



U.S. ARMY

2021

ARMY MODERNIZATION STRATEGY:

Investing in the Future



Army Modernization Strategy

The Army Modernization Strategy (AMS) describes how the Total Army – Regular Army, National Guard, Army Reserve, and Army Civilians – is transforming into a multi-domain ready force by 2035 in order to meet its enduring responsibility, as part of the Joint Force, to provide for the defense of the United States and retain its position as the globally dominant land power. The 2018 U.S. Army Modernization Strategy Report to Congress introduced the Army’s six materiel modernization priorities to make Soldiers and units more lethal to deploy, fight, and win our Nation’s wars. The 2019 AMS expanded the Army’s approach beyond those six priorities, outlining a more holistic approach to modernization while maintaining continuity of priorities. This 2021 version updates the AMS to meet Army Directive 2020-15 by including targeted modernization of sustainment; intelligence, surveillance, and reconnaissance (ISR) capabilities; and enduring, non-Cross Functional Team capabilities essential to the execution of Multi-Domain Operations. Modernization is a continuous process requiring collaboration across the entire Army. Therefore, while this AMS outlines an end state for the Army of 2035, Army modernization will remain ongoing as we must continue to test and refine operating concepts, draw on emerging technologies and organizational designs, and anticipate changes in the operating environment.

Army Modernization Framework

The primary end state of the 2021 update to the AMS, nested with the 2018 Army Strategy, is a **modernized Army** ready to conduct **Multi-Domain Operations** (MDO) as part of an integrated Joint Force. The MDO concept describes how the Army will support the Joint Force in the rapid and continuous integration of all domains of warfare – land, sea, air, space, and cyberspace – to deter and prevail as we compete short of conflict, and fight and win if deterrence fails.

To achieve this end state by 2035, the Army will modernize **how we fight, what we fight with, and who we are**. This approach integrates the elements of doctrine, organizations, training, materiel, leader development and education, personnel, facilities, and policy (DOTMLPF-P) within the Army, with other Joint Force elements, and alongside allies and partners. **How we fight** is the realm of concepts, doctrine, organizations, and training. **What we fight with** is characterized by materiel development and procurement, guided by the Army’s six materiel modernization priorities. **Who we are** encompasses our people, leader development, education, and 21st century talent management. Modernizing across each effort in a synchronized way will ensure the Army has well-trained Soldiers, organized into effective warfighting formations with modern weapon systems and sufficient capacity to win in any conflict, on any battlefield, anywhere in the world. These elements are interdependent and require corresponding updates to global force posture, facilities, and policies to ensure the Army’s modernization efforts remain synchronized over time and with the rest of the Joint Force.

The Army’s reform efforts have reduced bureaucracy and realigned funding towards our top priorities to enable these modernization efforts. The Army realigned elements of the modernization enterprise and established Army Futures Command (AFC) to lead modernization and bring unity of effort to the force design and development processes. Cross-Functional Teams

(CFT), subordinate elements of AFC, align requirements developers with acquisition experts and representatives from the testing, logistics, science and technology, and other communities, dramatically reducing the time span from identification of a capability gap to prototype testing and operational experimentation. In addition, the Army Rapid Capabilities and Critical Technologies Office (RCCTO) is uniquely chartered to deliver rapid experimental prototypes with residual combat capability in support of Army modernization priorities. The Army has also demonstrated its commitment to fully resourcing priority modernization efforts. Since 2018, the Army has realigned \$39.5B to ensure adequate funding for CFT and RCCTO signature efforts. Together, the realignment of the modernization enterprise and prioritization of funding, combined with feedback from the operating force, are the means by which we will execute the AMS.

