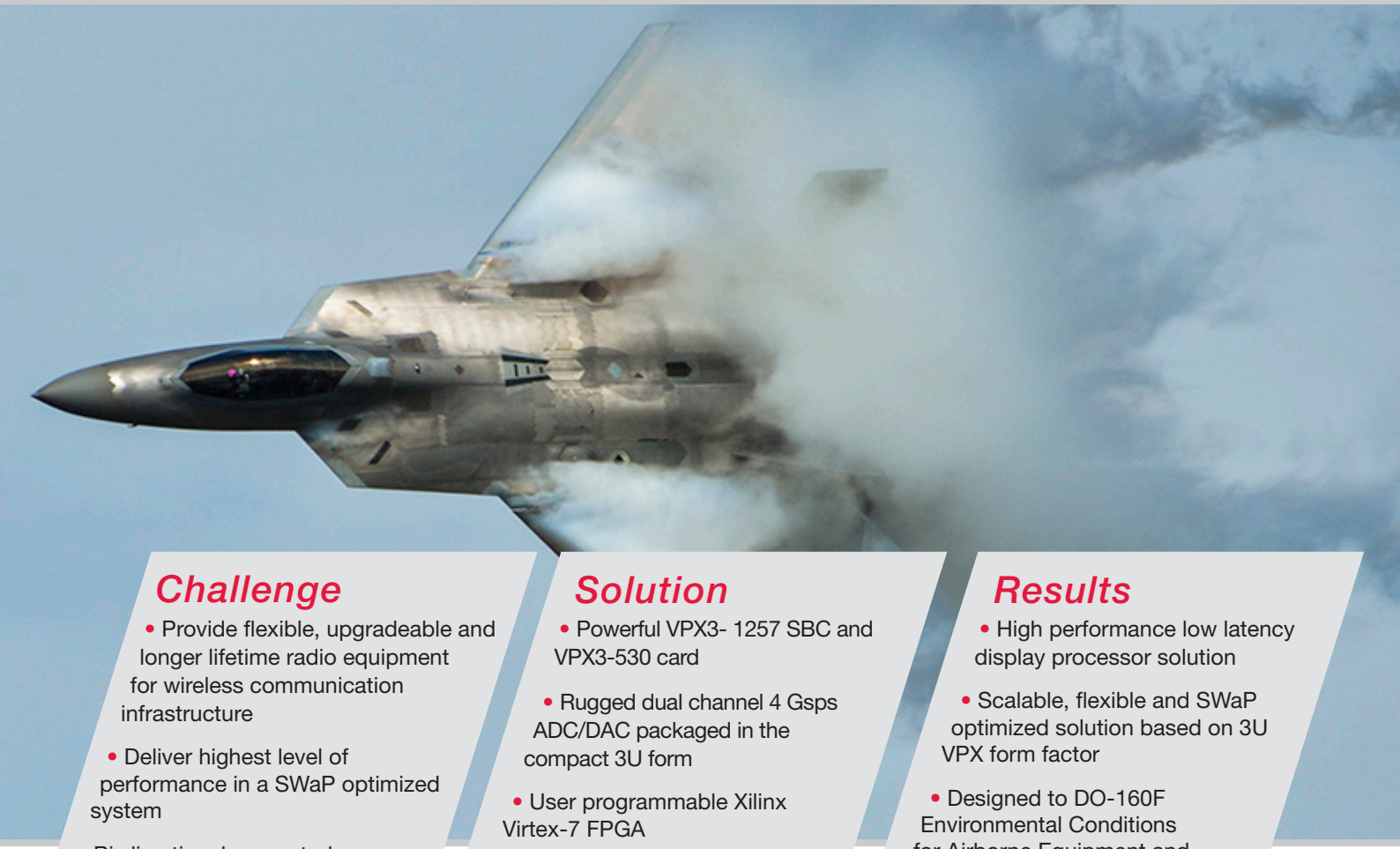
CASE STUDY

3U VPX Software Defined Radio (SDR) Solution

CURTISS-WRIGHT

DEFENSE SOLUTIONS



Challenge

- Provide flexible, upgradeable and longer lifetime radio equipment for wireless communication infrastructure
- Deliver highest level of performance in a SWaP optimized system
- Bi-directional encrypted communication system

