

How digitalization of production processes becomes a breeze

Webinar

Digitalization in production logistic

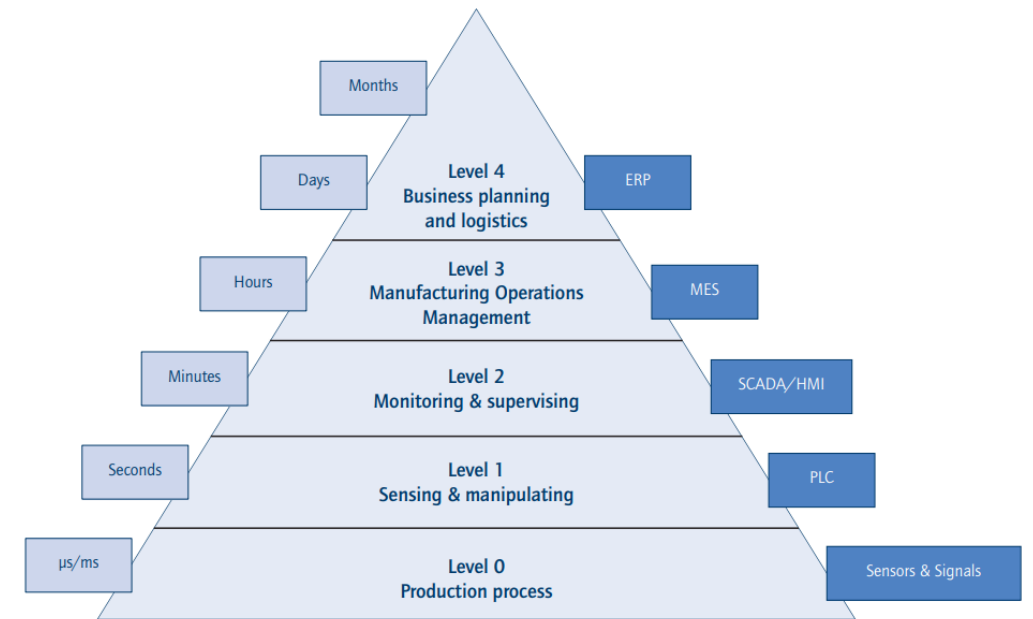
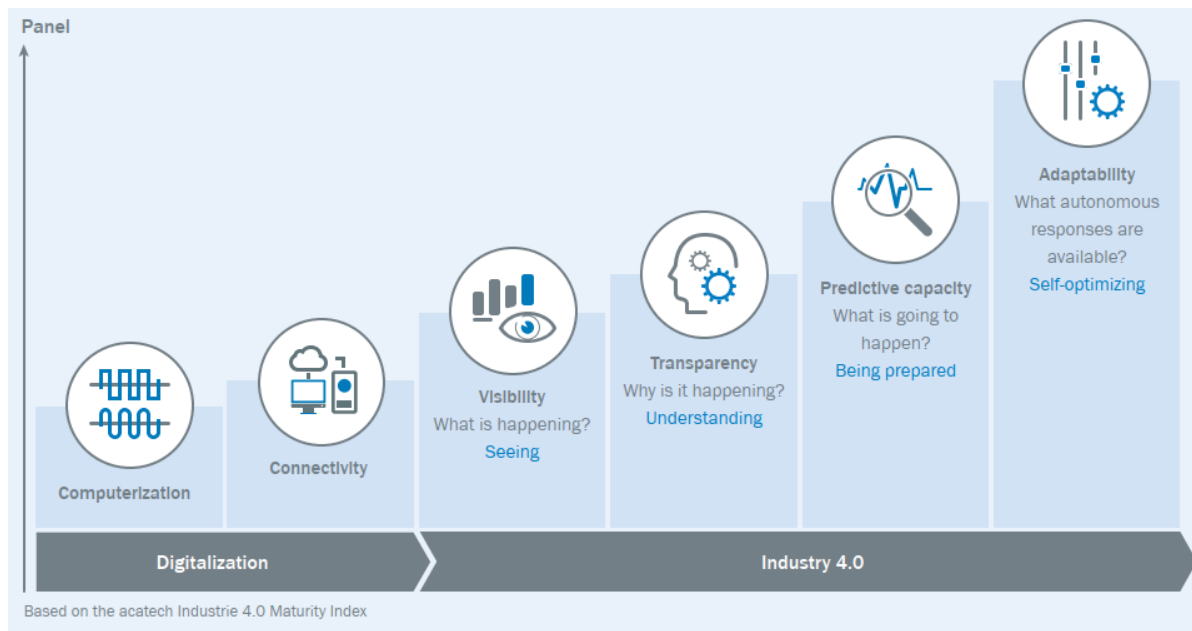
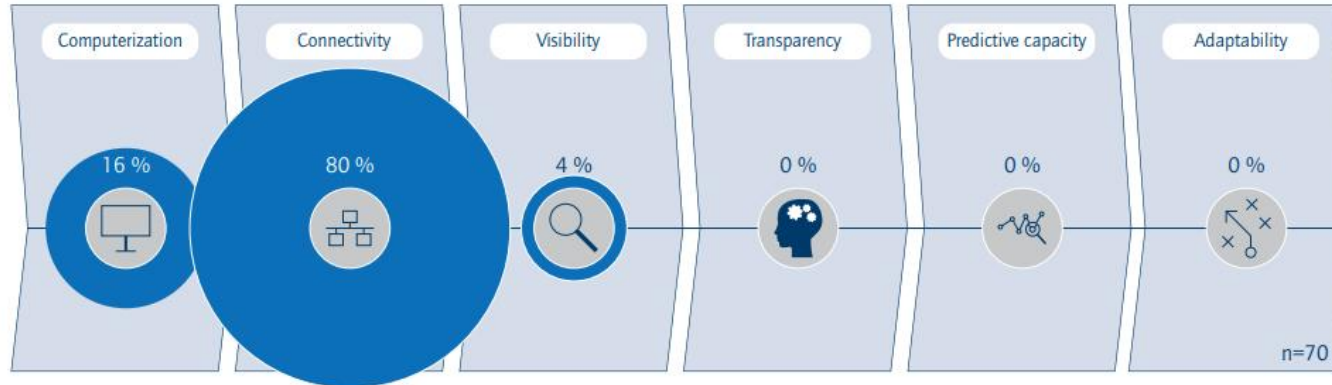


Figure 8: Automation pyramid based on the ISA 95 model (source: Åkerman 2018, p. 2)

Digitalization in production logistic

Status Quo – Where is the customer today?



Just under half (49%) of companies using the Maturity Index are still at the "computerisation" stage in the structural area of "resources". This means that they have yet to achieve widespread "connectivity" of their machines and equipment. The picture is similar in the structural area of "information systems". 45% of companies have still not achieved extensive horizontal and vertical integration of their in-house systems.

Figure 4: Companies by average overall maturity stage; n=70 (source: Industrie 4.0 Maturity Center)

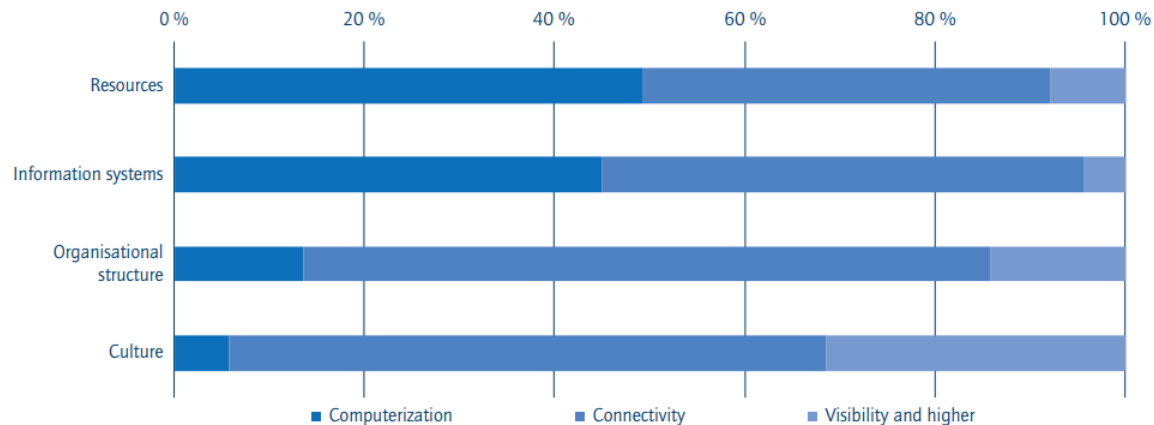


Figure 6: Distribution of companies' maturity stages for the four structural areas; n = 70 (source: Industrie 4.0 Maturity Center)

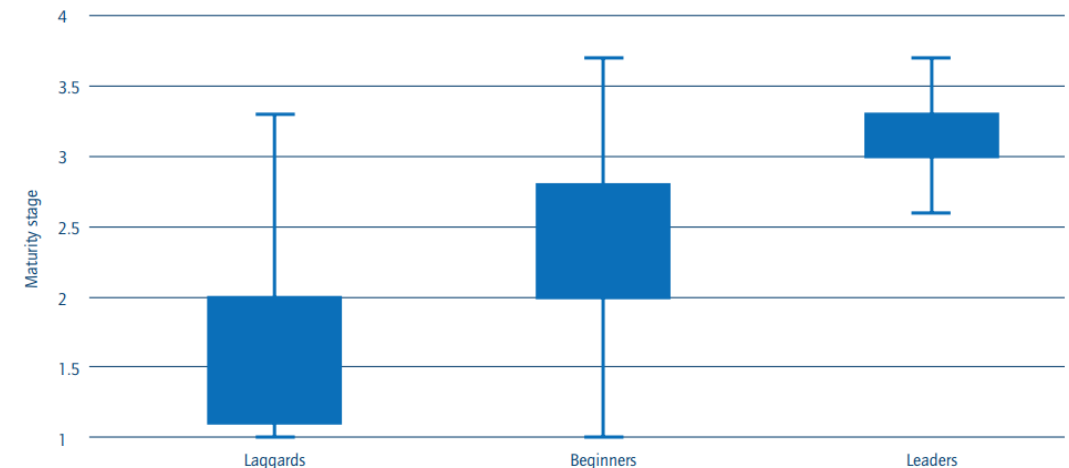
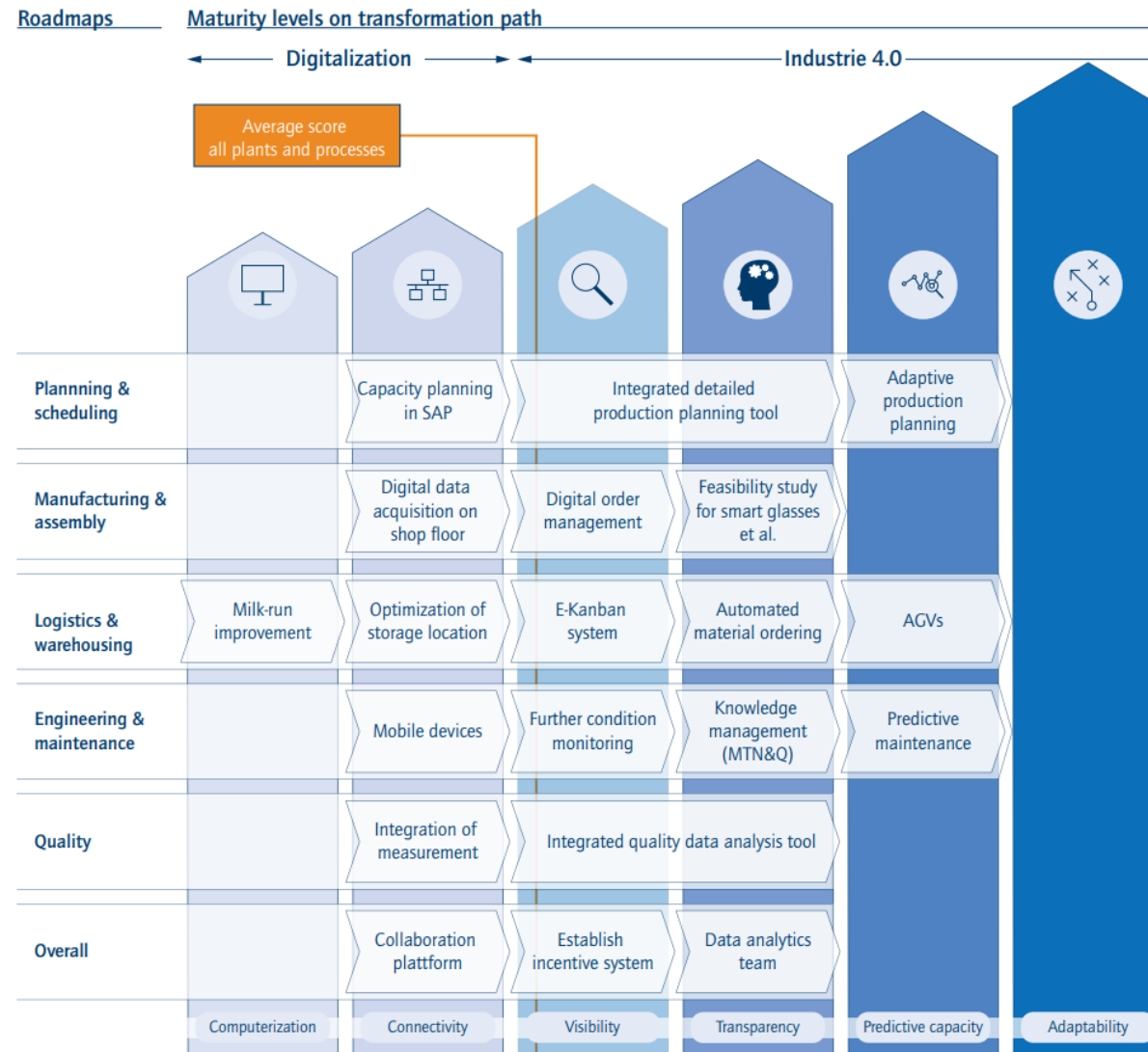


