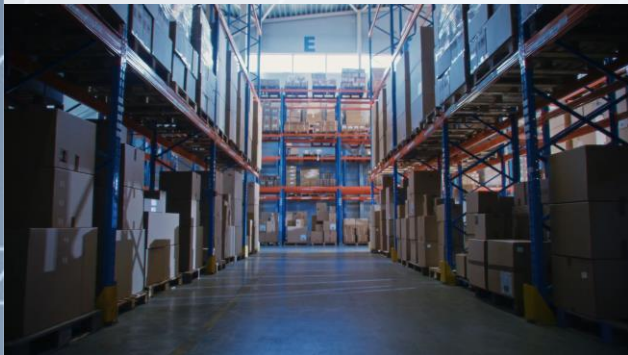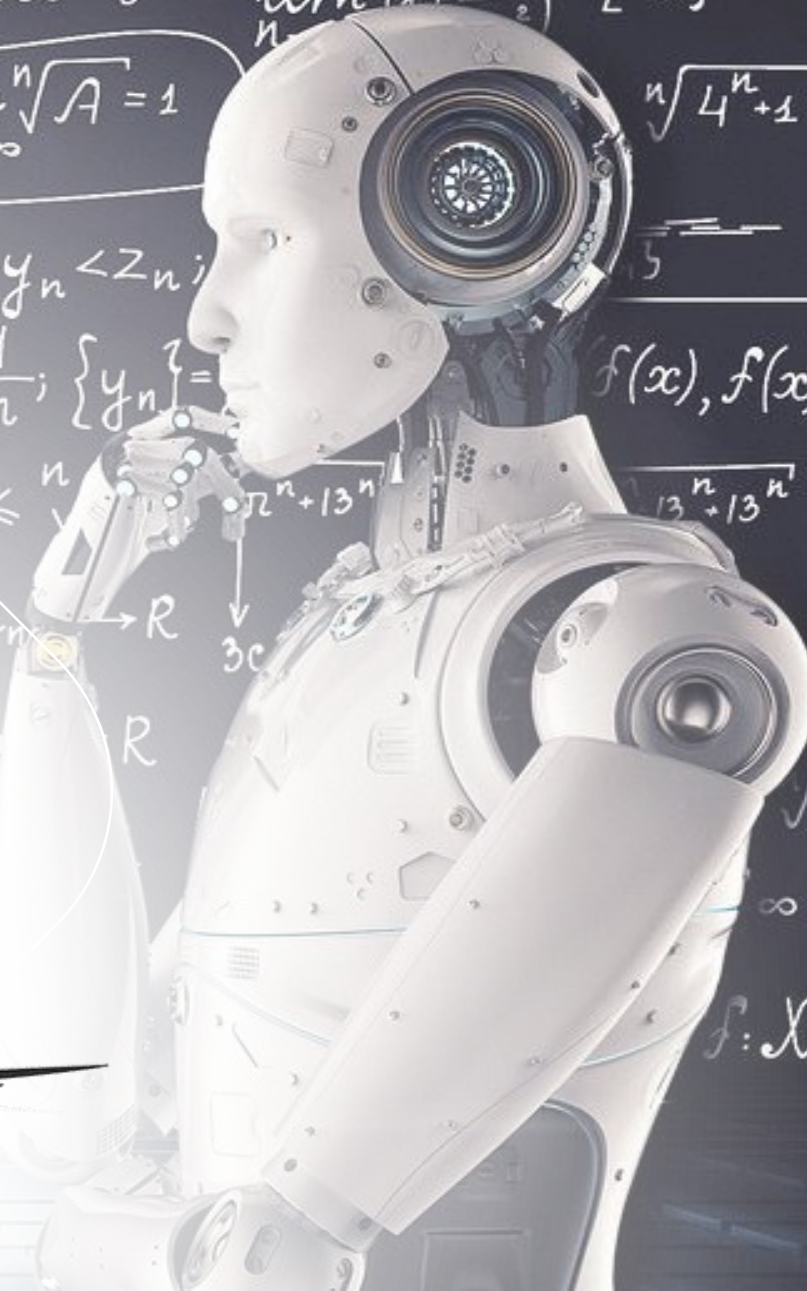# Smart Warehousing

Investor Presentation

Mar 14[h], 2022

![yooBee eye]

Topics for Today

- yooBeeEYE product Overview: What does it do; Why is it going to change the world

- USP and Competitive Landscape

- Business Case: Short term / Long term

- Match with your fund

- Additional questions:

  - Safety: How do you guarantee the safety of forklift operations? Do you carry liability if it doesn't work?

  - How does your system adapt if some pallets are placed outdoor?

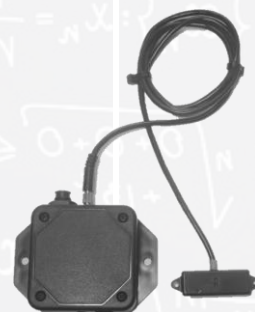 - What are the barriers to entry?

yooBee *eye*

◆ UNIQUE

Accurate RTLS (av. error ~10cm; <30cm) **without the need to install infrastructure** in the warehouse

