCC will be sponsoring a lecture by Tony Barnston, Head of Forecast Operations at the International Research Institute for Climate Prediction, Columbia University. He will be talking about El Nino and Climate Prediction. He will be giving two talks, at 2 PM in room B118 and at 7:30 PM in the Seelig Theatre. Admission is free.

The Northeast Astronomy Forum will be held at Rockland County Community College on May 17<sup>th</sup> and 18<sup>th</sup>. Our club has been offered a free space for a table on the balcony for the show. Last year we went on Saturday. Anyone wishing to volunteer to man the table can contact John at [kocis@catskill.net](mailto:kocis@catskill.net). The table worked out well for us last year and gave the club some exposure. We handed out observing schedules and newsletters.

Nine members of the club met for dinner and conversation at the Blue Horizon Diner in Monticello on March 29<sup>th</sup>. It was proposed that when the observation sessions are canceled due to poor weather that we could meet for dinner instead.

A few members of the club have been discussing the possibility of having a public solar observation day in April. After contacting the Galleria Mall we found out that they do not allow outdoor events. At our dinner get together on the 29<sup>th</sup> we discussed moving the public solar observation day to the summer. We decided to look into doing the observation

session at a fair or other public outdoor event. The Little Worlds Fair in Grahamsville, the Riverfest in Narrowburg, and outdoor farmers market at the Woodstock concert site in Bethel were all considered as possibilities.

The March observation sessions for the club were canceled due to poor weather. The April observation sessions are scheduled for the 5<sup>th</sup> and the 26<sup>th</sup>. There is also a makeup session on the 12<sup>th</sup>.

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

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

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

The telescope review website Cloudy Nights is in trouble and is looking for suggestions concerning how to continue serving the amateur astronomy community. An open letter to the readership can be found at [www.cloudynights.com](http://www.cloudynights.com).

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

Donald Savage (202) 358-1547  
NASA Headquarters, Washington, D.C.

Guy Webster (818) 354-6278

Jet Propulsion Laboratory, Pasadena, Calif.

Maria Martinez (210) 522-3305

Southwest Research Institute, San Antonio, Texas

News Release: 2003-031 March 6, 2003

## **Rising Storms Revise Story of Jupiter's Stripes**

Pictures of Jupiter, taken by a NASA spacecraft on its way to Saturn, are flipping at least one long-standing notion about Jupiter upside down.

Stripes dominate Jupiter's appearance. Darker "belts" alternate with lighter "zones." Scientists have long considered the zones, with their pale clouds, to be areas of upwelling atmosphere, partly because many clouds on Earth form where air is rising. On the principle of what goes up must come down, the dark belts have been viewed as areas where air generally descends.

However, pictures from the Cassini spacecraft show that individual storm cells of upwelling bright-white clouds, too small to see from Earth, pop up almost without exception in the dark belts. Earlier spacecraft had hinted so, but not with the overwhelming evidence provided by the new images of 43 different storms.

"We have a clear picture emerging that the belts must be the areas of net-rising atmospheric motion on Jupiter, with the implication that the net motion in the zones has to be sinking," said Dr. Tony Del Genio, an atmospheric scientist at NASA's Goddard Institute for Space Studies, New York. "It's the opposite of expectations for the past 50 years".

Del Genio is one of 24 co-authors from America and Europe reporting diverse results from the Cassini imaging of Jupiter in Friday's edition of the journal Science. Cassini's camera took about 26,000 images of Jupiter, its moons and its faint rings over a six-month period as the spacecraft passed

nearby two years ago.

“The range of illumination angles at which Cassini viewed Jupiter’s main ring gives insight about particles in the ring by the way they scatter sunlight. The particles appear to be irregularly shaped, not spheres,” said camera-team leader Dr. Carolyn Porco of Southwest Research Institute, Boulder, Colo. “They likely come from surfaces of one or more moons being eroded by micrometeoroid impacts.”

