



The Distribution Centre of the [near] future

Mike Vernon, UK Head of Innovation – Contract Logistics
Warehouse Technology Group Live
Mantra Learning, Manchester, 13th June 2018

Agenda



Introduction

Why the move to autonomous operation

Storage

Internal Transport

Palletisation

Picking

The 12 points to running a successful project

Questions

Mike Vernon

UK Head of Innovation – Contract Logistics



- Over 35 years in automation industry
- Director and Past President of AMHSA – Automated Material Handling Systems Association
- President of British Materials Handling Federation – UK's route to FEM for AMHSA, SEMA, BITA, IPAF, ALEM and CEA
- Head of Innovation for Kuehne + Nagel Contract Logistics since 2017



KN is a global force in industry...



We've worked hard to be recognised as one of the world's leading contract logistics service providers - supporting loyal customers across more than 65 countries worldwide with the end to end management of complex supply chains.



More than
4.4 million
TEUs
handled



1.6 million
tons
handled



Over 10.6
million m²
warehousing
& logistics
space



18.4 million
shipments

KN Contract Logistics Positioning in the Regions



NORTH AMERICA



6,400
Specialists



1.5
million sqm
logistics centre footprint

EUROPE



36,900
Specialists



7.0
million sqm
logistics centre footprint

LATIN AMERICA



1,800
Specialists



0.2
million sqm
logistics centre footprint

MIDDLE EAST & AFRICA



800
Specialists



0.3
million sqm
logistics centre footprint

ASIA PACIFIC



1,600
Specialists







0.6
million sqm
logistics centre footprint

We are an extension of your business



We are one of the leading contract logistics companies in the UK, delivering business-critical logistics services that add value at every stage of the supply chain. We operate across a wide variety of sectors - with specific expertise in drinks, consumer and retail, technology and Government and defence logistics.

 Drinks	 Consumer & Retail	 Aerospace, Hi-Tech & Pharma	 Government & Military
<ul style="list-style-type: none">• 28 sites• 2.2m ft²• £210m turnover• 1,000+ vehicles• 3,000 staff	<ul style="list-style-type: none">• 17 sites• 2.2m ft²• £235m turnover,• 679 vehicles• 3,750+ staff	<ul style="list-style-type: none">• 16 sites• 4.2m ft²• £130m turnover• 123 vehicles• 2,100+ staff	<ul style="list-style-type: none">• 2 key sites• 7.4m ft²• £119m turnover• 100+ vehicles• 1,100+ staff





1

Why the move to Autonomous Operations?

Why the move to Autonomous Operation

Key Drivers



Continued growth in distribution demand is creating an acute *labour shortage*, especially in midlands and south

How is the Milton Keynes economy performing?

What are the key recruitment issues facing the city?



Pupils Achieving 5A*-C GCSEs inc.
Maths & Eng. (52.5%) 2017

Working Age Population
with No Formal
Qualifications (7.6%)
2017

Housing Affordability
Ratio 2017 - 9.56

Mean house price £280k

Average Weekly
Workplace Earnings
2017 £618.8

Number of Business
Enterprises - 12,530

Population of 264,500



Total Jobs 2017 – 185,000

2017 Employment Rate 76.73%

Demographics.....

People Born Outside the UK 18.54%

Working Age Population - 169,000

Unemployment (JSA Claimants) (November
2017) 1,840



Business Closures (per 10,000 population) 62

Business Start-ups (per 10,000 population) 80.72

One of the UK's
fastest growing
cities means lots of
supply-chain
opportunities and
local demand

Unemployment
rate at lowest
level in over a
decade!

Milton Keynes is a dynamic and growing place with a scale and pace of growth, powered by investment in housing and employment, unique in the UK. Between 2005 and 2017, employment increased by almost 25%, with 33,000 new jobs created. The population increased by approximately 17%. It is estimated that the population will continue to increase from 264,500 in 2016 to over 300,000 by 2027. The Milton Keynes economy (GVA) was worth £11.2 billion in 2015 and £12.14 billion in 2017 (provisional), an increase of 8%. The value of goods and services produced within the borough is an impressive £64,800 per worker, the fifth highest of UK cities.

Why the move to Autonomous Operation

Key Drivers



April 2018:

Aldi and B&M are to create 1,400 jobs in Wixams, Bedford with the development of two major regional distribution centres.

