



## Astronomy Club News

August, 2005

John Kocijanski, Editor

Jim McKeegan,	President
John Kocijanski,	Vice President
Bud Wertheim,	Secretary
Lisa Brody,	Treasurer

A club officers meeting was held on July 25<sup>th</sup>. At the meeting club treasurer duties were officially transferred to Lisa Brody. She will take over from Bud Wertheim with assistance from her husband Jim McKeegan. Our club secretary Brian Deis will be moving to California so Bud Wertheim will take over as secretary. Indoor club meetings were a topic of discussion. The owner of Morgan Outdoors in Livingston Manor, NY Lisa Lyons has allowed the club to have indoor meetings at her store. She has a large back room that will work well for our needs. We hope to have our first meeting there in September. A date will be announced in the future. Anyone who has ideas about topics for indoors meetings should feel free to share them. A dark site observation session at Tennanah Lake near Roscoe, NY was also discussed. So far nothing definite has come of this but it is still something that will hopefully occur in the next month or two.

The July 2<sup>nd</sup> observation session took place at Walnut Mountain Park. Sixteen people attended. We witnessed the International Space Station fly over. We were also treated to amazing views through a 20 inch dobsonian telescope brought by Rob Teeter or Teeters Telescopes in New Jersey. The view of the open cluster M11 through a binoviewer was especially striking. The scope is shown below.



The July 9<sup>th</sup> observation session was moved to July 11<sup>th</sup>. Three people attended. We had an opportunity to view many deep sky objects including two faint galaxies that are not usually viewed. NGC 6207 is very close to the globular cluster M13. Seeing them in the same field of view was unique. NGC 6217 can be found in Ursa Minor. It was fairly easy to find close to where the handle meets the bowl of the Little Dipper.

The August observation sessions are scheduled for the 6<sup>th</sup> and 27<sup>th</sup>.

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

## NASA Telescope Reveals Nearby Galaxy's Invisible Arms

A new image from NASA's Galaxy Evolution Explorer shows that a galaxy once thought to be rather plain and old is actually endowed with a gorgeous set of young spiral arms.

The unusual galaxy, called NGC 4625, is a remarkable find because it is relatively nearby. Until now, astronomers had thought that this kind of youthful glow in galaxies was a thing of the past.

"This galaxy is an amazing surprise," said Dr. Armando Gil de Paz of the Carnegie Observatories, Pasadena, Calif., lead author of a paper appearing in the July issue of *Astrophysical Journal Letters*. "We are practically up-close and personal with a galaxy undergoing an evolutionary stage that was thought to occur only at the dawn of the universe, in very young and faraway galaxies."

The image can be found at <http://www.nasa.gov/centers/jpl/missions/galex.html> or <http://www.galex.caltech.edu/>. It offers astronomers their best look yet at what our Milky Way galaxy might have looked like in earlier times.

"We do not fully understand how stars were created in our galaxy," said Dr. Barry Madore of the Carnegie Observatories, co-author of the new paper. "This nearby galaxy represents one of our possible histories, in which stars developed first in the galaxy core and then later in the arms."

Previous visible-light images of NGC 4625 showed only an oval-shaped ball of light, with very faint hints of a halo of spiral arms. These arms were finally revealed to the ultraviolet eyes of the Galaxy Evolution Explorer. Their intense brightness indicates that the arms are teeming with hot, newborn stars, which shine primarily with ultraviolet light.

"The stars in the arms are about one billion years old, while the stars in the body are about ten times older," said Gil de Paz.

NGC 4625's spiral arms are very lengthy, extending four times beyond the size of the core of the galaxy. They represent the largest ultraviolet galactic disk discovered so far.

Also of interest in the new Galaxy Evolution Explorer image is a nearby companion galaxy, which looks very similar to NGC 4625, yet has no arms. How could this galactic duo have turned out so differently? Astronomers do not know, but some theories hold that the presence of the armless galaxy was required for NGC 4625 to grow a set.

"We know that interactions between galaxies can spur the creation of stars, but it is not clear why only one galaxy ended up with arms," said Dr. Chris Martin of the California Institute of Technology in Pasadena, Calif, principal investigator for the Galaxy Evolution Explorer.

Previous studies of the gas distribution around the two galaxies indicate that NGC 4625 might have developed in a more dynamically stable environment, while the armless galaxy grew up in a more chaotic and turbulent setting.

