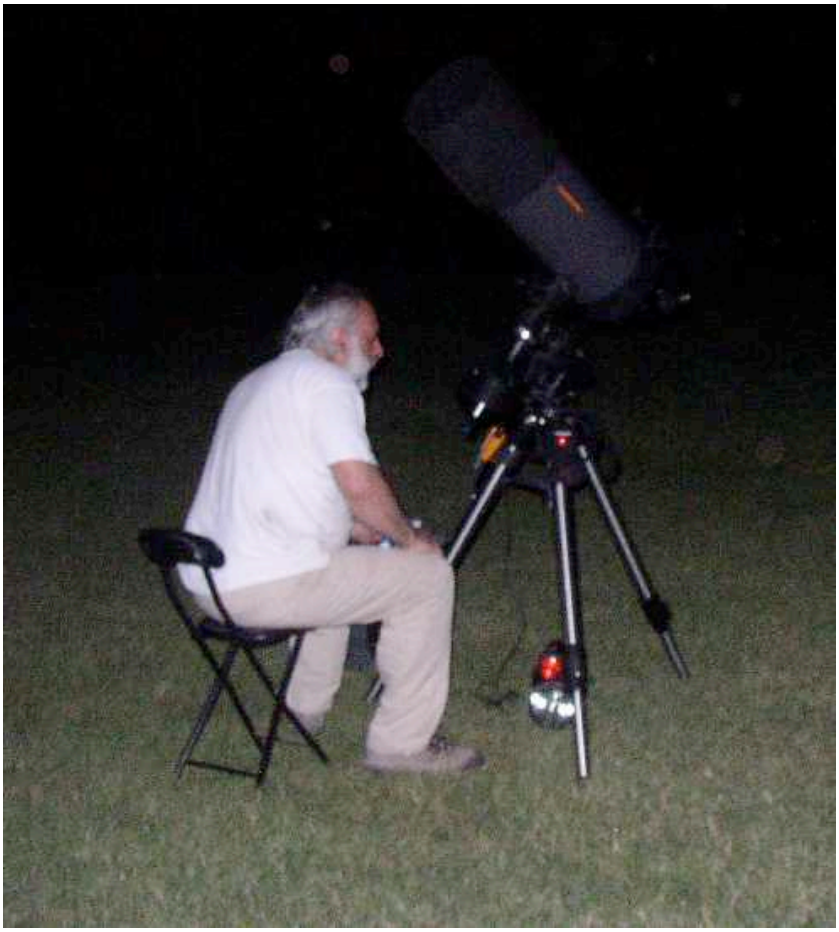
Catskills Astronomy Club News

August, 2007

8/1/07

Club News:

An observation session was held at Walnut Mountain Park on July 14th. Five people attended despite a poor forecast. The skies cleared nicely until later in the evening when hazy conditions started to develop. Early in the evening Jupiter and three of its moons were observed as well a few double stars such as Albireo and Polaris. After the skies darkened many deep skies objects were observed such as the Ring Nebula in Lyra and the Great Cluster in Hercules. The Great Cluster is one of the finest globular star clusters in that can be viewed in the skies of the northern hemisphere. Later in the evening after finding the galaxy NGC 5866 we were fortunate enough to find Comet Linear VZ13. It appeared as a faint oval glow between Ursa Major and Bootes. The image below shows the Celestron 9.25 inch Schmidt-Cassegrain telescope brought by Rich Johnson to the observation session.



The July 7th observation session was unattended despite favorable skies.

The August observation sessions are scheduled for the 4th and 11th.

Martha Brunelle of Port Jervis has donated a three inch Edmund reflecting telescope and two eyepieces to our club. It will become an additional telescope for members to borrow and for use at observation sessions. It seems to work well and is quite user friendly. The scope is great for beginners to get their feet wet with. The image below shows the telescope.

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

The club has selection of astronomy books, dvds, and a Meade eight inch reflector as well as a three inch Edmund reflector for members to borrow. Please contact John at 791-5240 or 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.

NEWS RELEASE: 2007-077 July 11, 2007

NASA's Spitzer Finds Water Vapor on Hot, Alien Planet

A scorching-hot gas planet beyond our solar system is steaming up with water vapor, according to new observations from NASA's Spitzer Space Telescope.

