



AMRs

STREAMLINE YOUR LOGISTICS
FLOW WITH OUR NEXT
GENERATION AMRS

April 2026





10.00-10.15	15 min	Introduction
10.15-11.15	60 min	Use cases & portfolio
11.15-11.45	30 min	Plant and Safety Requirements
11.45-12.15	30 min	Integration
12.15-12.25	10 min	Fleet management
12.25-12.55	20 min	ROI & Business case
12.10-12.50	40min	Demonstration
12.50-13.00	10 min	Q&A

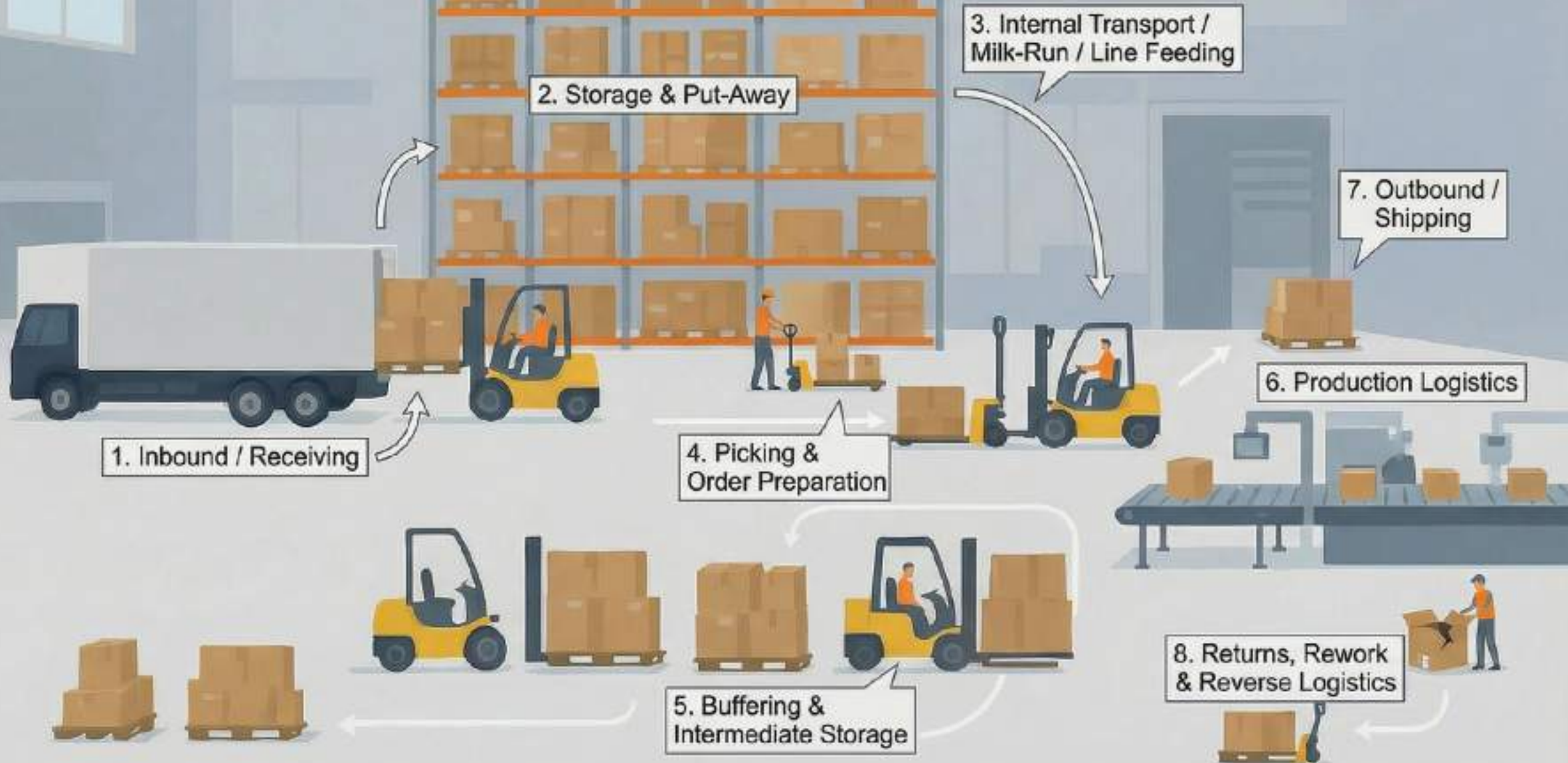
Tour de Table



Introduction



Intralogistics





FRAMEWORK

Forklift accident cost **35 000 M\$ / year**

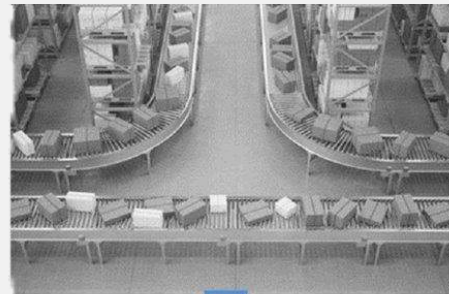
SIERA

62,000 forklift related injuries, per year; 30% increase in last decade

Occupational Safety and Health Administration

86% of companies faced Warehouse operational staff shortage armazém in last 2 years

Chartered Institute of Logistics and Transport UK



Flowbotic | USP



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Flowbotic is a European robotics and automation company with strong expertise in advanced development, engineering, and cutting-edge electronics.

We design, manufacture, and deploy highly reliable and user-friendly AMRs, delivering safe, efficient, and flexible intralogistics solutions for industrial environments.

Portfolio



Flowbotic | BACKGROUND

>90

Installed AGVs / AMRs



PSA/PSA Group
 1. 2000 operating since Nov'10
 Interaction with existing infrastructure
 Design of electric circuits (Eplan)
 100 m circuit operating 24/7



PSA/PSA Group
 2. 2000 operating since Nov'10
 operating since Nov'10
 Automatic battery charging
 Off-hand guidance
 Accurate movements in narrow area



PSA/PSA Group
 3. 2000 operating since Nov'10
 operating since Nov'10
 Interaction with existing infrastructure
 Design of electric circuits (Eplan)
 100 m circuit operating 24/7



PSA/PSA Group
 4. 2000 operating since Nov'10
 Automatic battery charging
 Interaction with existing infrastructure
 3 off 300m circuits



Volkswagen AG/Body
 10. 2000 operating since Apr'10
 operating since Apr'10
 Hydraulic lifting
 Accurate movements in narrow area



PSA/Volkswagen Hexabot
 7. 2000 operating since Apr'10
 operating since Apr'10
 Hydraulic lifting
 Wireless communications and management



Volkswagen AG/Body assembly
 16. 2000 operating since Apr'10
 operating since Apr'10
 Automatic pin
 Accurate movements in narrow area



Fitradia/PSA - 2000/Body assembly
 5. 2000 operating since Nov'10
 operating since Nov'10
 Hydraulic lifting
 Accurate movements in narrow area



SAS/Pharmaceutical
 3. 2000 operating since Feb'10
 operating since Feb'10
 Automatic process validation
 Accurate docking



BASF/Pharma
 2. 2000 operating since Feb'10
 operating since Feb'10
 Conveyor platform
 Wireless communications and management

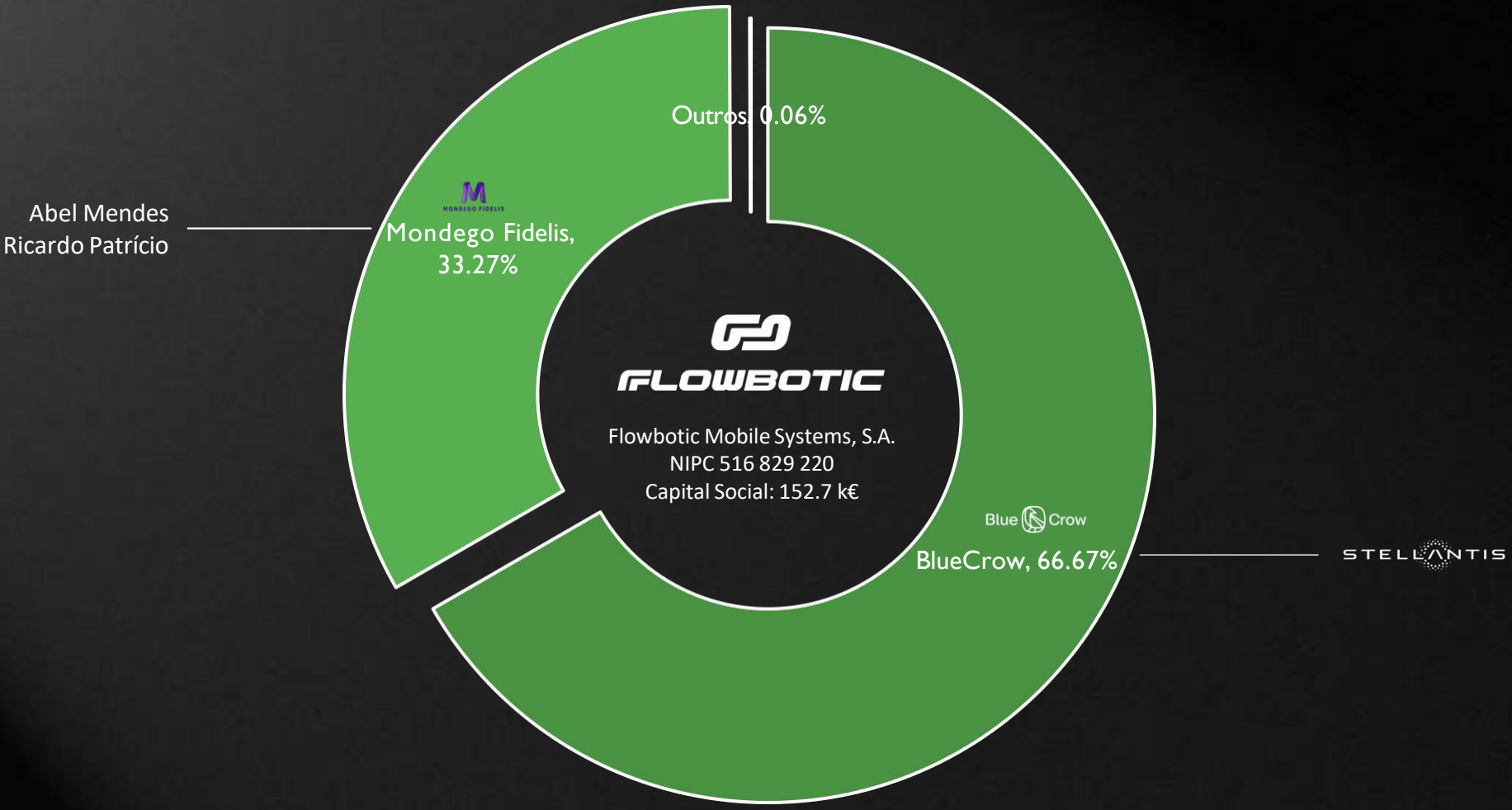


BTI/Pharma
 4. 2000 operating since Mar'10
 operating since Mar'10
 Lifting Table
 Natural Navigation
 Food Industry Compliance



