

Southwest Florida Astronomical Society

SWFAS



The Eyepiece February 2013

A MESSAGE FROM THE PRESIDENT

Will Punxsutawney Phil see his shadow?

We had a great meeting down at FGCU last month. I would like to thank Dr.'s Fauerbach and Mon for their presentation. This month's meeting on Feb 7th at 7:30 pm will be at the Calusa Nature Center Planetarium. Carole Holmberg will be doing a presentation on Green Bank Radio Observatory.

The equipment that has been donated recently will be auctioned off at this month's meeting for the PST fund. If you did not get a listing of the items, please let me know and I will send you one. You do not have to be present to bid - I am taking bids up to Thursday noon. Some items are multiples and we will take the appropriate high bids.

The star party at the CRP on Jan 12th had some cloud issues, but we still were able to get some observing in. Carol Stewart would like to thank those that came out to help for the Orion Night at the Planetarium on Jan 12th. They had about 50 people even though they were dodging clouds too.

The Christa McAuliffe Charter observing night unfortunately was the victim of weather again this year.

At the Wine Under the Stars event at the Calusa Nature Center, Alice Mack and Ron Madl (and his lovely wife) and I were able to show everyone Jupiter, the moon, the Pleiades, and the Orion Nebula. They had a great turnout.

Saturday Feb 2nd is the Kiwanis Science and Engineering Fair at the FGCU Arena. (7:30 am setup time, cold but the weather is looking good!) If you can help, it would be appreciated.

On Friday Feb 8th Kelly Flaherty is doing Astronomy for Amateurs at Hickey's Creek Park on SR 80 out towards Alva and could use some help with telescope observing.

On Feb 9th, we have our monthly CRP Star Party.

On Fri Feb 15th, we will be doing a public Star Party at Rotary Park in Cape Coral. We can use all the help we can get as there is usually a very good turnout.

On Feb 16th, Carol Stewart has Moonstruck event at the Calusa Nature Center Planetarium.

On Feb 23rd, we have the Burrowing Owl Festival at Rotary Park in Cape Coral all day. We also may be present at the Edison Day of Discovery all day event at the Imaginarium.

Next month's meeting is on Mar 7th and will have a program by Jack Berninger, who has returned to give us two programs this spring.

Moon: Last Quarter 3rd, New 10th, 1st Quarter 17th, Full 25th.

Planets: Mars is very low in the west at sunset. Saturn rides high in the predawn sky. Jupiter is high in Taurus near the Pleiades at sunset. Mercury will make a brief evening appearance with the greatest elongation on the 16th. Venus is slipping towards the sun in the morning sky.

Dues for 2013 are now due. I sent out email notifications to all members who have not already paid. 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.

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Upcoming Events

- * Sat Feb 2nd Thomas A. Edison Kiwanis Science and Engineering Fair at FGCU Arena, 10am – 4 pm. The Science Fair is now separate from the Edison Day of Discovery. The Science Fair is planning outdoor activities at FGCU.
- * Sat Feb 2nd 10th Annual Dark Sky Festival in Harmony, FL (S of Orlando), 5 pm-10pm
- * Thurs Feb 7th Monthly meeting at the Calusa Nature Center Planetarium, 7:30pm (Green Bank - Carole Holmberg) PST Auction
- * **Fri Feb 8th Astronomy for Amateurs Hickeys Creek Park 6:45 pm (Kelly Flaherty)**
- * Sat Feb 9th Star Party at Caloosahatchee Regional Park, dusk
- * Fri Feb 15th Asteroid Encounter at UCF (Orlando), 1 pm-3 pm
- * Fri Feb 15th Public Star Party at Rotary Park, Cape Coral Parks and Rec, dusk
- * **Sat Feb 16th Moonstruck - Calusa Nature Center Planetarium Feb Program 7:30pm-9pm (Carol Stewart)**
- * Sat Feb 23rd Burrowing Owl Festival, Rotary Park Cape Coral, 10am-4pm
- * **Sat Feb 23rd Edison Festival Day of Discovery, Imaginarium, 10am-4pm (Carol Stewart)**
- * Thurs Mar 7th Monthly meeting at the Calusa Nature Center Planetarium, 7:30pm (Jack Berninger Program)
- * **Fri Mar 8th Astronomy for Amateurs Hickeys Creek Park 6:45 pm (Kelly Flaherty)**
- * **Sat Mar 9th STEMtastic Lee County School Public Education Center (Colonial/Metro) 10:00 am - 2:00 pm**
- * Sat Mar 9th Club Star Party at Caloosahatchee Regional Park (Dusk -?)

Astronomy for Amateurs - Kelly Flaherty would appreciate any help she can get. We usually bring out scopes and set them up in the parking lot while she does a presentation, then they come to look through the scopes. (kflaherty@leegov.com)

Moonstruck - Carol Stewart would like some help from members with telescopes for observing that night at the planetarium. (cjstewart@mindspring.com)

STEMtastic - This is a big event, and we really need help here, not just with scopes. Plans are to have some projects like the pocket solar system and a sundial available for make and take as well as the 'make a planisphere' project. Last year 50 schools (Elementary, Middle, High and Tech Centers) were a part of STEMtastic and almost 2,000 children and parents attended. We hope that school participation and attendance both increase this year.

Carol Stewart has agreed to be the coordinator for the Edison Day of Discovery at the Imaginarium on Feb 23rd, provided that she can get some help. If you can help with this event, please let Carol or Brian Risley know ASAP, as we need to get officially registered.

Brian Risley will be busy producing a lot of handouts for our many upcoming events. If anyone is interested in helping collate some of these, please let him know. We have a lot of events over the next few months, so we don't have to have them all done at once.

CRP Star Party Schedule

The 2013 Caloosahatchee Regional Park schedule has now been set. Star Parties for 2013 will be February 9, March 9, April 13, May 11, June 8, July 6, August 3, September 14, October 5, November 2, November 30, and December 28.

