

ROVING MARS: SPIRIT, OPPORTUNITY, AND THE EXPLORATION OF THE RED PLANET

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In January of 2004, twin robotic explorers named *Spirit* and *Opportunity* landed on Mars. Expected to last for 90 days, the two rovers have now been exploring the martian surface for more than a year and a half. Their objective is to search for evidence of past water on Mars, and to determine if Mars ever had conditions that would have been suitable for life.

Spirit landed in Gusev Crater, a large impact crater in the southern highlands of Mars. Finding only basaltic lava on the crater floor, *Spirit* drove almost three kilometers to the base of the Columbia Hills, a small mountain range to the east of the landing site. There *Spirit* has ascended Husband Hill, the highest summit in the range, and has found strong evidence that the rocks there were modified long ago by water.

Opportunity landed on Meridiani Planum, a smooth plateau near the martian equator, coming to rest in a small impact feature named Eagle Crater. Within Eagle Crater, *Opportunity* found compelling evidence for long-ago water on Mars. This evidence included “blueberries”: small concretions rich in hematite that precipitated from liquid water. It also included rocks that are made largely of sulfate salts, deposited when water evaporated away, and rocks that preserve ancient ripples that formed billions of years ago as water flowed over sand on Mars. The conditions long ago at Eagle Crater would have been suitable for some simple forms of life. Whether life could have developed there, however, is a much more difficult question.

After leaving Eagle Crater, *Opportunity* drove eastward to Endurance Crater, a much larger crater that allowed access to deeper and older rocks which also proved to be blueberry-laden sulfate-rich sediments. Since leaving Endurance Crater, *Opportunity* has explored southward, driving more than five kilometers across the martian surface.

The talk will provide an up-to-date summary of the mission of *Spirit* and *Opportunity*, from their initial conception through their launch, landing, and operations on the surface of Mars.

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