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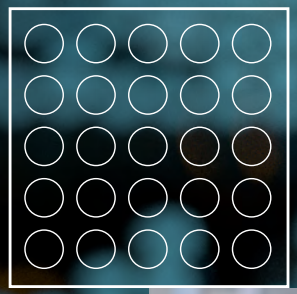

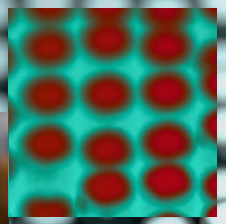

How to partner your people with AI:

Strategies and deployment considerations for manufacturers

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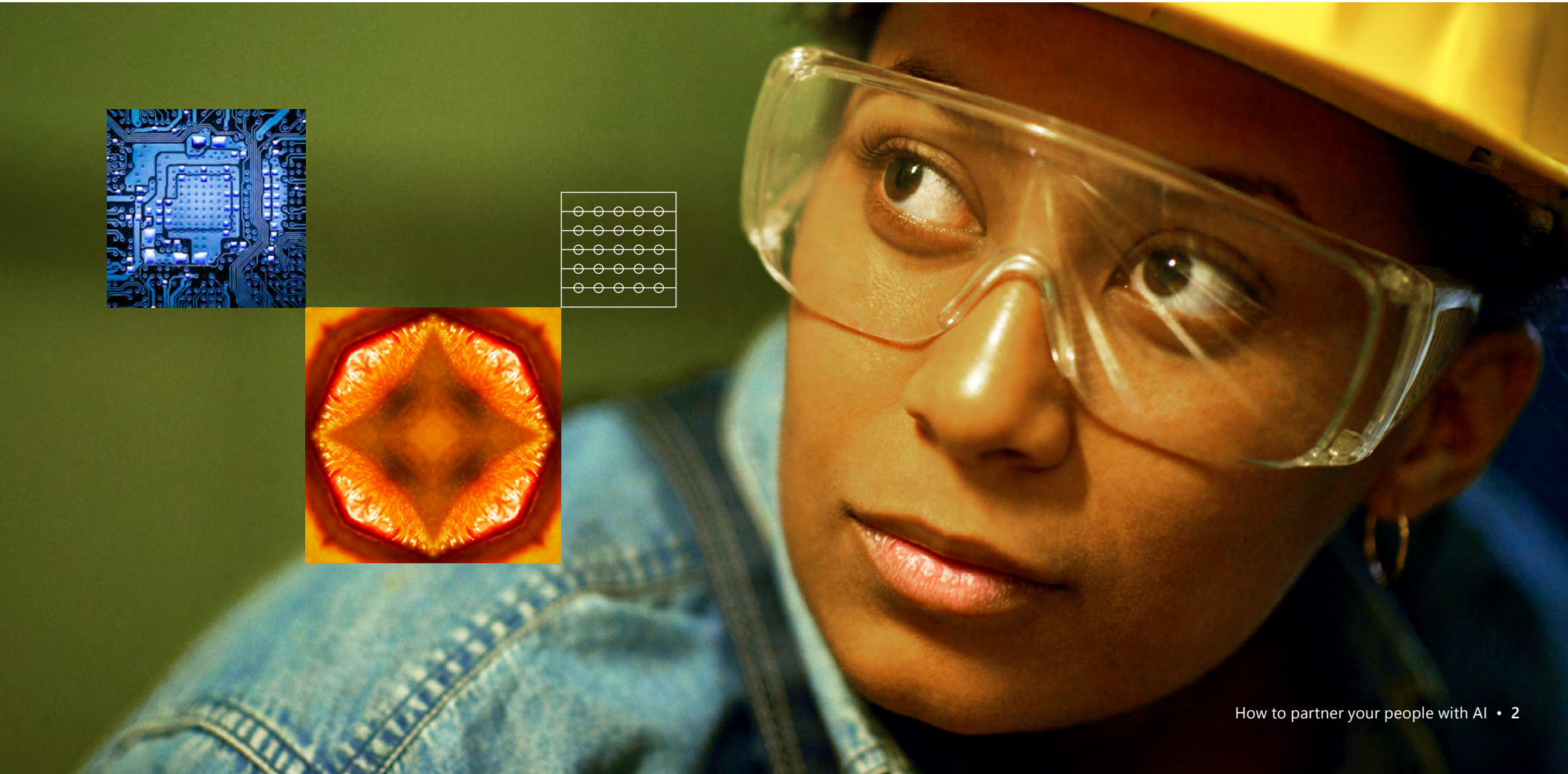


Introduction

In the aftermath of an unrelenting 2020, businesses worldwide had to adapt their operating models to service a socially distant workforce.

