



HOW TO SELECT MOBILE PCs IN AN EXPANDING SUPPLY CHAIN TECHNOLOGY CLIMATE

By Advantech®

The Technical Landscape in the Plant is changing

In recent technology trends, manufacturing and supply chain are forecast to become more interoperable as they become complex. A recent example is the developments in blockchain as an enabler to quickly trace product origination. Recent industry news stories cover Walmart®'s blockchain requirements to its vendors to provide traceability of food products to their source in an effort to provide customers with safe, quality foods. But Advantech takes the position that the tide was coming anyway: The benefits of blockchain and AIDC (Automatic Identification and Data Capture) technology are parallel to the gains recently made possible by the Internet of Things (IoT) in the manufacturing industry, where the ability to stream real-time industrial control data to Big Data analytics applications in the cloud brings new traceability possibilities, new business intelligence, and new ways to be competitive.

Such is it with logistics and materials handling. With increased mandates for intelligent systems in logistics applications, including traceability,

palletizing/product setup and ERP interface, ideally this shift includes the use of mobile device applications for the workforce, enabling them to automatically identify items and synch wirelessly with backend systems. Consider the technology leaps in the consecutive process steps after the receiving dock to the manufacturing plant floor: Instead of being tethered at a workstations, more manufacturers are renovating the inefficient legacy plant floor workflows based on scanners attached to workstations and panels. Plant floor operators can monitor automation systems with freedom to access critical HMI and production information wherever they are. Workers can obtain and display a visual representation of performance and production data, and add to it in real-time.

All of this can be made possible by first addressing some hardware technology obstacles. Not only is there an ERP renovation task required, but also the proper integration of mobile tablets and handhelds to fit the workplace in order to work reliably and always stay connected.

New Requirements for Mobile and Handheld PCs on the Floor

In manufacturing, there was a time when BYOD (bring your own device) was the by-word for mobile device integration into the automation control practice. This resulted in some good application developer involvement and fast mobile adoption. While outside the plant, this created a developer trend for products offering good mobile control and access to production data over cellular and WiFi. But inside the harsh environment a plant or supply chain hub, employees are becoming less likely to subject their personal hardware to the unpredictability of the workday.

Companies also soon learned that commercial grade tablets such as iPads, while inexpensive to replace, became limiting in their lack of flexible customization options. (Plus, once a worker or the environment ruins a commercial grade tablet 2 times, the ROI is shot when compared to that of a MIL-SPEC rated industrial grade tablet that will keep on performing.) Once a new requirement to upgrade to a barcode scanner or RFID is undertaken, the reliability and input limitations of consumer off-the-shelf peripherals can deter an innovative I/O integration. And instead of iOS, the playing field is now more open for mobile application developers with rugged tablet PCs being offered in Android, Windows 10 or a Linux variety - now preferred choices for developers in mobile industrial applications in the past 10 years.

For many users, the most liberating improvement in the recent adoption of mobile control in supply chain is the wireless connectivity options. With consideration to wireless communication from the facility floor, rugged tablet PCs designed for supply chain applications are now offering the redundancy of Wi-Fi with GSM cellular within the walls of the plant or warehouse. This ensures real-time, high performance connectivity needed for graphics-intensive or low-latency application requirements of today's production data flows. Often the facility's hunger

for high bandwidth requires the option for 4G LTE to meet the data dependability need, and many industrial grade tablet vendors are jumping to supply this need.

There are also ways to optimize the Wi-Fi antenna for usage inside the plant, evidenced by this [video](#), to ensure uninterrupted coverage, no matter where you are in the facility.

Plant Floor Examples

A typical manufacturing location can average 1,600 bar-code scans a day. Whether it be RFID, barcode, or other input format, there are many new facets of the plant floor landscape that require a data scan.

AIDC

More of a process rather than a technology, Automatic Identification and Data Capture (AIDC) is the functionality of a recognition system to be able to both automatically identify objects and encode meaningful data about them for the computer or data record without user involvement. More innovative approaches to AIDC hold that a handheld PC's role is not to simply acquire single-unit data through a scan, but to associate that unit within a larger goods tracking framework and transmit it, usually to the management layer in the cloud. Soon the supply chain practice will rely on AIDC as a means for identifying and tracking items, inventory, tools, assets, and even people, extending to WMS (Warehouse Management Systems), carrier fleets and materials handling.

