



# Automated Marshalling

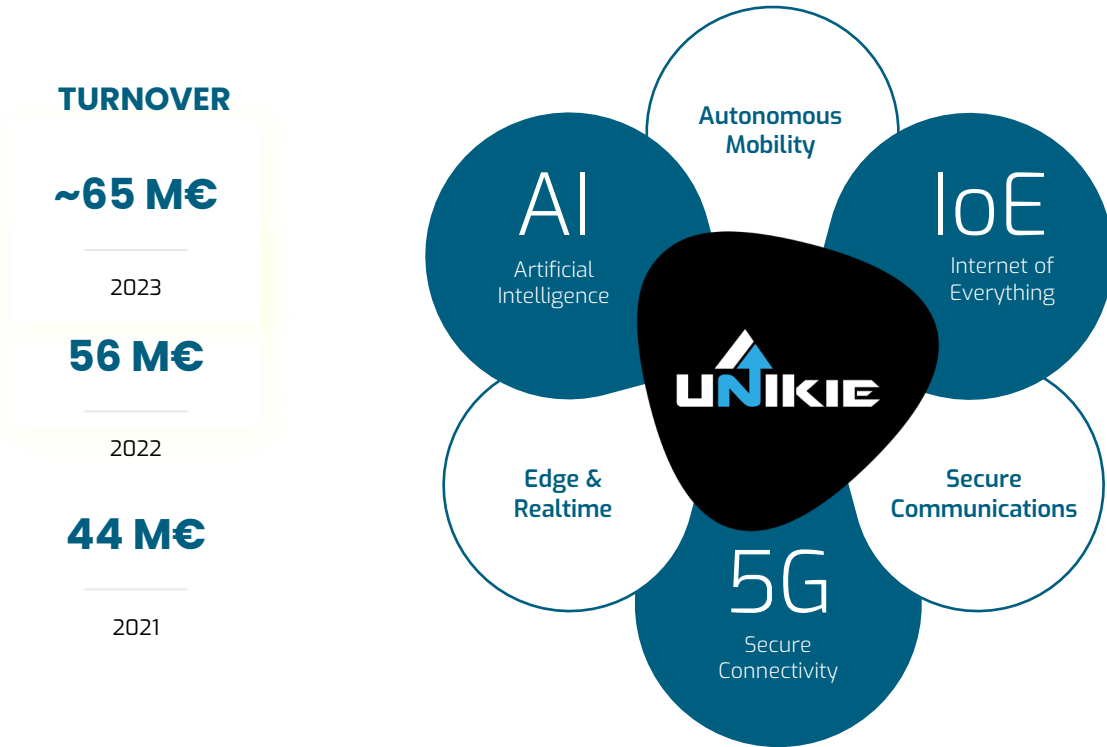
AUTONOMOUS & REALTIME TECHNOLOGY

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*Unikie Solutions Business*  
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# UNIKIE IN BRIEF

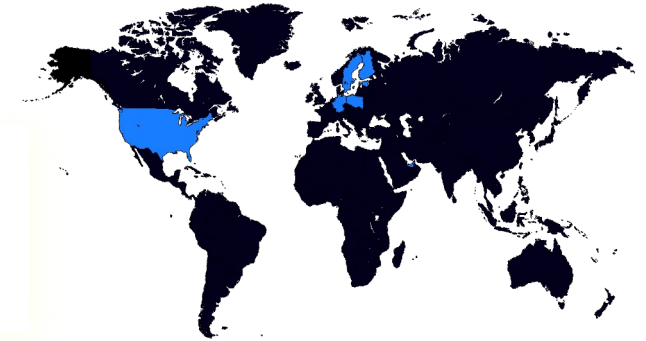
Next Generation Technology - Fast International Growth



We are a pioneering **engineering** company focused on enabling **smart spaces** by bringing intelligence to machines, vehicles, and industrial solutions.

We are the **experts** at aligning complex multi-faceted technologies like IoE, 5G, and AI to bridge enterprise systems with the physical world.

The technology we create enables our clients to **become digital leaders** in their own industries.



## Finland

Headquarters

600+

Team Headcount

2015

Year Founded

7

Countries

## UNIKIE OWNERSHIP

**Capman Growth**

Private Equity Investor

**Tesi**

Finnish Industry Investment Ltd.

