



# ASTRO

NEWSLETTER

Volume 11, Issue 15

Sep 3, 2018

## CONTENTS

- New NASA Competition Aims to Convert CO<sub>2</sub> into Exploration Sweet Success ..... 1
- Small Air Leak Detected on International Space Station ..... 1
- Is There Water on Jupiter? ..... 2
- NASA's InSight has a thermometer for Mars ..... 2
- NASA, SpaceX Agree on Plans for Crew Launch Day Operations ..... 3
- Will NASA Cut The Cord On Opportunity Prematurely? ..... 3
- Astronomy Picture of the Day ..... 4



## Small Air Leak Detected on International Space Station

A small air leak was detected on the International Space Station Wednesday night (Aug. 29) but does not pose an immediate danger to the astronauts currently living aboard the orbiting laboratory.

Flight controllers on Earth began to notice signs of a slight pressure drop in the orbiting laboratory around 7 p.m. EDT (2300 GMT), while the six crewmembers of Expedition 56 were sleeping, NASA officials said in a statement today (Aug. 30).

Because the pressure loss was "very small," flight controllers determined that the astronauts and cosmonauts "are in no danger," officials with the European Space Agency (ESA) said in a separate statement.

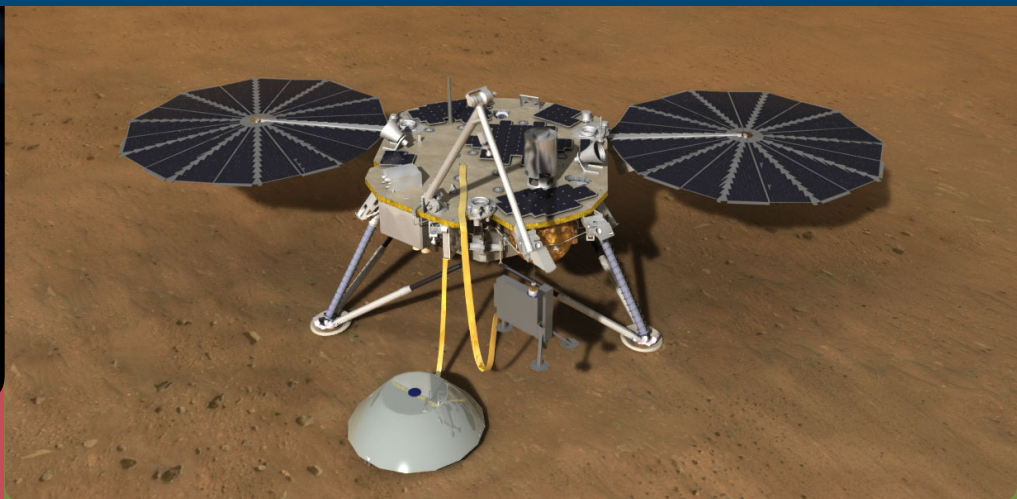
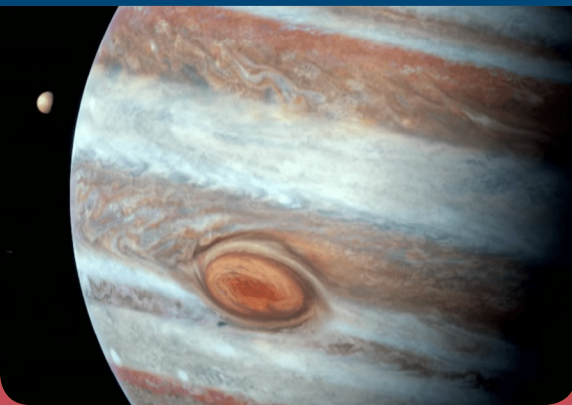
After the crew awoke today, flight controllers at NASA's Johnson Space Center in Houston and the Russian Mission Control Center near Moscow alerted them to the problem so the astronauts could begin working to pinpoint the leak's location. They determined that the leak is in the Russian segment of the space station, but the exact module and cause have not been identified, NASA officials said.

