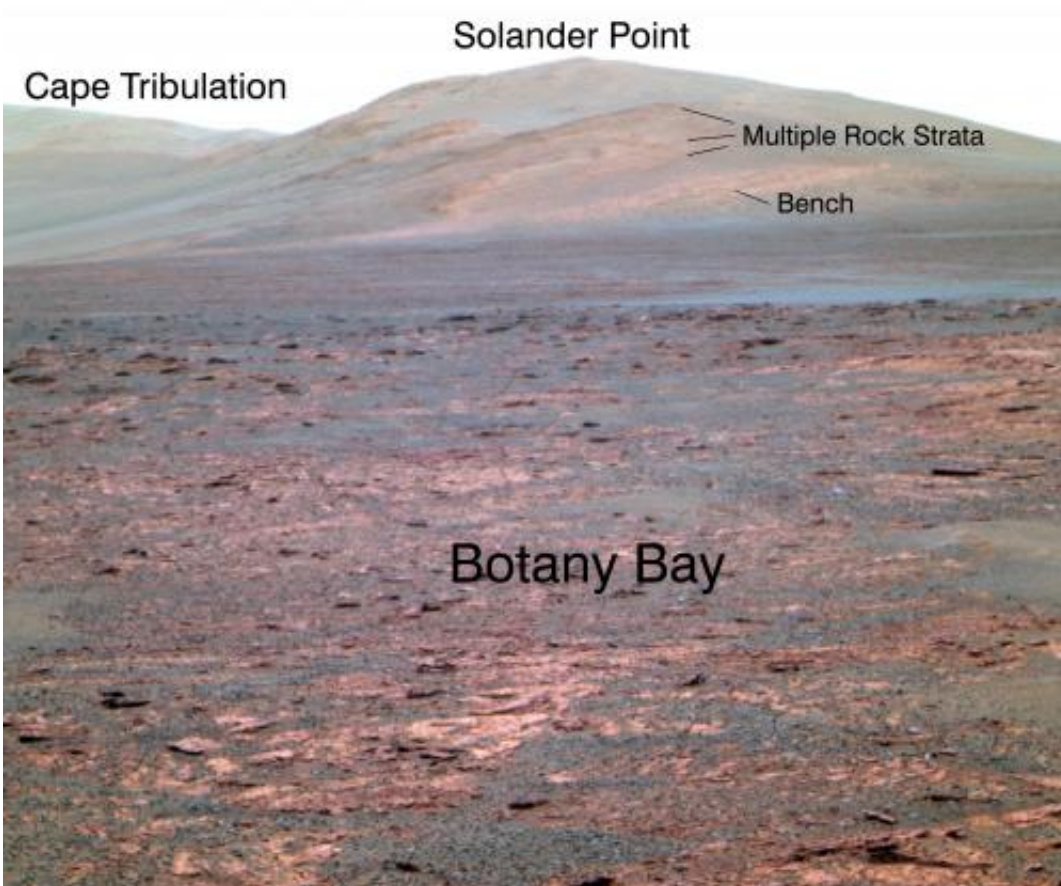


Mars rover Opportunity trekking toward more layers

June 7 2013, by Guy Webster



NASA's Mars Exploration Rover Opportunity used its panoramic camera (Pancam) to acquire this view of "Solander Point" during the mission's 3,325th Martian day, or sol (June 1, 2013). Credit: NASA/JPL-Caltech/Cornell Univ./Arizona State Univ

(Phys.org) —Approaching its 10th anniversary of leaving Earth, NASA's Mars Exploration Rover Opportunity is on the move again, trekking to a new study area still many weeks away.