Universe in Harmony: A Central Florida Town Celebrates the Stars by Keeping You in the Dark

One of the lingering memories of 2004's Hurricane Charley was how Central Florida looked with the power out. The neon-and-halogen-glow of Orlando receded and pitch blackness took over. The star-gazing was spectacular.

These days, you have to go to great lengths to find a night sky dark enough to see what used to get Galileo so worked up.

"There's Kissimmee Prairie Preserve," near Okeechobee, offers Derek Demeter, director of the Seminole State College Planetarium. Ocala National Forest? "The light dome of Ocala and even Gainesville has ruined that." Farther west, Demeter has heard of a shell mound just off the coast in the Gulf of Mexico.

"We're a very populated state. Those dark places are pretty much gone," Demeter says.

But one place, easy to get to, is celebrated for its darkness and its stargazing. The planned community of Harmony, southeast of St. Cloud on U.S. 192-441, was designed as a close-to-nature living space where residents could live among, not displace, wildlife.

"Part of that was an effort to protect the night sky," says Greg Golgowski, conservation director for Harmony. The planners decreed shielded street and outdoor home lighting that doesn't cast light upward.

Harmony has been recognized by the Dark Sky Association as a "development of distinction," and the town square is rated Class 4 on the Bortle Dark-Sky Scale of Light Pollution used by amateur astronomers—which means it's dark enough to see the Milky Way. That's why, once a year, Harmony celebrates the Dark Sky Festival, a night of music, food, exhibits, nocturnal nature-watching, stargazing and talks by NASA experts. The event, unique to the East Coast, began with just 450 sky enthusiasts but in recent years has drawn upward of 5,000. On February 2, the Dark Sky Festival celebrates its 10th anniversary.

"We're outside the urban glow of Melbourne or St. Cloud," Golgowski says. So, Demeter adds, the light domes from those cities haven't spoiled Harmony's views.

Demeter promises "sort of an open-air planetarium," with telescopes and high-powered laser pointers that allow astronomers to point out planets, stars and constellations. "Kids who have never spent much time outside of a city will be stunned by what they can see in a truly dark night sky," he says.

The festival runs 5 to 10 p.m. and admission is free. For information go to darkskyfestival.com - by Roger Moore. This article appears in the January 2013 issue of Orlando Magazine

February Meeting

Our February monthly meeting will be held on Thursday February 7th at 7:30 pm at the Calusa Nature Center Planetarium. Carole Holmberg, who visited Green Bank, WV last month, will give a talk entitled *My Visit to Green Bank and the World's Largest (Fully Steerable) Telescope*. We will also have an auction of donated items to raise funds to purchase a PST Solar Telescope.

SWFAS Auction for PST

For those of you who have not been at the last few meetings, we had a lot of equipment donated that was designated as being up for auction specifically to fund a PST Solar Scope that we could use with the CPC-800 telescope. Thank you to everyone who has donated items or made other donations towards the PST.

Brian Risley will be auctioning these items off at the February 7th meeting. You do not need to be present. You can send him information in advance about what you would like to bid on the items. Some of the cases have multiples. If there are differences (such as having a strap), the most complete units will be auctioned first. All items will be available for review before the meeting on the 7th.

The plan is as follows: Brian has placed a starting price on these items. If you would like to bid on them, please let him know. He will send a response to any bids and a summary to all bidders as bids are placed so you can increase your bid.

At the February 7th meeting, Brian will auction them off with any emailed bids identified first. If you want to do any emailed stepped bidding, please let him know the steps and he will apply them as other bids come in. (Reasonable steps only please.)

Any items that do not sell will be placed on AstroMart or Cloudy Nights.

All proceeds are going to the PST purchase. Any checks should be made out to SWFAS. Cash is also accepted. Please keep in mind this is a fundraising event, so please bid accordingly!

We have a few other items that will be sold later, including a Celestron 150 Omni XLT Reflector (minor mirror marks) that has a custom Focus Motor attached (have source for focus motor control software too.) If you are interested in experimenting with this, please let Brian know. He also has a C-8 that currently has optical problems (trying to determine if we can correct for them in any way) that can mount in either the fork or on a Super Polaris GEM mount (motorized) that he is testing.

Cases (in very good to excellent condition, just some minor cosmetic marks on the outside)

- 3 Silver 15lx7wx9h (internal), has key, 2 dividers, top has eggcrate foam (Starting \$15 each)
- 2 Black Padded soft TGI Cases 15lx9wx3h (internal) with 1" padded front zipper pocket and rear Velcro pocket. (1 has shoulder strap) (Starting \$15 each)
- 1 Zeikos Rolling Case Black w Silver Trim. 18" Extendable Handle 22.5l x 14w x 6h (internal) Foam has been precut for 2" eyepieces/accessories. No Key (New on EBay \$65, opening bid \$40)
- 2 Hercules Black/Silver Trim Case 17lx12wx4 (internal) Bottom foam, top eggcrate foam, no middle layer foam. Has 2 large (12 in), 1 medium (10 in), 2 small (6 in), 1 Small (5 in) dividers. One has shoulder strap. (new cases this style around \$25, opening bid \$15)

Miscellaneous Items

3 USB 16ft Data Extension Cables. (Do not know if they support USB2.0, suspect only 1.1) Starting at \$5 each

1 Belkin 7 port USB Powered Hub (Do not know if it supports USB 2.0, suspect only 1.1) (Comes with USB to USB Mini cable for attaching to standard USB Port) Starting at \$5

