Safe Situational Awareness for Improved Emergency Response

aegex10™ Intrinsically Safe Tablets • NexVu IoT Solution • VCORE fourDscape Platform on the Verizon Network

By Aegex Technologies and VCORE Solutions

Introduction

In critical operations - whether emergency response, resource extraction, large industrial operations, or other crucial and time-sensitive work – precise, real-time information is key. All personnel involved must have the full operational picture to be able to perform their jobs safely with accuracy and efficiency.

But not all critical ops environments are conducive to easily collecting, delivering and receiving information. Where combustible materials are present – such as in the case of gas leaks, HazMat spills or other emergencies involving combustible atmospheres – typical devices like cell phones or computers are themselves an explosion risk and are not a viable means of communication or data management. These environments have been excluded from a digital transformation due to their unique operating and regulatory conditions. These critical operations require advanced technologies that enable:

1: **Pervasive and safe capture and distribution** of information without compromising performance;

2: **Visualization of a broad range of data** in a common operating picture to keep all parties informed and prepared for emerging and fast-changing conditions; and

3: **Prioritized/dedicated, secure and reliable communications** to ensure crucial and timely information flow

Never is this type of safe, real-time information management more crucial than in the case of emergency response to disasters and crisis situations.

The Situation

A tanker truck accident in a subterranean tunnel causes a massive chemical fire engulfing dozens of vehicles and threatening the integrity of the entire tunnel system.

Immediate Information Needs:
- Locale mapping/physical plans including water/sewage, other infrastructure
- Location of gas lines and other potential greater risks
- Type, location and quantity of hazardous materials present and HazMat and other response organizations' availability and location
- Visual images/video of incident and real-time operating picture
- Location/status of victims
- Air quality/contaminant concentration at the scene (oxygen, carbon monoxide, carbon dioxide, other toxic or volatile gases)
- Direction/speed of plume movement
- Air pressure/temperature
- Command and Control Situational Awareness and distributed visualization to field response.

The Response

First responders are enabled with new technologies that will give them a full, common operating picture of the situation.
The technologies must be able to securely manage the real-time communications needs of all teams involved in the operation.

Communications Needs:
- Location data of all emergency personnel
- Real-time audio/visual communication and alerts among responders and with ops command
- Visualization of data points coming from disparate sources and locations
- Real-time inventory of resources on the scene, new inventory requests
- Security of all comms (Software Defined Perimeter, encryption of data)
- Fast/prioritized transmission of data and communications (dedicated public safety channels, 5G)

NexVu™
IoT Solution

aegex10™
Intrinsically Safe Tablets

VCore fourDscape
situational awareness software

Verizon Responder
Private Core, SDP, 5G

NexVu IoT Solution by Aegex

The first step in emergency response is to get a clear, thorough assessment of the situation by collecting as much data as possible. With better data, first responders can be better prepared and react appropriately.

With the NexVu IoT Solution from Aegex Technologies, first responders can rapidly customize intrinsically safe (non-combustible) IoT sensors and place them within minutes in and around the disaster zone to collect a myriad of actionable data points about the situation. The NexVu sensors are customizable for thousands of configurations and a variety of data analytics and require only a few battery-powered and LTE-enabled components.

So, in the case of the tunnel explosion, first responders can attach to the NexVu endpoint nodes of up to 40+ different sensors including methane, CO, CO2, O2, H2S, chlorine, temperature, pressure, vibration, and others to ensure a live conditional assessment. The "smart" sensors do not need prior programming – they are automatically recognized in the Cloud with pre-established hazard thresholds, so field personnel need only to focus on the crisis at hand

· Customizable combinations of 40+ different sensors
· Up to 32 simultaneous sensor nodes per endpoint yielding more than 60,000 possible configurations
· Simple plug-and-play design

aegex10™ Intrinsically Safe Tablet

The next step in emergency response is having a suitable device for receiving and disseminating data and conducting communications. The aegex10 Intrinsically Safe Tablet is purpose-built to perform these functions in hazardous environments.

Data from NexVu IoT Sensors, for example, can be utilized by any device with secure access, but it can be safely viewed in potentially combustible environments on aegex10 Intrinsically Safe Tablets. These tablets are certified for the most explosive of environments - Class I, II, III Division 1 or ATEX/IECEx Zone 1 hazardous areas - so they will not cause an explosion in volatile situations where gases, dusts or other combustible materials are present. The tablets are also ruggedized to IP65 standards to withstand extreme temperatures, drops/impacts and water or particle ingress. Their Windows 10 OS allows for user-friendly operation and immediate, secure synchronization with most IT systems for easy data management. The tablets connect to the Cloud via LTE or WiFi or can be interact offline via Bluetooth and NFC communications.

