German company becomes first in Europe to launch fully commercial orbital rocket

Isar Aerospace, founded in 2018 by three students at a German university, successfully launched a privately-developed rocket into low-Earth orbit Saturday from a Norwegian spaceport inside the Arctic Circle.

The two-stage rocket, named Spectrum, became the first fully commercial launch vehicle in Europe to reach orbit. With Saturday's success, Isar is the clear leader among a pack of several European launch startups vying to inject some competition into Europe's stagnant launch market.

Isar's 92-foot-tall (28-meter) Spectrum rocket lifted off at 4:12 pm EST (20:12 UTC) Saturday from Andøya Spaceport in northern Norway, where it was 10:12 pm local time as the final bluish hues of daylight faded from the late summer sky. Seven minutes later, the rocket was in orbit.

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https://arstechnica.com/space/2026/09/german-company-becomes-first-in-europe-to-launch-fully-commercial-orbital-rocket/

Farmed salmon may not be as

nutritious as it once was, new research suggests

Eat more fatty fish.

That dietary advice has changed the way the world consumes salmon, pushing consumer demand ever upward and production to higher and higher levels. Most of that demand is being met with farmed salmon: Today, nearly 70 percent of the salmon consumed on the planet are raised in pens and cages.

The US Department of Agriculture’s Dietary Guidelines for Americans recommend eating at least 8 ounces of fish a week and urges people to choose salmon or other species that are similarly high in “heart-healthy” Omega-3 fatty acids. But new research led by USDA scientists finds that levels of these fatty acids in farmed salmon have dropped considerably, potentially making the agency’s own advice, and similar recommendations, including from the American Heart Association, outdated and insufficient.

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Medieval manuscripts are

“biological time capsules” for deadly sheeppox virus

Sheeppox is a highly contagious, often fatal viral disease that was largely eradicated from much of European livestock in the 20th century. But there is still the occasional regional outbreak, such as the one that afflicted many flocks of sheep in Greece last year. In order to reconstruct how the virus has evolved over the last 3,500 years, scientists extracted and sequenced sheeppox DNA preserved in the animal skins used for the parchment of numerous medieval manuscripts. They reported their findings in a new paper published in the journal Science Advances.

“The recording of ancient DNA of pathogens has completely changed our understanding of infectious disease in the past, and here we show that parchment can also preserve animal pathogen DNA. It is possible that archives and libraries around the world also contain the genetic traces of disease outbreaks in animals in the past,” said co-author Louis L’Hôte, a graduate student at University College Dublin. “These genomes help us understand how these pathogens evolved and how they impacted past societies—such as sheeppox virus, which we show has been affecting Eurasian sheep herds for at least three and a half millennia.”

Per the authors, the earliest known written evidence of sheeppox infection dates to the first century CE, when Roman accounts described outbreaks of skin lesions (“pustules”) in the animals. There are more frequent mentions of deadly outbreaks of “pockes” or “variola” in sheep by the Middle Ages, recorded in various agricultural texts and accounting documents in France, Spain, and England. There seemed to be a decline in outbreaks in 17th-century France, although frequent outbreaks re-emerged in the 18th and 19th centuries, often with high mortality rates in the flocks. Great Britain did not

experience a sheeppox resurgence until 1847.

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Second complete map of a fruit fly brain completed

On Friday, researchers announced the completion of a map of every neuron in the brain of a male fruit fly. The "connectome" provides a tool that can accelerate neurobiology research. But it also provides an opportunity to do some science on its own, as the connectome of a female *Drosophila* had been completed earlier this year. The work also provided the team behind it the opportunity to refine tools that are likely to be applied to ever-more complex nervous systems, including (potentially) those of vertebrates.

The new work involved a collaboration between biologists at the Howard Hughes Medical Institute's Janelia Research Campus and computer scientists at Google—both acknowledge that neither could have done the project without the other. Preparation of an entire brain for imaging at the necessary resolution requires a distinct set of skills, as does interpreting what those images indicate. But building a complete picture of the hundreds of millions of synapses in a brain as small as the fruit fly's is a task that can't be achieved by humans in a manageable amount of time.

The people behind the effort expect that in the long term, the effort will be worth it, as the connectome could give neurobiologists a valuable tool for understanding how the brain works.

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https://arstechnica.com/science/2026/09/brain-of-a-male-fly-completely-mapped-joins-earlier-map-of-a-female-brain/

Meet the 2026 Ig Nobel Prize winners

It’s that time of year again, when we learn which lucky scientists are among the winners of the Ig Nobel Prizes. This year, the prizes honor research on designing the perfect splash-free urinal; using mosquito proboscises to “necroprint” tiny nozzles; studying composition rates of buried cotton underwear; and the aerodynamics of a healthy nose-blow, among other highlights.