1 Telrad Finder Base (Just the base, adhesive pads unused) Starting at \$5
1 Celestron 93633A T-Adapter (Starting at \$10)
1 Celestron 1.25" Mirror Diagonal (made by Vixen) Starting at \$25
1 Antares 1.25" Laser Collimator w diagonal target (\$44 new, starting at \$20)
1 Celestron Travel Scope 70mm f1400 with rings/scopestuff bar for 8" SCT (bar may have been modified for other mountings) and 1.25 45deg diagonal (Opening bid \$100)
1 GPUSB w 6pin rj12 Cable. Adapts USB output to AutoGuider (St-4) output (\$75 new, starting at \$40)
1 Celestron C-8 Wedge with AZ/Alt Adjustment (Going for 100-150 on EBay, Starting at \$75)
Has some minor paint peeling where knobs/wedge plate touch base and some minor rust/oxidation areas)
1 Celestron Tripod (Powerstar Series) for C-8 Has Rubber Feet, central post extension. Minor rust on some screws and the legs. (Starting at \$50)
1 Celestron PowerStar C-8 Fork Mount. Has built in RA Drive Corrector, Worm Gear (Byers?). Will support Dec/Focus motors, but they are not included. (Not a GOTO mount, but a very reliable fork that can run off AC or DC). (Starting at \$50)
- *Thanks for bidding, Brian Risley, President, Southwest Florida Astronomical Society, Inc.*

Astronomy for Amateurs at Hickey's Creek Mitigation Park

(Kelly is restarting the astronomy programs. If you can help her out either night, please let her know. - *Brian*)

February 8 at 6:45 pm and March 15 at 8:15 pm

Registration is required! This free program is designed to show beginning astronomers how to easily find stars, constellations and planets. Bring binoculars, water, bug spray, a flashlight and a lawn chair or something to sit on. We will meet in the parking lot. This program is free with paid parking but may be cancelled due to inclement weather, clouds, or if the minimum participation is not met. Register online at www.leeparks.org or by calling Kelly at (239) 822-5212.

Hickey's Creek Mitigation Park, located at 17980 Palm Beach Boulevard, is one of the largest Regional Parks in Lee County encompassing 862 acres. Views of Hickey's Creek can be enjoyed from trails and overlook areas. The park is home to threatened Florida scrub-jays and gopher tortoises. Park amenities include parking, restrooms, a canoe/kayak landing, a fishing pier, 2 picnic areas, 2 trail shelters and 5 miles of hiking trails. The park is open 7AM to 6PM Daily. The parking is free for those with a valid Lee County parking pass. Those who do not have a pass are required to pay \$1.00 per hour or \$5.00 per day. Please bring exact change.

- *Kelly Flaherty, Lee County Parks and Recreation, (239)822-5212, kflaherty@leegov.com*

Asteroid Encounter at UCF

I wanted to invite you to our Asteroid Encounter at UCF from 1 to 3 pm Feb. 15. The event is a chance to listen to four international experts speak about current and future asteroid research. But the exclusive and most exciting part our event is a live feed from Spain that we will be broadcasting on campus at 2:15 pm. It will show asteroid 2012 DA 14 buzzing by Earth at just more than 14,000 miles away. It's the closest "fly by" in history. There is no danger of impact, but it is a unique opportunity to see an asteroid up close as it squeezes by Earth and the communications satellites orbiting our planet. The folks who discovered the asteroid work with one of our professors, Humberto Campins, who first discovered water ice and organic materials on an asteroid. Thanks to that partnership they will be providing us an exclusive feed. We'd love to have you attend. The event is free and open to the public. More information is available at www.cos.ucf.edu/asteroid/

We hope to see you on Feb. 15 for our Asteroid Encounter.

- *Zenaida Gonzalez Kotala, UCF News & Information, 407-823-6120, Zenaida.Kotala@ucf.edu*

Comet of the Century?

Out near the orbit of Jupiter, a faint speck of light is moving through the black of space. At first glance it doesn't look like much, no brighter than a thousand distant stars speckling the velvet sky behind it; indeed, it takes a big telescope make out that it is a comet.

But what a comet it could turn out to be....

Later this year, "Comet ISON" could blossom into a striking naked eye object visible even in broad daylight.

"Comet ISON is a sungrazer," explains Karl Battams of the Naval Research Lab. "The orbit of the comet will bring it very close to the sun, which we know can be a spectacular thing."

Russian astronomers Vitali Nevski and Artyom Novichonok found the comet in Sept. 2012. It bears the name of their night-sky survey program, the International Scientific Optical Network.

As 2013 unfolds, the comet is still very far away—near the orbit of Jupiter. That's why it looks like a speck. "But for an object at such extreme distance, it is actually very bright," says Battams.

The comet's glow suggests that is spewing gas and dust from a fairly large nucleus—"in the 1 to 10 km range," estimates Matthew Knight of the Lowell Observatory.

On Nov. 28, 2013, this "dirty snowball" will fly through the sun's atmosphere little more than a million km from the stellar surface. If the comet survives - a big IF - it could emerge glowing as brightly as the Moon, briefly visible near the sun in broad daylight. The comet's dusty tail stretching into the night sky could create a worldwide sensation.

Some reporters have started calling ISON the "Comet of the Century," but Don Yeomans of NASA Near-Earth Object Program thinks that's premature.

"I'm old enough to remember the last 'Comet of the Century'," he says. In 1973, Comet Kohoutek looked like it would put on a great show, much like ISON. The actual apparition was such a let-down that Johnny Carson made jokes about it on the Tonight Show. "It fizzled," says Yeomans. "Comets are notoriously unpredictable."

"Comet ISON has the potential to live up to the hype, but it also has the potential to do nothing," agrees Battams.

One hazard is the sun. Tidal forces and solar radiation have been known to destroy comets. A recent example is Comet Elenin, which broke apart and dissipated in 2011 as it approached the sun. Elenin, however, was a much smaller comet.

A better comparison, perhaps, is Comet Lovejoy, which flew through the sun's atmosphere in 2011. Lovejoy emerged intact and wowed observers with a garish tail for weeks.

