

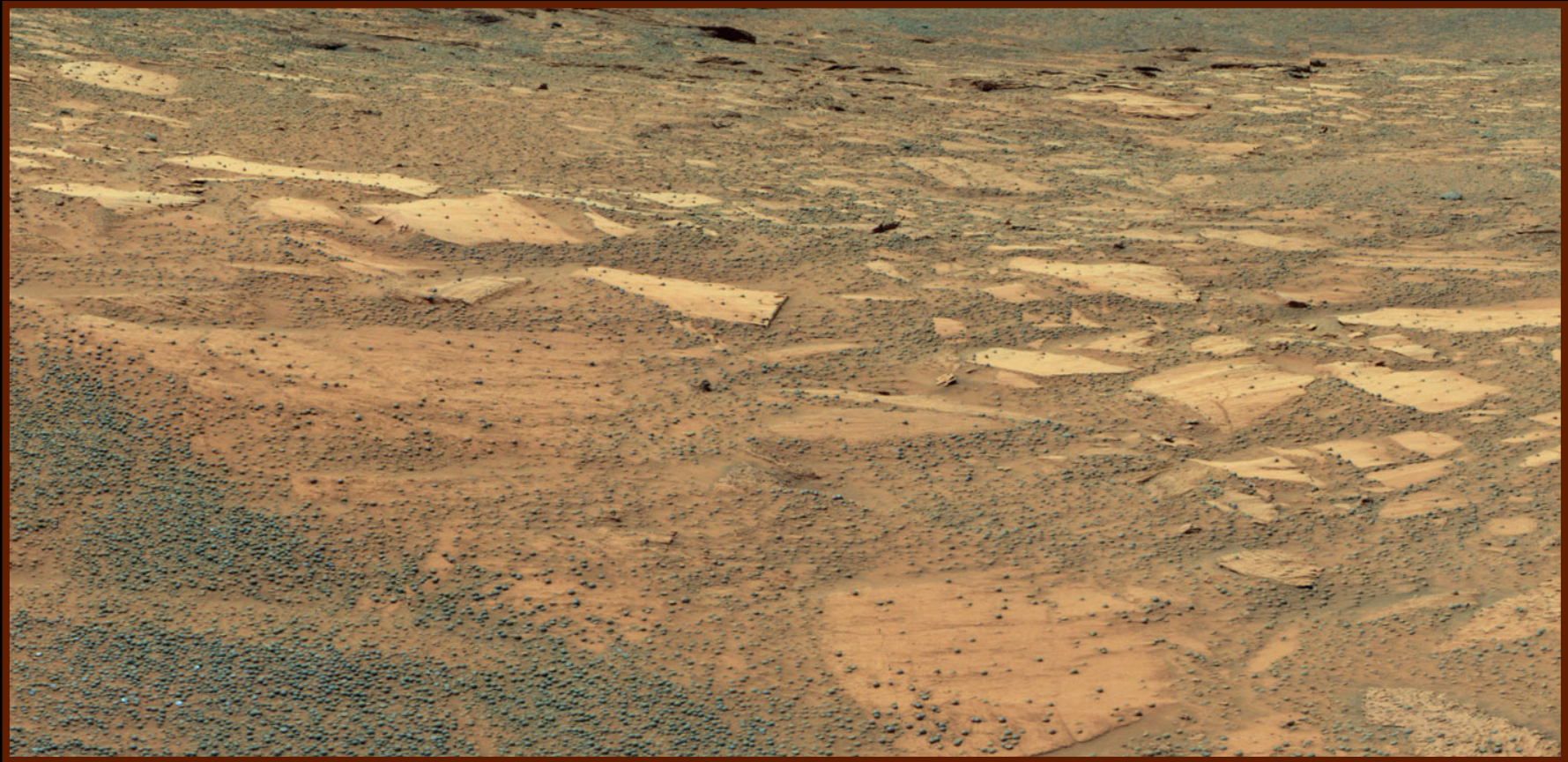
Mars Exploration Rover Mission

**Spirit
and
Opportunity**



**Week in Review
June 5 - June 11**

**Opportunity entered Endurance Crater this week,
in search of clues to an earlier history of water
than those already found inside Eagle Crater
where Opportunity landed.**



False-color panoramic camera mosaic taken on June 6, 2004.