The planet, called HD 189733b, swelters as it zips closely around its star every two days or so. Astronomers had predicted that planets of this class, termed "hot Jupiters," would contain water vapor in their atmospheres. Yet finding solid evidence for this has been slippery. These latest data are the most convincing yet that hot Jupiters are "wet."

"We're thrilled to have identified clear signs of water on a planet that is trillions of miles away," said Giovanna Tinetti, a European Space Agency fellow at the Institute d'Astrophysique de Paris in France. " Tinetti is lead author of a paper on HD 189733b appearing today in Nature.

Although water is an essential ingredient to life as we know it, wet hot Jupiters are not likely to harbor any creatures. Previous measurements from Spitzer indicate that HD 189733b is a fiery 1,000 Kelvin (1,340 degrees Fahrenheit) on average. Ultimately, astronomers hope to use instruments like those on Spitzer to find water on rocky, habitable planets like Earth.

"Finding water on this planet implies that other planets in the universe, possibly even rocky ones, could also have water," said co-author Sean Carey of NASA's Spitzer Science Center at the California Institute of Technology in Pasadena. "I'm excited to tell my nephews and niece about the discovery."

The new findings are part of a brand new field of science investigating the climate on exoplanets, or planets outside our solar system. Such faraway planets cannot be seen directly; however, in the past few years, astronomers have begun to glean information about their atmospheres by observing a subset of hot Jupiters that transit, or pass in front of, their stars as seen from Earth.

Earlier this year, Spitzer became the first telescope to analyze, or break apart, the light from two transiting hot Jupiters, HD 189733b and HD 209458b. One of its instruments, called a spectrometer, observed the planets as they dipped behind their stars in what is called the secondary eclipse. This led to the first-ever "fingerprint," or spectrum, of an exoplanet's light. Yet, the results came up "dry," probably because the structure of these planets' atmospheres makes finding water with this method difficult.

Later, a team of astronomers found hints of water in HD 209458b by analyzing visible-light data taken by NASA's Hubble Space Telescope. The Hubble data were captured as the planet crossed in front of the star, an event called the primary eclipse.

Now, Tinetti and her team have captured the best evidence yet for wet, hot Jupiters by watching HD 189733b's primary eclipse in infrared light with Spitzer. In this method, changes in infrared light from the star are measured as the planet slips by, filtering starlight through its outer atmosphere. The astronomers observed the eclipse with Spitzer's infrared array camera at three different infrared wavelengths and noticed that for each wavelength a different amount of light was absorbed by the planet. The pattern by which this absorption varies with wavelength matches that created by water.

"Water is the only molecule that can explain that behavior," said Tinetti. "Observing primary eclipses in infrared light is the best way to search for this molecule in exoplanets."

The water on HD 189733b is too hot to condense into clouds; however, previous observations of the

planet from Spitzer and other ground and space-based telescopes suggest that it might have dry clouds, along with high winds and a hot, sun-facing side that is warmer than its dark side. HD 189733b is located 63 light-years away in the constellation Vulpecula.

Other authors of the Nature paper include Alfred Vidal-Madjar, Jean-Phillippe Beaulieu, David Sing and Nicole Allard of the Institute d'Astrophysique de Paris: Mao-Chang Liang of Caltech and the Academia Sinica, Taiwan; Yuk Yung of Caltech; Robert J. Barber and Jonathan Tennyson of University College London in England; Ignasi Ribas of the Institut de Ciències de l'Espai, Spain; Gilda E. Ballester of the University of Arizona, Tucson; and Franck Selsis of the Ecole Normale Supérieure, France.

JPL manages the Spitzer Space Telescope mission for NASA's Science Mission Directorate, Washington. Science operations are conducted at the Spitzer Science Center at the California Institute of Technology, Pasadena. JPL is a division of Caltech. Spitzer's infrared array camera was built by NASA's Goddard Space Flight Center, Greenbelt, Md. The instrument's principal investigator is Giovanni Fazio of the Harvard-Smithsonian Center for Astrophysics in Cambridge, Mass.

