John J. McCarthy Observatory

February 2026 Newsburst

Financed, in part, with a grant from The Planetary Society, a new dome has been constructed on the grounds of the McCarthy Observatory. The ten-foot dome is now home to the once-retired 16-inch Meade Schmidt-Cassegrain telescope that was the workhorse for NEO observations for over twenty years in the Observatory's main dome.

Dedicated to the study of Near-Earth Objects (NEOs), the facility has been designed for remote operation. Currently in the commissioning phase, the installation has already delivered precision NEO observations from commands issued by operators in the main building.

A formal dedication of the facility will be held on February 7th, along with the celebration of the McCarthy Observatory's 25th anniversary.

Photo: Courtesy of Matt Cunningham

Artemis II Rollout

On January 17th, NASA rolled out the integrated SLS (Space Launch System) rocket and Orion spacecraft for the Artemis II mission to Pad 39B at the Kennedy Space Center. NASA's Crawler-Transporter 2, originally built for the Apollo Saturn V rocket, carried the rocket assembly, along with its 11.5 million pound (5.2 million kg) Mobile Launcher platform, the 4.2 miles (6.8 km) from the Vehicle Assembly Building to the launch pad keeping the payload vertical and stable even as the crawler climbed the 5% grade of the ramp from the roadway up to the pad.

Courtesy: NASA TV

Medical Emergency Bring Crew 11 Home Early

NASA's SpaceX Crew 11 returned from their mission aboard the International Space Station (ISS) a month early, splashing down in the Pacific Ocean off the coast of San Diego in the early hours of January 15th. The nominal six-month mission was cut short by a "medical emergency" involving one of the crew. NASA has not identified which astronaut experienced the health problem, or any details on the disorder, citing privacy concerns.

The early departure of Crew 11 leaves just three people to manage ISS operations, NASA's Christopher Williams along with Sergey Kud-Sverchkov and Sergei Mikayev of the Russian space agency Roscosmos. Williams is the only one on the American segment of the station, although the two cosmonauts are qualified to operate U.S. systems in an advisory or assistant mode, if needed. However, activities such as space walks will not be possible potentially putting the station at risk should there be a major component failure.

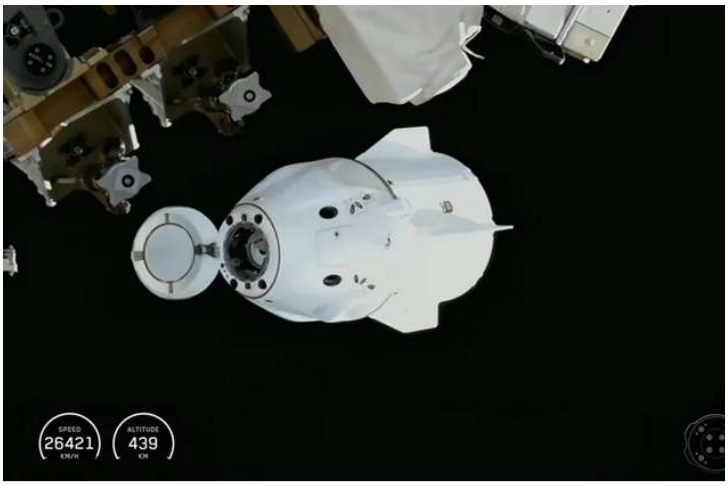
There are many health risks for humans living and working in a microgravity environment including fluid shifts, bone loss, radiation exposure, vision changes and sleep cycle disruptions. While this is the first medical evacuation, it is not the first medical emergency on the ISS. During a 2019 mission, an astronaut developed the first known blood clot (Deep Vein Thrombosis) in a neck vein. The astronaut did not experience any symptoms and the condition was only discovered when the individual took an ultrasound of their neck for a research study on how body fluid is redistributed in zero gravity. Fortunately, the medical staff on Earth was able to diagnose and recommend a treatment regimen, including blood thinners, that precluded the need to return the astronaut to Earth.

During Crew 11's five month stay on the ISS, they traveled nearly 71 million miles and completed more than 2,670 orbits around the Earth while conducting research activities aboard the station. The crew was also onboard to celebrate the station's 25th anniversary of continuous human presence on the orbiting laboratory.

The mission was NASA astronaut Michael Fincke's fourth spaceflight (first for Cardman and Platonov and second for Yui). Fincke has now logged a total of 549 days in space, fourth among all NASA astronauts. Peggy Whitson tops the list with 695 days followed by Suni Williams and Don Pettit. Cosmonaut Oleg Kononenko has spent the longest time in space with 1,111 days, over 5 flights.

NASA's SpaceX Crew-11 members. Front row, from left, are Pilot Mike Fincke and Commander Zena Cardman, both NASA astronauts. In the back from left, are Mission Specialists Oleg Platonov of Roscosmos and Kimiya Yui of JAXA (Japan Aerospace Exporation Agency).