"Comet ISON is probably at least twice as big as Comet Lovejoy and will pass a bit farther from the sun's surface" notes Knight. "This would seem to favor Comet ISON surviving and ultimately putting on a good show.

One of the most exciting possibilities would be a partial break-up. "If Comet ISON splits, it might appear as a 'string of pearls' when viewed through a telescope," speculates Battams. "It might even resemble the famous Comet Shoemaker-Levy 9 that hit Jupiter in 1994."

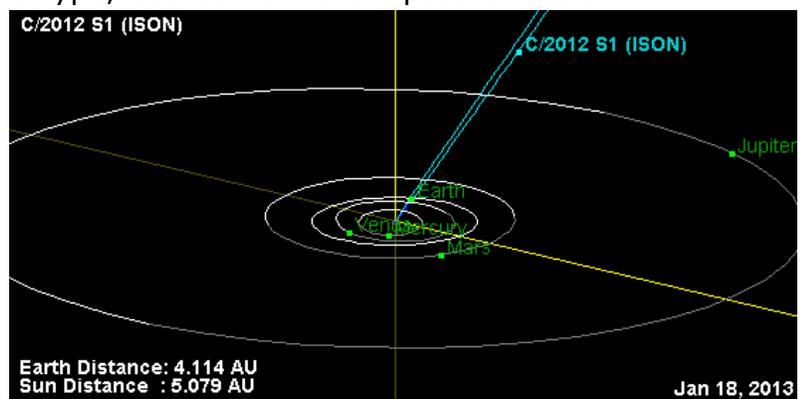
A break-up would pose no threat to Earth, assures Yeomans. "Comet ISON is not on a collision course. If it breaks up, the fragments would continue along the same safe trajectory as the original comet."

Whatever happens, northern sky watchers will get a good view. For months after it swings by the sun, Comet ISON will be well placed for observers in the northern hemisphere. It will pass almost directly over the North Pole, making it a circumpolar object visible all night long.

Will Comet ISON fizzle ... or sizzle? Stay tuned to Science@NASA for updates.

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

FULL STORY: http://science.nasa.gov/science-news/science-at-nasa/2013/18jan_cometison/



More Info on How to Find Comet ISON (and Pan-Starrs)

Comet ISON is not mentioned in the 2013 RASC Handbook. However, there is an entire page and some other references in the Ottewell Calendar, so that will be very handy. Pan-Starrs (C/2011 L4) is also there. Both *Sky and Telescope* and *Astronomy* magazines have charts of both comets.

Stuart Atkinson has a blog on both comets with a lot of good information. He created "charts" which show the observer's view. Check it out at <http://waitingforison.wordpress.com/comet-panstarrs/>

For your own personal finder, there are two Android phone apps, Sky Safari and Sky Tools, with both comets.

Bob Riddle has a blog page about Pan-STARRS which uses several graphics to highlight its path through the inner solar system and across constellation boundaries, and shows viewing opportunities. If this pans out (pan pun intended) then the evenings of March 12 and 13 with the thin waxing crescent Moon and Mars, and April 2-5 as the comet passes M31 should be great 'photo ops'. Bob's blog page is: <http://bobs-spaces.net/comets/comet-pan-staars-c2011-l4/>

Cassini Suggests Icing on a Lake

It's not exactly icing on a cake, but it could be icing on a lake. Scientists on NASA's Cassini mission find that blocks of hydrocarbon ice might decorate the surface of existing lakes and seas of liquid hydrocarbon on Saturn's moon Titan. The presence of ice floes might explain some of the mixed readings Cassini has seen in the reflectivity of the surfaces of lakes on Titan.

"One of the most intriguing questions about these lakes and seas is whether they might host an exotic form of life," said Jonathan Lunine, Cassini Titan scientist. "And the formation of floating hydrocarbon ice provides an opportunity for interesting chemistry along the boundary between liquid and solid, a boundary that may have been important in the origin of terrestrial life." Titan is the only other body besides Earth in our solar system with stable bodies of liquid on its surface. But while our planet's cycle of precipitation and evaporation involves water, Titan's cycle involves hydrocarbons like ethane and methane. Ethane and methane are organic molecules, which scientists think can be building blocks for the more complex chemistry from which life arose. Cassini has seen a vast network of these hydrocarbon seas cover Titan's northern hemisphere, while a more sporadic set of lakes bejewels the southern hemisphere.

Up to this point, Cassini scientists assumed that Titan lakes would not have floating ice, because solid methane is denser than liquid methane and would sink. But the new model considers the interaction between the lakes and the atmosphere, resulting in different mixtures of compositions, pockets of nitrogen gas, and changes in temperature. The result, scientists found, is that winter ice will float in Titan's lakes and seas if the temperature is below the freezing point of methane: -297° F. The scientists realized all the varieties of ice they considered would float if they were composed of at least 5% "air," which is an average composition for young sea ice on Earth. ("Air" on Titan has significantly more nitrogen than Earth air and almost no oxygen.) If the temperature drops by just a few degrees, the ice will sink because of the relative proportions of nitrogen gas in the liquid versus the solid. Temperatures close to the freezing point of methane could lead to both floating and sinking ice - that is, a hydrocarbon ice crust above the liquid and blocks of hydrocarbon ice on the bottom of the lake bed. Scientists haven't



entirely figured out what color the ice would be, though they suspect it would be colorless, as it is on Earth, perhaps tinted reddish-brown from Titan's atmosphere.

Cassini's radar instrument will test this model by watching what happens to the reflectivity of the surface of these lakes and seas. A hydrocarbon lake warming in the early spring thaw, as the northern lakes of Titan have begun to do, may become more reflective as ice rises to the surface. This would provide a rougher surface quality that reflects more radio energy back to Cassini, making it look brighter. As the weather turns warmer and the ice melts, the lake surface will be pure liquid, and will appear to the Cassini radar to darken.

