

# ARMY EQUIPMENT MODERNIZATION STRATEGY

***Equipping the Total Force  
to Win in a Complex World***

MARCH 2015

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## Foreword

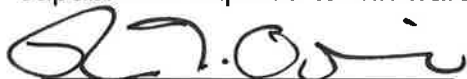
The 2014 *Quadrennial Defense Review* identifies 11 mission areas in which the Army plays a significant role to support U.S. policy in a rapidly changing security environment. The Army must be manned, equipped and trained to prevent conflict, shape the security environments and win wars. When adequately tailored, the Army, as part of the Joint Force, provides multiple options, integrates efforts of multiple partners and operates across multiple domains to present enemies and adversaries with multiple dilemmas.

The *Army Operating Concept*, October 2014, identifies the first order capabilities the Army needs to meet these challenges. This *Army Equipment Modernization Strategy* describes how the Army will apply resources to adapt materiel in the near-term, evolve programs in the mid-term and innovate with Science and Technology for the long-term.

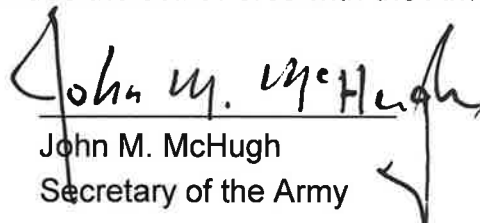
In the near-term through FY 2020, the Army will use existing capabilities in new ways, modify and adapt capabilities to respond to new needs and more rapidly exploit new opportunities with innovative approaches. The Army must adapt faster than enemies and potential adversaries. In the mid-term, FY 2021-2029, the Army will evolve capabilities to retain overmatch and enhance expeditionary maneuver to rapidly deploy and conduct operations with ample duration and sufficient scale to win. For the long-term, the Army will innovate with less mature, but promising technologies to sustain Army asymmetric advantages and achieve significant leaps in warfighting efficiency and effectiveness.

The *Army Equipment Modernization Strategy* applies the first principles for technological development which emphasize the integration of technology with Soldiers and teams to *Enhance the Soldier for Broad Joint Mission Support*. Our Soldiers and our foundational tactical formation, the Squad, must *Remain Prepared for Joint Combined Arms Maneuver* to defeat enemies at close quarters in urban and complex terrain. Our formations must possess the right combination of mobility, protection and lethality to fight and win. This strategy seeks to simplify systems, maximize reliability, describe equipment that ensures the capacity and readiness to accomplish any mission and reduce logistical demands and life cycle costs. It ensures interoperability and anticipates enemy countermeasures and *Enables Mission Command* by investing in a network with agile and expeditionary tactical command posts that are supported by a more robust home station architecture.

The *Army Equipment Modernization Strategy* describes the materiel capabilities, which combined with leadership, skilled Soldiers and well-trained units, retains the U.S. Army's differential advantage over enemies and provides the Joint Force with the Army capabilities required to win wars.



Raymond T. Odierno  
General, United States Army  
Chief of Staff



John M. McHugh  
Secretary of the Army

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Army Equipment Modernization Strategy  
*Equipping the Total Force to Win in a Complex World*

**Table of Contents**

Overview	2
Strategic Environment	5
Equipping Implementation of the <i>U.S. Army Operating Concept</i>	6
Risk Mitigation of Fiscal Realities	8
Path Ahead	10
Annex A: Soldier	11
Annex B: Mission Command	15
Annex C: Intelligence	19
Annex D: Maneuver	22
Annex E: Aviation	25
Annex F: Indirect Fires	28
Annex G: Air and Missile Defense	31
Annex H: Protection (Assured Mobility)	34
Annex I: Protection (Force Protection and Chemical, Biological, Radiological, Nuclear and High Yield Explosive (CBRNE))	37
Annex J: Sustainment (Transportation)	40
Annex K: Sustainment (Service Support)	43
Annex L: Operational Energy	46
Annex M: Army Medicine	49
Annex N: Science and Technology	52
Annex O: References	56
Annex P: Acronyms	57

Army Equipment Modernization Strategy  
*Equipping the Total Force to Win in a Complex World*

## **Overview**

*“We must ensure that the Army stays manned, postured and equipped in order to contribute to the Joint Force and protect our Nation’s interests.”<sup>1</sup>*

The *Army Equipment Modernization Strategy* nests with *Army Strategic Planning Guidance* (ASPG) and the *U.S. Army Operating Concept* by incorporating its framework for building the future force. The U.S. Army remains the world’s decisive land force. Soldiers and units operate as part of joint, inter-organizational and multinational teams. The Army protects the homeland, prevents conflict through regional engagements, shapes security environments and gives our political leadership multiple options for crisis response. To execute our equipment modernization strategy we must adapt in the near-term (Fiscal Year (FY) 2016-2020), evolve in the mid-term (FY 2021-2029) and innovate for the long-term (FY 2030-2045). In the near-term, the Army must adapt faster than enemies and potential adversaries. The Army must develop materiel solutions much faster than in the past to counter the ease and speed of technology transfer and adaptation by enemies. Adaptation in the near-term will largely consist of changes to doctrine, policy, leader development and training which may occur quickly and with limited monetary cost. Equipment adaptation in the near-term may consist of Engineering Change Proposals (ECP) and exploitation of technology opportunities to restore capabilities. In the mid-term, Army equipment modernization focuses on increasing expeditionary qualities, addressing overmatch and restoring the balance of mobility, lethality and protection for combat vehicles and formations. For the long-term, the Army invests in Science and Technology (S&T) and applied research for significant improvements to capabilities, addressing warfighting challenges and capability gaps, for asymmetrical advantages.

