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Rapid, Future-Ready IT Modernization in Defense Agencies

Transforming operations capability
and mission support with technology.

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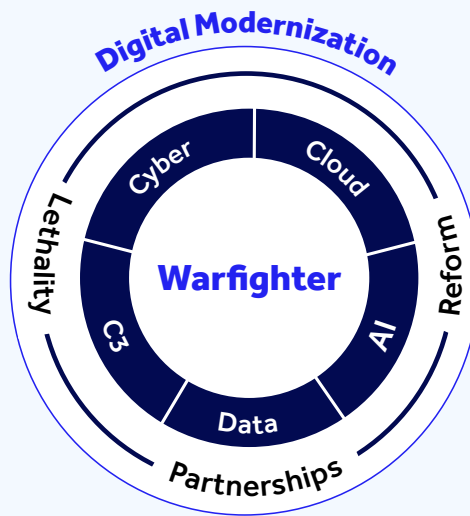
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The opportunity for a positive impact on the core mission.



The United States Department of Defense (DoD) and related agencies are driving an across-the-board IT modernization initiative. The [DoD Chief Information Officer's vision](#) is to create “a more secure, coordinated, seamless, transparent, and cost-effective IT architecture that transforms data into actionable information and ensures dependable mission execution in the face of a persistent cyber threat.” The US Army, for one, is leveraging their adoption of cloud, artificial intelligence (AI), and data analytics to form the IT backbone of their modernization initiatives across weapons, personnel, and strategy.

According to a [McKinsey](#) article on defense modernization among G7 nations, “one audit authority estimated the cost of systemic delays at 10% of the entire defense equipment budget. Clunky and bureaucratic acquisition processes, inaccurate initial cost or time estimates, and in-year budgetary pressures are all to blame. Typical procurement cycles for traditional weapons systems range from four to 30 years. Those for digital technology last around a year. Unless defense departments can radically change the way they acquire military equipment, they will simply be unable to keep up with the pace of technological change.”

Almost without exception, defense processes need to be revamped. To address issues, most departments add new processes, but older, redundant processes are never

discarded or reconfigured. All defense organizations need to make decisions rapidly, whether urgent or routine. Workflows are complex and unique—the processes for purchasing and equipping a nuclear submarine are very different from those needed to constantly supply food to a base or to upgrade office equipment or software. In order to be efficient, specific processes must be tailored to each defense agency and department.

There is a real opportunity to use up-to-date and actionable data—not just to make effective and strategic decisions, but to also drive down costs and delays. Analytics and AI/machine learning leverage data across silos to transform the way departments and their partner agencies, business stakeholders, warfighters, and civilians operate and interact. In addition, automating repeated and manual tasks enables warfighters, as well as civilians, to focus on higher priority and more value-added activities, leading to greater motivation among personnel and faster decision-making.

The DoD and its agencies are striving to transform their processes and systems to power flexible and rapid modernization, increase efficiencies with optimized operations, and build a foundational technology platform that can support their long-term needs.

The drive toward digitization and modernization.

In March 2021, US Secretary of Defense Lloyd Austin outlined his top priorities for the DoD, which included upgrading legacy IT systems and modernizing DoD technologies. “Where necessary, we will divest of legacy systems and programs that no longer meet our security needs, while investing smartly for the future,” Austin said. “In turn, we will improve the efficiency of the force and guarantee freedom of action in contested, complex operating environments.”

The DoD has multiple strategies to meet these priorities:

- **Enable automation and autonomy** to extend and complement human capabilities. Advantages include persistence, size, speed, maneuverability, and reduced risk to human life. The DoD targets seamless integration of diverse unmanned/mixed team capabilities that provide flexible options for the Joint Force.

- **Leverage AI** to enable US forces to operate more effectively and efficiently. This includes evaluating which processes and procedures can be enabled via adoption of AI technology to meet warfighter needs and defense priorities.
- **Move to enterprise cloud services** to provide scalable, flexible, and cross-domain capabilities to warfighters and civilians across joint forces.

The aim of all these strategies is to enhance and transform combat capability and mission support through IT modernization to enable DoD to conduct multi-domain operations (MDO) across an array of scenarios in multiple theaters.

To be successful, it is critical that these strategies are delivered by leveraging a trusted, credible technology with multiple successful implementations across departments and agencies behind it.



Defense technology challenges.

In the recent past, the US military was termed the most complex, bureaucratic, unwieldy organization in the world. Since then, a key priority for the military has been comprehensive IT modernization efforts. The organization focused on a new strategy to spur innovation by adopting cutting-edge technologies from the private sector and adapting them for military use. But there are many challenges facing the DoD and its agencies as they endeavor to deliver on their strategic IT modernization goals. Here are three of the most crucial:

Legacy systems – Legacy systems and platforms in DoD agencies are costly and ineffective, demanding more maintenance and upkeep and introducing more risk. The [National Defense Authorization Act for Fiscal Year 2022](#) includes a proposed mandate that would require each military service to initiate an effort to account for legacy IT systems, applications, and software. This is expected to remove redundant and unnecessary investments that can be retired or managed differently to free up funds that can be reinvested in other priorities.

