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## Mirror image – software lab mimics the station on orbit

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Software development for the ISS is a unique challenge – an international effort, brought together 220 miles in the sky in a phased manner and built to the most exacting standards to ensure crew safety. Software within each computer is qualified at its respective designer location, before beginning phase two of its journey – further integration and testing at NASA’s ISS Software Development and Integration Laboratory (SDIL) in Houston.

Mainly run by Boeing, this unique lab sits in a large building next to NASA’s

Neutral Buoyancy Lab, the pool where astronauts train for each mission. Likewise, software developers and operators also train for each mission and software operation in the SDIL. The lab provides the ability to test the integrated station software in an environment as close as possible to the real one on orbit. To the maximum extent possible, the lab uses flight-equivalent computers, power, and wiring connections to ensure the system timing and interface conditions will be realistic and mimic those on station.

During the recent software upload, Boeing software engineers created an identical system in the SDIL to mimic the configuration on orbit. Like during the software upload, Boeing had a team of experts in the SDIL and in NASA's Mission Evaluation Room



*Command and Control System Software developer Jason Anderson sets up equipment for a software test at the SDIL at JSC.*

to monitor the software when the Japanese HTV docked to the space station Sept. 17 for the first time.

“We are connected to the MER and we bring our facility up in the same configuration as on orbit and follow along when they are doing their procedures. If they have an anomaly on orbit, then we will see the same problem in our rig,” said Boeing hardware and software integration manager Dale Kohn.

The team has also designed and deployed a portable version of the lab that has been instrumental in working with the international partners. The team packed up the portable lab and shipped

it to Japan when working with the Japanese on integrating the HTV software into the overall system.

“Having a portable lab has proven to be very useful, efficient, and cost effective when working with our international partners as they design and integrate their software into the overall system,” said John Royal, Boeing manager of Integrated Systems Analysis and Test team. “We were able to ship the portable lab to Japan and by finding problems early we significantly reduced any anomalies that might have come up when our systems “talk” for the first time in our Houston lab.”

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