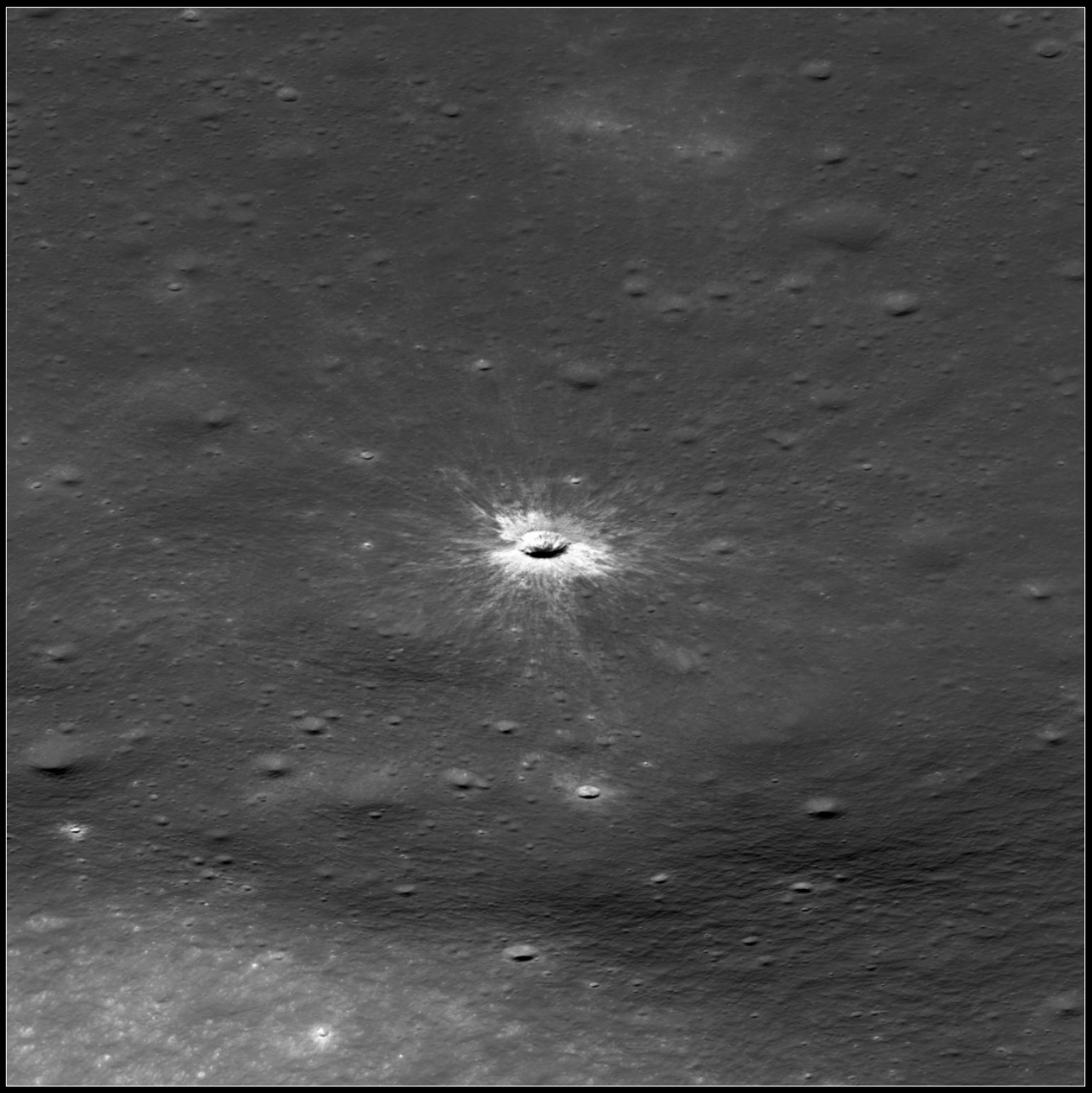
John J. McCarthy Observatory

November 2026 Newsburst



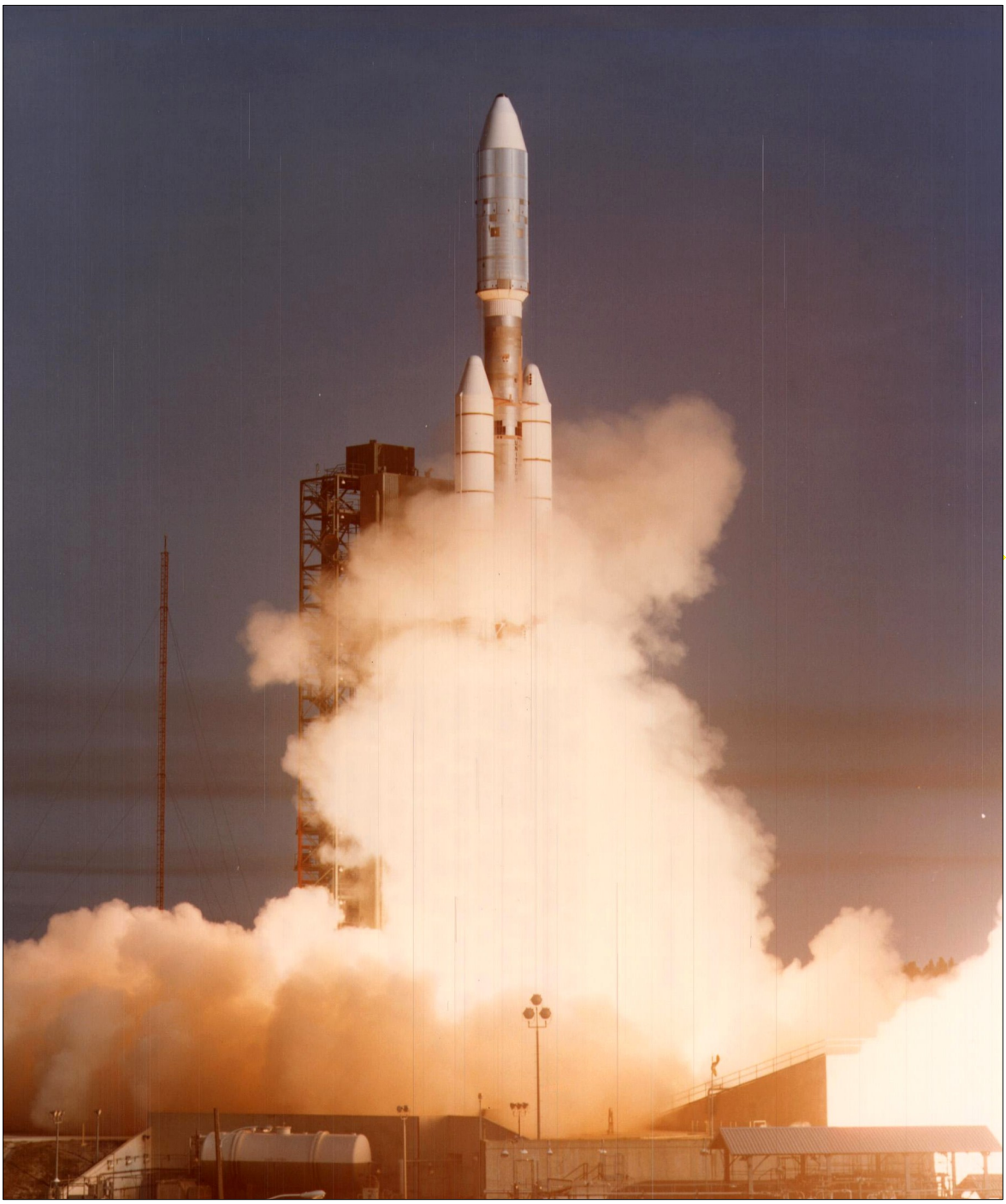
An oblique view of McGetchin crater, an impact feature that appeared sometime between April and May 2024.

The new lunar crater has an average diameter of 728 feet (222 meters), a depth of 141 feet (43 meters), wall slopes averaging 24° (but reaching nearly 40° in places), and a rim that rises 26 feet (8 meters) above the pre-existing surface, on average.

This oblique view was captured by NASA's Lunar Reconnaissance Orbiter.

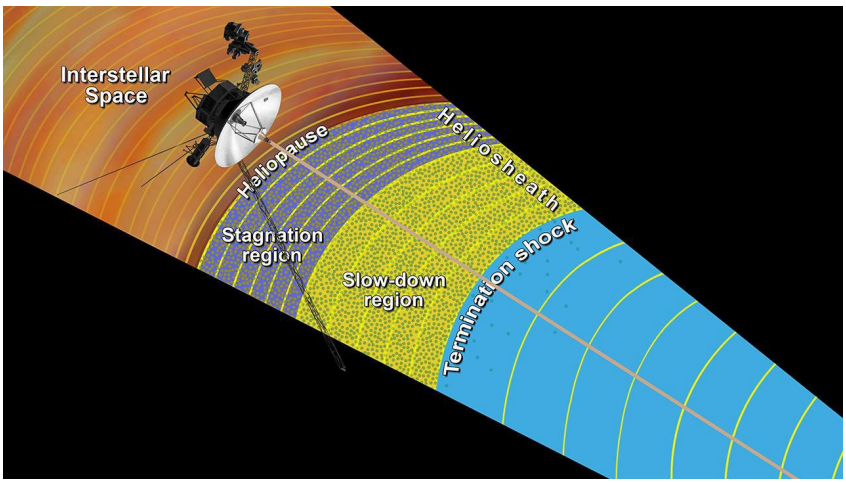
Credit: NASA/GSFC/Intuitive Machines

49 Years and One Light-Day



NASA's Voyager 1 spacecraft leaves Earth for the final frontier atop its Titan/Centaur-6 launch vehicle

Credits: NASA/JPL-Caltech/KSC



This artist's concept shows the outer regions of our solar system where the Sun's influence gradually wanes and travelers like Voyager 1 enter a realm called interstellar space, or the space between stars.

This seemingly empty expanse is actually filled with the dust and gas, charged particles and cosmic rays.

Image Credit: NASA/JPL-Caltech

49 Years and One Light Day

NASA's Voyager 1 was launched on September 5, 1977, 16 days after its twin, Voyager 2. The two robotic spacecraft, powered by plutonium-238 radioisotope thermoelectric generators (RTGs), were designed to explore the outer Solar System and beyond.

Voyager 1 flew by Jupiter in March 1979, with discoveries that included active volcanoes on Jupiter's inner Galilean moon Io. In November 1980, the craft passed through the Saturnian system with a close flyby of Saturn's largest moon Titan. The decision to visit Titan, with its thick atmosphere, sent Voyager 1 on a trajectory that would take it out of the ecliptic plane (Voyager 2 would go on to visit Uranus and Neptune after its Saturn encounter).

In early December 2004, the spacecraft crossed the solar system's termination shock boundary, where the solar wind slows from supersonic to subsonic speed, at a distance of 8.7 billion miles from the Sun. Voyager 1 crossed the heliopause, where the solar wind is stopped by interstellar medium, and entered interstellar space on August 25, 2012, the first spacecraft to do so.