Image Credit: NASA/Robert Markowitz



SpaceX's Crew 11 Dragon (Endeavour) spacecraft backing away from its ISS docking port before starting its return to Earth.

Credit: NASA TV

Perseverance Rover Health Check

NASA’s Perseverance Mars rover
Credit: NASA/JPL-Caltech

Since landing on Mars on February 18, 2021, NASA's Perseverance rover has traveled more than 26 miles (42 km), climbed up on an ancient river delta remnant and scaled the crater wall to explore the hinterlands. With the future of the Mars Sample Return mission undecided, and the answer to whether life ever developed on Mars likely among the samples collected by the rover (and stored within the rover), the longevity of Perseverance is paramount to sample retrieval. Towards that end, NASA’s Jet Propulsion Laboratory has been putting the rover’s systems through a series of health checks.

Testing has indicated that the rover is in excellent health with nearly all the vehicle’s subsystems expected to operate until at least 2031. The rotary actuators that turn the rover’s wheels have been certified for at least another 37 miles (60 km). Brake testing is ongoing.

Former Google CEO Plans to Fund Four Telescope Projects

Former Google CEO Eric Schmidt and his wife Wendy have announced a major investment in four new telescope projects. The most ambitious project of the four is an optical space telescope, called Lazuli. It will have a mirror diameter of 3.1 meters (10 feet), as compared to Hubble's 2.4 meter (8 feet). Lazuli will be placed in an elliptical orbit with an apogee (furthest distance) of 170,000 miles (275,000 km) and a perigee (closest) of 40,000 miles (77,000 km). Hubble, by comparison, operates about 310 miles (500 km) above the Earth in a region that has become increasing crowded with other satellites.

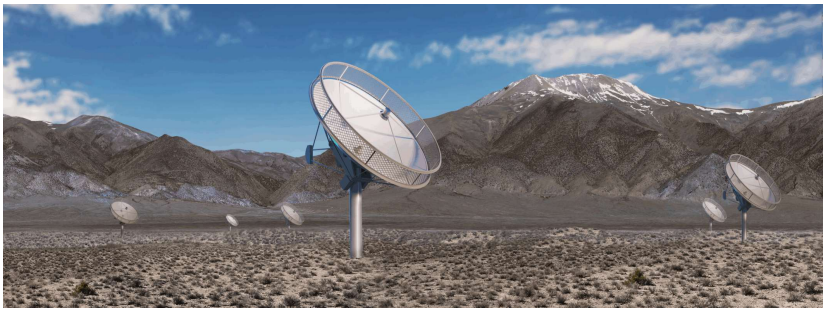
Lazuli will be equipped with a wide-field camera, a spectrograph, and a coronagraph for exoplanet detection (by blocking the light from the host star). Schmidt Sciences is setting an aggressive schedule for construction, with launch as early as late 2028 and science observations beginning the following year.

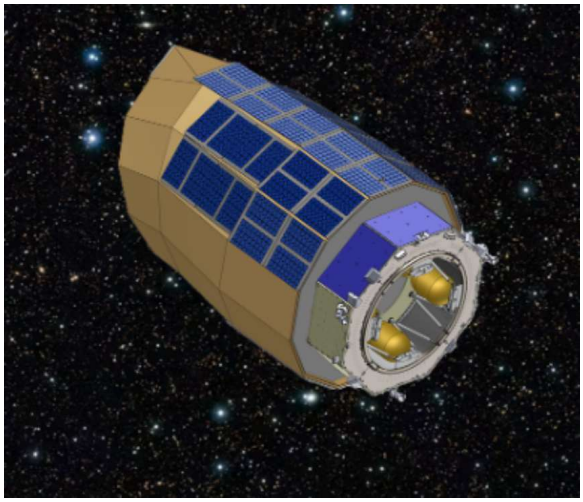
The other three astrophysics projects are Earth-bound.

The Argus Array, likely to be located in Texas, will be an array of 1,200 11-inch (.3 meter) telescopes. The array will image the entire Northern Hemisphere sky, capturing objects as faint as 18th or 19th magnitude. Movies of the night sky, generated by the nightly images, will allow astronomers to capture celestial events as they develop. The project will be managed by the University of North Carolina and co-funded by the Schmidts and a Russian-born British financial trader named Alex Gerko.

Fully funded by the Schmidts, the Deep Synoptic Array (DSA) will be comprised of 1,600 radio dishes. Each with a 6 meter (20 foot) antenna, the array will be located in a valley in Nevada. The array will perform much like one large dish to map over a billion radio sources. It will aim to generate a picture of the sky every 15 minutes. The project will be managed by the California Institute of Technology and is targeting science operations in 2029.