Figure 5: Distribution of overall maturity stages for the different company categories; n = 70 (source: Industrie 4.0 Maturity Center)

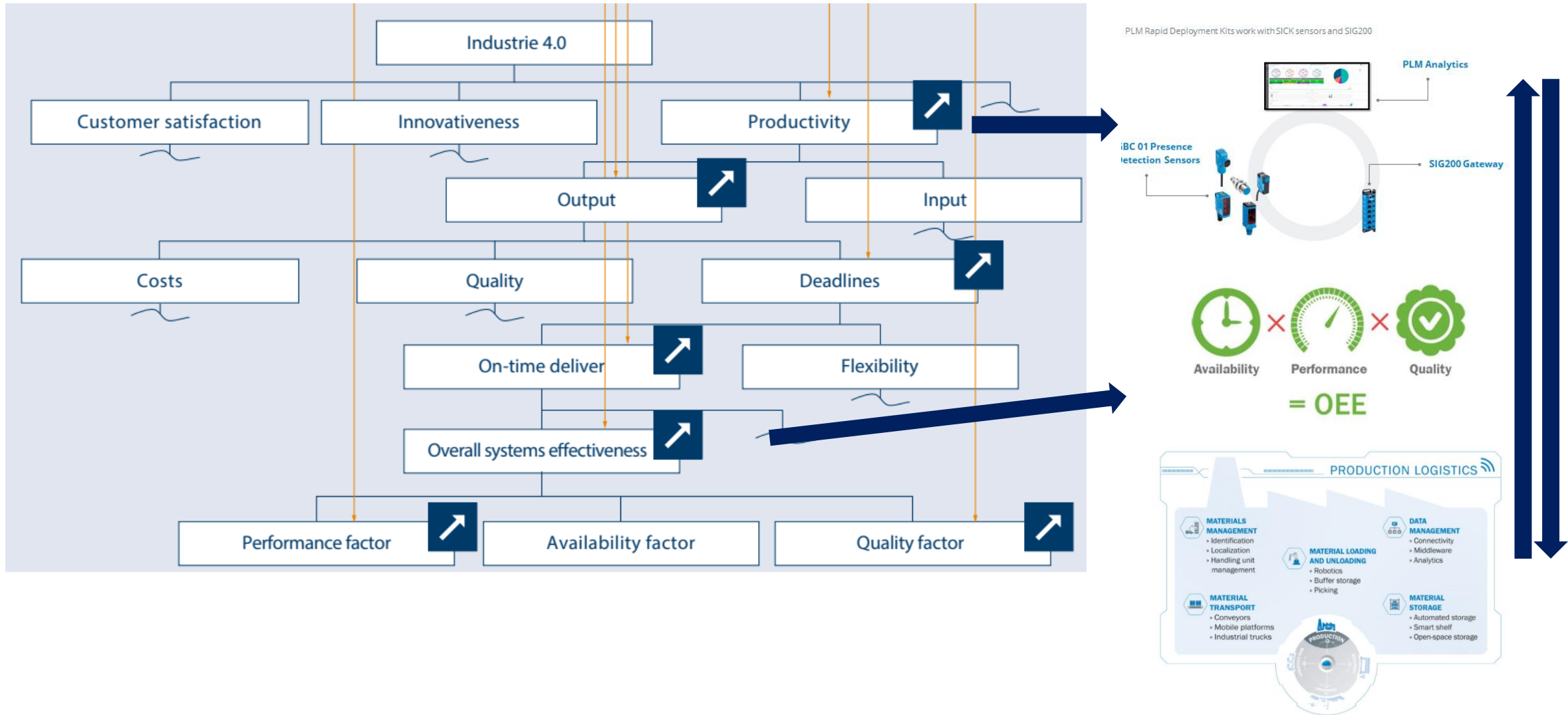
Digitalization in production logistic

Status Quo – Where is the customer today?



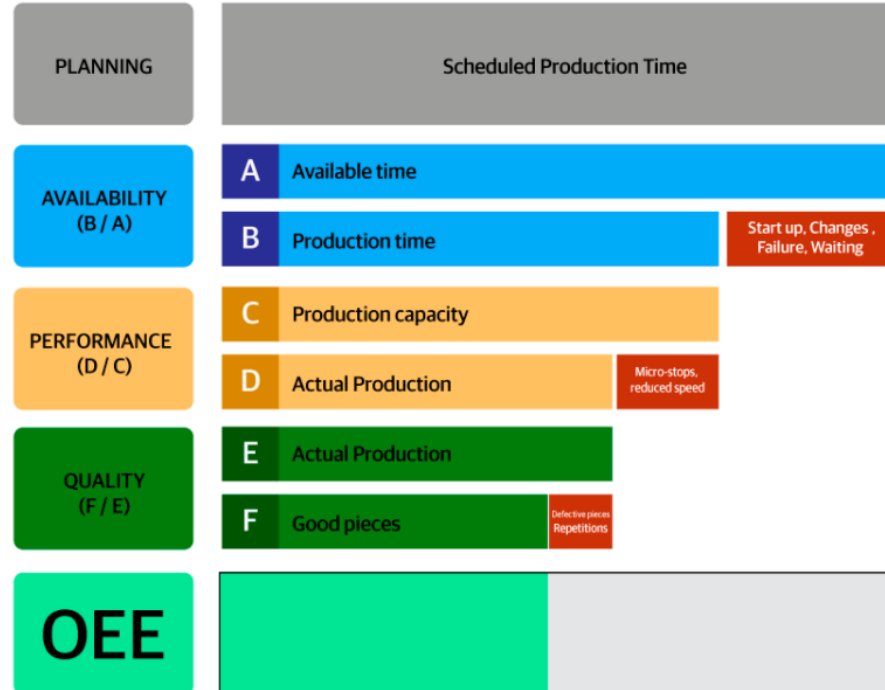
Digitalization in production logistic

What are the topics and where can we enter?



Digitalization in production logistic

What is OEE?



"Six Big Losses"

Availability	Performance	Quality
Planned Downtime	Minor Stops	Production Rejects
Breakdowns	Speed Loss	Rejects on Start up

In a 480 minute shift :-

On a machine rated at 100 products output per minute

Maximum output = 480 mins x 100 units = 48000 units

Shift info:

Output (Good Production)	= 32000 units
Speed	= 98 units per minute
Planned downtime	= 82 mins
Bottleneck loss due to B/down	= 30 mins
Rejects (in process)	= 1255 in 8 hr shift

Output (OEE) = 32000 / 48000 = 66.7%

480mins x 66.67% = 320 mins, therefore Total Loss = 160 mins

Six Loss Calculations:

Speed loss

Max theoretical units possible at actual speed = 98 x 480 = 47040

= (32000/47040) - (32000/48000) =

68.03% - 66.67% = 1.36%

480 x 1.36% = 6.53 mins / 480 = (1.36%)

Planned downtime = 82 mins / 480 = (17.08%)

Breakdown = 30 mins / 480 = (6.25%)

Rejects = 1255 / 98 (actual running speed) = 12.81 mins / 480 = (2.67%)

Minor stops = 480-320-6.53-82-30-12.81 = 28.66 mins / 480 = (5.97%)

Total loss = 160 mins = (33.33%)

OEE Calculations (Time in mins):

Production time = 480 Time less availability loss = 368 Time less performance loss = 333

Availability Loss

Planned downtime = 82

Breakdowns = 30

Total = 112

Availability (368/480) = 77%

Performance Loss

Speed loss = 6.53

Minor stops (<5mins) = 28.66

Total = 35.19

Performance (333/368) = 90%

Quality Loss

Rejects on start up = 0

Rejects in process = 12.81

Total = 12.81

Quality (320/333) = 96%

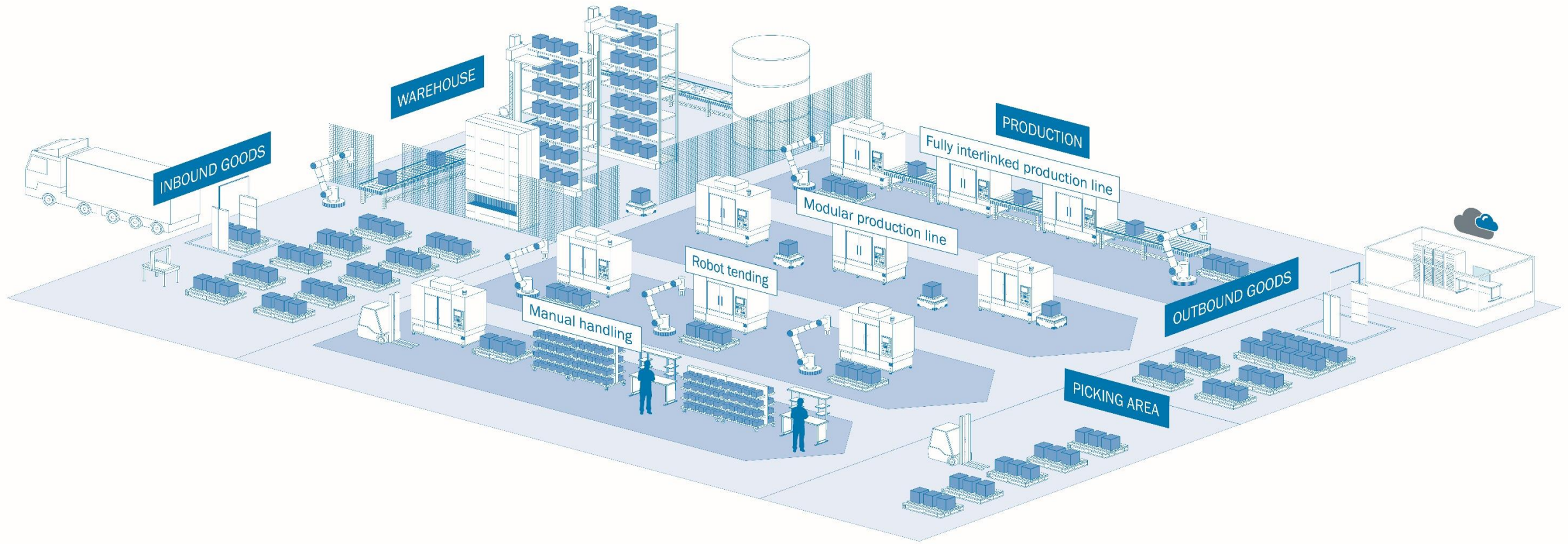
OEE = 0.77x0.9x0.96 = 66.7%

Agenda

1. Production logistics overview
2. How SICK can digitalize your processes
 - a. Inbound/Outbound area
 - b. Material flow
 - c. Kanban
 - d. One piece flow
 - e. Mobile platforms
 - f. Safe material flow
 - g. Data integration
 - h. Open space storage
 - i. Robot loading

