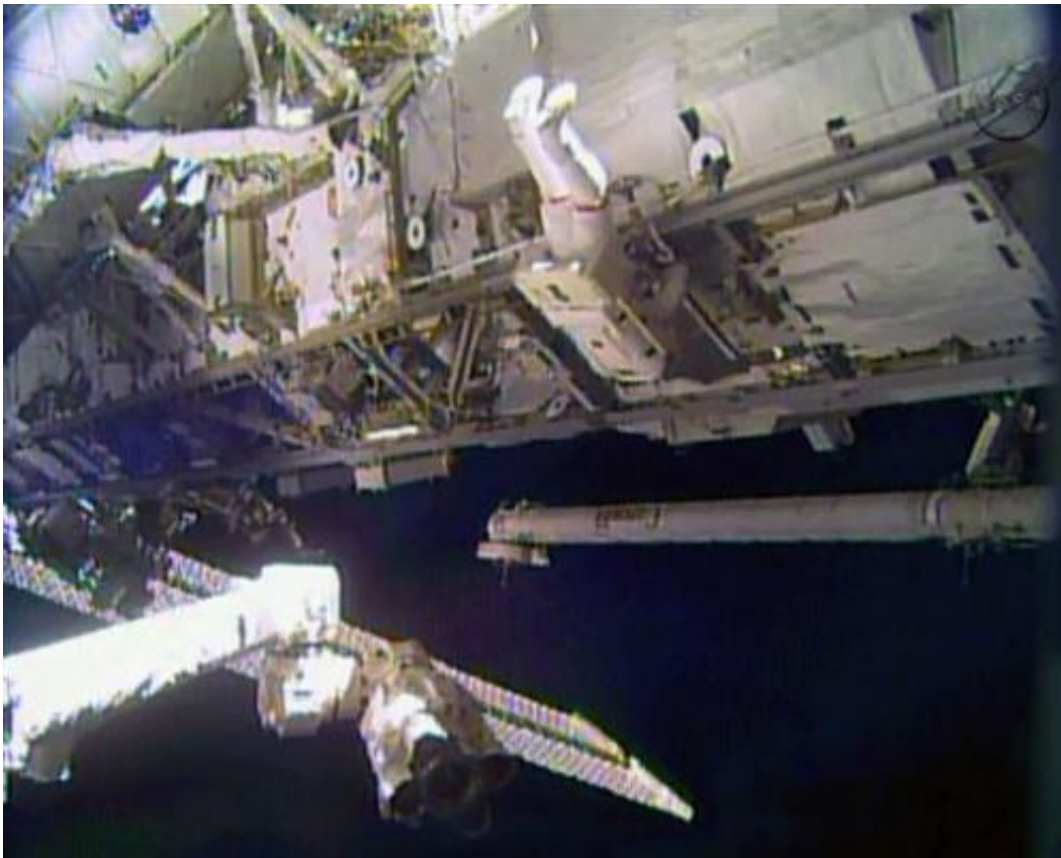


Space suit issue prompts delay of second spacewalk

December 22 2013, by Marcia Dunn



In this image made from video provided by NASA, astronaut Rick Mastracchio performs a space walk outside the International Space Station on Saturday, Dec. 21, 2013. Mastracchio and Michael Hopkins ventured out of the station to try to revive a crippled cooling line. (AP Photo/NASA)

Astronauts removed an old space station pump Saturday, sailing through

the first of a series of urgent repair spacewalks to revive a crippled cooling line.

The two Americans on the crew, Rick Mastracchio and Michael Hopkins, successfully pulled out the ammonia pump with a bad valve—well ahead of schedule. That task had been planned for the next spacewalk, originally scheduled for Monday but now delayed until Tuesday, Christmas Eve, because of the need for a suit swap.

"An early Christmas," observed Mission Control as Mastracchio tugged the refrigerator-size pump away from its nesting spot.

If Mastracchio and Hopkins keep up the quick work, two spacewalks may be enough to complete the installation of a spare pump and a third spacewalk will not be needed as originally anticipated.

Several hours after Saturday's spacewalk ended, Mission Control bumped spacewalk 2 to Tuesday to give Mastracchio enough time to prepare a spare suit. His original suit was compromised when he inadvertently turned on a water switch in the air lock at the end of Saturday's excursion. NASA officials said Saturday night that it's unclear whether a third spacewalk will be needed and when it might occur, if required. A third spacewalk had been slated for Christmas Day before the latest turn of events. NASA requires a day off between spacewalks for astronaut rest.