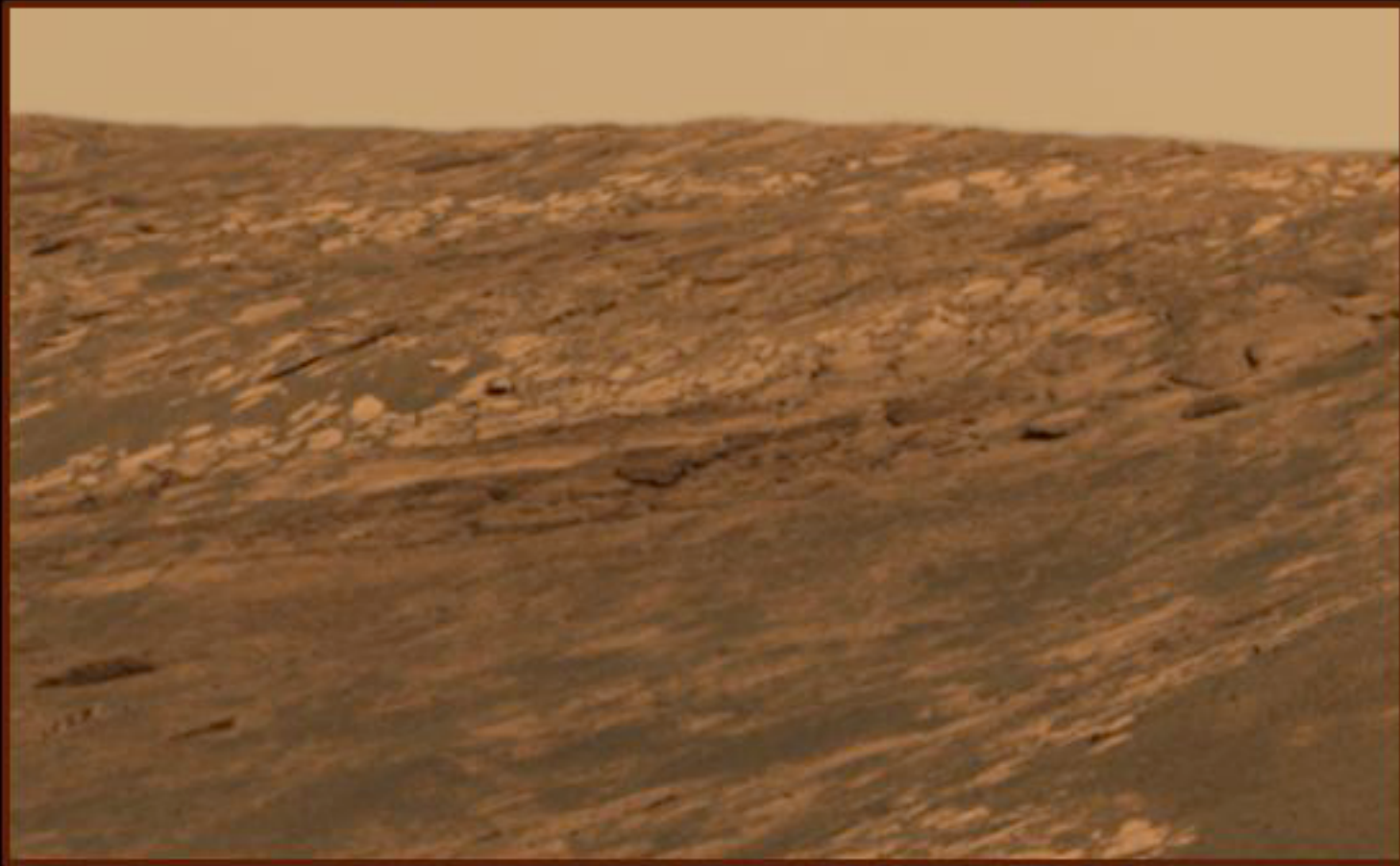
Because Endurance Crater is about five times deeper than Eagle Crater, more rock and soil layers created through martian history are exposed.



