



FEDTEX

Individual and Unit Tactical Gear, Uniforms and Personal Protective Equipment

May 19-20, 2026 Raleigh, North Carolina

Hosted By
US Senator Thom Tillis
US Senator Ted Budd
North Carolina Military Business Center



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How Embracing Artificial Intelligence Can Change Your Textile Business

- Moderator: **Lee Moritz**, Regional Program Manager (Hickory), NC Military Business Center
- Adrienne Kroll, Assistant Director of Quality, North Carolina State University, Industry Expansion Solution
- Angie Peterson, Senior Director of IT, Milliken & Company



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FEDTEX CONFERENCE 2026 ·

How Embracing Artificial Intelligence Can Transform Your Textile Business

Adrienne Kroll, Assistant Director of Quality

NC STATE UNIVERSITY

Industry Extension Services



Agenda

1. What is Artificial Intelligence?
2. AI Is Quickly Moving From Tools to Agents
3. Why AI Now? The Textile Industry's Turning Point
4. A Practical AI Adoption Roadmap



What is Artificial Intelligence?

AI is software that learns from data to make predictions, recognize patterns, and take actions – without being explicitly programmed for every scenario. It gets better over time as it processes more information.



Machine Learning

Algorithms that find patterns in data and improve their accuracy through experience. Powers recommendations, forecasts, and anomaly detection.




Computer Vision

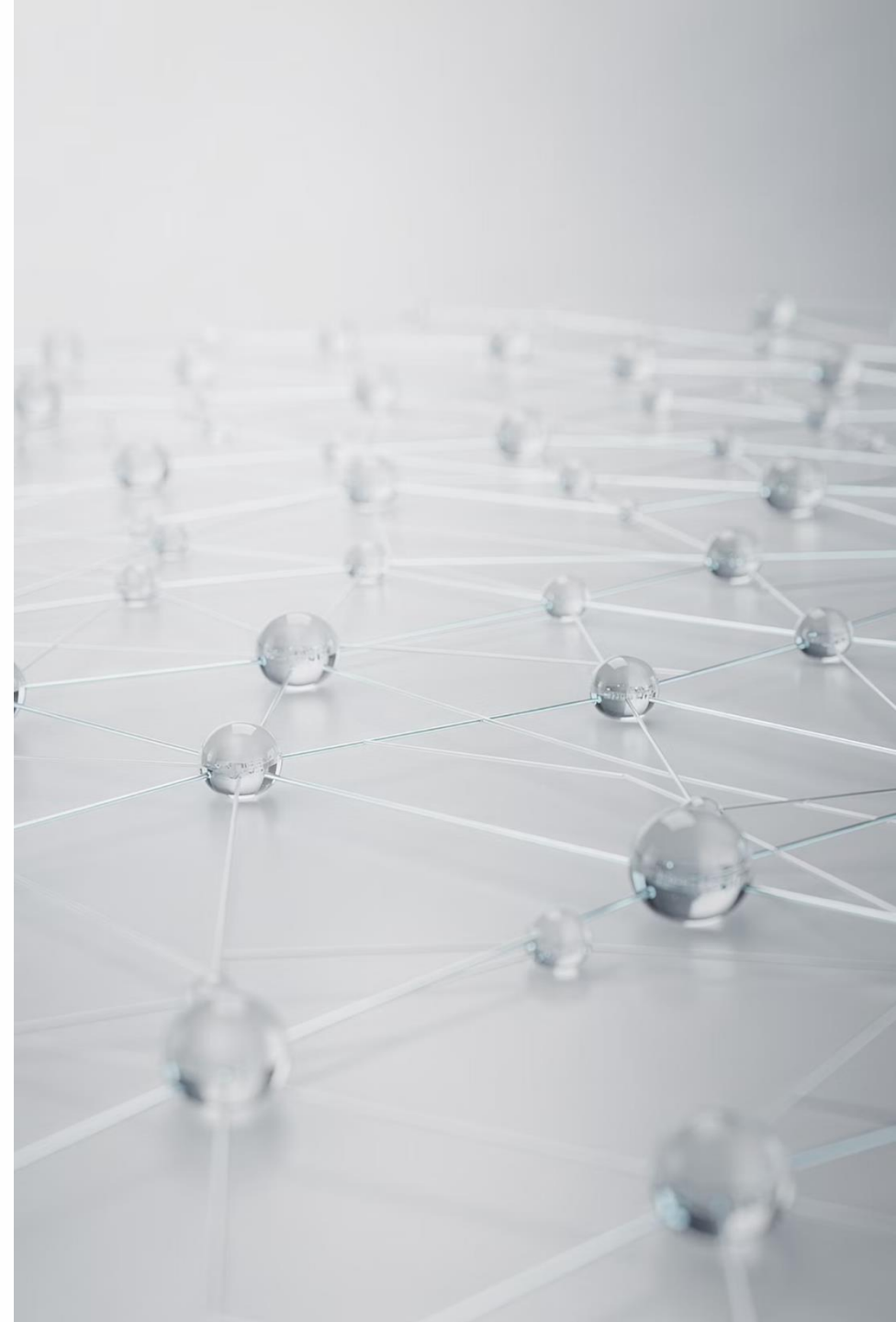
AI that interprets images and video. Enables machines to inspect, identify, and classify visual information in real time.



Natural Language Processing

AI that reads, writes, and understands human language. Powers chatbots, document analysis, and voice interfaces.

 By 2030, AI is projected to contribute **\$15.7 trillion** to the global economy. (Source: PwC)



AI Is Quickly Moving From Tools to Agents

Practitioners are moving from AI tool users to Agent orchestrators!

Understanding the four levels of Agentic AI helps manufacturers make informed decisions about **where to deploy AI, how much oversight to require, and what governance structures must be in place** before expanding.

