

PUBLIC



2019-11-05

Industrial Use cases – Towards Autonomy

European Industry Partnerships Lighthouses to Thrive in the New Digital Age

ABB Corporate Research, Linus Thrybom



Industrial Use cases – Towards Autonomy

Customer trends driving new automation needs

Customer trends



Individualization



Volatile demand



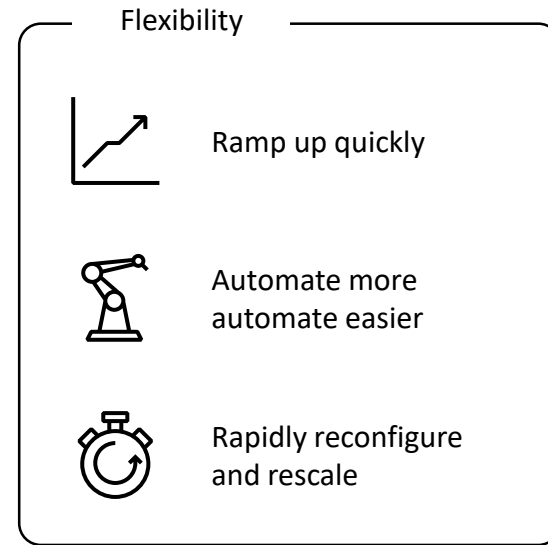
Shorter product lifecycles



Automation needs



Productivity
and efficiency



Autonomy

Industrial Use cases – Towards Autonomy

Automation → Autonomy

Autonomous systems

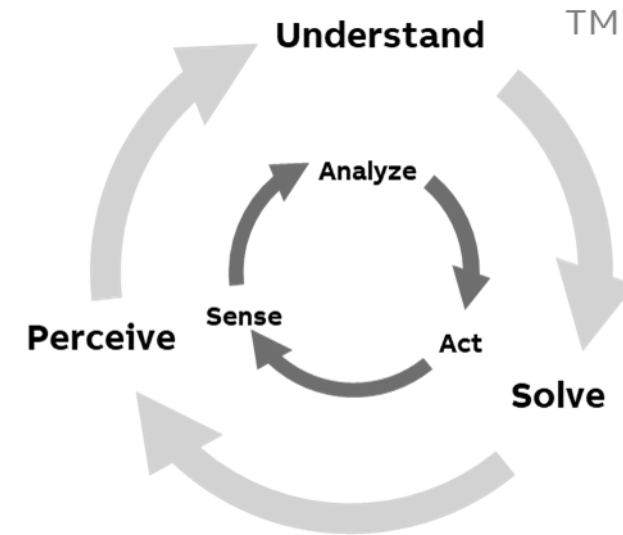
Autonomous systems are characterized by the ability to act independently of direct human control, whereas automated systems are not.

AI will change today's control paradigm:

- from signal marshalling to process data analytics
- from feedback loops to prediction
- from process calibration to self-optimization

Looking ahead, a continuous cycle of self-learning algorithms will enable process and plant optimizations we can hardly imagine today.

Perceive – Understand – Solve



Industrial Use cases – Towards Autonomy

Domain examples

Autonomous shipping

Autonomous tugboat – in operation 2020



Mobile autonomous robots

Mobile robots – not only in manufacturing!



Autonomous operation

Underground and open pit mining



Industrial Use cases – Towards Autonomy

Conclusion

Technologies supporting Autonomy

5G – A suitable platform for building autonomous systems:

- URLLC link
- Positioning
- Time sync
- Distributed edge cloud

Edge, brings cloud capabilities closer to the plant, analytics & AI can be used even within the control loop!

4G/LTE performance is sufficient in many applications though

Enablers

Robustness, resilience and security by design

Trust & proven in use

Integration with legacy systems & networks – Simple engineering and operation

Regulators

- Availability of industrial spectrum for private networks
- Industry-compatible net neutrality frame for public networks

Network operators

- Flexible operator model for industrial 5G networks
- Transparent industrial network coverage for IoT applications

URLLC yes, but first robustness, resilience and security!

Industrial Use cases – Towards Autonomy

Project example – Industrial IoTSP

Target

Trial and demonstrate new technologies

- To achieve trust
- To demonstrate business values
- Develop technology awareness

Customer focused trials

Funded by PiiA / Vinnova

Achievements

AI/ML pilot with district heating utility

Mine ventilation application → Cloud

Cloud QoS

Cloud based controller with 5G I/O

Lessons learned

Spin-off projects and pilots

National → International to ensure scalable solutions

Public funding support long term perspective in short term businesses focus

Industrial IoTSP pilots → Gain trust by demonstrating technology maturity in industrial utilities & plants

ABB