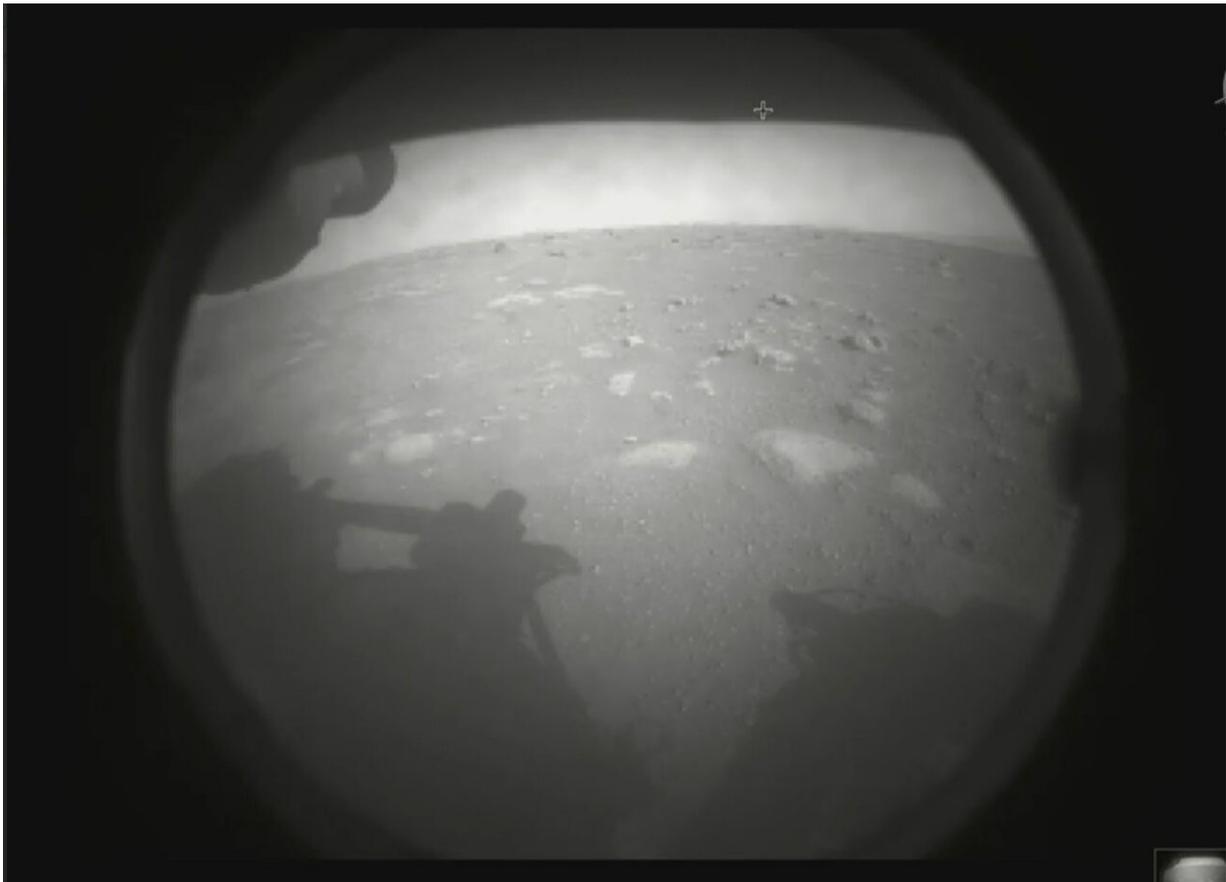


NASA rover lands on Mars to look for signs of ancient life

February 18 2021, by Marcia Dunn



This photo made available by NASA shows the first image sent by the Perseverance rover showing the surface of Mars, just after landing in the Jezero crater, on Thursday, Feb. 18, 2021. (NASA via AP)

A NASA rover streaked through the orange Martian sky and landed on the planet Thursday, accomplishing the riskiest step yet in an epic quest to bring back rocks that could answer whether life ever existed on Mars.