Production Logistics

Manufacturing process



Topics around Production Logistics

And the matching SICK solution portfolio

Material Data Management

- › Identification, Handling Unit Management

Material Flow Optimization

- › Identification, Localization, Analytics

Kanban

- › Identification, Smart Shelf, Middleware

One Piece flow

- › Identification, Robotics

Mobile Platform Navigation

- › Mobile Platforms, Middleware

Safe Material Transport

- › Mobile Platforms, Industrial Trucks

Data Integration

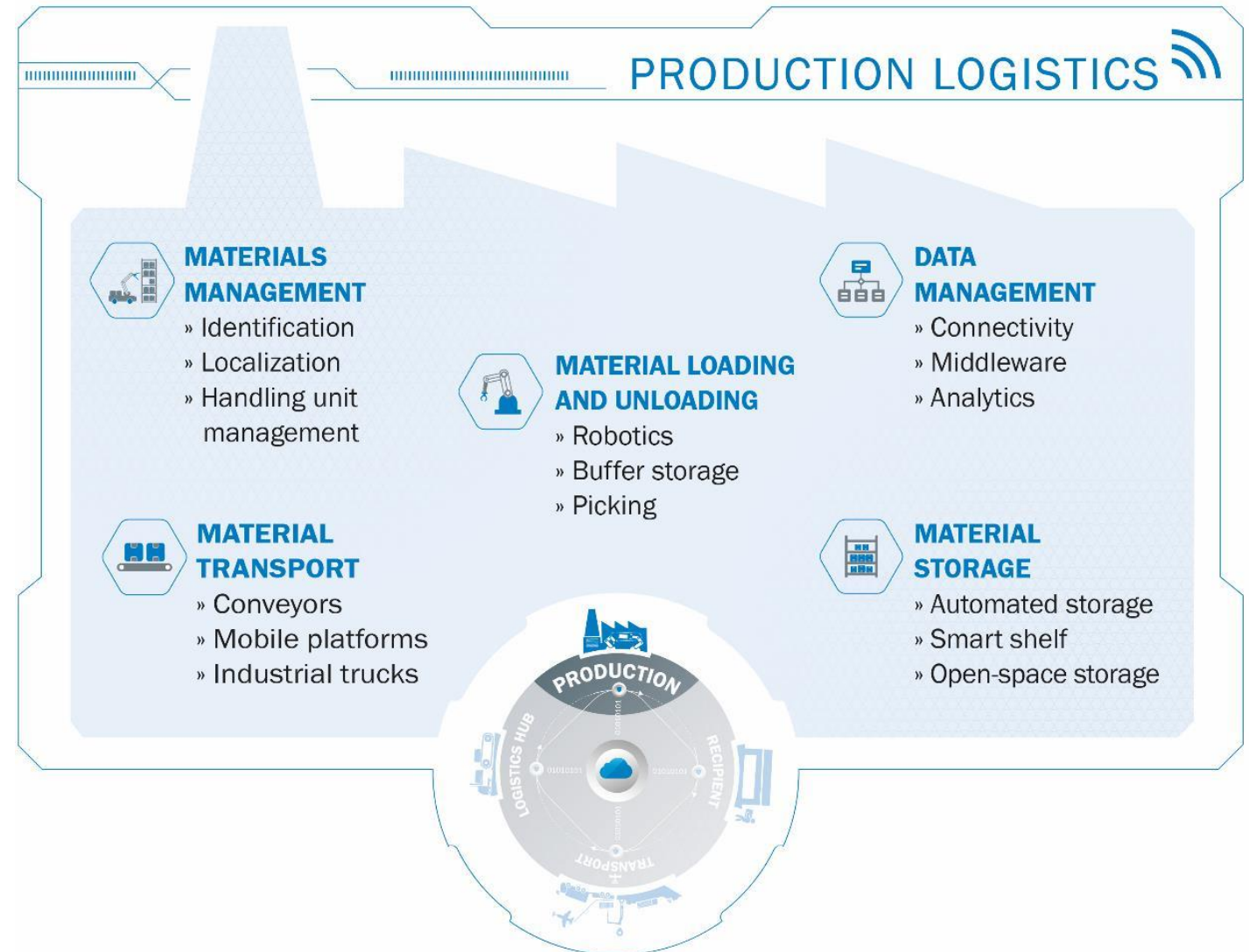
- › Connectivity, Middleware, Analytics

Open Space Storage

- › Localization, Picking

Flexible robotic Loading

- › Robotics



Topics around Production Logistics

And SICK highlight solutions

Material Data Management › Identification, Handling Unit Management	RFGS, MDA, AutoID
Material Flow Optimization › Identification, Localization, Analytics	Asset Analytics, Reading Gate
KanBan › Identification, Smart Shelf, Middleware	AutoID, SmartShelf
One Piece flow › Identification, Robotics	PLOC, Auto ID
Mobile Platform Navigation › Mobile Platforms, Middleware	LIDAR LOC, Locu, MLS
Safe Material Transport › Mobile Platforms, Industrial Trucks	Nano Scan, Visionary B, Docking
Data Integration Middleware › Connectivity, Middleware, Analytics	Connectivity, Batch Reading HD, Asset Analytics
Open Space Storage › Localization, Picking	Locu UC3, Locu UC4
Flexible robotic Loading › Robotics	Pallettizer, PLB, Safe Robot Speed

Master Data Management

Highlight applications and solutions

Why is it important

Many Logistic IT Systems use the material master data. The most relevant logistic features are:

- › Reference ID
- › Volume
- › Weight
- › Quantity

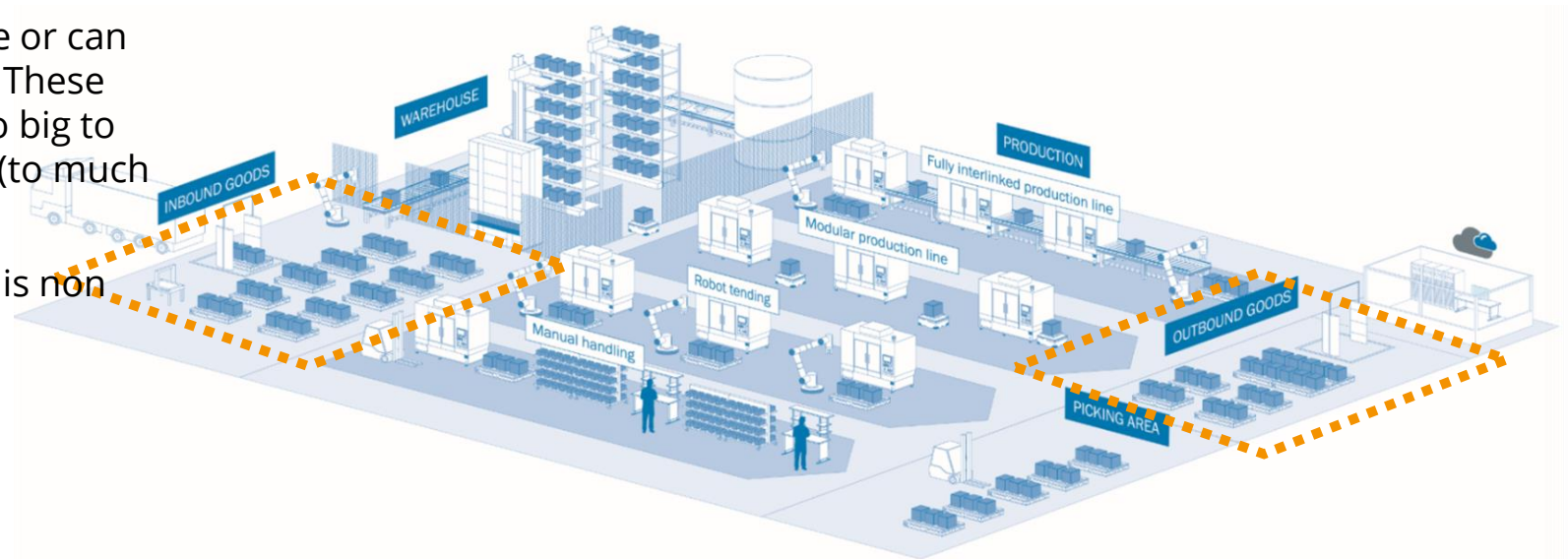
These features are sometimes not available or can be wrong in the material master database. These errors can root cause logistic problems (too big to handle, too little parts) or waste resources (too much space needed / too many parts).

Manually checking or editing these feature is non value added work.

How can SICK help

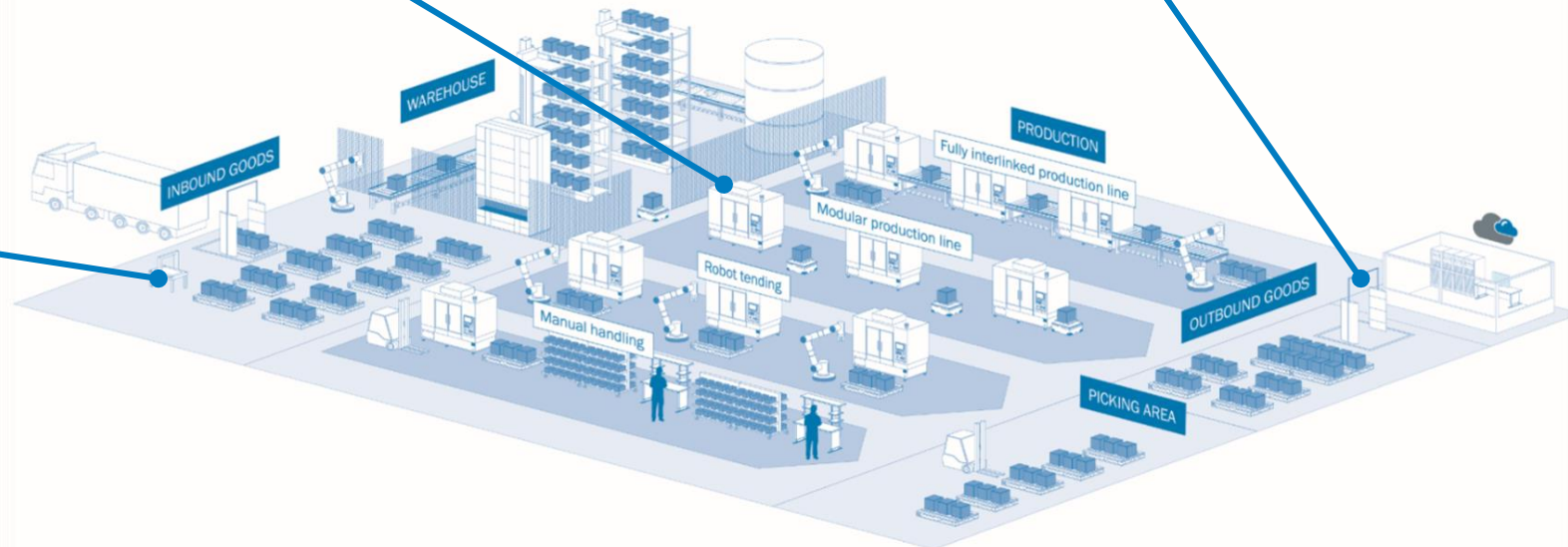
SICK Systems can help checking or automatically editing material master data, single or multi feature based

- › Auto ID Products
- › Reading gate
- › Master Data Analyzer



Master Data Management

Focus areas



Material Flow Optimization

Highlight applications and solutions

Why is it important

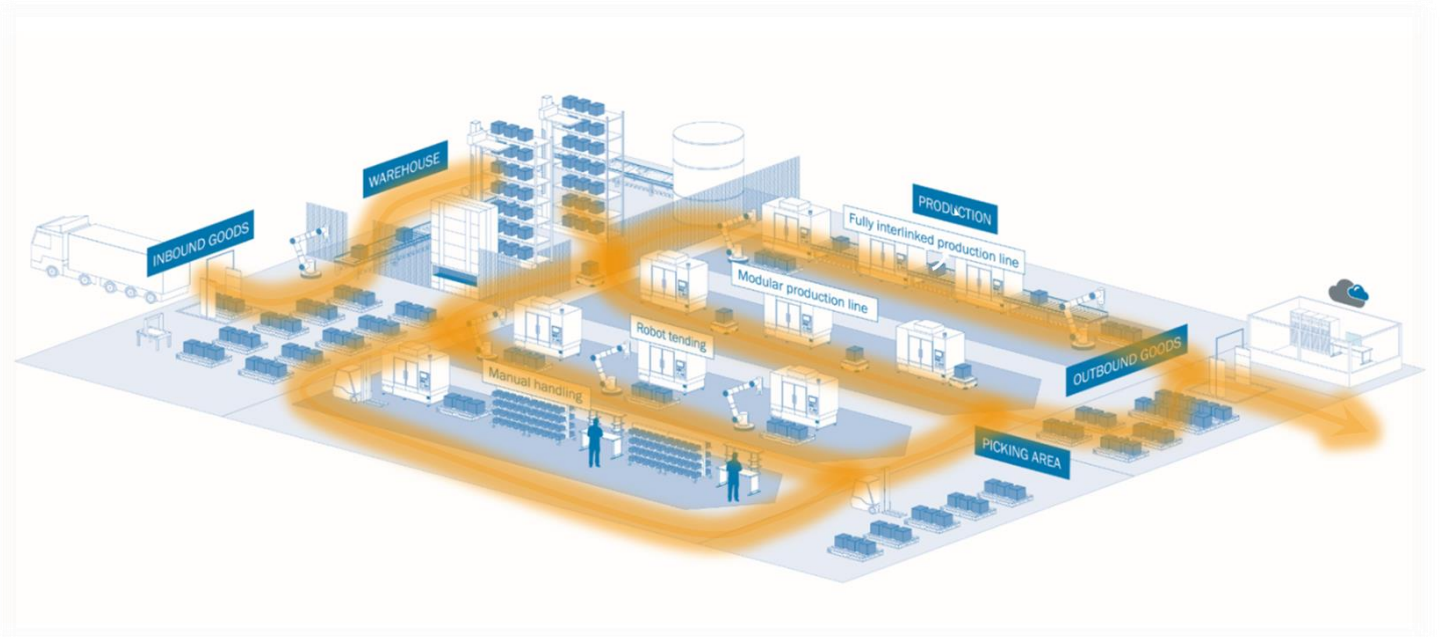
The material flow within a production is often subject to optimization. The reason is, that a non optimized material flow generates non value add processes like inefficient transport or searching and also unnecessarily binds too much capital.

