Upgrading an Electronic Warfare Suite with an Integrated System Solution

CURTISS-WRIGHT

DEFENSE SOLUTIONS

Challenge

- Need to upgrade existing system to increase functionality
- SWaP-constrained platform deployed in challenging environments
- Short lead time

Solution

- Rugged, powerful processing in a small footprint
- SWaP-optimized NAS with internationally recognized encryption
- Vendor-loaned equipment to accelerate development and testing

Results

- Increased processing functionality
- Non-ITAR, internationally certified encryption
- Decreased program time and risk

Challenge

In electronic warfare (EW), each segment - attack, protection, and support - plays an important role in military missions, and the technology to support these functions must be reliable, trusted, and field proven to provide end users with full confidence. A global helicopter manufacturer, faced with a need to upgrade an existing EW suite to increase functionality, sought high-performance technology with a reputable pedigree that they could offer to their growing customer base.

The manufacturer's aircraft gateway processor (AGP) leverages data from EW sensors to increase situational awareness and countermeasure response, thereby enhancing platform survivability. Because new EW sensors were added on-board the aircraft, the AGP required a processor upgrade to deliver more powerful and robust processing capability. To capture and securely store the new sensor data, the customer required network attached storage (NAS) with encryption technology. And, to connect the AGP and NAS, the manufacturer required a size, weight, and power (SWaP)-optimized switch.

Challenged by an accelerated program schedule, the helicopter manufacturer required proven, low-risk solutions with short delivery lead times. Having a long-standing relationship, this manufacturer turned to Curtiss-Wright, who provided the original AGP, to deliver an upgrade solution.

XMC-121 XMC Mezzanine Processor SBC

DTS1 Network Attached Storage

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DuraNET® 20-11 Ethernet Switch

Solution

Through a number of on-site visits, Curtiss-Wright worked with the manufacturer to define an AGP upgrade solution that would meet demanding environmental requirements, a NAS system that would increase system data recording functionality while providing their customers with a globally recognized data-at-rest (DAR) encryption path, and an Ethernet switch to connect the two and many other devices.

Replacing the existing AGP single board computer (SBC) with the XMC-121 Intel® 7th generation Xeon XMC mezzanine processor provided the EW suite with powerful x86 processing in a small sized footprint. The processor provides robust Intel processing in an XMC form factor and can be coupled with one of our VPX boards, like the VPX3-1220, effectively doubling processing performance in a single slot. Through additional testing and modification of the processor, the XMC-121 was able to meet the customer's demanding temperature requirements.

Through a number of discussions about encryption technology and the benefits of using commercial off-the-shelf (COTS) data-at-rest encryption solutions, the customer identified the DTS1 NAS, with its two encryption layers which are both Common Criteria (CC) certified, as a solution that their customers would benefit from. Because the manufacturer bids on international projects, and to companies with different encryption requirements, the international CC certification enables them to offer a certified encryption solution to the 31 Common Criteria Recognition Agreement (CCRA) member countries (to learn more about Common Criteria certified COTS encryption visit our website). The DTS1 is also listed on NATO Information Assurance Products Catalogue for use by NATO allies. The customer also benefited from the DTS1 not being ITAR controlled, making it easier for them to offer it to their international customers. With the loan of a fully functional DTS1 early in the program, the customer developed a lab system to prove system integration success and reduce program risk. The low size and weight of the DTS1 (3.08 lbs and 48.75 in^3) and the removable 4 TB SSD cartridge was a perfect fit for the space constrained helicopter.

To enable the AGP to interface with the DTS1, the manufacturer selected the rugged, COTS Parvus® DuraNET 20-11. This ultra-small form factor (USFF) switch is optimized for extremely SWaP-constrained platforms, measuring roughly 10 in^3 in volume, weighing 0.5 lbs, and typically consuming 5W of power. Offering eight Gigabit Ethernet (GbE) ports and a reliable design tested to endure harsh environmental conditions, the DuraNET 20-11 delivered both the performance and durability required.

In order to assist the customer, Curtiss-Wright agreed to start building the products prior to the final order placement, ensuring that the customer could meet their delivery deadline.

Results

Curtiss-Wright worked with the customer to develop an upgrade solution that would increase functionality of their existing system while minimizing SWaP and reducing risk. The upgraded processor provided the customer with increased processing performance while ensuring reliability in the rugged environment. Having received a DTS1 loaner unit before the initial purchase, the customer was able to prove system integration success early in the program, thus lowering the program risk. Both on-site and virtual support provided by Curtiss-Wright ensured the system integration was as seamless as possible. With internationally recognized encryption certification and no ITAR restrictions, the NAS provided an attractive solution to the manufacturer's growing base of international customers. As well, the extremely rugged and SWaP-optimized switch helped minimize the impact of the system footprint while ensuring reliability. Because Curtiss-Wright started production prior to receiving the purchase order, the customer was able to meet their tight program deadlines despite funding delays.