SIRIUS ASTRONOMER

www.ocastronomers.org

The Newsletter of the Orange County Astronomers

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OCA GENERAL ELECTION THIS MONTH! GET OUT AND VOTE!

The ever-popular Orion Nebula (M42) is seen in this spectacular image from Kaz Fuseya, created on October 26 from Julian, CA (outside San Diego). Kaz used an Orion 8-inch Astrograph with a Canon T3 to create the image. The Orion Nebula is an easy target for beginners and offers enough detail to keep even the most experienced observer busy!

OCA CLUB MEETING

The free and open club meeting will be held January 9 at 7:30 PM in the Irvine Lecture Hall of the Hashinger Science Center at Chapman University in Orange. This month's speaker is Dr. Hooshang Nayyeri from UC Irvine, speaking on the Hubble Space Telescope Study of Massive and Evolved Galaxies at High Redshift.

NEXT MEETINGS: February 13, March 13

STAR PARTIES

The Black Star Canyon site will open on January 24. The Anza site will be open on January 17. Members are encouraged to check the website calendar for the latest updates on star parties and other events.

Please check the website calendar for the outreach events this month! Volunteers are always welcome!

You are also reminded to check the web site frequently for updates to the calendar of events and other club news.

COMING UP

The next session of the Beginners Class will be held at the Heritage Museum of Orange County at 3101 West Harvard Street in Santa Ana on February 6. The following class will be held March 6.

GOTO SIG: TBA
Astro-Imagers SIG: Jan. 13, Feb. 10
Remote Telescopes: TBA
Astrophysics SIG: Jan. 16, Feb. 20
Dark Sky Group: TBA

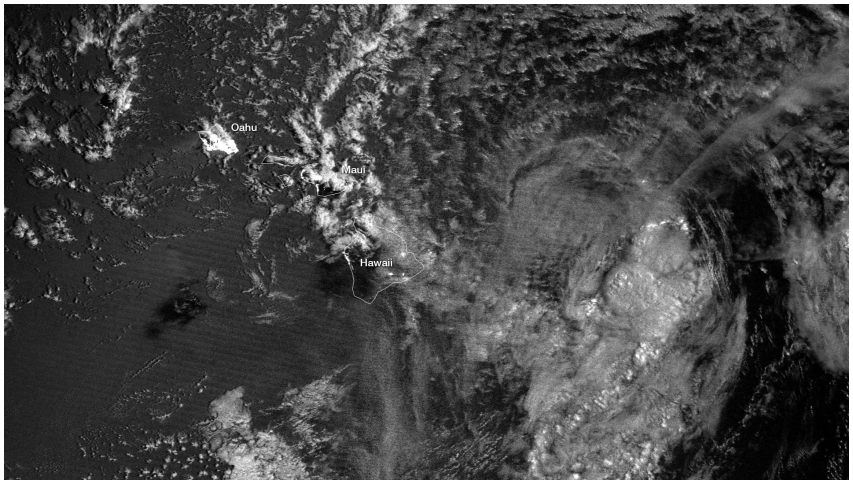
Keeping an Eye on Storms and More

By Kieran Mulvaney

In late July 2013, Tropical Storm Flossie barreled furiously toward Hawaii. The question was not if it would strike, but when and where it might do so.

During the afternoon hours of July 29, forecasts predicted landfall later that week on the state's Big Island; however, by the time residents of the 50th state awoke the following morning things had changed. NOAA's Central Pacific Hurricane Center warned that the islands of Oahu, Molokai and Maui were now at a greater risk.

This overnight recalculation was thanks to the Day/Night Band viewing capabilities of the Visible Infrared Imaging Radiometer Suite, or VIIRS, on board the Suomi National Polar-Orbiting Partnership (Suomi NPP) satellite. VIIRS is able to collect visible imagery at night, according to Mitch Goldberg, program scientist for NOAA's Joint Polar Satellite System (JPSS), of which Suomi NPP is a part. That means it was able to spot some high-level circulation further north than expected during the nighttime hours. This was an important observation which impacted the whole forecast. Without this forecast, said the Hurricane Center's Tom Evans, "we would have basically been guessing on Tropical Storm Flossie's center."



S-NPP captured this image of Tropical Storm Flossie heading toward Hawaii using its VIIRS Combined Day-Night Band sensor. Credit: NOAA.

Polar-orbiting satellites, like Suomi NPP and the future JPSS-1 and JPSS-2 (scheduled for launch in 2017 and 2021, respectively), sweep in a longitudinal path over Earth as the planet rotates beneath them—scanning the globe twice a day. VIIRS, the imager that will be aboard all the JPSS satellites, images 3,000 km-wide swaths on each orbit, with each swath overlapping the next by 200 km to ensure uninterrupted global coverage. This high-resolution, rapidly updating coverage allows researchers to see weather patterns change in near real-time.

Instruments on Suomi NPP allow scientists to study such long-term changes too—things like, "the patterns of sea surface temperature, or coral bleaching," says Goldberg. They are even used by the World Bank to determine how much energy is burned off and wasted from natural gas flares on oil drilling platforms.

While scientists are excited by the JPSS series' wide range of capabilities, the ability to address pressing immediate concerns is, for many, the most tangible value. That was certainly the case in July 2013, when thanks to Suomi NPP, authorities had ample time to close ports and facilities, open shelters, activate emergency procedures, and issue flash flood warnings. Despite heavy rains, high surf, and widespread power outages, accidents and injuries were few. By the time the storm passed, Hawaii was soaked.