The first step to optimization is visualizing the current situation and generate transparency.

How can SICK help

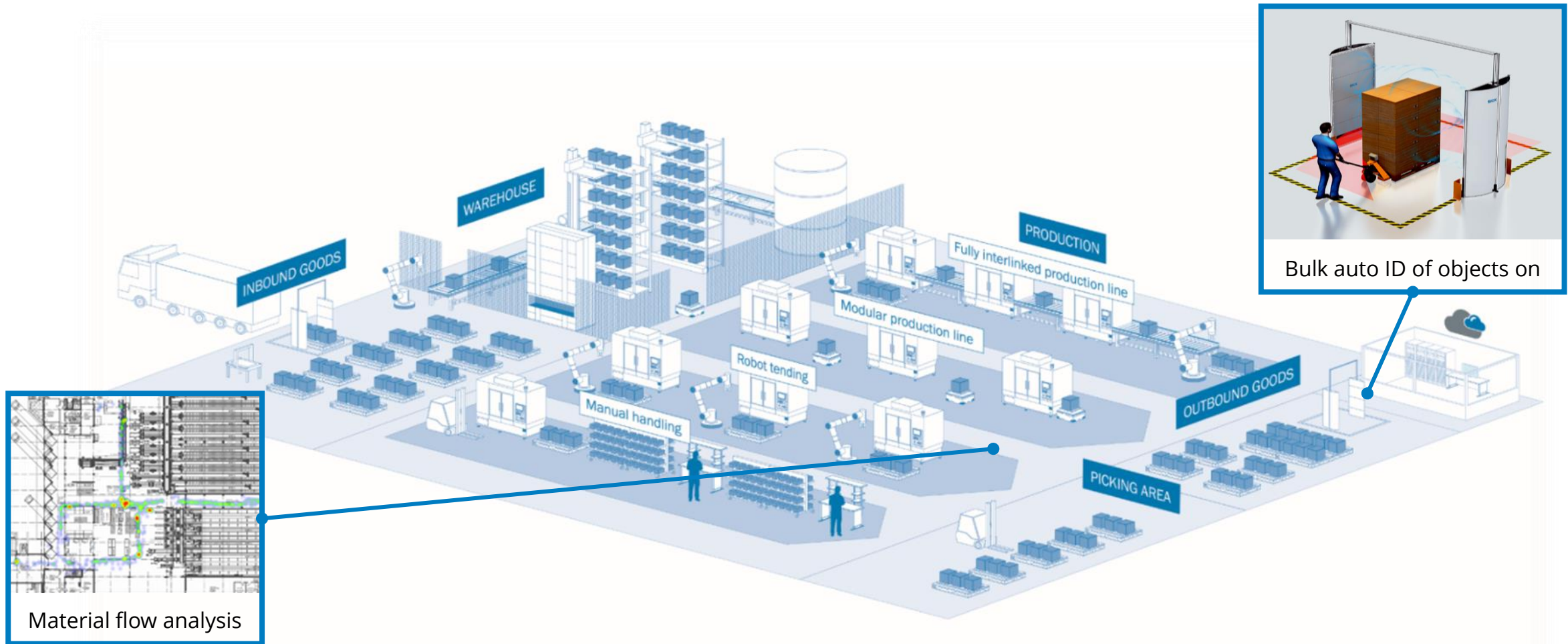
SICK localization solutions give full transparency of the material flow including analytical tools

- › Auto ID (esp. reading gates)
- › Asset Analytics



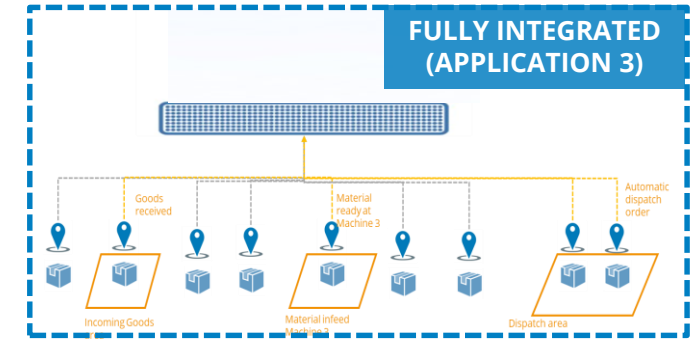
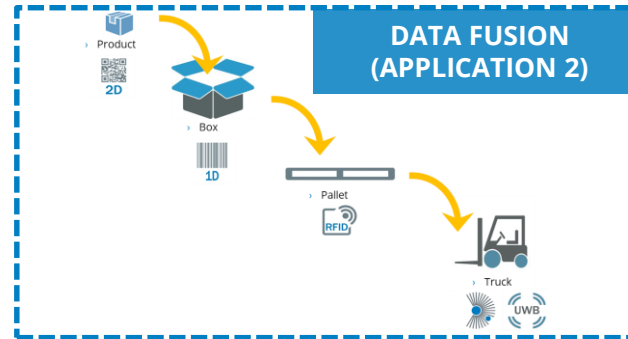
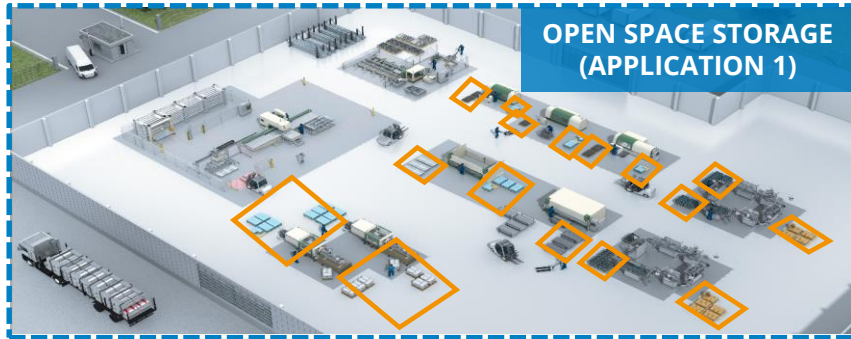
Material Flow Optimization

Focus areas



Material Flow Optimization

DEVELOPMENT STAGES AND OPERATIONAL BENEFITS



ENABLE VISIBILITY



Real-time information
for assets or materials



Continued tracking
of physical transaction

GENERATE TRANSPARENCY



No gray spots



Less
searching

MAKE PREDICTABLE



Estimated
time of arrival (ETA)
at transport unit level



Minimal idle time



Improved inventory
management



Specific alert
functions

PROCESS MANAGEMENT



Automatic booking
of receipts



Faster reactions
to unexpected events



Reduce manual
material postings



More efficient
use of assets

Kanban

Highlight applications and solutions

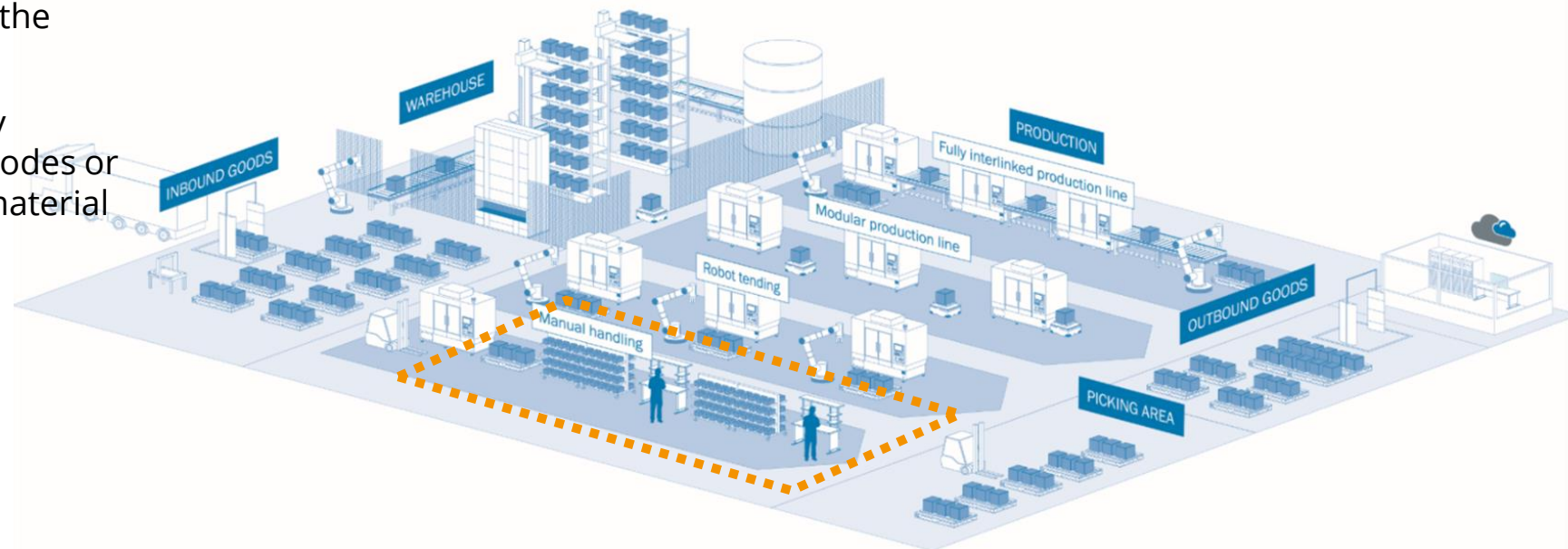
Why is it important

Kanban is a scheduling system for lean manufacturing and just-in-time manufacturing. In its original form, Kanban cards are used to trigger replenishment within production. Often parts are stored in special Kanban shelves. When taking out a container with a specified amount of parts, the respective card has to be sent to the manufacturing unit.

Modern systems are working digitally connected using ID Systems like Barcodes or RFID in order to automatically start material replenishment.

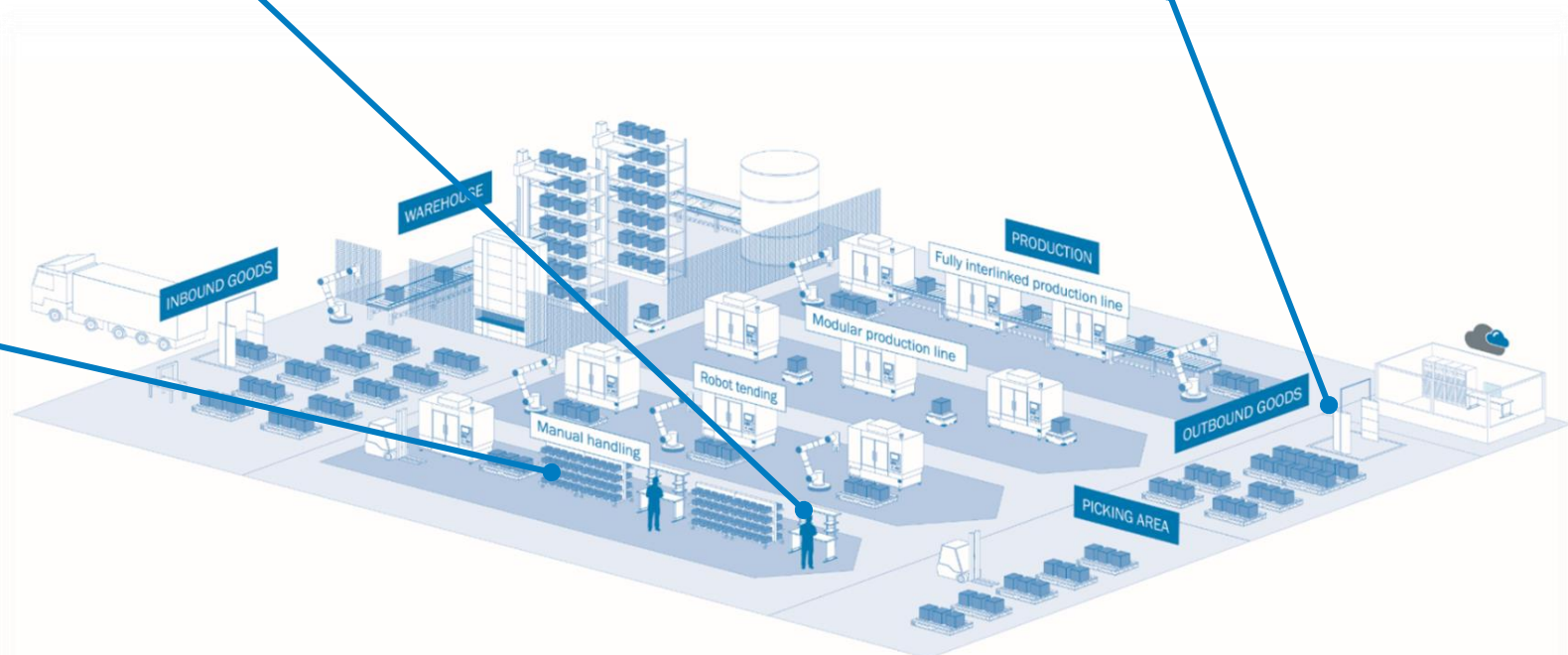
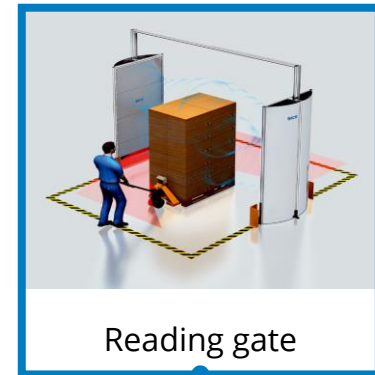
How can SICK help