Ground controllers at the space agency's Jet Propulsion Laboratory in Pasadena, California, leaped to their feet, thrust their arms in the air and cheered in both triumph and relief on receiving confirmation that the six-wheeled Perseverance had touched down on the red planet, long a deathtrap for incoming spacecraft.

"Now the amazing science starts," a jubilant Thomas Zurbuchen, NASA's science mission chief, said at a news conference, where he theatrically ripped up the contingency plan in the event of a failure and threw the document over his shoulders.

The landing marks the third visit to Mars in just over a week. Two spacecraft from the United Arab Emirates and China swung into orbit around Mars on successive days last week. All three missions lifted off in July to take advantage of the close alignment of Earth and Mars, journeying some 300 million miles in nearly seven months.

Perseverance, the biggest, most advanced rover ever sent by NASA, became the ninth spacecraft since the 1970s to successfully land on Mars, every one of them from the U.S.

The car-size, plutonium-powered vehicle arrived at Jezero Crater, hitting NASA's smallest and trickiest target yet: a 5-by-4-mile strip on an ancient river delta full of pits, cliffs and rocks. Scientists believe that if life ever flourished on Mars, it would have happened 3 billion to 4 billion years ago, when water still flowed on the planet.

Over the next two years, Percy, as it is nicknamed, will use its 7-foot (2-meter) arm to drill down and collect rock samples containing possible

signs of bygone microscopic life. Three to four dozen chalk-size samples will be sealed in tubes and set aside to be retrieved eventually by another rover and brought homeward by another rocket ship.



This photo made available by NASA shows the second image sent by the Perseverance rover showing the surface of Mars, just after landing in the Jezero crater, on Thursday, Feb. 18, 2021. (NASA via AP)

The goal is to get them back to Earth as early as 2031.

Scientists hope to answer one of the central questions of theology, philosophy and space exploration.

"Are we alone in this sort of vast cosmic desert, just flying through space, or is life much more common? Does it just emerge whenever and wherever the conditions are ripe?" said deputy project scientist Ken Williford. "We're really on the verge of being able to potentially answer these enormous questions."



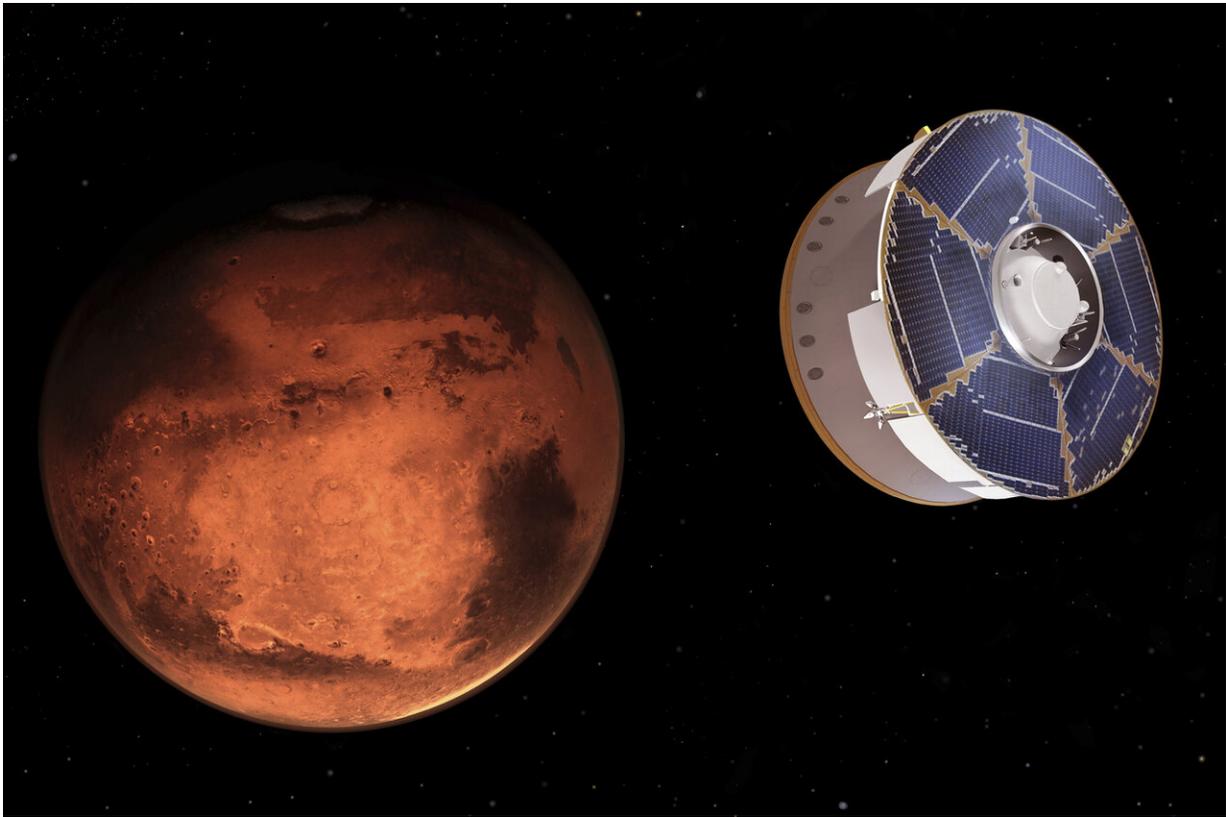
In this photo provided by NASA, members of NASA's Perseverance rover team react in mission control after receiving confirmation the spacecraft successfully touched down on Mars, Thursday, Feb. 18, 2021, at NASA's Jet Propulsion Laboratory in Pasadena, Calif. The landing of the six-wheeled vehicle marks the third visit to Mars in just over a week. Two spacecraft from the United Arab