This call for resiliency set an incredible pace of innovation and adoption, launching organizations years ahead of their 2019 strategic plans just to stay productive. This adoption is especially prevalent in the relationship between manufacturers and artificial intelligence (AI) solutions.

Despite constant economic changes, **over 75 percent of AI investments carried on as planned.** In fact, according to Gartner, **30 percent of organizations chose to increase their AI efforts.**[1]

Whether by enforcing social distancing on the factory floor or supporting a reduced staff to maintain production, AI thrived as a reliable solution to a workforce with limitations. However, the relationship between workers and AI is still often a delicate one. This ebook addresses the approaches and benefits of how your teams can work *with* AI to achieve more together.

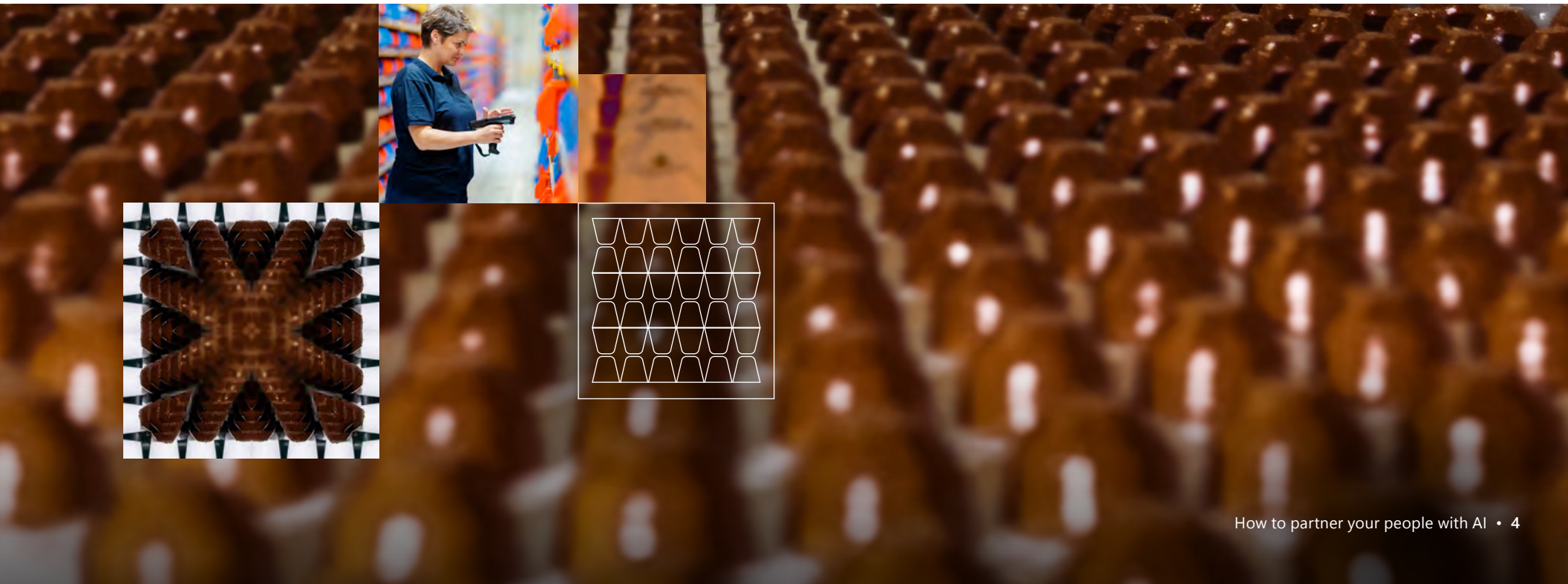
We'll explore and illustrate the solutions where AI and autonomous systems advise, aid, and act alongside human counterparts to help complete work that is dull, dirty, or dangerous.

By design, autonomous systems exist to serve human operators by:

- Providing calculated advice for workers as they navigate new challenges.
- Assisting operators through complex tasks.
- Acting autonomously to complete assigned tasks.

