DHL GLOBAL TECHNOLOGY **CONFERENCE 2015**

Breakout session: Augmented Reality in Logistics

Dubai, 16th April 2015

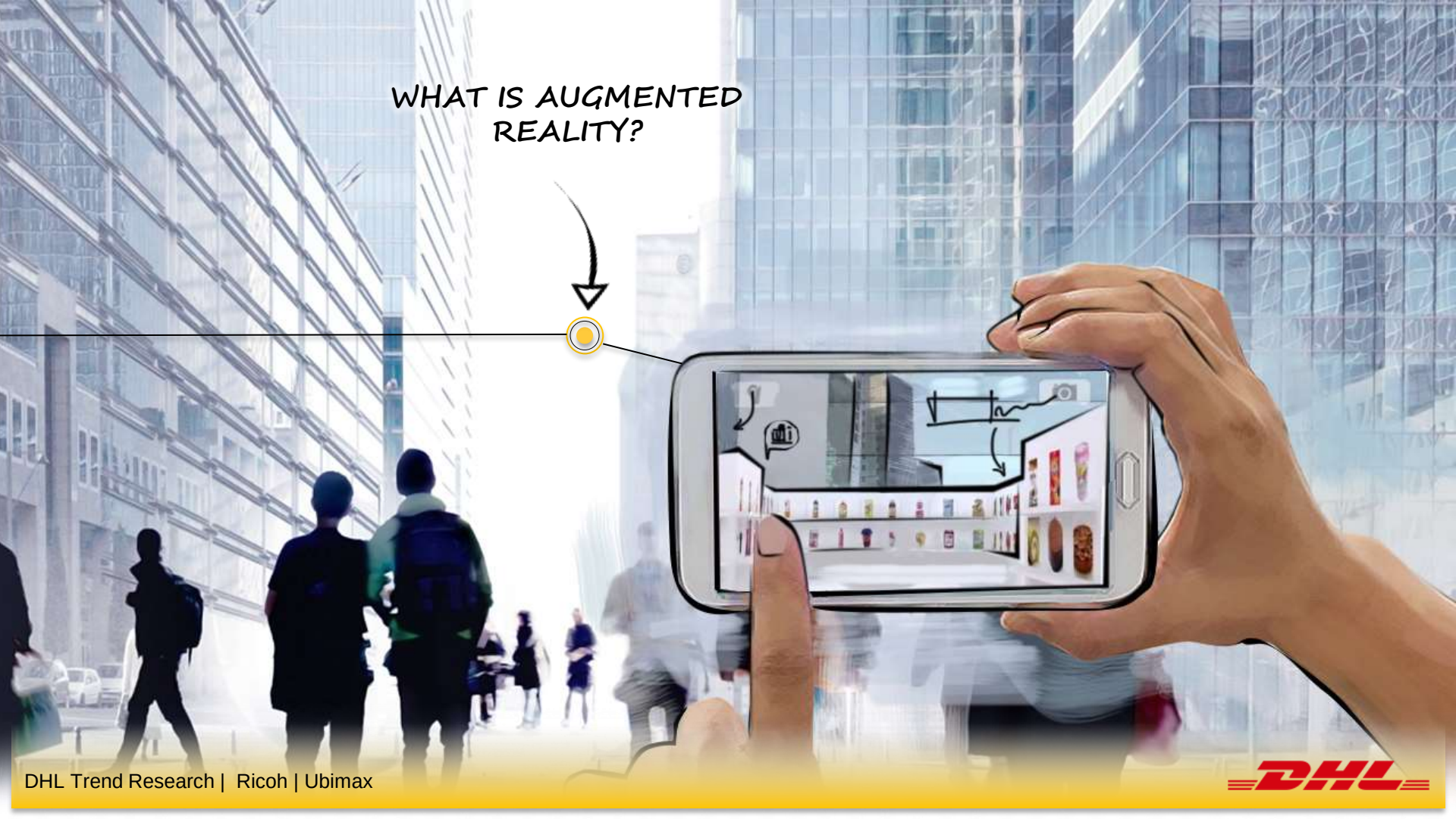
WHAT WILL HAPPEN IN THIS SESSION?

