

NASA's Ingenuity helicopter survives first night alone on Mars

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This NASA illustration depicts Mars Helicopter Ingenuity during a test flight on the Red Planet

NASA's Ingenuity mini-helicopter has survived its first night alone on the frigid surface of Mars, the US space agency said, hailing it as "a major milestone" for the tiny craft as it prepares for its first flight.

The ultra-light aircraft was dropped on the surface on Saturday after detaching from the belly of the Perseverance rover, which touched down on the Red Planet on February 18.

Detached from the Perseverance, Ingenuity had to rely on its own solar-powered battery to run a vital heater to protect its unshielded electrical components from freezing and cracking during the bitter Martian night, where temperatures can plunge as low as minus 130 degrees Fahrenheit (minus 90 degrees Celsius).

Making it through the frigid Martian night was "a major milestone for the small rotorcraft," NASA said in a statement Monday.

"This is the first time that Ingenuity has been on its own on the surface of Mars," said MiMi Aung, Ingenuity project manager at NASA's Jet Propulsion Laboratory.

"But we now have confirmation that we have the right insulation, the right heaters, and enough energy in its battery to survive the cold night, which is a big win for the team. We're excited to continue to prepare Ingenuity for its first flight test."

Ingenuity helicopter: first powered flight on Mars
Expected to make its first flight attempt no earlier than April 11

MAIN MISSION
First test of a powered flight on another planet

Test flights during a 30-Martian-day* experimental window

Take off, fly, and land with minimal commands from Earth sent in advance

INGENUITY:

- 1 hitched a ride on rover's belly, which touched down on Feb 18
- 2 deployed to Martian surface on Apr 3

- FLIGHT ALTITUDE: up to 5 m
- RANGE: up to 300 m
- MARS ENVIRONMENT: Very thin atmosphere, less than 1% the density of Earth's
- HELICOPTER WEIGHT: 1.8 KG on Earth, 0.68 KG on Mars

Solar panel Power: good for one 90-second flight per day

Blades Span: 1.2 m

Avionics and body

Sensors, cameras

Legs

Batteries

Antennas

PERSEVERANCE ROVER

2.2 m

*Martian days: 24 h 37 mins
Earth days: 23 h 56 mins

Sources (including helicopter image): NASA/JPL-Caltech

AFP

Graphic on Ingenuity, the helicopter that hitched a ride on the Perseverance rover, which is scheduled to make its first flight attempt no earlier than April 11.

Over the coming days, Ingenuity will undergo tests of its rotor blades and motors.

If all goes well, Ingenuity is expected to make its first flight attempt no earlier than the evening of April 11, the Jet Propulsion Laboratory said.

It will be the first aircraft to attempt powered, controlled flight on another planet.

Tribute to Wright brothers

Ingenuity is carrying a small piece of cloth that covered one of the wings of the Wright brothers' first aircraft which achieved the first powered flight on Earth at Kitty Hawk in 1903, to pay tribute to the milestone.

Its attempt will also coincide with the 60th anniversary of the first human space flight, by Soviet cosmonaut Yuri Gagarin on April 12, 1961, and 40th anniversary of the April 12, 1981 launch of the first space shuttle, Columbia.

Ingenuity will be attempting to fly in an atmosphere that is one percent the density of Earth's, which makes achieving lift harder—but will be assisted by gravity that is one-third of our planet's.

"Our 30-sol test schedule is frontloaded with exciting milestones," said Teddy Tzanetos, Ingenuity deputy operations lead.



Ingenuity (shown on the surface of Mars behind the Perseverance rover) will perform tests of its rotors and motors over the coming days ahead of its first flight attempt, scheduled no earlier than April 11

"Whatever the future holds, we will acquire all the [flight](#) data we can within that timeframe."

The four-pound (1.8-kilogram) rotorcraft cost NASA around \$85 million to develop and is considered a proof of concept that could revolutionize space exploration.

Ingenuity is now alone on the surface of Mars after detaching from the belly of the Perseverance rover

Future aircraft could cover ground much quicker than rovers, and explore more rugged terrain.

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The first flight will involve climbing at a rate of about three feet (one meter) per second to a height of 10 feet (three meters), hovering there for 30 seconds, then descending back to the surface.

Ingenuity will be taking high-resolution photography as it flies from its "airfield" in the Jezero Crater.

A series of flights are planned over its mission lasting 30 Martian sols (31 Earth days).

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