



Contact: Julia Deets, Marketing & Internal Sales Manager
149 4th St SW, PO Box 1468
Mason City, IA 50401
Email: JuliaD@idplate.com
800-437-5283

CASE STUDY

RFID Takes Flight

Boeing's earliest RFID effort continues to net solid returns

Problem:

The Boeing Company's Philadelphia site manufactures the V-22 Osprey and CH-47 Chinook rotorcraft and refurbishes helicopters and airplanes as part of their St. Louis, Missouri-based Integrated Defense Systems unit – a \$32.4 billion business responsible for defense and aerospace products and services.

Managing the movement of complete rotorcraft and more than 100,000 SKUs – high value company-owned and government-owned equipment – across the 335-acre Philadelphia site and between partners in Delaware and New Jersey proved a continual challenge.

More than 95 percent of the parts and equipment have external movement – to warehouses or back and forth between Department of Defense (DoD) customers. Often, as many as 20 parts are collected as a kit; each of these kits required manual inventory during collection, when stocked as inventory and upon delivery to the manufacturing floor.

“Better visibility in our supply chain would help reduce cost,” said Parkash Bhaya, a Boeing RFID Project Manager. “We knew there had to be a more effective way to track assets.”

Much as Boeing had lead adoption of barcode technologies, they were prepared to explore RFID – a wireless technology that promised to more effectively identify and manage materials.

Solution:

Boeing and its DoD customers agreed it was time to develop an RFID system that would more effectively track the movement of government property and high-dollar Boeing-owned parts.

But the technology and its capabilities were so new that Boeing and its partners and customers first had to develop joint requirements – what data needed to be collected at what points in the process, and who was going to use the data for what purpose.

Despite the nascent technology, Boeing hit their early milestones on schedule – initial RFID system installation and testing by the end of 2002 and additional installations and development of a Web-based RFID Manager application for end-user computing by the end of 2003.

RFID tag development was among the chief challenges to implementation. The form factors and other environmental conditions needed to be taken into account in overall process and systems design; Boeing had to determine what tags and readers were most appropriate for which applications.

To help Boeing navigate the tag decisions, Bhaya turned to Metalcraft. The Mason City, Iowa-based manufacturer of custom, durable ID products developed, tested and delivered RFID tag designs to meet Boeing's evolving requirements.

One of Metalcraft's earliest tasks was to develop a product that could be attached when there was no surface for applying an adhesive label. The response: a double-sided hang tag that could be fastened to the part.

“In partnership with Boeing, we went through about a half dozen refinements of what is, today, our standard hang tag design,” said Aaron Hobert, RFID Sales Support at Metalcraft. “It's always rewarding to find solutions like durable, non-adhesive attachment, especially when it leads to a new product that meets ongoing marketplace needs.”

Metalcraft's hang tags and mount-on-metal labels have proved especially useful – allowing attachment and ID for a variety of materials and rugged manufacturing conditions.

Parts are first associated with the EPC-compliant Gen2 tags when they enter Boeing's Philadelphia site – coming off an aircraft to be refurbished, replaced or scrapped. Other parts are first tagged as new inventory.

Either way, all assets, once tagged, are tracked in the plant and third-party warehouses via 40 readers at these locations. Most are portals – RFID-sensing equipment arranged at doorways – that automatically identify and record a part's movement.

Boeing's Parts Tracking and Accountability system associates the asset with its tag and updates legacy systems as an asset moves. Suppliers and other partners are connected to this system – one of several applications served by Boeing's Web-based RFID Manager middleware. With the host systems linked between suppliers and warehouses, Boeing can see parts 'on the shelf', in transit and during receipt and can spread the work of associating tags with new parts.

Boeing's system has security functions built in, too.

“One of the things we realized very early is that people get nervous about ‘big brother’,” said Bhaya. “So, we made it clear that there is no information stored on the RFID chip, other than a chip number. All data related to that chip number is associated in our system.”

The data-free RFID tags helped calm employee fears and eliminated the chance of tag-based data intercept – a concern for Boeing's DoD customers.

Still, alerts are issued from RFID Manager via email to notify the Boeing team whenever a system component goes down. Even the tags can trigger alerts to impede theft.

Result:

Fundamentally, RFID is saving time. Before the system was developed, a manufacturing staging area was accustomed to spending a weekend of overtime sorting and inventorying kits of parts. Now, sorting 500 kits takes five minutes.

RFID also brings real-time visibility in Boeing's supply chain, which reduces the loss high-value parts. Often, misplaced tools or equipment can still be 'sniffed out' with a handheld RFID reader.

The ability to re-associate and reuse the Metalcraft products contributes to Boeing's return on their system investment, too. And Metalcraft continues to design and deliver an expanding array of RFID label products to grow alongside Boeing's use of RFID in Philadelphia.

Boeing is developing a point-of-use delivery system – sending parts requests to the warehouse that result in delivery beyond the dock directly to the mechanic's station, delivering parts right where the mechanic needs them.

Additionally, Boeing has begun tracking retrofit salvage parts. They are in a pilot project to share more RFID data with suppliers. They've begun tracking composite materials in freezers. And they are adding 20 more portals to the factory line to realize real-time location visibility on the manufacturing floor.

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