85% At every stage, human-AI tandems have proven to increase productivity by as much as 85 percent in reduced stoppages.[2]

By logging expert skills within the AI, an autonomous system can scale that knowledge across the entire workforce to assist more junior employees. The transfer of that captured knowledge to the AI creates an active library of expertise for future reference beyond the career of the worker and reduces the time and resources it takes to onboard new workers. As we continue toward a more data-driven manufacturing model, the organizations and individuals that unite human intuition and experience with the performance power of autonomous systems promise to rise to the top of their industries.



Advise
Empower performance through improved AI

At its most basic function, AI exists to help a person perform a task.

Because an autonomous system is taught the varying methodologies for performing a given operation, it can combine approaches and test different variables safely in a simulated environment before going to work in the real world. The AI can identify improvement opportunities and offer these solutions to its human counterpart for the operator to either accept or reject at their discretion.

The instincts and education that allow an operator to make the right decision come after years of exposure and experience. By comparison, an autonomous system represents an aggregate of learnings offered by the leading contributors across an organization's past and present. This ability to learn from the leaders essentially democratizes the experience and insights of an entire facility and delivers that perspective to employees of every skill level to improve operational outcomes.

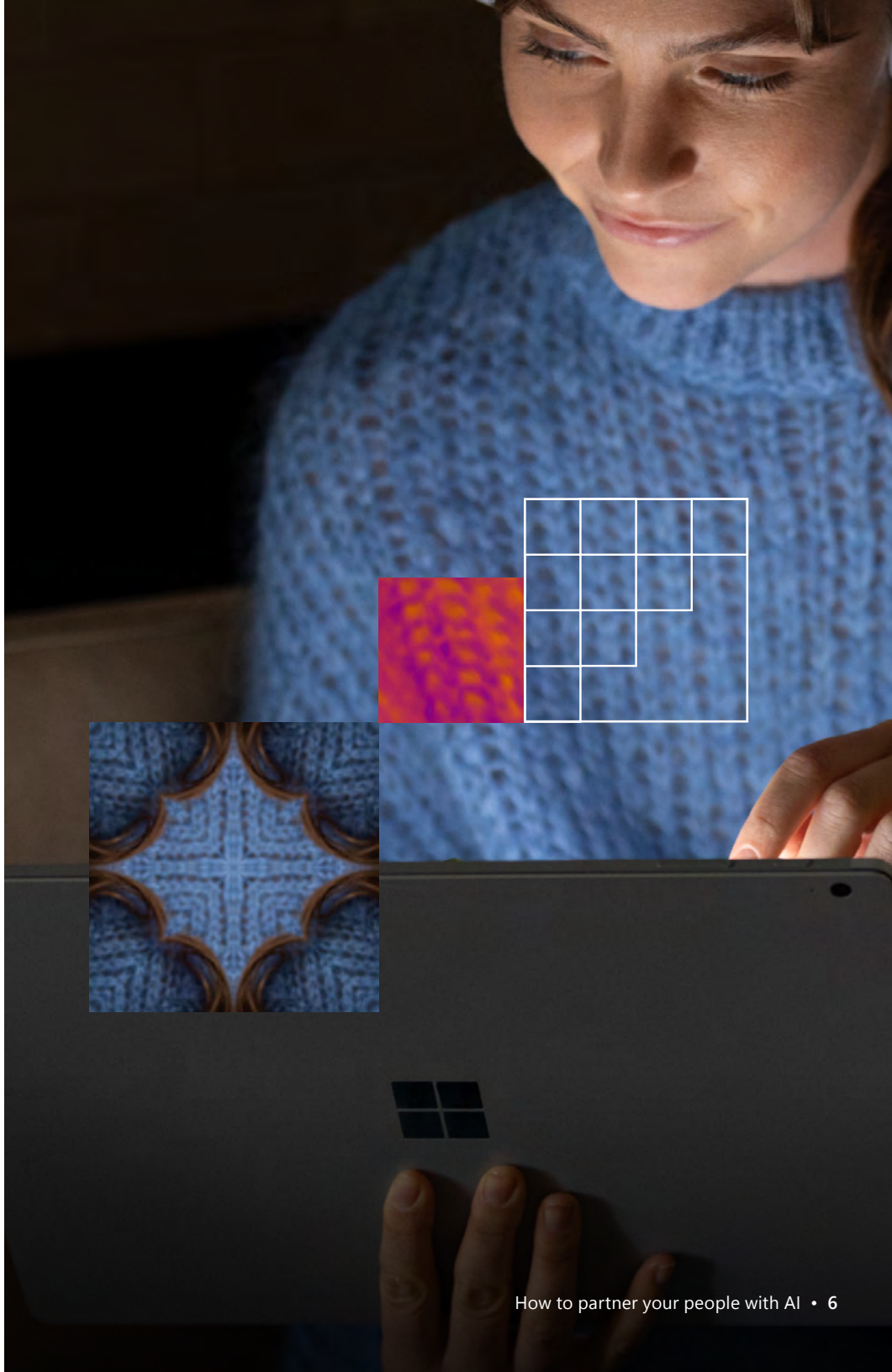
Together, this AI-advised operating model can help organizations better understand their operating conditions to anticipate challenges and make more proactive maintenance schedules and performance strategies. Traditionally, owners and operators were forced into a reactive operating model. If a system broke down, then a maintenance crew would be dispatched to identify and resolve the issue. Likewise, production strategies would respond to growing market trends and shifting audience preferences as they occurred.