Spherical particles would suggest an origin as melted droplets, not erosion. In addition, Cassini imaging shows the degree to which the orbits of two small moons near the ring, Metis and Adrastea, are inclined matches the vertical thickness of the ring. That points to those moons as sources of the ring particles, said Porco.

One surprise in ultraviolet images of Jupiter’s north polar region is a swirling dark oval of high-atmosphere haze the size of the planet’s famous Great Red Spot. “It’s a phenomenon we haven’t seen before, so it gives us new information about how stratospheric circulation works,” said Dr. Robert West of NASA’s Jet Propulsion Laboratory, Pasadena, Calif. The results show the winds and the life cycle of clouds in the stratosphere.

Also, movies of infrared images reveal persistent bands of globe-circling winds extending north of the conspicuous dark and light stripes. “The planet’s appearance at high latitudes is like leopard spots, but when you see it in motion, it’s interesting that all the spots at one latitude move in one direction and all the spots at adjacent latitudes move the opposite direction,” said Dr. Andrew Ingersoll of the California Institute of Technology, Pasadena.

Other discoveries reported include atmospheric glows of the large moons Io and Europa during eclipses, a volcanic plume over Io’s north polar region, and the irregular shape of a small outer moon, Himalia.

“The Jupiter results provide some hints of the spectacular new findings that await Cassini when it reaches Saturn,” Dr. Larry Esposito of the University of Colorado, Boulder, principal investigator for Cassini’s ultraviolet-imaging spectrograph instrument, predicts in a separate commentary in Science about the Cassini camera results at Jupiter. Cassini will begin orbiting Saturn July 1, 2004, and will release its piggybacked Huygens probe about six months later for descent through the atmosphere of the moon Titan.

Cassini is a cooperative venture of NASA, the European Space Agency and the Italian Space Agency. JPL, a division of Caltech, manages the mission for NASA’s Office of Space Science, Washington, D.C. Other co-authors include scientists from Cornell University, Ithaca, N.Y.; Free University of Berlin, Germany; Queen Mary, University of London, United Kingdom; University of Arizona, Tucson; University of Paris, France; German Aerospace Center, Berlin; and University of California, Los Angeles.

Images and mission information are available on the Internet at:

<http://saturn.jpl.nasa.gov/gallery/jupiter-flyby/index.cfm> and  
[http://ciclops.lpl.arizona.edu/ciclops/images\\_jupiter.html](http://ciclops.lpl.arizona.edu/ciclops/images_jupiter.html)

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EMBARGOED UNTIL: 9:00 a.m. (EST) March 6, 2003

PHOTO NO.: STSci-PRC03-07

## HUBBLE RESOLVES A BLAZE OF STARS IN A GALAXY’S CORE

The central region of the small galaxy NGC 1705 blazes with the light of thousands of young and old stars in this image, taken by NASA’s Hubble Space Telescope. At 17 million light-years away, the individual stars of the dwarf irregular

galaxy NGC 1705 are out of range of all but the sharp eyes of Hubble. NGC 1705 is classified as a dwarf irregular because it is small and lacks any regular structure.

This image was taken in March 1999 and November 2000 by an international science team led by Monica Tosi at Italy's National Institute of Astrophysics (INAF) at the Osservatorio Astronomico di Bologna.

Image Credit: NASA, ESA, and The Hubble Heritage Team (STScI/AURA) Acknowledgment: M. Tosi (INAF, Osservatorio Astronomico di Bologna)

To see and read more about galaxy NGC 1705, please click on <http://hubblesite.org/news/2003/07> <http://heritage.stsci.edu/2003/07> and <http://sci.esa.int/hubble>

Donald Savage (202) 358-1547  
NASA Headquarters, Washington, D.C.

Mary Hardin (818) 354-0344  
Jet Propulsion Laboratory, Pasadena, Calif.

News Release: 2003-032 March 6, 2003

## **Scientists Say Mars Has a Liquid Iron Core**

New information about what is inside Mars shows the red planet has a molten liquid iron core, confirming the interior of the planet has some similarity to Earth and Venus.