Agenda

1. **Why Augmented Reality?**
   Introduction of topic and purpose of discussion
2. **What are some of the use cases for the logistics industry?**
   - Overview of augmented reality @ DPDHL
   - Use cases Warehousing/ Transport/ Last Mile
3. **Results of first AR pilot „pick by vision“ by Ricoh**
   Set-up, results and next steps
4. **Live demonstrations of “pick by vision” use cases**
   - Live demo with Google and Vuzix Glasses
   - Showcase/video of potential future applications
5. **Short voting activity!**

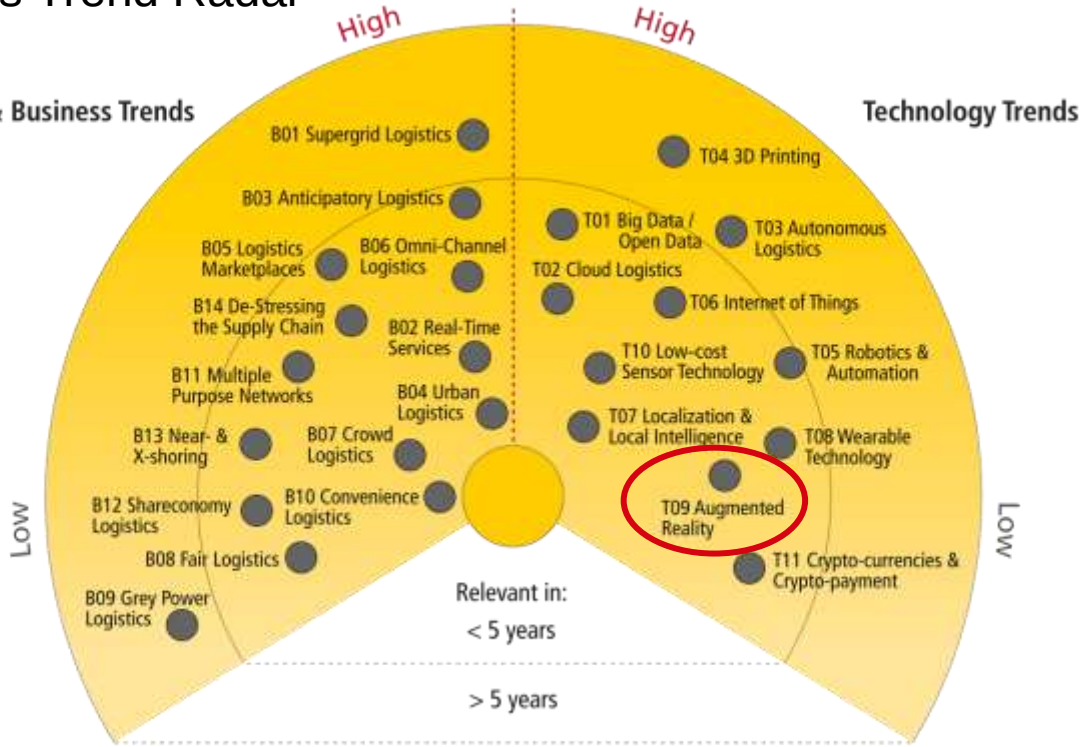
Facilitators

- DHL: Dr. Markus Kückelhaus, Gina Chung
- Ricoh: Pieter-Jelle van Dijk
- Ubimax: Jan Junker


WHAT IS AUGMENTED REALITY?

WHY AUGMENTED REALITY?

DHL Logistics Trend Radar



Source: DHL Trend Research

TREND RESEARCH VALUE CHAIN

Augmented Reality

1
TREND RADAR

Research phase initiated Feb 2014

2
TREND REPORT

AR Trend report published June 2014

3
INNOVATION CENTER EXHIBIT

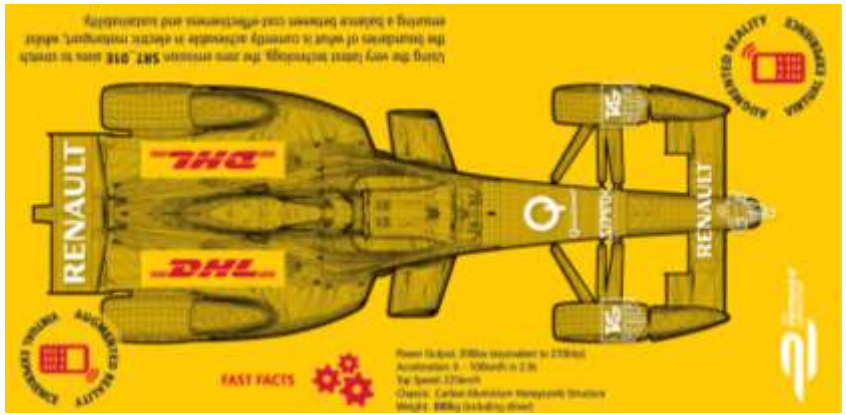
Exhibit planned for Innovation Centers in Troisdorf and SG