PSA/Pharma
 1. 2000 operating since Mar'10
 operating since Mar'10
 Accurate movements in narrow area
 RF communications

Stakeholders



Customers



Flowbotic | OUR AMRs: under-carriers



Model	GoMini	GoMouse	GoMouse-X
Size	400 x 400 x 340 mm	535 x 1235 x 200 mm	784 x 1238 x 297 mm
Max speed	0.3 m/s	1.5 m/s	1.5 m/s
Max cargo	50 kg	1000 kg	1300 kg
Elevation	-	-	60 mm
Direction	Bi-direccional	Bi-direccional and central rotation	Bi-direccional and central rotation
Navigation	Natural or reflectors	Natural or reflectors	Natural or reflectors
Positioning precision	±15 mm	±10 mm	±10 mm
Battery	LiFePo4 256 Wh (@12 Vdc)	LiFePo4 1.5 kWh (@48 Vdc)	LiFePo4 1.5 kWh (@48 Vdc)
IP	Indoor	Indoor	Indoor
Safety	360° based on navigation LiDAR	360° based on safety LiDAR	360° based on safety LiDAR
Standards	ISO EN 50636-2-107	ISO 3691-4	ISO 3691-4

Flowbotic | OUR AMRs: tuggers



Model	GoTugger-S	GoTugger	GoTugger 5T
Size	540 x 630 x 380 mm	540 x 630 x 380 mm 540 x 950 x 380 mm (-x)	1500 x 900 x 450 mm
Max speed	1.5 m/s	1.5 m/s	1.0 m/s
Max cargo	200 kg	600 N traction 900 N traction	5000 kg
Elevation	-	-	-
Direction	Uni-direccional (reverse for coupling)	Uni-direccional (reverse for coupling)	Uni-direccional (reverse for coupling)
Navegation	Natural or reflectors	Natural or reflectors	Natural or reflectors
Positioning precision	±10 mm	±10 mm	±10 mm
Battery	LiFePo4 1.5 kWh (@48 Vdc)	LiFePo4 1.5 kWh (@48 Vdc)	LiFePo4 4,8 kWh (@48 Vdc)
IP	Indoor	Indoor	Outdoor
Safety	Safety LiDAR based	Safety LiDAR based	Safety LiDAR based
Standards	ISO 3691-4	ISO 3691-4	ISO 3691-4

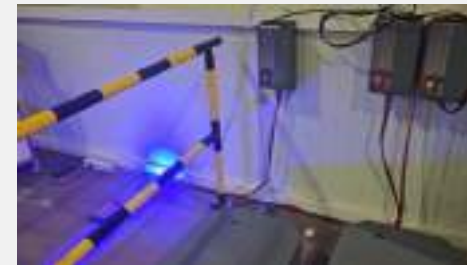
Flowbotic | OUR AMRs: pallet truck



Model	GoPallet	GoStacker 1.6	GoStacker 2
Size	750 x 1855 x 1850 mm	750 x 1855 x 2010 mm	750 x 1855 x 2450 mm
Max speed	1.0 m/s	1.0 m/s	1.0 m/s
Max cargo	1500 kg	1500 kg 1300kg @ 1.6m	1500 kg 1200kg @ 2m
Elevation	180 mm	1600 mm	2000 mm
Direction	Uni-direccional (reverse for loading and unloading)	Uni-direccional (reverse for loading and unloading)	Uni-direccional (reverse for loading and unloading)
Navigation	Natural or reflectors	Natural or reflectors	Natural or reflectors
Positioning precision	±15 mm	±15 mm	±15 mm
Battery	LiFePo4 1.5 kWh (@48 Vdc)	LiFePo4 1.5 kWh (@48 Vdc)	LiFePo4 1.5 kWh (@48 Vdc)
IP	Indoor	Indoor	Indoor
Safety	Safety LiDAR based	Safety LiDAR based	Safety LiDAR based
Standards	ISO 3691-4	ISO 3691-4	ISO 3691-4

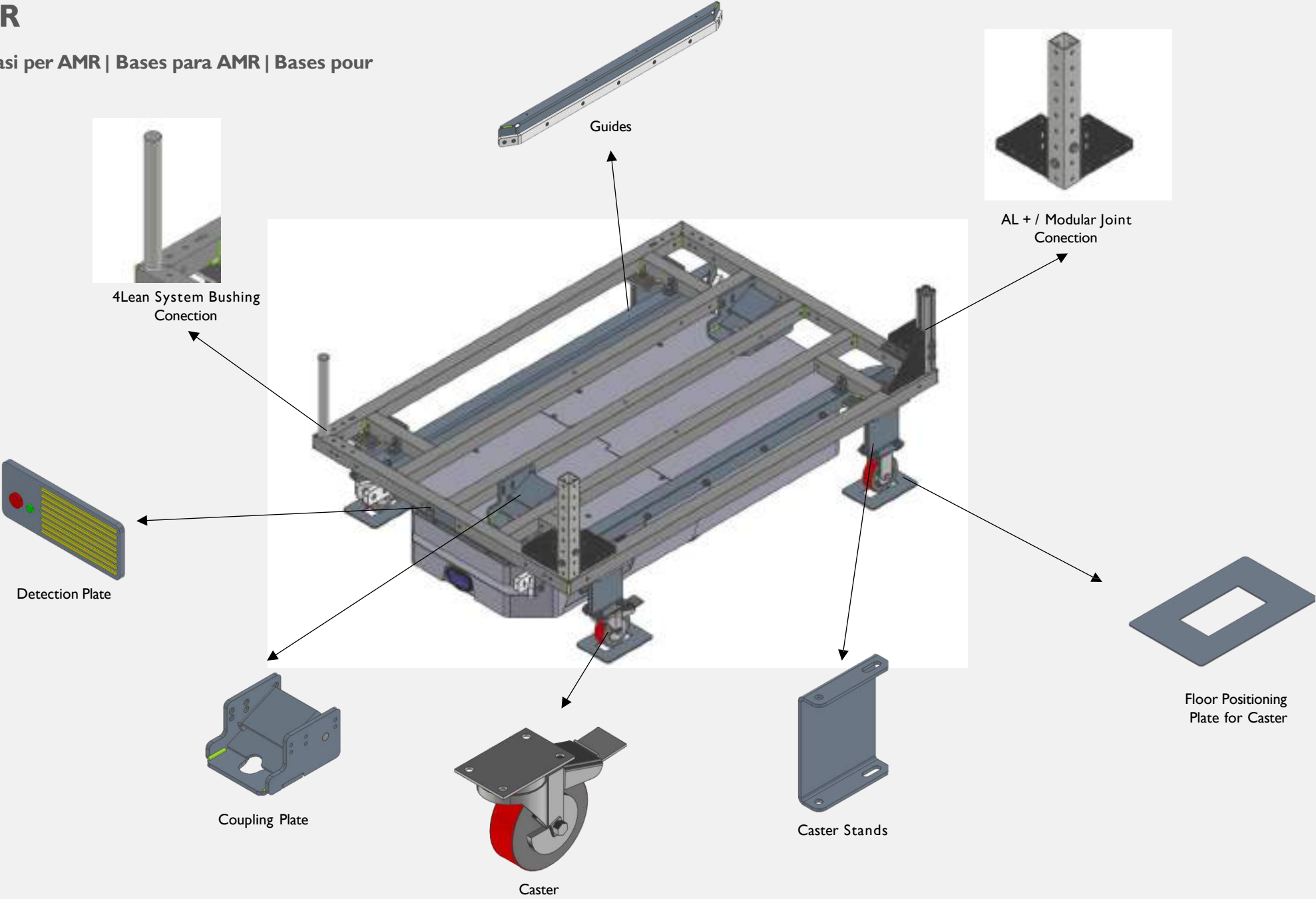
Flowbotic | ACCESSORIES

- Automatic battery charging.
- Call buttons.
- Indexing of trolleys.
- Lifting tables.
- Conveyor tables for automatic loading and unloading.
- Towing pins.
- Manual control joystick.
- High obstacle detection, among others.
- etc



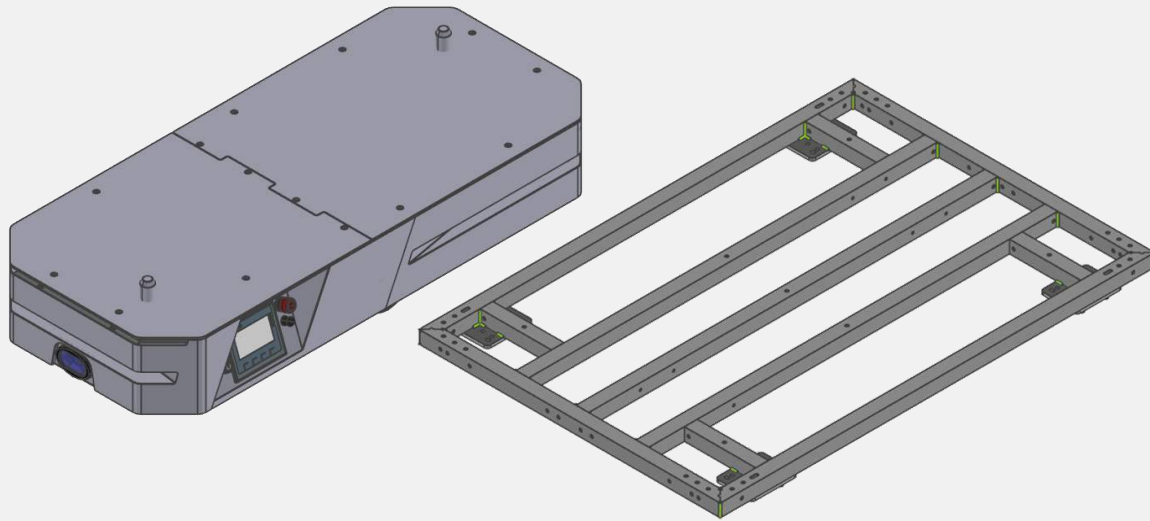
Bases for AMR

| Bases para AMR | Basi per AMR | Bases para AMR | Bases pour AMR |






Bases for AMR


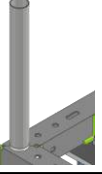
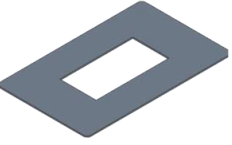
| Bases para AMR | Basi per AMR | Bases para AMR | Bases pour AMR |