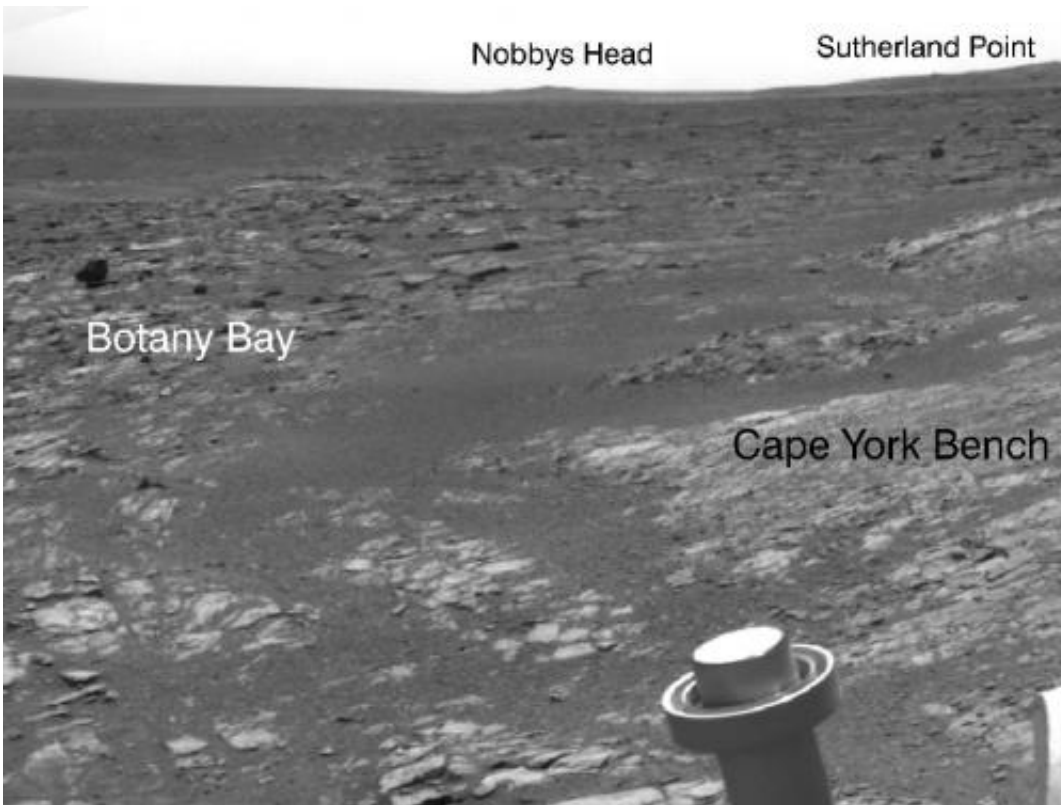
The destination, called "Solander Point," offers Opportunity access to a much taller stack of geological layering than the area where the rover has worked for the past 20 months, called "Cape York." Both areas are raised segments of the western rim of Endeavour Crater, which is about 14 miles (22 kilometers) in diameter.

"Getting to Solander Point will be like walking up to a road cut where you see a cross section of the rock layers," said Ray Arvidson of Washington University, St. Louis, deputy principal investigator for the mission.

Solander Point also offers plenty of ground that is tilted toward the north, which is favorable for the solar-powered rover to stay active and mobile through the coming Martian southern-hemisphere winter.

"We're heading to a 15-degree north-facing slope with a goal of getting there well before winter," said John Callas of NASA's Jet Propulsion Laboratory, Pasadena, Calif., project manager for the [Mars Exploration Rover Project](#). The minimum-sunshine days of this sixth Martian winter for Opportunity will come in February 2014.

NASA's [Mars Exploration Rover](#) Project launched twin rovers in 2003: Spirit on June 10 and Opportunity on July 7. Both rovers landed in January 2004, completed three-month prime missions and began years of bonus, extended missions. Both found evidence of wet environments on [ancient Mars](#). Spirit ceased operations during its fourth [Martian winter](#), in 2010. Opportunity shows symptoms of aging, such as loss of motion in some joints, but continues to accomplish groundbreaking exploration and science.

