Engineers Close in on Cause of ISS Computer Glitch

TARIG MALIK, NEW YORK

NASA engineers and their Russian counterparts are closing in on the source of a major computer glitch that afflicted the international space station (ISS) during the June shuttle mission to the orbital laboratory.

ISS engineers are eyeing odd readings in cables and corrosion in an electronics box as potential culprits for last month’s failure of control and navigation computers in the station’s Russian segment during NASA’s STS-117 construction mission.

“We know something is definitely anomalous in these areas,” Kirk Shireman, NASA’s deputy ISS program manager, said in a recent mission briefing. “Is that the only problem? We’re still looking at that.”

The targeted cables and electronics box, known as a BOK 3 unit, both feed into the station’s six-computer network governing Russian control and navigation systems, Shireman said.

The computers, which oversee the station’s Russian-built command systems, vital life support hardware and attitude control thrusters, failed as the shuttle Atlantis’ astronaut crew installed and activated a new pair of starboard-side solar arrays at the ISS. The glitch left the orbital laboratory temporarily dependent on its U.S. segment and Atlantis’ thrusters for attitude control.

ISS Expedition 15 commander Fyodor Yurchikhin and flight engineer Oleg Kotov later reactivated the littering computers, using jumper cables to bypass faulty surge protector-like secondary power sources in each of the machines.

Engineers initially suspected the glitch stemmed in some part from changes to the station’s environment or power grid after Atlantis astronauts installed a new 17.5-ton pair of starboard trusses and unfurled two new solar wings.

“At this point in time, it’s looking like that was not the cause,” Shireman said, adding that engineers continue to look at all possible sources. “But we haven’t dismissed it.”

In its current configuration, the repaired ISS computer systems are capable of supporting NASA’s planned STS-118 shuttle mission to the station in early August, mission managers said.

Commanded by veteran shuttle flyer Scott Kelly, shuttle Endeavour and its STS-118 crew will deliver the fourth set of cargo to the station, as well as a new spacer piece of the outpost’s starboard-side truss and a host of space parts.

Endeavour’s crew also includes NASA’s first educator astronaut Barbara Morgan, who first joined NASA more than 20 years ago as the backup flyer for the agency’s Teacher in Space program before the 1986 Challenger accident.

ISS engineers, however, continue to discuss whether to send replacement parts for the afflicted cables, BOK 3 unit or computers themselves to the ISS aboard the unmanned Russian cargo ship Progress 26 before Endeavour’s crew reaches the orbital laboratory.

The automated supply ship is slated to launch Aug. 2 from Baikonur Cosmodrome in Kazakhstan and dock at the ISS a few days later.

NASA’s STS-118 crew is set to launch aboard Endeavour Aug. 7.

“It’s likely that we’ll actually perform some of the maintenance activities while we are docked during STS-118,” Shireman said.

NSSO Turns to the Internet Community for Space Solar Power Study

JEREMY SINGER, BOSTON

A Pentagon office is taking advantage of the collaborative nature of the Internet as it studies potential applications for space-based solar power, according to one of the officials leading the effort.

That marks the first time the National Security Space Office (NSSO) has conducted a study that relies heavily on Internet collaboration, according to Air Force Col. (select) M.V. “Coyote” Smith, chief of the NSSO’s future concepts division. Smith is the director of the study, which began in late April.

In a July 18 interview, Smith said his time is the only resource the NSSO has used on the study, which is due to be delivered to Maj. Gen. James Armos, NSSO’s director, in September. Two other Pentagon officials leading the effort are working on a volunteer basis in their spare time, and John Mankins, a former NSSO official who had led the agency’s work on this topic, is donating his time as well to help the NSSO tap into past work, Smith said.

Mankins currently serves as president of the Space Power Association.

A key component of the study is an ongoing discussion moderated by Smith on a Web site hosted by the Space Power Association. The foundation also has helped collect input from scientists and engineers who also have been working on the space-based solar power issue, in many cases in their spare time as well.

The Web site, which is located at http://space.solarpower.wordpress.com, has received more than 5,000 hits since it went online in mid-June, Smith said. The Web site features a blog run by Smith, and people interested in the topic can respond to his posts with feedback.

The site also features information about the NSSO study and articles on the topic.

Based on the success thus far, Smith said that he would like to see the NSSO open future studies up to similar public discussion where classification is not a limiting factor.

Jeff Krukin, executive director of the Space Frontier Foundation, which has been studying space-based solar power for years, said that he has been pleased with the collaboration with the NSSO thus far, and would like to work together again on other topics in the future.

Krukin said he has welcomed the NSSO’s interest in space-based solar power, as it helps add legitimacy to the concept. The Space Frontier Foundation believes there is energy and environmental benefits that could come from space-based solar power—collecting solar power in space and transmitting it back to Earth—and that construction of systems for this purpose could provide a major stimulus for the space industry. For example, it could lead to the construction and launch of more satellites, he said.

Krukin said the idea for collaborating with the NSSO came after an event in April when he asked a Pentagon official who was speaking at a luncheon about the NSSO’s interest in space solar power after reading about it in Space News. Smith was sitting next to Krukin, and the two began talking about space-based solar power, Krukin said.

Both Smith and Krukin said while they are excited about the potential benefits that could come from space-based solar power, they do not view it as a panacea for military or civilian energy needs, and encouraged the development of other new energy sources.

With satellites that could collect solar energy and beam it to areas all over the world, Smith said space-based solar power could help reduce the military’s need for convoys that carry fuel through dangerous areas, and could be used for disaster relief operations like the reconstruction of an area devastated by a hurricane as well.

“It’s a formidable challenge—going back to the Moon might be easier,” Smith said. “Currently with today’s technology, we can’t do it. I don’t know if the technology of tomorrow can close the business case, but the technology from the day after tomorrow will close it. My job is to find the critical path to the day after tomorrow’s technology.”

Air Force Col. M.V. “Coyote” Smith