Other authors of this paper include: Dr. S. Boissier, Carnegie Observatories; Dr. R. Swaters, University of Maryland, College Park; Dr. R. J. Tuffs, Max Planck Institut fur Kernphysik, Germany; Dr. K. Sheth, Caltech; Dr. R.C. Kennicutt, University of Arizona, Tucson; Drs. L. Bianchi and D. Thilker, Johns Hopkins University, Baltimore, Md.

Caltech leads the Galaxy Evolution Explorer mission and is responsible for science operations and data analysis. NASA's Jet Propulsion Laboratory, Pasadena, Calif., manages the mission and built the science instrument. The mission was developed under NASA's Explorers Program managed by the Goddard Space Flight Center, Greenbelt, Md. South Korea and France are the international partners in the mission.

For images and information about the Galaxy Evolution Explorer on the Internet, visit <http://www.galex.caltech.edu/> .

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News Release: 2005-119

July 25, 2005

### **Cassini Reveals Saturn's Eerie-Sounding Radio Emissions**

Saturn's radio emissions could be mistaken for a Halloween sound track.

That's how two researchers describe their recent findings, published in the July 23 issue of the Geophysical Research Letters. Their paper is based on data from the Cassini spacecraft radio and plasma wave science instrument. The study investigates sounds that are not just eerie, but also descriptive of a phenomenon similar to Earth's northern lights.

"All of the structures we observe in Saturn's radio spectrum are giving us clues about what might be going on in the source of the radio emissions above Saturn's auroras," said Dr. Bill Kurth, deputy principal investigator for the instrument. He is with the University of Iowa, Iowa City. Kurth made the discovery along with Principal Investigator Don Gurnett, a professor at the University. "We believe that the changing frequencies are related to tiny radio sources moving up and down along Saturn's magnetic field lines."

Samples of the resulting sounds can be heard at [www.nasa.gov/cassini](http://www.nasa.gov/cassini) , <http://saturn.jpl.nasa.gov> and <http://www-pw.physics.uiowa.edu/cassini/> .

The radio emissions, called Saturn kilometric radiation, are generated along with Saturn's auroras, or northern and southern lights. Because the Cassini instrument has higher resolution compared to a similar instrument on NASA's Voyager spacecraft, it has provided more detailed information on the spectrum and the variability of radio emissions. The high-resolution measurements allow scientists to convert the radio waves into audio recordings by shifting the frequencies down into the audio frequency range.

The terrestrial cousins of Saturn's radio emissions were first reported in 1979 by Gurnett, who used an instrument on the International Sun-Earth Explorer spacecraft in Earth orbit. Kurth said that despite their best efforts, scientists still haven't agreed on a theory to fully explain the phenomenon.

They will get another chance to solve the radio emission puzzle beginning in mid-2008 when Cassini will fly close to, or possibly even through, the source region at Saturn. Gurnett said, "It is amazing that the radio emissions from Earth and Saturn sound so similar."

Other contributors to the paper include University of Iowa scientists George Hospodarsky and Baptiste Cecconi; Mike Kaiser (currently at Goddard Space Flight Center, Greenbelt, Md.); French scientists Philippe Louarn, Philippe Zarka and Alain Lecacheux; and Austrian scientists Helmut Rucker and Mohammed Boudjada.

Cassini, carrying 12 scientific instruments, on June 30, 2004, became the first spacecraft to orbit Saturn. It is conducting a four-year study of the planet, its rings and many moons. The spacecraft carried the Huygens probe, a six-instrument European Space Agency probe that landed on Titan, Saturn's largest moon, in January 2005.

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. JPL designed, developed and assembled the Cassini orbiter. The radio and plasma wave science team is based at the University of Iowa, Iowa City.

For information on the Cassini mission visit <http://saturn.jpl.nasa.gov> and <http://www.nasa.gov/cassini> .

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Image Advisory: 2005-114

July 11, 2005

### **Spongy-Looking Hyperion Tumbles Into View**

Two new Cassini views of Saturn's tumbling moon Hyperion offer the best looks yet at one of the icy, irregularly-shaped moons that orbit the giant, ringed planet.

The image products released today include a movie sequence and a 3D view, and are available at <http://saturn.jpl.nasa.gov>, <http://www.nasa.gov/cassini> and <http://ciclops.org>.