**Private Investor**

**Founders**

Esko Mertsalmi,  
Seppo Kolari

**Employee Group**

Group of early stage employees

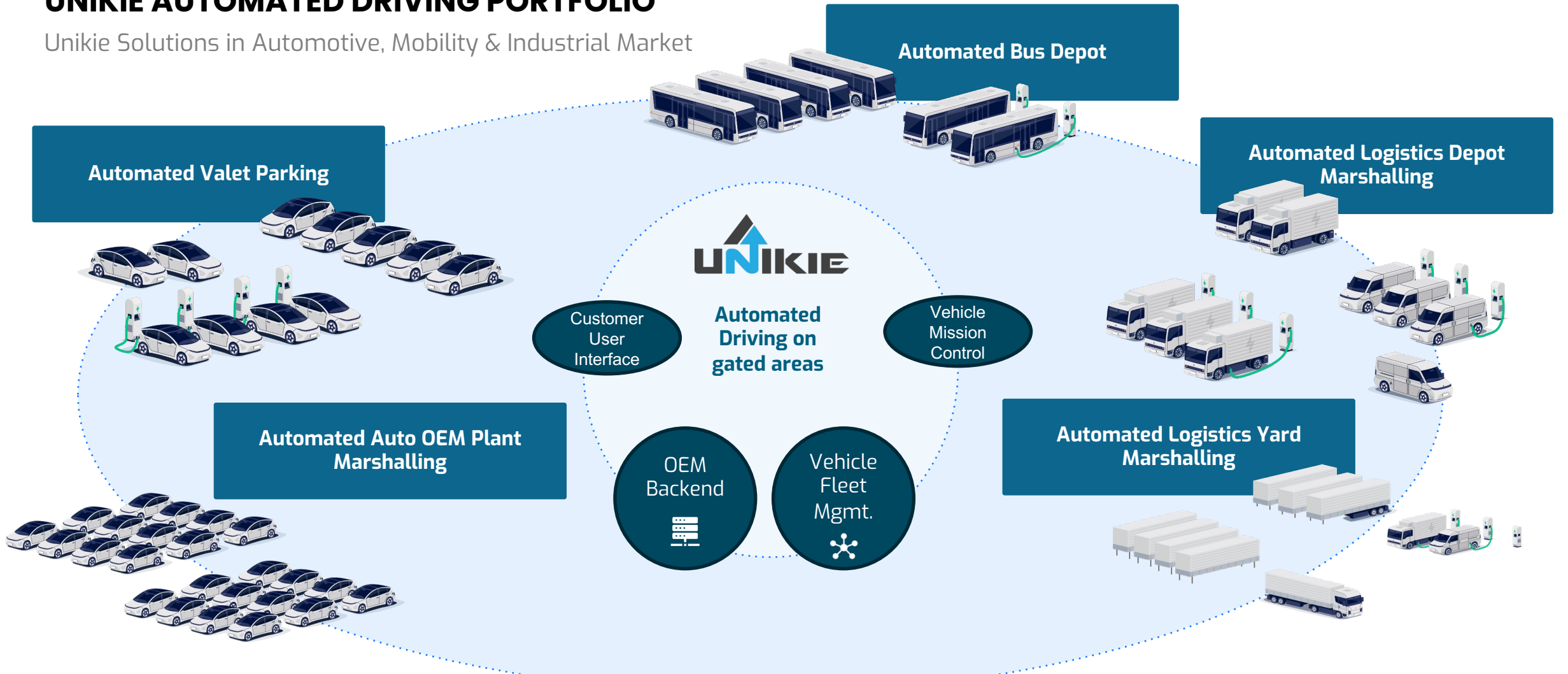
**Individual Employees**

Individual minority share holders



# UNIKIE AUTOMATED DRIVING PORTFOLIO

Unikie Solutions in Automotive, Mobility & Industrial Market



Unikie founded

Development on Autonomous Driving

Pivot to Infrastructure Based Marshalling

Automated Valet Parking Showcase in IAA Mobility 2021

Automated Plant Marshalling PoC

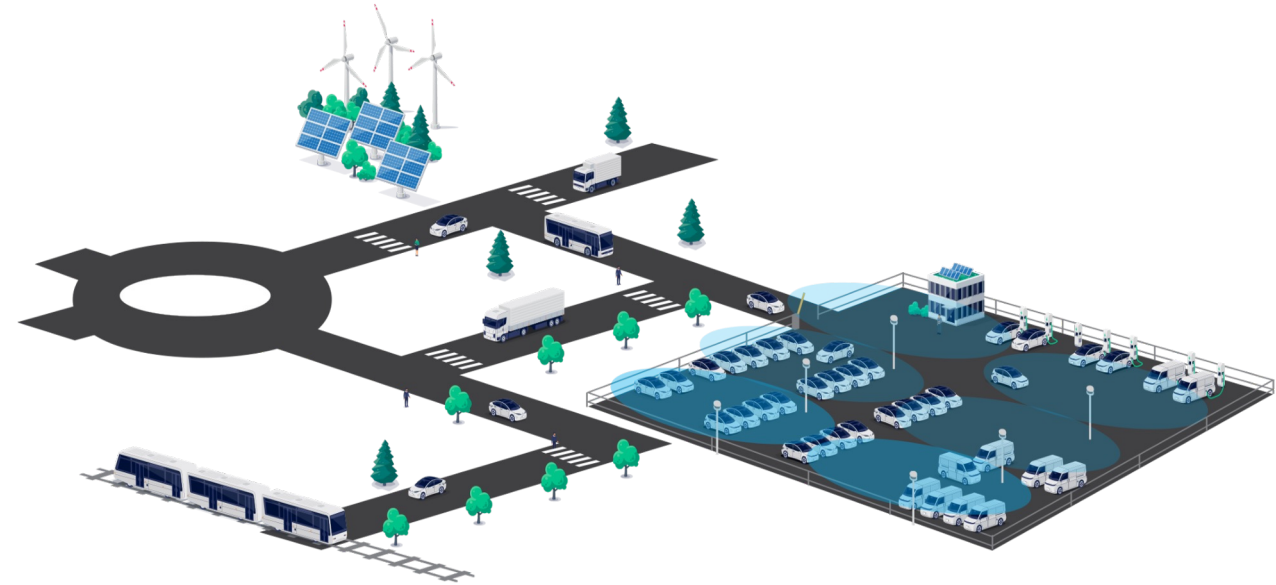
Automated Bus Depot Marshalling



# UNIKIE AUTOMATED DEPOT MARSHALLING

Business cases for private, managed / gated grounds

- Autonomous driving on public roads is still years away
- Standardized technology is already here to enable autonomous driving solutions on private, managed / gated grounds
- Unikie has already helped major European OEMs in piloting and commercially using Plant Marshalling for efficiency gains
- Unikie automated Marshalling implementations throughout the logistics chain provides returns for an OEM and their customers

