Astronomy Club News
July, 2006
John Kocijanski…. Editor

Jim McKeegan…… President
John Kocijanski…. Vice-President
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The indoor movie and pizza meeting held on June 24th at Morgan Outdoors in Livingston Manor was a great success. About thirty people attended and were shown the Imax movie Space Station. The movie showed how astronauts constructed parts of the space station as well as various aspects of life on the space station. The movie was well received and the midpoint break generated a nice discussion of the purpose and future of the space station. About 30 people attended the event. The image below shows the pizza line before the movie.

The observation session scheduled for June 17th was held at Walnut Mountain Park. Three people attended. Early in the evening Jupiter and a few double stars were observed including Graffias in Scorpius. Later on in the evening some deep sky objects were observed including the globular star cluster M5 and the Ring Nebula M57. The highlights of the evening were the planetary conjunction of Mars and Saturn as well as a pass of the International Space Station.

The observation session scheduled for June 24th after the movie was canceled due to poor weather. The observation sessions for July are on the 22nd and 29th.

Jim McKeegan will be giving as telescope workshop for beginning astronomers at Morgan Outdoors in Livingston Manor on July 1st. The workshop starts at noon and a solar observation session will follow starting at 1:00 lasting for an hour.

The observation session on July 29th will take place at the Big Twig recording studio near Roscoe, NY and will be hosted by Dana Duke. Walnut Mountain Park is in use that evening and this provides an opportunity for an observation session at a dark sky site. Check out their website at http://www.bigtwig.com. A map and directions are given on their site. More information will be given in the near future as far as a start time and possible alternate date. Dana has granted permission for overnight camping at his facility. There are also a few lodging locations in Roscoe that can be considered as well. The following is a listing of them. If you are considering them please call for reservations as soon as possible.

Baxter House – 607-498-5811

Creekside Cabins – 607-498-5873

Reynolds House Inn – 607-498-4422

Roscoe Motel – 607-498-5220

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

The club has selection of astronomy books, Stardate audio CDs, NASA software and DVDs, 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 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: 2006-085 June 19, 2006

Pace Quickens for NASA Spacecraft Orbiting Mars

NASA's newest spacecraft at Mars has already cut the size and duration of each orbit by more than half, just 11 weeks into a 23-week process of shrinking its orbit. By other indicators, the lion's share of the job lies ahead.

"The orbits are getting shorter and shorter. We've finished about 80 of them so far, but we have about 400 more to go, and the pace really quickens toward the end," said Dan Johnston, Mars Reconnaissance Orbiter deputy mission manager at NASA's Jet Propulsion Laboratory, Pasadena, Calif.

Supplementing the daily attentions of navigators, engineers and scientists, the orbiter has begun

using unprecedented onboard smarts to schedule some of its own attitude maneuvers during each orbit.

The current phase of the Mars Reconnaissance Orbiter mission, called "aerobraking," began in late March with the spacecraft in a pattern of very elongated, 35-hour orbits. It will end in early September, according to current plans, once hundreds of careful dips into Mars' atmosphere have adjusted the orbit to nearly circular, two-hour loops. Then, after some touch-up engine burns, deployment of a radar antenna and other transitional tasks, the spacecraft will be in the right orbit and configuration to start its main science phase in November.

During the two-year science phase, Mars Reconnaissance Orbiter will examine Mars from subsurface layers to the top of the atmosphere. It will use its 3-meter (10-foot) diameter dish antenna to pump data Earthward at up to 10 times the pace of any previous Mars mission. Besides providing information about the history and extent of Mars' water, the orbiter will assess prospective landing sites for NASA robots launching in 2007 and 2009.

When the spacecraft first entered orbit around Mars, its farthest point from the planet was about 45,000 kilometers (28,000 miles). After 11 weeks of aerobraking operations, this distance has been reduced to about 20,000 kilometers (12,000 miles). On each orbit since early April, the nearest-to-Mars portion of the orbit has passed through the upper atmosphere, usually at about 105 kilometers (65 miles) above the surface of the planet. The drag created by interaction of the atmosphere with spacecraft surfaces slows the craft.

"Our biggest challenge is the variability of the atmosphere," Johnston said. "It's not uncommon to get a 35 percent change in how much drag the spacecraft experiences from one pass to the next. We need to monitor each pass carefully and be prepared to change the altitude to a safe one for the next pass, if necessary."

While the orbiter is above the atmosphere, it can orient its antenna toward Earth and its solar panels toward the sun. Before it enters the atmosphere for each pass, it pivots so that the back surfaces of the solar panels and antenna face the direction of travel. An innovative capability of Mars Reconnaissance Orbiter's onboard software enables it to calculate the time when it needs to reorient itself for the next pass. This feature, called "periapsis timing estimator," was activated in May.

