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Press Release

maxon involved in another historical milestone: a one-way flight on Mars.

Ingenuity helicopter currently on Mars made its first one way flight. Six DC micromotors from maxon are inside Ingenuity helping steer the direction of flight.

In its fifth flight on the Red Planet, Ingenuity helicopter has reached another historical milestone succeeding in the first one-way flight from Wright Brothers Field to another airfield 129 metres to the south. Upon arrival, the rotorcraft rose to an altitude of 10 metres and captured high-resolution colour images of the surrounding terrain before touching down. The one-way flight began at 3:26pm EDT, 12:33pm local Mars time and lasted 108 seconds.

There are six maxon DC micromotors with a diameter of 10 millimeters that control the tilt of Ingenuity's rotor blades, which determines the direction of flight. Aiko Stenzel, Aerospace Design Engineer at maxon, was part of the team that developed the DC motors. "The biggest challenge was the extreme weight requirement. We had to take off every tenth of a gram we could, so that the helicopter can fly in the thin atmosphere on Mars. It's great that we were able to find a solution with enough power to adjust the rotor blades, despite the weight reduction — and which could handle all the vibration and temperature fluctuations as well."

According to NASA JPL, the flight marked Ingenuity's transition to a new operations demonstration phase, which will focus on investigating the range of capabilities rotorcraft operating from Mars can provide. This is expected to include scouting, aerial observations of areas not accessible by a rover, and detailed stereo imaging from atmospheric altitudes.

Ingenuity is now expected to await future instructions, relayed via Perseverance, from mission controllers.

The Perseverance rover is also scheduled to travel south, where it is expected to commence scientific operations and sample collection. Perseverance has 10 maxon DC motors inside, including for the first time brushless DC motors: nine EC 32 flat DC motors and one EC 20 flat DC motor in combination with a GP 22 UP (Ultra Power) planetary gearbox. Years of collaboration between maxon and the space experts at JPL led to the development of the BLDC motors which handle the valuable soil samples on Mars during Perseverance's mission.

Like all of our electric DC motors used on Mars, they are based on standard catalogue products especially modified to suit the harsh conditions of Space travel. Florbela Costa, SpaceLab Project Manager at maxon said "(the DC motors) are different from other applications, above all because of their generally higher quality requirements for things like resistance to vibration and temperature. Consequently, everything needs to be analysed and tested. Parts used in our standard motors are re-evaluated to make absolutely certain that they will function in space or on other planets".

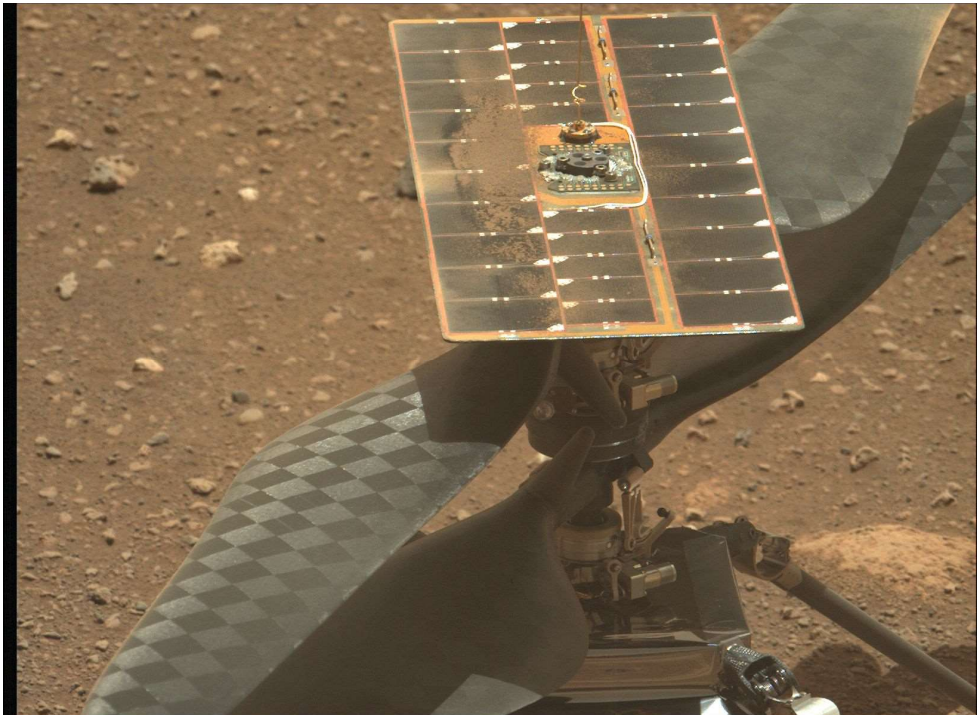
The Aerospace team at maxon can't afford to make mistakes as not only is there no way to fix materials once they're on Mars but it could also cause the entire mission to fail. "When making motors for Mars, nearly everything has to be done by hand. Every move and every assembly step have to be documented and has to be right — we can't afford to make mistakes. We're working with materials that you can't just get from the warehouse" said Dominik Omlin, Production Engineer Aerospace at maxon.

maxon have expertise in space applications and have established quality assurance processes that meet the expectations of the industry. Customers from other industries where requirements can be just as demanding, like the medical sector, also benefit from this know-how.

For more information about DC motors for harsh environments please contact maxon motor Australia tel. +61 2 9457 7477. Visit maxonworld to follow the Mars adventure.

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The press release is available on the internet at: www.maxongroup.net.au



maxon DC motors onboard Ingenuity © NASA/JPL-Caltech
Image Credits: NASA/JPL-Caltech.



NASA's Ingenuity Mars Helicopter's fifth flight was captured on May 7, 2021, by one of the navigation cameras aboard the agency's Perseverance rover. The helicopter ascended to a new height record of 10 meters and flew 129 meters to a new landing site. This was the first time the helicopter made a one-way flight. It was airborne a total of 108 seconds. © NASA/JPL-Caltech

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The Swiss specialist for quality drives

maxon is a developer and manufacturer of brushed and brushless DC motors, as well as gearheads, encoders, controllers, and entire mechatronic systems. maxon drives are used wherever the requirements are particularly high: in NASA's Mars rovers, in surgical power tools, in humanoid robots and in precision industrial applications, for example. To maintain its leadership in this demanding market, the company invests a considerable share of its annual revenue in research and development. Worldwide, maxon has more than 3000 employees at nine production sites and is represented by sales companies in more than 30 countries.