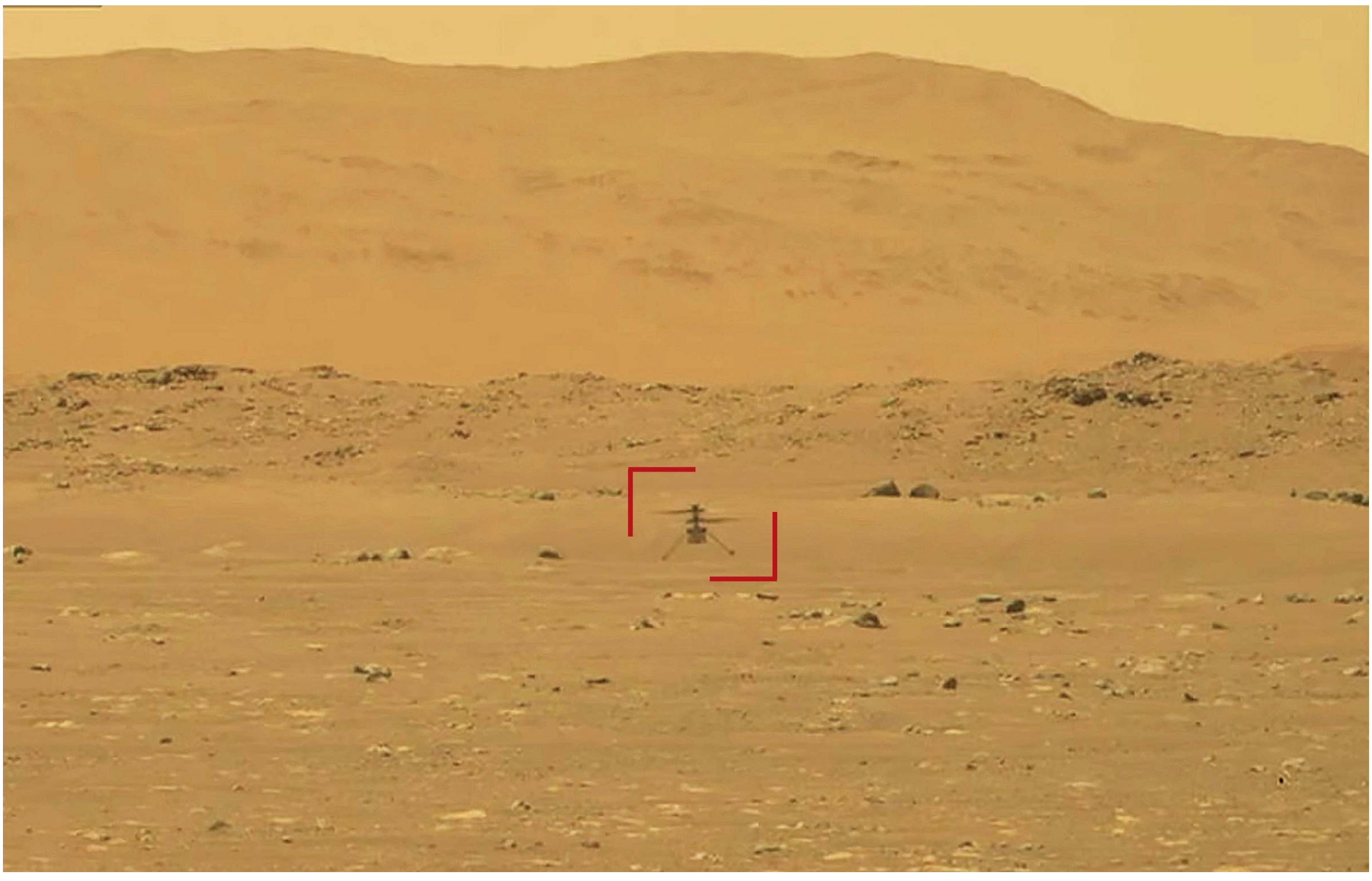
SPECIAL REPORT



In this image from NASA, NASA's experimental Mars helicopter Ingenuity lands on the surface of Mars on April 19. The little 4-pound helicopter rose from the dusty red surface into the thin Martian air Monday, achieving the first powered, controlled flight on another planet. (NASA via AP)

## Science freed from the surface forever

# GOOSEBUMPS FROM A WRIGHT BROTHERS MOMENT

# Ingenuity takes flight on Mars

CAPE CANAVERAL, Fla., April 20, (AP): NASA's experimental helicopter Ingenuity rose into the thin air above the dusty red surface of Mars on Monday, achieving the first powered flight by an aircraft on another planet.

