



ASTRO

NEWSLETTER

Volume 11, Issue 18

November 1, 2018

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Scientifically designed modules

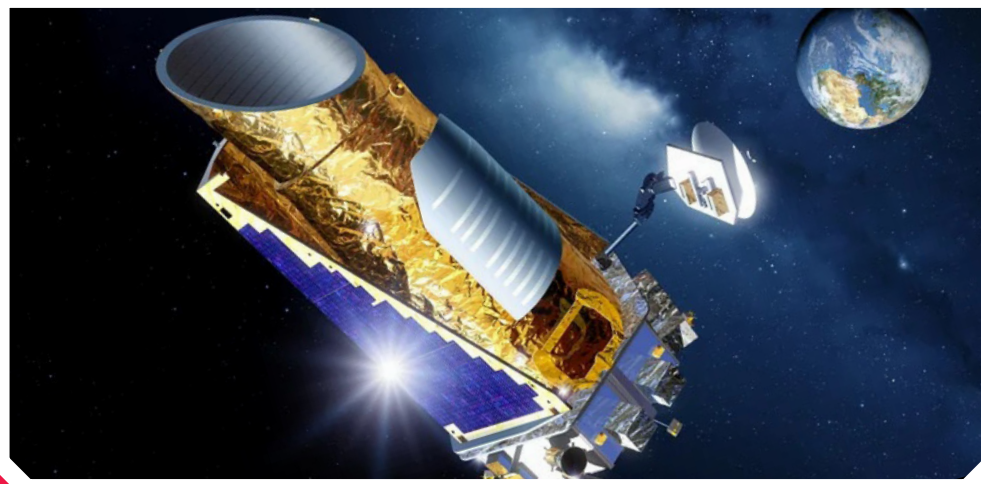
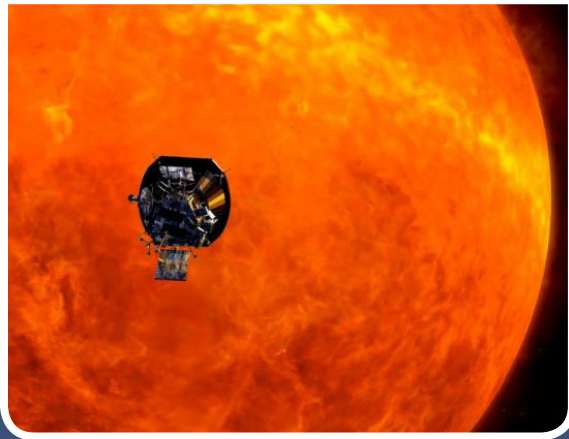


"Generation Mars", the New Futuristic Exhibit at Space Camp Turkey

Mars Likely to Have Enough Oxygen to Support Life

The new study began with the discovery by NASA's Curiosity Mars rover of manganese oxides, which are chemical compounds that can only be produced with a lot of oxygen. Curiosity, along with Mars orbiters, also established the presence of brine deposits, with notable variations in the elements they contained. A high salt content allows for water to remain liquid -- a necessary condition for oxygen to be dissolved -- at much lower temperatures, making brines a happy place for microbes. Depending on the region, season and time of day, temperatures on the Red Planet can vary between minus 195 and 20 degrees Celsius (minus 319 to 68 degrees Fahrenheit). The researchers devised a first model to describe how oxygen dissolves in salty water at temperatures below freezing. A second model estimated climate changes on Mars over the last 20 million years, and over the next 10 million years.

Now, Space Camp Turkey will take you on a journey to the 2030s. After the first manned landing took place, the first Martian colony was established, and the astronauts had begun to work on the surface. Imagine you're one of those astronauts. You woke up to the bright sun beating through the windows. The storm is over. Donning a spacesuit, you head out through the airlock to sweep the dust off the solar arrays from last night's storm. Although this situation may seem like just an excerpt out of a book or movie, space travel to Mars and the advanced technologies needed may be closer than you think. NASA is on a journey to Mars and is turning science fiction into science fact. Every day, NASA is working to develop new technology and find innovative solutions to challenges facing aeronautics, space exploration, and the greater scientific community. Before the astronauts arrive on Mars, NASA will need to pre-position supplies for them and robots to build some of the infrastructure necessary to make the environment safer and more habitable. NASA focuses on the development of technologies to support automated development of planetary surface structures, including roads, berms, radiation, blast and micro-meteoroid protection, and pressurized and un-pressurized structures, using materials found on the planet. Technology like these will minimize the number of crew-hours required to operate and maintain a habitat on long-duration missions.



A NASA Spacecraft Just Broke the Record for Closest Approach to Sun

RIP, Kepler: NASA's Revolutionary Planet-Hunting Telescope Runs Out of Fuel

A NASA sun-studying spacecraft just entered the record books. In April of 1976, the German-American Helios 2 probe made spaceflight's closest-ever solar approach, cruising within 26.55 million miles (42.73 million kilometers) of the sun. But NASA's Parker Solar Probe zoomed inside that distance today (Oct. 29), crossing the threshold at about 1:04 p.m. EDT (1704 GMT), agency officials said.

