

NASA 'optometrists' verify Mars 2020 rover's 20/20 vision

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In this image, engineers test cameras on the top of the Mars 2020 rover's mast and front chassis. The image was taken on July 23, 2019, in the Spacecraft Assembly Facility's High Bay 1 at NASA's Jet Propulsion Laboratory in Pasadena, California. Credit: NASA/JPL-Caltech

Equipped with visionary science instruments, the Mars 2020 rover

underwent an "eye" exam after several cameras were installed on it. The rover contains an armada of imaging capabilities, from wide-angle landscape cameras to narrow-angle high-resolution zoom lens cameras.

"We completed the machine-vision calibration of the forward-facing cameras on the [rover](#)," said Justin Maki, chief engineer for imaging and the imaging scientist for Mars 2020 at JPL. "This measurement is critical for accurate stereo vision, which is an important capability of the vehicle."

To perform the calibration, the 2020 team imaged target boards that feature grids of dots, placed at distances ranging from 1 to 44 yards (1 to 40 meters) away. The target boards were used to confirm that the cameras meet the project's requirements for resolution and geometric accuracy. The cameras tested included two Navcams, four Hazcams, the SuperCam and the two Mastcam-Z cameras.

"We tested every [camera](#) on the front of the rover chassis and also those mounted on the mast," said Maki. "Characterizing the geometric alignment of all these imagers is important for driving the vehicle on Mars, operating the [robotic arm](#) and accurately targeting the rover's laser."

In the coming weeks, the imagers on the back of the rover body and on the turret at the end of the rover's arm will undergo similar calibration.



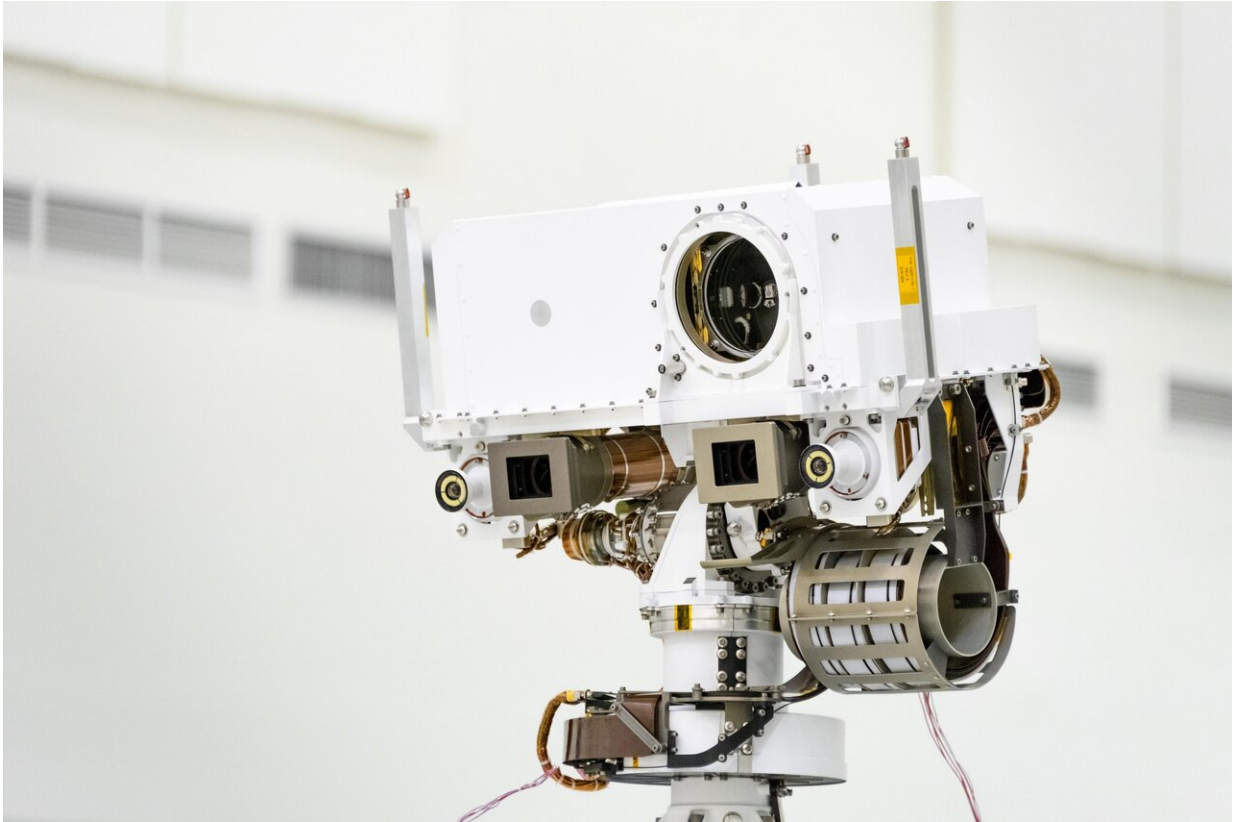
Engineer Chris Chatellier stands next to a target board with 1,600 dots. The board was one of several used on July 23, 2019, in the Spacecraft Assembly Facility's High Bay 1 at NASA's Jet Propulsion Laboratory in Pasadena, California, to calibrate the forward-facing cameras on the Mars 2020 rover. Credit: NASA/JPL-Caltech

Mounted on the rover's remote sensing mast, the Navcams (navigation cameras) will acquire panoramic 3-D image data that will support route planning, robotic-arm operations, drilling and sample acquisition. The Navcams can work in tandem with the Hazcams (hazard-avoidance cameras) mounted on the lower portion of the rover chassis to provide complementary views of the terrain to safeguard the rover against getting lost or crashing into unexpected obstacles. They'll be used by software enabling the Mars 2020 rover to perform self-driving over the Martian

terrain.

Along with its laser and spectrometers, SuperCam's imager will examine Martian rocks and soil, seeking organic compounds that could be related to past life on Mars. The rover's two Mastcam-Z high-resolution cameras will work together as a multispectral, stereoscopic imaging instrument to enhance the Mars 2020 rover's driving and core-sampling capabilities. The Mastcam-Z cameras will also enable science team members to observe details in rocks and sediment at any location within the rover's field of view, helping them piece together the planet's geologic history.

JPL is building and will manage operations of the Mars 2020 rover for the NASA Science Mission Directorate at the agency's headquarters in Washington. NASA will use Mars 2020 and other missions, including to the Moon, to prepare for human exploration of the Red Planet. The agency intends to establish a sustained human presence on and around the Moon by 2028 through NASA's Artemis lunar exploration plans.



This image, taken in the Spacecraft Assembly Facility's High Bay 1 at the Jet Propulsion Laboratory in Pasadena, California, on July 23, 2019, shows a close-up of the head of Mars 2020's remote sensing mast. The mast head contains the SuperCam instrument (its lens is in the large circular opening). In the gray boxes beneath mast head are the two Mastcam-Z imagers. On the exterior sides of those imagers are the rover's two navigation cameras. Credit: NASA/JPL-Caltech

More information: For more information about the mission, go to: mars.nasa.gov/mars2020/

Provided by Jet Propulsion Laboratory

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