Siloed data across multi-domain operations – The DoD hopes to leverage data as a strategic asset and transform into a data-centric enterprise. However, this is easier said

than done. Making data available across warfighting, intelligence, and business systems is essential to gaining an enterprise-wide view into the daily multi-domain operations of DoD, and absolutely critical to the success of both the 2022 National Defense Strategy and the 2019 Digital Modernization Strategy. Siloed data within DoD agencies must be unlocked and made easily shareable to improve readiness and overall mission success.

Cloud migrations – In 2018, DoD kicked off a plan to [migrate about 960 systems to the cloud](#) and shutter 60 data centers by the end of fiscal year 2021. Fourteen defense agencies and field activities are focused on cloud adoption and data center consolidation. According to DoD's [Information Technology Environment document](#), "The unnecessary complexity of this network and computing environment limits visibility and impedes the capability to securely share information and globally execute operations with mission partners. The current legacy environment offers too few enterprise and shared services. It is difficult to defend and costly to both operate and maintain."



The need for an adaptable, trusted platform.

The DoD and its agencies are in the process of implementing modernization initiatives. This transition requires operating with an application-driven approach. According to [Gartner's](#) "Top 10 Application Predictions Through 2025," how IT departments and organizations deliver services and modernize is changing. Adopting a value-driven, low-code, robotics/machine learning approach will make overcoming the challenges put forth by legacy systems, data silos, complex cloud and as-a-service journeys, and retiring knowledge workers and knowledge retention, more achievable. [Gartner](#) defines an enterprise low-code application platform as one that provides rapid application

development and deployment using low-code and no-code techniques such as declarative, model-driven application design and development together with the simplified one-button deployment of applications.

Over one million personnel are employed in key functional areas of the DoD. Of these functional areas, a workforce equivalent to 30 Pentagons is involved in supply chain and logistics, acquisition management, and human resources management. Here is a short list of core technology capabilities that will enable defense organizations to accelerate their IT modernization initiatives in these functional areas:

Acquisitions Management	Logistics Management	Workforce Management
<ul style="list-style-type: none">Contracting and program team collaboration across definition, review, and finalization of procurement requirements.Greater control and compliance through automation and machine learning for contract writing.Proactive management and tracking of funding, spending, and contract dates and automation for awards management.	<ul style="list-style-type: none">Automated defense logistics, asset data management, and cataloging with high data quality from flagpole to front line.Standardized processes for field resources and services management across the deployment lifecycle.Visibility into field activities and resolution status and real-time tracking of DoD fleet and assets.	<ul style="list-style-type: none">Automation across the DoD investigation life cycle with intelligent and integrated case management applications.Mobile CAC optimized across the enterprise with automated capturing, storing, and routing of all documents for recruiters.Onboard new warfighters, civilians, and contractors securely, post-adjudication, with speed and efficiency.

What defense departments and agencies need is a flexible low-code platform to build the workflows and process automations that best meet their requirements, without being tied to out-of-the-box, hard-coded process structures. "Data anywhere" should be a reality—that is, usable data should be accessible across sources without requiring movement of data.

Workflows and applications should work on-prem, in the cloud, or in hybrid environments that support the technology modernization, cloud migration journeys, and multi-domain operations. A platform approach that enables agencies to launch modernization initiatives with one or two processes and then grow the program across applications and organizations will also help them achieve mission objectives for efficiency and cost optimization.

Case Studies

Acquisition management | The US Air Force and CON-IT.

A screenshot of the CON-IT web application interface. The title bar reads "Create Solicitation for Requirement: A000001". The form is divided into several sections: "Basic Information" (including fields for Name, Solicitation Number, and Solicitation Title), "Solicitation Details" (including fields for Release Date, Release Type, and Release Status), "Sourcing Information" (including fields for Organization Name, Contact, and Address), and "Contract Details" (including fields for Contract Number, Contract Title, and Contract Status). The interface is clean and professional, with a blue header and a white background.

[The US Air Force's Contracting-Information Technology \(CON-IT\) program](#) is a model example of successful digital transformation within the DoD. Built on the Appian Platform, the enterprise-wide contract management system replaces seven disparate contract writing systems, standardizing the contract management process across the entire US Air Force.

The CON-IT platform supports worldwide contracting needs, including base operations, logistics, contingency, and weapons system contracting. The solution has been rolled out across the entire Air Force, with thousands of users managing every contract in support of every mission.