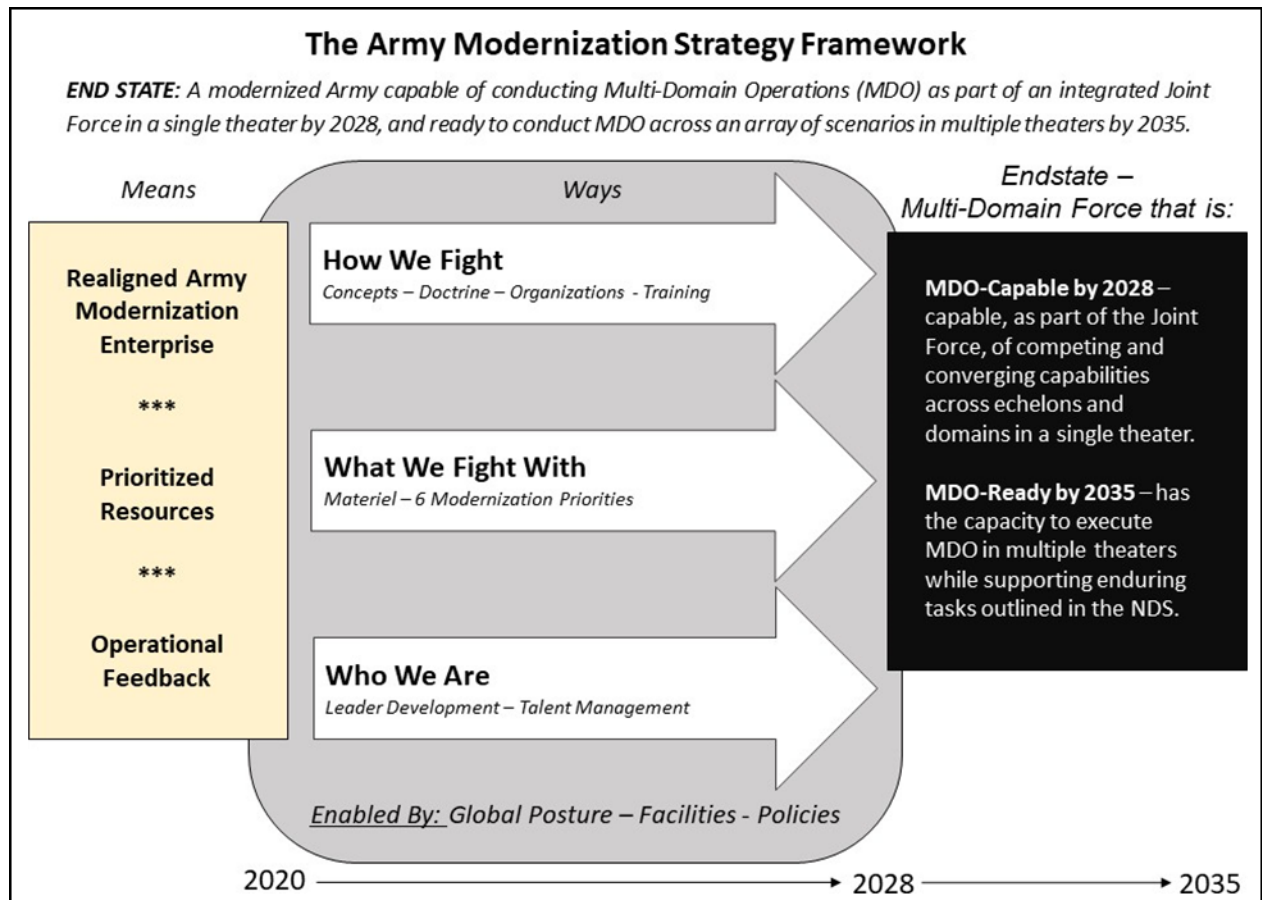


Figure 1. The Army Modernization Strategy Framework

The Strategic Environment: Renewed Great Power Competition in the Information Age

The 2018 National Defense Strategy (NDS) states that we must prioritize long-term strategic competition with China and Russia while deterring regional adversaries and sustaining irregular warfare competency. Future Operational Environment 2035-2050 describes how conflict is not the only kind of future contestation the Army needs to prepare for. Political, economic, social, and technological changes will continue to create challenges and opportunities for the U.S.

Army as we maintain our land dominance. Future warfare will only expand in geographic scale, domains, and types of actors while decision cycles and reaction times compress.

China is the Army's current "pacing threat." Rapidly modernizing its armed forces, China is projected to surpass Russia as our most capable threat this decade. China is one of the world's leaders in technological research and development. China is now conducting research into a wide range of militarily relevant technology including Artificial Intelligence (AI), hypersonics, robotics, swarming, advanced materials, bio-engineering, quantum information sciences, space technologies, biometrics, and other areas. An examination of the People's Liberation Army (PLA) highlights modernization is not just investment in technology; the PLA is undergoing the most comprehensive modernization effort since inception, to include readiness, training, education, and organizational change of the force. Their focus on anti-access and area denial (A2/AD) capabilities includes naval forces, cruise and ballistic missiles, and a formidable proficiency in cyber and space operations.

Russia remains our nation's most capable nuclear-armed threat in the near term. The Russian military has made considerable progress in reviving its capabilities to wage modern war, and it has capitalized on operational lessons learned from Crimea, eastern Ukraine, and Syria. Russia has unveiled new capabilities such as the use of proxies, unmanned and robotic systems, precision strike weapons, and sophisticated cyber capabilities. Russian Armed Forces continue to improve readiness through annual national-level and "snap" exercises, and continue to develop enduring capabilities, including extensive investments in artillery, rockets, and missiles, training of ground forces, electronic warfare, and chemical and biological weapons.

The United States faces these challenges alongside numerous allies and partners. Russia and China often compete with non-military instruments of national power, and many countries are increasingly concerned by their revisionist actions. The Army must continue to work closely with our longstanding allies and partners, and attract new partners that offer unique perspectives and capabilities, as we pursue this modernization approach. Leveraging foreign advanced technology and investment funding enables the Army to fill critical capability gaps and reduce overall modernization costs, thereby accelerating our modernization efforts. Alliances strengthen our military and political partnerships, signal that strength to deter potential aggression, increase interoperability and operational effectiveness, position forces and capabilities for future challenges, and refine our operational concepts and tactical practices.

Assumptions

This strategy is based on four key assumptions. Changes in any of these assumptions could affect the Army's strategic approach to modernization.

- The Army's budget will remain flat, resulting in reduced spending power over time.
- Demand for Army forces will continue to grow while we execute this strategy.
- Research and development will mature in time to make significant improvements in Army capabilities by 2035.

- China’s modernization programs are accelerating in terms of capability levels and timelines. Modernization programs of other adversaries will stay on their currently estimated trajectories.

