



THE BLUE MOON OBSERVER

DECEMBER 2018 VOLUME 20, NUMBER 12



Door Peninsula Astronomical Society

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www.doorastronomy.org

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The Blue Moon Observer

The December general meeting of DPAS will be held at the Ray and Ruthie Stonecipher Astronomy Center at 7 PM on Tuesday, December 4. President Gary Henkelmann will introduce the Great Courses program on Galaxies and Clusters. John J. Beck will lead the Leaning the Night Sky on Galaxies and Clusters.

Meeting Notes from the November 6 general meeting

The November 6, 2018 Membership Meeting attracted a crowd of 24 members and guests to witness two first time presenters: UW Engineering graduate Cody Schwartz, relating his Summer internship at SpaceX; and Tom Gwilym, treating us to a progress report on his new backyard observatory and a tour of the current night sky as imaged by the Stellarium astronomy software.

SpaceX is the builder of the rockets NASA is using to launch its' satellites and service the ISS. Cody spent the summer assisting in the design of molds used to produce the carbon fiber fuel tanks that the Big Falcon Rocket (BFR) will use to send people and payloads to the Moon and Mars. It is the primary mission of SpaceX, and its' founder, Elon Musk, to facilitate and accelerate the colonization of these, our closest neighbors. Not only would this expand our understanding of the universe, but it would provide humankind with a more robust resiliency in the face of potential existential threats here on Earth. Cody gave us an insider's perspective on how it is to work among and with a group of extremely intelligent, creative, focused, and enthusiastic peers. The positive and collaborative environment was both relaxed and stimulating, and the time flew by. Perhaps Cody's best memories were when Elon Musk visited the factory on

several occasions, exuding a "Rock Star" aura as he worked his way around the plant.

The DPAS audience peppered Cody with questions, showing a real interest in the vision of SpaceX and the circumstances that put Cody into the trajectory he is experiencing.

Ann Hickey provided the lead that resulted in Cody crossing paths with us, and we thank her for sharing.



The "Big Falcon Rocket" carbon fiber fuel tank mold that he worked on is shown in the slide displayed on our new 85" TV.

Following Cody's presentation the members and visitors were treated to refreshments provided by David and Christa Ott.

The meeting was rounded out by Tom Gwilym who showed slides of the process he went through to build his own observatory including digging the *continued on page 3*

Who We Are

DPAS is a local club and chapter of the Astronomical League. We are also a club member of the International Dark-Sky Association and the Night Sky Network, teaching arm of the Astronomical Society of the Pacific. We meet on the first Tuesday of every month, with rare exception. Meetings are held at the Ray & Ruthie Stonecipher Astronomy Center unless otherwise announced. We operate and maintain the Leif Everson Observatory which houses a 16" Ritchey-Cretien telescope on a sophisticated tracking mount controlled by computer, and a new Maksutov-Cassegrain telescope for planetary viewing. A weather station is housed in the observatory. Current weather readings are shown on our web site:

www.doorastronomy.org

The StarGarden near the observatory is used for viewing the sky with unaided vision, binoculars and members' telescopes. There are also binocular mounts set in concrete which allow viewers of different heights to view the same object through the same binocular.

The Ray & Ruthie Stonecipher Astronomy Center provides for storage, projects, meetings, warm-up and toilet facilities. It also housed a StarLab, an inflatable planetarium with a sophisticated projection system. The planetarium was used for group presentations. See announcements page 6.

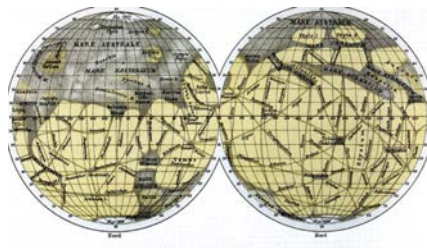
An Analemmatic Sundial was dedicated on October 20, 2012.

The "astronomy campus" as described here is reached by taking Utah Street east to the stop sign and turning left through the gate onto Stargazer Way. Or you can set your GPS to 2200 Utah.