The Large Fiber Array Spectroscopic Telescope (LFAST) project will be led by the University of Arizona and also fully funded by the Schmidts. Likely based in Arizona, instrument will consist of a rack of 20, 80 centimeter (2.6 foot) mirrors to provide the equivalent observing power of a 3.5-meter (11.5 foot) telescope. The light from the array will be directed via optical fibers to medium- and high-resolution optical and near-infrared (NIR) spectrographs. As the technology matures, additional modules will be added. LFAST is expected to contribute to the study of exoplanet atmospheres, supernovae and neutron star – black hole mergers.





Lazuli will be the largest privately funded space telescope

Credit: Schmidt Sciences

The Argus Array of 1,200 telescopes

Credit: Schmidt Sciences

Artist's rendering of the Large Fiber Array Spectroscopic

Credit: University of Arizona/Schmidt Sciences

Artist's rendering of the Deep Synoptic Array of 1,600 radio dishes

Credit: Caltech/Schmidt Sciences

NASA's Pandora Spacecraft to Study Alien Atmospheres

On January 11th, NASA's Pandora space telescope was launched into a sun-synchronous low-Earth orbit. It is the first space telescope specifically built to study the starlight passing through the atmosphere of exoplanets as they move in front of their host stars. The orbit will enable long, uninterrupted observations of the target stars with the spacecraft's solar panel in constant sunlight.

Pandora's 18 inch (.45 meter) Cassegrain telescope will send the filtered starlight to both an infrared and visible detector as it looks for hydrogen or water-dominated atmospheres. During Pandora's prime mission, 20 known exoplanets will be observed over 10 transits, accumulating about 24 hours of total observing time for each target. The host stars are all less massive and cooler than our Sun with spectral classes K and M.

Artist's rendering of the Pandora spacecraft without thermal blanketing

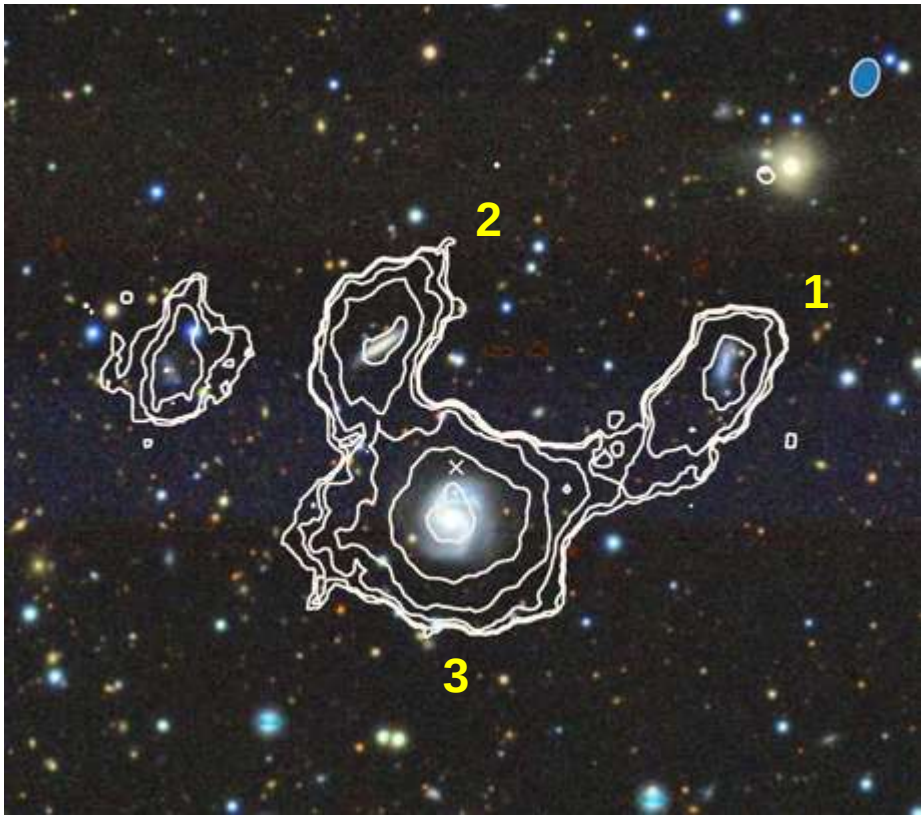
Credit: NASA's Goddard Space Flight Center/CI Lab

A Serendipitous Discovery

Astronomers using the South African MeerKAT radio telescope planned on observing the star-forming gas in a single radio galaxy. The team didn't find any neutral hydrogen, the fuel for star formation, in the galaxy they were studying. What they did find, however, in their data from a single 2.3 hour observation, were 49 additional and previously unknown, gas-rich galaxies.

