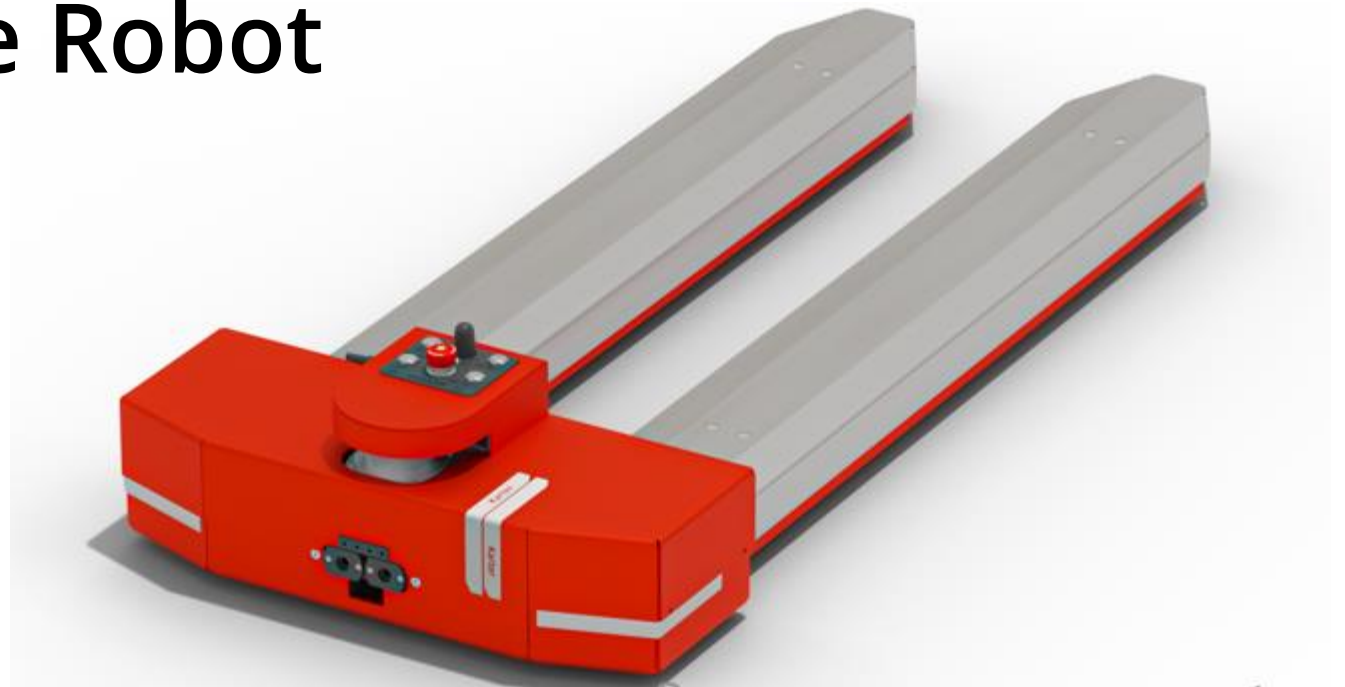


# Karter - AMR

## Autonomous Mobile Robot



# Content

- ▶ AMR – General
- ▶ Karter - Weighpack
- ▶ Karter - In Control
- ▶ The Karter Approach
- ▶ Karter Models
- ▶ Karter - Bluebotics

# AMR - General

- ▶ Autonomous Mobile Robots (AMRs) will transport materials in a safe and reliable way
- ▶ Software and technical developments have made it easier to build, maintain and deploy AMRs.

As a result investment and operational cost have decreased

- ▶ Main drivers for deploying AMRs:
  - ▶ increased safety
  - ▶ cost reduction
  - ▶ high availability
  - ▶ constant performance

# Karter

# Karter - Weighpack

- ▶ Karter B.V. is a sister company of Weighpack
- ▶ Weighpack offers state-of-the-art packaging solutions
- ▶ Innovation is part of our mission: Thinking Ahead
- ▶ The Karter AMR is a logical product line extension: transporting materials to and from our packaging lines