Traveling at roughly 38,000 mph (about 17 km per second) relative to the Sun, Voyager 1 has been traveling for over 49 years. On November 18th, at 2:16:07 a.m. PST, Voyage 1 will reach a distance of 16.094 billion miles (25.902 billion km) from Earth, or the distance light travels in 24 hours - also known as one light-day. From a practical standpoint, transmitting instructions to Voyager 1, via radio waves traveling at the speed of light, will take a full day to reach the spacecraft and another full day will be needed for any reply or data to return from the spacecraft. Voyager 1 transmits data via a 3.7-meter high-gain directional antenna pointed directly at Earth. By the time the signal reaches Earth, the signal strength, which started out between 22-23 watts, drops to a fraction of an attowatt (less than a billionth of a billionth of a watt), needing NASA's largest receiving antenna in its Deep Space Network for reception.

With its RTGs generating less and less power, the Voyager team back on Earth has been powering off heaters and non-critical instruments, or those whose performance has degraded, in an effort to prolong the spacecraft's operating life. Today, only the magnetometer and plasma wave subsystem remained powered on. With the RTG losing about 4 watts of power each year, it is expected that the spacecraft will run out of electrical power and stop communicating with Earth around 2036. However, the silent spacecraft will continue traveling through space on its current trajectory (barring any collision). It is expected to reach the theorized Oort cloud (a vast reservoir of comets surrounding the solar system) in about 300 years and take about 30,000 years to pass through it.

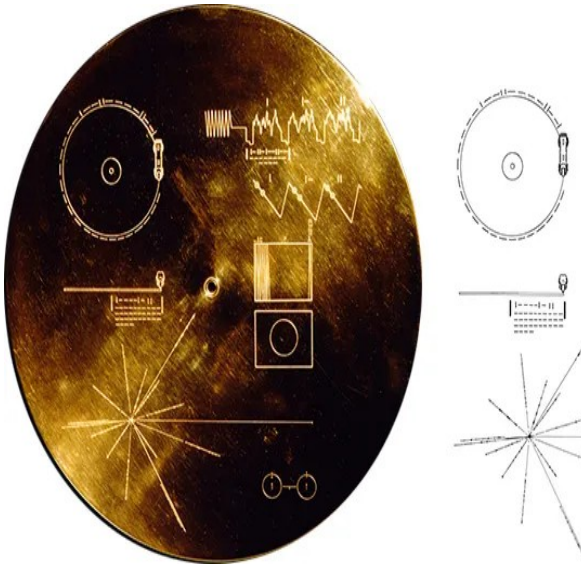
It will pass within 2 light-years of the star Gliese 445 in about 44,000 years and less than 1 light-year of the M3V star TYC 3135–52–1 in 306,000 years. Should anyone intercept the craft, Voyager 1 carries a 12-inch gold-plated copper phonograph record as a cosmic time capsule and designed to tell the story of Earth.

The Golden Record cover shown with its extraterrestrial instructions.

A record was included with each Voyager spacecraft. The records were sealed in a protective aluminum jacket that included a cartridge and a needle for playback. The cover features symbolic, math-based diagrams explaining how to play the record and a star map showing Earth's location relative to 14 pulsars so the finders know where it originated.

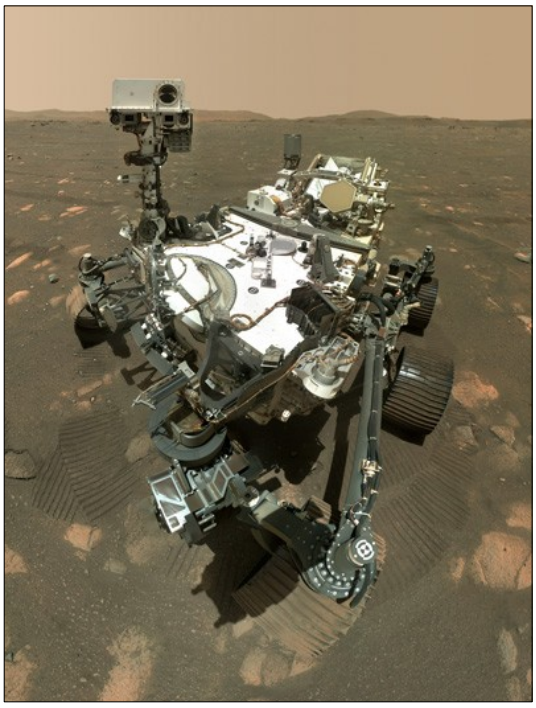
The concept was the brainchild of John Casani, the Voyager project manager, who delegated the task of creating it to astronomer Carl Sagan and his colleagues. The record features images and a variety of natural sounds, such as thunder, birds, musical selections from different cultures and eras, and spoken greetings in 55 languages.

