

Cloud transformation role in Aerospace and Defense enterprises



Introduction

In today's rapidly evolving landscape, aerospace and defense (A&D) companies are under increasing pressure to accelerate innovation, improve agility and respond more swiftly to market demands—all while reducing technical debt accumulated over decades of operating legacy systems. This technical debt, often embedded in aging infrastructure and monolithic applications, hinders scalability, flexibility and resilience. As these enterprises embark on digital transformation journeys, cloud transformation has emerged as a strategic enabler, offering the ability to modernize legacy real estate while preserving core business value. A critical pathway to this modernization lies in transforming the triple bedrock of ERP, PLM and MES/MoM systems—the foundational enterprise platforms that drive product development, manufacturing execution and supply chain management in A&D. By transitioning these applications to cloud platforms through tailored strategies such as rehosting, replatforming, refactoring and rebuilding, A&D companies can not only modernize their IT landscape but also align it closely with evolving business priorities. This transformation is increasingly supported by adopting SaaS and PaaS solutions, which enable scalable, modular and resilient enterprise capabilities while reducing the burden of infrastructure management.

Modernization must also be forward-looking, focusing on cloud-native architectures that facilitate agility, portability and continuous innovation. Building applications using microservices, containers and APIs while integrating DevSecOps practices ensures security, automation and faster delivery across the software development lifecycle. This holistic transformation must also consider data sovereignty. This is especially critical in the defense sector, ensuring compliance with national and industry regulations while maintaining control over sensitive data

assets. To support this cloud-centric approach, a robust digital foundation is essential. This includes modern networking and security frameworks such as Software-Defined Wide Area Networking (SD-WAN) and Secure Access Service Edge (SASE) architectures, which provide secure, high-performance connectivity for cloud delivery and edge computing scenarios. These technologies enable secure data access, seamless user experiences and compliance with stringent defense-grade security standards.

Furthermore, the fusion of cloud, AI and advanced data analytics empowers A&D organizations to unlock new operational efficiency and insight levels. Cloud platforms enable real-time integration and data sharing across ERP, PLM and MES systems, breaking down silos and enabling more informed, data-driven decision-making. By combining modern cloud infrastructure with intelligent services, A&D enterprises can drive innovation, enhance production readiness and remain competitive in an increasingly complex global environment.

To fully realize the benefits of these modernization efforts, A&D companies must adopt a holistic approach that integrates cloud and application modernization strategies. This involves rethinking how applications are developed, deployed and managed in a cloud environment, ensuring they are optimized for performance and aligned with business objectives. This POV explores cloud trends driving the A&D industry and the value proposition that HCLTech services can provide with its capabilities enabling seamless customer experiences.



Challenges of legacy IT Systems for A&D Enterprises

The aerospace and defense (A&D) industry relies heavily on complex, mission-critical systems. However, legacy IT infrastructure can create significant challenges that hinder agility and innovation. We are seeing business and technical hurdles faced by A&D organizations. A&D organizations often face challenges with their legacy IT infrastructure, including:

- High total cost of ownership
- Regulatory compliance (DFAR/CUI/CDI/ITAR/HSPII/PII)
- Time consuming Infosec certifications
- Need for business agility and faster cycle times
- Diminishing talent pool in legacy technologies
- Outdated Security protocols leading to Security Vulnerabilities, cyberattacks
- Hinderance to data-driven decision making due to data silos

While legacy IT presents significant challenges, it's essential to acknowledge these systems' critical role in the industry's history. However, the limitations become increasingly apparent as technology advances. Cloud computing offers a compelling alternative, providing scalability, agility and enhanced security features that can address these challenges head-on. Cloud adoption is significantly aiding the aerospace and defense (A&D) industry in its digital transformation and driving innovation in several key ways:

Enhanced Collaboration and Data Sharing:

Cloud platforms enable seamless collaboration across geographically dispersed teams and partners, facilitating real-time data sharing and communication.

Improved Data Analytics and AI

Capabilities: The cloud provides scalable computing power and advanced analytics tools, allowing A&D companies to leverage big data, machine learning, and AI for

predictive maintenance, mission planning, and operational efficiency.

Cost Efficiency and Scalability: By using cloud services, A&D companies can reduce IT infrastructure costs and scale resources according to their needs, ensuring cost-effective operations and flexibility.

Accelerated Innovation and Development Cycles:

Cloud environments support rapid prototyping, testing, and deployment of While legacy IT presents significant challenges, it's important to acknowledge the critical role these systems have played new technologies and solutions, speeding up the innovation cycle and reducing time to market.

Enhanced Security and Compliance:

Leading cloud providers offer robust security measures and compliance certifications that meet stringent industry standards, ensuring data protection and regulatory adherence.

Supply Chain Optimization: Cloud-based solutions help in managing complex supply chains by providing real-time visibility, improving coordination, and reducing lead times.

