Southwest Florida Astronomical Society, Inc.
SWFAS

The Eyepiece
April 2019

Contents:

A MESSAGE FROM THE PRESIDENT

Well, the clouds got us in March. We had a nice turnout of members for the Rotary Park star party and we had people, but we also had some heavy cloud cover. We were able to show some people different things through the clouds.

On the next night at CRP, it looked like it was going to be somewhat clear, but as we got out there, a cloud covered most of the sky and didn't move much. Matthew Knight and I along with a new club member were out there and were able to look at a few things, but the clouds never really broke.

We also got clouded out for the Carefree Lunar Observing session.

We have another CRP star party this month on the 6th, do remember to get out there before dark as the gates tend to close early. We also have a Seahawk Park Star Party on the 13th where the moon will be well placed for observing.

Big Cypress and UT McDonald Observatory are holding a Dark Sky Academy down at Big Cypress the 8th to the 10th. I am planning on being there the entire time, but general observing will be held there for the Academy participants each night. Club members are welcome to come down. The first night is a general observing night where they will learn about some objects and interact with the club members that are there. (A group from the east coast is also helping.) On the second day, they will be learning how to use some scopes that are being provided and that night they will be learning to use them to find objects. Again, some help would be nice, but it will be more about them understanding how to use the telescopes and find some specific

objects that night. They are expecting to pair up that night and rotate between the goto Alt-Az, dobs and binoculars so that each Ranger gets a chance with all equipment.

The third night is a bar-b-que followed by general observing. I have been preparing a document for them on outreach materials and will be supplying them with samples of the different outreach materials that we use along with samples from Night Sky Network, Astronomy from the Ground Up, Astronomical League, NASA, NOAA, NOAO, Astronomers without borders and of course, the International Dark-Sky Association.

We have a library program in Golden Gate on the 18th at 2:00

There is a new meteorite exhibit with some beautiful samples in the lobby of the planetarium.

Brian

Program this Month

The South West Florida Astronomical Society is pleased to announce that Ted Wolfe, accomplished astrophotographer and author of over 100 consecutive monthly columns on astronomy for the Naples Daily News, will be presenting to the SWFAS on Thursday, April 4, 2019. Mr. Wolfe has had many of his images published in Sky and Telescope and Astronomy magazines and has had a 20 month exhibit of his astrophotos on display at the Kennedy Space Center at Cape Canaveral. His latest effort, a long exposure image of NGC 3939, will be in the June, 2019 edition of Sky and Telescope as part of an article on "open" galaxies. Additionally, permanent displays of his astrophotos can be seen at the Center for Space Studies at the University of Florida and in the Logan Science Center at the University of Notre Dame.

If you enjoy viewing breathtaking photographs of deep space celestial wonders this is a presentation that you surely do not want to miss. Mr. Wolfe's presentation will begin at 7:30pm on Thursday, April 4th, in the Planetarium at the Calusa Nature Center and Planetarium in Fort Myers. The regular monthly meeting of the South West Florida Astronomical Society will follow immediately thereafter.

His latest article for Naples Daily news is at:
https://www.naplesnews.com/story/news/local/communities/collier-citizen/2019/03/29/looking-up-exploring-kitchen-making-stars-and-planets/3276504002/

Michael J. McCauley
VP/Program Coordinator SWFAS

Annual Dues Reminder

Dues were increased to $25.00 per year as of the November 2018 meeting. We are now collecting the 2019 dues. If you had already paid the 2019 dues, you do not have to worry about the difference. If you have any issues, please privately contact an officer. Dues can be mailed to: SWFAS, Inc. P.O. Box 100127 Cape Coral, FL 33910

Star Party Schedule 2019

SeaHawk Park – April 13th, May 11th, June 1st, July 6th, Aug 3rd, Aug 31st, Sept 28th, Nov 30th

Caloosahatchee Regional Park – Apr 6th, May 4th, Oct 26th, Nov 2nd, Nov 30th

We have scheduled some of the Seahawk Park nights to coincide with the moon being a crescent to 1st quarter stage to allow for lunar observing.

Members' Recommended Reading & News Links

***Members are encouraged to submit to the editor links to recommended articles and books that might be of interest to Club members*.**

"How to See Sirius in the Daytime", Bob King, March 6, 2019, Sky and Telescope Weekly

"Saturn's Rings Built Up Its Tiny, Close-in Moons", Camille M. Carlisle, March 28, 2019, Sky and Telescope Weekly

Each Weekly Newletter of S&T has a 60-second news section. The general link for S&T Astronomy News is https://www.skyandtelescope.com/astronomy-news/ .

"Opportunity's Parting Shot Was a Beautiful Panorama", March 14, 2019, NASA-JPL, Week in Review

"Galactic Wind Provides Clues to Evolution of Galaxies", March 5, 2019, NASA-JPL, Week in Review – ***pairs well with Special Galaxy Issue of Astronomy Magazine, March 2019.***

For NASA-JPL News see https://www.jpl.nasa.gov/ .

"How to Observe Galaxies", Astronomy Magazine, Michael E Bakich, page 44, March 2019.