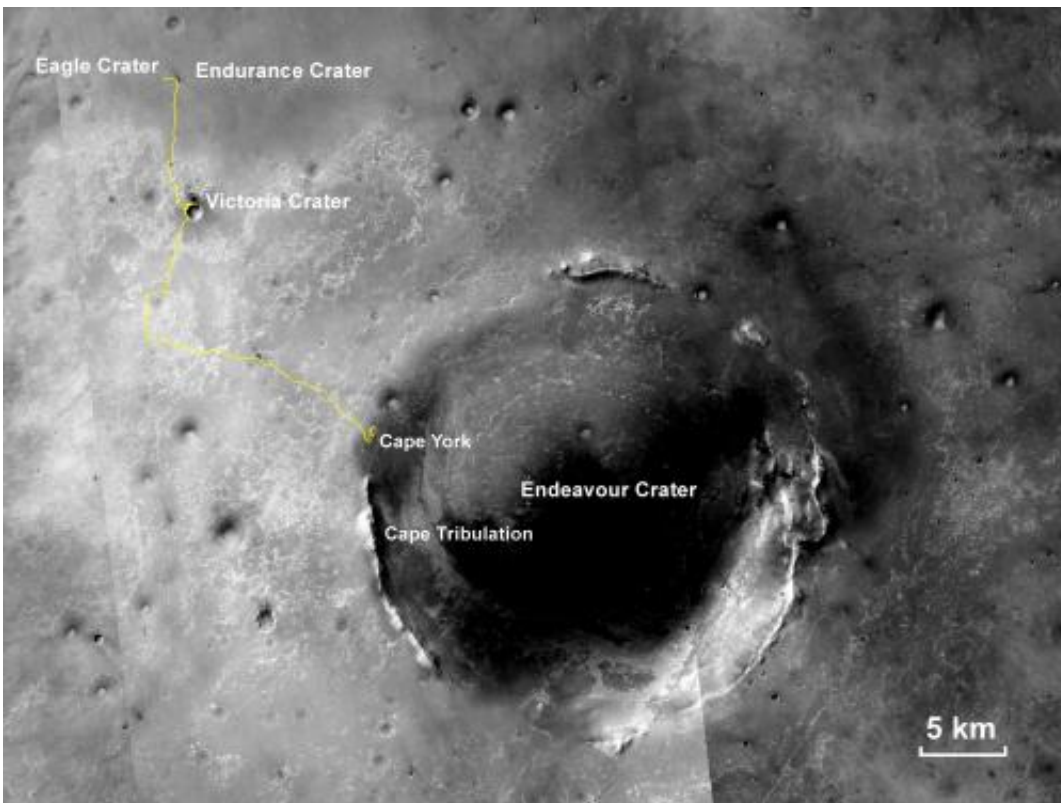


NASA's Mars Exploration Rover Opportunity used its navigation camera to acquire this view looking toward the southwest on the mission's 3,315th Martian day, or sol (May 21, 2013). The scene includes tilted rocks at the edge of a bench surrounding "Cape York," with Burns formation rocks exposed in "Botany Bay." The rover was located at the southwestern portion of Cape York, a segment of the western rim of Endeavour Crater. Isolated Endeavour rim segments "Sutherland Point" and "Nobbys Head" can be seen in the distance. Opportunity automatically stopped when onboard sensors showed that its tilt reached a maximum allowable value of 20 degrees on the drive across the bench surface, serendipitously providing end-of-drive images of the transition between bench and Botany Bay strata. Bench strata represent the oldest sedimentary rocks deposited on the eroded rim of Endeavour and are overlain by Burns formation rocks. Credit: NASA/JPL-Caltech

Shortly before leaving Cape York last month, Opportunity used the rock

abrasion tool, the [alpha particle](#) X-ray spectrometer and the microscopic imager on its robotic arm to examine a rock called "Esperance" and found a combination of elements pointing to clay-mineral composition.

"The Esperance results are some of the most important findings of our entire mission," said Steve Squyres of Cornell University, Ithaca, N.Y., principal investigator for the mission. "The composition tells us about the environmental conditions that altered the minerals. A lot of water moved through this rock."



This map shows the 22.553-mile (36.295-kilometer) route driven by NASA's Mars Exploration Rover Opportunity from the site of its landing, inside Eagle crater at the upper left, to its location more than 112 months later, in late May 2013, departing the "Cape York" section of the rim of Endeavour crater. The gold line covers traverses through the 3,323rd Martian day, or sol, of Opportunity's work on Mars (May 30, 2013). The base image for the map is a

mosaic of images taken by the Context Camera on NASA's Mars Reconnaissance Orbiter. The scale bar is 5 kilometers (1.24 miles). Opportunity completed its three-month prime missions in April 2004 and has continued operations in bonus extended missions. The Mars Reconnaissance Orbiter reached Mars in 2006, completed its prime mission in 2010, and is also working in an extended mission. This traverse map was made at the New Mexico Museum of Natural History & Science, Albuquerque. NASA's Jet Propulsion Laboratory, a division of the California Institute of Technology in Pasadena, manages the Mars Exploration Rover Project and the Mars Reconnaissance Orbiter for the NASA Science Mission Directorate, Washington. Malin Space Science Systems, San Diego, built and operates the orbiter's Context Camera. Credit: NASA/JPL-Caltech/MSSS/NMMNHS

Cape York exposes just a few yards, or meters, of vertical cross-section through geological layering. Solander Point exposes roughly 10 times as much. Researchers hope to find evidence about different stages in the history of ancient Martian environments. The rim of Endeavour Crater displays older rocks than what [Opportunity](#) examined at Eagle, Endurance, Victoria and Santa Maria craters during the first eight years of the rover's work on Mars.

Provided by NASA

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