JPL's Jim Graf, project manager for Mars Reconnaissance Orbiter, said, "In the past, the times for turning to aerobraking attitude had to be calculated on the ground and sent to the spacecraft for each pass. Now, the spacecraft can do that itself. This will be especially helpful when the spacecraft gets to the point when it is doing several drag passes per day."

Mars Reconnaissance Orbiter is the third NASA Mars mission -- after Mars Global Surveyor in 1997 and Mars Odyssey in 2001 -- to use aerobraking to get into a desired, near-circular orbit. The strategy allows launching the spacecraft with much less fuel than would be required if using just rocket engines to decelerate into the desired orbit. Each drag pass this month is slowing Mars Reconnaissance Orbiter by an average of about 2 meters per second (4.5 miles per hour), which would otherwise require consuming about a kilogram (2.2 pounds) of fuel.

Transition activities during the two months between the end of aerobraking and the beginning of the main science phase will include unfolding two 5-meter (16-foot) lengths of antenna for a ground-penetrating radar instrument, removing the lens cap from a mineral-identifying spectrometer instrument and characterizing all instruments' performance in different modes of

use. From early October to early November, Mars will be nearly behind the sun as viewed from Earth. Communication with all spacecraft at Mars will be unreliable during portions of that period, so commanding will be minimized.

Additional information about Mars Reconnaissance Orbiter is available online at http://www.nasa.gov/mro . The mission is managed by JPL, a division of the California Institute of Technology, Pasadena, for the NASA Science Mission Directorate, Washington. Lockheed Martin Space Systems, Denver, is the prime contractor for the project and built the spacecraft.

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IMAGE ADVISORY: 2006-082 June 5, 2006

Andromeda Adrift in Sea of Dust in New NASA Image

The Andromeda galaxy, named for the mythological princess who almost fell prey to a sea monster, appears tranquil in a new image from NASA's Spitzer Space Telescope. The mesmerizing infrared mosaic shows red waves of dust over a blue sea of stars.

"What's really interesting about this view is the contrast between the galaxy's smooth, flat disk of old stars and its bumpy waves of dust heated by young stars," said Dr. Pauline Barmby of the Harvard-Smithsonian Center for Astrophysics, Cambridge, Mass. Barmby and her colleagues recently observed Andromeda using Spitzer.

To view the picture, visithttp://www.spitzer.caltech.edu/Media/releases/ssc2006-14/ .

Barmby and her team used the Spitzer data to make drastically improved measurements of Andromeda's infrared brightness. They found that the galaxy shines with the same amount of energy as about 4 billion suns. Based on these measurements, the astronomers confirmed that there are roughly 1 trillion stars in the galaxy. Our Milky Way galaxy is estimated to house a couple of hundred billion stars.

"This is the first time the stellar population of Andromeda has been determined using the galaxy's infrared brightness," said Barmby. "It's reassuring to know our numbers are in agreement with previous estimates of the mass of the stars based on the stars' motion."

The new false-colored portrait also provides astronomers with the best look yet at the dust-drenched spiral arms that swirl out of the galaxy's center, a region hidden by bright starlight in visible-light images. Dust and gas are the building materials of stars. They are clumped together throughout the spiral arms, where new stars are forming.

"The Spitzer data trace with startling clarity the star-forming material all the way into the inner part of the galaxy," said Dr. George Helou, deputy director of NASA's Spitzer Science Center at the California Institute of Technology in Pasadena. "The challenge is to understand what shapes the distribution of this gas and dust, and what modulates the star formation at different locations."

Spitzer's infrared array camera captured infrared light emanating from both older stars (blue) and dust made up of molecules called polycyclic aromatic hydrocarbons (red). These carbon-

containing molecules are warmed by sunlight and glow at infrared wavelengths. They are often associated with dense clouds of new stars, and can be found on Earth in barbecue pits and car exhaust, among other places.

The Andromeda galaxy, also known by astronomers as Messier 31, is located 2.5 million light-years away in the constellation Andromeda. It is the closest major galaxy to the Milky Way, making it the ideal specimen for carefully examining the nature of galaxies. On a clear, dark night, the galaxy can be spotted with the naked eye as a fuzzy blob.

Andromeda spans about 260,000 light-years, which means that a light beam would take 260,000 years to travel from one end of the galaxy to the other. By comparison, the Milky Way is about 100,000 light-years across. When viewed from Earth, Andromeda occupies a portion of the sky equivalent to seven full moons.

Spitzer's wide field of view allowed the telescope to capture a complete snapshot of the Andromeda galaxy, though the task wasn't easy. The final mosaic consists of 3,000 or so individual picture frames stitched together seamlessly.

Barmby presented these observations today at the 208th meeting of the American Astronomical Society in Calgary, Canada. A previous image of Andromeda taken with Spitzer's longer-wavelength infrared camera can be found at http://www.spitzer.caltech.edu/Media/releases/ssc2005-20/ssc2005-20a.shtml

For more information about Spitzer, visit www.spitzer.caltech.edu/spitzer .