Additional accessories

| Acessórios extra | Accessori aggiuntivi | Accesorios adicionales | Accessoires supplémentaires |

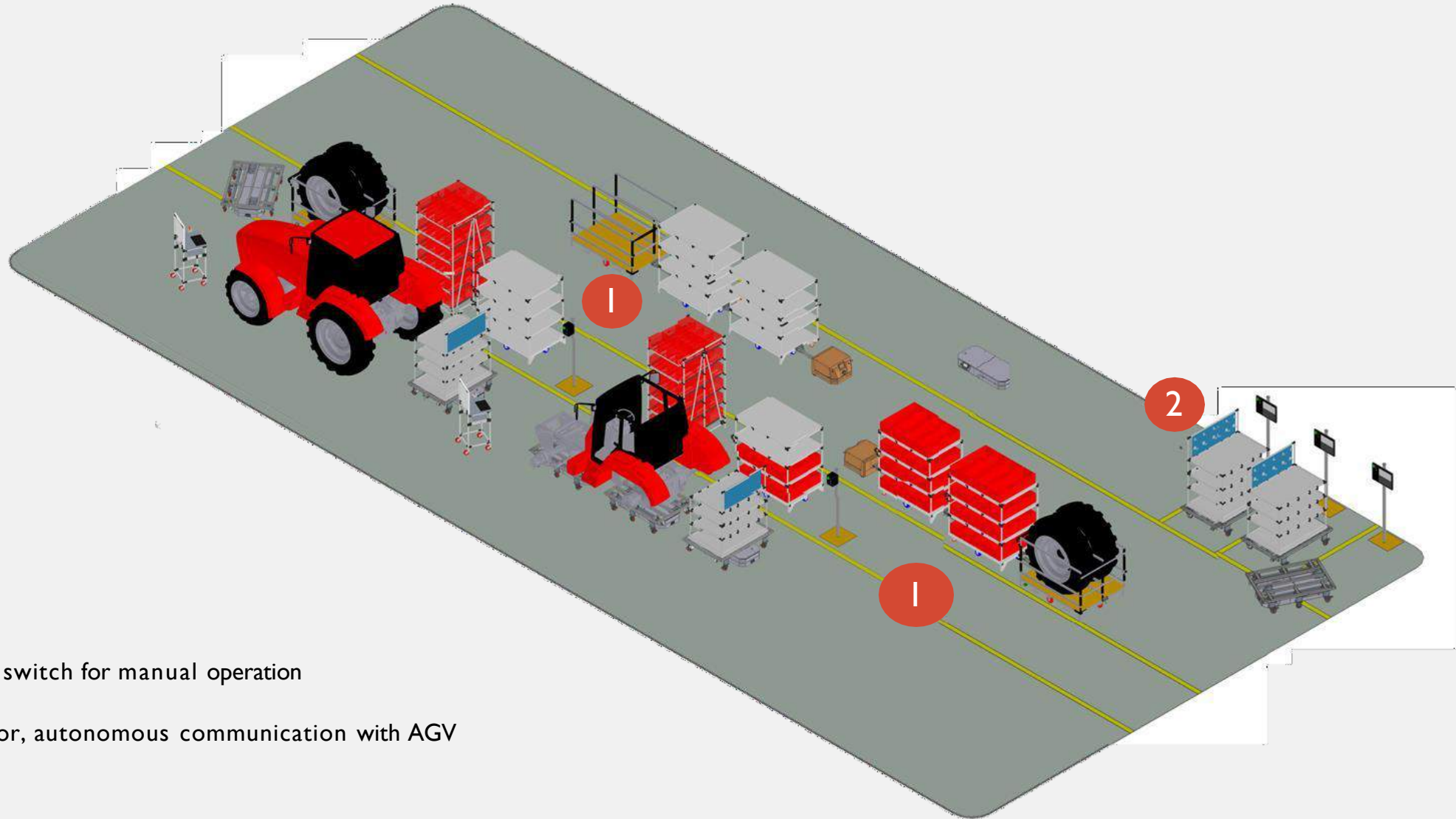
Reference	Product
Guide	
RO...	
Stand	

Reference	Product
AL+ / Mod	
System	
Floor Plate for Caster Coupling	



Bases for AMR

| Bases para AMR | Basi per AMR | Bases para AMR | Bases pour AMR |



1 – Push-button switch for manual operation

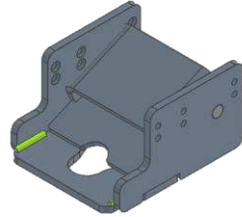
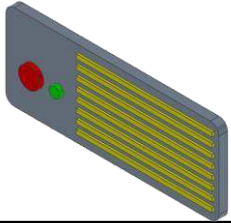
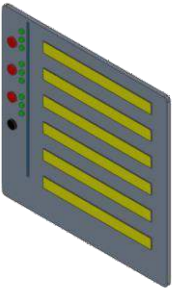
2 – Electric sensor, autonomous communication with AGV

Bases for AMR

| Bases para AMR | Basi per AMR | Bases para AMR | Bases pour AMR |

*Coupling options:

- Coupling steel Plate and 2 Guides;
- 2 Coupling Steel Plates.

Reference	Product
Coupling Steel Plate	
Detection Plate	
Detection Plate for Pilar	

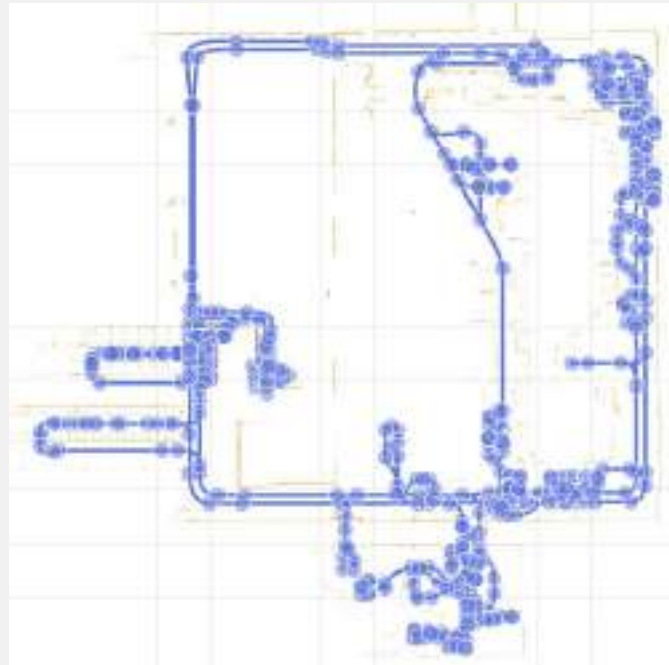
Use Cases



Use Cases

GoMouse

- Renault (Horse)
- ZF SafeLife
- Stellantis
- Preh
- CITEVE
- INESC
- Exporlux
- Casa da Malha



21 GoMouse

558 Daily orders

Orders by manual button & HSGP (mqqt)

>10 kms per day

45 circuits

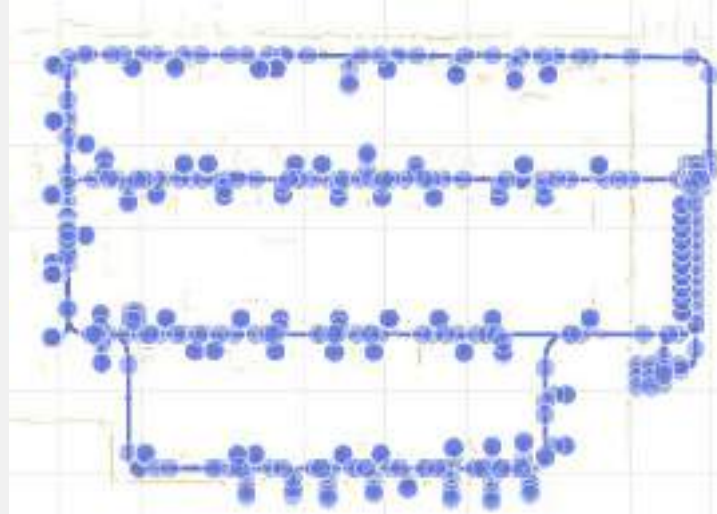
62 charriots

48 destinations

Use Cases

GoMouse

- Renault (Horse)
- ZF SafeLife
- Stellantis
- Preh
- CITEVE
- INESC
- Exporlux
- Casa da Malha



6 GoMouse

Orders from SAP (shared table)

GoDock app 

4 automatic battery chargers

4 circuits with >60 destinations

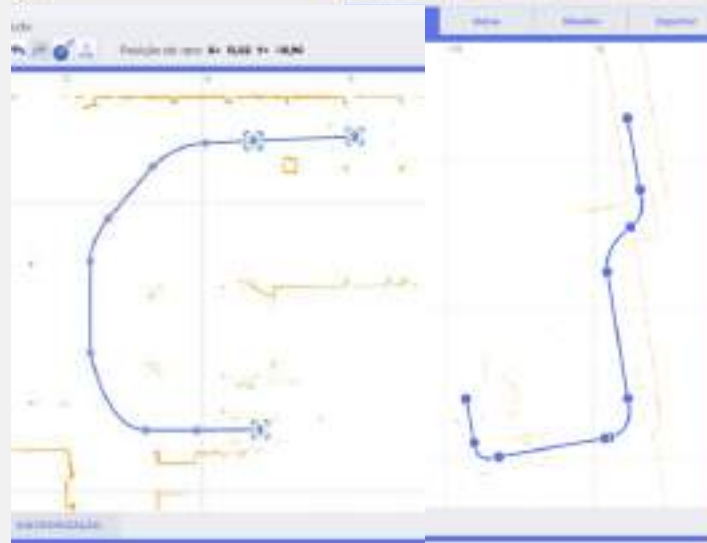
Aprox 80 charriots



Use Cases

GoMouse

- Renault (Horse)
- ZF SafeLife
- Stellantis
- Preh
- CITEVE
- INESC
- Exporlux
- Casa da Malha