The Strategic Approach: Maintaining our Priorities and Generating Momentum

The AMS supports the priorities outlined in the 2018 Army Strategy, which expresses the Army’s commitment to modernization while sustaining readiness for current operations. The six Army modernization priorities – long range precision fires, next generation combat vehicles, future vertical lift, network, air and missile defense, and Soldier lethality – remain constant.

Additionally, the Army will continue to reform its business processes, shifting from Industrial Age to Information Age approaches, and ensuring we have sufficient funds available for the Army’s modernization priorities. Our Congressional, defense industry, and international partners can remain confident that these priorities – and our focus – remain constant. A deliberate, synchronized approach that modernizes **how we fight, what we fight with, and who we are** will enable the Army to achieve irreversible momentum now to build the MDO ready force by 2035.

Modernization is a continuous process requiring collaboration across the entire Army, and Army Futures Command brings unity of effort to the Army’s modernization approach. AFC, under the strategic direction of Headquarters, Department of the Army (HQDA), develops and delivers future concepts, requirements, and organizational designs based on its assessment of the future operating environment. AFC works closely with the Army’s modernization stakeholders to integrate and synchronize these solutions into the operational force across the DOTMLPF-P. In addition to AFC, key Army stakeholders of the modernization enterprise include:

- **Headquarters, Department of the Army (HQDA)**, provides strategic guidance and direction, develops Army policies, prioritizes resources, and sets the strategic direction for the Army. Integrates and synchronizes Army efforts and Army Senior Leader decisions across all force modernization time horizons.
- **Assistant Secretary of the Army for Acquisitions, Logistics, and Technology (ASA(ALT))** is the supported organization for materiel acquisition, responsible for the delivery of modernization efforts to the warfighter.
- **Army Futures Command (AFC)**, is the supported command for Force Design, including the design of the AimPoint to bring about the MDO ready force of 2035, and is the supported command for Force Development, including development of the WayPoint of 2028, with direct support from the Combined Arms Center (CAC) and its subordinate Centers of Excellence (CoEs).
- **Training and Doctrine Command (TRADOC)**, with its functional Centers of Excellence, is the lead for doctrine development, development of operating force organization products, training, leader development and education, and acquiring and developing people.
- **Army Materiel Command (AMC)**, reorganized to include Installation Management

Command, will execute the modernization of facilities – the Army’s power projection platforms – to meet requirements for training, sustaining, projecting, and maintaining the future force. As the supported command for force sustainment and strategic divestiture, AMC ensures persistent modernization efforts are supportable to enable strategic readiness and unburdens the modernized force through divestiture of platforms no longer required.

- **Forces Command (FORSCOM)** plays a key role as the service force provider by enabling the Army to test, experiment, and draw on the insights of the operational force, while balancing readiness requirements for current operations and contingencies.

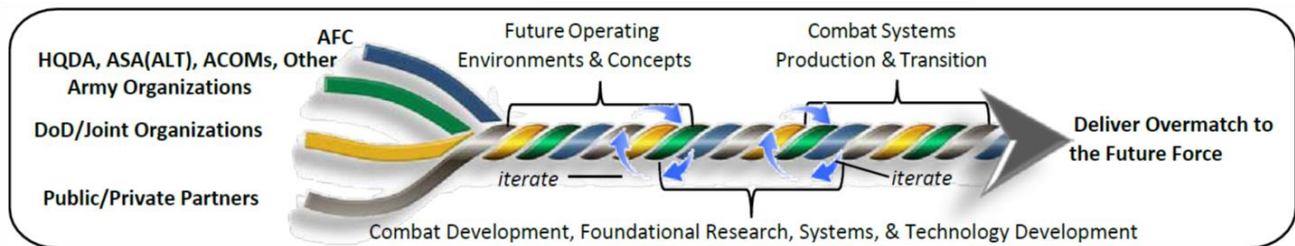


Figure 2. Integrating Modernization Across the Army

How We Fight

The Army will continuously update its doctrine, organizational designs, and training to conduct operations as a multi-domain force. The Army will continue to validate the MDO concept, and refine it as necessary. The Army will pursue every opportunity to rapidly integrate MDO into our evolving doctrine. The Regionally Aligned Readiness and Modernization Model (ReARMM) serves as the synch matrix to incorporate future capabilities into the force in a predictable, persistent manner, balancing current demands with future modernization. Additionally, the use of experimentation, war gaming, and analysis will inform the organizational design, materiel solutions, and training requirements for the MDO ready force. Units will train for MDO using the new Synthetic Training Environment capabilities at home station, and redesigned combat training centers will enable the collective training of units at echelon to conduct MDO.

Multi-Domain Operations

Near-peer competitors such as China and Russia seek to achieve their aims by using multiple layers of stand-off across all domains – land, sea, air, space, and cyberspace – to separate U.S. forces and our allies in time, geography, and function. They hope to deny our ability to project combat power, thereby creating de facto spheres of influence. Our competitors will do this through a combination of long-, mid-, and short-range weapons systems, conventional forces, integrated air defenses, electronic warfare and jamming, cyber-attacks, swarms of unmanned and autonomous systems, and denial of space-based capabilities, such as reconnaissance, navigation, and communications, as well as an array of political and informational tools.

