# Industry 4.0: Augmented Reality Maintenance Planning

## Aegex10 IS Tablets + Virtualware Solutions

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# Augmented Reality Maintenance Planning

Industry 4.0, or the digital transformation of industries, represents the “fourth industrial revolution” in the development of an Internet of Things, Data and Services. It connects embedded system production technologies and smart production processes to pave the way to a new technological age that will radically transform industry, production value chains and business models. Aegex and Virtualware present a use case scenario in which augmented reality and Industry 4.0 are tightly connected.

# The Situation:

A European utilities company wants to improve the efficiency of its maintenance operations for an urban subterranean electrical grid. The network is dispersed over a large geographic area and encompasses many component parts, each of which need routine inspection to ensure they are functioning properly. Any malfunction in one part of the network could cause a shutdown of the entire grid, so proper upkeep is essential.

# The Challenge:

Most parts of the underground electrical system are classified as hazardous locations where highly combustible materials are present. Maintenance operators and inspectors cannot use electronic equipment that is not certified for ATEX/IECEx Zone 1 hazardous areas because non-certified equipment could cause a spark that could potentially ignite an explosion. Maintenance crew have been using pen and paper to document conditions in the field sites and then entering data into digital systems when they return to their laptop or desktop.

# Requirements:

The company is seeking a mobile, cloud-based solution that will improve the efficiency of maintenance inspections, reports, inventory and repair. Inspectors would like to be able to:

- **Identify** the location of various components of the electrical grid
- **Inspect** the components' functionality
- **Document** components' status
- **Report** resulting data onsite
- **Communicate** with teammates during inspections
- **Visually share** and discuss any questionable components

To perform these functions, maintenance crew need a mobile device that is specially certified for these dangerous Zone 1 areas, plus appropriate software applications that allow them to complete these tasks in real time.

# The Proposed Solution:

The proposed technology solution for this utility is the Aegex10 Intrinsically Safe Tablet in conjunction with an augmented reality technology app for Maintenance Planning.

**1: Hardware - Aegex10 Intrinsically Safe Tablet**

**2 : Maintenance App - Virtualware Maintenance Planning**

# 1. Hardware – aegex10™ Intrinsically Safe Tablet

Using the Windows-based Aegex10 IS Tablet, operators can access Windows 10 apps, cloud services and third party apps, even in the most volatile hazardous areas (UL Class I,II,III Div 1; ATEX/IECEx Zone 1). Certified for UL Class I, II, III Division 1 hazardous locations in North America, as well as equivalent areas in Europe (ATEX Zone 1) and internationally (IECEx Zone 1), the Aegex10 operates on Wi-Fi or 4G LTE from any hazardous location around the globe on a unified platform.

The 10.1-inch Aegex tablet is rated IP65 rugged for industrial use, yet is lightweight and priced as low as non-certified devices. Its Windows 10 operating system gives users uniform access to the Microsoft cloud, plus apps and services, including software like that of OSIsoft.

Oil & Gas | Chemical | Public Safety | Mining | Utilities | Pharmaceutical

## Purpose Built

- **Rugged IP 65**
- **UL913 5th edition:** C I, II, III Div 1 Gr A-G T4, Tamb= -10° C...+50° C; Cl Zo Gr IIC T4 IP65, Tamb= -10° C...+50° C
- **CSA 22.2 part 157 IECEx 60079:** Ex ib IIC T6 Gb, Ex ib IIIC T85° C Db IP6X, Tamb= -10° C...+50° C
- **ATEX:** II 2G Ex ib IIC T6 Gb, II 2D Ex ib IIIC T85° C Db IP6X, Tamb= -10° C...+50° C

