



BREAKING DOWN SILOS

HOW WINDCHILL
PLM ACCELERATES
AEROSPACE & DEFENSE
INNOVATION

WHITEPAPER 2026





EXECUTIVE SUMMARY

NAVIGATING UNPRECEDENTED DEMANDS IN AEROSPACE AND DEFENSE

The aerospace and defense (A&D) industry faces mounting pressures: aging fleets, record backlogs, surging demand for next-generation systems, and rapid procurement cycles driven by global tensions. Manufacturers must deliver faster than ever before, without compromising on quality, security, or compliance.

Yet, increasing complexity—spanning advanced technologies, intricate supply chains, and evolving regulatory requirements—combined with fragmented systems and manual processes, continues to stall progress.

As organizations strive to keep pace, the cracks in legacy approaches become more apparent. Disconnected data, siloed teams, and outdated workflows threaten development timelines and delivery schedules. In this environment, building a stronger product data foundation is more critical than ever.

This white paper explores how PTC's Product Lifecycle Management (PLM) solution, Windchill, provides the unified digital backbone A&D organizations need to accelerate delivery, burn down backlogs, and drive operational readiness.





THE CORE CHALLENGE: DISCONNECTED SYSTEMS

A&D organizations struggle with pervasive data silos, disconnected systems, and manual processes that slow development, delay production, and increase costly rework. These challenges are tangible, surfacing at every stage of the product lifecycle:



ENGINEERING

Hardware and software development processes are often disjointed, with teams relying on disparate tools and platforms. This lack of connectivity means engineers work in disciplinary silos and lack a reliable single source of truth, leading to miscommunication, version control issues, and delays. Establishing one clear, authoritative source of truth across engineering is essential, keeping designs accurate, work aligned, and development moving quickly without compounding errors downstream.



MANUFACTURING

The divide between engineering and manufacturing data is complicated by the need to manage multiple product configurations, thousands of suppliers, and constant engineering changes. Without unified processes and a single source of truth, teams risk manufacturing the wrong components or configurations, resulting in costly rework and production delays. Ensuring the as-designed product matches the as-manufactured product is essential to avoid errors and maintain quality.



SERVICE

Once products are in the field, service teams must reconcile in-service data with original engineering documentation. Aircraft and defense systems are used and maintained for decades, requiring frequent repairs and updates. Without a clear link between engineering data and in-service data, maintenance becomes inefficient, and mission readiness is compromised.

Quality, compliance, and supplier data also need to be managed and integrated across these areas. Stringent regulatory requirements demand airtight control of sensitive information, and any gaps can threaten delivery schedules and compliance status.

The risks of disconnected systems are significant: missed deadlines, inflated costs, and eroding competitive advantage. In a high-stakes environment where speed, security, and reliability are non-negotiable, overcoming these disconnected systems is essential for success.



THE SOLUTION: A UNIFIED DIGITAL BACKBONE WITH WINDCHILL PLM

PTC's Windchill delivers a robust PLM platform tailored for the unique demands of A&D. It enables a model-based design foundation with secure, real-time information sharing, dynamic data visualization, and frictionless collaboration across teams—addressing the complexity and speed required in today's environment.

EXTENDED BOM MANAGEMENT

Windchill allows organizations to digitally generate and link engineering (eBOM), manufacturing (mBOM), and service (sBOM) views. Its BOM Roll-up capability aggregates material attributes such as weight, cost, and compliance at the design stage, empowering teams to make smarter sourcing and design decisions early in the lifecycle. This digital continuity between design and manufacturing guarantees that changes are propagated efficiently, reducing errors and rework.



Analyst Validation

A differentiator for PTC Windchill is the support it provides for BOM transformation and standardization so that you have the same access to product data from engineering to production, manufacturing, and service teams. This is comparatively a strong distinguisher for PTC.



—ABI Research, *PLM for Large Manufacturing Enterprises Competitive Matrix*

ADVANCED CONFIGURATION MANAGEMENT

Managing complex product variations and maintaining traceability across the lifecycle is essential in A&D. Windchill supports rich, extensible product models and orchestrates change control across engineering, manufacturing, and service, so that every stakeholder works from the correct product definition.



