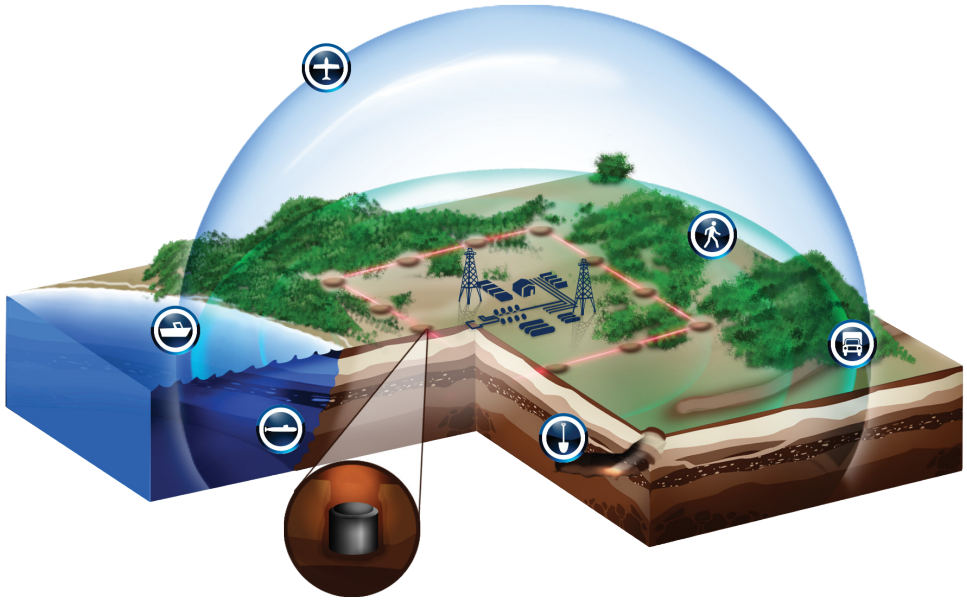
QUANTUM™ TECHNOLOGY SCIENCES

VECTOR QM SERIES

a SENSE *for* SECURITY

MULTICHANNEL SEISMIC-ACOUSTIC SYSTEM



FEATURES

Superior Detection Ranges
Increases time and space for proactive security

Concealed Installation
Difficult to evade or disable

Non-Line-Of-Site Detection
Detects potential threats that are visually obstructed

Layered Security Platforms
Cues other resources to look & verify

Low False & Nuisance Alarm Rates
Trusted alerts when there is actually a potential threat

Classifies Potential Threats in Earth, Water, Air
Land-based sensors monitors all domains

Integration Friendly
Easily augments and enhances existing security

Broadly Scalable Solutions
Reduces countless assets to a single data stream

SYSTEM OVERVIEW

Quantum Technology Sciences offers expanded security awareness through the Vector Series Seismic-Acoustic Sensor System. This low visibility system meets the demand for beyond the perimeter persistent movement monitoring, intrusion detection, and real-time situational awareness. The standard QM Series products are configured to detect and classify human footsteps, motor vehicles, and digging.

Whether the need is to expand the security awareness zone beyond the perimeter, or to extend the awareness zone for long distances, Quantum's Vector Series does both. These products are the building blocks for a situational awareness solution with three dimensional 360° detection sensitivity in air, water and the earth.

VIBRATIONS TO ACTIONABLE INFORMATION

Vibrations in the earth are converted to signals by each sensor and are immediately analyzed by the node automatically. The sensors don't require line-of-sight with the signal source to detect it. When the system determines that the vibrations are from a programmed signal of interest, such as human footsteps, the node immediately transmits (wired or wireless) an alert message. Each alert message informs the user which sensor generated the alert, the type of signal detected, and ancillary information like state of health. One monitoring station can operate with inputs from multiple multichannel nodes. Customer needs dictate the type of monitoring station, such as a command center computer, remote laptop, smart phone, or other security architecture.

Expanded security awareness zones for any particular application are created using an optimized combination of Quantum sensor systems. The QM-100 and QM-101 have 8 to 16 sensors all serviced by a single node.

DEPLOYMENT

The system can be deployed by itself in a stand-alone role, or can be easily integrated with other systems and architectures. For each sensor of the system is buried in a small hole approximately 10" in diameter and 20" deep. Spatial orientation of the sensor in the ground is not critical, which simplifies deployment. Only the sensor itself must be buried. The QM-100 node and connecting cables can also be buried to make the entire system extremely difficult for intruders to detect or defeat, or in the case of the QM-101 placed indoors or in a NEMA enclosure for easier access.