1

Assistive AI

Helps employees perform tasks more effectively. The human remains fully in control of every decision.

- SOP and documentation drafting
- Data analysis and report generation

2

Augmented AI

AI surfaces insights and recommends decisions. Humans review and approve before action is taken.

- Quality trend analysis and alerts
- Predictive maintenance recommendations

3

Semi-Autonomous Agents

AI executes defined tasks within pre-approved rules. Human oversight is periodic, not continuous.

- Automatic reorder triggers
- Dynamic production scheduling

4

Autonomous Systems

AI acts independently and continuously. Governance frameworks must be fully operational before deployment.

- Closed-loop process control
- Automated inspection and rejection

Why AI Now? The Textile Industry's Turning Point

Current Challenges in Global Textiles

~ David Hinks, Ph.D., Dean, Wilson College of Textiles, NCSU (*AI in the Textile & Fashion Industries Conference, April 2026*)

Four converging forces are reshaping the competitive landscape – and demanding a new kind of response.



Talent Pipeline

Finding and retaining skilled workers is a critical barrier to growth. An aging workforce, limited vocational training pipelines, and competition from other industries leave many orgs understaffed and under-skilled.



Industry Image & Innovation

Textiles is often perceived as a legacy industry. Attracting next-generation talent and investment requires reshaping the narrative around innovation, technology, and career opportunity.



Environmental Pressures

Regulatory scrutiny, customer sustainability demands, and resource constraints (water, energy, chemicals) are forcing manufacturers to rethink production processes from the ground up.



Homeland Security & Supply Chain Resilience

Geopolitical disruption, pandemic-era shortages, and nearshoring pressures have exposed the fragility of global supply chains. Domestic textile capacity is now a national security priority.



CHALLENGE 1 · TALENT PIPELINE

AI & the Talent Pipeline: Doing More With the Team You Have

AI is a force multiplier...it should amplify, not replace skilled workers.



Accelerated Onboarding

AI-powered training and guided workflows can reduce time-to-competency for new hires. New hires can now learn on **digital twins** before touching live equipment.



Knowledge Capture

AI tools can extract and encode the tacit knowledge of veteran workers — their pattern recognition, troubleshooting instincts, and process intuition — before they retire.



Augmented Operators

AI-assisted quality inspection, predictive alerts, and real-time guidance allow less-experienced workers to perform at a higher level with fewer errors.



Workforce Analytics

AI helps managers identify skill gaps, predict turnover risk, and optimize shift scheduling — turning workforce data into actionable decisions.

AI & Industry Image: Making Textiles the Industry of the Future

AI isn't just a tool for efficiency – it's a signal. Companies that embrace AI can attract talent, stronger investment, and more innovative partnerships.



AI-Powered Design & Prototyping

AI can help compress the design cycle. Designers can explore thousands of colorways, patterns, and constructions digitally – before a single yarn is wound.



Repositioning the Brand

AI-enabled capabilities (smart textiles, performance fabrics, sustainable production) give companies compelling stories to tell customers, recruits, and investors.



Attracting Next-Gen Talent

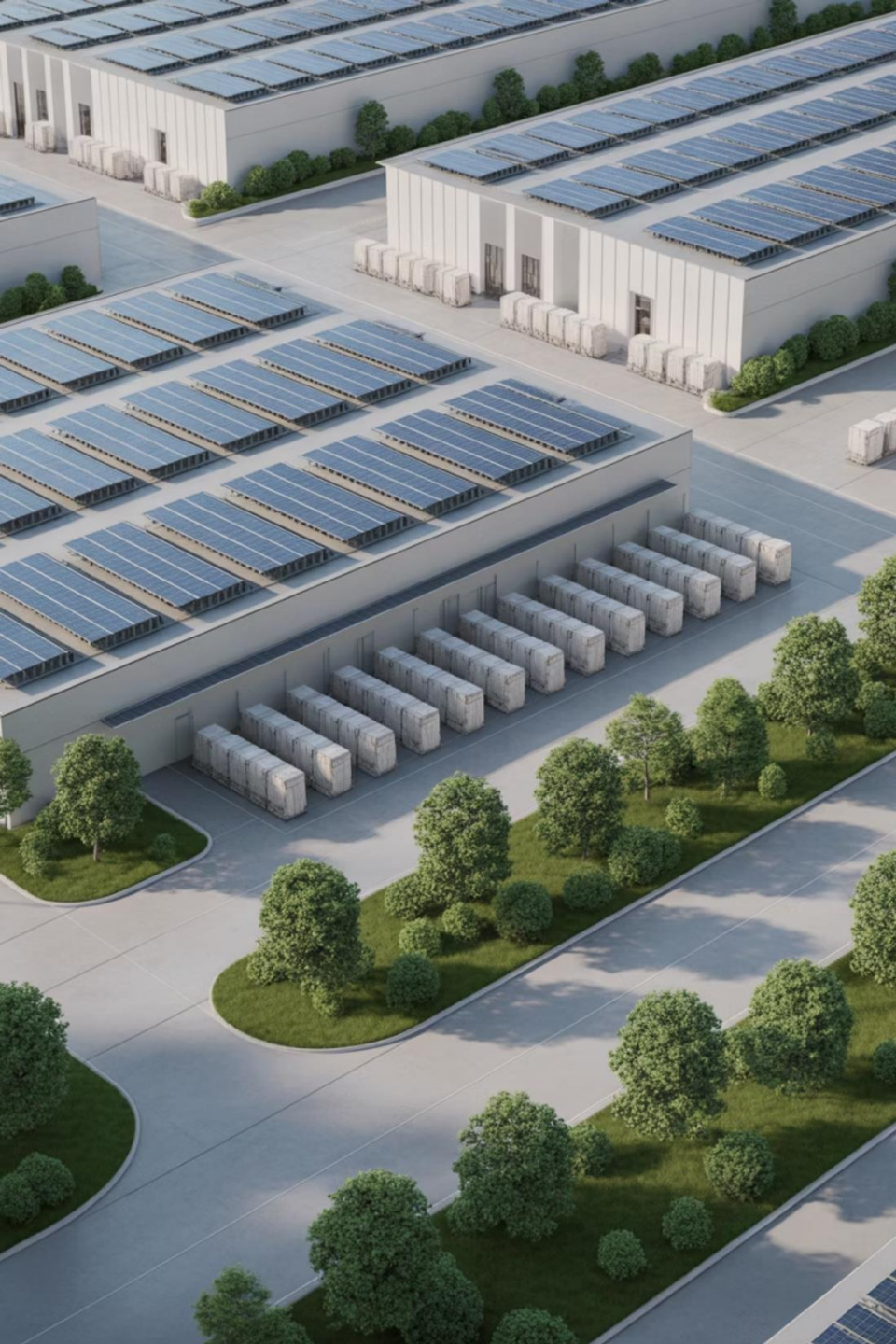
Young engineers and data scientists want to work with cutting-edge technology. AI adoption signals that textiles is a high-tech career – not a legacy one.