2 GoMouse – peinture
1 GoMouse- assemblage

Orders from PLC

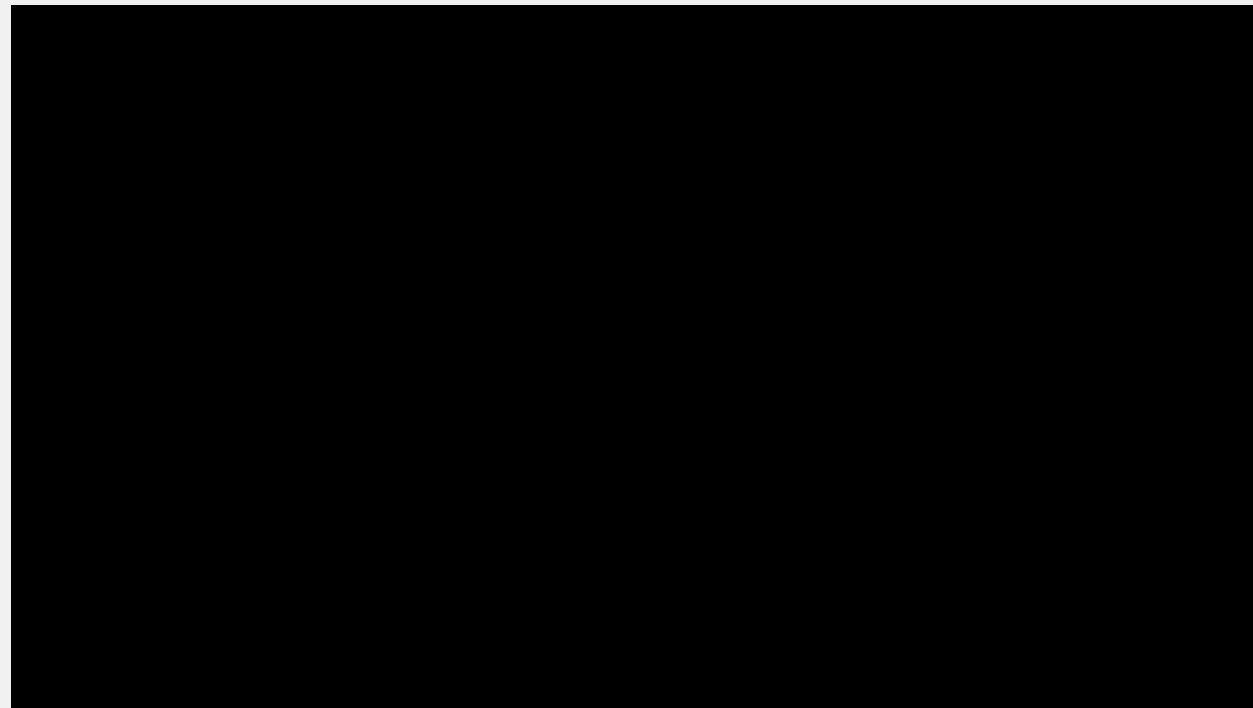
GoDock app

Automatic battery chargers

2 circuits

Crosses railway - Un-even floor

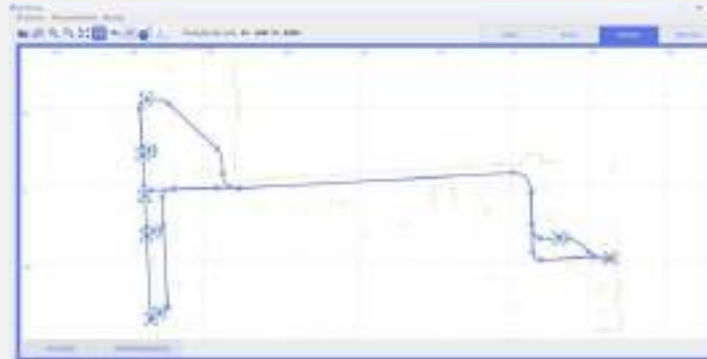
Interaction with charriot loader



Use Cases

GoMouse

- Renault (Horse)
- ZF SafeLife
- Stellantis
- Preh
- CITEVE
- INESC
- Exporlux
- Casa da Malha



I GoMouse

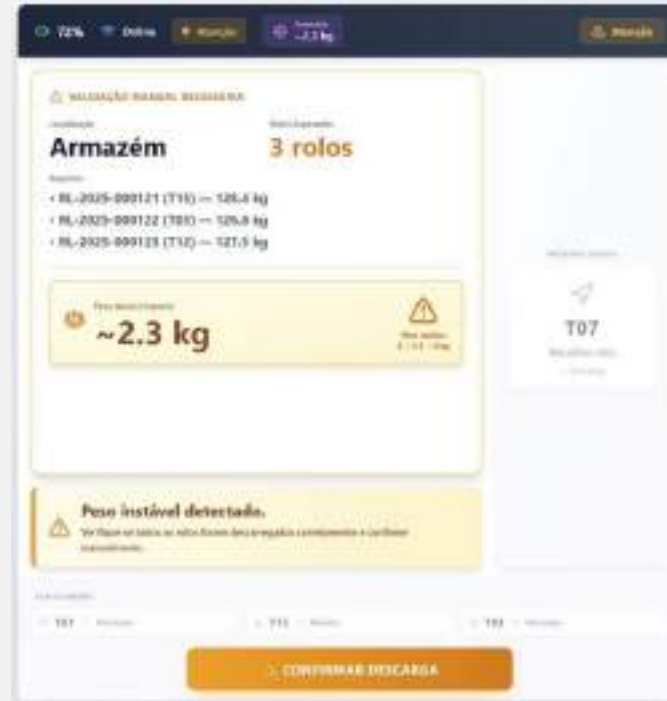
- Orders from manual button
- Automatic battery charger
- Structure for carrying cassettes
- ESD Clean Room compatible



Use Cases

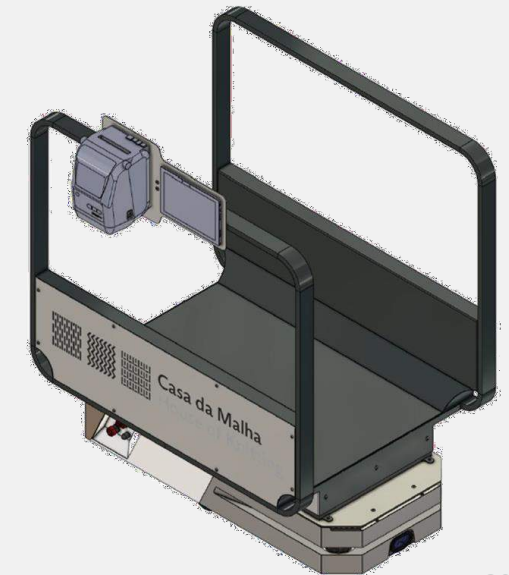
GoMouse

- Renault (Horse)
- ZF SafeLife
- Stellantis
- Preh
- CITEVE
- INESC
- Exporlux
- Casa da Malha



I GoMouse

- Orders from ERP (mqqt)
- Possibility to add manual orders
- Automatic battery charger
- Structure for carrying textile wraps
- Scale to weight textile wraps
- Specific app adapted to customer



Use Cases

GoTugger

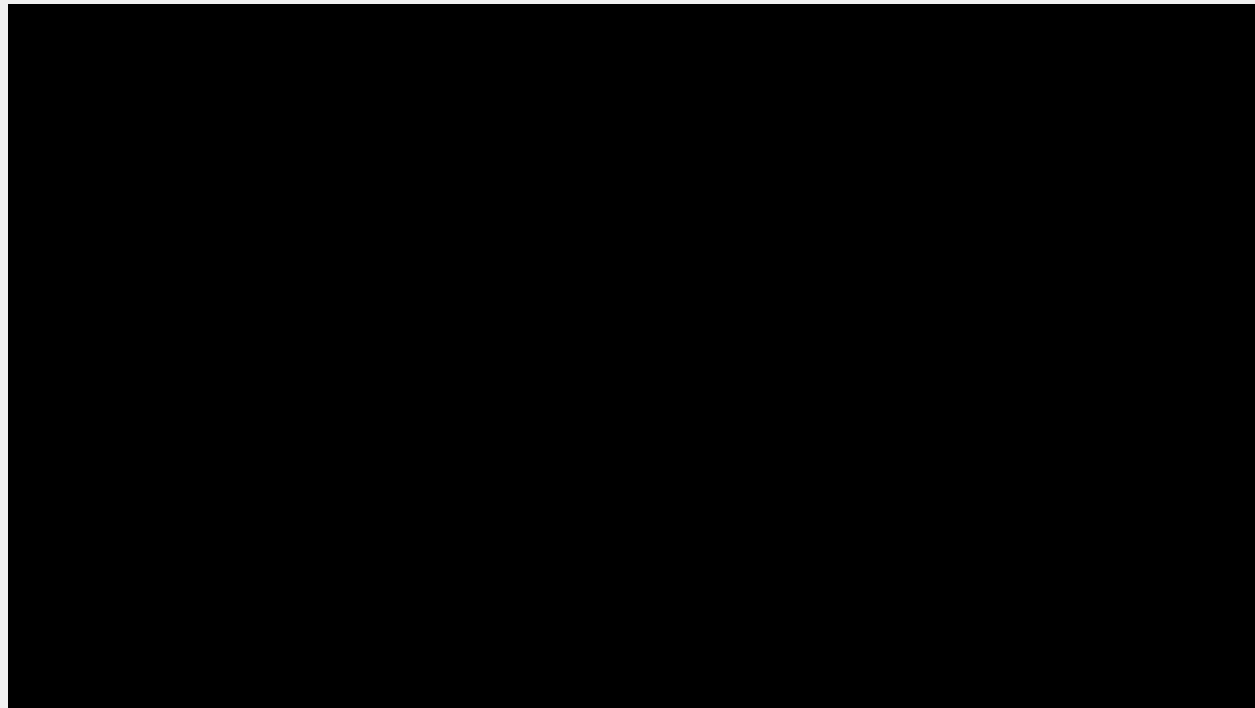
- Stellantis
- Fucoli
- Renault (Horse)
- HUF
- ZF Safelife