To solve the problem of layered stand-off, the MDO concept describes how a strategically-

postured Army, operating as part of the Joint Force, will compete below the threshold of armed conflict, penetrate and exploit windows of opportunity to break through enemy standoff capabilities, and then return to competition on favorable terms. The MDO concept defines three tenets of multi-domain operations. The first tenet is “calibrated force posture” – a combination of forward presence, expeditionary capability, and access to joint, national, and partner capabilities. The second tenet is the use of “multi-domain formations” that have the capacity, capability, and endurance to maneuver and choreograph effects across multiple domains. The final tenet is “convergence” – the ability to rapidly converge effects from multiple domains, simultaneously and nearly continuously, using multiple forms of attack and redundant layered sensor-to-shooter networks enabled by robust mission command. An MDO capable force will allow the Army, as part of an integrated Joint Force, to expand the options available to civilian authorities, to include effective deterrence and competition short of armed conflict, or timely response to an attack attempting to permanently change the status quo.

Multi-Domain Formations

The Army must provide a full range of capabilities to enable the Joint Force commander’s ability to deter, compete, and if required quickly transition to armed conflict. Additionally, the Army must have enough expeditionary capacity available to provide follow-on forces to reinforce the theater if needed. These capabilities are collectively referred to as a “force package.”

The MDO capable force will consist of modernized formations that are strategically positioned and able to leverage national-level capabilities and authorities. The MDO capable force will combine tailorable formations of networked manned and unmanned platforms, fires, electronic warfare, cyber, intelligence, surveillance, reconnaissance, engineers, sustainment, communications, and protection capabilities at all echelons, from squad to theater.

The Army will build, employ, and refine the capabilities in the MDO force packages over time, based on continuous assessments of the strategic environment. This development will be driven by continuous operational testing and analysis – such as experiments with Multi-Domain Task Forces in both the European and Indo-Pacific theaters, regular war gaming and experimentation, and rapid and iterative capability assessments with units deployed and in the field. The Army will use the lessons learned from this experimentation to refine the design of future multi-domain formations.

Targeted Modernization of Sustainment

In order to deploy to the fight and support forces in the fight, the Army must modernize sustainment practices and capabilities as it builds the MDO ready force. The Army, as part of the Joint Force, excels at global power projection - the ability to convey overwhelming combat power around the world. This excellence hinges on a constantly aging network of roads, airfields, ports, railheads, sea and air strategic lift assets, and Army Prepositioned Stocks (APS). The Army is committed to targeted modernization of this complex network to assure power projection, maximize geographic flexibility, reduce response times to aid allies and partners, and protect national objectives. For forces in the fight, sustainment determines the depth, breadth, and duration of operations. Therefore, modernization of the sustainment warfighting function is required to ensure freedom of action, extend operational reach, and prolong endurance of

Soldiers and units in the field.

To maintain excellence in power projection and constantly improve sustainment of deployed forces, the Army seeks to leverage several advancements. The integration of sensor technology, remote diagnostics, artificial intelligence, machine learning, robotics, quantum computing, and enhanced network capabilities will deliver predictive and actionable analytics from the Strategic Support Area (SSA) to the forward point of contact. Alternative power propulsion systems, vehicle electrification, advanced manufacturing, power management, and battery power technologies that significantly reduce or eliminate fossil fuels will reduce the degree of sea and air strategic lift dedicated to energy resupply and improve maneuver force endurance and flexibility. Semi-autonomous ground resupply capabilities will provide flexible, responsive, and redundant sustainment to distributed operations while simultaneously mitigating the early entry and high operational tempo of U.S. Army Reserve and Army National Guard forces, which provide the preponderance of Army distribution capabilities. Development of materiel solutions that result in reduction of ammunition volume and weight will maximize strategic lift, lighten individual Soldier load, and decrease distribution requirements while investments in revolutionary propellants will make ammunition safer to handle and transport.

What We Fight With

The Army's six modernization priorities will drive materiel development for the MDO capable force. The whole is greater than the sum of the parts – it is the combination of these capabilities that will allow the Army to fight MDO.

- **Long range precision fires** enable multi-domain forces to penetrate and neutralize enemy A2/AD capabilities while ensuring military overmatch at every echelon.
- **Next generation combat vehicles** increase the firepower, speed, and survivability of land forces, allowing them to maneuver into superior positions on the battlefield and pair with robotic vehicles.
- **Future vertical lift** platforms and technologies increase the maneuverability, endurance, lethality, and survivability of Army aircraft – increasing their operational reach and effectiveness against near-peer competitors.
- The modernization of Army **network** technologies is necessary to command and control forces distributed across vast terrain, converge effects from multiple domains, and maintain a common situational understanding in MDO.
- Our competitors have invested heavily in their indirect fire and missile capabilities necessitating the modernization of our **air and missile defense** capabilities. New technologies will defend ground forces against adversary air threats, and will also defend ours and our allies and partners' infrastructure against a host of air and missile threats.
- Finally, efforts modernizing **Soldier lethality** will increase the capability of individual Soldier weapons, provide Soldiers with enhanced night vision, and increase their ability

to quickly understand and react to emerging situations – increasing their lethality, precision, and survivability. These efforts will be complementary to ongoing Soldier performance initiatives to improve fitness, nutrition, and resiliency, to ensure we are modernizing the Soldier, not just the equipment for our Soldiers.

