



DIGITAL INVENTORY

December 2017



NRW INVEST
GERMANY









INVENTORY ACCURACY IS STILL A MANUAL PROCESS

- Manual repetitive tasks by humans are the norm
- Operations still lack sophistication & technology enablement
- Enhancing humans with technology doesn't eliminate errors
- Checks are time consuming, risky & utilize expensive equipment
- There's never enough time with existing staff
- Accuracy lacks precision



WE AUTOMATE THE DIGITIZATION OF INVENTORY, EQUIPMENT AND PROCESSES



IDENTIFY

Inventory identification using RFID, barcode, text, deep Learning computer vision or active tag



LOCATE

Low cost & very robust sensor platform to pin point inventory whereabouts in 3D



ORCHESTRATE

Powerful process automation engine requiring minimal human intervention



AUGMENT

Simple real-time integration to existing systems delivers increased value to current investments



DAIMLER



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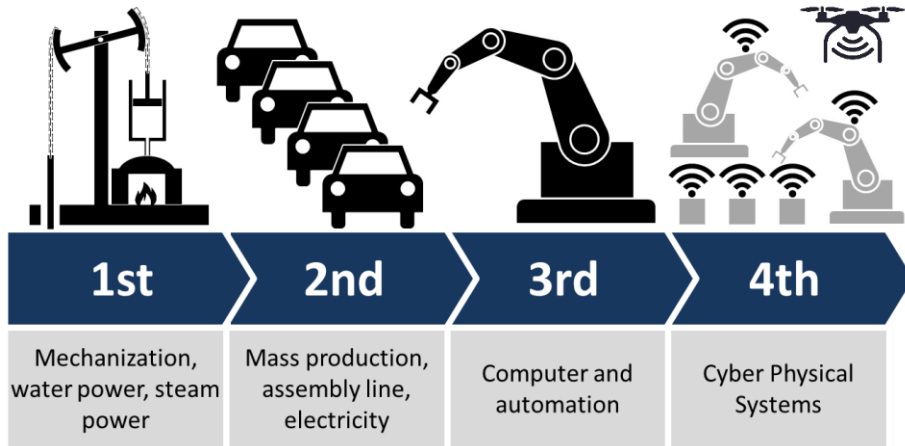


AERIAL ROBOTS FOR INVENTORY CHECKS



Automatic, accurate, efficient, and safe inventory checks in hard to reach locations.

INDUSTRIAL REVOLUTIONS 1.0 TO 4.0



Picture by Christoph Roser

- Autonomous Vehicles and Robots
- Sensor Fusion
- Deep-Learning Computer Vision
- Machine <> Human Collaboration
- Big Data & Artificial Intelligence

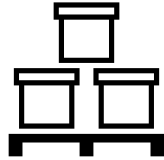
DESIGN PRINCIPLES FOR AN INDUSTRY 4.0 SOLUTION

- Augment Existing Operations & Investments
- Packaged as Self-Contained Robot Solution
- Robots Need to be Fully Autonomous
- No Additional Infrastructure Investment to Operate Robots
- No Change in the Way Inventory is Labelled
- Robot Sensors Understand/React to Changes in the Environment
- Computer Vision is Able to Understand/Interpret What the Robot is Looking At
- Robots & Humans Can Interact and Collaborate
- Rich Data Generated in Real-Time

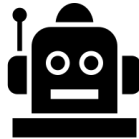
TECHNOLOGY ENABLERS



Cloud/Edge application platform



Inventory identification & localization



Autonomous navigation



Enhanced power for long flight times



Advanced frame to handle environment

WHY DRONES?