4
PROOF OF CONCEPT

Successful pilot with DSC/Ricoh Dec 2014

BEST PRACTICE CONSUMER APPLICATIONS

Live Demo



Source: DHL, Wordlens

CURRENT AND UPCOMING DEVICES

Vuzix M100

Google Glass Explorer

Epson Moverio BT-200

META Spaceglasses 01

Lumus DK-40

Sony SmartEyeglass

Knapp Kisoft Vision

Omnivision OVP2200

Recon Jet

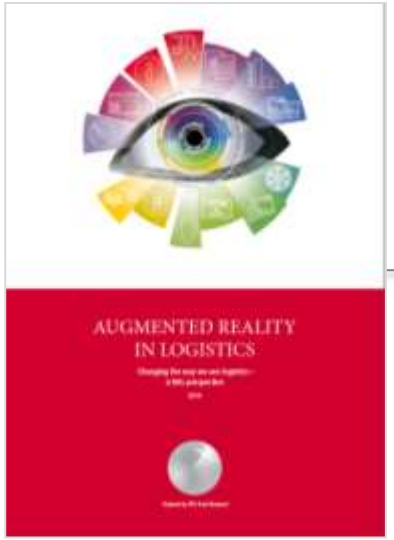
Si14 GlassUp

Brother AirScouter

Microsoft Hololens

AUGMENTED REALITY IN LOGISTICS

Trend Report launched at last year's technology conference. First report of it's kind focusing on 11 concrete use cases along the supply chain.



Source: DHL Trend Research, www.dhl.com/augmentedreality

AUGMENTED REALITY IN LOGISTICS

1

Augmented Warehouse

2

Future of Transportation

3

Last-mile: Future Postman

AUGMENTED REALITY IN LOGISTICS

1

Augmented Warehouse

2

Future of Transportation

3

Last-mile: Future Postman

1). AUGMENTED WAREHOUSE

Source: DHL Trend Research

Warehouse Operations:

Vision Picking, Packing & Sorting

- Warehouse staff are equipped with smart glasses that can barcode scan and assist with tasks to increase productivity and reduce errors

Value-Add: Assembly & Repair

- Assembly and repair teams are equipped with smart glasses that blends in visual step-by-step instructions for the task and identifies any quality issues to the worker

AUGMENTED REALITY IN LOGISTICS

1

Augmented Warehouse

2

Future of Transportation

3

Last-mile: Future Postman

2). FUTURE OF TRANSPORTATION

Source: DHL Trend Research

Dynamic Traffic Support

- Replacement of navigation systems in delivery vehicles with AR. Critical information can be superimposed such as cargo temperature, surrounding threats, vehicle status

Completeness Check

- AR devices register if a delivery is complete by capturing pallet and parcel numbers, volume and even check if there are any damages.

AUGMENTED REALITY IN LOGISTICS

1

Augmented Warehouse

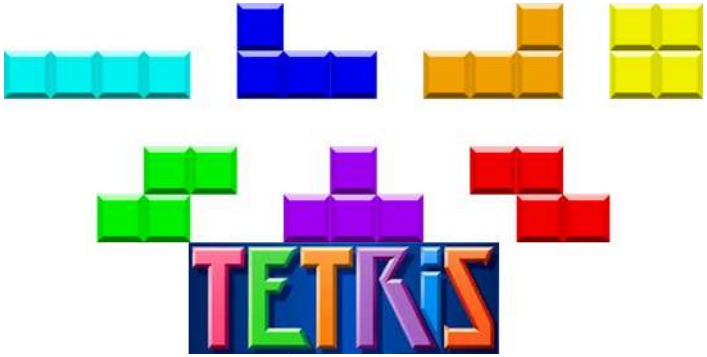
2

Future of Transportation

3

Last-mile: Future Postman

3). LAST-MILE: THE FUTURE POSTMAN



Parcel Loading & Drop-off

- Save time and improve parcel handling by using AR to optimize parcel loading, highlight the correct parcel in the van for drop-off and overlay parcels with information (fragile, weight etc.)

