

Southwest Florida Astronomical Society

SWFAS



The Eyepiece June/July 2013

A MESSAGE FROM THE PRESIDENT

Summer's here and so is the rain!

During the summer months we have only a few events planned. Since July 4th would be our July meeting date, we have cancelled that meeting.

Last month at the CNCP observing event on the 17th, Carol Stewart, Gary McFall and Ron Brignoni came out to show Saturn and other objects to the 15 people that came out.

During the summer we have some summer camps that call on us as well as the City of Cape Coral's Parks and Rec Day on July 20th at the Yacht Club (10am-1pm). Carol Stewart and I are doing programs with the Edison Home this first week of June.

We may be doing some events with the Riverside Retreat east of Alva during the summer. I will be sending email out on these events.

Dr Berte would like everyone to know that Dr. Theo Koupelis will be teaching his class on the Solar System. The course starts on Aug 21, 2013 at Edison College (Lee Campus in Ft. Myers) Location- L Bldg. Room 104, Tues. and Thurs. 3-5 pm. You can take it for credit or audit the course. You have to go thru the Admissions Bldg. on campus which is located in the bookstore bldg. After Admissions, go to Registration in the same building (Taeni Hall). The cost for the course is \$420.00 (a 4 credit or audit is \$105/credit). The book is \$172.00 at the bookstore: *In Quest of the Universe, 7th Edition*, by Dr. Koupelis. The course is twice weekly and ends about the first week or so in Dec. You may need to ask Admissions to get a waiver of the prerequisite for a math course, if possible, from Dr. Koupelis.

I am looking for someone to do the August Meeting program.

Moon: June New 8th, 1st Quarter 16th, Full 23th, Last Quarter 30th,
July New 7th, 1st Quarter 15th, Full 22nd, Last Quarter 29th

Planets: Mars recently passed behind the sun, so is not easily visible in the morning sky. Jupiter reaches opposition midmonth so is basically unobservable until late in the summer. Venus is creeping into the evening sky and Mercury has joined it in the evening sky reaching greatest elongation on June 7th. Saturn rises now well before sunset and is well placed in the sky most of the night. In July, we will have the Delta Aquarid meteor shower which starts off the summer meteor shower season. There are several smaller but noticeable showers starting the in last weeks of July carrying through to the Perseids in mid-August. The moon is at last quarter on the 29th, so it will hinder observing somewhat.

Dues for 2013 are now due. I will be sending out last notices to all members who have not already paid. (Please contact me if you get a notice and have paid or are sending in your payment, as we will be doing our full member list with the Astronomical League midmonth.) Please pay at the meetings or events we are holding or send your payment in to SWFAS P.O. Box 100127, Cape Coral, Florida 33910. If you have any questions about your dues, contact me.

Club Positions

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Upcoming Events

- * Thurs June 6th Monthly meeting at the Calusa Nature Center Planetarium, 7:30pm
- * Sat June 8th Club Star Party at Caloosahatchee Regional Park (Dusk -?)
- * Sat July 8th Club Star Party at Caloosahatchee Regional Park (Dusk -?)
- * Sat July 20th City of Cape Coral Parks and Rec Day at the Yacht Club 10am-1pm
- * Thurs Aug 1st Monthly meeting at the Calusa Nature Center Planetarium 7:30 PM

Please note that there will NOT be a meeting on Thursday July 4.

June Meeting

Our June monthly meeting will be held on June 4th at 7:30 pm at the Calusa Nature Center Planetarium. The program is TBD.

CRP Star Party Schedule

The remaining Star Parties for 2013 will be June 8, July 6, August 3, September 14, October 5, November 2, November 30, and December 28.

Going to Mars With MAVEN Campaign

The Mars Atmosphere and Volatile Evolution Mission, known as MAVEN, is set to launch to the Red Planet in November 2013. And your name and personal message could hitch a ride to Mars!

Names that are submitted to the *Going to Mars with MAVEN* website will be placed on a DVD that will be carried aboard the MAVEN spacecraft. Participants who submit their names to the Going to Mars campaign can print a certificate of appreciation.

The MAVEN spacecraft will also carry personal messages from three contest winners. The Message to Mars contest is looking for personal messages in the form of haiku poems to send to the Red Planet. The public will vote to select the top three entries. Entries must be written in English. Winning haikus will be carried aboard the MAVEN spacecraft and will be prominently displayed on the MAVEN website.

Names and entries for the Message to Mars contest are due July 1, 2013.

- For more information and to submit your name and message, visit

<http://lasp.colorado.edu/maven/goingtomars/send-your-name/>.

Questions should be directed to <http://lasp.colorado.edu/maven/goingtomars/contact/>.

