

Curiosity rover sees a pixel's-worth of comet Siding Spring

November 7 2014, by Bob King



In this before-and-after animation, you can see how much noise needed to be cleaned from the original photos to uncover the the comet. Credit: NASA/JPL-Caltech/Malin Space Science Systems/James Sorenson

When Comet Siding Spring skimmed just 84,500 miles from Mars last month, NASA's Opportunity and Curiosity Rovers – along with several orbiting Mars spacecraft – readied their cameras to record the historic flyby. Opportunity's photos revealed a small, fuzzy blob against the stars

of Cetus the Whale, but most of us searched in vain to find any trace of the comet among the blizzard of noise in pictures snapped by Curiosity. Yet it may be there after all.

In this panoramic image at top, assembled and processed by James Sorenson to remove the pervasive noise in the original photos, we see with a twilit landscape just after sundown. Look closely in the upper left hand corner and you'll see a speck of light. That's it! Combined with positional information, Sorenson tentatively identified that pixel as Comet C/2013 A1 Siding Spring. OK, it's not much to look at but may be our best candidate for the hoped-for photo from Curiosity.

Remember that conditions were far from ideal when the picture was taken. There was considerable dust and haze in the Martian atmosphere over Gale Crater. Dust effectively absorbs and also scatters light. The bright twilight sky only made the comet more difficult to discern. If you've ever struggled to see Mercury at dusk on a hazy summer evening, you'll understand what our robot was up against.

The European Space Agency's Mars Express orbiter also chimed in with a recent set of comet images. As it flew by, Siding Spring was traveling at around 35 miles per second (56 km/sec) relative to Mars. Images were acquired at 17-second intervals at a resolution of 10.5 miles (17 km) per pixel. What do they show? The irregular shape might make you think you're seeing the actual shape of the comet's nucleus. Unfortunately, that's impossible because it's less than a kilometer across and each pixel in the photo spans 17 km. Instead, we're seeing the combined light of the nucleus and extended coma, the surrounding cloud of gas and dust. Why the images are pure black and white with no grey tones is unclear.



In this panoramic view taken by NASA's Curiosity Rover on October 19th shortly after local sunset (6:11 p.m.), Comet Siding Spring may be the single bright pixel at far upper left. Two stars are also visible near the center in the lower third of the photo. Click for a high resolution version. Credit: NASA/JPL-Caltech/Malin Space Science Systems/James Sorenson

Besides the the close-up photo taken with the HiRISE camera on NASA's Mars Reconnaissance Orbiter, its Compact Reconnaissance Imaging Spectrometer for Mars (CRISM) got busy photographing the dusty inner coma generated when sunlight warms and vaporizes dust-laden ice in the nucleus. The scale of the left image is approximately 2.5 miles (4 km) per pixel; for the right image, it is about 3 miles (5 km) per pixel.

According to NASA, CRISM observed 107 different wavelengths of light in each pixel. Here, only three colors are shown. Researchers think the appearance of color variations in the inner coma could be due to the properties of the comet's dust, possibly dust grain size or composition. More photos and results from all the spacecraft will appear in the weeks and months ahead as scientists continue their analyses.

Comet Siding Spring has left Mars and its crew of robotic eyes behind as it crawls north into the constellation Serpens low in the southwest at dusk. Amateur astronomers are still keen to photograph it at every opportunity. Recent observations indicate a temporary re-brightening, though the comet remains a dim 11th magnitude object.



This single image is one of series that were acquired by the HRSC camera on board Mars Express during the comet Siding Spring flyby on October 19, 2014. Click to animate. Credit: ESA/DLR/FU Berlin

Source: [Universe Today](#)

Citation: Curiosity rover sees a pixel's-worth of comet Siding Spring (2014, November 7) retrieved 24 May 2024 from <https://phys.org/news/2014-11-curiosity-rover-pixel-worth-comet-siding.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.