inpixon Indoor Intelligence™

CASE STUDY

INTRANAV
An Inpixon Company

Seamless Component Monitoring In Aircraft Maintenance

Location-aware digital twin ensures real-time visibility in the material assembly process and reduces search efforts

The Company

For one of the largest global operating aviation groups

As a global aviation group, this enterprise handles services including logistics, engineering, and catering. Their technical center operates as the leading provider of aircraft maintenance, repair, overhaul, and modification for both civil and commercial aircraft. In this case study, we look closely at the successes achieved by implementing the INTRANAV.IO platform to reduce search efforts and streamline visibility.

The Challenge

Save valuable labor time by reducing search efforts, ensure reliable component selection, and prevent material loss

In our client's aircraft maintenance department, various propeller turbines and fan engines with more than 30 variants are maintained and repaired. In the inspection process, the individual flight parts are examined and surveyed. The parts are then collected and transported to the "Repair Department" in special cage trolleys/large containers. During transport, components are not always unloaded at the correct storage locations. In other cases, there is not enough space and the parts are deposited outside the storage locations. As a result, parts inspectors, with the help of colleagues, have to search for the parts manually and cannot do their actual work. If parts can no longer be found, further costs and expenses are incurred for the procurement of spare parts, and there may also be delays in the assembly of the engine.

Repair orders are then opened in the repair department and the appropriate repairs are instructed. The aircraft components are initially stored until the repair window is called. Once repairs and testing have been completed, they are sent back into storage until they are ready for assembly.

In aircraft manufacturing, as soon as one part is defective, all other associated components in the component group must be replaced. Here, the aviation company required a solution for digitally marrying parts with the corresponding production order number in order to ensure the unambiguous assignment of parts. This is because an incorrect system assignment can cause incorrect picking, which in turn leads to incorrect installation and time-consuming rework during reassembly, as well as delays in the overall process. The aim of the project is thus to ensure seamless monitoring of the components, including possible subsequent analyses to optimize production control.

Customer Requirements

1. Saving of working hours due to reduction in search efforts

The client needed access to capabilities like instant track and trace to find the real-time location of tagged assets and track their movements throughout warehouse processes. This is achieved through using a digital twin via the INTRANAV.IO platform, each associated with a single turbine.

2. Clear parts picking of corresponding component groups

Individually stored components are clearly assigned and associated with each other using INTRANAV.RTLS Tags in the INTRANAV.IO platform and SAP. This ensures that parts can easily be located and picked and notifies the user through alerts if errors occur.

3. Preventing component loss

Thanks to real-time location tracking, the location of individual components can be seen at any time via a live map in the INTRANAV.IO platform. INTRANAV.IO users will be quickly notified using alerts if any errors are discovered.

4. Location and device-independent access to location information

Real-time location data can be accessed via the INTRANAV.IO platform on any device (tablet, desktop, or smartphone) by multiple workers, all from one centralized system.

The Solution

Inpixon's INTRANAV.IO platform enables the real-time location tracking of aircraft components thereby addressing our aviation customer's requirements

By implementing our technology, they were able to:

Search and Display of Assets and Components

Using Inpixon's real-time location enterprise platform, INTRANAV.IO, employees can search for individual parts or parts assigned to an order using IDs or ESNs (Engine Serial Numbers) via the Digital Twin live map or asset manager. Items and assets not included in the search can be hidden or "flagged" so that only the group of parts being searched for are displayed with their associated individual components. In addition, the live map shows the floor level, making floor differentiation immediately apparent. The overall view shows the real-time location of all tracked assets.

Merging Several Parts into One Order in the INTRANAV.IO and SAP System

When coupling INTRANAV.RTLS tags with individual parts or carts, it is important that a higher-level connection can be established between the parts and carts to one order. For this purpose, various tags are stored in the INTRANAV.IO platform in a bundle (i.e. under one serial number). The order numbers are associated with the INTRANAV.RTLS tag, which is attached to the component, in the INTRANAV.IO and SAP system. Real-time backups ensure the permanent, secured linking of the created component relationships (component affiliation to the component group) so in the event of a system crash, the relationship data is not lost. Highlighted zones/areas are an important indicator for the presence of a tag during search queries.