But it was largely unharmed.

Learn more about JPSS here: http://www.jpss.noaa.gov.

AstroSpace Update

January 2015

Gathered by Don Lynn from NASA and other sources

Philae (comet lander) – Further analysis of Philae's data, sent before its battery exhausted, has produced these results: a probe was hammered into the surface and found it hard as ice (dust or snow had also been predicted for the surface). Another instrument confirmed a very hard surface. However overall density measurements of the comet made by Rosetta show that much of the interior is porous, that is, has open spaces in the ice. Cometary activity (outgassing) was low at the landing point, though it is being seen by the Rosetta orbiter at other surface locations. A large amount of water ice was detected at the landing site. A 3-dimensional profile of the comet core has been produced from radio waves sent through the comet. All 10 instruments on Philae were operated, and returned data, before the battery died. The surface was drilled and analyzed. The comet's atmosphere was sniffed, and organic molecules, among others, were detected. The thermal mapper functioned during descent, during the 2 bounces, and after final touchdown. The landing spot was -243°F (-153°C) at touchdown, but cooled about 18°F (10°C) during the next half hour. The thermal mapper indicated 4-8" (10-20 cm) of dust overlays much of the ice of the comet. The solar arrays were rotated to best face the Sun. It is hoped that eventually the battery will be recharged from the solar panels and Philae will wake up and operate again. This may not happen until spring 2015, when the comet's orbit will bring it into a different relation to the Sun. Analysis of the Philae data continues. Rosetta continues to orbit the comet and is sending good science data. It is scheduled to operate for more than a year.

Oceans source – It is thought that the formation of the Earth became too hot to allow water to survive, so our oceans must have been added later. By measuring the amount of deuterium (heavy isotope of hydrogen) in the oceans, it was hoped to find a matching source. The most popular theories for ocean sources were Kuiper Belt comets, Oort Cloud comets, or asteroids. Since 1986, a number of Oort Cloud comets have had their deuterium measured, and they are consistent, and do not match the oceans. Only one Kuiper Belt comet (Hartley 2) was measured, and its deuterium matched Earth's oceans. But Rosetta just made the 2nd measurement of a Kuiper Belt comet (67P/Churyumov-Gerasimenko), and its deuterium is far higher than Hartley 2 or the oceans. Theorists had been telling us that Kuiper Belt comets should have high deuterium content, and the Hartley 2 must be a fluke. The new Rosetta measurement supports this. So that may rule out Kuiper Belt comets. Maybe asteroids will work. Deuterium measurements of asteroids are needed to settle this.

Martian water – Ample evidence of ancient rivers, streams and lakes make it clear that Mars was at some point warm enough for liquid water to flow on its surface. New research suggests that warmth and water flow on ancient Mars probably occurred in relatively short episodes related to brief periods of volcanic activity that spewed greenhouse-inducing sulfur dioxide gas into the atmosphere. The research combines the effect of volcanism with new climate models of early Mars. It shows the warm periods lasting only for tens to hundreds of years at a time. Crater dating of many water-related features suggests that water flowed on Mars about 3.7 billion years ago. This is a time when massive volcanoes are thought to have been active on Mars. The climate models for Mars show that volcanic activity will warm Mars, even though it cools Earth's atmosphere.

Curiosity (Mars rover) – New science results: Mount Sharp was built up by sediments deposited in a large lake bed over tens of millions of years. The deposits were made by rivers, presumably fed by rain, flowing down from the crater rim. The evidence indicates that the lakes were each long lasting, thousands to millions of years. Note that this contradicts findings reported in the previous paragraph. The lakes dried up periodically, but returned often. The lakes were at least 100 yards (100 m) deep. The sediments probably filled much of Gale Crater. The sediments became a mountain when later wind erosion removed the easier parts, leaving a peak of hard material.

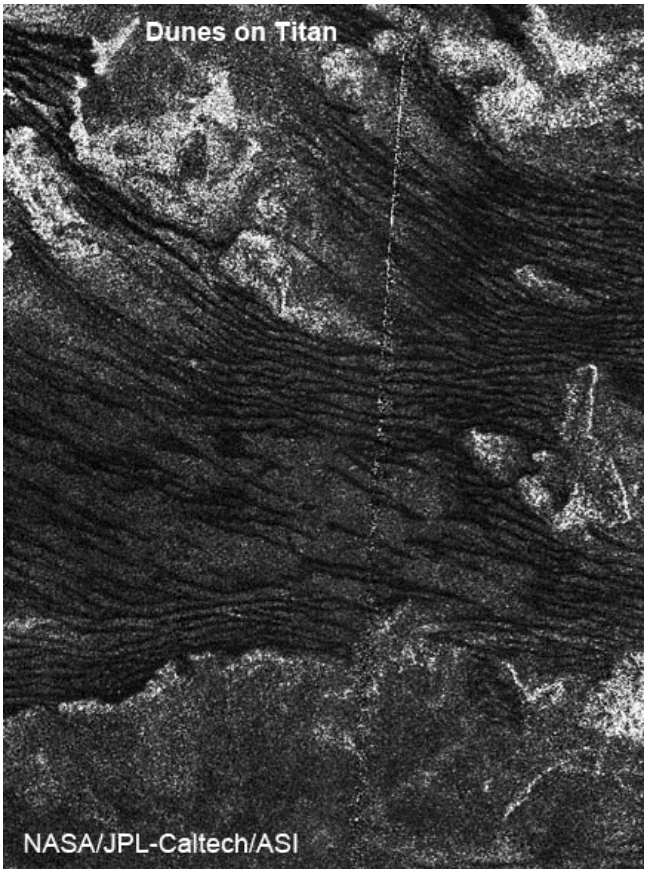
Curiosity also found a 10-fold increase in methane in the air during 4 measurements out of 12 that were spread out over 20 months. This indicates that methane is coming out of the ground in specific locations and then dissipating. Methane on Earth is produced both by life and non-life processes. This may reconcile the conflicting results of previous measurements from orbit and the Martian surface that detected methane sometimes, but detected none other places and times. Analysis of powder produced by drilling rocks found several carbon compounds. Again, these can be produced by life or non-life processes. It was difficult to prove what car-

