

“Some things just can’t be described. And stepping onto the moon was one of them.” Buzz Aldrin



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### NASA’s Shrinking Window for a Mission to Triton

Prockter’s team is proposing the mission under NASA’s Discovery program for low-cost missions. But competition will be steep. Other proposed missions including exploring Venus or returning samples from Mars. And even if Trident is eventually selected, the development timeline means a launch wouldn’t happen until 2026, just in time for an arrival at Triton in 2038.

One of the prime mission goals is to understand the plumes Voyager spotted three decades ago. Mars and comets sometimes puff out material when the sun heats their surfaces, causing small explosions of warmed gases and materials. The volcanically active Jovian moon Io also spouts off material. But Triton’s plumes are more likely to imitate the icy moons Europa and Enceladus, and possibly be spouting material from its ocean interior.

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

## After the Moon in 2024, NASA Wants to Reach Mars by 2033

NASA has made it clear they want astronauts back on the Moon in 2024, and now, they are zeroing in on the Red Planet -- the US space agency confirmed that it wants humans to reach Mars by 2033.

Jim Bridenstine, NASA’s administrator, said Tuesday that in order to achieve that goal, other parts of the program -- including a lunar landing -- need to move forward more quickly. Any mission to Mars would take at least two years, given the distance to be traveled. Getting there alone would take six months, as opposed to the three days needed to reach the Moon.

A round trip to Mars can only take place when the Red Planet is positioned on the same side of the Sun as Earth -- that occurs about every 26 months, so the dates are 2031, 2033, and so on.

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



## Indian Satellite Destruction Created 400 Pieces of Debris

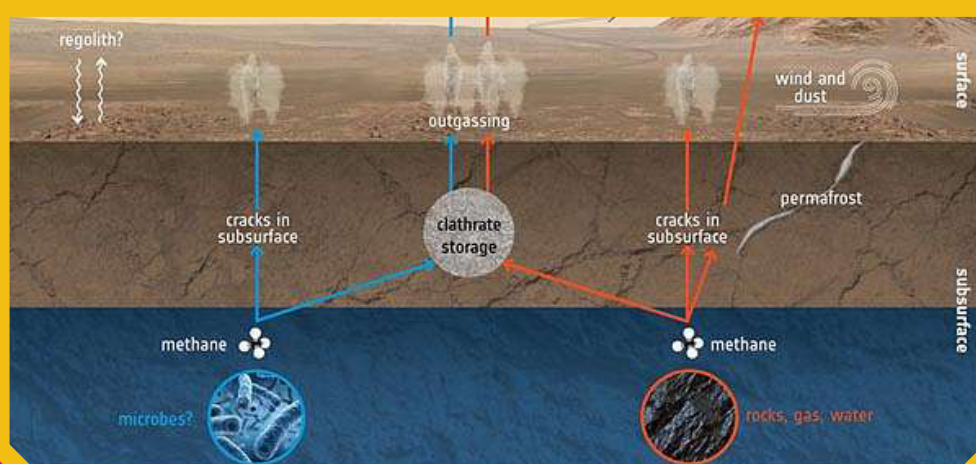


### Indian Satellite Destruction Created 400 Pieces of Debris

The head of NASA on Monday branded India's destruction of one of its satellites a "terrible thing" that had created 400 pieces of orbital debris and led to new dangers for astronauts aboard the International Space Station. Jim Bridenstine was addressing employees of the National Aeronautics and Space Administration five days after India shot down a low-orbiting satellite in a missile test to prove it was among the world's advanced space powers. Not all of the pieces were big enough to track, Bridenstine explained. "What we are tracking right now, objects big enough to track - we're talking about 10 centimeters (six inches) or bigger - about 60 pieces have been tracked."

The Indian satellite was destroyed at a relatively low altitude of 180 miles (300 kilometers), well below the ISS and most satellites in orbit. But 24 of the pieces "are going above the apogee of the International Space Station," said Bridenstine. The US military tracks objects in space to predict the collision risk for the ISS and for satellites. They are currently tracking 23,000 objects larger than 10 centimeters. As a result of the Indian test, the risk of collision with the ISS has increased by 44 percent over 10 days, Bridenstine said. But the risk will dissipate over time as much of the debris will burn up as it enters the atmosphere.

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



## Mars Express Matches Methane Spike Measured by Curiosity

A reanalysis of data collected by ESA's Mars Express during the first 20 months of NASA's Curiosity mission found one case of correlated methane detection, the first time an in-situ measurement has been independently confirmed from orbit.