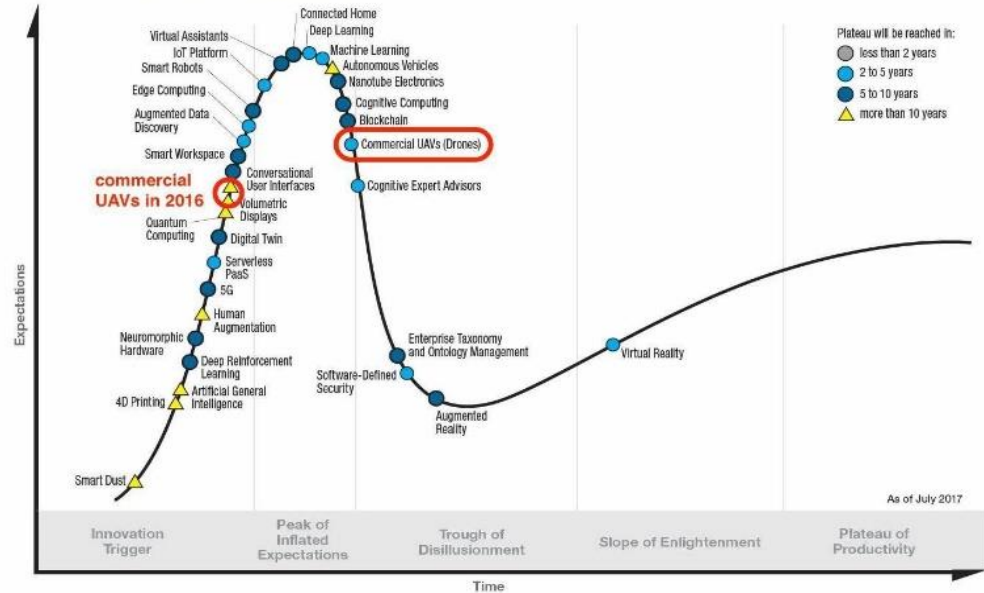
Predicts 2017: Drones

Published: 29 December 2016 ID: G00316163

Analyst(s): Gerald Van Hoy | Brady Wang

Summary

Drones are becoming a vital tool for enterprises. They can be an IoT endpoint, a collector of IoT data, and carry out delivery and other key functions.



WHAT OTHERS ARE SAYING?

The New York Times

Walmart Looks to Drones to Speed Distribution

By RACHEL ABRAMS JUNE 2, 2016

Forbes

Using Drones To Improve Manufacturing And Supply Chain Capabilities



Steve Banker, CONTRIBUTOR
Takes on logistics and supply chain management. [FULL BIO](#) ✓
Opinions expressed by Forbes Contributors are their own.

 **EY** Building a better working world

EY scaling the use of drones in the audit process

London, 13 June 2017


pwc

Global Market for Commercial Applications of Drone Technology Valued at over \$127 bn

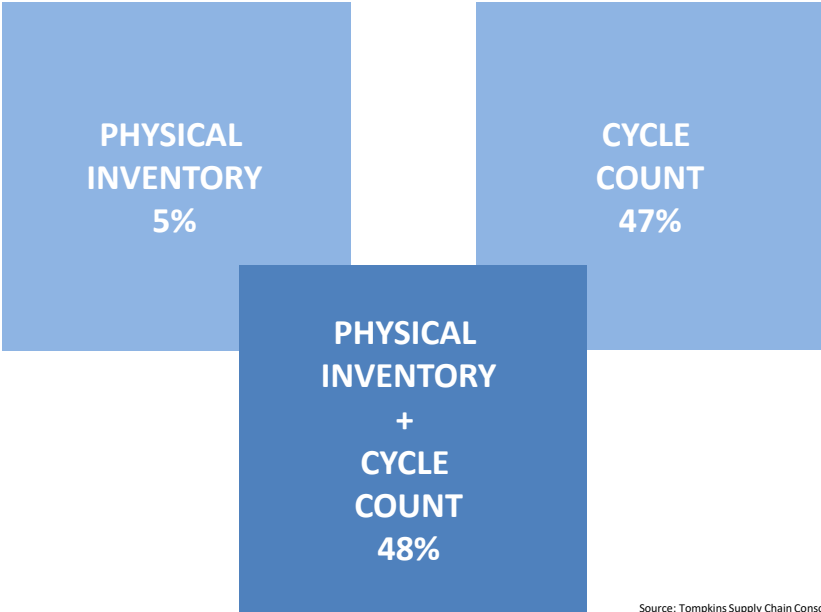
CSCMP's
Supply Chain
[QUARTERLY]

FORWARD THINKING

Drones in the supply chain: more than just last-mile delivery

By Susan Lacefield | From the [Quarter 3 2016](#) issue

INVENTORY COUNTING METHODS



Source: Tompkins Supply Chain Consortium Report: Inventory Accuracy Through Cycle Counting.