Neutral hydrogen atoms emit radio waves at a 21 cm (8.3 inch) wavelength. Detection of the faint emission by large radio telescopes can be used to trace the distribution of this gas within and between galaxies. An abundance of neutral hydrogen is a signature of active star formation.

As an example, researchers found that galaxies 1, 2 and 3 are connected by neutral hydrogen. Galaxy 3, a large spiral, is the most active, suggesting that it may be stripping gas from the other two, smaller galaxies to bolster its own star formation.



Neutral hydrogen abundance from the MeerKAT survey illustrating the connection/interaction of the three galaxies

" A serendipitous discovery of H i-rich galaxy groups with MeerKAT," M Glowacki, L Albrow, T Reynolds, E Elson, E K Mahony, J R Allison, Monthly Notices of the Royal Astronomical Society, Volume 529, Issue 4, April 2024, Pages 3469–3483

What Happened to T Corona Borealis?

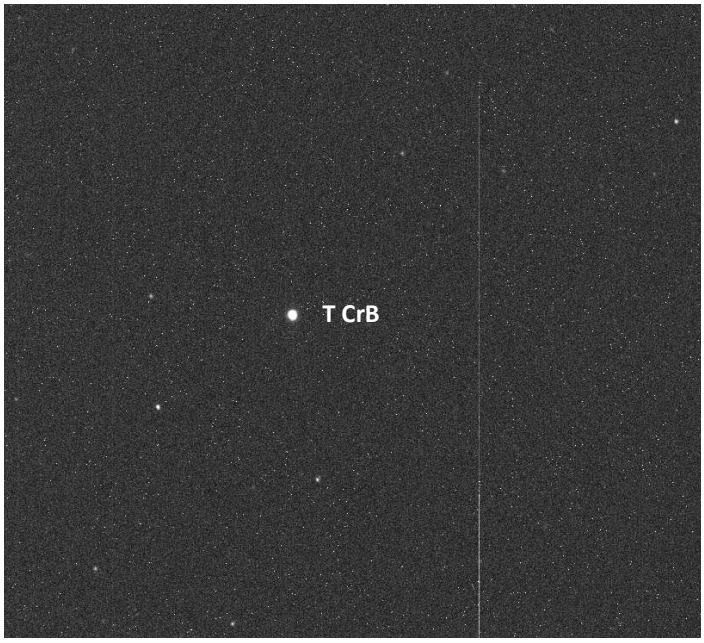
T Coronae Borealis is a binary star within the boundaries of the constellation Corona Borealis, the Northern Crown. At 10th magnitude the binary is invisible to the eye without optical aid.

The system consists of a white dwarf star and a red giant. Located at distance of almost 3,000 light years, the two stars orbit one another in close proximity – about half the distance between Earth and Sun. The red giant, in its final stage of stellar evolution, is shedding its outer layers of hydrogen, some of which is falling on the white dwarf. Over time, this layer of red giant hydrogen builds until the pressure and temperature reaches a critical point. At this time, the layer explodes in a runaway thermonuclear reaction, destroying the layer but leaving the underlying white dwarf star intact. The explosion briefly brightens the "star" in our sky to that comparable to 2nd magnitude Polaris.

The process then begins again, repeating roughly every 80 years, based on past sightings. As such, T Corona Borealis is considered a recurrent nova.

The rapid brightening last occurred in 1946. Prior to the event, the binary dimmed, about a year before the outburst. Such a dimming was detected in April 2024, so expectations were high for a 2025 nova. While a sudden increase of the accretion rate for T Coronae Borealis was reported in February of 2025, the remainder of the year passed without incident.

Coronae Borealis is currently in the morning sky and being monitored by both professional and amateur astronomers. When the brightening event does occur, it will be short-lived, fading fast after reaching peak brightness, so it is important to watch for news bulletins if you want to catch this rare celestial event.



The binary star system T Coronae Borealis (T CrB)

Image credit: McCarthy Observatory

Depiction of a white dwarf hidden a disk of gas flowing from the red giant

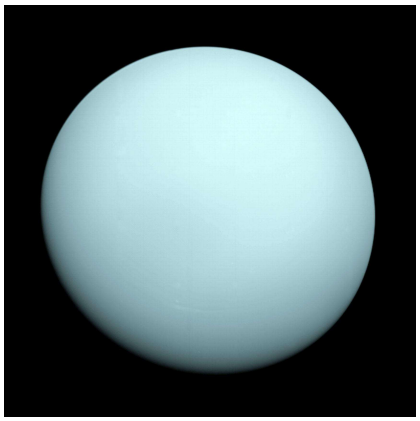
Credit: NASA/Goddard Space Flight Center

NASA FY26 – Funding for Uranus Orbiter Study

NASA's 2026 appropriations include funding for the "formulation of the Uranus Orbiter and Probe mission." A flagship mission to the ice giant was identified as a high priority in the 2012–2022 Planetary Decadal Survey, having only been visited once before when Voyager 2 flew by in January 1986.

