



Catskills Astronomy Club News

November, 2007

John Kocijanski.....Editor
Jim McKeegan.....President
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Lisa Brody.....Treasurer
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11/1/07

Club News:

Both observation sessions for the month of October were canceled due to poor weather conditions. The Big Twig observation session has not been rescheduled yet.

The November observation sessions are on the 3rd and 10th.

The club has selection of astronomy books and DVDs as well as a Meade eight inch reflector and an Edmund three inch reflector for members to borrow. Please contact John at 791-5240 or kocis@verizon.net if you are interested in borrowing any of these.

A new section has been added to our newsletter for member classifieds. Any member who has any astronomy related items that they would like to post for sale can send their ad to John at kocis@verizon.net. The ad can be placed in the newsletter for all members to see.

Astronomy News:

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

Feature

October 2, 2007

First Contact: Sputnik

To say the least, it was incredible. The news relayed by the voice on the other end of the phone line hit the president of the San Gabriel Valley Radio Club like a blow to the head. Too incredible, Henry Richter hoped, to be true.

Hope was something Richter knew quite well. It went with the job. Not only as president of a local ham radio club; although you always hoped the guy on the other side of the world talking to you over the shortwave would have something interesting to say. No, Richter's familiarity with hope came as a charter member of the nascent space exploration industry.

"Some of the things that occurred during that period I can recall like they happened yesterday," said 80-year-old Richter. "There was a warning that it was going to happen, but they were so secretive about everything. Why would they change now?"

The warning materialized in the form of a phone call from Richter's boss, William Pickering, the director of the Jet Propulsion Laboratory. Pickering was attending meetings in Washington when he heard from a Russian scientist that the Soviets would launch a satellite in the near future.

On October 4 at 10:28 p.m. Moscow time, a brilliant and deafening detonation of smoke and flame illuminated the Soviet Union's rocket test site near Tyuratam, Kazakhstan, as the 32 nozzles announced the rise of the Russian R-7 intercontinental ballistic missile. 295 seconds and 142 miles later, the last of the R-7's engines shut down for good. Soon after, pneumatic locks were activated, a nosecone fairing separated, and an antenna spike was released. Then, in one final act that signaled the dawn of the space age, a pushrod connected to a bulkhead of the R-7 was activated, shoving a 183-pound beach ball-sized aluminum sphere into the cold, harsh blackness of space. Sputnik had arrived.

"I was in my office in Building 125 at JPL when Dr. Pickering called again," said Richter. "I do not recall exactly what was said but it was a short conversation about Sputnik. I then went to a radio receiver and tried to dial it in."

The Russians were advertising that signals from their satellite could be received on a frequency 20 MHz (megacycles). But all Richter could dial in was static. He immediately suspected the high-tension wires located on a hill above JPL were blocking out the frequency. So the U.S. Navy veteran and Caltech graduate got on the phone, but not to his boss Pickering this time. Instead, he called a friend, and more importantly, a member of the San Gabriel Valley Radio Club.

"Bob Legg had a lot of ingenuity and his own ham setup, and he lived in nearby Temple City," said Richter. "At the time there were no high tension wires near Bob's home, so he had a clear shot at receiving a signal."

The one thing Legg did not have was an antenna that could pick up transmissions on 20 MHz. So the resourceful Legg looked around his house and found something he thought could do the job: a wire-mesh mosquito screen on one of his windows. He ran a wire from the screen to his radio, dialed in 20 MHz and listened.

"When Bob called me back and said he'd heard it I sort of went numb," said Richter. "America had been working toward being first in space. The United States had plans on launching a Navy satellite called Vanguard in the coming months. And the Russians had beaten us to it."

As stunned as Richter felt, he knew he still had a job to do. There were many questions to be answered. What could our Cold War enemies do that we could not? What exactly was it that was placed in an orbit above our heads? And most immediate, what was the significance of the continuous string of pulse transmissions radiating out of Sputnik? Richter knew his country's leaders would need these answers as soon as possible. He also knew that JPL was one of the few places in the nation with personnel who had the knowledge, training and equipment to tell them.

Richter and three others piled JPL's best radio gear into a trailer, hooked it to a JPL truck and headed as far away from those infernal high-tension wires as they could. An hour later they pulled up to the substation of the Temple City Sheriff's Department.

"We went here because they were part of a disaster preparedness group. I knew they had a ham radio station and that they could get clear signals from their location," said Richter, "which was appropriate because this certainly qualified as a disaster in my book. Furthermore, the hams had built a Microlock Station there in anticipation of tracking our American satellite."