The Army must be equipped to win in a complex world across multiple mission sets, under widely varied conditions, in unforgiving geographies and against evolving threats. The strategic environment is complex, meaning that it is unknown, unknowable and constantly changing. In 2014, the Army had to rapidly

**Complex is defined as an environment that is not only unknown, but unknowable and constantly changing<sup>2</sup>**

respond to assure our allies in Europe by expanding our regionally aligned forces to respond to the deteriorating situation between Russia and the Ukraine; deploy to conduct humanitarian assistance in Africa in response to the Ebola crisis; and deploy to deter our enemies in the deteriorating security environment in Iraq. These three diverse, yet critically important missions highlight that our Army and our Army’s equipment needs to be effective as the foundation of the Joint Force in diverse environments and mission sets, be tailorable and scalable to different formations and support equipping demands across all warfighting functions.

As the Army continues to balance end strength, current force readiness and equipment modernization, we have chosen to accept mid-term risk in equipment

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<sup>1</sup> General Raymond T. Odierno, Association of the United States Army, 14 October 2014.

<sup>2</sup> The U.S. Army Operating Concept: *Win in a Complex World*, 31 October 2014, pg. iii.

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*Equipping the Total Force to Win in a Complex World*

modernization. The Army cannot afford to equip and sustain the Total Army with the most modern equipment; therefore we must acknowledge fiscal realities and we will selectively modernize equipment and formations. We will mitigate risk to our forces and mission accomplishment through sustained S&T investments, leveraging our current fleets by investing in incremental improvements and building new only by exception and delaying our next generation of platforms until they are both affordable and cost effective. Force 2025 and Beyond (F2025B) is executing a Campaign of Learning (CoL) to examine Army Warfighting Challenges that will inform Army modernization investment decisions. This effort will recommend the highest operational value capabilities and recommended “capability trades” enabling these investments. To ensure capability improvements and asymmetrical advantages, the Army will invest the majority of our S&T dollars where we are “technology makers” (i.e., lethality, lightweight armor, rotary aircraft, watercraft and Intelligence, Surveillance and Reconnaissance (ISR)) and assume risk where we are “technology takers” (i.e., information technology, fixed wing aircraft) and can capitalize on commercial sector advances. We will optimize our procurement capacity, incrementally improving systems, while maintaining the industrial base and always having the ability to scale up to defeat any adversary when large scale deployment or mobilization is required. Finally, we will minimize our developmental costs by capitalizing on our S&T; this ensures technologies will be mature enough for military application and will help avoid expensive, long duration development.

For the Army to meet this strategy, it must focus on the centerpiece of our formations: lethal, protected, situationally aware Soldiers and Squads. Mission Command modernization enables Soldiers and Squads by providing information to the point of need, at the right time, to make the best possible decisions. In turn, this information is provided to all echelons of command and when shared across the Joint network, gives Army formations access to Joint capabilities. To provide increased lethality, mobility and protection, the Army will modernize the maneuver and sustainment platforms that provide the Soldiers with superior warfighting capability. Thus, the objectives of the Army’s equipping modernization strategy are:

*Enhance the Soldier for Broad Joint Mission Support.* Invest in the fusion and integration of weapons, optics, fire control and robotic squad augmentation to facilitate unified land operations and provide the Soldier and Squad with improved lethality, protection and situational awareness.

*Enable Mission Command.* Ensure the Soldier and Squad are provided with information to the point of need, as well as connectivity with teams consisting of joint, interagency, intergovernmental and multinational partners. We will build the capacity of our network across our formations to a common standard that includes the common operating environment; we will increase the operational utility and adaptability of the network by emphasizing both simplicity and security; we will also enable the new *U.S. Army Operating Concept* by investing in a network with agile and expeditionary tactical command posts that are supported by a more robust home station architecture.

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*Remain Prepared for Joint Combined Arms Maneuver.* Invest in technologies and capabilities that ensure the Soldier remains prepared for decisive action: mobile protected firepower; emerging ground combat systems to achieve capable future combat vehicles; upgrade our tactical vehicle fleet and watercraft systems; upgrade aviation platforms; Unmanned Aircraft Systems (UAS); Remote and Autonomous Systems (RAS); precision munitions; Ottawa compliant systems; improved launcher, missile and howitzer capabilities; fielding an Integrated Air and Missile Defense Battle Command System (IBCS). We will prioritize the development of technologies that reduce the logistics footprint and increase efficiency, providing tailorable and scalable combat enablers, while increasing deployability, lethality, mobility and optimizing protection as part of our Joint Force.