8 GoMouse

Use of reflectors

20 remote boxes



Use Cases

GoTugger

- Stellantis
- Fucoli
- Renault (Horse)
- HUF
- ZF Safelife

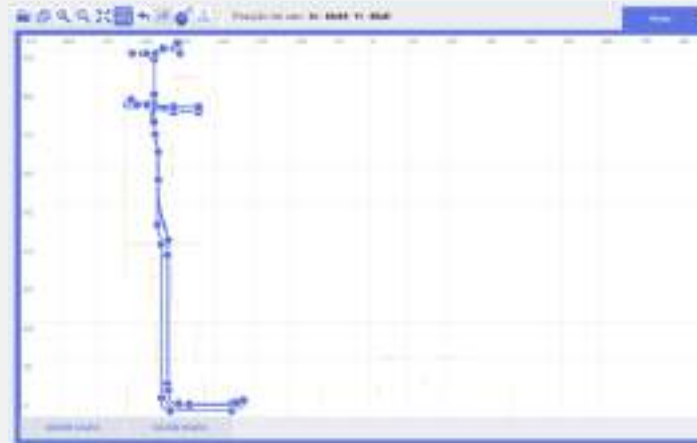
4 GoTugger

Interaction with ASTI AGV
Automatic battery chargers
Un-even floor and slope

Use Cases

GoTugger

- Stellantis
- Fucoli
- Renault (Horse)
- HUF
- ZF Safelife



2 GoTugger

Automatic battery chargers

Precision docking mechanism

Use Cases

GoTugger

- Stellantis
- Fucoli
- Renault (Horse)
- HUF
- ZF Safelife



I GoTugger

Orders from HSGP

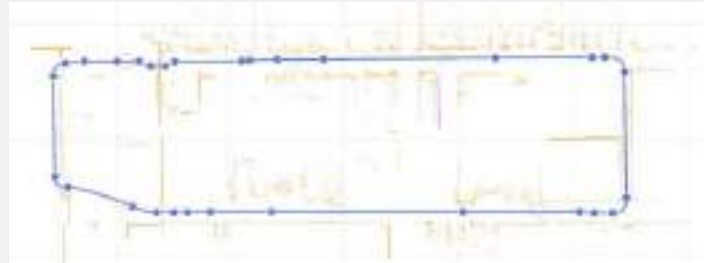
Manual loading

Interaction with GoMouse fleet

Use Cases

GoTugger

- Stellantis
- Fucoli
- Renault (Horse)
- HUF
- ZF Safelife



2 GoTugger

- Orders from manual button
- Milk run with water spider
- Manual battery chargers
- 1 circuits with >12 destinations
- Runs partially outdoor
- Interaction with GoPallet

Use Cases

GoTugger

- Stellantis
- Fucoli
- Renault (Horse)
- HUF
- ZF Safelife

ZF Safelife

6+6 GoTugger

Interaction with 3 GoMini
Magnetic docking



Use Cases

GoPallet

- HUF
- Fucoli
- Exporlux
- Microplásticos
- Treves

1 GoPallet

Orders from manual button

Automatic battery charger

1 circuits with 12 loading destinations

17 buffer positions for unloading

App for operator to release buffer



Use Cases

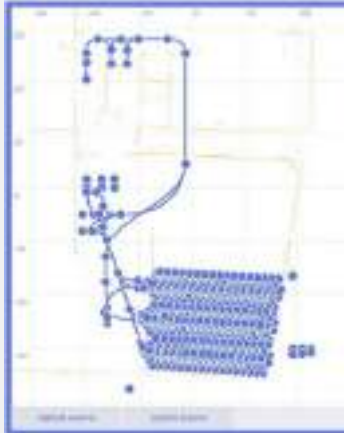
GoPallet

- HUF
- Fucoli
- Exporlux
- Microplásticos
- Treves



I GoPallet

Orders from specific app
120 buffer positions
Interaction with scale



Use Cases

GoPallet

- HUF
- Fucoli
- Exporlux
- Microplásticos
- Treves



I GoPallet

Orders from manual button

I automatic battery charger

>10 destinations

Use Cases

GoPallet

- HUF
- Fucoli
- Exporlux
- Microplásticos
- Treves

I GoStacker

Orders from manual buttons and ERP

I automatic battery charger

>20 destinations in 2 levels

QR code reader

GoForkLift



RECUPERAR
PORTUGAL



GoForkLift



RECUPERAR
PORTUGAL



Demonstration



Requirements



Flowbotic | Site Readiness

Infrastructure & Layout

Ensure floor quality suitable for AMR traffic (level, stable, no defects).

Maintain clear AMR routes (no permanent obstructions, safe intersections with pedestrians).

Provide defined parking / pickup / drop-off locations for all stations.

Ground clearance 0.02 m
Maximum incline/decline 3%
Max gap 5 cm

Process Discipline

Guarantee that trolleys / carriers are positioned in the defined slots

→ repeatability is mandatory for reliable automation.

Ensure exchange operations (loading/unloading) respect the agreed cycle times.

Electrical & Charging

Provide 230 VAC power points in the charging area.

Provide 230 VAC power points near each GoRemotelO / interface box (if applicable).

Ensure charging zones remain accessible and protected from blockage.

Flowbotic | Site Readiness

Network / IT

Provide a dedicated Wi-Fi network (VLAN / SSID) for AMRs across the entire operating area.

Guarantee minimum coverage: ≥ -70 dBm with stable latency.

Provide access to required network configuration (IP plan, DHCP/static rules, firewall rules).

If GoFleet is included: provide a PC/VM/server meeting minimum specs (or approve Flowbotic supply).

Integration / Interfaces

Ensure PLC / upstream systems are ready to generate transport calls (when applicable).

Support coordination for commissioning and acceptance tests (FAT/SAT style).

Operations & Maintenance

Nominate trained operators + maintenance technicians for daily checks and first-line actions.

Follow preventive maintenance routines and basic operational rules (clean routes, safe usage).

Allow remote access support (when enabled) for faster troubleshooting.

Safety & Compliance

Provide access to site safety rules and support risk assessment activities.

Ensure workplace procedures support safe AMR coexistence (signage, training, behavior rules).