Endurance Crater

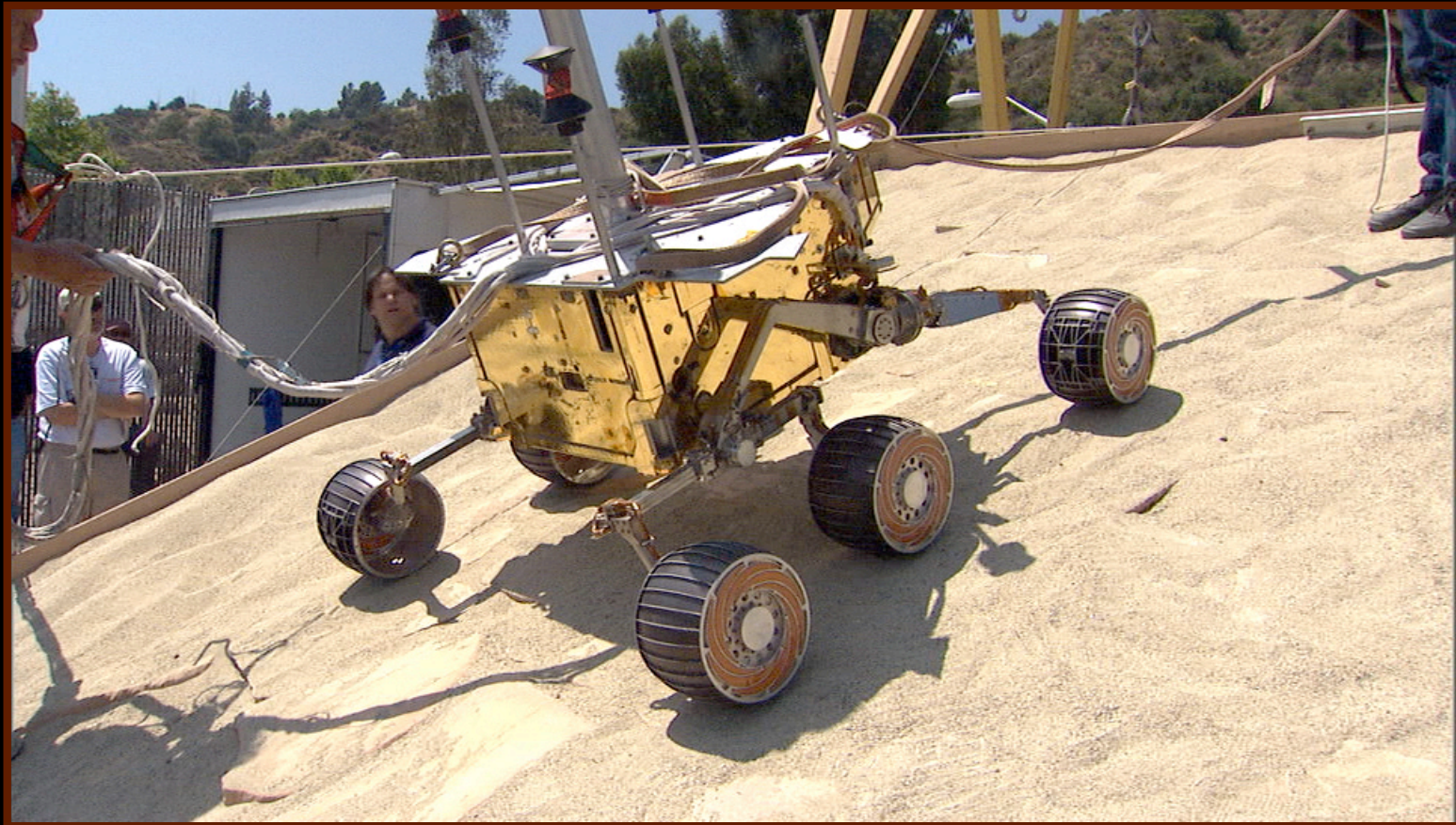
Once the rover examines the layers, scientists will have a better idea of how far back into martian history they can “see” in the rock record.

The strategy for driving on the crater's inner slope was to keep the wheels on rock surfaces instead of on sand and to make sure that the slopes were not too steep.