The sensor deployment pattern is designed to support the specified awareness zones required for monitoring and alerting on the activity of interest. Each installation can be temporary or permanent, with deployments as small as a single QM node solution to establish a security awareness zone around a fixed asset, or as large as many QM nodes along an extended perimeter or deployed along miles of pipeline, boundary, or border.

The solution may display alert and state of health information on Quantum's user interface or may be transmitted via an XML data stream to other technologies such as VMS, cameras, and/or access control.

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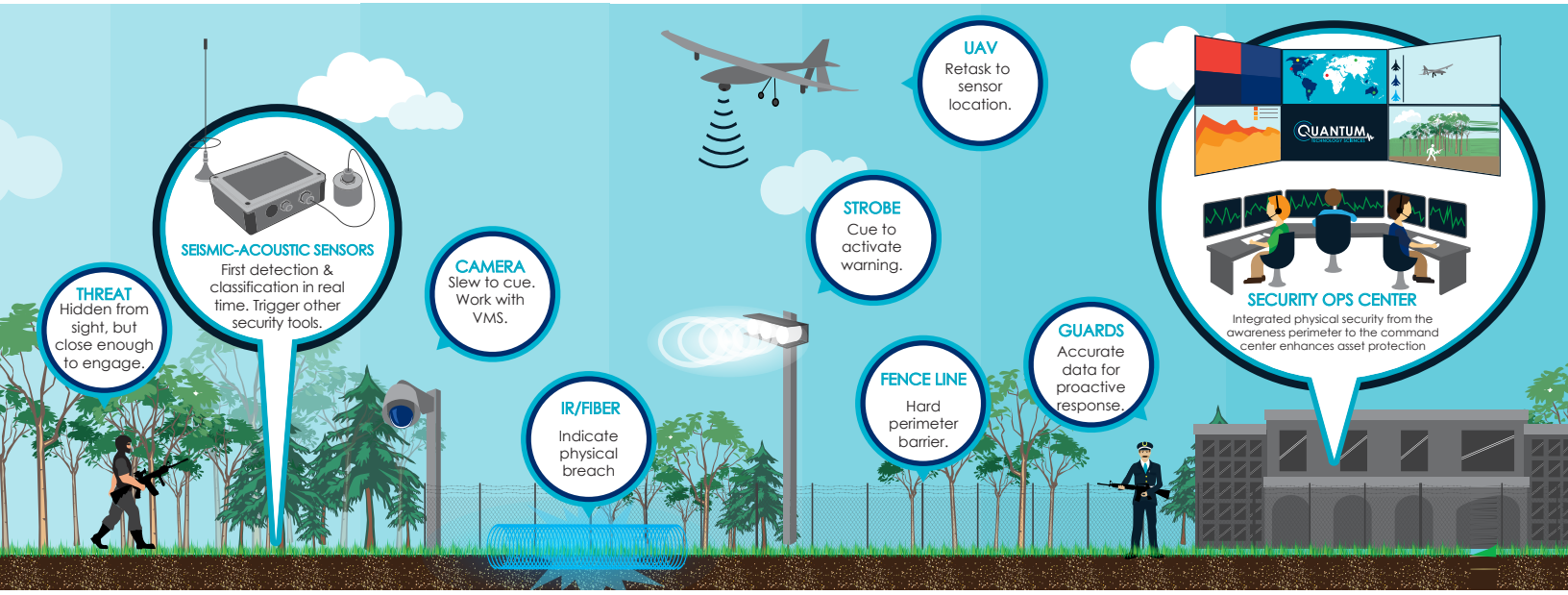
FULLY INTEGRATED LAYERED SECURITY INFRASTRUCTURE

Quantum Technology Sciences seismic-acoustic sensor solutions operate as independent movement monitoring and intrusion detection tools to increase probablility of detection. When fully integrated with other security architecture, Quantum increases probablilty of deterrence by collaborating with line of sight technology, physical barriers and security personnel.