Army Futures Command's CFTs enable the modernization priorities. CFTs bring together the major stakeholders – requirements, acquisition, science and technology, testing, and logistics – to work together to develop requirements in support of MDO in a timely manner. Early prototyping, testing, and touch points with Soldiers from the operational force help ensure that the solutions generated are the right ones. The eight CFTs align with the Army's six modernization priorities, plus two enabling areas – assured positioning, navigation, and timing (PNT) and the synthetic training environment (STE). As a component of a persistently modernizing Army, CFTs will adjust as technology advances and our competitors adapt. In addition, Army forces will require targeted, incremental modernization of key enabling programs in order to field an MDO ready force. As the thirty-one CFT signature efforts are fielded, some current systems will be upgraded to provide complementary overmatch capabilities.

In addition to the thirty-one CFT efforts, the RCCTO also leads four signature efforts to enable Army modernization priorities. These efforts include Hypersonics, Mid-Range Capability, and Directed Energy for both Maneuver-Short Range Air Defense (M-SHORAD) and Indirect Fire Protection Capability (IFPC). The RCCTO is prototyping a land-based, Long Range Hypersonic Weapon (LRHW) to deliver residual combat capability to Soldiers by FY23. The RCCTO is also developing a ground-launched, prototype Mid-Range Capability for delivery to an operational battery in FY23. The LRHW and MRC are complementary to other critical systems in the Army's Long Range Precision Fires portfolio. As lead for Army directed energy efforts, the RCCTO is prototyping the Directed Energy Maneuver-Short Range Air Defense (DE M-SHORAD), a Stryker-mounted, 50 kilowatt (kW)-class High Energy Laser (HEL) weapon system, which will deliver residual combat capability to maneuver units in FY22. Finally, the RCCTO is also prototyping an Indirect Fire Protection Capability-High Energy Laser (IFPC-HEL), a 300 kW-class laser system for fixed and semi-fixed site defense, which will be fielded in FY24.

The Army may not succeed on the first demonstration and experimentation for every system, but we will learn and rapidly adjust programs and concepts. Key to developing the technologies necessary to meet our modernization goals is encouraging a culture of innovation within the Army, and forging new partnerships with traditional and non-traditional industries, academia, and other partners. We will use adaptive acquisition approaches that leverage the full scope of Congressional authorities, such as Middle Tier Acquisition, to accelerate development, production, and delivery of materiel capabilities. We will also use innovative contracting tools, such as Other Transaction Authorities and Cooperative Research and Development Agreements, to foster innovation and encourage American small and medium enterprises to help meet current and future needs of our Soldiers. We will employ a deliberate and balanced approach to intellectual property (IP) that will make us more sophisticated customers, enabling us to access creative technologies emerging from the private sector while still protecting IP.

In addition to shifting the way the Army approaches acquisition, we will also fundamentally change the way we develop materiel capability. Advanced manufacturing methods and materials will be incorporated into system design, development, production, and sustainment. Adoption of

CFT and RCCTO Signature Efforts

Long Range Precision Fires (LRPF)	<ul style="list-style-type: none"> • Extended Range Cannon Artillery (ERCA) • Strategic Fires • Precision Strike Missile (PrSM)
Next Generation Combat Vehicle (NGCV)	<ul style="list-style-type: none"> • Optionally Manned Fighting Vehicle (OMFV) • Armored Multi-Purpose Vehicle (AMPV) • Mobile Protected Firepower (MPF) • Robotic Combat Vehicle (RCV)
Future Vertical Lift (FVL)	<ul style="list-style-type: none"> • Future Attack Reconnaissance Aircraft (FARA) • Future Long Range Assault Aircraft (FLRAA) • Future Unmanned Aircraft System (FUAS) • Modular Open Systems Approach (MOSA)
Network	<ul style="list-style-type: none"> • Unified Network • Command Post Common Operating Environment (COE) • Interoperability (Joint/Coalition-accessible) • Command Post Mobility/Survivability
Assured Positioning, Navigation, and Timing (APNT) <i>Enabling Area</i>	<ul style="list-style-type: none"> • Assured Positioning, Navigation, and Timing (APNT) • Navigation Warfare (NavWar) • Tactical Space
Air and Missile Defense (AMD)	<ul style="list-style-type: none"> • Army Integrated Air and Missile Defense (AIAMD) • Maneuver – Short Range Air Defense (M-SHORAD) • Indirect Fire Protection Capability (IFPC) • Lower-Tier Air and Missile Defense Sensor (LTAMDS)
Soldier Lethality	<ul style="list-style-type: none"> • Enhanced Night Vision Goggle-Binocular (ENVG-B) • Integrated Visual Augmentation System (IVAS) • Next Generation Squad Weapon – Rifle (NGSW-R) • Next Generation Squad Weapon – Automatic Rifle (NGSW-AR)
Synthetic Training Environment (STE) <i>Enabling Area</i>	<ul style="list-style-type: none"> • STE Information Systems - Training Simulation Software (TSS), Training Management Tools (TMT), and Live Mission Command • Reconfigurable Virtual Collective (Air/Ground) Trainers (RCTCT-A/G) • Soldier Virtual Trainer (SVT) • Squad Immersive Virtual Trainer (SiVT) • One World Terrain
The Army Rapid Capabilities & Critical Technologies Office (RCCTO)	<ul style="list-style-type: none"> • Long-Range Hypersonic Weapon (LRHW) • Directed Energy (DE) for M-SHORAD • High Energy Laser (HEL) and High Power Microwave for IFPC • Medium-Range Capability (MRC)

Figure 3. Current CFT and RCCTO Signature Efforts

these advanced technologies throughout a system’s lifecycle will allow us to quickly develop the next generation of weapons systems and maintain overmatch against near-peer adversaries.