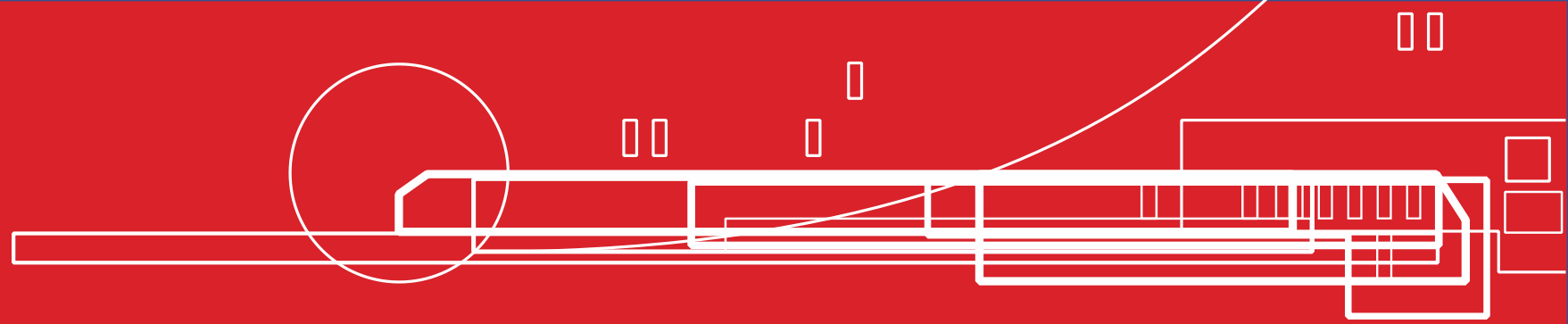
# Karter - In control

- ▶ Safe operation in manned areas
- ▶ Compact and agile
- ▶ In complete control of your processes
- ▶ Easy to configurate
- ▶ Navigation without extra infrastructure
- ▶ 10 minutes charging equals 8 hours of operation
- ▶ Communication by Wi-Fi

# The Karter Approach

- ▶ Think ahead
- ▶ Understand your logistical challenge
- ▶ Provide a solution – Karter
  - Design
  - Production
  - Installation, integration and training
  - Maintenance
  - Service
- ▶ Tailor it to your logistical process



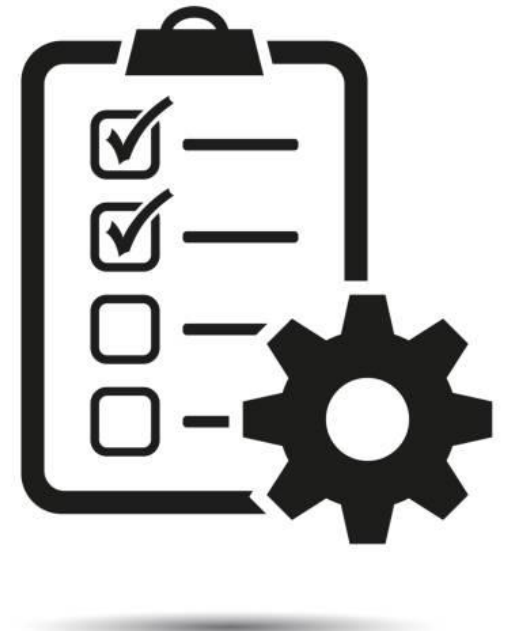


# Karter models



# Karter – general specs

- Safety: safety laser scanner and safety software
- Navigation: ANT® Autonomous Navigation Technology – natural feature navigation, based on mapping the working environment
- Position accuracy:  $\pm 1$  cm
- Speed: 2 km/h (standard), 4 km/h (option)
- Turning radius: 0 m (turns around its axis)
- Operation down to  $-25^{\circ}\text{C}$
- CE-marked



# Karter – power

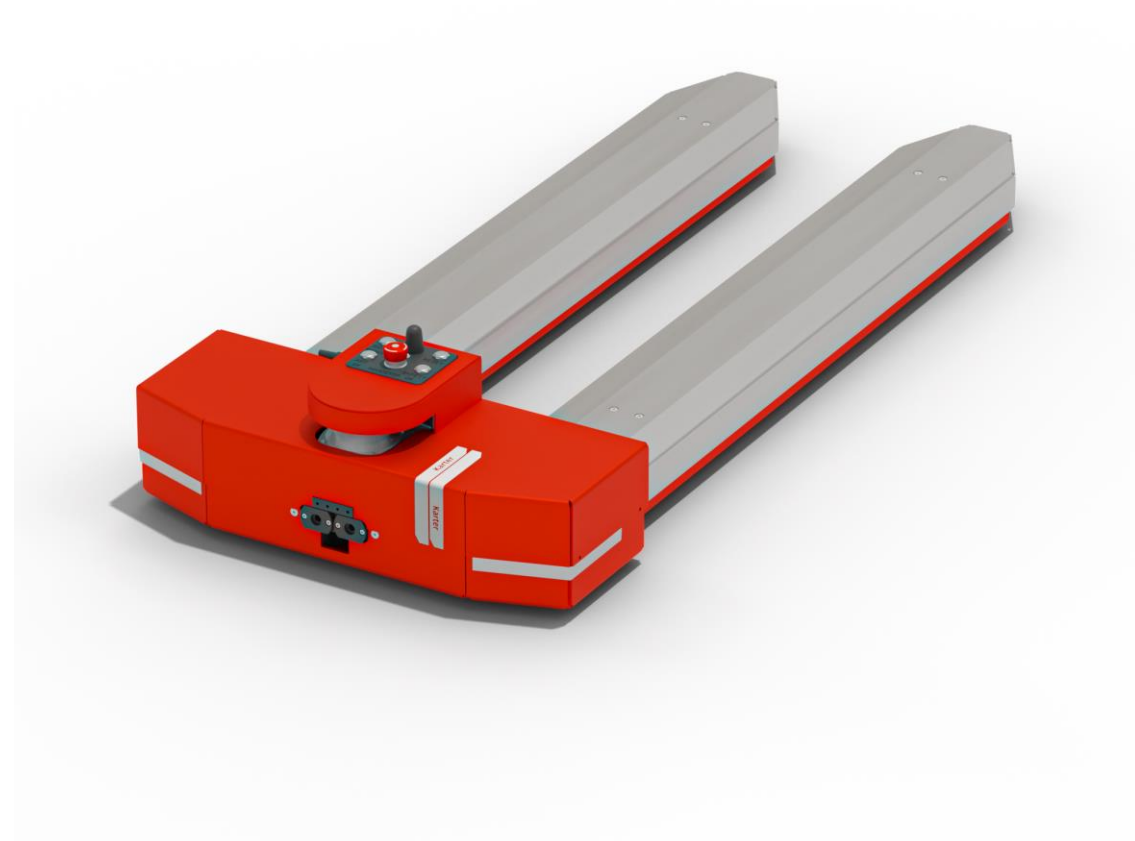
- Battery: LiFePO<sub>4</sub>, 24 V, 50 Ah, on-board Battery Management System (BMS)
- Charging time: 10 minutes for 8 hours typical operation
- Docking: automatic, controlled by the BMS
- Larger battery packs: option on some Karter models