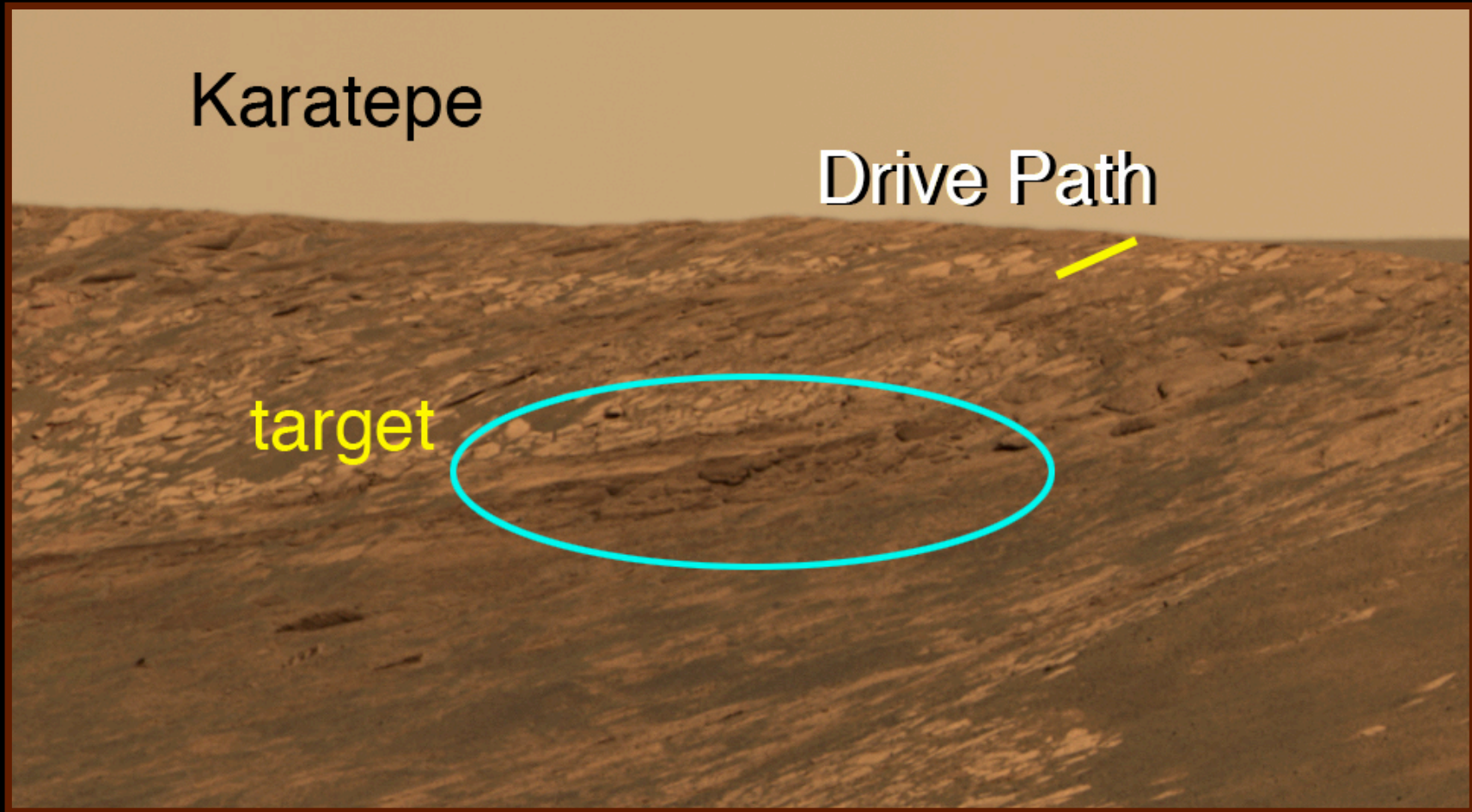
Panoramic camera mosaic of the Karatepe target area where Opportunity entered Endurance.

Rover mobility tests were done on simulated surface conditions of the Karatepe area, where Opportunity would enter Endurance Crater.



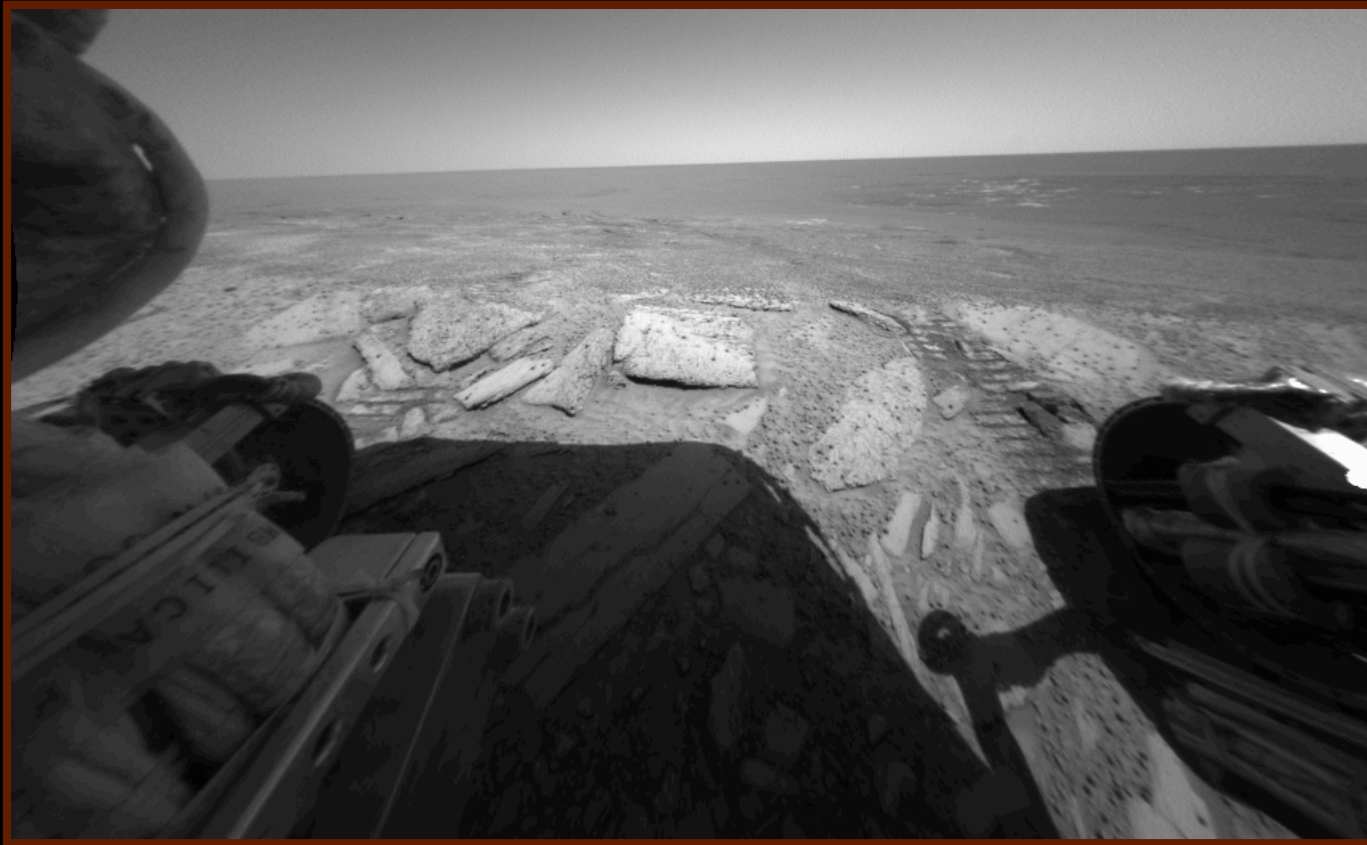
They indicated the rover could safely drive down and up a slope of 25 degrees.