With an autonomous system advising the decision-making process, the operator and AI can work together to take a proactive approach to their daily operations. The AI can process site performance data and recommend a best practice for system operation under high humidity or adjust efficiency practices to meet a supply shortage or assess global market trends to suggest production goals. The analysis and insights that once came from an entire research team can be synthesized and delivered to an operator in seconds.

No matter the task, an autonomous system can advise its human counterpart with alternative methods and potential outcomes. By supplying objective counsel throughout the production process, operators can make more consistent decisions, test innovative strategies, and set more ambitious performance goals—all while reducing risk and waste.

The autonomous system elevates its counterpart while providing new learnings for future efforts through instant assessments and accessible innovations.

Learn how NOV uses AI to advise its operators ›



Assist
Expand human performance

What good is technology if it's not first serving humanity for the better?

By taking a people-centric approach to AI, autonomous systems create an opportunity to partner AI alongside humans as they explore new ideas. It takes senior operators years of education and decades of on-site experience to earn their status at the top of their line. That's decades of expertise that even the best worksite training programs simply cannot replicate.

25%

With 25 percent of all manufacturing workers over age 55,[3] those senior leaders account for a rapidly decreasing portion of the manufacturing workforce.

In fact, **78 percent of manufacturing firms** are concerned about how they will adapt to this aging workforce moving forward, while **97 percent share concern** about the potential loss of institutional and technical knowledge that comes with the retirement of these specialists.[3]

With an autonomous system comes the potential for firms to capture that institutional experience within the AI. Top operators can transfer those skills and strategies to the autonomous system to control the system's actions and help train and empower future workers.