Credits: NASA/JPL-Caltech



New Off-World Driving Record

Perseverance's record breaking drive as recorded by the rover's navigation camera on October 11th Credit: NASA/JPL-Caltech



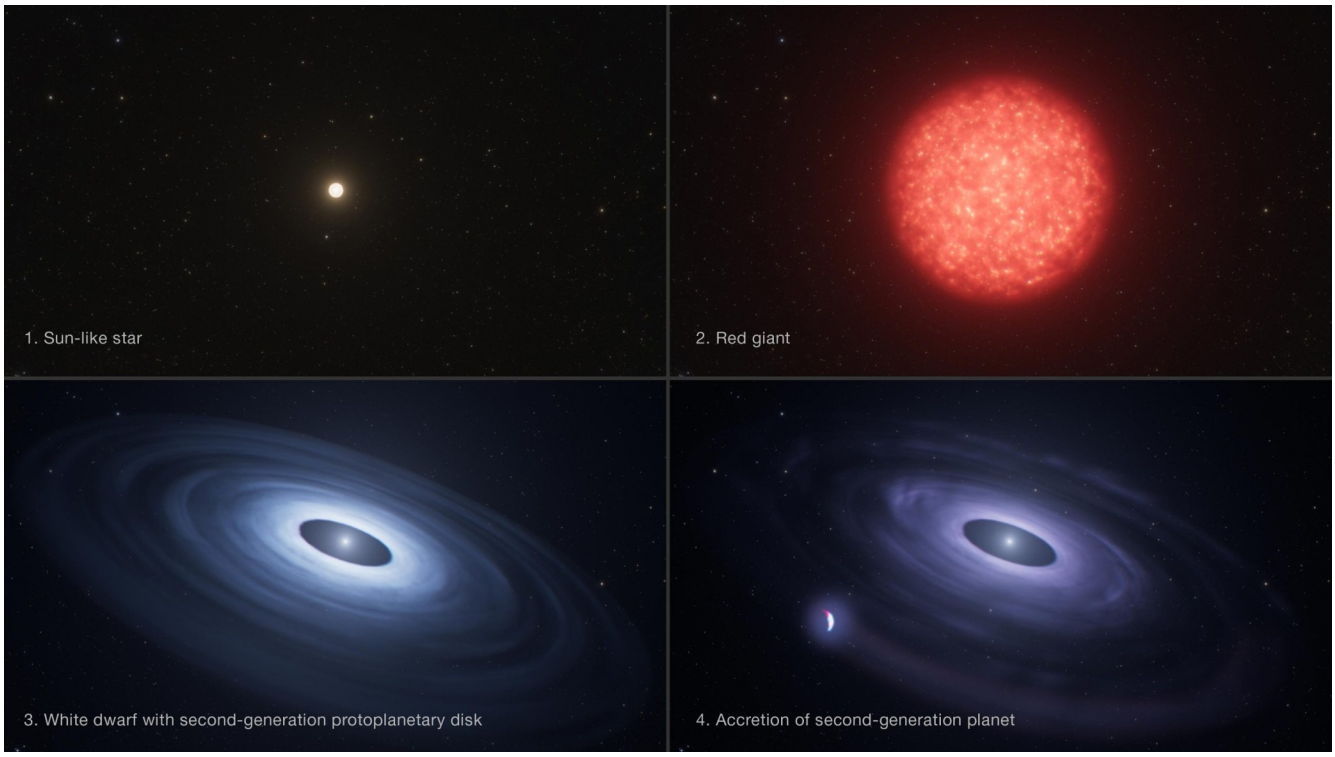
Perseverance Rover: NASA/JPL-Caltech/MSSS

NASA's Perseverance rover established a new off-world driving distance record on its 2,006th Martian day, or sol. On October 11th, the rover rolled past 28.10 miles (45.22 km), in its exploration of the western rim of Jezero crater, exceeding the total distance driven by the Mars Opportunity rover.

Perseverance covered the distance that took Opportunity almost 15 Earth-years in just five and a half Earth-years. While Opportunity's drives were pre-planned on Earth and never exceeded 721 feet (220 meters) in a single sol, Perseverance's self-driving capability has the rover covering as much as 1,351 feet (412 meters) in one drive as it plots its own course around obstacles. More than 90% of the distance covered by Perseverance has been with its "AutoNav" navigation system (compared to about 5% for Opportunity).

Perseverance isn't the only rover actively exploring Mars. The Curiosity rover, which landed in Gale Crater in 2012, is working its way up Mount Sharp and has logged more than 23.65 miles (38.07 km). The terrain encountered by Curiosity, and excessive wheel wear, has had the rover taking a slower and more cautious approach in its climb up the mountain.

Phoenix Rising



This artist's concept, not to scale, imagines the evolution of a Sun-like star (1) into an aging red giant (2) and then a small, bright white dwarf surrounded by a disk of its expelled outer layers (3), from which a second-generation planet forms (4).

Credit: NASA, ESA, Leah Hustak (STScI)

New stars can form from gas and dust clouds enriched with heavy elements dispersed in the cataclysmic demise of a previous generation of stars (our Sun is believed to be a 3rd generation star based on the abundance of elements heavier than hydrogen and helium). When a star the size of our Sun ceases fusing hydrogen in its core, the layers around the core collapse. The compression increases the temperature in the core but also causes the outer layers of the star to expand and cool. In the distant future, our Sun will be transformed into a Red Giant, 100 times larger than its original size. As the star expands, it sheds its outermost layers, pushed by strong stellar winds. High-energy ultraviolet radiation ionizes the shell, causing the gas to glow brightly and creating, what we refer to as a planetary nebula. Eventually, all that is left is an Earth-size and exceptionally dense stellar remnant – a white dwarf. In the death throes of the star, the inner planets would likely be destroyed or consumed, leaving behind a cloud of debris.