"The Next Mars Rover Will Take a Friend Along – *A Helicopter*", Air & Space Magazine, April-May 2019, Preston Lerner, pages 36-41.

Sky and Telescope has a new free introductory E-book "Stargazing: Getting Started" if you sign up with your email. https://skyandtelescope.com

In the Sky this Month

Moon: New – Apr 5; Apogee – Apr 1; 1st Quarter – Apr 12; Perigee – Apr 16; Full – Apr 19; Last Quarter – Apr 26.

Mercury (dawn, looking East-Southeast) rises about 1 hour before sunrise early this month. It is low (<5°) at sunrise and only about 0.9 magnitude. By the end of April, it rises about 40 minutes before sunrise, but its magnitude is about -0.3. Mercury and Venus appear together in April, Mercury rising shortly after Venus. They are 10° apart on the 1st, and just over 4° apart in quasi-conjunction on the 16th. Mercury starts April 4° north of the Moon.

Venus (dawn) rises just ahead of Mercury with a brightness of -3.9, <12" across. It appears to lag behind Mercury's closer orbit to the Sun by the 16th. It begins the month 3° north of the Moon.

Mars (dusk - evening, looking West) sets >4 hours after the Sun to start the month and <3 hours by the end of the month. It moves through Taurus this month between Aldebaran and Pleiades. It dims slightly from magnitude 1.5 to 1.6, and shrinks from– 4.6" to 4.2".

Jupiter (midnight – dawn all month, South - Southeast) will rise after 1 a.m. EDT on the 1st, but a little after 11 p.m. EDT on the 30th while Mars sets. Its brightness increases a little from -2.3 - -2.5, and its diameter increases from 40" – 43". It is seen best when at its highest in the south, about 1-2 hours before sunrise. On the 10th, it begins westward retrograde and will be in opposition in two months in June.

Saturn (pre-dawn – dawn all month, South - Southeast) comes up about 3 a.m. on the 1st and 1 a.m. on the 30th. Saturn is in eastern Sagittarius and brightens from 0.6 – 0.5. It is <26° from Jupiter to begin the month and about 27° by month's end. On the 29th in the North America, Saturn start its retrograde motion. Saturn and Jupiter slowly separate for the next two months. Saturn grows a little to 17" and the rings can be seen tilted at high angle.

Uranus is at conjunction with the Sun on the 22nd and not visible in the solar glare. See https://is.gd/urnep for a finder chart or pages 48-49 in September 2018 issue of Sky & Telescope.

Neptune (dawn) is difficult to see in the solar glare at dawn this month at magnitude of almost 8. It is just barely north of Venus on the 10th in the Americas. See https://is.gd/urnep for a finder chart or pages 48-49 in September 2018 issue of *Sky & Telescope*.

International Space Station: The ISS is visible in the evening (7-9 p.m.) from 7-9 April over Ft Myers, and during early morning (6:30-5 a.m.) from the 23rd to the 29th. See this link for specific times and routes for the ISS: http://www.heavens-above.com/

The **Hubble Space Telescope** will be visible April 1st-7th during the evening hours, about 6-10 p.m., and early morning (6:30-5:00 a.m.) from April 17th -30th. See this link for specific times and routes for the HST: http://www.heavens-above.com

Southwest Florida Astronomical Society, Inc. Event Schedule for 2019

Date	Event	Location	Time/Note
April 4th, 2019	Monthly Meeting	Calusa Nature Center Planetarium	7:30pm
April 5th, 2019	Public Observing	FSW Moore Observatory Punta Gorda Campus	Dusk
April 6th, 2019	Monthly Star Party	Caloosahatchee Regional Park	Dusk
April 8-10, 2019	Dark Sky Academy	Big Cypress Welcome Center - Ochopee	Nightly observing with Academy Participants
April 13th, 2019	Monthly Star Party	Seahawk Park	Dusk
April 18th, 2019	Program	Golden Gate Library	2:00 pm
April 20th, 2019	Solar Observing	Harbour Heights Park Port Charlotte	9:00 am - Noon
May 2nd, 2019	Monthly Meeting	Calusa Nature Center Planetarium	7:30pm
May 3rd, 2019	Public Observing	FSW Moore Observatory Punta Gorda Campus	Dusk
May 4th, 2019	Monthly Star Party	Caloosahatchee Regional Park	Dusk
May 11th, 2019	Monthly Star Party	Seahawk Park	Dusk
May 18th, 2019	Solar Observing	Gilchrist Park Punta Gorda	9:00 am - Noon
June 1st, 2019	Monthly Star Party	Seahawk Park	Dusk
June 6th, 2019	Monthly Meeting	Calusa Nature Center Planetarium	7:30pm
June 22nd, 2019	Solar Program	North Fort Myers Library	11:00 am-Noon
July 6th, 2019	Monthly Star Party	Seahawk Park	Dusk
July 9th, 2019	Lunar Program	East County Regional Library	6:30 pm – 8:00 pm
July 13th, 2019	Cape Coral Parks and Rec Fun Day	Austen Youth Center	9:00 am-Noon
August 1st, 2019	Monthly Meeting	Calusa Nature Center Planetarium	7:30pm
August 3rd, 2019	Monthly Star Party	Seahawk Park	Dusk
August 31st, 2019	Monthly Star Party	Seahawk Park	Dusk

All observing events are Weather Permitting.

