Southwest Florida Astronomical Society
SWFAS

The Eyepiece
December 2011

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A MESSAGE FROM THE PRESIDENT

I am sad to report that Stewart Rorer, our Treasurer, passed this past month. He will be greatly missed.

This month's meeting will be December 1st at 7:30pm at the Calusa Nature Center Planetarium. This is our annual election meeting. We will definitely need a Treasurer. As for this or the other positions, if you are interested, please attend and speak up! The presentation is by Dennis Lazar who has a video he put together on a solar eclipse cruise in the Caribbean.

This past month we had several events. The Spring Creek Elementary Star Party was a success. The Edison Estates Girl Scout Star Party was a big success, with nearly 100 girl scouts. I would like to thank all that came out and helped us on these events.

Unfortunately, the Immokalee Rotary Club Star Party had to be cancelled, but it worked out as the weather that night was not good. We are hoping to reschedule it after the new year. I have several other requests in for school based events both day and night.

2012 Events

Lee County South Regional Library
Jan 10th 2012 Intro to Astronomy talk, Jan 17th Observing Session

Edison Festival Day of Discovery (FGCU Alico Arena)
January 14th

Christa McAuliffe Elementary School Star Party
January 27th 2012

Astronomy for Amateurs (Hickey Creek Park – Kelly Williamson)
January 27 6:45 p.m.

City of Cape Coral Parks and Rec Rotary Park Star Party
Feb 17th

Burrowing Owl Festival (Rotary Park Cape Coral)
February 25th

President's Message Continued

The sky this month:

- The Full Moon is on the 10th. We will miss the total eclipse that occurs at 9:36 am.
- The New Moon is on the 24th.
- Mercury is at inferior conjunction on the 4th and greatest western elongation in morning sky on the 23rd.
- Geminid Meteor Shower 12-15th (Rates up to 120/hour Nearly Full Moon will interfere.)
- Ursid Meteor Shower 22/23 (10-12/hour, radiant near Kochab)
- Mercury is returning to the evening sky late in the month.
- Jupiter is low in the east at sunset, high in the sky at midnight.
- Venus is now appearing in the evening sky.
- Mars is rising just before midnight in Leo.
- Saturn is in the morning sky near Spica.

December Meeting

We will hold our annual elections during the business meeting. Our presentation is by Dennis Lazar, who now lives in Port Charlotte, but was active for many years in the Astronomical Society of the Palm Beaches. He has a video he put together on a solar eclipse cruise in the Caribbean. He writes in an email, "It includes clips from on-board lectures by Rick Feinberg, publisher of Sky and Telescope and Dennis DeCicco, associate editor and renowned astro imager as well as views of lots of equipment, from Orion to Takahashi, brought by amateur and pro astronomers to view and record the eclipse. Of course, there is the eclipse itself with all the "ooos" and "ahhs" in the background."

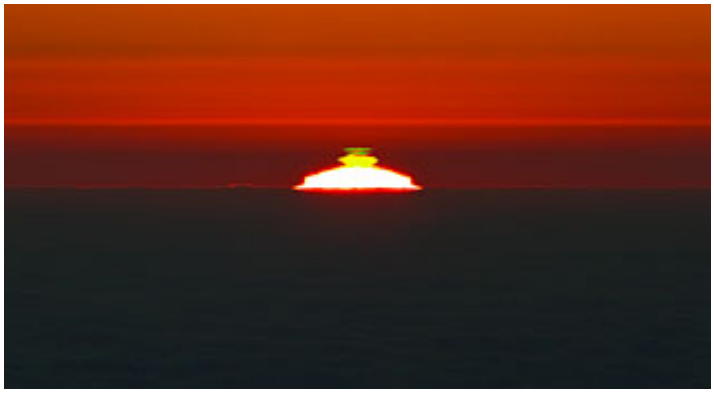
Sad News

It is with a very sad and heavy heart that I am notifying you that SWFAS member Stewart Rorer passed away yesterday [November 17]. Stewart, who was our Treasurer for a number of years, lost his fight with a terminating illness that he had been dealing with for many years. Stewart was a very dedicated and hard-working member of our club, and he will be greatly missed. Our hearts and deepest sympathies go out to his wife Judy, daughter Roberta, and his family for their loss. It is my understanding when talking with Judy, that there will not be any services right now as Stewart has elected to donate his body to an organization for medical and scientific research.