Moments after arrival, the JPLers hooked into the station's power supply, powered up their best receiver, adjusted their antenna and waited. They soon became among the first humans to hear the 'beep-beep-beep' that was announcing the birth of the space age.

In the name of national security Richter and company soon took over the basement of the sheriff's building and set up for the long haul.

"It came in loud and clear," said Richter. "But we did more than listen. We took audio on a reel-to-reel recorder and rolls of strip chart plots of these first signals. We were looking for anything, trying to decipher the significance of what Sputnik was sending out."

Over the next days, weeks and even months, the significance of Sputnik's signals was fiercely debated. Some scientists stated the space transmissions were simply a carrier signal, intended to assist in the confirmation and tracking of the satellite. Others charged that the Soviets were receiving scientific information from Sputnik in code.

While the debate raged, Richter and his group concentrated on the job at hand. Enconced in the sheriff's basement, they did not immediately appreciate the effect the Soviet achievement had on world opinion. As they monitored and documented the satellite's orbits, the word Sputnik itself, which means "companion" in Russian, quickly became part of the American lexicon. Sputnik was on the front page of just about every major newspaper in America. Within days of their discovery, a wave of VIPs began streaming in to the Temple City Sheriff's Department to hear for themselves what America's Cold War enemies had achieved.

"JPL and Caltech staff were dropping by to get an earful and it soon got pretty crowded in that basement," said Richter. "Then the media came, including the three networks. There were so many people crowded into that small room, it got to be too much. So I said the next guy to come down those stairs was getting kicked out. Sure enough, here comes someone and without looking I told him to get the heck out. Turns out, it was the Under-Sheriff Pitchess of Los Angeles County. It was his station and he could have kicked me out, but instead he turned around and left his own basement; more than once he referred to that incident publicly. He was a proud American and knew we were doing important work."

JPL's important work in the basement of the Temple City Sheriff's Department would go on for several months. But well before Sputnik gave its final beep 22 days later, Richter was pulled away to work on another important project. On behalf of JPL and his boss Dr. William Pickering, Richter crisscrossed the country, representing the team that would find the perfect instruments to go into a JPL-made satellite.

The first chance to reach the high ground of space came two months and two days later.

At 11:45 AM on [HYPERLINK "http://en.wikipedia.org/wiki/December_6"](http://en.wikipedia.org/wiki/December_6) \o "December 6" December 6, 1957, a nationwide audience watched as the Navy's Vanguard rocket, the United States first orbital space attempt, exploded on the pad. America's next shot at the high ground came from JPL and the US Army's Explorer program.

"Explorer was a crash program," said Richter. "We were determined to get this thing up one way or another and Sputnik merely pushed the button."

On January 31, 1958, a Juno rocket climbed eastward into the night's sky over Cape Canaveral, Florida. Within minutes, the Juno and its cargo, the JPL-manufactured satellite called Explorer 1, disappeared over the horizon -- its fate unknown.

"I was at the Cape that night waiting for our JPL listening post on the West Coast to confirm that they heard signals coming down from the satellite," said Richter. "We had all these listening posts and the first call I get is from one of my club's ham radio operators saying they were receiving Explorer 1. My guys were first to hear we made it, that we made it for America."

The 50th Anniversary of JPL's Explorer 1 mission is January 31, 2008.

Hear beeps from Sputnik and other audio in a podcast at [HYPERLINK "http://www.kintera.org/TR.asp?a=eLLULgMZLoK1LnI&s=kqLTK1ODKaLLLYPJE&cm=dqKMJXPyFdJXG"](http://www.kintera.org/TR.asp?a=eLLULgMZLoK1LnI&s=kqLTK1ODKaLLLYPJE&cm=dqKMJXPyFdJXG) \t "_blank" <http://www.jpl.nasa.gov/multimedia/podcast/sputnik20071002/>

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NEWS RELEASE: 2007-113

Oct. 8, 2007

Cassini is on the Trail of a Runaway Mystery

NASA scientists are on the trail of Iapetus' mysterious dark side, which seems to be home to a bizarre "runaway" process that is transporting vaporized water ice from the dark areas to the white areas of the Saturnian moon.

This "thermal segregation" model may explain many details of the moon's strange and dramatically two-toned appearance, which have been revealed exquisitely in images collected during a recent close flyby of Iapetus by NASA's Cassini spacecraft.

Infrared observations from the flyby confirm that the dark material is warm enough (approximately minus 230 degrees Fahrenheit or 127 Kelvin) for very slow release of water vapor from water ice, and this process is probably a major factor in determining the distinct brightness boundaries.