Equipment modernization will enable Joint combined arms operations by giving our Soldiers and formations multiple options and present the enemy with multiple dilemmas across multiple domains. To accomplish this, we must **adapt** our current equipment and use commercially available technologies in the near-term to meet current operational needs. We will **evolve** in the mid-term to increase the expeditionary capabilities of the force and address challenges to overmatch. We will **innovate** in the long-term by investment in science and technology for affordable solutions which provide asymmetrical advantages and provide combat, theater foundational and enabling capabilities to the Joint Force.



## Strategic Environment

Our Army operates in complex environments, in uncertain conditions with multiple Joint and Coalition partners while task organizing our units into effective teams that range from Humanitarian Assistance/Disaster Response teams to brigade combat teams. We must ensure Soldiers and Squads are prepared for new, emerging and evolving missions in areas such as space, cyberspace, missile defense and countering weapons of mass destruction while maintaining our existing asymmetric advantages. This requires us to equip with capabilities that enable all our combat and enabling formations across the range of military operations and develop capabilities that apply innovation and exploit opportunities that provide:

- Enhanced Joint and Coalition interoperability: Interoperability and interdependence will become increasingly important; globally integrated operations will leverage unique capabilities of each military service and coalition partner;
- Versatility: Army equipment must work safely in various terrains, in cold and hot weather, in energy and water constrained environments and across a variety of mission sets;
- Scalable and tailorable capability to multiple formations: Combatant commanders will use Army formations from the individual Soldier through Corps; therefore, our equipment and systems must be scalable while maintaining the capability to surge quantities to meet mobilization needs;
- Support equipping demands across all Warfighting Functions: Capabilities such as engineers, military intelligence, air defense, aviation, communication, logistics and military police will maintain a high operational deployment tempo; keeping them resilient and equipped with up-to-date technologies is a priority. These formations require equipment with increased operational readiness and reliability, increased ease of technological refresh and we must ensure that their equipment can enable multiple uses for formations that have traditionally been niche capabilities;
- Reduce the training, maintaining and energy burdens to use equipment: Equipment that is “intuitive” to train on and in use, is energy efficient/flexible and easily maintained;
- Innovation: The result of critical thinking and the conversion of new ideas into valued outcomes. It drives the development of new tools or methods that permit Army forces to anticipate future demands; and
- Opportunities with Industry: Create conditions for successful industrial-based performance and support; reward the commercial sector for keeping costs down and delivering on time; maintain key capabilities in the industrial base and advanced skills required to scale up production in times of emergency.

## **Equipping Implementation of the U.S. Army Operating Concept**

As the Army balances end strength, current force readiness and equipment modernization, we have accepted mid-term risk in equipment modernization. However, within equipment modernization, investment in the military application of S&T will be protected. S&T investment must lead to the development of solutions that counter traditional, unconventional and hybrid threats. S&T will continue to shape the future environment for both the U.S. and adversaries. Thus, as potential adversaries modernize at a significant rate, “our technology development and system designs must accommodate this reality.”<sup>3</sup>

By adapting in the near-term and evolving in the mid-term, the Army will be able to restore capabilities affected by Size, Weight and Power (SWaP) impacts of Mission Equipment Packages that have significantly increased protection over the past 13 years. Additionally, near- and mid-term modernization will enhance expeditionary capabilities, address overmatch and focus on achieving appropriate combinations of mobility, lethality and protection capabilities for combat vehicles and formations demanded for future missions. We will manage risk through prioritization and quantity management. By innovating in the long-term, the Army will address warfighting challenges and capability gaps for asymmetrical advantages. Through adapting, evolving and innovating, the Army will be able to maintain overmatch through the following key technological focus areas that enable our Soldiers, Mission Command and Maneuver and Sustainment platforms: <sup>4</sup>

*Mobile, Protected Firepower.* Army S&T efforts focus on developing lighter weight, lethal platforms to increase protection and improve tactical, operational and strategic mobility and deployability. Mobile protected systems that possess scalable precision firepower and operate with reduced logistical demand are critical to the future force’s ability to project power, conduct joint combined arms maneuver and secure wide areas. S&T advances may allow integration of greater capability onto future platforms, but in the meantime the Army programs solutions with existing technology for rapid transition;

*Lethality and Effects.* Army S&T must focus on developing munitions, platforms, sensors, targeting and mission command systems that are tailorable and scalable providing the capability to detect, recognize and identify enemy targets and identify, classify and respond to enemy threats either before or immediately upon hostile fire, to provide the commander the ability to overmatch the enemy while employing lethal and non-lethal effects with precision discrimination;

*Logistics Optimization.* To improve the Army’s ability to conduct expeditionary maneuver and sustain high tempo operations at the end of extended supply lines, the Army must increase logistical efficiencies and unit self-sufficiency. New technologies enable increased operational readiness and reduced demand through water reuse, lower fuel consumption, decreased waste generation, efficient power and energy

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<sup>3</sup> Hon. Frank Kendall, Better Buying Power 3.0, 19 September 2014.