For graphics related to this research and more information about Spitzer, visit **http://www.spitzer.caltech.edu/spitzer and http://www.nasa.gov/spitzer .**

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NEWS RELEASE: 2007-076 July 9, 2007

NASA Readies Mars Lander for August Launch to Icy Site

PASADENA – NASA's next Mars mission will look beneath a frigid arctic landscape for conditions favorable to past or present life.

Instead of roving to hills or craters, NASA's Phoenix Mars Lander will claw down into the icy soil of the Red Planet's northern plains. The robot will investigate whether frozen water near the Martian surface might periodically melt enough to sustain a livable environment for microbes. To accomplish that and other key goals, Phoenix will carry a set of advanced research tools never before used on Mars.

First, however, it must launch from Florida during a three-week period beginning Aug. 3, then survive a risky descent and landing on Mars next spring.

"Our 'follow the water' strategy for exploring Mars has yielded a string of dramatic discoveries in recent years about the history of water on a planet where similarities with Earth were much greater in the past than they are today," said Doug McCuistion, director of the Mars Exploration Program at NASA Headquarters, Washington. "Phoenix will complement our strategic exploration of Mars by being our first attempt to actually touch and analyze Martian water -- water in the form of buried ice."

NASA's Mars Odyssey orbiter found evidence in 2002 to support theories that large areas of Mars, including the arctic plains, have water ice within an arm's reach of the surface.

"Phoenix has been designed to examine the history of the ice by measuring how liquid water has modified the

chemistry and mineralogy of the soil," said Peter Smith, the Phoenix principal investigator at the University of Arizona, Tucson.

"In addition, our instruments can assess whether this polar environment is a habitable zone for primitive microbes. To complete the scientific characterization of the site, Phoenix will monitor polar weather and the interaction of the atmosphere with the surface."
With its flanking solar panels unfurled, the lander is about 5.5 meters (18 feet) wide and 1.5 meters (5 feet) long. A robotic arm 2.3 meters (7.7 feet) long will dig to the icy layer, which is expected to lie within a few inches of the surface. A camera and conductivity probe on the arm will examine soil and any ice there. The arm will lift samples to two instruments on the lander's deck. One will use heating to check for volatile substances, such as water and carbon-based chemicals that are essential building blocks for life. The other will analyze the chemistry of the soil.

A meteorology station, with a laser for assessing water and dust in the atmosphere, will monitor weather throughout the planned three-month mission during Martian spring and summer. The robot's toolkit also includes a mast-mounted stereo camera to survey the landing site, a descent camera to see the site in broader context and two microscopes.

For the final stage of landing, Phoenix is equipped with a pulsed thruster method of deceleration. The system uses an ultra-lightweight landing system that allows the spacecraft to carry a heavier scientific payload. Like past Mars missions, Phoenix uses a heat shield to slow its high-speed entry, followed by a supersonic parachute that further reduces its speed to about 217 kilometers per hour (135 miles per hour). The lander then separates from the parachute and fires pulsed descent rocket engines to slow to about 9 kilometers per hour (5.5 miles per hour) before landing on its three legs.

"Landing safely on Mars is difficult no matter what method you use," said Barry Goldstein, the project manager for Phoenix at NASA's Jet Propulsion Laboratory, Pasadena, Calif. "Our team has been testing the system relentlessly since 2003 to identify and address whatever vulnerabilities may exist."

Researchers evaluating possible landing sites have used observations from Mars orbiters to find the safest places where the mission's goals can be met. The leading candidate site is a broad valley with few boulders at a latitude equivalent to northern Alaska.

Smith leads the Phoenix mission, with project management at the Jet Propulsion Laboratory and the development partnership located at Lockheed Martin, Denver. International contributions are provided by the Canadian Space Agency, the University of Neuchatel, Switzerland, the University of Copenhagen, Denmark, the Max Planck Institute, Germany, and the Finnish Meteorological Institute. Additional information on the Phoenix mission is available online at: **http://www.nasa.gov/phoenix** .

Additional information on NASA's Mars program is available online at: **http://www.nasa.gov/mars** .

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NEWS RELEASE: 2007-075 July 7, 2007

NASA Mission to Asteroid Belt Rescheduled for September Launch

WASHINGTON - The launch of NASA's Dawn spacecraft, a mission that will explore the two largest objects

in the asteroid belt in an effort to answer questions about the formation of our solar system, has been rescheduled to September.