This is not the first time a small leak has sprung up on the space station, which has been continuously inhabited by rotating crews since 2000. Another leak occurred in the station's Harmony module (which is located on the U.S. segment) in 2007 during Expedition 16. NASA officials said at the time that this leak was no cause for concern.

[scientificamerican.com](http://scientificamerican.com)

## New NASA Competition Aims to Convert Carbon Dioxide into Exploration Sweet Success

When astronauts begin exploring Mars, they'll need to use local resources, freeing up launch cargo space for other mission-critical supplies. Carbon dioxide is one resource readily abundant within the Martian atmosphere. NASA's new CO<sub>2</sub> Conversion Challenge, conducted under the Centennial Challenges program, is a public competition seeking novel ways to convert carbon dioxide into useful compounds. The competition is divided into two phases. During Phase 1, teams must submit a design and description of a conversion system that includes details of the physical-chemical approaches to convert carbon dioxide into glucose. NASA will award up to five teams \$50,000 each, to be announced in April 2019. Phase 2, the system construction and demonstration stage, is contingent on promising submissions in Phase 1 that offer a viable approach to achieving challenge goals. Phase 2 will carry a prize purse of up to \$750,000, for a total challenge prize purse of \$1 million.



## Is There Water on Jupiter? Great Red Spot May Hold the Answer

Jupiter is a special world. It's the largest planet in our solar system, and likely was the first body to funnel the sun's leftover elements to form, according to NASA. So, it's no surprise, then, that researchers once thought Jupiter had an identical composition to the sun. But subsequent studies of the planet over the last few decades have revealed a Jupiter that is more complex. The hints of water in Jupiter's Great Red Spot come from a recent study by Gordon Bjoraker, an astrophysicist at NASA's Goddard Space Flight Center in Greenbelt, Maryland.

Bjoraker and colleagues collected radiation data on Jupiter using two special telescopes on the Mauna Kea summit in Hawaii — an instrument at NASA Infrared Telescope Facility, and the "most sensitive infrared telescope on Earth" at the Keck Observatory, according to the space agency.

With ground-based instruments on Earth, the team watched thermal radiation leak from the depths of the Great Red Spot. They found that above the clouds in this turbulent region's abyss, chemical signatures of water existed. Models, both theoretical and computer-generated, support their findings of "abundant" water on Jupiter.

The researchers found that the deepest cloud layer with water signatures inside the Great Red Spot is at 5 bars, or five times the atmospheric pressure on Earth, where the temperatures reach water's freezing point.

This depth, in addition to the levels of carbon monoxide researchers detected on Jupiter, appears to confirm that Jupiter is rich in oxygen, and, since its abundance of hydrogen is already well-known, it has the ingredients for water.

space.com

## NASA's InSight has a thermometer for Mars

Ambitious climbers, forget Mt. Everest. Dream about Mars. The Red Planet has some of the tallest mountains in the solar system. They include Olympus Mons, a volcano nearly three times the height of Everest. It borders a region called the Tharsis plateau, where three equally awe-inspiring volcanoes dominate the landscape. But what geologic processes created these features on the Martian surface? Scientists have long wondered - and may soon know more.

NASA and DLR (German Aerospace Center) plan to take the planet's temperature for the first time ever, measuring how heat flows out of the planet and drives this inspiring geology. Detecting this escaping heat will be a crucial part of a mission called InSight (Interior Exploration using Seismic Investigations, Geodesy and Heat Transport), managed by NASA's Jet Propulsion Laboratory in Pasadena, California.

InSight will be the first mission to study Mars' deep interior, using its Heat Flow and Physical Properties Package (HP3) instrument to measure heat as it is conducted from the interior to the planet's surface. This energy was in part captured when Mars formed more than 4 billion years ago, preserving a record of its creation. That energy is also due to the decay of radioactive elements in the rocky interior.

The way heat moves through a planet's mantle and crust determines what surface features it will have, said Sue Smrekar of JPL, the mission's deputy principal investigator and the deputy lead for HP3.

"Most of the planet's geology is a result of heat," Smrekar said. "Volcanic eruptions in the ancient past were driven by the flow of this heat, pushing up and constructing the towering mountains Mars is famous for."

