"Creative thinking inspires ideas. Ideas inspire change." Barbara Januszkiewicz

SPACE CAMP TURKEY
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A Large Asteroid Passed Between Earth and the Moon

Earth had a close encounter this morning when Asteroid 2019 OK sped by at 1:22 GMT, at a speed of nearly 55,000 miles (88,500 kilometers) per hour. The closest it came to Earth was just under 45,000 miles (72,500 km), a safe distance, but still much less than the distance between the Earth and Moon.

Astronomers only noticed the space rock within the past few days, when astronomers at SONEAR Observatory in Brazil picked it up. Because it's such a newcomer, there's still a lot astronomers aren't sure about, from its orbit to its size, which ranges between 187 to 426 feet (57 to 130 meters) across.

While Earth gets a few asteroid visitors that buzz closer than the Moon every year, this one is the largest so far in 2019. It's possible other such objects likewise sneak by Earth under cover of light. But the bigger the asteroid, the harder it is to hide, and NASA is keeping their eyes open.

Astronomy.com

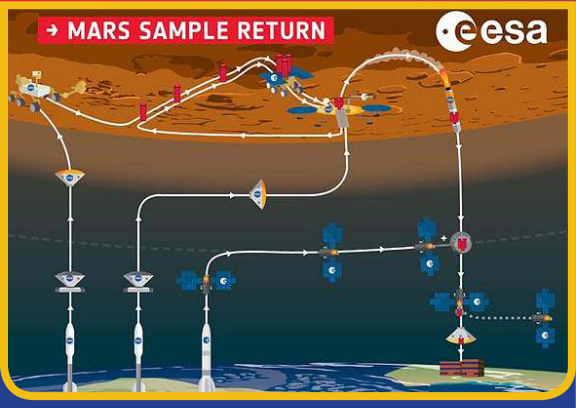
What is Artemis?

NASA is committed to landing American astronauts, including the first woman and the next man, on the Moon by 2024. Through the agency's Artemis lunar exploration program, we will use innovative new technologies and systems to explore more of the Moon than ever before. We will collaborate with our commercial and international partners to establish sustainable missions by 2028. And then we will use what we learn on and around the Moon to take the next giant leap – sending astronauts to Mars.

Where Did The Name Artemis Come From?

Artemis was the twin sister of Apollo and goddess of the Moon in Greek mythology. Now, she personifies our path to the Moon as the name of NASA's program to return astronauts to the lunar surface by 2024, including the first woman and the next man. When they land, our American astronauts will step foot where no human has ever been before: the Moon's South Pole.

Technology.org



Europe Prepares for Mars Courier

The first round-trip to the Red Planet will see a European orbiter bringing martian samples back to Earth. ESA is opening the door to industry to build the spacecraft that will deliver the precious rocks, dust and gas from Mars - the key to understanding whether life ever existed on our closest planetary neighbour. This 'take-away' service is called the Earth Return Orbiter, and will be ESA's major contribution to the Mars Sample Return campaign. The ESA Orbiter will carry NASA's Capture and Containment and Return System, which will rely on the ESA-led spacecraft for transit to and from Mars.

Three launches from Earth and one from Mars - the first ever from another planet -, two rovers and an autonomous capture in Mars orbit are all part of an ambitious series of missions that ESA is embarking on together with NASA.

The campaign aims to bring at least 500 grams of samples back from the Jezero crater that once held a lake and contains an ancient preserved river delta. The rocks in the area preserve information about Mars' diverse geology.
NASA's Mars 2020 rover that is slated for launch in July 2020 will scientifically select the best samples to store in tubes and deposit them onto the martian surface for later retrieval.

MarsDaily.com

Japan's Space Agency Develops New Filter to Recycle Urine

Japan's astronauts could be drinking water distilled from their own urine in the near future, thanks to the latest innovation from Japan's space agency. Japan Aerospace Exploration Agency, or JAXA, said they have developed a distiller, used during space flight, that converts urine into potable water, Yomiuri Shimbun reported Thursday.

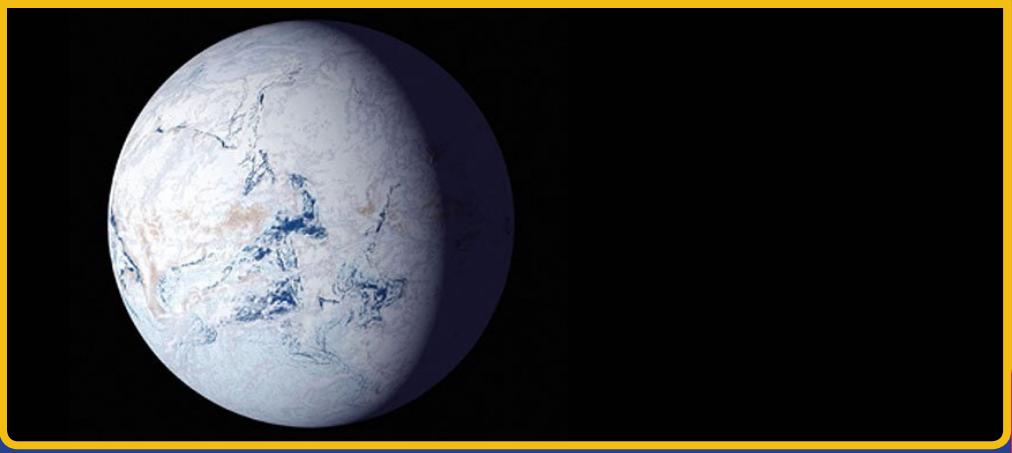
Satoshi Matsumoto said the device can help with the efficient use of water during space expeditions. "Technology that can allow for the efficient use of water during long missions to the moon or Mars is extremely important," Matsumoto said, according to the report. The device can convert about 85 percent of human urine into drinking water.