bon compounds were present before the analysis, because perchlorate chemicals, known to be present in Martian dirt, can react to create new chemicals during the analysis process.

Curiosity analyzed the isotopes of hydrogen contained in water trapped in minerals and found that the rock containing the minerals formed after a considerable amount of Mars's original atmosphere was lost, but long before current conditions. Since water containing ordinary hydrogen is lost to space from the top of the atmosphere more easily than water with deuterium, the ratio of the isotopes of hydrogen changed over the time that water was lost. The rocks analyzed probably formed more than 3.9 billion years ago, as determined by other measurements. So large amounts of water were lost to space before the rocks formed, but water was also lost after.

MAVEN (Mars orbiter) completed its commissioning activities and has formally begun its 1-year primary science mission, though much science data was gathered during commissioning. MAVEN's goal is to understand how Martian atmosphere escapes to space, and to try to extrapolate backwards in time to determine how early Mars lost atmosphere. This may explain how the climate was in the past denser, wetter and warmer, but is now thin, cold and dry.

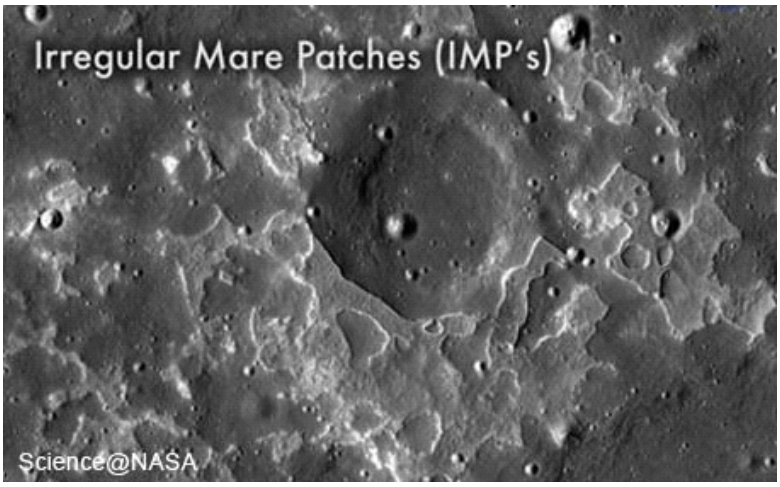
Martian life? – Reminiscent of the largely questioned result announced in 1996, another team has announced a new set of evidence for microbial life on Mars, found in a meteorite. It fell on Earth 3.5 years ago in the Moroccan desert. It is believed to have been blown off the surface of Mars 700,000 years ago by a meteorite impact. The researchers say that the organic (carbon) material within the meteorite is best explained as being of life origin. Such a bold claim will undoubtedly be reviewed by others scientists, and likely rebutted.



Titan dunes – Experiments in a wind tunnel indicate that particles in the sand dunes of Titan (Saturn's largest moon) require faster wind to move them than previous estimates. Because of uncertainties in the properties of Titan sand, they used 23 different varieties of sand in the wind tunnel. The new speed limit is 3.2 mph (1.4 m/s). Previous estimates were made by extrapolating from wind tunnel experiments. With different gravity, particle mass, air density, and temperature than Earth dune conditions, apparently the extrapolation was not very good. Titan is almost 10 times as far from the Sun as Earth is, and has little heating from sunlight and very slow winds. Measured speeds have been less than this newly determined speed. So most winds don't even move the sand particles at all. This may explain why Titan winds are almost always measured to be blowing from the east, but the dune shape says they were formed by winds from the west. Apparently the east winds never get sufficient speed to move the sand. According to atmospheric models, the wind reverses twice during a Saturn year (about 30 Earth years), when the Sun crosses the equator. Then during a brief time the winds blow from the west. Scientists think Titan dunes are composed of small particles of solid hydrocarbons, or perhaps ice wrapped in hydrocarbons, with a density about 1/3 that of terrestrial sand. Titan's gravity is roughly 1/7 that of Earth. Temperature is about -290°F (-180°C).