If it is cloudy or a chance of rain, we may not setup at all.

There may be no way to provide advance notice of cancellation.

Events may be cancelled several hours before scheduled time based on observed conditions and forecasts at that time and weather may change.

Monthly Star Parties: These are held at either Seahawk Park in Cape Coral or at Caloosahatchee Regional Park (CRP) off SR78 7 miles east of SR31. Other than park fees noted, these are free and open to the public. Those wanting to learn how to use equipment can bring it to the monthly star parties or the monthly meetings. We are always glad to help people learn how to use their telescopes. It is also a great way to learn about different telescopes and try some out before making a purchase.

Seahawk Park is in North Cape Coral off Wilmington Blvd. (Nelson Rd or Chiquita Blvd are the nearest cross streets.) There is a brown sign in the center median at the entrance to the park. (GPS may not get you to the park, as some of the local roads have been closed.) You will make a big J hook before getting to the parking area. Seahawk Park is managed by the *Cape Coral* R/*Seahawks* Club for Radio Controlled Planes and they have priority. They are usually done by sunset but may be there before sunrise. Park in the lot and transport your equipment to the concrete staging area before the runway. This park is handicap capable as there is level concrete leading from parking to the staging area.

CRP has a gate that closes at dusk, you can check the county's website for current gate closing times and the status of the park's Northside entrance as that is where we observe from. (They may close the area if there are issues with the trails.) There is a parking fee of $1/hr or $5/day at CRP. Park in the main Northside parking lot. We sometimes setup down the dirt road that goes to the east. That area is grassy and may not be level, so one should walk on the dirt road as much as possible and watch their step.

Big Cypress: The Big Cypress Visitor Center is located off US41 5 miles east of SR29 about 25 miles east of Naples. Big Cypress has earned a Dark Sky Park designation. They hold observing events down the road that extends south of the Visitor Center during the winter months. This is a real dark sky site. Their observing events are free.

Solar Events: We have daytime solar events where one can safely look at the Sun. Things such as sunspots and prominences may be visible. These are free unless tied to another event that may have an entrance fee. There are seasonal monthly events held at different parks around Charlotte County as well as at other major public events in SW FLA.

Rotary Park Star Party: This is a free public star party held at Rotary Park at the south end of Pelican Blvd in South Cape Coral. Park to the west of the main building and walk to where we are setup to the east of the main building.

Moore Observatory, FSW Punta Gorda Campus: The campus is located off Airport Rd just east of I-75. Go to the right around the lake and park. The observatory is located down the path along the lake. Besides the telescope in the observatory, additional scopes may be setup around the observatory. This is a free event.

Star Party Etiquette: Bright white flashlights are not welcome. We use red flashlights to preserve our night vision. At the parks, please use just your parking lights if possible. As there may be cords and tripod legs that are hard to see in the dark, we ask that all children be well behaved and cautious around the telescopes. If you need help in moving around in the dark, just ask. Someone will be happy to guide you with a red light. If you have a telescope and need help with it, just ask. Someone will be glad to show you how to use it.

Golden Rules to Telescope Observing: Move your eye to the telescope, don't try to move the telescope to your eye! Ladders/chairs are there for your support, the telescopes do not provide support and should not be touched.

Minutes of the Southwest Florida Astronomical Society – March 7, 2019

The regular monthly business meeting of the Southwest Florida Astronomical Society was called to order at 7:39 pm by president Brian Risley in the Calusa Nature Center Planetarium.

President Brian Risley introduced Brian Darley of the Fort Myers Amateur Radio Club who presented the program on a recent event setting up live voice communication between local students and the International Space Station.

At 8:43 pm the business meeting resumed.

Twenty-five people were present, including two visitors and a new member.

A drawing was held to give away a Night Sky Network Lunar Calendar, which was won by Mike Moses.

Night Sky Network Outreach pins were presented to Tim Barrier, Phil Jansen, and Chuck Pavlick.

Some public library events are being considered for June and/or July. Mike McCauley is conducting an event at the Golden Gate Library in April. Tom Segur is conducting an event at Charlotte County Libraries in July.

The past events listed in the printed agenda were reviewed. Another SkyWatch Cruise at Babcock Ranch is being considered for fall or early next year.

Upcoming events listed in the printed agenda were discussed.

Tom Segur had a Meade camera available for give away.

Send pictures of events or astrophotos to newsletter editor Mike Moses.

John MacLean made a motion, seconded by Ed Sidor, to approve the minutes of the February meeting as contained in the March newsletter. The motion passed on a voice vote.

Treasurer Tim Barrier presented some reasons to consider moving the club bank accounts from Wells Fargo to Bank of the Ozarks. After discussion, Ed Sidor made a motion, seconded by John MacLean, to move the club bank accounts to Bank of the Ozarks. The motion passed on a voice vote.

Tim presented the February treasurer's report, with an ending balance of $1544.94. Tony Heiner made a motion, seconded by Robert Ficarelli, to approve the report. The motion passed on a voice vote.

