Simularity AI Software Offers Market Ready Solution
For Real Time Anomaly Detection in Hazardous Areas

> *"The ability to view all areas of a hazardous location operation in real time with intrinsically safe sensors, combined with the means to instruct personnel to address any problems on the spot via a safe mobile device, makes troubleshooting and issue resolution much simpler and quicker. Aegex solutions are a great complement to Simularity's AI, and together, they can truly help prevent catastrophes."* – – **Thomas P. Ventulett, CEO Aegex Technologies**

Simularity's predictive anomaly detection gives early warning of impending disasters

Operation Convergent Response

Simularity made a successful demonstration in deploying its AI software for anomaly detection during "Operation Convergent Response" (OCR). This interactive event showcased the single-largest, real-world IoT test environment. Hosted at the Guardian Centers' 800-acre facility in Perry, GA, Operation Convergent Response was as close as you can get to real-life hazardous locations and real disaster scenes without being in an actual oil refinery, chemical plant, or disaster area. In fact, Simularity's market ready solution for disaster management could be offered using sensors and gateways powered by Intel.

OCR was an opportunity to witness firsthand the power of emerging IoT technologies, including IoT sensors, advanced communications, robotics, artificial intelligence and more, and to discover how technology and innovation investments can bring big data to life while offering value for daily operations, as well as in extreme situations.
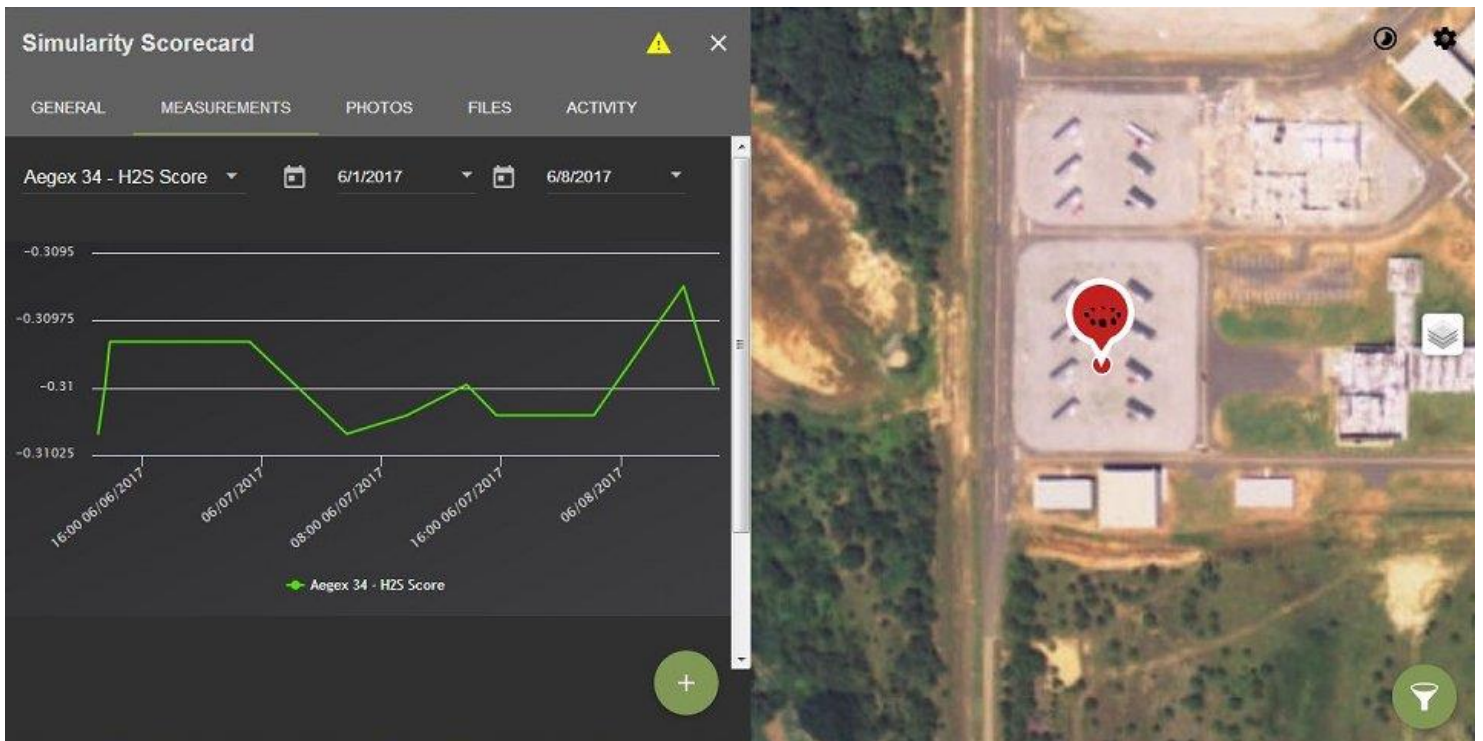
The Scenario: Chemical Plant Leak and Collapse

In one of the scenarios at OCR, a "chemical plant" was outfitted by SensorInsight with a variety of intrinsically safe air quality sensors from Aegex supported by Intel.