Researchers at NASA's Jet Propulsion Laboratory, Pasadena, Calif., analyzing three years of radio tracking data from the Mars Global Surveyor spacecraft, concluded that Mars has not cooled to a completely solid iron core, rather its interior is made up of either a completely liquid iron core or a liquid outer core with a solid inner core. Their results are published in the March 7, 2003 online issue of the journal

Science.

“Earth has an outer liquid iron core and solid inner core. This may be the case for Mars as well,” said Dr. Charles Yoder, a planetary scientist at JPL and lead author on the paper.

“Mars is influenced by the gravitational pull of the Sun. This causes a solid body tide with a bulge toward and away from the Sun (similar in concept to the tides on Earth). However, for Mars this bulge is much smaller, less than 1 centimeter (0.4 inch). By measuring this bulge in the Mars gravity field we can determine how flexible Mars is. The size of the measured tide is large enough to indicate the core of Mars can not be solid iron but must be at least partially liquid.”

The team used Doppler tracking of a radio signal emitted by the Global Surveyor spacecraft to determine the precise orbit of the spacecraft around Mars. “The tidal bulge is a very small but detectable force on the spacecraft. It causes a drift in the tilt of the spacecraft’s orbit around Mars of one-thousandth of a degree over a month,” said Dr. Alex Konopliv, a planetary scientist at JPL and co-author on the paper.

The researchers combined information from Mars Pathfinder on the Mars precession with the Global Surveyor tidal detection to draw conclusions about the Mars core, according to Dr. Bill Folkner of JPL, another co-author of the paper.

The precession is the slow motion of the spin pole of Mars as it moves along a cone in space (similar to a spinning top). For Mars, it takes 170,000 years to complete one revolution. The precession rate indicates how much the mass of Mars is concentrated toward the center. A faster precession rate indicates a larger dense core, compared to a slower precession rate.

In addition to detection of a liquid core for Mars, the results indicate the size of the core is about one-half the size of the planet, as is the case for Earth and Venus, and that the core has a significant fraction of a lighter element such as sulfur.

In addition to measuring the Mars tide, Global Surveyor has been able to estimate the amount of ice sublimated, changed directly into a gaseous state, from one pole into the atmosphere and then accreted onto the opposite pole. "Our results indicate the mass change for the southern carbon dioxide ice cap is 30 to 40 percent larger than the northern ice cap, which agrees well with the predictions of the global atmosphere models of Mars," said Yoder.

The amount of total mass change depends on assumptions about the shape of the sublimated portion of the cap. The largest mass exchange occurs if we assume the cap change is uniform or flat over the entire cap, while the lowest mass exchange corresponds to a conically shaped cap change.

JPL manages the Mars Exploration Program for NASA's Office of Space Science, Washington, D.C. JPL is a division of the California Institute of Technology in Pasadena.

PRESS RELEASE NO.: STScI-PR03-08

## TOO CLOSE FOR COMFORT: HUBBLE DISCOVERS AN EVAPORATING PLANET

Astronomers using NASA's Hubble Space Telescope have observed for the first time the atmosphere of a planet beyond our solar system evaporating into space. Most of the planet may eventually disappear, leaving only a dense core. The evaporating planet is a member of a type of planet called a "hot Jupiter," a giant gaseous planet that orbits very closely around its parent star, drawn to it like a moth to a flame. The scorched planet, called HD 209458b, orbits only 4 million miles (7 million kilometers) from its yellow, Sun-like star. The planet circles the parent star in a tight 3.5-day orbit. The Hubble observations reveal a hot and bloated hydrogen atmosphere, which is evaporating off the planet. This huge

envelope of hydrogen resembles a comet with a tail trailing behind the planet.

An international team of astronomers, led by Alfred Vidal-Madjar of the Institut d'Astrophysique de Paris, CNRS, France, is reporting this discovery in the March 13 NATURE Magazine.