Total BOM

< €800

High resolution Top Camera

Load Detector Height Sensor

Display & Speaker

Edge Computer, optimized for image processing and AI

Product

PUSH PLAY

yooBee eye

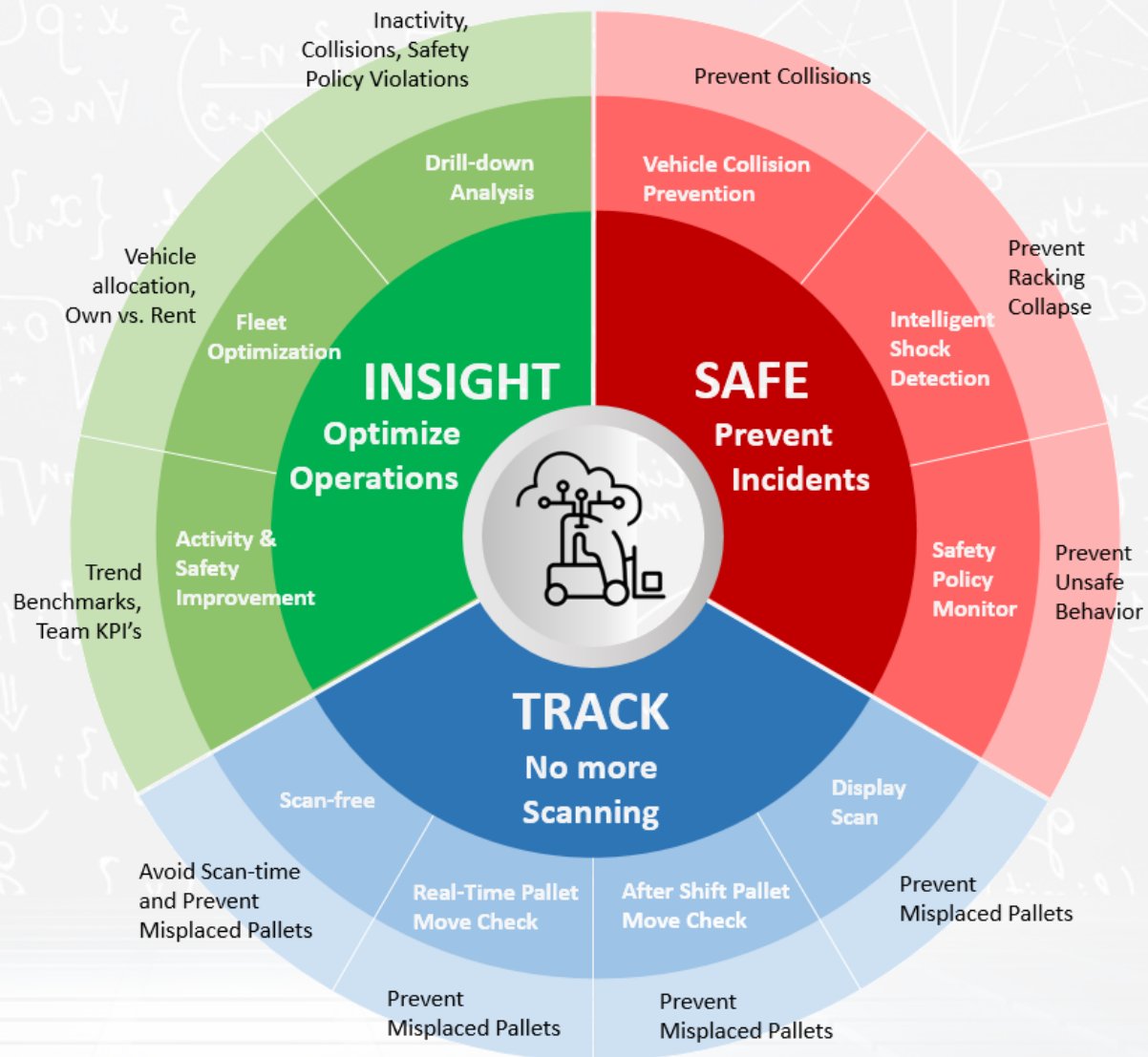Retro-fit vehicles with Smart Technology to boost efficiency and safety

A platform of services to boost safety and efficiency
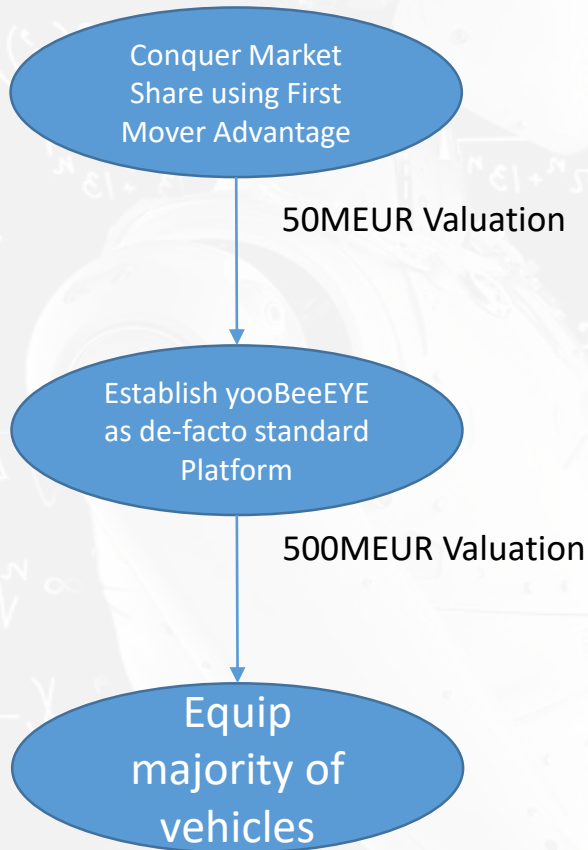
Computer Vision
and
Artificial Intelligence

Advanced TomTom for
Material handling Vehicles

INSIGHT — Optimize Operations
- Inactivity, Collisions, Safety Policy Violations
- Drill-down Analysis
- Vehicle allocation, Own vs. Rent
- Fleet Optimization
- Trend Benchmarks, Team KPI's
- Activity & Safety Improvement

SAFE — Prevent Incidents
- Prevent Collisions
- Vehicle Collision Prevention
- Prevent Racking Collapse
- Intelligent Shock Detection
- Safety Policy Monitor
- Prevent Unsafe Behavior

TRACK — No more Scanning
- Scan-free
- Display Scan
- Avoid Scan-time and Prevent Misplaced Pallets
- Real-Time Pallet Move Check
- After Shift Pallet Move Check
- Prevent Misplaced Pallets
- Prevent Misplaced Pallets
- Prevent Misplaced Pallets

yooBee eye

USP

Conquer Market Share using First Mover Advantage

50MEUR Valuation

Establish yooBeeEYE as de-facto standard Platform

500MEUR Valuation

Equip majority of vehicles

- Accurate RTLS **without the need to install infrastructure** in the warehouse – Key competitive advantage
  - Cost Effective
  - Scalable
  - Low barrier for entry
- **Location aware Platform instead of point solutions**: Game changer
  - Safety features
  - Tracking features
  - Data analytics
  - Third party solutions: Bosch – Comnovo/Rombit
- **Vendor neutral**