Data from these sensors was collected by SensorInsight's Integrate, their middleware platform. The data was fed to Simularity's AI for anomaly detection. The sensor readings and anomaly scores were displayed on SensorInsight's Foundation dashboard and viewed by first responders on Aegex's intrinsically safe tablets.

When the "chemical leak" that preceded the collapse of the building happened, Simularity's AI detected the anomalous readings and, based on those, SensorInsight's application issued an alert.

This complete end-to-end solution enables building owners to spot and deal with small leaks before they become big problems, avoiding costly and dangerous situations.

SensorInsight's dashboard shows the anomalous readings for hydrogen sulfide and displays the sensor location.

For this scenario, real-time anomaly alerts about the leak could have been noticed by building management when it first happened, before deadly amounts of the chemicals built up and led to the collapse of the building. However, in this exercise, we also demonstrated the use of this complete end-to-end solution for hazardous areas as part of managing disasters that were not prevented.

In this case, a hydrogen sulfide leak was detected. When this happens, the space should be ventilated. If the gas cannot be removed, first responders need to use appropriate respiratory protection and any other necessary personal protective equipment (PPE), rescue and communication equipment. Atmospheres containing high concentrations (greater than 100 ppm) are considered immediately dangerous to life and health (IDLH), and a self-contained breathing apparatus (SCBA) is required. In such a case, with dangerous flammable gases, only intrinsically safe electronics should be used.

As the disaster unfolded, first responders were able to monitor the levels of chemical hazard on the Aegex tablets on site. This helped them properly prepare for and locate the source of the toxic leak.

Deployment in Days

The nature of this demonstration meant that end-to-end deployment needed to be completed within a few days. Several days before OCR started, the SensorInsight team installed a variety of Aegex sensors in the "chemical factory". The streaming data was integrated with Simularity's SAM (Smart Asset Monitor), and the SAM built anomaly models for all sensors based on a day's worth of data. The anomaly models were deployed and integrated with SensorInsight's Foundation dashboard in less than 24 hours. When OCR started, the entire monitoring system, complete with a handful of predictive anomaly detectors, was live and ready to go.

Solution

Simularity's Smart Asset Monitoring (SAM)
Simularity has developed innovative software that can analyze large volumes of time-series data in real time at the edges of the network. By capturing real-time data from multiple sources, the artificial intelligence software can 'learn' what's normal and predict incidents **before they happen. Simularity's solution is powered by Intel through sensors and gateway used for this solution. See Solution Architecture below.**

Aegex Intrinsically Safe Sensors
Specially designed hazardous area sensors by Aegex Technologies provided data that detected the leak. Aegex sensors are certified intrinsically safe, meaning they will not cause a spark that could ignite combustible atmospheres.

Aegex Intrinsically Safe Tablets
Aegex10 Intrinsically Safe Tablets were used by personnel onsite near the hazardous area to provide the ability to receive and view predictive user notifications. The Aegex10 was used to

- Record video of the scenario
- Use Exchange/Outlook to email photos
- Upload information to SensorInsight Foundation
- Check maintenance records

Bringing people with decision-making and problem-solving skills into hazardous areas remotely or on-site with the Aegex tablet can speed up time to resolution and ensure proper functionality.