Librarian Maria Berni reported some books from Carol Stewart are available for members.

Equipment Coordinator Brian Risley reported most equipment is available for member checkout after this month's public events.

Website Coordinator Bill Francis thanked Matt Knight for help with the website.

The business meeting was adjourned at 9:20 pm.

Submitted by Don Palmer, secretary

Photo by Chuck Pavlick

Thor's Helmet

NASA's Mars 2020 Rover Is Put to the Test

JPL-News Weekly, March 22, 2019

In a little more than seven minutes in the early afternoon of Feb. 18, 2021, NASA's Mars 2020 rover will execute about 27,000 actions and calculations as it speeds through the hazardous transition from the edge of space to Mars' Jezero Crater. While that will be the first time the wheels of the 2,314-pound (1,050-kilogram) rover touch the Red Planet, the vehicle's network of processors, sensors and transmitters will, by then, have successfully simulated touchdown at Jezero many times before.

"We first landed on Jezero Crater on Jan. 23rd," said Heather Bottom, systems engineer for the Mars 2020 mission at the Jet Propulsion Laboratory in Pasadena, California. "And the rover successfully landed again on Mars two days later."

Bottom was the test lead for Systems Test 1, or ST1, the Mars 2020 engineering team's first opportunity to take the major components of the Mars 2020 mission for a test drive. Over two weeks in January, Bottom and 71 other engineers and technicians assigned to the 2020 mission took over the High Bay 1 cleanroom in JPL's Spacecraft Assembly Facility to put the software and electrical systems aboard the mission's cruise, entry capsule, descent stage and rover through their paces.

"ST1 was a massive undertaking," said Bottom. "It was our first chance to exercise the flight software we will fly on 2020 with the actual spacecraft components that will be heading to Mars - and make sure they not only operate as expected, but also interact with each other as expected."

The heritage for Mars 2020's software goes back to the Mars Exploration Rovers (Spirit and Opportunity) and the Curiosity rover that has been exploring Mars' Gale Crater since 2012. But 2020 is a different mission with a different rover, a different set of science instruments and a different destination on Mars. Its software has to be tailored accordingly.

Work began in earnest on the flight software in 2013. It was coded, recoded, analyzed and tested on computer workstations and laptops. Later, the flight software matriculated to spacecraft testbeds where it was exposed to computers, sensors and other electronic components customized to imitate the flight hardware that will launch with the mission in 2020.

"Virtual workstations and testbeds are an important part of the process," said Bottom. "But the tens of thousands of individual components that make up the electronics of this mission are not all going to act, or react, exactly like a testbed. Seeing the flight software and the actual flight hardware working together is the best way to build confidence in our processes. Test like you fly."

Making the Grade

On the day before ST1 began, the High Bay 1 cleanroom was hopping with "bunny suit"-clad engineers and technicians assembling, inspecting and testing the mission's hardware. The next day, Wednesday, Jan. 16, the room was eerily quiet. The majority of workers had been replaced by two technicians there to monitor the flight test hardware. Lines of electrical cabling - "umbilicals" - were added to provide data and power to the spacecraft's cruise stage, back shell, descent stage and rover chassis, which have yet to be stacked together. The ground to in-flight spacecraft (and in-flight spacecraft to ground) communications were handled by X-band radio transmission, just like they would be during the trip to Mars.

ST1 began with commands to energize the spacecraft's electrical components and set up thermal, power and telecom configurations. While all the spacecraft components remained in the cleanroom, Bottom and her team had them thinking they were sitting on top of an Atlas 541 rocket 190 feet (58 meters) above Launch Complex 41 at Cape Canaveral on July 17, 2020, waiting to be shot into space.

Next, they focused on another part of cruise before testing the landing sequence. Then they did it all over again.

After a successful launch, they time jumped 40 days ahead to simulate deep space cruise. How would the software and hardware interact when they had to perform navigation fixes and trajectory correction maneuvers? And how would they work when simulated events didn't go as planned? The team looked for answers on the operators' computer screens in the test operations room beside the cleanroom.

"From the test operations room, you could look out the windows onto the cleanroom floor and clearly see the flight hardware," said Bottom. "Nothing was visibly moving, but underneath the outer structure, there were flight computers swapping sides, radios sending and receiving transmissions, fuel valves moving in and out, subsystems being energized and later turned off, and electrical signals being sent to nonexistent pyrotechnic devices. There was a lot going on in there."

On Jan. 30, the Mars 2020 test team was able to close their 1,000-plus page book of procedures for ST1. They went two-for-two on Mars landings. They also launchedfour times, performed deep space navigation, executed several trajectory correction maneuvers and even tested a few in-flight off-nominal situations.This first evaluation of flight hardware and software, over a year in the making, had been a thorough success, demonstrating where things excelled and where they could be improved. When these new changes have been investigated on both a virtual workstation and in the testbed, they will have their chance to "fly" in one of the many other systems tests planned for Mars 2020.

"One of the future scenario tests will place the rover inside a thermal chamber and simulate being on the surface. It will step through mission critical activities at some very low Mars surface temperatures," said Bottom. "Both literally and figuratively it will be a very cool test."