Night Skies Star Stencils

The Night Skies Star Stencils can create a relaxing and romantic display of a real night sky in any darkened room of anyone lured by the attraction of the sky at night, particularly those associated with the Southwest Florida Astronomical Society. The Night Skies Star Stencils are available in two sizes featuring accurate and educational winter or summer night time displays over the Northern Hemisphere. Luminous paint and a corresponding star map are included with each Night Skies Star Stencils. The stencils can be used more than once and additional luminous paint is available. The 8-foot Night Skies Star Stencils are priced at \$30.00 each and the 12 foot at \$35.00 each. They are also featured on several other scientific related websites. For freight, the 8 foot Night Skies weigh 3 pounds and the 12 foot Night Skies weigh 5 pounds each to ship from Macomb, Illinois. To order, fax the choice of size and scene along with name and complete address to 309-836-4149. Shipping costs will be automatically added to the charge. The Night Skies Star Stencils are a portion of the Ursa Major stencil selection produced by Bridgeway Training Services headquartered in Galesburg, Illinois. B.T.S. is a not-for-profit agency that provides an assortment of services to disabled people. The sale of its American made products help fund those programs.

- Submitted by Dick Shimmin, Bridgeway Training Services (BTS), Galesburg, Illinois, dshimmin@bway.org . More information about the Night Skies Star Stencils is available at www.ursamajorstencils.com .

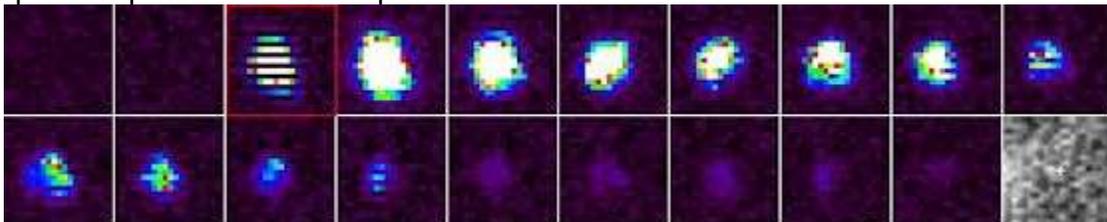
Bright Explosion on the Moon

For the past 8 years, NASA astronomers have been monitoring the Moon for signs of explosions caused by meteoroids hitting the lunar surface. "Lunar meteor showers" have turned out to be more common than anyone expected, with hundreds of detectable impacts occurring every year. They've just seen the biggest explosion in the history of the program.

"On March 17, 2013, an object about the size of a small boulder hit the lunar surface in Mare Imbrium," says Bill Cooke of NASA's Meteoroid Environment Office. "It exploded in a flash nearly 10 times as bright as anything we've ever seen before."

Anyone looking at the Moon at the moment of impact could have seen the explosion--no telescope required. For about one second, the impact site was glowing like a 4th magnitude star. Ron Suggs, an analyst at the Marshall Space Flight Center, was the first to notice the impact in a digital video recorded by one of the monitoring program's 14-inch telescopes. "It jumped right out at me, it was so bright," he recalls.

The 40 kg meteoroid measuring 0.3 to 0.4 meters wide hit the Moon traveling 56,000 mph. The resulting explosion packed as much punch as 5 tons of TNT.



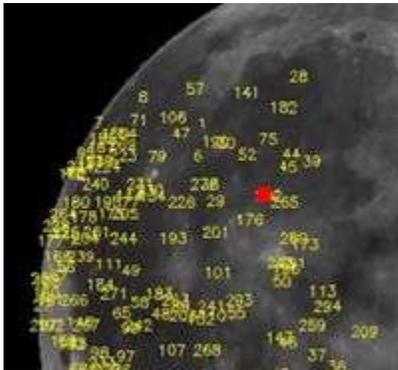
Caption: These false-color frames extracted from the original black and white video show the explosion in progress. At its peak, the flash was as bright as a 4th magnitude star.

Cooke believes the lunar impact might have been part of a much larger event. "On the night of March 17, all-sky cameras picked up an unusual number of deep-penetrating meteors right here on Earth," he says. "These fireballs were traveling along nearly identical orbits between Earth and the asteroid belt."

This means Earth and the Moon were pelted by meteoroids at about the same time.

"My working hypothesis is that the two events are related, and that this constitutes a short duration cluster of material encountered by the Earth-Moon system," says Cooke.

Controllers of NASA's Lunar Reconnaissance Orbiter have been notified of the strike. The crater could be as wide as 20 meters, which would make it an easy target for LRO the next time the spacecraft passes over the impact site. Comparing the size of the crater to the brightness of the flash would give researchers a valuable "ground truth" measurement to validate lunar impact models.



Caption: NASA's lunar monitoring program has detected hundreds of meteoroid impacts. The brightest, detected on March 17, 2013, in Mare Imbrium, is marked by the red square.

Unlike Earth, which has an atmosphere to protect it, the Moon is airless and exposed. "Lunar meteors" crash into the ground with fair frequency. Since the monitoring program began in 2005, NASA's lunar impact team has detected more than 300 strikes, most orders of magnitude fainter than the March 17th event. Statistically speaking, more than half of all lunar meteors come from known meteoroid streams such as the Perseids and Leonids. The rest are sporadic meteors--random bits of comet and asteroid debris of unknown parentage.

U.S. Space Exploration Policy eventually calls for extended astronaut stays on the lunar surface. Identifying the sources of lunar meteors and measuring their impact rates gives future lunar explorers an idea of what to expect. Is it safe to go on a moonwalk, or not? The middle of March might be a good time to stay inside.

"We'll be keeping an eye out for signs of a repeat performance next year when the Earth-Moon system passes through the same region of space," says Cooke. "Meanwhile, our analysis of the March 17th event continues."