R&D Acceleration

AI models can predict fabric performance, simulate wear testing, and identify novel fiber combinations, helping accelerate innovation cycles.





AI & the Environment: Producing More While Using Less

Sustainability isn't just a regulatory requirement — it's an advantage.



Water & Chemical Optimization

AI can monitor dyeing and finishing processes in real time.



Energy Management

Machine learning models can predict energy demand across the plant, enabling smarter load balancing, off-peak scheduling, and identification of energy waste hotspots.



Waste Reduction

AI-powered defect detection catches quality issues earlier in the process — reducing material waste, rework, and end-of-line rejects before they compound.

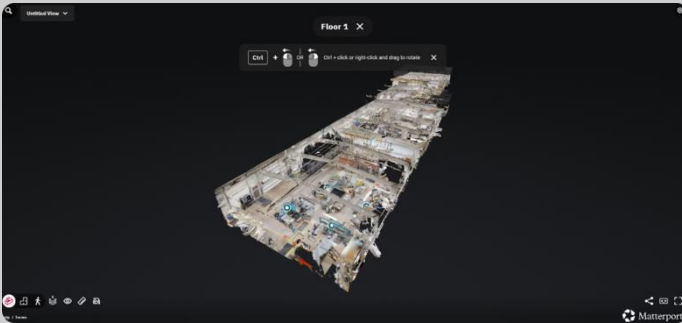


Sustainability Reporting & Compliance

AI can automate the collection and analysis of environmental data, making ESG reporting faster and audit-ready; helping reduce compliance burden.

Example: Digital Twins & AI

Analyzing Matterport Results with Gemini



Prompt:

You are a **Lean Six Sigma Black Belt** and manufacturing operations expert. I am providing you with information extracted from a Matterport scan of a manufacturing facility. Your role is to analyze this environment and identify opportunities to improve efficiency, quality, safety, and operational performance.

Swap out personas:

- OSHA Safety Inspector
- Maintenance Technician
- Quality Engineer, etc.

EXECUTIVE OPERATIONS BRIEFING

Subject: Integrated Facility Review & Improvement Roadmap
Reference: Matterport Digital Twin ID: gmVqaAvCJGT

Strategic Summary: The facility possesses high-quality technical assets but operates with significant non-value-added motion and space inefficiency. By transitioning from a "Batch-and-Queue" mindset to a "Flow-Centric" model, leadership can reclaim approximately 25% of floor capacity and reduce lead times by 30-40% within 90 days.

I. Operational Audit: Lean & Material Flow

The current **Functional Layout** creates islands of activity, resulting in high "Transportation" and "Motion" waste.

- **Congestion Points:** Convergence of forklifts and WIP near finishing stations creates safety risks and delays.
- **Space Utilization:** Extensive floor-staging of WIP prevents the addition of new revenue-generating machinery.
- **Improvement:** Transitioning to **U-Shaped Manufacturing Cells** and implementing **Kanban Visual Signals** will synchronize production and reduce inventory overhead.

II. Safety & Compliance Risk Matrix (OSHA)

AI & Supply Chain Resilience: Visibility, Speed, and Domestic Strength

AI can transform reactive supply chains into anticipatory ones.



End-to-End Supply Chain Visibility

AI integrates data from suppliers, logistics partners, and internal systems to give manufacturers a real-time view of their entire supply chain.



Disruption Prediction & Risk Modeling

Machine learning models analyze geopolitical signals, weather patterns, port congestion, and supplier financial health to flag risks before they become crises.



Domestic Capacity Optimization

As nearshoring becomes important, AI helps domestic mills maximize throughput, reduce changeover time, and compete on speed and flexibility — not just cost.



Defense & Government Compliance

For those serving defense and government customers, AI can enable the traceability, documentation, and audit trails required for compliance.





A Practical AI Adoption Roadmap

The AI Adoption Roadmap: 4 Phases to Getting Started



Phase 1: Awareness

See It in Your World – Understand what AI is, where it's already being used in manufacturing, and how it could apply to your operation.



Phase 2: Discovery

Understand Your Process Before You Automate It – Walk the floor, map your current-state processes, and identify where AI can reduce friction and waste.



Phase 3: Prioritization

Don't Boil the Ocean – Evaluate AI opportunities by Impact, Effort, and Speed. Focus on Quick Wins first.



Phase 4: Execution

Start Small. Prove Value. Scale Smart. – Run a focused pilot, measure results, and expand what works.



The goal isn't transformation overnight – it's building momentum one smart decision at a time.

PHASE 1

Awareness → See It in Your World

AI Integration in the Textile Business

Before investing in AI, your team needs to recognize where it already fits into the work they do every day. This phase is about opening eyes — not overwhelming minds.