Competitive Landscape

Competition		yooBeeEYE advantage
Real Time Locating Systems		
UWB	Dozens of suppliers (IntraNav, Poxyz, Lopos, Rombit, Comnovo, etc.) all similar/same chipsets, offering	Accurate, cost effective RTLS **without the need to install infrastructure** in the warehouse with unique vision-based positioning
	Requires dense, expensive beacon infrastructure	
	Accuracy issues in environments with lots of metal	
	Not scalable: Infrastructure is needed even for a single vehicle	
Markers	Vision-based positioning using (ARUCO) markers (TotalTrax; Essensium)	**No need to install infrastructure**
	Requires infrastructure	
SLAM	Less mature. Main activity at universities, Intermodalics being the exception	Separation of mapping and tracking results in **cheaper and better solution**; Possible candidate for outdoor yard management
	Requires stereo camera – more expensive	
	Suffers from drift issues	
LIDAR	(IdentPro) High accuracy, but expensive; LIDAR's limited feature detection capability makes SLAM approach problematic; Mirrors, as an alternative, requires cumbersome installation.	Cost effective, reliable and adequate accuracy
Safety Point solutions		
Shock detection	All major brands – Toyota's I-site; Linde's Safety guard	Location Aware, cost-effective, vendor-neutral platform instead of expensive combo of point solutions from multiple vendors
Dynamic Speed Control	All major brands – Using transponders	
Person Detection	Blaxtair - Kigis	

Technology

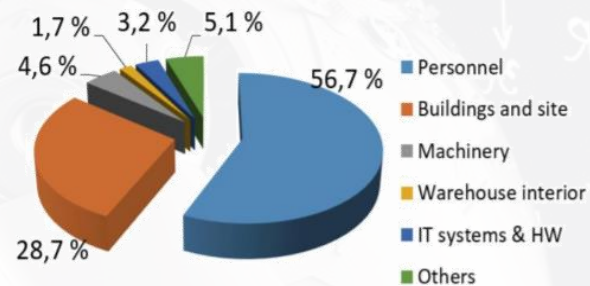| SLAM	yooBeeEYE
Dynamic Model – Simultaneous Locating and Mapping	**Static Model** – Separate Mapping step (using SLAM) and Tracking
Random set of features	Well defined set of features that are found in warehouses. Using DNN for feature detection
Works everywhere	Only works in warehouses
Suffers from Drift: small errors during the mapping/locating accumulate, due lack of absolute references. Special measures (e.g. loop closures) are needed to reduce drift	**No problem with drift**, initialization
Drift and moving features (e.g. moving pallets) makes it difficult to guarantee performance always and everywhere	Fixed model yields **consistent performance**
Works good for relative positioning Other methods are required for absolute positioning (drift compensation – initialization – kidnapped robot problem	**Particle filter for tracking: Excellent positioning with cost effective mono-camera** Quad camera system for high quality (SLAM based) mapping – no need for manual interventions
Active field of research	Thoroughly tested in multiple warehouse environments

yooBeeEYE Business Case

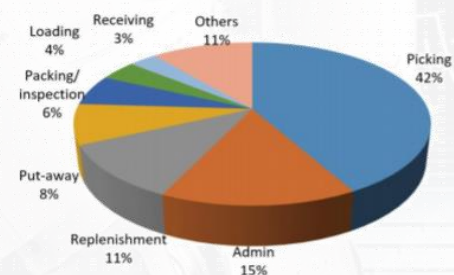# Opportunity

56,7%
of Warehouse cost is Personnel

68,0%
of Personnel cost is moving goods

Intralogistics is an essential component in the world-wide economic fabric.

E-commerce is boosting growth.

Intralogistics relies heavily on Labor for simple moving-good tasks (~40% of the cost).

Intralogistics faces two challenges:

- Slim Net Profit Margins (~2%) [1]

- Low wages and therefore shortage of personnel to address swelling demand

Technology that reduces this reliance on (simple) labor has 2 key benefits:

- **Boost of Net Profit**

- **Boost of revenue**

Reduction of Labor Cost 10%   **Increase of Net Profit** 150%

Digital Technology that reduces the reliance of Intralogistics on labor represents a multi billion Euros market opportunity[2]

Composition of warehouse costs

1,7 %
3,2 %
5,1 %
4,6 %
56,7 %
28,7 %

- Personnel
- Buildings and site
- Machinery
- Warehouse interior
- IT systems & HW
- Others

Source: Optiscan group.

Composition of Warehouse specific labour costs

Loading 4%
Receiving 3%
Others 11%
Packing/ inspection 6%
Picking 42%
Put-away 8%
Replenishment 11%
Admin 15%

Vision

First focus on driver assistance and then on self driving vehicles
While building a +100MEUR company, data is collected for creating a Unicorn

Similar to Tesla's approach to self-driving cars, but in a much simpler setting of warehouses and therefore significantly more feasible without excessive amounts of capital.

Step

01
**Driver Assistance
to boost efficiency of forklifts** [1,2,3,4]

**Collect Data from
thousands of vehicles**

+

**AI Deep
Reinforcement
Learning**

AlphaGo
(Lee Sedol 2016)

This document focuses on Step 1 only

Step

02
**Self Driving
vehicles**

**Superhuman Driver, Fast,
Error-free, Versatile**

**Current AGV Approach
Zombie Driver, Slow,
Expensive, Inflexible**

DeepBlue
(Kasparov 1997)

[1] And other types of Material Handling Equipment, such as reach trucks, transpallets, man-ups, etc.
[2] Manual operated MHE vehicles remain the workhorse of warehousing in the coming 5~10yrs.
[3] Toyota Material Handling expects in the coming 5 years only 5% of their vehicles to be automated (AGV). The remaining 95% are traditional vehicles.
[4] According to IDTechEx (2019) only 100,000 autonomous forklifts are expected to be sold between 2020 and 2030, less than 1% of the total forklift sales over the same period.

Problem

Location aware vehicles boost driver efficiency and drive down the Cost of Operations with up to

14%

How to boost driver efficiency?

Prevent incidents

How to prevent collisions between vehicles and/or persons during my watch?

How to prevent Rack collapse during my watch?

How to prevent unsafe behavior that sooner or later leads to damages and down-time

Knowing the exact **Location and Speed** of vehicles prevents incidents

Safer

No more scanning

How to prevent production stop due to missing items?

How to prevent shipping wrong goods?

How to boost inventory accuracy?

How to find pallets without labelling/scanning?

Knowing the exact **Locations of vehicles** renders barcode scanning obsolete

Error-free

Optimize operations

What is happening during the night/weekend?