# Karter Kompakt

Optimised for transporting pallets

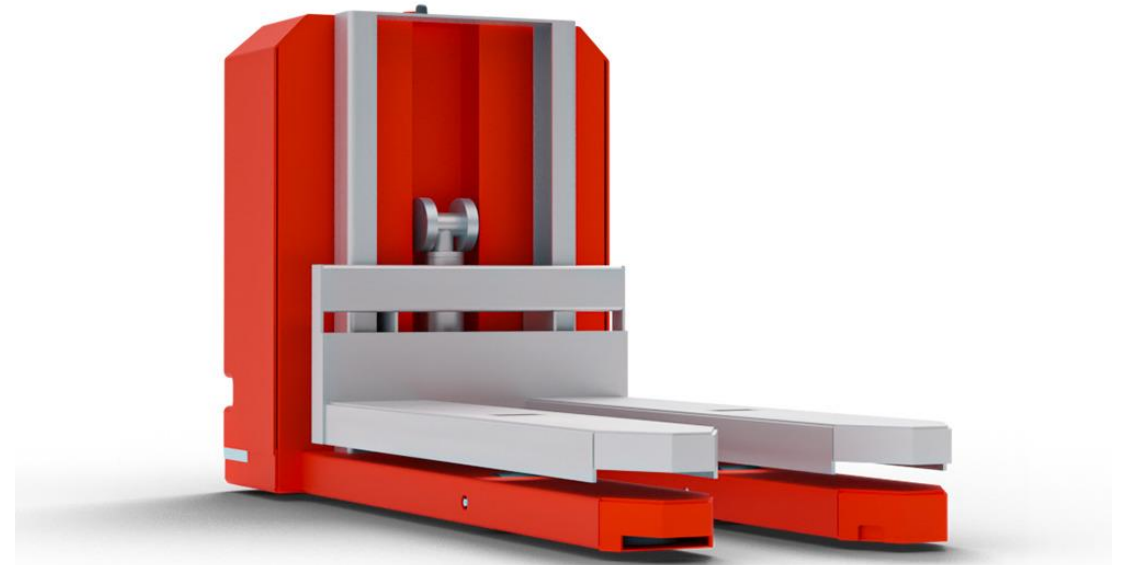
- Weight: 120 kg
- Maximum load: 1500 kg
- Lifting stroke: 30 mm (option: 35 or 40 mm)
- Option: external parts in stainless steel



# Karter Lyft

Transports and lifts pallets

- Weight: 250 kg
- Maximum load: 1000 kg
- Lifting stroke: 500 mm
- Option: external parts in stainless steel

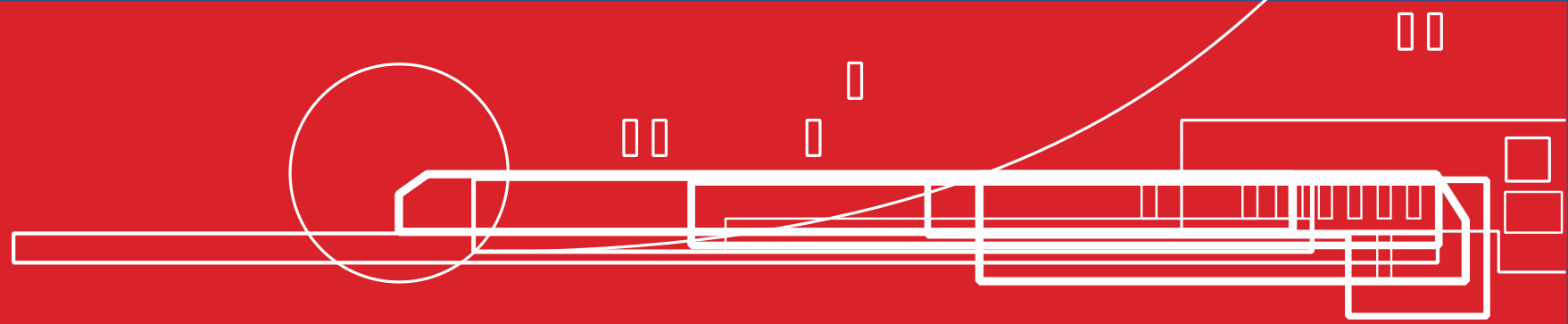


# Karter Mono

Handles a wide range of loads: roller cages, boxes, etc.