The decision was made today to move the launch to September after careful review by NASA's Science Mission Directorate officials, working with Dawn mission managers, the Dawn principal investigator, and with the concurrence of the NASA Administrator.

Primary reasons for the move were a combination of highly limited launch opportunities for Dawn in July and the potential impact to launch preparations for the upcoming Phoenix Mars Lander mission, set for early August. A September launch for Dawn maintains all of the science mission goals a July launch would have provided.

NASA will hold a news briefing at 8:30 a.m. Pacific Time (11:30 a.m. Eastern Time) on Monday, July 9, to preview the launch of the Phoenix Mars Lander. Prior to the Phoenix presentations, media will have the opportunity to learn in more detail about the rescheduled Dawn launch. The briefing will originate from the NASA Headquarters auditorium, 300 E St., S.W., Washington. It will air live on NASA Television and be streamed online at http://www.nasa.gov/ntv .

The Phoenix mission, scheduled for liftoff in early August from Cape Canaveral Air Force Station, Fla., will examine whether the icy soil on Mars could have been a habitable environment for microbial life.

For more information about the Phoenix mission, visit:

http://www.nasa.gov/phoenix

For more information about Dawn, visit:

http://www.nasa.gov/dawn

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NEWS RELEASE: 2007-071 July 4, 2007

NASA Finds Hydrocarbons on Saturn's Moon Hyperion

PASADENA, Calif. - NASA's Cassini spacecraft has revealed for the first time surface details of Saturn's moon Hyperion, including cup-like craters filled with hydrocarbons that may indicate more widespread presence in our solar system of basic chemicals necessary for life.

Hyperion yielded some of its secrets to the battery of instruments aboard Cassini as the spacecraft flew close by in September 2005. Water and carbon dioxide ices were found, as well as dark material that fits the spectral profile of hydrocarbons.

A paper appearing in the July 5 issue of Nature reports details of Hyperion's surface craters and composition observed during this flyby, including keys to understanding the moon's origin and evolution over 4.5 billion years. This is the first time scientists were able to map the surface material on Hyperion.

"Of special interest is the presence on Hyperion of hydrocarbons--combinations of carbon and hydrogen atoms that are found in comets, meteorites, and the dust in our galaxy," said Dale Cruikshank, a planetary sci-

entist at NASA's Ames Research Center, Moffett Field, Calif., and the paper's lead author. "These molecules, when embedded in ice and exposed to ultraviolet light, form new molecules of biological significance. This doesn't mean that we have found life, but it is a further indication that the basic chemistry needed for life is widespread in the universe."

Cassini's ultraviolet imaging spectrograph and visual and infrared mapping spectrometer captured compositional variations in Hyperion's surface. These instruments, capable of mapping mineral and chemical features of the moon, sent back data confirming the presence of frozen water found by earlier ground-based observations, but also discovered solid carbon dioxide (dry ice) mixed in unexpected ways with the ordinary ice. Images of the brightest regions of Hyperion's surface show frozen water that is crystalline in form, like that found on Earth.

"Most of Hyperion's surface ice is a mix of frozen water and organic dust, but carbon dioxide ice is also prominent. The carbon dioxide is not pure, but is somehow chemically attached to other molecules," explained Cruikshank.

Prior spacecraft data from other moons of Saturn, as well as Jupiter's moons Ganymede and Callisto, suggest that the carbon dioxide molecule is "complexed," or attached with other surface material in multiple ways. "We think that ordinary carbon dioxide will evaporate from Saturn's moons over long periods of time," said Cruikshank, "but it appears to be much more stable when it is attached to other molecules."

"The Hyperion flyby was a fine example of Cassini's multi-wavelength capabilities. In this first-ever ultraviolet observation of Hyperion, the detection of water ice tells us about compositional differences of this bizarre body," said Amanda Hendrix, Cassini scientist on the ultraviolet imaging spectrograph at NASA's Jet Propulsion Laboratory, Pasadena, Calif.

Hyperion, Saturn's eighth largest moon, has a chaotic spin and orbits Saturn every 21 days. The July 5 issue of Nature also includes new findings from the imaging team about Hyperion's strange, spongy-looking appearance. Details are online at: http://ciclops.org/view.php?id=3303 .