The first part of Opportunity's drive on June 8, 2004 was to move just far enough forward to get all six rover wheels into the crater.



Panoramic camera mosaic of Karatepe area.

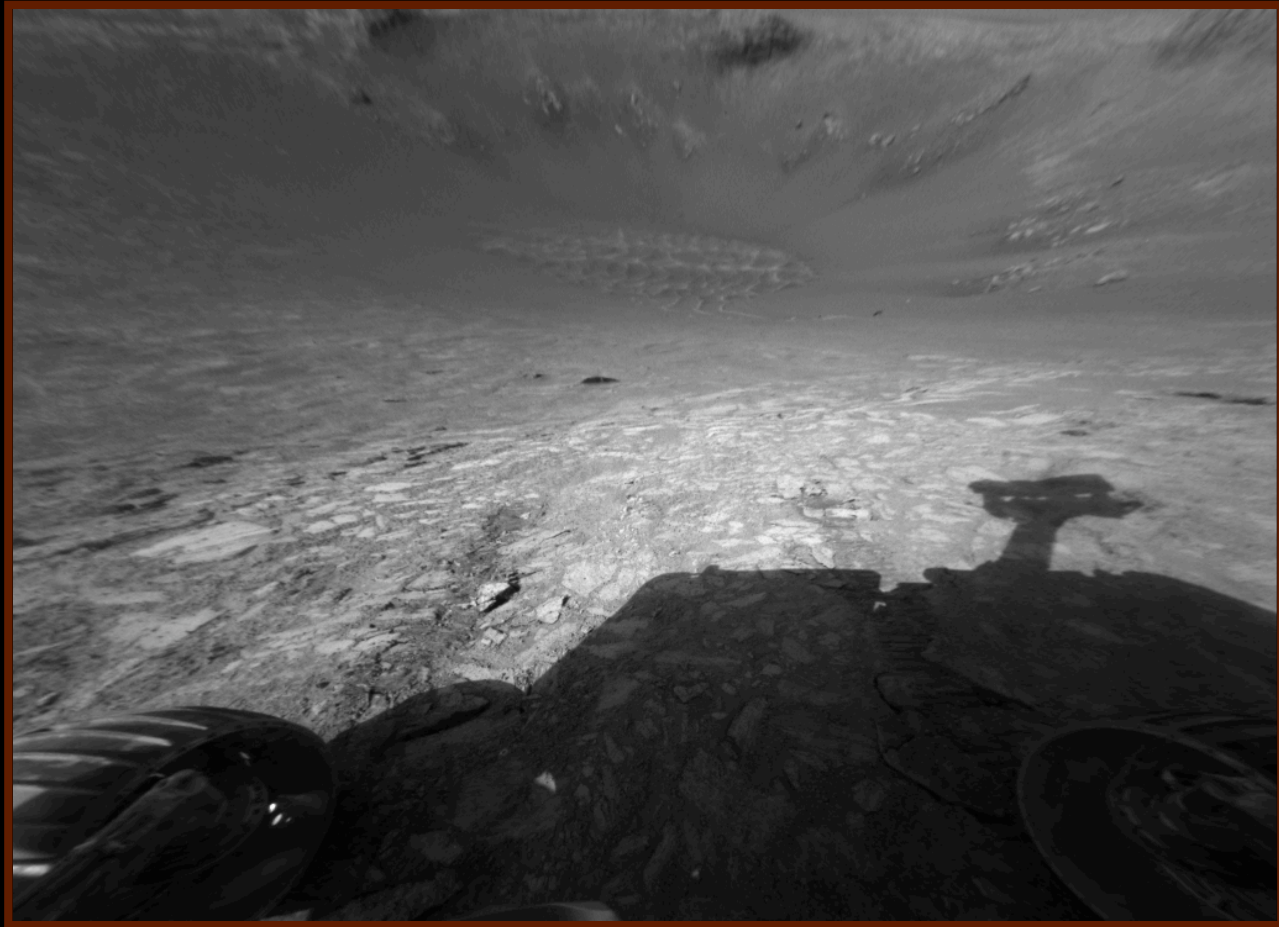
**Opportunity executed the first real “dip”
into the crater successfully!**