"The side of Iapetus that faces forward in its orbit around Saturn is being darkened by some mysterious process," said John Spencer, Cassini scientist with the composite infrared spectrometer team from the Southwest Research Institute, Boulder, Colo.

Using multiple instruments on Cassini, scientists are piecing together a complex story to explain the bright and dark faces of Iapetus. But yet to be fully understood is where the dark material is coming from. Is it native or from outside the moon? It has long been hypothesized that this material did not originate from within Iapetus, but instead was derived from other moons orbiting at a much greater distance from Saturn in a direction opposite to Iapetus.

Scientists are now converging on the notion that the darkening process in fact began in this manner, and that thermal effects subsequently enhanced the contrast to what we see today.

"It's interesting to ponder that a more than 30-year-old idea might still help explain the brightness difference on Iapetus," said Tilmann Denk, Cassini imaging scientist at the Free University in Berlin, Germany. "Dusty material spiraling in from outer moons hits Iapetus head-on, and causes the forward-facing side of Iapetus to look different than the rest of the moon."

Once the leading side is even slightly dark, thermal segregation can proceed rapidly. A dark surface will absorb more sunlight and warm up, explains Spencer, so the water ice on the surface evaporates. The water vapor then condenses on the nearest cold spot, which could be Iapetus's poles, and possibly bright, icy areas at lower latitudes on the side of the moon facing in the opposite direction of its orbit. So the dark stuff loses its surface ice and gets darker, and the bright stuff accumulates ice and gets brighter, in a runaway process.

Scientists say the result is that there are virtually no shades of gray on Iapetus. There is only white and very dark.

Ultraviolet data also show a non-ice component in the bright, white regions of Iapetus. Spectroscopic analysis will reveal whether the composition of the material on the dark hemisphere is the same as the dark material that is present within the bright terrain.

"The ultraviolet data tell us a lot about where the water ice is and where the non-water ice stuff is. At first glance, the two populations do not appear to be present in the pattern we expected, which is very interesting," said Amanda Hendrix, Cassini scientist on the ultraviolet imaging spectrograph team at NASA's Jet Propulsion Laboratory, Pasadena, Calif.

Because of the presence of very small craters that excavate the bright ice beneath, scientists also believe that the dark material is thin, a result consistent with previous Cassini radar results. But some local areas may be thicker. The dark material seems to lie on top of the bright region, consistent with the idea that it is a residual left behind by the sublimated water ice.

Some other mysteries are coming together. There are more data on the signature mountain ridge that gives Iapetus its "walnut" appearance. In some places it appears subdued. One big question that remains is why it does not go all the way around. Was it partially destroyed after it formed, or did it never extend all the way around the moon? Scientists have ruled out that it is a youthful feature because it is pitted with craters, indicating it is old. And the ridge looks too solid and competent to be the result of an equatorial ring around the moon collapsing onto its surface. The ring theory cannot explain features that look like tectonic structures in the new high resolution images.

Over the next few months, scientists hope to learn more about Iapetus' mysteries.

New Iapetus images, temperature maps and other visuals on Iapetus are available at: [\t "_blank" http://saturn.jpl.nasa.gov](http://www.kintera.org/TR.asp?a=dkLUI9PSImJQJfL&s=plK3IgNXLfLVKdP3F&m=gjLUL8ONfIIZE) and [\t "_blank" http://www.nasa.gov/cassini](http://www.kintera.org/TR.asp?a=7eIIJRMuGgIFLYJ&s=plK3IgNXLfLVKdP3F&m=gjLUL8ONfIIZE).

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 mission for NASA's Science Mission Directorate, Washington, D.C.

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NEWS RELEASE: 2007-114

Oct. 9, 2007

Astronomers Find Dust in the Wind of Black Holes

The hit song that proclaimed, "All we are is dust in the wind," may have some cosmic truth to it. New findings from NASA's Spitzer Space Telescope suggest that space dust -- the same stuff that makes up living creatures and planets -- was manufactured in large quantities in the winds of black holes that populated our early universe.

The findings are a significant new clue in an unsolved mystery: where did all the dust in the young universe originate?

"We were surprised to find what appears to be freshly made dust entrained in the winds that blow away from supermassive black holes," said Ciska Markwick-Kemper of the University of Manchester, U.K. Markwick-Kemper is lead author of a new paper appearing in an upcoming issue of the *Astrophysical Journal Letters*. "This could explain where the dust came from that was needed to make the first generations of stars in the early universe."