Activity benchmarking

Do we have too many vehicles? Do we have the right mix of long term vs. short term lease?

Analysis of what is happening **where**, enables actionable insights to remove inefficiency

More Efficient

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What customers like about yooBeeEYE

Addresses the core needs of warehousing

Compatible with all Material Handling Equipment

Single platform with multiple services

Ease of introduction

Scalability

Price

Customer Traction

yooBee eye

KATOEN NATIE

Demonstrated yooBeeEYE is the only working system for man-up collision prevention. [Conducting Pilot] with follow-up order of potentially 650 units

FIEGE

Pallet Tracking to prevent lost pallets, especially pallets with valuable good (Media Market).

H.ESSERS

Pallet Tracking to avoid scanning.
Customer satisfied with accuracy of Pilot
Considering business case of full roll-out

GOBO Transport & Logistics

Display Scan to avoid labelling infrastructure

CARGLASS

Looking for an alternative to available shock detection systems, which are inadequate.

SKF

Dynamic speed limiting

Lotus BAKERIES

All Safety features with the goal of increasing max speed while reducing incidents

SONOCO

Pallet Tracking combined with RFID identification with partner ZETES;
Test case with follow-up @ Inbev and Coco-Cola

SCANIA

All safety features with emphasis on Vehicle collision prevention system.
Potential to increase max speed while reducing incidents

VOLVO

All Safety features
And Pallet Tracking as a next step

Atlas Copco

Pallet Tracking for 100% inventory accuracy to prevent production loss due to lost items.
Pilot ongoing

CAT CATERPILLAR

Man-up collision Prevention
Other features in a next step

Sales Funnel

Person Detection on same platform is game changer

Sales funnel demonstrates strong customer traction

	Track	Track	Track	Track	Track	Track	Safe	Safe	Safe	Safe	Safe	Safe	Safe	Track	Safe	Safe	
	SONOCO	ESSERS	ESSERS - POV	ATLAS	ATLAS-POV	FIEGE	BELRON	KATOEN NATIE	KATOEN NATIE-POV	SCANIA	SCANIA	VOLVO	SKF	GOBO	CATERPILLAR	LOTUS Bakeries	
# vehicles	9	150	20	120	20	3	92	650	21	250	3	600	70	24	15	35	2,082
HW Sale	36,270 €	423,150 €	56,420 €	411,060 €	68,510 €	12,090 €	181,056 €	2,010,125 €	42,252 €	856,375 €	10,137 €	3,587,340 €	368,008 €	87,720 €	49,200 €	141,050 €	8,340,763 €
20% PartnerFee	7,254 €	84,630 €	11,284 €	82,212 €	13,702 €	2,418 €	36,211 €	402,025 €	- €	171,275 €	- €	717,468 €	73,602 €	- €	9,840 €	28,210 €	1,640,131 €
HW revenu	29,016 €	338,520 €	45,136 €	328,848 €	54,808 €	9,672 €	144,845 €	1,608,100 €	42,252 €	685,100 €	10,137 €	2,869,872 €	294,406 €	87,720 €	**39,360 €**	112,840 €	**6,700,632 €**
HW COGS	11,133 €	120,900 €	16,120 €	96,720 €	16,120 €	2,418 €	60,352 €	804,050 €	13,776 €	201,500 €	2,418 €	832,200 €	86,590 €	19,344 €	12,090 €	28,210 €	2,323,941 €
Recurring Sale	4,536 €	77,400 €	- €	51,840 €	- €	1,080 €	26,496 €	374,400 €	- €	72,000 €	- €	345,600 €	40,320 €	5,184 €	3,240 €	20,160 €	1,022,256 €
20% PartnerFee	907 €	15,480 €	- €	10,368 €	- €	216 €	5,299 €	74,880 €	- €	14,400 €	- €	69,120 €	8,064 €	1,037 €	- €	4,032 €	203,803 €
Recurring revenu	3,629 €	61,920 €	- €	41,472 €	- €	864 €	21,197 €	299,520 €	- €	57,600 €	- €	276,480 €	32,256 €	4,147 €	3,240 €	16,128 €	**818,453 €**
Sum Rev 22	**32,645 €**	400,440 €	**45,136 €**	370,320 €	**54,808 €**	10,536 €	166,042 €	1,907,620 €	**42,252 €**	742,700 €	**10,137 €**	3,146,352 €	326,662 €	91,867 €	**42,600 €**	128,968 €	7,519,085 €

Probability	100%	100%	50%	50%	50%	100%	50%	50%	100%	50%	50%	50%	25%	50%	50%	25%	
# vehicles	9	150	10	60	10	3	46	325	21	125	1.5	300	17.5	12	7.5	8.75	1106.25
HW Revenu	29,016 €	338,520 €	22,568 €	164,424 €	27,404 €	9,672 €	72,422 €	804,050 €	42,252 €	342,550 €	5,069 €	1,434,936 €	73,602 €	43,860 €	19,680 €	28,210 €	**3,458,234 €**
HW COGS	11,133 €	120,900 €	8,060 €	48,360 €	8,060 €	2,418 €	30,176 €	402,025 €	13,776 €	100,750 €	1,209 €	416,100 €	21,648 €	9,672 €	6,045 €	7,053 €	1,207,384 €
Recurring revenu	3,629 €	61,920 €	- €	20,736 €	- €	864 €	10,598 €	149,760 €	- €	28,800 €	- €	138,240 €	8,064 €	2,074 €	1,620 €	4,032 €	**430,337 €**

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Partnerships

zetes

Over 80% of the top 500 European supply chain companies rely on Zetes as their trusted advisor to optimize their business process execution.
1200 supply chain solutions specialists are available in more than 30 offices in over 20 countries in EMEA.

JUNGHEINRICH

Founded in 1953, Jungheinrich ranks among the leading solutions providers for the intralogistics sector, with revenue of €3.8 billion and more than 18,000 employees worldwide.

TOYOTA

MATERIAL HANDLING

Toyota Material Handling International (TMHI) is a total solution provider within the material handling business. Part of Toyota Industries Corporation (TICO), the global number one company in material handling since 2001.