Finally, investing in digital transformation and the modernization of the Army’s underlying network and computer infrastructure is essential to our success. Specifically, the Cloud is the foundation for this entire modernization effort. The Army will develop cloud computing technologies, improve data access and sharing environments, and streamline software development tools and services. Together, these technology investments will allow the Army to take advantage of emerging machine learning and AI technologies and applications to understand, visualize, decide, and direct faster than our competitors. By leveraging the Cloud, open-architecture information can flow rapidly between the enterprise and Soldiers on the ground. This will enable commanders to counter adversaries in the information environment as effectively as they do in physical domains and win in the cognitive space.

Targeted Modernization of Intelligence, Surveillance, and Reconnaissance (ISR) Capabilities

The goal of developing future ISR capabilities is to provide commanders situation awareness and understanding across all warfighting domains, leading to the accomplishment of objectives in competition, crisis, and conflict through the targeted employment of CFT signature efforts and enduring capabilities. The Army has created an ISR Task Force to leverage emerging technologies, drive the development of requirements for fielding of new capabilities, and support the reform of intelligence processes, policies, and procedures. The Task Force will shape requirements for an ISR framework that leverages the optimal mix of organic collection systems and access to data from National, Joint, and Coalition Partner collectors to support commanders' situational awareness and long-range precision targeting requirements during Multi-Domain Operations.

The ISR Task Force seeks to modernize four layers of ISR. The Terrestrial Layer shapes requirements for ground-based intelligence, electronic warfare, and cyber capabilities to tactical commanders. The Aerial Layer shapes requirements for multi-intelligence sensor capabilities to commanders using both manned and unmanned aerial platforms to extend range. The Space Layer shapes requirements for current and emerging space-based intelligence capabilities to tactical commanders. The Foundation Layer shapes requirements for the nexus between Intelligence and Operations, operationally synchronizing capabilities across the other three layers consistent with requirements for Multi-Domain Operations. All four layers will include a counterintelligence and security component to help protect U.S. advantage in MDO.

Targeted Modernization of Enduring Capabilities

Transformation of the Army into an MDO ready force by 2035 will not come about by CFT signature efforts alone. To complete the transformation, enduring operational and institutional capabilities will also be targeted for modernization. All capabilities - CFT signature efforts, enduring capabilities identified as crucial to achieving MDO readiness, CFT key enablers and critical components, capabilities and capacity associated with proposed solutions to operational challenges, and enduring operational and institutional capabilities - will compete for resourcing. Investments will be made based on an assessment of operational benefit and the health – affordability, schedule, and technical viability – of each program.

Key enablers of CFT signature efforts include critical components - improved power plants, information systems, munitions - and support equipment, such as radar or sustainment platforms. Without these key enablers, the Army will not be able to deliver the full potential of each new capability to the warfighter.

To execute MDO at theater-scale, the Army is pursuing solutions to a range of operational challenges. Examples include solutions to remedy how the Army provides command and control to multiple Corps in a single theater of operations, protects forces as they maneuver from assembly areas to close contact, integrates electronic warfare and cyber capabilities at the Brigade Combat Team, optimizes Division headquarters for theater-scale ground combat against near-peer competitors, or prepares to fight and win in the future operating environment, which may include chemical, biological, radiological, and nuclear (CBRN) and industrial hazards.

The Army will leverage defense-wide investments to maintain pace with evolving and emerging threats. These defense-wide efforts must support adaptive capability development with S&T; an increased understanding of pathogens that are novel or genetically engineered; improving prophylaxis and therapeutics to mitigate the effects of Chemical Warfare Agents/Biologics/Industrial Chemicals; develop capabilities that reduce the number of Soldiers who must operate within such hazard areas; and protect Soldiers who must operate within such hazard areas. These operational challenges, among others, are being resourced, reevaluated, and resolved.

Additionally, enduring institutional capabilities require targeted modernization to shift the Army from Industrial Age to Information Age approaches. The Army Organic Industrial Base (AOIB), a subset of the larger Defense industrial base, must have the capability and capacity to sustain fielded systems, maintain pace with Army modernization efforts, and surge to support MDO at theater-scale. 2020 presented unique challenges that reinforced how a resilient supply chain is a fundamental necessity to meet the materiel needs of the current and future force. The Army will create sustainment breadth and depth by eliminating single points of failure in the industrial base that could disrupt our ability to provide resources to the warfighter. Expedited and increased introduction of new combat systems also makes the capabilities more vulnerable to compromise by information becoming available to adversaries, building increasing stress on the Army Security Enterprise to protect critical technologies that will ensure uncompromised delivery of modernized capabilities in MDO. Moreover, to keep the Army on a stable sustainment readiness footing and make informed decisions based on real-time, global visibility of equipment and supplies, the Army must invest in data analytics and an agile and resilient networked materiel enterprise system. Acquiring these tools and technologies will enable the Army to quickly identify gaps, shortfalls, and backlogs. Finally, installations must be capable of supporting current and evolving readiness needs. The Army continues to seek ways to improve and protect Army installations to ensure power projection and allow Soldiers to focus on, and effectively train for, their warfighting mission.