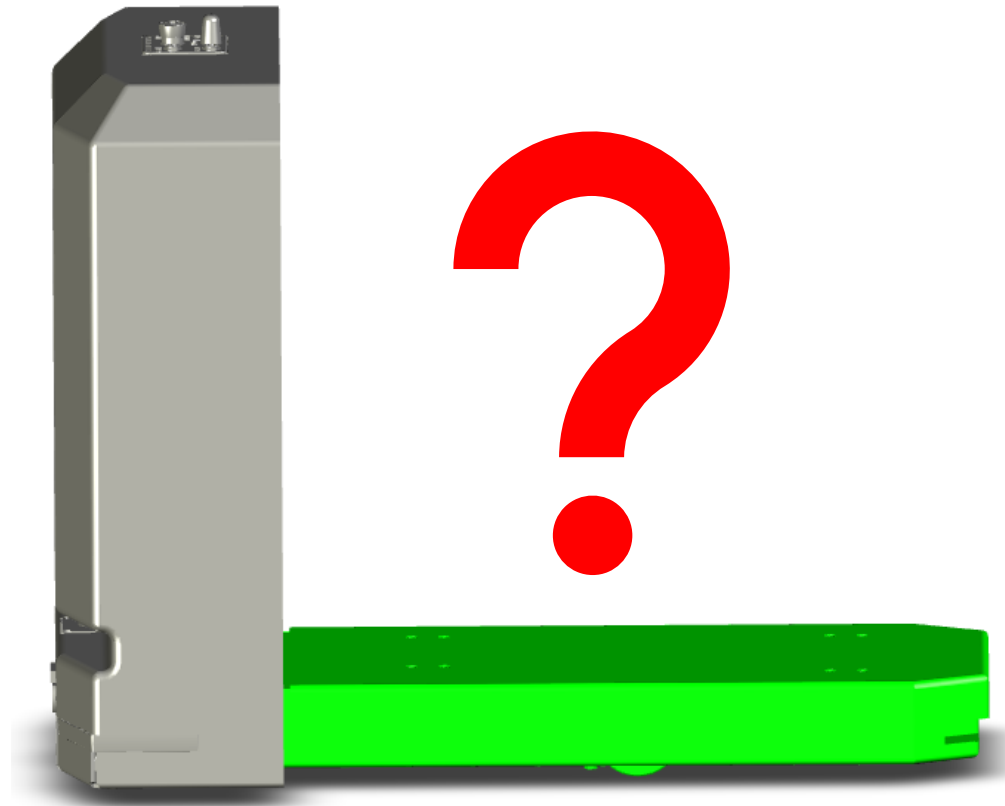
- Weight: 200 kg
- Maximum load: 1500 kg
- Option: external parts in stainless steel