- Bob Francis

A Double Green Flash

At sunset, the sky is often painted with an array of oranges, reds and yellows, and even some shades of pink. There are, however, occasions when a green flash appears above the solar disc for a second or so. One such occurrence was captured beautifully in this picture taken from Cerro Paranal, a 2600-metre-high mountain in the Chilean Atacama Desert, by ESO Photo Ambassador Gianluca Lombardi. Cerro Paranal is home to ESO's Very Large Telescope.



The green flash is a rather rare

phenomenon; seeing such a transient event requires an unobstructed view of the setting (or rising) Sun and a very stable atmosphere. At Paranal the atmospheric conditions are just right for this, making the green flash a relatively common sight. But a double green flash such as this one is noteworthy even for Paranal.
The green flash occurs because the Earth's atmosphere works like a giant prism that bends and disperses the sunlight. This effect is particularly significant at sunrise and sunset when the solar rays go through more of the lower, denser layers of the atmosphere. Shorter wavelength blue and green light from the Sun is bent more than longer wavelength orange and red, so it appears slightly higher in the sky than orange or red rays from the point of view of an observer.
When the Sun is close to the horizon and conditions are just right, a mirage effect related to the temperature gradient in the atmosphere can magnify the dispersion — the separation of colors — and produce the elusive green flash. A blue flash is almost never seen as the blue light is scattered by molecules and particles in the dense blanket of air towards the horizon.
The mirage can also distort the shape of the Sun and that of the flash. We see two bands of green light in this image because the weather conditions created two alternating cold and warm layers of air in the atmosphere.
This stunning photo was taken by ESO Photo Ambassador Gianluca Lombardi on 28 March 2011. The phenomenon was captured on camera as the Sun was setting on a sea of clouds below Cerro Paranal.
- http://www.eso.org/public/images/potw1147a/ , photo credit G. Lombardi/ESO

Coordinate Converter

Having trouble converting from degrees, arcminutes, and arcseconds to degrees, or vice versa? Try the Hands On Universe coordinate converter at http://www.handsonuniverse.org/get_images/radec_converter.html

