Sent: Wednesday, September 05, 2012 8:45 AM
Subject: Space Station Repair -- More important now, and seems to be Working

1. Two astronauts are outside the space station trying to install a spare power unit that jammed during a spacewalk last week.
2. The initial failure was a 'must-fix-now' critical problem that was on the carefully-defined "BIG FOURTEEN" list of can't-wait repairs. See previous message below.
3. After the failed spacewalk repair effort, and completely by unlucky coincidence, a SECOND electrical failure occurred. See para 5 in last week's advisory, below.
4. This new one was failure "1e" on the 'Big-14' list -- see below.
It's called a Direct Current Switching Unit (DCSU)
5. This made the electrical power problem into a much more serious issue, and it reduced available power by 25%, forcing a lot of equipment power-downs.
6. If the repair today of the original problem succeeds, the NEW problem remains and 'by the book' it also will require ANOTHER spacewalk.
7. These kinds of repair spacewalks are the 'new normal' for space station work now that assembly and deployment spacewalks are no longer needed.
8. I wrote an article two years ago describing the first of this 'new type' of spacewalk, attached below.
9. If today's attempt to install the replacement unit does NOT succeed, the 220-pound-mass box will be brought inside the station for more efforts to clean its connectors.
10. In THAT case, the power situation -- especially in light of potential additional failures of aging equipment -- becomes much, MUCH more serious.
11. But odds are that today's attempt to fix the first problem, will succeed.

----- Original Message -----
From: James E Oberg
Sent: Thursday, August 30, 2012 4:47 PM
Subject: Space Station Repair Setback: Frustration, But Not Emergency

Jim Oberg advises:
1. Don't worry about the spacewalk setback on the space station today that left an American and a Japanese spacewalker struggling outside with balky equipment hours longer than planned.
2. Disregard alarmist coverage.
3. The space station is a stable outpost, not a precarious and dynamic flying machine subject to dangerous detours if critical equipment breaks.

4. The station was designed, built, and stocked with spare parts precisely BECAUSE critical parts were certain to break down on the decade-long [or LONGER] mission.
5. Engineers have defined a list of fourteen critical failures that could occur, and would need expedited response from the station crew. Not emergency response -- that would require a SECOND unlucky failure -- but all the same, a response that takes priority over normal operational and research tasks.
6. This is called the "Big Fourteen", and I have attached it at the end of this message.
7. When the first of these failures occurred, about when expected by statistical analysis of expected hardware lifetime, two years ago [August 2010], I wrote up the concept for an engineering magazine, 'Spectrum'. The link is http://spectrum.ieee.org/aerospace/space-flight/iss-repair-space-walk-a-glimpse-into-the-stations-future
8. That failure was code "2b" on the 'Big Fourteen' list.
9. The article described the philosophy of managing such failures as they continued to occur.
10. It specifically addressed the question of how to train EVERY new space station crew for a wide variety of possible spacewalk repair tasks.
11. In the past, when such special tasks became necessary, the next-in-line visiting space shuttle crew was given highly-specialized task-specific training on Earth, and then carried out the maintenance once they got into space.
12. No more space shuttles -- hence, no more task-trained specialized spacewalkers 13. The 'generic-trained' regular station crew needed to be able to handle ALL possible failures.
14. One clever approach: develop a specific set of tools and techniques that the crewmembers would all be trained on, and then design the equipment to be repairable with THOSE existing tools and techniques. Each repair would NOT be "optimized" to maximum efficiency, but ALL repairs would be do-able.
15. Earlier this year, "Big Fourteen" failure number "1c" occurred. Main Bus Switching Unit (MBSU) R&R [Remove and Replace with spare]
16. NASA scheduled it for the now only annual ISS spacewalk, which occurred today.
17. But one connector jammed and could not be driven home.
18. The ground will work out new procedures, and the crew will study them and go outside maybe in a week to try again.
19. There's no rush.
20. This is the way that space repairs will be scheduled, managed, and carried out, now, forever -- more or less.