Market Size

Short term SAM ~50,000 units
(Served Addressable Market)

- Direct Sales in BEL
- Aiming for ~8% market share
- > 6 MEUR revenue in 2024
- > 1 MEUR profit in 2024

Long term SAM > 500,000 units

- Top 3 Partners sell > 500,000 units/yr
- Aiming for ~10%
- Selling > 50,000 units/yr
- Annual Revenue > 100MEUR

TAM (Total Addressable Market)

>10 million units

New Vehicles in Belgium
(extrapolated from 2014-2017 numbers)

Vehicle in use in Bel **>50,000** [1]

| | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |

Legend: ■ Reachtrucks ■ Pallettrucks ■ Stapellers ■ Other
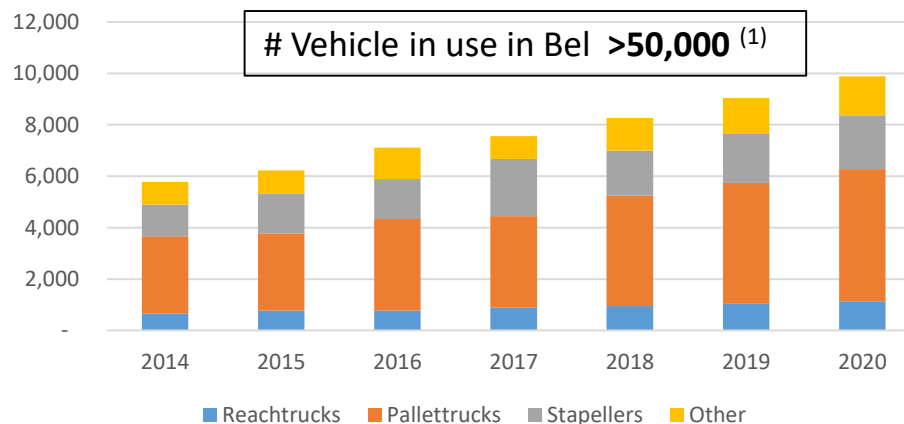
Market Share of Forklift Companies (CY2020)
©Deallab

- Toyota Industries — 19.7%
- KION Group — 12.7%
- Jungheinrich — 8.4%
- Crown Equipment — 6.9%
- Mitsubishi LogiNext — 6.8%
- Hyster-Yale — 5.2%
- Heli — 3.6%
- Hangcha — 3.2%
- Doosan — 1.4%
- Lonking Forklift — 0.7%
- Manitou — 0.5%
- HHI — 0.4%

The global forklift truck market size was **1,384 thousand units** in 2020[2]

(1) https://www.valuechain.be/nl/nieuws/detail/6328/markt-van-heftrucks-en-magazijntrucks-blijft-boomen

(2) https://www.fortunebusinessinsights.com/industry-reports/forklift-trucks-market-101541

Financials

Targets 2024

- Sell approx. 2,800 units
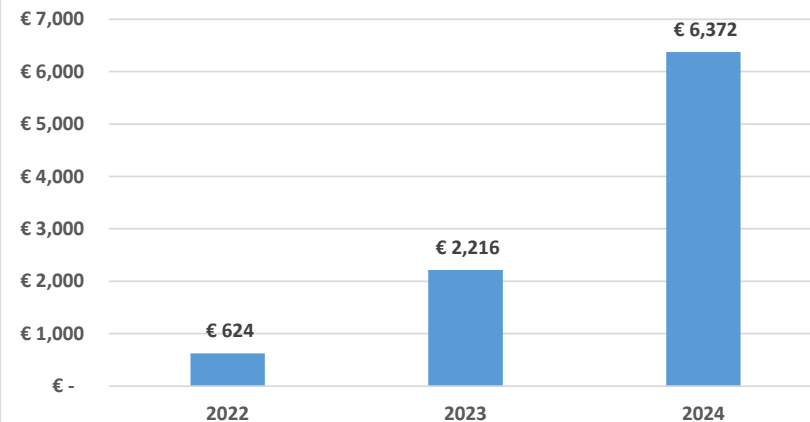- Revenue > 6MEUR
- Profit > 1MEUR
- Required Capital 2MEUR

Units Sold
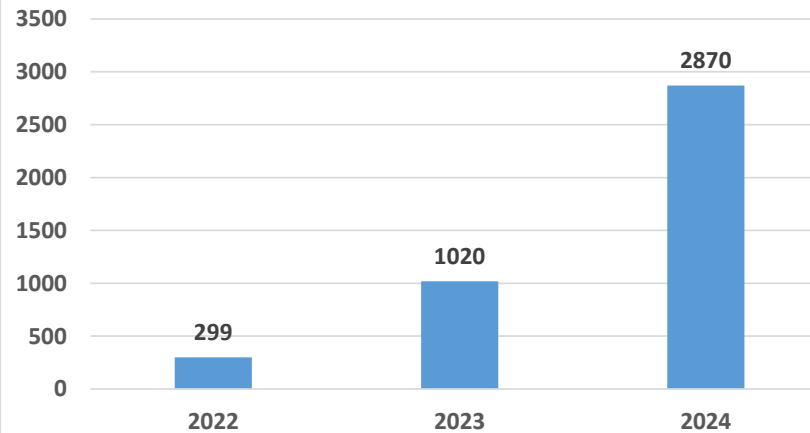
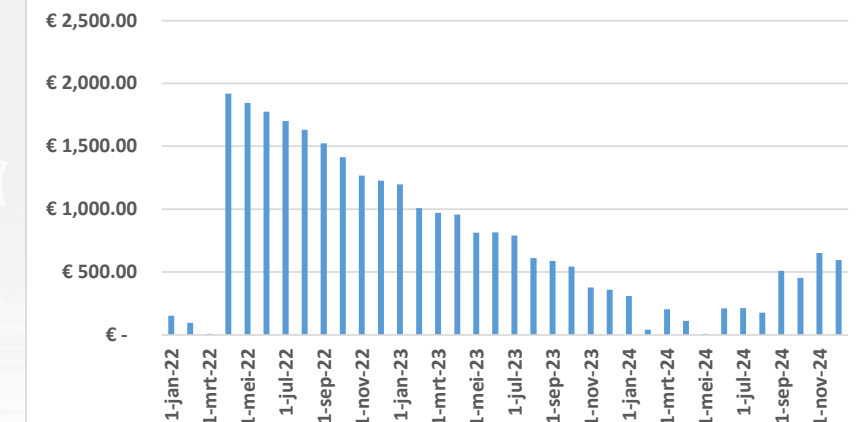**Units Sold as percentage of Belgium SAM**
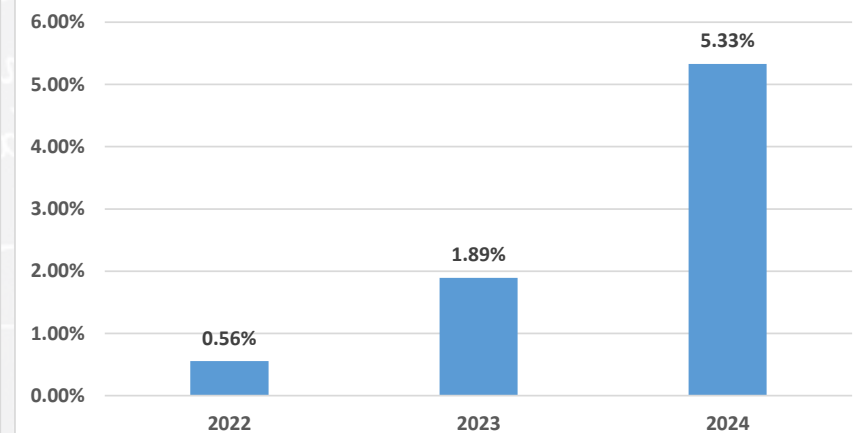
Revenue (KEUR)

