

INTRANAV
An Inpixon Company

Smart Factory

How Inpixon helped an agricultural machinery company optimize transport order management while minimizing post-processing efforts through plausibility checks in assembly



The Challenge

Intelligent transport order control and reduced sequencing efforts for lean production

For our client, an agricultural machinery manufacturer, tractor pre-assembly requires pneumatic add-on modules for the axle which are manufactured in one location and then transported by route train to the axle assembly line on the production site, where the axle is then assembled. The manufacturer has a very high sequencing effort due to a large number of part variance, which is why there is a risk of confusion when picking components very quickly. The high volume often also makes buffering more confusing. In general, sequencing errors can quickly become expensive if they lead to high rework costs and thus to delays in the completion or delivery of end products.

The company's international product portfolio includes forestry machinery, construction machinery and equipment for lawn and grounds maintenance. In-house production transport must also be planned cyclically to the production cycle, reducing empty or wasted runs, cycle idling, and long throughput times.

To optimize transportation utilization and flow, the company turned to Inpixon. They were looking to improve logistics control through component and inventory tracking in addition to implementing route guidance from pre-assembly areas with the desired goal of minimizing waste and significantly reducing rework costs. The real-time location data obtained by using Inpixon's INTRANAV IoT and [RTLS technology](#) is then leveraged to analyze material throughput times and to optimize the flow of material.



Customer Requirements



Order to order matching of the load carrier components

Due to high variance at the main assembly, pneumatic assemblies must be recorded in the MAS/SAP system during pre-assembly with the order and the load carrier.



Load carrier tracking - INTRANAV SMART Sensors

Real-time tracking of load carriers using a digital twin.



Sequence/plausibility check during component picking on the assembly line

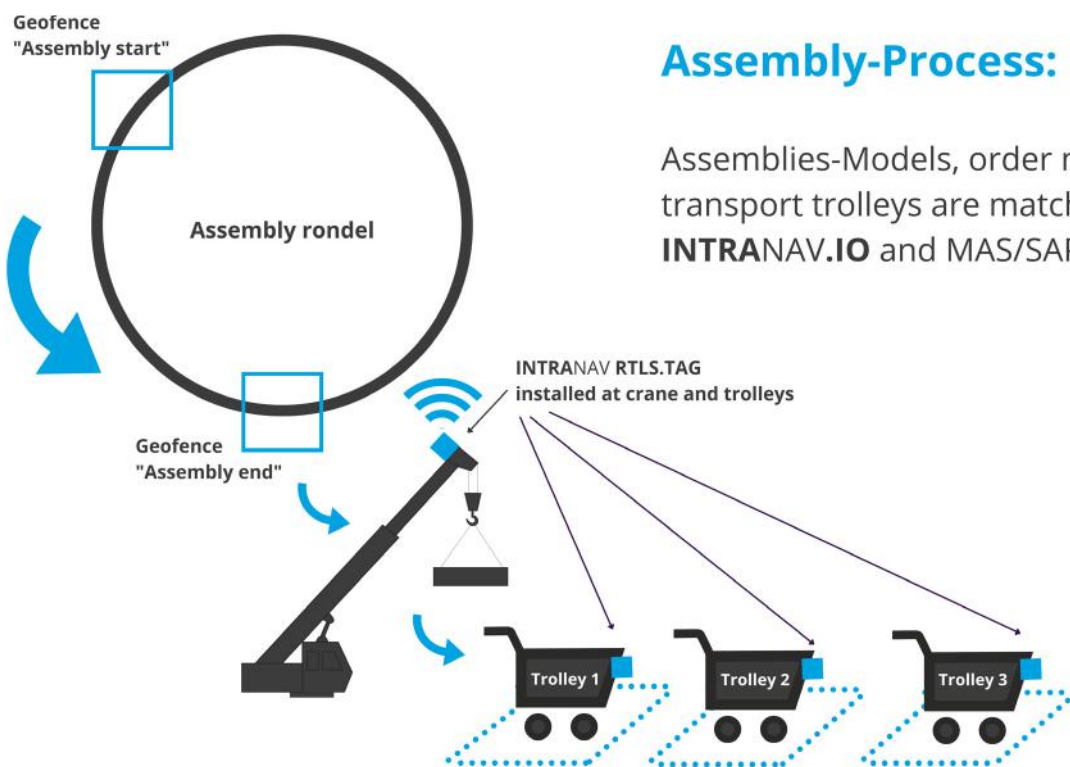
In order to avoid incorrect assembly, quality control must take place at the assembly line for automatic component picking by matching items via a parts list in main and subgroups.

The Solution

With INTRANAV's real-time location solution at the production line, our customer was able to address their requirements

Step 1: Assemblies Trolleys Order Matching during Model Production for the Axis

For real-time tracking of pneumatic assemblies, the assembly roundel, the picking crane, and transport carts are equipped with INTRANAV.RTLS TAGs. The tag on the roundel receives the order number from the respective assembly component, which it is carrying on the conveyor at the time. Two virtual zones, also referred to as geofences, are set up around the roundel. These geofences are responsible for order matching. As the roundel enters the starting point of the **geofences**, the component order number is systematically associated with the **RTLS tag**; this is done via an interface in the client's multi-agent system (MAS) or SAP system. The component is tracked in real-time until the end of the cycle. At the end of the cycle, the assembled module is lifted by crane onto the transport trolley, which can hold a maximum of five different modules or order numbers. There is also a geofence around each trolley parking space so the system can recognize which assembly module is in which transport trolley. At the completion of this process, order matching (transport-order) has taken place.

