

Analysis of sounds captured by Perseverance rover reveals speed of sound on the Red Planet

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An international team of researchers analyzing the sounds captured by the Perseverance rover has determined the speed of sound on Mars. Baptiste Chide, with Los Alamos National Laboratory, gave a [presentation](#) at this year's 53rd Lunar and Planetary Science Conference

outlining the findings by the team.

The Perseverance rover landed successfully on the surface of Mars a little more than a year ago, and since that time, has been rolling around, studying the landscape with a host of cameras and sensors. Perseverance has also been outfitted with a [microphone](#), which allowed the rover to beam back the first sounds ever heard from a distant world—many of those sounds can be heard on NASA's [Perseverance rover page](#). In this new effort, the researchers have been analyzing the sounds sent back by Perseverance to find out if they might reveal anything useful.

Chide reported that the team has used data from the microphone to measure the speed of sound on Mars. This was done by measuring the amount of time it took for sounds emanating from laser blasts from Perseverance to return to the rover's microphone. The laser blasts were used to vaporize nearby rocks to learn more about their composition. They found sound to be traveling on Mars at approximately 240 m/s. But they also found that different frequencies of sound travel at different speeds on Mars. The speed increases by approximately 10 m/s above 400 Hz. This finding suggests that communication would be extremely difficult on Mars with different parts of speech arriving to listeners at different times, making conversations sound garbled.

Chide says the microphone also allowed for measuring temperature on Mar's surface in and around the rover. This is because sound travels at different speeds depending on temperature. By measuring sound speed every time Perseverance fired its laser, the researchers were able to calculate rapid temperature changes. Chide also noted that the research team plans to continue monitoring and analyzing sounds from Mars over the course of a year to learn more about fluctuations during different events on the planet, such as during the winter months or when [dust storms](#) kick up.

More information: Audio from Perseverance:
mars.nasa.gov/mars2020/multimedia/audio/

Lunar and Planetary Science Conference:
www.hou.usra.edu/meetings/lpsc2022/

Sound Speed on Mars measured by the SuperCam microphone on Perseverance: www.hou.usra.edu/meetings/lpsc2022/pdf/1357.pdf

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