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July 27, 2021

How to Leverage RFID to Improve Automotive Production

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Today's Presenter



Daniel Thomas
RFID Product Manager
SICK AG



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How to Leverage RFID to Improve Automotive Production

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OUR UNIVERSE IS ALL ABOUT SENSOR SOLUTIONS

FOR 75 YEARS



WE ARE ONE OF THE WORLD'S LEADING COMPANIES

WE DEVELOP SENSOR SOLUTIONS FOR
CUSTOMERS AROUND THE GLOBE

- › Over 50 subsidiaries worldwide
- › Around EUR 1.7 billion sales in 2020
- › More than 10,000 employees



NO MATTER WHERE YOU COME FROM

WE WILL CREATE AN INDIVIDUAL SOLUTION
FOR YOUR BUSINESS NEEDS

- › Automotive and part suppliers
- › Airport
- › Traffic
- › Consumer goods
- › Power
- › Oil and gas
- › Packaging
- › Electronics
- › Robotics
- › Cranes
- › Building materials
- › Waste and recycling
- › **And many more**

USING “SENSOR INTELLIGENCE.” IN A SMART WAY

AS A CUSTOMER, OUR SOLUTIONS ARE OPEN TO YOU
AND TO YOUR SYSTEMS



Detecting



Identifying



Measuring



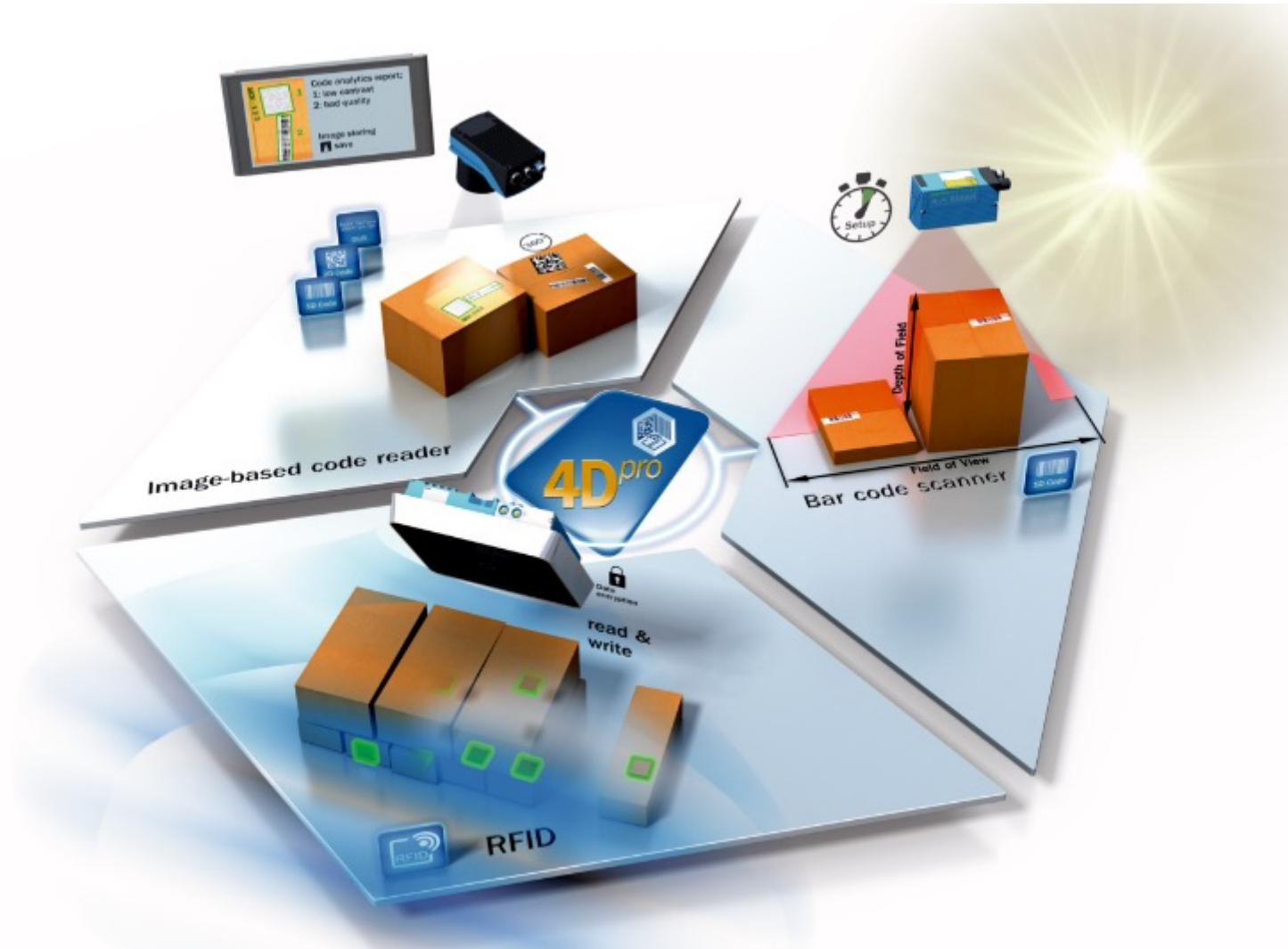
Protecting



Integrating



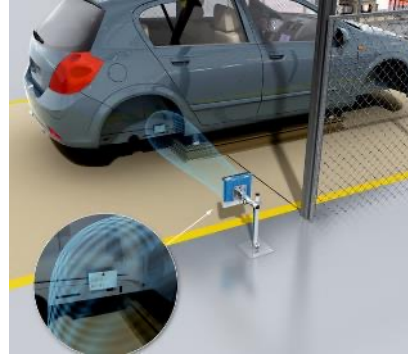
Controlling



RFID in Automotive Production

Agenda

Car body identification



RFID-based Kanban



Identifications of tires



automotive part identification



RFID in Automotive Production

Car body identification

RFID tag

- Removeable high-temp label
- or
- Fixed on-metal high-temp tag

RFID reader

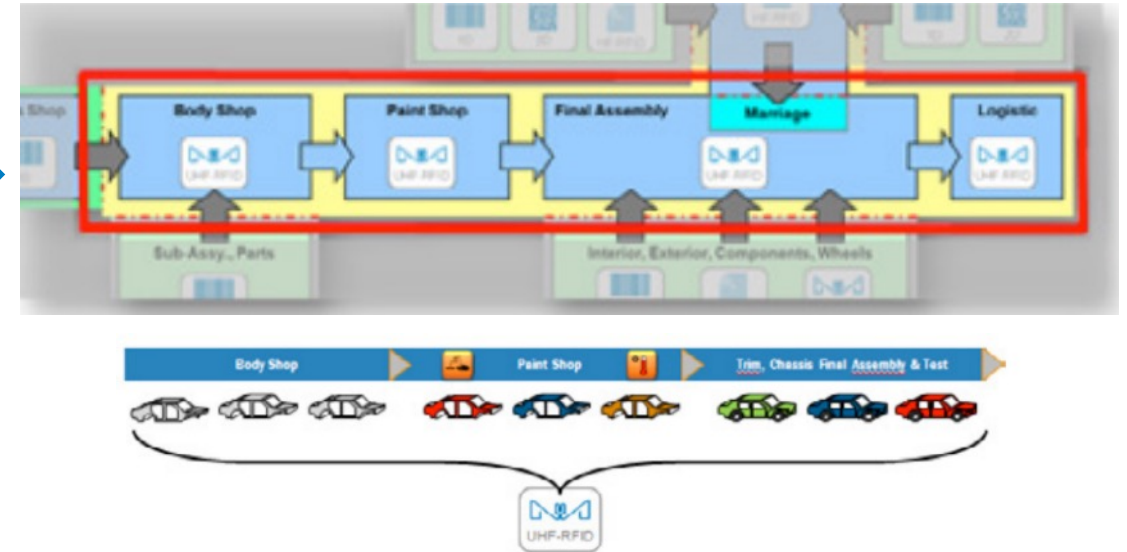
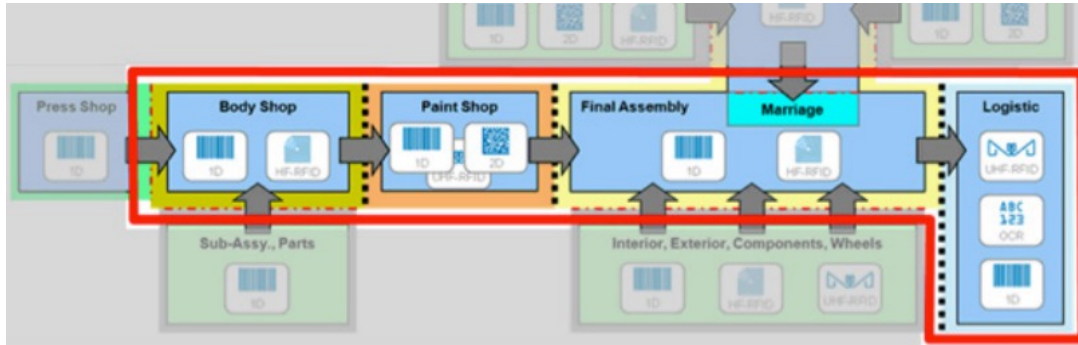
- Integrated antenna
- typ. up to 2m range
- Connected to PLC via fieldbus