iPad App

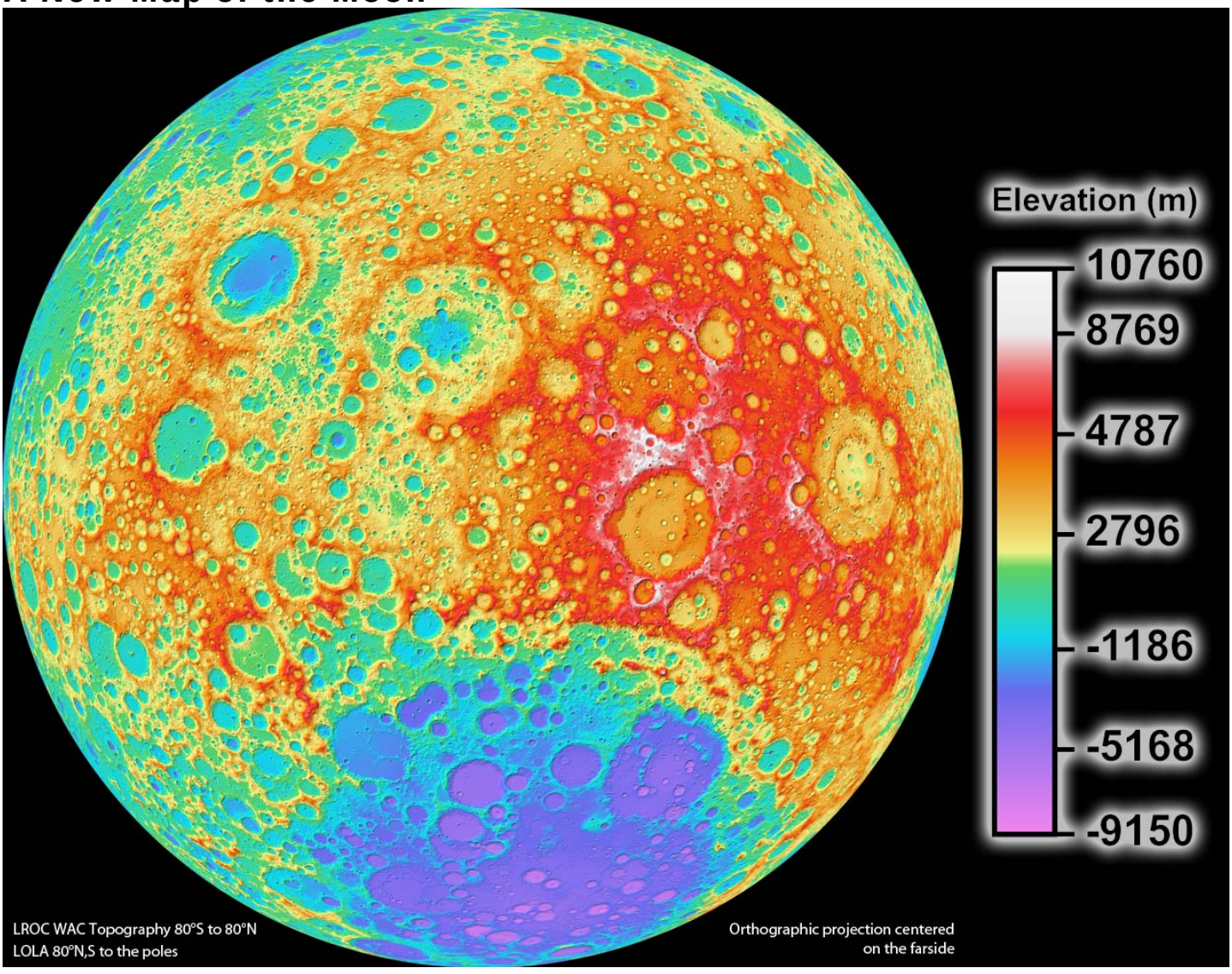
There is a cool free app for the iPad called "Planets". In case you haven't played with it, it uses the active 3D compass of the iPad so by holding the iPad to the sky, it shows which stars or planets you are seeing. It's much easier than using paper starcharts or trying to figure out what someone else is pointing to.

Curiosity in Context

Right: *Full-scale models of three generations of Mars rovers: Sojourner (center), which landed with Mars Pathfinder on July 4, 1997; the Mars Exploration Rovers Spirit and Opportunity (left), which landed on Mars on January 4 and 25, 2004; and Mars Science Laboratory Curiosity, which launched for Mars last Saturday. Credit: NASA / JPL*

If you'd like to see how far Mars rover technology has come in a mere 15 years, read Emily Lakdawalla's in-depth Mars rover comparison. She compares Sojourner, Spirit/Opportunity, and the new Curiosity rover (with a Viking lander thrown in for good measure). It's really incredible to think we've gone from a shoebox-size rover to one the size of a Mini Cooper in just a decade and a half.
Her blog is at http://planetary.org/blog/article/00003271/
- The Year in Space Calendar

A New Map of the Moon



NASA's Lunar Reconnaissance Orbiter science team released the highest resolution near-global topographic map of the moon ever created. This new topographic map shows the surface shape and features over nearly the entire moon with a pixel scale close to 328 feet. Although the moon is Earth's closest neighbor, knowledge of its morphology is still limited. Due to the limitations of previous missions, a global map of the moon's topography at high resolution has not existed until now. With LRO's Wide Angle Camera and the Lunar Orbiter Laser Altimeter instrument, scientists can now accurately portray the shape of the entire moon at high resolution. Image Credit: NASA/Goddard Space Flight Center/DLR/ASU
- http://www.nasa.gov/images/content/605013main_WAC_CSHADE_O000N1800_1000.jpg