Last-meter Navigation

- AR to identify the correct building and entrance as well as indoor navigation. A learning system is able to add user-generated content to the AR map (e.g. A hidden entrance)

Source: DHL Trend Research

AUGMENTED REALITY ROADMAP AT DHL

Successive POCs using more advanced devices planned in 2015

Q4 2014

Ricoh Vision Picking, NL

Goal: lighthouse productive pilot to test feasibility of vision picking using the Vuzix M100/Google Glass in a live operational environment

Key measure: productivity gain

Q1 2015

Vision Sorting

Goal: POC for commissioning process at the our sorting center using augmented reality smart glasses from Epson (still needs 1 year before ready for productive usage)

Key measure: error reduction

Q3 2015*

Vision Picking, UK

Goal: visionary POC to eliminate barcode scanning using Meta's see through augmented reality glasses for vision picking. Meta glasses still need 2 to 3 years before ready for productive usage

Key measure: error reduction, documentation

Complexity

Source: DHL Trend Research | *TBC

Ricoh Europe Supply Chain Management

RICOH
imagine. change.

DHL Global Technology Conference 2015

Pieter-Jelle van Dijk,
Director Operations RESCM
Leader Global Team (Logistics)

Introduction

CONNECT

Pieter-Jelle van Dijk
Director Operations
Leader Global Team Logistics
Member of the European SCM Council

Ricoh Europe SCM
Tel: +31 164 280 620
Mobile: +31 6 2158 3834
Pieter-jelle.van.dijk@ricoh-europe.com

BACKGROUND

- 17 Year in the logistics services industry
- Now 6 Years with Ricoh

MY 2015 GOAL

Climbing the Aple d'Hues 6 times on 1 day

Raising funds for Cancer research.
KWF

http://deelnemers.opgevenisgeenoptie.nl/acties/pieterjelle-vandijk/pieter-jelle-van-dijk/

Project Summary

BACKGROUND

- Joint initiative
  - Ricoh Europe SCM
  - DHL Supply Chain & DHL Trend Research
- 3 weeks pilot (December 2014)
- Trolley picking solution with Google Glass & Vuzix M100
- Using Ubimax's software and server

BENEFITS FROM VISION PICKING

- Productivity increase from increased speed/pick
- Improvement of picking accuracy
- Satisfied and engaged employees
- Reduction in paper
- Reduction in trainings times and language dependency*

Prove that smart glasses can be used for order picking in a more cost effective manner than RF scanners and paper pick lists

SET-UP

3 weeks of successful productive order picking

Pick-by-vision used by **10 order pickers**

More than **9,000 orders** fulfilled

More than **20,000 items** picked

Source: DHL Trend Research,*not in scope of pilot

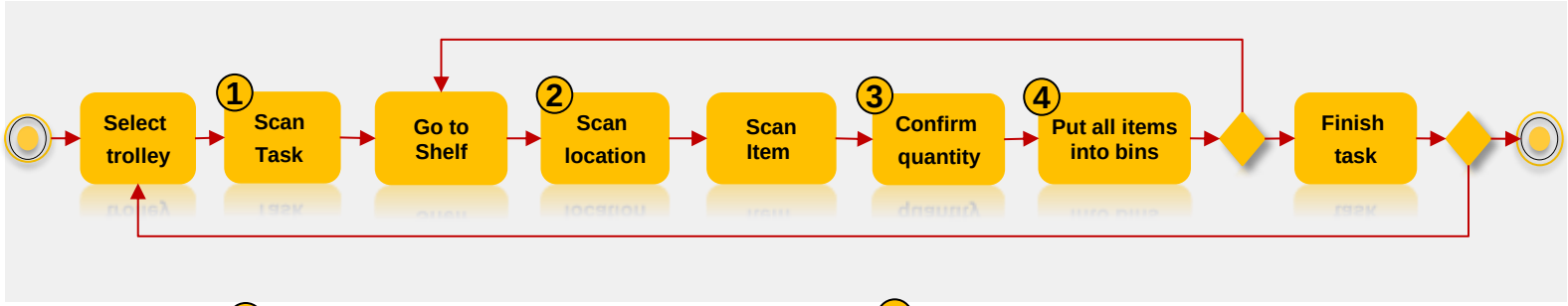
Current Picking Process

1

- Paper pick list displayed in a non-user friendly format
- More prone to error

3

- Errors arise from items that are single units
- E.g. picker takes 3 packaged boxes instead of 3 single units



2

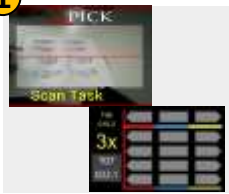
- Time lost in putting the RF scanner back and forth away to scan and sort items.