Discovery → Understand Your Process Before You Automate It

Don't start with AI, start with your processes

Walk the Floor First

Observe the actual work being done, not what's documented. Surface bottlenecks, rework loops, manual workarounds, and tribal knowledge.

Map It

Create a simple current-state map. You don't need perfection - you need visibility

Spot the AI

Overlay your process map with AI potential – mark every step that is repetitive, data-driven, or decision-heavy.

Apply the AI Lens

At every step, ask: Is this repetitive? Is data involved? Same decision, over and over? Where the answer is yes – that's your AI opportunity.

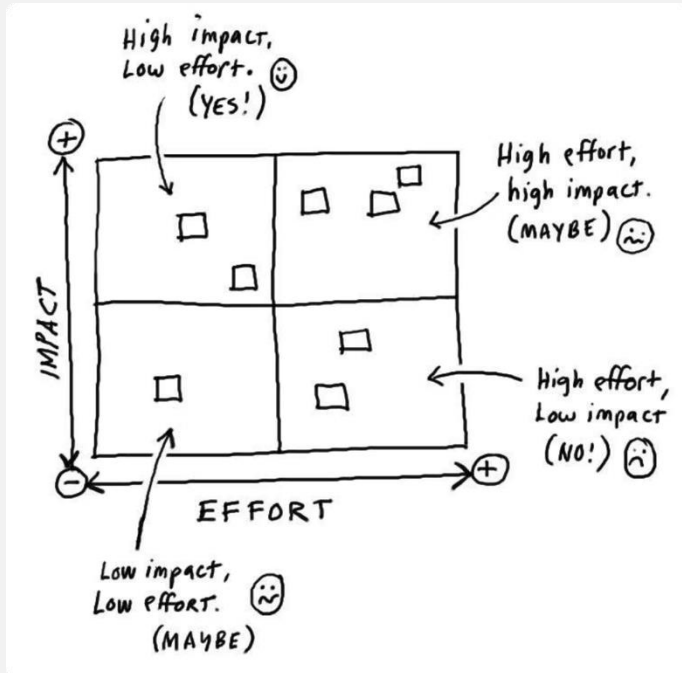
Find the Pain

Identify the steps that cause the most friction, waste, or inconsistency across your textile operation.



Prioritization → Don't Boil the Ocean

The goal isn't to do everything – it's to do the **right first thing**. With a clear list of AI opportunities, the next step is deciding where to focus your energy and resources.



The Simple Prioritization Model

Evaluate every AI idea against three dimensions:

Impact — Will this actually improve output, quality, or cost?

Effort — How complex or resource-intensive is implementation?

Speed — How fast can we see measurable results?

✔ High Impact + Low Effort + Fast Results = **Start Here.**

Quick Wins

Start here. AI-generated production reports, maintenance reminders, defect trend summaries, onboarding assistants. Fast to build, easy to prove.

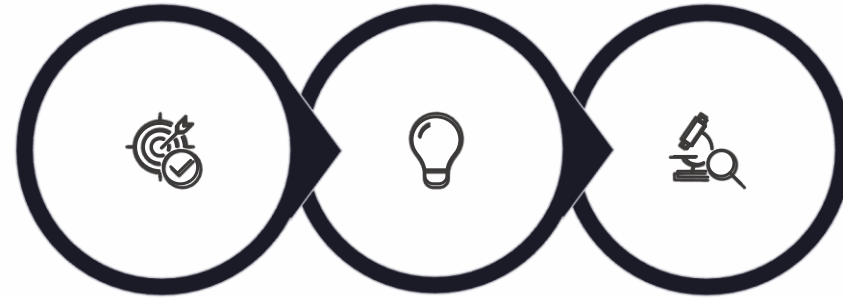
Next Plays

Build momentum. Shade variation alerts, scheduling optimization, quality prediction models. Slightly more complex.

Long-Term Bets

Don't ignore — just don't start here. Full process automation, predictive analytics platforms. Plan for these once the foundation is solid.

Execution → Start Small. Prove Value. Scale Smart.



Pick 1 - 2
Use Cases

Build
Something
Simple

Measure
Results

1

Pick Your Pilot

Choose 1–2 high-impact, low-effort use cases from your prioritization list. Narrow focus is a feature, not a limitation – it keeps execution clean and results clear.

2

Build Something Simple

You don't need enterprise software to start. A basic production dashboard, or an automated alert system can deliver immediate value with minimal technical overhead.

3

Measure What Matters

Track concrete outcomes: **time saved** per shift, **errors reduced** in defect logging or reporting, and **throughput improved** in key production stages. Numbers build the case for scale.

4

Scale What Works

Once a pilot proves its value, expand it. Roll out to additional lines, shifts, or departments – using the same model, refined by real-world feedback from your team.

Three Frameworks. One Governance System.

You don't need to build AI governance from scratch. ISO 9001, ISO 42001, and the NIST AI Risk Management Framework give you a proven, interlocking foundation — each playing a distinct role in keeping AI trustworthy, auditable, and aligned with your business.