Also see the following for detailed explanation:
http://lroc.sese.asu.edu/news/index.php?/archives/484-Lunar-Topography-As-Never-Seen-Before!.html

New Evidence for Liquid Water on Europa

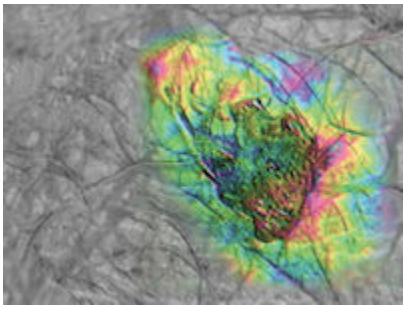
In a potentially significant finding in the search for life beyond Earth, scientists studying data from NASA's Galileo probe have discovered what appears to be a body of liquid water the volume of the North American Great Lakes locked inside the icy shell of Jupiter's moon Europa.

The water could represent a potential habitat for life, and many more such lakes might exist throughout the shallow regions of Europa's shell, say researchers writing in the journal *Nature*.

"The data opens up some compelling possibilities," said Mary Voytek, director of NASA's Astrobiology Program. "However, scientists worldwide will want to take a close look at this analysis and review the data before we can fully appreciate the implication of these results."

The Galileo spacecraft, launched in 1989, provided scientists decades of data to analyze before the probe plunged into Jupiter's atmosphere in 2003. One of the most significant discoveries was the inference of a global salt water ocean below the surface of Europa. This ocean is deep enough to cover the whole surface of Europa and contains more liquid water than all of Earth's oceans combined. However, being far from the sun, the ocean surface is completely frozen. Most scientists think this ice crust is tens of miles thick.

"One opinion in the scientific community has been if the ice shell is thick, that's bad for biology. That might mean the surface isn't communicating with the underlying ocean," said Britney Schmidt, postdoctoral fellow at the Institute for Geophysics, University of Texas at Austin. "Now, we see evidence that it's a thick ice shell that can mix vigorously and new evidence for giant shallow lakes. That could make Europa and its ocean more habitable."



Left: Thera Macula (false color) is a region of likely active chaos production above a large liquid water lake in the icy shell of Europa.

Schmidt and her team focused on Galileo images of two roughly circular, bumpy features on Europa's surface called chaos terrains. Based on similar processes seen on Earth -- on ice shelves and under glaciers overlaying volcanoes -- they developed a four-step model to explain how the features form. The model resolves several conflicting observations. Some seemed to suggest the ice shell is thick. Others suggest it is thin.

The recent analysis suggests chaos features on Europa's surface are formed by mechanisms that involve significant exchange between the icy shell and the underlying lake. This kind of "chaos" may provide a pathway for transferring nutrients and energy between the surface and the vast global ocean already thought to exist below the thick ice shell. Researchers believe this would increase the potential for life there.

"This new understanding of processes on Europa would not have been possible without the foundation of the last 20 years of observations over Earth's ice sheets and floating ice shelves," said Don Blankenship, senior research scientist at the Institute for Geophysics, where he leads airborne radar studies of Earth's ice sheets.

The authors have good reason to believe their model is correct. Still, because the inferred lakes are several miles below the surface, the only true confirmation of their presence would come from a future spacecraft mission designed to probe the ice shell. Such a mission was rated as the second highest priority flagship mission by the National Research Council's recent Planetary Science Decadal Survey and is being studied by NASA.
For more images and a video animation of the findings, visit the University of Texas at Austin.
- Production Editor: Dr. Tony Phillips | Credit: Science@NASA
- Full story at http://science.nasa.gov/science-news/science-at-nasa/2011/16nov_europa/