Uranus and Neptune are unlike the gas giants Jupiter and Saturn, not only in size but with slower rotation, asymmetric magnetospheres and chemical composition. Uranus is of particular interest with its extreme axial tilt (98°), windy atmosphere and low internal heat.

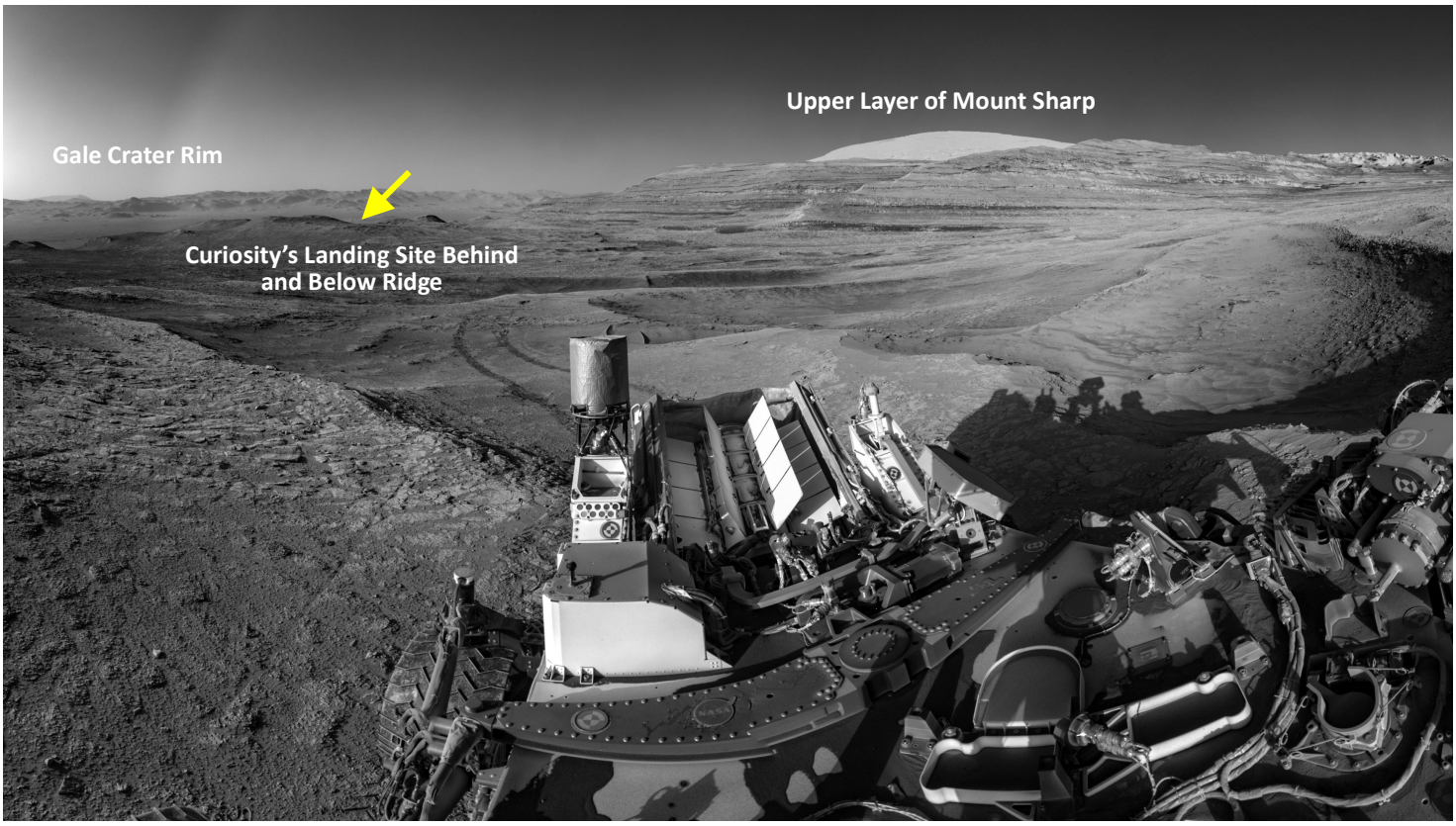
If fully funded, a Uranus mission could launch in the early 2030s and, depending upon the trajectory and launch vehicle available, reach the seventh planet in about 13 years. The mission would likely incorporate a flyby of Uranus' moons Miranda, Ariel, Titania, Oberon, and Umbriel for signs of subsurface oceans, as well as explore the 13 known, faint, and narrow ring systems that encircle the planet.



