

# Rugged Recording and Mission Computing on a Tactical Fighter Aircraft

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## Challenge

- SWaP-constrained environment
- Legacy aircraft interface
- Tight program timescales

## Solution

- Trusted, proven COTS supplier
- Mature technology
- Small form factor devices

## Results

- SWaP optimized system design and development
- Successful legacy interface integration
- Compact system fits into limited available space

## Challenge

Tactical Air Support recently won a contract to support the Naval Aviation Warfighting Development Center (NAWDC) and the Navy Strike Fighter Tactics Instructor program, better known as TOPGUN, with a fleet of modified F-5AT (Advanced Technology) Tiger II military supersonic tactical fighters. Tactical Air is uniquely positioned to service U.S. and allied forces with tactical training support thanks to its staff's decades of experience with fighter weapons, operational command, instruction, and test piloting.

Having won the contract, Tactical Air needed to modify its fleet of F-5ATs with upgraded radar, high-tech displays, controls, mission computers, and electronic warfare (EW) capabilities to simulate modern air-to-air threat aircraft and weapons. Acting as an aggressor squadron against the Navy

in a simulated conflict, this upgrade would provide the best combination of threat representation, safety, and efficiency for the U.S. Navy. Due to the additional on-board data processing and storage required for the upgrade, Tactical Air needed to find a supplier for its mission computer and file server requirements.

Because there is limited space available on-board the aircraft, hardware added to the platform was highly scrutinized with respect to size, weight, and power (SWaP). To ensure that program risk was minimized, Tactical Air sought a trusted supplier with mature, proven technology. The tight timescales of the program also required that the suppliers had off-the-shelf solutions available to minimize product lead time effects on the program schedule.



DTS3: 3-slot rugged Network Attached File Server

Parvus® DuraCOR® 8042 Mission Computer



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To reduce program risk and cost, system interoperability was a critical requirement. Due to the platform's MIL-STD-1553 bus, which is still ubiquitous on aircraft despite its legacy status, the mission computer required a MIL-STD-1553 interface as standard. Additional mission computer requirements included video capture and Ethernet capability. To capture and store the network data, the file server required removable memory cartridges with a clear capacity upgrade path as well as certified encryption technology.

## Solution

As a trusted leader in commercial off-the-shelf (COTS) system design, development, and integration, Curtiss-Wright became a prime supplier candidate for the Tactical Air program. With a portfolio of pre-qualified computing and storage systems that have been field proven in similar environments, Curtiss-Wright proposed a solution that would minimally affect system weight and cost while fulfilling the program requirements.

With three removal memory cartridges (RMC), each supporting up to two terabytes of data storage, the [Data Transport System 3-Slot \(DTS3\)](#) was a perfect fit to fulfill the network file server requirements. The DTS3 uses time tested technology and provides reliable storage for rugged, deployed applications, while providing FIPS 140-2 certified AES-256 bit encryption for data-at-rest protection. The DTS3's use of an industry standard 2.5" SATA drive allows the use of a wide range of SSD types and capacities, enabling a clearly supported capacity upgrade path. With three removable storage cartridges, the mission, map, and maintenance data can be stored on separate drives.

With a MIL-STD-1553 interface and video capture capability, the [Parvus DuraCOR 8042 mission computer](#) was proposed to fulfill the mission computer requirements. Optimally designed for SWaP-sensitive applications, the DuraCOR 8042 combines powerful graphics and multi-core processing with ultra-reliable modular, mechanical robustness in a fanless IP67 design. The small size of the DuraCOR 8042 allowed Tactical Air to install it in an existing architecture with little room for new avionics, thus minimizing effects on SWaP while providing MIL-STD-1553 and video capture support in a small form factor (SFF). Seamless integration with existing avionics and interfaces streamlined development and deployment while reducing cost and risk.

The DuraCOR 8042 leverages a quad-core (8-thread), 5th gen Intel® Core™ i7 processor to deliver high-performance mission computing. Qualified through extensive MIL-STD environmental and EMI testing, including conditions specific to jet fighter applications, the DuraCOR 8042's rugged system design reduces program risk while providing all the cost-saving and development-accelerating advantages of rugged, open architecture COTS technology.

## Results

In October 2018, Curtiss-Wright was awarded a contract to supply Tactical Air with a DTS3 and DuraCOR 8042 to upgrade its fleet of F-5ATs. This was the first selection of the DTS3 network file server for use on a fixed wing supersonic tactical fighter. The DTS3 supports FIPS 140-2 hardware encrypted solid-state storage of mission data and communicates seamlessly via Ethernet to a modified version of Curtiss-Wright's DuraCOR 8042 modular mission computer subsystem. The initial contract, which is valued at more than \$1 million, is scheduled to run through the second quarter of 2019. In support of this program, a DTS3 and DuraCOR 8042 will be installed on Tactical Air's current aircraft fleet as well as future Tactical Air fighter acquisitions.

Image Credit: Andy Wilson

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