PHYSICAL ASSET TRACKING SYSTEM

by Group 19 - BMW Group
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The Problem

What's the issue?

- Monitoring the 100 logistics vehicles operating within Hams Hall Plant
- GPS is unable to function accurately inside the warehouse
- Difficult to find cheap tracking alternatives
- Challenging to generate vehicles optimal routes
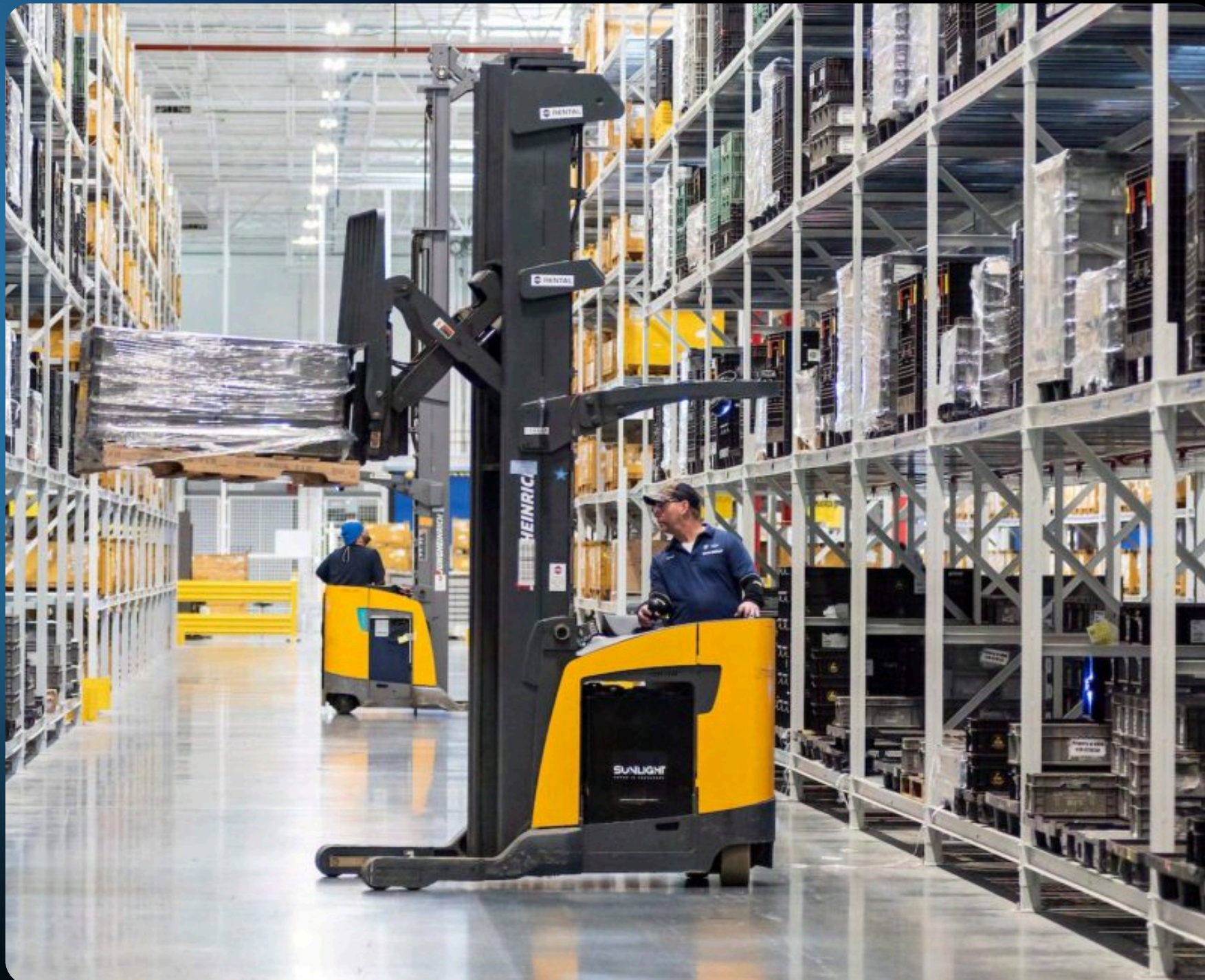
Why is this problem an issue?