The Mars 2020 Project at JPL manages rover development for NASA's Science Mission Directorate. NASA's Launch Services Program, based at the agency's Kennedy Space Center in Florida, is responsible for launch management. Mars 2020 will launch from Cape Canaveral Air Force Station in Florida.

For more information on Mars 2020, visit:

https://www.nasa.gov/mars2020
For more information about NASA's exploration of Mars, visit:
https://www.nasa.gov/mars

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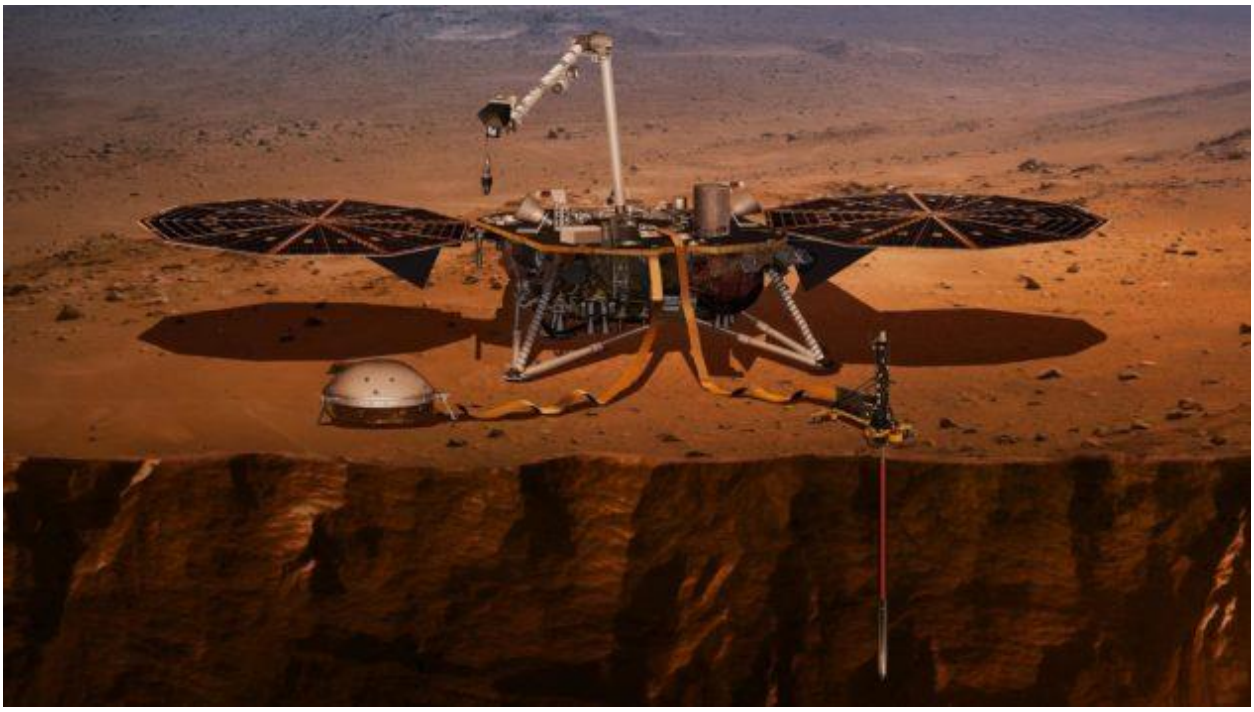
2019-043

Mars Insight's "Mole" Hits a Snag - Sky & Telescope

David Dickenson, Sky & Telescope Weekly, March 11, 2019

Drilling operations for NASA's Mars Insight Lander have been put on hold as the "mole" has hit unexpected obstacles.

Drilling is never easy — especially when you're trying to do it 172 million miles away on another planet. NASA recently announced that its Mars Insight lander will pause drilling operations for about two weeks, following an unexpected stoppage. Engineers think the halt is due to small stones blocking the drill.



An artist's concept of Insight on Mars. ***NASA / JPL***

"The team has decided to pause the hammering for now to allow the situation to be analyzed more closely, and jointly come up with strategies for overcoming to obstacle," said Tilman Spohn (German Areospace Center) in a recent press release (https://www.jpl.nasa.gov/news/news.php?feature=7346).