Who We Are

The Army has always relied upon capable and highly trained Soldiers. The complexities of emerging technologies and the global security environment, and the sophistication of our MDO concept, make that reliance all the greater. As more fully articulated in the 2019 Army People Strategy, the Army will update its leader development and education processes to increase critical, creative, and systems thinking so that the next generations of Army leaders and warfighters are prepared for the complexities of MDO. We will use talent management principles to transform our personnel systems to maximize individual knowledge, skills, behaviors, and preferences that help our Soldiers and Civilians reach their full potential. Additionally, we will continue to explore more flexible talent management approaches and opportunities that ensure the Total Army has the talent it needs for the future environment. Finally, the new Squad Performance Model will use performance metrics to evaluate how modernization efforts are improving lethality at the Soldier level.

The Army will always fight as a member of the Joint Force alongside allies and partners. Partnerships are key to great power competition, and our nation's allies and partners give us an important asymmetric advantage. The knowledge that we are prepared to fight together, and that we are willing to do so when needed, is a powerful deterrent to potential adversaries.

As part of our modernization effort, we will seek opportunities to develop concepts and capabilities with our allies and partners. We will strengthen not only technical interoperability, but also human and procedural interoperability, to ensure that we can fight as one team. We will use exercises, training opportunities, and leader exchanges to strengthen that interoperability, and to refine our approaches to MDO as a Joint and combined force.

Supporting Efforts

By 2022, the Army will determine the calibrated force posture it needs for MDO – the combination of forward presence, expeditionary capacity, and access to national level assets. Strategic force posturing will be accompanied by the delegation and synchronization of those authorities necessary to conduct MDO.

The Army will also modernize its installations and facilities to support new technologies and materiel that enable MDO, and will develop more efficient, effective, and resilient systems to support how we mobilize, protect, project, and sustain expeditionary forces from the SSA. Army Prepositioned Stocks mutually support modernization and expeditionary capability to provide strategic flexibility for MDO. Furthermore, our installations and organic industrial base will modernize to support readiness, mobilization, and surge requirements for conflict, and to support the equipment developed by the CFTs and RCCTO and fielded to the Total Army.

Additionally, MDO requires an ongoing reassessment of existing policies and authorities across three broad areas: access, surveillance, and employment. Army forces require access to military and civilian networks that enable surveillance, deception, and protection operations in competition

Army Priority Research Areas
1. Disruptive Energetics: Greater than 2x energetic energy over smaller footprints.
2. RF Electronic Materials: Taking advantage of optical and thermal properties of diamond materials.
3. Quantum: Optimized information transfer, sensing, and communication with unparalleled security.
4. Hypersonic Flight: Aerodynamics, materials, and processes.
5. Artificial Intelligence: Increasing speed and agility in which we respond to emerging threats.
6. Autonomy: Maneuverability and off-road mobility of platforms.
7. Synthetic Biology: Reactive and responsive skins/spectrally selective materials/anti-materiel properties.
8. Material by Design: Protection overmatch against future threats.
9. Science of Additive Manufacturing: For next generation munitions for increased range and lethality.

Figure 4. Army Priority Research Areas

and armed conflict. If competition escalates into armed conflict, Army forces must have the ability to rapidly employ capabilities such as electronic attack, offensive cyberspace and space, and lethal strike.

Finally, the Army conducts relevant, transformative research rooted in the tenets of discovery, innovation, and transition to deliver science and technology (S&T) solutions. Army S&T maintains focused investments in basic and applied research. The Army will execute an investment strategy that delivers underpinning knowledge and technology which addresses the elements of force modernization. To support this effort, the Army is aligning its research centers and laboratories to priority modernization efforts and developing external partnership agreements. For example, AFC has cooperative agreements with Texas A&M University for hypersonics, University of Texas-Austin for robotics, and Carnegie Mellon University for artificial intelligence. Army S&T will continue to have a heavy emphasis on mid- and far-term capabilities, through threat based, concept driven and capability informed work.

Resourcing

The Army reinvigorated its budgeting processes and realigned \$39.5B over the past three years to fund the six material modernization priorities, new organizations, training upgrades, facilities improvements, and other associated modernization efforts. This was an important start, but the costs of modernization while maintaining readiness are only going to grow as systems enter low-rate initial production and then procurement. The Army must continue to find savings through reform initiatives to ensure we have the resources available to develop and scale systems. For example, the Army will take a deliberate approach to transitioning equipment to sustainment based on business case analyses. This entails assessing our capability needs, acquisition programs, and existing systems to determine the most economical sustainment approach. In many cases, it will result in forgoing additional incremental upgrades to legacy systems. The Army will also divest select legacy programs to support modernization priorities.

Towards an MDO Ready Force: The Temporal Framework to 2035 and Beyond

Multi-Domain Operations will fundamentally transform the Army. Implementing new formations and capabilities will occur over three periods of change. These periods are intended to institutionalize annual re-evaluation of Army modernization, enable informed decision-making, and link Force Design activities – which generally focus 5-15 years into the future to design operational and functional concepts that address the future operational environment and its anticipated threats – to Force Development activities – which generally focus 2-7 into the future – to mature concepts into an integrated force. Continued flexibility, experimentation, learning, and adjustment will ensure the Army fields the MDO ready force of 2035 and continues to achieve emerging conceptual milestones in decades beyond.