Cash EOM (KEUR)

👍 All ingredients for a runaway success:

🎯 Experienced Team with a passion for innovation

☁ Unique technology that disrupts a large and fast growing market

📈 Solving real problems with appealing short term business opportunities and huge long term potential

⏱ Time is Right: Customer traction and the competition is lagging behind

👍 Focus area: Cutting edge technology (AI, Computer vision and edge computing) that shapes the 4.0 Industry/Logistics 4.0

👍 Early stage: At the verge of ramping up revenue (Close to Series A)

👍 2MEUR Capital Raise @ appealing (pre-revenue) valuation

Use of Funds

Raising 2MEUR with 4 goals

Cap Table		
	# Shares	%
Founders/Mgmt	15,008	69%
LRM	4,447	21%
SOP - I	2,160	10%
Convertible (1)		
Totaal	21,615	100%

(1) 600KEUR with 25% discount

yooBeeEYE FTEs

1 Strengthen the Tech Support team for successful completion of deployments.

2 Strengthen the Sales Team for direct sales, guaranteeing independence from partner sales performance.

3 Strengthen the R&D team for product upgrades and preparation of Step 2.

4 Working Capital to build inventory of critical components
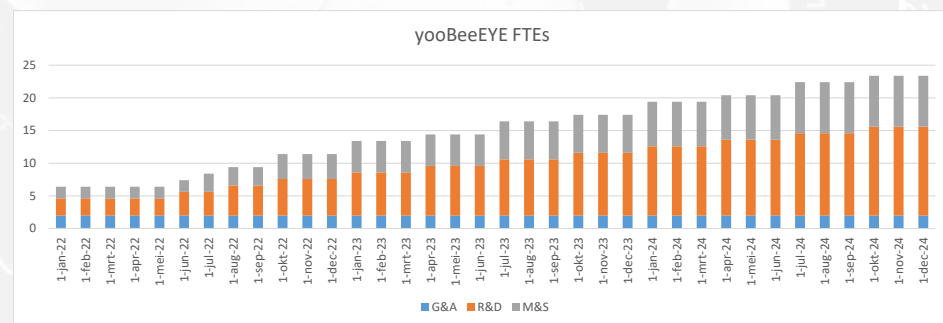
Key Take Away

1 Experienced Team

2 Unique product in a large and growing intralogistics market (No-infra RTLS; Platform)

3 Strong Customer traction and partnership with leading players

4 Raising 2MEUR @ appealing (pre-revenue) valuation

5 Short term exit opportunities and long term growth opportunities with excellent multiple potential (De-facto Standard Platform - DRL-based self driving vehicles)

Additional Questions

- Safety: How do you guarantee the safety of forklift operations? Do you carry liability if it doesn't work?

- How does your system adapt if some pallets are placed outdoor?

- What are the barriers to entry?

Safety Guarantees

- yooBeeEYE does not guarantee vehicle safety and apart from the standard CE certification, there are no general safety standards yooBeeEYE needs to comply with.

- Some States in Germany (and perhaps some future prospects may) require a specific SIL (Safety Integrity Level) for man-up collision prevention. We are currently investigating with Eurofins if it makes sense to invest in this.

- Toyota has made an offer to one of their large customers for leasing a fleet of vehicles, including coverage for damages if yooBeeEYE is installed.

Outdoor yooBeeEYE

- yooBeeEYE only works indoor. Outdoor vehicle tracking is possible via GPS (embedded in 4G module), but accuracy is too low for asset tracking or safety features. High accuracy GPS is prohibitively expensive for most customers.

- Outdoor pallet tracking is a small market.

- Yard management (tracking of trailers/containers, 1m accuracy is OK, ref. Van Moer) is an interesting market segment that will be addressed later. Maintaining focus on Intralogistics is key now.

- yooBeeEYE is scalable with a low barrier to entry (e.g. Fiege)

- Key barrier to entry is the fact that yooBeeEYE is new:

  - BlooLoc is not yet an established brand with a solid track record

  - Concern whether yooBeeEYE's performance can be guaranteed in customer specific setting?

  - First of a Kind product. Customers cannot benchmark the price.

- Pallet tracking requires interfacing with WMS via API's:

  - Start with Display Scan and gradually integrate more tightly with WMS.

- Bandwidth to support customer traction -> Capital Raise

Thank You

Backup slides

Who are we

BlooLoc delivers State-of-the-Art Indoor Positioning Solutions

Ivo Vandeweerd,
CEO

Koen Deforche,
CTO

Wilfried Van der Perre,
COO

Stijn Vantilt,
Sales & Marketing

Roland Meekers,
Independent Board Member

yooBee care — (BLE) – Care segment

yooBee connect — (BLE) – Smart Buildings / Trade shows

yooBee eye — (Vision & AI) – Logistics & Industry

Struck Gold

Released yooBeeEYE in Q4 2021: Combines advanced Computer Vision and AI for indoor positioning of MHE vehicles to boost safety and efficiency of Warehouse Operations.

Successfully completed multiple Pilot Projects in Logistics & Industry.

Secured first orders and built rich sales funnel demonstrating strong customer traction.