RFID in Automotive Production

Car body identification

Motivation:



Situation in the past:

- multiple ident technologies throughout production
- different data carriers
- data conversion from one medium to another

Save costs and reduce complexity by

- using less technologies
- using one data carrier → one UHF tag per car
- no media changes / data transfer points


RFID in Automotive Production

Car body identification

Challenges

Requirements for tag:

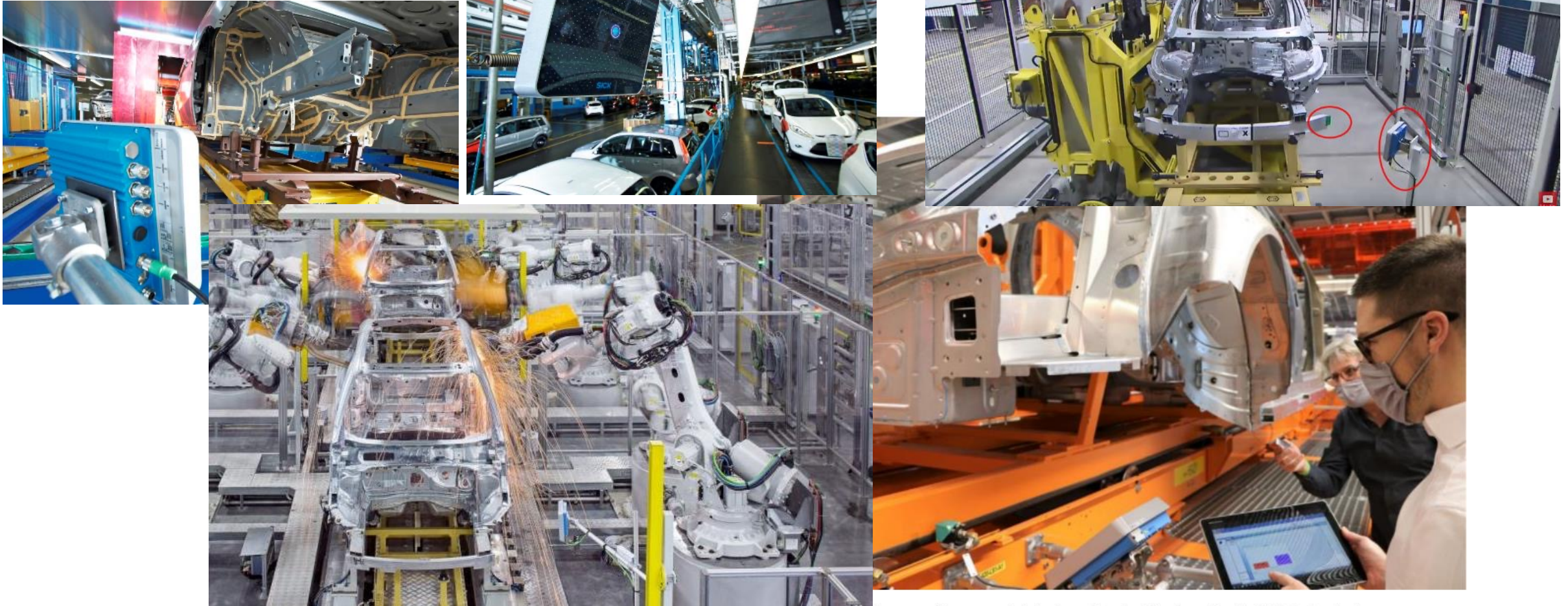
- Short and long ranges
- Difficult orientations between reader and tag
- Chemicals in catalytic process
- no line-of-sight in paint shop
- High temperature in dry oven

Automotive AIDC Required Tasks	Identification Technologies			
	Optical		RFID	
	Laser-based ID 	Camera-based ID 	HF 	UHF 
Very Short Range < 2 inches	X	X	✓	✓
Short Range > 2 inches < 8 inches	✓	✓	✓	✓
Mid Range > 8 inches < 40 inches	✓	✓	X	✓
Long Range > 40 inches < 80 inches	✓	✓	X	✓
Very Long Range > 80 inches	X	✓	X	✓
Omni-directional	X	✓	✓	✓
No Direct Line-of-sight Necessary	X	X	✓	✓
Environmentally Resistant	X	X	✓	✓
Maintenance-free (no lens cleaning required)	X	X	✓	✓
Dynamic Bulk Reading (e.g., dock door)	X	X	X	✓
Rewritable	X	X	✓	✓

