CASE STUDY

Pods: Bridging the SWaP-constrained Gap Between Old and New

CURTISS-WRIGHT

DEFENSE SOLUTIONS

Challenge

- SWaP-constrained, uniquely shaped area for hardware
- Extreme ruggedization requirements
- Challenge upgrading to modern COTS hardware while keeping legacy proprietary infrastructure

Solution

- Rugged solution in a small space using less power
- Pin-compatible design with added XMC capability allows roadmap progression for pods applications
- Lifecycle services to support lengthy program duration

Results

- Flexibility of COTS designs allows maintenance of legacy infrastructure
- Superior performance in a SWaP-constrained platform
- Quicker time to market and lower cost solution than was offered by any other supplier

Challenge

A customer approached Curtiss-Wright with a requirement to upgrade their legacy pods modules. Located on the wing, side, or underbelly of a military aircraft, pods can serve several purposes. For example, targeting pods contain infrared sensors used to project target images to the pilot in the cockpit, while navigation pods allow the pilot to see 'through' objects and targets in a variety of visibility and weather conditions. Because pods are entirely self-contained, they have strict legacy power and cooling specifications that cannot be modified, as well as legacy temperature, vibration, and shock requirements that are difficult to meet with modern COTS hardware.

The pods' location in very small, uniquely-shaped spaces on the outside of the aircraft necessitate not only a highly ruggedized solution that can withstand harsh environmental conditions, but also a size, weight and power (SWaP)-optimized footprint. In addition, pods are historically made with proprietary form factors, which makes the switch to newer COTS modules difficult. This customer needed an upgrade in processing power, without any modification to the interconnect of their current system. All these requirements made a pods upgrade – especially to flexible, modern COTS hardware - a significant challenge.

PSU3-THOR and XMC-120

Solution

With their legacy pods technology designed-in, this customer asked Curtiss-Wright to replicate the same capabilities in a smaller space with less power. This would provide more volume and power to their pods system and allow new, enhanced capabilities to be added to each pod. To help accommodate added processing power, Curtiss-Wright was able to provide the PSU3-THOR power supply, which has two mezzanine sites and a switch built-in to provide the maximum power in the smallest footprint. While the legacy pod hardware has its volume envelope consumed by a dedicated power supply, the PSU3-THOR's mezzanine sites allow that volume to be used for added processing. This also provides clean VPX power rails to other cards in the system.

To gain the required processing power without adding extra slots, our customer chose our XMC-120 Intel® Atom™ Mezzanine Processor and our XMC-121 Intel Kaby Lake Xeon® Mezzanine Processor to be installed on the PSU3-THOR power supply's mezzanine sites. Curtiss-Wright was able to provide pin- and rail-compatible replacements to this customer's legacy hardware, and since our roadmap progression will continue to offer pin-compatible solutions, our customer has increased flexibility the next time their pod system needs a tech refresh. Because pods programs can span up to two decades, our customer took advantage of Curtiss-Wright's lifecycle services to keep their application in top shape for the long haul.

Results

Because we were able to accommodate this customer's legacy interfaces as well as their power, current draw, and thermal requirements – all on new COTS designs with upgraded processing power – our solution helped them retain their proprietary infrastructure. In this way, our customer avoided obsolescence issues while gaining modern processing technology. Our XMC modules gave these pods capabilities they've never previously had, including the flexibility to mount, power, and communicate in the very unorthodox size and shape of the pod. With this upgrade, our customer finally got a generational improvement – not just an evolutionary one. Not only that, Curtiss-Wright was the only supplier able to meet the pods application's significant design challenges in the time frame and price point that was required, resulting in an extremely satisfied customer.

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