Safety



Flowbotic | OUR AMRs

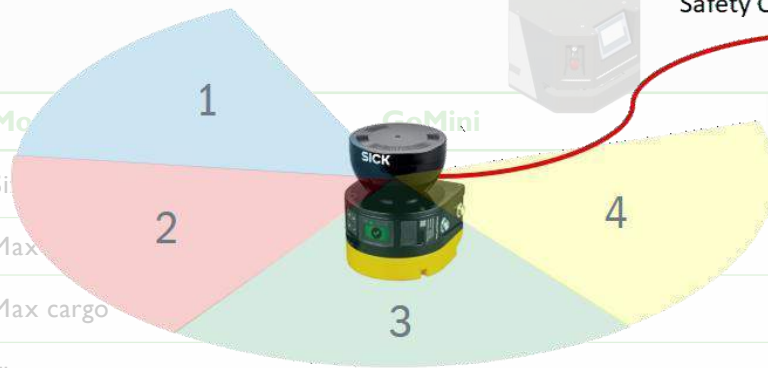
GO MINI

GO MOUSE

GO MULE

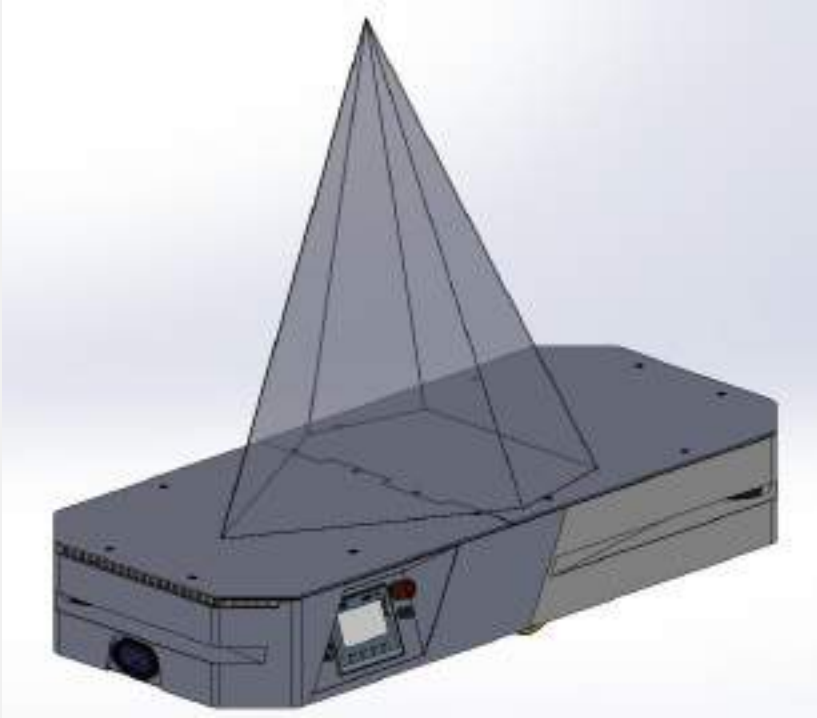
GO TUGGER

GO PALLET

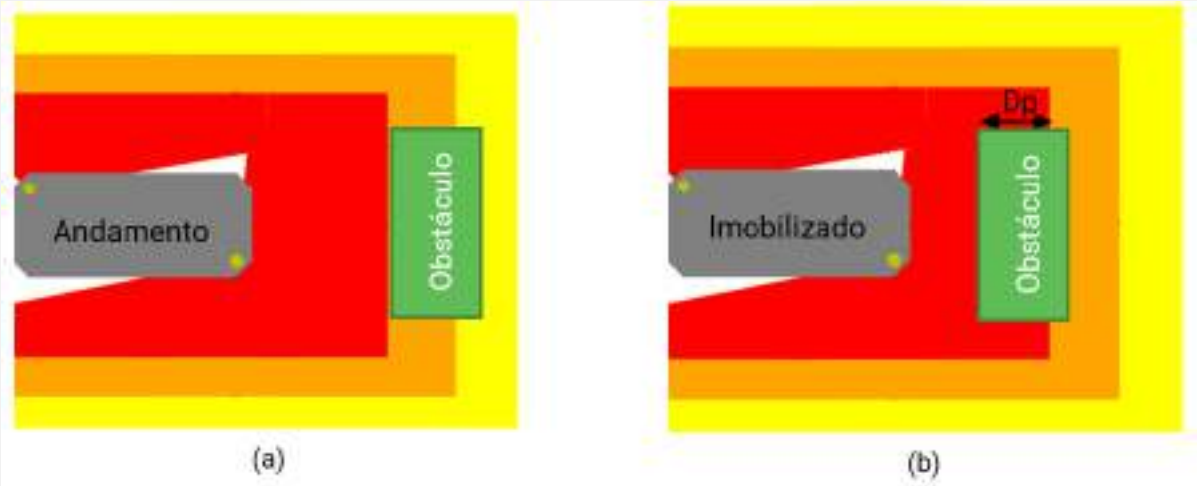
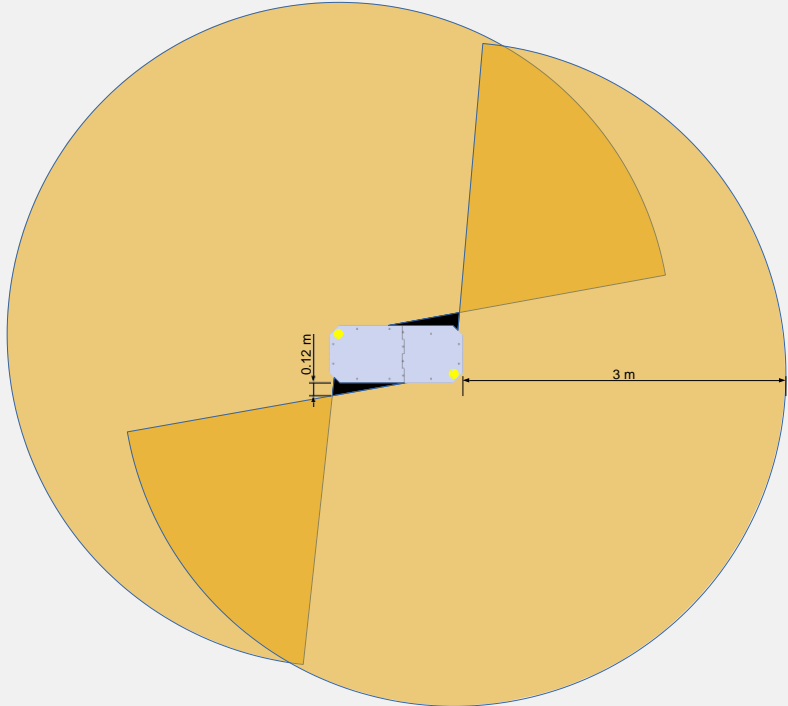


Model	GoMini	GoMouse	GoMule	GoTugger	GoPallet
Size	535 x 1235 x 200 mm	535 x 1235 x 200 mm	538 x 1238 x 200 mm	540 x 630 x 380 mm 540 x 950 x 380 mm	750 x 1235 x 1850 mm
Max speed	1.5 m/s	1.5 m/s	1.5 m/s	1.5 m/s	1.0 m/s
Max cargo	1000 kg	1000 kg	1300 kg	800 N traction 1500 N traction	1500 kg
Elevation	-	-	60 mm	-	180 mm 1.6 m
Direction	Bi-direccional	Bi-direccional and central rotation	Bi-direccional and central rotation	Uni-direccional (reverse for coupling)	Uni-direccional (reverse for loading and unloading)
Navigation	Natural or reflectors	Natural or reflectors	Natural or reflectors	Natural or reflectors	Natural or reflectors
Positioning precision	±15 mm	±10 mm	±10 mm	±10 mm	±15 mm
Battery	LiFePo4 256 Wh (@12 Vdc)	LiFePo4 1.5 kWh (@48 Vdc)	LiFePo4 1.5 kWh (@48 Vdc)	LiFePo4 1.5 kWh (@48 Vdc)	LiFePo4 1.5 kWh (@48 Vdc)
Safety	360° based on safety LiDAR	360° LiDAR based	360° LiDAR based	LiDAR based	LiDAR based
Standards		ISO 3691-4	ISO 3691-4	ISO 3691-4	ISO 3691-4

Safety GoMouse | Speed and stopping distance / Cargo CoG

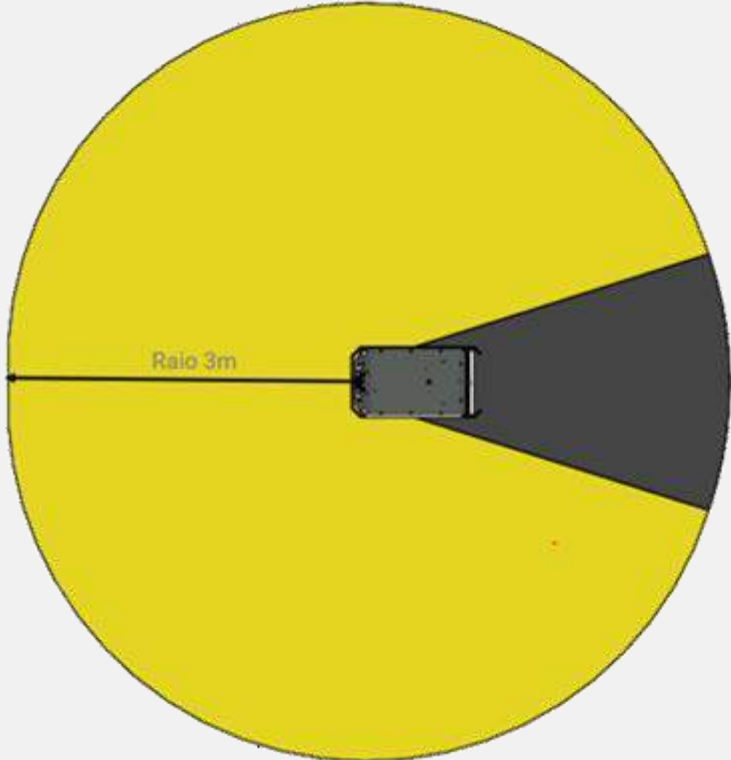


Safety GoMouse | LiDAR

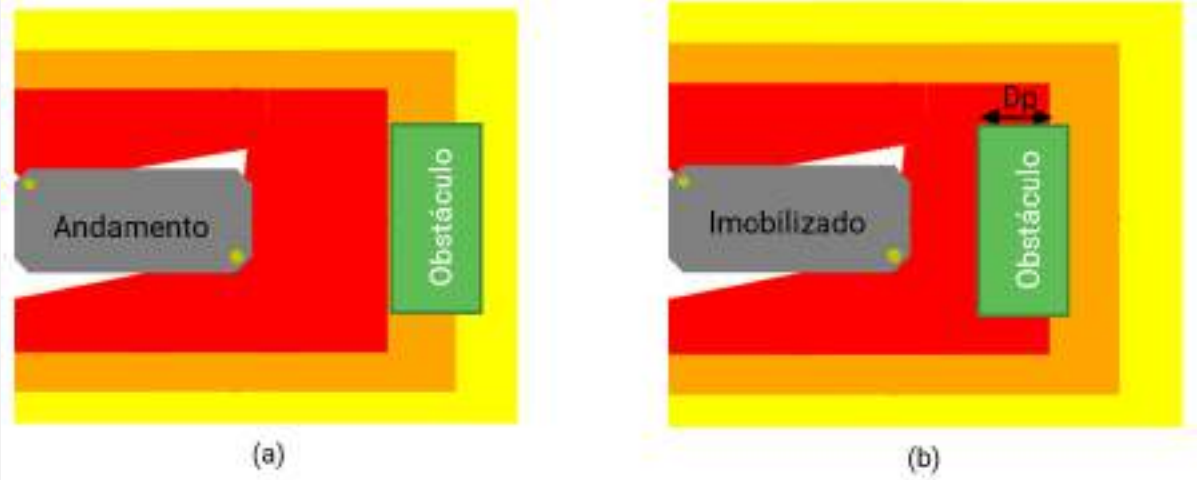


AMR stopping distance: (a) - Obstacle detection in the emergency zone; (b) - Vehicle immobilisation (D_p - Stopping distance) .