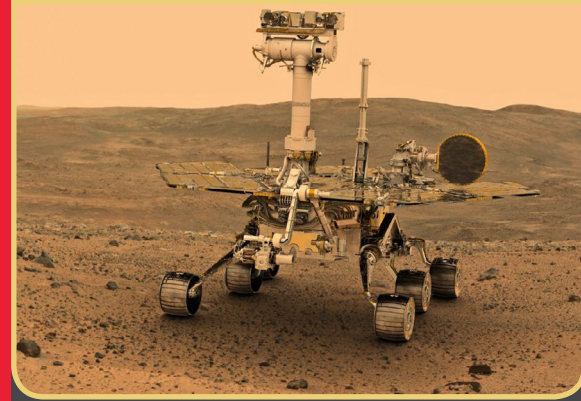
### A mole for Mars

While scientists have modeled the interior structure of Mars, InSight will provide the first opportunity to find ground truth - by literally looking below the ground.

HP3, built and operated by DLR, will be placed on the Martian surface after InSight lands on Nov. 26, 2018. A probe called a mole will pummel the ground, burying itself and dragging a tether behind it. Temperature sensors embedded in this tether will measure the natural internal heat of Mars.

That's no easy task. The mole has to burrow deep enough to escape the wide temperature swings of the Martian surface. Even the spacecraft's own "body heat" could affect HP3's super-sensitive readings.

marsdaily.com



## Will NASA Cut The Cord On Opportunity Prematurely?

NASA has unveiled a timeline for its suddenly-silent Opportunity rover: 45 days. That's when the craft, which has explored Mars for more than 14 years, will be put on "listen only" mode, effectively shutting down operation of the spacecraft. However, according to anonymous sources within NASA, there is dissent in the ranks over whether that window is too short and could sacrifice a real change to reawaken Oppy, and former Opportunity project leaders tell PM the window is too short.

The rover, which arrived at Mars in 2004, was assigned an original mission of just 90 days. Its sister craft, Spirit, roamed for about five years before becoming permanently stuck in Martian soil. Opportunity has soldiered on for years since then, but was caught up in a global dust storm on Mars this summer. It hasn't been heard from since June 10. During the course of this storm, the craft didn't receive enough solar energy to recharge its battery.

To some Mars experts, 45 days isn't enough. According to a statement sent to reporters by Opportunity engineers, provided on the condition of anonymity, every Martian year Opportunity has encountered a "cleaning event" in which more favorable weather conditions have removed the dust that has gotten lodged on the rover. If that happens again this year, it should start sometime in mid-November. "I am very optimistic that opportunity is still sitting on Mars, charging its batteries, waiting until it's at the power level to contact us, and I'm terrified that we would miss that," says Mike Seibert, former flight director and rover driver on Opportunity.

[popularmechanics.com](http://popularmechanics.com)

## NASA, SpaceX Agree on Plans for Crew Launch Day Operations

NASA's Commercial Crew Program and SpaceX are finalizing plans for launch day operations as they prepare for the company's first flight test with astronauts on board. The teams are working toward a crew test flight to the International Space Station, known as Demo-2, with NASA astronauts Bob Behnken and Doug Hurley in April 2019. In preparation for this test flight, SpaceX and NASA will continue to complete and review the important analyses and tests leading to launch.

A key question the program and the company have been assessing is whether the astronauts will climb aboard the Crew Dragon spacecraft before or after SpaceX fuels the Falcon 9 rocket. NASA has made the decision to move forward with SpaceX's plan to fuel the rocket after the astronauts are in place. While the agreement makes this plan the baseline for operations, it is contingent upon NASA's final certification of the operation.

SpaceX is continuing to test and qualify many of the systems and components of the Falcon 9 rocket. NASA teams will review, verify, and evaluate both those individual systems and components as well as the overall SpaceX launch system. NASA teams will continue to conduct independent analysis and testing to ensure all identified risks have been mitigated or accepted.

