

# Opening The Door To New Materials For Exploration

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Scientists just got their space-bound luggage back after a four-year wait. On October 3, containers filled with experimental materials that might one day be used to build the vehicles that carry humans to Mars were opened for the first time since their return to Earth.

These materials endured four years of continuous exposure in space before Space Shuttle Discovery brought them back in August.

The opening of the containers was a "tell-all" moment for the Materials International Space Station Experiment, or MISSE.

"I'm excited to see if, after four years in space, do these experiments and specimens have the same mechanical properties as they did before?" wondered MISSE Principal Investigator and Chief Scientist Bill Kinard.

Researchers and reporters joined Kinard at NASA's Langley Research Center to witness the first opening of the containers. The big question, as Kinard put it, was "Did (the materials) survive space?"

Yes, they did.

The materials endured very well as a group, though some samples were missing and there was light damage to the case shells.

After such a long stay in space, some damage was expected according to Kinard. Without a detailed examination, he couldn't be sure if the

damage was due to man-made debris or meteorites. Either way, it was minimal.

The MISSE experiments will now be returned to the scientists who proposed them for thorough analyses and testing.

## About MISSE

The MISSE is surprisingly simple considering its importance.

The experiment collects dozens of small samples of materials into a container that looks like a metal suitcase.

This 'suitcase' -- officially known as a Passive Experiment Container -- travels into space with a space shuttle crew. Once they arrive at the international space station, the shuttle crew opens the container and clamps it to the outside of the station to expose the samples to the space environment.

Then you leave it there... for a long time.

After all, we expect a mission to Mars will take over one year using current technologies. If you're going to subject astronauts to that kind of mission, you must know that the materials in their spacecraft and equipment will stand up to the test.

Space is a tough place. Materials that are used in space must survive extreme temperatures, meteorites, corrosive atomic oxygen, radiation and the absence of an atmosphere and gravity. Simulations here on Earth can mimic only a couple of these factors at a time. Ultimately, nothing is as effective as testing materials that you hope to use in space in... well, space.

Astronauts attached the experiment to the international space station in 2001 during the STS-105 mission. The experiment was intended to stay in space for one year, but the loss of Space Shuttle Columbia and the STS-107 crew postponed MISSE's return indefinitely.

By the time that the STS-114 astronauts brought it back, the experiment had flown for four times longer than planned. Astronaut Steve Robinson retrieved the MISSE containers during a spacewalk on July 30.

To continue the experiment, astronaut Soichi Noguchi attached a new MISSE container to the space station. NASA plans to retrieve it in about one year.

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