Scaling Generative AI capabilities: GenAI models for industry specific applications often rely on vast amounts of product or sensor data for training. Cloud platforms offer secure and scalable data storage solutions, enabling companies to store and manage large datasets effectively, which ensures seamless integration with GenAI workflows.

Several aerospace and defense (A&D) companies have successfully embraced cloud technologies to enhance efficiency and drive innovation. For example, Boeing utilized Microsoft Cloud and its AI capabilities to update its critical

infrastructure, streamline business processes and accelerate new innovations in digital aviation.ⁱ It also selected AWS as a strategic cloud provider to migrate applications from on-prem data centers to AWS to strengthen its digital foundations for engineering and manufacturing, driving product innovation, efficient operations and improved customer support.ⁱⁱ Another example from the industry is defense manufacturer Lockheed Martin, which partnered with Microsoft on classified cloud capabilities and services for the Department of Defense.ⁱⁱⁱ It also expanded its partnership with SAP to transform its mission-critical business systems through the OneLM Transformation Program (ILMX).^{iv} This initiative leverages SAP's RISE with SAP solution to enhance speed, agility and competitiveness. Lockheed is also working with Google Cloud to integrate advanced generative AI into its AI Factory ecosystem.^v

HCLTech cloud strategic options for A&D

Cloud computing enables shared hardware that can be accessed via a network connection for a variety of A&D applications. As the A&D ecosystem grows, this is a major advantage. Here is a brief overview of the cloud-enabled strategic options that A&D enterprises can leverage

Shared Data Center as a Service (DCaaS)

-offers a secure, cost-effective cloud solution for A&D. It provides both shared and dedicated options, along with a catalog of regulated workloads. HCLTech DCaaS prioritizes security, compliance, and control, giving customer flexibility and peace of mind for their sensitive data.

Public Cloud: Secure and efficient migration of A&D workloads to the cloud, minimizing disruption & ensuring a smooth transition. Leverage automation tools and best practices to optimize migration

processes. HCLTech unlocks the power of public Cloud for A&D by designing secure migration plans, and expertly move applications and data, then slash costs and boost agility with modernization like using containers, serverless, and microservices. This unlocks new features and optimizes performance, giving you a secure, efficient, and agile cloud future.

Gov Cloud: The A&D industry relies heavily on government cloud solutions for secure data storage and compliance. HCLTech understand Gov Cloud needs and strict security requirements. They leverage their experience (e.g., building model-based engineering solutions) to deliver secure Gov Cloud projects.

MultiCloud Strategy: Spreads workloads across multiple public cloud providers, increasing redundancy, reducing reliance on a single vendor, and fostering better pricing negotiations. Customer are looking multi cloud not only for portability but to deploy workloads for purpose build. HCLTech has significant experience on multicloud engagements helping customers embarking their cloud journey.

CloudBurst: Cloud bursting leverages the elasticity of public cloud resources to handle surges in workload demands that on-premises infrastructure can't accommodate. HCLTech analyzes A&D workloads and identifies those best suited for cloud bursting. HCLTech cloud bursting solutions empower A&D companies to leverage the cloud's scalability and cost-efficiency while maintaining the security and compliance of their on - premises infrastructure.

HCLTech strategy for Cloud is CloudSMART (CloudSMART: Cloud Consulting, Cloud Solutions | HCLTech), a suite of offerings, capabilities and platforms enabling clients to build agile businesses by optimizing

cloud as a business platform. CloudSMART provides industry aware solutions enabled by a powerful ecosystem of Partners. CloudSMART Modernization Experience (CSME) guides a client through the art-of-the-possible approaches to Refactoring, Replatforming, Rebuilding and Rearchitecting application and migrating to cloud leveraging HCLTech platforms. As an example, HCLTech's CloudSMART for Rise with SAP is a full stack offering to simplify and accelerate your cloud transformation journey by leveraging industry-specific accelerators. This framework includes shifting SAP workloads to the cloud, transitioning to Govcloud, digital transformation to SAP S/4HANA, adopting cloud-native applications, TechOps, Cloud Application Services (CAS) and Application Management Services (AMS).

Driving innovation in A&D with our unique differentiators

HCLTech's commitment to driving innovation in the aerospace and defense (A&D) sector is underscored by our unique differentiators. These elements set us apart and enable us to deliver exceptional value to our clients:

Robust controls and compliance: HCLTech has well-built controls in-place which align to the requirements prescribed in DFARS. We have seven ITAR-compliant facilities in US and are registered with Directorate of Defense Trade Controls (DDTC), USA, and Canada's Controlled Goods program (CGP) for secure export of controlled data between client sites and HCLTech locations, properly managed with all applicable export authorizations.