Aldi has been issued planning permission for a 800,000 sq ft DC, creating around 400 jobs, while B&M is to open a 1 million sq ft DC that will create 1,000 new jobs.

Source: Logistics Manager

Why the move to Autonomous Operation

Key Drivers



**Technological advances are
opening the door to
increasingly complex systems,
both for operation and safety**



2

Storage

Storage

What are the Trends?



Storage

- Build higher
- Build denser
- Automate

Storage – Pallet Crane Stores

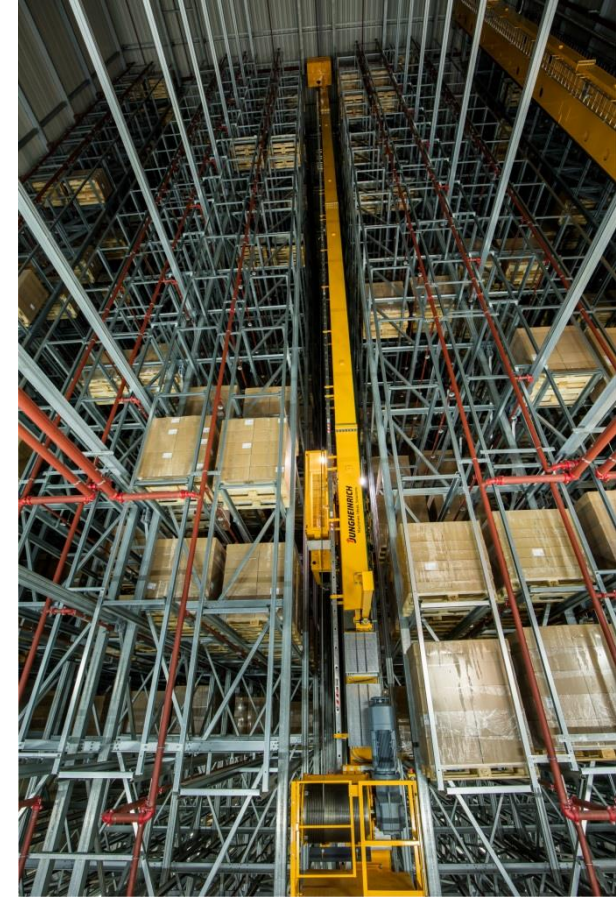


New Developments

- Can go up to 45 metres high
- Can store 1,000 kg pallets three deep using telescopic forks

Cranes only really considered when have:

- Over 18,000 mm clear internal height
- Aisle length over 80 metres
- Requirement for double/triple deep storage
- High throughput