The Cassini-Huygens mission is a cooperative project of NASA, the European Space Agency and the Italian Space Agency. JPL, a division of the California Institute of Technology in Pasadena, manages the Cassini-Huygens mission for NASA's Science Mission Directorate, Washington.

More information on the Cassini mission is available at: http://www.nasa.gov/cassini .

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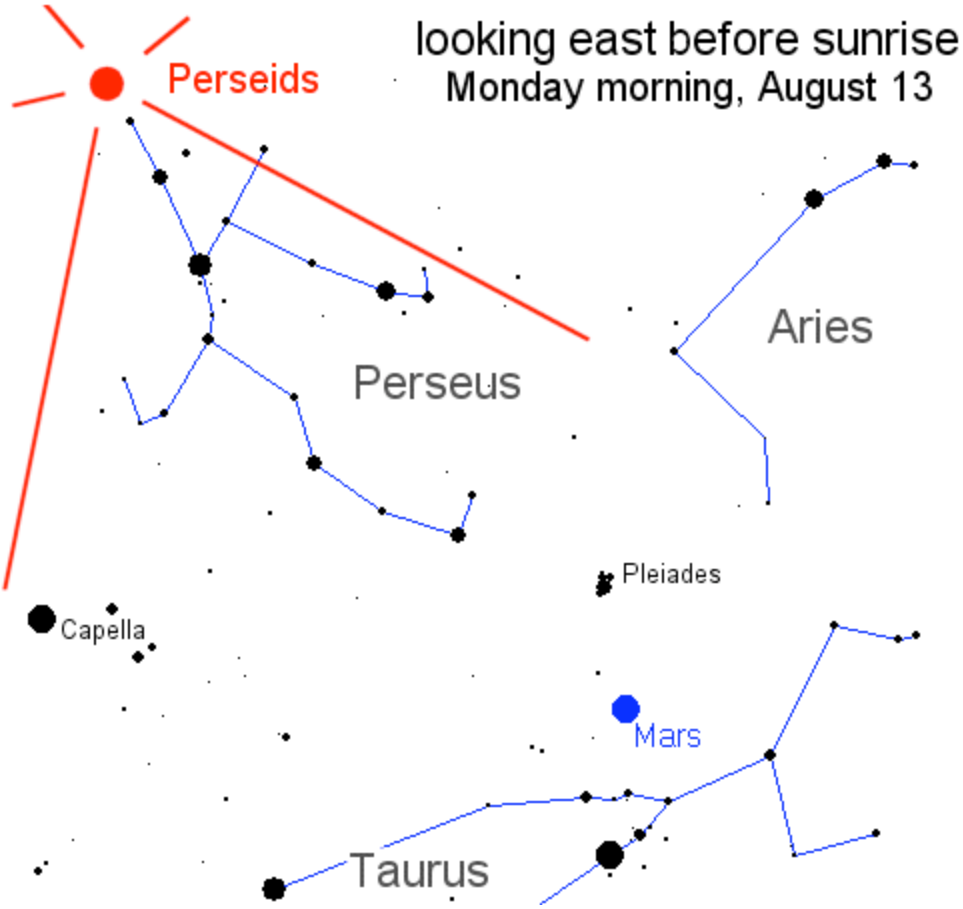
Observations and Photographs

The picture below shows the Venus/Saturn conjunction of 7/1/07 taken by John Kocijanski with an Olympus d550 digital camera. Regulus is the bright star to the left.

Middle Evening Observing Highlights for August

Jupiter is bright in the southern sky. The Milky Way stretches across the sky from south to north. Sagittarius is in the southern sky. It forms an easily recognizable "teapot' shape. The globular cluster M22 can be seen at the top right of the "teapot". Slightly west of the "teapot" is M8, the Lagoon Nebula. Above Sagittarius there are a number of star clusters and nebula that can easily bee seen. 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. Full moon is on August 28th and new moon is on August 12th. The Perseid meteor shower peaks on August 12th and 13th. Some Perseids are visible from July 23rd to August 20th. They are at about a quarter of their maximum intensity from August 9th to August 14th. A new moon will make for excellent viewing. The image below shows the part of the sky the meteors will radiate from. It is taken from the following NASA website where more information can be found about the meteor shower.

http://science.nasa.gov/headlines/y2007/11jul_greatperseids.htm



NASA Space Place

Omit Needless Bytes!

by Patrick Barry and Tony Phillips

Now is an exciting time for space enthusiasts. In the history of the Space Age, there have never been so many missions "out there" at once. NASA has, for example, robots on Mars, satellites orbiting Mars, a spacecraft circling Saturn, probes en route to Pluto and Mercury—and four spacecraft, the two Voyagers and the two Pioneers, are exiting the solar system altogether.

