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RTLS SOLUTION PROVIDES PRECISE TOOL TRACKING FOR LEADING AEROSPACE MANUFACTURER

Facing Competitive Pressures

Aircraft manufacturers strive to ensure utmost precision, quality, and efficiency during every step of the build process. They have depended on tried and proven methods to reduce costs and increase productivity, while ensuring quality for their customers. However, technology is driving change.

First, the design integration of lightweight composite materials is providing fuel-efficient aircraft and challenging traditional production processes. Second, innovative technology utilized in the production environment provides real-time, precise information that automates and accelerates business process change. For this leading aircraft manufacturer, tool management stood out as an area where significant efficiency improvement was possible.

Challenge

For this manufacturer, aircraft assembly begins in a large “moving line” factory, where all major components are integrated, including the fuselage, wings and engines. Then the aircraft is moved to a large outdoor flight line and parked in a service stall, where all remaining production, test, and quality assurance tasks are completed. Each stall contains many service and storage sheds for easy access to parts, tools, and equipment. For larger or less frequently used tools and equipment, there are dedicated, large open areas two to three acres in size. The overall outdoor work environment is over 50 acres.

Aircraft assembly includes thousands of manual processes, which require mechanics to use costly, specialized tools and equipment to complete tasks. One of the mechanics’ production support teams is Tool Services (TS), responsible for the pickup, delivery, maintenance, and inventory of all tools and equipment utilized for production. Mechanics adjust their scheduled tool requests based on actual completion of prior tasks. When these adjustments occur, it is TS’s responsibility to quickly react, fill these requests, and ensure production schedules are met.

For this manufacturer, delays in availability forced the TS to search for tools and equipment based upon the location of the last known user. Impatient mechanics would contact other mechanics to secure the tools they needed. Additionally, due to the many manual steps involved, inaccurate information was recorded in the tool management system (TMS). These non-documented transactions and errors compromised the system. This also created an environment where workers would hoard and pre-request tools.



Zebra® Dart UWB Real-Time Locating System (RTLS)

Customer

Leading aerospace manufacturer

Industry

Aircraft design, manufacturing and refurbishment

Challenge

- Reduce capital expenditure for high-value, customized tools and equipment
- Increase tool check-in/checkout efficiency
- Eliminate work delays due to misplaced and lost tools
- Integrate with existing tools management system

Zebra Solutions

- Zebra Dart UWB Real-Time Locating System (RTLS)

Results

- Improved equipment utilization by 20 percent
- Eliminated tool hoarding
- Reduced out-of-certified tools by 30 percent
- Reduced search/find time from over eight hours, to less than 30 minutes
- Reduced work delays due to missing tools by 80 percent
- Reduced capital replacement for “currently not found” items by 50 percent



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In addition, management desired to reduce the time from issuing the Tools Services work orders to tool delivery time. Delays in tool deliveries created work delays, resulting in order slippages. Given the large outdoor geographical area of over 50 acres, finding misplaced tools generated waste in overtime labor. A TS supervisor stated, "Finding a tool in a multi-acreage flight line is like finding a needle in a haystack."

Tool and equipment inventory minimums reached an all time high as production goals increased. Management purchased and leased tools and equipment based on inventory minimum/maximum levels and inaccurate usage reports that portrayed the majority of out-of-stock tools as "In Use." Lack of visibility affected productivity and resulted in excess equipment spend. It also exposed the company to Sarbanes Oxley audits and delays in achieving tool certification—a critical aspect of meeting FAA aircraft flightworthy compliance.

This motivated TS management to explore options related to increasing asset visibility and automating tool management software with an end goal of increasing operational efficiency and limiting their capital expenditure rate.

Solution

In order to help TS staff locate misplaced tools, process more work orders, maintain required tool stocks and receive alerts when tool servicing was required, the aircraft manufacturer management recognized that they needed a solution that provided automated real-time asset visibility. The real-time asset visibility solution would also be required to operate over a large geo-footprint, integrate with the existing tool management system (TMS), operate with limited time and effort by the TS group, and function in high-metallic, interference-prone radio frequency (RF) environments.

TMS integration enabled automation by eliminating manual check-in/checkout processes and alerting staff in real time when assets unexpectedly exited work areas. Longer term, the optimal system would provide rich data, including tool dwell time and alert triggers. Management could use this data to analyze and further optimize processes based on location, asset use, and usage time to make better decisions on what truly critical tools and equipment inventory shortages existed.

After extensive evaluation of various RFID and Wi-Fi location technologies, the project team concluded that Zebra® Dart Ultra-Wideband (UWB) RTLS was best suited for their challenging indoor and outdoor environments. Total cost of installation, tag positional accuracy, outdoor capabilities, intrinsically safety rated products and customer support were the top qualifiers.

Zebra Dart UWB RTLS offers cost-effective coverage of very large indoor and outdoor areas, such as aircraft factory and flight lines. Within each work zone, the company installed Zebra Dart Vision Readers (DVR), an RTLS presence reader to locate all tagged tools and equipment within specified work zones. Tools and equipment are identified by unique Dart RTLS tags transmitting every few seconds to ensure real-time and accurate location data is provided. This new RTLS system seamlessly integrated with the company's existing TMS, injecting true automation for the first time into its asset management lifecycle.

Results

Upon "go live," the company realized immediate results. Tool Services personnel gained real-time tool and equipment visibility, allowing them to quickly locate misplaced tools that were not in the crib or in the appropriate work zone, while preventing hoarding and pre-staging. At the click of a mouse, staff can now view precise location of assets without the typical manual searches and audits that take them away from their primary responsibilities, such as processing work orders.

Mechanics now know the location and usage status of tools is accurate and reliable. The TMS reduced the time and effort required to request, receive, and return tools and equipment—promoting more adoption of the new TMS.

Due to new system, the company reduced original budgeted capital expenditure, reduced workloads, and eliminated manual inventory audits and cycle counts. When an audit occurs, it can easily report—in real time—all tagged assets. Automated TMS entries enable staff to make informed decisions, eliminating tool contribution to production delays, while minimizing downtime and maximizing asset utilization.



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Another benefit is the reduction in equipment movement. The new enterprise-level visibility minimizes the need for equipment relocation. Instead of moving tools and equipment to central locations, personnel can now store assets closer to the point of use, decreasing travel time to production areas and the time from request to operational use.

With the Zebra Dart UWB RTLS solution, management can now quickly learn the identity and last location of an asset, measure if the process is working or not working, and improve the process—which leads to even more business savings.



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