**ATEX Zone 1**

**IECEx Zone 1**

**UL Class I, II, III Division 1**

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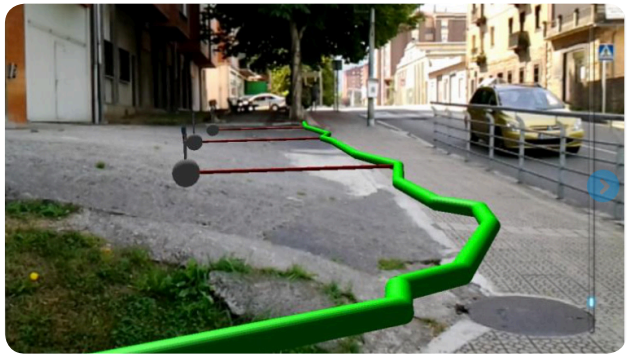
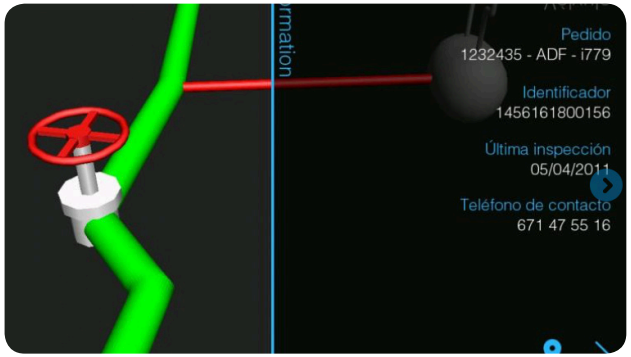
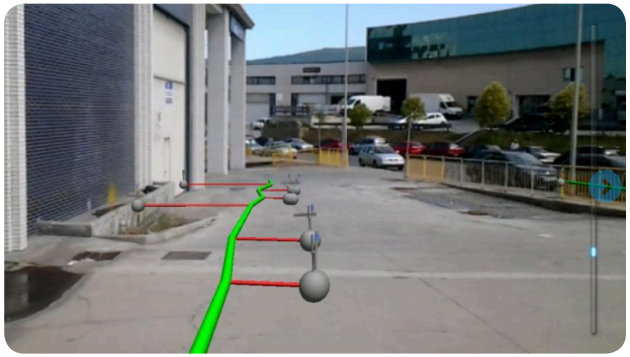
# 2. Software – Virtualware Maintenance Planning





The Virtualware Maintenance Planning app is a mobile augmented reality application that shows the geolocation of field assets and permits operators to plan maintenance inspections, review all assets, consult technical data, report findings and schedule repairs in real time. All the information is stored in Microsoft Azure cloud-based platform using the tablet's 4G LTE or Wi-Fi connection.

The app allows users to identify the location of underground and security assets (cables, wires, transformers, security cameras, etc.) using Augmented Reality and geolocation through the GPS function of the mobile device. The application overlays the security and underground electrical infrastructure over the real-world view using the tablet's camera to identify components' locations and aid in maintenance procedures.

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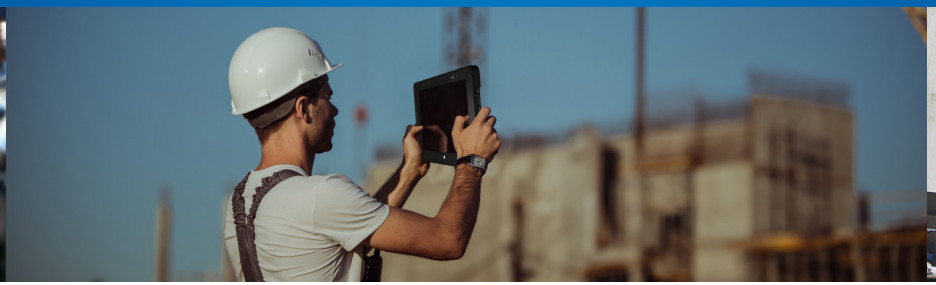


# The Results:

Using the Aegex10 IS Tablet, maintenance crew can enter the most volatile hazardous areas (ATEX/IECEx Zone 1; UL Class I , I I , III Div 1) and assess the maintenance situation without fear of causing an explosion.

With the Aegex10 IS Tablet running the Virtualware Maintenance Planning solution, operators can

- **Easily obtain information** about an existing installation's status and maintenance updates
- **Identify the exact location** of the problem without risking damaging other parts of the system
- **Pinpoint the specific assets** in question within complex underground systems
- **Perform a virtual classification** of all elements of an installation
- **Upload information** to a Microsoft Azure cloud-based platform

Operators can also use a number of Windows 10 applications to communicate information to teammates, such as:

- **Opening a Skype for Business** line to speak directly and show visually the item in question
- **Using Exchange/Outlook** to email photos or other data

The Virtualware apps sync easily w ith companies' existing I T systems, and can be used anywhere in hazardous locations via the Aegex10 IS Tablet. They are also viewable offline when wireless networks are not available. The solution is transferrable across different geographies since the Aegex10 IS Tablet is certified worldwide.

The Virtualware + Aegex10 IS Tablet solution makes maintenance inspections and repair planning simpler and quicker, even in hazardous areas.

# **Contact Aegex** or **Virtualware** to **learn more.**

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**About Virtualware**

Virtualware is an innovative and technological company that specialize in the development of Hardware and Software solutions based on Immersive and Interactive technologies. We offer high-tech value-added solutions, products and services through our offices in the United Kingdom, Spain and Latin America as well as through our partners around the world. Virtualware is made up of a multidisciplinary team of highly qualified professionals working together to create truly interactive experiences.

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**About Aegex:** A technology engineering and design company that provides intrinsically safe Industrial Internet of Things (IIoT) and mobile solutions for hazardous industries. Our 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.

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