EBOOK

Redefining Readiness: How AI Applications Drive Mission Success for the US Army

2025

VIRTUALITICS®

Introduction

The U.S. Army is widely considered the most globally dominant land power in the world, fighting when called upon at the required speed and scale. As part of the Joint Force, the Army provides over 50% of all force protection for our nation globally and must remain prepared to take on this massive responsibility. However, the sheer size and scope of the Army's forces make maintaining operational readiness a significant challenge. Major disruptions—like emerging and evolving conflicts in austere environments, aging platforms and weapons systems, complex supply chain issues, and recruiting and retaining personnel—all significantly impact the U.S. Army's ability to deploy, fight and win our nation's wars.

Additionally, across all military services, leaders are under pressure to meet operational objectives with finite resources. They must often decide quickly whether to maintain existing systems or acquire new platforms to counter advancing future threats.

Making decisions that ensure seamless operations and rapid recovery is increasingly difficult given the complexities of personnel, equipment, processes, and infrastructure. Because readiness is a multi-domain challenge, successful solutions require collaboration and coordination across all teams and data silos.

Effectively navigating these complexities is critical for the Army's operational tempo, as evidenced by recent demands of the Patriot missile system. These vital air and missile defense assets have experienced issues with readiness, highlighting the persistent problem of maintaining the fleet, modernizing equipment at pace, and balancing the deployment of a critical, low-density asset across global theaters. These challenges directly compromise the Army's ability to achieve its combat readiness goals, a target that Army leaders have stated is crucially connected to modernizing the force.

To overcome these roadblocks, military leaders increasingly need to embed AI into their decision making. By providing a trustworthy and transparent way to integrate, process, and analyze the large quantities of complex military operation data, AI can surface actionable insights that lead to optimal readiness. This guide will explore how AI applications are driving mission success and powering a new era of military decision intelligence.

"Artificial intelligence and machine learning are not just buzzwords; they are vital tools that will enable us to operate more effectively, make faster decisions, and ultimately gain overmatch in future conflicts."

General Randy George, Chief of Staff of the Army

What Does “Readiness” Mean in Defense?

Military readiness is a dynamic and constant state of preparedness. However, achieving this state often involves the complex and challenging process of manually pulling together data from multiple, disparate systems, including:

- **Sustainment operations** (i.e. asset readiness, maintenance planning, personnel scheduling)
- **Force readiness** (i.e. deficiency reporting, readiness degrader tracking, contested logistics planning, human performance insights)
- **Materiel accessibility** (i.e. storage optimization, materiel movement planning, logistics support)
- **Cyber threat vulnerability assessment** (i.e. identifying, understanding, and prioritizing cyber threats)

Teams have to combine and analyze all this information in the hopes of surfacing insights that will guide them to the right decisions. It’s an extremely time-consuming operation often completed after the information is no longer relevant or useful.

Why data analysis is challenging

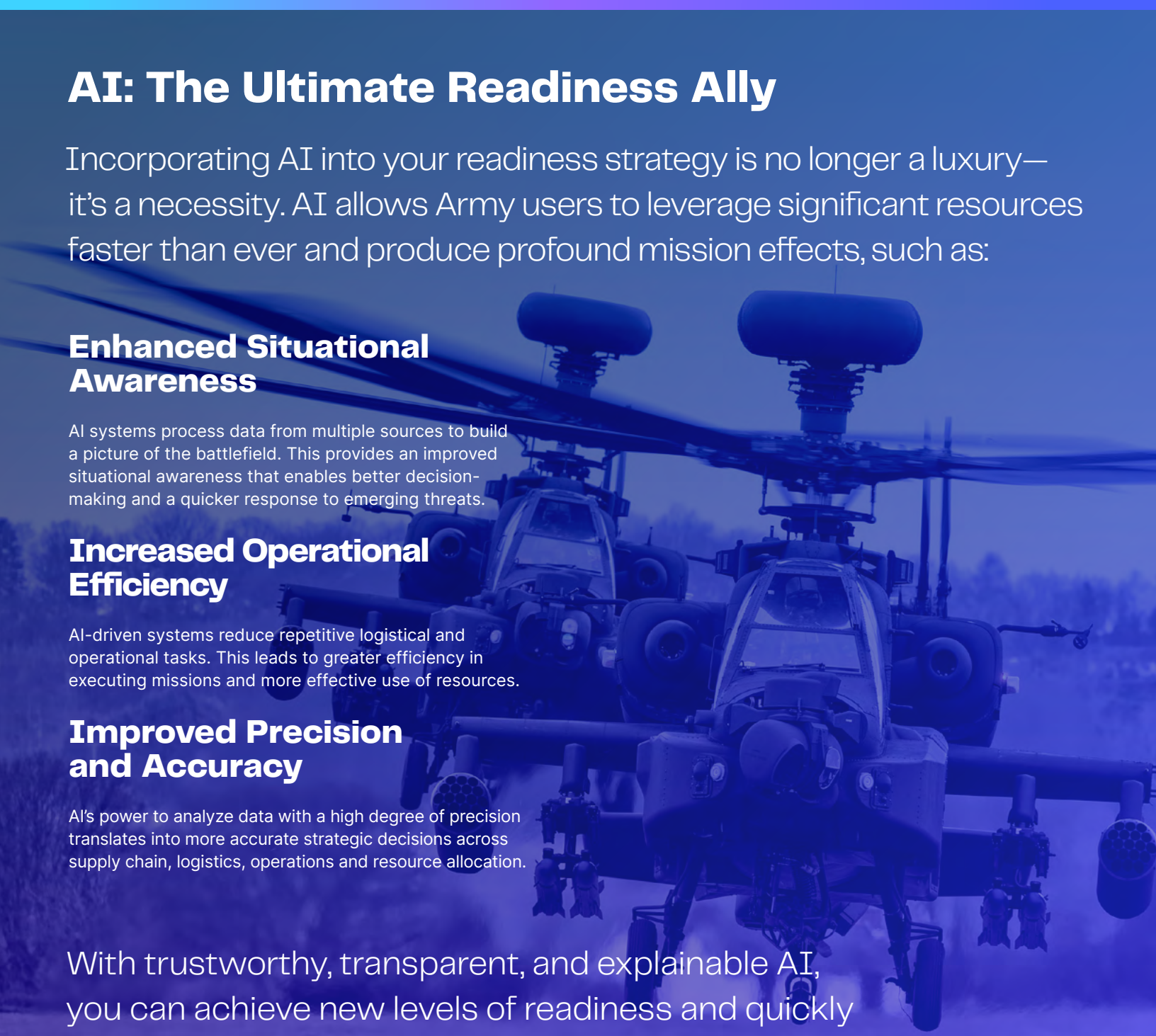
While having a wealth of information readily available may seem beneficial for Army decision-makers, discerning the one data point that will truly impact mission success can be daunting when faced with what feels like a swarm of data. The right insights are difficult to surface due to:

- **Data Volume & Silos:**
  Army forces have vast amounts of data, but often operate in silos; resulting in fragmented and overwhelming data systems. This lack of integration makes it difficult to get a Unified Readiness Picture to coordinate efforts across units.
- **Data Quality & Formats:**
  Inconsistent data quality and standards such as structured and unstructured data can lead to slow data cleansing efforts and, at worst, inaccurate insights.
- **Outdated Systems:**
  Many military organizations rely on outdated legacy technology that cannot support advanced data analytics.
- **Resource Constraints:**
  Limited budgets impede the implementation of modern data analytics tools and the retention of technically trained talent.
- **Privacy & Security Concerns:**
  Securely sharing and moving data across different security domains while adhering to protocols to prevent breaches is paramount.

Fortunately, decision intelligence tools leverage AI, advanced data analytics, and decision-making processes to remove these obstacles and turn raw data into actionable and timely insights. With decision intelligence support, Army leaders can anticipate operational needs, identify factors that put their mission at risk, and find opportunities for efficiency. Ultimately, exceptional AI applications help leaders increase readiness and achieve mission success.

AI: The Ultimate Readiness Ally

Incorporating AI into your readiness strategy is no longer a luxury—it's a necessity. AI allows Army users to leverage significant resources faster than ever and produce profound mission effects, such as:



Enhanced Situational Awareness

AI systems process data from multiple sources to build a picture of the battlefield. This provides an improved situational awareness that enables better decision-making and a quicker response to emerging threats.

Increased Operational Efficiency

AI-driven systems reduce repetitive logistical and operational tasks. This leads to greater efficiency in executing missions and more effective use of resources.

Improved Precision and Accuracy

AI's power to analyze data with a high degree of precision translates into more accurate strategic decisions across supply chain, logistics, operations and resource allocation.

With trustworthy, transparent, and explainable AI, you can achieve new levels of readiness and quickly gain a clear understanding of:

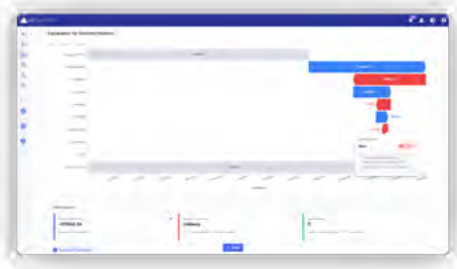
What is the risk?

How should we respond?

And what would happen if we took this action?

3 Foundations of AI for Readiness

While AI in military applications runs much deeper than simple automation, it's critical to understand that not all AI is the same. To provide the right decision support, look for AI applications with the following capabilities:



1. Decision Transparency

Explainable AI (XAI) is a framework that helps humans understand and trust the insights generated by their AI models. It uses specialized models and algorithms to provide clear explanations and reasoning for how it came to a certain conclusion or recommendation. When leaders can trust their AI to help them make the right proactive decisions, they can optimize pre-existing readiness activities while also anticipating future needs in the most efficient ways possible.