Solution

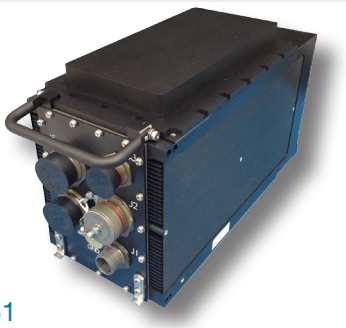
- Powerful VPX3- 1257 SBC and VPX3-530 card
- Rugged dual channel 4 Gsps ADC/DAC packaged in the compact 3U form
- User programmable Xilinx Virtex-7 FPGA

Results

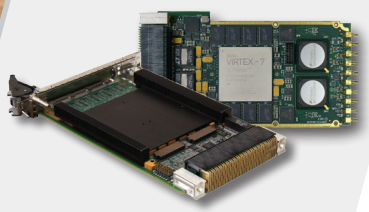
- High performance low latency display processor solution
- Scalable, flexible and SWaP optimized solution based on 3U VPX form factor
- Designed to DO-160F Environmental Conditions for Airborne Equipment and capable of passing numerous environmental tests

Challenge

Software Defined Radio (SDR) provides flexible, upgradeable and longer lifetime radio equipment for wireless communication infrastructure. Modern communication systems require high-reliability processing and highly specialized digital processing and I/O. Regardless of the algorithm and waveforms, SDR requires high performance signal acquisition build-blocks. Curtiss-Wright offers a wide range of rugged signal acquisition products ready for integration with processing and Radio Frequency (RF) electronics for deployment. These applications have a number of components working together within a Size, Weight and Power (SWaP) constrained system which pave the way for bi-directional encrypted communication systems.



MPMC-9351
5-slot 3U VPX Multi-platform Mission Computer



Curtiss-Wright's VPX3-1257 and VPX3-530

Solution

The solution must produce a radio which can receive and transmit widely different radio waveforms based on the software using high performance signal acquisition building-blocks, high performance single board computers, and legacy radios.

3U VPX technology, available from Curtiss-Wright is the ideal fit. The 3U VPX form factor can accommodate the stringent physical constraints of almost any platform, and can provide a SDR solution that fit these requirements. The two key features of the system are the high performance 3U Open VPX single board computer (SBC) VPX3-1257 and the high performance 3U VPX3-530.

The VPX3-1257 is a rugged, high performance 3U OpenVPX Single Board Computer (SBC) based on the Gen3 Intel Core i7 Quad-Core processor. Each of the 3rd Generation Core i7's four cores delivers 2.1 GHz of performance, providing advanced Intel Architecture processing in a lightweight, compact configuration ideal for SWaP constrained applications. With a wide complement of on-board I/O, Gen2 PCI Express (PCIe) fabric and XMC expansion, the VPX3-1257 Intel Single Board Computer (SBC) satisfies the most demanding fielded applications for unmanned aerial and ground vehicles, tactical aircraft, armored vehicles and rugged naval systems.

The VPX3-530 combines multiple channel high-speed Analog to Digital Converter (ADC) and Digital to Analog Converter (DAC) with the latest generation user programmable Xilinx Virtex-7 FPGA. The VPX3- 530 module provides the high speed data interface and programmable processing through a combination analog I/O and FPGA monolithic board featuring the Xilinx Virtex-7 FPGA, and up to 8 GB of onboard Synchronous Dynamic Random Access Memory (SDRAM). The FusionXF development kit complements the VPX3-530 by providing infrastructure and by supporting HDL development, multi-processing applications and software.

These powerful components are packaged within the deployable rugged 3U 5- slot MPMC-9351 system offering an extremely short lead time. The system accommodates the highest power 3U cards in the embedded computing market within a 5-slot, forced-air enclosure.

Result

The MPMC-9351 based system provides a configurable, high bandwidth, low latency display processor in a compact low-power form factor. The system is backed by unprecedented processing power and the flexibility to meet the needs of deployable systems. It is designed to meet the harsh environments of many military computing applications, while satisfying the software, processing, and compress needs in a fully qualified and packaged system solution.

Overall, the system can be quickly configured to meet the needs of any military or aerospace requirements, and is designed to meet or exceed the DO-160F environmental conditions for airborne equipment and is capable of passing numerous environmental tests, including harsh avionics and vehicular environments.

Platform images courtesy of Defense.gov

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