Space dust is essential to the formation of planets, stars, galaxies and even life as we know it. The dust in our corner of the universe was piped out by dying stars that were once a lot like our sun. But, when the universe was less than a tenth of its present age of 13.7 billion years, sun-like stars hadn't been around long enough to die and make dust. So, what produced the precious substance back when the universe was just a toddler?

Theorists have long postulated that short-lived, massive exploding stars, or supernovae, might be the source of this mysterious dust, while others have proposed that a type of energetic, growing supermassive black hole, called a quasar, could be a contributing factor. A quasar consists of a supermassive black hole surrounded by a dusty doughnut-shaped cloud that feeds it. Theoretically, dust could form in the outer portion of the winds that slowly blow away from this doughnut cloud.

"Quasars are like the Cookie Monster," said co-author Sarah Gallagher of the University of California at Los Angeles, who is currently a visiting astronomer at the University of Western Ontario, Canada. "They are messy eaters, and they can consume less matter than they spit out in the form of winds."

Nobody has found conclusive proof that either quasar winds or supernovae can create enough dust to explain what is observed in the early universe. Markwick-Kemper and her team decided to test the former theory and investigate a quasar, called PG2112+059, located in the center of a galaxy about 8 billion light-years away. Although this particular quasar is not located in the early universe, because it is closer, it is an easier target for addressing the question of whether quasars can make dust. The team used Spitzer's infrared spectrograph instrument to split apart infrared light from the quasar and look for signs of various minerals.

They found a mix of the ingredients that make up glass, sand, marble and even rubies and sapphires. While the mineral constituting glass was expected, the minerals for sand, marble and rubies were a surprise. Why? These minerals are not typically detected floating around galaxies, suggesting they could have been freshly formed in the winds rushing away from the quasar.

For instance, the ingredient that makes up sand, crystalline silicate, doesn't survive for long free-floating in space. Radiation from stars zaps the minerals back to an amorphous, glass-like state. The presence of crystalline silicate therefore suggests something -- possibly the quasars winds -- is churning out the newly made substance.

Markwick-Kemper and her team say the case of the missing dust is not firmly shut. They hope to study more quasars for further evidence of their dust-making abilities. Also, according to the astronomers, quasars may not be the only source of dust in the early universe. "Supernovae might have been more important for creating dust in some environments, while quasars were more important in others," said Markwick-Kemper. "For now, we are very excited to have identified the different species of dust in a quasar billions of light-years away."

Other authors of this paper include Dean Hines of the Space Science Institute, Boulder, Colo., and Jeroen Bouwman of the Max Planck Institute for Astronomy, Heidelberg, Germany. NASA's Jet Propulsion Laboratory, Pasadena, Calif., 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, also in Pasadena. Caltech manages JPL for NASA. Spitzer's infrared spectrograph was built by Cornell University, Ithaca, N.Y. Its development was led by Jim Houck of Cornell.

For graphics and more information about Spitzer, visit [HYPERLINK "http://www.kintera.org/TR.asp?a=7eLILWNqH6LGJ0J&s=plJ3KgOXJfIVJdM3G&m=erLQJ8NFL8KWG"](http://www.kintera.org/TR.asp?a=7eLILWNqH6LGJ0J&s=plJ3KgOXJfIVJdM3G&m=erLQJ8NFL8KWG) <http://www.spitzer.caltech.edu/spitzer> and [HYPERLINK "http://www.kintera.org/TR.asp?a=arJOL5OCJ9KNLaI&s=plJ3KgOXJfIVJdM3G&m=erLQJ8NFL8KWG"](http://www.kintera.org/TR.asp?a=arJOL5OCJ9KNLaI&s=plJ3KgOXJfIVJdM3G&m=erLQJ8NFL8KWG) <http://www.nasa.gov/spitzer> .

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NEWS RELEASE: 2007-122

Oct. 25, 2007

Missing Black Hole Report: Hundreds Found!

PASADENA, Calif. - Astronomers have unmasked hundreds of black holes hiding deep inside dusty galaxies billions of light-years away.

The massive, growing black holes, discovered by NASA's Spitzer and Chandra space telescopes, represent a large fraction of a long-sought missing population. Their discovery implies there were hundreds of millions of additional black holes growing in our young universe, more than doubling the total amount known at that distance.

"Active, supermassive black holes were everywhere in the early universe," said Mark Dickinson of the National Optical Astronomy Observatory in Tucson, Ariz. "We had seen the tip of the iceberg before in our search for these objects. Now, we can see the iceberg itself." Dickinson is a co-author of two new papers appearing in the Nov. 10 issue of the *Astrophysical Journal*. Emanuele Daddi of the Commissariat à l'Énergie Atomique in France led the research.