"Cassini's extended stay in the Saturn system gives us an unprecedented opportunity to watch the effects of seasonal change at Titan," said Linda Spilker, Cassini project scientist. "We'll have an opportunity to see if the theories are right."

- *The full version of this story with accompanying images is at:*

www.jpl.nasa.gov/news/news.php?release=2013-010&cid=release_2013-010

Martian Crater May Once Have Held Groundwater-Fed Lake



A NASA spacecraft is providing new evidence of a wet underground environment on Mars that adds to an increasingly complex picture of the Red Planet's early evolution.

The new information comes from researchers analyzing spectrometer data from NASA's Mars Reconnaissance Orbiter (MRO), which looked down on the floor of McLaughlin Crater. The Martian crater is 57 miles in diameter and 1.4 miles deep. McLaughlin's depth apparently once allowed underground water, which otherwise would have stayed

hidden, to flow into the crater's interior.

Layered, flat rocks at the bottom of the crater contain carbonate and clay minerals that form in the presence of water. McLaughlin lacks large inflow channels, and small channels originating within the crater wall end near a level that could have marked the surface of a lake.

Together, these new observations suggest the formation of the carbonates and clay in a groundwater-fed lake within the closed basin of the crater. Some researchers propose the crater interior catching the water and the underground zone contributing the water could have been wet environments and potential habitats.

"Taken together, the observations in McLaughlin Crater provide the best evidence for carbonate forming within a lake environment instead of being washed into a crater from outside," said Joseph Michalski. Michalski used the Compact Reconnaissance Imaging Spectrometer for Mars (CRISM) on the MRO to check for minerals such as carbonates, which are best preserved under non-acidic conditions.

McLaughlin Crater sits at the low end of a regional slope several hundreds of miles long on the western side of the Arabia Terra region of Mars. As on Earth, groundwater-fed lakes are expected to occur at low regional elevations. Therefore, this site would be a good candidate for such a process.

- *The full version of this story with accompanying images is at:*

http://www.jpl.nasa.gov/news/news.php?release=2013-028&cid=release_2013-028



NASA Eyes 'Hedgehog' Invasion of Mars Moon Phobos

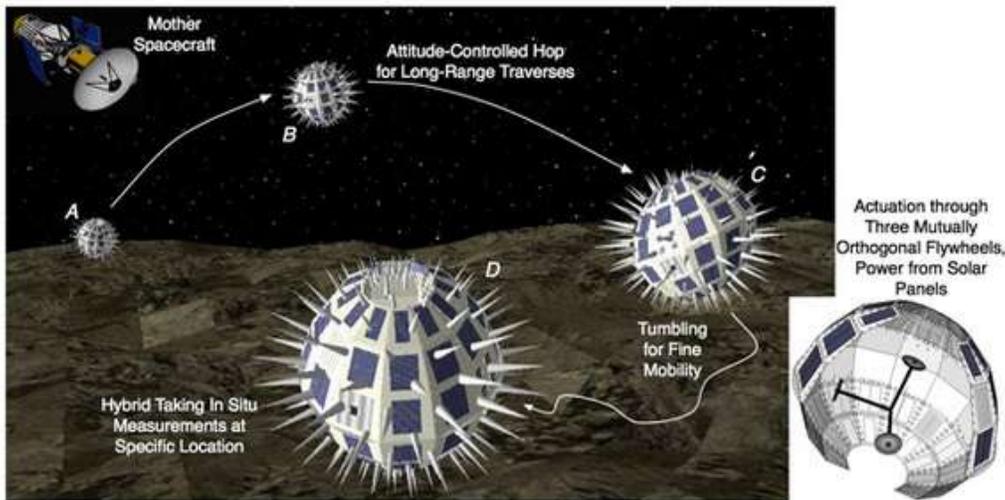
Caption: Mars' largest moon Phobos, as seen during a recent flyby performed by the European spacecraft Mars Express.

A daring, "Angry Birds"-like NASA mission could bombard a Martian

moon with robotic "hedgehog" probes in the next few decades, scientists say.

The space hedgehogs are actually small, spiky, spherical rovers that form part of a novel mission idea called Phobos Surveyor. The rovers would take advantage of the low gravity on the Mars moon Phobos, its sister moon Deimos, or asteroids in the solar system. Engineers have designed the devices to work in concert with a nearby mother ship.

The hedgehogs would work well in the low gravity of the 16-mile-wide Phobos, a force 1,000 times weaker than the gravity on Mars itself, said researcher Marco Pavone of Stanford University. Gravity on Mars is about one-third that of the Earth.



"The problem with [conventional] rovers is, in low gravity, you don't have any traction. That means your wheels spin and you do not move," said Pavone, who developed the hedgehog mission concept.

Caption: This illustration depicts the Phobos Surveyor mission concept, which would land small, spiky "hedgehog" probes

on Mars' largest moon, Phobos, while a mother ship monitored the landers from nearby.

Robot hedgehogs in space

Instead of using wheels to move across a planetary surface, however, the hedgehogs would use internal, rotating discs. Plans call for three discs encased in each hedgehog. Each spacecraft would measure about 2 feet in diameter, and NASA has already built a prototype version. The three discs inside a hedgehog point in different directions, giving controllers the ability to move the devices with precision, Pavone said. Slightly speeding up the discs can send the hedgehogs tumbling, and a quick spin can make the hedgehog hop to a nearby location, he added.

To get to Phobos, the hedgehogs will potentially hitch a ride inside the proposed Phobos Surveyor, which could be a Discovery-class NASA mission with a cost of about \$250 million and a streamlined development schedule to meet its science goals. At best, the Phobos mission could launch in 10 to 20 years, but that assumes the concept is approved and funded.

The exploitation of inertial motion is not entirely new to space exploration, as the Japanese Space Agency's Hayabusa spacecraft pursued a similar idea. That craft released a small lander while above the asteroid Itokawa. Dubbed MINERVA (for Micro/Nano Experimental Robot Vehicle for Asteroid), Hayabusa's tiny lander was supposed to bounce on the asteroid using rotating actuators. But it never made it to the surface.