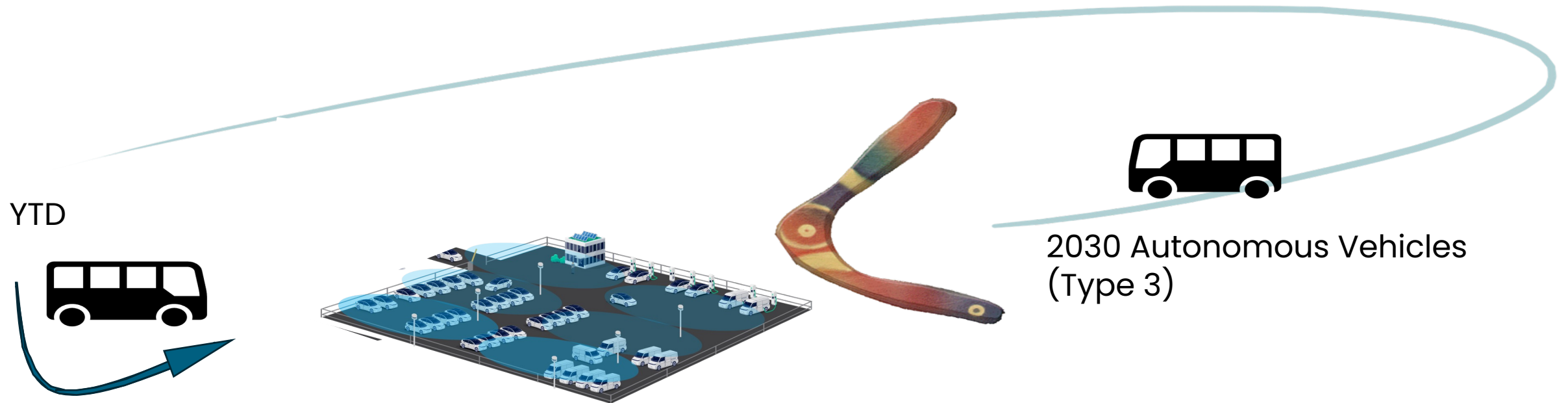


Public roads

Private, managed ground / gated area



# AUTOMATED MARSHALLING IN FUTURE ALSO IS NECESSARY FOR AUTONOMOUS VEHICLES ENTERING GATED LOGISTICS AREAS AND BECOMING PART OF THE LOGISTICS PROCESSES.



2024  
Automated  
Vehicles  
(Type 2)

## **The Automated Marshalling Market will develop from two sides**

- Remote controlled vehicles, observed by infrastructure, controlled by Automated Marshalling system
- Autonomously self-driving vehicles driving on their own, getting directions and orders from Automated Marshalling system

# UNIKIE ENABLES AUTOMATED DRIVING, FOCUSSED ON TYPE 2 AND TYPE 3 SOLUTIONS

On private, managed ground / gated areas



TYPE 1 solution is almost entirely reliant on vehicle capability,

TYPE 3 is a hybrid mainly reliant on vehicle but utilizing infrastructure for greater accuracy (see behind corners, predict traffic, see outside the vehicle etc.).

	TYPE 1	TYPE 2	TYPE 3
SENSORS	PART OF THE VEHICLE	INFRASTRUCTURE	VEHICLE AND/OR INFRASTRUCTURE
SAFETY	PART OF THE VEHICLE	INFRASTRUCTURE	VEHICLE AND/OR INFRASTRUCTURE
DECISIONS	PART OF THE VEHICLE	INFRASTRUCTURE	VEHICLE AND/OR INFRASTRUCTURE
MISSION CONTROL	FLEET MANAGEMENT SOLUTION	FLEET MANAGEMENT SOLUTION	FLEET MANAGEMENT SOLUTION

CATEGORIZATION SPECIFIED BY THE AUTOMOTIVE INDUSTRY

ISO 23374 standardization effort for fleet management of autonomous vehicles

ISO 12768 Intelligent transport systems – Automated Valet Driving Systems (AVDS)



# OUR AUTOMATED MARSHALLING SOLUTION

## MPE – MAPPING OF PHYSICAL ENVIRONMENT

- Map creation & real-time updates
- Infrastructure connected sensors
- Lidars, Cameras, Radars etc.

**i** Unikie has access to wide range of sensors and has partnerships with Lidar & Camera manufacturers

## DIGITAL TWIN

- Based on CARLA open source simulator
- Simulations based on real maps
- Weather condition simulation
- Moving obstacle models
- AD Vehicle model simulation
- Sensor models

**i** CARLA is in daily use at Unikie AD projects.

## CONTROL HUB

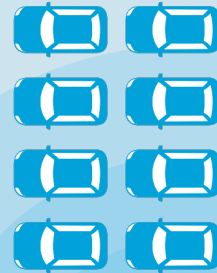
- ISO23374 compliancy
- Planning & Operations
- Traffic Management, traffic rules
- Secure vehicle Control & Trajectory planning
- Parametrisation
- Analytics & AI &MLP
- User interaction / Communication interfaces
- Visualisation

**i** Customer approved and has been invested 4 years already.

## AI VISION

- 3D Situational Awareness – Environmental model – Edge Computing
- Sensor fusion
- Object Detection, Tracking, Classification
- Positioning & SLAM
- Weather condition compensation

**i** Unikie AI Vision is customer approved and has been invested 4 years already.



5G

- Qos
- Security



ERICSSON

Unikie & Ericsson partnership in bringing 5G to automotive

## UNIKIE AUTOMATED BUS DEPOT MARSHALLING - [LINK](#)





# UNIKIE BUS DEPOT AUTOMATED MARSHALLING, BUSINESS CASE

When buses go into depots they have to stop at multiple stations for refuelling and charging, cleaning, maintenance and repairs, inspection and parking. This is what an automated bus can do in a bus depot.



**In the workshop** an automated bus can perform tight manoeuvring without damaging the bus, in a safe manner, even in mixed traffic. Workshop processes can be optimized, as busses are moving as required and as often as required.