For updates stay tuned to science.nasa.gov.

- Author Dr. Tony Phillips | Production editor Dr. Tony Phillips | Credit Science@NASA

- http://science.nasa.gov/science-news/science-at-nasa/2013/16may_lunarimpact/

New ET Detection Method Leads To Quest For World's Largest Telescope

An artist's rendition of the Calotte design, a revolutionary advance in telescope structure technology. (Credit: Dynamic Structures Ltd.)

Until recently, one of the ultimate mysteries of the universe -- how many civilizations may exist on planets orbiting other stars in the Milky Way Galaxy - - relied on the possibility of detecting intelligent beings by radio signals. Now a team of astronomers, engineers, and physicists have proposed a new and powerful technique to search for intelligent life.



Rather than looking for radio waves, the team suggests searching for the heat signatures of nearby planets, which requires a giant telescope that could detect infrared radiation directly from an exoplanet, thus revealing the presence of a civilization.

"The energy footprint of life and civilization appears as infrared heat radiation," says Jeff R. Kuhn, the project's lead scientist. "A convenient way to describe the strength of this signal is in terms of total stellar power that is incident on the host planet." The technique arises from the fact that a civilization produces power that adds to the heat on a planet, beyond the heat received from its host star. A large enough telescope, idealized for infrared detection, could survey planets orbiting stars within 60 light-years of the Sun to see whether or not they host civilizations.

The quest for direct infrared detection of extraterrestrial civilizations, along with many other research possibilities, has led the team to the funding and building of a giant telescope.

Currently planned large infrared telescopes, the Giant Magellan Telescope, the Thirty Meter Telescope, and the European Extremely Large Telescope, would not be large enough.

Instead, a telescope (dubbed Colossus) with a primary mirror about 250 feet (77 meters) in diameter could find hundreds of Earth-sized or larger planets in habitable zones, and perhaps dozens of extraterrestrial civilizations, by using a sensitive coronagraph - and the technology to build such an instrument exists.

The international team thus seeks funding to build a 77-m telescope, which would be constructed from revolutionary thin-mirror slumping and polishing technologies developed by the Innovative Optics team. The telescope would consist of approximately sixty 8-m mirror segments, and would operate at a high-altitude site.

Colossus's field of view would be optimized for star-like sources. It would be the world's best high-resolution infrared telescope and would excel at the study of stellar surfaces, black holes, and quasars, objects that appear smaller than 1 arc-second on the sky.

Exoplanets? There's an App for That

As part of my outreach as an astrophysicist I've created an iPhone app called Exoplanet. The app keeps users informed of exoplanet discoveries, with a news section listing the latest announcements and weblinks to the discoverers' research papers. It also includes an interactive model of the Milky Way with animations of the planetary systems that we have found so far. I'm not running this as a business: the basic app is free and I just want to engage the public. It can be downloaded from the iTunes store at <http://bit.ly/OY4pBi>

- Hanno Rein, Princeton, NJ, from page 8, July 2013 edition, *Sky & Telescope* magazine

Lowell Observatory: Can crowdsourcing fix iconic telescope?

The Clark Telescope in 1905. The Lowell Observatory is turning to crowdsourcing to fund repairs at the historic facility.

Is it possible to crowdsource an old telescope? The Lowell Observatory in Flagstaff, AZ is about to find out.

Built by the astronomer Percival Lowell in 1894, the 24-inch Alvan Clark Telescope has been in continuous use for 117 years. About the turn of the 20th century, Lowell used it to study Mars — famously arguing (incorrectly) that “canals” he saw on the planet’s surface were evidence of intelligent life. Astronomer V.M. Slipher discovered galactic redshifts there in 1912; the Apollo program used the instrument to prepare for moon missions.



For some time now, the telescope, which is near downtown Flagstaff and is a National Historic Landmark, has been used mainly for public outreach and education. On almost any clear night, stargazers line up at the Clark Telescope to peer into the heavens — more than a million over the last 20 years, according to observatory outreach manager Kevin Schindler.

But that kind of traffic brings a lot of wear and tear, he said. It's gotten hard for telescope staff to open the shutter doors on the dome, which have “been banged up over the years.” In the winter, snow drifts in from holes in the ceiling. Sometimes, workers have to climb on ladders to aim the telescope properly toward the sky, causing delays for visitors. The facility's century-old electrical system casts off sparks and arcs.

“We have a dome of Ponderosa pine,” Schindler said. “We don't like sparking and arcing.” Hoping to stave off further damage and prevent a bigger overhaul down the road, the nonprofit observatory has begun a 60-day campaign on the fundraising website Indiegogo (www.indiegogo.com/projects/restore-the-clark) to bring in about a quarter of a million dollars for repairs.

Chuck Wendt, deputy director of advancement, admitted that was a lot of money and joked that he had a "backup plan" that involved hitting the streets of Flagstaff with a sandwich board and a tin cup. But he also said he was "cautiously optimistic" the observatory's campaign would pay off. Six days in, the Clark had racked up more than \$12,000 in donations from 160 people. At a launch event for the effort, Wendt said, staffers were glued to their smartphones, nervously tracking the donations as they trickled in.