Uranus from Voyager 2 in 1986

Credit: NASA/JPL-Caltech

Ascending Aeolis Mons (Mount Sharp)



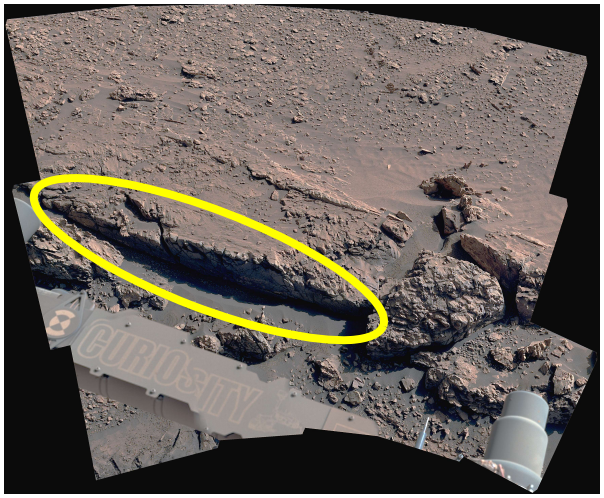
NASA's Curiosity rover landed on Mars on August 5, 2012. The rover was set down by a rocket-powered sky crane onto the floor of Gale Crater, a 93 mile wide (150 km) impact crater estimated to be between 3.8 and 3.5 billion years old. In the center of the crater is a 3 mile (5 km) high mountain comprised of layers of wind-blown and water-deposited sediments. Since its landing, Curiosity has been exploring the foothills of the mountain, finding evidence of persistent surface water, as well as a climate that transitioned from warm and wet to the cold and dry conditions that we see today.

Over the past 13 years, the rover has driven 22.5 miles (36.2 km) while moving higher up on the mountain. The mosaic (above) is comprised of 15 separate images, captured as Curiosity crossed an area defined by a network of boxwork formations - hardened ridges of mineral deposits.

Scientists believe that these low ridges were formed by ancient groundwater as the climate became drier. Curiosity's onboard chemistry laboratory has also found an abundance of salty minerals (magnesium sulfates) in the area, which can form when water evaporates.

Rear view of Mars Science Laboratory (Curiosity) rover with nuclear power source (with white radiator fins) and cylindrical UHF antennae

Credits: NASA/JPL-Caltech



Boxwork Ridge Segment

Credits: NASA/JPL-Caltech/MSSS

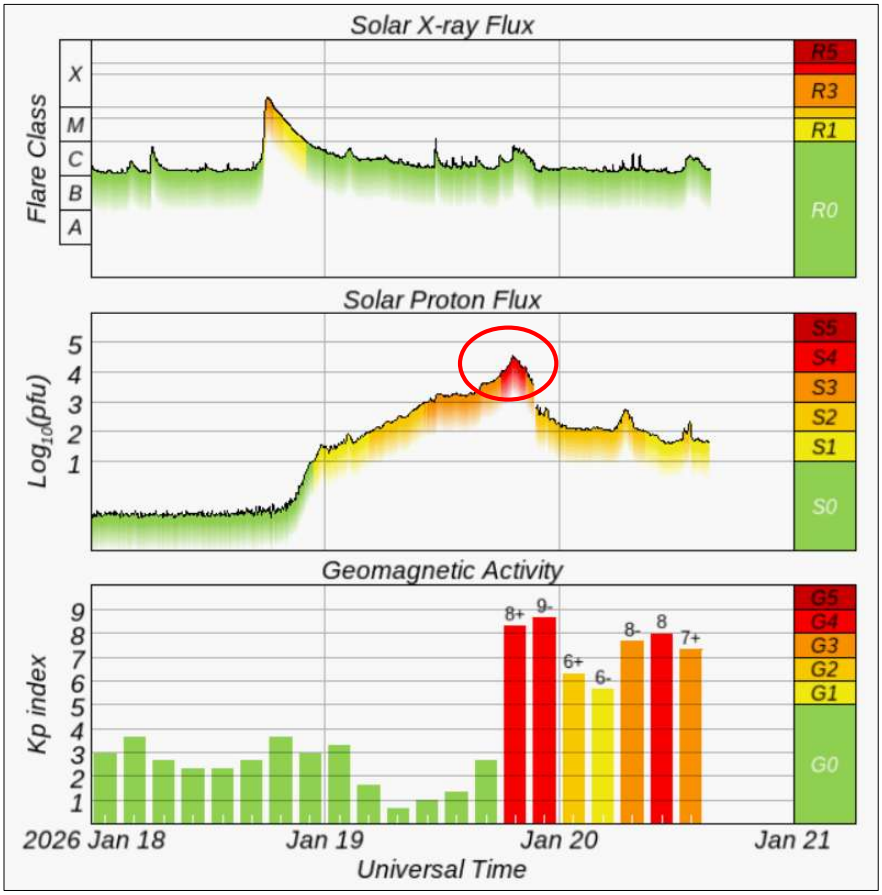
Curiosity is equipped with a variety of instruments, including the Sample Analysis at Mars (SAM) instrument suite. The suite analyzes samples delivered by the rover's impact drill or scoop with its Gas Chromatograph, a Quadrupole Mass Spectrometer, and a Tunable Laser Spectrometer to detect organic and inorganic molecules associated with life. The rover's CheMin (Chemistry & Mineralogy) instrument suite is able to identifies minerals using X-ray diffraction. Curiosity is also equipped with a powerful laser that can vaporize rock from up to 25 feet (8 meters) away. The spark created in the annihilation can then be analyzed by an onboard telescope and spectrometer to determine the chemical composition.

