IEC/IEEE 60802 Edition 2

Wireless Examples

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Outline

- Reliable and Available Wireless (RAW) technologies
- Some 5G deployment examples

IEC/IEEE 60802 Edition 2
Additional TSN Industrial Automation Use Cases v0.4

- Use Case 01: Deterministic Wireless Communications
  a) IEEE 802.11
  b) IEEE 802.15.1
  c) IEEE 802.15.3
  d) IEEE 802.15.4
  e) 5G / 6G

Reliable and Available Wireless (RAW) Technologies

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- IETF RFC 9913 Reliable and Available Wireless (RAW) Technologies

  Section 4. IEEE 802.11 Wireless Local Area Networks (WLAN)

  Section 5. IEEE 802.15.4 Time-Slotted Channel Hopping (TSCH)

  Section 6. 5G

5G Works

Private 5G addresses manufacturing connectivity challenges...

Coverage
CONNECT EVERYTHING EVERYWHERE

SENSORS | CAMERAS | AMR | WORKFORCE

Mobility
CONNECT & CONTROL MOVING OBJECTS

AMR | WORKFORCE | DRONES

Reliability
A NETWORK TO DEPEND ON

SAFETY | CRITCAL | INDUSTRIAL CTRL

Control
FULL OWNERSHIP OF DATA

ON-PREM | CLOUD | ANALYTICS

Security
SECURE CONNECTION OF ASSETS

Flexibility
PURPOSE BASED DEPLOYMENT

INDOOR | OUTDOOR | MULTI-SITE

Scalability
MORE CONNECTED ASSETS AND DATA

Infrastructure cost savings
CONNECT MORE ASSETS

NO CABLES | COMMUNICATION SYSTEMS

Integration
EASILY INTEGRATE 5G (ENVIRONMENT & PROCESSES)

Airbus (Germany)

Scaling industry 4.0 at Airbus factories

Use Case

- Manufacturing plants for industry 4.0 applications

Results with 5G

- Module architecture and network management tools expedited deployment
- Reliability and performance necessary to add more locations and scale use cases including 3D simulation, augmented reality, improved traceability for parts, and predictive maintenance , real-time quality control, and collaborative robotics

- https://www.ericsson.com/en/news/2025/10/airbus-and-ericsson-accelerate-industrial-digitalization-with-private-5g-deployment-at-hamburg-and-toulouse-plants

CIMPOR (Portugal)