Reports of methane in the martian atmosphere have been intensely debated, with Mars Express contributing one of the first measurements from orbit in 2004, shortly after its arrival at the Red Planet. The molecule attracts such attention because on Earth methane is generated by living organisms, as well as geological processes. Because it can be destroyed quickly by atmospheric processes, any detection of the molecule in the martian atmosphere means it must have been released relatively recently - even if the methane itself was produced millions or billions of years ago and lay trapped in underground reservoirs until now.

While spacecraft and telescopic observations from Earth have in general reported no or very low detections of methane, or measurements right at the limit of the instruments' capabilities, a handful of spurious spikes, along with Curiosity's reported seasonal variation at its location in Gale Crater, raise the exciting question of how it is being generated and destroyed in present times.

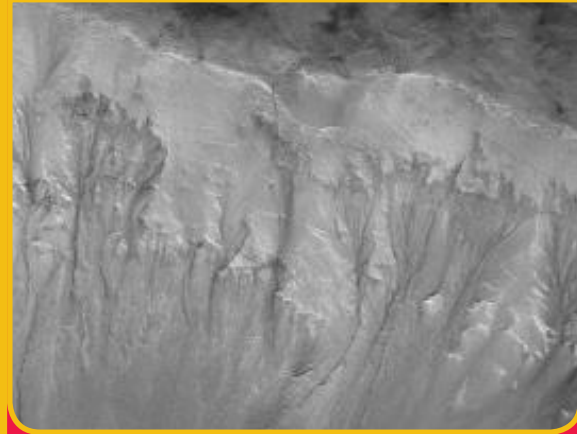
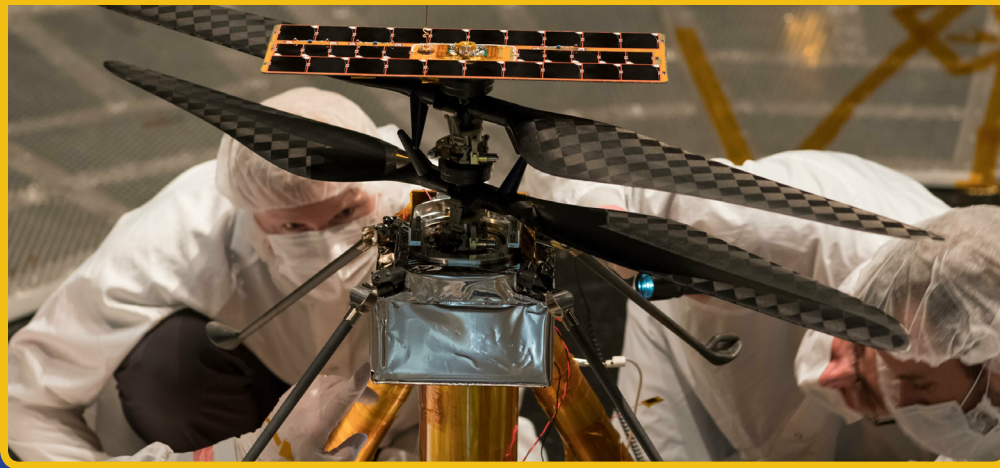
Now, for the first time, a strong signal measured by the Curiosity rover on 15 June 2013 is backed up by an independent observation by the Planetary Fourier Spectrometer (PFS) onboard Mars Express the next day, as the spacecraft flew over Gale Crater.

The study exploited a new observation technique, allowing the collection of several hundred measurements in one area over a short period of time. The teams also developed a refined analysis technique to get the best out of their data.

"In general we did not detect any methane, aside from one definite detection of about 15 parts per billion by volume of methane in the atmosphere, which turned out to be a day after Curiosity reported a spike of about six parts per billion," says Marco Giuranna from the Institute for Space Astrophysics and Planetology in Rome, Italy, the principal investigator for the PFS experiment, and lead author of the paper reporting the results in *Nature Geoscience* today.

Ten other observations in the Mars Express study period that reported no detections at the limit of the spectrometer's sensitivity corresponded to a period of low measurements reported by Curiosity.

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



## NASA's Mars Helicopter Completes Flight Tests

Since the Wright brothers first took to the skies of Kill Devil Hill, North Carolina, Dec. 17, 1903, first flights have been important milestones in the life of any vehicle designed for air travel. After all, it's one thing to design an aircraft and make it fly on paper-or computer. It is quite another to put all the pieces together and watch them get off the ground. In late January 2019, all the pieces making up the flight model (actual vehicle going to the Red Planet) of NASA's Mars Helicopter were put to the test.

