

**MiR | a better way**

**MiR**

# Agenda

- ▶ Mobile Industrial Robots
- ▶ **Internal Logistics & Automation**
- ▶ Market needs and predictions
- ▶ **AMR (Autonomous Mobile Robots)**
- ▶ Applications of AMR
- ▶ Case studies
- ▶ Navigation and safety
- ▶ How to start

# Timeline

## Product development

First construction idea made of LEGO bricks by founder Niels Jul Jacobsen



Mobile Industrial Robots (MiR) established in May



Thomas Visti entered as CEO in October



MiR100 commercialized



MiRHook launched in February

Regional office in New York. New HQ in Odense, DK



MiR200 and MiRHook200 launched in April

Regional offices in Barcelona, Shanghai, Singapore



MiR500 launched in June

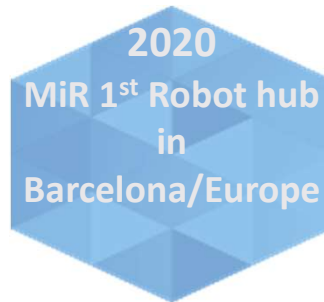
Regional office in San Diego. Acquired by Teradyne in April



MiR1000 launched in April

Regional offices in Frankfurt and Tokyo opened

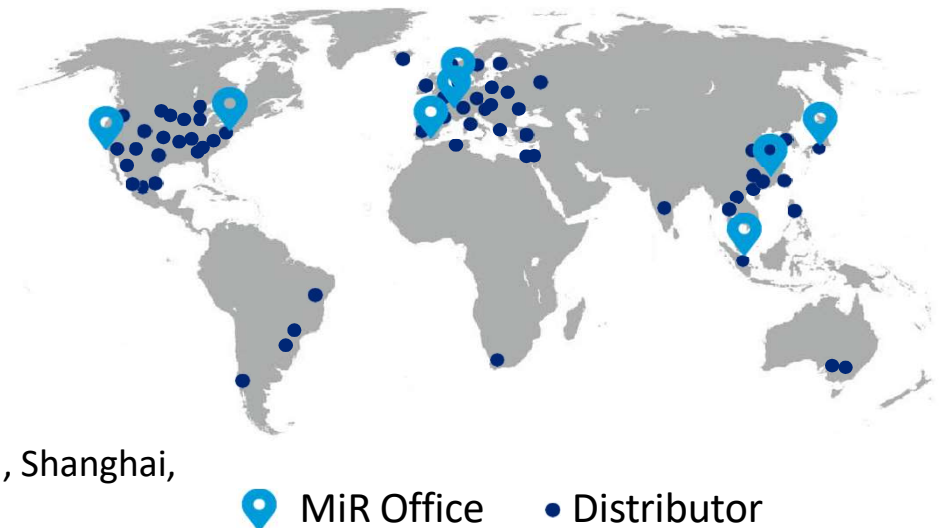
## Business development



# The Company Today

## MiR Highlights:

- Born global: 167 distributors in 50 countries
- Local presence: Offices in New York, San Diego, Barcelona, Shanghai, Tokyo, Frankfurt, Singapore and Japan.
- Award-winning technology: Winner of multiple international awards

