CASE STUDY 01

Autonomous Package Induction

Dexterity's Full Task Robots Transform Parcel-Induction Processes by Automating Workflows With **Minimal Infrastructure Modifications**

Global Parcel Carrier

Sort & Induct Anything

Dexterity's robotic systems are **in production 24/7** powering parcel sortation, package fulfillment, case level picking, and palletizing for large enterprise customers. Unlike generally available robots, which require installing expensive and bulky material handling equipment, Dexterity's robots operate within **existing workflows** at beyond human rates and with a human-sized footprint. Our robots share **networked intelligence** to coordinate actions, improve performance, and provide real-time insights into upstream and downstream operations.

> "I've seen all the robotics companies, and you're a significant step above everyone on the totem pole"
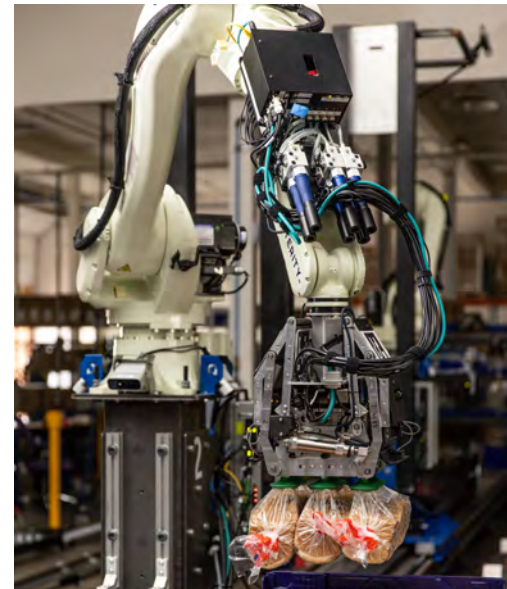>
> - R&D MANAGER

MIXED SKU PALLETIZAION & DEPALLETIZATION

PARCEL PACKAGE SINGULATION

ORDER FULFILLMENT & LINE KITTING

Transforming the operations of two of the largest parcel carriers

100K+

unique SKUs picked in production

2,000+ PPH

peak picking rate in production

24/7 Guarantee

with white glove service and a performance SLA

Problem

One of the largest parcel carriers in the world faced an uphill battle to keep pace with **increasing package volume** while facing an intense labor shortage. These challenges, ongoing over the past five years, were amplified by the COVID-19 pandemic leading to unsustainably **low labor availability**, **high turnover**, and intense **recruiting competition**.

In response, the carrier decided to introduce robots: they engaged with dozens of robotic automation providers, yet all failed to handle live production.

CHALLENGES:

- Increased parcel volume

- Labor shortage

- High turnover

- Recruiting challenges

KEY REQUIREMENTS

✔ Super human speed in parcel picking (~**2,000 PPH**)

✔ **Low capex** integrated with existing warehouse infrastructure

✔ **Flexibility** to handle piles of flats, boxes, bubble packs, polybags, non-inductables

✔ Human fallback and ability to remove robot from picking station in **<5 mins**

Dexterity's Mandate

To deliver transformative impact, the customer worked together with Dexterity to introduce robotics into its parcel singulation and induction process. This use case, to pick items out of a bulk pile and on to a **tilt-tray sortation system**, had broad applicability across the customer's operations. Robots were required to operate at a very high speed (**2,000+ picks per hour peak**) while accurately picking a near-infinite variety of packages, boxes, and polybags from cluttered flowing chutes packed with items. More importantly, the robots had to **minimize human interventions**, manage irregulars, and unstick chutes as needed.

Dexterity's Approach

Dexterity's platform provides intelligent controls, scheduling, and machine learning-based computer vision to whatever robotic arms and grippers are needed to **perform intelligent tasks**. These baseline software tools enable rapid authoring of **new robot behaviors** to address a wide range of material handling tasks, including singulation and induction.

Before any design work started, Dexterity worked closely with the customer to determine how to deploy the system with minimal workflow disruption. This meant the robots would have to pick to existing high-speed conveyor systems. The customer also wanted the robots to fit within existing 1m square picking stations so they could **easily interchange human and robotic labor** at their singulation stations. All these features enabled the customer to deploy robots with **minimal additional infrastructure cost or downtime** during the installation process.