NASA's hedgehog would have the ability to not only hop, but also tumble, which would make it potentially a more versatile lander than MINERVA if it were to arrive on Phobos.

Probing Phobos' origins

Pavone's team has already built two versions of the hedgehogs, but the rovers still require several design changes before they could make it to space. The researchers also plan further testing, including flying the hedgehogs on parabola flights that simulate low gravity, just to see how they behave.

Pavone said he hopes the hedgehogs will help solve a long-standing mystery: Did Phobos form at the same time as Mars, or is it an asteroid pulled in by the Red Planet's gravity?

"By providing answers to this equation, it will be possible to calibrate this model ... for [other] asteroids through the solar system," Pavone said.

According to the plan, five or six hedgehogs could make the trip to Phobos, which would take about two years. The Phobos Surveyor mother ship could then spend a few months analyzing potential landing sites before releasing the hedgehogs, one at a time.

The mother ship would stay in orbit and map the surface's composition, though scientists are still discussing which actual instruments to send aboard the craft. The ship could also relay the hedgehogs' findings back to Earth.

- by Elizabeth Howell, *SPACE.com Contributor*, www.space.com/19342-space-hedgehogs-mars-moon-phobos.html

Dung Beetles Navigate Via the Milky Way, an Animal-Kingdom First



Talk about star power—a new study shows that dung beetles navigate via the Milky Way, a first in the animal kingdom.

Caption: A dung beetle rolling its ball in South Africa. Photograph courtesy Eric Warrant.

The tiny insects can orient themselves to the bright stripe of light generated by our galaxy, and move in a line relative to it, according to recent experiments in South Africa.

"This is a complicated navigational feat—it's quite impressive for an animal that size," said Eric Warrant, a biologist at the University of Lund.

Moving in a straight line is crucial to dung beetles, which live in a rough-and-tumble world where competition for excrement is fierce.

Once the beetles sniff out a steaming pile, males painstakingly craft the dung into balls and roll them as far away from the chaotic mound as possible, often toting a female that they have also picked up. The pair bury the dung, which later becomes food for their babies.

But it's not always that easy. Lurking about the dung pile are lots of dung beetles just waiting to snatch a freshly made ball. That's why ball-bearing beetles have to make a fast beeline away from the pile.

"If they roll back into the dung pile, it's curtains," Warrant said. If thieves near the pile steal their ball, the beetle has to start all over again, which is a big investment of energy.

Seeing Stars

Scientists already knew that dung beetles can move in straight lines away from dung piles by detecting a symmetrical pattern of polarized light that appears around the sun. We can't see this pattern, but insects can thanks to special photoreceptors in their eyes.

Caption: The Milky Way glimmers over Indonesia. Photograph by Justin Ng, Your Shot.



But less well-known was how beetles use visual cues at night, such as the moon and its much weaker polarized light pattern. So Warrant and colleagues went to a game farm in South Africa to observe the nocturnal African dung beetle *Scarabaeus satyrus*.

Attracting the beetles proved straightforward: The scientists collected buckets of dung, put them out, and waited for the beetles to fly in.

But their initial observations were puzzling. *S. satyrus* could still roll a ball in a straight line even on moonless nights, "which caused us a great deal of grief—we didn't know how to explain this at all," Warrant said.

Then, "it occurred to us that maybe they were using the stars—and it turned out they were."

Dapper Beetles

To test the star theory, the team set up a small, enclosed table on the game reserve, placed

beetles in them, and observed how the insects reacted to different sky conditions. The team confirmed that even on clear, moonless nights, the beetles could still navigate their balls in a straight line.

To show that the beetles were focusing on the Milky Way, the team moved the table into the Johannesburg Planetarium, and found that the beetles could orient equally well under a full starlit sky as when only the Milky Way was present.

Lastly, to confirm the Milky Way results, the team put little cardboard hats on the study beetles' heads, blocking their view of the sky. Those beetles just rolled around and around aimlessly.

Caption: The scientists put hats on the dung beetles to block their ability to see stars. This beetle, which is wearing a clear hat, acted as a control in one experiment. Photograph courtesy Eric Warrant.



Dung beetle researcher Sean D. Whipple said that the "awesome results provide strong evidence for orientation by starlight in dung beetles." He added that this discovery reveals another potential negative impact of light pollution, a global phenomenon that blocks out stars.

"If artificial light—from cities, houses, roadways, etc.—drowns out the visibility of the night sky, it could have the potential to impact effective orientation and navigation of dung beetles in the same way as an overcast sky," Whipple said.

Keep On Rollin'

Warrant added that other dung beetles likely navigate via the Milky Way, although the galaxy is most prominent in the night sky in the Southern Hemisphere. What's more, it's "probably a widespread skill that insects have—migrating moths might also be able to do it."

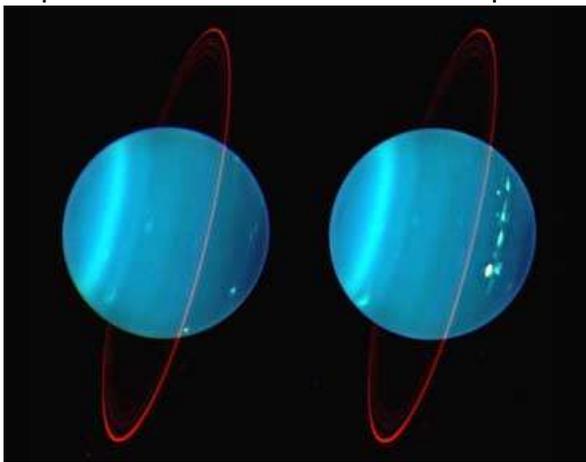
As for the beetles themselves, they were "very easy to work with," he added. "You can do anything you want to them, and they just keep on rolling."