If the push is ultimately successful, the observatory, which is funded by Percival Lowell's estate, will look at crowdsourcing to help pay for other needs, Wendt said — perhaps even turning to the masses to support the scientific work pursued by its 24 astronomers.

"With the government tightening resources, it's possible some of the money scientists have been used to getting won't be there," he said. "Hopefully it won't happen, but maybe we can keep scientists working by paying their expenses. We're looking at a lot of funding sources."

- *By Eryn Brown, Los Angeles Times*

www.latimes.com/news/science/sciencenow/la-sci-sn-lowell-observatory-indiegogo-crowdsourcing-20130320,0,3576001.story

Hubble Maps 3-D Structure of Ejected Material Around Erupting Star

A flash of light from a stellar outburst has provided a rare look at the 3-D structure of material ejected by an erupting nova.

Astronomers used the Hubble Space Telescope to observe the light emitted by the close double-star system T Pyxidis, or T Pyx, a recurring nova, during its latest outburst in April 2011.

A nova erupts when a white dwarf, the burned-out core of a sun-like star, has siphoned off enough hydrogen from a companion star to trigger a thermonuclear runaway. As hydrogen builds up on the surface of the white dwarf, it becomes hotter and denser until it detonates like a colossal hydrogen bomb, leading to a 10,000-fold increase in brightness in a little more than one day. Nova explosions are extremely powerful, equal to a blast of one million billion tons of dynamite. T Pyx erupts every 12 to 50 years.

The astronomers were surprised to find the ejecta from earlier outbursts stayed in the vicinity of the star and formed a disk of debris around the nova. The discovery suggests material continues expanding outward along the system's orbital plane, but it does not escape the system.

"We fully expected this to be a spherical shell," says Arlin Crofts of Columbia University, a member of the research team. "This observation shows it is a disk, and it is populated with fast-moving ejecta from previous outbursts."

Co-investigator Jennifer Sokoloski suggests these data indicate the companion star plays an important role in shaping how material is ejected, presumably along the system's orbital plane, creating the pancake-shaped disk.

Using Hubble's Wide Field Camera 3, the team took advantage of the blast of light emitted by the erupting nova to trace the light's path as it lit up the disk and material from previous ejecta. The disk is so vast, about a light-year across, that the nova's light cannot illuminate all of the material at once. Instead, the light sweeps across the material, sequentially illuminating parts of the disk, a phenomenon called a light echo. The light reveals which parts of the disk are nearer to Earth and which sections are farther away. By tracing the light, the team assembled a 3-D map of the structure around the nova.

"We've all seen how light from fireworks shells during the grand finale will light up the smoke and soot from shells earlier in the show," team member Stephen Lawrence said. "In an analogous way, we're using light from T Pyx's latest outburst and its propagation at the speed of light to dissect its fireworks displays from decades past."

Although astronomers have witnessed light propagating through material surrounding other novae, this is the first time the immediate environment around an erupting star has been studied in three dimensions.

Astronomers have studied light echoes from other novae, but those phenomena illuminated interstellar material around the stars instead of material ejected from them.

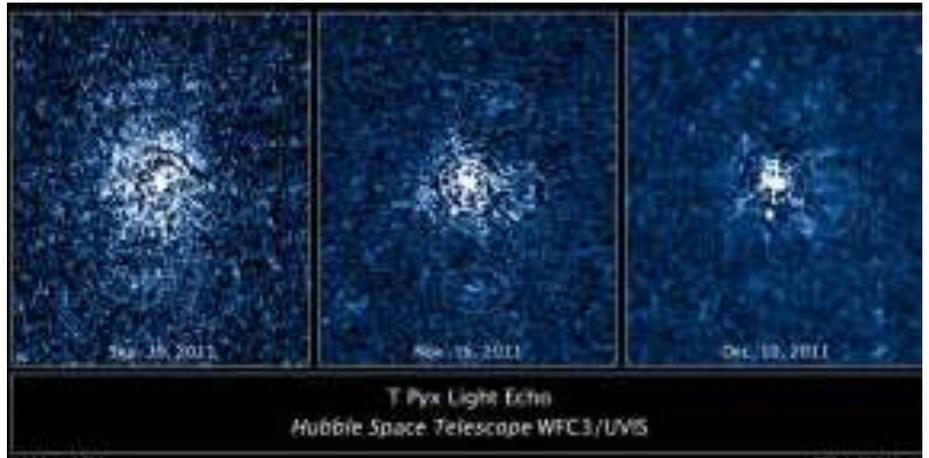
The team also used the light echo to refine estimates of the nova's distance from Earth. The new distance is 15,600 light-years from Earth. T Pyx is located in the southern constellation Pyxis, or the Mariner's Compass.

The team is continuing to analyze the Hubble data to develop an outflow model. T Pyx has a history of outbursts. Besides the 2011 event, previous eruptions were seen in 1890, 1902, 1920, 1944, and 1966.

Astronomers call erupting stars novae, Latin for "new," because they abruptly appear in the sky. A nova quickly begins to fade in several days or weeks as the hydrogen is exhausted and blown into space.