AUTOMATION REDEFINES THE PROCESS



**PHYSICAL
INVENTORY**

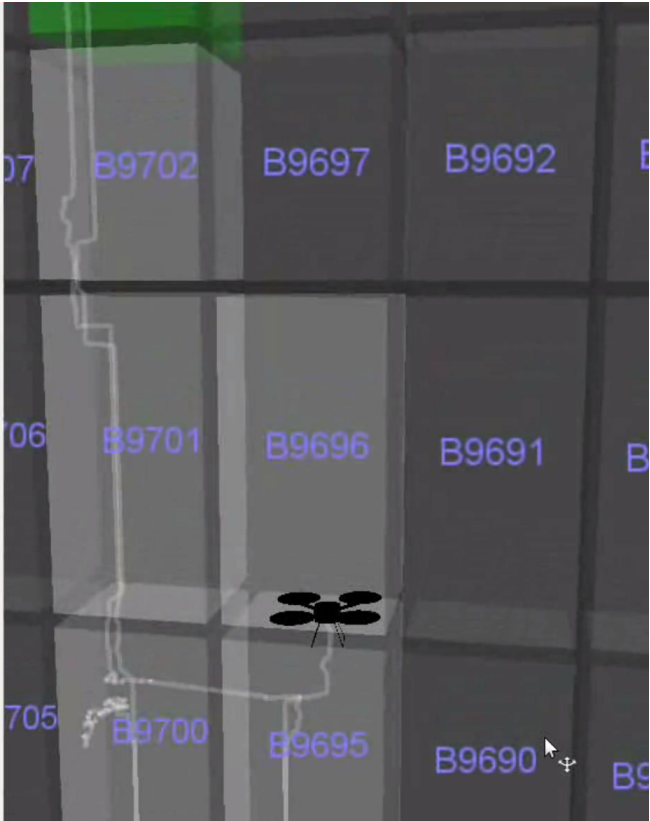


**CYCLE
COUNT**



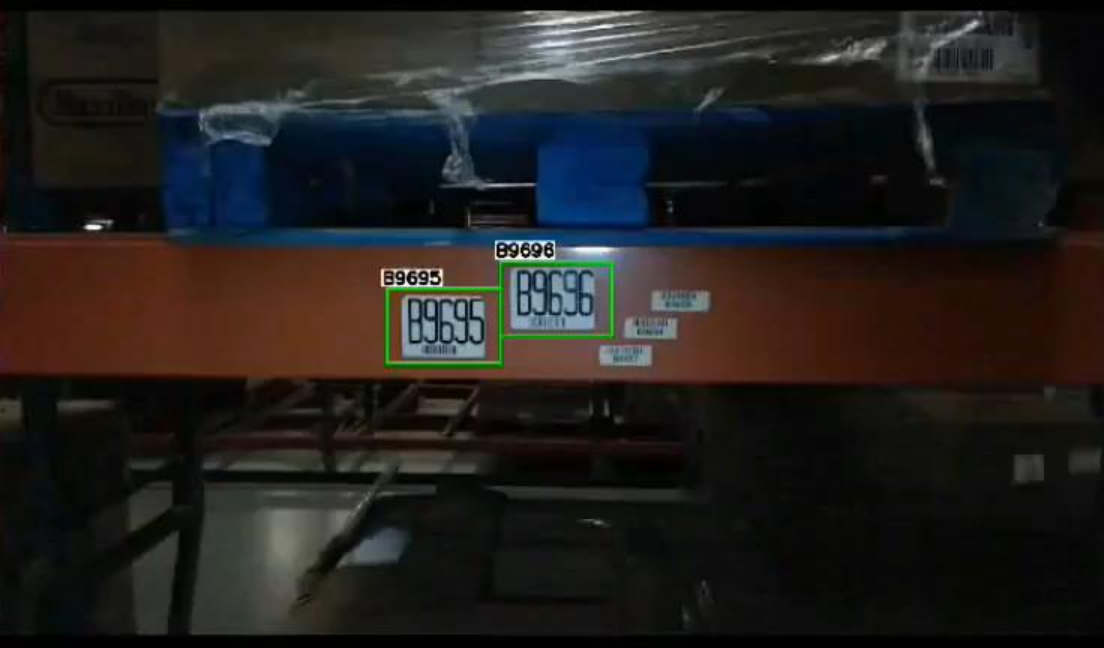
AUTOMATED INVENTORY MANAGEMENT

CONFIRMING LOCATION



CONFIRMING INVENTORY

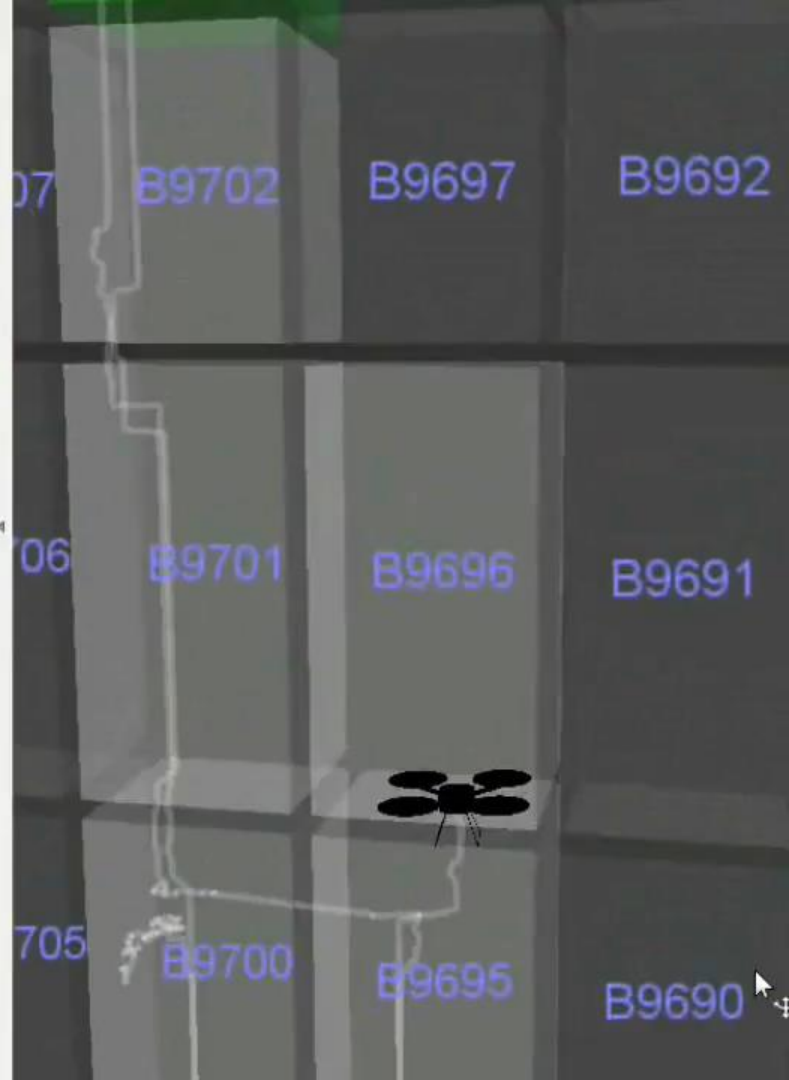




Palette OCR Image



Rack OCR Image



KEY BENEFITS

1. Improved Inventory Accuracy Rates

- Frequent automatic inventory checks
- Reduced losses due to inventory shrinkage
- More reliable financial reporting and conversion-cycle key performance indicators (KPIs)
- Better decision making about reorder points, out-of-stock inventory and excess inventory

2. Greater operational efficiency

- Savings in personnel costs or operations downtime
- Elimination of resources and equipment
- Staff retrained to handle more

3. Employee safety





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