Sirius

- The brightest star in Canis Major is named Sirius. Sirius is not only the brightest star in Canis Major, but it is also the brightest star in the nighttime sky. Only the Moon, Venus, Jupiter and Mars are brighter. Sirius is sometimes called the Dog Star, and its position in the constellation is at the nose of the Large Dog.
- Sirius was a major star in the sky for many cultures. Ancient civilizations described the star as red and fiery, but today it is very white.
- The ancient Egyptians believed that the flooding of the River Nile was caused by the "power" of the star Sirius. Egyptian records show that the rising of Sirius at dawn was used by the astronomer-priests at least as early as 3000 BC. The day on which Sirius was first seen to rise at dawn became New Year's Day for the Egyptians, and they called Sirius "Mistress of the Year." In honor of Sirius, the Egyptians oriented temples so that they faced that point on the horizon where Sirius was first seen to rise at dawn. One such temple was built as early as 2700 BC.
- The ancient Greeks also had several interesting beliefs concerning Sirius. The Athenian New Year began with the appearance of Sirius. He was seen as two-headed, like the Roman God Janus: looking back at the past year and forward to the new one.
- The name Sirius may come from the Greek meaning "scorching." In ancient Greece, the Dog Star was already associated with the Sun, since the Sun enters that part of the sky in the hot summer months. The ancients thought that the heat of Sirius was added to that of the Sun. To this day we call the hottest portion of summer the "dog days." Today, the star is mostly thought of as a winter star, accompanying Orion, rather than as the summer home of the sun.
- According to the Polynesians, Sirius was not always the brightest star. They believed that once, long ago, the Pleiades (or Seven Sisters) were much brighter than Sirius. The Pleiades had a reputation of bragging about their beauty. One day Sirius convinced the god Tane to hurl the star Aldebaran at this brightest star, shattering it into the group of six stars we see now.

Re-thinking an Alien World: The Strange Case of 55 Cancri e

Forty light years from Earth, a rocky world named “55 Cancri e” circles perilously close to a stellar inferno. Completing one orbit in only 18 hours, the alien planet is

26 times closer to its parent star than Mercury is to the Sun. If Earth were in the same position, the soil beneath our feet would heat up to about 3200 F. Researchers have long thought that 55 Cancri e must be a wasteland of parched rock.

Now they're thinking again. New observations by NASA's Spitzer Space Telescope suggest that 55 Cancri e may be wetter and weirder than anyone imagined.

Spitzer recently measured the extraordinarily small amount of light 55 Cancri e blocks when it crosses in front of its star. These transits occur every 18 hours, giving researchers repeated opportunities to gather the data they need to estimate the width, volume and density of the planet.

According to the new observations, 55 Cancri e has a mass 7.8 times and a radius just over twice that of Earth. Those properties place 55 Cancri e in the "super-Earth" class of exoplanets, a few dozen of which have been found. Only a handful of known super-Earths, however, cross the face of their stars as viewed from our vantage point in the cosmos, so 55 Cancri e is better understood than most.

When 55 Cancri e was discovered in 2004, initial estimates of its size and mass were consistent with a dense planet of solid rock. Spitzer data suggest otherwise: About a fifth of the planet's mass must be made of light elements and compounds—including water. Given the intense heat and high pressure these materials likely experience, researchers think the compounds likely exist in a "supercritical" fluid state.