The findings are also the first direct evidence that most, if not all, massive galaxies in the distant universe spent their youths building monstrous black holes at their cores.

For decades, a large population of active black holes has been considered missing. These highly energetic structures belong to a class of black holes called quasars. A quasar consists of a doughnut-shaped cloud of gas and dust that surrounds and feeds a budding supermassive black hole. As the gas and dust are devoured by the black hole, they heat up and shoot out X-rays. Those X-rays can be detected as a general glow in space, but often the quasars themselves can't be seen directly because dust and gas blocks them from our view.

"We knew from other studies from about 30 years ago that there must be more quasars in the universe, but we didn't know where to find them until now," said Daddi.

Daddi and his team initially set out to study 1,000 dusty, massive galaxies that are busy making stars and were thought to lack quasars. The galaxies are about the same mass as our own spiral Milky Way galaxy, but irregular in shape. At 9 to 11 billion light-years away, they existed at a time when the universe was in its adolescence, between 2.5 and 4.5 billion years old.

When the astronomers peered more closely at the galaxies with Spitzer's infrared eyes, they noticed that about 200 of the galaxies gave off an unusual amount of infrared light. X-ray data from Chandra, and a technique called "stacking," revealed the galaxies were, in fact, hiding plump quasars inside. The scientists now think that the quasars heat the dust in their surrounding doughnut clouds, releasing the excess infrared light.

"We found most of the population of hidden quasars in the early universe," said Daddi. Previously, only the rarest and most energetic of these hidden black holes had been seen at this early epoch.

The newfound quasars are helping answer fundamental questions about how massive galaxies evolve. For instance, astronomers have learned that most massive galaxies steadily build up their stars and black holes simultaneously until they get too big and their black holes suppress star formation.

The observations also suggest that collisions between galaxies might not play as large a role in galaxy evolution as previously believed. "Theorists thought that mergers between galaxies were required to ini-

tiate this quasar activity, but we now see that quasars can be active in unharassed galaxies," said co-author David Alexander of Durham University, United Kingdom.

"It's as if we were blindfolded studying the elephant before, and we weren't sure what kind of animal we had," added co-author David Elbaz of the Commissariat a l'Energie Atomique. "Now, we can see the elephant for the first time."

The new observations were made as part of the Great Observatories Origins Deep Survey, the most sensitive survey to date of the distant universe at multiple wavelengths.

Consistent results were recently obtained by Fabrizio Fiore of the Osservatorio Astronomico di Roma, Italy, and his team. Their results will appear in the Jan. 1, 2008, issue of *Astrophysical Journal*.

NASA's Marshall Space Flight Center, Huntsville, Ala., manages the Chandra program for the agency's Science Mission Directorate. The Smithsonian Astrophysical Observatory controls science and flight operations from the Chandra X-ray Center in Cambridge, Mass. NASA's Jet Propulsion Laboratory, Pasadena, Calif., 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, also in Pasadena. Caltech manages JPL for NASA.

The National Optical Astronomy Observatory is operated by the Association of Universities for Research in Astronomy under a cooperative agreement with the National Science Foundation.

For more information and graphics, visit [HYPERLINK "http://www.kintera.org/TR.asp?a=ciIMJZOLKjJLK9L&s=ou11LdMTLeJTKaOZF&m=hjKRJ8PRJnK7G"](http://www.kintera.org/TR.asp?a=ciIMJZOLKjJLK9L&s=ou11LdMTLeJTKaOZF&m=hjKRJ8PRJnK7G) \t "_blank" <http://www.spitzer.caltech.edu/spitzer> and [HYPERLINK "http://www.kintera.org/TR.asp?a=agLIITNDLiIQKbj&s=ou11LdMTLeJTKaOZF&m=hjKRJ8PRJnK7G"](http://www.kintera.org/TR.asp?a=agLIITNDLiIQKbj&s=ou11LdMTLeJTKaOZF&m=hjKRJ8PRJnK7G) \t "_blank" <http://www.nasa.gov/spitzer>; and [HYPERLINK "http://www.kintera.org/TR.asp?a=brKKJWOHijLPiI&s=ou11LdMTLeJTKaOZF&m=hjKRJ8PRJnK7G"](http://www.kintera.org/TR.asp?a=brKKJWOHijLPiI&s=ou11LdMTLeJTKaOZF&m=hjKRJ8PRJnK7G) \t "_blank" <http://chandra.harvard.edu/> and [HYPERLINK "http://www.kintera.org/TR.asp?a=8eLELNvHhLFJXJ&s=ou11LdMTLeJTKaOZF&m=hjKRJ8PRJnK7G"](http://www.kintera.org/TR.asp?a=8eLELNvHhLFJXJ&s=ou11LdMTLeJTKaOZF&m=hjKRJ8PRJnK7G) \t "_blank" http://www.nasa.gov/mission_pages/chandra/main/index.html.