JAXA's invention will be delivered in the fall to the International Space Station, or ISS, currently in low Earth orbit. The ISS is a joint project with the United States, Russia, Europe and Canada. The device will be tested in orbit. It would then send distilled urine samples to Earth for analysis of water quality, according to JAXA. JAXA's appliance would remove impurities from urine with a resin filter, and would be able to produce up to 0.8 liters of water daily through electrolysis.

Raising temperatures and increasing pressure during experiments showed the recycling rate can be raised as high as 85 percent, higher than the distiller and filters developed by NASA, designed to process astronauts' urine and sweat into clean drinking water. Japan's space agency is testing the new distiller at a time when it is building a new system for space-related startup businesses.

The Nikkei Asian Review reported JAXA is turning to smaller startups to produce new business ideas and applications. "Startups may not have money, but they have a sharper focus and more innovative ideas," said Nobutaka Komatsu, an investment analyst and member of a JAXA panel on space solar panels.

SpaceDaily.com



Study Suggests Frozen Earthlike Planets Could Support Life

Icy planets once thought too cold to support life might have livable land areas above freezing, challenging the typical assumption of what kinds of planets might be habitable, a new study suggests. Scientists have long thought snowball planets—Earthlike planets with oceans frozen to the equator—were hostile to life because of the extreme cold. But new research in AGU's Journal of Geophysical Research: Planets finds some snowball planets might have areas of land near their equators that reach livable temperatures. "You have these planets that traditionally you might consider not habitable and this suggests that maybe they can be," said Adiv Paradise, an astronomer and physicist at the University of Toronto and lead author of the new study.

The habitable zone is a range of distances from a star where a planet could theoretically have liquid water and temperatures warm enough to support life. Planets in the habitable zone can be warm and temperate like Earth, or entirely frozen, like snowball planets.

Geologists suspect Earth has gone through anywhere from one to three snowball phases in the past and that marine microorganisms likely survived through at least one of those periods. "We know that Earth was habitable through its own snowball episodes, because life emerged before our snowball episodes and life remained long past it," Paradise said. "But all of our life was in our oceans at that time. There's nothing about the land."

In the new study, Paradise and his colleagues wanted to know if areas of land on snowball planets could reach life-sustaining temperatures. They used a computer program to simulate different climate variables on theoretical snowball planets, adjusting conditions like the amount of sunlight and configuration of the continents. The results also suggest Earthlike planets can become stuck in a snowball state under certain conditions. Scientists used to think planets exited snowball phases through a gradual buildup of carbon dioxide released by volcanoes. But weathering could draw out enough carbon dioxide out of the atmosphere to balance volcanic output, creating a negative feedback loop where the planet never thaws, according to the researchers.

Phys.org

NASA's Planet-Hunting TESS Telescope Finds 21 New Worlds in 1st Year

NASA's TESS mission was designed to hunt alien planets, but it's done more than that in its first year at work, as a new NASA video highlights.

Sure, the telescope, which is now halfway through its primary mission, has gathered enough data to let scientists identify 21 new exoplanets already. But in between planet-spotting, the instrument, which is formally called the Transiting Exoplanet Survey Satellite, has also dabbled in the art of catching asteroids and comets — even comets in other solar systems. And TESS has also recording flashes from six different supernovas marking the explosions of dead stars.

"The pace and productivity of TESS in its first year of operations has far exceeded our most optimistic hopes for the mission," George Ricker, TESS's principal investigator at the Massachusetts Institute of Technology, said in a statement. "In addition to finding a diverse set of exoplanets, TESS has discovered a treasure trove of astrophysical phenomena, including thousands of violently variable stellar objects." And scientists have plenty more discoveries to look forward to from the instrument: NASA announced earlier this month that it would give the TESS mission two extra years of operations, keeping it running through 2022.

Space.com

Astronomy Picture of the Day

Earth's Circular Shadow on the Moon

Image Credit & Copyright: *Cristian Fattinnanzi*

What could create such a large circular shadow on the Moon? The Earth. Last week's full Moon -- the Buck Moon -- was so full that it fell almost exactly in a line with the Sun and the Earth. When that happens the Earth casts its shadow onto the Moon. The circularity of the Earth's shadow on the Moon was commented on by Aristotle and so has been noticed since at least the 4th century BC. What's new is humanity's ability to record this shadow with such high dynamic range (HDR). The featured HDR composite of last week's partial lunar eclipse combines 15 images and include an exposure as short as 1/400th of a second -- so as not to overexpose the brightest part -- and an exposure that lasted five seconds -- to bring up the dimmest part. This dimmest part -- inside Earth's umbra -- is not completely dark because some light is refracted through the Earth's atmosphere onto the Moon. A total lunar eclipse will occur next in 2021 May.

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