- › Identification Solutions
- › Auto ID reading gate
- › Smart Shelf



Kanban

Focus areas



One Piece Flow

Highlight applications and solutions

Why is it important

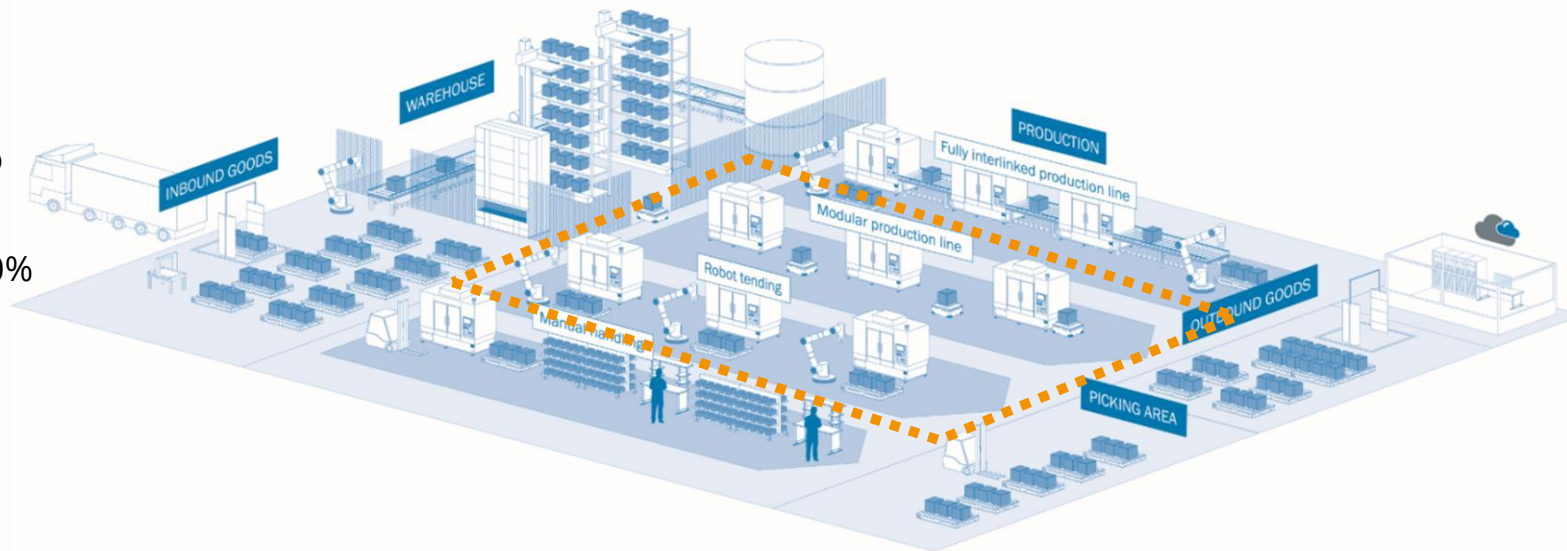
One piece Flow describes a production concept, that is widely used to cover the demands for a high flexibility down to batch size zero. The idea is, that a production “line” can manufacture products with a high variance. Often it is realized by generating a modular cell based manufacturing concept, which can handle different product variant with no or minimal set up times.

These concepts require the manufacturing cell to match the current product variant with the necessary operations. Hence each product has to be reliably identified in the manufacturing cell.

Another aspect is that these concept enable a 100% traceability in terms of quality control.

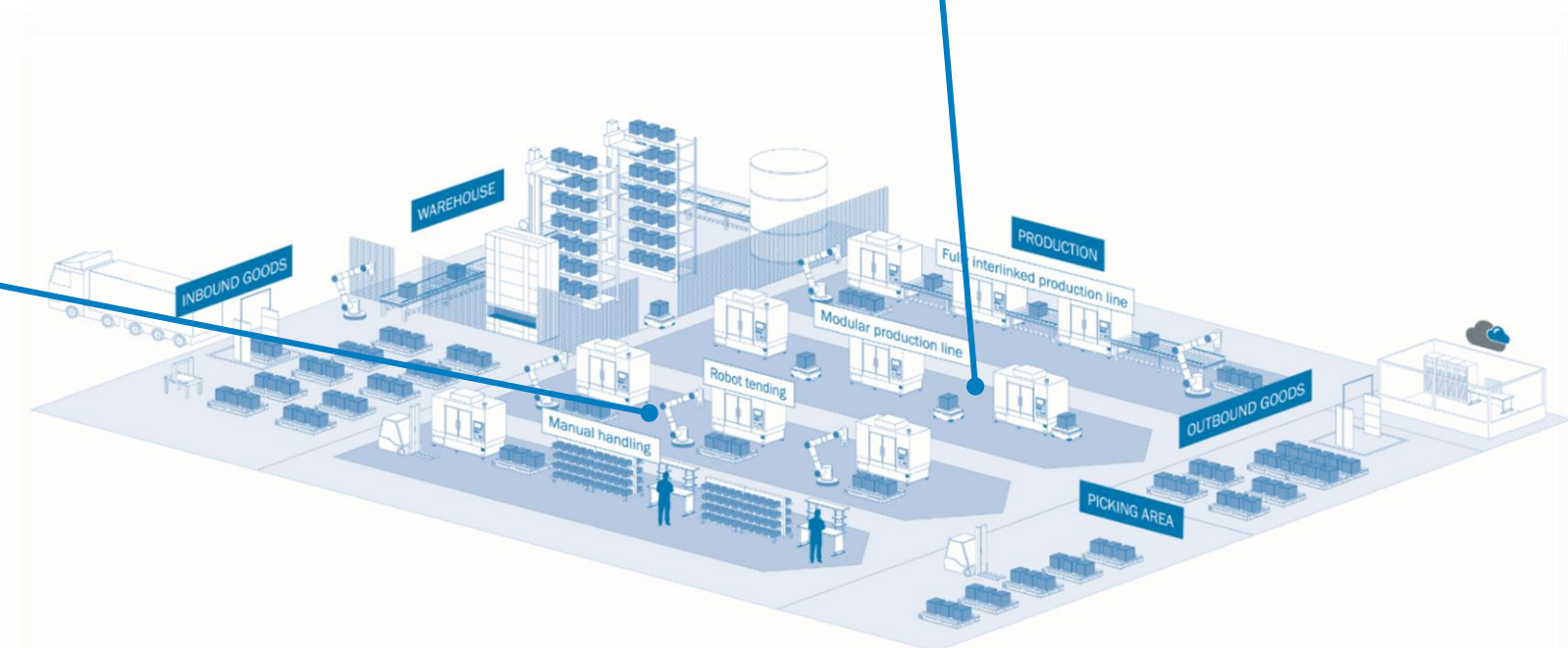
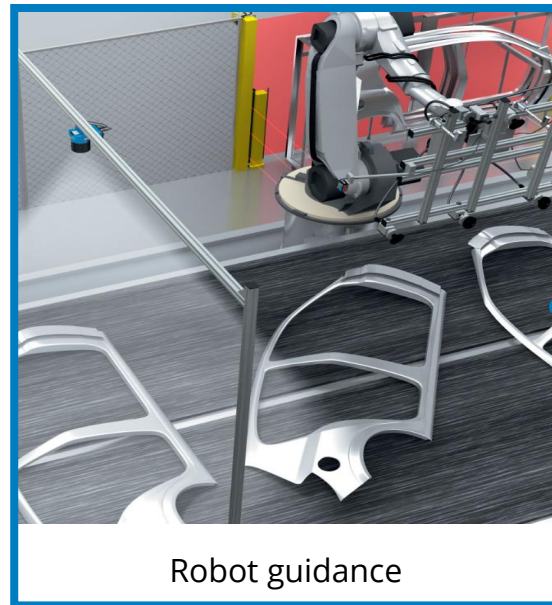
How can SICK help

- › Auto ID Products
- › Robot guidance



One Piece Flow

Focus areas



Mobile Platforms

Highlight applications and solutions

Why is it important

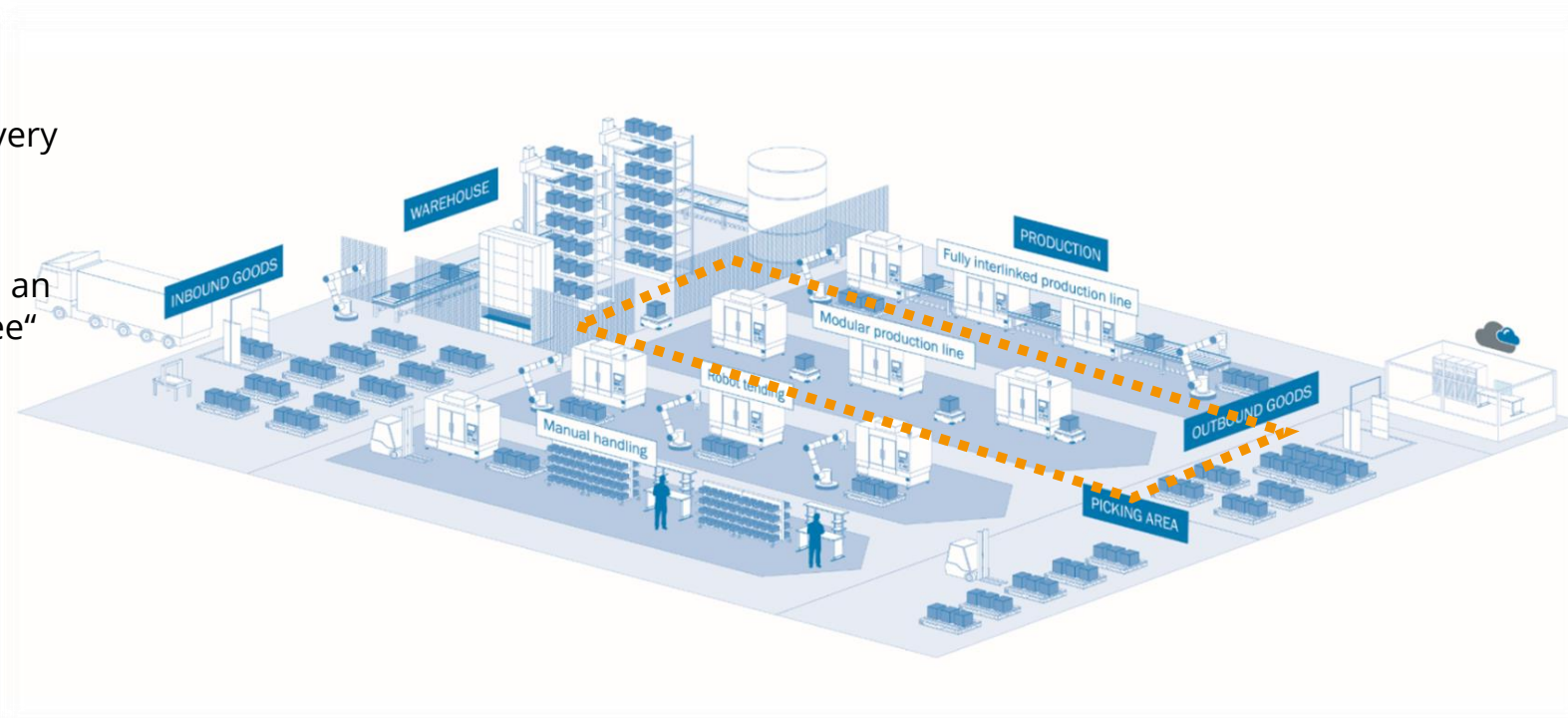
In high flexible production mobile platforms like AGV's are one of the most important solution to reach the necessary flexibility. Fast, reliable and flexible internal transport is important. To coordinate all these autonomous driving vehicles in a production area it is key to know where these vehicles are driving and which route they are following. Here is SICK delivering different solution for localization and navigation.