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Member Classifieds:

For Sale:

Lightly and caringly used Tele Vue NP-101 4 inch APO refractor includes the 2" Everbrite diagonal with 1-1/4" adapter, a screw-on metal lens cover, a custom hard shell carry case, and a captive/sliding dew shield. Also included is a Tele Vue Starbeam flip mirror finder. Both purchased in Summer 2005. \$2,850.

Tele Vue Sol-Searcher Sun Finder. \$15 when purchased with NP-101.

Kendrick Baader Solar Filter 6006-B (for tube 112 to 122mm) to fit NP-101. \$70 when purchased with

NP-101.

Losmandy 65mm Finder Bracket and Adapter to Attach to NP-101 Mounting Sleeve. \$40 when purchased with NP-101. This bracket allows the attachment of a Coronado PST to the NP-101 OTA.

Tele Vue Gibraltar Alt-Azimuth (Ash) Mount. \$525.

Universal Astronomics Unistar Deluxe and Medium Surveyor Tripod. \$500.

Celestron Vibration Dampening Pads (3). \$25 when purchased with either Gibraltar or Universal Astronomics mounts.

Large Orion Padded Tripod Carrying Bag. \$45 when purchased with either Gibraltar or Universal Astronomics mounts.

Buy the NP-101 and either of the mounts and take five (5) percent off the total combined price.

Interested? Want pictures or a look first-hand? Contact Chris Maier: regionabove@verizon.net

Member Photos:

This image was taken by John Kocijanski of the conjunction of Venus, Saturn, and Regulus on the morning of October 12th. The image was taken with a Canon S3 IS digital zoom camera mounted on a tripod. It shows Venus, Saturn, and Regulus in a triangular shape as well as "The Sickle" asterism in Leo.



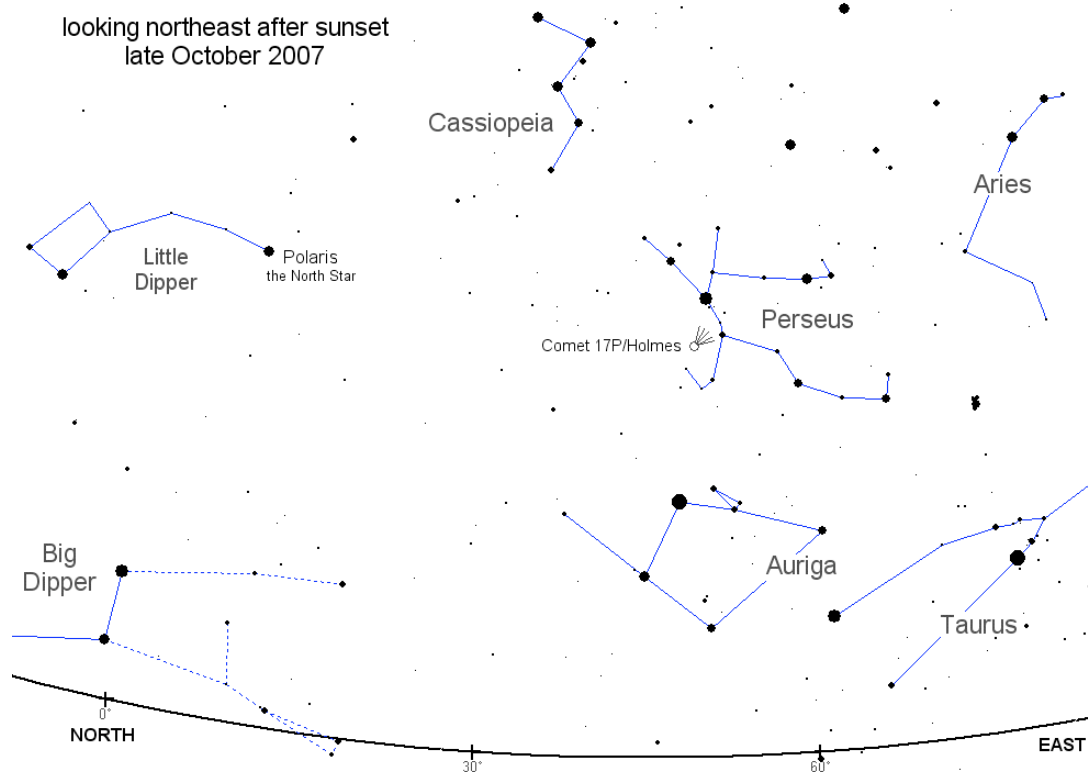
Mid Evening Observing Highlights for November

