

# Perseverance rover returns videos from its descent to the Martian surface

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Mere days after the Perseverance rover landed on the surface of Mars, on February 22, NASA scientists presented another first in planetary exploration: multiple videos of a rover's entry, descent and landing sequence from the perspective of the rover itself.

A total of five cameras were used to film the various stages of Perseverance's descent. Two were placed on the rover, one pointed up to observe the rocket pack as that part of the landing system lowered the rover to the ground via sky crane, and one pointed down, providing a front-row seat from the perspective of a vehicle landing on Mars as it hurtled toward the Martian surface.

Two others were attached to the outer shell that protected the rover during entry into Mars' atmosphere and were aimed upwards, watching the parachute deploy from two different perspectives. A final camera was added to the bottom of the rocket pack to record the rover as it was deployed, which provided the stunning image of the rover being gently placed on the red planet.

Every frame of these videos will be carefully studied for years to come. They are the first time that anyone has been able to view a Mars landing as it happened in real time, and every moment provides crucial information about the state of the spacecraft during what is arguably the most difficult part of the mission.

The two videos in which the sky crane was featured are also the first time this system has been seen in operation. While every other aspect of the spacecraft can be tested on Earth (parachute, heat shield, rover), the fact that the sky crane is designed to work specifically in the Martian atmosphere and under Mars' gravity means that it cannot be tested on Earth. Though the system was first envisioned 15 years ago for the Curiosity mission, this is the first time its designers

have seen it in operation. By all accounts, the system performed flawlessly.

At the same time, NASA also released the first audio recordings from Mars. Perseverance has a microphone attached to its SuperCam instrument, which recorded a soft breeze blowing at the rover's landing site. The raw and filtered audio are available here. The microphone will continue to record sounds, primarily to listen to the sounds made as Martian rocks are vaporized by the laser mounted on the SuperCam. These data will be used in conjunction with the rover's cameras and spectrometers to analyze the chemistry and geology of those rocks.

A whole slew of other imagery has been released, including images of the rover's descent system as it was heading to the final landing point, taken by the orbiting Mars Reconnaissance Orbiter, and thousands of raw images taken by Perseverance. While all of these images are primarily used as part of the process to ensure the rover is functioning as expected after landing, they have already provided some initial scientific insights into the history of Jezero Crater.

Mission controllers have also received confirmation that the Ingenuity helicopter, currently attached to the underside of the rover, is operating as expected. Over the next several days, the craft's batteries will be charged in preparation for when it will be deployed and hopefully fly above the Martian surface, currently scheduled for 30 to 60 days from now.



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