<sup>4</sup> The U.S. Army Operating Concept: Win in a Complex World, 31 October 2014, pp. 36-39.

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generation, distribution and storage, reduction in spare parts and timely and agile logistics and precision resupply;

*Army Aviation.* To offset the loss of capacity, advances in payload capabilities, vertical take-off and landing technology improve future vertical lift capabilities; future mission command systems, flight planning systems and cockpit information management systems will enhance situational understanding; technology advances will provide more capable and survivable UAS and RAS that have increased commonality;

*Information to Decision.* To enable the situational understanding across the Joint Force, the Army will continue to develop and field advanced processing and analytic fusion tools, mission command decision aids and simplified networks resistant to cyber attacks, providing situational awareness and information to the point of need;

*Human Performance Optimization.* Advances in cognitive, behavioral and learning sciences will improve critical thinking, increase cognitive and physical performance, foster intuition and social empathy, improve health and stamina, facilitate talent management, enhance leader training and strengthen unit cohesion;

*Medical Sciences.* Continued investment in the medical sciences allows improved Soldier resiliency, quicker physical and mental healing, smoother integration back into society and improved quality of life for the Soldier; and

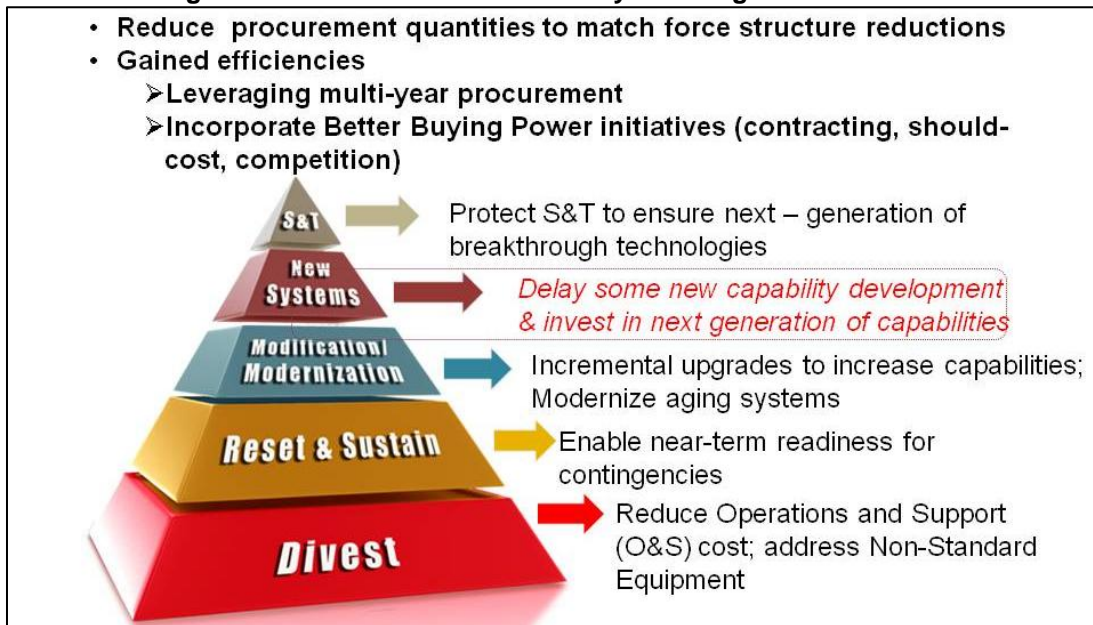
*Autonomy-enabled Systems.* Application of emerging technology creates the potential for affordable, interoperable, autonomous and semi-autonomous systems that improve the effectiveness of Soldiers and units. Robotics will enable the future force by making forces more effective across wider areas, contributing to force protection and providing increased capabilities to maintain overmatch.

## Risk Mitigation of Fiscal Realities

The Army cannot afford to equip and sustain the entire force with the most modern equipment; therefore we must acknowledge fiscal realities when modernizing equipment. Every equipment decision must be both affordable within the overall budget and cost-effective in addressing the known capability gap being addressed. Decisions made in the near-term will impact our national defense for decades to come. Figure 1, Modernization in a Fiscally Challenged Environment, illustrates the risk mitigation factors the Army will use to focus on effectively using constrained resources to balance near-term requirements and tailoring our long-term investments to provide the right capabilities for Soldiers.

Modernization in a fiscally challenged environment describes how the Army balances modernization investments. We will manage risk through the balance of protecting S&T investments, leveraging our current fleets by investing in incremental improvements and building new only by exception, delaying our next generation of platforms and divesting equipment that is determined as no longer required.

**Figure 1: Modernization in a Fiscally Challenged Environment**



We invest the majority of our S&T dollars where we are “technology makers” (i.e., lethality, lightweight armor, rotary aircraft, watercraft and ISR) to facilitate the next-generation of breakthrough technologies and assume risk where we are “technology takers” (i.e., information technology, fixed wing aircraft) and can capitalize on commercial sector advances. We will minimize our developmental costs by capitalizing on our S&T and ensuring technologies include Human-Systems Integration (HSI) and are mature enough for military application and avoid expensive, long duration capability development.