Dexterity selected the hardware that would meet the customer's performance and pricing requirements. By using Kawasaki arms, the carrier had a hardware solution that could easily **scale across their global operations**. Additional design included the modularity of a dual arm station to hit the customer's desired peak induct speed and a six-sided barcode scanner that matched human scan rates before slotting.

DEXTERITY'S DIFFERENCE

- **Commodity robots** powered by the Dexterity Platform that scales across applications

- Human-sized footprints with **minimal disruptions**

- **Full-stack approach** from controls and machine-learning, to 24/7 support

DEXTERITY

Dexterity leverages computer vision and learning to segment parcels, plan their picks, identify labels, and improve system performance over time.

To ensure that the new chutes delivered on the quality and speed expectations of the customer, Dexterity delivered a **slot monitoring system** that identifies and tracks cell metrics. Integrating this system into the carrier's operations system enabled the customer to minimize double picks to a single tray and to determine the occupancy and utilization rate of each one of their sorters.

The slot monitor system, combined with robot pick data, provides **granular insights into overall facility performance** that the customer never knew they could access - and function equally well on manual induction lines.
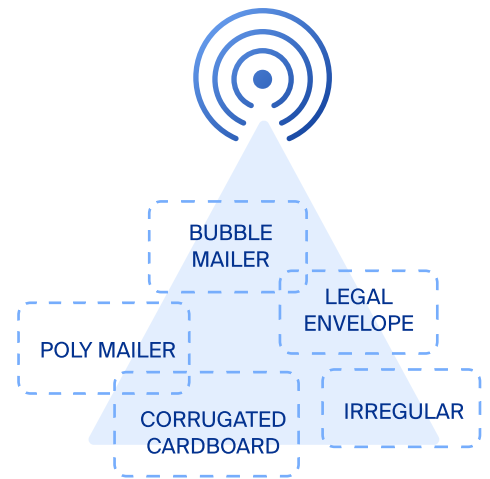
Complicated production environments is where Dexterity's robot intelligence really shines. Each scene presented to the robot is new, and the data generated from picking in these environments is used to reinforce good robot behavior. Production experience increases the intelligence and performance across the entire robot fleet.

2526 SCANS	7 MISPICKS	18 NON INDUCTABLES	12% OCCUPIED TRAY RATE
29% FLATS	36% POLYBAGS	35% BOXES	92% SCAN RATE

DATA AT YOUR FINGERTIPS TO DRIVE ACTIONABLE INSIGHTS

Results

Dexterity's commercial model enabled the customer to demonstrate **immediate ROI**. The carrier bought robots , licensed Dexterity's software, and had minimal additional infrastructure costs, meaning they could demonstrate savings on the first day of deployment.

2200
PPH PER
WORKCELL

Since April 2021, Dexterity's robots have been running full shifts picking at rates that **exceed the customer's 2,000 pph benchmark**. The facilities with Dexterity robots also feature the carrier's highest mix of packages including flats, bubble packs, polybags, and irregulars. Since deployment, Dexterity's robots have handled over **10,000 different package types** in production.

10K
PACKAGE
TYPES

As with all Dexterity customers, the carrier received a **24/7 guaranteed support SLA** that meant they could rely on their new robots through two service peaks.

Let's solve your toughest challenges in the warehouse

Dexterity delivers intelligent robots with human-like dexterity that enable customers to unlock the maximum value of their workforce. Dexterity solves labor shortages by delegating repetitive tasks so employees can focus on higher-level, cognitive work. Its full stack robotics solutions automate routine tasks for logistics, warehousing, and supply chain operations and can be deployed to perform a wide variety of complex manipulations in unpredictable environments.

Learn more at **www.dexterity.com**.

SAMIR MENON, PhD
FOUNDER/CEO
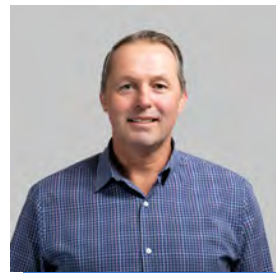
JASON BARTON
VP, PARCEL VERTICAL,
PARTNERSHIPS &
GLOBAL CHANNELS

Backgrounds in robotics, logistics and academia

Over 180 Engineers and Support personnel across the West (HQ), Midwest and East Coast

200M+ in Funding

KLEINER PERKINS™   B37   Lightspeed   OBVIOUS

LET'S GET STARTED

DEXTERITY

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