PC-Like Computing Components fly Aboard Boeing AV-8B

An innovative Department of Defense acquisition pilot project known as OSCAR (Open Systems Core Avionics Requirement) flew for the first time May 29, aboard a U.S. Marine Corps AV-8B Harrier II Plus aircraft at the Naval Air Warfare Center at China Lake, Calif.

This jointly funded program - with the Republic of Italy and Kingdom of Spain as partners with the U.S. Government - is a step toward making weapon system computing more like commercial personal computing. This results in hardware and software being interchangeable across various platforms; less expensive components; hardware independent of software; and software that's simpler to program, upgrade and test. Ultimately, the objective is to reduce life cycle costs while steadily improving aircraft capabilities.

"Performance of the entire system during this inaugural flight was superb - if not remarkable," noted Maj. Jim Derdall, U.S. Marine Corps, pilot for OSCAR's first flight. "We flew the new computer over a wide range of flight conditions, and its performance was impeccable. We suffered zero resets, and the system functioned according to design. OSCAR has clearly made tremendous progress. It represents the future of weapon system upgrade and platform improvement."

OSCAR replaces the AV-8B's mission computer and weapons management computers with modern computers based on commercial processor and interface standards. It also re-engineers the operational flight program (software) to use a commercially available operating system and application program interfaces (APIs). The APIs isolate the application software from the operating system and hardware.

With OSCAR, both the hardware and software use the commercial marketplace as leverage and take advantage of "off-the-shelf" products. This allows the government to add capability to the aircraft without a significant upfront investment every time.

The OSCAR computers were developed entirely around commercial microprocessors and standards, software languages and development tools, according to Robert Tock, OSCAR program manager for The Boeing Company.

"OSCAR is providing initial validation that the open systems approach will work in tactical aircraft," Tock says. "It's like a PC. You can add more capability with new software. But you can't run new software without upgrading the hardware first. So you pick a standard that's widely accepted in commercial operations, and you stick with it. Then you plug in the software."

OSCAR uses a commercial mainstream high-order programming language called C++, as opposed to the former assembly language, which requires much more intricate and time-consuming programming.

The software development activity is a team effort between the Joint System Support Activity at China Lake and Boeing. About 115 Boeing people work on the international OSCAR team, based in St. Louis. About 85 of them - including software engineers from Italy's Alenia - are producing the operational flight program.

OSCAR is one of several open architecture initiatives that Boeing is leading.

Beginning in the year 2000, these open systems activities will help enable the Harrier II to deliver precision weapons such as JDAM (Joint Direct Attack Munition) and the AIM-120 AMRAAM (Advanced Medium Range Air-to-Air Missile). Flight testing of OSCAR will continue at least through the year 2000 at the Naval Air Warfare Center at China Lake. OSCAR is scheduled to be delivered on the remanufactured AV-8B Harrier II Plus beginning in fiscal year 1999.

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