NASA and Houston hospital work on spacesuit issue

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Italian astronaut Luca Parmitano stands beside his space suit sitting under a medical imaging scanner Monday, Dec. 8, 2014, in Houston as he talks about his 2013 space walk when he nearly drowned in his helmet. The imaging technology was demonstrated on the spacesuit for an annual event that brings three of Houston's biggest industries -- medicine, energy and aerospace -- to discuss ideas and technologies that could be shared by the different fields. (AP Photo/Pat Sullivan)

The empty spacesuit that sat on the operating table in a lab at Houston Methodist Hospital's research institute made for an unusual patient.

The bulky garment ended up in the state-of-the-art research lab after NASA sought innovative ways to pinpoint problems with its spacesuits in the wake of an Italian astronaut nearly drowning in his helmet during a 2013 spacewalk on the International Space Station. It happened when debris clogged a pump mechanism inside his spacesuit.

NASA hopes the advanced imaging equipment in the lab, including a CT scanner attached to a robotic arm, can help it create 3-D pictures of its spacesuits that can be used to better diagnose malfunctions that might happen in the future.

Luca Parmitano, the Italian astronaut who survived the harrowing experience with the spacesuit, said the work NASA and the hospital are doing is a step forward in preventing others from going through what he faced.

"I never thought about seeing a spacesuit lying on a surgeon's table. That is a first for me," said Parmitano, as he stood next to the spacesuit, which was not the same one he wore during the spacewalk.

The imaging technology was demonstrated on the spacesuit during "Pumps & Pipes," an annual conference that brings three of Houston's biggest industries—medicine, energy and aerospace—together to discuss technologies that could be shared by the fields.

Italian astronaut Luca Parmitano looks at his space suit as it sits under a medical imaging scanner Monday, Dec. 8, 2014, in Houston as he talks about his 2013 space walk when he nearly drowned in his helmet. The imaging technology was demonstrated on the spacesuit for an annual event that brings three of Houston's biggest industries -- medicine, energy and aerospace -- to discuss ideas and technologies that could be shared by the different fields. (AP Photo/Pat Sullivan)

Parmitano, an officer in the Italian Air Force, described to an audience at the event how the water began building behind his head in his helmet and later started to cover his ears, eyes and nose. He said he imagined a newspaper headline that read, "Italian astronaut drowns in space."

Brian Macias, the spacesuit subsystem manager at NASA's Johnson Space Center in Houston, said a fan component that failed during the spacewalk was later examined with X-rays and N-rays, another form of

radiography, but this gave engineers limited information.

"It's breaking new ground for us because we haven't used imaging a whole lot in finding out spacesuit anomalies," Macias said. "I see great potential."

he spacesuit worn by Italian astronaut Luca Parmitano when he nearly drowned in his helmet during a 2013 space walk sits under a medical imaging scanner Monday, Dec. 8, 2014, at Houston Methodist Hospital. The imaging technology was demonstrated on the spacesuit for an annual event that brings three of Houston's biggest industries -- medicine, energy and aerospace -- to discuss ideas and technologies that could be shared by the different fields. (AP Photo/Pat Sullivan)

During a demonstration Monday at the conference, the robotic arm rotated the CT scanner around the spacesuit's helmet, creating red, black and white 3-D images that can allow engineers to look at the integrity of different components.

Dr. Alan Lumsden, the medical director of the Methodist DeBakey Heart and Vascular Center who led the demonstration, said techniques used in endovascular surgery to examine problems with blood vessels are the same kind that can diagnose future problems with the spacesuits.

"Here is a situation where we are going to use our technology to potentially look at a problem that helps NASA," he said. "We really want to help as much as we can."