To see and read more, please click on  
<http://hubblesite.org/newscenter/2003/08>  
<http://hubble.esa.int>

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Space Weather news for March 27, 2003  
<http://www.spaceweather.com>

Sky watchers in several US states were startled around midnight on March 27th when a brilliant fireball streaked across the sky and exploded. It was a small (perhaps less than a few meters wide) rocky asteroid with a mass of about 10 metric tons. Some 500 fragments scattered over a 10-km wide zone in the suburbs south of Chicago. Meteorites struck houses, cars, roads—but no people. Such fireballs are surprisingly common: Researchers expect an asteroidal object one meter in diameter or larger to strike Earth's atmosphere about 40 times per year. Few are seen, however, because they usually appear over unpopulated areas.

Visit [spaceweather.com](http://spaceweather.com) for more information.

Contact: Jane Platt (818) 354-0880

News Release: 2003-041 March 27, 2003

## **The Sky's the Limit: Grand Finale for Twin-Telescope Survey**

The celestial harvest from astronomy's most thorough high-

resolution digital survey of the entire sky, completed by twin infrared telescopes, is now online for scientists to scrutinize and the entire world to savor.

An atlas of about 5 million pictures from the grand finale of this milestone in modern astronomy is available at <http://www.ipac.caltech.edu/2mass/gallery> .

“The public will ‘ooooh and aaaah’ at the pictures, while scientists will mine the data for decades, learning a great deal more than we currently know about our Milky Way galaxy, its hundreds of millions of stars, and the millions of galaxies in the nearby universe,” said Dr. Michael Skrutskie, principal investigator for the Two Micron All-Sky Survey. Skrutskie, with the University of Virginia, Charlottesville, was formerly with the University of Massachusetts, Amherst.

“This survey will change the way astronomy is conducted and the types of experiments that can be carried out, because astronomers can now sit at their desk and have data for any spot on the sky literally at their fingertips without going to a telescope,” said Dr. Roc Cutri, the survey’s project scientist at the Infrared Processing and Analysis Center of the California Institute of Technology and NASA’s Jet Propulsion Laboratory, Pasadena, Calif. “It also makes astronomy more open to the public, providing beautiful pictures and serving as a powerful educational tool.”

The survey was conducted at infrared wavelengths, which are longer than the red light our eyes can see. Infrared wavelengths penetrate dust better than visible light, making them an effective tool for detecting dust-obscured objects both inside and outside of our Milky Way.

“For the first time in history, we can, in effect, step outside our galaxy and see it in detail, as it would appear from above,” Skrutskie said. “We can also see the texture in the distribution of galaxies outside the Milky Way. Before this survey, astronomers tried to connect the dots, but nearly

one-third of the galaxies were obscured by dust. Now, we can connect all the dots.”

“The idea of a survey is an old human activity, but the Two Micron All-Sky Survey has a modern twist,” said Project Manager Rae Stiening at the University of Massachusetts. “Just as English admiralty sent Captain Cook and others to map the world, this new survey has mapped the nearby universe.”

The project used two dedicated 1.3-meter (51-inch) telescopes, one at Fred Lawrence Whipple Observatory, Mount Hopkins, Ariz., the other at the Cerro Tololo Inter-American Observatory in Chile. Operations began in Arizona in June 1997 and in Chile in March 1998. Since observations concluded in February 2001, scientists have been processing and validating data to complete the analysis of the entire sky. The atlas was compiled from 120 million images containing 14 trillion pixels, or data measurements. The survey produced catalogues brimming with nearly half a billion objects.

The bonanza of astronomical discoveries already made by the survey includes:

- Hundreds of brown dwarfs, or cool, failed stars; enabling scientists to define new classes of stars
- Maps of the Milky Way’s structure and dust distribution, and large-scale structure in the nearby universe, inside and outside our Milky Way
- Observations of galaxies hidden behind the disc of the Milky Way
- Details about the Large Magellanic Cloud, a satellite galaxy of the Milky Way
- Numerous dust-obscured galaxies and quasars in the distant universe
- The largest database ever of location, brightness, color and position of asteroids

For the next two years, scientists will conduct an extended

Two Micron All-Sky Survey mission, reviewing and delivering more content of the raw data to the public. They will also process and release more sensitive observations made during the survey, including images of the entire Large and Small Magellanic clouds. “A lot of great stuff that will be discovered with this survey hasn’t been conceived of yet,” Stiening said. “The best is yet to come.”