KATOEN NATIE   H.ESSERS   GOBO Transport & Logistics   Atlas Copco   VOLVO

Looking for 2MEUR to accelerate yooBeeEYE business in 2022.

Team

Team experience

Ivo Vandeweerd (CEO): PhD from KUL in micro-electronics.
- Serial high tech entrepreneur with multiple successful exits.

Koen Deforche (CTO): PhD from KUL in bio-informatics.
- ICT genius.

Wilfried Van der Perre (COO):
- Engineer with passion for running organization effortlessly and efficient.

Stijn Vantilt (Head of Marketing & Sales):
- Economics degree with MBA of Vlerick with experience in running a family business and selling to large retailers.

Koen Delaet (Head of the Care business unit):
- Marketing expert with life long experience in the healthcare sector (hospitals and elderly care)

Thomas Dendale (Embedded System development):
- Electrical engineer that turned into an embedded systems guru.

Leander Hendriks (Computer Vision expert):
- Engineer with life long experience in computer vision.

Victor Raminez (Project Manager):
- Engineer with passion for customer satisfaction.

Lise Bulens:
- Office manager with focus on admin and logistics.
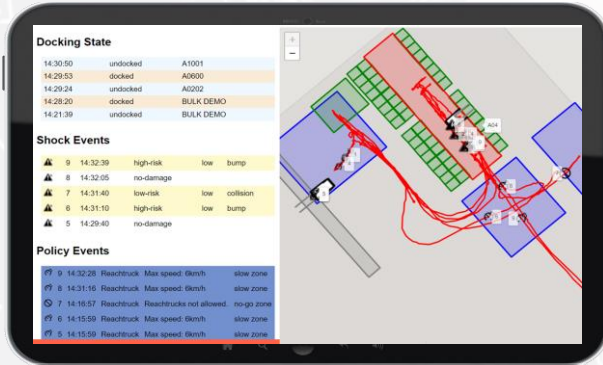
Sofie Vandersmissen:
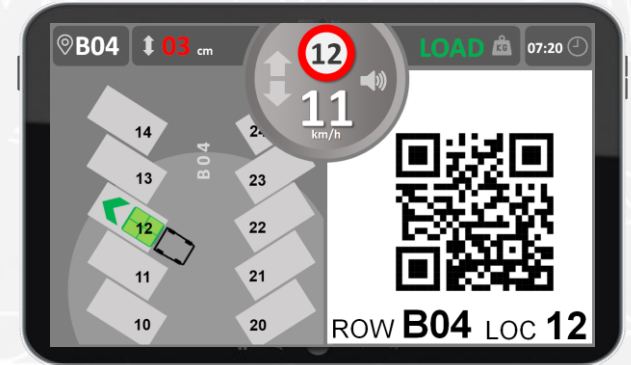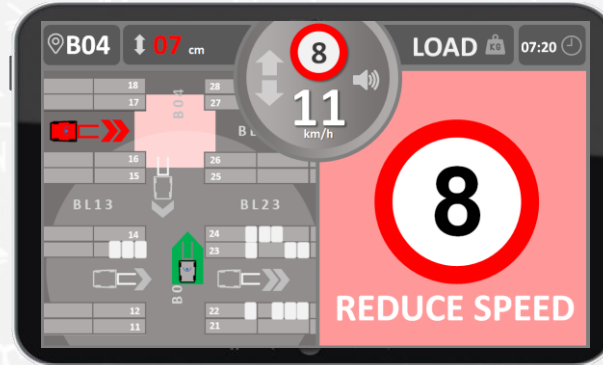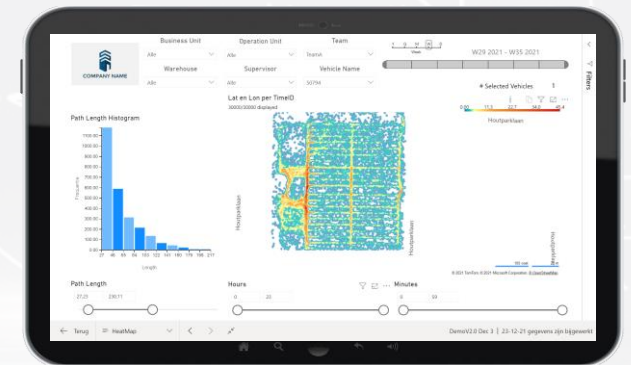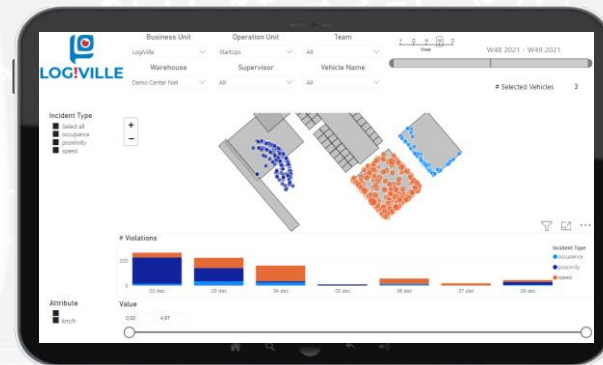- Office manager with focus on finance, legal and HR.

yooBee eye

Software

Live Map

In-cabin display

Dashboards Historical Data

Competitive Landscape

yooBeeEYE is a unique product

Feature	Competition		yooBeeEYE
Accurate RTLS	INTRANAV.	UWB requires a dense, expensive grid of beacon infrastructure (e.g. IntraNav)	Vision based, non need to install infrastructure: Cost efficient
Collision prevention	Rombit com novo	UWB proximity based. Anywhere, generating false alarms due to interference (e.g. Rombit, Comnovo)	Location Aware, only active where relevant (e.g. cross roads)
Dynamic Speed limit	KION GROUP JUNGHEINRICH TOYOTA	Location based Speed limits require cumbersome installation of transponders (MHE vendors)	Location Aware built-in
Shock detection	KION GROUP JUNGHEINRICH TOYOTA	Available solutions require a user defined threshold and immobilization of vehicles (MHE vendors)	Location Aware built-in
Pallet tracking	identpro® Material Tracking Innovations	Uses LIDAR (e.g. IdentPro)	Vision based solution: Cost effective
Data Analytics			First of a kind

POINT SOLUTION

PLATFORM of SOLUTIONS

Business Model

yooBeeEYE ASP (excl VAT) - per vehicle [1]