The triumph was hailed as a Wright brothers moment. The mini 4-pound (1.8-kilogram) copter even carried a bit of wing fabric from the Wright Flyer that made similar history at Kitty Hawk, North Carolina, in 1903.

It was a brief hop — just 39 seconds and 10 feet (3 meters) — but accomplished all the major milestones.

"Goosebumps. It looks just the way we had tested," project manager MiMi Aung said as she watched the flight video during a later briefing. "Absolutely beautiful flight. I don't think I can ever stop watching it over and over again."

Flight controllers at NASA's Jet Propulsion Laboratory in California declared success after receiving the data and images via the Perseverance rover. Ingenuity hitched a ride to Mars on Perseverance, clinging to the rover's belly when it touched down in an ancient river delta in February.

The $85 million helicopter demo was considered high risk, yet high reward.

Scientists cheered the news from around the world, even from space, and the White House offered its congratulations.

"A whole new way to explore the alien terrain in our solar system is now at our disposal," Nottingham Trent University astronomer Daniel Brown said from England.

This first test flight — with more to come by Ingenuity, the next as soon as Thursday — holds great promise, Brown noted. Future helicopters could serve as scouts for rovers, and eventually astronauts, in difficult, dangerous places.

Ingenuity has provided a third dimension to planetary exploration and "freed us from the surface now forever," said JPL director, Michael Watkins.

Ground controllers had to wait more than three excruciating hours before learning whether the preprogrammed flight had succeeded 178 million miles (287 million kilometers) away. The first attempt had been delayed a week because of a software error.

When the news finally came, the operations center filled with applause, cheers and laughter. More followed when the first black and white photo from Ingenuity appeared, showing the helicopter's shadow as it hovered above the surface of Mars.

"The shadow of greatness, #MarsHelicopter first flight on another world complete!" NASA astronaut Victor Glover tweeted from the International Space Station.

Next came stunning color video of the copter's clean landing, taken by Perseverance, "the best host little Ingenuity could ever hope for," Aung said in thanking everyone.

The helicopter hovered for 30 seconds at its intended altitude of 10 feet (3 meters), and spent 39 seconds airborne, more than three times longer than the first successful flight of the Wright Flyer, which lasted a mere 12 seconds on Dec. 17, 1903.

To accomplish all this, the helicopter's twin, counter-rotating rotor blades needed to spin at 2,500 revolutions per minute — five times faster than on Earth. With an atmosphere just 1% the density of Earth's, engineers had to build a helicopter light enough — with blades spinning fast enough — to generate this otherworldly lift. The Martian wind was relatively gentle Monday: between 4 mph and 14 mph (7 kph to 22 kph).

More than six years in the making, Ingenuity is just 19 inches (49 centimeters) tall, a spindly four-legged chopper. Its fuselage, containing all the batteries, heaters and sensors, is the size of a tissue box. The carbon-fiber, foam-filled rotors are the biggest pieces: Each pair stretches 4 feet (1.2 meters) tip to tip.

Ingenuity also had to be sturdy enough to withstand the Martian wind, and is topped with a solar panel for recharging the batteries, crucial for surviving the minus-130 degree Fahrenheit (minus-90 degree-Celsius) Martian nights.

NASA chose a flat, relatively rock-free patch for Ingenuity's airfield. Following Monday's success, NASA named the area for the Wright brothers.

"While these two iconic moments in aviation history may be separated by time and ... million miles of space, they now will forever be linked," NASA's science missions chief Thomas Zurbuchen announced.

The little chopper with a giant job attracted attention from the moment it launched with Perseverance last July. Even Arnold Schwarzenegger joined in the fun, rooting for Ingenuity over the weekend. "Get to the chopper!" he shouted in a tweeted video, a line from his 1987 sci-fi film "Predator."

Up to five increasingly ambitious flights are planned, and they could lead the way to a fleet of Martian drones in decades to come, providing aerial views, transporting packages and serving as lookouts for human crews. On Earth, the technology could enable helicopters to reach new heights, doing things like more easily navigating the Himalayas.