If all goes according to plan, on launch day, the Falcon 9 composite overwrap pressure vessels, known as COPVs, will be loaded with helium and verified to be in a stable configuration prior to astronaut arrival at the launch pad. The astronauts then will board the spacecraft about two hours before launch, when the launch system is in a quiescent state. After the ground crews depart the launch pad, the launch escape systems will be activated approximately 38 minutes before liftoff, just before fueling begins. SpaceX launch controllers then will begin loading rocket grade kerosene and densified liquid oxygen approximately 35 minutes before launch. The countdown and launch preparations can be stopped automatically up to the last moment before launch. In the unlikely event of an emergency at any point up to and after launch, the launch escape systems will allow the astronauts to evacuate safely.

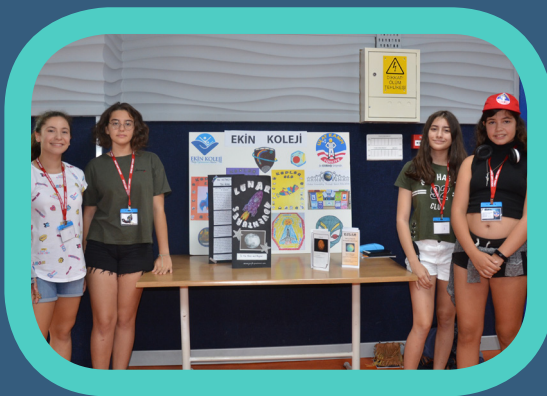
This timeline is consistent with the fueling procedures SpaceX uses for its commercial resupply missions and satellite launches.

The crew launches of NASA's Commercial Crew partners SpaceX and Boeing will return the nation's ability to launch our astronauts from the United States to and from the International Space Station on American spacecraft.

# FES Week

We completed our FES Week on August 12-18, 2018. All the campers had a wonderful time during the week. The campers learned about "How things fly?" from Prof. Inge Christ, Head of Chemistry, Life Sciences, and Environmental Technology Department of Stavanger University. Also, the campers had a video conference with NASA Flight Director Ed Van Cise and a chance to learn more about space.

We had participants from Bulgaria, Greece, Czech Republic, England, Romania, Norway and different provinces of Turkey. You can check out some of the photos taken during the FES Week on the right side!

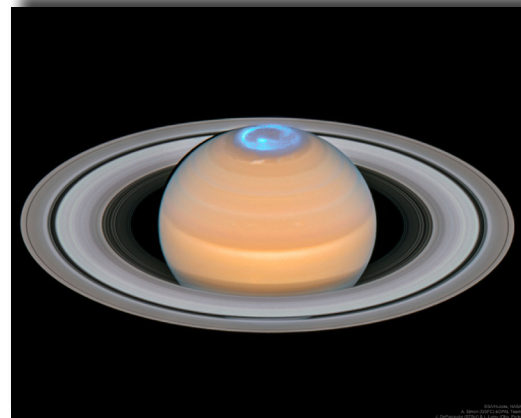


## Astronomy Picture of the Day

### Aurora around Saturn's North Pole

Are Saturn's auroras like Earth's? To help answer this question, the Hubble Space Telescope and the Cassini spacecraft monitored Saturn's North Pole simultaneously during Cassini's final orbits around the gas giant in September 2017. During this time, Saturn's tilt caused its North Pole to be clearly visible from Earth. The featured image is a composite of ultraviolet images of aurora and optical images of Saturn's clouds and rings, all taken recently by Hubble. Like on Earth, Saturn's northern auroras can make total or partial rings around the pole. Unlike on Earth, however, Saturn's auroras are frequently spirals -- and more likely to peak in brightness just before midnight and dawn. In contrast to Jupiter's auroras, Saturn's auroras appear better related to connecting Saturn's internal magnetic field to the nearby, variable, solar wind. Saturn's southern auroras were similarly imaged back in 2004 when the planet's South Pole was clearly visible to Earth.

[apod.nasa.gov](http://apod.nasa.gov)



Space Camp Turkey, Aegean Free Zone 35410 Gaziemir, Izmir / Turkey

Phone : +90 232 252 35 00 Fax : +90 232 252 36 00

Email: [info@spacecampturkey.com](mailto:info@spacecampturkey.com)

© 2018 - SPACE CAMP TURKEY / ALL RIGHTS RESERVED - An ESBAS Enterprise