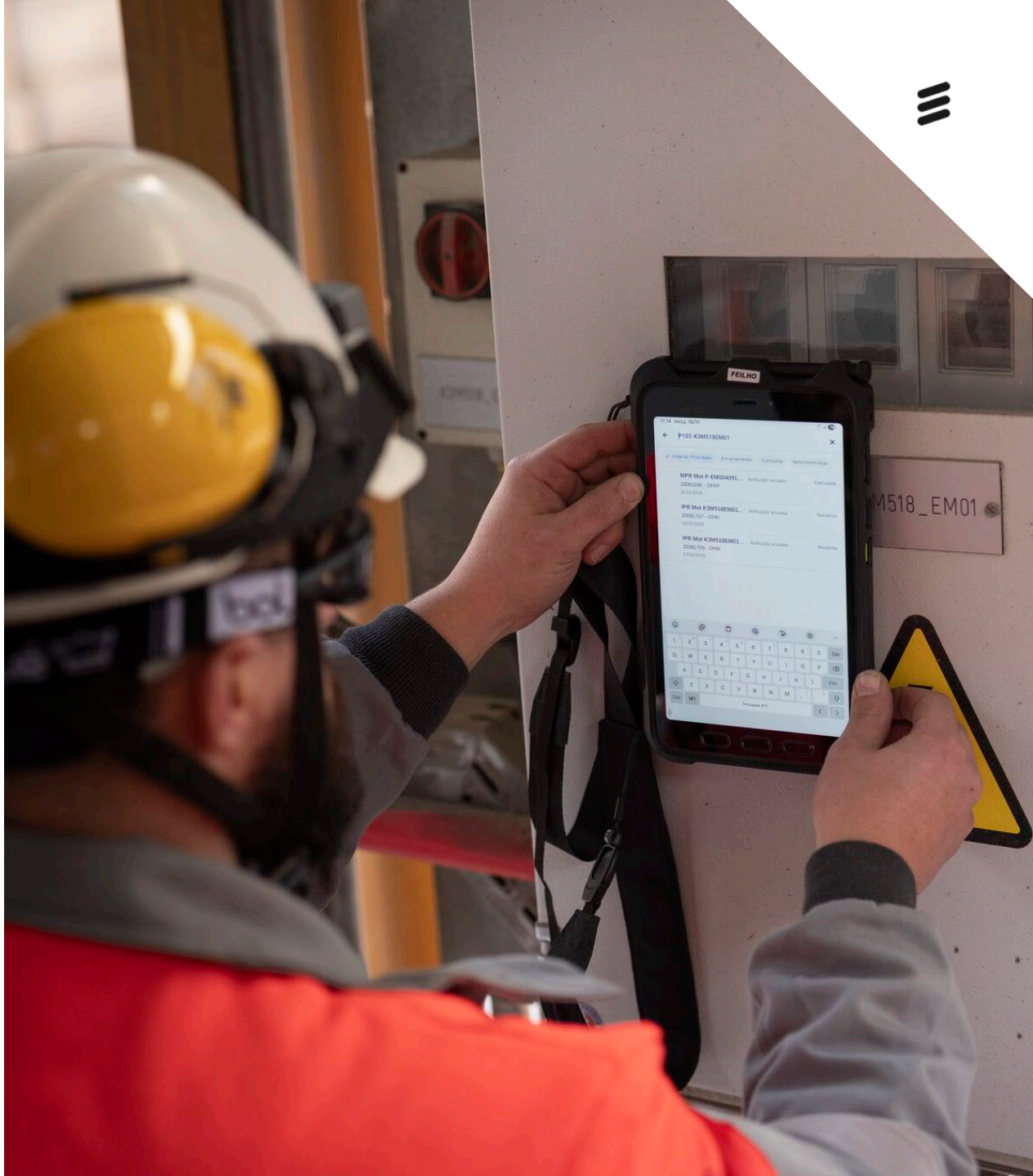
Using data, AR/VR, etc., to bolster efficiency at 3 plants

Challenges

- Wireless connection reliability at CIMPOR's cement production plants in Portugal
- Latency requirements for use cases such as drones for inspections, smart glasses for remote assistance, VR for training, predictive maintenance, and worker tablets

Results with 5G

- Predictive maintenance saves up to $1 million per year/plant
- Efficiency from digital tech saves CIMPOR from $10 million to $15 million and reduces CO2 emissions by 140,000 tons



Hitachi Rail (U.S.)

Consistent mobility for smart factory

Challenges

- Reliability of wireless connections for mobility-dependent technologies such as robotic dog for safety inspections, physical AI, digital twins, predictive maintenance, and IoT-driver material transport

Results with 5G

- Ultra-low latency and high bandwidth for real-time execution of critical processes — driving significant gains in efficiency, precision, and worker safety.
- Ample scalability for future "smart factory" projects

- https://www.ericsson.com/en/blog/2024/6/smart-factory-inspections-with-private-5g

Hitachi Energy (Sweden)

High availability for smart tools and automation

Challenges

- "Smart production" initiatives such as automation applications and digitals tools such as wireless screwdrivers require reliable mobile connectivity

Results with 5G

- High availability of connected power tools increases productivity and efficiency

- https://www.globallogic.com/about/press-room/press-release/globallogic-and-ericsson-deploy-private-5g-network-at-hitachi-rails-state-of-the-art-digital-factory

Nestle (Brazil)