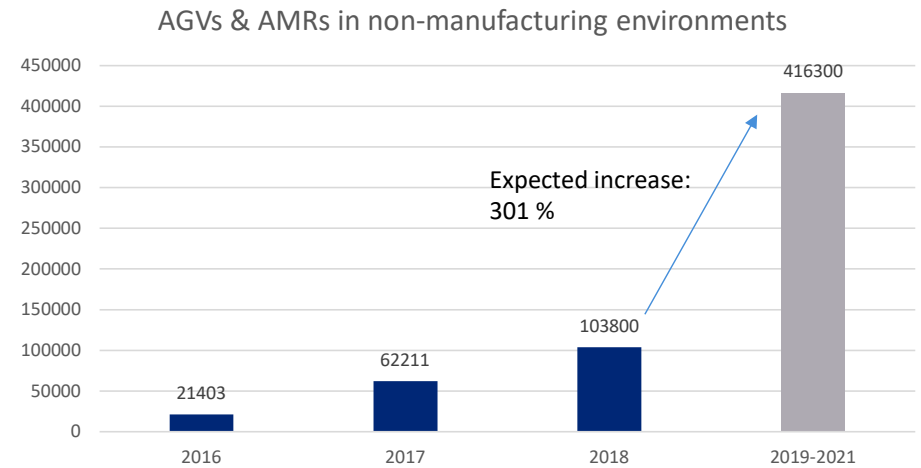
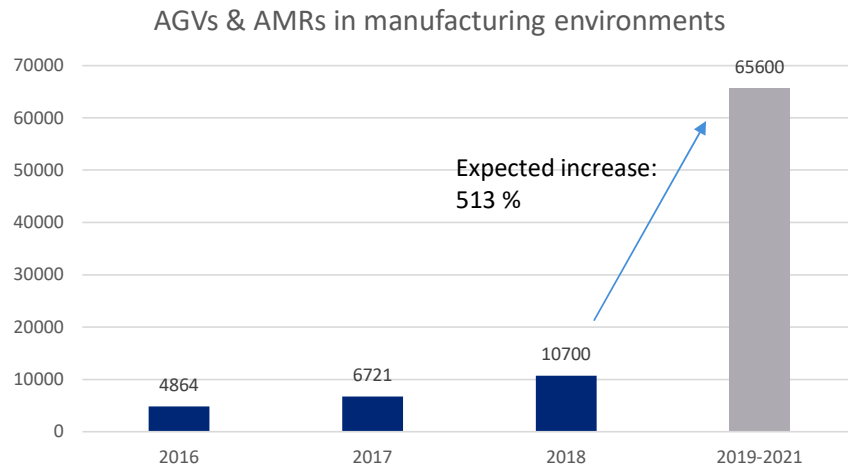


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- ▶ Internal Logistics & Automation
- ▶ Market Needs and predictions
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# IFR Predictions

## Development in global adoption of AGVs and AMRs



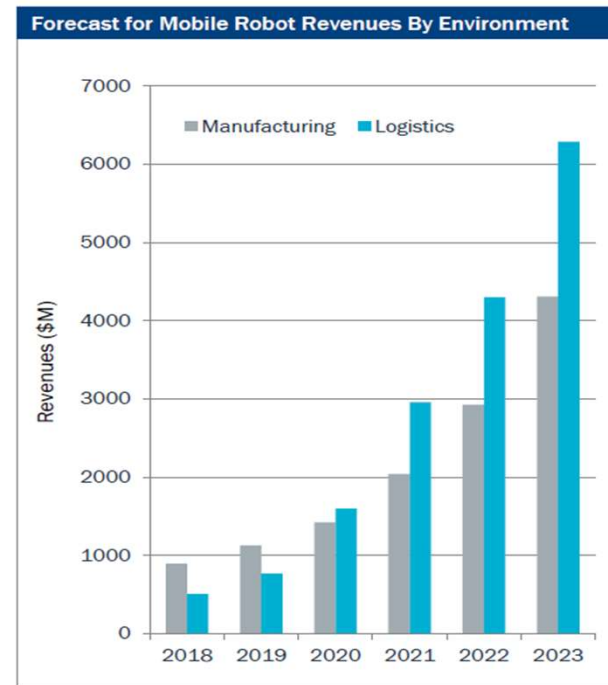
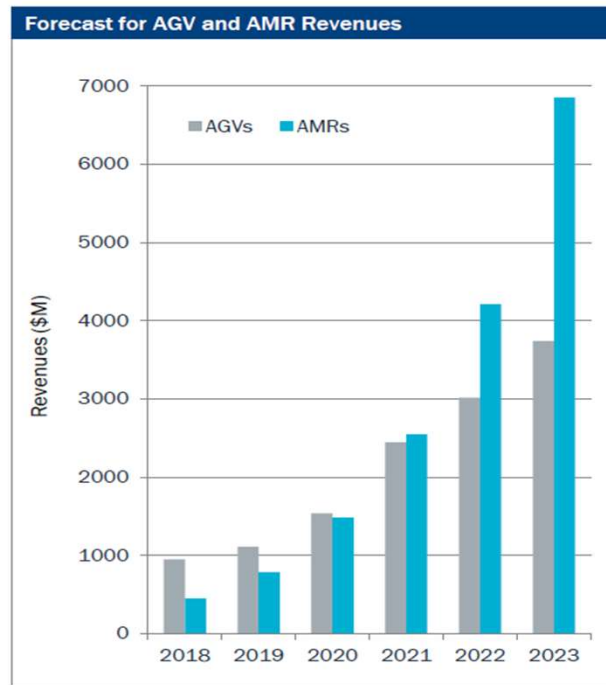
Both manufacturing and non-manufacturing environments (e-commerce, 3PL, hospitals etc.) are key markets.