Emirates and China swung into orbit around the planet on successive days last week. (Bill Ingalls/NASA via AP)

China's spacecraft includes a smaller rover that will also seek evidence of life, if it makes it safely down from orbit in May or June. Two older NASA landers are still humming along on Mars: 2012's Curiosity rover and 2018's InSight.

Perseverance was on its own during its descent, a maneuver often described by NASA as "seven minutes of terror."

Flight controllers waited helplessly as the preprogrammed spacecraft hit the thin Martian atmosphere at 12,100 mph (19,500 kph), or 16 times the speed of sound, slowing as it plummeted. It released its 70-foot (21-meter) parachute and then used a rocket-steered platform known as a sky crane to lower the rover the final 60 or so feet (18 meters) to the surface.

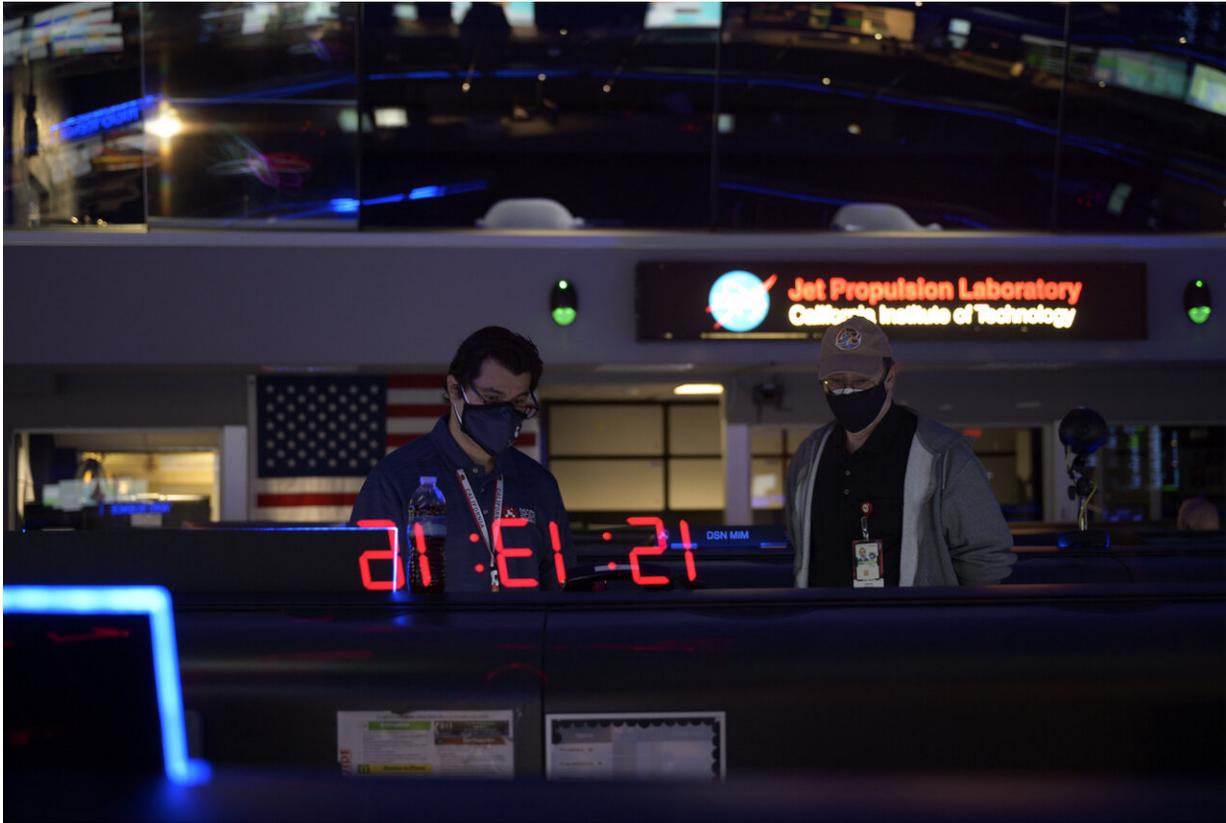


This illustration provided by NASA depicts the Mars 2020 spacecraft carrying the Perseverance rover as it approaches Mars. Perseverance's \$3 billion mission is the first leg in a U.S.-European effort to bring Mars samples to Earth in the next decade. (NASA/JPL-Caltech via AP)

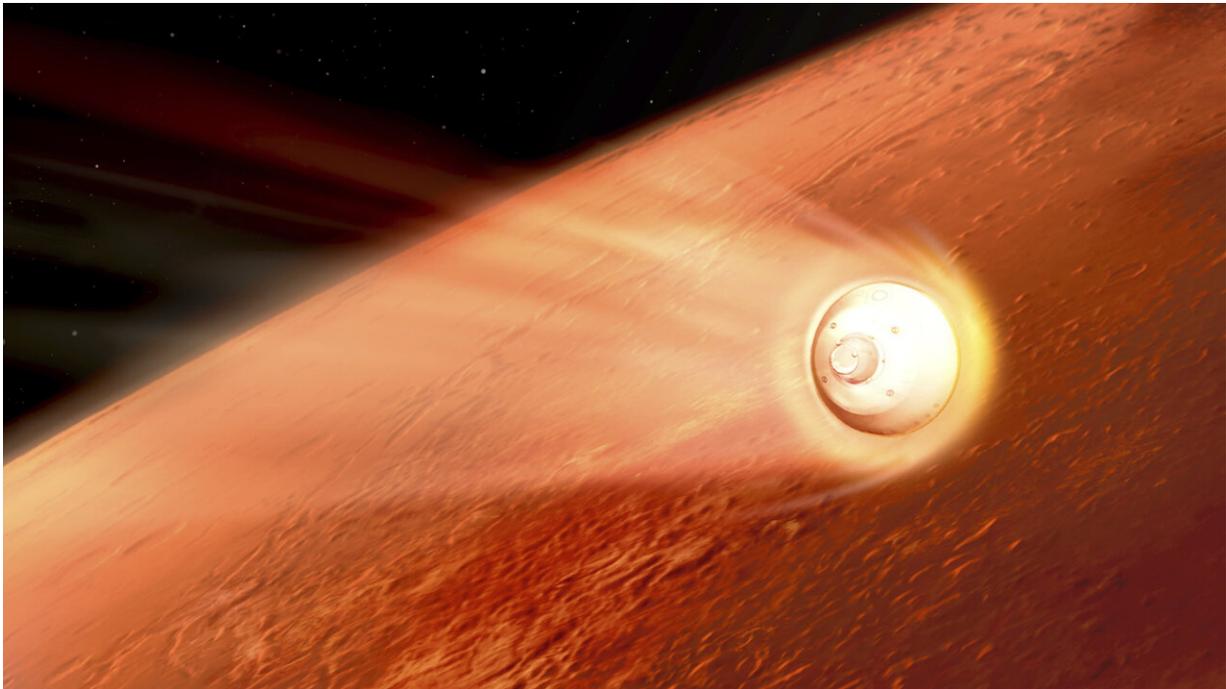
It took a nail-biting 11 1/2 minutes for the signal confirming the landing to reach Earth, setting off back-slapping and fist-bumping among flight controllers wearing masks against the coronavirus.