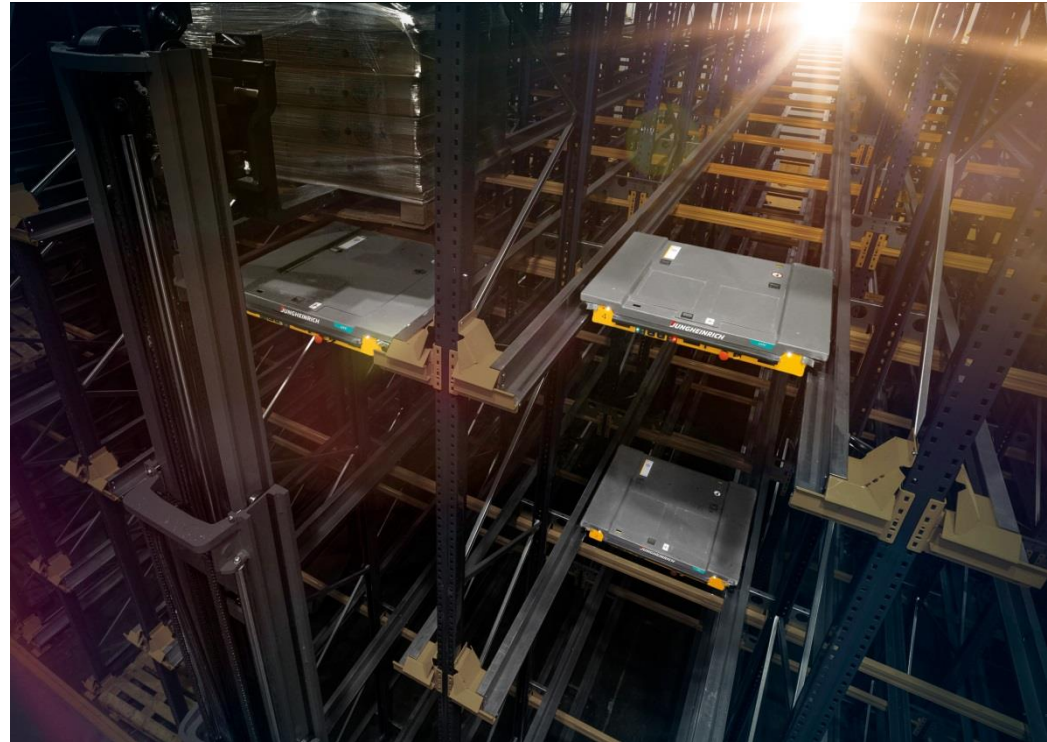


Storage – Pallet Satellite Stores



New Developments

- Crane, VNA or reach truck loading
- Can go up to 45 metres high (crane fed)
- Can store up to 100 pallets deep
- Can infeed and outfeed at opposite ends (flow through)
- Shuttles can be mains, battery or capacitor powered



Storage – Pallet Satellite Stores



Prerequisites:

- Suited to batch production storage
 - Multiple pallets of same batch code
 - Length of aisle optimised to batch size
- Generally First-in Last-out
- Uniform pallet size (width across rails)
- Can be used for:
 - Raw material storage
 - Packaging material storage
 - WIP
 - Finished Goods storage
 - Make up of sequenced delivery loads



[Video 01:04](#)

Automated Feed to/from Shuttle Store



Combined use of Automated Reach Truck and Pallet shuttle Store

Key Facts – Kuyaray - Cologne

- 19 moves in and out per hour
- 3,450 pallet spaces
- Seven Li-ion pallet shuttles,
- Three automated Still FM-X reach trucks,
- Conveyor components, such as chain conveyors, transverse transfer cars with telescopic forks, buffer spaces and a stacker for the empty pallets
- Material flow calculator
- Warehouse Control System – WCS

[Video](#)

Storage - VNA



Semi-auto VNA

- Software guides truck to location
- 25% faster than manual VNA
- Can have in-aisle picking

[Semi-Auto VNA 05:22](#)

Fully Automatic VNA

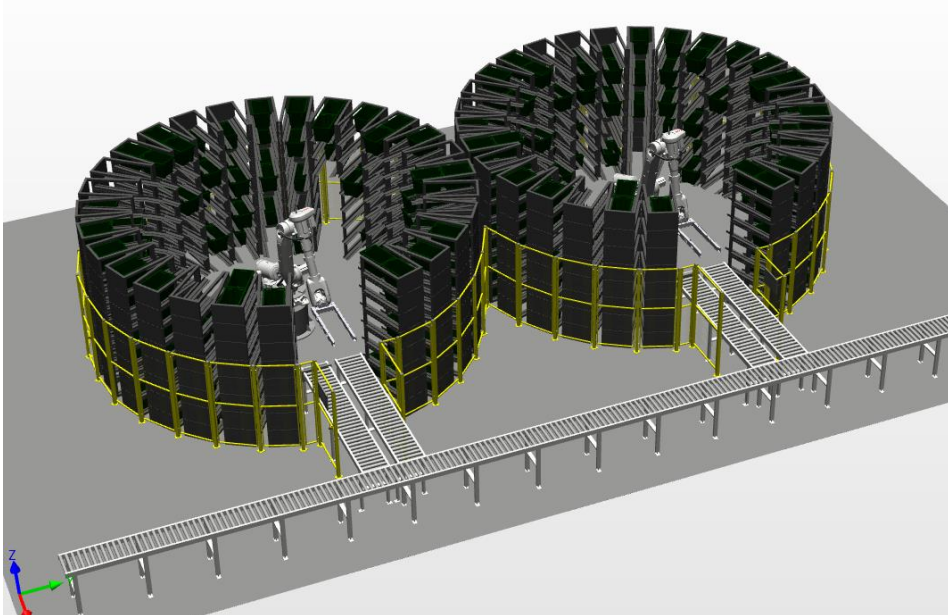
- All pallets must be profile checked
- Slightly slower than semi-auto but can work 24/7
- In-aisle power bus-bar