Now to FY2028

This period is already exhibiting rapid change as the Army tests and fields first solutions. During this period, the Army will begin fielding CFT and RCCTO signature efforts and move toward the first WayPoint in 2028, the MDO capable force. This WayPoint, informed by concept testing, experimentation, and analysis to validate and refine elements of the MDO concept, will provide the

force development foundation as the Army adapts formations to incorporate the modernized equipment required to execute MDO and achieve an MDO ready force by 2035. The Army will also shift its training paradigm to meld sophisticated live, virtual, and synthetic environments while transforming existing training centers to simulate multi-domain environments for echelons above brigade. MDO best practices, demonstrated by warfighters during hands-on testing and experimentation, will continue to be incorporated into doctrine.

FY2029 to FY2034

This period will see the Army build upon the MDO capable force as it moves toward its initial AimPoint, the MDO ready force of 2035. The Army will extend the fielding of CFT signature efforts across Army formations, both in numbers and to tactical, operational, and theater/strategic echelons. Informed by the Future Operational Environment 2035-2050, the Army will continue developing, testing, and refining operational approaches that integrate new technologies.

FY2035 and Beyond

This period will likely bring extensive changes in warfare's character with the adoption of new, disruptive technologies and the increased military capabilities of other great powers. The AimPoint 2035 concept intends to answer how the Army, as part of a globally postured Joint and Combined force, will employ landpower using emerging technologies and tactics during armed conflict against a peer adversary in an environment characterized by contested domains, rapid machine-enabled decision-making, and human-machine teaming. Even now, the Army is developing the core of this future, operational-level concept to explain how the Army could fight, with what it could be equipped, and how it could be organized to deter, compete below the threshold of conflict, and transition to crisis. As the operational environment and character of war continue to evolve, the Army will identify challenges it must address and the next opportunities it should pursue. Successive operational concepts, oriented on these emerging challenges and opportunities, will provide iterative re-evaluation of the Army's persistent modernization and provide deliberate decision-points for future Army leaders.

Risk

The United States has accumulated substantial strategic risk over the past few decades to our ability to maintain land dominance against great power competitors, as we focused on developing capabilities to counter insurgent and terrorist threats. The 2021 update to the AMS builds on the Army's recent efforts to reduce that risk by maintaining clearly identified modernization priorities, and making difficult, but necessary choices to ensure sufficient funding for priority materiel solutions. While the AMS mitigates those risks, it introduces others, which Army leaders will actively mitigate.

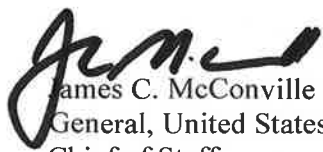
- **Readiness.** Readiness risk increases as resources are prioritized toward modernization efforts. The Army has no choice but to do both – remain ready and modernize. Increasing the resources devoted to program development to support modernization is likely to put pressure on the resources available for near-term needs.

- **Capability.** Capability risk increases as we transition legacy systems to sustainment and introduce new combat systems, at relatively greater volume, and in a relatively short period of time. These transitions will stress the Army’s logistical system. They will also stress the training enterprise, which will have to support new training requirements from the Army’s generating and operating forces. Capability risk also increases if modernization initiatives are delayed or compromised. The organizational and materiel initiatives supporting MDO are designed to be inter-dependent, and changes or delays in one area are likely to affect the overall synchronization of DOTMLPF-P effort.
- **Infrastructure.** Infrastructure risk increases if the Army does not modernize facilities at pace with new weapons systems and formations. These transitions could stress installations with unplanned infrastructure requirements, which could put fielding timelines at risk. Modernized facilities provide the supporting infrastructure to fully capitalize on new technologies. The Army will plan for upgrades and changes to maintenance facilities, motorpools, network infrastructure, administrative facilities, housing, barracks, secure facilities, training facilities, ranges, maneuver land and airspace, and utilities to keep pace with other modernization efforts and mitigate this risk.
- **Budget.** Budget risk increases if funding decisions are delayed, risking early industry commitment to identified programs and competition, and requiring additional funding from the Army budget. Trade-offs exist between science and technology advancements and DOTMLPF-P activities until technologies are available to achieve the required capabilities of MDO. Solutions along all elements of DOTMLPF-P must mitigate materiel shortfalls in order to produce a MDO ready force by 2035.

Conclusion

The Army is transforming, and the 2021 update to the Army Modernization Strategy lays the foundation for Army modernization - how we will develop a force ready for Multi-Domain Operations, and how we will set conditions to remain a continuously modernizing Army. The Army will synchronize modernization efforts using the Annual Modernization Guidance, which will be published as an annex to the Army Planning Guidance. Successful implementation of this strategy requires a whole Army effort, with HQDA and each Army Command playing a key role in close coordination with the Joint Force, Congress, allies and partners, industry, academia, and other partners. If we modernize effectively, efficiently, and persistently, the Army can do its part to ensure we are prepared to compete, deter, fight and win when our Nation calls.


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