InSight Landing in Perspective

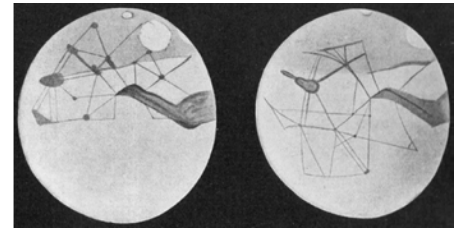
How exciting that scientists can launch an object which contains scientific instruments, send it to Mars, have it land intact on three legs, and put it to work gathering and sending home new information about the "red planet". Before we look at InSight in detail, lets look back on what mankind has learned about Mars.

Aristotle and others thought Earth was the center of everything and that the sun revolved around Earth. Copernicus and others were convinced that Earth and the other planets orbit the sun. Both theories assumed circular orbits. Along came Tycho Brahe who without the benefit of a telescope performed and recorded amazingly precise measurements of Mars' orbit. In the early 17th century, Johannes Kepler used Brahe's data to demonstrate that Mars' orbit is an ellipse and thus was born Kepler's three laws of planetary motion. So Mars provided the data needed to understand how our solar system works. No small contribution.



Carte d'ensemble de la planète Mars
avec ses lignes canaux supposés

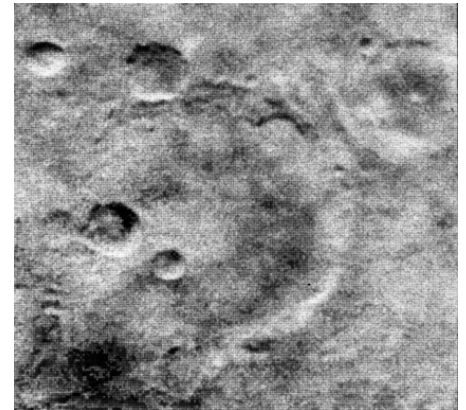
In the late 19th century, Giovanni Schiaparelli published his drawings of what he felt he was seeing through his telescope while viewing Mars. He referred to the streaks as "canelli" in Italian meaning "channels" in English. Apparently Percival Lowell misinterpreted the term as "canals" and from his observations at Lowell Observatory at Flagstaff, AZ he attempted to map a network of canals on Mars, suggesting intelligent life on the planet. Of course, this fueled the opportunity for



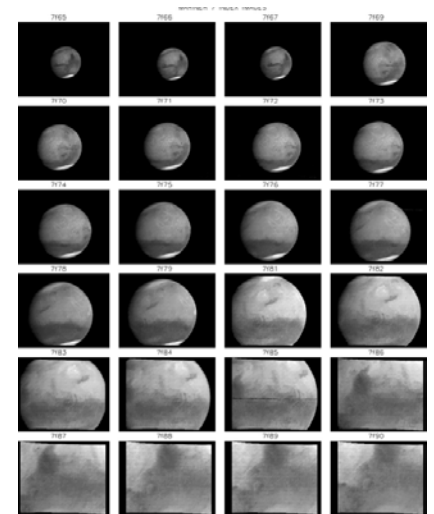
science fiction writers to whet our imaginations with conjectures about what "Martians" might be like: human-like, insect-like, or neither.

Fast forward to the mid 1960' when Mariner 4 did a flyby of Mars, took pictures, recorded the data on a tape recorder, and transmitted the data back to earth.

Mariner 4 image of Mars



Mariner 4 was followed by flybys of Mariner 6 & 7 which failed to show any canals on our neighboring planet.



An orbiter can image far more of a planet's surface than can a flyby, *continued on page 4*

DPAS BOARD

Gary Henkelmann, President
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David Lenius, Vice President

Thomas Minahan, Outreach
Coordinator

Susan Basten, Secretary,
Membership Chairperson, and
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treasurer@doorastronomy.org

Jacque Axland, Membership
Chairperson and Recording
Secretary of the Board

John J. Beck, Past President
and Editor
editor@doorastronomy.org

John W. Beck, Past President
and Webmaster

Dennis Sundin, Member at
Large

Ray Stonecipher, in spirit

Barbara Henkelmann serves as
the DPAS Archivist.

