pwc

The next competitive edge in aerospace and defense: AI-powered sustainment

July 2026

Table of Contents

Introduction

When you fully integrate AI tools with enterprise resource planning (ERP) and asset management systems, you can hardwire performance and sustainment to drive profitable growth.

US aerospace and defense (A&D) leaders responsible for program performance, operations, and sustainment face compounding structural challenges: cost overruns on marquee programs, decade-long delivery timelines, and sustainment costs that dominate life-cycle spend. Legacy program management and maintenance tools are no longer up to the task. They rely on retrospective indicators and struggle with the scale and complexity unavoidable today.

The good news is that a truly human-centered approach to AI innovation can equip your teams with predictive capabilities to efficiently forecast cost-to-complete trajectories, model schedule risks, and dynamically quantify financial exposure. When you fully integrate AI tools with enterprise resource planning (ERP) and asset management systems, you can hardwire performance and sustainment to drive profitable growth.

Every organization faces unique issues in its AI adoption journey. But underlying every bespoke solution in A&D today is this one critical insight: sustainment is no longer a secondary function. It's the primary driver of economic value.

A&D's growth trajectory confronts program execution gaps

MDAPs have recently required on average

11 years

to deliver operational capability, often exceeding planned schedules by several years.

Program management challenges can be especially acute in defense aviation manufacturing. Despite sustained demand growth, the sector faces persistent structural inefficiencies in program execution. In its 2025 annual weapon systems assessment, the Government Accountability Office (GAO) found that the Department of Defense (DoD) continues to struggle with delivering innovative technologies quickly and within budget.

- Program development delays, exacerbated recently by inflation, contribute to cost growth in major defense acquisition programs (MDAPs).
- Programs often waste development time on efforts with low levels of maturity and resort to using the middle tier of acquisition (MTA) pathway, which is intended for speed.
- Newly launched MDAPs are not taking full advantage of product development practices that lead to efficiencies.[1]

Program timelines reveal the resulting inefficiency. GAO analysis in 2024 found that MDAPs have recently required on average 11 years to deliver operational capability, often exceeding planned schedules by several years.[2] Convergently, commercial aerospace manufacturers worldwide are managing backlog levels exceeding a decade, placing sustained pressure on production systems and supplier networks.

Rethink program performance as a financial control system

On a $10 billion program, even a 2% cost variance can mean $200 million in margin impact.

Too often, isolated programmatic failures are blamed for such systemic problems. But the real challenges lie in gaps in program governance, data integration, and execution discipline.

In some organizations, reliance on multiple, incompatible legacy data formats compromises analytics. That means even basic but essential questions—*Will this program be profitable in five years?*—can be simply unanswerable. The hits to the bottom line can add up. On a $10 billion program, even a 2% cost variance can mean $200 million in margin impact.

But if you reconceive program performance as a financial control system, you realize how AI can be part of your solution. Predictive analytics applied early in the life cycle can materially reduce financial risk exposure by identifying supply-chain disruptions, engineering-rework risks, and production inefficiencies before they escalate into systemic issues. This is where AI shines. It's not enough to provide visibility into metrics across program operations, financial performance, forecasting, deliveries, material availability and suppliers, but it can leverage these insights to make recommendations. The dearth of data presented through legacy formats and business systems was just too complicated for humans to digest and make optimized business decisions.

Transform pricing and risk allocation through life-cycle accountability

AI-driven modeling allows organizations to simulate maintenance demand, forecast failure rates, and estimate long-term sustainment costs with much greater precision.

The shift toward life-cycle accountability is transforming pricing strategies across both commercial and defense aviation sectors. For example, the DoD increasingly requires contractors to price the total cost of ownership and guarantee performance outcomes under availability-based or performance-based contracts.[3]

GAO assessments of performance-based logistics (PBL) programs in defense procurement dating back at least two decades indicate that insufficient predictive capability has long limited their effectiveness[4]. But now AI-driven modeling allows organizations to simulate maintenance demand, forecast failure rates, and estimate long-term sustainment costs with much greater precision.

Pricing for sustainment in aviation, especially in defense, can be exceptionally challenging. Geopolitical disruptions like the blockade of the Strait of Hormuz, regional instability, and uncertain operating conditions can all dramatically alter the cost of sustainment. The good news is that AI can effectively simulate such factors to give a more precise range of costs and enable better pricing models.

