

# Southwest Florida Astronomical Society SWFAS



## The Eyepiece May 2018

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### A MESSAGE FROM THE PRESIDENT

TESS successfully launched!

May is upon us already. As noted in In the Sky this Month, the planets are starting to come back into the evening sky. Jupiter and Venus are now in the evening sky. Saturn and Mars will be following on later this summer!

We have multiple scopes available for members to check out. The CPC-800, Celestar 8 and Nexstar 6 are great scopes for observing the planets. The PST is available for those who want to look for prominences or other solar events (unfortunately we are approaching solar minimum so the activity is not plentiful, but activity does happen.)

Our snowbird members are returning north (or planning to since it is still snowing in some places!) I will miss some of them as they have been helpful with the public events. If you are local, please come out to help at the events that we do have coming up over the summer and fall.

Brian

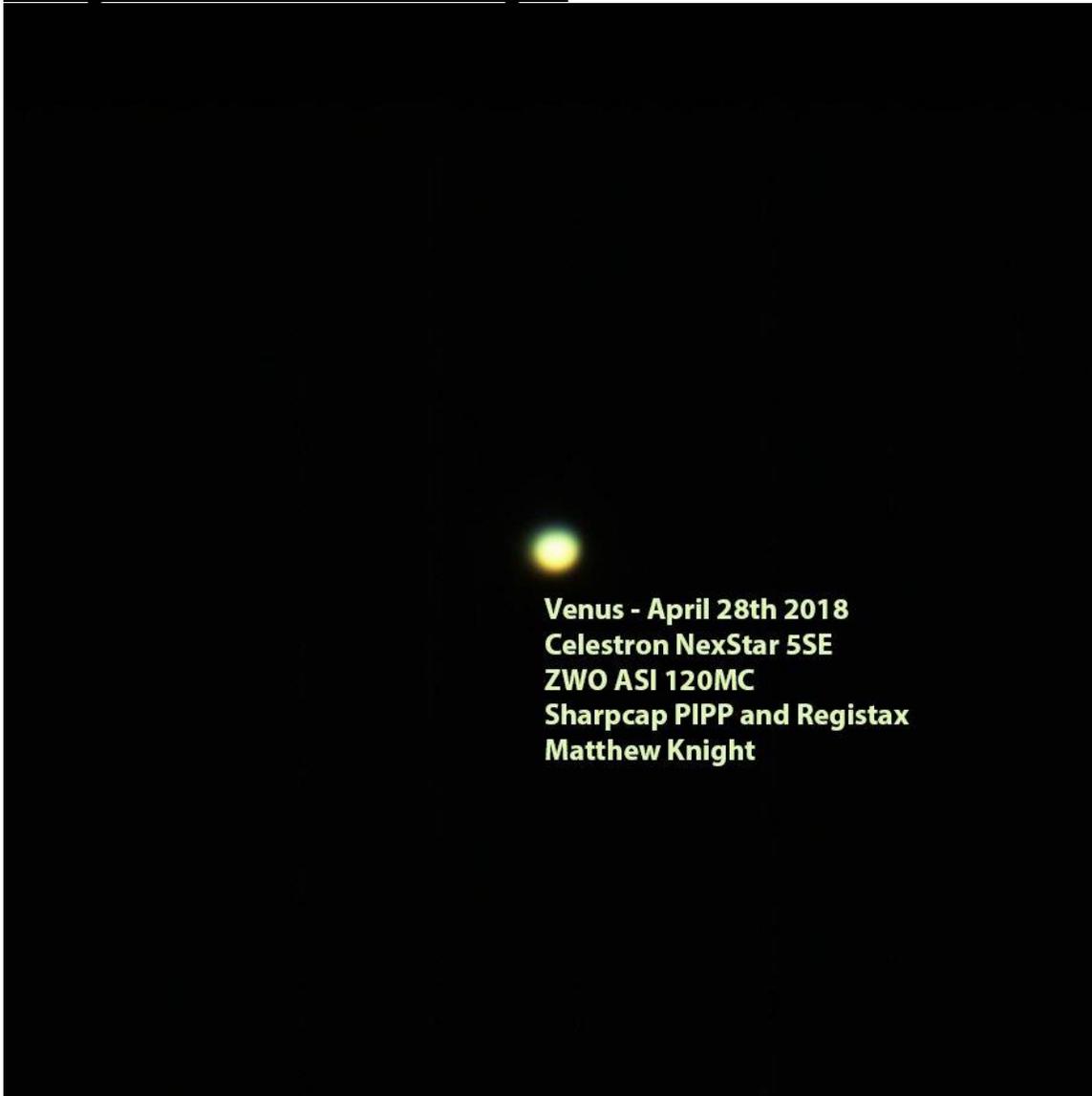
## **Programs this Month and Next**

In lieu of a guest speaker for the May meeting of the South West Florida Astronomical Society we will be showing a new planetarium program entitled, "Explosions that Shape the Cosmos". This program will be shown immediately after the regular business meeting of the SWFAS on Thursday, May 3rd at the Calusa Nature Center and Planetarium. The business meeting will commence at 7:30pm.

Professor Antonio Paris, Professor of Astronomy at St. Petersburg College and Chief Scientist at the Center for Planetary Science will be our guest speaker at the June meeting. More details concerning the contents of Professor Paris' presentation will be made available prior to the June meeting.

Michael J. McCauley  
Program Coordinator

## **Image from Matthew Knight**



Venus 89% illuminated phase, Celestron Nexstar 5se telescope was used along with a ZWO ASI 120mc camera. Capture of 1 minute and 59 seconds worth of frame's at 640x480 using SharpCap proceed using PIPP and registax. Capture was done on April 28th 2018 in East Fort Myers.

## Images from Chuck Pavlick



**Tadpole nebula IC 410**

Scope: Takahashi FSQ106 w/0.73 reducer

