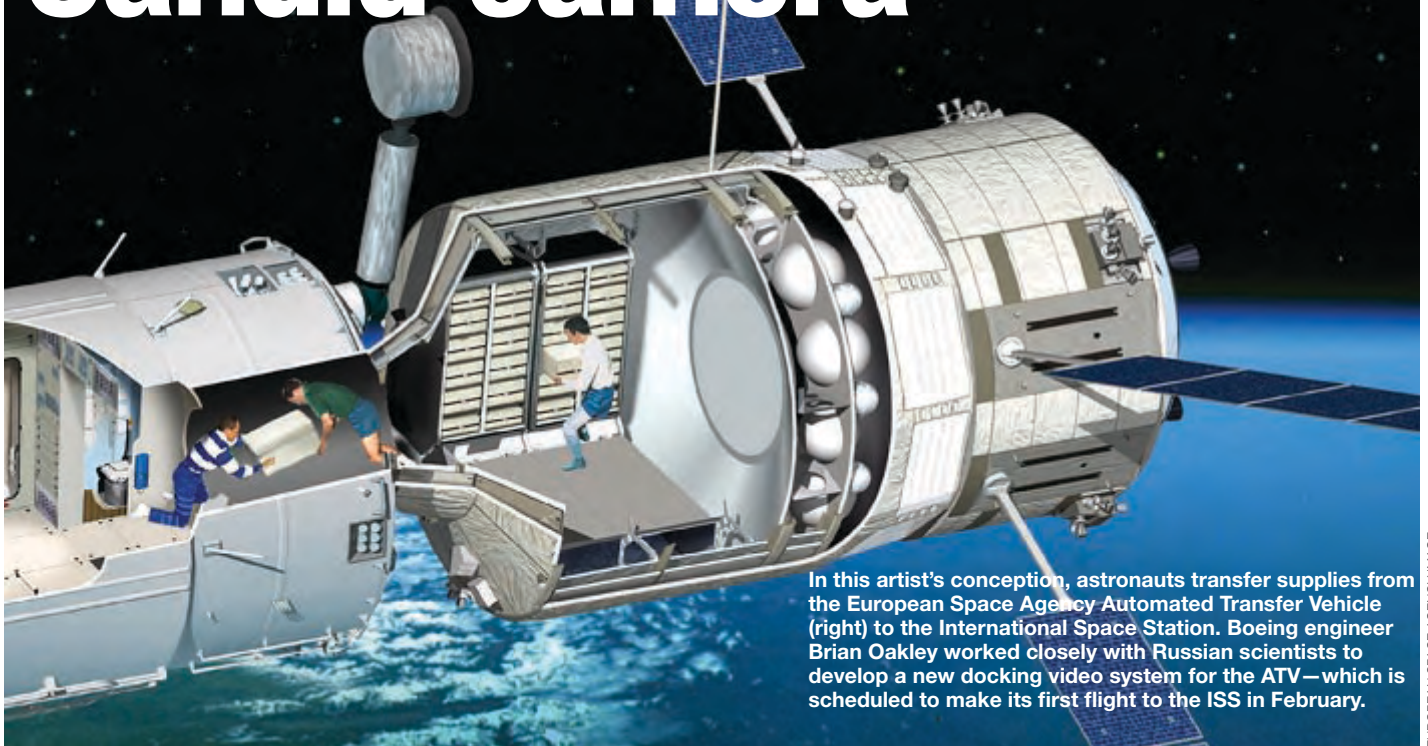


Candid camera



In this artist's conception, astronauts transfer supplies from the European Space Agency Automated Transfer Vehicle (right) to the International Space Station. Boeing engineer Brian Oakley worked closely with Russian scientists to develop a new docking video system for the ATV—which is scheduled to make its first flight to the ISS in February.

EUROPEAN SPACE AGENCY IMAGE

Russian teammates laud Boeing-developed ISS video docking system

By Ed MEMI

When the European Space Agency's newest cargo spacecraft docks with the International Space Station in February, it will use a new digital video docking system designed in part by Boeing.

The system streams a high-quality digitized video feed from the Russian segment analog docking cameras and sends the signal down through the station's Boeing-developed Joint Station Local Area Network, rather than using an analog line-of-sight route to Russian ground stations. The digital signal is downloaded via the Tracking and Data Relay Satellite System to mission control centers in Houston, Germany and Moscow.

The new system improves safety and also is being used to support Russian spacecraft dockings. The video includes telemetry and has an overlay that provides additional visual cues to ensure a smooth docking.

The chief engineer of the Russian space company Energia was so impressed with U.S. efforts that he presented individual achievement awards celebrating the 50th anniversary of Sputnik to Boeing ISS engineer Brian Oakley and NASA Johnson Space Center computer resources system manager Sean Kelly, who jointly oversaw the project. Energia is working with the European Space Agency on the new cargo spacecraft called the Automated Transfer Vehicle. The ATV, unlike the Russian spacecraft, must have the video system to dock to the ISS.

"If the Russians can't get line of sight to the ISS from a ground site, they don't have communications. So what happens, you have huge blocks of time where you can't talk to the vehicle that you are trying to dock to and you have no video whatsoever," said Rob Shields, Boeing's Joint Station Local Area Network manager.

Oakley's role was to support end-to-end integration and coordinate testing plans and procedures for all tests. "The ability to pull together all these different technical groups and have the data be handed off from place to place and then have it all work—it has been a challenge, and it has been very rewarding," he said.

"Because of the constraints on docking opportunities using the Russian ground sites, we were limited to 23 dockings a year. With the new system, we have more than 100 opportunities to dock with the station now," Kelly said.

An added benefit to video is that docking specialists on the ground can sometimes see things that the crew might not see.

"All the way from onboard the ISS through the Tracking and Data Relay Satellite System and the ground stations to literally halfway around the world, we have a 1.5-second latency time requirement," Kelly said. "We also had to interface with NASA, the European Space Agency and Russian operations groups as well as the international partner organizations on those technical teams. The human interaction challenges were just as tough as the technical challenges."

Oakley said being able to test many of the systems in the ISS Electronics System Test Laboratory at Johnson Space Center was critical before the first Russian test flights. ESTL replicates the avionics used on station. "When we first got video in Moscow, it was a really big deal," he said ■

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