The Keystone of Hercules is setting in the west. The Summer Triangle (Vega, Altair, and Deneb) is in the western sky. The Great Square of Pegasus is directly overhead with M31 (the Andromeda Galaxy) almost overhead. Perseus is high in the northeastern sky. Taurus and Auriga are rising in the east. Later in the month Orion will be rising in the east. The Big Dipper is low on the northern horizon. The Pleiades (M45) is also rising in the east. The Leonid meteor shower peaks on November 17th before dawn. New moon is on November 9th and full moon is on the 24th.

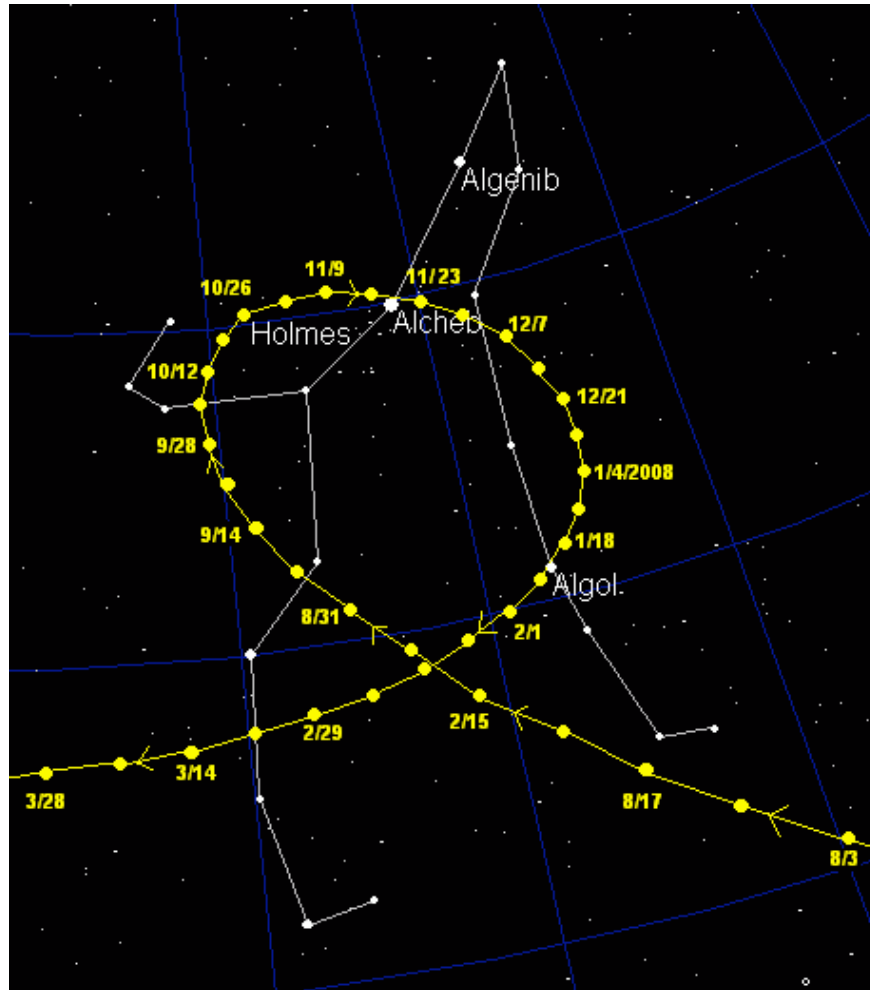
Comet Holmes brightened dramatically at the end of October and is predicted to remain bright into November. See the following link on the Sky and Telescope website for details.

HYPERLINK "<http://www.skyandtelescope.com/observing/home/10775326.html>"
<http://www.skyandtelescope.com/observing/home/10775326.html>

The comet finder chart below comes from HYPERLINK "<http://www.spaceweather.com>"
www.spaceweather.com.



The following image shows the position of the comet over the next few months. It comes from the Wikipedia entry for Comet Holmes at [HYPERLINK "http://en.wikipedia.org/wiki/17P/Holmes"](http://en.wikipedia.org/wiki/17P/Holmes) <http://en.wikipedia.org/wiki/17P/Holmes>.