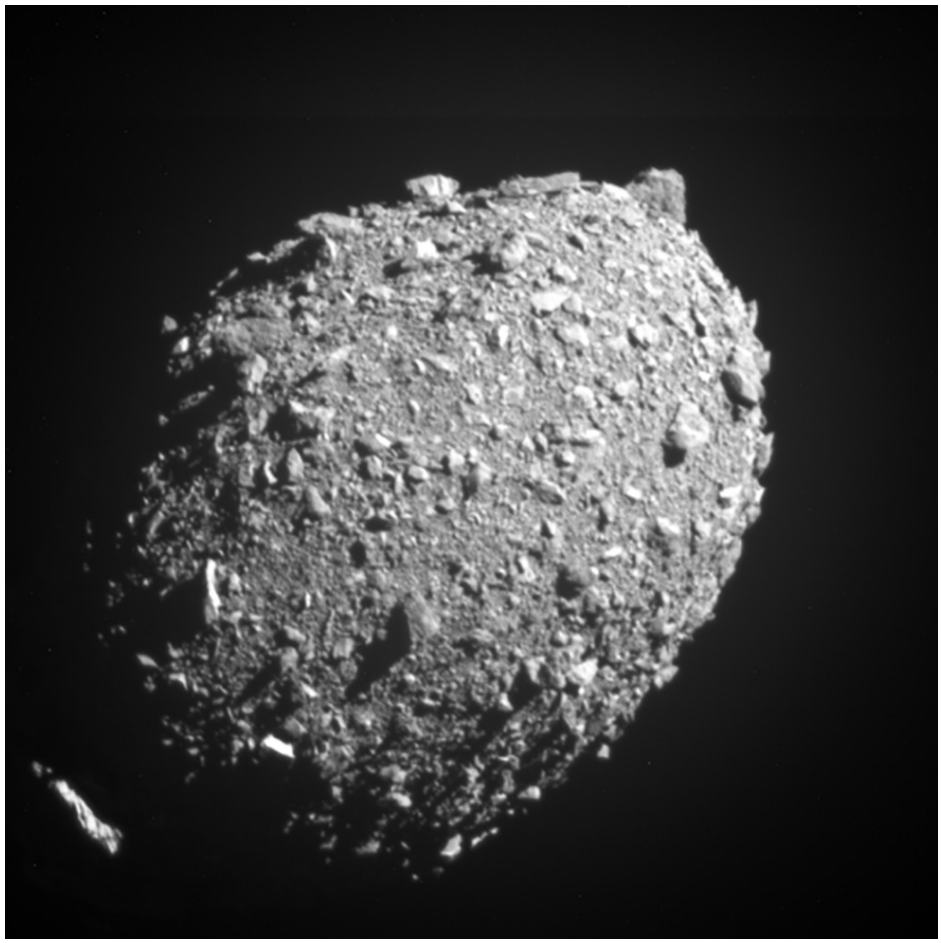
Now, for the first time, there is evidence that, from this debris a new planet can coalesce. Astronomers, after analyzing the data from observations made by the Hubble Space Telescope of a white dwarf called HS 0209+0832, located about 270 light-years from Earth, believe that they have detected a planet orbiting very close to the star. The planet was first detected by NASA's Transiting Exoplanet Survey Satellite (TESS). Recurring changes in the white dwarf brightness suggest the planet is orbiting only about 3.7 million miles (6 million km) from the white dwarf (for comparison, the average distance of Mercury from our Sun is about 36 million miles or 58 million km). The planetary candidate (still requiring confirmation) is likely a gas giant and, because of its proximity, is rapidly losing its atmosphere to the star.

It was Hubble's detection of the element niobium in the white dwarf's spectra that suggests that the planet was born of stellar ash. Niobium would have been the among the alphabet soup of elements expelled as the star died. Captive niobium would have sunk towards the core of the dwarf and not be detectable on the star's surface, which is dominated by the lighter elements such as hydrogen and helium. As such, astronomers believe that the niobium they are seeing is coming from the orbiting planet that was formed from the ashes of the original star.

This is the first time that a potential second generation planet has been detected. It is estimated that 95% to 98% of all stars will eventually end their lives as white dwarfs so that discovery suggests that planets, as well as stars, can have a second or third life. Whether biological life has another opportunity is yet unknown.

Return to the Scene of the Impact

Four years ago, NASA placed its Double Asteroid Redirection Test (DART) spacecraft on a collision course with a small asteroid called Dimorphos as a means of evaluating whether a kinetic impact could sufficiently alter the course of a minor planet. Dimorphos orbits a larger body called Didymos and had a pre-impact orbital period of about 12 hours.



A DART captured closeup image of Dimorphos (about 560 feet or 170 meters across) moments before impact

Source: NASA / JHAPL

The events on September 26, 2022 exceed all expectations with the 14,760 mph (23,760 kph) collision blasting out at least 2.2 million pounds (1 million kg) of asteroidal material, including a swarm of large boulders, and changing the smaller asteroid's orbital period by about 33 minutes (NASA's measure of success was 73 seconds or more). The resulting trail of debris was visible from Earth-based and space telescopes.

Now, four years later, another spacecraft has returned to the crash site. The European Space Agency's Hera spacecraft, launched in October 2024, has now arrived on the scene.