RFID in Automotive Production

Car body identification

Examples



Als erstes Werk im Volkswagen-Konzern nutzt Audi am Standort Neckarsulm die RFID-Technologie zur Fahrzeugidentifikation durchgängig im gesamten Produktionsprozess und vernetzt damit Prozesse gewerkeübergreifend. Bild: Audi

RFID in Automotive Production

RFID based Kanban

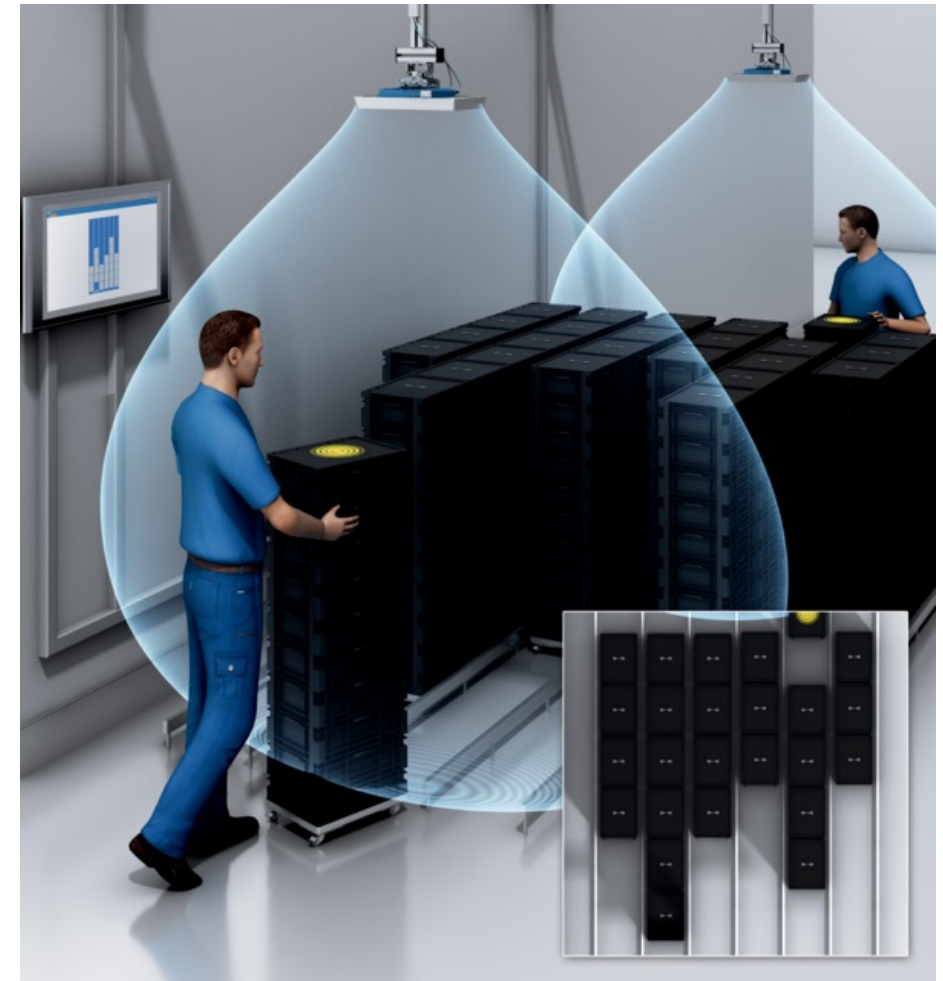
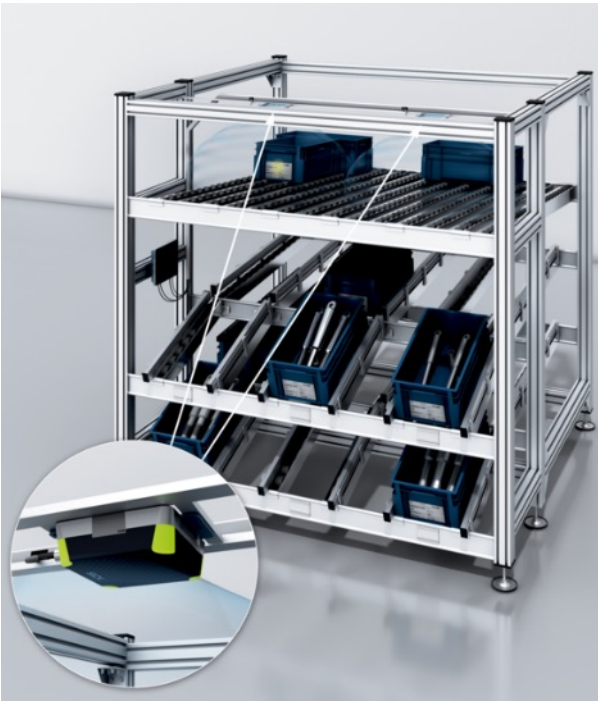