Ingenuity's team has until the beginning of May to complete the test flights so that the rover can get on with its main mission: collecting rock samples that could hold evidence of past Martian life, for return to Earth a decade from now.

The team plans to test the helicopter's limits, possibly even wrecking the craft, leaving it to rest in place forever, having sent its data back home.

Until then, Perseverance will keep tabs on Ingenuity. Flight engineers affectionately call them Percy and Ginny.

"Big sister's watching," said Malin Space Science Systems' Elsa Jensen, the rover's lead camera operator.

# UAE names second astronaut batch

In a new step that translates to the UAE's relentless pursuit towards global leadership in the field of space exploration, His Highness Sheikh Mohammed bin Rashid Al Maktoum, Vice President and Prime Minister of the UAE and Ruler of Dubai announced the names of the two new Emirati astronauts who will form the second batch of the UAE Astronaut Programme, and further revealed that it includes the first female Arab astronaut. The new batch of astronauts will continue the scientific march that the UAE launched years ago with the aim of strengthening the space sector and developing a national team of astronauts capable of achieving the country's aspirations in scientific exploration and participating in manned space exploration.

His Highness Sheikh Mohammed bin Rashid Al Maktoum said: " Today we announce two new Emirati astronauts, among them the first female Arab astronaut — Nora AlMatrooshi and Mohammed AMulla. They were selected from more than 4,000 applicants and their training will soon begin for international space flights. We congratulate the country on them. We congratulate them and count on them to raise the name of the UAE ever higher in space."

**An integrated team**

The two new astronauts join astronauts Hazzaa AlMansoori and Sultan AlNeyadi to form a team of four under the UAE Astronaut Programme, serving the strategy of the Mohammed Bin Rashid Space Centre base on achieving the vision of the wise leadership of the UAE and make it one of the leading nations in the field through the National Space Programme.

**First female Arab astronaut, Nora AlMatrooshi**

The second batch of the UAE Astronaut Programme includes the first Arab astronaut, Nora AlMatrooshi, who obtained a bachelor's degree in mechanical engineering from the UAE University in 2015 and has years of experience in the field of engineering. AlMatrooshi excelled in the fields of engineering and mathematics during her academic years, placing first in the UAE for the 2011 International Mathematical Olympiad and representing the UAE in the Youth Conference at the United Nations in the summer of 2018 and winter of 2019.

**Astronaut Mohammed AlMulla**

The other astronaut in the second batch of the UAE Astronaut Programme is Mohammed AlMulla, who at the age of 19 obtained a commercial pilot's license from the Australian Civil Aviation Authority to become the youngest pilot in Dubai Police. He then set another record, becoming the youngest trainer in the same organisation at 28 years, after getting his pilot trainer license from GCAA. While pursuing his career he obtained a bachelor's degree in law and economics in 2015 and an Executive Master of Public Administration from the Mohammed Bin Rashid School of Government in 2021.

AlMulla is currently the Head of Training Department of the Air Wing Centre at Dubai Police. He has received the Bravery Medal from His Highness Sheikh Mohammed bin Rashid Al Maktoum and the Commander in Chief Award for the Best Officer in a Specialised Field, in addition to the Dubai Police Global Excellence Award.

**For humanity**

The future missions for Emirati Astronauts will provide the scientific and global community with new scientific knowledge and will support the advancement of the space industry in the Arab world and contribute to making a better future for humanity.

**An outstanding example from the Arab World**

The steps the UAE has taken in preparing astronauts, who exhibit the highest records in fields such as technology, science and math and sending them to space is in fact an invitation for the Arab youth to dream big and follow suit. The UAE today has carved a strong name for itself in the Arab space sector, capitalizing on the impressive achievements so far such as the success of the Hope Probe, the first Arab mission to Mars.

**Towards the next 50 years**

The announcement of the second batch of astronauts is a testimony of the progressive vision of the leadership towards building a knowledge-based economy in a smart community founded by the pillars of technological innovation and scientific research. This defines the journey towards UAE Centennial 2071.

The national space sector recorded investments of more than AED22 billion over the past few years with the selection of astronauts to empower national cadres being an integral project leading this sector.

## editor's choice