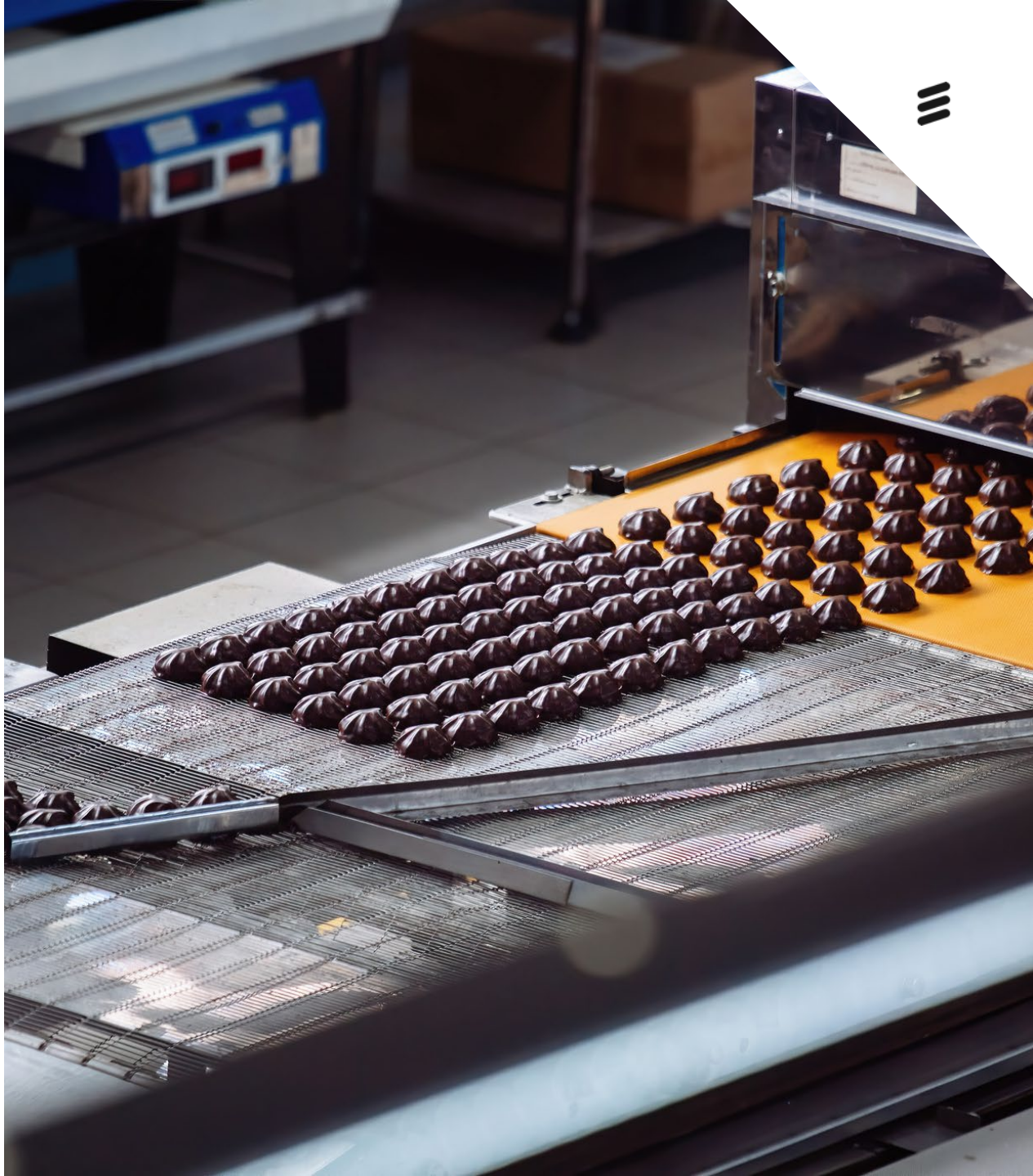
Expanding connected fleet with better TCO

Challenges

- High latency unacceptable for industry 4.0 applications such as autonomous vehicles; predictive sensors and assisted and augmented reality for maintenance; and computer vision for identifying missing wafers

Results with 5G

- Smooth mobility for various devices without connection drop-offs
- Support extremely low latency and high-bandwidth applications



ArcelorMittal (France)