The business of the DPAS is largely conducted at the Board meetings to leave the general meetings open for programs. The Board meetings are held at the Astronomy Center at 7 PM on Monday, 8 days prior to the following general meeting. Members of DPAS are invited to attend Board meetings.

Meeting notes from page 1.

hole for the concrete fittings for his beefy mount, construction of the domed observatory, and the telescope, computer hookup, wiring, etc. He also demonstrated his favorite planetarium software, Stellarium, pointing out a number of choice targets for viewing this time of year.



Looking Ahead to 2019

Your Board is anticipating giant leaps forward in the coming year. 2018 was no slouch, with the successful hosting of NCRAL 2018 and the acquisition of new equipment which we hope to put to full use in 2019. Although the 14" Celestron which served the Leif Everson Observatory well for many years has been removed and fully refurbished, it has been replaced as the main telescope by a 16" Ritchey-Cretien unit which will greatly enhance our ability to capture high definition wide field images supplemented by a 7" Maksutov-Cassegrain 'scope for planetary viewing and imaging. Adjustments to the mount including the planned purchase of a counterbalance shaft extension and fine tuning the software will mark some of the projects for early in the year and should bear fruit for a great 2019 of astronomy at Leif Everson Observatory.

The new flat screen monitor is in place and already in use at our meetings. The Board is looking into an improved planetarium solution; planetary classes by Susan Basten have been a major part of our outreach. An plans are underway for programs for our monthly meetings.

Mars from page 6

atmosphere using orbiters and landers. The project is supported by Russian Space Agency and NASA.



That brings us to InSight. What does this recently landed, stationary probe add to the nearly exponentially increasing body of knowledge about Mars?

The nickname is derived from Interior Exploration using Seismic Investigations, Geodesy and Heat Transport. The total mission will involve three landers total, each equipped to sense the most subtle seismic activity in hopes of learning more about the interior composition of the planet. It will be the first to study the crust, mantle, and core. "In comparison to the other terrestrial planets, Mars is neither too big nor too small. This means that it preserves the record of its formation and can give us insight into how the terrestrial planets formed. It is the perfect laboratory from which to study the formation and evolution of rocky planets."

Riding along with InSight on its way to Mars were two briefcase-size mini-spacecraft or cubesats named MarCO were the first test of this technology and relayed information to Earth from InSight as it entered Mars' atmosphere.

Whether or not humans ever colonize Mars, in a short period of time humans have found that there are no canals or Martians on Mars.

Astronomy Quiz

- How tall is the highest peak on the moon?
- During December, 2018 is Venus the morning “star” or the evening “star”?
- During December, 2018, which of the following describes our view of Venus?
 - Venus looks larger and brighter and is a greater percent illuminated.
 - Venus looks smaller and dimmer and a greater percent is illuminated.
 - Venus looks smaller and dimmer and a lesser percent is illuminated.
- In December there is in our night sky a constellation between Orion and Perseus.

What is the name of the constellation?

What is the name of its brightest star?

What is the name of the largest open star cluster in that constellation?



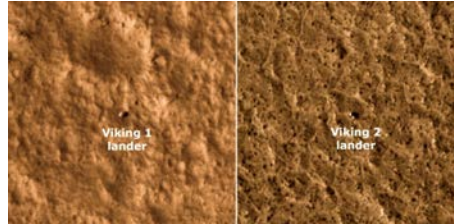
The Blue Moon Observer

Mars continued from page 2
and that was first accomplished by Mariner 9. Over 1971-1972, Mariner 9 waited for a dust storm to clear, then imaged and mapped 100% of Mars’ surface.

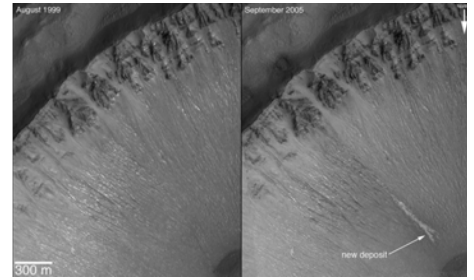


Mariner 9 image

For even closer views of Mars’ surface, the Viking Landers were assigned the task in the late 1970’s .



The Mars Global Surveyor orbited from 1997 to 2006 and showed changing weather patterns plus geologic features which suggested the presence of water flow in the past.

