Air Force SBIR STTR

FIELDED OPERATIONAL CAPABILITY

COULD SAVE MILLIONS OF DOLLARS AND REDUCE DOWNTIME

TOPIC NUMBER:
AF03-094

TOPIC TITLE:
Enhanced Bus Characterization Integrity Toolset

CONTRACT NUMBER:
FA8650-15-C-1799

SBIR COMPANY NAME:
DragoonITCN
Dayton, OH

TECHNICAL PROJECT OFFICE:
AFRL Information Directorate
Rome, NY

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A testing technology developed by a small business in partnership with the Air Force will help the B-1 Program save money and boost readiness levels. (U.S. Air Force photo)

AIRCRAFT TESTING INNOVATION

FUELS BIG SAVINGS AND INCREASED READINESS

The Air Force is poised to save millions of dollars and return a key aircraft to service faster because of a testing technology improved through a small business partnership.

With support from the Air Force Small Business Innovation Research/Small Business Technology Transfer Program, Ohio-based DragoonITCN created the Bus Characterization Integrity Toolset as a quicker and more precise way to diagnose certain aircraft system problems. Also known as BCIT, the test tool combines multiple capabilities into one; tests cabling more accurately by locating an open, short or ground to within six inches of the problem; and is portable enough for a single mechanic to carry into the bowels of an aircraft.

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DragoonITCN sold earlier versions of the technology to the Air Force and Navy. More recent advancements – such as enhanced functionality with portability – have earned the company more than $2 million in new Phase III contracts from the Air Force Research Laboratory's Information Directorate to develop and field new BCIT units and update older units. Phase III contracts, which denote funding from outside the Air Force SBIR/STTR Program, indicate that program participants are meeting a critical commercialization benchmark.

BCIT is expected to save the Air Force more than $10 million during an ongoing B-1 modification cycle while more efficient trouble shooting and reduced repair times will boost future aircraft availability, according to Air Force projections.

BEHIND THE TECHNOLOGY

DragoonITCN launched BCIT about 15 years ago under the Air Force SBIR/STTR Program to develop a maintainer-friendly diagnostic network tester, analyzer and controller to collect multiple data streams from diverse sources. The tool would also need to be adaptable to the most popular data transfer standards beyond the legacy MIL-STD-1553 bus.

The "bus" is a series of connectors and cables that transfer information among the different avionic systems throughout an aircraft.

Early fundamental research focused on defining Ethernet requirements and a conceptual approach for an Ethernet monitor module as well as meeting environmental requirements for deployment on various platforms such as the B-1 and B-2 bombers, according to Joel Moore, a computer scientist in the High-Performance Systems Branch of AFRL's Information Directorate.

Initial funding provided the company with key engineering and manufacturing resources and spawned advancements such as alternate bus interfaces and digital video interface capabilities. Additional funding from the Air Force SBIR/STTR Commercialization Readiness Program last year enabled improvements on those attributes while reducing BCIT's size, weight and power needs.

The prototype was about the size of a mini refrigerator, so shrinking it was a key development.

"We wanted the tester to be the maintenance technician's 'go-to' tester," Moore said.

Employees of DragoonITCN prepare newer BCIT machines for use in the field. The Ohio-based company has been growing because of its work on the technology. (Photo courtesy of DragoonITCN)

With support and guidance from AFRL along the way, including from AFRL's Aerospace Systems Directorate and Sensors Directorate, DragoonITCN matured the technology through multiple contracts and met the demand for a single bus interface and cable integrity tool that is portable, rugged and reliable.

COMMERCIALIZATION FUELS GROWTH

Because of its utility, BCIT is gaining acceptance as a bus testing tool across the Air Force fighter-bomber maintenance community and is often referred to as a "Swiss Army knife" test tool for legacy aircraft. This type of commercialization is critical because it ultimately helps drive down technology costs, bring new technology to the warfighter and stimulate the economy through small business growth.

Delivering a product rugged enough to withstand long-term use and that met the one-man-carry size and weight goals outlined by the B-1B Program Office has been key to growth at DragoonITCN and positioned the company for long-term success. The BCIT technology is the core of the company's new flagship product, Corvus.

Corvus is designed to be a key enabler for a wide range of new test targets including commercial avionics, missile ground-system enclaves, counter measure testers, and virtually any system architecture that is comprised of interfaces and cabling.