Real-Time Location Tracking of Components, Retrievable Via Any Device

Components can be tracked and retrieved using the INTRANAV.IO platform via a tablet, smartphone, and desktop computer.

Data Analysis for Process Optimization of Production Control

The real-time data acquired is stored in a uniform format from the outset so that it can be used in subsequent processes to further optimize production control.

Data and Production Planning and Control Systems (PPS)

The location information obtained is utilized in the future steps to generate automatic feedback of process steps to the production planning and control systems.

The Result

By using the technology-independent INTRANAV.IO **RTLS platform** to produce a Digital Twin, and RTLS hardware, the airline's technology center was able to achieve seamless real-time location tracking of all aircraft component groups and the respective individual parts. As a result, the company was able to increase the certainty of correct component selection, significantly reduce additional employee effort in the form of component searches, and minimize additional efforts required to correct incorrectly installed parts in the repair process, which in turn also reduces new procurement costs.

Summary of the results achieved by our customer with INTRANAV:

- Significantly reducing and avoiding the need to search for materials; the real-time location of components can be viewed digitally via the INTRANAV.IO platform
- Saving employees time by reducing search efforts. Now employees can concentrate on doing their jobs instead of looking for materials
- Preventing component loss with alerts for theft or when items are placed in the incorrect zone, resulting in better inventory security
- Preventing unnecessary delays in the engine overhaul process due to loss or re-procurement
- Preventing time-consuming rework, through correct component picking
- Increasing the security of the component material flow and the storage/retrieval recording and management

Future Projects

- Possibility to automate process steps in the production planning and control system, such as feedback that the component has arrived at a specific station or machine
- Possibility of material flow analyses for optimization of production control

Key Benefits

INTRANAV benefits through a virtual component warehouse with search function:

- Digital Twin of components via INTRANAV.IO: Real-time component material flow tracking for maximum process reliability and reduction of search times
- Differentiation of floors on the Digital Twin Live Map
- “Flagging” for search filtering of components and component groups
- Real-time alerts for incorrect material placement from specified zones via SMS & Email
- “Bundle” entry and association of individual components and associated component groups in the INTRANAV.IO and SAP system
- Replacing scanning activities with automated posting (booking in and out) by geofences in internal transportation
- Paperless Logistics - Goods accompanying documents and order numbers can be called up directly via mobile device
- Proof of compliance with transport/storage security and transport guidelines
- Real-time alerts for theft or delivery to/from restricted zones via SMS & email
- Uniform data collection and provision for analysis formats
- Various innovative interfaces enable the connection to all common ERP, EWM, and CRM systems and databases as well as to Power BI, SQL Server, and some others. Data coupling enables further processing and use for optimizing logistics and supply chain processes as well as the entire information flow.

INTRANAV offers a highly flexible and cost-effective enterprise solution, ideal for aviation, automotive, production, intralogistics and logistics or supply chain. Further fields of application are possible for example in warehouses, manufacturing, production line for incoming and outgoing goods tracking or as asset finder/asset database.

If INTRANAV maintenance and other IIoT solutions are interesting to you, contact us to talk about optimization possibilities of your supply chain and logistics workflows today!

About INTRANAV, an Inpixon Company

INTRANAV, an Inpixon company, offers a highly flexible and cost-effective enterprise solution, ideally suited for automotive, aerospace, logistics or production. Further fields of application are for example, in the area of production line automation; automatic cycle feedback into SAP systems, line balancing/production leveling by INTRANAV SMART Factory, "Just in Sequence" – provision for the right sequence, plausibility checks or zone-based control of automatic programmable logic controllers.

Let's talk about your goals.

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