In production area the environment could change very fast. A reliable localization and navigation of these vehicles is the challenge which has to be solved.

There are solution from line guidance systems with an fixed route or Lidar systems which are used for „free“ navigation in a closed production area.

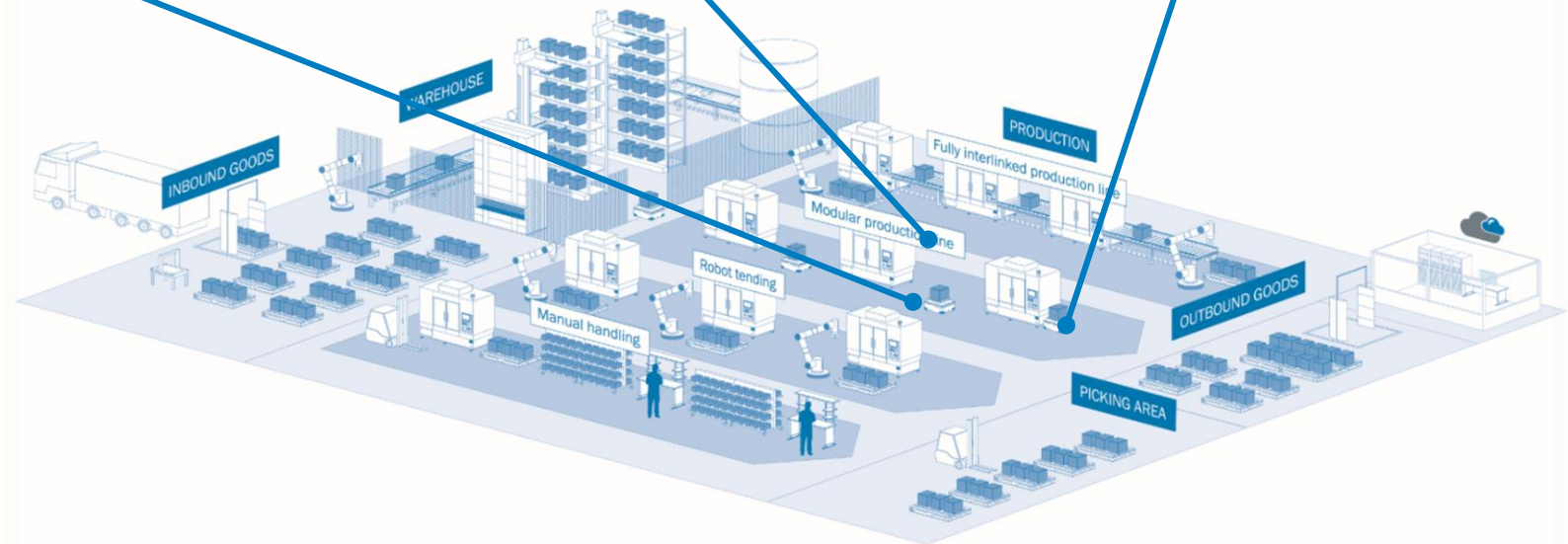
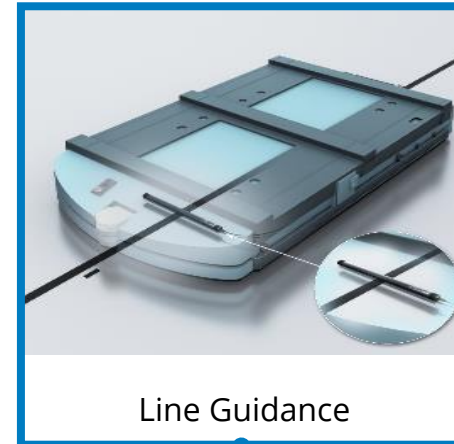
How can SICK help

- › [MLS Magnetic Line System](#)
- › [LiDAR LOC – VLS Virtual Line System](#)
- › [UWB](#)



Mobile Platforms

Focus areas



Mobile Platforms

Why is navigation/ localization important



ALLOW VISIBILITY

Keep overview in large facilities or areas



Check availability of assets or goods



CREATE OVERVIEW

Allow Estimated Time of Arrival



Decrease effort searching assets



ENABLE EFFICIENCY

Eliminate manual material postings



Enable inventory management



Increase efficient use of assets



MANAGE AGILE PROCESS

Enable agile navigation of assets

Safe Material Flow

Highlight applications and solutions

Why is it important

Material Transport means moving goods.

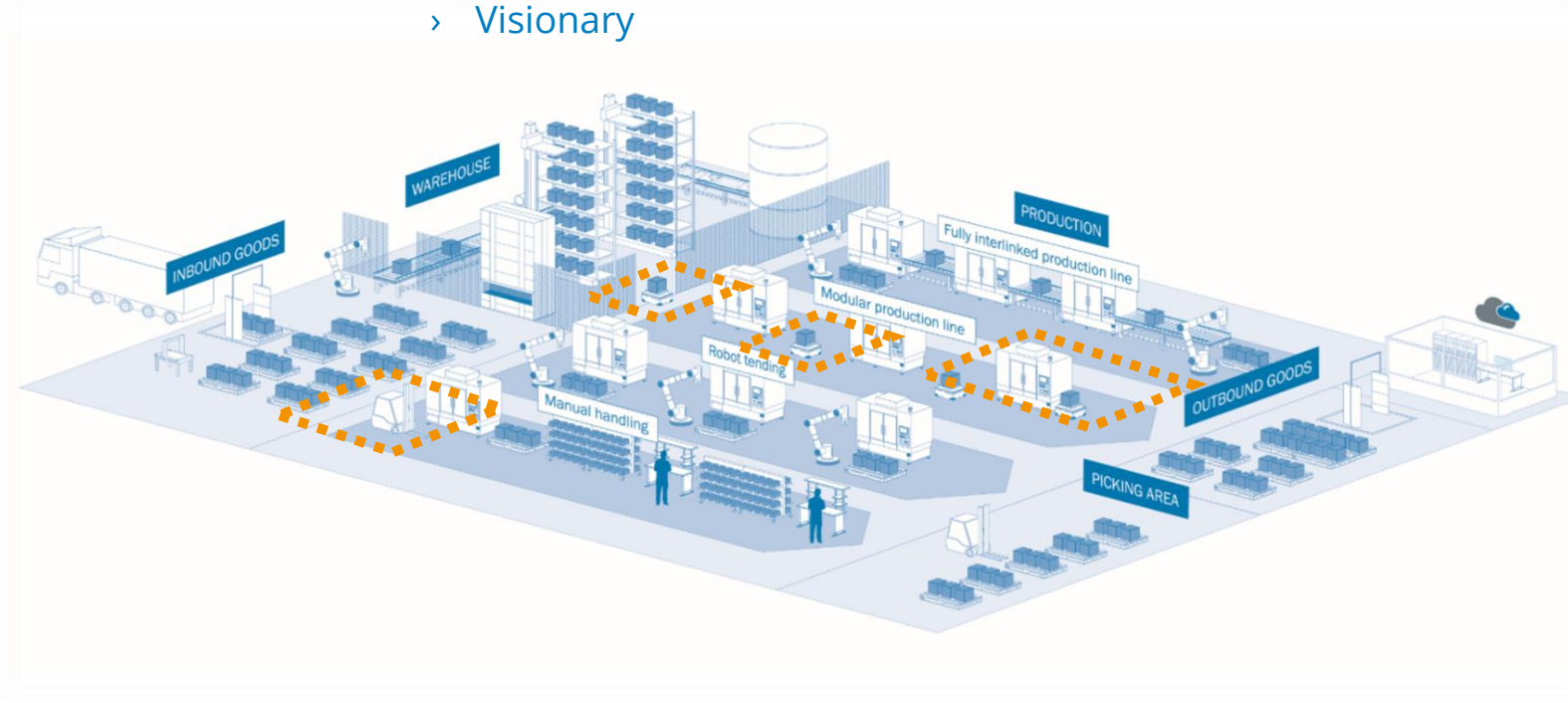
Movement can easily mean a hazard to people and material.

Not only on open space, but also at the interfaces between to predeceasing or following process steps like storage or machines.

How can SICK help

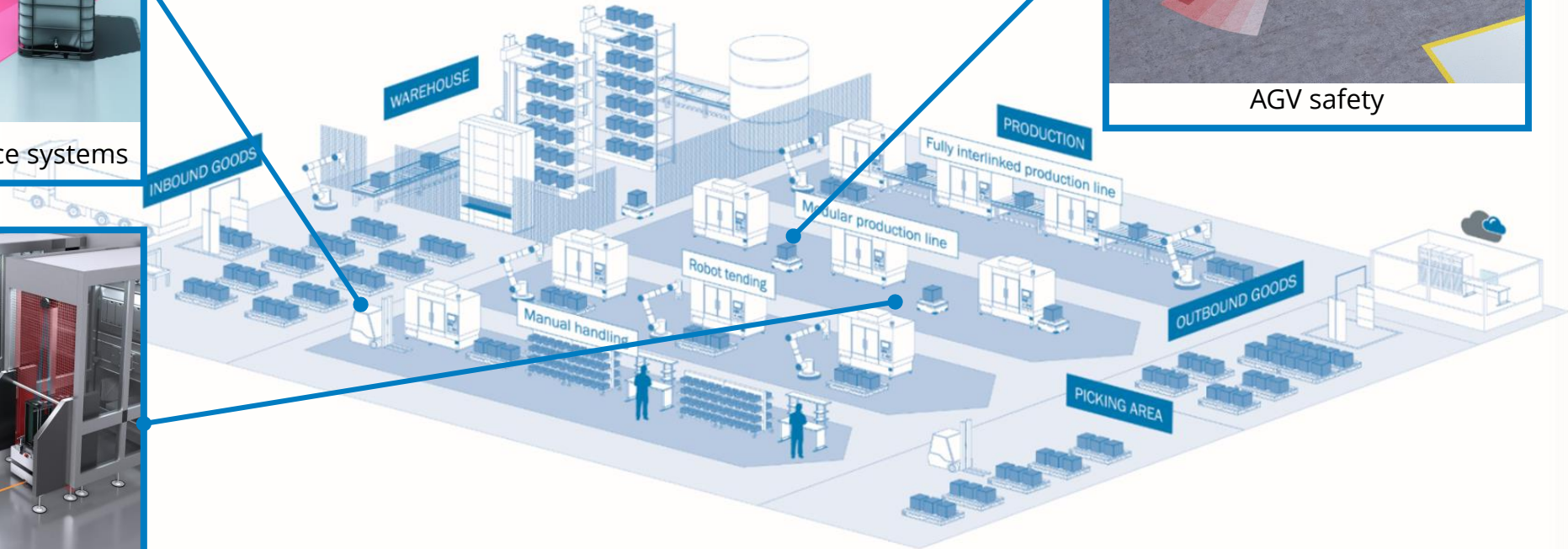
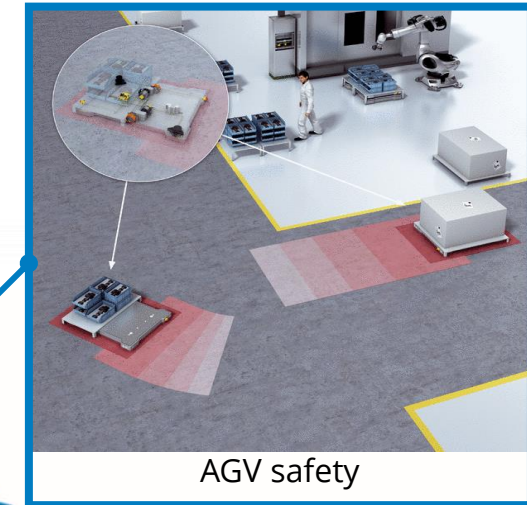
SICK offers assistance solution for trucks and safety solutions for mobile platforms and the interface between the mobile platforms and machines.