Perseverance promptly sent back two grainy, black-and-white photos of Mars' pockmarked, pimply-looking surface, the rover's shadow visible in the frame of one picture.

"Take that, Jezero!" a controller called out.



In this photo provided by NASA, members of the Perseverance Mars rover team study data on monitors in mission control, Thursday, Feb. 18, 2021, at NASA's Jet Propulsion Laboratory in Pasadena, Calif. The landing of the six-wheeled vehicle would mark the third visit to Mars in just over a week. Two spacecraft from the United Arab Emirates and China swung into orbit around the planet on successive days last week. (Bill Ingalls/NASA via AP)



In this illustration made available by NASA, the spacecraft containing the Perseverance rover slows down using the drag generated by traveling through the Martian atmosphere. (NASA/JPL-Caltech via AP)



In this photo provided by NASA, members of NASA's Perseverance rover team react in mission control after receiving confirmation the spacecraft successfully touched down on Mars, Thursday, Feb. 18, 2021, at NASA's Jet Propulsion Laboratory in Pasadena, Calif. The landing of the six-wheeled vehicle marks the third visit to Mars in just over a week. Two spacecraft from the United Arab Emirates and China swung into orbit around the planet on successive days last week. (Bill Ingalls/NASA via AP)



Jennifer Trosper, deputy project manager at NASA's Jet Propulsion Laboratory comments on the Mars 2020 Perseverance's descent, which has been described by NASA as "seven minutes of terror," in which flight controllers can only watch helplessly, at NASA's Jet Propulsion Laboratory (JPL) Thursday, Feb. 18, 2021, in Pasadena, Calif. (AP Photo/Damian Dovarganes)

NASA said that the descent was flawless and that the rover came down in a "parking lot"—a relatively flat spot amid hazardous rocks. Hours after the landing, Matt Wallace, NASA deputy project manager, reported that the spacecraft was in great shape.

Mars has proved a treacherous place for the world's spacefaring nations, the U.S. included. In the span of less than three months in 1999, a U.S.

spacecraft was destroyed upon entering orbit because engineers had mixed up metric and English units, and an American lander crashed on the surface after its engines cut out prematurely.