Severe Radiation Storm

A fast moving Coronal Mass Ejection (cloud of magnetized plasma), was launched from Sunspot 4341 on January 18th. The result of an X-Class solar flare, its impact on Earth's magnetic field generated impressive auroras over Europe on the following night (the storm was subsiding by the time the sun set on the east coast of the United States).

Of greater interest was the radiation storm generated by the outburst. The intensity of the storm (S4) had not been seen since the historic barrage of storms in October and early November 2003.

Severe radiation storms, although rare, pose an increased radiation exposure risk for astronauts and high-latitude airline flights. There is also an enhanced risk to satellites and disruption to high-frequency communications in polar regions.



The Solar Proton Flux is an indicator of the severity of a radiation storm

Source: NOAA Spaceweather Prediction Center

Coordinated Lunar Time (LTC)

Chinese scientists have developed a means to accurately synchronize time on the Moon with clocks on Earth. Clocks run a bit faster on the Moon due to its weaker gravity – by about 56 millionths of a second per day (a phenomenon called gravitational time dilation, which was predicted by Einstein's theory of general relativity).

In the past, the difference was addressed on a per mission basis, which were relatively infrequent. With renewed interest in colonizing the Moon, the International Astronomical Union formally called upon space agencies around the world to establish a lunar timekeeping standard. The White House Office of Science and Technology Policy tasked NASA with developing an implementation strategy for lunar time standardization by the end of 2026.

The Chinese software is designed to support lunar navigation as they prepare for crewed landings in the next few years. The tool, created by the Purple Mountain Observatory in Nanjing, accounts for both the moon's weaker gravity and its motion through space. This allows events on the Moon to be synchronized with clocks on Earth.