According to Mike Allen, the program manager responsible for this comprehensive initiative, "CON-IT is modernizing the contracting enterprise. CON-IT allows for audit transparency and is built on a modernized technical platform that resides in the cloud. CON-IT is faster and cheaper to maintain than legacy systems that are antiquated and have been mandated to retire. Our users are involved throughout development and deployment, and the feedback we've gotten so far has been exceptional."

The CON-IT solution expanded on a baseline from acquisition systems developed by the Defense Information Systems Agency (DISA). DISA's operationally proven contract writing solutions, leveraging an underlying low-code platform, automate the processes involved in offering, issuing, and managing a DoD contract. Modern contract management can be a deeply challenging undertaking without a foundational platform that is flexible and scalable enough to meet complex and stringent requirements. Multi-million-dollar DoD programs and initiatives have come to a halt because of a lack of agility and standardization.

CON-IT enables strategic sourcing and other acquisition efficiencies by normalizing data, business rules, and milestone tracking. Furthermore, CON-IT allows for a standardized and integrated method of anticipating and responding to changes in process, regulation, and technology across the contract domain.

Acquisitions management | The Robins Air Force Base HRT application.



The 402nd Software Maintenance Group (SMXG) at Robins Air Force Base (AFB) in Houston County, Georgia is a digital transformation leader. It chose the Appian Platform to quickly and cost-effectively design, develop, and deploy large-scale applications with low-code. The SMXG built its first Appian application, the [Hazard Reporting Tool \(HRT\)](#), and deployed it to 20,000 users in a single day. The application is used by every Robins AFB employee. It unifies data across legacy systems, providing a complete dossier on each case for better decision-making.

It captures every action and document for a comprehensive audit trail. The HRT gives Air Force leadership visibility into potential hazards, case status, and staff response across the base.

And the HRT application was just the beginning—it was the first application in a larger rollout of solutions built on Appian. Since then, SMXG has advised, developed, and deployed more than 40 applications on the Appian Platform for project management, peer reviews, quality assurance, auditing, squadron dashboards, purchase approvals, and talent management.

With the power of low-code and process automation, Robins AFB was able to institutionalize and standardize their processes. Appian lets them work more efficiently and allows status reporting to be done at the click of a button across systems and data sources.

Robins Air Force Base is one of three US Air Force Air Logistic Complexes and manages a wide range of aircraft, engines, missiles, software, and avionics and accessories components.

Logistics management | The US Marine Corps TDM-CATALYST project.



The US Marine Corps (USMC) operates installations on land and aboard sea-going amphibious warfare ships around the world. Several of the Marines' tactical aviation squadrons, primarily Marine Fighter Attack squadrons, are also embedded in Navy carrier air wings and operate from the aircraft carriers.

The USMC handles a great deal of mission-critical military material and equipment, including weapons, vehicles, radios, and tools, as well as subcomponents of equipment and supplies and parts for repair and replacement. Using Appian, the USMC launched a major logistics IT modernization effort called the [Technical Data Modernization \(TDM\)-CATALYST project](#) to create a modern cataloging and provisioning system of record. Provisioning and cataloging are critical logistics support processes.

Developed in just 18 months on the Appian Platform, this first-of-its-kind, agile application bridges the gap between acquisition activities and logistics processes to manage and automate the lifecycle of weapons systems and equipment.

These catalogs also hold information about the equipment configurations used by Marine Corps personnel, who provision parts and equipment for the warfighter. They use multiple sources to acquire, sustain, and dispose of items that support the warfighter.

Their legacy lifecycle process used one external and five separate internal IT systems to catalog and provision items. This led to massive inefficiencies, wasted hours, and inaccurate data. To solve this, the USMC laid out the following product vision proof points:

1. Implement a cloud-based, low-code, rapid application development and data platform.
2. Use the platform to build an application for the acquisition logistics and product support community to streamline and largely automate the provisioning and cataloging processes, improve data quality and visibility, and transform the user experience.
3. Plan future projects to rapidly redesign and integrate logically grouped legacy system and application functions and design features to automate new, unsupported business process segments, fast.



The CATALYST system provides a single, cloud-ready database for all acquisition logistics, one of the first applications on the Marine Corps Cloud environment. The new applications streamline user interaction, maximize automation, and drive robust validations that improve data quality across all USMC logistics processes. The efficiency of the system reduces time spent on cataloging and provisioning and empowers the Deputy Commandant for Installations and Logistics of the Marine Corps to accomplish their main goal of supporting the warfighter more effectively.

The cloud-based database is delivering the USMC enterprise Item Master capability to support configuration management and enhanced integration for the fleet's ground equipment, as well as to provide enterprise distribution of the Marine Corps' technical publications.