In the tunnel disaster, first responders and their command units can carry the lightweight aegex10 tablets by hand or in hands-free carrying cases directly into the disaster zone without fear of igniting the volatile atmosphere. The tablets enable teams to communicate in real time for up to 12 hours on a single charge, and they can be operated with or without a stylus and/or gloves in the extreme environment, where high temperatures, water, airborne particulates and other hazards are present. The Aegex tablets ensure all personnel are connected and able to securely communicate during the entire mission.

- **Intrinsically Safe C1D1, ATEX/IECEx Zone 1**
- **4G LTE, WiFi, Bluetooth, GPS**
- **IP65, -10°C to +50°C operating temperature**
- **12-hour battery, 2.6 lbs**

aegex TECHNOLOGIES™

fourDscape® Software Platform

VCORE's fourDscape software is an interactive, augmented virtual representation of the real world that integrates digital information from existing data sources and shares that information with those who need it, where they need it, when they need it and how they need it. The flexible 3D visualization software platform integrates connected devices, bringing video, audio, sensors, devices, analytics and other intelligence into a Common Operating Environment (COE) that enables command staff and field operators to manage and protect critical assets.

Equipped with Machine-to-Machine (M2M) communication and Software Defined Perimeter (SDP) secure network technology, fourDscape enables:

- 3D visualization of IoT sensors and sensor data (from NexVu IoT Sensors, Fire/HazMat sensors, etc.)
- Notifications from news/Police/EMS
- Power outage information
- Camera footage from traffic/mobile cameras
- Feed from autonomous drones
- 3D visualization of geo-referenced first responders/field operators, equipment and drones
- 2-way mobile audio/HD live streaming and video playback of field events

vcore
SOLUTIONS

Verizon Responder Private Core, Software Defined Perimeter, 5G

In the event of an emergency, all communications and data transfer must be secure and given priority access to make sure it gets through to the people who need it in real time. Verizon's Responder Private Core, a dedicated network for public safety and first responders, enables secure collaboration among emergency management and response teams by prioritizing their communications over all other transmissions.

Verizon's Software Defined Perimeter (SDP) helps to secure vital assets and data from vulnerabilities with multiple security layers that restrict system and sensor access to only verified users and validated devices.

Coming soon, Verizon's 5G network will allow even faster data and communications - eventually 10 gigabits per second - to ensure that emergency response operations are carried out as quickly and efficiently as possible. The 5G Ultra Wideband for IoT will significantly enhance the ability to provide Ultra Reliable, Low Latency (URLL) mission-critical services. 5G could also support more real-time video, as well as edge computing, to make sure only the most important information gets transmitted immediately.

verizon✓

The Results

In the tunnel emergency, Aegex intrinsically safe tablets and IoT sensors were the safest choices for responder teams facing potentially deadly, explosive conditions. They were able to capture the data they needed with NexVu IoT Sensors and display it on aegex10 tablets in the hands of all first responders and command units so they could be better prepared and connected when entering the hazardous conditions. With VCore's fourDscape, all involved could see the location of teammates and other assets, receive alerts and other situational information, communicate with real-time communications apps, and better coordinate their efforts for timely and effective response. Verizon's dedicated network solutions ensured that all communications among and within responder teams were secure and timely.

The Converged Solution: Safe Situational Awareness

| NexVu IoT Sensors | Cloud, via Verizon (5G + a SDP) | fourDscape app | aegex10™ IS Tablet |

With NexVu IoT Sensors collecting data, sending it to the Cloud and distributing it over the Verizon network on Aegex Intrinsically Safe Tablets, critical information can be quickly and easily shared and understood by all necessary parties. Integrating safe devices with smart applications and secure transmission enables first responders – or any mission-critical teams – to collaborate safely, securely and efficiently for improved performance and outcomes.

The Safe Situational Awareness Solution will be demonstrated at Operation Convergent Response (#OCR2019), November 19-21, at the Guardian Centers in Perry, GA, USA

Contact Aegex or VCORE Solutions to learn more.

Aegex delivers innovative solutions that drive improved performance for industries with hazardous environments. Our globally certified intrinsically safe tablet provides cloud connectivity to personnel working in some of the world's most volatile environments in public safety, oil and gas, chemical, pharmaceutical and other industries with potentially explosive atmospheres. The tablet can work in conjunction with our NexVu IoT Solution of sensor modules and cloud services to form an Industrial Internet of Things (IIoT) that improves safety, efficiency and productivity in hazardous operations.

www.aegex.com

VCORE Solutions is an Internet of Things (IoT) and surveillance technology company offering advanced software and cloud-based applications to help organizations manage and protect critical assets in a hyper-connected world. VCORE brings decades of experience and expertise in surveillance and response technologies, visualization and simulation, and systems implementation to serve a diverse set of private and public sector customers.

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