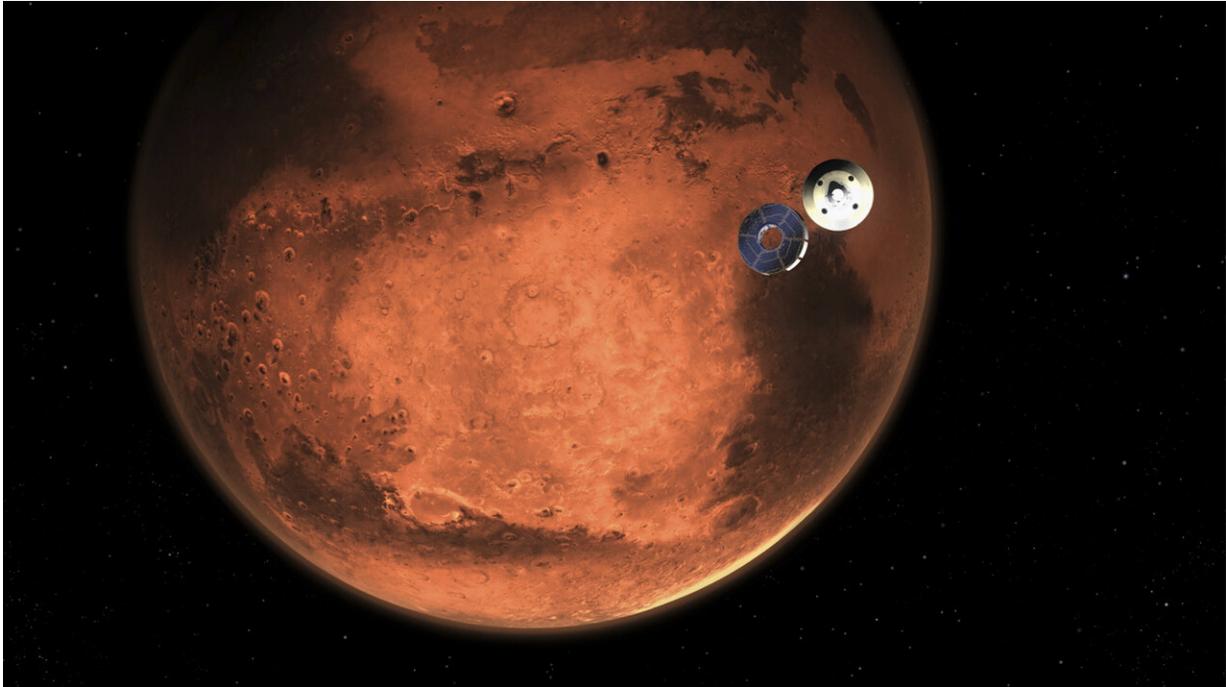
In this photo provided by NASA, members of NASA's Perseverance Mars rover team watch in mission control as the first images arrive moments after the spacecraft successfully touched down on Mars, Thursday, Feb. 18, 2021, at NASA's Jet Propulsion Laboratory in Pasadena, Calif. (Bill Ingalls/NASA via AP)



Bekah Siegfriedt, Mars 2020 mission operator comments on the Mars 2020 Perseverance's descent to the surface of the planet which has been described by NASA as "seven minutes of terror," in which flight controllers can only watch helplessly, at NASA's Jet Propulsion Laboratory (JPL) Thursday, Feb. 18, 2021, in Pasadena, Calif. (AP Photo/Damian Dovarganes)



Images from Nasa are streamed live showing the landing of NASA's Perseverance on Mars, shown on Piccadilly Lights in central London, Thursday Feb. 18, 2021. The Mars rover landing mission begins it's search for traces of life after the successful landing, to explore and collect samples for future return to Earth. Eros statue top left. (AP Photo/Alastair Grant)



In this illustration made available by NASA, the Perseverance rover casts off its spacecraft's cruise stage, minutes before entering the Martian atmosphere.
(NASA/JPL-Caltech via AP)



A full-scale model of the Mars Helicopter Ingenuity is displayed for the media at NASA's Jet Propulsion Laboratory (JPL) Wednesday, Feb. 17, 2021, in Pasadena, Calif. (AP Photo/Damian Dovarganes)

President Joe Biden tweeted congratulations over the landing, saying: "Today proved once again that with the power of science and American ingenuity, nothing is beyond the realm of possibility."

NASA is teaming up with the European Space Agency to bring the rocks home. Perseverance's mission alone costs nearly \$3 billion.

The only way to confirm—or rule out—signs of past life is to analyze the samples in the world's best labs. Instruments small enough to be sent to Mars wouldn't have the necessary precision.

