



The Hyundai MOBIS Alabama-Georgia Plant uses a JMA optical DAS network during daily operations.

SOLUTION BRIEF: MANUFACTURING

Wireless networks enable workflows, and assure control, mobile access and security

OVERVIEW

The Move to an Untethered Industrial Environment

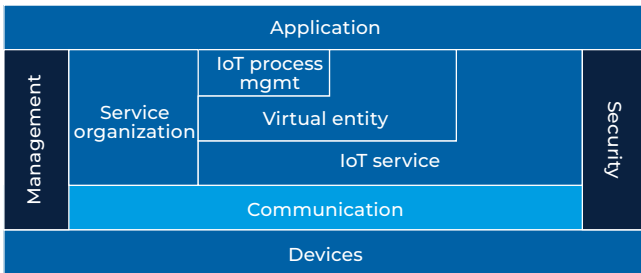
With today's global economy the industrial sector is becoming more competitive. It is ushering in new technologies and processes to ensure factories become more agile, productive, efficient and profitable.

The Industrial Internet of Things (IIOT) revolution is fundamentally changing how factories operate. IIOT is still in the nascent stages of adoption and considered the new frontier in manufacturing, but it could amount to a \$2 trillion opportunity by 2020.¹ Potentially the IIOT will impact everything from new product opportunities, to factory optimization and worker efficiency gains, resulting in top and bottom line increases. Consistent and reliable wireless communications is critical for factories in general, and now more than ever with IIoT-based smart manufacturing environments.

SITUATION

The many industrial market challenges

Whether enabling wireless communications in a standalone factory or across an expansive manufacturing campus there are many challenges to overcome. Factories oftentimes are constructed of concrete and steel, materials that impede wireless signals. Additionally, many companies such as General Motors, Volkswagen and Nike are constructing facilities that are LEED (Leadership and Energy in Environmental Design) certified. To work within the LEED framework companies are installing "low-E" (low emissive) glass. It reduces operating cost and increases employee comfort by transmitting visible light while controlling the amount of solar heat that enters. However, low-E glass is another barrier to wireless communications.



Furthermore, a wireless network must be robust enough to support the different situations encountered on a manufacturing campus. There are expansive outdoor areas where employees need seamless wireless communications while walking between buildings. This same outdoor network also is used to track assets on moving trucks as they enter and leave the loading docks.

The huge factory floor presents other connectivity issues. Inside a manufacturing facility there are many moving parts, competing technologies, massive machines, hundreds of workers and possibly corrosive chemicals, which present further challenges to mobile communications. However, **cellular connectivity is critical for machine-to-machine communications**, keeping supervisors informed and workers safe.

Wireless connectivity is also critical in the office of an industrial campus. Mobile communication is necessary to stay connected to the factory for remote monitoring and troubleshooting of equipment, and for gathering advanced analytics and multiple data points in real-time.

The connected factory



- Large areas to cover
- High variance in signal interference
- Indoor and outdoor network usage
- Human and machine communications
- Varying environmental conditions
- Poor signal penetration from surrounding cellular

SOLUTION

The Teko DAS – a resilient offering for the connected industrial campus

Even though manufacturing environments present many obstacles to cellular connectivity, the Teko DAS from JMA Wireless supports multiple operators and bands, as well as a full range of mobile technologies including LTE. Since the solution is cellular based and licensed it offers more control than other wireless technologies.

Solution brief: Manufacturing

¹ "IoT Primer - The Internet of Things: Making Sense of the Next Megatrend", September 3, 2014, Goldman Sachs
² "Planning for the Industrial Internet of Things", ARC Advisory Group

Its rack mounted master unit drives the high power and low power RUs (remote units) deployed throughout the facility to ensure overall cellular communications. The Master Unit driving the RUs is done by way of an integrated platform and common optical transceivers, sub-racks, power supply and supervision modules. It supports the different units automatically and brings the proper level to the BTS (base transceiver station).

Using 50% to 75% less fiber than competitive solutions, the Teko DAS is very cost efficient.

This advantage uses three different technologies: 1) WDM (Wavelength Division Multiplexing) filters are integrated in the optical modules, enabling a single fiber per RU to support the wavelengths for uplink and downlink transmissions. 2) The point-to-point link uses a single fiber to connect up to 16 RUs in a sector and one MIMO (multiple input multiple output) path. Once a remote area is reached, a star topology is implemented to connect all of the remote units in it. 3) DWDM (Dense Wavelength Division Multiplexing) is integrated in the head-end at the BTS and in the remote location to further minimize the number of fibers. DWDM filters enable one fiber to support up to four sectors or 64 total RUs.

In addition, the Teko DAS includes a supervisory module, which provides remote management for factory supervisors. When increased coverage and capacity is needed the antennas can be redirected remotely.

These unique elements of the Teko design allow for a Centralized DAS (C-DAS) deployment topology, enabling critical mobile processing equipment to be off-premise while robust antenna and amplifier technologies are carefully placed throughout the facility. This approach simplifies delivery, preserves facility real estate, and allows businesses to achieve greater economies of scale.

The Teko DAS platform is built with the future in mind. **There is no need to "rip and replace"** every time a new technology is launched into the marketplace. With its transparently adaptable modulation, new technologies can be introduced without more hardware or configuration changes. Existing fiber and the software configurable DAS tray can be used for newer technologies. The adaptable BTS interface options enable reuse of existing sub-rack designs. Its modular sub-rack is designed to easily support new sectors and services introduced into a system.

RESULT

Providing unprecedented support

Whether building a new facility or expanding an existing manufacturing campus, JMA is there to ensure robust cellular coverage and capacity. With its end-to-end solution there is no need to deal with multiple vendors, but with only one true partner – JMA Wireless.



About JMA Wireless

JMA Wireless is the leading global innovator in mobile wireless connectivity solutions that ensure infrastructure reliability, streamline service operations, and maximize wireless performance. Employing powerful, patented innovations their solutions portfolio is proven to lower the cost of operations while ensuring lifetime quality levels in equipment and unrivaled performance for coverage and high-speed mobile data.

JMA Wireless solutions cover macro infrastructure, outdoor and indoor distributed antenna systems and small cell solutions. JMA Wireless corporate headquarters are located in Liverpool, NY, with manufacturing, R&D, and sales operations in over 20 locations worldwide.

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