Predictive maintenance AI algorithms only strengthen these simulations. By continuously ingesting real-world maintenance data, these models build a probabilistic picture of component lifespan, failure modes, and labor intensity under a given set of operating conditions. Feed that into a disruption scenario and the output becomes a bounded probability distribution that program managers can use to better dial in pricing.

This is especially valuable today, when many companies acknowledge that recent advances still leave a lot of room for improvement in their operational data collection, especially for complex critical systems such as engines. Defense aviation is adopting enterprise systems that open the opportunity to ask, *Why now?* When your enterprise collects operational data that feeds into predictive models, both contractors and the DoD—and taxpayers—can benefit.

Across commercial aviation, connected assets, digital twins, and integrated data ecosystems can help companies anticipate maintenance demand, improve asset availability, and enhance life-cycle costs. Rather than reacting to failures, operators and manufacturers can use shared operational insights to increase aircraft availability and improve sustainment outcomes. The same principles can help defense organizations secure margins on long-term performance-based contracts while improving readiness. Bad data and legacy business systems aren't a back-office problem. They're a margin and military readiness problem dressed in the same uniform.

Win a market edge with sustainment economics

Winning in sustainment economics starts with human-led, tech-powered AI embedded in your organization's digital core.

Most life-cycle cost in A&D is incurred during sustainment. The GAO reports that approximately 70% of naval life-cycle costs occur after delivery.[5] In 2021, the DoD spent roughly $90 billion annually on maintenance and sustainment activities,[6] while the Congressional Budget Office (CBO) estimates that operations and sustainment currently account for approximately 58% of the US defense budget.[7]

In commercial aerospace, the rapidly growing maintenance, repair, and overhaul (MRO) is also highly vulnerable to sustainment inefficiencies. The International Air Transport Association (IATA) estimated that supply chain-related disruptions could cost airlines more than $11 billion in 2025, including maintenance-related inefficiencies.[8] (Conflicts in the Middle East could make the figure higher for 2026.)

PwC's 29th Annual Global CEO Survey (2026) finds that the question of overwhelmingly greatest concern to CEOs these days is *Are we transforming our business fast enough to keep up with technology, including AI?* Yet only 30% of respondents tell us their company has realized tangible results from AI adoption over the last 12 months through additional revenues. The urgency of finessing the adoption of AI at *enterprise scale* is clear.

Winning in sustainment economics starts with human-led, tech-powered AI embedded in your organization's digital core. Predicting failures, optimizing spares and repair routing, and streamlining depot/line maintenance directly shift cost per flight hour and availability. By linking predictive models and GenAI assistants to ERP and enterprise asset management via your digital thread, you can forecast demand, shorten turnaround time, and structure smarter PBL/availability-based contracts. With an AI whole-factory approach and responsible AI guardrails, decisions become trusted and repeatable at scale.

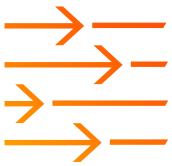
Drive system optimization through predictive maintenance

In defense, predictive maintenance enhances mission readiness by reducing unscheduled maintenance and increasing operational availability.

Predictive maintenance represents a system-level transformation rather than a discrete capability. By integrating sensor data, maintenance records, and operational usage profiles, AI models can estimate failure probabilities and enhance maintenance timing. That enables organizations to transition from reactive maintenance models to predictive, demand-driven systems. In aviation, predictive maintenance reduces aircraft-on-ground (AOG) events and improves fleet availability, keeping passengers and crews flying happy.

In defense, predictive maintenance enhances mission readiness by reducing unscheduled maintenance and increasing operational availability. But there's a sharper element to this. AI-enabled predictive maintenance directly impacts decision advantage. Not only are assets available more of the time, but commanders have a clearer picture of what combat power is available for future operations. With that picture, they can deploy their forces at a time and place of their choosing, and with greater speed and precision than their adversaries.

Integrate your architecture: ERP + EAM + AI = success



ERP + EAM + AI creates a continuous learning system

The effectiveness of AI in A&D depends on an integrated enterprise architecture. ERP systems provide the deterministic control layer, confirming data integrity, governance, and auditability. Enterprise asset management (EAM) systems provide life-cycle visibility across assets, while AI delivers predictive insights and optimization capabilities.