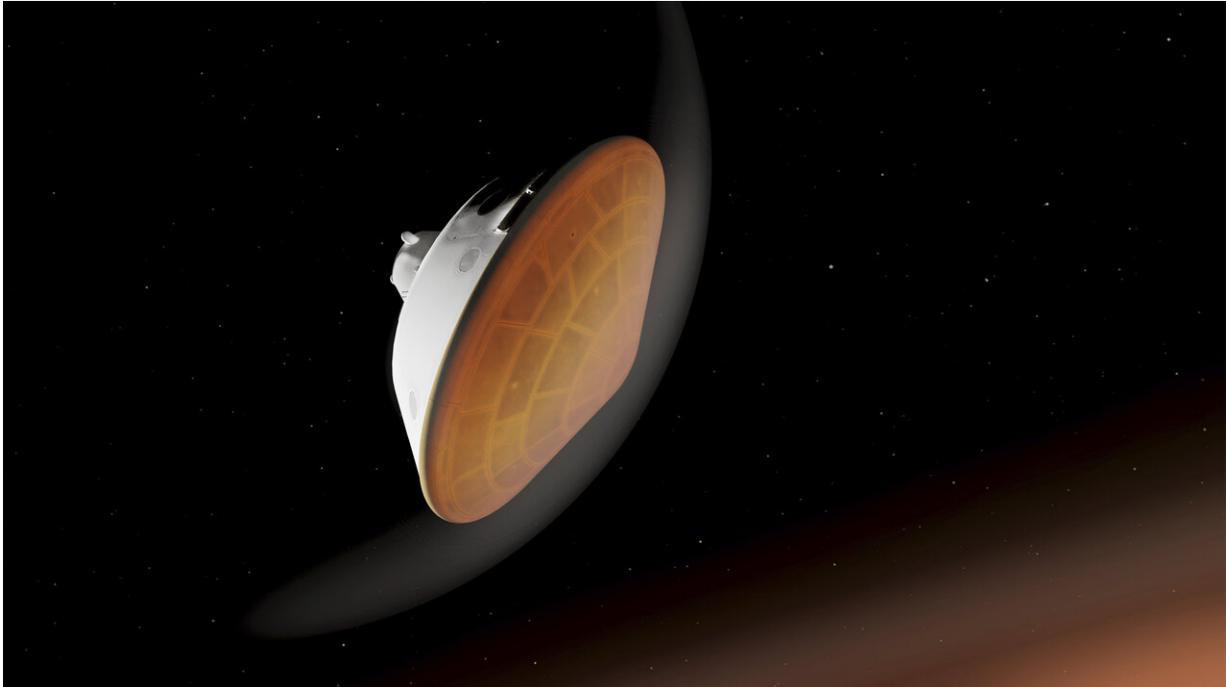
"It's really the most extraordinary, mind-boggingly complicated and will-be history-making exploration campaign," said David Parker, the European agency's director of human and robotic exploration.



Thomas Zurbuchen, NASA Associate Administrator Science Mission Directorate, raises his arms, center, with Lori Glaze, Director of NASA's Science Mission Directorate's Planetary Science Division, right, as they walk with members of NASA's Perseverance rover team after receiving confirmation the spacecraft successfully touched down on Mars, Thursday, Feb. 18, 2021, at NASA's Jet Propulsion Laboratory in Pasadena, Calif. (AP Photo/Damian Dovarganes)



In this illustration provided by NASA, the Perseverance rover fires up its descent stage engines as it nears the Martian surface.. This phase of its entry, descent and landing sequence, or EDL, is known as "powered descent." (NASA/JPL-Caltech via AP)



In this illustration made available by NASA, the Perseverance rover, with its heat shield facing the planet, begins its descent through the Martian atmosphere. (NASA/JPL-Caltech via AP)

Former astronaut and one-time NASA science chief John Grunsfeld tweeted that Perseverance's landing was "exactly the good news and inspiration we need right now."

"Reminds us all that we will persevere COVID and political turmoil and that the best is yet to come," he said.

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