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We will selectively modernize, informed from F2025B Maneuvers, investing in the highest operational value capabilities, identifying trades, enabling affordability and building new only by exception, delaying procurement of our next generation of platforms until they are both affordable and cost effective. Meanwhile we will invest in our current fleets, making incremental improvements to increase these existing capabilities and improve aging systems; optimize our procurement capacity while maintaining the industrial base so we always have the ability to scale-up production to meet demands when large scale deployment or mobilization is required. Once our equipment is fielded to the force, we will have robust sustainment and reset programs to ensure current and near-term readiness. Finally, to achieve strategic balance, we will endeavor to divest wherever possible. We will seek out instances of redundancy, obsolescence, inefficiency, ineffectiveness and capabilities of marginal value.

## ***Path Ahead***

As the Army continues to balance end strength, current force readiness and equipment modernization, we have chosen to accept mid-term risk in equipment modernization. The vision of our equipment modernization strategy is to protect our investment in S&T, make incremental improvements to our existing platforms and invest in new, developmental systems only by exception while ensuring that we *Enhance the Soldier for Broad Mission Support, Enable Mission Command and Remain Prepared for Joint Combined Arms Maneuver*.

The *Army Equipment Modernization Strategy* reflects how the Army will focus in defense and commercial technologies to close capability gaps and address the Army Warfighting Challenges associated with the *U.S. Army Operating Concept*. To equip Soldiers to meet the Army Warfighting Challenges and become a leaner, more lethal and expeditionary asset to the Joint Force we will have to invest in both non-developmental and developmental capabilities. Non-developmental capabilities leverage commercial technologies and don't require significant Army S&T or Research, Development, Testing and Evaluation (RDT&E). Developmental capabilities will most often be utilized in areas where we are 'technology makers' such as mobile, protected firepower, lethality, rotary aviation, watercraft and ISR.

Our equipment modernization strategy requires an industrial base that is rewarded for reducing costs and can react to the increased quantity demanded during national emergencies while still retaining the Army's ability to affordably procure smaller quantities between major conflicts. We will continue to take advantage of existing technologies, while investing in the research to produce significant technological change with military application.

The Army is committed to working hand in hand with the Army's Training and Doctrine Command (TRADOC) to transform big ideas such as logistics demand reduction, integration of robotics and autonomy enabled systems and mobile, protected firepower into lethal, reliable equipment in the hands of Soldiers. The Army will prioritize resources to allow it to adapt in the near-term, evolve in the mid-term and innovate in the long-term. Adaptation is the modification of existing capabilities or decisions that adjust the balance between force structure, readiness and modernization. Evolution is the gradual development of something into a more complex or better form. Innovation is the act or process of introducing something new, or creating new uses for existing designs.<sup>5</sup> To accomplish these priorities and control the life-cycle costs, we must synchronize our requirements, resourcing, acquisition and sustainment systems by assessing promising technologies through experimentation of concepts, reduce equipment complexity and energy and water consumption and ensure that our Soldiers and formations are equipped to win in a complex world.

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<sup>5</sup> The *U.S. Army Operating Concept: Win in a Complex World*, 31 October 2014, pp. 34-35.

