Working together matters here

St. Louis labs ensure that weapons systems interact flawlessly

By Kathy Cook

Boeing's Global Strike Systems organization delivers fighters, bombers, weapons and unmanned systems for U.S.-allied defense departments and ministries worldwide. But in a reflection of the way Boeing designs and develops products, GSS also ensures Boeing weapons systems are fully integrated—to the end that warfighters have the best possible tools to accomplish their mission.

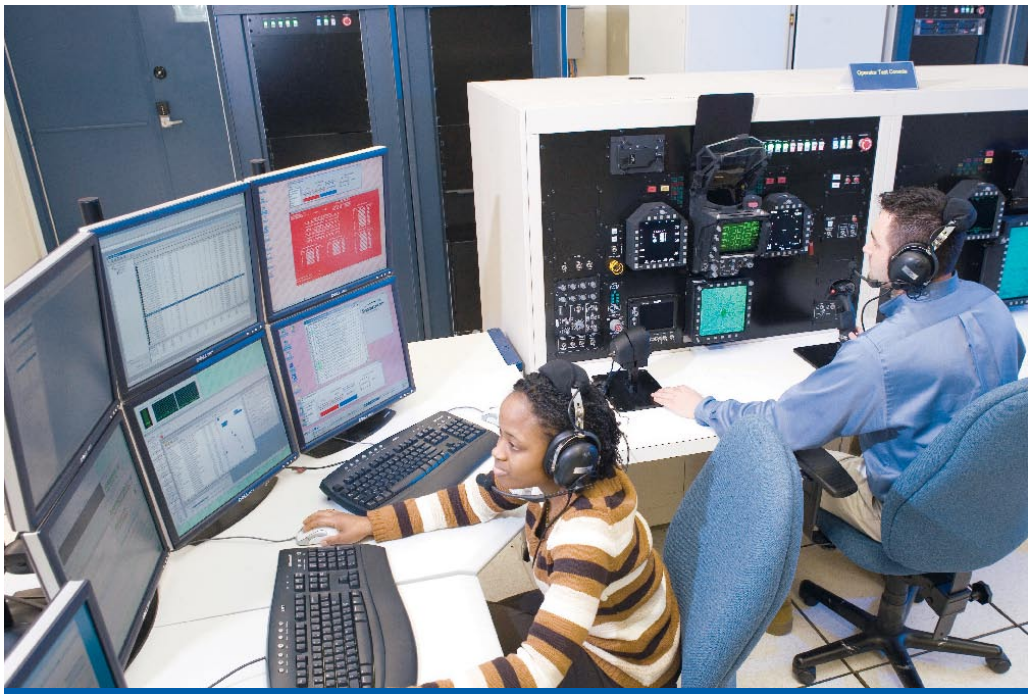
Kurt McDougal, manager of the IDS Electronic Systems Integration Labs (ESIL), and his team in St. Louis are tasked to ensure the electronics for Boeing weapons systems—whether it's an F-15K or an F/A-18E/F—work seamlessly.

"These weapons systems are very intricate and complex," McDougal said. "Each element has to work with every other element. It's never as easy as just hooking the boxes together."

In addition, several other services are offered, including what McDougal called "deliverable facilities"—ready-made labs that international customers can set up in their countries to be able to integrate new capabilities onto their aircraft. Here's a brief look at the work being done in the five major ESILs.

Integration labs: These labs take electronic subsystems under development and integrate them in simulated aircraft environments with other components of a particular aircraft or weapons system. By bringing all the hardware and software together, the lab can make sure that the new subsystem does what it's supposed to do within the context of the overall avionics system.

For example, the F/A-18E/F team is developing an advanced navigation system (ANAV) that combines two separate boxes for the inertial navigation system and global positioning system into a single, integrated box. The subcontractor for the system, Honeywell, designed and built the box. But it was up to Boeing to verify the aircraft avionics system, including the new ANAV, provided the required improvements to navigation and weapons targeting accuracy.



At the EA-18G integration lab in St. Louis, Claudeliah Terry (left) checks data while Matt Tosto tests simulation equipment. They're engineers on the EA-18G program.
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Electromagnetic Compatibility (EMC) Integration Facility: This facility ensures that new systems are compatible from an electromagnetic aspect. New systems, such as new missiles or avionics boxes, are subjected to electromagnetic "noise" to evaluate the effect on them. Additionally, the lab personnel make sure the item itself is not emitting noise that could interfere with other systems. The facility is the only National Voluntary Laboratory Accreditation Program–certified EMC facility at Boeing. Naval Air Systems Command regulations require that only NVLAP-certified facilities be used to qualify naval aircraft systems. The EMC team also supports aircraft safety-of-flight testing, and has been called upon to support other activities, including verification of ground support equipment and development of EMC test procedures for the Boeing 787 Dreamliner program.

Smartt Field Antenna Test Range: This facility checks the performance of antennas to be sure each one has the desired coverage—and that an antenna for one system doesn't adversely affect the antenna function of another system. At the Test Range, full-size aircraft models are mounted on 50-foot (15-meter) towers. A positioner device under the model allows it to be rotated horizontally and vertically to measure the antenna coverage at all angles. The facility also has a robust capability to characterize radomes, the aerodynamic covers that protect the antennas from the environment.

Near-Field Test Facility: This facility's mission is to verify the radar cross section of an aircraft to ensure that it's as invisible to opposing radar as possible. The F/A-18 program randomly samples 10 aircraft a year, as they are assembled, to verify the radar cross section.

Compact Range: The Compact Range performs the same mission as the near-field facility, except the evaluation is done on aircraft parts, rather than the entire aircraft. The compact range employs a large radio frequency reflector, which is used to simulate radar return signals at long ranges. ■

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