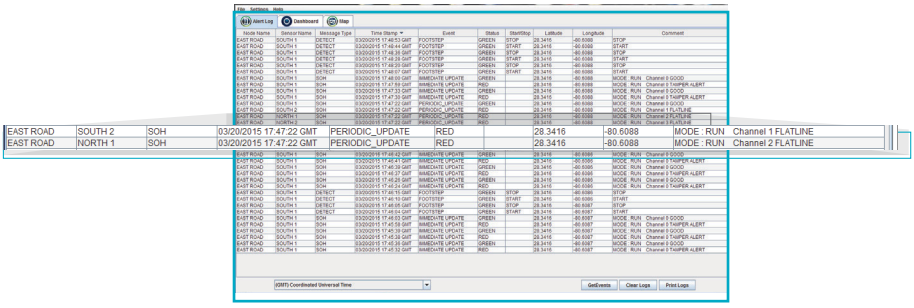
QUANTUM USER INTERFACE

- **THE USER INTERFACE ALLOWS** remote access to the node(s) ethernet or optional wireless connections from a computer application or mobile device. It can graphically monitor the system as a whole or examine activities of individual nodes, and can also play back historical alerts. The user interface software provides an interactive map, a node status summary, and a message viewer. Users also have access to the full functionality of the display via monitoring device with a proprietary, secure app.

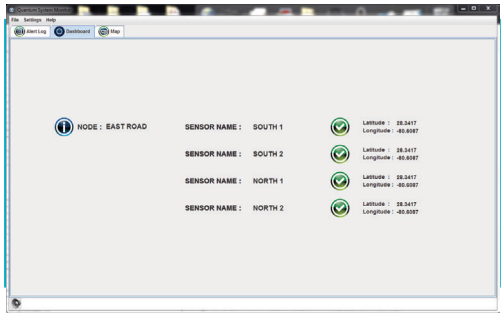
- **THE USER INTERFACE INTERACTIVE MAP DISPLAYS**
  - Node(s) location
  - The current state-of-health status of the individual nodes and sensors
  - Detection & classification alerts from individual nodes and sensors
  - Node and sensor status

- **THE NODES AUTOMATICALLY AND IMMEDIATELY** report all alerts and, at programmed intervals, state of health (SOH) messages to the monitoring device, and record them internally as well. The monitoring device uses these reports to continuously update the user interface with the most current information.

Map Display with Active Sensors



Alert Log Display



Multiple Node Status Display

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SPECIFICATIONS

Used for ruggedized deployments where the node is exposed to the elements above or below grade; uses proven military-grade hardware enclosures and connectors and is fully IP67 compliant.

PERFORMANCE

DETECTION RANGE (MAXIMUM)

Walking:	125m / 410ft
Vehicle:	240m / 787ft
Gunshots:	500m/1,640ft
	(Ranges will vary)

INPUT POWER

System requires 12V DC Power Source

Optional Power-over-Ethernet (PoE), IEEE 802.3af standard

TYPICAL POWER CONSUMPTION

Ethernet Communications:

8 Ch - 5.6 Watts

16 Ch - 7.5 Watts

Wireless Communications (Optional):

Device Dependent

NODE TO HOST INTERFACE OPTIONS

100Mbps Ethernet (Standard)

WIRELESS OPTIONS

900MHz Wireless RF Modem
WiFi 802.11 a/g/n
GSM-LTE/3G/4G

MONITORING DEVICE RECOMMENDATIONS

Windows operating system, an equivalent of an i5 processor, with 4-8 GB RAM, a minimum of 512 MB of video memory and 3D graphics Android 4.x

INTEROPERABILITY

Common Alerting Protocol (CAP)
IP Camera or other IP Devices
XML or ASCII Interface
WiFi/Ethernet Radio/GSM

OPTIONAL CLASSIFICATIONS

Digging
Motorized Watercraft
Gunshots
Light Aircraft

PHYSICAL

SENSOR

Deployment Location:

Buried with soil fill at an 8 inch minimum depth below the surface

Size: 6.43cm x 5.84cm / 2.53in x 2.3in (Height x Diameter)

Sensor to Node Cable:

Length: Up to 600m/2,000ft

Connectors: 4/18 Pin Mil-DTL-26482

Weight: 118g / 0.26 lbs

NODE

Sizes 8ch, 16ch: 25.5cm x 18cm x 7.62 cm (L x W x D)

Power Cable:

Length: 1.8m / 6ft

Connector: 2 Pin Mil-DTL-26482

Weight: 816.5g / 1.7lbs

ENVIRONMENTAL

OPERATING TEMPERATURE

-40°C to +70°C (-40°F to 158°F)