YOUR EXISTING FOUNDATION

ISO 9001: Quality Management Backbone

- The quality management system most textile manufacturers already operate
- Provides: process discipline, risk-based thinking, continual improvement, and management review
- AI governance extension: Apply your existing PDCA cycle, corrective action process, and internal audit program to AI systems
- Key clause: §6.1 Risk & Opportunities, §8.5 Controlled Processes, §9 Performance Evaluation



THE AI-SPECIFIC LAYER

ISO 42001: The AI Management System

- The first international standard specifically designed for governing AI systems
- Provides: AI system inventory, impact assessment, roles & responsibilities, and AI-specific controls
- Designed to integrate directly with ISO 9001 — extend your QMS, don't replace it
- Key clause: §6.1 AI Risk Assessment, §6.2 AI Objectives, §8 AI System Lifecycle Controls



THE RISK INTELLIGENCE LAYER

NIST AI RMF: The Risk Intelligence Layer

- A flexible, voluntary framework from the U.S. National Institute of Standards and Technology
- Provides: structured risk thinking across four functions — GOVERN, MAP, MEASURE, MANAGE
- Complements ISO standards with practical risk categorization and measurement guidance
- Key functions: GOVERN (culture & accountability), MAP (context & risk ID), MEASURE (metrics), MANAGE (response & recovery)

☐ **Together, these three frameworks cover the full governance lifecycle — from management system structure (ISO 9001) to AI-specific controls (ISO 42001) to risk intelligence and measurement (NIST AI RMF). If you're ISO 9001 certified, you're already 40% of the way there.**

You don't need a perfect plan. You need a first move.

AI Is Already Accessible

You don't need a data science team. The tools exist today – free or low-cost – and your team can start using them this week.



The Roadmap Works

Awareness → Discovery → Prioritization → Execution. Four phases, proven in practice. Start where you are, not where you wish you were.



Small Wins Build Big Momentum

One pilot. One problem. One team. That's how every successful AI adoption story begins – with a result.

Your Action Items This Week:

- Pick one recurring problem your team talks about but hasn't solved.
- Spend 30 minutes with Gen AI exploring what patterns might exist in your data.
- Identify one person on your team who could be an AI Champion.

The question is no longer whether AI will change manufacturing, it already has! **It's, "how will you evolve?"**

Going Deeper: Build AI Awareness through Education



AI-Driven Manufacturing: Practical Productivity for Manufacturing Teams

A one-day, hands-on course from NC State Industry Extension Services designed to introduce manufacturing professionals to the practical use of generative AI. No prior AI or technical experience required – participants leave with concrete skills they can apply immediately.

- Introduction to generative AI and how it works
- Practical AI use cases in manufacturing operations
- Using AI to draft SOPs, work instructions, and communications
- AI-supported troubleshooting and problem-solving
- Prompt design basics and responsible AI use

 Next Session: July 21, 2026 | Raleigh, NC | \$395

Register at: ies.ncsu.edu/courses/ai-driven-manufacturing-productivity/



Let's Connect!



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ies.ncsu.edu

Have a question or want to talk through an idea?

Let's connect.

NC State Industry Extension Services

NC State Industry Extension Services helps manufacturers grow and compete with confidence. IES supports employee development, business development, localizing supply chains, and reaching new markets.

Solutions include Management Systems, Lean Manufacturing, Six Sigma, Technology Advancement, and more.

We serve clients at every level of the organization, delivering practical and lasting results.



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- **Angie Peterson**, Senior Director of IT, Milliken & Company



2026

MILLIKEN & COMPANY

How Embracing Artificial
Intelligence Can Transform
Your Textile Business

Milliken[™]