RFID in Automotive Production

RFID based Kanban

Advantages with RFID

- Reduce manual efforts for operator
- Real-time information → transparency
- History about material flow → continuous improvement
- → reduction of stock



RFID in Automotive Production

RFID based Kanban

Challenges

ESD container

→ the right tag

Overshoots

→ limiting reading zone

Network

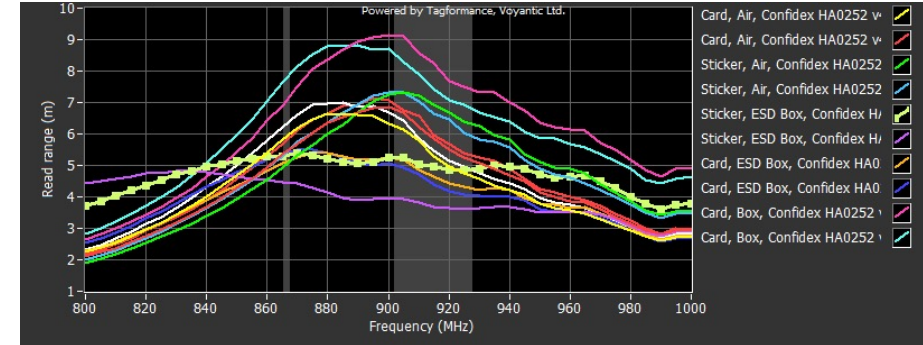
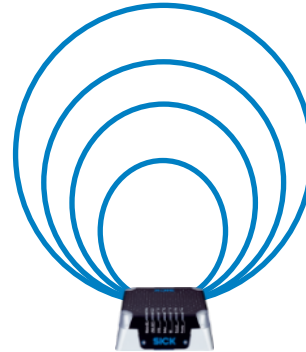
→ Power over Ethernet

IT integration

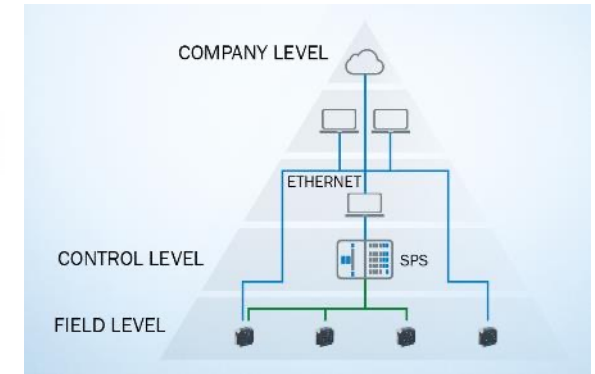
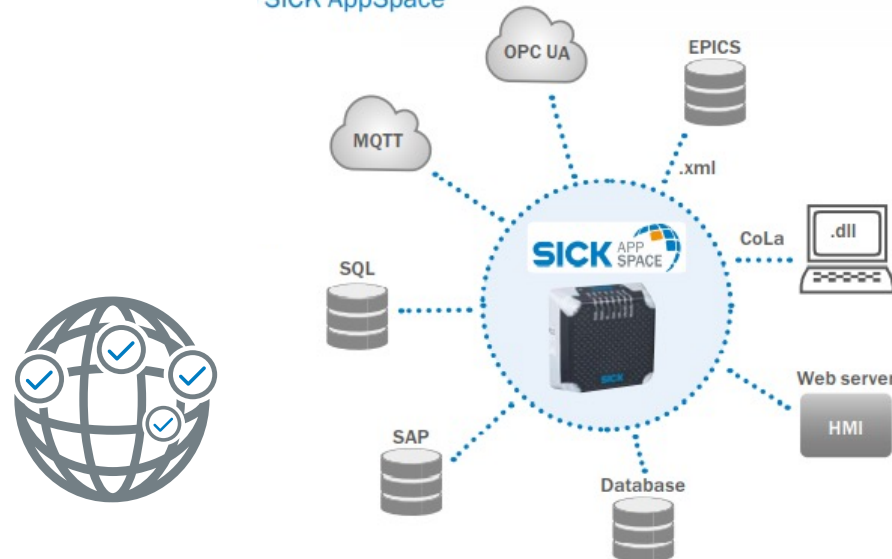
→ Middleware