Safety GoTugger | LiDAR



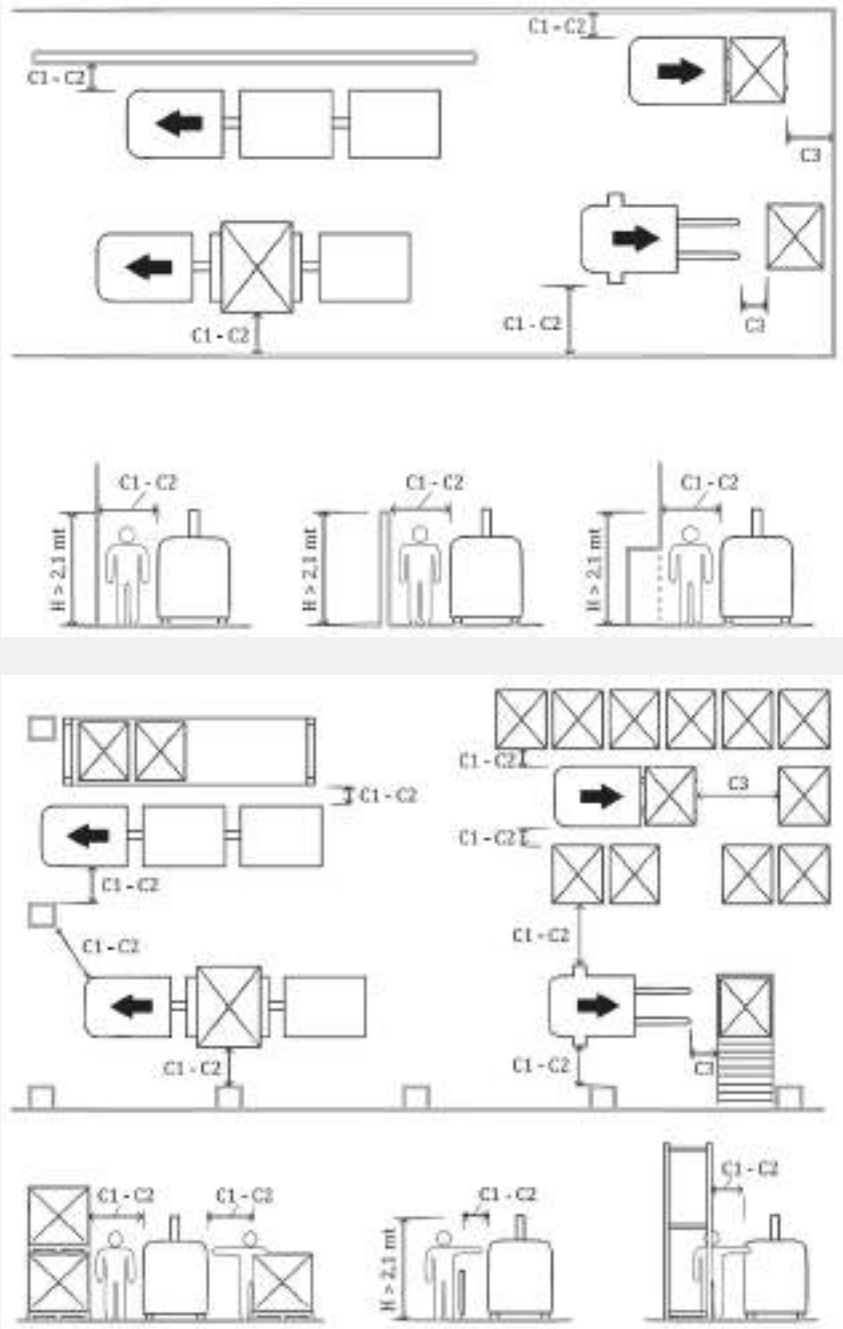
As per ISO 3691-4, GoTugger can reverse in “blind” direction if:
<math>< 0.3 \text{ m/s}</math>
sounds alarm
clear marking on the floor



Safety | Clearance

Zone	C1 (mm)	C2 (mm)	C3 (mm)	Maximum speed (m/s)	Zone classification	Extra marking ¹	Auto star
2.1	> 500	> 500	> 500	-	Operational	No	Yes
2.2	> 500	> 500	< 500	0.7	Operational hazard	Yes	
2.3	> 500	< 500	> 500	1.2			
2.4	> 500	< 500	< 500	0.7			
2.5	< 500	< 500	> 500	1.2			
2.6	< 500	< 500	< 500	0.3 ²			No

ISO 3691-4



Safety | Installation testing

F.1. Test A: Detection of a person lying down

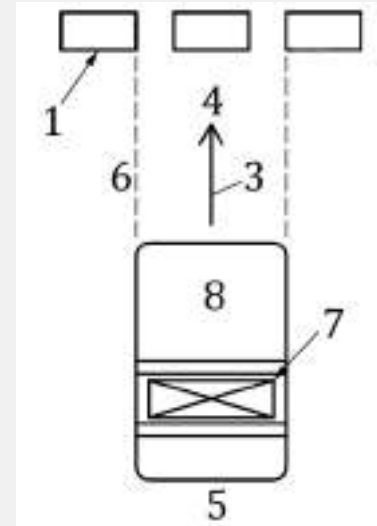
For this test, a cylindrical test piece with a diameter of 200 mm and a length of 600 mm, in matt black, must be used. The image on the left, from Figure55, shows the three positions of the test specimen that must be tested in order for the operational scenario to be approved for installation. In this test, the test specimen must be placed horizontally on the ground, perpendicular to the direction of movement of the AMR.

The test will be considered approved if the AMR stops before touching the test piece and the load remains stable during braking.

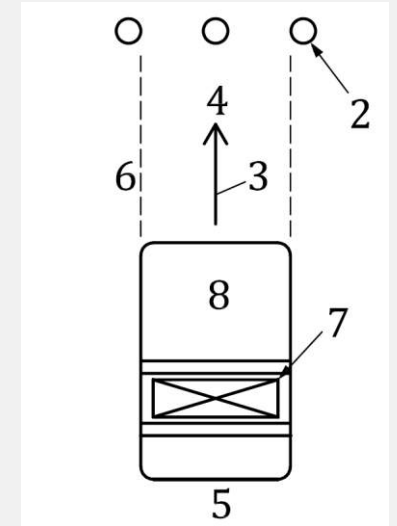
F.2. Test B: Leg detection

For this test, a cylindrical test piece with a diameter of 70 mm and a length of 400 mm, in matt black, should be used⁷. The image on the right, from Figure55, shows the three positions of the test piece that must be tested in order for the operational scenario to be approved for installation. In this test, the test piece should be used in a vertical position.

The test will be considered approved if the AMR stops before touching the test piece and the load remains stable during braking.



