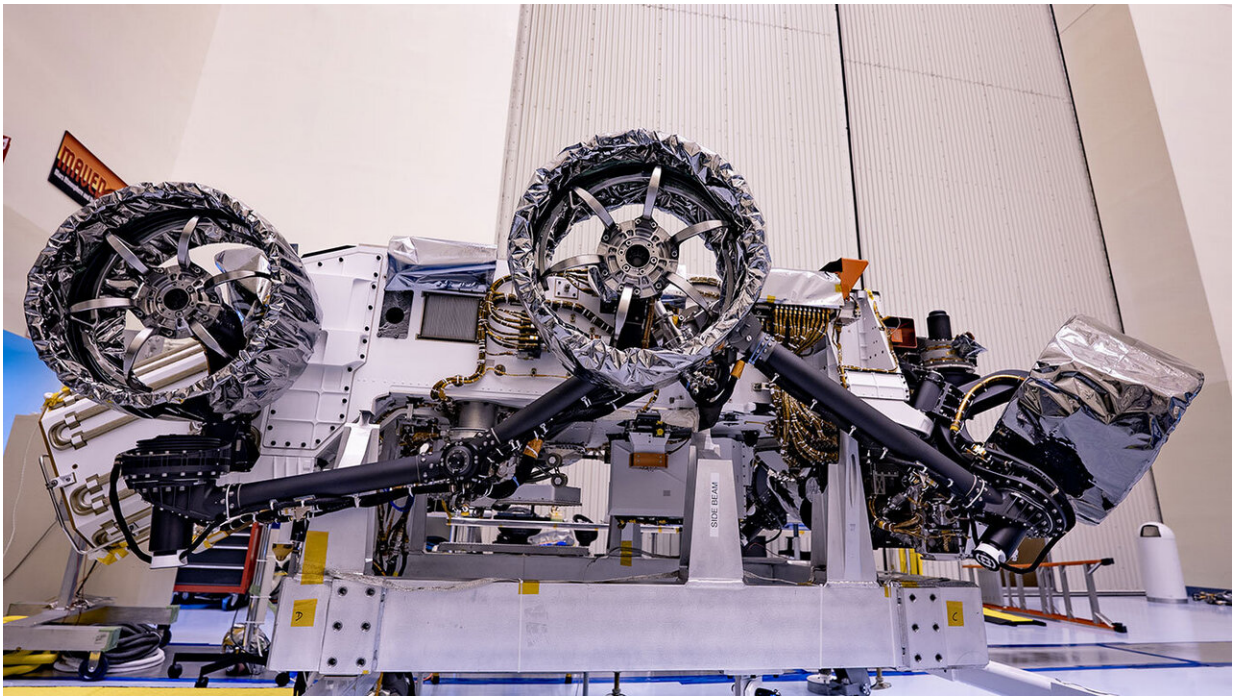
NASA's Perseverance Mars rover gets its wheels and air brakes

April 4 2020, by Grey Hautaluoma / Alana Johnson



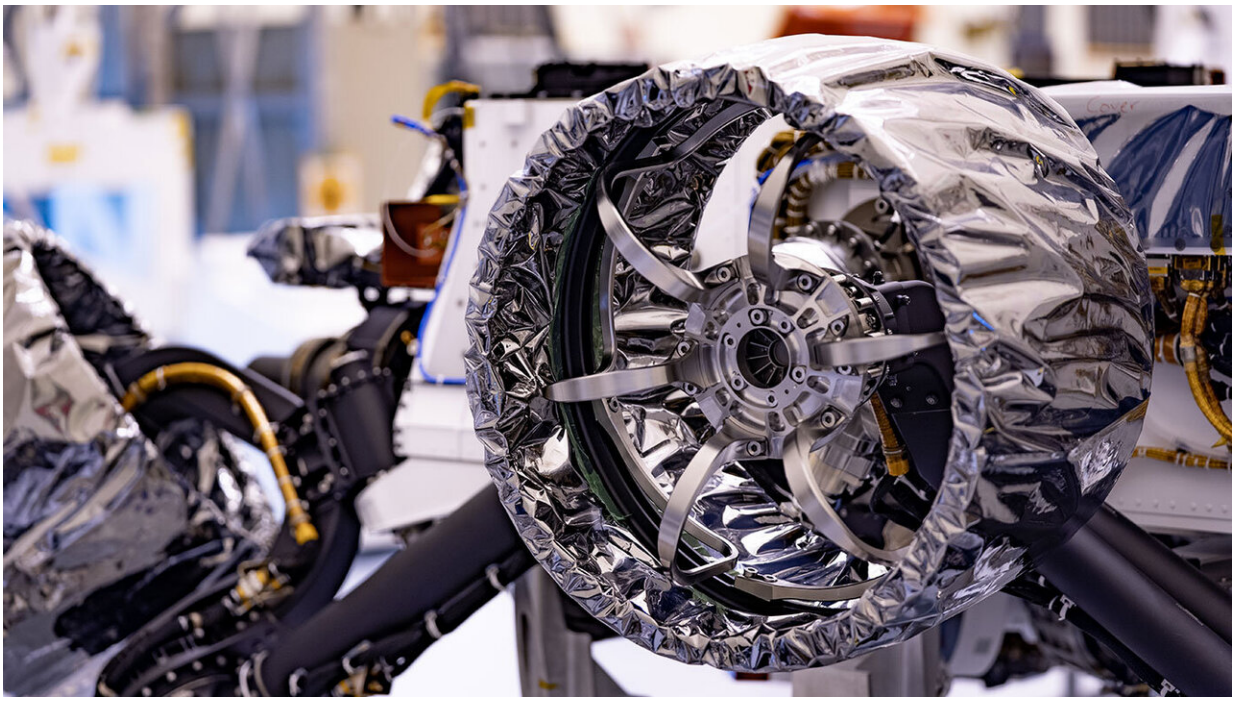
Three of the six flight wheels that will travel to Mars can be seen attached to NASA's Perseverance rover (which is inverted on a handling fixture) on March 30, 2020 at the Kennedy Space Center in Florida. The protective antistatic foil covering the wheels will be removed before launch this summer. Credit: NASA

