

NASA's older Mars rover notches another milestone

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This image provided by NASA shows the late-afternoon shadow cast by the Mars rover Opportunity at Endeavour Crater. The six-wheel rover landed on Mars in January 2004 and is still going strong. (AP Photo/NASA)

Opportunity, NASA's other Mars rover, has toiled around the red planet for so long it's easy to forget it's still alive.

Some 5,000 miles (8,000 kilometers) away from the limelight surrounding Curiosity's every move, Opportunity this week quietly embarks on its tenth year of exploration—a sweet milestone since it was only tasked to work for three months.

"Opportunity is still going. Go figure," said mission deputy principal investigator Ray Arvidson of Washington University in St. Louis.

True, it's not as snazzy as Curiosity, the most high-tech interplanetary rover ever designed that awed the world with its landing near the [Martian equator](#) five months ago.

After so many years crater-hopping, Opportunity is showing its age: It has an arthritic joint in its [robotic arm](#) and it drives mostly backward due to a balky front wheel—more annoyances than show-stoppers.

For the past several months, it has been parked on a clay-rich hill along the western rim of Endeavour Crater that's unlike any scenery it encountered before. It plans to wrap up at its current spot in the next several months and then drive south where the terrain looks even riper for discoveries.

Long before Curiosity became everybody's favorite rover, Opportunity was the darling.

The six-wheel, solar-powered rover parachuted to Eagle Crater in Mars' [southern hemisphere](#) on Jan. 24, 2004, weeks after its twin Spirit landed on the opposite side of the planet.

During the first three months, there were frequent updates about the twin rovers' antics. The world, it seemed, followed every trail, every rock touched and even kept up with Spirit's health scare that it eventually recovered from.

Opportunity immediately lived up to its name, touching down in an ancient lakebed brimming with minerals that formed in the presence of water, a key ingredient for life. After grinding into rocks and sifting through dirt, Opportunity made one of the enduring finds on Mars: Signs abound of an ancient environment that was warmer and wetter than today's dusty, cold desert state.

Spirit, on the other hand, landed in a less interesting spot and had to drive some distance to find geologic evidence of past water. After six productive years wheeling around, it fell silent in 2010, forever stuck in Martian sand.

Opportunity went on to poke into four other craters, uncovering even more hints that water existed on Mars long ago.

The rover "is not like a lander staring at the same real estate. We've gone to different terrains, explored different geology and answered different questions on Mars," said project manager John Callas of the [NASA](#) Jet Propulsion Laboratory, which runs the \$984 million project.

What's still unknown is whether Mars ever had the right environmental conditions to support microscopic organisms—something Curiosity is trying to answer during its two-year mission. Besides water, it's generally agreed that a power source like the sun and carbon-based compounds are essential for life.

Unlike the flashier Curiosity, armed with the latest tools, Opportunity is not equipped with a carbon detector. Its latest crater destination, which it arrived at last year after an epic three-year journey, contains sections rich in clay deposits. Clays typically form in the presence of water and can be a fine preserver of carbon material. But scientists will never know.

As it enters its tenth year on Mars, Opportunity will continue studying the chemical makeup and pinning down the ages of several interesting rocks at its location for several more months before adding more mileage to the 22 miles (35 kilometers) it has logged since landing.

As for the hunt for carbon, all eyes are on Curiosity, set to drive later this year to the base of a mountain where rock layers containing clay minerals have been detected.

Callas, the JPL project manager, said Curiosity has a long way to go to catch up with Opportunity, which has nearly a decade head start on the Martian surface.

"Mars is big enough for more than two rovers to explore," he said.

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