[Auto VNA 01:54](#)

Storage – Tote Buffer



- Small Footprint Tote Buffer
- Storage of up to 600 totes
- 300 totes in + 300 totes out per hour

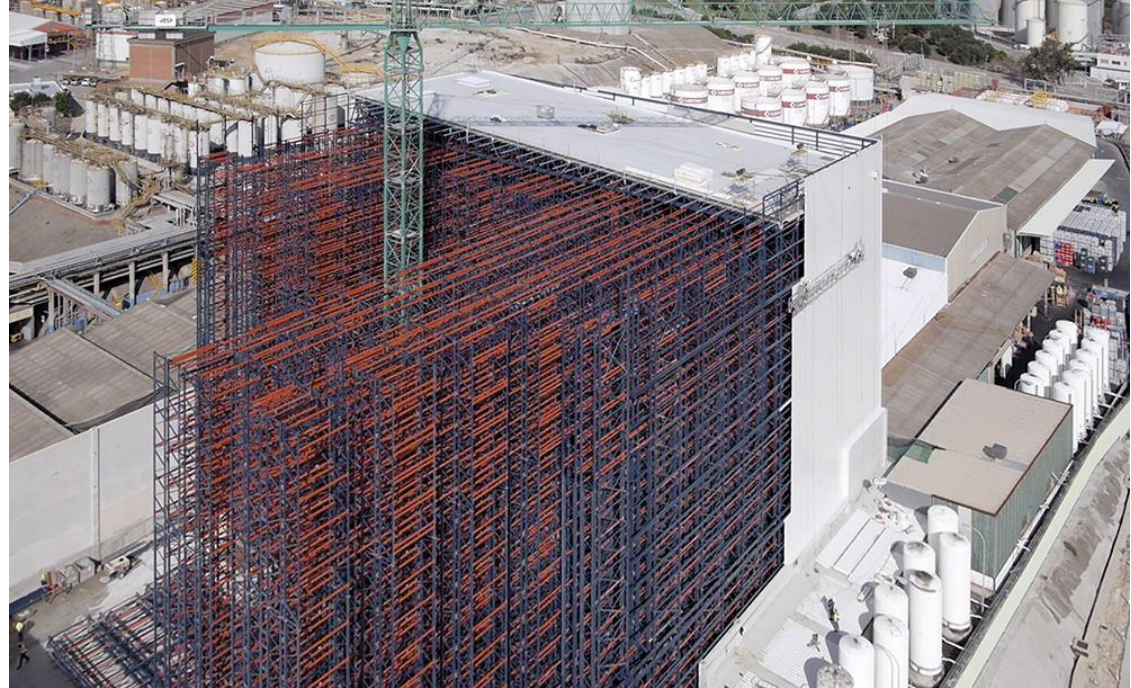


[Video 00:41](#)

Building developments – Clad Rack Construction



- The pallet store building itself can be a clad rack structure where the racking supports the external cladding.
- 15% construction cost saving (approx.) over standard portal frame construction.
- Roof camber reduced to 0.5° - can add 1.5 metres to clear internal height
- Generally used for >25 metres high