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SECURE SUPPLY CHAIN COLLABORATION

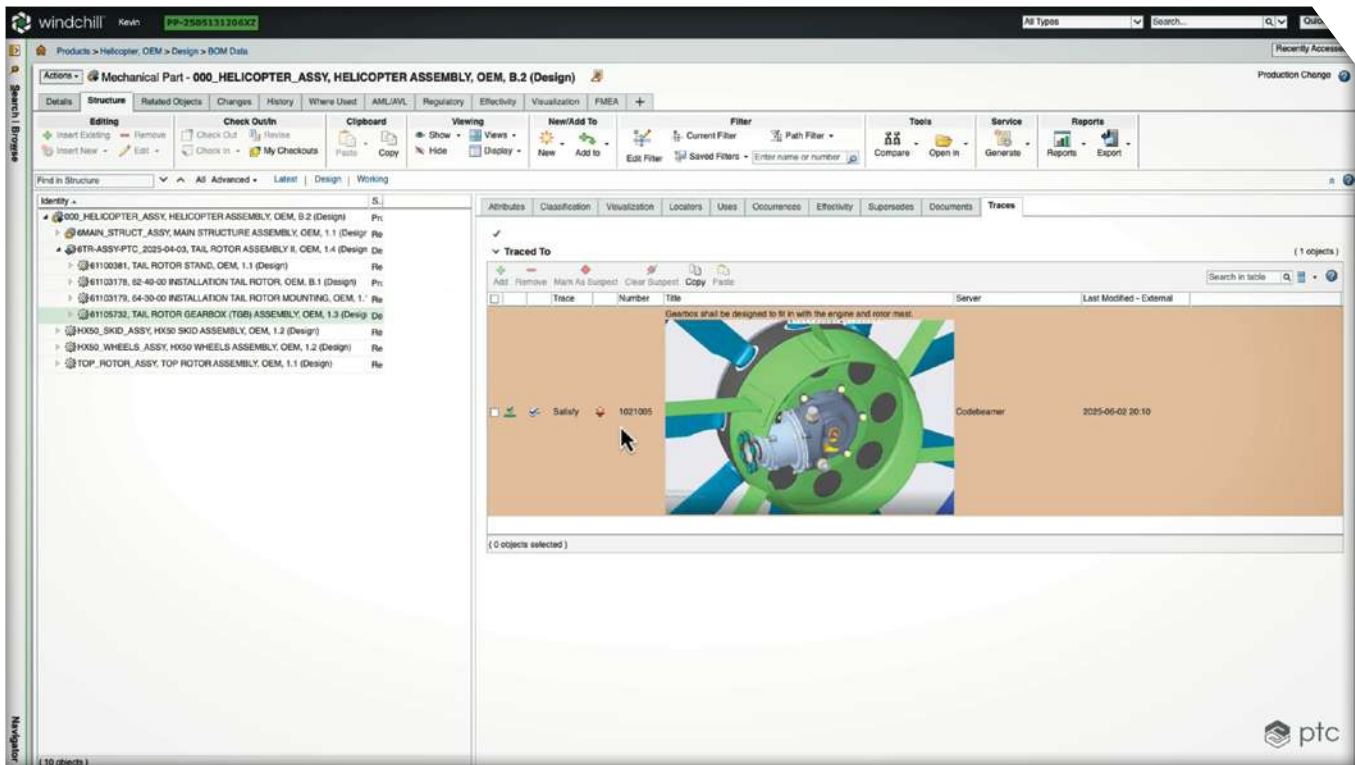
With Windchill, manufacturers can extend secure, controlled data access to partners and suppliers. This improves coordination, reduces lead times, and ensures that external contributors have the information they need to meet demanding specifications. The platform supports dynamic vendor and material relationships, enabling agile responses to supply chain risks and opportunities.