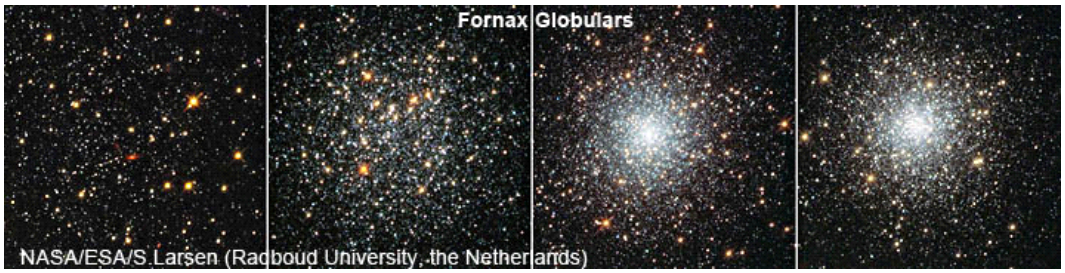
Venusian aurora – A new study used a 3.5-meter telescope in New Mexico to watch Venus for 1.6 years, observing the green oxygen spectral line. The goal was to see how it behaved as this current sunspot cycle grew in activity. It is thought that this line indicates auroral activity. The line has only occasionally been detected on Venus before. The new study indeed detected this, particularly strong after coronal mass ejections from the Sun. This appears to mean that auroral activity can occur on planets without magnetic fields. The MAVEN spacecraft at Mars should be looking for similar activity there, as Mars does not have a global magnetic field either.

Young lunar volcanoes – Back in 1971, Apollo 15 astronauts photographed an odd formation on the Moon, which became known as Ina. It looked like the aftermath of a volcanic eruption. The strange thing about Ina is that it appeared newer than the billion years ago that scientists generally thought lunar volcanic activity ended. Now the Lunar Reconnaissance Orbiter (LRO) data has been examined by a team of researchers, who found 70 objects similar to Ina. They have been termed Irregular Mare Patches, or IMPs. Some of these IMPs have been crater-count dated at no more than 100 million years old, possibly only 50 million years. IMPs are too small to be seen from Earth, averaging less than 1/3 mile (500 m) across. That's why they weren't found until LRO produced high-resolution images of the Moon. IMPs have now been found to be widespread on the Moon's near side. This may indicate that the Moon's interior is hotter than thought, and volcanic activity continued much closer to the present.



Solar System formation – The most accurate laboratory measurements yet made of magnetic fields trapped in grains within a primitive chondrite meteorite are providing important clues to how the early Solar System evolved. The measurements indicate shock waves traveling through the cloud of dusty gas around the newborn Sun was a major factor in Solar System formation. The new work mapped the magnetic field variations frozen in the meteorite at formation time, millimeter by millimeter. The meteorite is known as Semarkona, and fell in India in 1940. The strength of the fields found are what are expected if shock waves melted the material that became the chondrules in the meteorite while the material was about where the asteroid belt lies, while other melting scenarios would produce other magnetic fields.

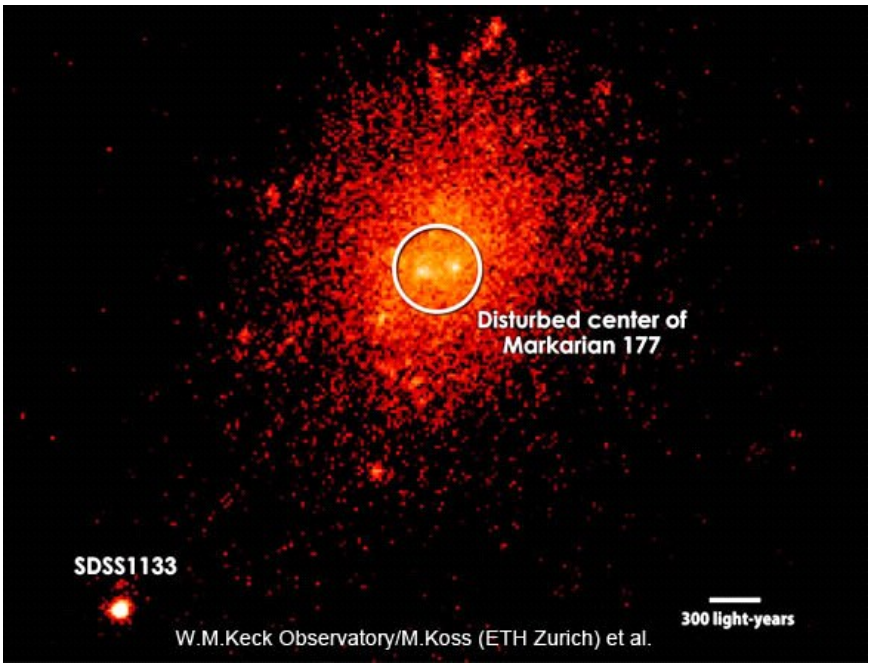
Oort Cloud asteroids – Jan Oort long ago proposed that there must be a cloud of comets far beyond Neptune to account for the source of comets that approach from long distances. Theoretical work since then has indicated the comets must have formed much closer to the Sun than the current location of that Oort Cloud, but were thrown outward by the gravity of the giant planets early in the history of the Solar System. Simulations of that throwing outward indicate asteroids should also have been included into the Oort Cloud, but asteroids coming in from there were not seen until a single one was discovered in 1996. Many wrote it off as a worn-out comet. Now a few more asteroids coming in from the Oort Cloud have been found. A new study predicts there are 8 billion asteroids in the Oort Cloud, which sounds big, but is far smaller than the 500 billion comets estimating to populate the Oort Cloud.



Hubble Space Telescope (HST) has observed 4 globular clusters that orbit the Fornax Dwarf Spheroidal Galaxy. Theoretically globulars of dwarf galaxies should have stars of a single age, as opposed to globulars of large galaxies (like the Milky Way), which are known to have 2 or more distinct birth times for stars. Also, those stars should be very low in heavier elements (heavier than hydrogen and helium). But the new observations showed multiple birth times for the stars of Fornax globulars, and some heavier elements. The only current theory about how multiple times of star birth occur in any globular results in many stars being thrown free of the globular, and can then be found in a halo about the globular. But the Fornax globulars have no halos of thrown out stars, so the theories are really in trouble.