Proven track record: We have supported 28 Defense customers for HCLTech in US

across 43+ ITAR projects. We have invested ~\$15.5 M in setting up 5 local design centers with 3000+ employees.

Domain expertise: Our industry specific solution accelerators include: Base90, which is SAP qualified partner packaged solution ; Base90 PEO, with a focus on complex manufacturing ; iMRO/4 which is SAP enterprise asset management add-on for maintenance, repair and overhaul ; Plant workblaze, AI driven solution providing a comprehensive view of plant IT and OT ecosystems and MBE 2.0, a decision-making framework that helps A&D companies drive manufacturing digital transformation.

Strategic investments: HCLTech subsidiary Butler Aerospace and Defense operates as an independent company with a separate board of directors and an ITAR compliant focus on US Defense work. Butler Aerospace and Defense has FACILITY CLEARANCE (FCL) to work on classified contracts and hold personnel security clearances.

Cybersecurity for A&D: HCLTech drives innovation through its global network of co-innovation labs and design studios. Our Cybersecurity Fusion Center (CSFC) delivers cybersecurity and GRC services, and SAP DigiLabs focuses on SAP-centered product development.

Case study

HCLTech is migrating legacy applications to the gov cloud and external cloud for a US-based aerospace and defense manufacturer, ensuring InfoSec compliance.

Conflicting stakeholder needs, various operating systems and security concerns complicate things. Delays arise due to the client's infrastructure not being ready. InfoSec's slow approvals and changing security requirements add to the wait.

Outdated applications cause build and deployment issues. Limited test cases, tester availability and prioritization struggles make testing difficult.

Our solution helped the client modernize their IT infrastructure by migrating applications, servers, databases and data centers to the government cloud. The project involved upgrading and modernizing 50+ legacy applications (rebuilding, refactoring and replatforming cloud treatments), having a landscape of 200+ servers, 150+ databases and 6+ data centers to gov cloud. HCLTech provided end-to-end automation with automated build and collaboration tools for deployment and management. They also implemented a secure identity and access management system and ensured compliance with information security standards. This resulted in an 80% reduction in technical debt, 40% faster software delivery and improved efficiency and security for the client.

Recognition: A Trusted Leader in Cloud Services



Conclusion

As A&D companies develop or migrate & modernize their applications to cloud, HCLTech is uniquely positioned to be their digital partner. With a proven track record of delivering end-to-end Application Management as a Service (AMaaS) services to 350+ other clients across verticals, supporting ITAR, EAR, PII, GDPR, DFAR etc. based compliance requirements, we are well equipped to help A&D customers in every stage of their cloud modernization and transformation journey.

Our AMaaS capabilities are recognized and rated "Leader/Top Tier" by experts like ISG App Dev and Maintenance, Forrester App Modernization, Everest Application Transformation, ISG SAP HANA & Leonardo ISG SIAM/ITSM, Gartner Security Services.

We leverage our strong partnerships with software product vendors like Azure, GCP, AWS, IBM, SAP, Adobe, Infor and Oracle to provide a comprehensive suite of best practices, tools and accelerators keeping customers always at the forefront of digital transformation.

i <https://news.microsoft.com/2022/04/06/boeing-and-microsoft-deepen-partnership-in-digital-aviation/>

ii <https://press.aboutamazon.com/2022/4/boeing-and-aws-join-forces-to-transform-aerospace-design-and-manufacturing/>

iii <https://news.microsoft.com/2022/11/16/lockheed-martin-microsoft-announce-landmark-agreement-on-classified-cloud-advanced-technologies-for-department-of-defense/>

iv <https://news.sap.com/2023/01/sap-lockheed-martin-expand-25-year-partnership/>

v <https://www.lockheedmartin.com/en-us/news/features/2025/lockheed-martin-google-collaborate-to-advance-generative-ai-national-security.html>

Authors



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Atul brings more than 2 decades of experience in IT, Enterprise/solution architecture, services and delivery management. As part of HCLTech Digital business, he has been associated with Application Modernization and Migration services, pre-sales solution creation, validation, hyper scalers and go-to-market cloud solutions.



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Anshul Sharma, an A&D Industry Principal at HCLTech, is responsible for sales enablement and thought leadership initiatives. He has over 15 years of A&D experience, primarily in business research, presales and client account planning and in supporting large-scale digital transformations and go-to-market initiatives for A&D companies.

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HCLTech is a global technology company, home to more than 223,000 people across 60 countries, delivering industry-leading capabilities centered around digital, engineering, cloud and AI, powered by a broad portfolio of technology services and products. We work with clients across all major verticals, providing industry solutions for Financial Services, Manufacturing, Life Sciences and Healthcare, Technology and Services, Telecom and Media, Retail and CPG, and Public Services. Consolidated revenues as of 12 months ending March 2025 totaled \$13.8 billion. To learn how we can supercharge progress for you, visit hcltech.com.

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