Building developments – Reduced Oxygen Environment

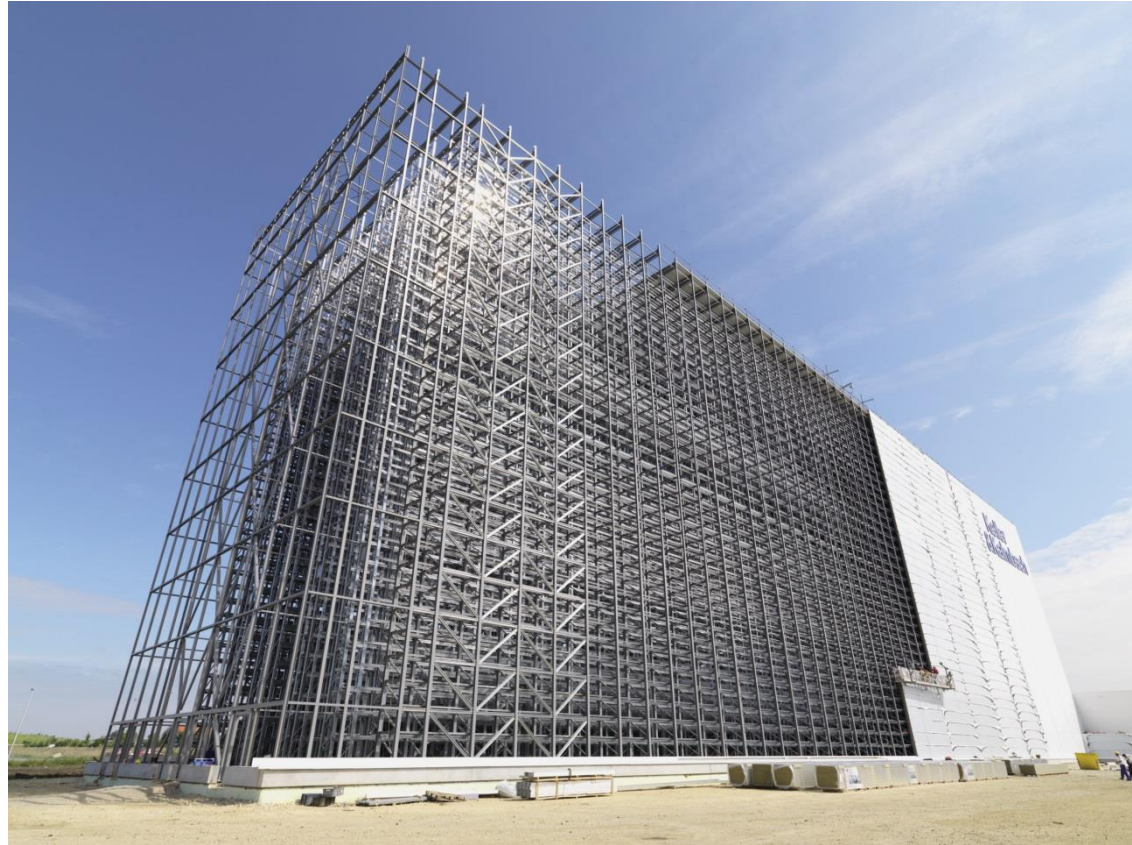


Possible to construct a reduced-oxygen atmosphere

- Prevents fire
- No need for sprinkler systems
- Offers 20% cost saving over the cost of fitting a sprinkler system

[Video s + 01:48](#)

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3

*Internal
Transport*



Internal Transport

- Autonomous Vehicles
 - Pallet transportation
 - Pallet/cage towing
 - Tote handling

Internal Transport



What do these have in common?

1



2



3



Internal Transport



AGV Systems

Usage

- Link between production and warehouse
- Marshalling of outbound loads

New Developments

- 3D camera and GPS technology – totally free roaming
- Improved software – maximise utilisation
- Lithium ion batteries and Hydrogen fuel cells (in development)