Lensed supernova – Using the Hubble Space Telescope, astronomers have discovered a remote supernova behind a galaxy cluster that is gravitationally lensing the supernova into 4 separate images. This is the 1st known multiple-lensed supernova. The cluster of

galaxies, known as MACS J1149.6+2223, is 5 billion light-years away, and the supernova is 9.4 billion (given in light travel time distance, as the expansion of the Universe changes these distances as the light traveled toward us). Further work (spectrum) is needed to determine what type of supernova it is. Distant Type Ia supernovas help determine how the expansion of the Universe has changed speed in the past, due to gravity and dark energy. 2 years ago, that same galaxy cluster was found to be lensing (and therefore brightening) what was then the most distant galaxy known.



Recoiled black hole – A team of researchers analyzing decades of observations from many facilities has discovered what appears to be a black hole booted from its host galaxy. The object is part of the dwarf galaxy Markarian 177, located in Ursa Major. Supermassive black holes occupy galactic centers, but the new black hole, referred to as SDSS1133, is at least 2600 light-years from the center of Markarian 177. The black hole was found in archived observations dating back about 60 years. High-resolution near-infrared images were then made using the Keck II telescope in Hawaii. The researchers believe they are seeing the aftermath of a merger of 2 small galaxies and their central black holes, but apparently one black hole recoiled and was thrown out. Such recoils have been predicted in theory, but have not been seen until now. More work will need to be done to rule out other possible explanations of the observations. Next step will be ultraviolet observations by the Hubble Space Telescope. Archived observations by the Swift space telescope show that the black hole has been approximately changeless in ultraviolet for a decade, though it has brightened in visible light in the last 6 months, which supports the recoiled black hole interpretation.

Aligned quasars – A research team has found that the rotation axes of the central supermassive black holes in a sample of quasars are parallel to each other, and are aligned with the length of cosmic web structures. This was not expected, since the quasars are billions of light-years apart. The study looked at 93 quasars that are at such a distance that we are seeing them as they were when the Universe was about 1/3 of its current age. The rotation axes were inferred by the effect on polarizing the light from the quasars.

Black hole mass – Researchers have used a new method to measure the distance to the active spiral galaxy NGC 4151 with unprecedented precision. This affects the calculated mass of the central black hole of the galaxy, and it was found to be about 40% more massive than previous calculations. The previous distance had been calculated from the redshift, which is somewhat unreliable for an individual galaxy because random motions of galaxies "pollute" the redshift observed. If this new result is representative, this may mean that many masses of central black holes will need to be increased. The new method of distance measurement is: measure the time delay between variations in ultraviolet and infrared brightness. The infrared is known to come from the ring of dust that orbits the black hole, while the ultraviolet comes from very near the black hole. The time delay was measure at 30 days. Thus the dust ring must have a radius of 30 light-days. The angular size of the dust ring was then measured (.04 arcseconds) with the twin Keck Telescopes used as an interferometer. From this the distance of the galaxy from us was calculated to be 62 million light-years, somewhat larger than redshift measurements. Next steps are to use the new method to measure distances to other active galaxies (because active galaxies have the dust rings).

Cosmic lightning – Scientists have found gamma-ray eruptions emerging from the center of radio galaxy IC 310. They are the strongest variations in gamma rays known from a black hole. They believe it is caused by particles accelerating to high speed in an electric field, and are comparing it to a cosmic lightning storm. The brightness shifts on the order of 5 minutes, indicating the source is less than 5 light-minutes across, smaller than the event horizon of the black hole at the center of IC 310.

ALMA (radiotelescope array) has found a triplet of young galaxies more than 12.5 billion light-years away, one of which is producing new stars at nearly 1000 times the rate of our Milky Way. This galaxy, known as AzTEC-3, and its surroundings may be the best evidence yet that large galaxies grow from the merger of smaller ones in the early Universe. AzTEC-3 is surrounded by galaxies also producing new stars, but at a more normal rate. AzTEC-3 is what is known as a submillimeter galaxy because it shines brightly in that wavelength of light, but is remarkably dim at visible and infrared wavelengths. This is due to light from its stars being absorbed by dust in the star-forming regions and then re-emitted by the dust at far-infrared wavelengths. Expansion of the Universe stretches this far infrared into submillimeter wavelengths. The researchers observed very little rotation in AzTEC-3's dust and gas, suggesting that something had disrupted its motion, probably a recent merging with another galaxy.

Rare galaxy – With the help of citizen scientists, a team of astronomers has found an important new example of a rare type of galaxy that may yield valuable insight on how galaxies developed in the early Universe. The galaxy is named J1649+2635, is nearly 800 million light-years away, is a spiral galaxy, like our Milky Way, but with prominent jets of subatomic particles propelled outward from its core at nearly the speed of light. The problem is that spiral galaxies are not supposed to have such large jets (which is what makes it rare). This is only the 4th jet-emitting spiral known. The 1st was found in 2003. Citizen scientists classified a huge number of galaxies, and extreme agreement on spiral type was found on a set of about 35,000 of them. An astronomer cross-matched the list with radiotelescope surveys and found this one to be both spiral and with jets. It was then found to be the 1st known grand-design spiral with a large visible-light halo surrounding it. Work will continue to find more galaxies like it, either for jets or a visible halo. It is a mystery how it formed, since theories to explain the jets would destroy the spiral design.