The Marine Corps realized many benefits as a result of this modernization. For example, in order to validate national stock numbers, users previously had to update 12 different systems, which took **6–8 months** and involved both catalogers and multiple agencies. There were frequent errors, out-of-date information, and duplicate orders. The new TDM-CATALYST system uses Appian data fabric to consolidate data from all systems in a single view, enabling users to complete the process in **24–48 hours**.

Acquisition management | Army Contract Writing System



The US Army built the Army Contract Writing System (ACWS) on the Appian Platform to improve contract writing capabilities for Army procurement. By leveraging the US Air Force's Contract Information Technology (CON-IT) application—a successful US Air Force program built on the Appian Platform—the Army was able to develop and deploy ACWS in just 23 weeks.

ACWS provides a single, next-generation, enterprise-wide system that standardizes Army procurement business processes. It seamlessly integrates with the Army's ERP system and other financial systems, providing an integrated view to stakeholders across the Army. ACWS is replacing Standard Procurement System/Procurement Desktop-Defense and the Procurement Automated Data and Document System.

During its initial deployment, ACWS will enable users to:

- Generate solicitation, award, and modification documents.
- Generate Procurement Data Standard-compliant transactions.
- Import vendors from the System for Award Management (SAM.gov).
- Integrate with the Procurement Integrated Enterprise Environment.

- Leverage Clause Logic Service to complete required clause interviews.
- Receive purchase requests from the Defense Enterprise Accounting and Management System.
- Connect to the Federal Procurement Data System to complete contract action reports.

ACWS significantly improves integrated contract writing capabilities for the contracting workforce, enabling faster, more efficient acquisitions to help the Army meet its mission. It will ultimately be used by 10,000 users at more than 280 sites worldwide.

ACWS users can anticipate further system integrations with the Virtual Contracting Enterprise and required financial systems, including the General Fund Enterprise Business System, Corps of Engineers Financial Management System, and the Logistics Modernization Program. Future capabilities will include additional support for construction contracting, the awarding of grants, cooperative agreements, major systems procurements, and secure contracting capabilities. These future integrations, built with agile methodology on the Appian Platform, will help achieve complete automation for faster and more efficient services and programs.

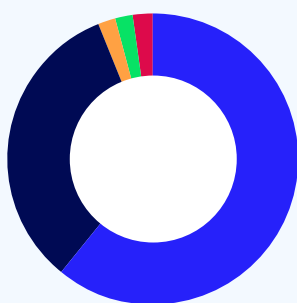
Choosing flexible, frictionless, future-proof technology.

The US Government Accountability Office ([GAO](#)) analyzed 65 federal legacy systems and identified the 10 most critical. The systems, which were being used at 10 agencies including the DoD, were eight to 51 years old and, collectively, cost about \$337 million annually to operate and maintain. GAO also found that the DoD was one of only two departments to have a comprehensive modernization plan.

But despite their plan, innovation at the DoD is stifled by technical debt—agencies are over-allocating resources

toward maintaining and trying to modernize their existing legacy infrastructure. Complex, brittle, and inflexible legacy software needs to be replaced with new technologies. Adopting new tech will not only lower the total cost of ownership of aging systems, it will also unify siloed data and help create efficiencies with smarter, integrated, automated processes. Taking advantage of emerging technology for future conflict will help organizations maintain a strategic edge.

What emerging IT area will be most impactful in the next 3-5 years?



AI (machine learning, RPA, chatbots)	61%
Low-code application development	33%
Internet of Things (IoT)	2%
Connected/Autonomous Vehicles	2%
Other	2%

According to [Gartner](#), "By 2025, 70% of new applications developed by enterprises will use low-code or no-code technologies, up from less than 25% in 2020."

An industry-leading platform for defense agency modernization initiatives should have the following capabilities:

1. **Low-code.** Rapidly and effortlessly develop customized applications with minimal coding for current requirements and changes.
2. **Automation.** Adopt machine learning and robotic process automation (RPA) bots to orchestrate personnel, systems, and data in a single workflow, scaling across your entire organization.
3. **Data fabric.** Access your data wherever it resides and make it widely integrated and usable with flexibility and speed.
4. **Process mining.** Discover bottlenecks more easily in your workflows. Optimize them from a unified platform, reducing the number of steps and time from insight to action.
5. **An application-as-a-service cloud-based model.** Enable cloud migrations to run on-prem, in the cloud, or in hybrid environments as you move along your cloud journey for multi-domain operations.
6. **Case management.** Jump-start your workflow modernization with connected, repeatable processes in acquisition management, logistics and asset management, global workforce management, and more.
7. **A trusted, future-proof system.** Start phased implementations and grow across agencies and domains to achieve longer-term modernization objectives.



Appian is a software company that automates business processes. The Appian AI Process Platform includes everything you need to design, automate, and optimize even the most complex processes, from start to finish. The world's most innovative organizations trust Appian to improve their workflows, unify data, and optimize operations—resulting in better growth and superior customer experiences.

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