Other members of Barmby's team include: Drs. Steven Willner, Matthew Ashby, John Huchra and Michael Pahre of the Harvard-Smithsonian Center for Astrophysics; Drs. Luciana Bianchi and David Thilker of The Johns Hopkins University, Baltimore, Md.; Drs. Charles Engelbracht, Karl Gordon, Joannah Hinz, Pablo Pérez-González and George Rieke of the University of Arizona, Tucson; and Drs. Robert Gehrz, Roberta Humphreys, Elisha Polomski and Charles Woodward of the University of Minnesota, Twin Cities.

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. 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.

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Image Advisory: 2006-087 June 21, 2006

NASA's Cassini Spacecraft Captures Saturnian Moon Ballet

The cold, icy orbs of the Saturn system come to life in a slew of new movie clips from the Cassini spacecraft showing the ringed planet's moons in motion.

In addition to their drama and visual interest, scientists use these movies to refine their understanding of the orbits of Saturn's moons. Engineers at NASA's Jet Propulsion Laboratory, Pasadena, Calif., use the same images, and the orbital positions of the moons, to help them

navigate Cassini. The spacecraft is nearing the halfway mark of its prime four-year tour of Saturn and its moons.

Pictures capturing several moons in one frame are strikingly beautiful, especially when deliberately imaged in red, green and blue spectral filters, which allow scientists to create a color photo. One recent color image shows two of Saturn's most fascinating moons, icy-white Enceladus and orange, haze-enshrouded Titan.

Still images and five short movie sequences acquired over the past six months are being released today at: http://www.nasa.gov/cassini , http://saturn.jpl.nasa.gov and http://ciclops.org .

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. 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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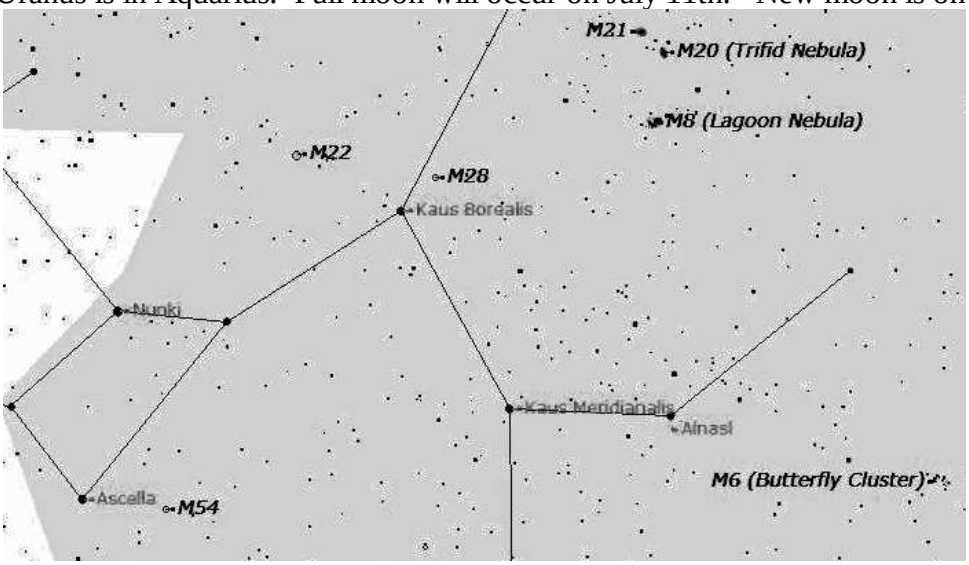
Middle Evening Observing Highlights for July

The brighter stars in the sky are Antares, Arcturus, Spica, Vega, Deneb, and Altair. Antares is in the southern sky in the constellation Scorpius. It has an orange. The globular cluster M4 can be found just to the west of it. Spica is in the western part of the sky in the constellation Virgo. Arcturus is in the western sky in the constellation Bootes but it is higher in the sky than Spica. Arcturus has a “ginger ale” tint. Vega, Deneb, and Altair are in the eastern sky. They form the asterism known as the Summer Triangle. Vega is in the constellation Lyra. Deneb is in the constellation Cygnus (the Northern Cross). Altair is in the constellation Aquilla. The Keystone of the constellation Hercules is almost directly overhead (in the zenith). In the middle of the western side of the Keystone the globular cluster M13 can be seen. In the southeastern sky the constellation Sagittarius can be seen. It has a “teapot” shape. The Lagoon Nebula (M8) can be found to the northwest of the “teapot”. The globular cluster M22 can be found just to the east of the top of the teapot. The center of our galaxy is located near Sagittarius. The plane of our galaxy (the Milky Way) stretches from the south to the north across the sky. Jupiter is in the western sky. Neptune and Uranus are rising in the eastern sky. Neptune is in Capricorn and

Uranus is in Aquarius. Full moon will occur on July 11th. New moon is on July 26th.