4

- Up to 15 to 30 possible bins per trolley - each bin is linked to a customer order
- Errors and time lost from reading pick list to locate the right bins for items

Vision Picking Process

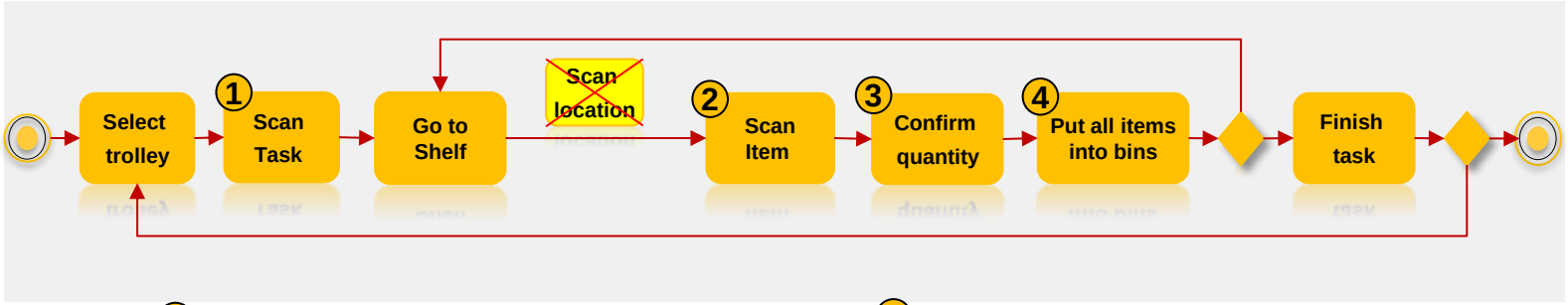
1



- Smart glasses can scan login and task ID
- All task information integrated into user interface

3

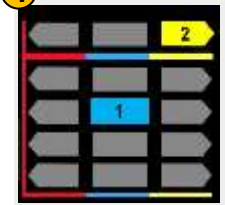
- Smart glasses display warning picture for items with this risk only



2

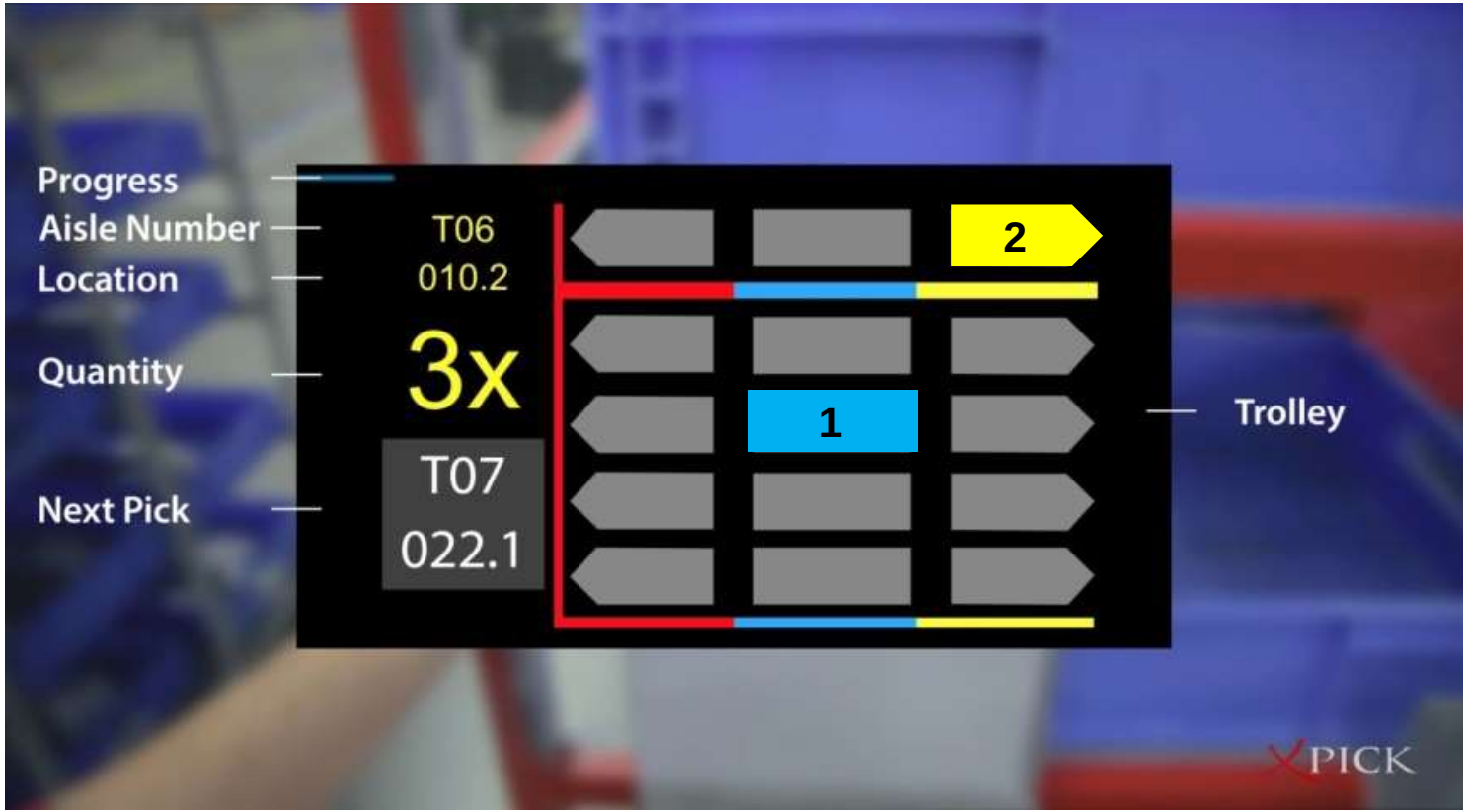
- Smart glasses can barcode scan, has voice functionality to confirm all units picked
- Location scan was not include in the pilot (compensated in Time analysis)