- › Safety Laser Scanners in mobile platforms
- › Mobile Platform Machine interface (Docking)
- › Visionary



Safe Material Flow

Focus areas



Data Integration

Highlight applications and solutions

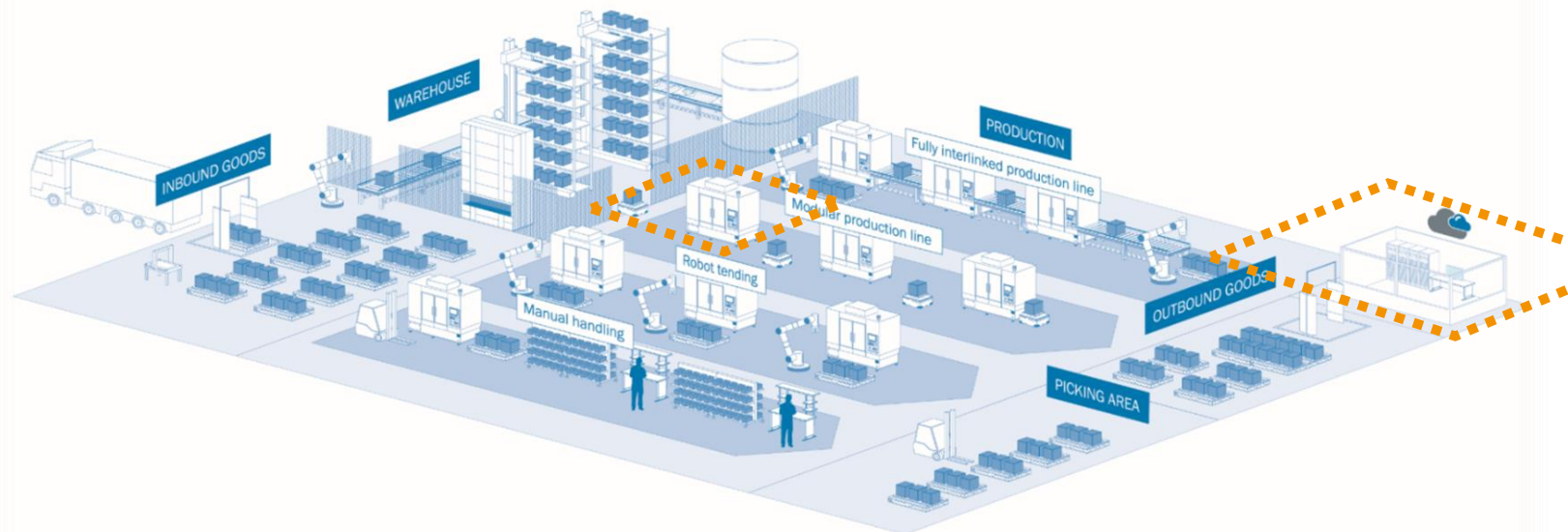
Why is it important

Information is only valuable if it can be used in the appropriate system. Data integration into customer systems. Systems like Production Scheduling, MES, PPS, ERP often need a feedback loop from the field in order to have life feedback and to operate dynamically.

How can SICK help

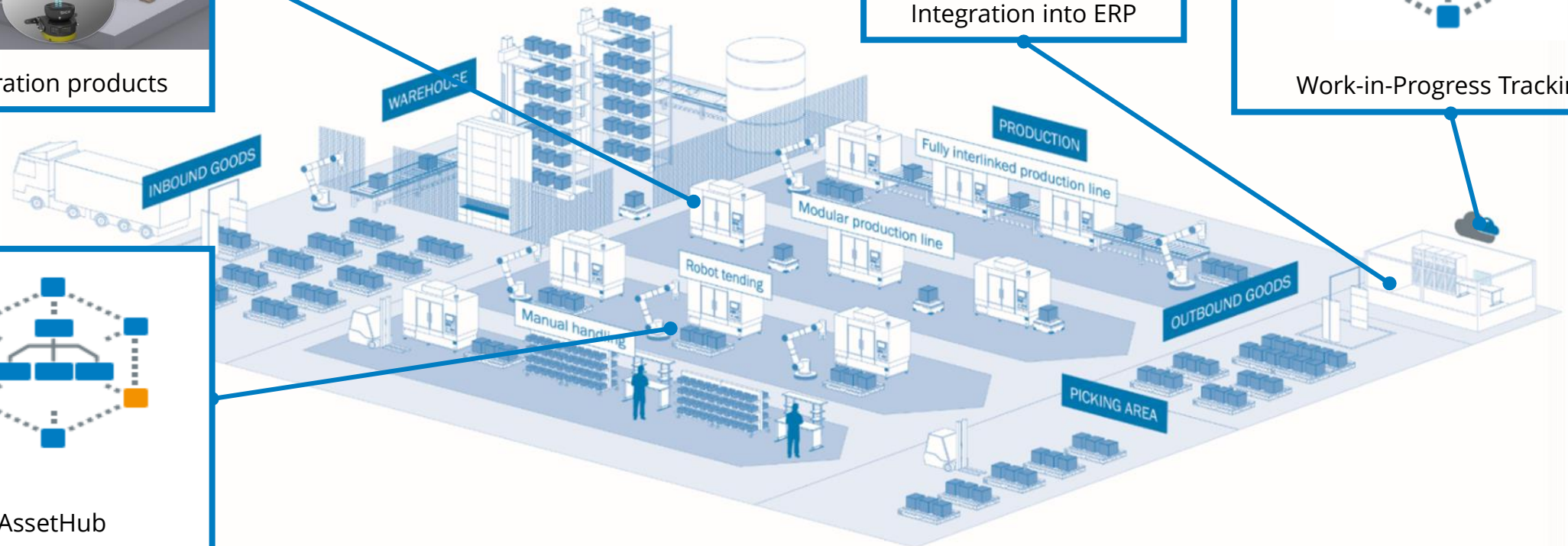
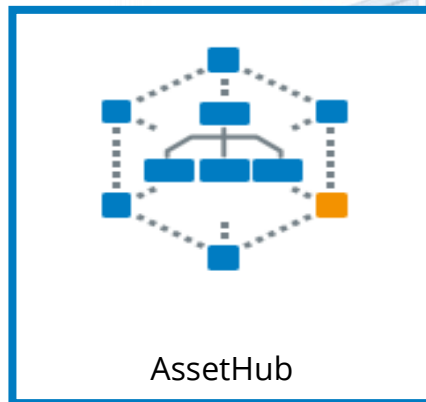
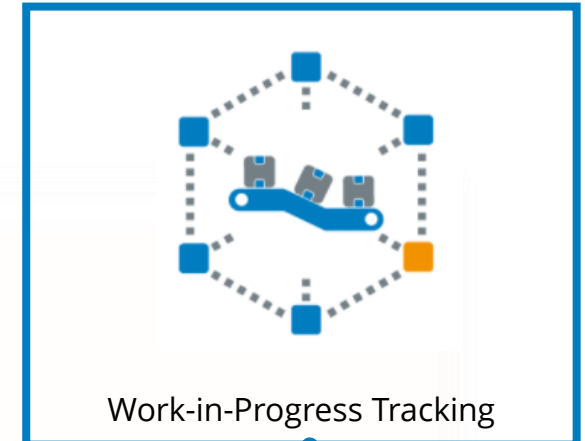
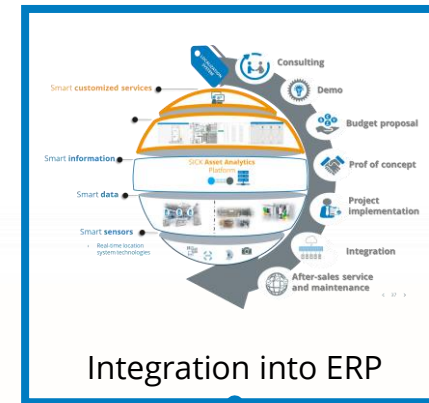
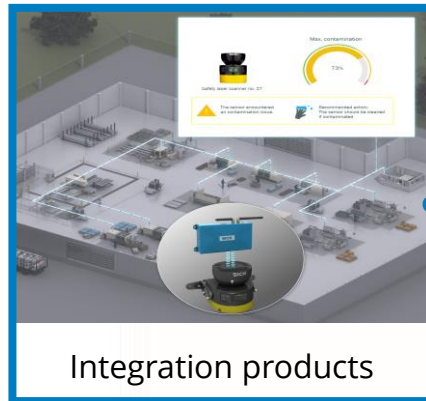
SICK offers a wide range of products systems and services to integrate sensor information into customer systems.

- › Connectivity Products like TDC-E / SIM
- › Middleware Batch Code reading ERP integration
- › Asset Analytics
- › Work-In-Process Tracking



Data Integration

Focus areas



Data Integration

Integration Products

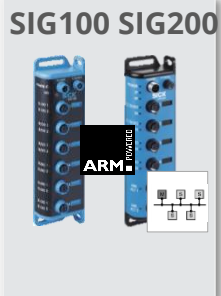
Telematic Data Collector



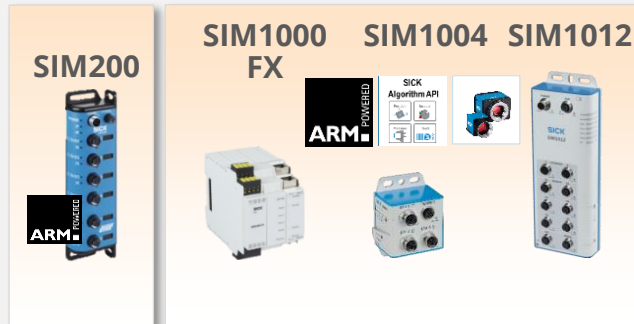
Ident Connection Boxes



Sensor Integration Gateways



Sensor Integration Machines



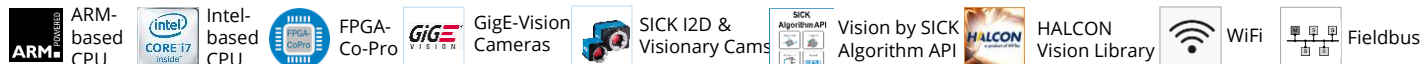
Data Integration Machine



Sensor Integration Displays



- › Scalable portfolio for multi-sensor data acquisition and processing
- › Maximum performance thanks to the latest and powerful CPU architecture
- › IoT gateway for vertical sensor data integration into the cloud



Data Integration

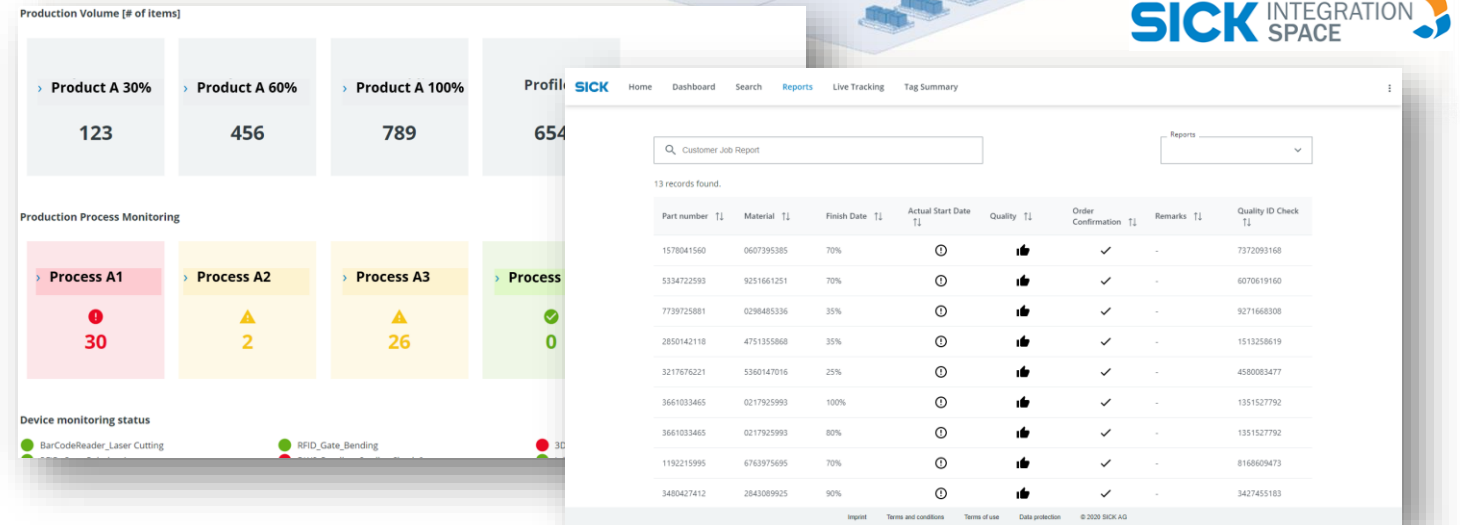
Work-In-Process Tracking

How to use shop floor live data to optimize lead times? Do you suffer from uncertainties in your manufacturing lead times?