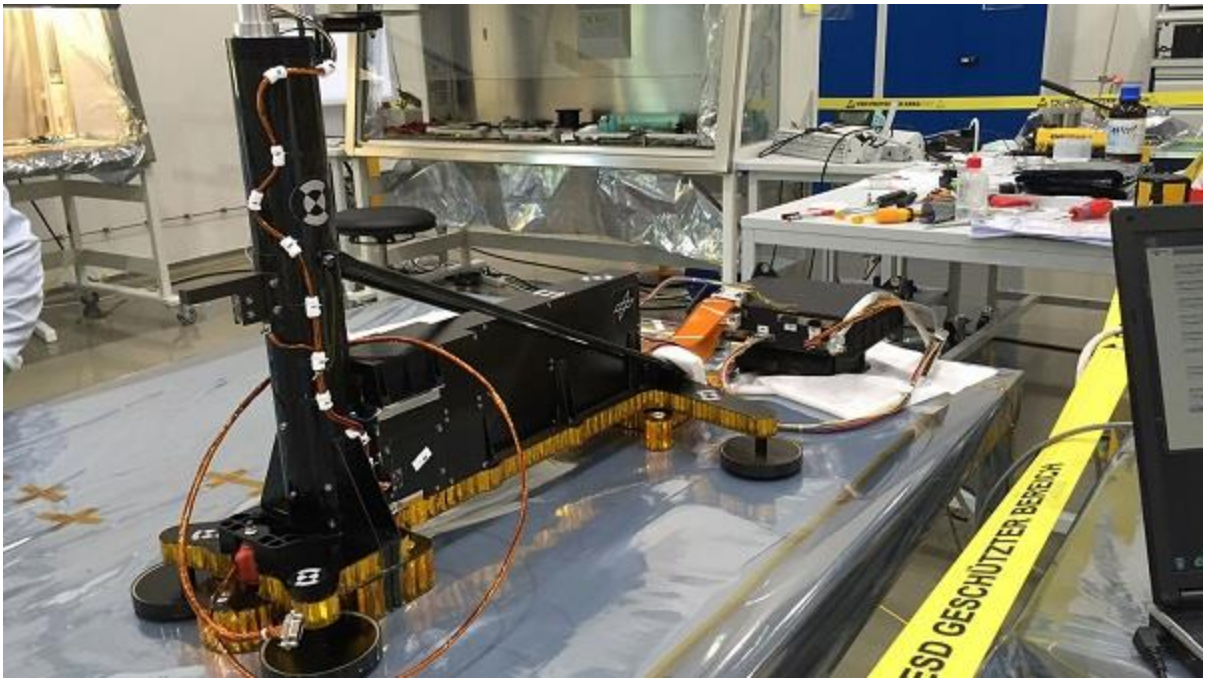
The drill is part of Heat Physical Properties Package (HP^3) and is designed to bore at least 16 feet (5 meters) down into the Martian regolith to measure the heat emanating from the planet's interior. Provided by the German Aerospace Center (DLR), the drill hammered the Martian soil (https://www.dlr.de/dlr/en/desktopdefault.aspx/tabid-10081/151_read-32400/#/gallery/33593) with 4,000 tiny blows for about 4 hours on its first attempt on February 28th. After about five minutes, it had reached a depth of at least 7 inches but no more than 20 inches (18 to 50 centimeters); subsequent estimates put the drill depth at around 12 inches (30 cm). At this depth, the drill was about three-quarters of the way out of its housing structure. Three and a half hours later, the drill rotated about 15 degrees; it might have encountered a small rock or a layer of gravel and eventually moved around it or pushed it aside.

The drill, also known as the "mole," then stopped to cool down for three days before beginning another hammering session on March 2nd. This time, the drill made no significant progress, which prompted the team to put a hold on further drilling to understand the problem. The team speculates that the mole may have hit another small stone or a layer of gravel.

A timelapse showing the deployment of the HP^3 package on the surface of Mars.
The Planetary Society / Emily Lakdawalla

Launched (https://www.skyandtelescope.com/astronomy-news/insight-lander-heads-to-mars/) from Vandenberg Air Force Base in California on May 5, 2018, along with its Mars Cube One (https://www.skyandtelescope.com/astronomy-news/mars-cube-one-cubesat-launch-with-mars-insight/) relays, Insight landed on Mars on November 26, 2018. The only mission to make the journey during the biennial Mars launch window, Insight is also the first dedicated geodesy mission designed to probe the interior of Mars.

Scientists had hoped that the regolith around the lander would be relatively stone-free — that's why the team selected the flat, featureless Elysium Planitia landing site for the mission. The mole needs to hit a minimum 3-meter depth for useful science, and the mission team hopes to reach 5 meters. The mole is designed to overcome these brief snags. In fact, DLR engineers put the mole through its paces here on Earth, and it easily deflected small stones and debris placed along its path. However, a rougher regolith will make for slower going than expected.



The heat probe, HP^3, underwent tests in Germany before InSight's launch.
NASA / JPL-Caltech / DLR

The probe itself is working as expected, measuring heat dissipation and thermal conductivity. This means scientists can calibrate the sensors embedded in the mole's tether. Once the mole has reached 50 cm, the first temperature sensor on the tether will enter the regolith and the instrument will begin to measure heat radiating from the core of Mars itself. Mars's internal warmth is partly leftover from the planet's formation and partly a product of radioactive decay in its interior.

Mars Insight successfully deployed its Seismic Experiment for Interior Structure (SEIS) seismometer, along with its protective bowl-shaped cover, on the Martian surface on December 19, 2018.

Sensing Phobos

Meanwhile, the Mars Insight team is also conducting another interesting observation using the radiometer on the HP^3 package. The Martian moon Phobos will transit the Sun several times in early March as seen from Insight's location. The team already managed to "see" the first 30-second event last week (https://www.dlr.de/blogs/en/desktopdefault.aspx/tabid-5893/9577_read-1090/, which appeared as a brief dip in temperature of about 1°C on the surface of Mars, much like a lone cloud passing in front of the Sun on a sunny day. This observation is important for measuring the amount of *thermal inertia* present in the regolith's surface layer. Thermal inertia is a function of density, heat capacity, and thermal conductivity: a small value could reveal porous, low-density regolith, while a larger than expected value could indicate denser regolith. Insight is also expected to detect small land tides raised by the passage of Phobos.