- <http://newswatch.nationalgeographic.com/2013/01/24/dung-beetles-navigate-via-the-milky-way-an-animal-kingdom-first/>

Keck Zooms in on the Weird weather of Uranus

Capitalizing on the optical capabilities of the Keck Telescope, scientists have gained an unprecedented look at the atmosphere of Uranus, providing new insight into some of the most enigmatic weather in the solar system.

A pair of images reveal more cloud features - an abundance of atmospheric phenomena that vary dramatically in size, brightness and longevity - than have been observed before on Uranus.



Caption: The two sides of the planet Uranus, as viewed in this composite image by the Keck Telescope at near infrared wavelengths. These new images promise to help scientists unravel the mysteries of the weather on Uranus. (Image credit: Lawrence Sromovsky.)

"The cloud features range from small to large, from dim and diffuse to sharp and bright, from rapidly-

evolving systems to stable features that last for years," says Lawrence Sromovsky, a senior scientist at the Space Science and Engineering Center.

What's more, the new Keck images captured several Uranian weather oddities, including a big southern hemisphere storm feature that, during the course of several years, seesaws over 5° of latitude.

"It's weird behavior that hasn't been recognized before on Uranus. It's similar to what's been

seen on Neptune, although there the oscillation is much more rapid," Sromovsky explains. "It is not surprising to see cloud features drifting in latitude, but our models don't show these oscillations. We don't know what makes it keep coming back to its starting point."

Another unusual Uranian weather feature is a long, narrow complex of cloud features that is probably the largest group of atmospheric features ever seen on the planet. Spotted in the northern hemisphere of Uranus, the 18,000-mile-long complex of clouds dissipated completely during the span of a month.

Together, the new images of Uranus reveal more than 30 cloud features, exceeding the total observed in all pictures obtained by the Voyager probe, the Hubble Space Telescope and other telescopes up to the year 2000.

The scientific value of the new pictures lies in their ability to help scientists unravel some of the atmospheric novelties of Uranus. The cloud features they show, for example, are being used to trace and help define wind patterns and predict the motions of the large storm systems that sweep across the pale blue planet.

"The large, longer-lived cloud features of Uranus may be underpinned by giant hurricane-like vortices, as we've seen on Neptune," says Sromovsky, "but it's unlikely that they are as violent as the hurricanes that routinely batter Florida, for example."

Earthly hurricanes, he explains, dispense a lot of energy. Uranus, which is 19 times as far from the sun as the Earth, has far less solar energy to dissipate.

Uranian storms seem to survive and thrive because the atmosphere is "slippery," providing less of the atmospheric resistance that help storms on Earth dispense their energy.

"There is very little temperature contrast and very little energy to drive the weather in Uranus," says Sromovsky. "Whatever is happening has to be well lubricated; it has to be a low-friction environment."

The quality of the new images, says Sromovsky, demonstrates the optical capabilities of the Keck Telescope: "It is amazing that the amount of detail we can see from the ground with Keck far exceeds what we could see with Voyager during its relatively close pass by the planet. And we can get better resolution than Hubble, especially at the near infrared wavelengths we use to improve cloud contrast."

Situated at the summit of Hawaii's dormant Mauna Kea volcano, the Keck Telescope boasts a 10-meter diameter segmented mirror, and a revolutionary adaptive optics system that detects and corrects most of the atmospheric effects that blur viewing.

- by Terry Devitt, <http://www.news.wisc.edu/10402>

Sunita Williams Gives a Tour of the ISS Orbital Laboratory

<http://www.wimp.com/orbitaltour/>

Blown Up Star Seen Expanding in 58 Year Time Lapse Video

In 1901, the star GK Persei, 1,300 light years from Earth, exploded. Images of the remnant (Nova Persei 190) by the Isaac Newton Telescope and the Nordic Optical Telescope in Spain spliced together allow a 3-D model to be created.

<http://www.space.com/19417-blown-up-star-seen-expanding-58-year-time-lapse-video.html>



The Art of Space Imagery

By Diane K. Fisher

When you see spectacular space images taken in infrared light by the Spitzer Space Telescope and other non-visible-light telescopes, you may wonder where those beautiful colors came from? After all, if the telescopes were recording infrared or ultraviolet light, we wouldn't see anything at all.

So are the images "colorized" or "false colored"?

No, not really. The colors are translated. Just as a foreign language can be translated into our native language, an image made with light that falls outside the range of our seeing can be "translated" into colors we can see. Scientists process these images so they can not only see

them, but they can also tease out all sorts of information the light can reveal. For example, wisely done color translation can reveal relative temperatures of stars, dust, and gas in the images, and show fine structural details of galaxies and nebulae.

Spitzer's Infrared Array Camera (IRAC), for example, is a four-channel camera, meaning that it has four different detector arrays, each measuring light at one particular wavelength. Each image from each detector array resembles a grayscale image, because the entire detector array is responding to only one wavelength of light. However, the relative brightness will vary across the array.

So, starting with one detector array, the first step is to determine what is the brightest thing and the darkest thing in the image. Software is used to pick out this dynamic range and to re-compute the value of each pixel. This process produces a grey-scale image. At the end of this process, for Spitzer, we will have four grayscale images, one for each for the four IRAC detectors.

Matter of different temperatures emit different wavelengths of light. A cool object emits longer wavelengths (lower energies) of light than a warmer object. So, for each scene, we will see four grayscale images, each of them different.

Normally, the three primary colors are assigned to these gray-scale images based on the order they appear in the spectrum, with blue assigned to the shortest wavelength, and red to the longest. In the case of Spitzer, with four wavelengths to represent, a secondary color is chosen, such as yellow. So images that combine all four of the IRAC's infrared detectors are remapped into red, yellow, green, and blue wavelengths in the visible part of the spectrum.