40+

Manufacturing
locations



15

Countries



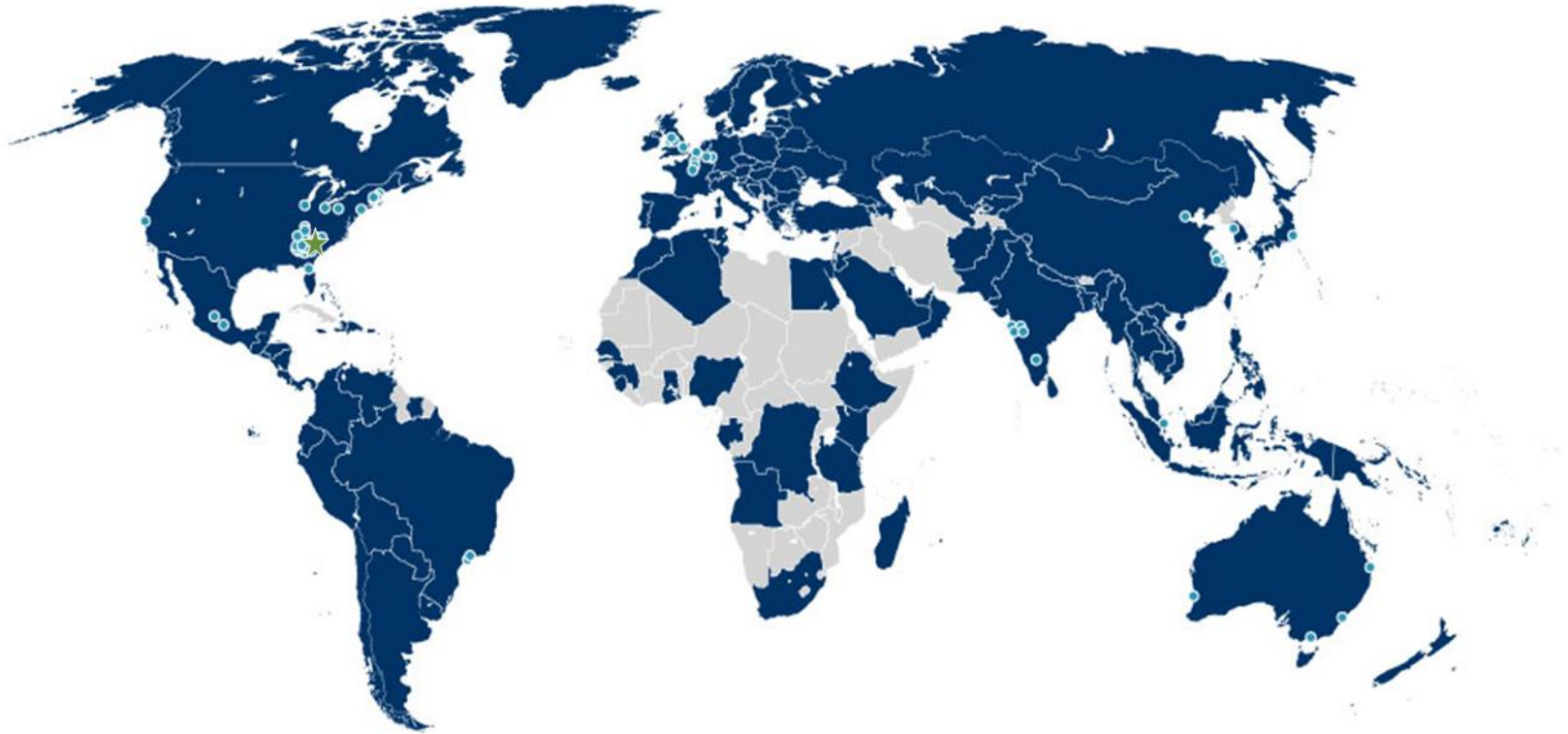
7000+
Associates



11,000+
Products



MILLIKEN AT A GLANCE



APPAREL



AUTOMOTIVE



BUILDING AND
INFRASTRUCTURE



CONSUMABLES



DURABLES



HOSPITALITY



INDUSTRIAL



MEDICAL



MILITARY



PACKAGING

AUTOMATION JOURNEY

Our Automation journey began to improve our labor cost competitiveness starting with a Labor Assessment.

Where are people spending their time?

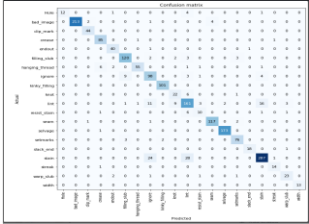


AUTOMATION THEMES

1

VISUAL INSPECTION AUTOMATION

Artificial
Intelligence



AI Embedded
Imaging



Mechanical
Automation



2

MATERIAL HANDLING AUTOMATION

Radio Frequency
Identification



RFID
Technology



Autonomous
Mobile Robots



3

ROBOTICS

Pick & Place Robots



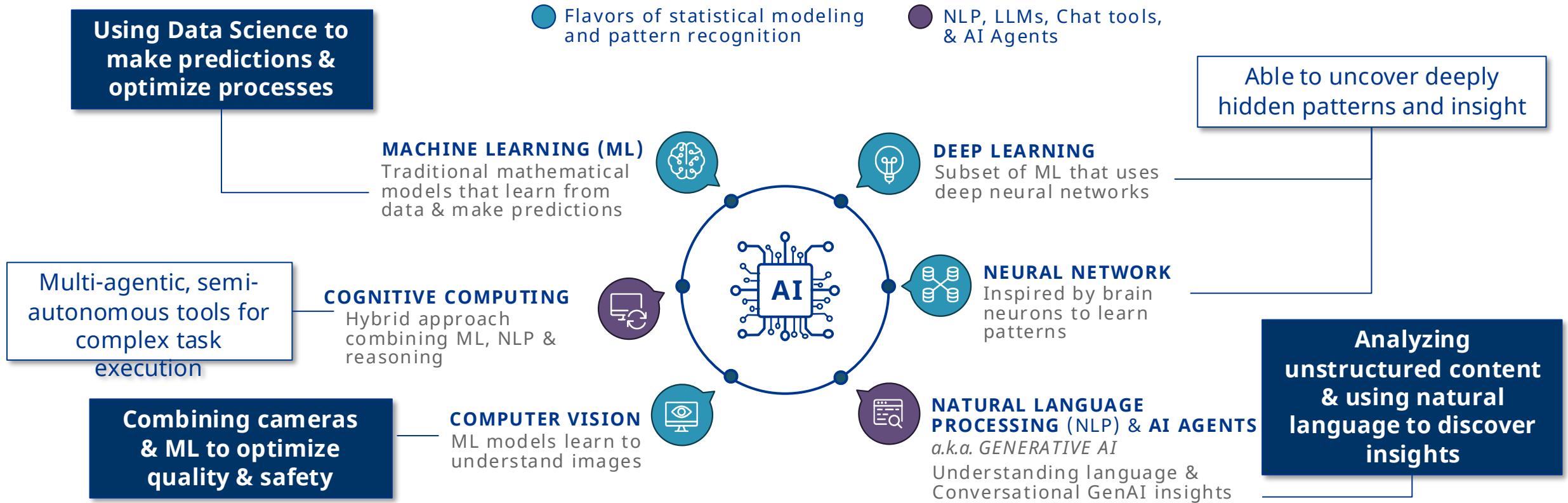
3D Printing



WHAT IS ARTIFICIAL INTELLIGENCE (AI)?