INTEGRATED MANUFACTURING PROCESS MANAGEMENT

Windchill connects manufacturing processes directly to the engineering digital thread, facilitating concurrent process planning and production ramp-up. Manufacturing engineers can access product design details in real time, develop strategies and tooling in parallel with design evolution, and validate alternate production methods based on capacity and resource availability. This integration helps scale production and propagate change with confidence.

COMPREHENSIVE SERVICE PROCESS MANAGEMENT

Operational readiness is vital in A&D, where products are maintained for decades. Windchill links engineering data to service and sustainment activities, ensuring that service teams have up-to-date technical documentation and can efficiently plan maintenance, repairs, and overhauls. This closed-loop approach improves mission readiness and optimizes sustainment operations.



WHY PTC'S WINDCHILL IS THE STRATEGIC CHOICE

SCALABILITY AND SECURITY FOR DEFENSE COMPLIANCE

Windchill can operate in classified or restricted environments where many other PLM solutions cannot, ensuring mission-critical data remains protected and compliant. It offers flexible deployment options, including on-premises, hybrid, and SaaS models, and scales seamlessly across global users, multi-tier supplier networks, and long product lifecycles while maintaining strict configuration control and end-to-end traceability to fit diverse operational requirements.

Windchill is engineered to meet the security and sovereignty needs of A&D organizations. It supports ITAR/EAR, export control, and

defense-grade security. PTC maintains a **DoD IL5 SaaS Authorization** that includes Windchill and covers all levels of unclassified DoD data. PTC also maintains a **FedRAMP Moderate SaaS Authorization** that includes Windchill+. FedRAMP is the U.S. government requirements for secure cloud systems and for defense contractors that require CMMC / NIST 800-171 level security.



Analyst Validation

PTC's tracking of compliance standards and regulations is wider than the market average and is beyond the level of mainstream vendors. Windchill currently manages complex deployments with large discrete manufacturers managing BOMs with upward of 2.5 million components.



—ABI Research, [PLM for Large Manufacturing Enterprises Competitive Matrix](#)



DIGITAL THREAD FOR END-TO-END CONTINUITY AND TRACEABILITY

Amid the disconnected engineering, manufacturing, and service systems that slow A&D programs, Windchill provides one of the few truly end-to-end digital threads capable of unifying the entire lifecycle. Requirements, CAD models, BOMs, configurations, changes, compliance artifacts, and lifecycle states are all seamlessly connected, ensuring full lifecycle traceability. This provides a single, authoritative source of truth across departments and eliminates the inefficiencies and risk associated with disconnected or siloed systems.

This digital continuity forms the foundation for integrated product engineering (IPE), an approach where disciplines operate as a coordinated system rather than isolated functions. Windchill enables this by enforcing governance, synchronizing data flows, and sustaining a continuous digital thread across the entire lifecycle. It integrates tightly with design, simulation, software, and manufacturing systems to ensure that every stakeholder works with the most current, connected product definition.

Windchill synchronizes work across disciplines by connecting the systems and artifacts that traditionally operate in isolation:

- **Mechanical and systems engineering** via CAD-driven and model-based systems engineering integrations
- **Software and embedded development** through alignment with ALM workflows and traceable software-related artifacts
- **Manufacturing process planning**, enabling the transition from eBOM to mBOM to governed work instructions
- **Quality, compliance, and certification workflows**, ensuring issues, requirements, and verification steps remain connected to authoritative product data





As a result, Windchill does more than manage design data; it unifies engineering, manufacturing, quality, and service information into a single governed system, ensuring digital continuity from initial requirements to sustainment. This allows A&D organizations to operate with clarity, speed, and control while maintaining the traceability demanded by regulated, mission-critical programs.

OPEN ARCHITECTURE FOR ENTERPRISE INTEGRATION

Windchill integrates with existing enterprise systems rather than requiring disruptive replacements. It connects to ERP, MRO, MES, CRM, and IoT platforms, and supports multi-CAD and heterogeneous IT environments. This open architecture enables incremental transformation, allowing organizations to modernize at their own pace without the need for costly rip-and-replace programs.



Analyst Validation

Windchill provides unified views to manage multi-MCAD (mechanical computer-aided design) data in a single place by integrating Creo, Creo+, SolidWorks, AutoCAD, and other CAD tools.