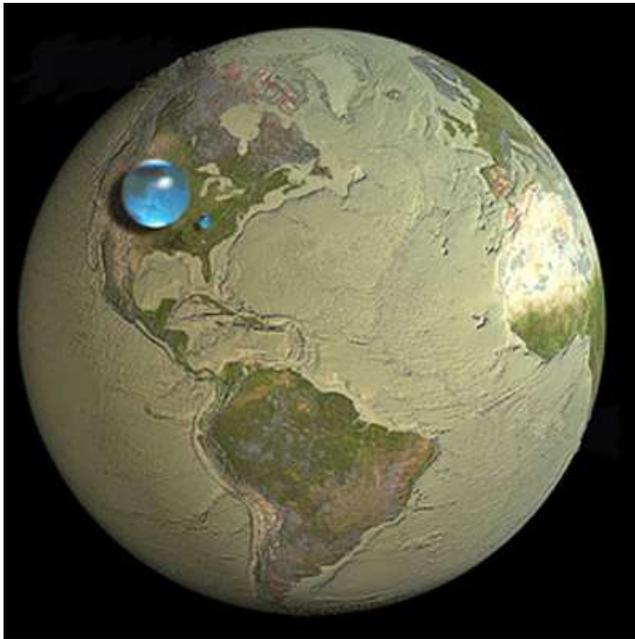
Hubble imaged the double-star system T Pyxidis over a four-month period. T Pyx is a recurrent nova, erupting every 12 to 50 years. The star is the white blob in the middle of each image.

- www.sciencedaily.com/releases/2013/06/130604121511.htm



If You Made a Sphere of All Earth's Water, How Big Would It Be?

We think of Earth as the water planet. But what if you could take all of the water on Earth and form it into a sphere, or bubble? How big would the bubble be? The U.S. Geological Survey (USGS) has the answer. All the water on Earth would fit into a sphere 860 miles wide. That's a lot smaller than Earth itself, as the drawing to the left shows.



Surprised? Water planet, you said? In fact, there's a lot of water in the large blue sphere depicted above. The largest sphere – representing all water on, in, and above Earth – would be about 860 miles in diameter. That's in contrast to about 8,000 miles for Earth.

All the water on Earth would fit into a sphere 860 miles wide. Medium-sized sphere = Earth's liquid fresh water in groundwater, swamp water, rivers, and lakes. Smallest sphere = fresh water in all the lakes and rivers on the planet

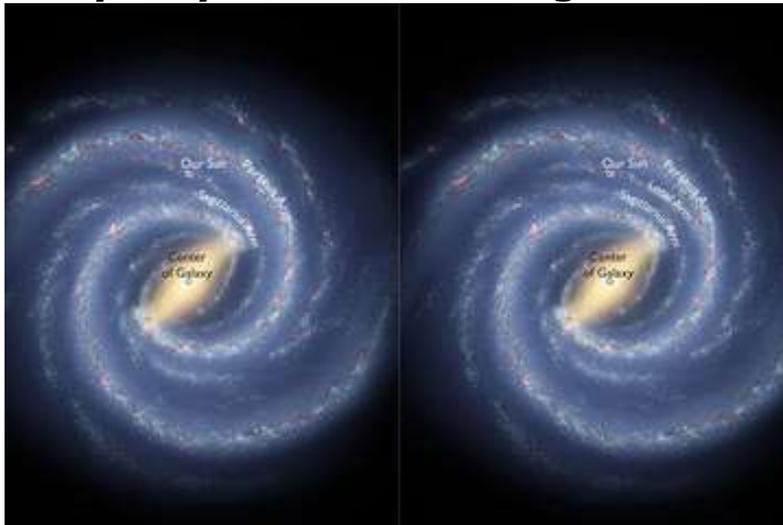
Or to put it another way, the largest blue sphere above holds 332,500,000 cubic miles water. See the smaller sphere over Kentucky? It represents Earth's liquid fresh water in groundwater, swamp

water, rivers, and lakes.

And do you see the even smaller (very tiny) bubble over Atlanta, Georgia? That one represents fresh water in all the lakes and rivers on the planet. USGS says that most of the water people and other earthly life require every day comes from these surface-water sources.

- Deborah Byrd in <http://earthsky.org/earth/if-you-made-a-sphere-of-all-earths-water-how-big-would-it-be>

Milky Way's Local Arm Larger Than Previously Thought



(Left) Old picture: Local Arm a small "spur" of Milky Way. (Right) New picture: Local Arm probable major branch of Perseus Arm.

Our home in the Milky Way could be much larger than ever thought before, according to a new study.

Astronomers using the National Science Foundation's Very Long Baseline Array (VLBA) found that the area of the galaxy that holds Earth and the rest of the solar system is a prominent feature of the spiral galaxy.

The solar system exists in a part of the galaxy known as the Local Arm. Until now, scientists thought that this particular part of the Milky Way was just a tiny spur

between two large branches known as the Sagittarius and Perseus arms.

New evidence suggests that the Local Arm should appear as a prominent feature of the Milky Way. In fact, the Local Arm looks to be as long as 16,000 light-years wide.

Scientists can't be sure what the Milky Way galaxy truly looks like from the outside, because we are stuck within it. Researchers have to measure distances between objects in the Milky Way to understand exactly where something might fit within the context of the rest of the cosmic

neighborhood.

The new research, which uses data collected between 2008 and 2012, used simple trigonometry to understand the placement of the solar system in relation to the rest of the galaxy.