*In this rear hazard-avoidance camera image taken June 8, 2004,
Opportunity looks back at the plains from inside the crater rim.*

**Opportunity then reversed back up the slope
to examine what the rover wheels did to the rocks.**

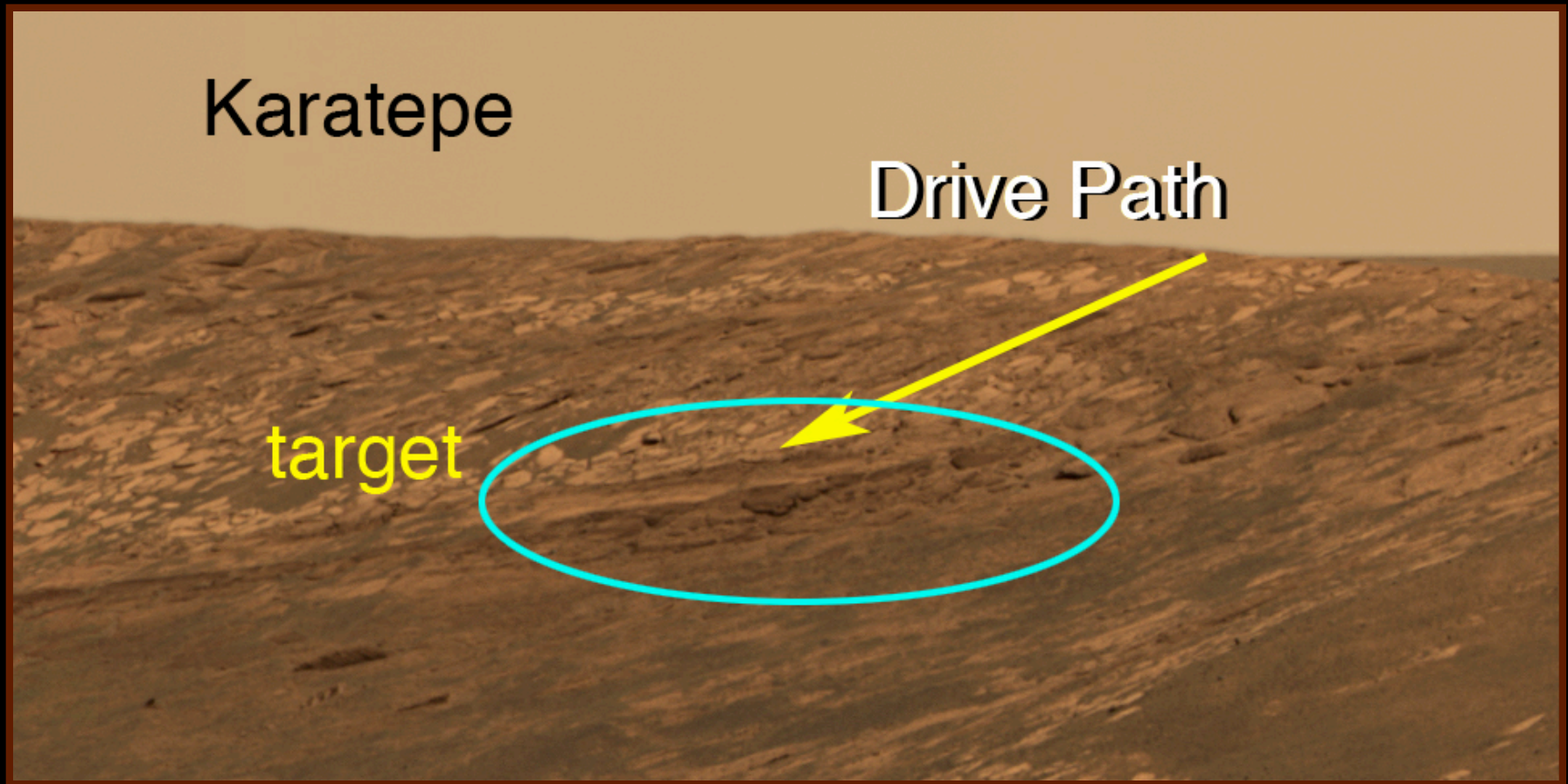
**The next sol, Opportunity climbed down
13 feet (3.9 meters), then backed up 5 feet (1.4 meters).**



The rover looks down on the floor of Endurance Crater with its front hazard-avoidance cameras.