## **Annex A: Soldier**

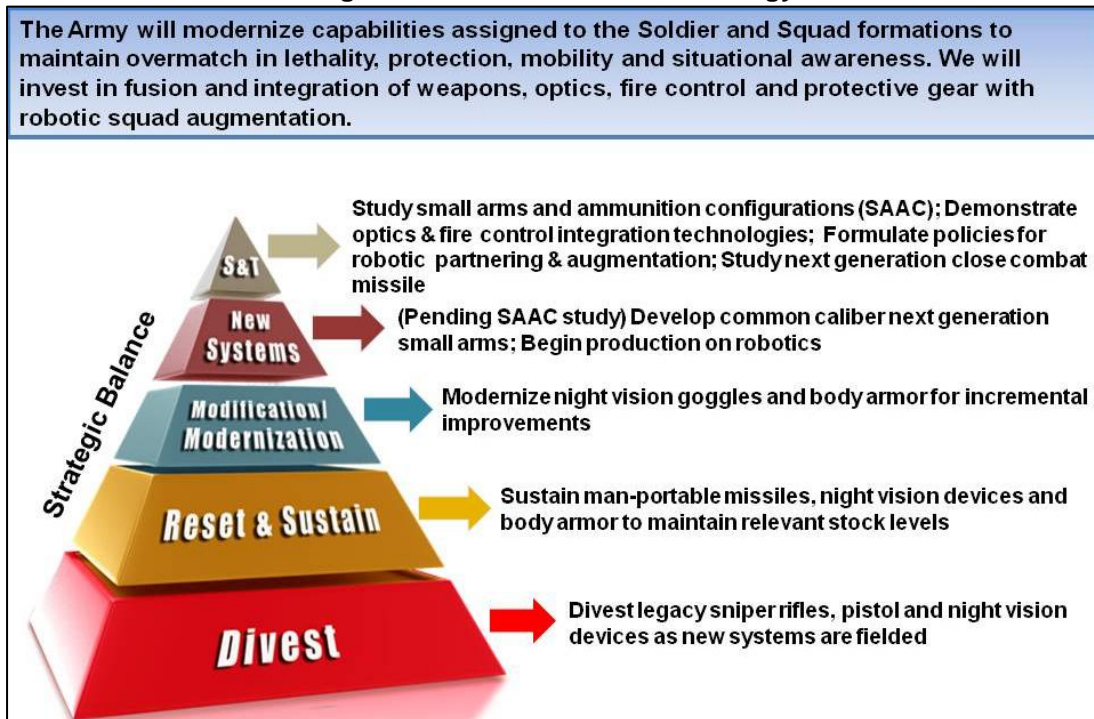
### **Description**

Our Soldiers and our foundational tactical formation, the Squad, must be prepared to fight and win engagements with the enemy at close quarters in urban and complex terrain. Soldiers and Squads will be equipped to:

- Operate in complex and uncertain environments;
- See and fight across a wide area;
- Make contact with the enemy under favorable conditions;
- Overmatch the enemy in encounter actions;
- Maneuver rapidly to seize and retain the initiative;
- Identify and act on opportunities;
- Adapt rapidly to changing conditions of battle; and
- Operate as part of a Joint, combined arms, air-ground team.

The Soldier Investment Strategy is graphically depicted in figure 2 below:

**Figure 2: Soldier Investment Strategy**



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## Risks and Challenges

The rifle squad risks losing overmatch, over time, due to the proliferation of cheap commercially available technologies that are rapidly closing the gap between our capabilities and those of our adversaries. The availability of armor piercing munitions, night vision devices and advanced body armor on the open market provide both near-peer and non-state adversaries with similar capabilities at the squad level. Additionally, commercial off the shelf optics and communications devices enable asymmetric tactics that too often, allow the enemy to choose the timing, location and conditions for engagements.

As we think about modernizing this portfolio, it is critical to view the Soldier as a system. Capabilities will be organized as common Soldier equipment, leader equipment and mission specific equipment. Fully integrated solutions will balance weight, power and cognitive load burdens within these sets and will be carefully synchronized with doctrine, organizations, training and leader development. Key evaluation criteria are:

- Lethal Squads capable of engaging the enemy with overwhelming firepower, minimizing collateral damage, scaling from non-lethal to full lethal effects, conducting beyond line of sight engagements and attacking defiladed enemies;
- Network Enabled Squads capable of transmitting and receiving data to develop a common operating picture enhanced by situational awareness fed from ISR;
- Trained Squads able to operate in a complex environment, among various cultures, in coordination with host nation and allied partners;
- Sustainable Squads capable of sustaining themselves for 72 hours without planned re-supply;
- Maneuverable Squads capable of moving long distances, while maintaining power requirements in austere environments; and
- Resilient and Protected Squads that have tailorable and scalable protection from small arms, blast and fragmentation and ability to measure and mitigate blast effects.

Accessing external combined arms and Joint capabilities and achieving mutual support with other units requires reliable communications. Because Squads engage the enemy in close combat, they are the formations that have the greatest need for access to the tactical network for situational awareness including friendly unit locations and the locations of identified enemy forces. Extending the tactical network to the Squad will provide our forward-most units with enhanced awareness of the battlefield including information obtained through reconnaissance to help Squads make contact under



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favorable conditions and ensure that our forces do not have to fight for information about the enemy more than once. Improved situational awareness at the Squad level will also permit rapid employment of fires and air support as well as ease coordination with adjacent units to ensure mutual support.

Less tangible improvements in training, the cognitive and psychological dimensions of preparation for combat and leader development and education are also vital to improving the internal capabilities of the Squad. Building competent, confident leaders at the Squad level is and will remain an essential element of success in combat.

Modernization priorities for the Soldier portfolio are to identify affordable and cost-effective solutions that increase lethality through rapid target acquisition technologies and extended small arms engagement ranges; enhance situational awareness through access to the tactical network; next generation optics and night vision; reduce Soldier load and power consumption; and improve survivability through protection and blast mitigation. Improved optics and target location capabilities will help the Squad observe enemy activity at greater distances, make contact with the enemy under favorable conditions and gain an early advantage in battle. Soldiers' loads will be lightened to ensure greater agility and speed of action as Squads conduct fire and maneuver to gain positions of advantage over the enemy.

### **Near-Term (Fiscal Year 2016-2020) (FY 16-20) Objectives**

In the near-term, improvements to Soldier and internal squad capabilities include optics, squad agility and weapons. Specifically, the Army will prioritize the modernization of existing weapons such as the M4A1 individual carbine while investing in the development of a new generation of Soldier weapons and ammunition. Existing technology will deliver a counter-defilade target engagement system. Additionally, the Army will invest in small arms fire-control technology that will incorporate variable power optics, range determination, visible and infrared pointing and a ballistic engine that provides an offset aim point to improve Soldier weapon performance. In the area of protection and mobility, the Army will incrementally improve ballistic protection against existing enemy weapons while lightening the Soldier's load. We must sustain initiatives directed at reducing Soldier's load through theater leadership policies, equipment weight reductions, load assistance technology and equipment-carrying technology. Additionally, focus on enabling the company and below with capabilities versus encumbering them with operation, transport and maintenance of additional equipment. We will increase safety, energy flexibility, interoperability, efficiency and management attributes among Soldier, vehicle and basing systems.