- Uncertainty on the accuracy of optimal route
- Crucial for the vehicle's location to be tracked
- Delayed deliveries or even accidents may occur inside the warehouse

Plant 12.0 Hams Hall

A PHYSICAL ASSET
TRACKING VISION PLATFORM

The Solution

Introducing to the BMW Group:

- QR Codes
- RFID Tags
- RFID Readers

We will be utilising:

- Plant Hams Hall's Existing CCTV System
- The Digital Twin System

QR CODES

Diving deeper into our solution

What will they be used for?

- To help identify and track logistics vehicles

How will we do this?

- QR Codes will be laminated vinyl stickers (placed on sides of logistic vehicles)
- Existing CCTV system will capture the QR codes on vehicles
- AI imaging processing system reads QR codes from CCTV frames

SCAN ME

Diving deeper into our solution...

Innovative Use Cases of RFID Asset Tracking

RFID

INOXOFT

RFID Tags

- embedded within warehouse flooring
- assists with tracking logistics vehicles

RFID Readers

- uses Raspberry Pi circuits
- placed underneath vehicles
- programmed to send off messages to the Digital Twin

Alerts

PREVENTING & ALERTING OF INCIDENTS

- alerts users of the system of:
  - incidents
    - processed by AI
    - manually input by users
  - incidents that are likely to happen
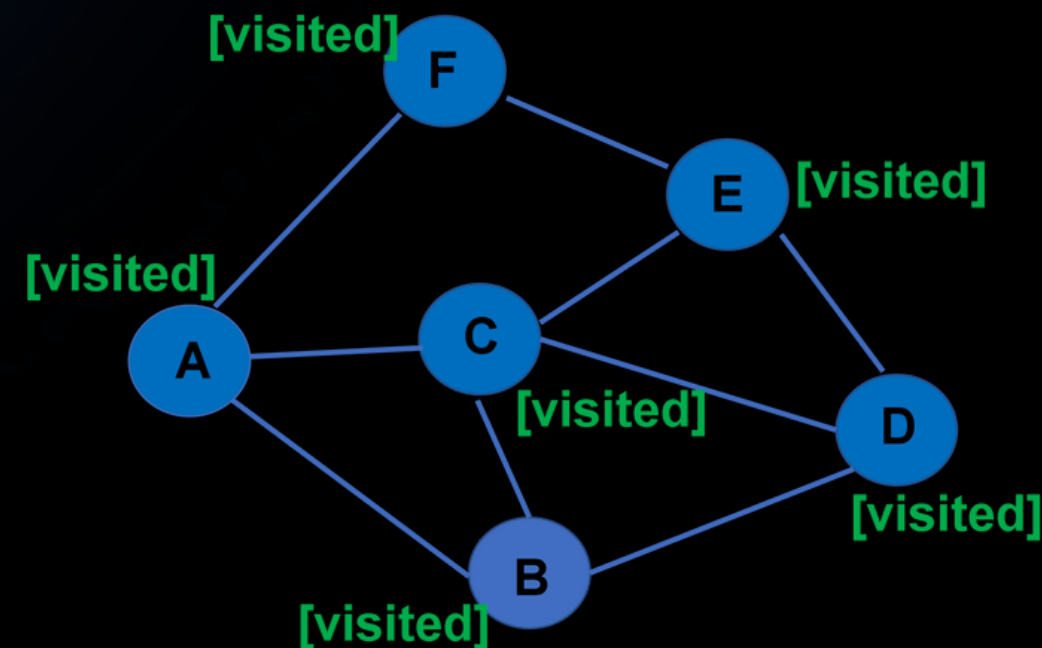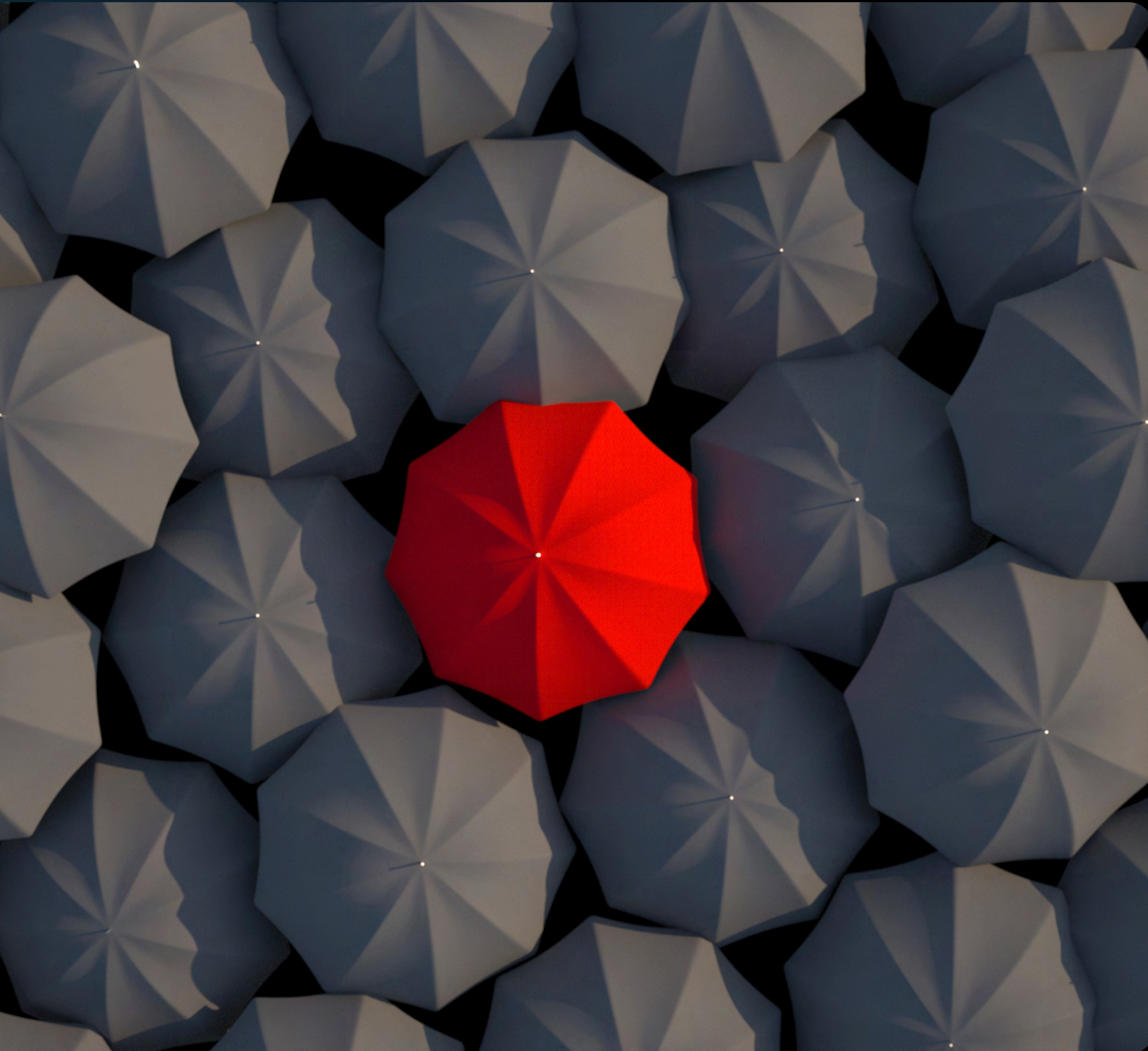 - vehicles that need repairing / replacing

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Optimised Routes

- uses Djikstra's algorithm to find the shortest path
- takes into account all vehicle's locations & areas of high traffic

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Value Proposition

WHAT MAKES OUR SOLUTION DIFFERENT?