Download a new Spitzer poster of the center of the Milky Way. On the back is a more complete and colorfully-illustrated explanation of the "art of space imagery." Go to spaceplace.nasa.gov/posters/#milky-way.



Caption: This image of M101 combines images from four different telescopes, each detecting a different part of the spectrum. Red indicates infrared from Spitzer's 24-micron detector, and shows the cool dust in the galaxy. Yellow shows visible starlight from the Hubble telescope. Cyan is ultraviolet light from the Galaxy Evolution Explorer space telescope, which shows the hottest and youngest stars. And magenta is X-ray energy detected by the Chandra X-ray Observatory, indicating incredibly hot activity, like accretion around black holes.

- This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a

contract with the National Aeronautics and Space Administration.



Nights without Stars? Join the GLOBE at Night campaign - on your mobile phone

Spend a few minutes helping scientists by measuring the brightness of your night sky. Just match the appearance of the constellations of Orion or Leo with star maps of progressively fainter stars - and submit



your measurements by computer or smart phone.

Involve your whole astronomy club: Take the ADOPT-A-STREET CHALLENGE (NEW FOR 2013):



Here's a club project where your members can participate to create a map of light pollution in your own city. This can be used for a variety of applications such as informing your city and government officials, providing data for scientists and even for students doing science fair projects.

Lake County astronomers in Illinois hold "Astronomy Under the City Lights"

Five opportunities in 2013 to participate in GLOBE at Night: January 3 - 12, January 31 - February 9, March 3 - 12, March 31 - April 9, and April 29 - May 8

Time to renew?

Remember that as a member of the Night Sky Network, you have access to on line renewal of magazine subscriptions at the club discount rate. No need to wait for subscription processing or inconveniencing your Club Treasurer! This service is provided through the Astronomical Society of the Pacific.



Wishing you clear skies and exciting events for 2013!,
Marni Berendsen & Vivian White, The 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: January 3, 2013

CALL TO ORDER: The monthly meeting of the Southwest Florida Astronomical Society was held at Florida Gulf Coast University, Ft Myers Florida, on Thursday, January 3, 2013. The meeting convened at 7:30pm, President Brian Risley presiding, and Lee Kraemer, secretary.

MEMBERS IN ATTENDANCE: There were approximately 31 members in attendance.

OPENING REMARKS: Brian Risley, President

Annual audit provided by Susan Musick. No issues with audit. Results attached. Upcoming events:

Friday Jan 4th 7pm – Big Cypress National Preserve (Ochopee) 7pm Public Observing.

Sat Jan 12th – Star Party at Caloosahatchee Regional Park (Dusk)

Sat Jan 12th Orion Event at CNCP 7:30 – 9:00pm

Fri Jan 18th Christa McAuliffe Charter School Evening Observing (1st Quarter Moon)

Jan 22/23 Pelican Elementary Cape Coral Observing 6:30 – 8:00pm (Contact Carol Stewart)

Sat Jan 26th – "Wine Under the Stars" fundraiser at CNCP 6:30 – 9:00pm (Contact Carol Stewart)

Sat Feb 2nd – Thomas A. Edison Kiwanis Science and Engineering Fair- FGCU. The Science Fair is now separate from Edison Day of Discovery. The Science Fair is Planning outdoor activities at FGCU.

Sat Feb 2nd - 10th Annual Dark Sky Festival at Harmony FL (s Of Orlando 5:00 – 10:00pm

Excellent viewing and Equipment at December's Star Party (CRP)

Norm Woodward has donated his equipment to SWFAS due to his health and need to relocate.

VICE PRESIDENT'S REPORT: Bruce Dissette, Vice President reported Correction in CRP Star Party Schedule (see upcoming events)

NEWSLETTER EDITER'S REPORT: Carole Holmberg, Newsletter Editor - No report.

SECRETARY'S REPORT: Kathleen Hendrix / Lee Kraemer, Secretary No report.

TREASURER'S REPORT: Tony Heiner, Treasurer, reported a balance

November \$1941.23

December \$2346.86

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

Great CRP Star Party on the 15th. Noted correction on Schedule.

Caloosahatchee Regional Park Star Party Schedule: Jan 12, Feb 9, Mar 9, Apr 13, May 11, Jun 8, Jul 6, Aug 3, Sep 14, Oct 5, Nov 2, Nov 30, Dec 28

Fakahatchee Strand star parties to be announced.

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

CLUB HISTORIAN: Danny Secary No report.

EQUIPMENT COORDINATOR: Brian Risley – Acknowledged recent donations and planned sale of donated equipment in order to purchase PST (Personal Solar Telescope).

WEBSITE COORDINATOR: Dan Fitzgerald - No report

PROGRAM COORDINATOR: Open

ASTRONOMICAL LEAGUE COORDINATOR (ALCOR): Carol Stewart

Evening Program: Studying Fragments: From Exotic Nuclei to Exotic Asteroids
Michael Fauerbach PHD

ADJOURNMENT: Thursday February 7th 2013 was set as the next regular meeting. The meeting was adjourned.

13 Must See Stargazing Events in 2013

- 1) January 21 — Very Close Moon/Jupiter Conjunction
- 2) February 2-23 — Best Evening View of Mercury
- 3) March 10-24 — Comet PANSTARRS at its best
- 4) April 25 — Partial Lunar Eclipse
- 5) May 9 — Annular Eclipse of the Sun (“Ring of Fire” Eclipse)
- 6) May 24-30 — Dance of the Planets
- 7) June 23 — Biggest Full Moon of 2013
- 8) August 12 — Perseid Meteor Shower
- 9) October 18 — Penumbral Eclipse of the Moon
- 10) November 3 — Hybrid Eclipse of the Sun
- 11) Mid-November through December — Comet ISON
- 12) All of December — Dazzling Venus
- 13) December 13-14 — Geminid Meteor Shower