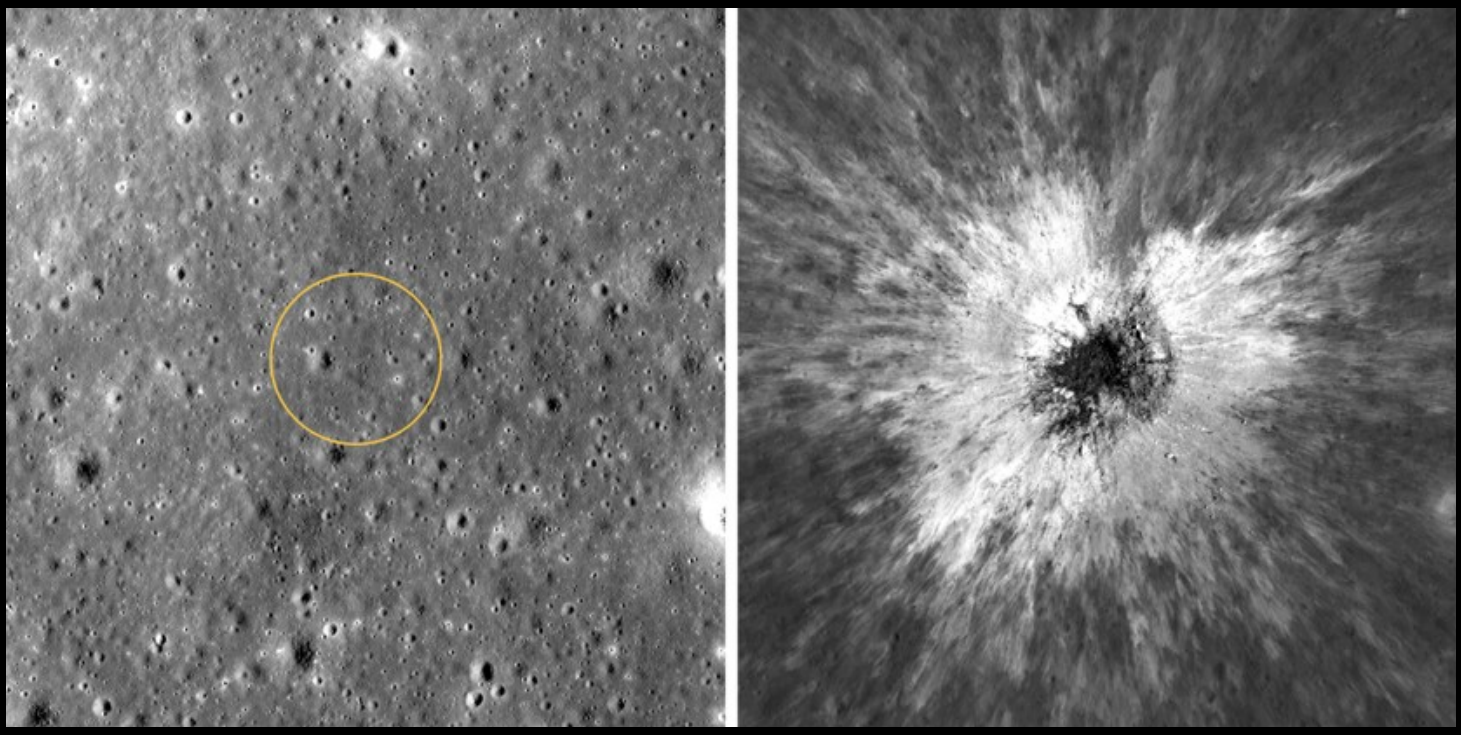
Hera successfully executed multiple braking thruster burns (on October 15th and 22nd) to reduce its velocity to that of Didymos and Dimorphos. In early November, the ESA team expects that the spacecraft will slowly approach the pair (to an operating distance of about 15 to 19 miles or (25 to 30 km) and begin its study of the DART impact site. In December, Hera will move even closer for a more detailed survey of both asteroids and begin to construct high-resolution 3D maps.

Early next year, Hera will release two piggyback nanosatellites, one called Milani and the other Juventas. Both will initially orbit Dimorphs, with Milani characterizing the composition of materials on and around Dimorphos while Juventas will use radar to provide scientists a look inside the rocky body. Expectations are for Juventas to attempt a landing on Dimorphos at the end of its mission, with the possibility that Milani may follow.

The DART impact was not a simple "billiard ball" collision. The larger than expected change in Dimorphos' orbital period resulted from a complex interaction of the spacecraft's high velocity upon impact, the massive amount of material liberated, and possibly, the reshaping of the tiny asteroid.

If kinetic impact is going to be considered as a viable alternative to redirecting a hazardous asteroid's trajectory (in defense of Earth), the Hera mission will provide an on-site evaluation of the aftermath and a better appreciation of the consequences of such as action.

Once in a Lifetime



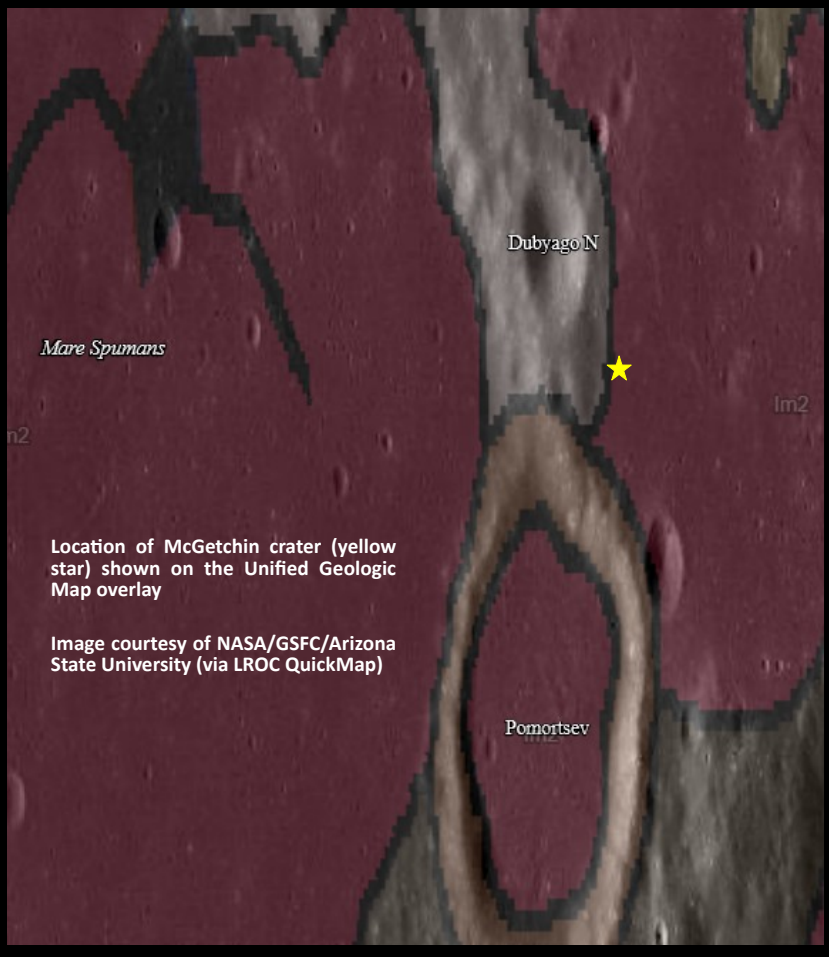
Images from the Narrow Angle Camera aboard NASA's Lunar Reconnaissance Orbiter. On the left, the yellow circle indicates the approximate location of the McGetchin crater rim on the undisturbed regolith (pre-impact). The post impact crater and ejecta blanket is shown on the right. Crater center is located at 51.3536°N, 67.1765°E