- Specifically designed for BMW's Hams Hall Plant and its challenges
- Integrates with BMW's current systems like the Digital Twin and CCTV system
- No changes required to BMW's current infrastructure
- Uses QR codes for real-time vehicle tracking
- RFID is used on vehicles and around the workspace to track vehicles

The Market

- BMW Group - Plant Hams Hall Logistics Operations
- Large-scale warehouses with multiple vehicles in operation
- Warehouses operating logistics vehicles moving high value goods
- Warehouses looking for a simple, scalable and affordable solution to become more efficient
- Warehouses looking for relief of the pressure of HGV and forklift shortage
- Companies with inadequate solutions with the potentials of today's technologies

Traction

"A recent study by Logistics UK showed that in 2019, 79,000 EU nationals left the UK logistics industry – around 7,000 of whom were lift truck drivers."

~ Toyota Material Handling (2019)

- Remove the pressure of forklift driver deficit by increasing the efficiency of current drivers
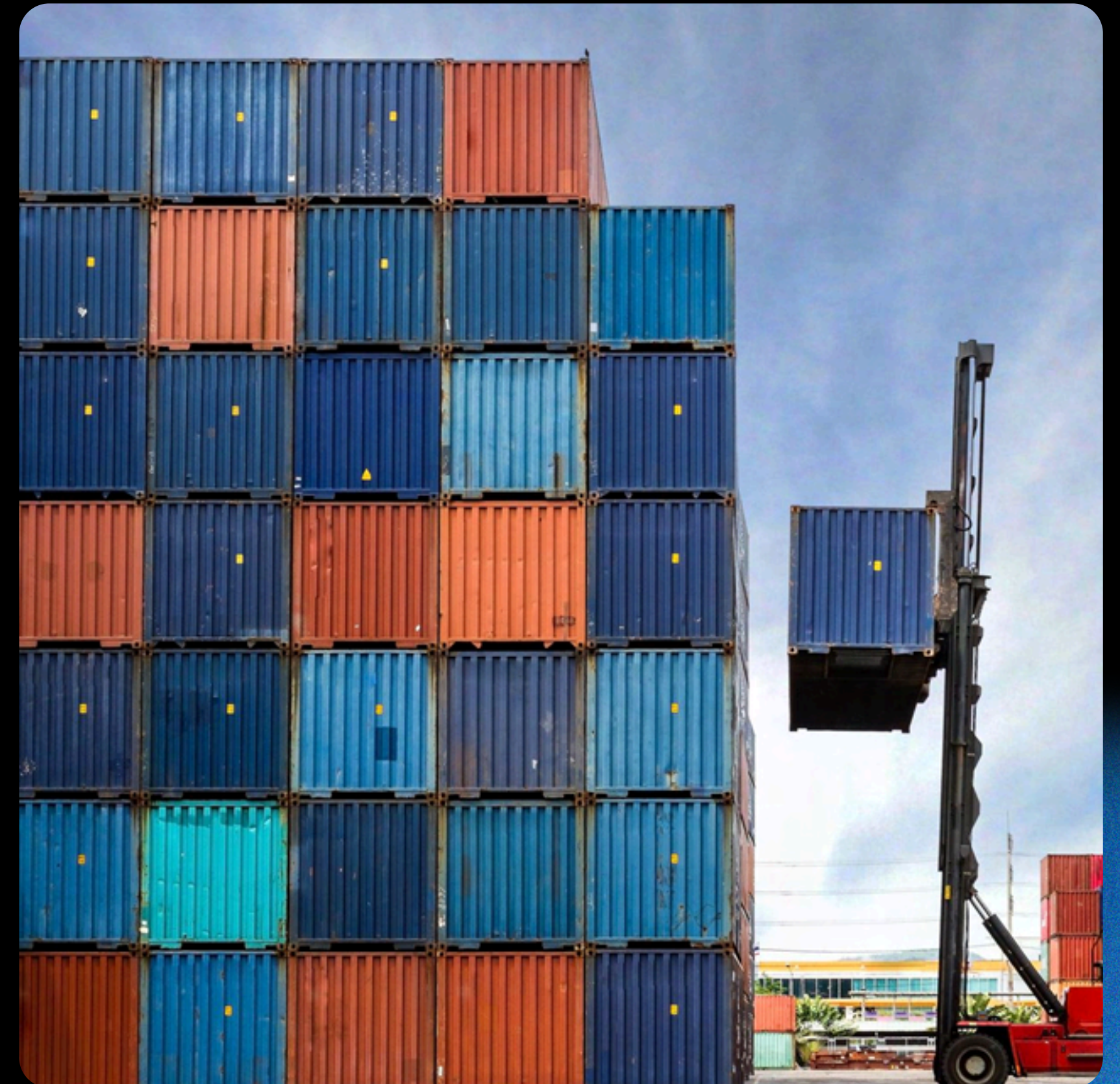
Traction