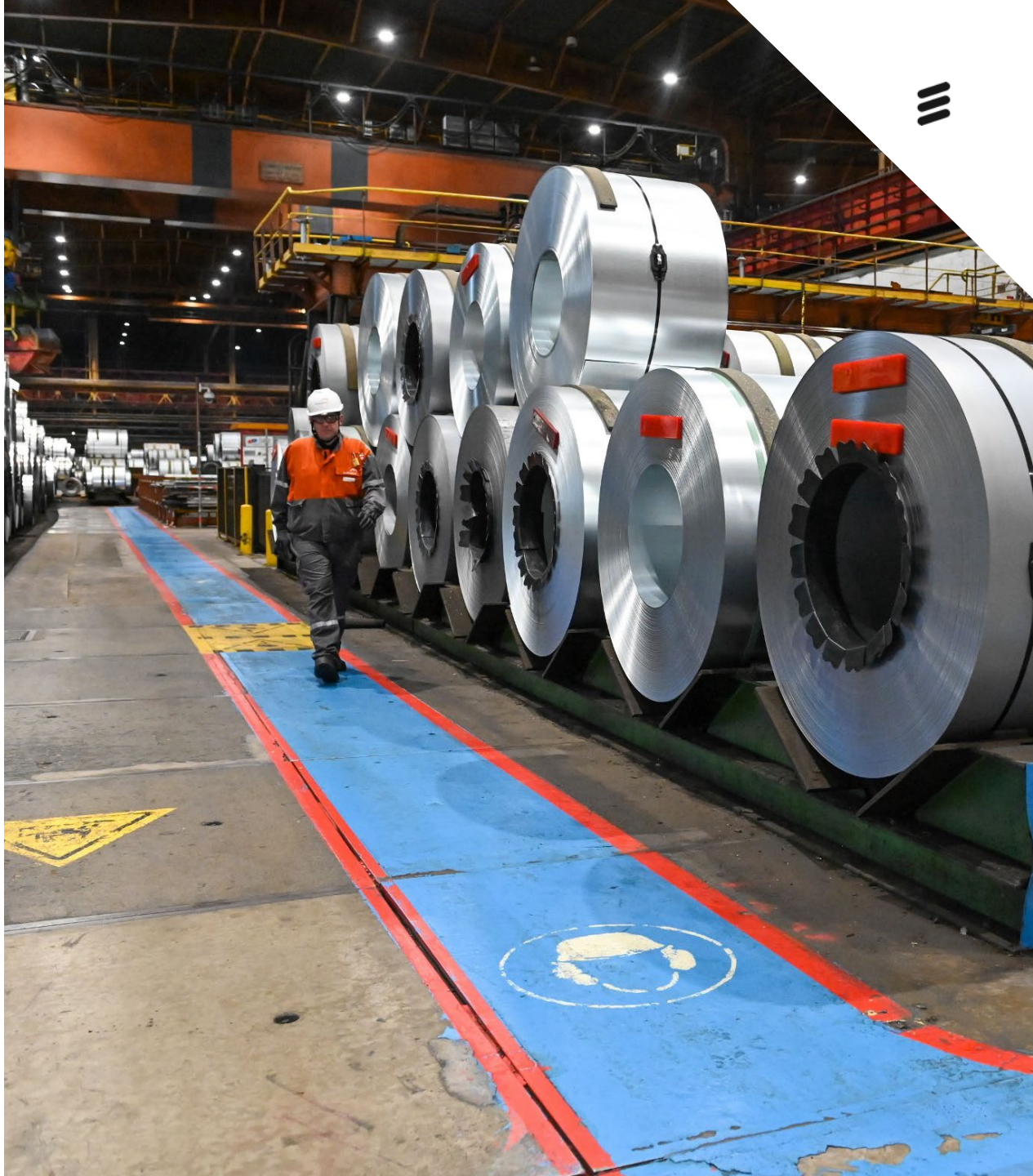
Mobility for steel production staff with digital tools