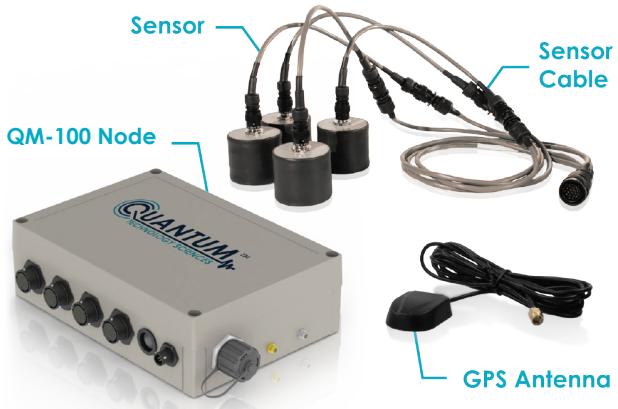
STORAGE TEMPERATURE

-40°C to +70°C (-40°F to 158°F)

RUGGEDIZED SYSTEM TESTED TO MIL-STD 810G-1

Tested Description	Method
Vibration Truck/Trailer Loose	514.7
High Temperature	501.6
Low Temperature	502.6
Blowing Sand	510.6
Blowing Rain	506.5
Salt Fog	509.6
Icing Freezing Rain	521.3
Freeze Thaw	524.1

IEC Standard 60529 **IP67 Compliant**



47 CFR Part 15 Subpart B IC ICES-003 Issue 5

RoHS Compliant

NOTE: We continuously improve our technology. These specifications are subject to change without notice.

SPECIFICATIONS

Commercial-grade implementation for field deployments leveraging control huts, rack mounts or environmentally sealed enclosures to protect the node and economical Cat5/6 connectors for cost reduction and ease of deployment.

PERFORMANCE

DETECTION RANGE (MAXIMUM)

Walking:	125m / 410ft
Vehicle:	240m / 787ft
Gunshots:	500m/1,640ft

(Ranges will vary)

INPUT POWER

12-15V DC or

Power-over-Ethernet (PoE/PoE+)
IEEE 802.3at/af

TYPICAL POWER CONSUMPTION

Ethernet Communications:
8 Ch - 5.6 Watts
16 Ch - 7.5 Watts

Wireless Communications (Optional):
Device Dependent

NODE TO HOST INTERFACE OPTIONS

100Mbps Ethernet (Standard)

WIRELESS OPTIONS

900MHz Wireless RF Modem
WiFi 802.11 a/g/n
GSM-LTE/3G/4G

MONITORING DEVICE RECOMMENDATIONS

Windows operating system, an equivalent of an i5 processor, with 4-8 GB RAM, a minimum of 512 MB of video memory and 3D graphics Android 4.x

INTEROPERABILITY

Common Alerting Protocol (CAP)
IP Camera or other IP Devices
XML or ASCII Interface
WiFi/Ethernet Radio/GSM

OPTIONAL CLASSIFICATIONS

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PHYSICAL

SENSOR

Deployment Location:
Buried with soil fill at an 8 inch minimum depth below the surface
Size: 6.43cm x 5.84cm / 2.53in x 2.3in
(Height x Diameter)
Sensor to Node Cable:
Cat5/5e/6/6A STP rated for direct burial
Node side: Shieldedd RJ45
Sensor side: Shielded RJ45, IP67 rated
Weight: 118g / 0.26 lbs

NODE

Sizes 8ch, 16ch: 3.5 x 8.5 x 8 in (89 x 216 x 203 mm)
(H x W x D)
Power Connector: DC Barrel, 5.5mm OD/2.5mm ID
Weight: 816.5g / 1.7lbs
Mounting: 2U half-width rack mount option
DIN-rail mount option
Enclosure: Indoors or NEMA/UL outdoor cabinet

ENVIRONMENTAL

OPERATING TEMPERATURE

-40°C to +70°C (-40°F to 158°F)

STORAGE TEMPERATURE

-40°C to +70°C (-40°F to 158°F)

SYSTEM TESTED TO MIL-STD 810G-1

Tested Description	Method
Humidity	507.5/2
High Temperature	501.6
Low Temperature	502.6

IEC Standard 60529

IP67 Compliant Sensors

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RoHS Compliant

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