



How AI Can Support Military Operational Readiness

In military maintenance and sustainment, AI promises to make institutional knowledge, maintenance data and operational insights more readily available. It has the potential to help defense organizations move from reactive maintenance to predictive readiness — not replacing people, but empowering them to reach their full potential in support of the mission.

During a recent [GovLoop virtual event](#), experts discussed how to turn that potential into operational reality.

The Speakers



Nina Khan, Strategic Operational Energy and AI, Integration Lead, U.S. Department of War



Thomas LaBatt, Chief Transformation Officer, One Aligned, Former Naval Sea Systems Command Executive and Director of Industrial Operations Transformation



Dominique Luzeaux, Transformation Champion and Special Adviser to Supreme Allied Commander Transformation, NATO Allied Command Transformation



Mark Taylor, Former Chief Technical Officer, U.S. Special Operations Command



Maddie Wolf, General Manager and Vice President of Operations, Legion Intelligence

Challenges to Mission Readiness

AI can deliver dramatic improvements, but the Pentagon faces significant implementation challenges, such as siloed systems and mounting technical debt.

Readiness suffers when teams cannot easily access, share or analyze critical maintenance and operational data. Without a reliable feedback loop, determining whether maintenance plans are working as intended or when they need to be adjusted becomes difficult.

Predictive maintenance helps technicians stay ahead of potential problems, but information bottlenecks remain. Too often, technicians arrive without access to historical data or analyses of previous issues. That delays their work because they must first diagnose the problem and determine what resources they need before they can get started.

Challenges related to data fragmentation, limited visibility and inadequate documentation also contribute to rising technical debt. Without sufficient information, organizations often default to maintaining legacy infrastructure. Aging technology is reassigned from one mission to another rather than modernized or replaced. As a result, technical debt continues to grow even as the military seeks to deploy more advanced capabilities.

The loss of institutional knowledge when experienced workers leave the workforce compounds these challenges. Ultimately, the greatest threats to readiness are not just aging assets, but aging information systems and disappearing expertise.

Bear in Mind



Readiness depends on data visibility.

Leaders need timely access to maintenance and operational data to make informed decisions and keep critical systems mission-ready.



Information gaps slow operations.

When data is fragmented or difficult to access, frontline personnel spend valuable time searching for answers instead of executing their mission.



Technical debt requires active management.

Organizations need a deliberate strategy for retiring legacy technology or risk increasing costs, reducing agility and slowing modernization.



"Too often, a server stops doing one job and simply gets reassigned to another. What ends up happening is that you're extending the life of your technical debt, instead of reducing it."

— Mark Taylor, Former CTO, U.S. Special Operations Command

How AI Can Bridge the Gaps

AI has the potential to transform maintenance and sustainment across the military. But what does that look like in practice, and how can organizations implement it effectively?

One opportunity is preserving institutional knowledge amid a wave of retirements. Many organizations already maintain knowledge management systems. AI can sit atop those repositories, allowing users to interact with information more naturally. Operators can ask complex questions and receive meaningful, context-rich responses.

AI can also help organizations extract valuable information from paper plans, manuals and other unstructured documents. To maintain a naval vessel, for instance, technicians need visibility into the status of its systems. AI can synthesize information from multiple sources and present it in ways that support faster, more informed decision-making.

For example, AI can identify and digitize data related to energy, fuel, water or electricity usage. Then, AI can analyze it, helping modernize processes that previously relied on manual effort.

This capability is particularly important as the military moves toward inventory optimization, advanced scheduling and prescriptive maintenance. AI can deliver actionable recommendations faster than manual approaches and uncover patterns that might otherwise go unnoticed, giving organizations a more complete picture of operational readiness.

"AI helps move organizations from a reactive maintenance model toward a proactive one."

— Dominique Luzeaux, NATO Allied Command Transformation

Action Items:



Preserve institutional knowledge at scale.

AI can help organizations capture expertise and make it readily accessible, reducing the impact of workforce turnover and accelerating onboarding for new personnel.



Turn information into operational insight.

AI can unlock valuable data trapped in maintenance records, manuals and other unstructured sources, enabling faster and more informed decision-making.



Improve decisions with machine-speed analysis.

AI can rapidly surface relevant guidance, identify hidden patterns and provide actionable recommendations that support readiness and sustainment efforts.

Modernize Without Replacing

As military leaders look to modernize maintenance and sustainment, they can start with what they have. This doesn't have to be a costly rip-and-replace.

For example, "some Navy vessels still track fuel usage with handwritten records," said Nina Khan of DoW. "Every two weeks those records come in, and someone has to sit down, decipher the handwriting, enter the data into a spreadsheet and then run the analysis."

That conversion is "a simple but incredibly tedious process that AI could handle," she said.

One Aligned's Thomas LaBatt pointed to efforts within the submarine community, which handles highly sensitive information. "We needed to perform analysis on maintenance data, but we didn't need the classified portions. We only needed the operational maintenance information contained within those systems," he said.

He leveraged AI to extract the controlled unclassified information the technicians needed, and to move that into an environment where it could be analyzed.

"[AI] allowed us to address a specific operational problem and build more predictive models, without requiring a wholesale replacement of existing systems."

— Thomas LaBatt, Former Naval Sea Systems Command Executive

Looking Ahead: The Future of AI in Maintenance and Readiness

As agencies continue to adopt AI, speakers emphasized that success would depend on more than technology alone. The next phase will require stronger alignment between maintenance and mission outcomes, greater trust in AI systems, better use of operational data, and closer collaboration between technical and domain experts.

Connect maintenance directly to mission readiness.

LaBatt stressed that AI initiatives must be tied to operational outcomes rather than pursued as standalone projects. "Every effort needs to connect back to operational effectiveness," he said, urging organizations to engage with these technologies now rather than wait for them to mature further.

Build trust to unlock AI's full potential. Realizing the value of AI requires confidence in the underlying data, models and implementation, said Dominique Luzeaux, Special Adviser to Supreme Allied Commander Transformation. With that trust in place, agencies can take greater advantage of advanced capabilities such as modeling, simulation, digital twins and predictive maintenance.

Shift from reactive maintenance to readiness forecasting. Khan argued that maintenance is evolving from a support function into an operational planning discipline. Rather than simply asking whether an asset is broken, organizations will increasingly focus on understanding how much useful operational life remains, enabling more informed readiness decisions.

Use AI to preserve expertise and develop the workforce.

Taylor, formerly at the U.S. Special Operations Command, highlighted AI's potential to capture institutional knowledge and help train the next generation of workers. AI-enabled assistants could not only provide insights into equipment health but also offer guidance, decision support and on-the-job training for less experienced personnel.

Pair technical expertise with mission expertise.

Maddie Wolf at Legion Intelligence said the biggest breakthroughs will come from collaboration between AI practitioners and subject-matter experts. That partnership is what transforms promising technologies into practical solutions that improve real-world outcomes.

"AI is here to stay. There's no need to fight it. We should embrace it, but we need to do so responsibly."

— Nina Khan, U.S. Department of War

To learn more about how AI can transform military maintenance and sustainment, [listen to the webinar here.](#)

