CASE STUDY

Airborne Modular Mission Processing System Optimized for a Customer Provided Software Suite

CURTISS-WRIGHT

DEFENSE SOLUTIONS

Challenge

- Deployable HPEC and graphics processing solution for the customer's mission software suite
- Leveraging and ruggedization of commercial components for airborne environments
- Flexibility for adaptation and deployment on multiple platforms

Solution

- SWaP-optimized, COTS high performance mission system for (un)manned applications
- Fully integrated, ruggedized, commercial-grade compute and graphics processors for the customer's software
- Modular, standards-based design for easy adaptation to other platforms

Results

- Optimal system configuration delivered in eight months
- More performance in SWaP restrained harsh environments
- More than two years shaved off development time
- 70% reduction in development budget

Challenge

Complex airborne surveillance and intelligence gathering missions rely on the collection and amalgamation of data from many sensors. As the number of onboard sensors continue to increase, defense organizations worldwide expect more capabilities and higher performance from mission systems. Software continues to evolve to address real-time need for decision making and visibility to the war fighters. Developing an integrated system that leverages the full capabilities of customer software, while keeping an eye on constrained budgets and development times, continues to be a challenge.

To find the optimal balance for a new mission system that leveraged the mission software suite, a defense agency turned to Curtiss-Wright. Having considered proposals on the upgrade program, the customer needed a solution that could deliver the required performance in less time and at a lower cost.

The project specifications called for a mission system upgrade built with ruggedized hardware that could fit into the constrained space on a fleet of deployed platforms. Capabilities and performance were required to match the results produced in the development lab.

Mission Processing System

Solution

As the incumbent provider of the previously deployed mission system, Curtiss-Wright was already familiar with the size, weight, and power restrictions that the new system had to meet. Working with the customer's development team and the software development partner, Curtiss-Wright developed a complete understanding of the computing requirements and engineered an system configuration based on its COTS board level products and pre-qualified chassis/enclosures that could leverage the full capabilities of the software.

The system is built on the same conduction-cooled chassis as the previously deployed system provided by Curtiss-Wright. This 6U OpenVPX-based modular mission management system offers an open-architecture and scalable platform, packaged with high-processing capability and a high-speed fabric interconnect.

Processing power is provided by multiple CHAMP-XD2M 6U OpenVPX™ High Memory Capacity Intel® Xeon® D Processor Cards. This rugged card is designed for use in high memory capacity, compute-intensive industrial, aerospace, and defense applications. Providing an extended temperature Intel Xeon D processor with 16 core processors, the CHAMP-XD2M DSP Processor Card has a peak performance of 870 GFLOPS @ 1.7 GHz.

Graphic processing capabilities are delivered by the VPX6-4942 6U VPX GPGPU Processor Card with the NVIDIA® Tesla® M6 graphics processor. The NVIDIA High Performance Compute (HPC) mode available with this board makes the board especially suitable for use as an advanced GPGPU compute engine. The card can also be individually tuned to maximize GPGPU capability while minimizing power usage.

Results

By working with the customer and the mission software suite developers, Curtiss-Wright was able to deliver the required capabilities and performance in a new mission system, while reducing development time and budget significantly. The new system was delivered ready for deployment and integration in eight months, rather than the two to three years originally projected for the project.

In addition, by leveraging its portfolio of pre-validated, pre-integrated, COTS-based ruggedized CPU and GPU products, Curtiss-Wright was able to maximize the embedded system's processing performance, significantly reduced the weight and power requirements within the constraints of an existing chassis.

Curtiss-Wright was able to deliver the optimal mission processing system with the right balance of performance and capabilities needed on the platform — a solution that could be adapted easily to other platforms, as needed.

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