Hardware	Price
Hi Res vision camera & Vision processing unit	1 911 €
Loudspeaker & display	147 €
Load-Height Sensor	520 €
Load-Height Sensor Battery Pack (optional)	214 €
Badge Reader (optional)	198 €

(1) Incl. partner commission (20%-30%)

yooBeeEYE ASP (excl VAT) - per vehicle

SaaS Feature Based Pricing, monthly license fee	Price
SAFE, Vehicel Collision prevention	12 €
SAFE, Intelligent Shock detection	6 €
SAFE, Safety Policy Monitoring	6 €
TRACK, DISPLAY Scan	6 €
TRACK, Re-Act post shift Pallet check	6 €
TRACK, Pro-Act Real-time check	6 €
TRACK, Integrate full Scan-Free	18 €
INSIGHTS, Activity, Efficiency, Safety Analysis	7 €

Business Model

yooBeeEYE Lease Price (excl. VAT) - per vehicle [1]	Lease fee	Use fee	Monthly fee
WORK SAFE package			
Vehicle Collision warning			
Intelligent Shock detection	42,88 €	24,00 €	69,00 €
Safety Policy Monitor			
BE SMART package = WORK SAFE package +			
Display Scan			
Re-Act, Verify pallet moves after shift	53,71 €	43,00 €	99,00 €
Insight			
DO MORE package = BE SMART package +			
Pro-Act, Real-time check			
Integrate, fully Scan-free	53,71 €	55,00 €	109,00 €

(1) Incl. partner commission (20%-30%)

WORK SAFE

Go and Stand Up.
The musthaves to work safe

€ 69,00 /month, ex VAT

Vehicle collision prevention	✔
Intelligent Shock detection	✔
Safety Policy Monitorring	✔

BE SMART

Ready to Stand Out.
Let's move

€ 99,00 /month, ex VAT

Vehicle collision prevention	✔
Intelligent Shock detection	✔
Safety Policy Monitorring	✔
Display Scan	✔
Re-Act Verify Pallet moves after shift	✔
Insights, Safety & Activity analytics	✔

DO MORE

The ultimate deal !
Do more and WIN BIG

€ 109,00 /month, ex VAT

Vehicle collision prevention	✔
Intelligent Shock detection	✔
Safety Policy Monitorring	✔
Pro-Act Real-time check	✔
Integrate Fully Scan-free	✔
Insights, Safety & Activity analytics	✔

Business Model

Efficiency gain

14%

€ 5,049
Fully Loaded
monthly cost
(truck +
driver)

2,5% — Safety & damage
3,8% — Search Lost Items
2,7% — Scanning
15% — In-efficiency (truck + driver)
76%

€1,211
Inefficiencies
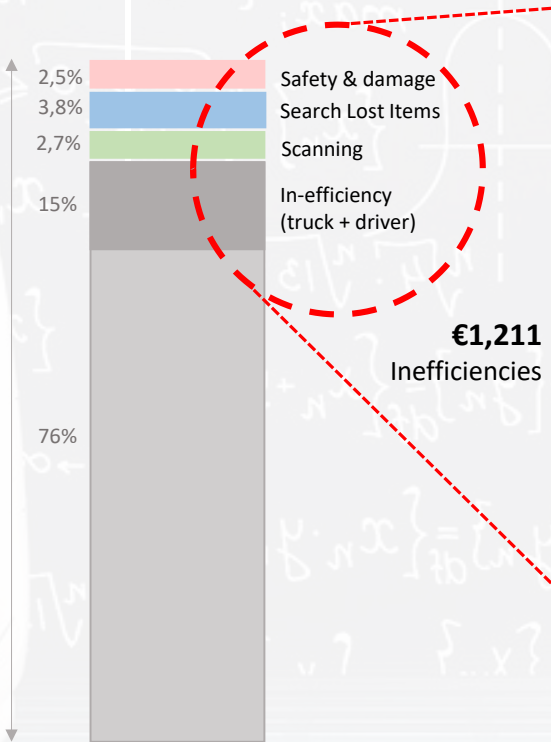
Safety   €126
Search Lost Items   €192
Scanning   €136
In-efficiency (truck + driver)   €757

SAFE (- 75%)
TRACK (-100%)
INSIGHT (-50%)

yooBee eye

14% Efficiency gain

€691

Safety €32
In-efficiency (truck + driver) €379
yooBeeEYE €109

€520

35

Sustainability

yooBeeEYE helps to "Foster sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all."

8.4

Target 8.4: Improve resource efficiency in consumption and production.
- Indicator 8.4.1: Material footprint, material footprint per capita, and material footprint per GDP:
  - yooBeeEYE's efficiency gains translate directly in energy savings

8.8

Target 8.8: Protect labor rights and promote safe working environments
- Indicator 8.8.1: Frequency rates of fatal and non-fatal occupational injuries
- Forklifts are hazardous tools:
  - 90% of all forklifts will be involved in some type of accident (EU, OSHA)
  - 2580 serious injuries result from forklift accidents each year in Belgium (FEDRIS 2018)
  - 69% of workplace incidents involve a forklift (Belgium AGORIA)
- yooBeeEYE SAFE aims to reduce drastically forklift related incidents

IPR

Patent on overall approach of yooBeeEYE is subject to workarounds

Effective IPR protection by two track approach:

1. Patent Application on DNN (Deep Neural Network) architecture and how it is embedded in a particle filter based sensor fusion architecture.

2. DNN training know-how:
    1. Selection of features which are used to train the network and how they are used to train the network. Part of the secret sauce.
    2. Training data. With each new deployment the training data is extended and DNN becomes better and more difficult to duplicate.

Asia

Asian Market Strategy

Partnerships with:

1. Hangcha (nr. 8 on world ranking)

2. Lonking forklift (nr. 10 on world ranking)

Both are deployed internationally and may want to use technology as a competitive advantage to gain market share (go for top-5)

LIDAR

1. LIDAR is (still) expensive compared camera's.

2. Vision provides more opportunities for feature detection (e.g. ceiling)

3. LIDAR based positioning suffers from initialization problems in warehouse environment. How to differentiate between racking and temporary objects?

4. Short range, low cost LIDAR could be added for Step 2: autonomous vehicles:
   - Cm level accuracy for docking
   - 100% reliable Person/object detection for safety