MiR | a better way
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

2011
First construction idea made of LEGO bricks by founder Niels Jul Jacobsen

2013
Mobile Industrial Robots (MiR) established in May

2014
Thomas Visti entered as CEO in October

2015
MiR100 commercialized

2016
MiRHook launched in February

2017
MiR200 and MiRHook200 launched in April

2018
MiR500 launched in June

2019
MiR1000 launched in April

Business development

2020
MiR 1st Robot hub in Barcelona/Europe

Regional offices in Frankfurt and Tokyo opened

Regional office in San Diego. Acquired by Teradyne in April

Regional offices in Barcelona, Shanghai, Singapore

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

Regional office in Beijing
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
Agenda

- MiR Robots
- Internal Logistics & Automation
- Market Needs and predictions
- AMR (Autonomous Mobile Robots)
- Applications of AMR
- Case Studies
- Navigation and safety
- How to start
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

- **Forecast for AGV and AMR Revenues**
- **Forecast for Mobile Robot Revenues By Environment**
## Megatrends That Affect Internal Logistics

### Automate internal logistics

<table>
<thead>
<tr>
<th>Megatrend</th>
<th>Effect</th>
<th>Concern</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Globalization of markets</td>
<td>Rapid growth of new economies and new business models</td>
<td>Global competition puts pressure on continued optimization.</td>
<td>Material handling is non-value adding activity. Automate it.</td>
</tr>
<tr>
<td>Digitization &amp; Industry 4.0</td>
<td>Enables higher degree of automation and IoT</td>
<td>Need for connectivity between different systems. Increased risk with interaction of machines and people.</td>
<td>WMS and ERP integration. Safe &amp; collaborative mobile robots.</td>
</tr>
<tr>
<td>Individualization of consumer needs</td>
<td>Mass customization production setups with higher variety and smaller batches</td>
<td>High switching cost and non-flexible solutions</td>
<td>Engage with an adaptable, scalable, and open platform setup.</td>
</tr>
</tbody>
</table>
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?

- Within 1 year: 29%
- 1-2 years: 21%
- 3-5 years: 7%
- 5+ years: 14%
- Unlikely to adopt: 14%
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.

**Existing Technologies**

**AMR Benefits:**
- Improving Work Environment
- Better Energy Footprint
- Flexible and Easy Integration
- Cost Saving

**Dry Storage Only**
Agenda

AMR Features and Benefits

► Applications of AMR
► Case Studies
► How to start?
Our solutions:

- MiR100
- MiR200
- MiR250
- MiR500
- MiR1000
- MiRHook
- MiRShelf Carrier
- MiRFleet
- MiRLifts
- MiR AI Camera
Market Needs

Improves working environment

Collaborative operations

Flexibility

Ownership

Price

User-friendly interface

Works safely alongside humans
## Benefits of using AMR

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

Table 1.3: Benefit factors for using service robots.
Agenda

- Internal Logistics & Automation
- 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
- Hook (towing)
- Pallet movement
- Robotic Arm
- Conveyor
COVID & pathogens solution by partners to create the safest working environment for people
Agenda

- Internal Logistics & Automation
- What is an AMR?
- Applications of AMR
  - Common Task and Application
  - Application Assessment
- IT Architecture
- Top Modules
- Case Studies
- How to start?
How It Works – IVECO
How It Works – HITACHI
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
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 aisleways 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!

Davide Boaglio
Sales Manager Italia
dbo@mir-robots.com