Helios 2 also set the mark back then for fastest speed relative to the sun, at 153,454 mph (246,960 km/h).

The Parker Solar Probe is expected to best that today as well, reaching higher speeds at about 10:54 p.m. EDT (0254 GMT on Oct. 30), NASA officials said. (NASA's Juno Jupiter spacecraft currently holds the record for top speed relative to Earth; the probe reached 165,000 mph, or 265,000 km/h, during its arrival at the giant planet in July 2016.)

The Parker Solar Probe's final flyby, in 2025, will bring the craft within a mere 3.83 million miles (6.16 million km) of the sun's surface. And the sun's powerful gravity will eventually accelerate the probe to a top speed of around 430,000 mph (690,000 km/h), NASA officials have said.

The first of these two dozen close encounters is just around the corner: It officially begins Wednesday (Oct. 31), with perihelion (closest solar approach) coming on the night of Nov. 5.

The most prolific planet-hunting machine in history has signed off. NASA's Kepler space telescope, which has discovered 70 percent of the 3,800 confirmed alien worlds to date, has run out of fuel, agency officials announced today (Oct. 30). Kepler can no longer reorient itself to study cosmic objects or beam its data home to Earth, so the legendary instrument's in-space work is done after nearly a decade. Today's announcement was not unexpected. Kepler has been running low on fuel for months, and mission managers put the spacecraft to sleep several times recently to extend its operational life as much as possible. But the end couldn't be forestalled forever; Kepler's tank finally went dry two weeks ago, mission team members said during a telecon with reporters today.

Leading the exoplanet revolution

Kepler hunted for alien worlds using the "transit method," finding the brightness dips caused when a planet crosses its star's face from the spacecraft's perspective. It still took a while for Kepler to get aloft. The spacecraft launched in March 2009, on a \$600 million mission to gauge how common Earth-like planets are throughout the Milky Way galaxy. Initially, Kepler stared continuously at a single small patch of sky, studying about 150,000 stars simultaneously. That work was incredibly productive, yielding 2,327 confirmed exoplanet discoveries to date. In May 2013, however, the second of Kepler's four

orientation - maintaining "reaction wheels" failed. The spacecraft couldn't keep itself steady enough to make its ultraprecise transit measurements, and Kepler's original planet hunt came to an end.

Not done yet

Even though Kepler has closed its eyes, discoveries from the mission should keep rolling in for years to come. About 2,900 "candidate" exoplanets detected by the spacecraft still need to be vetted, and most of those should end up being the real deal, Kepler team members have said. A lot of other data still needs to be analyzed as well, Dotson stressed.

And Kepler will continue to live on in the exoplanet revolution it helped spark. For example, in April, NASA launched a new spacecraft called the Transiting Exoplanet Survey Satellite (TESS), which is hunting for alien worlds circling stars that lie relatively close to the sun (using the transit method, just like Kepler). Some of TESS' most promising finds will be scrutinized by NASA's \$8.9 billion James Webb Space Telescope, which is scheduled to launch in 2021. Webb will be able to scan the atmospheres of nearby alien worlds, looking for methane, oxygen and other gases that may be signs of life.

Kepler's death "is not the end of an era," Kepler system engineer Charlie Sobek, also of NASA Ames, told Space.com. "It's an occasion to mark, but it's not an end."



Lockheed Martin Reveals New Human Lunar Lander Concept

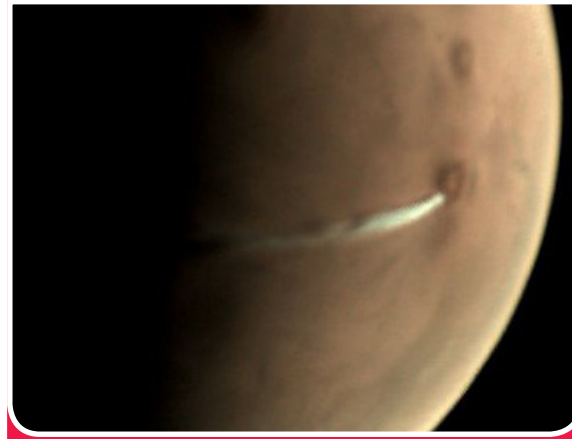
At this week's International Astronautical Congress (IAC) in Bremen, Germany, Lockheed Martin experts revealed the company's crewed lunar lander concept and showed how the reusable lander aligns with NASA's lunar Gateway and future Mars missions. The crewed lunar lander is a single stage, fully reusable system that incorporates flight-proven technologies and systems from NASA's Orion spacecraft. In its initial configuration, the lander would accommodate a crew of four and 2,000 lbs. of cargo payload on the surface for up to two weeks before returning to the Gateway without refueling on the surface. "NASA asked industry for innovative and new approaches to advance America's goal of returning humans to the Moon, and establishing a sustainable, enduring presence there," said Lisa Callahan, vice president and general manager of Commercial Civil Space at Lockheed Martin Space.