Credit: NASA/GSFC/Intuitive Machines

A new lunar crater was found on October 24, 2025 by Robert Wagner of the Lunar Reconnaissance Orbiter (LRO) team while reviewing archived camera data. The discovery was announced on September 16th of this year.

From the review, the impact was determined to have occurred sometime between April 11th and May 22nd of 2024 when a comet or asteroid struck the Moon's eastern limb, southeast of Dubyago N crater. The new crater formed on the border of 3 billion-year-old mare basalt (volcanic rock shown in red) and the even older anorthositic highlands crust (shown in gray). As such, the brightness of the material ejected by the impact shown above is not uniform, with the darker portion likely due to basalt reflecting less sunlight than anorthosite.

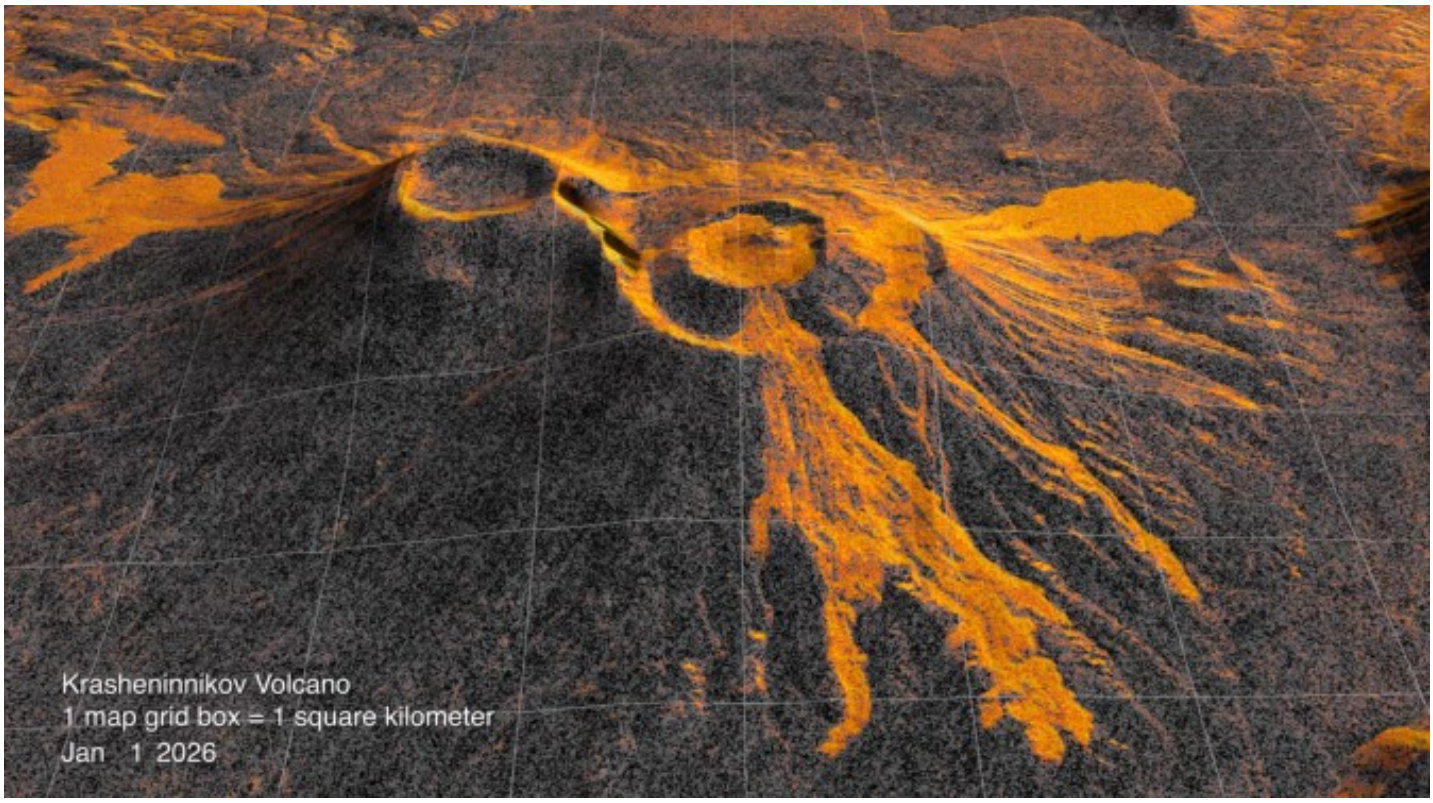
The LROC team proposed the name McGetchin for the crater to the International Astronomical Union to honor Thomas McGetchin, a pioneering lunar scientist during the Apollo era. Craters the size of McGetchin are estimated to form only once in a century – making McGetchin a true once in a lifetime event.