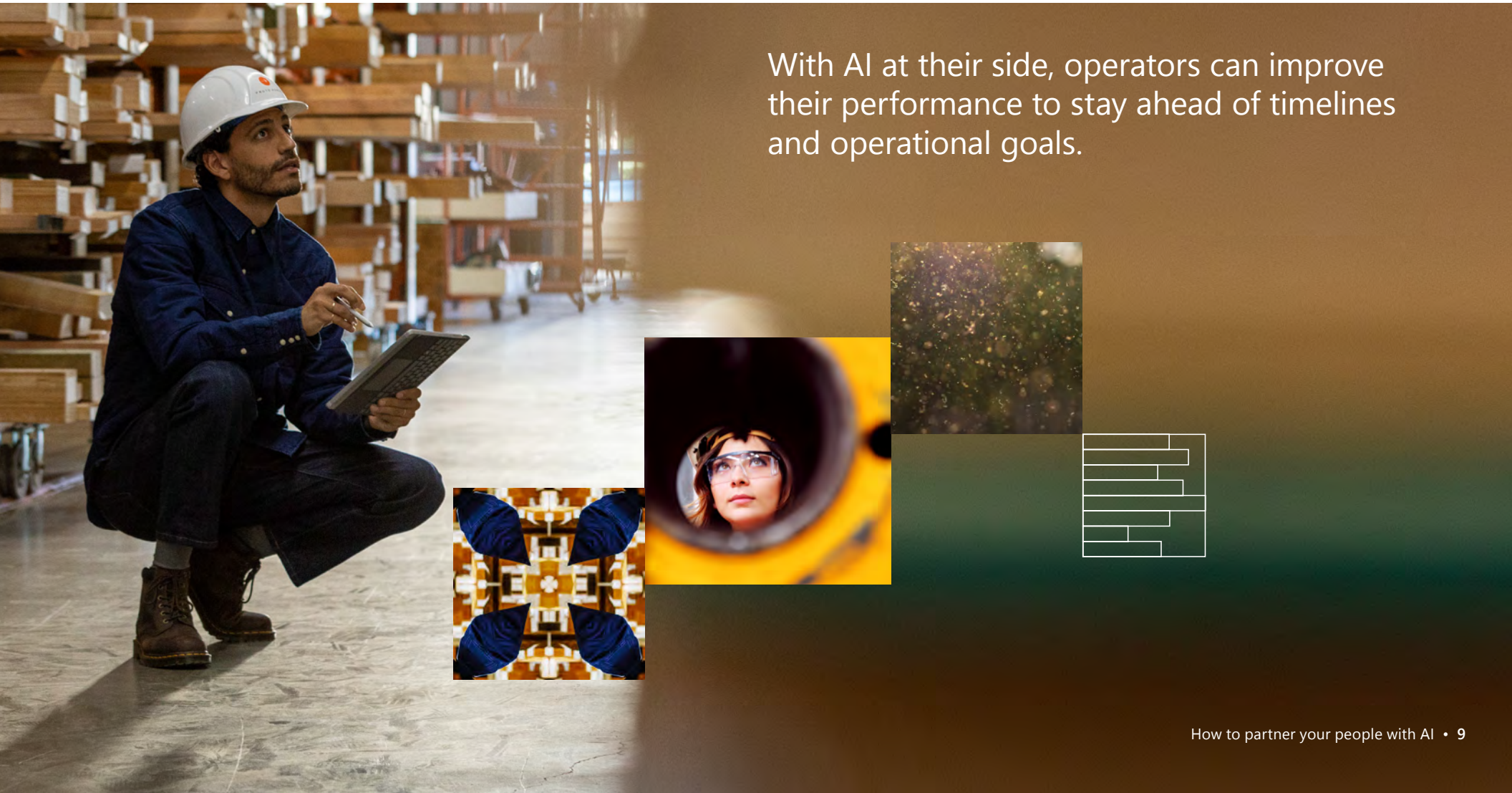
Autonomous systems also present a viable alternative for human workers in hazardous working environments.

In dangerous conditions like molten metal forges or chemical reactors, the option to deploy an AI assistant can help reduce worksite incidents and provide better long-term health outcomes for employees across their careers. Even something as simple as an autonomous system designed to help move freight from one end of a warehouse to another could reduce worksite injury.

Beyond the application of expert skills and safety improvements, autonomous systems can identify opportunities for improvement that humans might not otherwise anticipate. The AI processes thousands of inputs and data points in moments, perceiving even the most minute details as it guides the user through an industry-first application.

Because the AI has simulated the benefits and challenges of a given scenario, autonomous systems help operators better understand the decisions in front of them to create a safer, more optimized final outcome.

