

case study



Signal control and route resiliency is essential for mission-critical naval applications

Introduction

Today's naval surface warfare environment is more interconnected than ever before. This requires the highest level of signal fidelity and communications reliability while facing rapidly changing combat conditions. The shipboard communications environment must provide for radar control, sensor data, satellite uplink/downlink, digital signal processing, analog RFoF signal distribution and command/control. Combat missions cannot be allowed to fail because critical communications are interrupted.

Application

Signal control in naval radar

Technology

Optical fiber

Solution

POLATIS®

Optical circuit switching

Region

Various

Customer

Various

Radar suppliers

*The appearance of U.S. Department of Defense (DoD) visual information does not imply or constitute DoD endorsement.

Challenge

The real-time requirements of signal control in a combat situation demand the ability to provide immediate response to ever changing conditions. Signal flow must be maintained while providing the highest data fidelity demanded for critical decision making. Redundant cable routes are required to provide communication resiliency in the event of damage to primary cable runs or equipment failure in order to protect the mission.

Solution

The ability of fiber optics to carry extremely high bandwidth data over small, low loss, lightweight and robust cables lends itself naturally to the challenge of providing resilient communications paths on naval surface warfare platforms. Route redundancy switching can be provided by a Layer 1 Optical Circuit Switch (OCS), such as POLATIS®, which can quickly switch between primary and backup fiber cables in response to changing conditions.

POLATIS® switches are currently deployed in mission critical military networks worldwide and are a key component in several state-of-the-art Naval radar defense systems.

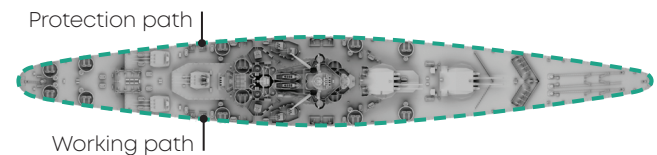
Result

Guaranteed signal fidelity

An OCS performs no Optical to Electrical to Optical (O-E-O) conversion, thus preserving signal fidelity, whereas an O-E-O switch will introduce jitter, amplitude distortion and latency. POLATIS delivers ultra-low insertion loss, protocol independence and near zero (30ns) signal latency. By maintaining an all-optical signal flow, the quality and security of the data is preserved, even in the harshest of environments.

Resiliency and dynamic topology changes

Naval combat situations require the absolute highest degree of flexibility for real-time decision management. If data paths are disrupted owing to incurred damage, diverse topology routes must exist to maintain mission critical signal flow. The ability to detect outages and switch to protection paths is critical to real-time situational reaction. Optical switching at the physical layer provides the required redundancy and control.



Support for mission/application growth

Routing of signals with an optical circuit switch is accomplished independent of the signal format, frequency or data rate. As signal requirements and application demands change over time, the same optical backhaul infrastructure can be used without need for upgrade. Mission controllers can even distribute different signal types through the same fiber infrastructure for maximum network flexibility.

Integration and control

POLATIS® optical switches can be remotely controlled via an embedded Web-based interface, dedicated control protocols or third party SDN controllers. Such dynamic control gives network operators the ability to change signal topologies in real-time, based on current conditions or network outages.

More to explore

With many years of expertise and a broad range of RF and fiber optic connectivity products, HUBER+SUHNER can provide the solutions that optimize your mission critical sensor and communication networks, on land, sea or air platforms.

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