

Transition

An example of Air Force supported SBIR/STTR technology that has been transitioned into an Air Force or other DoD system or subsystem or used by Air Force test ranges and facilities or maintenance depots.

SBIR Topic Number:
 AF03-094

SBIR Title:
 Innovative Information System Technologies: Real-Time Monitoring and Correlation of Multiple Streams of Information from Heterogeneous Sources

Contract Number:
 FA8650-04-C-1614

SBIR Company Name:
 ITCN, Inc., Dayton, OH

Technical Project Office:
 AFRL Information Directorate, Rome, NY, and Sensors Directorate, Wright-Patterson AFB, OH



BCIT in use testing B-2 aircraft at Whiteman AFB, MO

B-2 MIL-STD-1553 Avionics Bus Characterization and Integrity Toolset (BCIT)

- The Air Force has a requirement to perform integrated diagnostic testing of multiple MIL-STD-1553 avionics databuses embedded in operational B-2 aircraft
- This Phase II SBIR project was identified as a candidate for the Commercialization Pilot Program (CPP) and is the first such effort to successfully transition under CPP
- ITCN, Inc. has developed the BCIT network analyzer to locate 1553 cabling and wiring faults to within six inches, thus minimizing removal of stealth access panels
- Other potential BCIT applications include all Air Force and Navy aircraft, Navy surface ships and submarines, Army helicopters and tanks, and many commercial uses

Commercialization Pilot Program Series

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Air Force Requirement

The Air Force has a requirement to mitigate inherent problems associated with aging/overtaxed avionics network architecture, based upon MIL-STD-1553 databus technology, on operational B-2 aircraft. These aircraft are exhibiting network health anomalies that require a fully integrated diagnostic approach which can characterize network status and then fault isolate identified deficiencies. 1553 databuses are the embedded foundation within the B-2 upon which all enabling avionics mission capabilities are structured. Timely B-2 avionics network troubleshooting is constrained because existing test equipment is antiquated and/or obsolete, thus extending maintenance cycle times and jeopardizing B-2 aircraft availability and fleet readiness. In addition, low observable considerations mandate pinpoint trouble-shooting fidelity, thus minimizing intrusive maintenance based upon the random removal of access panels to facilitate cable test point access/failure mode isolation.

SBIR Technology

The B-2 1553 avionics Bus Characterization and Integrity Toolset (BCIT) network analyzer was developed by ITCN, Inc. under an AFRL-sponsored Enhanced Phase II SBIR program, with additional funding provided by the Defense Logistics Agency, the Air Warfare Battlelab, and the B-2 SPO. This SBIR was identified as a candidate for the Commercialization Pilot Program (CPP) in November 2007, and is the first successful Air Force SBIR transition effort supported by the CPP. This effort will transform the prototype BCIT into a ruggedized, deployable unit capable of withstanding rigorous worldwide field maintenance use. BCIT is an all-in-one test instrument for troubleshooting 1553 cables, diagnosing bus health, and monitoring system performance. It incorporates a high-performance Time Domain Reflectometer (TDR) that enables B-2 maintenance technicians to easily locate opens, shorts, and faulty shields and couplers in embedded 1553 cabling to within six inches. This preserves the stealth properties of the B-2 by minimizing access panel removal and the accompanying recertification of airframe surface integrity. The upgraded graphic user interface (GUI) will permit application to a broad array of 1553 systems, thus shifting the status of the BCIT to that of qualified common support equipment and ensuring its long-term sustainability.

Transition Impact

In addition to supporting B-2 mission delivery system requirements, the BCIT test equipment has potential as a



Ruggedized BCIT for Field Maintenance Use

cross-cutting solution for virtually all platforms utilizing MIL-STD-1553 network architectures. These include diverse Air Force platforms such as B-52 and B-1B bombers, C-130, C-5 and C-17 transports, KC-135 tankers, F-15, F-16 and F-22 fighters, and various missile programs. Other potential Government applications include Navy aircraft, surface ships and submarines, Army helicopters, tanks and howitzers, and NASA's space shuttle program. Potential commercial applications which utilize the 1553 databus include transit systems and manufacturing production lines.

Company Impact

"The BCIT is a great test tool for maintenance and troubleshooting of embedded systems. It can pinpoint wiring and cabling problems to within six inches, and is a versatile, programmable test tool as well," said Roy Penwell, President of ITCN, Inc. "Now with more rugged features added through the CPP, it will also be a tough, weather-resistant piece of instrumentation, suitable for field maintenance." He added, "With military cutbacks and fewer personnel available, this tool will prove to be even more valuable as time passes." The company's demonstrated success with BCIT on the B-2, and their high potential for extending this capability to other applications, will enable ITCN, Inc. to remain on the cutting edge of the state-of-the-art in the diagnostic testing of MIL-STD-1553 systems, thus improving their competitive position in this area.



U.S. AIR FORCE

SBIR/STTR

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