The image above shows some of the deep sky objects in Sagittarius.

BARLOW BOB'S CORNER

Barlow Bob is a member of the Rockland Astronomy Club.

THE THIRD STAR

By David Levy

It's dusk on a Saturday in ancient Jerusalem. A man stands outside the temple, anxiously looking upward. He sees a bright star rising in the east and a second one overhead. This man knows the sky well, and as he turns to the northwest, he sees Capella in the gathering darkness. "That's it!" he thinks. Three stars have appeared, signaling the end of a Sabbath more than two thousand years ago.

Although the Jewish tradition of sighting stars is no longer generally practiced, it dates back to the dawn of sky-watching. On cloudy nights, the observer would look at two strings, one blue and one white. He would judge the Sabbath over, when he could no longer tell their colors apart. This sense of space and time, deeply rooted to the observing of the sky, is one of the hallmarks of Judaism.

For many of us, the meaning of the night sky goes beyond mathematical equations. Our interest in the heavens has a strong spiritual component. I realized this many years ago during Kol Nidre, on the eve of Yom Kippur. While walking home as a youngster after one of these services, I noticed the bright 10-day-old gibbous Moon dominating the evening sky. I realized that the Moon displays the same phase every Kol Nidre night, as it is through the ages.

The first sader or ceremonial dinner of Passover always occurs, on the night of the Full Moon, since the Jewish and Muslim religious holidays are tied to the movements of the Moon.

`Many years ago, I told David levy's story to a Hassidic Jewish father and his son at a Cub Scout astronomy program. The father told me that Jewish men have a blue and white string sewn into their pants. In the morning, when they can tell their colors apart, they recite their prayers.

I attach a blue and white piece of yarn, to my step ladder for the vertically-challenged. At sunset, while amateur astronomers are eagerly awaiting the night sky, I tell children of all ages that half of them will look for the first three stars in the sky and the other half will look at the colors of the blue and white strings, to determine sunset. This has evolved into a challenge and emotional experience.

Barlow Bob

NASA Space Place

From Thunderstorms to Solar Storms…

by Patrick L. Barry

When severe weather occurs, there's a world of difference for people on the ground between a storm that's overhead and one that's several kilometers away. Yet current geostationary weather satellites can be as much as 3 km off in pinpointing the true locations of storms.

A new generation of weather satellites will boost this accuracy by 2 to 4 times. The first in this new installment of NOAA's Geostationary Operational Environmental Satellites series, called GOES-N, was launched May 24 by NASA and Boeing for NOAA (National Oceanic and Atmospheric Administration). (A new polar-orbiting weather satellite, NOAA-18, was launched May 2005.)

Along with better accuracy at pinpointing storms, GOES-N sports a raft of improvements that will enhance our ability to monitor the weather—both normal, atmospheric weather and "space weather."

"Satellites eventually wear out or get low on fuel, so we've got to launch new weather satellites every few years if we want to keep up the continuous eye on weather that NOAA has maintained for more than 30 years now," says Thomas Wrublewski, liaison officer for NOAA at NASA's Goddard Space Flight Center.

Currently, GOES-N is in a "parking" orbit at 90° west longitude over the equator. For the next 6 months it will remain there while NASA thoroughly tests all its systems. If all goes well, it will someday replace one of the two active GOES satellites—either the eastern satellite (75°W) or the western one (135°W), depending on the condition of those satellites at the time.

Unlike all previous GOES satellites, GOES-N carries star trackers aboard to precisely determine its orientation in space. Also for the first time, the storm-tracking instruments have been mounted to an "optical bench," which is a very stable platform that resists thermal warping. These two improvements will let scientists say with 2 to 4 times greater accuracy exactly where storms are located.

Also, X-ray images of the Sun taken by GOES-N will be about twice as sharp as before. The new Solar X-ray Imager (SXI) will also automatically identify solar flares as they happen, instead of

waiting for a scientist on the ground to analyze the images. Flares affect space weather, triggering geomagnetic storms that can damage communications satellites and even knock out city power grids. The improved imaging and detection of solar flares by GOES-N will allow for earlier warnings.

So for thunderstorms and solar storms alike, GOES-N will be an even sharper eye in the sky. Find out more about GOES-N at goespoes.gsfc.nasa.gov/goes . Also, for young people, the SciJinks Weather Laboratory at scijinks.nasa.gov now includes a printable booklet titled "How Do You Make a Weather Satellite?" Just click on Technology.

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

Caption:

New GOES-N satellite launches, carrying an imaging radiometer, an atmospheric sounder, and a collection of other space environment monitoring instruments.