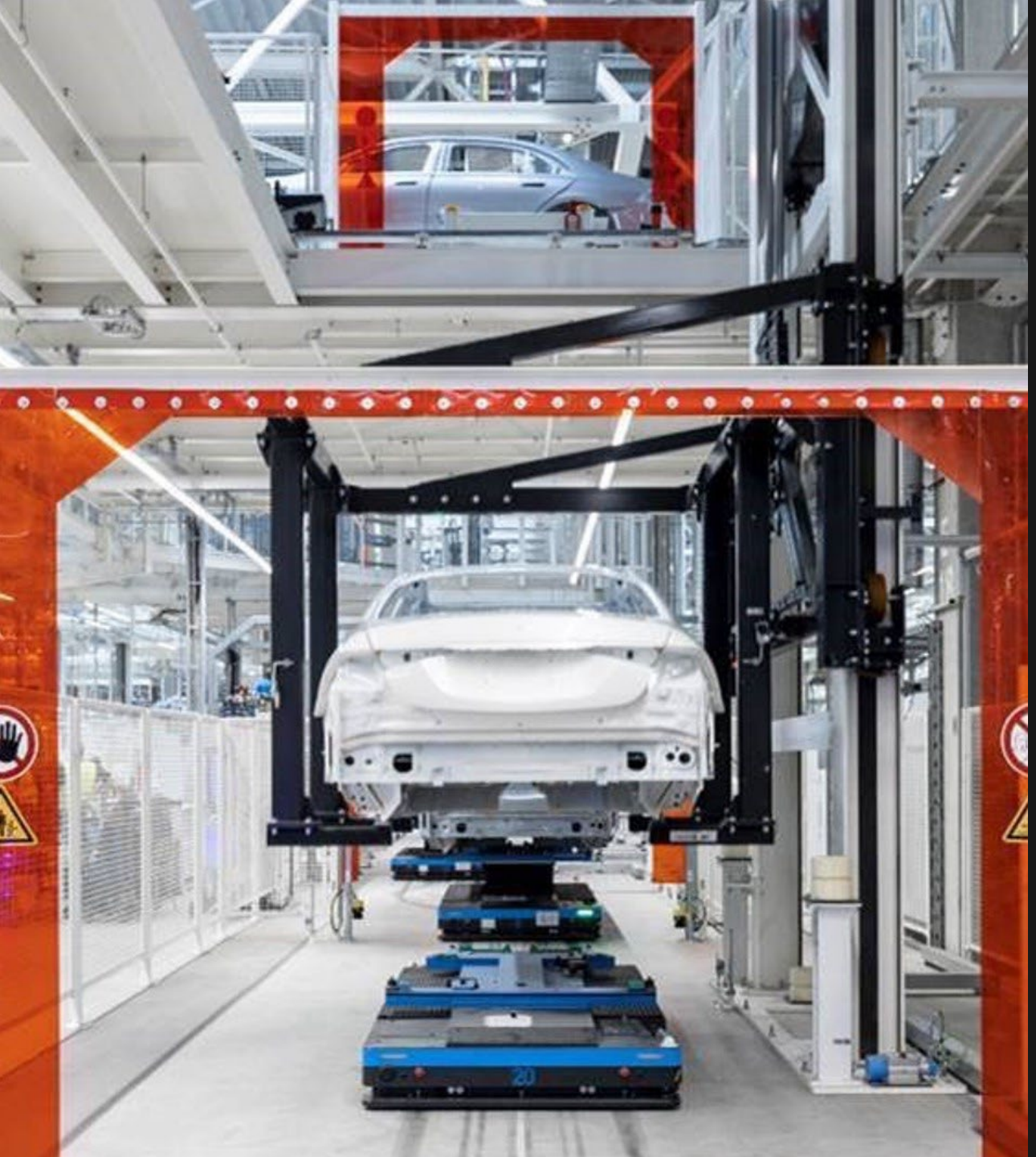
Challenges

- Complex wireless coverage scenarios inside and outside manufacturing plants
- Next-gen tech requires seamless mobility and low latency

Results with 5G

- Greater freedom to equip personnel with mobility-dependent digital tools throughout facilities





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"With the installation of a local 5G network, the networking of all production systems and machines in the Mercedes-Benz Cars factories will become even smarter and more efficient in the future."

Jörg Burzer
Member, Divisional Board of Management of Mercedes-Benz Cars, Production and Supply Chain

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"Porsche production is undergoing a comprehensive digital transformation. ...

5G technology is one of the key elements laying the groundwork for our Smart Factory"

Reimold, member, Executive Board for Production and Logistics at Porsche AG

https://newsroom.porsche.com/en/2021/company/porsche-ericsson-private-5g-research-network-plant-leipzig-26584.html

Some further examples

- Tesla
  - https://tecknexus.com/5gusecase/tesla-expands-private-5g-networks-at-berlin-gigafactory/
  - https://www.privatelteand5g.com/tesla-launches-private-5g-network-at-gigafactory-in-berlin/
  - also in Austin and Shanghai
- BMW
  - https://www.fierce-network.com/wireless/bmw-uses-private-5g-deliver-ai-automation-hungary
- OSRAM
  - https://www.t-systems.com/resource/blob/12534/1d189c8a4f4387e745f7f0f28c791de4/DL-Flyer-5G-Campus-Netzwerk-Osram-t-systems-en-09-2019.pdf

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https://www.ericsson.com/en/industries/manufacturing/manufacturing-customer-stories