How the Largest Automotive Manufacturing Facility in North America is Getting Ahead with AMRs

Presented by:
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Universal Logistics
Universal Logistics

- Truckload
- Brokerage
- Value-Added
- Dedicated Intermodal
Universal Logistics - Industries Served

- Automotive
- Retail & Consumer Goods
- Industrial
- Steel & Metals
- Energy
- Others
Manufacturing & Distribution Pain Points

 Labor Shortages

 Unfilled manufacturing & distribution jobs (US)

 Labor-Intensive Operations

 Forklift driver needs to stop/leave cab/pick/continue

 Reducing Cycle Times

 Days to Hours

 Lowering Costs

 Wages / Turnover / Accidents
Primary Goals for Universal

- Reduce FTE manual movements & efficiency improvements
- Solve sort-staffing issues
- Ability to redeploy to other sites
Universal Smyrna, TN

- Supports Nissan Motors plant, largest auto manufacturing facility in North America
- Unemployment Rate: 2.4% (one of lowest in US)
- Labor shortages in excess of 10% of required staff
- Facility: 1 Million sq ft
- Capacity: 640,000 vehicles annually
- Production: Nissan Altima, Maxima, Leaf, Pathfinder, Rogue; Infiniti QX60
Cart-based AMR Solution

Key Benefits
- Automates a wide range of workflows
- Easily adapts to existing & new processes
- Lowest robot / FTE ratio
- Very high utilization / low cost
- Recognized for safety (CE mark & ISO 13489 PLb)

Key Features
- Max Payload 77kg
- Adjustable shelves
- Manage & integrate with laptop, tablet, scanner, etc.

Key Workflows
- Order Picking
- Replenishment / Putaway
- Raw Material Delivery
Scanner / Mobile Computer Integration

Cloud-based software and services

Autonomous Mobile Robots

Scanner-triggered workflows
AMR Manufacturing Solutions

Core Workflows:
- Receiving to Raw Materials Storage
- Raw Material to Production Line
- Raw Material to Assembly Cells
- End of Line Handling

Value-added Workflows:
- Urgent Parts Delivery
- Kanban Replenishment
- Detrash to Recycling

Additional Workflows:
- IQC to Raw
- Raw to Kitting
- Kits to Sub-Assembly & Assembly
- Production Fallout to Troubleshooting / Repair
- Bulk materials / pallets to Assembly
- Floorstock Replenishment
Receiving to Raw Materials Storage
Receiving to Raw Materials Storage
Receiving to Raw Materials Storage
Raw Materials to Production Line
1. Picking Associate selects available FetchCart #1747 from a cart staging area in the Supermarket and pairs it with a pick-list or work order by scanning the Cart ID.

2. Associates picks material to FetchCart. Can be guided by RF, voice, or other device.

3. Once pick is completed, associate moves cart to designated Loaded Cart staging area in Supermarket.

4. Associate first scans position barcode, then scans Cart ID to trigger robot pickup from Supermarket and delivery to Production Line.
Robot arrives and picks up Cart# 1747.

Robot delivers Cart# 1747 to assembly station and proceeds to other tasks. FetchCart can be utilized as a mobile Kanban to replenish raw material to the production line. Material on cart is scanned into WIP and unpaired from cart #1747 upon assembly.

Once raw material on FetchCart is consumed, the Assembly Technician moves the empty cart to a pickup area along the Production Line.

Associate scans the position barcode to request robot pickup at Production Line. This triggers a robot to pickup the empty cart and return it to the Supermarket area.
A robot arrives and connects to the empty FetchCart and returns it to the Supermarket cart staging area.

Robot transports full FetchCart to specific assembly station and disconnects. Assembly Tech assembles product on the line with materials from FetchCart.
Hots Material Delivery
1. Urgent parts delivery arrives on overnight truck to inbound Receiving area.

2. Parts are received into the WMS, and immediately issued to an open work order in the MES or SFCS (Shop Floor Control System).

3. HMI/Shelf is standing by in Receiving area. Receiving Associate loads urgent parts onto HMI/Shelf.

4. Associate taps HMI/Shelf screen to send robot directly to production line station or assembly cell.
At production line, Assembly Technician receives the parts, then taps HMI screen to send robot back to ready position at Receiving.

Another urgent shipment arrives, which requires immediate turnaround for dispatch. Associate loads material (individually packed box) onto HMISelf and taps screen to send to Shipping dock.

At Shipping dock, shipping associate adds item to order (either overpack or build pallet or single item direct ship), then taps HMISelf screen to send empty robot back to Receiving.

HMISelf returns to staging area in Receiving, ready for next urgent order.
Convergence of technologies enables cloud robotics automation solutions to be a reality.
The cloud powers more and more aspects of our daily lives from communications to subscriptions to video streaming. From smart homes to warehouse automation, the cloud means speed, scalability, stability, & security. With the ability to access from anywhere.
Advantages of a Cloud Robotics Platform

- Deploying quickly without any new infrastructure in the facility
- Over-the-air updates to AMRs instead of manually updating each robot at every site
- Enabling users to easily add additional types of AMRs without having to change anything in the software or deployment
- Automatically (also over-the-air) adding optional native support for third party devices such as scanners
- Provide a single management pane of glass of AMRs across all your facilities
Cloud Robotics Platform in Action
Cloud-based Apps Make It Possible

All Managed By You

- Create custom tasks, workflows, and schedules
- Easy to use, intuitive interface
- Trigger IoT interactions

POWERED BY POSSIBILITIES.
Deploying Cloud Robotics: Automation in a Day

Months → Weeks → Hours
Step 1: Unpack robot
Step 2: Connect to WiFi
Step 3: Map facility
Step 4: Start work!
Accelerating Time-to-Value with Cloud Robotics

Decision is made to implement robotics

Cloud Robotics deployed

Optimization

Expansion

Other solution deployed

POWERED BY POSSIBILITIES.
RaaS is not a Lease. RaaS enables:

- Fast deployment
- Changing service if needed
- Scaling up without scaling infrastructure
- System wide software upgrades
- New features available immediately
- Immediate availability of new native device support
- Surge during peak seasons
- Pay as you go pricing or reserved pricing
- Leveraging other cloud tools such as ML or BI
- Portability -- Move without moving infrastructure
- Technology protection

RaaS: Like any other as-a-Service Model

SaaS

PaaS

IaaS

RaaS: Robotics as a Service
Our Experience with a Cloud-based AMR Solution

- Immediate Financial Benefit through RaaS
- Addressed Chronic Labor Shortages
- Focus Staff on Revenue Generating Tasks
- Improved Worker Satisfaction
- Fully Operational in Less Than a Week
- Boost Output while Managing Costs
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