

Miniature Ethernet Switches Deployed Onboard Unmanned Aircraft Systems

Challenge	Solution	Result
<ul style="list-style-type: none">▪ Ethernet switching connectivity onboard smaller Unmanned Aircraft Systems (UAS)▪ Rugged COTS solution minimizing SWaP yet delivering robust network management▪ Demanding environmental and EMI performance validation	<ul style="list-style-type: none">▪ Parvus® DuraNET® 20-11 / 20-12 COTS Ethernet switches▪ Reliable, in-flight managed Ethernet network connectivity▪ Ultra small form-factor rugged Ethernet switches with MIL-STD qualification testing	<ul style="list-style-type: none">▪ DuraNET switches were ideal fit for smaller UAS platforms▪ Systems complied with demanding environmental and EMI specifications▪ Miniature switches being deployed into other air and ground vehicles

Challenge

Tactical Unmanned Aircraft Systems (UASs) used by U.S. Army, Marine Corps, and other nations for reconnaissance, surveillance, targeting, and assessment required an upgrade for Ethernet switching capabilities for onboard communications and sensor payload equipment. These platforms enable situational awareness for commanders to see, understand, and act decisively in time-critical situations. The relatively small physical size of this class of vehicle and the noisy electromagnetic interference (EMI) generated by its comms equipment presented a challenge for the UAS manufacturer when identifying a reliable Commercial-Off-the-Shelf (COTS) networking solution. The product had to reliably operate in demanding environments, provide robust network functionality, while meeting the platforms' extreme size, weight and power (SWaP) constraints.



Parvus DuraNET 20-11: Rugged ultra-miniature 8-port GbE switch, fully managed, MIL circular connectors

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Solution

To meet these UAS application requirements, the systems integrator selected ultra-small, rugged Ethernet switches optimized for highly demanding SWaP constraints onboard unmanned and mobile platforms exposed to harsh environmental and noisy electrical conditions (e.g. high altitude, extreme shock & vibration, extended temperatures, humidity, dust & water exposure, noisy EMI, dirty power).

These “pocket sized” miniature Parvus® DuraNET® Ethernet switch systems are 10% of the size of a traditional small form factor Ethernet switch from Curtiss-Wright and only 25% of the weight of the next lightest Ethernet switch available in the portfolio. Two connectors variants of this miniature switch enabled UAS platforms to deploy either (8) ports of Gigabit Ethernet (GbE) through micro-miniature MIL-circular connectors or six (6) ports of 10/100 Ethernet through a rectangular connector fitted with Quadrax contacts for enhanced signal integrity. These extremely reliable Local Area Network (LAN) switching solutions allow systems integrators to perform technology refreshes and fit new platforms with the best in carrier-grade, fully managed Ethernet switching capabilities.

Results

At only 0.5 lbs in weight and 10 in³ in size, the DuraNET 20-11 and DuraNET 20-12 prove to be ideal solutions for smaller to mid-sized UAS platforms, while meeting harsh environmental and EMI standards. The success onboard these UAS platforms has resulted in these DuraNET Ethernet switches being chosen for multiple follow-on platforms to include air and ground vehicles. For applications requiring Gigabit Ethernet connectivity, see DuraNET 20-11 model. For applications requiring 10/100 Ethernet shielded Quadrax connectivity, see DuraNET 20-12 model.



Parvus DuraNET 20-12: Rugged ultra-miniature 6-port 10/100 Ethernet switch, fully managed, quadrax connector