

Submarine and Helicopter Sonar Suite Upgrades Mission Systems

**CURTISS -
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DEFENSE SOLUTIONS



Challenge

- SWaP-constrained sonar suite for rotary wing platform
- Legacy solution inadequate for new mission requirements
- Upgrade solution had to meet strict European regulations

Solution

- Miniature, power efficient mission computer and switch
- ITAR-free and EU-compliance to CE Mark, RoHS
- Pre-qualified MIL-STD-810/461 environmental/EMI testing

Results

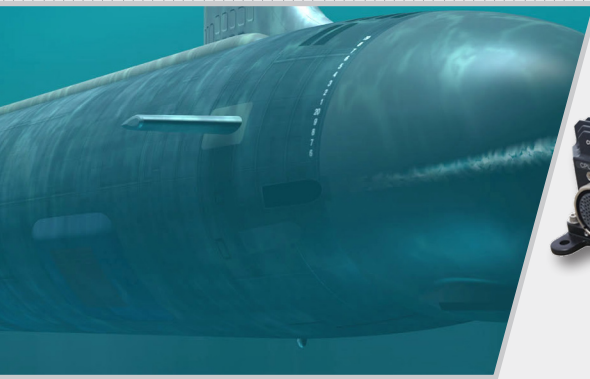
- Systems fit perfectly within underwater sonar suite
- Minimal effort to integrate into platform with excellent support
- Sonar suite deployed to customers ahead of schedule

Challenge

Sonar is a critical system for underwater warfare platforms. Not only is it vital for effectively carrying out missions, but also to ensure the survivability of crew members in the hostile environments in which they operate. Developing underwater anti-submarine warfare and mine countermeasure applications can be a tricky task, as sensors suites often demand high levels of performance and durability, but are extremely limited in available space and power, especially for dipping sonar systems used onboard helicopter platforms. When a well-known system developer was performing maintenance and overhaul on one of its sonar suites developed for both underwater and rotary aircraft platforms, it was deemed by the customer that existing subsystems supporting the acoustic sensors would no longer be able to cope with upgraded requirements.

The sonar system was developed based on an open, interoperable architecture in anticipation for such a situation when upgrades were deemed necessary, as well as keeping the costs of ownership to a minimum. Since the system was developed in such a way, the integrator looked beyond replacing just the outdated mission computer and sensor, but also the Ethernet switch that would connect the system and be able to support the large amount of data being streamed. The systems they would choose also had to be compliant with military vehicle and aircraft standards to withstand the harsh environments of both air and sea.

As a European company, the system developer was limited in the choices it had for rugged mission computers and switches, due to regulations such as CE marking,

**DuraCOR 80-41****DuraNET 20-11**

Restriction of Hazardous Substances Directive (RoHS), and Registration, Evaluation, Authorization and Restriction of Chemicals (REACH). Not only was it important to find solutions that met their technical requirements, but they also had to meet stringent European regulatory standards, and not fall under US Export ITAR restrictions.

Solution

With previous successes using Curtiss-Wright products, the system developer selected two rugged COTS small form factor (SFF) Parvus products (the Parvus DuraCOR 8041 and DuraNET 20-11) that aligned with their requirements and that would effortlessly integrate into the sonar suite.

As an Intel processor architecture was a requirement, the DuraCOR 8041 was chosen as the tactical mission computer. Based on a quad-core Intel Core i7 CPU, the 8041 provided the platform with the x86 computing and I/O performance needed out of a rugged, compact and modular processor unit. The Intel Core i7 was especially beneficial for this application because its architecture was composed of a high-performance CPU and integrated GPU that not only minimized space and weight, but made use of advanced power management technologies that yielded efficient operations.

To satisfy the network switch requirement, the Parvus DuraNET 20-11 was chosen both for its size and networking capabilities. This “pocket sized” fully managed Gigabit Ethernet switch with IEEE-1588 precision timing capabilities is one of the smallest rugged, managed Ethernet switches on the market, able to fit in someone’s palm with a weight of roughly half a pound (0.23 kg).

An important consideration for this application was for the mission systems to be able to withstand the harsh environments onboard a sea-faring helicopter and continue to reliably operate. The DuraCOR 8041 and DuraNET 20-11, as well as all Parvus products, undergo rigorous environmental and EMI qualification testing to ensure they

will perform under the stress of deployed environments. Having exceeded MIL-STD-810, MIL-STD-461, MIL-STD-704, and DO-160 standards, the integrator and customers gained peace of mind to know that their platforms will be able to operate reliably under the most hostile conditions. Additionally, to ensure compliance with regulatory requirements for electronics sold into the European Union and also to minimize export hassles, these products were classified by the US Commerce Department as EAR controlled (ITAR-free), and Curtiss-Wright performed additional testing for CE Mark EMI/safety compliance, along with supporting design files showing compliance to environmentally-friendly RoHS and REACH initiatives. While the process to achieve compliance to MIL and government standards is both costly and time consuming, it gives countries controlled under such regulations an opportunity to acquire products they previously did not have access to, but have the demand for them.

Results

The decision by the system developer to integrate the Parvus DuraCOR 8041 and DuraNET 20-11 into their sonar suite was successful and allowed them to redeploy the platforms on schedule. With a combined weight of 6 lbs., volume under 150 in³ and low power consumption (<50W and 5W, respectively), the combination of the two Parvus products came in well below the SWaP requirements set for the sonar platform. The integration process was a smooth one with excellent technical support provided by Curtiss-Wright product specialists. Additional testing of the complete sonar suite also proved that Curtiss-Wright’s extensive environmental testing were accurate and met the EMI requirements as to not interfere with the suite’s acoustic sensors. The developer was also pleased that the Parvus products were ITAR-free and complied with European standards so the entire sonar solution could be listed as such and wouldn’t require additional approvals.