Teste A

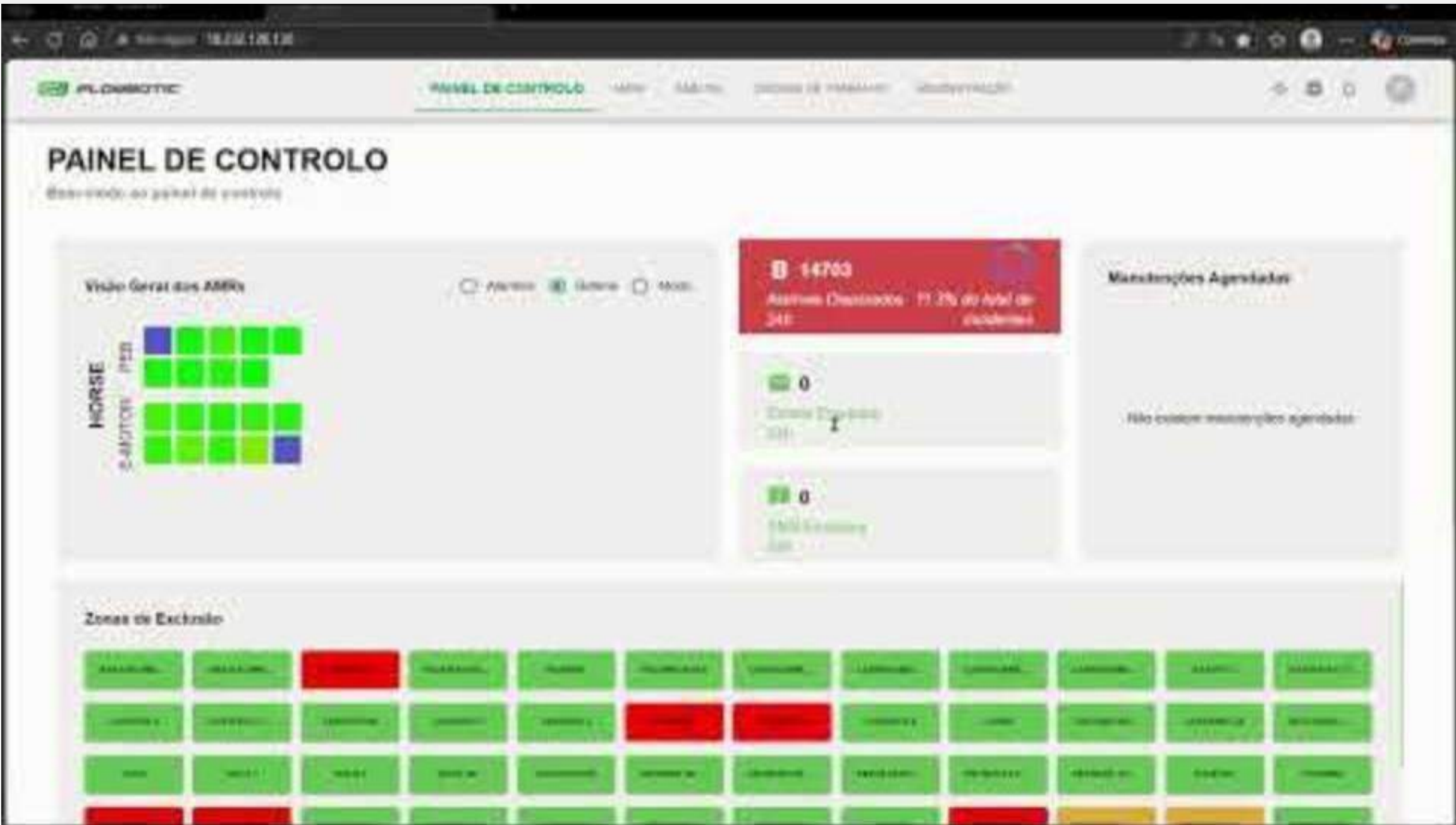


Teste B

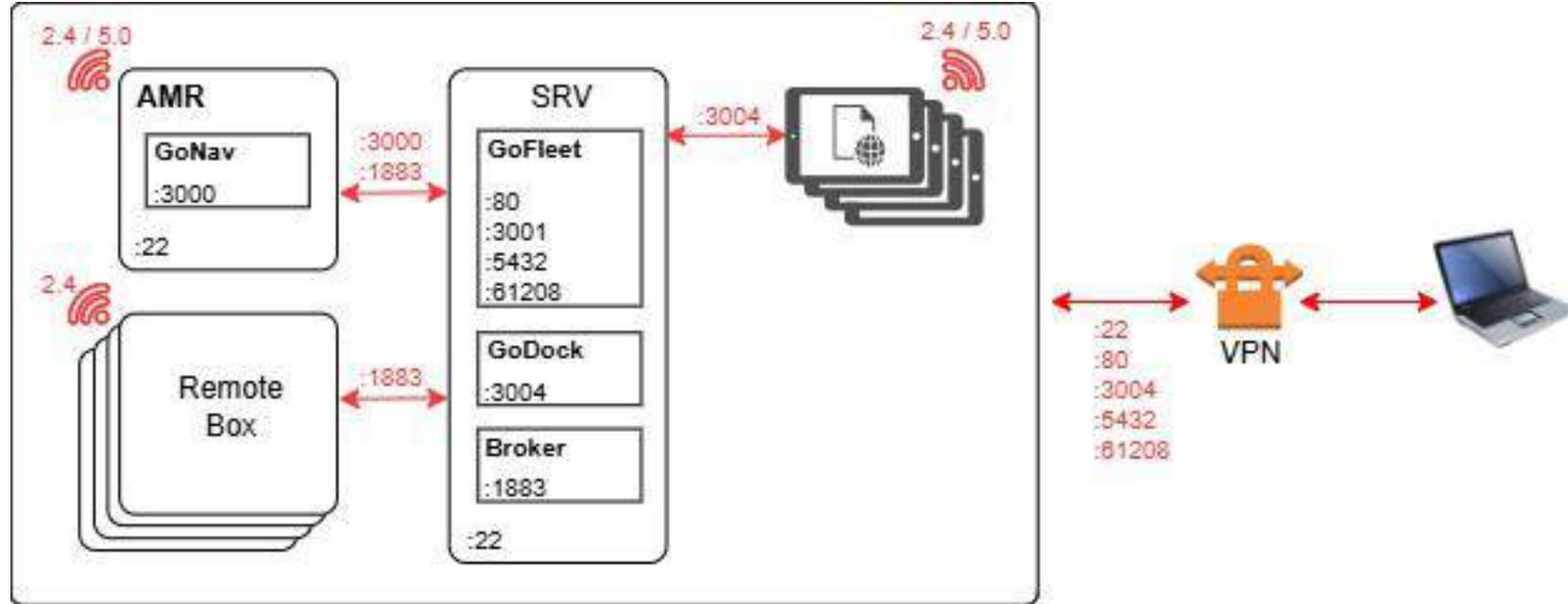
ISO 3691-4

Fleet Manager





Typical architecture of the fleet management implementation:



Minimum configuration: i5, 16gb ram, 80Gb SSD; OS: Linux Ubuntu 22.04.3 LTS (prefered), SUSE Linux; ports: 1883, 3000, 3001, 80, 61208, 5432.

Can run on a virtual server provided by the customer or on a PC to be added by [Flowbotic](#) as an option.

ROI



AMR's

| AMR's | AMR's | AMR's | AMR's |

Reference	Product
GoMini	
GoMouse	
GoMouseX	
GoTugger (S)	
GoTugger	
GoTugger (5T)	
GoPallet (180mm)	
GoPallet (1.6m)	



AMR Fleet Calculator

Calculate the optimal number of Autonomous Mobile Robots for your logistics operation

Project Summary

Based on 4 routes • Total transport: 14370

**4**

AMRs Required

Route Configuration

[↓ CSV](#)[↓ PDF](#)[+ Add Route](#)

Route 1

Distance (return) (m)	Movements/hour (/h)	Avg. speed (m/s)	Load time (s)	Unload time (s)	Door wait (s)	Unavailability (%)
300	0.05	0.7	40	15	0	20

CALC: Trip: 428.6s Cons: 0.992Ah MinChrg: 178.6s ChrgSlot: 190s Ineff: 85.7% Cycle: 749.3s X: 17.6

Route 2

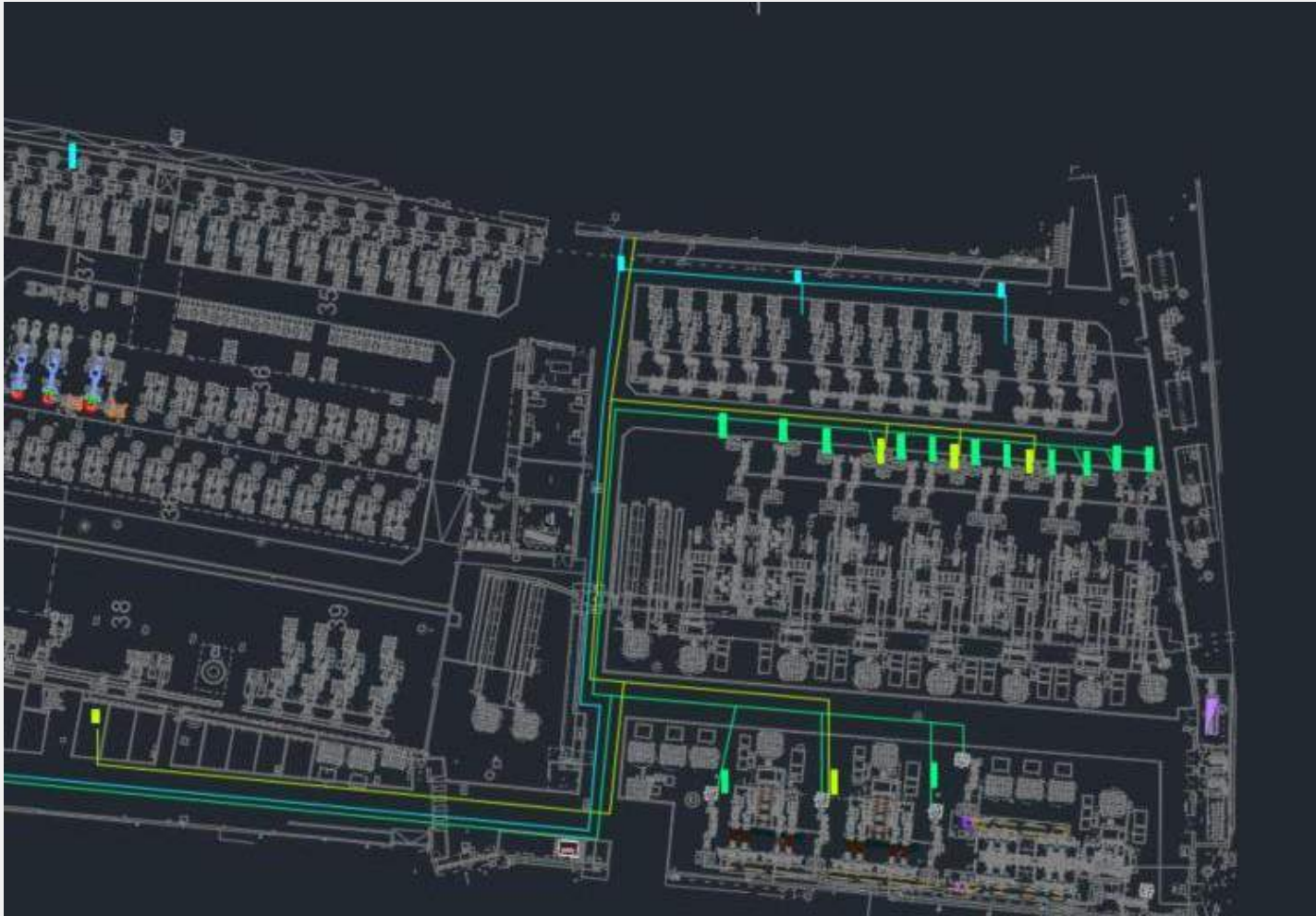
Distance (return) (m)	Movements/hour (/h)	Avg. speed (m/s)	Load time (s)	Unload time (s)	Door wait (s)	Unavailability (%)
300	10	0.7	40	15	0	20

CALC: Trip: 428.6s Cons: 0.992Ah MinChrg: 178.6s ChrgSlot: 190s Ineff: 85.7% Cycle: 749.3s X: 7492.9

Route 3

Distance (return) (m)	Movements/hour (/h)	Avg. speed (m/s)	Load time (s)	Unload time (s)	Door wait (s)	Unavailability (%)
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[AMR Fleet Calculator - Optimize Your Logistics](#)



Green:

- 300 meter return
- 3 movements per hour

Blue

- 320 meter return
- 1 movement per hour

[AMR Fleet Calculator - Optimize Your Logistics](#)

Based on average movements per hour. Beware of Tcy, max cycle times allowed on each line

Project Costs

AMR Configuration

AMRs per Forklift	Cost per AMR (€)
13	26000
Total AMRs Required	3
AMR Purchase Cost	78.000 €

AMR Maintenance

Maintenance per AMR/Month (€)	
200	
Annual Maintenance Cost	7.200 €

Installation

Installation Cost (€)
25000

Annual Energy Costs

Electricity (€/kWh)	Operating Hours/Day
0.2	8

* AMR uses 1.5kW per 8 hours of operation

Annual Energy Cost (all AMRs)	329 €
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Total Project Cost (one-time)	103.000 €
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Estimated Rent (60 month leasing)	2.060 €/month
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Annual Operating Cost <small>(energy + maintenance)</small>	7.529 €
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Annual Savings

Labor Reduction

Number of Operators	Annual Salary (€)
6	18000

Labor Savings	108.000 €
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Forklift Reduction

Number of Forklifts	Cost per Forklift/Year (€)
2	9000

Fuel/Energy per Month (€)	Maintenance per Month (€)
100	50

Lease Savings	18.000 €
Fuel Savings	2.400 €
Maintenance Savings	1.200 €
Total Forklift Savings	21.600 €

Accident Reduction

Cost per Accident (€)	Accidents per Year
5000	1

Accident Savings	5.000 €
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Total Annual Savings	134.600 €
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ROI Summary

Total Project Cost	Return on Investment	Total Annual Savings
103.000 €	0.81 <small>(year)</small>	127.072 € <small>(labor + forklift costs)</small>
Return to 0%		

Example #1:

-5 off GoMouse in a single circular circuit

Field elements (charger, cal buttons, GoFleet): 38k€

1 week installation

Optional maintenance contract (preventive): 4900€/year

Example #2:

-3 off GoMouse in 5 circuits

Field elements (charger, cal buttons, GoFleet): 58k€

3 weeks installation

Optional maintenance contract (preventive): 4900€/year

Example #3:

-6 off GoMouse in a 4 circuits (120 loading/unloading positions)

Field elements (charger, cal buttons, GoFleet, app): 65k€

6 week installation

Optional maintenance contract (preventive): 5900€/year

Example #4:

-21 off GoMouse in 45 circuits (Integration with MES/ERP)

Field elements (charger, cal buttons, GoFleet): 75k€

8 weeks installation

Optional maintenance contract (corrective): 15000€/year

Q&A





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