SADAR®–E

REAL-TIME SUBSURFACE ACTIVITY DETECTION

SADAR®-E is an event-driven, seismic-acoustic monitoring technology solution that detects, classifies, locates, and tracks subsurface events of Interest, automatically and in real-time. SADAR delivers greater range, accuracy, and minimal uncertainty than ever before.

SADAR-E is a passive seismic acoustic system that consistently listens to a defined volume of earth for seismic sources of interest. SADAR-E uses arrays of seismic-acoustic sensors for three-dimensional detection of activities associated with micro-seismicity, hydraulic fracturing, groundwater storage, and carbon capture and storage as well as hydrogen storage.

THE SADAR® ANALYTIC SEQUENCE - Signal and Information Processing

SADAR's coherent array processing offers several distinctive advantages. We enhance the already impressive performance of SADAR by deploying a network of tuned SADAR arrays. A SADAR Network adheres to a traditional event processing sequence of detect, associate, locate, and identify.

With the additional power of spatial analytics, SADAR operates simultaneously in both time and frequency domains, while spatially filtering the persistent wavefield. This improves every aspect of analytic performance by exploiting the resulting enhanced signal-to-noise ratio (SNR) and three-dimensional direction-finding to the event.

System Components

GRAPHICAL USER INTERFACE

The User Interface allows remote access to the system from a computer application or mobile device. It can graphically monitor the system as a whole or examine activities of individual SADAR-E arrays, as well as play back historical alerts. The user interface software provides an interactive map, a system state of health summary, and a message viewer.

The system automatically and immediately reports all events and, at pre-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.
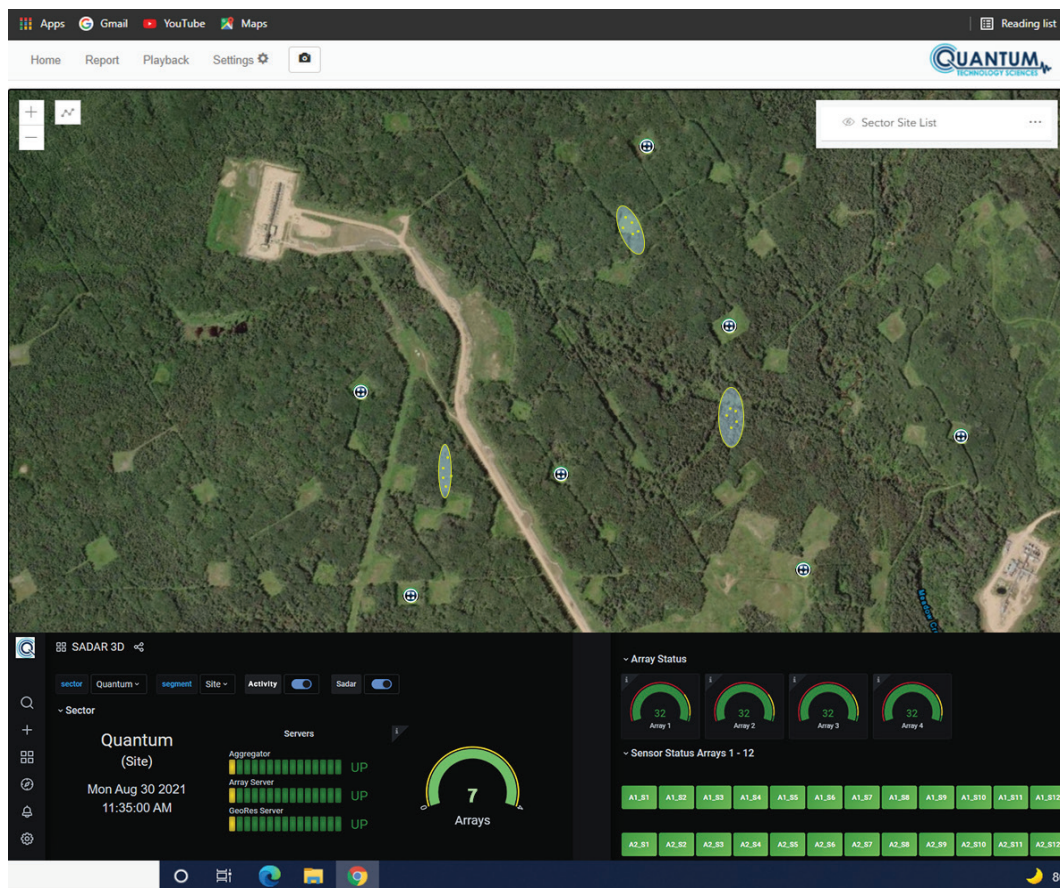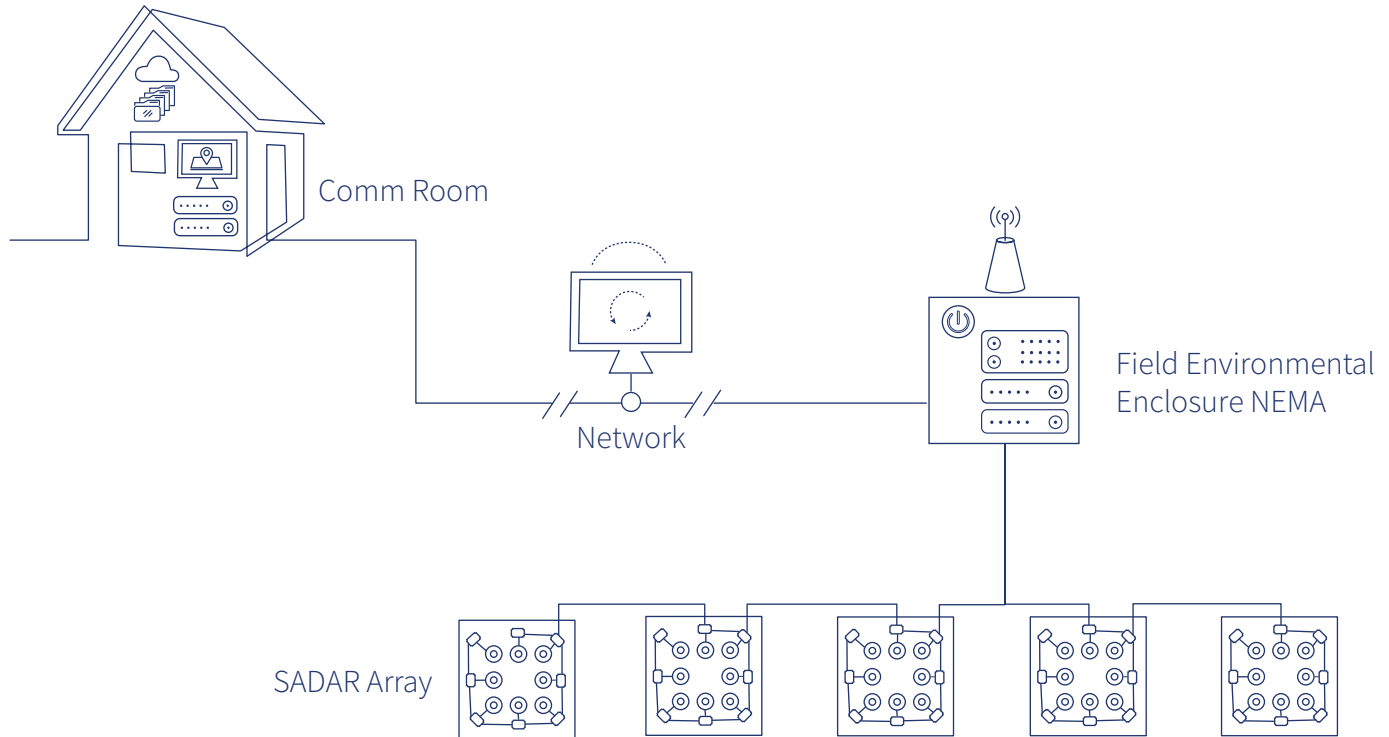