Camera": ASI 1600

Filters: Astrodon 7nm Ha,OIII, S2

Subs, Ha 22@300 sec., O3 30@300 sec, S2 30@300 sec,

Captured in Nebulosity and Processed in Pixinsight and Photoshop



**Boogie man Nebula**

Scope: Takahashi FSQ106 w/0.73 reducer

Camera": ASI 1600

Filters: Astrodon 7nm Ha,

Subs, Ha 12@480 sec., RGB 20@60 sec per color channel

Captured in Nebulosity and Processed in Pixinsight and Photoshop

## **In the Sky this Month**

### **Moon:**

Last Quarter – May 8; New – May 15; 1<sup>st</sup> Quarter – May 22; Full – May 29

**Venus** shines at -3.9 magnitude in the west and increases altitude to 27° at sunset. Its illuminated disc will shrink from 89% to 80% during the month. Giant orange Aldebaran is nearly 100 times dimmer as it hangs slightly below Venus early in the month. Venus will move into Gemini on May 19<sup>th</sup>, and be within 1° of M35 on May 20<sup>th</sup> and 21<sup>st</sup>.

**Jupiter** makes its appearance early in the evening this month and shines throughout the nighttime hours at a magnitude of -2.5. It is still in retrograde motion.

**Saturn** rises in Sagittarius a little after 10 pm by month's end. Best viewing will be early in the morning. It will be brightening a little from +0.3 to 0.2 during the month before its opposition.

**Mars** is rapidly increasing in both size and brightness on its way to opposition in late July. This will be the closest opposition of Mars in 15 years. It will be rising in the early morning while flaring from -0.4 (slightly brighter than Arcturus) to -1.2 magnitude during the month of May.

**Mercury, Uranus and Neptune** are too close to the Sun to be observed most of the month.

**International Space Station:** The ISS is only visible in the evening skies over Ft Myers from May 19<sup>th</sup> to the 23<sup>rd</sup>. Best days will be 20<sup>th</sup> and 21<sup>st</sup>. See this link for specific times and routes for the ISS:

<http://www.heavens-above.com/>

The **Hubble Space Telescope** appears in the evenings from May 1<sup>st</sup> to May 9<sup>th</sup>; best viewing dates are 3<sup>rd</sup> and 4<sup>th</sup>. See this link for specific times and routes for HST:

<http://www.heavens-above.com/>

## Southwest Florida Astronomical Society, Inc. Event Schedule for 2018

Date	Event	Location	Time/Note
May 3 <sup>rd</sup> , 2018	Monthly Meeting	Calusa Nature Center Planetarium	7:30pm
May 12 <sup>th</sup> , 2018	Solar Observing	Ponce DeLeon Park Punta Gorda	9 am to Noon
May 12 <sup>th</sup> , 2018	Monthly Star Party	Caloosahatchee Regional Park	Dusk (Arrive before gate closes, park fee)
May 18 <sup>th</sup> , 2018	Public Observing	Moore Observatory FSW, Punta Gorda	Dusk
June 7 <sup>th</sup> , 2018	Monthly Meeting	Calusa Nature Center Planetarium	7:30pm
June 9 <sup>th</sup> , 2018	Monthly Star Party	Seahawk Park - Cape Coral	Dusk
July 5 <sup>th</sup> , 2018	Monthly Meeting	Calusa Nature Center Planetarium	7:30pm
July 14 <sup>th</sup> , 2018	Cape Coral Parks and Rec Day	Austen Youth Center (Near SunSplash)	9 am to Noon
July 14 <sup>th</sup> , 2018	Monthly Star Party	Seahawk Park - Cape Coral	Dusk
Aug 2 <sup>nd</sup> , 2018	Monthly Meeting	Calusa Nature Center Planetarium	7:30pm
Aug 11 <sup>th</sup> , 2018	Monthly Star Party	Seahawk Park - Cape Coral	Dusk (Perseid Meteor Shower!)
Sept 6 <sup>th</sup> , 2018	Monthly Meeting	Calusa Nature Center Planetarium	7:30pm
Sept 8 <sup>th</sup> , 2018	Monthly Star Party	Seahawk Park - Cape Coral	Dusk
Oct 4 <sup>th</sup> , 2018	Monthly Meeting	Calusa Nature Center Planetarium	7:30pm
Oct 6 <sup>th</sup> , 2018	Monthly Star Party	Seahawk Park - Cape Coral	Dusk
Oct 14 <sup>th</sup> , 2018	Ding Darling Days' Family Fun Day	Ding Darling Wildlife Refuge - Sanibel	8am - 3pm
Nov 1 <sup>st</sup> , 2018	Monthly Meeting	Calusa Nature Center Planetarium	7:30pm
Nov 10 <sup>th</sup> , 2018	Monthly Star Party	Caloosahatchee Regional Park	Dusk (Arrive before gate closes, park fee)
Dec 6 <sup>th</sup> , 2018	Monthly Meeting	Calusa Nature Center Planetarium	7:30pm

***All observing events are Weather Permitting. If it is cloudy, we may not setup at all. There may be no way to provide advance notice of cancellation.***

**Monthly Star Parties:** These are held at either Caloosahatchee Regional Park (CRP) off SR78 7 miles east of SR31 or at Seahawk Park in Cape Coral. Other than park fees noted, these are free and open to the public.

**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.

**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 utilized by the 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.

**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.

**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 – April 5, 2018 will appear separately.**

# Successful Launch for NASA's TESS Exoplanet Mission

By: Elizabeth Howell from S & T

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Another planet-hunter is on its way to search for strange new worlds. The [Transiting Exoplanet Survey Satellite \(TESS\)](#) launched successfully on April 18th at 6:51 p.m. EDT aboard a SpaceX Falcon 9 rocket to survey the entire sky for exoplanets.



NASA's next planet-hunter, the Transiting Exoplanet Survey Satellite, successfully launched on a SpaceX Falcon 9 on April 18, 2018. TESS will search for new worlds outside our solar system for further study. *NASA Television*

The mission is coming just in time, as NASA's epic exoplanet mission, Kepler, is dying. Recently, the agency announced [the spacecraft will run out of fuel](#) in the coming months. Like Kepler, TESS will be looking for the brief dips in starlight created when exoplanets transit their stars. But unlike Kepler, which aimed to take a census of planets around Sun-like stars and therefore aimed toward a small field containing hundreds of thousands of mostly faraway stars, TESS will be examining the brightest stars near Earth. The planets it finds will be more easily studied through follow-up observations on the ground and in space.

Funding has been approved for the mission's first two years, but George Ricker (MIT), TESS's principal investigator, says the spacecraft is built to last: "TESS will be able to operate for 10 or 20 years." So far, the mission has cost less than \$200 million, excluding launch expenses.

The spacecraft will operate in a lunar-resonant orbit, dubbed P/2, that requires a minimum of operational fuel. TESS will circle Earth every 13.7 days – half of the Moon's orbital period. This orbit is extremely stable and maximizes TESS's ability to view the entire sky. It also allows TESS to send full-frame images back to Earth on every close pass.