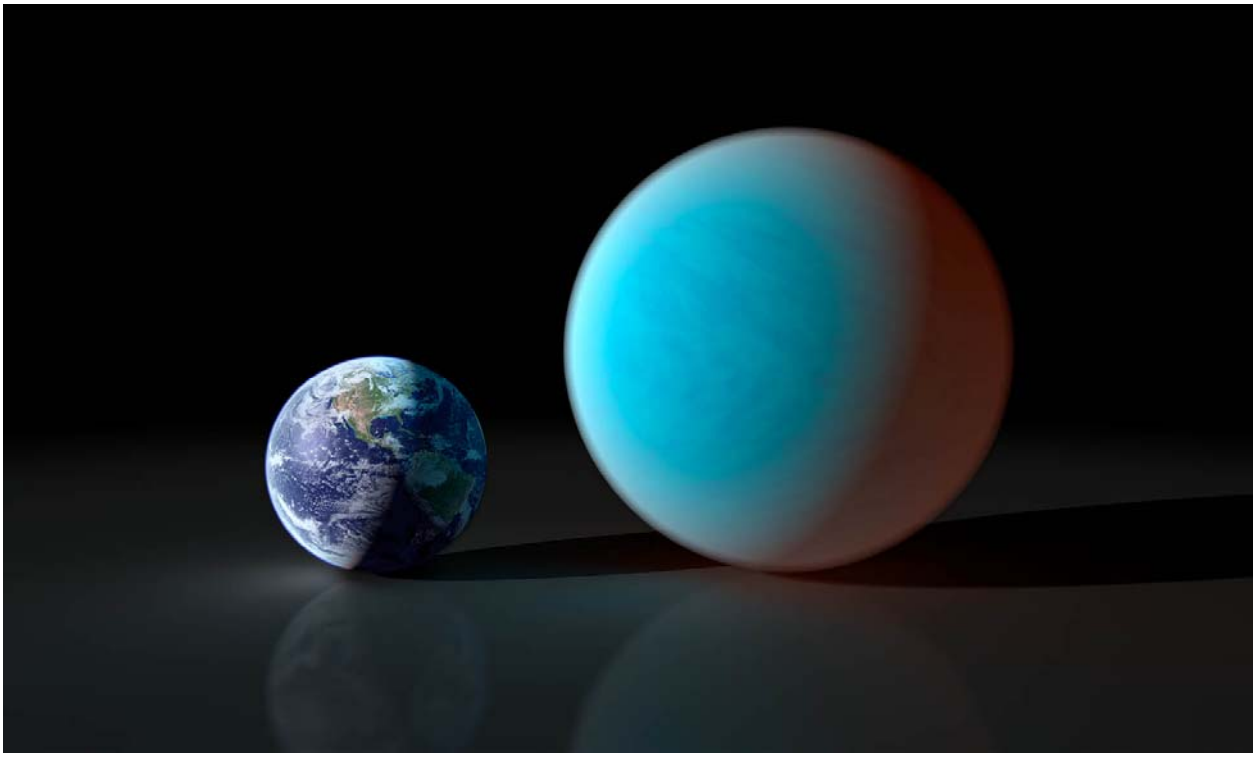
A supercritical fluid is a high-pressure, high-temperature state of matter best described as a liquid-like gas, and a marvelous solvent. Water becomes supercritical in some steam turbines—and it tends to dissolve the tips of the turbine blades. Supercritical carbon dioxide is used to remove caffeine from coffee beans, and sometimes to dry-clean clothes. Liquid-fueled rocket propellant is also supercritical when it emerges from the tail of a spaceship.

On 55 Cancri e, this stuff may be literally oozing—or is it steaming? —out of the rocks. With supercritical solvents rising from the planet's surface, a star of terrifying proportions filling much of the daytime sky, and whole years rushing past in a matter of hours, 55 Cancri e teaches a valuable lesson: Just because a planet is similar in size to Earth does not mean the planet is like Earth.

It's something to re-think about.

Get a kid thinking about extrasolar planets by pointing him or her to "Lucy's Planet Hunt," a story in rhyme about a girl who wanted nothing more than to look for Earth-like planets when she grew up. Go to http://spaceplace.nasa.gov/story-lucy.

The original research reported in this story has been accepted for publication in Astronomy and Astrophysics. The lead author is Brice-Olivier Demory, a post-doctoral associate in Professor Sara Seager's group at MIT.



Caption: Artist's rendering compares the size Earth with the rocky "super-Earth" 55 Cancri e. Its year is only about 18 hours long!

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

It's always a good idea to maintain a healthy respect for the Sun, especially if you are in charge of operating any satellites, which can be badly damaged by high-energy charged particles from solar storms. Thankfully, many satellites can now be put into a temporary "safe" mode when necessary. However, operators must know when to flip the "safety" switch. The GOES satellites are in geostationary orbit high above most other satellites. Along with keeping an eye on Earth's weather, the GOES also keep an eye on the Sun's antics and give warning when bad space weather threatens other satellites. "Shields Up!" is a new game on the SciJinks website, in which the player's job is to keep three separate satellites safe from random blasts of damaging rays and particles from the Sun, while still keeping the satellites operating as much of the time as possible. Read the story of a super solar storm in 1859, and play "Shields Up!" at http://scijinks.gov/shields-up.