## Washing and Cleaning

An automated bus can manoeuvre into the washing and cleaning area, or drive through the wash-station, without damage, keeping the flow through the stations.



**Refuelling and charging** can be reorganized and optimized with automated buses. For EV-Charging automated buses allow reduced investment into EV-charging infrastructure. Not every bus needs a own charging spot. Flexible charging overnight, or when needed is a new freedom.

**Parking** at tight areas and within buildings with automated busses is more flexible and agile. Optimized and reduced use of space is an advantage.



**Walk and Search** for buses and vehicles is eliminated with automated busses.

Driving into the depot the driver drops the bus at the drop off zone, Starting work the driver meets the automated bus at the pickup zone.

# GENERAL BUSINESS ADVANTAGES IMPLEMENTING AUTOMATED MARSHALLING

## DIGITAL REPRESENTATION OF ENVIRONMENT AND VEHICLES

- Simulation and analysis of optimized strategies for automated (and manual) driving and parking
- Flexible development of new and changed driving and parking strategies for individual vehicles and fleets.
- Low effort digital hd-map creation by fast lidar scanned 3D modelling
- Use of high precision 3D model for further purposes in planning and venue management

## BUSINESS EXTENSIONS

- Depot Marshalling enablement as additional sales feature towards fleet owner such as rental car companies
- Additional functional use cases without effort, e. g. change of vehicle positions for EV-Charging and cleaning
- Easy adoption to new environment and conditions
- Dynamic scaling by flexible onboarding of new venues
- Scaling effect by central and cloud-based mission control platform.
- Unlimited number of vehicles driving automated per venue
- Fast reaction on changing conditions

## BUSINESS OPTIMIZATION

- Removal of manual driving
- Optimized use of space, e. g. narrow parking
- Predefined Procedures for Handling of emergency cases
- Optimised parking & loading of vehicles during logistics process

## VEHICLE ADVANTAGES

- No vehicle damages
- No vehicle contamination
- No car-key logistics including lost keys and damaged keys
- No fraud by misused vehicles
- Optimized treatment of vehicle batteries
- Dynamic and flexible path planning by infrastructure for each individual vehicle.

## EASY SYSTEM INTEGRATION

- System integration interfaces with ERP/Logistic Systems, Production systems etc

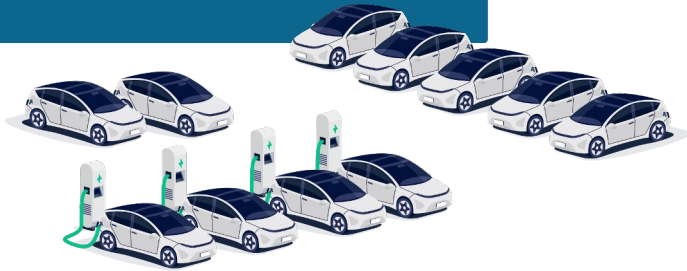
## INTEROPERABILITY

- Flexibility in mixed fleets. Similar automated driving patterns and quality with different car models
- Dynamic check in and check out of vehicles
- 100 % inventory control at any time

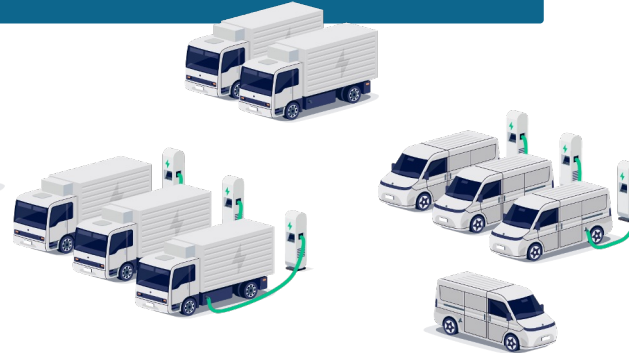
# UNIKIE TYPE 2 AUTOMATED DRIVING PORTFOLIO