Venus Express (European Venus orbiter) has completed an aerobraking campaign, where the spacecraft dips into the top of the atmosphere. This allowed measurements of upper atmosphere properties. But it was not without dangers (overheating or losing spacecraft control are possible), so this campaign had been scheduled near the end of the spacecraft life. The planned life was about 2 years, but the spacecraft has lasted 8 years, and is finally low on fuel. The low point of the campaign was 80 miles (129 km) above the surface, and after the aerobraking, was raised to 286 miles (460 km). However, even at this altitude, there is enough drag over months to bring the spacecraft down to a fiery end, which will be unavoidable after fuel is completely gone. Until then, probably some time in 2015, science observations will continue. Science findings from the aerobraking campaign: the density versus altitude of Venus's atmosphere is not smooth, with steep jumps occasionally; the atmosphere varies considerably day-to-day, and surprisingly largely day-to-night; the variation may indicate waves in the atmosphere, though such waves are not expected at such a high altitude. Venus Express has returned more science data than all previous missions to that planet combined.

Opportunity (Mars rover) is still struggling with flash memory after several months of controllers trying to work around the frequent resets and amnesia events. The rover is coming up on its 11th anniversary of landing on Mars, and is busy exploring the rim of Endeavour Crater, en route to a region that could have clay minerals (showing evidence of past water). The rover is still performing science. The flash memory was reformatted once again. Controllers are currently avoiding use of the flash, storing data in RAM instead. The team is developing longer term strategy to mask off part of the flash and resume using the remainder.

Curiosity (Mars rover) has completed a walkabout (rollabout?) of the lowest outcrop of sediment layers on Mount Sharp, using its cameras and laser zapper spectrometer to locate features that deserve further observation with other instruments. It is now making a 2nd pass around using those other instruments. During this pass a decision will be made whether to drill some spots and analyze the drilling dust. A problem has arisen with the laser used to focus the zapping spectrometer (but not the laser that does the zapping). The team is developing a work-around procedure to focus the spectrometer using the main laser instead of the focusing laser.

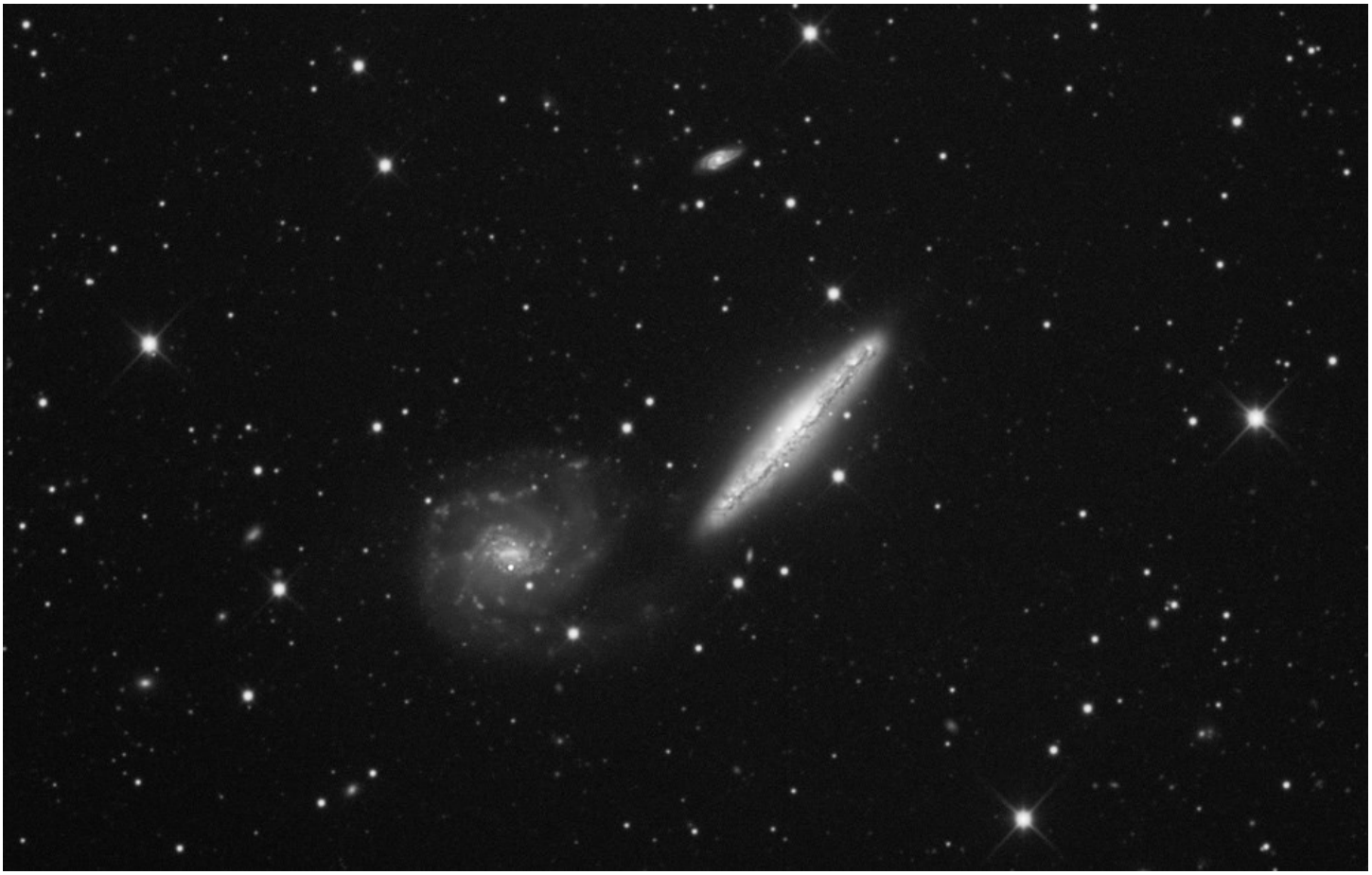
Hayabusa 2 – Japan has launched its 2nd spacecraft to collect and return a sample of material from an asteroid, and has named it Hayabusa 2. The 1st (Hayabusa, of course) completed a mission to asteroid Itokawa, returning a tiny bit of asteroid dust after being plagued by technical problems. The new target is asteroid 1999 JU3, which is about 3000 ft (900 m) across, a little larger than Itokawa, and is roughly spherical, while Itokawa has an elongated shape. The new spacecraft has many changes to avoid repetition of the glitches experienced last time. Hayabusa 2 has an updated ion propulsion engine as well as improved guidance and navigation systems, new antennas and a new altitude control system. Included is a mini-rover called Minerva 2.