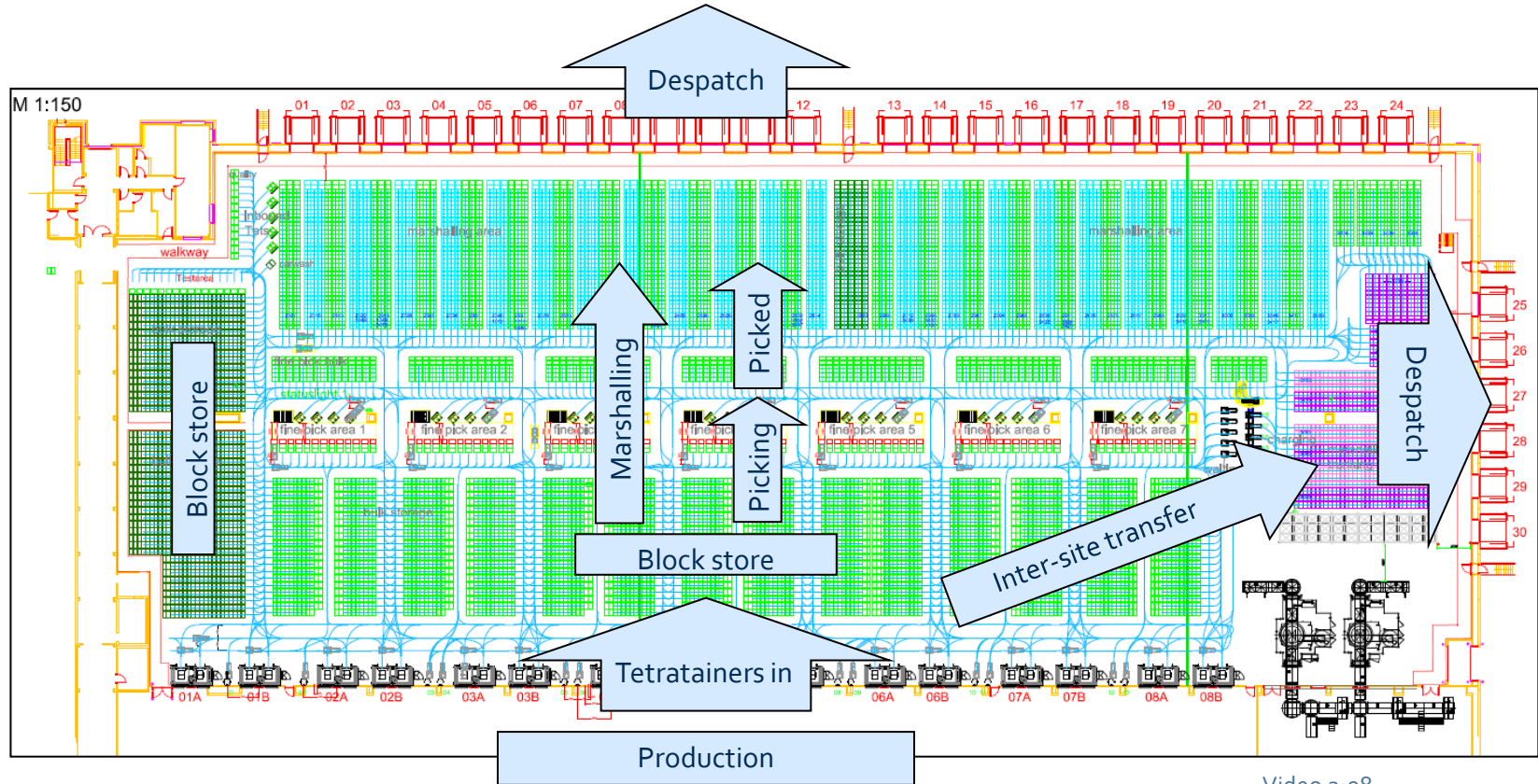
Case Study: ARLA FOODS – Aylesbury



Client Requirements:

- Green Field location
- Handle 240,000 litres of milk per hour in Phase 1
- Operate 24 hours per day
- Guaranteed availability
- No congestion or delay
- Feed Tetrainers from production lines to/from chill store to marshalling

Case Study: ARLA FOODS – Aylesbury



[Video 2:08](#)

Case Study: ARLA FOODS – Aylesbury



Special Features:

- Special design of AGV to handle Tetrainers
- Lithium Ion batteries gave 24/7 availability
- 18 off fully automated charging stations
- Master Control software with integrated Transport Manager



Case Study: ARLA FOODS – Aylesbury



Solution:

- 75 off AGV's
- Constant Route Optimisation
- Integrated front and rear personal protection laser scanner
- "Politeness" button to temporarily stop AGV to allow personnel access



AGV Tote Systems



- Several manufacturers offer tote based transportation systems
- Used when complex routing required
- Safe and versatile

[Video](#)





4 *Palletisation*

Palletisation

What are the Trends?