The unique orbit of the lunar Gateway provides global lunar access for a lander. Having the ability to visit multiple sites with a reusable lander supports many international, commercial, and scientific communities, in addition to NASA's sustainable exploration of the Moon. After a surface mission, it would return to the Gateway, where it can be refueled, serviced, and then kept in orbit until the next surface sortie mission. "The Gateway is key

to full, frequent and fast reusability of this lander," said Tim Cichan, space exploration architect at Lockheed Martin Space, who presented the lander concept at IAC. "Because this lander doesn't have to endure the punishment of re-entering Earth's atmosphere, it can be re-flown many times over without needing significant and costly refurbishment. That's a major advantage of the Gateway and of a modular, flexible, reusable approach to deep space exploration." The investments made in technology developed for Orion can be re-used to reduce the cost, complexity and development timeline. Some of the human-rated, flight-proven systems used in the design include avionics, life support, communications and navigation systems, and a light-weight version of its crew module pressure vessel.

Reusable landers are enabled by the lunar Gateway and are important for sustainable exploration. Additionally, landed human lunar missions and a lunar orbiting outpost are valuable to prepare for sending humans to Mars. While the Moon doesn't have an atmosphere, there are still many lessons that apply to a future crewed Mars lander, such as: operations experience in a challenging and dynamic environment, operating and refueling out of orbit, long-duration cryogenic propulsion, and terminal descent navigation, guidance and control.

moondaily.com



Mars Express Eyes a Curious Cloud

The long, thin, white cloud has been seen extending west of a Martian volcano since September 13. It looks as if it could be volcanic, yet it isn't. Here's what's going on. The European Space Agency (ESA) said on October 25, 2018, that its Mars Express spacecraft has acquired hundreds of images over a period of weeks of a curious cloud on Mars. ESA has tracked the cloud since September 13, as it hovers in the vicinity of the 12-mile-high (20-km-high) Arsia Mons volcano, close to Mars' equator.

It looks and sounds as if this cloud could be volcanic, doesn't it? Yet that would be highly unlikely, since scientists have never detected any form of volcanic activity on Mars; it appears to be a geologically dead world. ESA said the cloud isn't volcanic. Instead, it's driven by ordinary meteorological conditions, not unlike those found on Earth. The cloud extends about 900 miles (1,500 km) west of the volcano. As a comparison, the cone-shaped volcano has a diameter of about 155 miles (250 km).

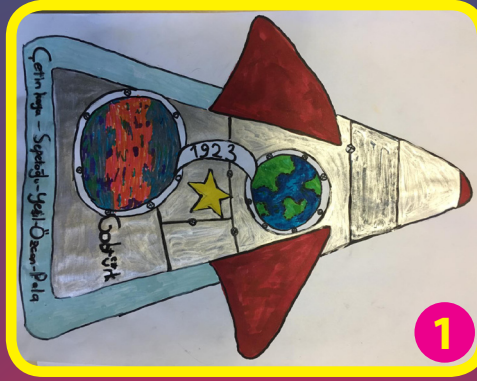
Mars experienced its northern winter solstice on October 16, bringing winter into Mars' Northern Hemisphere and summer to its Southern Hemisphere. ESA said: In the months leading up to this solstice, most cloud activity disappears over big volcanoes like Arsia Mons; its summit is covered with clouds throughout the rest of the Martian year.

However, a seasonally recurrent water ice cloud, like the one shown in this image, is known to form along the southwest flank of this volcano – it was previously observed by Mars Express and other missions in 2009, 2012 and 2015.

earthsky.org

Schools in Action

We made a great start to our educational programs with all of our participating schools and all the mysteries of Mission Patches have been revealed! These students needed no help from professionals when it came to designing a Mission Patch. Great details and awesome placement of objects on all the patches we saw so far. Thank you for sharing your imagination and creativity with us! Their next project will be the "Toys in Space". We are sure, they will come up with magnificent space toys! Well done!



1, 2 - Ekin Schools, IZMIR 3, 4 - FMV Nişantaşı, ISTANBUL 5, 6 - Rota Collage, IZMIR

Astronomy Picture of the Day

R Leporis: A Vampire's Star

Better known as Hind's Crimson Star, R Leporis is a rare star in planet Earth's night sky. It's also a shocking shade of red. The star's discoverer, 19th century English astronomer John Russell Hind, reported that it appeared in a telescope "... like a drop of blood on a black field." Located 1,360 light-years away in the constellation Lepus the star is a Mira-type variable, changing its brightness over a period of about 14 months. R Leporis is now recognized as a carbon star, a very cool and highly evolved red giant with an extreme abundance of carbon. Extra carbon in carbon stars is created by helium fusion near the dying stellar core and dredged up into the stars' outer layers. The dredge-up results in an overabundance of simple carbon molecules, like CO, CH, CN, and C2. While it's true that cool stars radiate most of their energy in red and infrared light, the carbon molecules strongly absorb what little blue light is left and give carbon stars an exceptionally deep red color. R Leporis is losing its carbon-rich atmosphere into the surrounding interstellar material through a strong stellar wind though, and could be near the transition to a planetary nebula.

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