Transcript:

High above the eastern shore of Virginia a rocket is hurtling through the atmosphere at nearly twice the speed of sound. Attached is a 3000 pound payload that is designed to test a parachute for Mars. On board, a computer is calculating the altitude and speed, to determine the precise time that it will signal to deploy the parachute.

These aren't the first tests of parachutes for Mars. Fifty years ago NASA began lofting parachutes to altitudes and speeds meant to simulate the conditions of Mars entry. Those early tests demonstrated the challenges of inflating lightweight materials in a 1500 mile an hour wind and having them survive well enough to help enable a safe landing on the Red Planet.

Today, as our missions become ever more daring, we need new parachutes capable of surviving those strenuous environments. And we need ways of testing them at loads higher than ever before.

To make those tests a reality, engineers at NASA's Jet Propulsion Laboratory worked with NASA's Wallops Flight Facility to develop a new test technique. The Advanced Supersonic Parachute Inflation Research Experiment, or ASPIRE, project uses a two-stage Black Brant 9 sounding rocket to carry its payload to the conditions needed to stress the parachute. The rocket is launched out over the Atlantic Ocean and ascends to altitudes where the atmosphere of Earth mimics the atmosphere near the surface of Mars.

The third and final ASPIRE test launched on September 7. The parachute was deployed at nearly twice the speed of sound. In less than half a second, 200 pounds of nylon, Kevlar, and Technora go from a small, drum-sized bag with the density of wood to an inflated parachute with the volume of a large house, generating nearly 70,000 pounds of drag.

Here, in slow motion images, you can see the rapid emergence of the parachute as it begins generating the drag crucial for deceleration at Mars. These images give us amazing insight into the physics and early behaviors of a supersonic parachute inflation. The apparent ease of the unfurling and unfolding in the parachute belies the severity of the extreme environment in which this occurs.

Awaiting below were a recovery team who had retrieved both the parachute and the payload and returned them to shore. The parachute was then meticulously rinsed and hung to dry before inspection. Miles and miles of thread and over 3 million stitches are used to hold the parachute together. And we will examine each stitch.

After three successful tests of ASPIRE, NASA has now tested their new parachute at loads and conditions exceeding any large supersonic parachute before it, and 40% higher than the highest load expected for the Mars 2020 mission. Our parachute is now certified for flight at Mars!