The views were acquired between June 9 and June 11, 2005, during Cassini's first brush with Hyperion.

Hyperion is decidedly non-spherical and its unusual shape is easy to see in the movie, which was acquired over the course of two and a half days. Jagged outlines visible on the moon's surface are indicators of large impacts that have chipped away at its shape like a sculptor.

Preliminary estimates of its density show that Hyperion is only about 60 percent as dense as solid water ice, indicating that much of its interior (40 percent or more) must be empty space. This makes the moon more like an icy rubble pile than a solid body.

In both the movie and the 3D image, craters are visible on the moon's surface down to the limit of resolution, about 1 kilometer (0.6 mile) per pixel. The fresh appearance of most of these craters, combined with their high spatial density, makes Hyperion look something like a sponge.

The moon's spongy-looking exterior is an interesting coincidence, as much of Hyperion's interior appears to consist of voids. Hyperion is close to the size limit where, like a child compacting a snowball, internal pressure due to the moon's own gravity will begin to crush weak materials like ice, closing pore spaces and eventually creating a more nearly spherical shape.

The images used to create these views were obtained with Cassini's narrow-angle camera at distances ranging from approximately 815,000 to 168,000 kilometers (506,000 to 104,000 miles) from Hyperion. Cassini will fly within 510 kilometers (317 miles) of Hyperion on Sept. 26, 2005.

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.

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*News Release: 2005-113*

*July 8, 2005*

### ***NASA's Deep Impact Tells a Tale of the Comet***

Data from Deep Impact's instruments indicate an immense cloud of fine powdery material was released when the probe slammed into the nucleus of comet Tempel 1 at about 10 kilometers per second (6.3 miles per second or 23,000 miles per hour). The cloud indicated the comet is covered in the powdery stuff. The Deep Impact science team continues to wade through gigabytes of data collected during the July 4 encounter with the comet measuring 5-kilometers-wide by 11-kilometers-long (about 3-miles-wide by 7-miles-long).

"The major surprise was the opacity of the plume the impactor created and the light it gave off," said Deep Impact Principal Investigator Dr. Michael A'Hearn of the University of Maryland, College Park. "That suggests the dust excavated from the comet's surface was extremely fine, more like talcum powder than beach sand. And the surface is definitely not what most people think of when they think of comets -- an ice cube."

How can a comet hurtling through our solar system be made of a substance with less strength than snow or even talcum powder?

"You have to think of it in the context of its environment," said Dr. Pete Schultz, Deep Impact scientist from Brown University, Providence, R.I. "This city-sized object is floating around in a vacuum. The only time it gets bothered is when the Sun cooks it a little or someone slams an 820-pound wakeup call at it at 23,000 miles per hour."

The data review process is not overlooking a single frame of approximately 4,500 images from the spacecraft's three imaging cameras taken during the encounter.

"We are looking at everything from the last moments of the impactor to the final look-back images taken hours later, and everything in between," added A'Hearn. "Watching the last moments of the impactor's life is remarkable. We can pick up such fine surface detail that objects that are only four meters in diameter can be made out. That is nearly a factor of 10 better than any previous comet mission."

The final moments of the impactor's life were important, because they set the stage for all subsequent scientific findings. Knowing the location and angle the impactor slammed into the comet's surface is the best place to start. Engineers have established the impactor took two not unexpected coma particle hits prior to impact. The impacts slewed the spacecraft's camera for a few moments before the attitude control system could get it back on track. The penetrator hit at an approximately 25 degree oblique angle relative to the comet's surface. That's when the fireworks began.

The fireball of vaporized impactor and comet material shot skyward. It expanded rapidly above the impact site at approximately 5 kilometers per second (3.1 miles per second). The crater was just beginning to form. Scientists are still analyzing the data to determine the exact size of the crater. Scientists say the crater was at the large end of original expectations, which was from 50 to 250 meters (165 to 820 feet) wide.

Expectations for Deep Impact's flyby spacecraft were exceeded during its close brush with the comet. The craft is more than 3.5 million kilometers (2.2 million miles) from Tempel 1 and opening the distance at approximately 37,000 kilometers per hour (23,000 miles per hour). The flyby spacecraft is undergoing a thorough checkout, and all systems appear to be in excellent operating condition.