- › Tracking items and material on shop floor
- › Optimization of value stream
- › Eliminate delays and errors
- › Reduce rework procedures

Based on the solved data application WIP Tracking, SICK is offering customized digital solutions with following project scope:

- › Digital Consulting Services
- › Identification System (e.g. RFID)
- › Data Integration Engineering
- › Software-as-a-Service (SaaS)
incl. cloud solution hosting on



Open Space Storage

Highlight applications and solutions

Why is it important

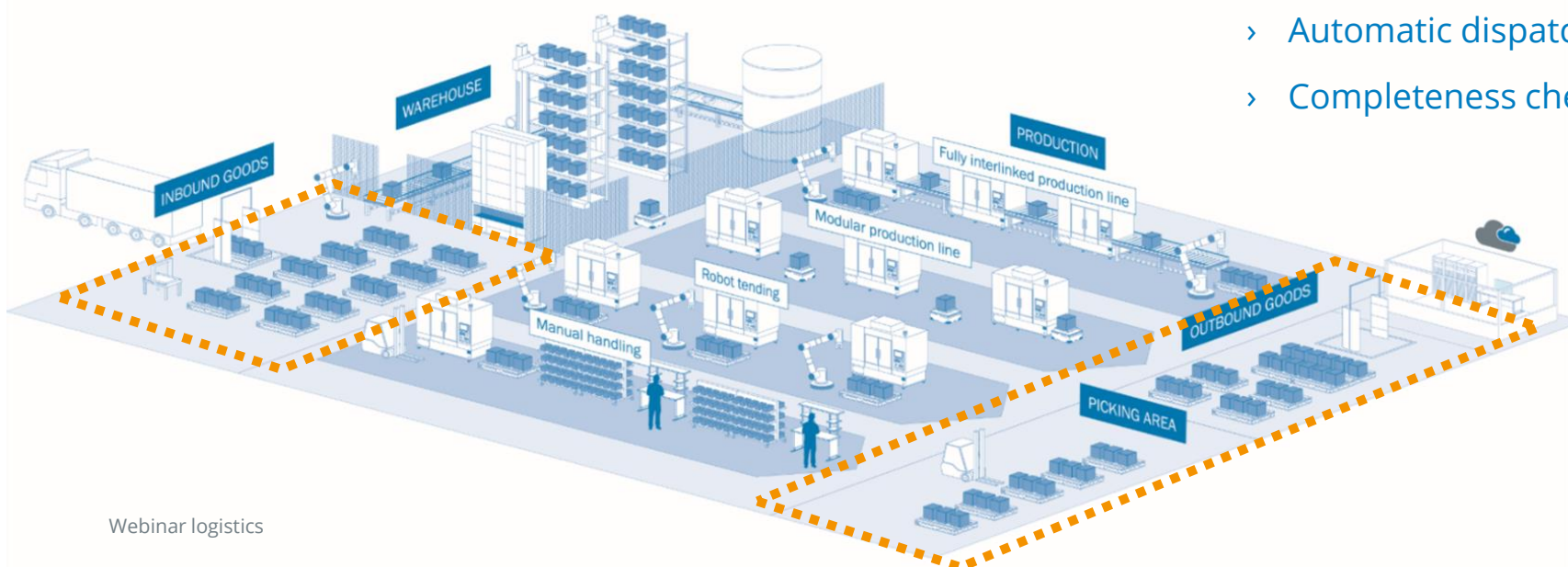
Many goods are too big to be efficiently stored in warehouses or the material flow requires them to be easily accessible. This is why open space storages are widely found in production environments.

The disadvantage is that object on open space storages can less easily be tracked and errors are more likely to occur due to a high rate of human interaction.

How can SICK help

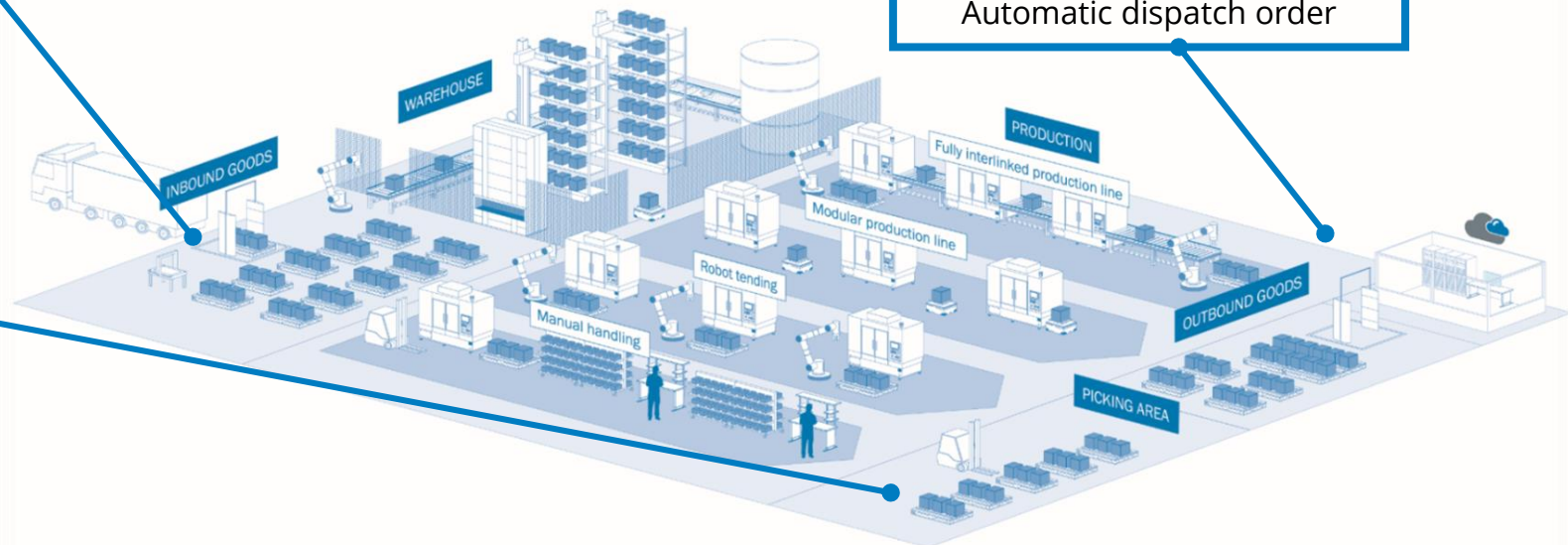
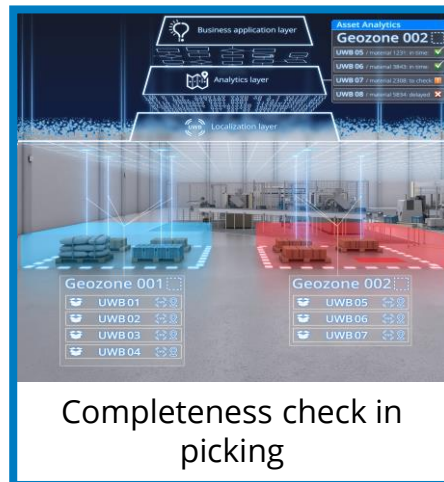
SICK Localization System LOC provides different ways to improve the efficiency of open space Storage. A simple visualization of the objects position will reduce searching. By using GeoZones, defined actions can be triggered like checking completeness of material in picking area or automatic issuing of dispatch order in outbound goods area.

- › Tag based localization of objects
- › Automatic dispatch order
- › Completeness check in preparation area



Open Space Storage

Focus areas



Flexible Robotic Loading

Highlight applications and solutions

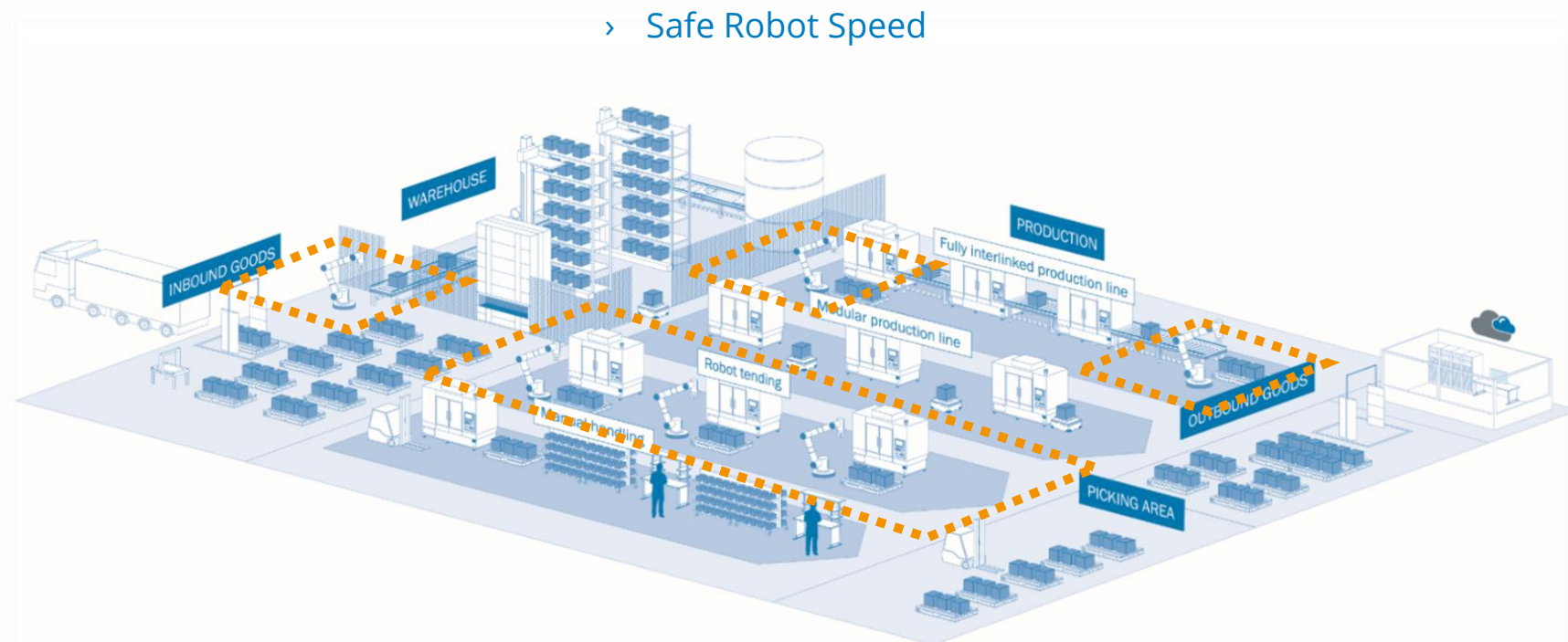
Why is it important

Robotic loading has become extremely popular, also driven by the availability of low cost collaborative robots. However, the increasing variety in manufacturing also requires loading robots to be flexible, efficient and safe and the same time.

How can SICK help

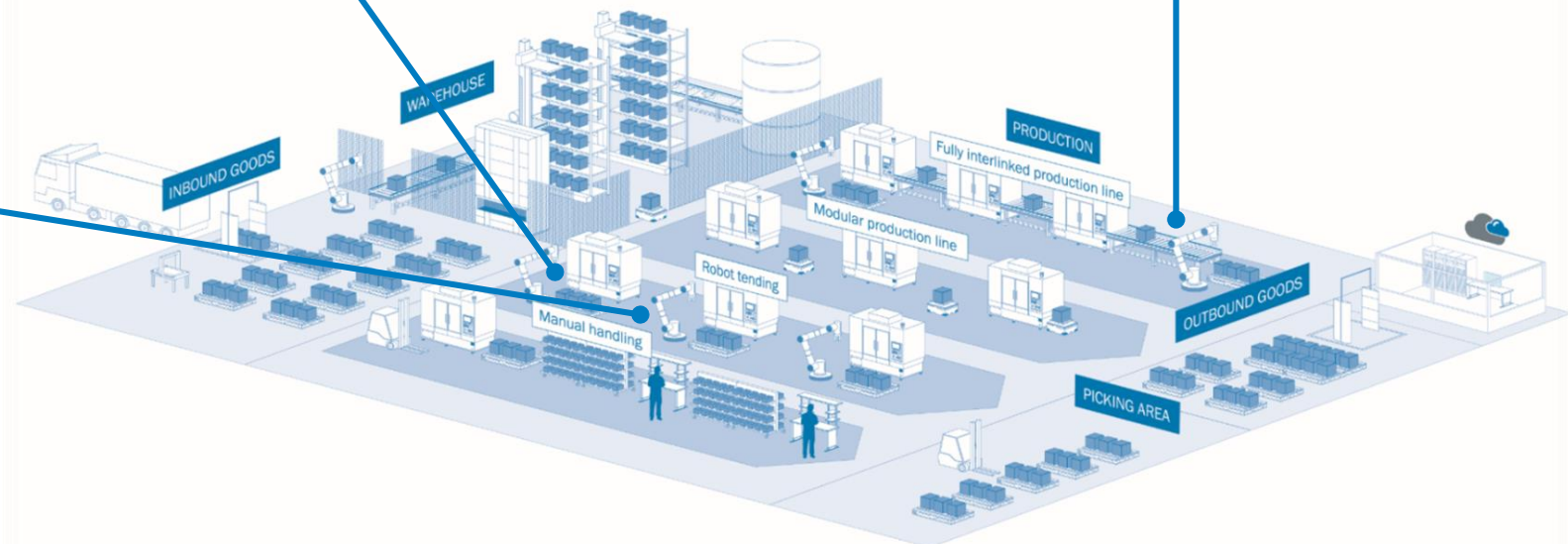
SICK offers a wide range of solutions for the flexible automation on robots

- › Vision system for Paletizing / Depaletizing
- › Vision system for bin picking
- › Safe Robot Speed



Flexible Robotic Loading

Highlight applications and solutions



Thank you for your attention!