Orion (manned spacecraft under development) has completed its 1st voyage (without crew) into space, traveling farther (3600 miles = 5800 km) than any spacecraft designed for astronauts has been in more than 40 years. Launched from Florida using a Delta IV Heavy rocket, it spent more than 4 hours in space and splashed down in the Pacific Ocean, southwest of San Diego. The spacecraft hit 20,000 mph (32,000 km/hr) and withstood temperatures approaching 4000°F (2200°C) as it entered Earth's atmosphere. On future missions, Orion will launch on the Space Launch System (SLS) heavy-lift rocket under development. The 1st is planned to orbit the Moon. It will not take place for a few years, since SLS will not be ready until then.

Instant AstroSpace Updates

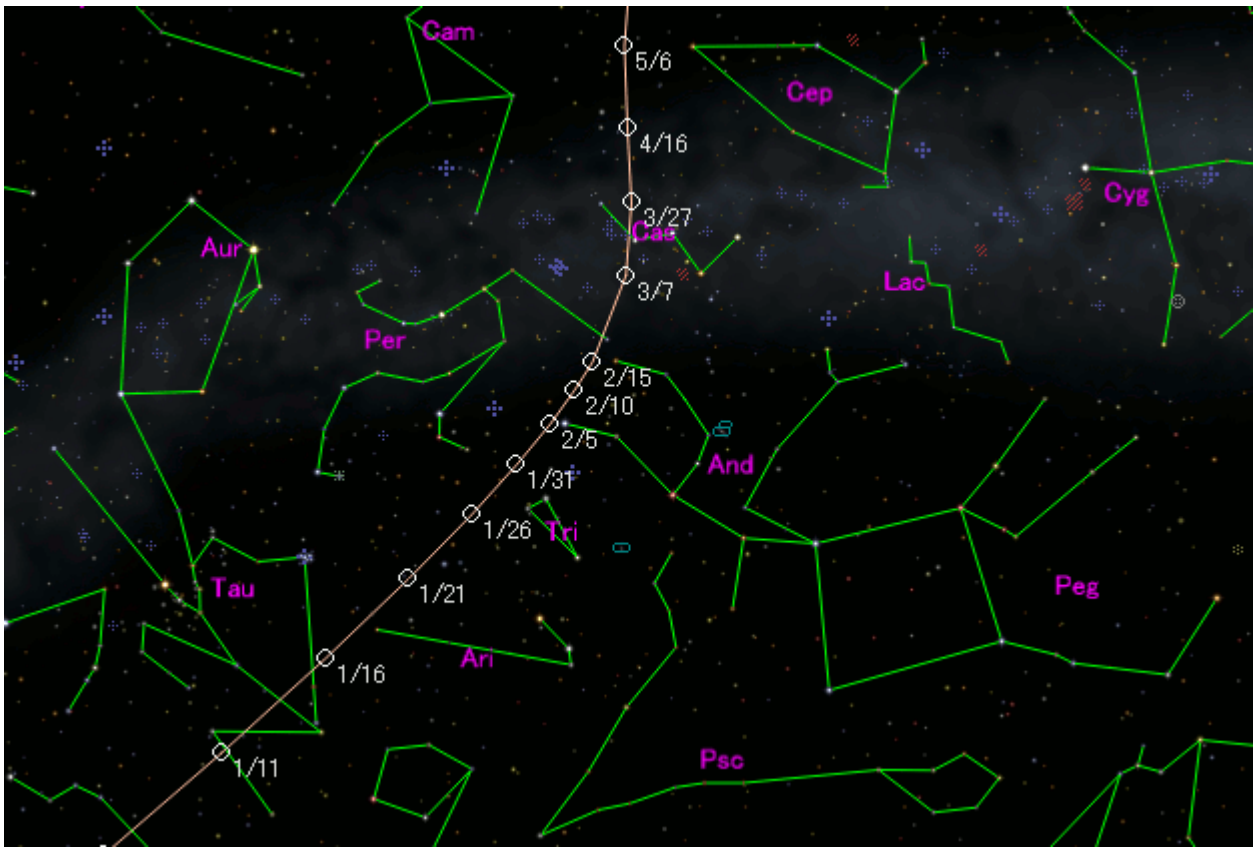
The US Geological Survey has released new detailed geological maps of parts of **Mars**, which show lake sediments in parts of Valles Marineris (the largest canyon in the Solar System) and areas that experienced marsquakes while wet. This adds to the evidence that Mars had liquid water in the past.

