Press Release

January 9, 2012

Eight Years Opportunity: Mars Rover Finds Signs of Water.

Built for eternity.

In the eighth year of its Mars expedition, the Mars rover Opportunity has found evidence that water once existed on Mars. According to briefings by NASA, in late 2011 the rover found a vein of a notably light colored mineral – apparently gypsum – deposited by flowing water.

For scientists, the gypsum deposits found by Opportunity on Mars are a sensation. They are convinced that the discovery proves that water once flowed at this site. On its way through the desolate Meridiani plane, the rover came across the light colored streaks in the ground by chance. An analysis of the minerals should help scientists better understand the geological history of Mars. Billions of years ago, the atmosphere on Mars was significantly denser; evidence indicates that there was once water in abundance on the surface of the planet. Today, the atmosphere is too thin to allow water to exist in liquid form.

The deposits formed at the same point on Mars where they are located today. At this very point, water escaped from cracks in the bedrock. Calcium that had dissolved from the volcanic rock was washed away. In the process, the calcium reacted with sulfur that had either leached from the rock or was introduced by volcanic gases. One of the analyzed gypsum deposits on the edge of Endeavour Crater is approximately 50 centimeters long and two centimeters wide. Prior to this discovery, Opportunity had not found anything similar to the gypsum deposit, which scientists refer to as the "Homestake." According to Steve Squyres, principal investigator for Opportunity and professor at Cornell University in Ithaca, this mineral is common on Earth, but on Mars, this discovery is almost a miracle; the type of event that makes geologists jump out of their chairs. "This tells a slam-dunk story that water flowed through underground fractures in the rock," says Squyres.

Eight years breaking new ground with maxon motors

In January 2012, Opportunity will celebrate its eighth birthday on the Red Planet. Originally, the mission was planned to last just 90 days. Since January 25, 2004, the rover has been exploring Mars on behalf of NASA. Opportunity has covered approximately 35 kilometers and, in the process, transmitted almost 162,400 images of the surface and the atmosphere of the Red Planet to the mission control center in Pasadena, California.

Motors manufactured by maxon motor ensure that the Mars rover is able to safely navigate the surface of Mars. A total of 39 DC motors by maxon motor are at work in Opportunity, and they continue to diligently carry out their tasks. The precision drives are used to drive the robotic arm, the Rock Abrasion Tool (RAT), the camera operation, and the control mechanism for the six wheels that propel the 180 kilogram vehicle, 1.6 meters long and 1.5 meters high, across the surface of Mars.
The motors are largely standard products with diameters of 20 to 25 millimeters and an efficiency of over 90 percent. Minor modifications were necessary to adapt the motors for the harsh environmental conditions: the temperature on Mars can fluctuate from approx. -120 degrees Celsius to 25 degrees Celsius. In addition, the motors had to withstand the special conditions during the voyage to Mars. And the atmosphere, which largely consists of carbon dioxide, is also a very special environment for the high-precision motors.

Originally, two rovers were active on Mars; however, since March 2010, NASA has been out of contact with Opportunity's twin, "Spirit." A next-generation rover is already on the way to resume where Spirit left off: "Curiosity," a space lab launched by NASA in November, is scheduled to land on Mars in August 2012.

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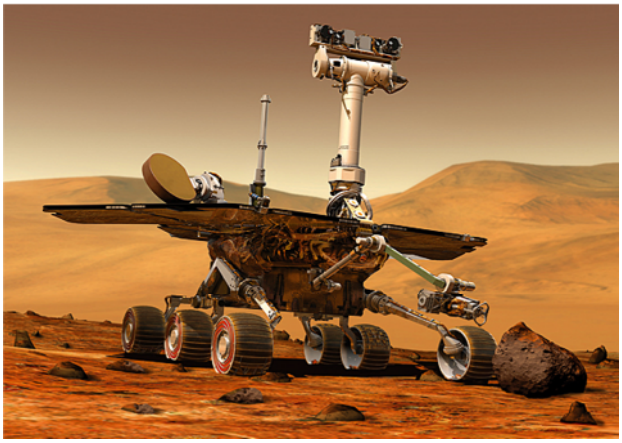

Fig. 1: Mars rover Opportunity.
Image credit: NASA/JPL-Caltech

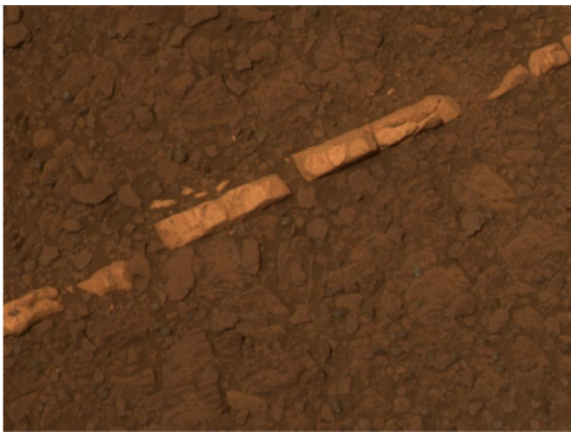

Fig. 2: An image of Homestake created with Opportunity's panoramic camera, using a combination of filters.
Image credit: NASA, JPL-Caltech

Fig. 3: RE 25 and RE 20 DC motors by maxon motor.
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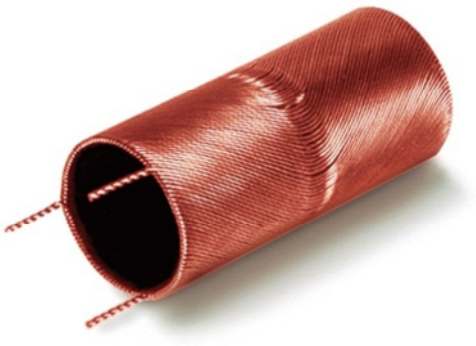

Fig. 4: Self-supporting ironless winding, designed by maxon. © 2011 maxon motor