For now, NASA and DLR will discuss strategies to get the drill up and running in the coming weeks. Insight is in good health, and continues to take surface measurements of the Martian environment. There's no need to call in Bruce Willis . . . yet.

The Astronomical League

As a member of the Southwest Florida Astronomical Society you are automatically also a member of the Astronomical League, a nationwide affiliation of astronomy clubs. Membership in the AL provides a number of benefits for you including receipt of The Reflector, the AL's quarterly newsletter, use of the Book Service, through which you can buy astronomy related books at a 10% discount. You can also participate in the Astronomical League's Observing Clubs. The Observing Clubs offer encouragement and certificates of accomplishment for demonstrating observing skills with a variety of instruments and objects. These include the Messier Club, Binocular Messier Club, the Herschel 400 Club, the Deep Sky Binocular Club, and many others. To learn more about the Astronomical League and its benefit s for you, visit http://www.astroleague.org

Introduction to the Astronomical League Observing Programs

There are some 50 formal Observing Programs available to choose from covering the whole gamut of object types accessible to the amateur astronomer. In addition there are from time to time additional programs set up for special targets including comets, eclipses, transits and so forth. Certificates and pins are awarded for successful completion and submission of the required observations for a particular program. There is no time limit for completing observations. The programs are categorized by level of difficulty (Novice, Intermediate, and Advanced) and each program is also categorized by
recommended equipment ranging from the naked eye through binoculars and telescope aperture. There are programs for Imagers and also for solar observers using H-alpha scopes. Visit http://www.astroleague.org/observing to obtain full details. Starting in February 2019, we will highlight one or two programs each month in the Newsletter.

The Astronomical League Messier Observing Programs

The Messier objects include some of the most familiar and spectacular deep sky targets for the amateur observer and the Astronomical League has developed both telescopic and binocular observing programs.

Messier Observing Program

This program requires the use of a telescope and there are two levels of awards. A certificate only is awarded for observing 70 objects and a certificate and pin are awarded for observing all 110 objects – the honorary level.

The procedure is to select and observe 70 objects and turn in the properly filled out observing logs to an officer of the local Astronomical Society (i.e. SWFAS in our case.) The officer will then review and approve the logs and notify the Astronomical League that the observer has met the requirements for receiving the award. The observing logs must include the date and time of the observations, the Lat/Long coordinates for the observing sites, the seeing and transparency conditions, the aperture and magnification, and a description of the Messier object as it appears in the scope. For the honorary level, all 110 objects must be observed and the logs processed again by an officer of the local member club.

Since the purpose of the Messier observing program is to familiarize the observer with the nature and location of the objects in the sky, the use of automated telescopes is not allowed and this includes use of Go-To scopes and both manual and digital setting circles. Navigation must be by manual star-hopping via finder scopes and Telrads or equivalent.

A convenient Messier List is provided which breaks down the Messier objects by season: I. Winter, II. Early Spring, III. Late Spring, IV. Mid-Summer, V. Late-Summer, and VI. Fall and Early Winter.

Binocular Messier Program

This program requires the observation of any 50 of the 110 recognized Messier objects. Two options are provided depending on binocular size.

Binoculars with 20 mm – 50 mm diameter lenses (e.g. 7 X 35, 7 X 50, 10 X 50)
Objects are selected from Appendix A which lists 76 objects with
42 classified as Easy
18 classified as Tougher, and
16 classified as Challenge.
To obtain the certificate, 50 objects including only 8 of the Tougher are required to be selected and observed.

Binoculars with 56 mm – 80 mm diameter lenses (e.g. 11 X 80)
Objects are selected from Appendix B which lists 102 objects with
58 classified as Easy
23 classified as Tougher, and
21 classified as Challenge.
To obtain the certificate, all 50 objects may be selected out of the Easy category for observation.

The observing logs are sent directly to the Astronomical League to receive the award.

Messier Observing Resources. In addition to the online seasonal Messier object listing mentioned above, the AL also publishes "Messier Objects: A Beginner's Guide" which is available via the online store for $8.

This article is distributed by NASA Night Sky Network

The Night Sky Network program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit nightsky.jpl.nasa.org to find local clubs, events, and more!

Mars the Wanderer

By David Prosper

April's skies find Mars traveling between star clusters after sunset, and a great gathering of planets just before sunrise.

Mars shows stargazers exactly what the term "planet" originally meant with its rapid movement across the evening sky this month. The ancient Greeks used the term *planete,* meaning *wanderer*, to label the bright star-like objects that travelled between the constellations of the zodiac year after year.

You can watch Mars as it wanders through the sky throughout April, visible in the west for several hours after sunset. Mars travels past two of the most famous star clusters in our night sky: the **Pleiades** and **Hyades**. Look for the red planet next to the tiny but bright Pleiades on April 1st. By the second week in April, it has moved eastward in Taurus towards the larger V-shaped Hyades. Red Mars appears to the right of the slightly brighter red-orange star **Aldebaran** on April 11th. We see only the brightest stars in these clusters with our unaided eyes; how many additional stars can you observe through binoculars?