Established in 1991, the Ig Nobels are a good-natured parody of the Nobel Prizes; they honor “achievements that first make people laugh and then make them think.” The unapologetically campy awards ceremony features miniature operas, scientific demos, and “24/7 lectures,” whereby experts must explain their work twice: once in 24 seconds and the second in just seven words.

Acceptance speeches are limited to 60 seconds. And as the motto implies, the research being honored might seem

ridiculous at first glance, but that doesn’t mean it’s devoid of scientific merit. In the weeks following the ceremony, the winners will also give free public talks, which will be posted on the Improbable Research website.

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https://arstechnica.com/science/2026/09/meet-the-2026-ig-nobel-prize-winners/

Spending deal comes with a bonus: Blocking political control of grants

On Tuesday, the House of Representatives passed a stopgap measure that would continue funding the US government through early December. While the measure still requires the signature of President Trump, it’s widely expected that he will act to avoid a government shutdown immediately before the midterm elections.

This is a normal part of how the US government has operated in recent years, as it’s often difficult to build the political support needed to pass a full year’s budget in advance. In fact, dissent within the House’s Republican caucus prevented them from agreeing on their own measure to keep the government open; instead, the House simply adopted a version of the spending bill that had previously passed the Senate.

From the perspective of scientists and their supporters, that adoption turned out to be a very good thing, because the

Senate’s budget bill, passed in early August, contains a provision that blocks the Office of Management and Budget (OMB) from implementing new rules that would give political appointees full control over what science is funded and allow them to cancel any grant at any time. The proposed rule has been widely decried as catastrophic for science, and it faced widespread opposition from scientific and health-focused organizations.

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Large genome models used to design new viruses

The same, yet different

In some ways, these designed viruses were quite similar to the original ΦX174, but in other ways they were quite distinct.

For the “the same” perspective, the most effective viruses in the group of 285 tended to look a lot like the original. The overall fraction of viable viruses was only 16 out of the 285 outputs tested (5.6 percent). But if you looked only at the outputs that were most similar to the original ΦX174 (those

with 98 percent sequence similarity and up), viability rose to 46 percent. So, if you don’t look a lot like a normal ΦX174, chances are good that you’re not going to work as a virus at all.

Most of the viable viruses had the same set of genes found in the original. None of them had even a single change in the stretch of DNA where the duplication of the virus’s genome starts.

All of that is in keeping with past studies that have shown that making even a single base change that alters just one amino acid in one of the proteins made from the virus’s genome had, on average, a 20 percent chance of inactivating the virus entirely. ΦX174 doesn’t just fear change; it’s typically murdered by it. Accordingly, the changes suggested by the AI produced a population of viable viruses that, on average, looked a lot like the original.

But, as individuals, the viruses were fairly distinct. One of them lost one of the viral proteins entirely, compensating for its loss with changes elsewhere in the genome. Another added an entirely new gene. Many had genes that were either longer or shorter than the original. One even replaced one of the ΦX174 genes with a gene from a very distantly related virus.

The researchers did an interesting analysis based on the idea that any one amino acid change had a 20 percent chance of inactivating the virus. Doing the math, they say that any viruses with less than 25 changes have only a 2.3 percent chance of being viable. Of the 300 or so viruses the AI output, five viruses fell in that range, and three of them were viable. At above 25 individual amino acid changes, the chances of producing a viable virus are essentially zero. Yet nearly a quarter of the AI-suggested viruses that had more than 25 changes were viable, including two that had over 50 amino acid alterations.

https://arstechnica.com/science/2026/08/large-genome-models-used-to-design-new-viruses/

Parasitic zombie-ant fungus thrives in mosses, too

The parasitic fungi in the *Cordyceps* genus are a favorite subject of nature documentaries. They've also infiltrated popular culture via the zombie-apocalypse video game *The Last of Us* (2013) and its TV adaptation, in which a parasitic fungus mutates to infect humans. Scientists are keen to study *Cordyceps* to learn more about the origins and intricate mechanisms underlying these pathogen-based diseases.

The latest finding: DNA analysis revealed the same fungus in both parasitized insects and surrounding mosses, according to a paper published in the journal IMA Fungus. (Yes, really.) This suggests a second life stage during which the fungus lives inside the moss, possibly an evolutionary adaptation to survive when insect hosts may be scarce. It could also explain why the host species seems to prefer biting into mosses during their final death throes.

As we've previously reported, there are more than 400 different species of *Cordyceps* fungi, each targeting a particular insect species, like ants, dragonflies, cockroaches, aphids, or beetles. The spores attach to the target insect, such as a carpenter ant, and germinate, spreading through the host's body via long tendrils called mycelia. *Cordyceps* essentially turns its host into a zombie

slave, compelling the ant to climb to the top of the nearest plant and clamp its tiny jaws in a death grip around a leaf or twig.