NASA Space Place

The Red (Hot?) Planet
by Patrick L. Barry

Don't let Mars's cold, quiet demeanor fool you. For much of its history, the Red Planet has been a fiery world.

Dozens of volcanoes that dot the planet's surface stand as monuments to the eruptions that once reddened Mars's skies with plumes of glowing lava. But the planet has settled down in its old age, and these volcanoes have been dormant for hundreds of millions of years.

Or have they? Some evidence indicates that lava may have flowed on Mars much more recently. Images of the Martian surface taken by orbiting probes show regions of solidified lava with surprisingly few impact craters, suggesting that the volcanic rock is perhaps only a million years old.

If so, could molten lava still occasionally flow on the surface of Mars today?

With the help of some artificial intelligence software, a heat-sensing instrument currently orbiting Mars aboard NASA's Mars Odyssey spacecraft could be just the tool for finding active lava flows.

"Discovering such flows would be a phenomenally exciting scientific finding," says Steve Chien, supervisor of the Artificial Intelligence Group at JPL. For example, volcanic activity could provide a source of heat, thus making it more likely that Martian microbes might be living in the frosty soil.

The instrument, called THEMIS (for Thermal Emission Imaging System), can "see" the heat emissions of the Martian surface in high resolution—each pixel in a THEMIS image represents only 100 meters on the ground. But THEMIS produces about five times more data than it can transmit back to Earth.

Scientists usually know ahead of time which THEMIS data they want to keep, but they can't plan ahead for unexpected events like lava flows. So Chien and his colleagues are customizing artificial intelligence software called ScienceCraft to empower THEMIS to identify important data on its own.

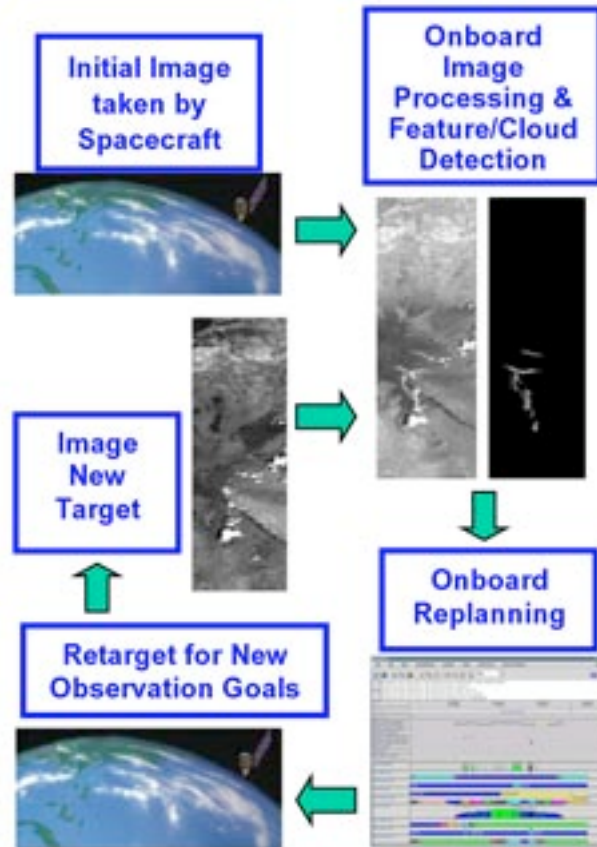
This decision-making ability of the ScienceCraft software was first tested in Earth orbit aboard a satellite called Earth Observing-1 by NASA's New Millennium Program. Earth Observing-1 had already completed its primary mission, and the ScienceCraft experiment was part of the New Millennium Program's Space Technology 6 mission.

On Odyssey, ScienceCraft will look for anomalous hotspots on the cold, night side of Mars and flag that data as important. "Then the satellite can look at it more closely on the next orbit," Chien explains.

Finding lava is considered a long shot, but since THEMIS is on all the time, "it makes sense to look," Chien says. Or better yet, have ScienceCraft look for you—it's the intelligent thing to do.

To learn more about the Autonomous ScienceCraft software and see an animation of how it works, visit [HYPERLINK "http://ase.jpl.nasa.gov" http://ase.jpl.nasa.gov](http://ase.jpl.nasa.gov).

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Caption:

Just as changing cloud patterns on Earth were identified using Earth Observing-1's Advanced Land Imager along with ScienceCraft software, the THEMIS instrument with ScienceCraft on the Mars Odyssey spacecraft can avoid transmitting useless images.