It's wonderful, but it is also creating a challenge.

The Deep Space Network that NASA uses to communicate with distant probes is becoming overtaxed. Status reports and data transmissions are coming in from all over the solar system—and there's only so much time to listen. Expanding the network would be expensive, so it would be nice if these probes could learn to communicate with greater brevity. But how?

Solving problems like this is why NASA created the New Millennium Program (NMP). The goal of NMP is to flight-test experimental hardware and software for future space missions. In 1998, for instance, NMP launched an experimental spacecraft called Deep Space 1 that carried a suite of new technologies, including a new kind of communication system known as Beacon Monitor.

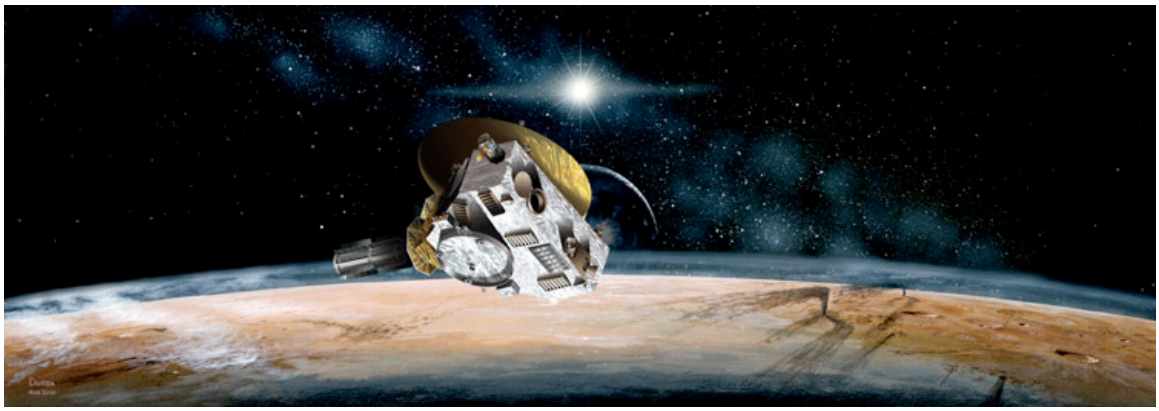
The system leverages the fact that for most of a probe's long voyage to a distant planet or asteroid or comet, it's not doing very much. There's little to report. During that time, mission scientists usually only need to know whether the spacecraft is in good health.

"If you don't need to transmit a full data stream, if you only need some basic state information, then you can use a much simpler transmission system," notes Henry Hotz, an engineer at NASA's Jet Propulsion Laboratory who worked on Beacon Monitor for Deep Space 1. So instead of beaming back complete data about the spacecraft's operation, Beacon Monitor uses sophisticated software in the probe's onboard computer to boil that data down to a single "diagnosis." It then uses a low-power antenna to transmit that diagnosis as one of four simple radio tones, signifying "all clear," "need some attention whenever you can," "need attention soon," or "I'm in big trouble—need attention right now!"

"These simple tones are much easier to detect from Earth than complex data streams, so the mission needs far less of the network's valuable time and bandwidth," says Hotz. After being tested on Deep Space 1, Beacon Monitor was approved for the New Horizons mission, currently on its way to Pluto, beaming back a simple beacon as it goes.

Discover more about Beacon Monitor technology, as well as other technologies, on the NMP Technology Validation Reports page, http://nmp-techval-reports.jpl.nasa.gov.

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



Caption:
This artist's concept shows the New Horizons spacecraft during its planned encounter with Pluto and its moon, Charon. The spacecraft is currently using the Beacon Monitor system on its way to Pluto. *Credit: Johns Hopkins University Applied Physics Laboratory/Southwest Research Institute (JHUAPL/SwRI)*