By identifying interesting targets, finding stars for calibration and providing data analysis techniques, the survey’s data will be a boon to future infrared space missions, including NASA’s Space Infrared Telescope Facility, scheduled for launch in April.

The Two Micron All-Sky Survey is a collaboration between the University of Massachusetts and the Infrared Processing and Analysis Center. The Center developed the software system that converted the nearly 25 terabytes of raw digital data into images and catalogues. The University of Massachusetts was responsible for design, construction and operation of the survey cameras and telescopes. The project was first proposed in 1991 by Dr. Susan Kleinmann at the University of Massachusetts, and the Center director at that time, Dr. Charles Beichman. Previous infrared sky surveys by Caltech include the first such survey, by Drs. Robert Leighton and Gerry Neugebauer, and the first all-sky survey from space, by the Infrared Astronomical Satellite. JPL is a division of Caltech.

The survey is primarily funded by NASA’s Office of Space Science, Washington, D.C., with additional funding provided by the National Science Foundation.

Additional information about 2MASS is available at <http://www.ipac.caltech.edu/2mass> and <http://pegasus.astro.umass.edu/GradProg/2mass.html> .

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Jane Platt (818) 354-0880  
Jet Propulsion Laboratory, Pasadena, Calif.

Donald Savage (202) 358-1547  
NASA Headquarters, Washington, D.C. March 25, 2003

News Release: 2003-040

## **Space Observatory to Study the Old, the Cold and the Dusty**

A NASA observatory will soon open a new window to the universe. By using infrared technology to study celestial objects that are either too cool, too dust-enshrouded or too far away to otherwise be seen, NASA's Space Infrared Telescope Facility will pierce the thick dust that permeates the universe.

From its Earth-trailing orbit around the Sun, the observatory, set to launch on April 18, will unveil new information about galaxies, stars, and dusty discs around nearby stars, which may be "planetary construction zones."

"The Space Infrared Telescope Facility will complete NASA's suite of Great Observatories, a program that includes three previous missions that studied the universe with visible light, X-rays and gamma rays," said Dr. Ed Weiler, NASA's associate administrator for space science. "Many cosmic objects produce radiation over a wide range of wavelengths, so it's important to get the whole picture." The three previous Great Observatories are the Hubble Space Telescope, Compton Gamma Ray Observatory and Chandra X-ray Observatory.

By studying the structure and composition of dusty planet-forming discs around stars, the mission will aid the search for Earth-like planets that may harbor life. This makes it a cornerstone of NASA's Origins Program, which seeks to answer the questions, "Where did we come from? Are we alone?"

Infrared detectors can see longer wavelengths than the red light visible to our eyes. As the universe expands, starlight from distant galaxies is shifted from blue to red and, ultimately, into the infrared. Most radiation emitted by stars, galaxies and other objects in the early universe now lies in the infrared. The Space Infrared Telescope Facility will enable scientists to look farther back in space and time than was previously possible.

“With this mission, we will see the universe as it was billions of years ago, helping us pinpoint how and when the first objects formed, as well as their composition,” said Dr. Anne Kinney, director of the astronomy and physics division at NASA Headquarters, Washington, D.C.

“The observatory will give us a better understanding of the universe and our place within it,” said Dr. Michael Werner, the mission’s project scientist at NASA’s Jet Propulsion Laboratory, Pasadena, Calif. “For example, interstellar space has lots of carbon-rich organic molecules. Understanding these may illuminate the processes by which life formed.”

During its two-and-one-half to five-year mission, the mission will also study brown dwarfs, or cool, “failed stars.” Some scientists think brown dwarfs may account for some or all of the elusive “dark matter” thought to be prevalent in the universe. The mission will also study planets in our own solar system, asteroids and comets.

