CASE STUDY

SWaP-Optimized Data Storage, Recording, and Networking Reduces Helicopter Program Risk and Costs

CURTISS-WRIGHT

DEFENSE SOLUTIONS

Challenge

- Low-SWaP data recording, storage, and switching
- Secure network-based architecture
- High cycle insertion/removable data storage

Solution

- Small-form factor NAS and switch LRUs
- Two-layer encryption upgrade path
- Network-attached file server with removable 2TB SSD

Results

- Customer happy with program management and support
- SWaP optimized, cost effective solution
- Working demo system for customer sales tool

Challenge

With limited space on-board helicopters and yet an increasing need for large amounts of data storage required by the latest flight systems, it becomes necessary to find size, weight, and power (SWaP) optimized systems. A leading mission systems integrator sought a data recording and storage device that could capture up to 1 TB of data in a removable drive, be easily integrated into their existing mission system network architecture, and would add minimal weight to the overall system.

In addition, the integrator needed an airworthy Ethernet switch to provide network connectivity between the network attached storage (NAS) device and other mission systems, all of which had to withstand the environmental conditions on-board a helicopter, including high vibration and shock.

Finally, because these devices were going into a complete mission system solution that the integrator would offer to a wide range of other platforms, there needed to be a clear encryption upgrade path for handling varying levels of cyber security requirements.

After the customer looked at all commercially available solutions on the market, the integrator was unable to find a rugged solution comparable in price and storage capacity to what Curtiss-Wright could offer. With a long history of successful projects with this customer and most recently having supplied also the mission computer for this program, Curtiss-Wright had been proven as a trusted supplier and therefore a natural choice to supply both the data storage and networking devices required.

DTS1
Data Storage

Gigabit Switch
DuraNET 20-10

Solution

The customer liked the small size and large storage capacity of the Curtiss-Wright Data Transport System (DTS) 1-Slot (DTS1). Weighing just under three pounds (<1.3 kg), taking up less than 48 cubic inches in volume, and providing flexible DZUS mounting options meant the device fit perfectly in the space available. With a 2TB removable SSD drive in a MIL-STD rugged chassis, the DTS1 also fulfilled the system integrator's storage requirements. In addition, the DTS1 removable memory cartridge (RMC) provides quick off load of data that has been protected with up to two layers of AES256 bit encryption. For this program, the system integrator chose to offer their customers single layer encryption with a clear upgrade path to two layer encryption, if needed. With a 100k insertion cycle connector the RMC can be easily removed from one DTS1 and installed into any other DTS1 or RMC download station, providing seamless, data transfer between one or more networks in separate locations

With 20 ports of Gigabit Ethernet (GbE) switching in a small MIL-STD-qualified design, the SWaP-optimized DuraNET 20-10 was chosen to support the helicopter's network connectivity. With the DuraNET 20-10 switch in the middle of the architecture, any network-enabled device such as the DTS1 can communicate with any other similar device, allowing any client to retrieve stored files or save new captured files. This NAS-based storage capability of the DTS1 provided SWaP advantages by negating the need for local storage inside each computer, display, or management device. These network clients can use the DTS1 to store sensor or maintenance data and to retrieve the latest mission and digital map data. Those network clients can be using different operating systems or different CPU's as long as they support industry standard NAS protocols. The combination of the previously supplied mission computer, plus the DTS1 and DuraNET 20-10 line replacement units (LRUs) enables the system integrator to offer their customers a flexible, rugged, low footprint solution.

Results

Choosing commercial off the shelf (COTS) solutions for this program enabled the system integrator to keep costs down for their own program and transfer these cost savings to their customers, increasing the attractiveness of their mission system solution. Early units were delivered and integrated into the helicopters mission system demo which the integrator developed to show their customers the system functionality and architecture. During the integration of these demo units, the front panel of the DTS1 needed to be swapped out to better fit the space available and to ensure it mounted correctly. Curtiss-Wright quickly found a solution and updated the device accordingly, enabling the system integrator to continue to meet program schedules.

Due to the history of program success, the systems integrator trusted that Curtiss-Wright could provide the program management and support needed to reduce risk, keep program costs down and deliver the systems on-time.

INFO: CURTISSWRIGHTDS.COM
EMAIL: DS@CURTISSWRIGHT.COM

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