Trigonometric Parallax method determines distance to star or other object by measuring its slight shift in apparent position as seen from opposite ends of Earth's orbit.

"By observing objects when Earth is on opposite sides of its orbit around the sun, astronomers can measure the subtle shift in the object's apparent position in the sky, compared to the background of more-distant objects," National Radio

Astronomy Observatory officials wrote in a statement. "This effect is called parallax, and can be demonstrated by holding your finger close to your nose and alternately closing each eye."

Scientists used parallax to measure the distances to star-forming regions of the Milky Way, because methanol and water molecules there boost radio waves (like those used by the VLBA), making it easier for researchers to collect accurate data.

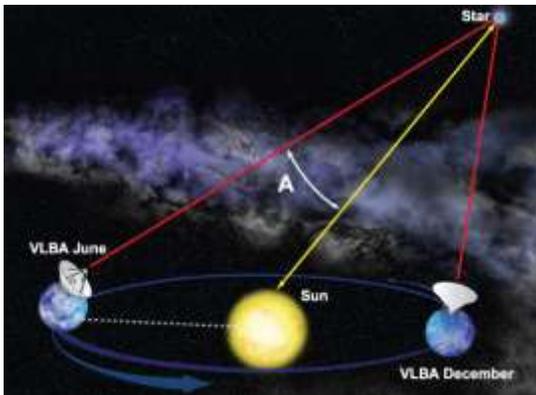
- by Miriam Kramer, SPACE.com Staff Writer, www.space.com/21406-milky-way-local-arm-large.html

Another American High Frontier First: 3-D Manufacturing in Space

In preparation for a future where parts and tools can be printed on demand in space, NASA and Made in Space Inc. of Mountain View, Calif., have joined to launch equipment for the the first 3-D microgravity printing experiment to the International Space Station.

If successful, the 3-D Printing in Zero G Experiment (3-D Print) will be the first device to manufacture parts in space. 3-D Print will use extrusion additive manufacturing, which builds objects, layer by layer, out of polymers and other materials. The 3-D Print hardware is scheduled to be certified and ready for launch to the space station next year.

"As NASA ventures further into space, whether redirecting an asteroid or sending humans to Mars, we'll need transformative technology to reduce cargo weight and volume," NASA



Administrator Charles Bolden said. "In the future, perhaps astronauts will be able to print the tools or components they need while in space."

NASA is a government leader in 3-D printing for engineering applications. The technology holds tremendous potential for future space exploration. One day, 3-D printing may allow an entire spacecraft to be manufactured in space, eliminating design constraints caused by the challenges and mass constraints of launching from Earth. This same technology may help revolutionize American manufacturing and benefit U.S. industries.

"The president's Advanced Manufacturing Initiative cites additive manufacturing, or '3-D printing,' as one of the key technologies that will keep U.S. companies competitive and maintain world leadership in our new global technology economy," said Michael Gazarik, NASA's associate administrator for space technology. "We're taking that technology to new heights, by working with Made in Space to test 3-D printing aboard the space station. Taking advantage of our orbiting national laboratory, we'll be able to test new manufacturing techniques that benefit our astronauts and America's technology development pipeline."

In addition to manufacturing spacecraft designs in orbit, 3-D printers also could work with robotic systems to create tools and habitats needed for human missions to Mars and other planetary destinations. Housing and laboratories could be fabricated by robots using printed building blocks that take advantage of in-situ resources, such as soil or minerals. Astronauts on long-duration space missions also could print and recycle tools as they are needed, saving mass, volume and resources.

"The 3-D Print experiment with NASA is a step towards the future," said Aaron Kemmer, CEO of Made in Space. "The ability to 3-D print parts and tools on demand greatly increases the reliability and safety of space missions while also dropping the cost by orders of magnitude. The first printers will start by building test items, such as computer component boards, and will then build a broad range of parts, such as tools and science equipment."

After flight certification, NASA plans to ship 3-D Print to the space station aboard an American commercial resupply mission. NASA is working with American industry to develop commercially-provided U.S. spacecraft and launch vehicles for delivery of cargo -- and eventually crew -- to the International Space Station.

For more information about Made in Space, visit www.madeinspace.us

Judge for Yourself Whether Supermoon is Truly Super

Supermoon. The name foretells something spectacular coming our way. Surely, it must be special and probably rare. You be the judge.

The recent full moon, as bright as it was, was not a supermoon. However, our next full moon, the one found glowing brightly on the night of June 22 into the following morning, will be. It will be the brightest full moon of 2013. By itself, this does not qualify it as a supermoon.

The moon revolves around our planet following an elliptical path, resulting in it, at times, lying comparatively close to Earth, while, at other times, being relatively far away. At its closest approach, known as perigee, the moon averages about 229,000 miles from Earth, and when it reaches its farthest point, known as apogee, it averages 250,000 miles from us. These two values averaged together give the commonly quoted Earth-moon distance of 240,000 miles.

When at a typical perigee, the moon's apparent diameter is 9% wider than at apogee, because it is 9% closer. It also covers 19% more area in the sky. When the full moon occurs at perigee these values increase, appearing 14% wider and nearly 30% greater in both area and brightness than when it happens at apogee. This creates a supermoon.