World-wide use

→ Radio approvals

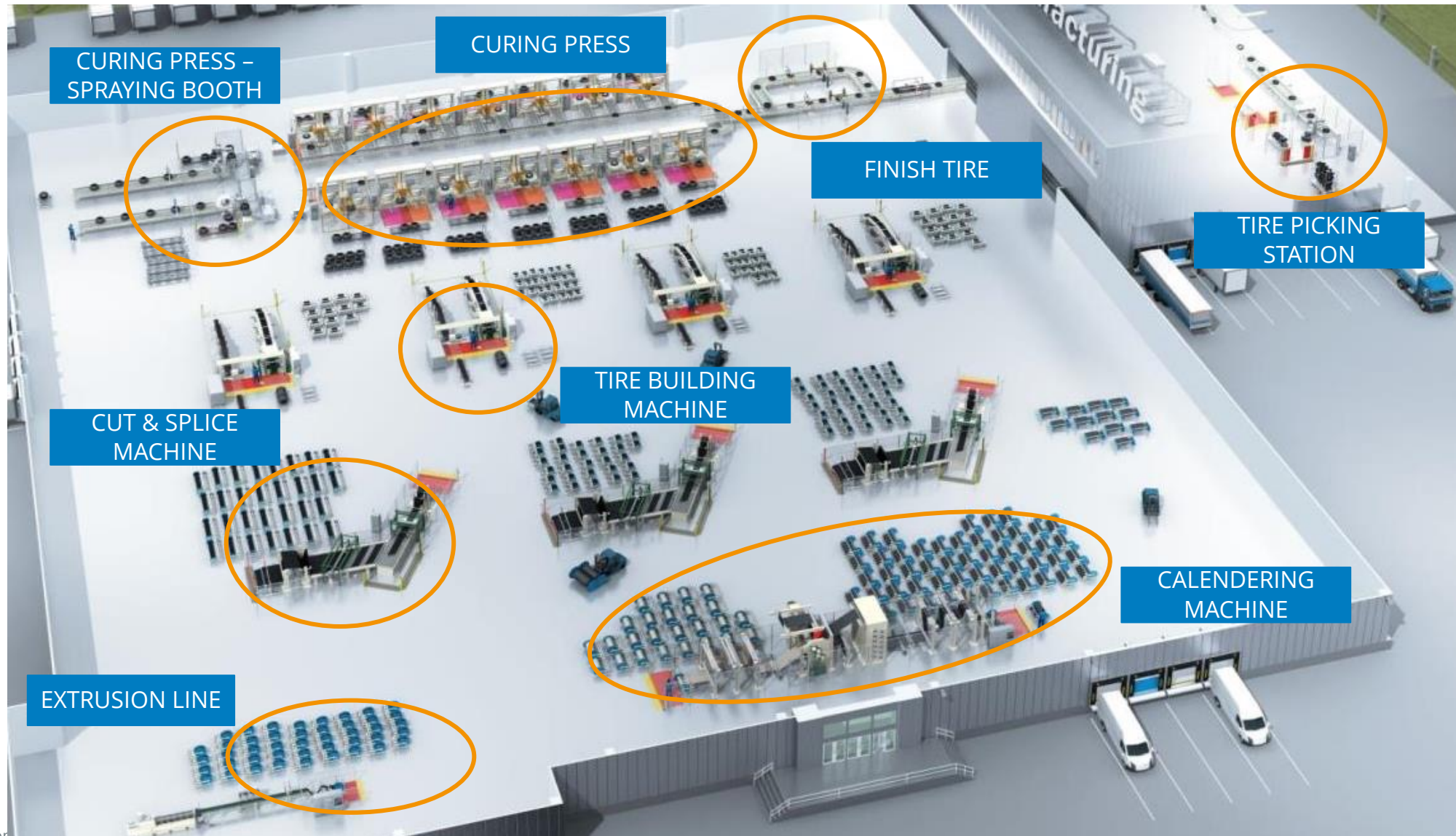


SICK AppSpace



RFID in Automotive Production

Identification of Tires



RFID in Automotive Production

Identification of Tires

Sick has a long history in tire identification with optical systems