Learn how PepsiCo uses AI to assist its operators ›

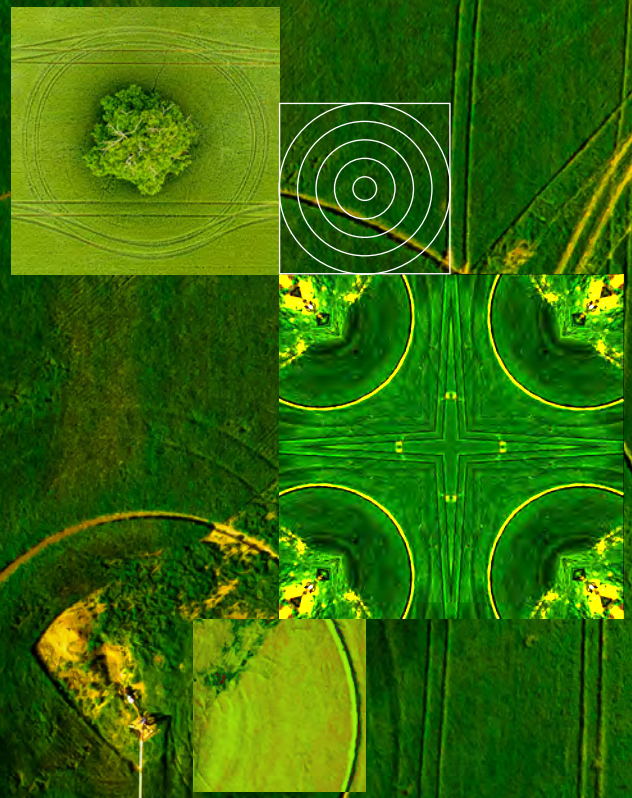


With AI at their side, operators can improve their performance to stay ahead of timelines and operational goals.

Autonomous
Activate independent AI

While advising and assisting human counterparts are critical functions of modern AI, it's called an "autonomous" system for a reason.

The system thrives when it is taught by an internal expert. Top operators and engineers can pass their experience onto the AI, then rely on the autonomous system to execute those skills and techniques independently. After learning each best practice, guideline, and methodology, the autonomous system masters each technique inside a simulated environment before tackling real-world challenges on its own.



At its most advanced, an autonomous system can be counted on to perform tasks independently. This ability to practice and perfect various strategies inside a 3D replica of the physical world equips an autonomous system to adapt to changing contexts in real time. While standard automations operate in binary, repetitive rhythms, autonomous systems exceed those expectations by adapting performance based on operational goals and conditions. This reliable execution of tasks frees workers to focus on more complex deliverables while maintaining, and often exceeding, benchmark performance capabilities and increasing a firm's production capabilities.

20%

Manufacturers have seen a 20 percent increase in productivity by implementing an autonomous system.[4]

This ability to merge human expertise with AI performance helps organizations meet their performance goals and creates a more optimized operating model. Because the autonomous system is constantly adapting, adjusting, and improving, the system can identify new efficiencies, reduce waste, and save time on nearly any task. This reliability frees up human operators to concentrate their efforts on more immediate value-added opportunities like research and development, strategic planning, or personal development. This freedom to explore and execute nonrepetitive tasks goes beyond performance to help engage employees through new skills and opportunities. Together, an autonomous AI and an empowered operator can pursue new innovations and make drastic improvements for any organization's future.

While an autonomous system offers workers a reliable solution for exceeding traditional performance capabilities and augmenting human performance, none of that matters if the system doesn't prioritize the needs of its operator.

Trust is critical for balancing humans and AI. Accountable, fair, and secure systems bridge that gap between reality and science fiction and help build confidence in the motivations behind their creation. Workers won't embrace tools sent to replace them. Society rejects technologies that infringe on privacy. Organizations refuse to adopt resources that could compromise their operations.

In a technology field that constantly looks ahead, responsible AI looks inward to ensure the pace of innovation aligns with the values of humanity.

Learn how Bell uses AI autonomously ›

Conclusion
Opportunities for autonomous partnerships

The success of any autonomous system hinges on acceptance.

Because the system needs people to train it, engineers and operators have to accept the system, understand the value it brings, and educate it on its daily operations before the AI can fully take flight.

Once properly trained, the autonomous system brings a dynamic new solution to daily operations. Through real-time decision making and analysis, the AI can augment the existing control systems to help optimize processes, deliver more consistent final products, reduce waste, and deliver safer working conditions for human operators. With autonomous systems and AI, humans have the tools to expand our capabilities beyond what we ever imagined possible. We have the support to better understand the unprecedented. We can step outside our own limitations and into a new era of innovation. **We invite you to join in the collaboration between humans and technology.**

Want to learn more about autonomous systems?

Visit the ***Microsoft autonomous systems homepage*** ›

Want to learn more about integrating AI into your workforce?

Contact us ›

[1] 2 Megatrends Dominate the Gartner Hype Cycle for Artificial Intelligence, 2020. Gartner. September 2020

[2] How Human-Robot Teamwork Will Upend Manufacturing. MIT Technology Review 2014

[3] The Aging of the Manufacturing Workforce: Challenges and Best Practices. The Manufacturing Institute. July 2019

[4] Bringing Autonomy to Industrial Control Systems. Microsoft. 2020