As with many orbital phenomena in the solar system, the ultimate cause for the supermoon rests with the sun's immense gravitational field. A full moon occurs when the moon, Earth, and

sun lie ordered in a straight line. If this alignment occurs when the moon is also at perigee, its closest point to Earth, the sun's gravity pulls the moon slightly closer toward it and Earth, making this perigee closer than average. The full moon appears consequently larger and brighter in our night sky, producing a supermoon.

If, instead, the moon reaches apogee when it is full, the sun's grip on it is somewhat lessened since it moves slightly farther from the sun. The apogee full moon then appears slightly smaller and glows less brightly in our night sky. Since this doesn't warrant people's attention, or the media's, there is no term for this condition.

How often does a supermoon occur? The period between successive full moons is 29.5 days and that between perigees is 27.6 days. It turns out that the time between every 14 full moons is almost equal to the time between 15 perigees, or about 413 days. So, there is about one year, one month and 18 days between supermoons. The last one of these special full moons occurred on May 5, 2012, and the next one comes on August 10, 2014.

The supermoon of May 5, 2012, created a media stir. As you can see, though, these special moons aren't particularly rare or unusual. Will any media attention be warranted for the June 22-23 event? Only you can be the judge.

PERTINENT LUNAR DISTANCES FOR 2013

Typical perigee: 229,000 miles

Typical apogee: 250,000 miles

Full moon and perigee (supermoon): June 22; 222,000 miles

Full moon and almost apogee: Dec. 17; 248,000 miles

Apogee: Dec. 19; 253,000 miles

- by John Goss, www.roanoke.com/news/astronomy/1952148-12/judge-for-yourself-whether-supermoon-is-truly-super.html

New Asteroid Families Discovered

Astronomers using data from NASA's Wide-field Infrared Survey Explorer (WISE) have identified 28 new families of asteroids. The findings are a critical step in understanding the origins of asteroid families, and the collisions thought to have created these rocky clans.

"We're separating zebras from the gazelles," said Joseph

Masiero of JPL. "Before, asteroid family members were harder to tell apart because they were

traveling in nearby packs. But now we have a better idea of which asteroid belongs to which family."

This artist's conception shows how families of asteroids are created.

An asteroid family is formed when a collision breaks apart a large parent body into fragments of various sizes. Some collisions leave giant craters. For example, the asteroid Vesta's southern hemisphere was excavated by two large impacts. Other smash-ups are catastrophic, shattering an object into numerous fragments, as was the case with the Eos asteroid family. The cast-off pieces move together in packs, traveling on the same path around the sun, but over

time the pieces become more and more spread out.

The new families were found in millions of infrared snapshots from the asteroid-hunting portion of the WISE all-sky survey, called NEOWISE.

The NEOWISE team looked at about 120,000 main belt asteroids out of the approximately 600,000 known. They found that about 38,000 of these objects, roughly one third of the



observed population, could be assigned to 76 families, 28 of which are new. In addition, some asteroids thought to belong to a particular family were reclassified.

The next step for the team is to learn more about the original parent bodies that spawned the families.

"It's as if you have shards from a broken vase, and you want to put it back together to find out what happened," said Amy Mainzer, NEOWISE principal investigator. "Why did the asteroid belt form in the first place and fail to become a planet? We are piecing together our asteroids' history."

More information about the mission is online at: <http://www.nasa.gov/wise>

- Credits: Author Dr. Tony Phillips | Production editor Dr. Tony Phillips | Credit Science@NASA

- http://science.nasa.gov/science-news/science-at-nasa/2013/29may_asteroidfamilies/

Bad (Space) Weather Cancels Pigeon Races



Pigeon racing is a big sport that dates back almost 2,000 years. All over the world, there are people with the hobby of training and racing a special kind of homing pigeon. They take their caged pigeons to a spot that is a carefully measured distance from their home. Then they open the cages and time how long it takes for the pigeons to fly home. The pigeon with the



shortest time gets the prize—or rather its owner gets the prize. The pigeon just gets tired, since it has flown as fast as it could for 60 – 600 miles or more!

But how do the pigeons know where home is?

A pigeon racer releases his pigeons far from home and hopes to see them again soon.

It has taken a lot of scientific study to figure it out, and there are still questions. One thing that seems certain is that the pigeons can detect Earth's magnetic field lines.

Earth is like a big magnet, with lines of magnetic force that loop around Earth from one magnetic pole

to the other. A compass needle will line up along the magnetic lines of force. That's how humans can know which way is north. The pigeons seem to have a compass too, but it is "built in," so they always know in which direction they are flying. We know they are not navigating by the position of the Sun in the sky, because they fly straight home even at night or in cloudy conditions when they can't see the Sun.

While the pigeons don't use the Sun for navigation, the Sun does affect their ability to navigate. When the Sun is in a stormy mood, it blasts charged particles into space at high speeds. If the blast of particles hits Earth, it shakes up Earth's protective magnetic field. When this happens,

the magnetic field that the pigeons use for navigation will change direction and the pigeon's navigation system will get confused and send the pigeon the wrong way. The anxious owner may never see his expensive champion racing pigeon again.

Inside the Space Weather Prediction Center in Boulder, Colorado, scientists keep an eye on the Sun. The GOES satellites send images that show activity on the Sun's surface that means a flare or eruption may be about to happen.