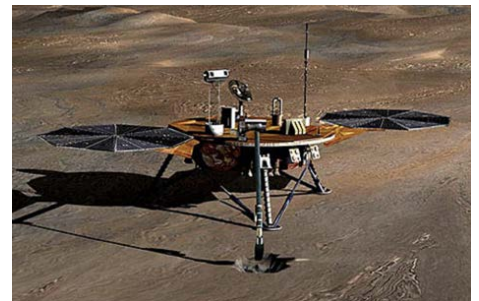


The above images from the Mars Global Surveyor from 1997 and 2006 show a new deposit has formed sometime over that time period.

The Pathfinder mission landed the first rover on Mars, labeled Sojourner. It crawled over the surface between 1996 and 1997. It carried a host of instruments and beamed chemical, atmospheric and other measurements as well as snapshots back to scientists on Earth.



In 2008 the Mars Polar Lander made its landing near the north pole. It sampled ice and using its ovens, analysed the chemistry of volatile substances, gathered information on weather and atmosphere, and obtained stereo images.



According to NASA, “Goals: Study continued on page 5

Poetry Corner

ALDEBARAN AT DUSK

Thou art the star for which all evening waits--
O star of peace, come tenderly and soon,
Nor heed the drowsy and enchanted moon,
Who dreams in silver at the eastern gates
Ere yet she brim with light the blue estates
Abandoned by the eagles of the noon.
But shine thou swiftly on the darkling dune
And woodlands where the twilight hesitates.
Above that wide and ruby lake to-West,
Wherein the sunset waits reluctantly,
Stir silently the purple wings of Night.
She stands afar, upholding to her breast,
As mighty murmurs reach her from the sea,
Thy lone and everlasting rose of light.

George Sterling, 1911

Mars from page 4

Key findings were that it was the first time that water had been "touched and tasted" on Mars.

Mars Odyssey was launched April 7, 2001 and inserted into orbit around Mars on October 24 of the same year. "For the first time, the mission globally mapped the amount and distribution of many chemical elements and minerals that make up the martian surface. Maps of hydrogen distribution led scientists to discover vast amounts of water ice in the polar regions buried just beneath the surface. Odyssey also recorded the radiation environment in low Mars orbit to determine the radiation-related risk to any future human explorers who may one day go to Mars. All of these objectives support the four science goals of the Mars Exploration Program." Odyssey also serves as a relay station for other projects in Mars exploration.



The rovers Spirit and Opportunity landed on opposite sides of Mars on January 4, 2004. "Carrying



identical, sophisticated sets of science instruments, both rovers have found evidence of ancient Martian environments where

intermittently wet and habitable conditions existed." "Spirit landed at Gusev Crater, a possible former lake in a giant impact crater. Opportunity landed at Meridiani Planum, a place where mineral deposits suggested that Mars had a wet history." Both have sent hundreds of thousands of detailed images of the Martian surface over their respective travels. It was exciting to follow their motions, challenges, redirections, and views ahead before reaching various targets and imaging them in finer detail. Scientists dealt with them getting stuck and exclaiming themselves with directions from Earth.

Their original missions were planned for 90 days of Mars exploration. Both exceeded that by many years. Spirit lasted 20 times longer than its original design until its final communication to Earth on March 22, 2010. Opportunity last called home on June 10, 2018 but dust storms encircling Mars have made it impossible to communicate with the rover since. It is still considered an active project and attempts to contact Opportunity will resume in January 2019.

Mars Express is a joint effort involving the European Space Agency, the Italian Space Agency, and NASA. Orbital insertion was on December 25, 2003 and it received a software update on April 11, 2018. One of the most



exciting findings from Mars Express data was radar detection of a pond of subsurface water in *continued on page 6*

Astronomy Quiz Answers

1. Okay, it's a trick question. The highest elevation on the moon is not a peak, but more like a plateau. However, it is higher above the moon's surface than is Mt. Everest above Earth's. Mount Everest is about 29,000 feet tall; the highest point on the moon is nearly 31,000 feet high. But don't try to find it with your telescope. It's on the far side of the moon.
2. Venus rises before the sun all month.
3. B is correct. Venus becomes slightly less bright over this month despite having a greater percent illuminated by the sun. The angular diameter decreases.
4. The constellation is Taurus the Bull, its brightest star is Aldebaran, and its open cluster is the Hyades.