- Average UK Forklift Driver salary £25,744 (indeed)
- If the system improves by 1%,
    - savings of £25,744 annually
- If improved by 5%,
    - over £125,000 annually saved
- Could be redistributed into workers' wages in order to decrease staff rotation

The Competition

Solution	Feature
GPS Tracking System	• real time satellite based location tracking • high accuracy, requires installation of GPS devices • TrackLogik provides GPS tracking
RFID	• uses RFID tags and readers • requires installation and limited range • ideal for closed environments
Bluetooth Beacons	• cost effective, good for indoor use • requires tag for each vehicle
AI Object Recognition	• uses camera and AI to recognise vehicle • often required GPS or Bluetooth for tracking
UWB (Ultra WideBase) System	• high accuracy location tracking indoors • expensive and difficult to set up • used by Volkswagen
AGV System	• vehicles are pre programmed with routes • no need for a human operator or driver • not adaptable to real-time CCTV integration or alterations

Comparison

Feature	GPS (TrackLogik)	UWB (Volkswagen)	AGV (Toyota)	Our Solution
GPS Tracking System	YES			
Bluetooth Beacons		YES		
Uses Existing CCTV Footage				YES
AI Object Recognition				YES
RFID Tags			YES	YES
QR Codes				YES

Quarter	Funding Available	Cost Structure	Plan	Revenue Potential (£)
Q1	£1250	£154 - 100 QR code laminated vinyl stickers **SPENT: £154** **LEFTOVER: £1096**	- implement QR code part of solution - take note if it makes a change to efficiency	£6250 - reduced staff hours for 100 workers if solution increases efficiency by 1%
Q2	£1250 + £1096	£40 - QR code sticker maintenance £161.98 - RFID circuit components to test for 5 vehicles **SPENT: £220.08** **LEFTOVER: £2144.02**	- start building the RFID solution circuits on a small scale - ensure the circuits work as expected without installation	£6250 - reduced staff hours for 100 workers if solution increases efficiency by 1%

Cost & Revenue

Quarter	Funding Available	Cost Structure	Plan	Revenue Potential (£)
Q3	£1250 + £2144.02	£240 - contingency fund £423 - RFID tag circuit components for 15 vehicles £200 - embedding RFID tags into floors **SPENT: £863** **LEFTOVER: £2531.02**	- embed RFID tags into the unoccupied floor areas of the warehouse - scale up to 20 vehicles	£15625 - reduced staff hours for 100 workers if solution increases efficiency by 2.5%
Q4	£1250 + £2531.02	£240 - contingency fund £1608 - RFID tag circuit components for the leftover 80 vehicles £1000 - embedding RFID tags into floors **SPENT: £2848** **LEFTOVER: £933.02**	- scale up RFID solution to all 100 vehicles and floor areas in the warehouse	£31250 - reduced staff hours for 100 workers if solution increases efficiency by 5%

Cost & Revenue

THANK YOU

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