Challenges with RFID

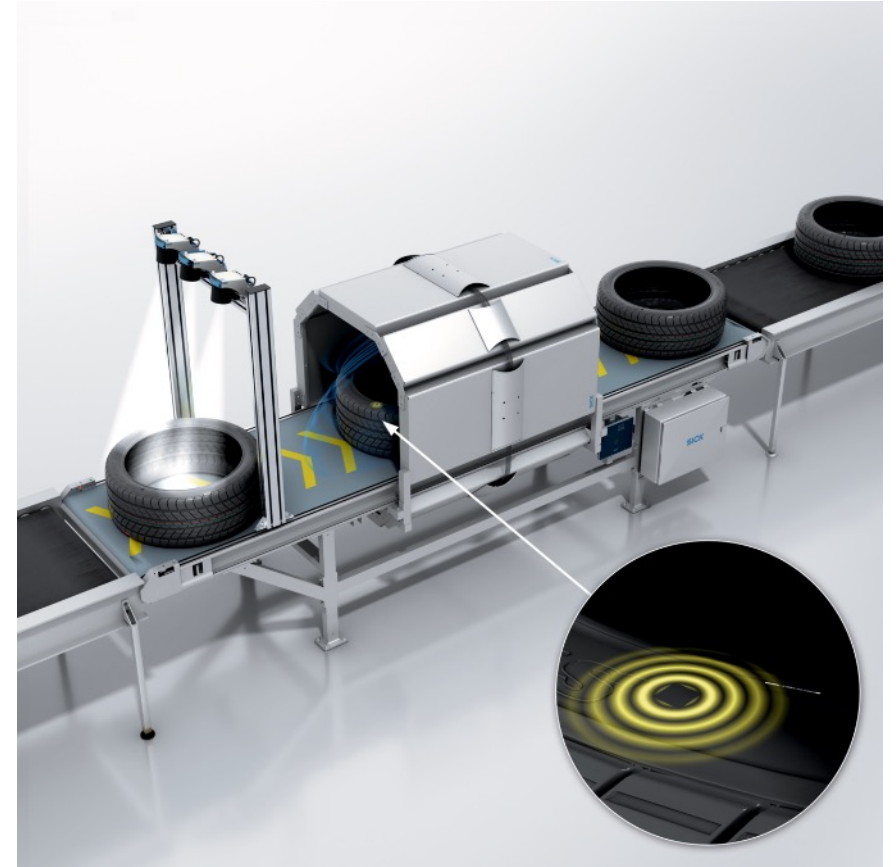
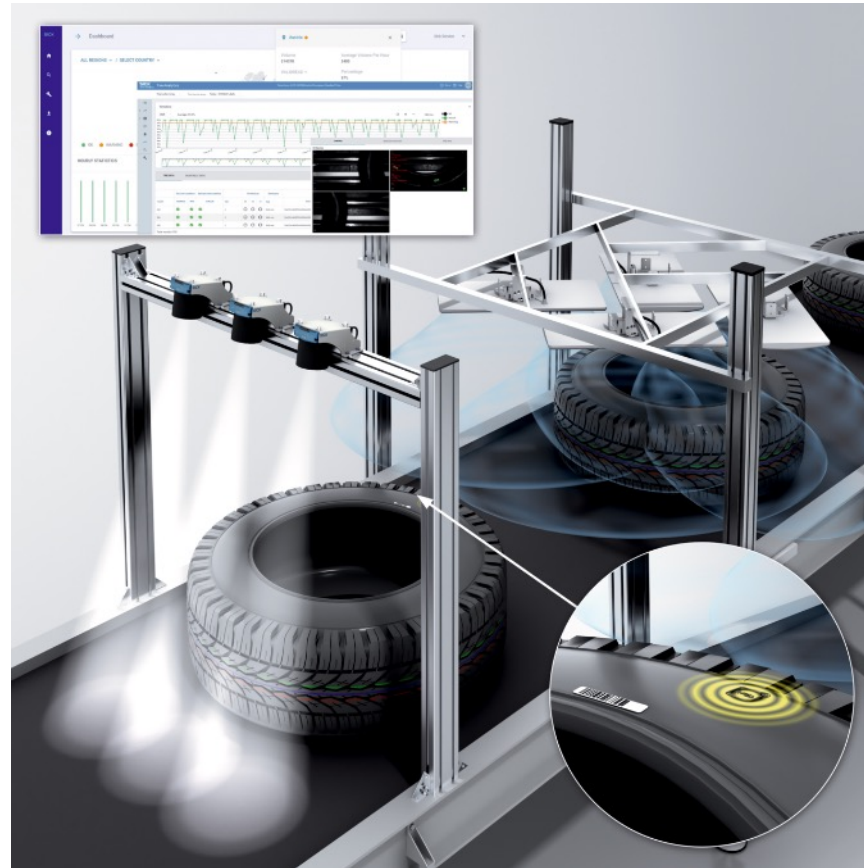
- Low performing tags
- Challenging tag environment
- Position & orientation of tire
- Dynamic read and write
- Large reading field
- CrossReads