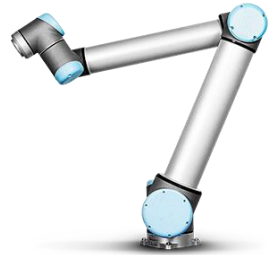
Palletisation

– Cobot

Cobot

&

Robot

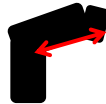


~ 30 kg

~ 10 kg

LOW

1,30 m



2150 kg

300 kg

HIGH

3,15 m



Product Development I Robotics status summary



Experience / challenges so far

- Cobots have limitations -> in many cases need traditional robots
- Cobots and Robots are only part of solution
- Processes must be automated before and/or after Cobot station
- Always local/ regional partners needed – must work with many integrators
- Implementation can take up to 9 months
- Procurement rules – minimum three offers difficult to follow



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[Video](#)



5

Picking



Smaller Case Sizes

Increased levels of eaches picking

Increased use of AGV

Increased use of Robotics

Full Case Picking



Manual

- Pick to pallet on truck

Semi-Automated

- Pick to pallet on truck
 - Voice technology
 - Glasses/vision technology
 - Pick-by-light (truck mounted)
- Truck automation
 - Truck follows picker
 - Truck can move between aisles
- Layer pick to sequencing buffer to manual pick station
 - (as at Asda NDC, Warrington)

Fully Automated

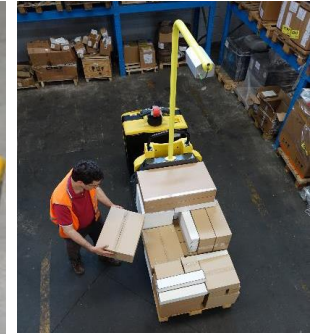
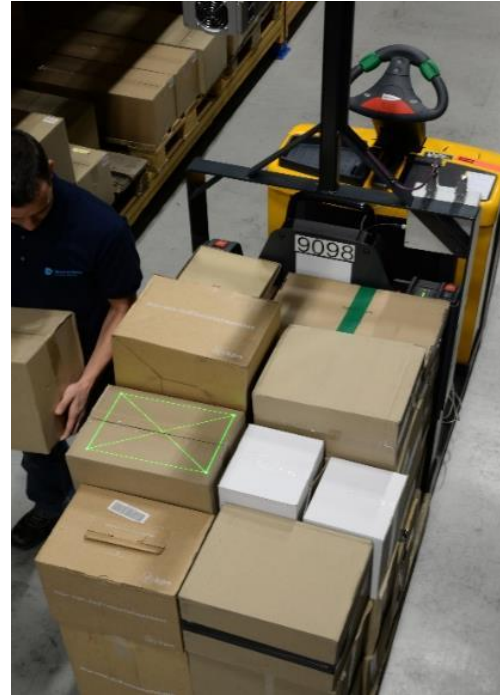
Full Case Picking



Semi-Automated using Stack Assist Tool (SAT)

- Retro-fit to most LLOPs
- Reduces need for re-stacking
- 15 – 20% productivity improvement
- Improved load stability
- Improved load fill

[Video 1:30](#)



Full Case Picking



Smart AGV – Pick'n'Go

- Retro-fit to most LLOPs
- Reduces walk distances
- 35 – 50% productivity improvement

[Video](#)



Eaches level picking



Intelligent Gripper Technology

Maximum Versatility



Central unit for small and medium size items

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Three Fingers for light or unstable items



Central unit plus three fingers for large items

[Video](#)

Small AGV

Pick to Tote or shelf



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[Video](#)

High Speed Tower

Goods to Person System



- Up to 1,000 picks per hour
- Up to 12,000 totes storage
- Up to 35 kg per tote
- Simultaneous picking and replenishment
- Light-guided picking
- Put-to-light pick stations

[Video](#)





6

*The 12 point
guide to running
a successful
project*

Developing the Correct Solution



- Automation is inherently suited to many of today's supply chain demands
- Logistics automation brings tangible benefits
- Implementation requires careful management at every stage



Developing the Correct Solution



The AMHSA 12 Point Plan to a successful project

Plan Early

...to allow time to consider every aspect of the business and possible future scenarios

