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Eavesdropping on Mars

The most compelling audio the Perseverance rover will record might well be the sounds it generates itself.



I WAS STOKED WHEN I heard they were putting microphones on the Perseverance rover. Of all the instrument data we use to understand other planets, visual images are always the most compelling because they connect directly to our senses, with no interpretation needed to grasp a lot about each new place. Sound recordings ought to do this as well: provide something we can relate to directly and feel what it would be like to be there.

Shortly after the thrill of the rover's landing at Jezero Crater in February, we were treated to the first release of audio from Mars. What we heard, of course, was wind. We already knew that the Red Planet has wind, but when we finally heard it, we learned that wind on Mars sounds . . . like wind.

▲ The Perseverance rover took this selfie on March 7, 2021, during sol 16 of the mission.

At first it was haunting to hear those distant zephyrs and realize they truly were recorded on another world. They were strangely gentle and quiet, because Mars's carbon-dioxide atmosphere is just 1% as dense as Earth's. Plus, there's scientific value in sounds the rover records. With the very first zap of the robot's SuperCam laser on rock, for instance, the mission team measured the speed of sound on Mars for the first time ever. As SuperCam Principal Investigator Roger Wiens told NPR, it's just a little over two-thirds as fast as it is on Earth.

I have to admit, though, that after listening several times to that Martian

breeze, I found it anticlimactic and dissatisfying for a couple of reasons.

First, what we heard was not really sound, but the wind noise that is made when a breeze strikes the diaphragm of a microphone, converting the motion into an audio signal. That rumbling, popping sound is familiar to us from recordings made here on windy days, but it's not what you'd really hear if you were standing outside on Mars at the time (even if you could be listening without a helmet).

Since the Perseverance team released those first sounds of wind and laser zaps, we've heard the rover's metal wheels crunching over stony terrain and its various instruments in operation (hear these recordings at <https://is.gd/marssounds>). These sounds, too, have value — to engineers operating the rover and to scientists determining which rock samples to cache for later return to Earth (a major mission objective).

Beyond the audio of wind and rover, though, we don't expect to hear anything. Those two types of sounds represent Mars's greatest sonic hits.

Alas, compared to Earth, with its chirruping birds, rustling leaves, and cracking thunder, to say nothing of the music, traffic, and laughter that human beings generate, Mars is bound to be a pretty boring place, sonically. Perhaps we'll find places where breezes whistle as they reverberate through wind-sculpted canyons. There may be storms so ferocious that the wind will howl past Perseverance, and we may hear the hiss of wind-carried dust particles pelting the rover. But by and large I'm not hopeful, beyond that initial novelty, of being greatly surprised or delighted by fresh sounds from Mars.

In the end, Jezero Crater is profoundly interesting not for what we hear there today but for what happened there billions of years ago, when free-flowing streams were gurgling and — just maybe — something was swimming or even singing.

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