Weighing in at no more than 4 pounds (1.8 kilograms), the helicopter is a technology demonstration project currently going through the rigorous verification process certifying it for Mars. The majority of the testing the flight model is going through had to do with demonstrating how it can operate on Mars, including how it performs at Mars-like temperatures. Can the helicopter survive-and function-in cold temperatures, including nights with temperatures as low as minus 130 degrees Fahrenheit (minus 90 degrees Celsius)?

All this testing is geared towards February 2021, when the helicopter will reach the surface of the Red Planet, firmly nestled under the belly of the Mars 2020 rover. A few months later, it will be deployed and test flights (up to 90 seconds long) will begin-the first from the surface of another world.

"Gearing up for that first flight on Mars, we have logged over 75 minutes of flying time with an engineering model, which was a close approximation of our helicopter," said MiMi Aung, project manager for the Mars Helicopter at NASA's Jet Propulsion Laboratory in Pasadena, California. "But this recent test of the flight model was the real deal. This is our helicopter bound for Mars. We needed to see that it worked as advertised." While flying helicopters is commonplace here on Earth, flying hundreds of millions of miles (kilometers) away in the thin Martian atmosphere is something else entirely. And creating the right conditions for testing here on Earth presents its own set of challenges.

"The Martian atmosphere is only about one percent the density of Earth's," said Aung. "Our test flights could have similar atmospheric density here on Earth-if you put your airfield 100,000 feet (30,480 meters) up. So you can't go somewhere and find that. You have to make it."

Aung and her Mars Helicopter team did just that in JPL's Space Simulator, a 25-foot-wide (7.62-meter-wide) vacuum chamber. First, the team created a vacuum that sucks out all the nitrogen, oxygen and other gases from the air inside the mammoth cylinder. In their place the team injected carbon dioxide, the chief ingredient of Mars' atmosphere.

## Mars May Have Lots of Water Deep Underground

The water thought to be responsible for Mars' intriguing seasonal dark streaks may be coming from very deep underground, a new study suggests. These streaks, known as recurring slope lineae (RSL), appear on some Martian slopes during warm parts of the year. Scientists have posited that RSL are caused by transient flows of briny water at, or just beneath, the Red Planet's surface. "We suggest that this may not be true," study co-author Essam Heggy, a research scientist at the University of Southern California (USC) and NASA's Jet Propulsion Laboratory in Pasadena, said in a statement. "We propose an alternative hypothesis that they originate from a deep pressurized groundwater source, which comes to the surface moving upward along ground cracks." If Abotalib and Heggy are right, Mars' deep groundwater system is more extensive than previously thought. Last year, Europe's Mars Express orbiter found evidence for a big subsurface lake near the planet's south pole, but signs of aquifers at lower latitudes have been lacking to date.

The new study is far from the last word on RSL, however. For example, not everyone thinks the streaks are indeed evidence of liquid water; some scientists regard dry landslides as a more likely explanation. And there could be more than one RSL-formation mechanism operating on Mars, Abotalib and Heggy noted.

## Schools in Action

Dear Followers,  
 Students had exams and holidays on their schedule this month. But despite that, they grabbed the chance to use their imagination for their projects. Hopefully in the future, their dreams will come true. Maybe we will see their space station models, rocketships or Mars colony ideas come to life sometime during the future space explorations.



1- Nikola Vaptsarov Middle School, BULGARIA 2- Velzys Gymnasium, LITHUANIA 3- 'HRISTO BOTEV' Secondary School, BULGARIA 4- FMV Nişantaşı, ISTANBUL 5- Maltepe Yönder Schools, ISTANBUL 6- Final Schools, SAMSUN

## Astronomy Picture of the Day

### Wisps Surrounding the Horsehead Nebula

The famous Horsehead Nebula in Orion is not alone. A deep exposure shows that the dark familiar shaped indentation, visible just below center, is part of a vast complex of absorbing dust and glowing gas. To bring out details of the Horsehead's pasture, an amateur astronomer used a backyard telescope in Austria to accumulate and artistically combine 7.5 hours of images in the light of Hydrogen (red), Oxygen (green), and Sulfur (blue). The resulting spectacular picture details an intricate tapestry of gaseous wisps and dust-laden filaments that were created and sculpted over eons by stellar winds and ancient supernovas. The Flame Nebula is visible just to the left of the Horsehead, while the bright star on the upper left is Anilam, the central star in Orion's Belt. The Horsehead Nebula lies 1,500 light years distant towards the constellation of Orion.

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



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