

# Reducing Development Time for High-Speed Embedded Data Collection

**CURTISS-  
WRIGHT**

DEFENSE SOLUTIONS

## Challenge

- High-performance embedded data storage in a compact, cost-effective form factor
- Optimal cooling in a SWaP-sensitive environment
- Tight time-to-market schedule for a fully integrated system

## Solution

- Reliable, high-throughput, and power-efficient XMC-based storage
- Conduction-cooled NAND flash solid-state drive (SSD) with no moving parts
- COTS-based XMC available now

## Results

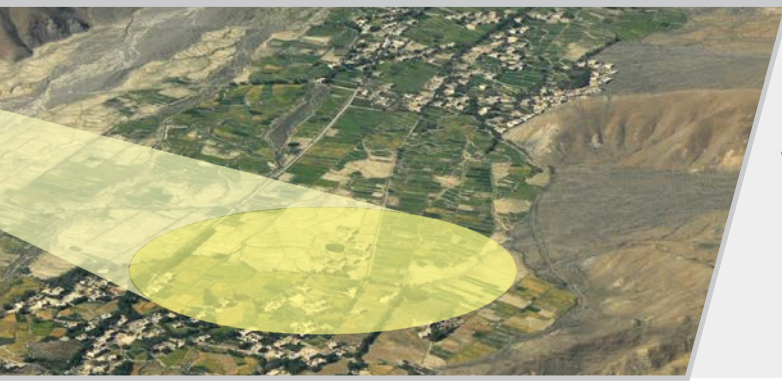
- High data rate performance provides optimal read and write capabilities
- Reduced SWaP using existing XMC site vs. external storage
- Development and integration time reduced by several months

## Challenge

Surveillance systems on manned and unmanned airborne platforms are required to capture a tsunami of data from multiple sensors. With the number of sensors onboard continuing to increase, the volume of data that must be captured and stored has risen exponentially. This has created significant engineering challenges for system integrators. To address these challenges for a new data collection system, a prime integrator turned to Curtiss-Wright Defense Solutions for a high-performance storage solution.

Faced with a tight schedule and very demanding specifications, the system integrator needed a solution that would reduce development time. The ideal solution would

provide a minimum of 1 TB of secure storage capacity, along with the high throughput needed to capture and store data and video from a variety of sensors. Since the new system was intended for both unmanned aerial vehicles (UAVs) and manned platforms, the available space for the solution was extremely restrictive. Size, weight, power, and cost (SWaP-C) were key considerations. In addition, the system specifications called for a conduction-cooled solution that would continue to provide reliable performance under the severe stress caused by extreme temperatures on airborne platforms.

**XMC-554**

## **Solution**

To meet system requirements and enable the integrator to meet production schedules, Curtiss-Wright proposed a Switched Mezzanine Card (XMC) solution with its XMC-554 Rugged SATA Solid-State Drive (SSD).

The XMC-554 is a rugged, high-performance, reliable, and power-efficient NAND flash SSD solution. This compact commercial off-the-shelf (COTS) XMC storage solution is ideal for SWaP-constrained applications. It does not have any moving parts, so it requires significantly lower power and provides an order of magnitude improvement in reliability in environments with vibration and contaminants compared to traditional rotating hard disk drives (HDDs).

To capture and store data from multiple sensors, the XMC-554 provides access to two independent SATA drives via a PCI Express bus for up to 2 TB of multi-level cell (MLC) NAND flash memory. Sequential read throughput is rated at 500 MB/s with a single SATA drive and 750 MB/s with dual SATA drives. Write throughput is rated at 400 MB/s with a single drive and 750 MB/s with dual drives.

The XMC-554's data storage drives capture a variety of information during operation that may be used to analyze drive health. The drives provide Self-Monitoring, Analysis, and Reporting Technology (SMART) features, which include monitoring and storing critical performance and calibration parameters to attempt to predict the likelihood of near-term degradation or fault conditions. And for secure applications, the SATA SSD can support AES-256 encryption and ATA Secure Erase features to protect sensitive data-at-rest.

## **Results**

Using the XMC site on an existing single board computer, the embedded XMC-554 saved significant SWaP compared to external data storage approaches. It also provided a clear performance advantage over other options because of the lower latency and higher data transfer rates it offered. With the XMC-554, the integrator was able to deliver significant benefits for operation in regular operating conditions, and more critically, in high-risk deployed environments that would be faced by manned and unmanned airborne platforms.

By opting for the integration-ready, COTS-based XMC-554 from Curtiss-Wright, the system integrator was able to shave several months off its production schedule and get a completely integrated system to market that met all performance requirements. Development and integration costs were contained and the delivered solution addressed the embedded storage requirements of the target platforms.