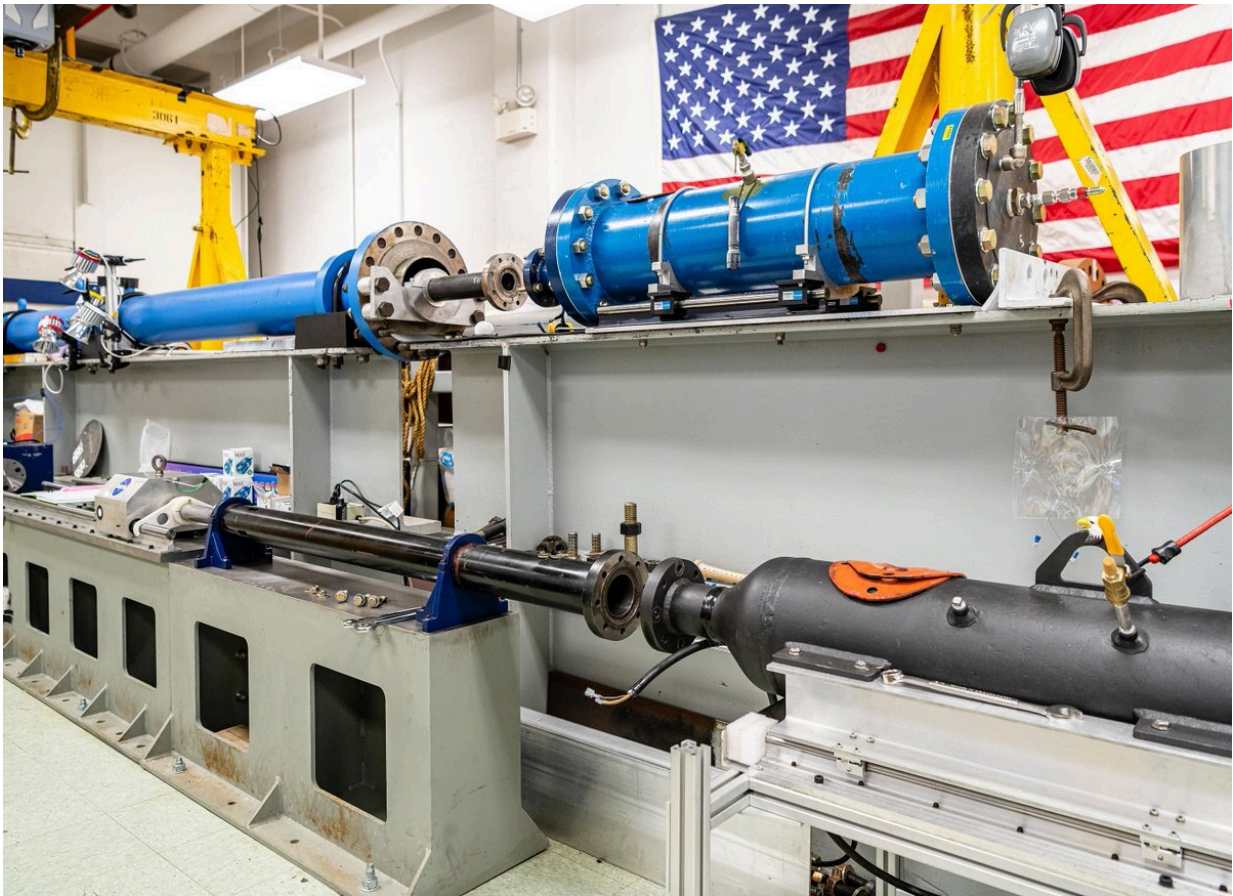


NASA ballistic air gun hurls rocks at space suits to test their micrometeorite protection

September 23 2021, by Andy Tomaswick



Credit: NASA

Shock testing is commonly used throughout engineering to determine how a product will do when impacted by something. That something

could be anything from the ground to a cruise missile. Like so much else in space exploration, engineers at NASA are performing the same type of test, just scaled up. Instead of simply dropping the object under test, as is common in most settings, they shoot it with a steel ball going 3000 ft/second.

Researchers at the Ballistics Impact Lab use a 40-foot-long gun to simulate what it would be like to be hit by a micrometeorite in [space](#). Recently, the team has focused on testing different types of [fabric](#) for use in [space suits](#). A rapid decompression from a micrometeorite strike anywhere on a suit would be fatal to any astronaut unlucky enough to suffer one.

Understanding how a piece of fabric would fail in such a situation is critical to improving its design. Some forms of failure are worse than others. The lab has a series of high-speed cameras and sensors surrounding the material under [test](#) to ensure it can capture as much data about those failure modes as possible.

Those failure modes can be caused by more than just steel balls. A different test rig shoots a piece of simulated moon rock (primarily made of basalt) vertically down onto the fabric. Also, the fabric isn't the only material that has to undergo such testing—other material that could be used on the exterior of habitats, or even material specifically designed to capture [space debris](#), must also undergo similar violent testing.

Such testing will continue, using a combination of resources from the Glenn Research Center, where the physical lab is located, and Johnson Space Center, where the data is analyzed. As maintaining a tight seal between the external void and the soft human inhabiting the suits and habitats of the moon becomes more critical, violently testing the materials that make those seals out of does so as well.



Ballistics Lab technical lead Mike Pereira sets up a drop test. Credit: NASA



Some of the basalt rocks used as projectiles in the tests. Credit: NASA

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