Expected units installed in total: **481,900 between 2019-2021**

Being easier to deploy, effectively run in a greater numbers to address more automation points is why experts predict AMR winning over AGV solutions

## AGV & AMR Revenues to Exceed \$10bn in 2023

Industry to average more than 50% growth annually



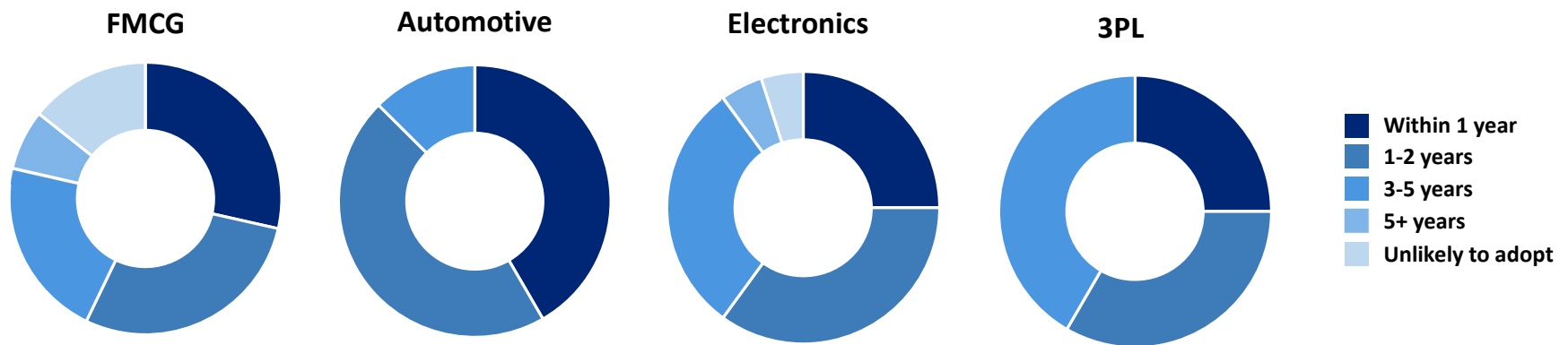
# Megatrends That Affect Internal Logistics

## Automate internal logistics

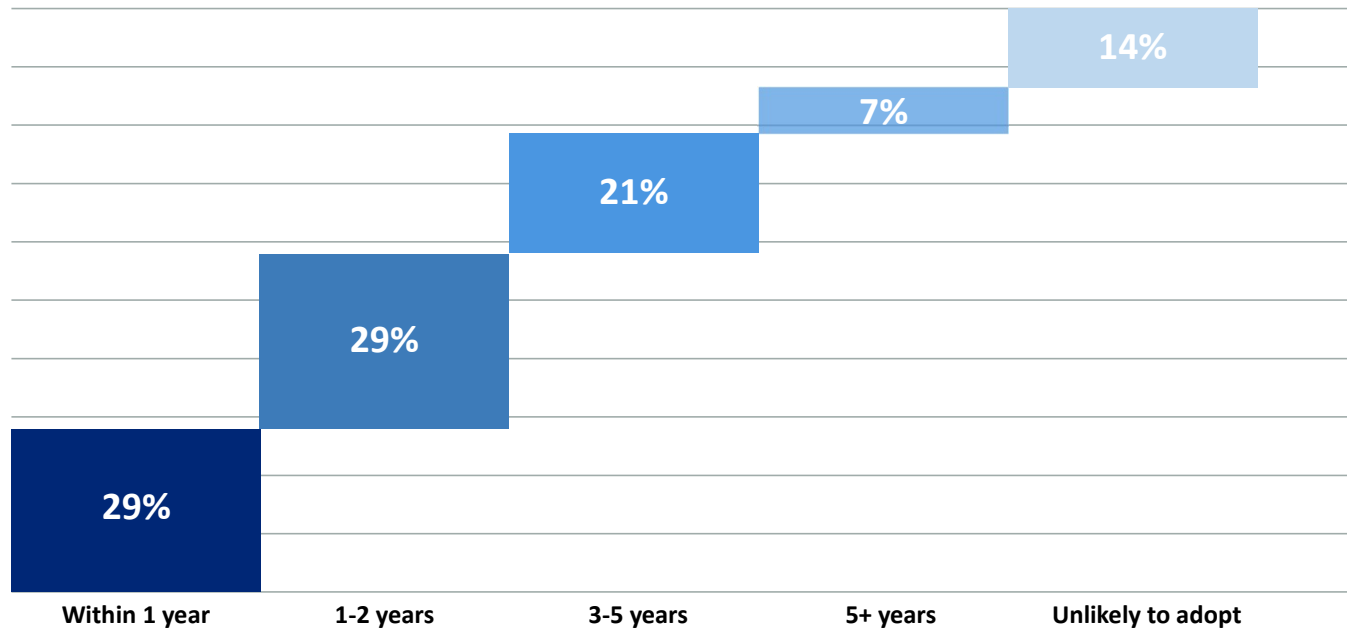
Megatrend	Effect	Concern	Solution
Globalization of markets	Rapid growth of new economies and new business models	Global competition puts pressure on continued optimization.	Material handling is non-value adding activity. Automate it.
Demographic shifts	Population gets older and new work patterns. Migration.	Labor shortage and retention hereof.	Relieve personal of repetitive and dull tasks.
Digitization & Industry 4.0	Enables higher degree of automation and IoT	Need for connectivity between different systems. Increased risk with interaction of machines and people.	WMS and ERP integration. Safe & collaborative mobile robots.
Individualization of consumer needs	Mass customization production setups with higher variety and smaller batches	High switching cost and non-flexible solutions	Engage with an adaptable, scalable, and open platform setup.