The space station breakdown 10 days earlier left one of two identical cooling loops too cold and forced the astronauts to turn off all nonessential equipment inside the orbiting lab, bringing scientific research to a near-halt and leaving the station in a vulnerable state.

Mission Control wanted to keep the spacewalkers out even longer Saturday to get even further ahead, but a cold and uncomfortable

Mastracchio requested to go back. The spacewalk ended after 5½ hours, an hour short on time but satisfyingly long on content.

Earlier, Mastracchio managed to unhook all the ammonia fluid and electrical lines on the pump with relative ease, occasionally releasing a flurry of frozen ammonia flakes that brushed against his suit. A small O-ring floated away, but he managed to retrieve it.

"I got it, I got it, I got it. Barely," Mastracchio said as he stretched out his hand.

"Don't let that go, that's a stocking stuffer," Mission Control replied.

"Don't tell my wife," Mastracchio said, chuckling, as he put it in a small pouch for trash.

Mastracchio, a seven-time spacewalker, and Hopkins, making his first, wore extra safety gear as they worked outside. NASA wanted to prevent a recurrence of the helmet flooding that nearly drowned an Italian astronaut last summer, so Saturday's spacewalkers had snorkels in their suits and water-absorbent pads in their helmets.

To everyone's relief, the spacewalkers remained dry while outside. But midway through the excursion, Mastracchio's toes were so cold that he had to crank up the heat in his boots. Mission Control worried aloud whether it was wise to extend the spacewalk to get ahead, given Mastracchio's discomfort.

Not quite two hours later, Mastracchio had enough as he clutched the old pump. When Mission Control suggested even more get-ahead chores, he replied, "I'd like to stow this old module and kind of clean up and call it a day." He said a couple of things were bothering him, not just temperature, and declined to elaborate when asked by Mission Control

what was wrong.

Flight controllers obliged him. Once the old pump was secured to a temporary location, the spacewalkers started gathering up their tools to go in.

Adding to the excitement 260 miles (418 kilometers) up, a smoke alarm went off in the space station as the astronauts toiled outside. It was quickly found to be a false alarm.

The pump replacement is a huge undertaking attempted only once before, back in 2010 on this very unit. The two astronauts who tackled the job three years ago were in Mission Control, offering guidance. Mastracchio promised to bring back a wire tie installed on the pump by the previous spacewalkers. "Oh, awesome, thanks Rick," replied the astronaut in Mission Control who put it on.

The 780-pound (354-kilogram) pump is about the size of a double-door refrigerator and extremely cumbersome to handle, with plumbing full of toxic ammonia. Any traces of ammonia on the spacesuits were dissipated before the astronauts went back inside, to avoid further contamination.

NASA's plan initially called for the pump to be disconnected in the first spacewalk, pulled out on the second spacewalk and a fresh spare put in, and then all the hookups of the new [pump](#) completed in the third outing.

In the days following the Dec. 11 breakdown, [flight controllers](#) attempted in vain to fix the bad valve through remote commanding. Then they tried using a different valve to regulate the temperature of the overly cold loop, with some success. But last Tuesday, NASA decided the situation was severe enough to press ahead with the spacewalks. Although the astronauts were safe and comfortable, NASA did not want to risk another failure and a potential loss of the entire cooling system,

needed to radiate the heat generated by on-board equipment.

NASA delayed a delivery mission from Wallops Island, Virginia, to accommodate the spacewalks. That flight by the private firm Orbital Sciences Corp., which should have occurred this past week, is now targeted for Jan. 7.

Until Saturday, U.S. spacewalks had been on hold since July, when an Italian astronaut's helmet was flooded with water from the cooling system of his suit. Luca Parmitano barely got back inside alive.

Engineers traced the problem to a device in the suit that turned out to be contaminated—how and why, no one yet knows.

For Saturday's spacewalk, Hopkins wore Parmitano's suit, albeit with newly installed and thoroughly tested components.

Just in case, NASA had Mastracchio and Hopkins build snorkels out of plastic tubing from their suits, before going out. The snorkels will be used in case water starts building up in their helmets. They also put absorbent pads in their helmets; the pads were launched from Earth following the July scare. None of the precautions were needed, in the end.

Besides the two Americans, three Russian and one Japanese astronaut are living on the [space station](#), all men.

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