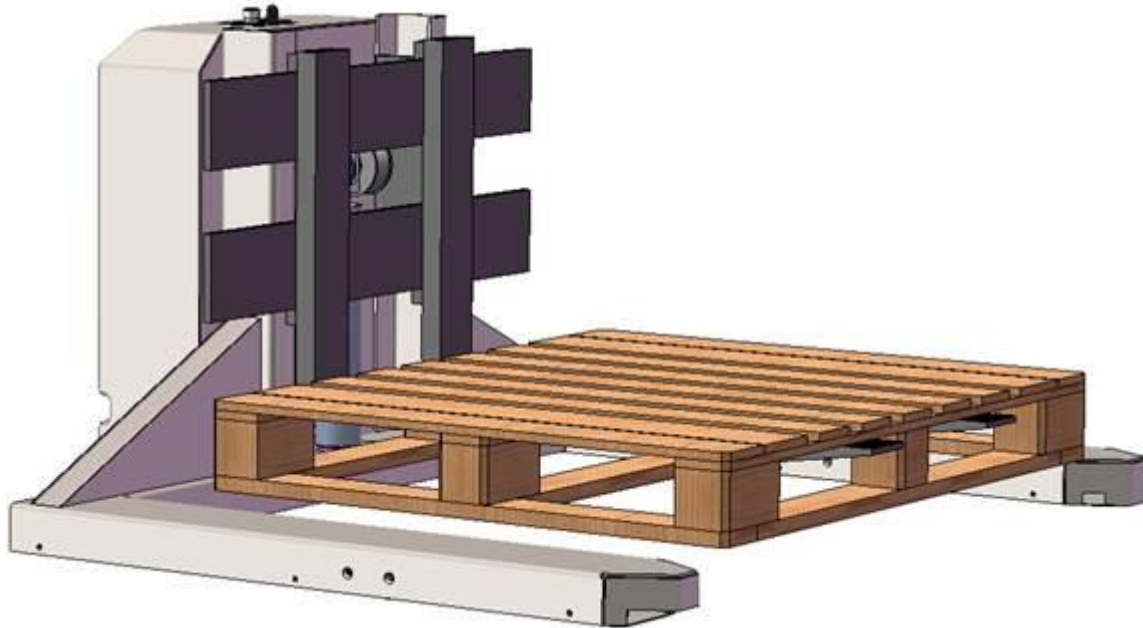


# Karter Development – customer specific engineering

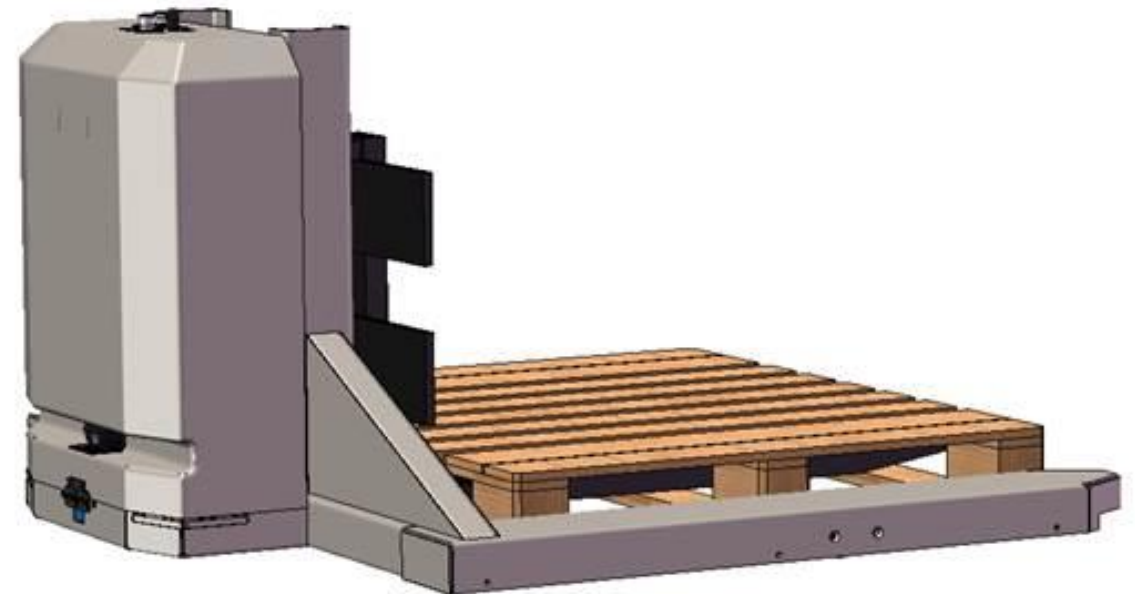
# Customer specific engineering



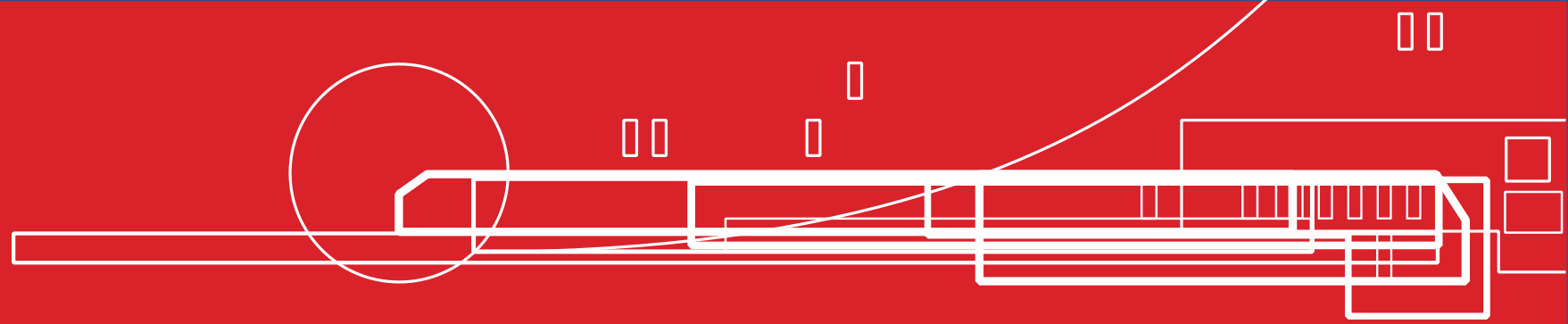
# Customer specific engineering



Study model for the US Market







# Karter - BlueBotics

# Karter - BlueBotics

- ▶ Karter has partnered with BlueBotics which has resulted in bringing together the best technologies.