### **Mid-Term (FY 21-29) Objectives**

Mid-Term goals include continued development of Soldier weapons and the use of threat studies to ensure consistent overmatch at the squad level. Lightening the Soldier's load efforts will include fielding lighter weapons, ammunition and equipment

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such as modular body armor. Unmanned squad equipment transport systems and improvements to tactical logistical systems and Soldier power management capabilities will shift the sustainment burden from the Soldier and Squad to the logistics infrastructure. The Army will continue ballistic protection improvements that result in greater protection against improved enemy weapons while being simultaneously lighter and more ergonomic. Future situational awareness efforts will fuse multiple types of sensors into a heads-up display that will link the Soldier to his weapon and network the Soldier and Squad to higher, supporting and adjacent units. A major emphasis that will impact lethality, mobility, protection and situational awareness will be the leveraging of robotics to enable manned/unmanned teaming to enhance protection, persistence, resilience and endurance of the Soldier and the Squad. We will also develop adaptive systems to manage Soldier power needs and to leverage available energy resources at expeditionary locations.

**Long-Term (FY 30-45) Objectives**

To support long-term modernization we will invest in disruptive technologies to facilitate revolutionary increases in Soldier and small unit formation capabilities. Research in the areas of Soldier power, armor technology, robotics, missile technology and advanced weaponry will support potential technological breakthroughs that will benefit the Soldier portfolio.

## **Annex B: Mission Command**

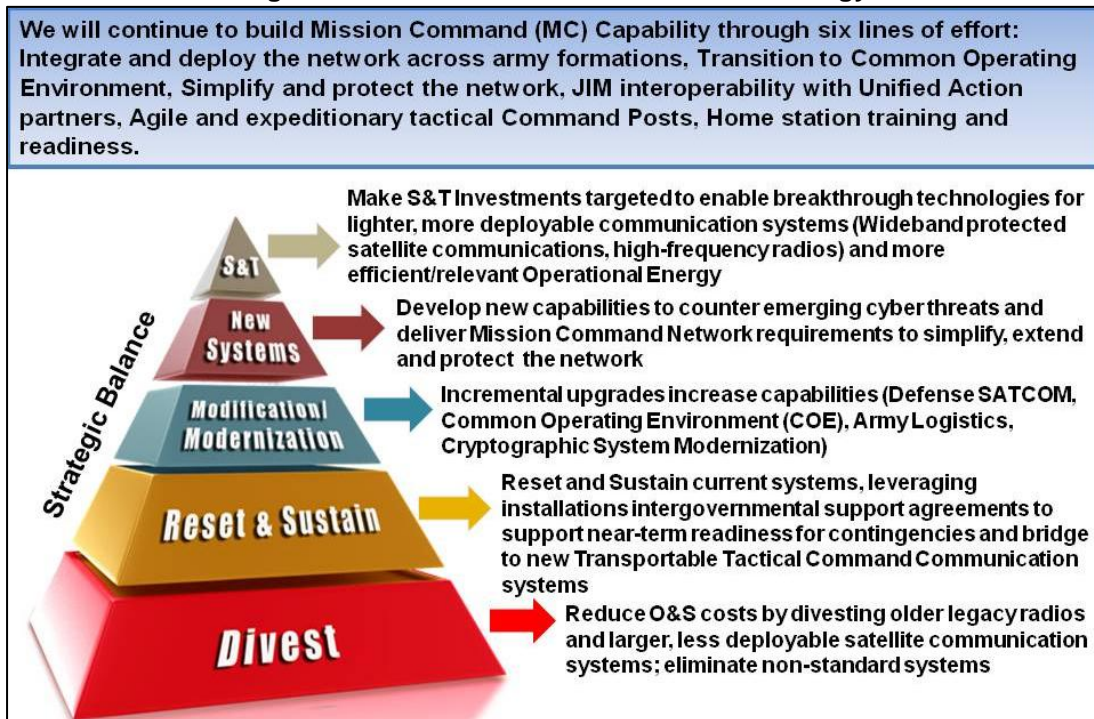
### **Description**

The Mission Command (MC) Network will provide expeditionary, uninterrupted mission command through a network comprised of intuitive, secured, standards-based capabilities adapted to commander's requirements and integrated into a common operating environment. Network capabilities will be assured, interoperable, tailorable, collaborative, identity-based and accessible at the point of need in operations that include unified action partners.

The MC Network enables globally responsive Joint combined arms teams to maneuver across domains and locations. It enables uninterrupted mission command and allows commanders to understand, visualize, describe, direct, lead and assess from home station, enroute and from agile and expeditionary tactical command posts in deployed locations, supported by a more robust home station architecture. The MC Network matures within a theater, is immediately available upon initial entry (through satellite) and enhances over time with aerial and terrestrial capabilities. It provides a common user experience across echelons, formations and phases. Command posts function in consolidated and distributed configurations, are able to deploy quickly and then scale to the desired size based on mission variables.