The fungus then slowly devours the ant, sprouting through its head in one final indignity. The bulbous growths on the ends of the mycelia burst, releasing even more spores into the air to infect even more unsuspecting ants. It’s not a great way to go: The entire process can take four to 14 days. Prior research showed that the zombification might be due to the release of a special chemical that causes the muscles in the infected ants’ mandibles to contract forcefully for that death-grip bite.

A 2017 study found that the fungal cells formed an elaborate, interconnected 3D network, enabling them to communicate and exchange nutrients. They essentially cut the brain off from the rest of the ant’s body so the networked cells can control its behavior. And in 2019, scientists found that the fungus doesn’t actually directly attach to an infected ant’s brain. Rather, it breaks apart the membrane that covers jaw-muscle fibers, causing contractions strong enough to damage or destroy the muscle filaments that slide past each other when the muscles contract.

https://arstechnica.com/science/2026/08/parasitic-zombie-fungus-thrives-in-mosses-too/

Here’s how engineers plan to save the satellite sent to

save NASA’s Swift mission

One week ago, more than 200 miles above the Earth, a refrigerator-size satellite making its way toward an attempted rescue of NASA’s $500 million Swift gamma-ray observatory suddenly spun out of control.

It didn’t look good. The spacecraft, named Link, was rotating on multiple axes, rendering it unable to maintain a reliable communications link with the ground and complicating efforts to arrest the spin. Two of the satellite’s three reaction wheels, used for pointing, also stopped working. Through sporadic radio contact, engineers discovered a problem with some of the spacecraft’s cold gas thrusters used for finer attitude control.

The Link satellite is built, owned, and operated by Katalyst Space Technologies, a satellite servicing startup that won a $30 million contract from NASA to fly up to the Swift observatory, grab onto it, and boost its orbit before succumbing to aerodynamic drag and burning up int he atmosphere.

The clock is ticking. In a few months, Swift will be too low for Katalyst to complete the rescue. This is the first time NASA has contracted with a commercial company to service one of its satellites. The space agency gave Katalyst less than a year to put the mission together. The Link satellite launched July 3 to begin the pursuit of Swift, and the mission proceeded mostly according to plan until last Saturday.

“When this happened, it was during one of the passes without comms,” said Ghonhee Lee, CEO of Katalyst, said in an interview with Ars. “We were, immediately prior, in a very stable configuration.”

Katalyst’s ground team, working from a control center near Denver, hurried to find a fix and recover the Link satellite. The good news was the spacecraft’s other systems remained healthy, including its power supply, three xenon-fueled electric thrusters, and the rendezvous and robotics hardware the Link satellite needs to capture Swift.

Keeping at it

Ars spoke with Lee, Katalyst’s chief executive, on Friday afternoon as the company’s ground team worked to stabilize the spacecraft. The first step involves using the satellite’s plasma engines to gradually slow the spin. The engines are primarily designed for orbit-raising, but they’re also suitable for attitude control because they can vector their thrust with a two-axis gimbal.

https://arstechnica.com/space/2026/08/heres-how-engineers-plan-to-save-the-satellite-sent-to-save-nasas-swift-mission/

Quantum computers outperform classical ones, with results you can trust

In this case, the team made a couple of key variations. The first is that it mostly performed what are called Clifford gates, which are relatively easy to simulate on classical hardware. But it sprinkled in a few non-Clifford gates (specifically T gates) of a specific type chosen in part

because they are less prone to error. “Z rotations (including T gates) are special in our hardware: they are implemented by virtual frame tracking and do not add extra noise,” the paper said.

But the T gates also help ensure that this is especially hard to simulate on a classical computer. “It’s got a stronger complexity argument because of the [T gates], which you can prove on average is exponentially hard to sample for a classical computer,” Gambetta told Ars. That will make it very challenging for classical algorithms to catch up.

The work also linked in a few additional qubits around the periphery of those used for the algorithm, arranged so that gentle measurements performed during the operations could detect whether errors had occurred; if they were detected, the results were discarded. (Note that this would also throw out valid results that were flagged by an erroneous read of these additional qubits.)

The result was an algorithm that “combines the broad output statistics of hard sampling problems with circuit structure that can be exploited for error detection and fidelity certification,” the team said.

The last of the new results comes from quantum software developer Algorithmiq, which used an algorithm similar to the one in Google’s “quantum echoes” work. A set of gates first alters a quantum system, after which the process is reversed. Additional operations performed during the reversal prevent the system from returning to its original state—instead, the noise creates an imperfect “echo” of the forward process. As with one of the earlier works, attempts to simulate this on classical hardware require some simplification, and different simplification methods yield different results. By its nature, then, the problem is beyond the reach of classical hardware.

https://arstechnica.com/science/2026/07/if-a-quantum-computer-

outperforms-normal-ones-can-you-tell-if-its-right/