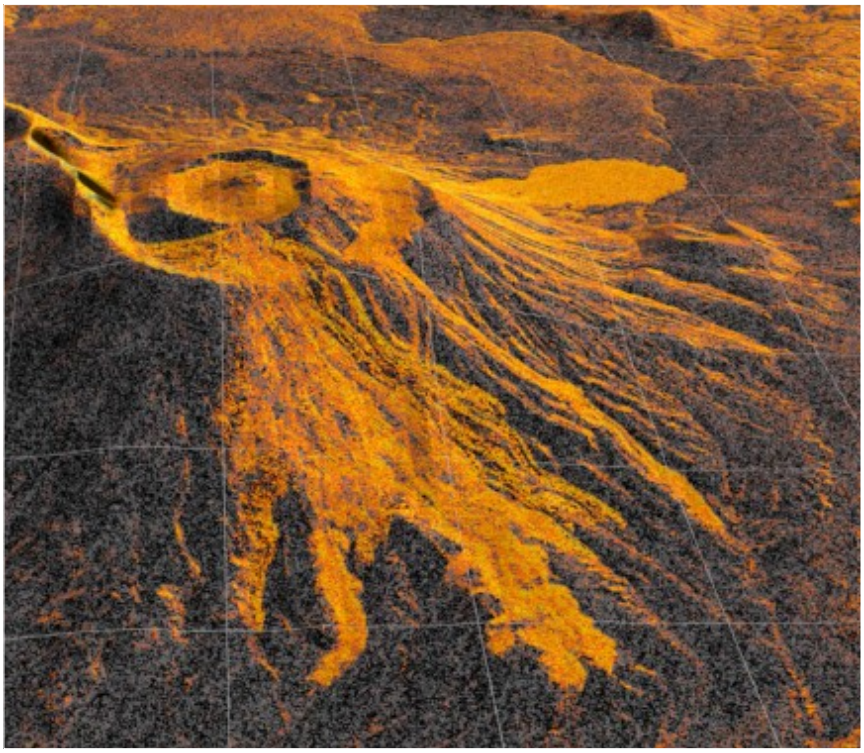


Location of McGetchin crater (yellow star) shown on the Unified Geologic Map overlay

Image courtesy of NASA/GSFC/Arizona State University (via LROC QuickMap)

NISAR Monitors Volcanic Eruption





NISAR data from January 1, 2026 (upper image) and August 17, 2026 showing the growth of the lava field from the northern crater of Krasheninnikov, a volcano pair on Russia's Kamchatka Peninsula. In the image, the lava field appears brighter than the surrounding surfaces.

Credit: NASA's Scientific Visualization Studio

NASA-ISRO's Synthetic Aperture Radar (NISAR) spacecraft has been monitoring the ongoing eruption of the Krasheninnikov volcano on the Pacific coast of Russia's Kamchatka Peninsula. The eruption, the first in nearly five centuries, followed an off-shore 8.8-magnitude earthquake in July 2025, at which time ribbons of lava could be seen flowing down toward the sea.

Shortly after becoming operational, NISAR, from its vantage point 464 miles (747 km) above the Earth's surface, began capturing images of the volcano twice every 12 days as it flew over the area.

The NISAR satellite is the first free-flying space mission to feature two radar instruments: an L-band and an S-band system. The two systems are complementary with the S-band system more sensitive to light vegetation and moisture in snow while the longer-wave L-band able to pass through foliage to image the underlying ground.

The 39-foot (12-meter) wide drum-shaped antenna reflector monitors Earth's land and ice surfaces, recording changes to the planet's ecosystem and tracking movement of ice sheets and glaciers.

Second Saturday Stars

FREE EVENT

John J. McCarthy Observatory
Behind the New Milford High School
860.946.0312
www.mccarthyobservatory.org

November 14th

7:00 - 9:00 pm

Free Star Party

Featuring:

Voyager 1

On the Edge of Forever

All are welcome to enjoy
a brief presentation along with
observing* the sights of the
autumn night sky through
a variety of telescopes!

*Observing if weather permits

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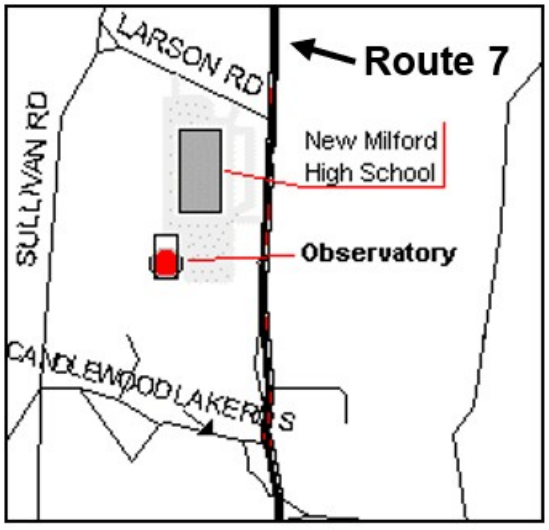
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