—SPARK Matrix PLM Q3 2023

OUT-OF-THE-BOX SUPPORT FOR A&D STANDARDS AND PROCESSES

Windchill comes with native support for key aerospace and defense standards, including S-Series (S1000D, S2000M, S3000L, etc.), and is designed to handle regulatory and compliance-driven data requirements. Its architecture is built for highly regulated environments, reducing the need for customization, lowering risk, and accelerating time to value.

TRUSTED PRODUCT DATA FOUNDATION FOR AI

Windchill provides clean, traceable lifecycle data and context-rich configuration and change history, supporting explainable and auditable AI outcomes. This trusted data foundation is essential; AI without reliable data undermines readiness and safety, especially in mission-critical A&D applications.

PROVEN AT GLOBAL SCALE IN AEROSPACE AND DEFENSE

Windchill supports millions of parts and configurations and is used across decades-long programs in safety- and mission-critical environments. Organizations reduce risk by choosing a platform proven at enterprise scale, empowering them to collaborate globally, adapt quickly, and maintain mission-critical security, all while reducing errors and speeding time-to-market.



PROOF IN ACTION: CUSTOMER SUCCESS STORIES

MBDA

MBDA is a leading European defense and aerospace company specializing in the design and manufacture of missile systems and related technologies. Operating in a highly regulated and security-focused environment, MBDA must ensure strict control, compartmentalization, and sovereignty over sensitive engineering and product data.



SECURING COLLABORATIVE PRODUCT DEVELOPMENT WITH WINDCHILL

Windchill enables MBDA to manage safety-critical engineering data with robust security and compartmentalization. The platform allows controlled sharing of information across multiple networks and countries, supporting collaborative programs while maintaining compliance with national sovereignty requirements.



STREAMLINING PRODUCTION WITH WINDCHILL MPMLINK

Windchill streamlines manufacturing planning and execution by connecting engineering data with production processes. Manufacturing teams use Windchill to access the latest product definitions, manage BOMs, and coordinate changes across the organization. This digital continuity reduces errors, accelerates production, and ensures that every part meets stringent quality standards.



ENABLING CUSTOMER SUPPORT WITH WINDCHILL

Windchill enables MBDA to manage safety-For MRO operations, Windchill is the backbone of Lufthansa Technik's digital thread. Service teams rely on Windchill to track component histories, manage maintenance schedules, and ensure compliance with aviation regulations. The platform supports real-time collaboration between service engineers, technicians, and customers, enabling faster turnaround times and higher reliability for aircraft in operation. [Watch the full MBDA story here.](#)

“Windchill—what we call Matrix at MBDA—has been immensely valuable. Because we operate across multiple networks and work in sovereign, highly classified environments, being able to share data in a controlled way is critical. Windchill enables us to synchronize and share only what each nation needs to support collaborative engineering programs. **”**

—Matt Beaumont, Director of Mechanical Engineering



LUFTHANSA TECHNIK

Lufthansa Technik is one of the world's leading providers of maintenance, repair, and overhaul (MRO) services for commercial aircraft. With operations spanning the globe and a portfolio of thousands of aircraft components, Lufthansa Technik must manage complex product data, regulatory compliance, and collaboration across engineering, manufacturing, and service.



CENTRALIZING PRODUCT DATA AND COMPLIANCE WITH WINDCHILL

Windchill provides Lufthansa Technik with a unified platform for managing engineering data and product configurations. By centralizing technical documentation and design information, Windchill enables engineers to maintain accurate, up-to-date records for thousands of components and aircraft types. This supports regulatory compliance and ensures that engineering teams can collaborate efficiently across locations.



DRIVING AGILE, ERROR-FREE PRODUCTION WITH WINDCHILL

Windchill streamlines manufacturing planning and execution by connecting engineering data with production processes. Manufacturing teams use Windchill to access the latest product definitions, manage BOMs, and coordinate changes across the organization. This digital continuity reduces errors, accelerates production, and ensures that every part meets stringent quality standards.