All AIDC technologies require some form of



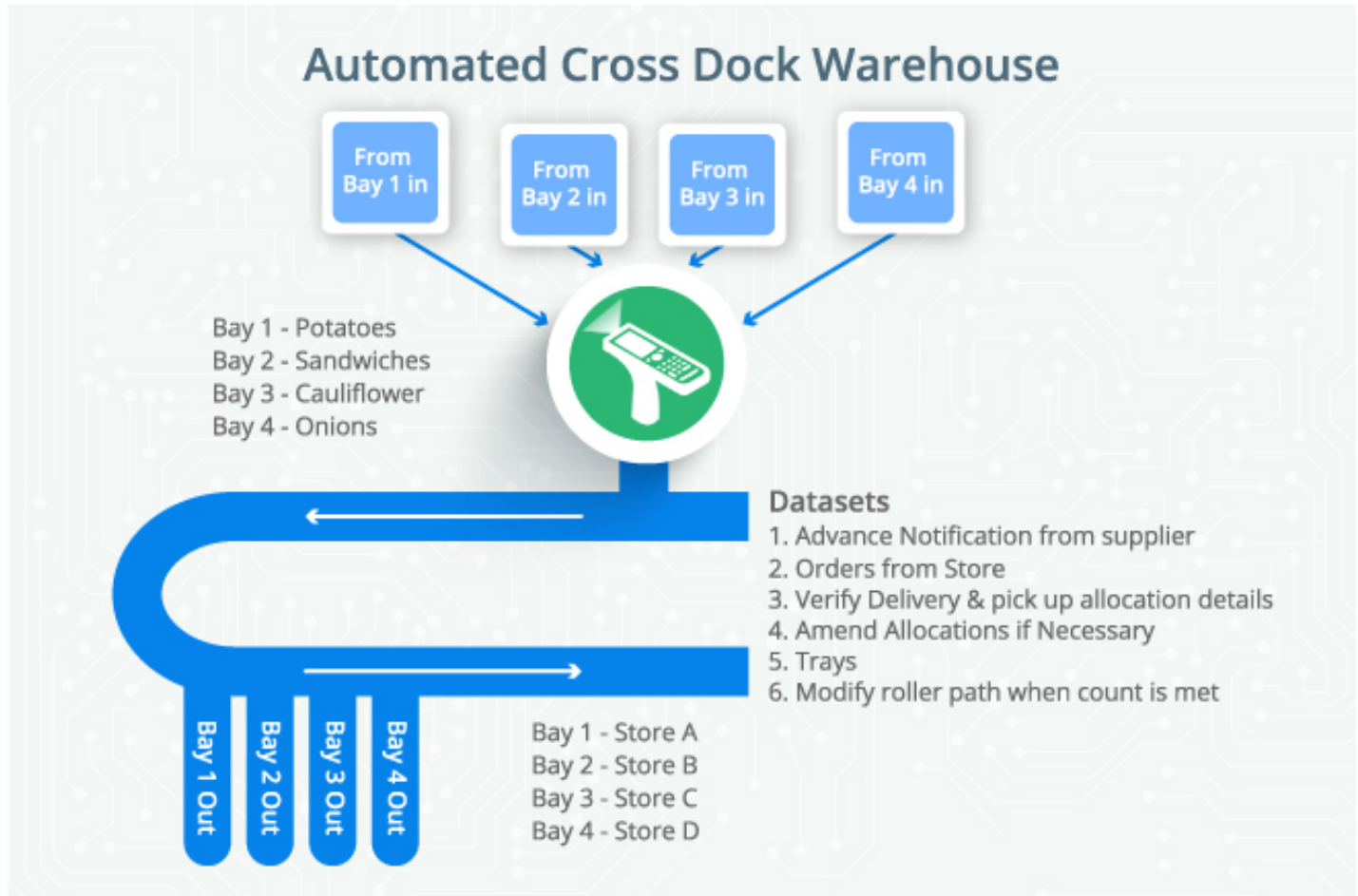


Diagram 1: Cross Dock Warehouse relies on AIDC to correlate asset-related information and swiftly route it.

reader and writer, and some form of interpretation. All stages of the supply chain AIDC process require IT systems to both provide them with data and to accept the received data and process it. Diagram 1 shows an example of a cross dock warehouse routing in a logistics hub, and how AIDC can scan the data and process it to route to the correct bay while following disparate asset routing rules.

Continuous-Flow Manufacturing

AIDC can play a huge role in Continuous-Flow manufacturing. The Continuous-Flow Manufacturing process requires delivery of replenishment parts to the production line process just ahead of assembly. When a replenishment part arrives at the assembly station, the bar code on the item is scanned. Once that item has been used on the assembly line, the ERP software sends a request

to the supplier for another. Good training, and a reliable communication platform is essential for a dependable continuous-flow process to obtain the end-to-end supply chain visibility essential for just-in-time (JIT) replenishment.

Take for example an individual worker's process in automobile manufacturing. Parts are coming in by the minute to add to an assembly line workflow with individual unit granularity. What was previously a time-wasting check of incoming parts through a PC terminal is reduced to a handheld scan via barcode or RFID tags before integrating into assembly.