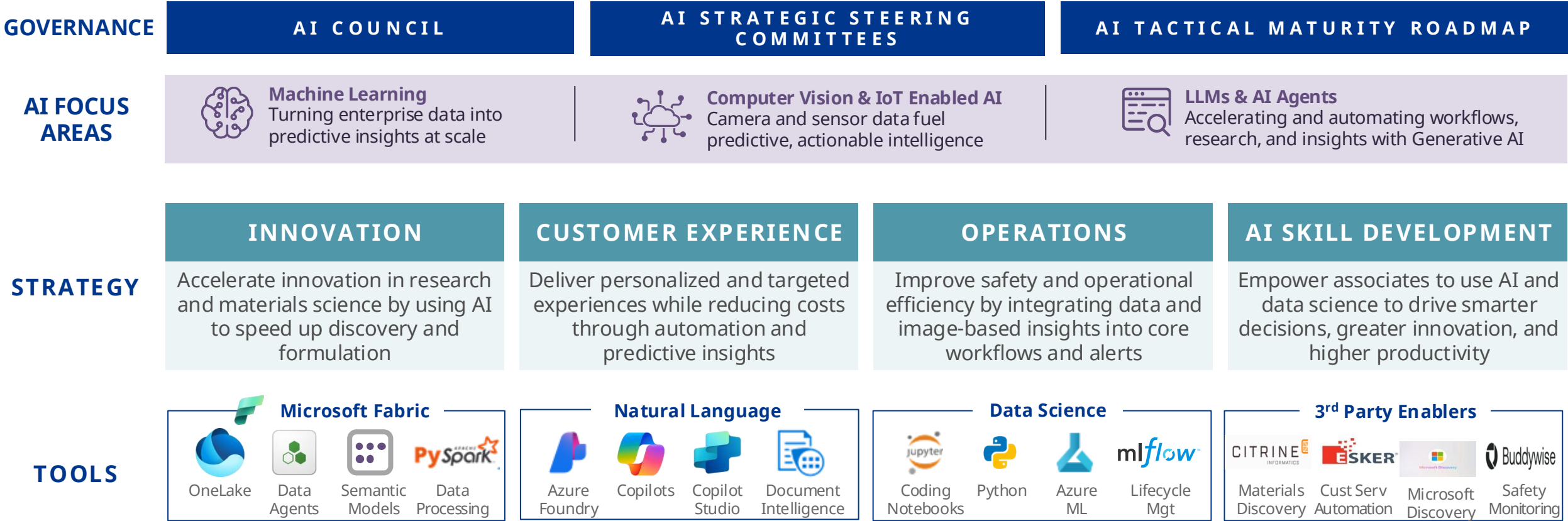
Artificial intelligence (AI) refers to computer systems capable of performing tasks that historically required human intelligence, such as **understanding language, making decisions, or identifying patterns.**

KEY COMPONENTS OF MILLIKEN'S AI STRATEGY



ARTIFICIAL INTELLIGENCE STRATEGY

Leveraging responsible, human-centered AI to accelerate R&D, personalize and automate CX, and drive operational excellence across the organization

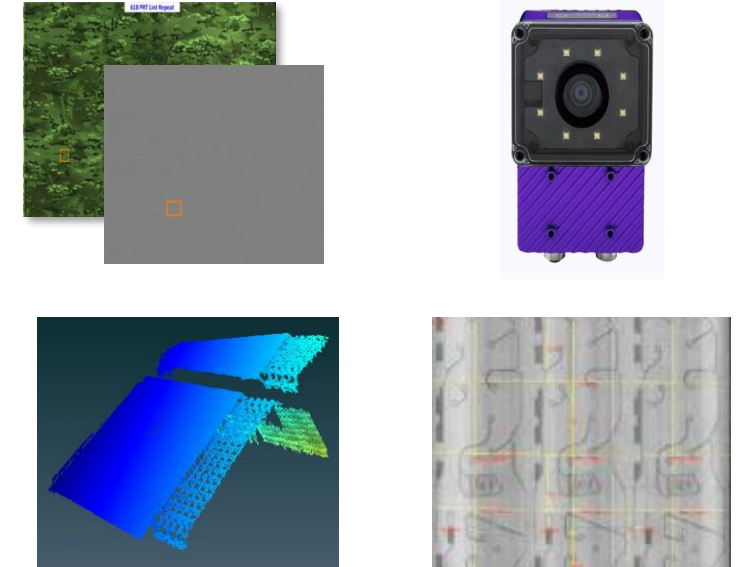


AI in Action: Computer Vision

Real-time defect identification with machine and process integration

How It Works

- ▶ AI imaging & camera-based inspection systems
- ▶ Recognizes patterns, defects & color variations in 2D & 3D
- ▶ Provides real-time alerts to operators thru machine integration
- ▶ Feedback loops with quality engineers & quality management system
- ▶ Foundation for new capabilities



