

# Spacesuit woes haunt NASA ahead of crucial spacewalks

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With three complicated spacewalks planned in the coming days, NASA is rushing to resolve a spacesuit problem linked to a 2013 emergency when water dangerously flooded a European astronaut's helmet.

The spacesuits that will be worn by astronauts Barry Wilmore and Terry Virts on their ventures outside the International Space Station are in

working order, NASA said Wednesday, but engineers are concerned about a recurring issue with a piece of equipment known as the fan pump separator, part of the spacesuit's temperature control system.

"That is the same area of concern we had back in 2013 when we had the issue of the water in the helmet," said Kenneth Todd, International Space Station Operations and Integration manager, in a briefing with reporters to outline plans for the trio of spacewalks to install new docking stations for commercial cargo at the orbiting lab.

NASA was alerted to the problem when astronauts were doing spacesuit maintenance in December and found that the fan pump in one suit did not speed up as expected.

A new fan pump separator that was on board the space station was installed as a replacement "and it has been working with no issues since that point," said Todd.

However, when NASA commander Wilmore was scrubbing cooling loops on another US spacesuit on January 20, he heard an "abnormally loud fan pump separator," according to NASA's blog of space station activities.

"We were doing the same kind of activity and encountered the same type of failure," Todd told reporters.

"That got us thinking: what has changed? What is happening?"

A new spacesuit was shipped to the outpost and will be worn by Wilmore during the spacewalks.



A new spacesuit was shipped to the ISS and will be worn by US astronaut Barry Wilmore for spacewalks outside the International Space Station

The other spacesuit, with the replacement part, will be worn by Virts. Its fan pump separator has shown some signs of corrosion, but it is working, Todd said.

"The two suits we are going out with have operated every time we turned them on," he said.

Engineers believe that small amounts of water are building up in the bearings inside the fan pump separator each time the suit is powered up and powered down, leading to corrosion over time.

## **Near drowning**

The issue is related to the water-in-helmet leak that nearly drowned Italian astronaut Luca Parmitano during a spacewalk in July 2013—he rushed back into the space station and quickly recovered—but is not expected to cause a similar gush of water, Todd said.

"With the water in the helmet, that was a totally different root cause issue. That was an issue with port holes getting clogged up in the water separator, that was due to the water chemistry," he explained.

"That is not an issue here. What we are talking about is a failure of the pump to start up. That in itself is not a water-type of event."

If the pump were to fail, the astronauts would have to end their spacewalk and return to the hatch.



This NASA TV image shows Italian astronaut Luca Parmitano working next to his space suit, which experienced a water-in-helmet leak that nearly drowned him during a spacewalk in July 2013

"This is not a risk to the crew in terms of loss of life," said Todd.

A final decision about whether or not the spacewalks—known as extra-vehicular activities, or EVAs—can begin Friday as planned depends on the outcome of further tests, and should be announced on Thursday.

"All indicators are—based on all the data from the ground testing as well as the testing of the suits on orbit—is that we will work our way through this and these suits are going to be okay. But we have some open work left to do," said Todd.

The spacewalks are scheduled for Friday, February 20; February 24 and March 1, each beginning at around 1210 GMT and lasting about six hours.



US astronaut Terry Virts speaks as his space suit is tested prior to blasting off to the International Space Station (ISS) on November 23, 2014

The astronauts will be preparing cables and communications gear for new docking ports at the space station.

The ports will be used by future astronaut crews launched from Cape Canaveral, Florida, once the first commercial capsules are ready to fly people beginning in 2017.

Boeing and SpaceX are in the process of completing their respective crew vehicles, which will restore the United States' ability to send astronauts to low-Earth orbit after the retirement of the space shuttle program in 2011.

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