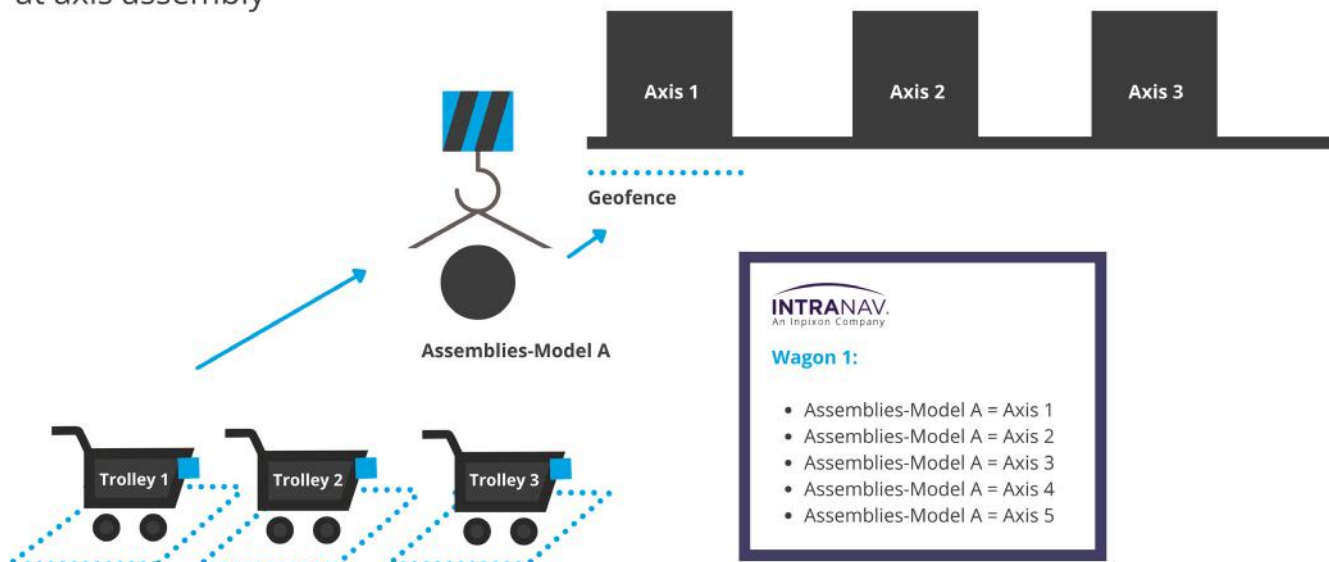


Step 2: Real-time Plausibility Check During Assemblies Model Assembly on the Axis Assembly Line

After transport trolley matching, the assembly models are transported to the axle assembly line. Dynamic geofences are placed around the transmission skid via INTRANAV.IO, where a plausibility matching process is performed. The parent assembly number carries all of its child sub-assembly numbers in its BOM structure, which allows the system to match them to prevent installation of the wrong components. The INTRANAV system checks if the assembly and order number from the skid matches the transport trolley and the crane then picks according to a defined first in first out (FIFO) sequence.

A plausibility check is done by order number matching of the component skid. If the match is positive, crane picking takes place on the assembly line. If the plausibility check is negative, this is indicated on the dashboard via the INTRANAV software, the incorrect order is recorded in the database, and the model is booked as “canceled” prompting the order number to be deleted from the crane tag and the model is not picked.

Plausibility matching process at axis assembly



Enhanced Capabilities

- ✓ Real-time location tracking of the route trains for dynamic control of empty wagon pickups. The driver is shown how much time is left for picking up the transport trolleys.
- ✓ Tool tracking to prevent the loss of tools caused by sharing with other workstations or unscheduled maintenance work. Ensure specialty tools are where they're supposed to be when needed with INTRANAV's real-time tool visibility.
- ✓ Path analysis for a lean production flow, to optimize routes, and to eliminate wastage all through a standardized database.

The Result

With INTRANAV's real-time material flow control and tracking solution at the two workstations, the agricultural machinery manufacturer significantly reduced the risk of errors during the picking processes.

Summary of the results achieved:

- Quality control: High sequencing effort can be safely and reliably controlled by automatic order number matching
- Reduction in post-processing work caused by sequencing errors
- Reliable calculation of production costs, as there are fewer deviations and waste
- Timely production completion and delivery as a result of fluid material flow and accurate product picking
- Real-time transport-order matching to optimize the transport flow and minimize empty and wasted route train runs
- The use of a Digital Twin to reduce inventory search times and transport trolleys
- Data analysis as the future basis for optimizing route & delivery frequency
- A reduction in belt inventory and special load carrier costs

Key Benefits

There are numerous benefits to using INTRANAV's smart factory solutions, including:

- Real-time component material flow tracking for maximum process reliability and reduction of search times through use of a digital twin via INTRANAV.IO platform
- Transport order matching/intelligent transport order assignment to avoid empty and wasteful runs
- Sequencing check and plausibility check to avoid the assembly of wrong components
- Real-time alerts for incorrect material placement from specified zones
- Capturing and association of model "Bundles" and associated transport trolleys in the INTRANAV.IO and SAP system
- Replacement of scanning activities with automated recording, for both in and out, through the use of geofences in internal transports
- Consistent data collection and delivery for analysis formats
- Various innovative interfaces enable connection to all common ERP, EWM and CRM systems and databases, as well as to Power BI, SQL Server and more. With data coupling, it is possible to further optimize logistics and supply chain processing, processes, and the entire flow of information.

Interested in how our smart factory solution can benefit your enterprise? **Contact us to talk about optimization possibilities for your production 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.

Interested in how our INTRANAV Production Solution can benefit your enterprise? Contact us to talk about optimization possibilities for your production and logistics workflows today!

Let's talk about your goals.

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