Final assembly and testing of NASA's Perseverance rover continues at Kennedy Space Center in Florida as the July launch window approaches. In some of the last steps required prior to stacking the spacecraft

components in the configuration they'll be in atop the Atlas V rocket, the rover's wheels and parachute have been installed.

Perseverance received its six flight wheels on March 30, 2020. While the rover took a test drive last December, it was on "flight spares" that wouldn't be making the trip to Mars. Designed for the kind of off-roading Perseverance will perform on the Red Planet, the wheels are re-engineered versions of the ones NASA's Curiosity has been using on its traverses of Mount Sharp.

Machined out of a block of flight-grade aluminum and equipped with titanium spokes, each wheel is slightly larger in diameter and narrower than Curiosity's, with skins that are almost a millimeter thicker. They also feature new treads, or grousers: In place of Curiosity's 24 chevron-pattern treads are 48 gently curved ones. Extensive testing in the Mars Yard at NASA's Jet Propulsion Laboratory, which built the rover and manages operations, has shown these treads better withstand the pressure from sharp rocks and grip just as well or better than Curiosity's when driving on sand.



This wheel, and five others just like it, heads to Mars on NASA's Perseverance rover this summer. Wrapped in a protective antistatic foil that will be removed before launch, the wheel is 20.7 inches (52.6 centimeters) in diameter. The image was taken on March 30, 2020, at NASA's Kennedy Space Center. Credit: NASA

The Parachute

The job of adding Perseverance's parachute to the back shell, where the rover will be stowed on the journey to the Red Planet, took several days and was finished on March 26. Tasked with slowing the heaviest payload in the history of Mars exploration from Mach 1.7 to about 200 mph (320 kph) during the rover's landing on Feb., 18, 2021, the 194 pounds (88 kilograms) of nylon, Technora and Kevlar fibers are packed so tightly into a 20-inch-wide (50-centimeter-wide) aluminum cylinder that it is as dense as oak wood. When deployed at about 7 miles (11 kilometers)

above the Martian surface, the chute will take about a half-second to fully inflate its 70.5-foot-wide (21.5-meter-wide) canopy.

Illustrated here, the aluminum wheels of NASA's Curiosity (left) and Perseverance rovers. Slightly larger in diameter and narrower, 20.7 inches (52.6 centimeters) versus 20 inches (50.8 centimeters), Perseverance's wheels have twice as many treads, and are gently curved instead of chevron-patterned. Credit: NASA/JPL-Caltech

The Perseverance rover is a robotic scientist weighing 2,260 pounds (1,025 kilograms). It will search for signs of past microbial life, characterize the planet's climate and geology, collect samples for future return to Earth, and pave the way for human exploration of the Red Planet. No matter what day Perseverance launches during its July 17-Aug. 5 launch period, it will land on Mars' Jezero Crater on Feb. 18,

2021.

Perseverance is part of a larger program that includes missions to the Moon as a way to prepare for human exploration of the Red Planet. Charged with returning astronauts to the Moon by 2024, NASA will establish a sustained human presence on and around the Moon by 2028 through NASA's Artemis lunar exploration plans.

Provided by NASA

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