Open clusters are made up of young stars born from the same "star nursery" of gas and dust. These two open clusters are roughly similar in size. The Pleiades appears much smaller as they are 444 light years away, roughly 3 times the distance of the Hyades, at 151 light years distant. Aldebaran is in the same line of sight as the Hyades, but is actually not a member of the cluster; it actually shines just 65 light years away! By comparison, Mars is practically next door to us, this month just a mere 18 light minutes from Earth - that's about almost 200 million miles. Think of the difference between how long it takes the light to travel from these bodies: 18 minutes vs. 65 years!

The rest of the bright planets rise before dawn, in a loose lineup starting from just above the eastern horizon to high above the south: **Mercury**, **Venus**, **Saturn**, and **Jupiter**. Watch this month as the apparent gap widens considerably between the gas giants and terrestrial planets. Mercury hugs the horizon all month, with Venus racing down morning after morning to join its dimmer inner solar system companion right before sunrise. In contrast, the giants Jupiter and Saturn move away from the horizon and rise earlier all month long, with Jupiter rising before midnight by the end of April.

The **Lyrids** meteor shower peaks on April 22nd, but sadly all but the brightest meteors will be washed out by the light of a bright gibbous Moon.

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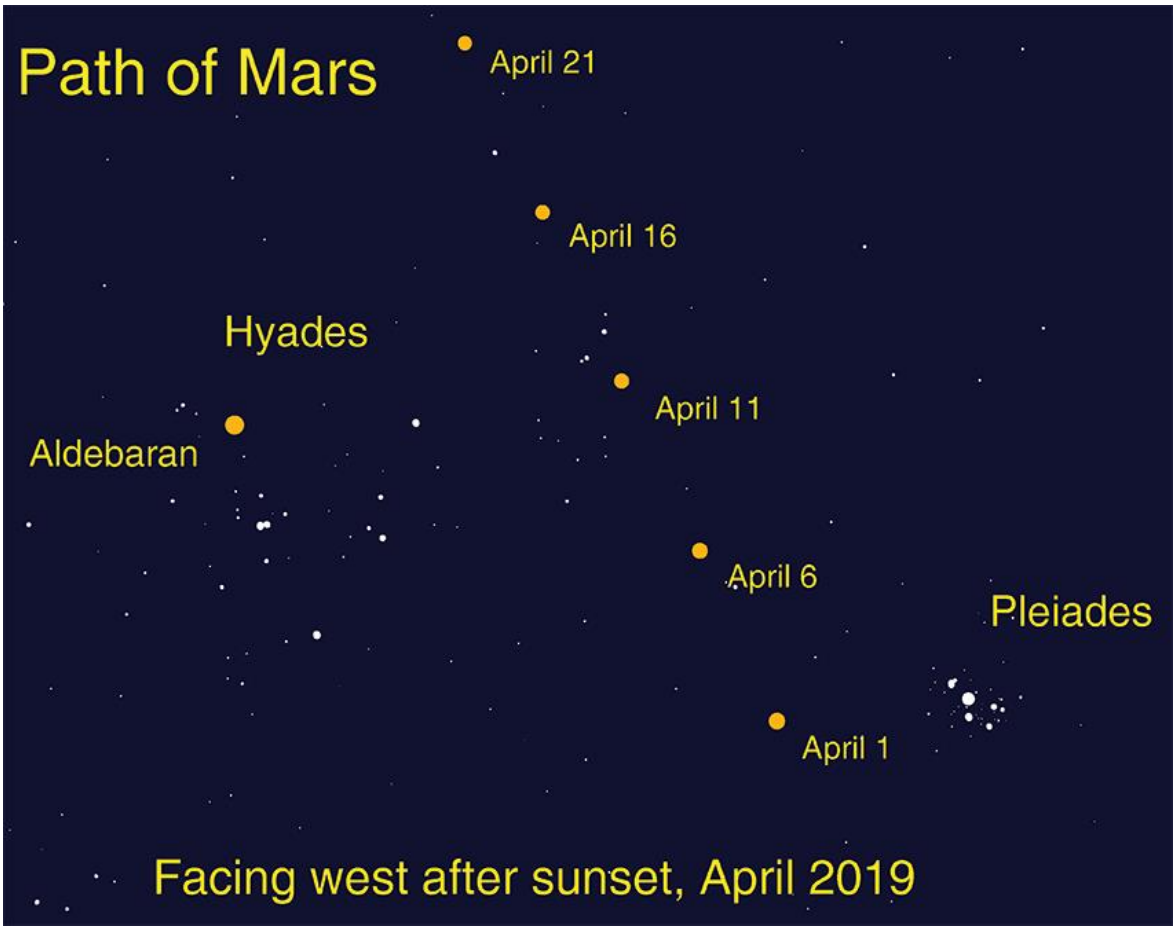

Caption: The path of Mars between the Pleiades and Hyades in April. Image created with assistance from Stellarium.

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