Viewing Nights

December 8
January 5

New Members

Welcome:

Dzintars Petersons &
BettyLou Shoemaker

Banquet

Traditionally the January meeting is supplanted by the annual banquet. This year the banquet will be at the Nightengale, 5:30 for social hour and seating for dinner at 6:30 on Tuesday, January 8, 2019. The address is 1541 Egg Harbor. A reminder will be sent by email. RSVP: Treasurer@doorastronomy.org. Dinners and beverages are "Dutch Treat"

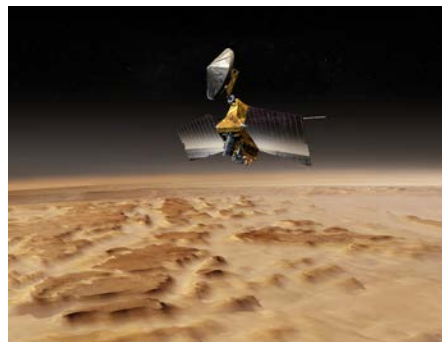
Mars from page 5

the south polar region under layers of ice and dust using ground-penetrating radar sounding techniques. It also detected chemicals which can only form in the presence of liquid water. Water ice has been confirmed at both poles as well. This image from Mars



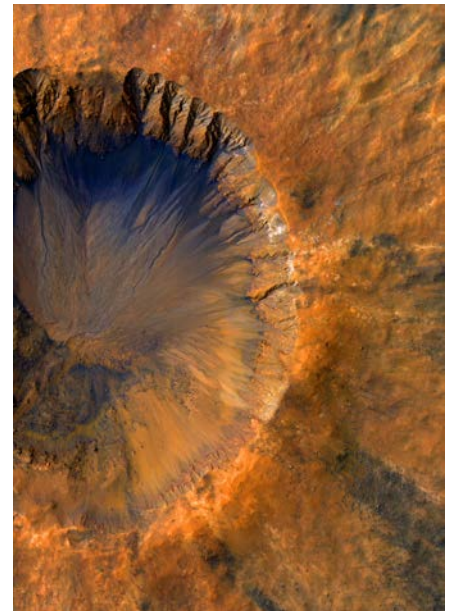
Express is thought to be either an impact crater or the remnant of a "super volcano".

The next orbiter is the Mars Reconnaissance Orbiter launched on August 12, 2005 and inserted into orbit on "Though previous cameras on other Mars orbiters could identify objects no smaller than a school bus, this camera can spot something as small as a dinner table" and is equipped with instruments to detect subsurface water and identify surface minerals. The MRO is a NASA project. "The orbiter's telecommunications systems provide a crucial service for future spacecraft, serving as the first link in a communications bridge back to Earth, an "interplanetary Internet" that can be used by numerous international spacecraft in coming years. Testing the use of a radio frequency called Ka-band, Mars Reconnaissance Orbiter has demonstrated the potential for greater performance in communications using significantly less power." It also carries technology which can be used in the future to guide landers precisely into position.



The above image is an artist's conception of the MRO over the surface

of Mars. The image below was taken by the MRO of an impact crater on the red planet.



Not only do rovers and orbiters supply different data, but advances in computer technology allows scientists to use data from multiple sources to construct images and even video imagery of Martian features. Enter the rover Curiosity, which landed August 6, 2012 at Gale Crater. The image below is a self portrait by/of Curiosity in a dust storm.



Atmospheric sampling has been done by MAVEN, the Mars Atmospheric and Volatile Evolution probe. Launched 11/18/2013, MAVEN has been the first project to actually sample Mars' atmosphere. It has demonstrated that Mars continues to lose atmosphere as a result of climate change on that planet. Like other orbiters, it can serve as a radio relay for landers.

Another program in the works is European Space Agency's planned ExoMars project. Its mission is to search for evidence of life on Mars by searching for trace minerals in Mars' *continued on page 3, column 2*