**In this position, the rover spent the first of
many nights inside the crater.**

On June 10, Opportunity reached the target area, about 16 feet (5 meters) inside Endurance Crater.



Panoramic camera mosaic.

It then began a series of atmospheric measurements with the miniature thermal emission spectrometer.

Scientists and engineers are assessing the next possible targets of scientific interest and routes for Opportunity to drive inside Endurance Crater.



Navigation camera image looking down into the crater taken on June 9, 2004.

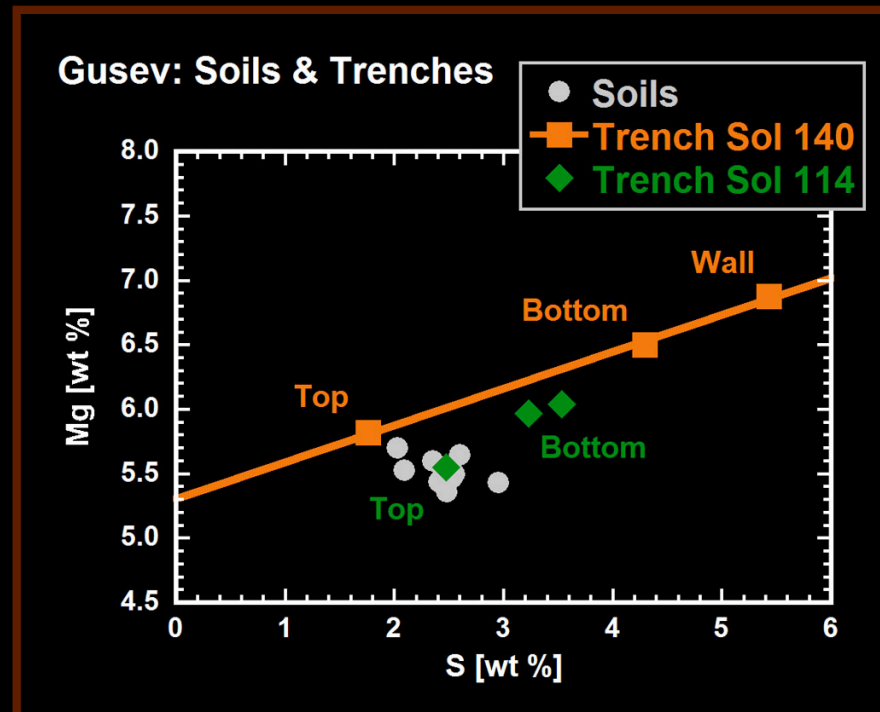


Meanwhile, Spirit scientists revealed their latest discovery of salty soil found in a trench dug by the rover earlier in the mission.



Panoramic camera image of the trench dug along the way toward the Columbia Hills.

Because concentrations of magnesium and sulfur occur in the same ratio throughout the trench, scientists believe the soil there contains magnesium sulfate.



*Alpha particle X-ray spectrometer data of soil composition.
Image credit: NASA/JPL/Cornell/Max Planck Institute.*

This finding is important because magnesium sulfate is often a salt left behind after water evaporates.



**On June 7, 2004,
Spirit passed
Plymouth Rock,
which has tiny cavities
that indicate the rock is
likely of volcanic origin.**