User Interface Interactive Map Displays

- Array(s) location
- State-of-health status of individual SADAR arrays
- Detection, classification, and localization alerts

Specifications subject to change at sole discretion of Geospace Technologies.

System Components

CONFIGURATION DIAGRAM

Comm Room

Network

Field Environmental
Enclosure NEMA

SADAR Array

Each SADAR-E system contains one or more of the following components:

- Ground Sensors
- Sensor Power Supply
- Mux/Demux and Line Conditioning Units
- Data Bunching and Conditioning Units
- Communication Devices
- Array Servers
- Aggregator Servers
- Timing Servers
- Data Storage Devices

GeoRes S8 (Server)

19in Rack-Mount Chassis	4U
SADAR-E Array Line Support per Chassis	8
SADAR-E Arrays per Line	7
Operating Temperature	-20°C to 60°C
Input Voltage/Power	100-260 VAC, 10W
Array Power Supplied via 450-05290-xx	Passthrough
Dimensions	19 in (W) x 13.5 (D) x 7 in (H)
	48.26 cm (W) x 34.29 cm (D) x 17.78 cm (H)
Weight	11 lbs/5 kg

GS-ONE Geophone

Response Frequency	10 Hz, 3.5%
Spurious Frequency	>240 Hz
Distortion from Vertical	<0.12% @ 12 Hz with 0.7 in/s p-p
Distortion at Vertical	0.05% typical
Sensitivity	2.00 V/in/s (78.7 V/m/s) typical
Damping	70% +/- 10%
DC Resistance	1800 ohms +/- 5%

Digitizer

Digitization	24-Bit Delta – Sigma
Sample Rate	0.5, 1, 2, 4 ms
Pre-amplifier Gains	0, 6, 12, 18, 24, 30, 36 dB
Maximum Input Signal for Sensor	26 mm/sec
Equivalent Input Noise	@ 2 ms sample rate 1.77 µmm/sec rms
Gain Accuracy	Better than 1%
Anti-alias Filter	83% Nyquist
Instantaneous Dynamic Range	124 dB @ 2 ms sample interval
Crossfeed Isolation	>90 dB
THD	<0.2%
System Timing Accuracy	GPS Disciplined Clock