A SpaceX Falcon 9 rocket soars upward after lifting off from Space Launch Complex 40 at Cape Canaveral Air Force Station in Florida, carrying NASA's Transiting Exoplanet Survey Satellite. NASA / Kim Shiflett

After launch TESS orbited Earth three times. Next, it will perform a lunar flyby.

"We get a gravitational assist by going by the Moon, and we don't have to use as much propulsion in adjusting the orbit," Ricker says. "We [also] put the orbit inclination up to about 40 degrees relative to the ecliptic," he adds. Otherwise, TESS would experience Moon or Earth eclipses every month, limiting its observations.

TESS's final orbit will have a perigee of 67,000 miles (110,000 kilometers) and an apogee of 232,000 miles (373,000 kilometers).

Engineers will give TESS a week after launch for instrument outgassing, then they will begin testing the instruments and ensure the spacecraft points correctly. The team will also take test images of star fields to check the sensitivity of the cameras and to understand how cosmic rays, which can generate false signals, affect the images. Software will easily remove the cosmic rays.

TESS will likely start its first survey in mid-June. As TESS points away from the Sun, June will see it aiming toward the galactic center in Sagittarius, Ricker says. TESS will remain there for a 27-day exposure, then move to the next anti-solar location every 27 days.

TESS's pointing direction will give ground observers an advantage, since its field of view is the local meridian at midnight. It provides ample opportunity for other telescopes to confirm the exoplanets it finds, Ricker says. "For a lot of missions, the satellites are typically looking 90 degrees to the Earth-sun line, and you'll be in a situation [on the ground] where it hasn't risen yet, or is setting."

TESS has funding for two years of operations. During its first year, it will circle the Southern Hemisphere; each 24-by-24-degree field of view will overlap in the ecliptic pole, providing about a year's worth of coverage at the pole. Then TESS will switch to the Northern Hemisphere for its second year, performing the same type of survey there. While circling the north pole, some of TESS's observations will follow up on Kepler's first four years of data collection in the constellations Cygnus and Lyra.

If funding continues into a third year, [long-term plans for TESS](#) include continuing the Kepler mission's K2 survey along the ecliptic plane. "We don't wait too long" to follow up on K2 discoveries of possible exoplanets, Ricker says. "Typically the periods are not well-enough established that you can extrapolate the orbits any more than two or three years."



## What's It Like Inside Mars?

By Jessica Stoller-Conrad

Mars is Earth's neighbor in the solar system. NASA's robotic explorers have visited our neighbor quite a few times. By orbiting, landing and roving on the Red Planet, we've learned so much about Martian canyons, volcanoes, rocks and soil. However, we still don't know exactly what Mars is like on the *inside*. This information could give scientists some really important clues about how Mars and the rest of our solar system formed.

This spring, NASA is launching a new mission to study the inside of Mars. It's called Mars InSight. InSight—short for Interior Exploration using Seismic Investigations, Geodesy and Heat Transport—is a lander. When InSight lands on Mars later this year, it won't drive around on the surface of Mars like a rover does. Instead, InSight will land, place instruments on the ground nearby and begin collecting information.

Just like a doctor uses instruments to understand what's going on inside your body, InSight will use three science instruments to figure out what's going on inside Mars.

One of these instruments is called a seismometer. On Earth, scientists use seismometers to study the vibrations that happen during earthquakes. InSight's seismometer will measure the vibrations of earthquakes on Mars—known as marsquakes. We know that on Earth, different materials vibrate in different ways. By studying the vibrations from marsquakes, scientists hope to figure out what materials are found inside Mars.