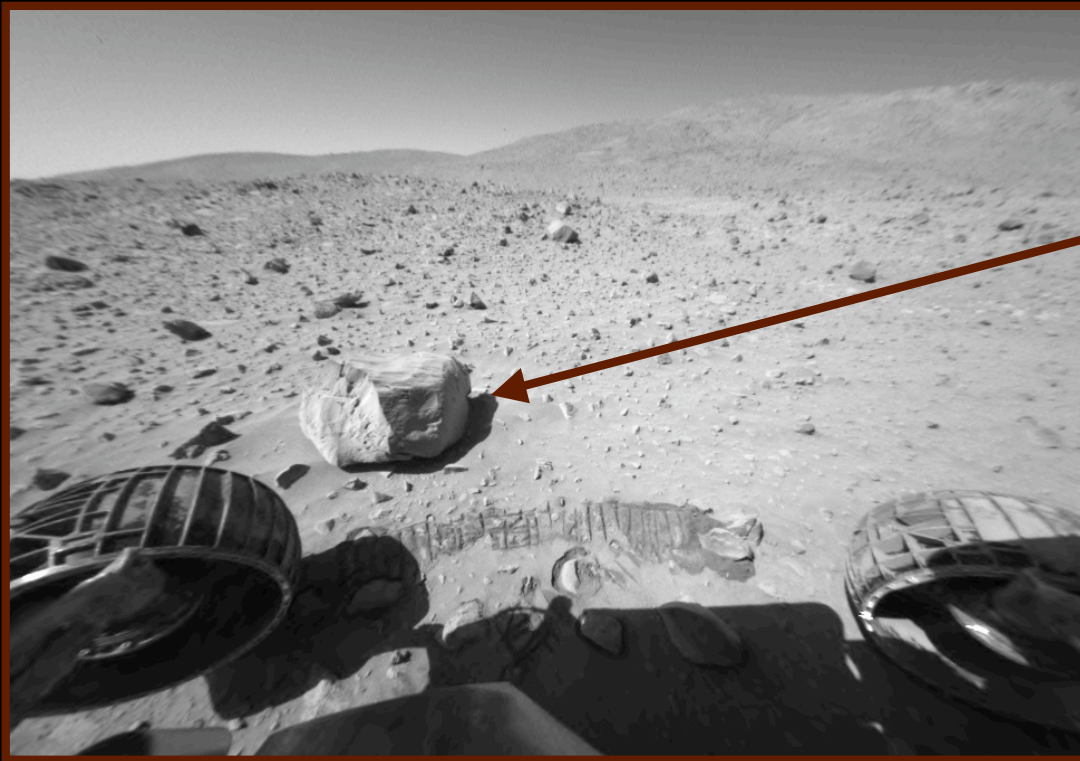


Panoramic camera image.

On June 8, 2004, the navigation camera captured Spirit's shadow as the rover pointed toward the base of the Columbia Hills.



As scientists attempt to get Spirit to Columbia Hills before martian winter sets in, they have to make tough decisions about when to stop and study new rocks.



This larger rock didn't make the cut, and Spirit passed on by, moving closer to new adventures on the hills.

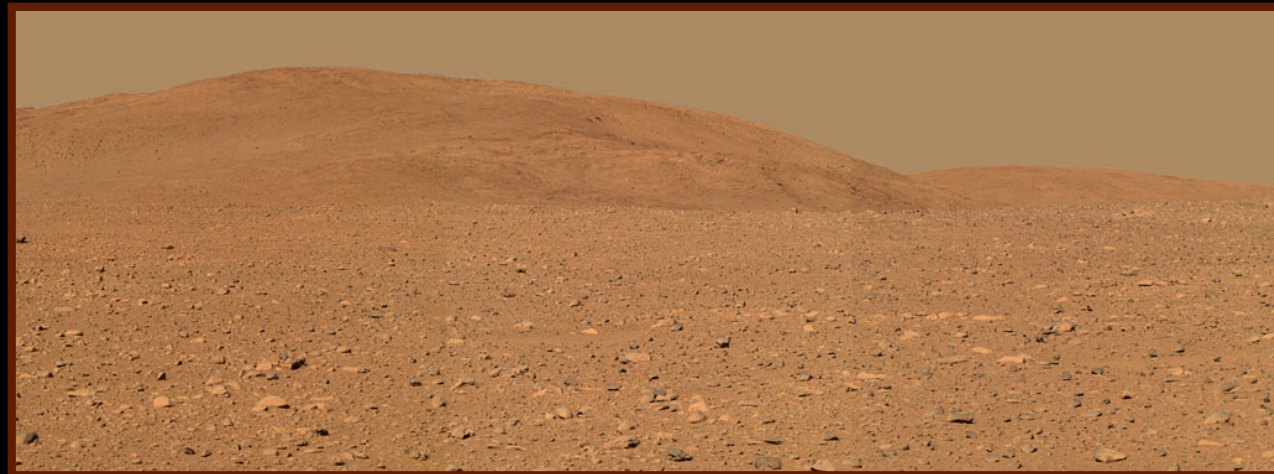
Front hazard-avoidance camera image taken June 9, 2004.



COMING UP!

*Approximate true-color rendering
of the central part of
Columbia Hills using
panoramic camera images.*

**Spirit made it to the Columbia Hills
on June 11 and will study them in detail!**



*Front hazard-avoidance camera
Image inside Endurance Crater.*

**Opportunity is ready to use
the instruments on its robotic
arm, and will most likely stay
inside Endurance Crater for
2-3 weeks of scientific study.**