

Opportunity mountain goal dead ahead as Mars orbiter restarts critical targeting hunt for habitability signs

August 6 2013, by Ken Kremer



Opportunity rover's 1st mountain climbing goal is dead ahead in this up close view of Solander Point at Endeavour Crater. Opportunity will ascend the mountain looking for clues indicative of a Martian habitable environment. This navcam panoramic mosaic was assembled from raw images taken on Sol 3385 (Aug 2, 2013). Credit: NASA/JPL/Cornell/Marco Di Lorenzo/Ken Kremer (kenkremer.com)

NASA's most powerful Mars orbiter has been given the green light today (Aug. 5) to capture new high resolution spectral scans that are absolutely crucial for directing the long lived Opportunity rover's hunt for signatures of habitability atop the intriguing mountain she will soon ascend.

In a plan only recently approved by NASA, engineers are aiming the CRISM mineral mapping spectrometer aboard the Mars Reconnaissance Orbiter (MRO) circling overhead to collect high resolution survey scans of Solander Point – Opportunity's 1st mountain climbing goal along the rim of huge Endeavour Crater.

"New CRISM observations centered over Solander Point will be acquired on Aug. 5, 2013," Ray Arvidson told Universe Today exclusively. Arvidson is the mission's deputy principal scientific investigator from Washington University in St. Louis, Mo.

NASA's decade old rover Opportunity is about to make 'landfall' at the base of Solander Point, the Martian mountain she will scale in search of the [chemical ingredients](#) that could sustain Martian microbes.

So the new spectral data can't come back to Earth soon enough.

And all this is taking place as NASA's Curiosity rover celebrates her 1st Birthday on the Red Planet. .

Currently, the science team lacks the same quality of high resolution CRISM data from Solander Point that they had at a prior stop at Cape York. And that data was crucial because it allowed the rover to be precisely targeted – and thereby discover a [habitable zone](#), Arvidson told me.

"CRISM collected lots of overlapping measurements at Cape York to sharpen the image resolution to 5 meters per pixel to find the phyllosilicate smectite [clay minerals] signatures at Matejivic Hill on Cape York."

"We don't have that at Solander Point. We only have 18 meters per pixel data. And at that resolution you can't tell if the phyllosilicate smectite

[clay minerals] outcrops are present."

Today's new survey from Mars orbit will vastly improve the spectral resolution – from 18 meters per pixel down to 5 meters per pixel.

"5 meter per pixel CRISM resolution is expected in the along-track direction over Solander Point by commanding the gimbaled optical system to oversample that much," Arvidson explained.



Opportunity rover's view from very near the foothills of Solander Point looking along the rim and vast expanse of Endeavour Crater. Solander Point is the 1st Martian Mountain NASA's Opportunity will climb and the rovers next destination. Solander Point may harbor clay minerals indicative of a past Martian habitable environment. This navcam mosaic was assembled from raw images taken on Sol 3374 (July 21, 2013). Credit: NASA/JPL/Cornell/Marco Di Lorenzo/Ken Kremer (kenkremer.com)

The new CRISM spectral survey from Mars is essential to enable the science team to carefully study the alien, unexplored terrain in detail and

locate the [clay minerals](#) and other water bearing minerals, even before the rover arrives.

Clay minerals form in neutral pH water conducive to life.

But it took some cajoling and inter team negotiations to convince everyone to move forward with the special but crucial CRISM imaging plan.

Since MRO is getting on in age – it launched in 2005 – NASA and the spacecraft managers have to carefully consider special requests such as this one which involves slewing the MRO spacecraft instruments and therefore entails some health risks to the vehicle.

"CRISM has been operating at Mars since 2006 and sometimes the optics on a gimble have actuators that get stuck a little bit and don't sweep as fully as planned."

Nevertheless, Arvidson told me a few weeks ago he was hopeful to get approval.

"I suspect I can talk the team into it."

And eventually he did! And informed me for the readers of Universe Today.

The fact that the Opportunity scientists already scored a 'Science Home Run' with their prior CRISM targeting request at Cape York certainly aided their cause immensely.



Opportunity snap up close view of the base of Solander Point and mountain slopes she will ascend soon. This hi res pancam camera mosaic was assembled from raw images taken on Sol 3385 (Aug 2, 2013). Credit: NASA/JPL/Cornell/ASU/Marco Di Lorenzo/Ken Kremer (kenkremer.com)

The new approved CRISM measurements due to be captured today will give Opportunity the best chance to be targeted to the most promising mineral outcrops, and as quickly as possible.

"With the coordinated observations from CRISM and Opportunity we will go into Solander Point a lot smarter!"

"And we'll have a pretty good idea of what to look for and where," Arvidson told me.

Today marks Opportunity's 3389th Sol or Martian day roving Mars. Merely 90 days were expected!

Having completed her investigation of the rocky crater plains, the rover continues to drive south.



Opportunity rover location in the latest MRO/HiRISE color image. The green line shows more or less the route we hope to take to the base of Solander point. Since it is only a couple of hundred meters away, we could be there in a couple of drives. Maybe by the end of next week. The label says “3374” but this is also roughly the location through 3379. Credit: NASA/JPL/Larry Crumpler

Any day now Opportunity will drive onto the Bench surrounding Solander and start a new phase of the mission.

Since she basically arrived at Solander with plenty of power and ahead of schedule prior to the onset of the 6th Martian winter, the robot has some spare time to investigate the foothills before ascending the north facing slopes.

"We will be examining the bench and then working our way counterclockwise to reach the steep slopes associated with the Noachian outcrops that are part of the Endeavour rim," Arvidson said.

Source: [Universe Today](#)

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