SensorInsight Integrate is a big data collection engine designed from the ground up to connect, monitor, and transform if necessary to ensure you see your whole environment. Real-time data on each of your assets or external systems can be pumped into the platform allowing you to gather large volumes of cross-domain data in a scalable and secure manner.
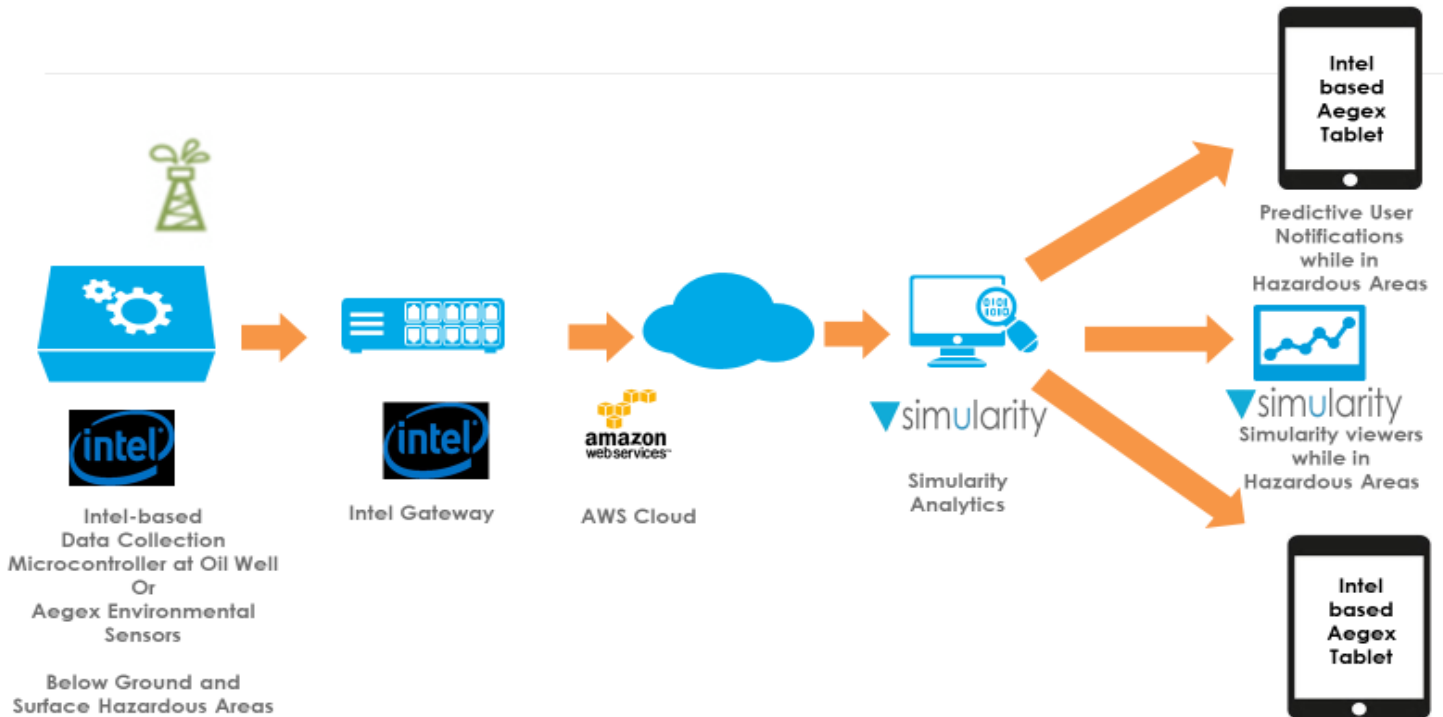
Conclusion

By using a combination of Simularity, SensorInsight, and Aegex products, this team was able to demonstrate an end-to-end solution for hazardous area monitoring and disaster response. Deployment was completed in less than one week.

With predictive analytics and AI that is accessible anywhere in a hazardous location via intrinsically safe sensors and mobile devices, decisions can be made in real time to resolve impending problems and ensure the safety and operational efficiency of the organization.

Installing a system to radically increase safety in hazardous areas doesn't have to be complicated. This end-to-end solution, with intuitive user interfaces, is available as a complete package, with installation, service, training, and support included. Contact us to find out more.

Solution Architecture

About Simularity:

Simularity helps customers eliminate unplanned downtime and improve operational efficiency with Artificial Intelligence driven analytics for connected assets. With cooperative distributed machine learning on large amounts of time series data, Simularity is among the very few companies in the world doing adaptive machine intelligence on small edge devices as well as cloud-based installations. Based in Point Richmond, near the Silicon Valley area of California, Simularity is engaged with global customers and partners focusing on Smart Asset Monitoring and Image Analytics using disparate sources of data ranging from sensors to satellites. http://www.simularity.com.

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Partner Acknowledgement

Aegex is a technology engineering and design company that provides intrinsically safe Industrial Internet of Things (IIoT) and mobile solutions for hazardous industries. It has globally certified intrinsically safe Windows 10 tablet, sensors and partner monitoring systems, form an IoT platform that manages big data to improve efficiency, safety and productivity in hazardous industrial environments in oil & gas, chemical, pharmaceutical, utilities, public safety, defense and other industries with potentially explosive atmospheres. http://www.aegex.com

SensorInsight, headquartered in Houston, Texas, creates and markets an Industrial Internet of Things (IIoT) platform designed to provide insight across specific domains, including energy and utilities, transportation, manufacturing, healthcare, and smarter cities. http://sensorinsight.io/