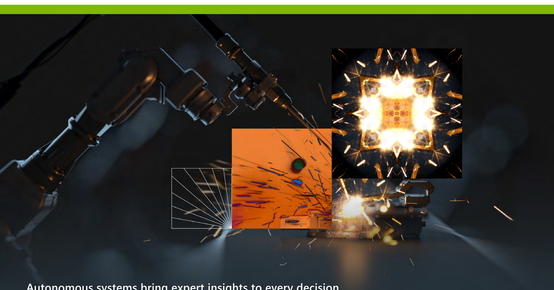
Microsoft

How manufacturers put autonomous systems to work

Improve quality and reduce downtime with human-trained AI



Autonomous systems bring expert insights to every decision.
With an expert-educated AI, autonomous systems optimize factory performance based on:

1	2	3	4	5	6
Production goals	Outside environment	Working conditions	Worker count	Infrastructure condition	and more

By applying the right method at the right time, autonomous systems help reduce waste and drive productivity while empowering workers to make the best decision in real time.

17%-20%
productivity gains by manufacturers that implemented intelligent systems.[1]

Traditional control systems

Manual		Automated
Easily adaptable	+	Scalable across functions
Rely on human expertise	+	Reduce reliance on human operators
Resource dependent	–	Little or no adaptability
Difficult to scale	–	Requires new skills to implement

Autonomous systems merge automated scalability and efficiency with human expertise to improve factory performance outcomes.

What is an autonomous system?

AI-powered automation built by engineers that optimizes equipment by observing and responding in real time.

Educated by experts

Autonomous systems are built by human experts who know the equipment and its behavior the best. Engineers and operators share their knowledge about what decisions to make given a particular set of circumstances. The AI is taught a little at a time, just like it is another member of the team. The AI then safely practices and perfects each goal inside a simulated environment before going to work on the factory floor.

This combination of expert wisdom and AI performance equips sites with dynamic solutions to deliver consistent products faster and more efficiently. By training with operators and engineers, the AI learns to adapt to changing events and can optimize for competing production objectives.

So, when the density of material changes slightly:

An automated system continues producing out-of-spec product until a human operator stops the system and adjusts key inputs – potentially leading to out-of-spec product, downtime, and waste.

An autonomous system recognizes the change and can adapt independently to help meet production objectives.

56% of manufacturers focus their AI efforts on maintenance and quality functions.[2]

Implementation options for autonomous systems on the factory floor:[3]

1 Advises operators
AI provides insights, and operators ultimately decide and act.
Example: AI recommends increased extruder pressure based on air humidity. The operator then decides whether to increase the pressure.

2 Assists operators
AI and humans work and act as a team, each making some decisions.
Example: AI makes decisions on a control that has only a five-second optimization window but continues to recommend optimization choices that operators have enough time to analyze.

3 Works independently
AI assesses and decides optimization decision on its own.
Example: AI implements its recommendation to increase the extruder pressure without an operator's approval.

By deploying an autonomous system, manufacturers can:

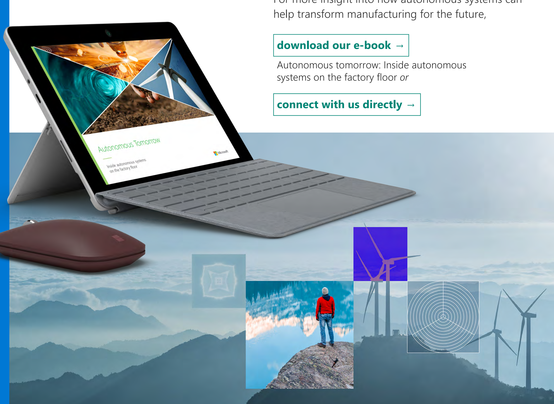
- Improve quality and consistency across a production line.
- Reduce downtime and wasted resources.
- Empower operators to make more consistent decisions.
- Optimize performance and adapt to new circumstances.

The AI-powered automation journey can start with a single control system or one part of a greater process. It can be implemented alongside people, and then expanded for the next opportunity.

For more insight into how autonomous systems can help transform manufacturing for the future,

download our e-book →
Autonomous tomorrow: Inside autonomous systems on the factory floor *or*

connect with us directly →



Sources:
1. Factory of the Future: Achieving Digital Excellence in Manufacturing, Today. Microsoft. 2019
2. Scaling AI in Manufacturing Operations: A Practitioners' Perspective. Capgemini Research Institute. 2019
3. Top 10 Strategic Technology Trends for 2019: Autonomous Things. Gartner. March 2019

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