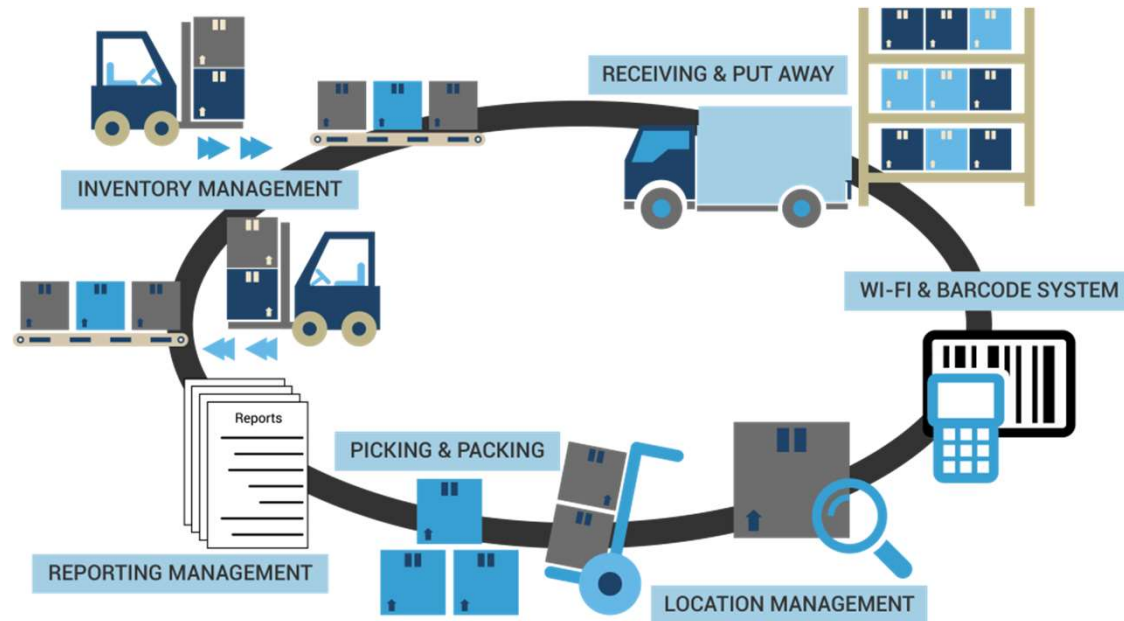
# When would it be realistic to integrate autonomous mobile robots into your internal logistics?