2. Ad-Hoc Analysis

Previously, data analysts needed advanced skillsets to explore the complex, interconnected data sets required to answer strategic questions. However, AI-guided analytics can now handle much of the heavy lifting, automatically finding insights and suggesting, in plain language, how to explore the data in more depth.

This helps analysts focus on interrogating the right data to validate and prioritize opportunities, as well as collaborate with data scientists to implement impactful readiness initiatives.

3. Data Flexibility

Rather than approaching data gathering and analysis manually, AI automates data integration and insights across the technology stack. This enables teams to mitigate risks and identify areas for improvements more quickly. Furthermore, the algorithms don't just process historical data, they learn from it, which also helps improve their predictions over time.

What "good" AI Looks Like

Model evaluation is a critical part of trustworthy AI at Virtualitics. It involves:

- **Rigorous Backtesting:**
  Uses hold out sets and walk-forward model evaluation. This ensures the AI models are robust and reliable, proving effectiveness on historical data before being applied to current or future operations.
- **"Best of Both" Approach:**
  Leverages traditional statistical models and AI models. This results in more relevant insights, ensuring solutions are not just elevated, but also grounded in sound principles.
- **Dynamic Modeling Pipeline:**
  Retrains and optimizes models as new data becomes available. This ensures the insights provided, remain relevant and highly accurate over time, avoiding the degradation of performance seen in static models.
- **Transparent XAI:**
  Lookback analysis enables users to understand model outputs. This is critical for building trust within military organizations operating in high-stakes environments.

"It's data overload. We still have to find out how to use emerging technologies, AI tools, in order to help... the commanders to make better and more informed decisions. That is the instinct we're looking for."

Lieutenant General Jeth B. Rey

Deputy Chief of Staff, G-6

Integrated Readiness Optimization (IRO)

IRO leverages Virtualitics-built AI to integrate disparate data and provide holistic, actionable insights, enabling operational leaders to shift their readiness decision making from reactive to proactive.

IRO Maintenance
Maintain critical asset uptime and performance

IRO Cognition
Uncover the readiness degraders to your units and missions

IRO Materiel
Optimize material inventory, storage, and movement

IRO Cyber
Enable actionable cyber security decision-making

IRO includes powerful AI features:

- AI Boosted Survival Models
- Resource Constraint Modeling
- Proprietary Risk Modeling
- Gradient Boosted Host Labeling
- Lookahead Simulations
- Predictive Go/No-Go Insights
- Expert Systems

Virtualitics AI Platform

IRO Readiness Applications run on the Virtualitics AI Platform, a rapidly deployable end-to-end solution that enables AI-generated explainability, interaction, and visualization. A comprehensive Developer Experience allows for Readiness AI App extensibility and customization.

Core capabilities include:

- AI Decision Support
- Security & Governance
- AI Data Integration
- IL5 and IL6 Deployment
- Extensibility & Customization

We know that AI alone doesn't create impact and solve problems. It takes a reliable decision intelligence solutions — like our Integrated Readiness Optimization apps — to unlock decision advantage across a range of mission sets.

Trusted By

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citi · LOCKHEED MARTIN · WELLS FARGO

Data-Driven Mission Success

Developing a more efficient and reliable readiness strategy is crucial for keeping Army fleets and forces mission-capable. This is the long tail of logistics, a goal achievable with AI-powered applications.

While the path to adopting innovative technologies isn't fast or easy in military sectors, working together to democratize data is essential to improving sustainment operations. The right AI-driven applications will integrate seamlessly into defense systems, using secure and rigorously tested models to rapidly generate insights that are clear, accurate, and validated.

Starting with a pilot project is an effective way to prove the value of AI technologies in specific areas, such as logistics optimization. Army leaders can use the results of these projects to advocate for increased budget and resources to contract and implement AI throughout their operations. Additionally, a phased implementation strategy can help ensure a smooth transition to embedding AI-powered systems.

Deployed at Scale in the Mission Today

10 Years
Historical Data + Backtesting
Across hundreds of assets and over 99K critical maintenance events

3 Months
Time to Value
From data access to full-scale deployment

1 Million+
AI-Generated Insights
Insights drive strategic prioritization and actionable recommendations

10+ US Patents
Supporting IRO
Our growing patent portfolio demonstrates the level of innovation in IRO applications

24%
Open + Scheduled MX Flagged
Potential improvement in jobs flagged as "No-Go" by IRO based on resource constraint analysis

32%
Improved Scheduling
Potential improvement in the efficiency of scheduling team process

Maximize Your Operational Potential

The role of AI in the Army's modernization efforts will only continue to grow. As the technology trajectory continues to evolve exponentially, AI will become an increasingly integral part of military operations, offering new ways for innovation and improvement.

With an AI-driven decision making approach, Army leaders gain an unparalleled level of insight, achieving an integrated plan for responding to evolving global threats and maximize mission readiness.

Contact Us To Get Started