The observatory’s telescope has three science instruments. The infrared array camera is a general-purpose camera for near-infrared to mid-infrared wavelengths. The infrared spectrograph breaks light into its various wavelengths, much like a prism, to help astronomers study the composition of cosmic objects. The multi-band imaging photometer will gather pictures and limited spectroscopic data at far-infrared wavelengths to study cool, dusty objects.

The spacecraft features several technological breakthroughs,

and the out-of-the-ordinary mission design will pay dividends as well. “The innovations have substantially reduced mission development costs,” said Project Manager Dave Gallagher at JPL. “For example, the mission’s Earth-trailing orbit simplifies scheduling and operations. Because the telescope detects heat from relatively cool objects, we have to keep it extremely cold. We’ve found a more efficient way to cool the telescope and slash the amount of liquid helium the observatory must carry,” Gallagher said. The mission’s technologies and science discoveries will help enable future Origins missions, such as the James Webb Space Telescope and Terrestrial Planet Finder.

JPL manages the Space Infrared Telescope Facility mission for NASA’s Office of Space Science, Washington, D.C. and conducts flight operations. NASA’s Goddard Space Flight Center, Greenbelt, Md., is responsible for building the Infrared Array Camera. The Space Infrared Telescope Facility Science Center at the California Institute of Technology, Pasadena will handle all aspects of science operations, including data processing. Lockheed Martin Space Systems Company, Sunnyvale, Calif., is responsible for spacecraft design and development, observatory systems engineering, integration and testing. Ball Aerospace and Technologies Corporation, Boulder, Colo., is responsible for the design and development of the cryo-telescope assembly, integration of the science instrument cold assemblies into the cryostat, and is subcontractor for two science instruments. For more information about the Space Infrared Telescope Facility on the Internet, visit <http://sirtf.caltech.edu> .

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### ***Mid Evening Observing Highlights for April***

Jupiter will be right next to the open cluster M44 otherwise known as the Beehive Cluster in Cancer. Saturn is in the

western sky. Orion is setting in the west. The bright star Arcturus and the globular star cluster M3 are rising in the eastern sky. The bright star Spica is rising in the southeast. The constellations Virgo, Coma Berenices, and Leo have many observable galaxies within their boundaries. The following image of Leo shows the positions of the galaxies M65, M66, M105, M96, and M95.



### ***Observations and Photographs***

If you are interested in submitting an observation or photograph please contact John at [kocis@catskill.net](mailto:kocis@catskill.net).

The following picture was taken by John Kocijanski and is of the open cluster M41 in Canis Major. It was taken with an Olympus OM1 with a 200mm telephoto lens piggybacked on a Celestron SPC-8.



### ***Member's Telescopes and Equipment***

The following picture shows a University Optics 6mm orthoscopic eyepiece recently purchased by John Kocijanski. University Optics eyepieces are relatively inexpensive and offer sharp views even though the field of view is a bit narrower than a plossl. They are especially good for lunar and planetary observing. Check them out at [www.universtioptics.com](http://www.universtioptics.com).



## ***BARLOW BOB'S CORNER***

Barlow Bob is a member of the Rockland Astronomy Club.

Barlow Bob's New Toy

Barlow Bob recently sent me a few pictures of his new solar scope. He has a Televue 101 with a Coronado hydrogen alpha filter and a binoviewer. He has expressed interest in participating in our solar observation session when it occurs.

## ***NASA Space Place***

### **Musical Satellites**

By Tony Phillips

If light were sound, then chemicals would play chords.

Water: C major. Cyanide: A minor. Chlorophyll: G diminished 7th. (Please note that the choice of chords here is only for the sake of illustration, and not meant to reflect the actual spectra of these chemicals.)

It's a loose metaphor, but an apt one. Musical chords are combinations of frequencies of sound (notes), while chemicals leave unique combinations of dips in the frequency spectrum of reflected light, like keys pressed on a piano. Spectrographs, machines that recognize chemicals from their "chords of light," are among the most powerful tools of modern chemistry.