RFID in Automotive Production

Identification of Tires

Different requirements need different solutions



RFID in Automotive Production

Identification of Tires

Important to know in advance

Conveyor width

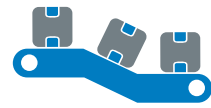
Conveyor speed

Position of tag

Object gap

Actions on air interface

- Read (UII, TID, User memory)
- Write (UII, User memory)
- Lock (UII, User memory)

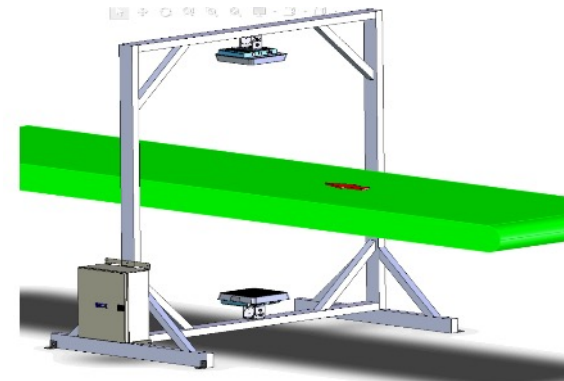


Host system

Protocol

Analytics

Radio approval



RFID in Automotive Production

Identification of Tires

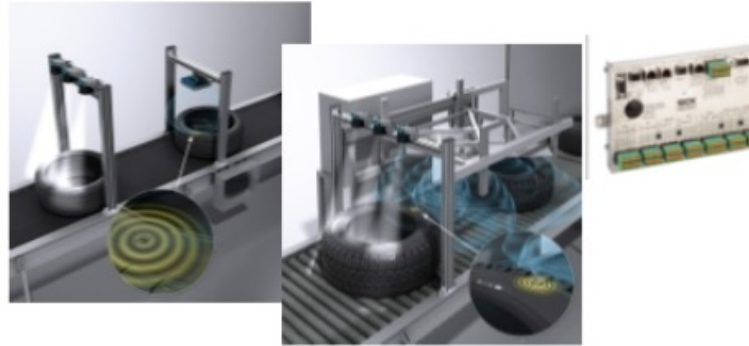


- **RFID Tire System Core**

- RFID reader + antennas
- Connection box (optional)
- Cabling and holders
- Trigger

- **Component approach**

- Only start/ stop
- 24V provided by customer
- Integration/ framing provided by customer



- **RFID Tire System Prime**

- System controller MSC800
- RFID reader + antennas
- System framing
- Trigger and encoder
- Standard shielding modules

- **Engineering for integration and framing**

- Standard shielding to avoid cross reads
- Advanced host interface
- Start/stop and tracking (different conveyor speed)
- Combination with optical scanner possible



- **RFID Tire System Pro**

- Absorber tunnel solution
- Antennas integrate in tunnel modules
- System controller MSC800
- Trigger and encoder

- **Self supporting RFID tunnel**

- Flexible and robust design
- Advanced shielding with absorbers to avoid cross reads
- Advanced tag reading with precision in tag assignment
- Start/stop and tracking (different conveyor speed)
- Combination with optical scanner possible

RFID in Automotive Production

Automotive part identification



RFID in Automotive Production

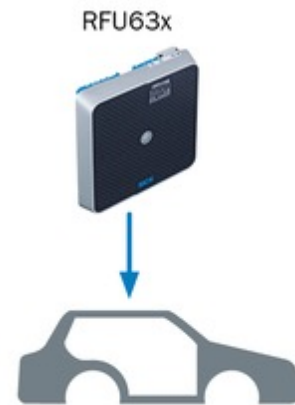
Automotive part identification



Short range
Limited space



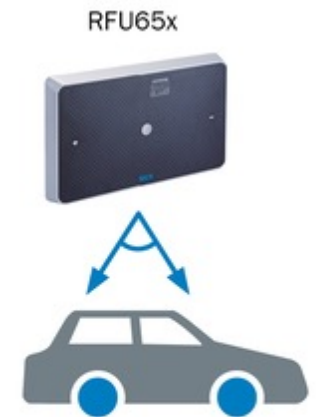
Mid range



Long range



Bulk reading
Long range
Direction detection



Direction detection
Long range

Q&A

For further questions and feedback, please mail to info@sick.com

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