For that reason, some pigeon racers call up the Space Weather Prediction Center (part of the National Weather Service) in Boulder, Colorado, before a big race. They want to know the "space weather"



forecast. The scientists who work there keep an eye on the Sun using satellites such as the GOES (for Geostationary Operational Environmental Satellites). These satellites have special instruments that monitor the Sun's x-rays and ultraviolet light output. They can detect the beginnings of a storm that might send bad space weather toward Earth. If bad space weather is on the way, the pigeon race is postponed. No one wants to lose a prized pigeon!

- <http://spaceplace.nasa.gov/pigeons/>



Count Meteors for LADEE

The LADEE mission to the Moon is scheduled for launch this September, but we want to get on the radar of NSN clubs for outreach opportunities related to both the launch and mission science now.

The thin lunar atmosphere may be generated in part by meteoroid impacts. The majority of these impacts are too small to be observable from Earth, but there is a correlation between the meteors seen in our own atmosphere and meteoroid impacts on the Moon. Comparing variations in the rates of meteors counted by observers on Earth with changes LADEE's instruments see in the structure and composition of the lunar atmosphere can help us better understand the role of impacts as a source for the lunar atmosphere.

There's a free app to help you count meteors and automatically submit the data to NASA. It's called Meteor Counter and is available for both Android and iPhone/Pad platforms. Download the Meteor Counter app now (<http://meteorcounter.com/>) and practice so you'll be ready to contribute to the science of our next mission to the moon in the Fall.

To find out more about the LADEE mission, go here:

www.nasa.gov/mission_pages/LADEE/main/get-involved.html

Introducing David Prosper, our new NSN Admin

Welcome to our newest team member, Dave Prosper! He is the new NSN Communications Specialist here at the Night Sky Network. Dave comes from the Eastbay Astronomical Society of Oakland, CA and brings with him a background in amateur clubs, a love of astronomy, and years of experience in communications and the tech industry. We are glad to have him on the team. You can reach both of us anytime at nightskyinfo@astrosociety.org



Wishing you clear skies!

Vivian White and David Prosper, Night Sky Network Team
nightskyinfo@astrosociety.org

The NASA Night Sky Network is a nationwide coalition of over 425 amateur astronomy clubs. The NASA Night Sky Network is managed by The Astronomical Society of the Pacific.

SWFAS Minutes

Meeting Date: April 4, 2013

CALL TO ORDER: The monthly meeting of the Southwest Florida Astronomical Society was held at the Calusa Nature Center & Planetarium, Ft. Myers, Florida on Thursday, April 4, 2013. The meeting convened at 7:30pm, President Brian Risley presiding, and Bruce Dissette, acting secretary.

MEMBERS IN ATTENDANCE: There were approximately 29 members and visitors in attendance.

OPENING REMARKS: Brian Risley, President

Brian welcomed those present. Visitors were introduced: Zack, Gerry and Tom, John McCain, Alvan and Samuel Fox.

Brian reminded everyone that 2013 dues are due. Those that owe money will be an email. Lee Kraemer has stepped down as secretary due to health issues and because he will be out of town for several months.

An 8-inch Celestron telescope was donated by a Sanibel couple.

The STEMtastic event yielded approximately 3500 people according to Doug Heatherly and Tony Heiner.

Doug Heatherly reminded us that the Shell Point Golf Course Star Party is this Saturday April 6. Volunteers can contact Doug. The start time is about 7 PM.

The CRP Star Party and Bar-B-Que starts at 2 PM next Saturday.

Loan-a-scope telescopes are in stock.

Brian called for a replacement for Lee Kraemer as secretary.

On Saturday April 12th there is an event at Skyline Elementary in Cape Coral. Carol Stewart will coordinate. There will be solar observing.

VICE PRESIDENT'S REPORT: Bruce Dissette, Vice President reported that discipline about lights needs to be reinforced at Star Parties.

NEWSLETTER EDITOR'S REPORT: Carole Holmberg, Newsletter Editor – Carole is back at the Calusa Nature Center 15 hours each week, taking the place of Carol Stewart.

SECRETARY'S REPORT: Lee Kraemer, Secretary – not present. Previous minutes were approved.

TREASURER'S REPORT: Tony Heiner, Treasurer, reported a total balance between checking account and savings of \$2653. The CNCP rent of \$250 is due. Mary Rawl will provide an invoice.

VIEWING COORINATOR'S REPORT: Chuck Pavlick, Tony Heiner, and Bruce Dissette, viewing Coordinators

Fakahatchee – no report. CRP – rained out. There will be a picnic this Saturday.

LIBRARIAN'S REPORT: Maria Berni, Librarian – No Report

CLUB HISTORIAN: Danny Secary - No report.

EQUIPMENT COORDINATOR: Brian Risley – 4 telescopes are for sale at the planetarium.

WEBSITE COORDINATOR: Dan Fitzgerald - No report

PROGRAM COORDINATOR: Vacant

Evening Program: Astro-geology by Jack Berninger

ADJOURNMENT: Thursday May 2, 2013 was set as the next regular meeting. The meeting was adjourned at 9:15 PM

May Minutes will be published in a future newsletter.

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