New Horizons spacecraft has been awakened from months of hibernation after nearly 9 years in space to begin its encounter with Pluto (flyby on July 14). Primary goal is exploration of Pluto and its many moons.



Chuck Edmonds created this image of NGC 5775 on May 18, 2007 from the club's Anza site using a 16-inch reflector at f/6.7 and an ST10XME imager. NGC 5775 is an edge-on spiral galaxy located 85 million light years from our solar system. The adjacent face-on spiral galaxy is NGC 5774. Although NGC has a greater intrinsic brightness at magnitude 12.3, the magnitude 12.8 NGC 5775 is more easily visible due to its slightly greater mean surface brightness. Both are visible in 6-inch or larger telescopes under dark skies.

Comet C/2014 Q2 (Lovejoy) seen on the border of constellations Columba and Lepus. As of late December 2014, it is at magnitude 5.6 (approx) and may get brighter as it approaches perihelion on 14 February 2015. Photograph taken with a WO FLT 132 refractor and QSI583wsg camera with 0.8x reducer/ flattener. (Paul Stewart)



Finder chart for Comet 2014 Q2 (Lovejoy) prepared by Seiichi Yoshida. Retrieved from http://www.aerith.net/comet/catalog/2014Q2/2014Q2.html

For Sale:

Telescope: Celestron C-11 NexStar GPS Go-To Schmidt-Cassegrain telescope with Star-Bright Coatings, carbon fiber tube with heavy duty Celestron tripod

Includes: (original equipment was: 1 ¼" star diagonal with 1 ¼" eyepiece; 9x50 finderscope, straight through).

UPGRADES INCLUDED:

Parks 2" diagonal; Orion SkyGlow Broadband light pollution filter (Schmidt-Cassegrain); Orion UltraBlock Narrowband light pollution filter (Schmidt-Cassegrain); 50 mm finder with 1 ¼" diagonal mounted on rings and standoff to shoe to C- 11 with crosshair eyepiece in diagonal; additional Celestron 1 ¼" illuminated eyepiece; Kendrick Quick Focus mask; original dust cover replacement, (remove three plastic hole covers to use as Quick Focus); Metal dew shield for C-11; RoboFocus mounted on C -11 to work with the Feathertouch focuser, attached with sticky pads; Belsico Skyan wireless telescope control unit;

Underside rail and counterweight for balancing the C-11; JMI Medium Size Universal Wheeley Bars; JMI CASEOTA11 JMI carrying case for the Optical Tube Assembly (OTA) ONLY includes two lockable latches, three steel-reinforced handles, a 2" by 30" steel hinge and die-cut foam lining for the telescope optical tube. It can be carried by two people using the two handles on either end or pulled using the attached Kryptane® wheels. The diagonal must be detached (from Celestron scopes) and inserted in a foam cutout inside the case. The wheels must be attached to the case by the customer which is easily accomplished in a few seconds with two 7/16" wrenches. An optional Large-Wheel Upgrade is available.

Software: Celestron NexRemote remote control software for C-11 GPS v1.6.14 on original CD.

Asking Price for telescope package: $3000

CCD Camera and HyperStar 11 for C-11:

SBIG ST-237A CCD Complete with COLOR WHEEL: This is a complete Santa Barbara Imaging Group ST-237A CCD camera system in the original box with all original cables, accessories, and software. The camera has the optional CRW5C Internal Color Wheel with I/R Blocking Dichroic Filters already installed, and the original Integral Shutter Wheel for B/W operation is also included. This is a 16 bit A/D camera based on the Texas Instruments TC237 CCD with 657 X 495 pixels that are 7.4 microns square, and features on-board thermoelectric cooling for reduced thermal noise. This system can be used for B/W imaging, color imaging, and for autoguiding. Included software is CCDSoftV5, CCDOPS for Windows, and CCDSharp for Windows. Updated software is available free from SBIG at their website.

Asking Price for the CCD/HyperStar 11: $1100

CONTACT:

Phil Trask

949-837-6645

patrask2@cox.net

For Sale: Losmandy G11 German Equatorial Mount. This mount is the digital drive (non-Gemini GOTO) version. It has encoders, a Robin Casady dovetail saddle, and many extras. It has a payload capacity of 60 pounds, plus counterweights. If interested, contact John Fisanotti at jfisanotti@sbcglobal.net or 818-957-2605 and he will send you an eight-page brochure with further details and many more photos. Asking $2400 and will deliver to a local (within Southern California) buyer.

FOR SALE: 2 Meade Maksutovs. Take your choice or buy both - excellent optics, rarely used.

ETX-125 5" $575

LX-200 7" $1500

Contact Rick Hull email hull3@cox.net

Venus begins coming into its own again this month with an apparition in the evening sky. Marc Huber obtained this image on May 31, 2004 using a Meade LX10 at f/18 and a Phillips TouCam from Oceanside, CA. The left-hand image is a stack of the best 200 of 1200 images; the right-hand image is a stack without realigning the images, which were taken low to the horizon. Contrary to popular belief Venus does offer a great deal for the visual observer. Subtle banding in the atmosphere visible through blue and violet filters, and the 'ashen light' phenomenon visible in the unlit hemisphere (hypothesized to be the effects of lightning in the Venusian atmosphere) are frequently observed by amateurs. Let's see how technology has improved over the past 11 years and get some new images!

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