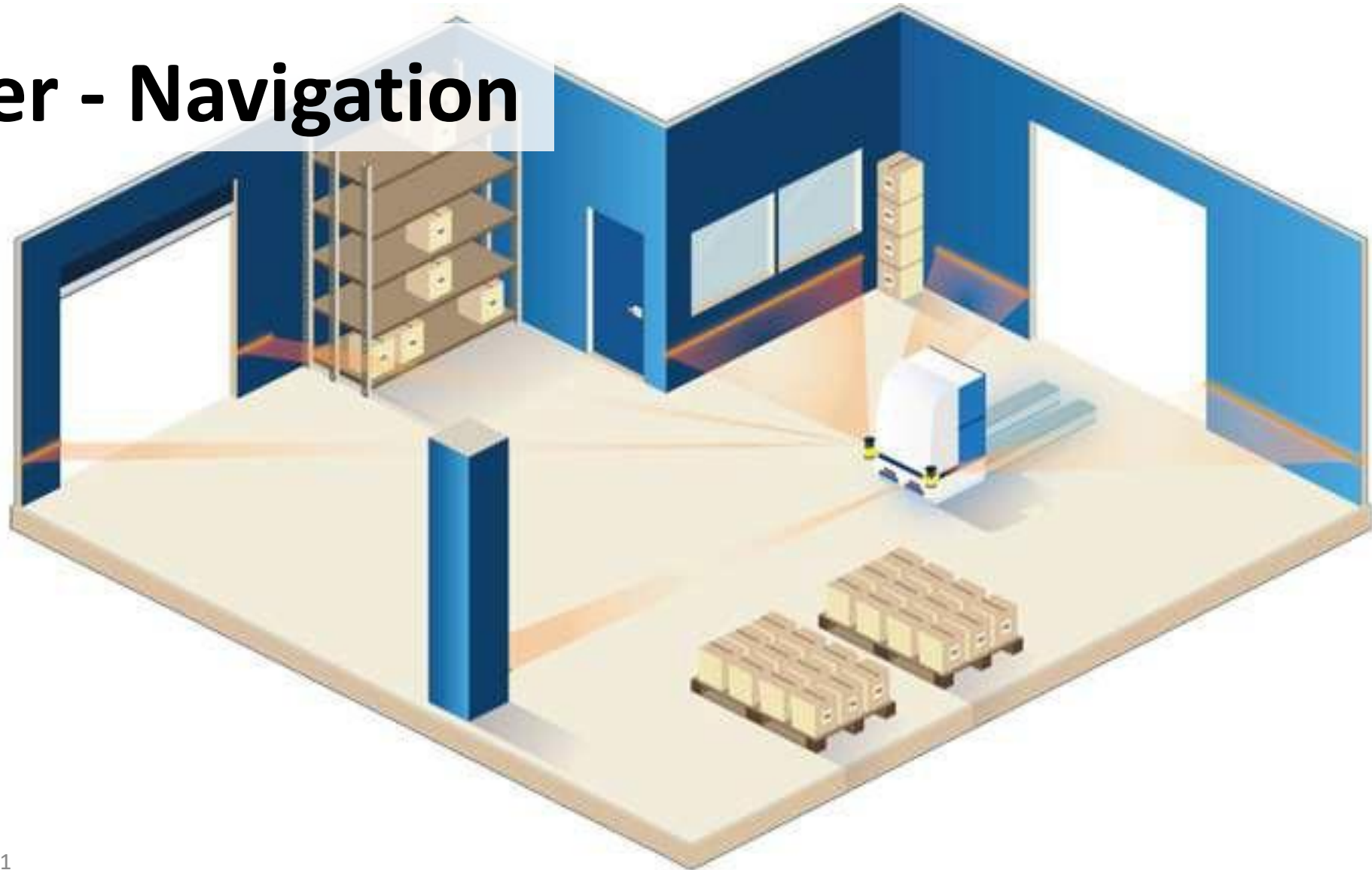


20 years of experience in natural feature navigation

2.500+ ANT® driven vehicles in operation worldwide

1000+ installations, 25+ countries, 5 continents

# Karter - Navigation



# Various navigation technologies



Line following



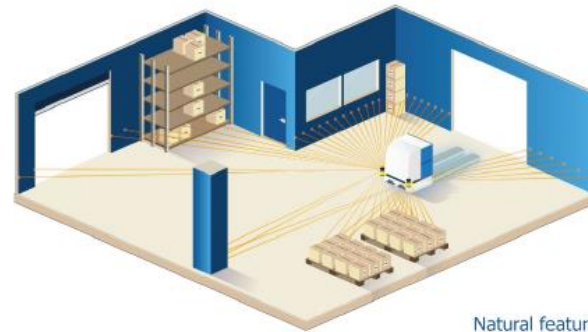
Tags



Laser triangulation



Vision guidance



Natural feature



Natural feature with ANT<sup>®</sup>

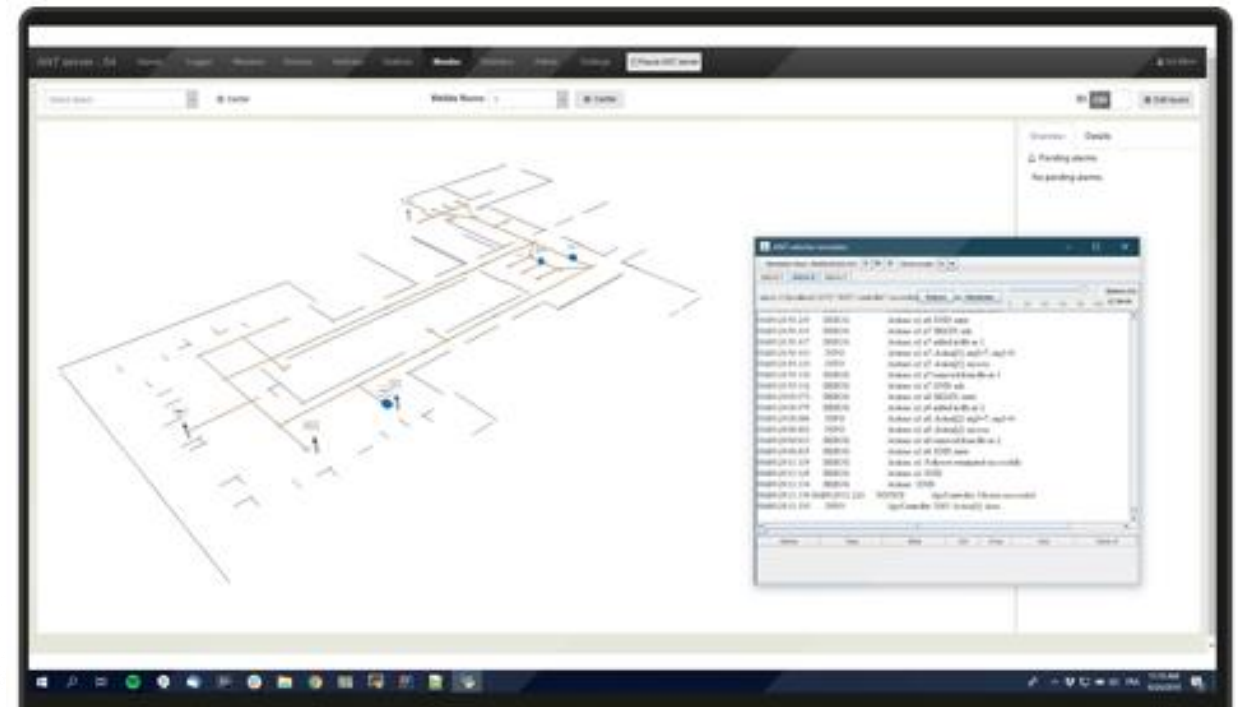
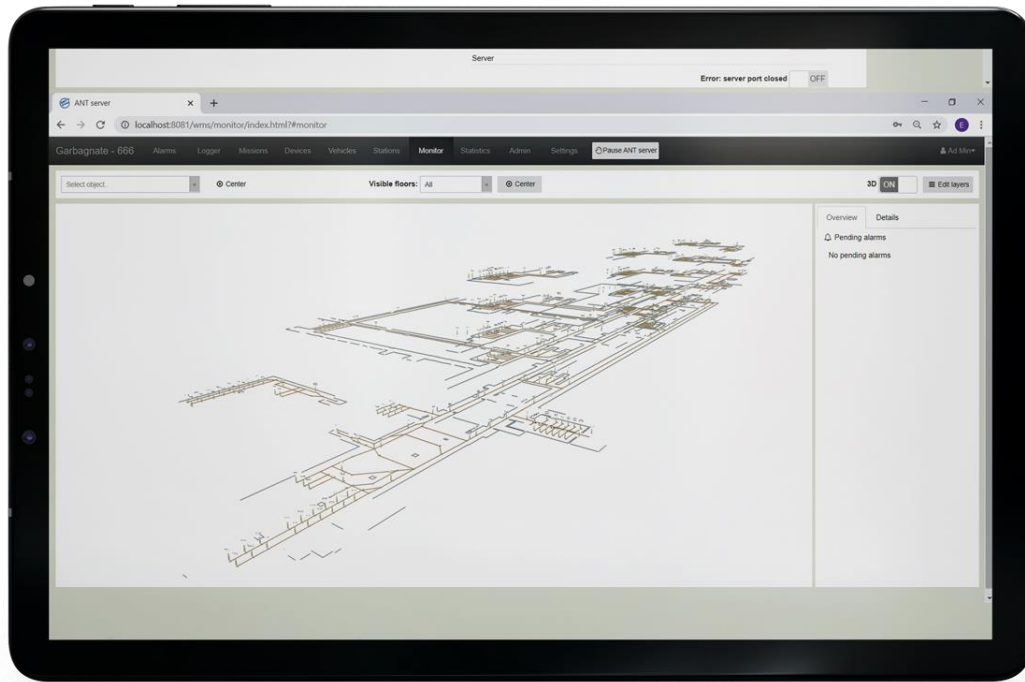
# Comparison various navigation technologies

	Cost of infrastructure	Installation time	Accuracy	Reliability	Robust to env. change	Vehicle speed	Cost of maintenance	Cost of modification	Fleet management
Line following	(\$)((\$))	★★★★	★★★★	★★★★	★★★★	★★★	(\$)((\$))	(\$)((\$))	★★★
Tags	(\$)((\$))	★★★★	★★★	★★★★	★★★★	★★★	(\$)((\$))	(\$)((\$))	★★★
Laser triangulation	(\$)((\$))	★★★★	★★★★	★★★★	★★★★	★★★★	(\$)((\$))	(\$)((\$))	★★★★
Vision guidance	(\$)((\$))	★★★★	★★★	★★★	★★★	★★★	(\$)((\$))	(\$)((\$))	★★★
Natural feature	(\$)((\$))	★★★★	★★★	★★★	★★★	★★★	(\$)((\$))	(\$)((\$))	★★★
Natural feature with ANT <sup>®</sup>	(\$)((\$))	★★★★	★★★★	★★★★	★★★	★★★★	(\$)((\$))	(\$)((\$))	★★★★

(\$)((\$)) Low-cost    (\$)((\$)) Avg.    (\$)((\$)) Expensive    
 ★★★★★ Neg.    ★★★★★ Avg.    ★★★★★ Positive