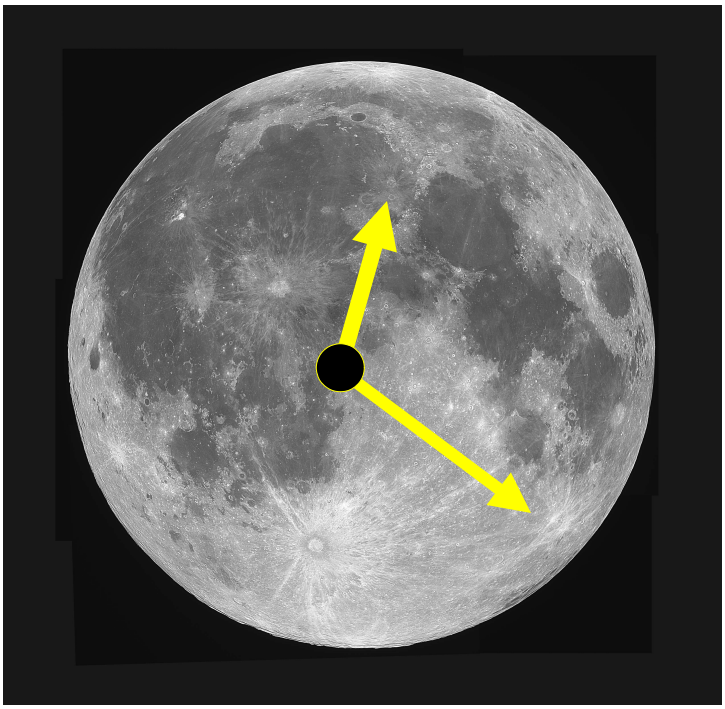
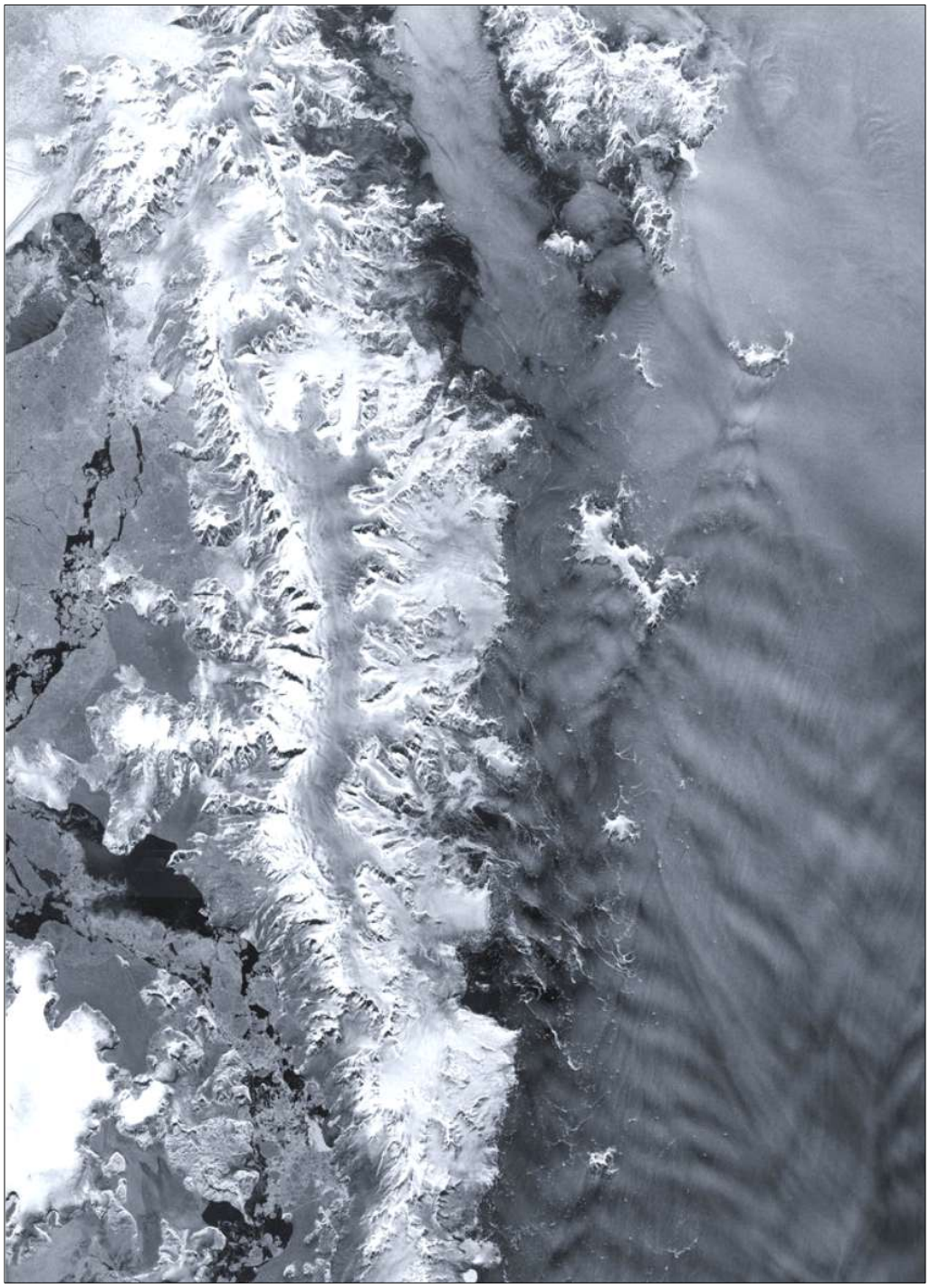


Photo: Bill Cloutier

Sentinel 1-D Commences Operations



The Antarctic Peninsula is part of the larger peninsula of West Antarctica. Roughly 800 miles in length (1,300 km), the rocky land form and adjacent islands are covered by an ice sheet (shown in white against the darker surrounding water).

Credit: Sentinel-1D

The first high-resolution images have been received from the European Space Agency's latest satellite in the Copernicus Sentinel-1 series (Sentinel-1-D). The satellite was launched in early November aboard an Ariane 6 rocket from the spaceport in French Guiana and placed in a Sun-synchronous polar orbit at an altitude of 430 miles (693 km).

The latest addition to the constellation will work with the previously launched Sentinel 1-A and 1-C satellites to monitor sea ice, glacier velocity, oil spills, marine winds, waves and currents, land-use change, land deformation, and support natural disaster planning and respond to other crisis situations.

Celebration of the John J. McCarthy Observatory's 25th Anniversary

February 7th

New Milford High School Auditorium

7:00 pm

and Dedication of the Center for NEO Studies

FREE EVENT*

All welcome: students, the community and our supporters

In the event of inclement weather, any changes will be posted on: www.mccarthyobservatory.org

* light refreshments will be served

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