4



- Trolley represented graphically
- Greatly increases efficiency for sorting products into bins

User Interface Explained



Video: Pilot, December 2014

Overview of Results

RICOH
imagine. change.

QUALITATIVE RESULTS

- User surveys show positive feedback with the exception of people with serious eye problems
- Areas for improvement – stronger scanning capability of the Google Glass, smart glass form factors, stable connectivity to server

USER FEEDBACK

- *"Much easier and faster to operate"*
- *"Quick and error free"*
- *"Great to have hands free"*
- *"You barely feel it once you are wearing it"*
- *"Need to get used to it first, but easy afterwards"*

QUANTITATIVE RESULTS

Source: DHL Trend Research

Conclusion and Next Steps

Smart glasses have relatively small investment and faster payback in comparison to other solutions such as full automation and pick-by-light.

However, a number of challenges needs to be addressed before vision picking can be seriously considered for implementation:

- **Hardware limitations:**
  - Smart glasses tested are consumer devices - not made for industrial usage
  - Hardware lifetime in productive environment relatively unknown due to newness
  - Battery life only 30min without ext. pack
- **Health and safety:** few studies on long-term effects of wearing monocular smart glasses. Concerns from workers councils.
- **IT support:** solution required if vision picking integrated into WMS
- **Legal:** data protection, devices potentially vulnerable to hacks

UBiMAX

Ubiquitous Computing Experts

Wearable Computing Company

- **European market leader** for wearable computing solutions
- **Experienced team** with extensive track-record
- Senior advisory board consisting of **wearable computing pioneers**
- Strong **partner network** with industry market leaders

GLASS · VUZIX M100 VAR · EPSON Moverio BT-200 VAR · Pioneer · MOTOROLA HC1 VAR · brother AirScouter VAR

- Office locations in **Bremen**, **Munich** and **Wiesbaden**

Central Platform

…

Innovative Solutions

XPICK · XMAKE · XBUILD

…

Satisfied Customers

BMW · DHL · DAIMLER · TOYOTA · WS

…

VISION SORTING

Sorter takes one good from the conveyor belt and scans the item with the smart glasses. Based on marker cubes positioned above, smart glasses provides graphical Augmented Reality information of where to put the scanned good directly in the field of view of the worker, increasing accuracy.

Source: Ubimax GmbH

AUGMENTED REALITY IN THE FUTURE

Source: Ubimax GmbH

INTERACTIVE LIVE DEMO

1. DHL/Ricoh vision picking demo pilot using Google Glass and the Vuzix M100 smart glasses

2. Vision sorting demo using the Epson Moverio smart glasses

3. “3D Packer” pallet-building demo using Google Glass

BREAKOUT SESSION ACTIVITY

Please vote for the top three use cases and leave your business card if you would like to be contacted for further discussions!

Guidelines

- One your way out, please vote for the three use cases that you see have the highest **feasibility and impact** in the supply chain
- Use the dots provided **OR** if you would like to be contacted afterwards, please vote using your business card!

THANK YOU