# Karter – Software

- ▶ Trained technicians can do the (logistical) routing configuration by themselves

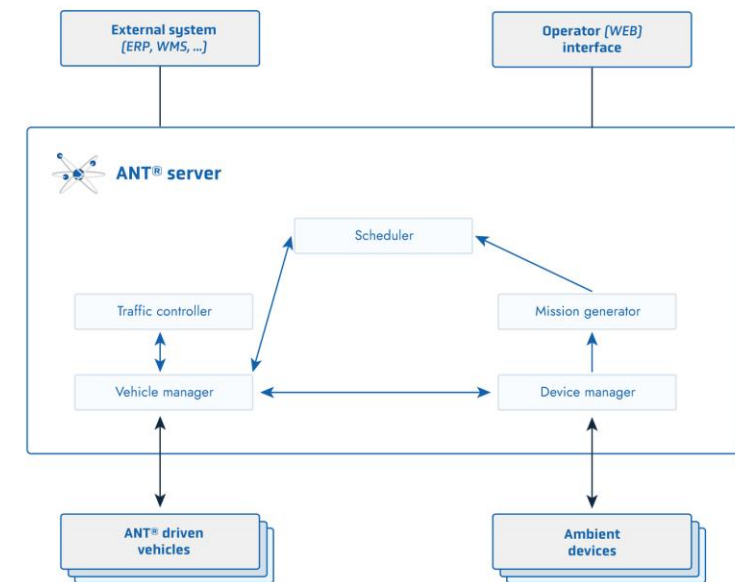
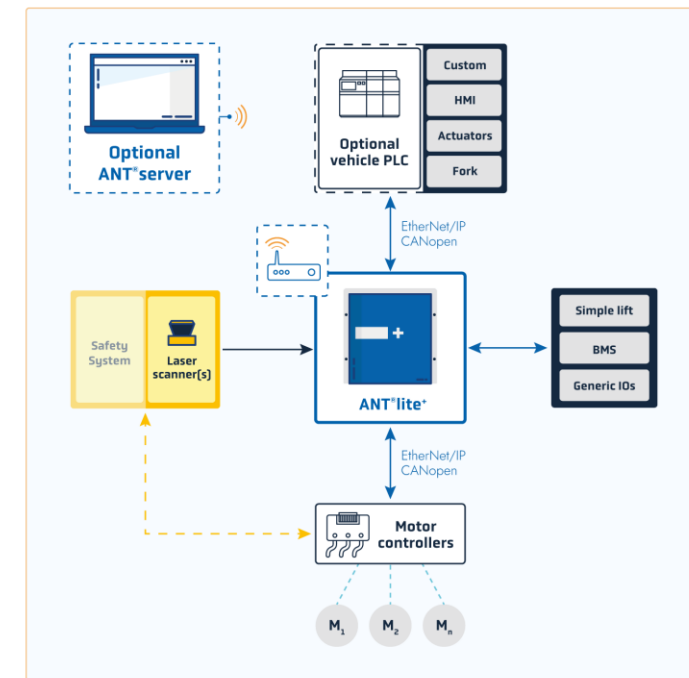


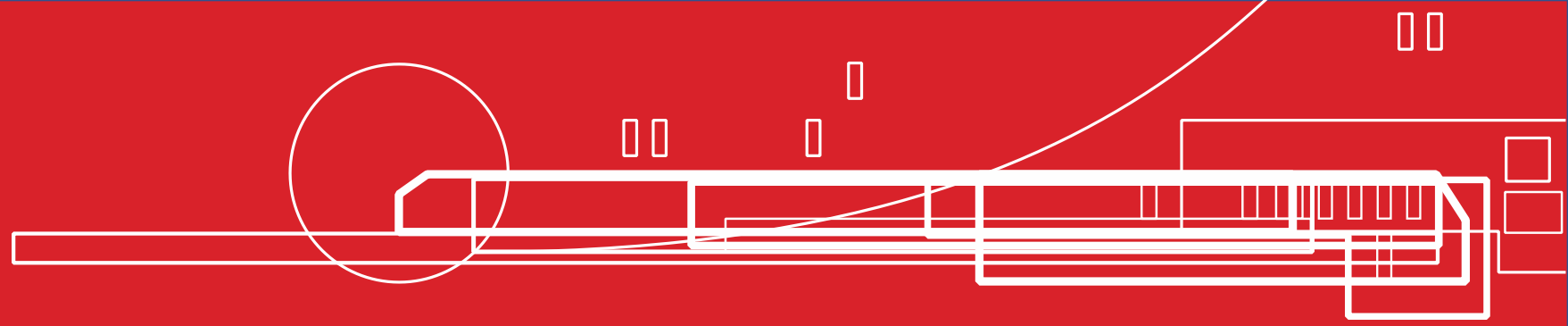
# Karter - ANT Server

- ▶ ANT Server is BlueBotics advanced mission and fleet management software

## Benefits

- ▶ Manage and optimize your on-site AGV operation (incl. traffic control)
- ▶ Build your ANT® driven fleet
  - Support any ANT driven vehicle (whatever type/brand/Kinematics)
  - Multiple AGVs, 1 management software
  - API integration with WMS/MES/ERP





# Meet the Karter from Weighpack

The Autonomous Mobile Robot