The Deep Impact mission was implemented to provide a glimpse beneath the surface of a comet, where material from the solar system's formation remains relatively unchanged. Mission scientists hoped the project would answer basic questions about the formation of the solar system by providing an in-depth picture of the nature and composition of comets.

The University of Maryland is responsible for overall Deep Impact mission science, and project management is handled by JPL. The spacecraft was built for NASA by Ball Aerospace & Technologies Corporation, Boulder, Colo. JPL is a division of the California Institute of Technology, Pasadena, Calif.

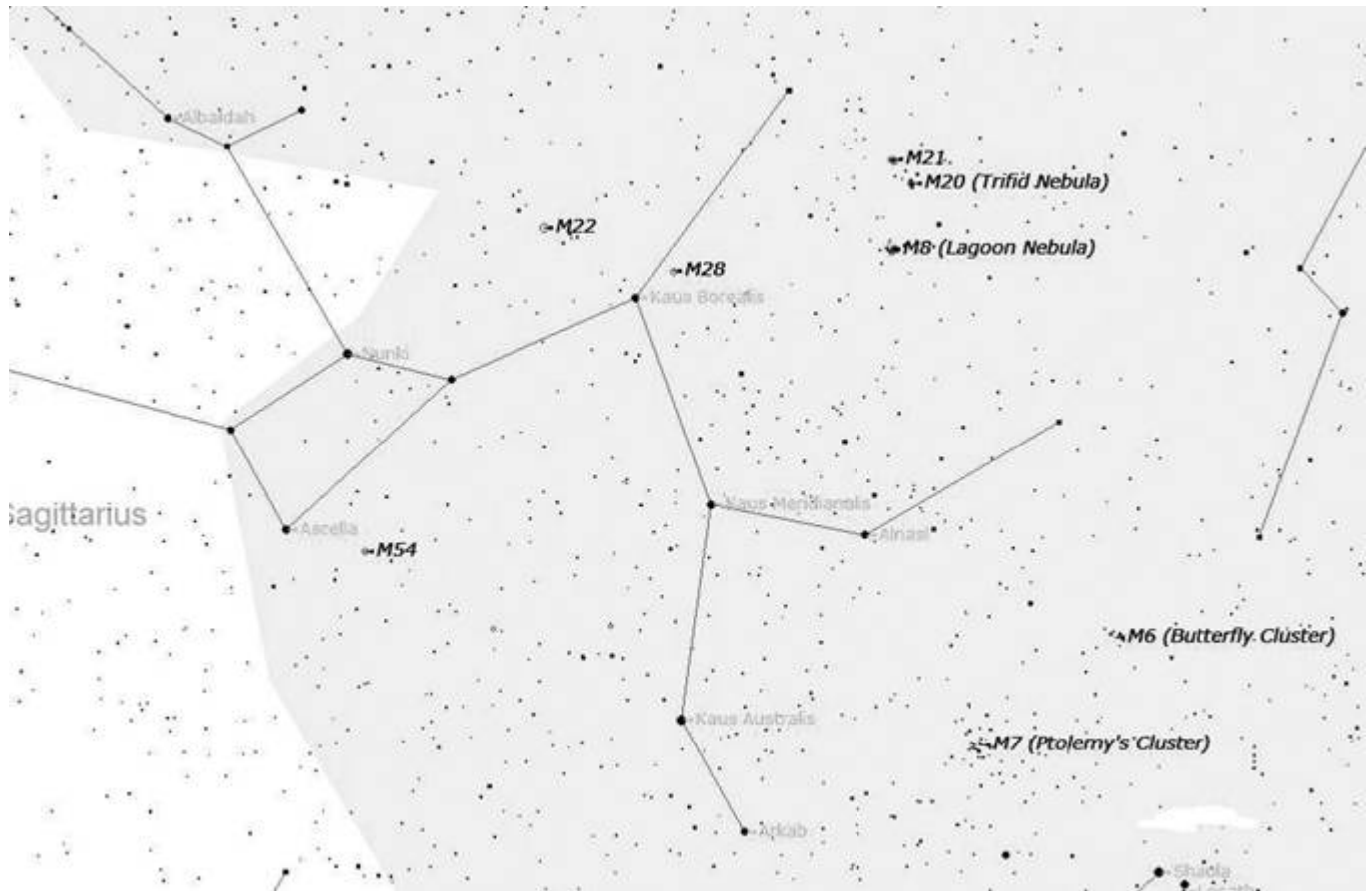
For information about Deep Impact on the Internet, visit:

[www.nasa.gov/deepimpact](http://www.nasa.gov/deepimpact)

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### ***Middle Evening Observing Highlights for August***

The Milky Way stretches across the sky from south to north. Sagittarius is in the southern sky. The globular cluster M22 can be seen at the top right of the “teapot”. Slightly west of the “teapot” is M8, the Lagoon Nebula. Closer to the southern horizon and west of the “teapot” M6 and M7 can be seen. Both are open clusters in Scorpius. 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 bright star Arcturus is in the western sky. Uranus is in the southeastern sky in Aquarius. Neptune can be found in Capricorn. The image below shows the location of M22, M8, M6, and M7.



Full moon is on August 19<sup>th</sup> and new moon is on August 5<sup>th</sup>.

The Perseid meteor shower peaks on August 11<sup>th</sup> and 12<sup>th</sup>. Some Perseids are visible from July 23<sup>rd</sup> to August 20<sup>th</sup>. They are at about a quarter of their maximum intensity from August 9<sup>th</sup> to August 14<sup>th</sup>. An almost first quarter moon will make for good viewing later in the evening. The shower may even be better than expected. Check out the link below.

[http://skyandtelescope.com/observing/objects/meteors/article\\_1557\\_1.asp](http://skyandtelescope.com/observing/objects/meteors/article_1557_1.asp)

*NASA Space Place*

## Newest Weather Sentry Takes Up Watch

by Patrick L. Barry

Today, we've become accustomed to seeing images of the Earth's swirling atmosphere from space every night on the evening news.

Before 1960, no one had ever seen such images.

The first-ever weather satellite was launched that year, kicking off a long line of weather satellites that have kept a continuous watch on our planet's fickle atmosphere—45 years and counting! The high-quality, extended

weather forecasts that these satellites make possible have become an indispensable part of our modern society, helping commercial aircraft, recreational boaters, and even military operations avoid unnecessary risk from hazardous weather.

But satellites don't last forever. Parts wear out, radiation takes its toll, and atmospheric drag slowly pulls the satellite out of orbit. Many weather satellites have a design life of only 2 years, though often they can last 5 or 10 years, or more. A steady schedule of new satellite launches is needed to keep the weather report on the news each night.

In May 2005, NASA successfully launched the latest in this long line of weather satellites. Dubbed NOAA-N at launch and renamed NOAA-18 once it reached orbit, this satellite will take over for the older satellite NOAA-16, which was launched in September 2000.

"NOAA always keeps at least two satellites in low-Earth orbit, circling the poles 14 times each day," explains Wilfred E. Mazur, Polar Satellite Acquisition Manager, NOAA/NESDIS. "As Earth rotates, these satellites end up covering Earth's entire surface each day. In fact, with two satellites in orbit, NOAA covers each spot on the Earth four times each day, twice during the day and twice at night," Mazur says.

By orbiting close to Earth (NOAA-18 is only 870 km above the ground), these "low-Earth orbit" satellites provide a detailed view of the weather. The other type of weather satellite, "geosynchronous," orbits much farther out at 35,786 km. At that altitude, geosynchronous satellites can keep a constant watch on whole continents, but without the kind of detail that NOAA-18 can provide.

In particular, low-Earth orbiting satellites have the ability to use microwave radiometers to measure temperature and moisture in the atmosphere—two key measurements used for weather prediction that, for technical reasons, cannot be sensed by distant geosynchronous satellites.

With NOAA-18 successfully placed in orbit, the 45-year legacy of high-tech weather forecasts that we're accustomed to will go on.

Find out more about NOAA-18 and the history of polar-orbiting weather satellites at

<http://goespoes.gsfc.nasa.gov/poes>. For kids and anyone else curious about the concept, the difference between polar and geosynchronous orbits is explained at [http://spaceplace.nasa.gov/en/kids/goes/goes\\_poes\\_orbits.shtml](http://spaceplace.nasa.gov/en/kids/goes/goes_poes_orbits.shtml)

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



Caption:

*NOAA-18, the newest in a long line of weather and environmental satellites, launched May 20, 2005.*