

Curiosity's mysterious Mars photo stirs speculation

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Credit: NASA



Did Curiosity capture the galactic equivalent of the Zapruder film when it landed on Mars?

Seconds after the <u>NASA</u> robot's landing Sunday night, <u>Curiosity</u> managed to squeeze off a handful of fuzzy, black-and-white photographs. One, taken with a device on its rear known as a Hazcam, captured the pebble-strewn ground beneath the rover and one of its wheels - and a blotch, faint but distinctive, on the horizon.

Update: <u>Photo mystery solved? Mars rover snapped pic of rocket stage</u> <u>crash, NASA says</u>

The images were relayed by a passing satellite. Two hours later, the satellite passed overhead again. This time, Curiosity sent home a new batch of higher-resolution photos. They showed the same horizon.

The blotch was gone.

Space junkies raced onto the Internet with giddy speculation about the difference between the photos.

Curiosity, the largest spacecraft ever sent to another planet, had just sailed through <u>deep space</u> for almost nine months and more than 350 million miles. It landed on its own, meaning scientists had no control over where, exactly, it would wind up, what direction it would be pointed in nor when it would snap its first images.

After all of those variables, the space junkies insisted, Curiosity had somehow snapped a photo of its chariot crash-landing a safe distance away, as planned. The camera shutter had been open for 200 milliseconds.

The blotch did look like a billowing <u>plume</u> of some sort, erupting from



the horizon. But the image "would be an insane coincidence," one engineer said. Most dismissed the chatter as wild-eyed speculation and a statistical impossibility. It was just dirt on the lens, some said - maybe a <u>dust devil</u> swirling in the distance, but nothing more than that.

Yet a pesky fact remained. In the first photo, the blotch is there. "And then it's not," said Sarah Milkovich, a scientist at the Jet Propulsion Laboratory in La Canada Flintridge and a leader of the team responsible for delivering images documenting the mission.

Early Tuesday morning, JPL engineers received a new image of the landing zone, taken by another satellite. With tongue in cheek, this photo was labeled the "crime scene" photo, because it not only showed Curiosity on the ground, but all of the pieces of spacecraft that the rover had discarded on the way down.

To the southwest was the supersonic parachute that had taken Curiosity out of free-fall, and was then jettisoned so it wouldn't land on top of the rover and smother it.

To the southeast was the heat shield, which soared to temperatures as high as 3,800 degrees and was then ditched so that Curiosity could turn on its radar to navigate its landing.

And to the northwest was the spacecraft that had deposited Curiosity on the surface. Known as the "<u>sky crane</u>," it was the remnants of the final stage of the rover's intricate descent.

Minutes before landing, Curiosity had been contained in an experimental "backpack" that lowered itself to the ground using powerful rocket engines. The engines could have kicked up so much dust that it suffocated the rover. So, just 66 feet above the ground, the backpack spat out Curiosity, leaving the rover dangling by three ropes.



The hovering spacecraft lowered Curiosity to the ground and was then cut loose. Once free, the crane throttled up its engines and arched across the Martian sky.

The crime scene photo showed that the sky crane had crash-landed, as designed, about 2,000 feet away - and in the direction Curiosity's rear was pointed toward when it snapped the first photo showing the blotch. The new photo also showed that the sky crane, when it crash-landed, kicked up a violent wave of dirt that had scarred the surface of Mars.

The impossible, it seemed, was possible.

"I don't think you can rule it out," Curiosity mission manager Michael Watkins said Tuesday. "It bears looking into."

Although the coincidence would be of little scientific value, "it would be incredibly cool. ... A crazy, serendipitous thing," Watkins said.

Justin Maki, a JPL engineer and scientist who led the team that developed the Hazcams, shorthand for hazard-avoidance cameras, said further review had suggested that the photograph might not be as crazy as it sounded initially. Between the front and rear Hazcams, the cameras covered 240 degrees of the horizon, or about two-thirds. And the material the sky crane kicked up when it crashed could have hung in the air for a minute or two, he said - Mars' gravity is 38 percent as strong as Earth's - which could have increased the chances of capturing the image.

"Something was out there," he said.

New images scheduled to arrive in the next two weeks will give engineers a higher-fidelity understanding of the landing and the orientation of the pieces on the ground. But there's a chance that the mystery of the photograph may never be solved - it was a one-time



event, over in seconds, and there will never be new images of that moment.

"It's circumstantial evidence - but it's pretty good circumstantial evidence," said Emily Lakdawalla, senior editor at the Planetary Society, a nonprofit Pasadena organization that advocates for space research and exploration. "It looks like we may actually have seen it, but it's hard to know."

Also Tuesday, engineers began turning on components of Curiosity's roving geochemistry laboratory, including a high-gain antenna that will permit a higher-bandwidth conversation between the rover and scientists back home.

An on-board radiation detector, officials said, had already begun sending home data. Understanding Mars' radiation environment is important to Curiosity's central mission - determining whether the Red Planet was ever capable of fostering life - and to potential human exploration of Mars.

On Wednesday, engineers are scheduled to take their most advanced step since Sunday's landing, deploying Curiosity's "mast."

The Remote Sensing Mast carries cameras that will deliver full-color video of Mars and study geological features at infrared wavelengths. And its "ChemCam" - a glass-covered circle at the top that many identify as the machine's eye - will examine minerals from as far as 23 feet away by shooting a laser and analyzing the light signature of the dust that is kicked up. The mast will rise nearly four feet above the "deck" of Curiosity.

"You could not look this in the 'eye' unless you were an NBA player," Watkins said. "These are the days that people worked five and 10 years



for."

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