
MastCam Images

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(Music)

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00:00:04,000 --> 00:00:08,000
Hi, I'm Justin Maki, the engineering camera team lead and Mastcam deputy P-I,

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00:00:08,000 --> 00:00:11,000
and this is your Curiosity rover report.

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One of the things that's so exciting about the Curiosity mission

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is that the rover takes so many pictures.

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Well, we've received a lot of questions about the cameras on the rovers

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and we're here to answer some of those questions.

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The Curiosity rover actually has 17 cameras on it,

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which is the most of any NASA planetary mission ever.

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We start with the MARDI, or the Mars Descent Imager,

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which you may recall took pictures as the rover was landing on Mars.

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Then we have the MAHLI instrument, which is the camera mounted on the end of the arm,

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00:00:41,000 --> 00:00:46,000

and that takes close-up, high-resolution color photos.

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Down here we have the hazard avoidance cameras, or the HazCams.

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There are four of these in the front and four in the back,

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and they're used to take pictures of the terrain near the wheels and nearby the rover.

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Up here on the mast, we have the cameras that take most of the pictures for the mission.

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We have the Navigation Cameras, which take pictures that are used to drive the rover.

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We have the Mast Cameras, which are color imagers used to do geology investigations.

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And then finally we have the remote microscopic imager, which is part of the ChemCam laser instrument.

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And that's used to document the laser spots, that the rover makes on the surface.

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Many of the black and white images that come back from the rover are from the engineering cameras,

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such as the Hazcams or the Navcams, shown here.

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The reason that they're black and white, or gray scale as we call it,

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is because that's all the rover really needs in order to detect rocks and other obstacles.

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Other cameras are color, such as the Mastcam imager, and the reason that they're color is because

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the scientists use the color information to learn about the soil and the rocks.

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The rover has 2 different types of cameras.

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There are 1-megapixel black and white imagers for the engineering cameras

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and 2-megapixel color imagers for the science cameras.

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Yes, in fact we already have taken video.

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In addition to the video that we took when the rover was descending on to the surface,

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we've taken movies of the soil being shaken in the scoop. The reason that we don't see more videos is

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because the video files are pretty large and because we have a limited downlink each day,

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00:02:17,000 --> 00:02:25,000
the scientists prefer to take still images of new targets.

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The rover takes panoramic photos much like you do with your smart phone.

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00:02:28,000 --> 00:02:32,000
By taking individual pictures and then moving between the frames

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00:02:32,000 --> 00:02:38,000

you can acquire a collection of pictures that you can then stitch together into a single panorama.

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The rover does the same thing.

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00:02:39,000 --> 00:02:48,000
We move the cameras between each individual picture and stitch them together on the ground.

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The rover is able to take its own picture using its robotic arm. Because the arm is 2 meters long,

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the rover is able to place the cameras out in front of itself and high above the rover deck.

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The self portrait appears as though its been taken from a single wide angle lens camera

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out in front of the rover but its actually a series of individual images stitched together.

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As this animation shows, the rover is imaging the deck while the arm is behind the camera.

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And then to image the ground, we spin the arm 180 degrees and image the terrain.

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And again, the arm is behind the camera when taking these pictures.

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And when we stitch them all together, you don't see the arm in any of the pictures.