Since this is the realm of real-time inventory, the smooth flow of accurate data between the manufacturer and its suppliers is mandatory, as missed counts can result in higher expenses or production line downtime.

Basic Hardware Requirements

Today's dynamic factory and materials handling workers need to be untethered. Due to its wireless and mobile nature, the benefits of a reliable hand held computer versus a scanner-workstation can be measured in velocity and inventory turns. This is why the industry sees expected growth trends for mobile PCs in materials handling and manufacturing through 2020. The important task for manufacturers will be the selection of reliable handheld PC platforms to communicate seamlessly with the backend, collect data accurately and have enough performance to offer intelligence for future technology updates.

5" Industrial-Grade Handheld PC for Next Generation AIDC

The Advantech [PWS-472](#) is powered with an ARM® Cortex™-A53 quad-core processor that supports Android 5.1. Available optionally as a pistol grip body RFID handheld, it can withstand rough handling in industrial environments. The PWS-472 features a wide operating temperature range (-20 ~ 60 °C), IP65 rating for resistance to water and dust ingress, and up to 4-foot drop tolerance. For the task of AIDC, there will need to be enough onboard compute performance to allow scanned data to be recognized, categorized and transmitted within three seconds. The PWS-472 is equipped to deliver and even outpace that performance need.

- ARM® Cortex™-A53, quad-core, 1.3 GHz processor with Android 5.1
- 5" HD (1280 x 720) capacitive multi-touch screen
- Options include: 1D/2D barcode scanner (C10, C12 & C13), UHF RFID (C30), & IR Thermometer (C40)
- Lightweight design (295g)
- IP65 rated for protection from water and dust
- Wide operating temperature range (-20~60°C)
- Wi-Fi, Bluetooth, GPS, BeiDou, and 4G LTE communication capabilities
- 13-megapixel auto-focus camera, and NFC reader



PWS-472

for data collection.

In addition, the PWS-472-C40 version comes with an embedded TMR (thermal meter reader). Fit for cold chain applications, this handheld can obtain temperature readings of goods with an aim and a press from a yard away with the infrared (IR) laser alignment on the target. Mobile workers can scan barcodes, take pictures & and get temperature readings from one unit.



The PWS-472 can obtain temperature readings of goods using an easy aim and shoot method. Also, mobile workers can scan barcodes, take pictures or get temperature readings from the same unit.

10.1" Rugged Tablet PC for Factory and Materials Handling

With Corning® Gorilla® Glass 3 and multi-touch PCAP control, the Advantech [AIM-68](#) brings a commercial tablet-like ease of use to couple with rugged, MIL-spec tablet design in a factory handheld PC. It is ideal for scanning via the modular barcode or UHF RFID reader options, as a mobile production data connection point for shipping and parts data, or as a hand-held HMI on the factory floor.

- Intel® Atom™ x7-Z8750 quad-core processor with support for Windows 10 IoT and Android 6.0
- 10" WUXGA IPS full HD LCD display with scratch-resistant Corning® Gorilla® Glass 3 and multi-touch



AIM-68

PCAP control (optional 800-nit brightness for viewability in sunlight)

- Built-in Wi-Fi, Bluetooth, NFC, GPS, and 3G/4G LTE communication technologies
- IP65 rating for protection from dust and water ingress
- Hot-swappable battery that supports 5 ~ 6 hours operation
- Optional extension modules and accessories, including a desk docking station, VESA mount dock, in-vehicle docking station, 1D/2D barcode scanner, UHF RFID reader, RJ45+COM module.

Conclusion

Reports of US retail logistics metrics continually reveal billions of dollars in combined excess inventory held to buffer against poor On-Time In-Full (OTIF) performance yearly. Supply chains will need to shore-up shortfalls in IT and access to real-time data in order to meet the tide of business moving at an Amazon-inspired speed. On the hardware side, the selection of proper future-proof handheld platforms for efficient AIDC will call for:

- A. Rugged, high-performance mobile PC designs
- B. Android and Windows 10 OS support for more open application development
- C. High-bandwidth and redundant wireless connectivity options
- D. The ability to acquire data from multi-format inputs (barcode scanner, RFID, NFC, etc.) using the same handheld device.

From the supplier through to manufacturing, AIDC will continue to offer more data possibili-

ties that will advance AI and IoT (Internet of Things) development, allowing supply chain providers to introduce improved working processes that optimize and replace the old to bring about better economies of service.

If you have projects this year for intelligent supply chain integration to enable new ideas and the discovery of new economies in logistics services, see Advantech iLogistics Solutions.

For more information on Advantech iLogistics Solutions products see ***Buy.Advantech.com/Go/Logistics*** or call **877-825-4146**