Prioritise

...your system priorities in terms of cost, quality and flexibility



Developing the Correct Solution



The AMHSA 12 Point Plan to a successful project

Create Partnerships

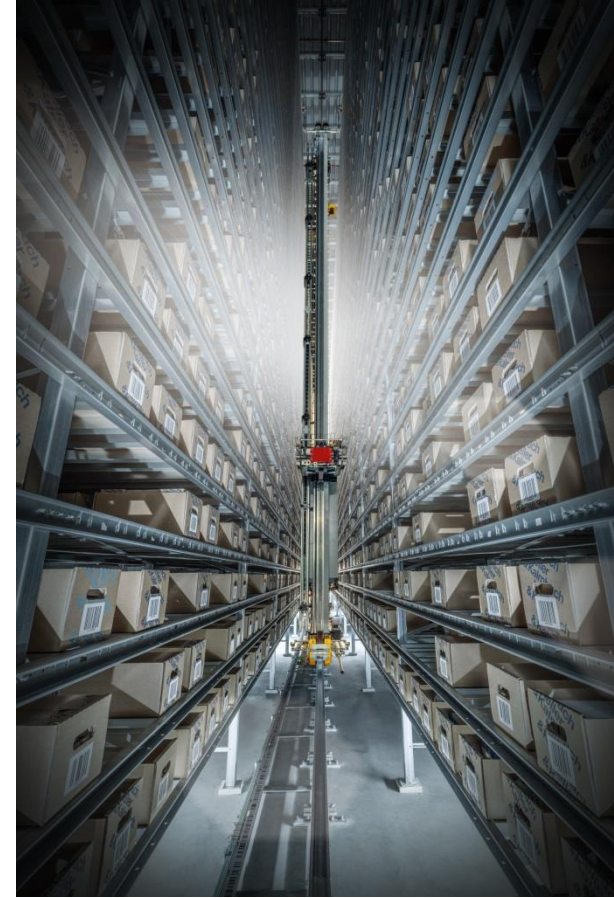
...foster a partnership approach and include all parties

Analyse Data

...you will need to provide a comprehensive set of relevant data

Allow for Growth

...agree the expected growth factor for your business



Developing the Correct Solution



The AMHSA 12 Point Plan to a successful project

Understand Functionality

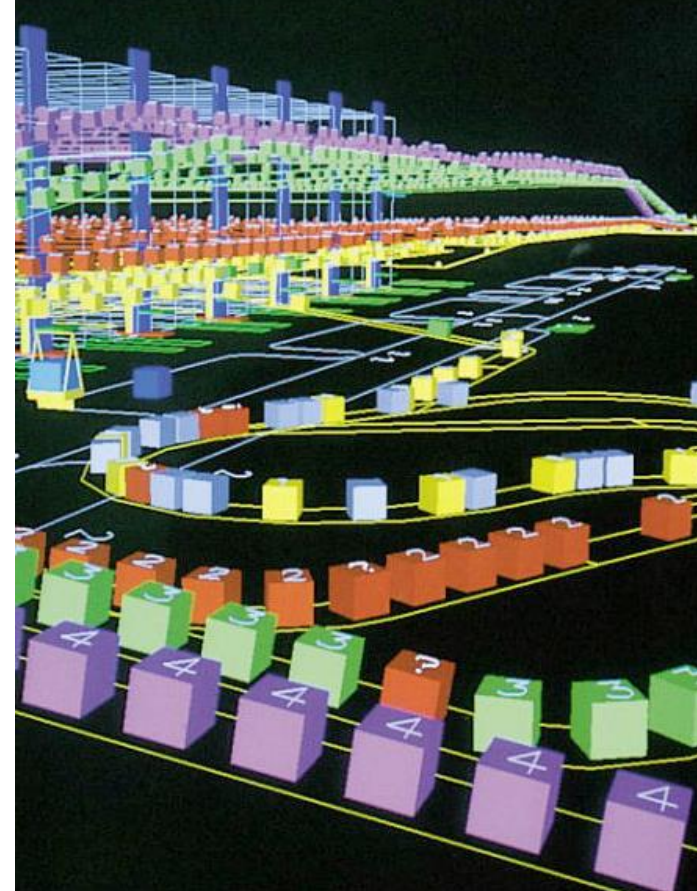
...ensure full understanding of the functionality of the WMS and WCS

Simulate

...agree the scope of any simulation

Design for Downtime

...include exception routines for critical equipment downtime



Developing the Correct Solution



The AMHSA 12 Point Plan to a successful project

Choose Suppliers Wisely

...select a competent main contractor and respected sub-contractors

Construct a Critical Path Analysis

...to show the effect of planning data from all parties, with drop-dead dates



Developing the Correct Solution



The AMHSA 12 Point Plan to a successful project

Set Realistic Targets

... for design, build and implementation
(including acceptance testing and training)

Allow for Migration

...there will be teething problems!

www.amhsa.co.uk

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Thank you



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