- Distributed by Laura K. Lincoln, on behalf of the Space Place Team

What does the coming year look like for your club? Take a look at some of the exciting opportunities to participate in transits, eclipses, and citizen science. How are you going to get involved?

Venus Transit 2012: Last Time in Our Lifetime - Are you sharing it?

Has your club made plans to hold an event on June 5, 2012 yet? That's the last Venus Transit for anyone alive today. You are among the few who can offer ways for the people in your community to observe the Transit safely. Login to post your Venus Transit events here:
http://nightsky.jpl.nasa.gov/club/event-edit.cfm

As a bonus for active NSN clubs, a brand new ToolKit all about the Sun will be arriving in time to use at your public Venus Transit (and solar!) viewing event.

The Moon Disappears in Earth's Shadow: Dec 10th
Serve coffee to your neighbors as you watch the Moon set, eclipsed in Earth's shadow, the morning of Saturday, December 10th. Then turn around and watch the Sun rise. Show them why eclipses happen using the activity from the Shadows & Silhouettes ToolKit: http://nightsky.jpl.nasa.gov/download-view.cfm?Doc_ID=327
No matter where you are, you can join a webcast with Star Gazers, featuring NSN member Dean Regas from the Cincinnati Observatory.
http://www.stargazersonline.org/webcast/
Details on the eclipse:
http://eclipse.gsfc.nasa.gov/OH/OH2011.html#LE2011Dec10T

ASP 2012 Awards Nominations are now open!
The Astronomical Society of the Pacific (ASP) is accepting nominations for the Society's 2012 awards. Nominations are welcomed until December 15. Recipients receive a cash award and engraved plaque, as well as travel and lodging to accept the award at the Society's 124th annual meeting.

Among the awards is the Las Cumbres Amateur Outreach Award that seeks to honor outstanding educational outreach by an amateur astronomer. Three out of the last four awardees were Night Sky Network members!
http://www.astrosociety.org/membership/awards/cumbres.html

InOMN Winners
Thanks so much to everyone who held events for the International Observe the Moon Night on October 8th. Congratulations to the randomly selected winners of the Moon Globes and Filters:
Gloucester Area Astronomy Club in Rockport, MA
Miami Valley Astronomical Society in Bellbrook, OH
Oklahoma City Astronomy Club in Oklahoma
Santa Barbara Astronomical Unit in California
Statesboro Astronomy Club in Georgia

May your return from daylight savings time be smooth and may you enjoy many clear, dark skies this autumn.
- Marni Berendsen, Kenneth Frank and Jessica Santascoy, Night Sky Network

SWFAS Minutes
There was no business meeting at our November meeting, so there are no minutes to report.

Future Events

CALUSA NATURE CENTER PLNTRM	12-1-11	7:30 PM	MONTHLY MEETING
CALUSA NATURE CENTER PLNTRM	1-5-11	7:30 PM	MONTHLY MEETING
LEE CNTY SOUTH REGIONAL LIBRARY	1-10-12		ASTRONOMY TALK
FGCU ALICO ARENA	1-14-12		SOLAR OBSERVING
LEE CNTY SOUTH REGIONAL LIBRARY	1-17-12		OBSERVATION SESSION
HICKEY'S CREEK PARK	1-27-12	6:45 PM	ASTRONOMY FOR AMATEURS STAR PARTY
CHRISTA MCAULIFFE ELEMENTARY	1-27-12		STAR PARTY
CALUSA NATURE CENTER PLNTRM	2-2-12	7:30 PM	MONTHLY MEETING
CAPE CORAL ROTARY PARK	2-17-12		STAR PARTY
CAPE CORAL ROTARY PARK	2-25-12		BURROWING OWL FESTIVAL – SOL OBSERVING

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