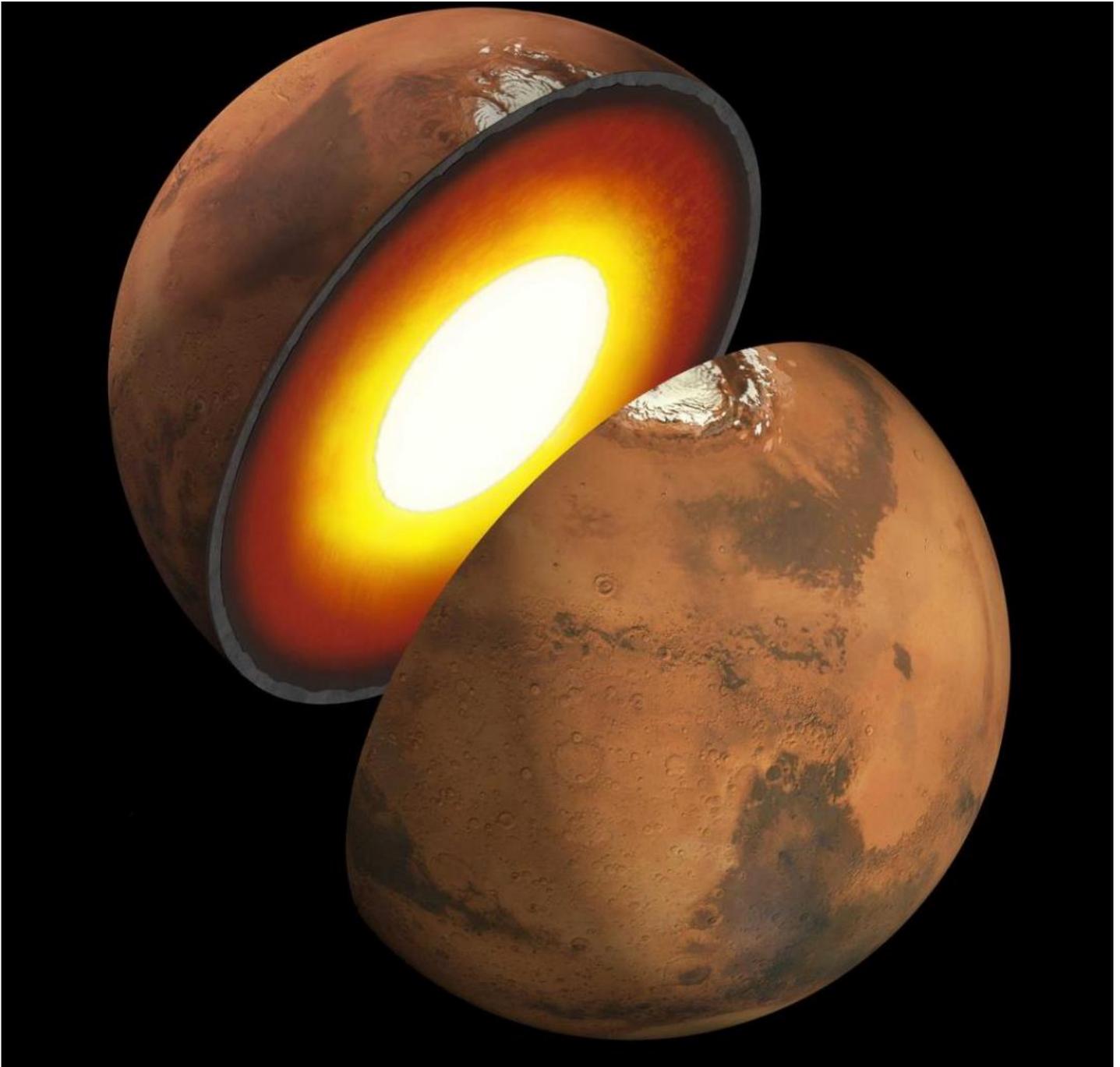
InSight will also carry a heat probe that will take the temperature on Mars. The heat probe will dig almost 16 feet below Mars' surface. After it burrows into the ground, the heat probe will measure the heat coming from the interior of Mars. These measurements can also help us understand where Mars' heat comes from in the first place. This information will help scientists figure out how Mars formed and if it's made from the same stuff as Earth and the Moon.

Scientists know that the very center of Mars, called the core, is made of iron. But what else is in there? InSight has an instrument called the Rotation and Interior Structure Experiment, or RISE, that will hopefully help us to find out.

Although the InSight lander stays in one spot on Mars, Mars wobbles around as it orbits the Sun. RISE will keep track of InSight's location so that scientists will have a way to measure these wobbles. This information will help determine what materials are in Mars' core and whether the core is liquid or solid.

InSight will collect tons of information about what Mars is like under the surface. One day, these new details from InSight will help us understand more about how planets like Mars—and our home, Earth—came to be.

For more information about earthquakes and marsquakes, visit:  
<https://spaceplace.nasa.gov/earthquakes>



*Caption: An artist's illustration showing a possible inner structure of Mars. Image credit: NASA/JPL-Caltech*

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