Most earth-watching satellites, like the highly successful Landsat series, carry spectrographs onboard. These sensors measure the spectra of light reflected from forests, crops, cities, and lakes, yielding valuable information about our natural environment. Current satellites do this in a fairly limited way; their sensors can “hear” only a few meager notes amid the symphony of information emanating from the planet below.

EO-1 could change that. Short for “Earth Observing 1,” EO-1 is an experimental NASA satellite in orbit since 2000. It’s testing out a more advanced “spectrometer in the sky”—the Hyperion hyperspectral imager. How good is it? If Landsat were “chopsticks,” EO-1 would be Gershwin’s “Rhapsody in Blue.”

The Hyperion sensor looks at 220 frequencies in the spectrum of visible and infrared light (0.4 to 2.5 microns) reflecting off Earth’s surface. Landsat, in contrast, measures only 10. Bryant Cramer, who manages the EO-1 project at the Goddard Space Flight Center, puts these numbers in perspective. “If we flew Landsat over the northeastern United States, it could readily identify a hardwood forest. But using hyperspectral techniques, you probably can . . . tell the oak trees from the maple trees.”

Future earth-watching satellites may use Hyperion-like instruments to vastly improve the environmental data they provide. EO-1 is paving the way for these future missions by taking on the risk of flight-testing the sensor for the first time.

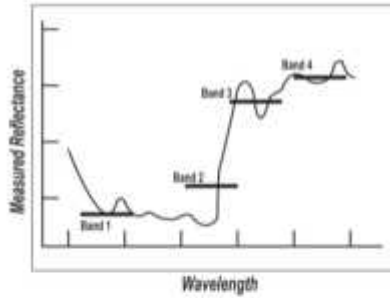
For farmers, foresters, and many others, this new remote sensing technology will surely be music to the ears.

Read about EO1 at <http://eo1.gsfc.nasa.gov> . Budding young astronomers can learn more at [http://spaceplace.nasa.gov/eo1\\_1.htm](http://spaceplace.nasa.gov/eo1_1.htm) ..

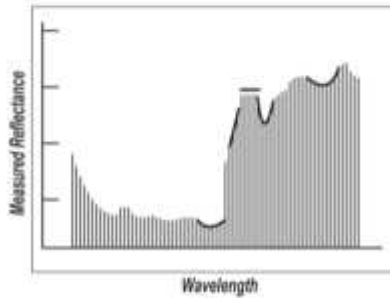
*This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.*

Caption:

*Hyperion instrument distinguishes hundreds of wavelength bands, while current Landsat instrument images only a few.*



**Multispectral Imaging  
(few bands)**



**Hyperspectral Imaging  
(hundreds of bands)**

Please print out the renewal form and send your check made out to  
Catskills Astronomy Club, mail it to:

Catskills Astronomy Club  
attn: Bud Wertheim, Treasurer  
143 Covered Bridge Road  
Livingston Manor, NY 12758

Thank you....

# Catskills Astronomy Club

143 Covered Bridge Road, Livingston Manor, NY 12758

<http://www.catskillsastro.com>

## Membership/Renewal Application

Name: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Phone: \_\_\_\_\_ e-mail: \_\_\_\_\_

Level of Experience: \_\_\_ Novice \_\_\_ Amateur \_\_\_ Advanced Amateur

### Type of Membership

(Valid for one year from January 1)

\_\_\_ New Individual.....\$28.50

\_\_\_ New Family (all with same mailing address).....\$33.50

\_\_\_ Renewal Individual.....\$23.50

\_\_\_ Renewal Family.....\$28.50

*Sustaining Membership is available for two times the cost of regular membership and your support is appreciated!*

Membership in the Astronomical League is reflected by the addition of \$3.50 per membership. Our affiliation with the League requires us to pay for each member.

If family membership, name of participants:

\_\_\_\_\_

Do you own a telescope? \_\_\_ yes \_\_\_ no \_\_\_ planning purchase? \_\_\_

Comments: \_\_\_\_\_

*Your participation in the Catskills Astronomy Club is greatly appreciated!*