

Rugged Router and Switch Combo Provides Secure Networking for Ground Vehicle's Warfare System

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DEFENSE SOLUTIONS

Challenge

- Ground vehicle platform with SWaP-constraints
- Rugged network solution based on Cisco® IOS™ technology
- Deploy a proven, MIL-STD-validated COTS solution

Solution

- Rugged and secure Cisco IOS routing architecture
- Managed Layer 2 Gigabit Ethernet switch
- Pre-qualified MIL-STD-810/461 environmental/EMI testing

Results

- Integration milestones met with support from a trusted supplier
- Integration complexity reduced thanks to familiarity with Cisco IOS software
- Delivery of seamless communication with supporting command platforms

Challenge

Safely transporting personnel and electronic warfare systems through modern combat environments is a demanding task. To meet the challenges of navigating through extreme conditions, armies often depend on heavily armored ground vehicles to successfully handle night missions, endure sandstorms, and protect against encounters with enemy troops and IEDs. Ensuring that onboard network communications equipment is both reliable and secure is essential, as any form of data breach could compromise the ability of these tactical vehicles to carry out tasks and keep its crew out of harm's way.

A leading system developer with extensive knowledge and experience building mobile ground platforms required a rugged network router and switch for a new command variant of an existing ground vehicle. The newly installed onboard system would be heavily dependent on an IP-

based network to ensure that onboard payloads, including sensors, computers, radios and other mission systems, would communicate effectively with one another. In addition, the platform required the means to convey information to remote locations such as mission command centers.

The program's requirements stipulated that the vehicle's communication network provide the highest level of security available in order to protect onboard computing devices from potential cyber threat while supporting seamless operation with remote systems. Building upon previous familiarity and successes, the system developer sought a commercial off-the-shelf (COTS) Cisco® Systems IOS®-based network router. This approach would enable both the developer and end user to leverage their existing knowledge and familiarity with Cisco's ubiquitous software architecture.



Parvus DuraMAR 5915 MIL-STD
Rugged Cisco 5915 Mobile IP Router



The system developer also had concerns about the size and weight of their solution, as well as survivability in harsh battlefield environments. Since the rugged network router and switch was for a reconfiguration of an existing platform, size, weight and power (SWaP) reductions were highly desired. This was to ensure that the router/switch would not negatively affect the platform's mobility or its passenger and payload capacity. The trade study for a networking solution would be swayed by examining past platform performance on similarly demanding ground vehicles, as well as the MIL-STD environmental, EMI, and power qualification testing performed. In addition, the developer wished to work with a local partner that would be able to support any integration needs.

Solution

The rugged, compact and proven design of Curtiss-Wright's Parvus® DuraMAR® 5915 rugged Cisco 5915 mobile IP router system made it an ideal choice to meet this program's challenging objectives. With help from Unitronix, a trusted supplier of Curtiss-Wright solutions based in New South Wales, Australia, the system developer was able to quickly choose and integrate a readily deployable solution.

"Our familiarity with both the developer's needs and our knowledge of Curtiss-Wright's small form factor Parvus products made the DuraMAR 5915 the default choice," said Tim Marshall, Engineering Director at Unitronix. "The DuraMAR 5915's combination of a Cisco 5915 Embedded Services Router and an integrated Gigabit Ethernet switch in a single rugged enclosure already validated for extreme environments made integration a breeze."

Delivering an integrated rugged router and switch solution, the DuraMAR 5915 was available pre-qualified to MIL-STD-810G, MIL-STD-461F, and MIL-STD-1275D environmental, EMI, and power test requirements (including thermal, shock, vibration, humidity, EMC, and power quality testing) for military ground vehicle platforms.

Satisfying the program's stringent network security requirements, the DuraMAR 5915 provided a low risk SWaP-optimized solution featuring a robust and secure

network routing architecture integrated with a Layer 2 Gigabit Ethernet switch. The router's Cisco 5915 ESR card ensured the performance, security, Quality of Service (QoS), high availability, and manageability that customers have come to expect from Cisco IOS-based technologies. The Cisco IOS software interface also provided the system developer with the ability to deploy the most advanced IPv4 and IPv6 network routing capabilities available from Cisco's Advanced Enterprise IOS, including hardware accelerated encryption (AES256/IPSec/VPN), remote call manager services (VoIP), and secure firewall/IDS/IPS protection. These features were essential for delivering the secure real time communications required by the ground vehicle's operator.

Given the programs expected longevity, the developer required that these on-board systems be available throughout the lifetime of the program. According to Mr. Marshall, "The developer expects the program to be in-service for an extended duration. If additional orders for this configuration are placed or replacements are needed, the developer needed to be assured that systems would be available without delay". As with all Parvus DuraCOR, DuraNET and DuraMAR products, Curtiss-Wright has been able to provide long lifecycle availability and support.

Results

The DuraMAR 5915's proven mechanical packaging, superior ruggedization (including military-grade power supply and connectors) and high reliability reduced risk and accelerated system integration and time to deployment. In addition, the advanced networking capabilities provided by the Cisco IOS technology delivered a high-level of security, performance and manageability. With the assistance of Unitronix, the developer was able to receive and implement the DuraMAR 5915 with minimal effort.

"Curtiss-Wright has proven it can provide industry leading products that can meet even the most stringent of requirement set by both developer and end user. Given the availability of the DuraMAR and quickness to integrate, overall program milestones were met, ensuring the platform was delivered to the end user on time," said Mr. Marshall.