TIES TO KEY THEMES: AUGMENTED OPERATORS • IMPROVED QUALITY & THROUGHPUT • NEW CAPABILITIES

Leveraging
Computer
Vision

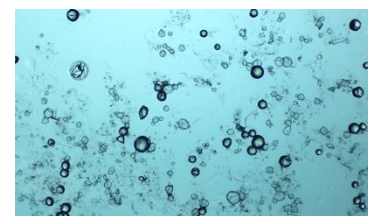
WORKPLACE
SAFETY



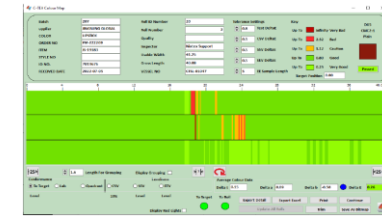
ORDER MANAGEMENT
AUTOMATION



ENCAPSULATION
MICROSCOPY



IN-LINE SHADE
MONITORING

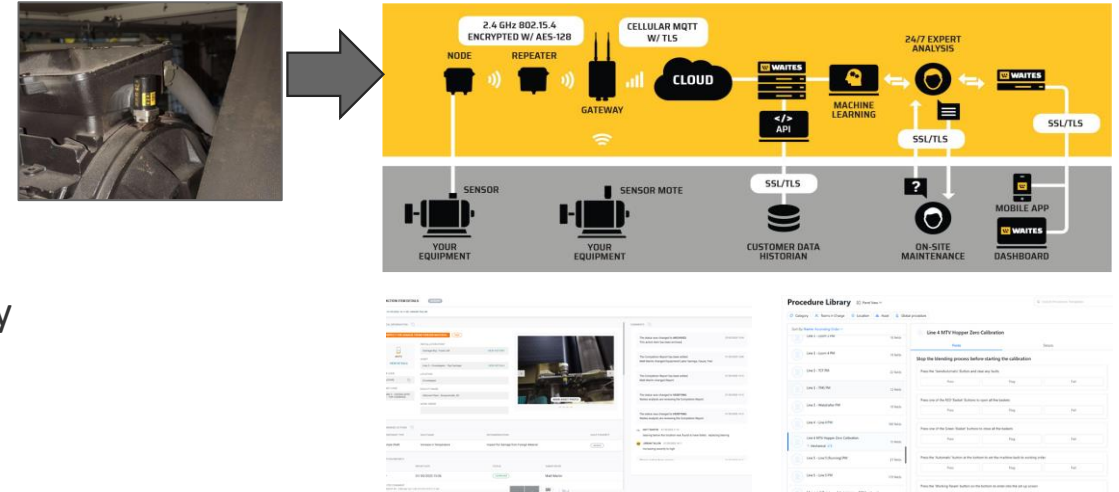


AI in Action: Machine Learning

Real-time anomaly detection with integrated alerts & resolution

How It Works

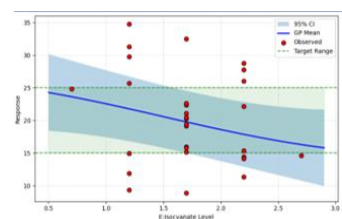
- ▶ IOT Sensors measure vibration & temperature in real-time
- ▶ Machine Learning flags equipment degradation before failure
- ▶ Findings & recommended actions alerted to maintenance teams
- ▶ Automated maintenance work orders created & spare parts visibility
- ▶ Continuous feedback loops with guided steps until resolution
- ▶ Leverages Live Chat capabilities & LLM for Machine Manuals



TIES TO KEY THEMES: IMPROVED OEE • SHARED PARTS VISIBILITY & REDUCED COSTS • PREDICTIVE MAINTENANCE

Leveraging
Machine
Learning

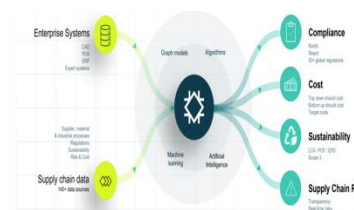
RESEARCH
DOE



DYE ADJUSTMENT
IMPROVEMENTS



LIFE CYCLE
ASSESSMENTS



AI Agents: Automation Progression

Agents to Agentic AI

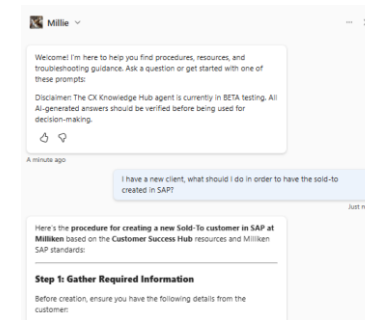
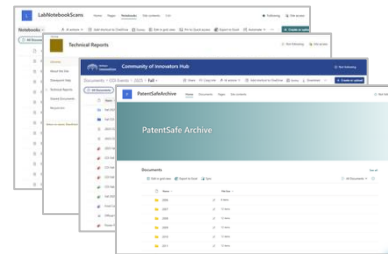
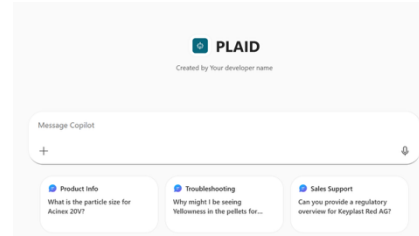


AI in Action: Agents & Large Language Models (LLMs)

Moving from Data to Knowledge to Insights

How It Works

- ▶ Agents act as an intermediary between content & LLMs
- ▶ Agents ingest structured & unstructured curated content & identify key relationships
- ▶ Agents build & update knowledge structures
- ▶ Users ask questions to LLMs for ad hoc analysis & insights



350,000+
LLM
Interactions
in 2026

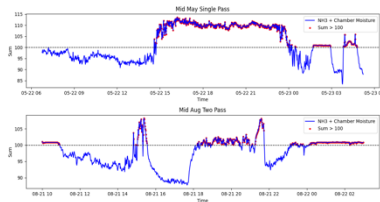
100+ Agents
deployed in 2026

TIES TO KEY THEMES: FASTER & NEW INSIGHTS • AUTOMATION • NEW SKILLS & CAPABILITIES

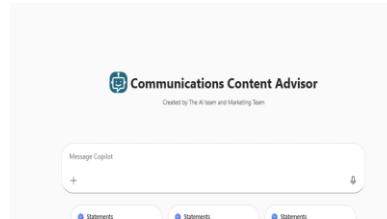
Leveraging
Agents & LLMs



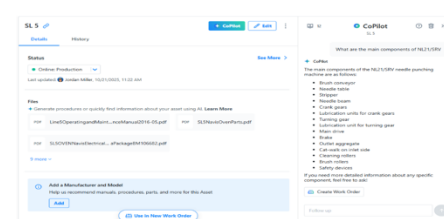
MICROSOFT CO-PILOT AGENT



COMMUNICATIONS AGENT



MACHINE MANUAL CO-PILOT



AGENTIC AI & MICROSOFT



Lessons Learned: Our Learnings for You

Start Small. Prove Value. Scale Smart.

Quick Wins Build Executive Buy-In

Start with visible, measurable pilots aligned to Business Outcomes

Data Quality is Non-Negotiable

Invest in master data management early. AI amplifies data quality — good or bad.

Governance Before Technology

Governance is the guardrail, not the brake.

Change Management Is Critical

Technology is the easy part. People, process, and culture are where the real work happens. Leverage AI Champions in the Subject.

Iterate, Don't Wait on Perfection

Launch, measure, refine. Don't wait. AI capabilities are always changing.

Workforce Needs to Support AI Change

Roles & capabilities change with AI at Scale.

What's Next: The Road Ahead

The journey doesn't end — it accelerates.

- 1 **Agentic AI Expansion**
- 2 **Enterprise Data & Security Governance for the Agentic World**
- 3 **Leveraging Data Lakes across Functions**
- 4 **Scaling across the Enterprise**
- 5 **Continuous Training & Change Management**

Questions?

Milliken™



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