Unikie Solutions in Automotive, Mobility & Industrial Market

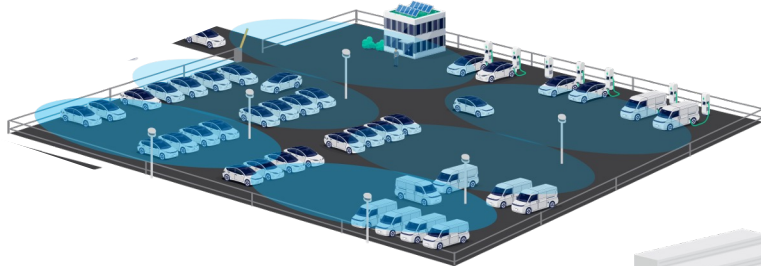
## Automated Valet Parking



## Automated Logistics Depot Marshalling



## Automated Auto OEM Plant Marshalling



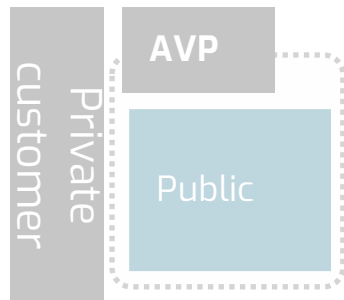
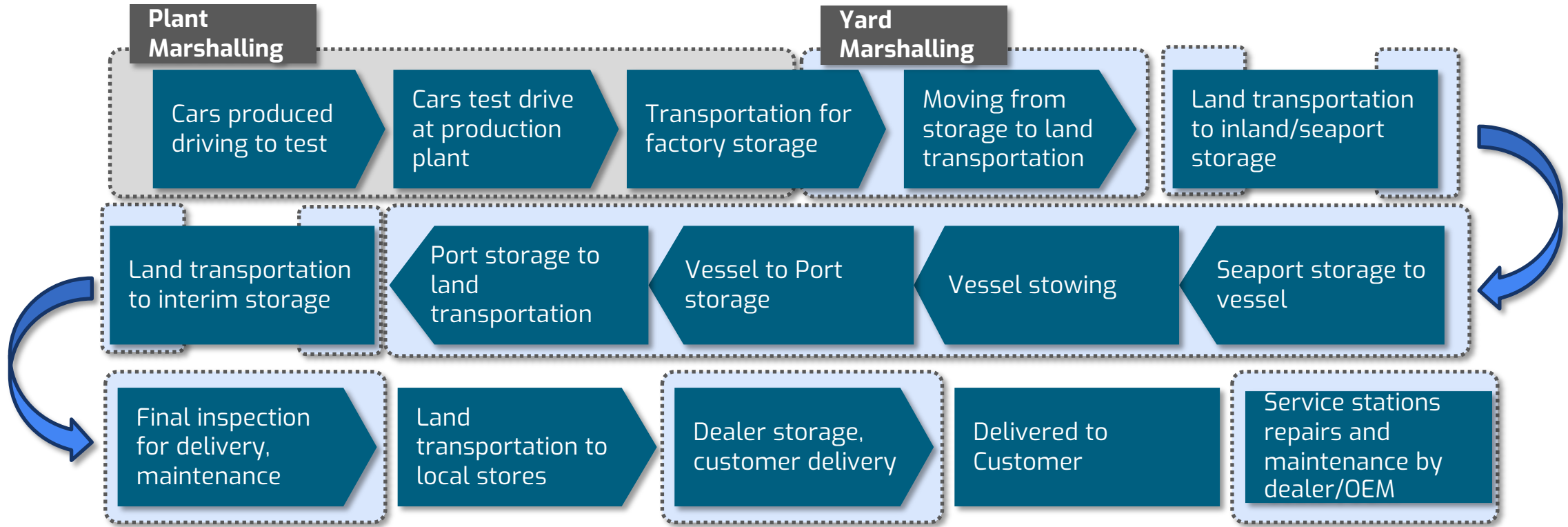
## Automated Logistics Yard Marshalling



## Automated Marshalling helps

- Passenger vehicle logistics driver shortage and efficiency by automating compounds of tens of thousands of vehicles
- Production plant logistics by extending automation between production lines and storage
- Logistics efficiency by enabling drivers to concentrate in public traffic and automating yard & depot maneuvers

# UNIKIE AUTOMATED DRIVING - MULTIPLE OEM USE CASES FROM PRODUCTION TO FLEET CUSTOMER



OEM

CUSTOMER



## UNIKIE X FORD – VOICE OF A CUSTOMER [link](#)





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<https://www.unikie.com/en/solution/automated-factory-parking/>