## When would it be realistic to integrate autonomous mobile robots into your internal logistics?



# Lifecycle Logistic Management

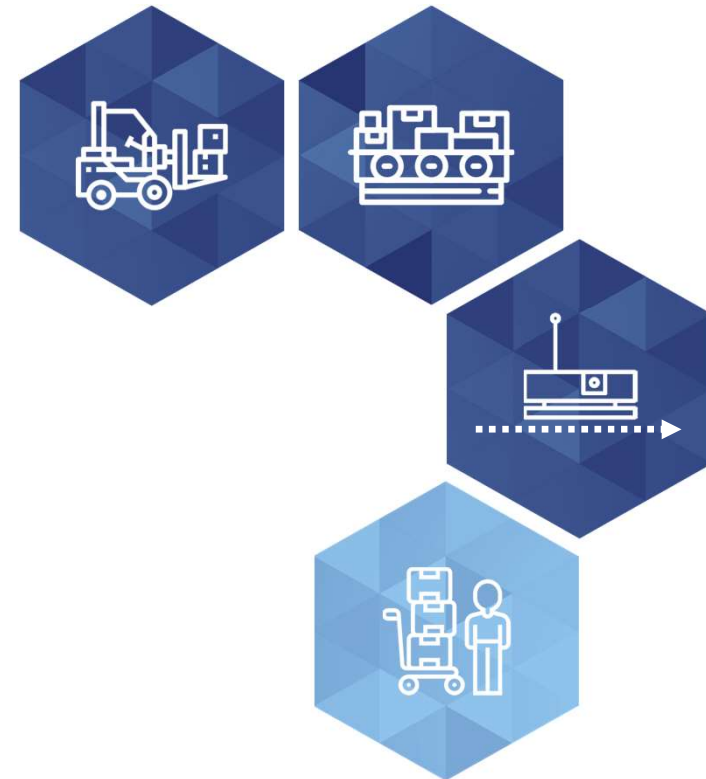


# Internal Logistics So Far

Internal logistics consume large amount of resources that do not contribute directly to your value creation

Today internal transportation is usually done by:

- ▶ Manned forklifts
- ▶ Static conveyor systems
- ▶ AGVs
- ▶ Usage of special designed trolleys or racks



Companies continuously automate to drive costs down. Together with our customers we have identified several areas for automation which still available for improvement because other technologies becoming obsolete



Raw Materials



Production



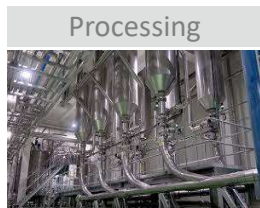
Finished Goods



Receiving



Storage



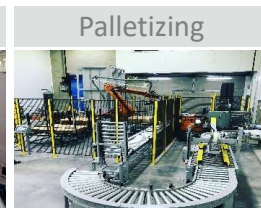
Processing



Filling



Packing



Palletizing

Existing Technologies



REACHTRUCK ELTRUCK GAS/DIESELTRUCK



ELTRUCK GAS/DIESELTRUCK REACHTRUCK



AMR Benefits:



Improving Work Environment



TBC Better Energy Footprint



Flexible and Easy Integration



Cost Saving

# Agenda

## AMR Features and Benefits

- ▶ **Applications of AMR**
- ▶ **Case Studies**
- ▶ **How to start?**

# Our solutions:

**NEW!**



# Market Needs

Improves working environment



User-friendly interface



Works safely alongside humans



# Benefits of using AMR

	Factors	Potential consequences for:	
		Domestic user	Professional user
Benefits	Higher work quality and productivity	-n/a-	higher product quality
			less material waste/less rejects
	Reduction of manual work	more leisure time	less salary payments
	Increased safety, risk avoidance	higher quality of life	lower salaries for dangerous professions
			less work accidents causing non-productive time
	Increased operational availability, temporal flexibility	-n/a-	higher output/higher throughput
			lower energy costs
	New, previously unavailable service	higher quality of life	unlocking/developing new markets
	Status, PR effect	higher quality of life	image of an innovative enterprise
			increase of public awareness

Table 1.3: Benefit factors for using service robots.

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- ▶ **What is an AMR?**
- ▶ **Applications of AMR**
  - ▶ **Common Task and Application**
  - ▶ **Application Assessment**
  - ▶ **IT Architecture**
  - ▶ **Top Modules**
- ▶ **Case Studies**
- ▶ **How to start?**

# Which top module should I use?



Basic Shelf (Fix)

Docking Shelf



Pallet movement



Robotic Arm



Hook (towing)



Conveyor

COVID & pathogens solution by partners to create the safest working environment for people



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## How It Works – IVECO



# How It Works – HITACHI



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## How to start?...Some Keys to Success

- Pilot project: focus on the Basics

*If you want to jump straight to Advanced, plan on a two-phased approach*



- Pay attention to culture needs:

*Example: initially, plan on simple routes in limited aiseways for the shopfloor staff to change their mindset and adapt*



- Scope out your project

*Time study? Loaded Costs? Top Module?*



- Attend training

*Have a champion (or two!) in house*



# Thank you!

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**MIR**