Companies that harness the opportunities offered by machine learning could experience exponential growth. When you conceive of AI as a layer that continuously learns from your human specialists, your workflow governance is newly empowered. This is critical today in civil aviation for maintenance processes governed by FAA regulatory oversight. Not just that, in the AS9100 framework—the premier, globally recognized quality management system standard adopted by the A&D and space industries—the *workflow itself* is the auditable deliverable that proves regulatory compliance.

One key to program management success in A&D now is embedding AI as a "learning layer" throughout your organization. An AI model that churns out predictions is one thing, but an AI that learns continuously from your own specialists is another. They could be planners with 15 years of experience in sales, operations, and inventory planning (SOIP). They could be a machinist with 20 years on the shop floor. When your ERP and EAM systems are integrated and AI-enabled, you launch a virtuous cycle. Your ERP improves the AI, and the AI improves your ERP.

The evolution AI brings is here

Sustainment stops being a cost center and becomes a source of competitive advantage.

The A&D industry has spent decades optimizing for program delivery, or at least attempting to do so. Cost overruns, schedule slippages, and ballooning sustainment budgets became the norm, not anomalies. Indeed, this is the predictable result of treating life-cycle performance and maintenance as a necessary evil and afterthought.

AI has the potential to change the calculus. It can make visible what was unknowable, things like actual cost-to-complete trajectories, actual and AI predictive maintenance demand curves, and combat power availability weeks or months out. When intelligence is hardwired into enterprise systems, pricing sharpens and sustainment stops being a cost center and starts being a source of competitive advantage, margin protection, and, in defense, mission accomplishment.

Organizations that get this now can price their contracts with better confidence, secure program profitability over decades-long life cycles, and deliver operational availability their customers, commanders, and taxpayers are demanding.

AI is not a panacea. But in A&D, it can become the competitive edge.

Authors

Holly McKenzie
Partner, Industrial Products Finance Transformation Leader
PwC US

Chris Morton
Vice President, Industries
IFS

Prepared with IFS

IFS is a leading provider of enterprise software and industrial AI solutions for asset- and service-intensive industries. Its cloud platform integrates enterprise resource planning (ERP); enterprise asset management (EAM); maintenance, repair, and overhaul (MRO); and service management capabilities in a unified environment.
IFS serves organizations across aerospace and defense, manufacturing, energy, telecommunications, and other industries, helping them manage critical assets and operations throughout the life cycle.

References

1. GAO, *Report to Congressional Committees: Weapon Systems Annual Assessment—DOD Leaders Should Ensure That Newer Programs Are Structured for Speed and Innovation* (GAO-25-10769), June 2025.
2. GAO, *Report to Congressional Committees: Weapon Systems Annual Assessment—DOD Is Not Yet Well-Positioned to Field Systems with Speed* (GAO-24-106831), June 2024.
3. See for example: The White House, Presidential Actions, Executive Orders, "Promoting Efficiency, Accountability, And Performance in Federal Contracting," Apr. 30, 2026.
4. See for example: GAO, *Defense Management: DOD Needs to Demonstrate That Performance-Based Logistics Contracts Are Achieving Expected Benefits* (GAO-05-966), Sept. 9, 2005; GAO, *Defense Logistics: Improved Analysis and Cost Data Needed to Evaluate the Cost-effectiveness of Performance Based Logistics* (GAO-09-41), Dec. 19, 2008; GAO, *Report to Congressional Committees: Defense Logistics—Improved Performance Measures and Information Needed for Assessing Asset Visibility Initiatives* (GAO-17-183), Mar. 2017.
5. GAO, *Report to Congressional Committees: Shipbuilding and Repair—Navy Needs a Strategic Approach for Private Sector Industrial Base Investments* (GAO-25-106286), Feb. 2025.
6. GAO, *Report to the Committee on Armed Services, House of Representatives: Military Readiness—Actions Needed to Further Implement Predictive Maintenance on Weapon Systems* (GAO-23-105556), Dec. 2022.
7. CBO, *DoD's 2026 Budget Request and Plan for Funding Provided by the 2025 Reconciliation Act*, Apr. 30, 2026.
8. IATA, "Supply Chain Challenges Could Cost Airlines More than $11 Billion in 2025" (media release), Oct. 13, 2025.

Thank you