Tough sensors for an insensitive planet

McQ SonoWatch™ 360° Acoustic Array

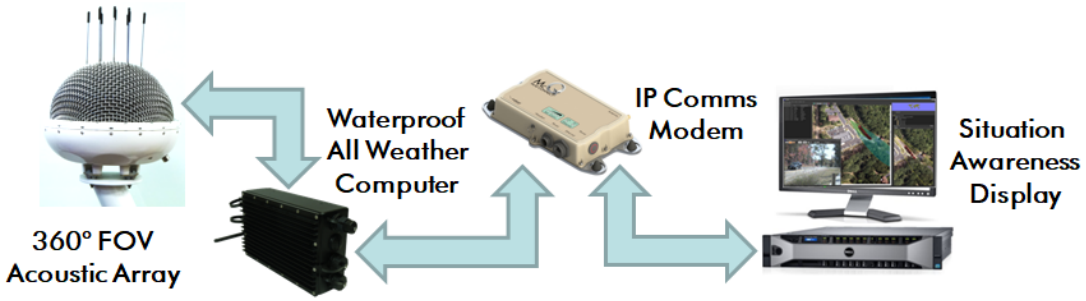
Situation Awareness for Maritime Safety and Security

SonoWatch™ DESIGN

The SonoWatch Acoustic Array Situation Awareness product uses state of the art electronics and algorithms to achieve high level performance while maintaining minimal size, power consumption, and cost. The SonoWatch System uses a 360° field of view acoustic array of microphone sensors to detect, classify, track, and locate acoustic targets. The seven microphone array provides azimuth and elevation signal collection. The rugged environment electronics capture acoustic signals over a 70 to 12,000 Hz frequency range. McQ processing algorithms quantify the signal features to determine the signal classification. SonoWatch acoustic information can be sent over an RF wireless IP network to the user interface. These include terrestrial and satellite networks. McQ can provide tailored detection and classification capabilities.

McQ's SonoWatch™ product provides autonomous collision avoidance for unmanned surface vessels (USVs) and manned watercraft by performing acoustic based detection, localization, and navigational meaning of signals (such as horns of other watercraft).

SonoWatch contains a high fidelity 360° field of view (FOV) acoustic array and data acquisition system which is rugged for maritime and extremely harsh outdoor environments. The system also performs advanced signal processing to autonomously characterize the signal, even in the presence of noisy environmental conditions (such as wind, rain, and engine noise), which can be reported to the USV autonomously or to an operator over standard protocols and network interfaces.



The acoustic array, IP network, and the computer/processor are environmentally hardened for harsh environments. McQ has developed signal processing with algorithms to uniquely classify many different acoustic navigation warning signals to meet the Navigation Rules requiring all vessels to have proper "lookout" to avoid the risk of collision in any condition of visibility. SonoWatch has sensitive acoustic microphones with a large signal dynamic range providing long range detection and identification of navigational signals. The acoustic array provides a very accurate line of bearing to the sound and the ability to track and locate the sound position. The SonoWatch acoustic system has the flexibility to include new sensing capabilities and features to meet the future requirements of the Navy and other potential customers. Future capabilities will include detection and classification of watercraft engines and land based detection and classification of vehicles and aircraft, including Unmanned Air Systems (UAS).

McQ SonoWatch™ Acoustic Sensor Technology

McQ SonoWatch™ PERFORMANCE

The small size and weight of the SonoWatch system is ideal for emplacing on a variety of host platforms, including manned and unmanned water vessels, robotic land vehicles, buoys, and static monitoring sites. As a maritime vessel lookout, SonoWatch meets navigation rules for detection and classification of naval audible acoustic signaling used to avoid the risk of collision. SonoWatch technology also has the capability to send acoustic situation awareness for vehicle, aircraft, and motorboat activity detection. The small size and weight of SonoWatch coupled with the capability to send acoustic activity information over wireless IP networks makes it a valuable provider of situation awareness. The sensor detection range and the high probability of detection make SonoWatch an excellent safety and security component easily integrated with other information sources.

Features and Specifications

360° Acoustic Array

Target Detection
- 7 element microphone array
- 70 to 12,000 Hz

Target Bearing and Location
- <15° Bearing Error
- Location derived from bearing changes over time

Vibration Isolation reduces noise
Power provided by All Weather Computer
Interface to All Weather Computer via Ethernet/USB

System Specifications
- Microphone Array (without mount): 10.3” D x 12.7” H; 6.6. lbs
- Microphone Array (with mount) 12.5” L x 10.3” W x 24.5” H; 8.6 lbs
- Operating Temperature: -40° to +55° C
- IP Rating: IP67

Waterproof All Weather Computer

Target Classification Features
- Maritime Navigation Signals

System Data Output
- Navigation Signal Classification, Signal Bearing, Signal Fundamental Frequency, Signal Intensity

Computer Size: 8.14” x 5.07” x 3.43”; 2.9 lbs
Operating Temperature: -20° to +55° C
IP Rating: IP67
Overall System Power Requirements: 14-30W typical; 95W peak
Input Voltage Range: 9-32 VDC, 13.8 VDC recommended
Optional AC Adapter: 120 VAC
External System Interfaces:
- Power over Ethernet (PoE)
- Ethernet
- USB

SonoWatch Acoustic Situation Awareness Applications

Navy Autonomous and Manned Surface Vessels
Manned Military and Commercial Vehicles
Floating Buoys, Port, and Coastal Surveillance
Shoreline Remote Coastal Monitoring
Unmanned Robotic Vehicle Situation Awareness
Counter Drone Detection

Specifications
- Small Baseline Azimuth and Elevation Array
- Detection and Characterization of Typical Maritime Sounds
- Provides Frequency, Duration, and Intensity of Sound Source
- Identify Direction and Location of Sound Source
- Extraction of Signals of Interest from the Acoustic Sound Spectrum
- Classification of Acoustic Sound Sources
- Autonomous Naval Vessel Lookout to Meet Coast Guard Requirements
- Ruggedized Microphone Array for Harsh Seawater Environments
- IP Communications Network for Integration with Standard Network Protocols
- Modular Architecture Enables Multiple Arrays for Larger Ships

Specifications may change due to product enhancements.
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