SPECIAL REPORT

Military aircraft avionics face new data-processing and security demands

SALLY COLE SENIOR EDITOR & JOHN MCHALE, EDITORIAL DIRECTOR

A few trends are emerging in military aircraft avionics, including a continued push toward large touch-screen displays, as well as a migration to multicore processing, open architectures, and a new focus on improving cyber resilience.

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MIL TECH TRENDS

Optimizing multicore architectures for safety-critical applications

RICH JAENICKE, GREEN HILLS SOFTWARE & RICK HEARN, CURTISS-WRIGHT DEFENSE SOLUTIONS

While multicore processors offer designers of safety-critical avionics the significant benefits of smaller size, lower power, and increased performance, bringing those benefits to safety-critical systems has proved challenging. That’s due mainly to the complexity of validating and certifying multicore software and hardware architectures.

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Something exciting is happening in the service representative community. Representatives from three different programs, one from each of the U.S. Department of Defense (DoD) services, have come together with a common objective to solve their respective acquisition problems with an agreed-upon, open architecture standard. Here is Part 1 of a 3-part article covering the SOSA [Sensor Open System Architecture] Consortium’s efforts.

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The Common Weakness Enumeration (CWE), a category system for software weakness and vulnerability, is now in use to provide a common vocabulary for source-code analysis tools for those developing mission-critical embedded systems. Some distinct groupings of CWE items – such as those that are associated with general coding practices – are focused on security-specific parts of a software system, including authentication and encryption, and those that can be mitigated through appropriate choice of programming languages or tools.

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CYBERSECURITY UPDATE

Is the military ready for AI to help make decisions on the battlefield?
SALLY COLE, SENIOR EDITOR

A study found that less-than-competent users of artificial intelligence (AI) on the battlefield – presumably those who would need that AI boost most of all – are actually the least likely to be swayed by rational justifications, even with AI thought to be infallible.

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Civil Certification of Multi-core Processing Systems in Commercial Avionics

COLLINS AEROSPACE AND WIND RIVER

Avionics systems are currently undergoing a transition from single core processor architectures to multi-core processors. This transition enables a reduction in size, weight and power (SWaP) and the use of common
processing platforms, providing multiple potential benefits for programs in terms of reduced costs, spares management and obsolescence.

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Hypersonic Flight Raises The Bar For Embedded Electronics
ABACO SYSTEMS

This white paper looks at how hypersonic flight will place radical new demands on the embedded computing systems on which they will rely ? in terms of not only new levels of performance, but also of new levels of ruggedness.

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Ground Vehicle Video Management System Integration
CURTISS-WRIGHT

The proliferation of video sources on-board today?s tactical ground vehicles has resulted in the need for modern video equipment to ensure the video?s usability and availability. Increasing demand for cost-effective, size, weight, and power (SWaP) optimized video management and rugged display solutions is driven by video system upgrades or new video system architectures required to maximize video source usefulness.

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Advancements in Card Lok Technology to Satisfy Swap and Second Level Maintenance Requirements
NVENT SCHROFF

Military equipment - such as shipboard, surveillance, mobile artillery and control stations, combat aircraft and unmanned air vehicles?often consists of highly technological and sensitive electronics. It is likely that
these electronics could be exposed to harsh environments, including extreme heat, dust, moisture, shock and vibration. Within these harsh environments, Card or Wedge Loks are used for printed circuit board retention and thermal management to ensure continued reliability and performance.

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