POWERING RELIABLE MRO OPERATIONS WITH WINDCHILL

For MRO operations, Windchill is the backbone of Lufthansa Technik's digital thread. Service teams rely on Windchill to track component histories, manage maintenance schedules, and ensure compliance with aviation regulations. The platform supports real-time collaboration between service engineers, technicians, and customers, enabling faster turnaround times and higher reliability for aircraft in operation. [Watch the full Lufthansa Technik story here.](#)

“ *It's [PLM] a fundamental role. It's not only in maintenance, but in meeting the engineering needs of our innovation teams... PLM is a central part, not only as a platform, but as an inspiration for our processes—from engineering into manufacturing and service.* **”**

—Dr. Severin Todt, Senior Director of IT, Completion and Manufacturing



HILL HELICOPTERS

Hill Helicopters is a UK-based aerospace innovator redefining the private helicopter market. By combining owner-built assembly with in-house production, Hill is working to deliver modern, high-performance helicopters that are accessible, customizable, and designed for an exceptional customer experience.



ACCELERATING PRODUCT DEVELOPMENT WITH WINDCHILL

In our [demo series](#), Hill Helicopters uses Windchill as the central hub for all engineering data and processes. Requirements are managed in ALM solution Codebeamer and system models are created in PTC Modeler, but Windchill unifies these inputs, ensuring traceability, version control, and smooth collaboration. Engineers develop and validate 3D designs in CAD solution Creo, with all design data checked into Windchill for secure management and downstream access. This connected digital thread enables Hill to innovate rapidly, respond to changing requirements, and maintain compliance throughout the development lifecycle.

See how Windchill can power engineering at Hill Helicopters:

[Watch the full engineering workflow demo for deeper insights.](#)



OPTIMIZING PLANNING AND PRODUCTION WITH WINDCHILL

Windchill bridges the gap between engineering and manufacturing at Hill. Teams can transform engineering BOMs into manufacturing-ready structures using Windchill's BOM Transformer,

enabling parallel planning and reducing manual effort. Manufacturing engineers can document assembly processes with rich 3D visuals and interactive work instructions, all managed and delivered through Windchill. This digital continuity ensures that every step, from design to shop floor, is informed, efficient, and traceable, accelerating production and improving quality.

Discover Windchill can impact manufacturing at Hill Helicopters:

[Watch the full manufacturing planning and production demo.](#)



ENABLING CONNECTED, DATA-DRIVEN SUPPORT WITH WINDCHILL

Windchill extends its value into service and sustainment by connecting engineering and manufacturing data with service operations. Service BOMs can be generated from manufacturing data in Windchill, and CAD assets can be reused for 3D service instructions. SLM solutions, Arbortext and Servigistics, can integrate with Windchill to streamline documentation and parts planning, while ServiceMax supports proactive service execution. This unified approach enables service teams to have accurate, up-to-date information, enabling faster, more reliable maintenance, and improved operational efficiency.

See how Windchill can connect service operations at Hill Helicopters:

[Watch the full service and support demo for more details.](#)



“ We’re building an organization to manufacture approved aircrafts to the tightest standards on planet earth. And that means that our business processes, our change-control processes, bills of materials, everything that goes into controlling what happens at every level of the business, is of vital importance to us. ”

—Jason Hill, Owner and Founder

ACHIEVING MISSION-CRITICAL OBJECTIVES WITH WINDCHILL

Industry leaders like MBDA, Lufthansa Technik, and Hill Helicopters have shown how Windchill transforms complexity into opportunity, enabling faster delivery, reducing risk, and supporting operational excellence. By unifying engineering, manufacturing, and service data on a secure, integrated platform, Windchill empowers aerospace and defense organizations to innovate with confidence, scale efficiently, and maintain readiness in a rapidly evolving environment.

If your organization is ready to break down silos, accelerate delivery, and build a resilient digital foundation for the future, it's time to explore what Windchill can do for you. [Contact your PTC representative](#) to discuss your unique challenges and discover how Windchill can help you achieve your mission-critical objectives.





Need more information?

Solutions for A&D >

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