The Mission Command Investment Strategy is graphically depicted in figure 3 below:

**Figure 3: Mission Command Investment Strategy**



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MC network capabilities are tailored to each commander's requirements based on echelon and formation, fully considering the unit mission profile and leader/Soldier workload. The MC network fully supports training and unit readiness.

Mission Command Network modernization is guided by the following design principles:

- **Simplicity:** The ability to (1) leverage MC network capabilities in intense, time-constrained situations placing significant cognitive and physical demands on leaders and Soldiers; and (2) provide for a common user experience across echelons, formations and phases of the operation;
- **Intuitive:** The ability for leaders and Soldiers to quickly learn MC network capabilities and employment with a minimum of formal training;
- **Integrated:** Fielded as a 'system of systems' operational and technical framework that unites the functioning of the MC network, enables MC nodes such as command posts and fully enables training and readiness;
- **Interoperable:** Provides integration of all elements of combat power, therefore we seek interoperability across echelons, formations and unified action partners;
- **Assured, reliable, durable:** Provide the ability to function as a mobile, protected network in order to (1) enable distributed, uninterrupted mission command; (2) function in severe terrain, environmental and threat (combat) conditions, to include cyber electromagnetic threats; and (3) maintain functionality in spite of the loss of key nodes and pathways through redundancy;
- **Flexible, responsive:** Provide the ability to rapidly adapt and reconfigure itself in response to dynamically changing situations, thus enabling operational and tactical flexibility;
- **Scalable, tailorable:** Provide the ability to adapt to a wide variety of situations;
- **Secure:** Provide viability in congested, contested cyberspace and electromagnetic spectrum conditions; and
- **Affordable:** Provide MC network capabilities available to as much of the force as possible, as quickly as possible, within available resources.

## Risks and Challenges

The Army's networking and cyberspace Warfighting Challenges are significant – the connectedness of networked devices presents adversaries with exploitable vulnerabilities. Mission Command solutions cannot be static; network capability gaps will emerge and change rapidly. Developmental timelines must be shortened with mature incremental improvements informed through reoccurring portfolio assessments

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culminating with Network Integration Evaluation (NIE) and Army Warfighting Assessment (AWA). These events test program of record systems, validate Capability Set integration and demonstrate new technologies in accordance with the Army's Agile Process Standard Operating Procedure (SOP). The current network is overly complex, unnecessarily increasing security risk and burdening units with additional training requirements. Adopting an incremental approach to increased capability through commercial technology presents risks by generating continuous resourcing requirements. This may introduce interoperability and sustainment issues if not managed closely.

To enable Expeditionary Maneuver, MC Network must integrate all elements of combat power from multiple locations, across all domains, including the full range of unified action partners in time-sensitive circumstances. Early entry operations present unique demands on the MC Network. Friendly forces are highly dispersed, in transit and constrained in numbers and equipment by available lift. These operations require interaction and interoperability with Joint forces to the lowest level. Once on the ground, friendly forces must be able to move immediately with communications and expand operations as additional forces arrive. In these operations, the MC Network must adapt to rapid changes, ensuring capacity and connectivity while minimizing 'blinks' in communications.

**Near-Term (Fiscal Year 2016-2020) (FY 16-20) Objectives**

In the near-term, we will field operational capability sets to a limited number of brigades setting the foundation to incrementally improve the network for the next 10-to-15 years. Priorities are fielding this integrated network with on-the-move capability; continuing migration to the Common Operating Environment to create standardized software/hardware infrastructure; effective Unit Task Reorganization (UTR); and reducing complexity and sustainment requirements by converging transport on advanced networking waveforms supporting a scalable/expeditionary force. Power research efforts are focused on maximizing fuel efficiency and increasing reliability, maintainability and transportability through commercial technology. The Army conducts NIE activities to enable focused testing, integration and demonstrations necessary for fielding Network 2020 and setting the conditions for future force development under Force 2025 and Beyond.

**Mid-Term (FY 21-29) Objectives**

The portfolio modernizes increasing numbers of formations through Capability Set fielding; continues incremental upgrades of transport capacity and convergence to the tactical edge; completes common operating environment implementation; integrates improved capability into next generation combat platforms; and continues development and fielding of cyber and electronic warfare capability to overmatch threat. The Army improves energy management by integrating and networking energy systems ("energy-informed operations") and by implementing cloud computing, as well as advancements

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*Equipping the Total Force to Win in a Complex World*

in efficiency, flexibility, size and weight.

**Long-Term (FY 30-45) Objectives**

The portfolio adopts the next generation of network technologies including nano for smaller, lighter, faster, more secure capabilities; facilitates Joint Force enterprise constructs; and completes fielding of on-the-move and an aerial layer integrated with advanced intelligence, surveillance and reconnaissance, electronic warfare, robotics, aviation and all ground platforms.

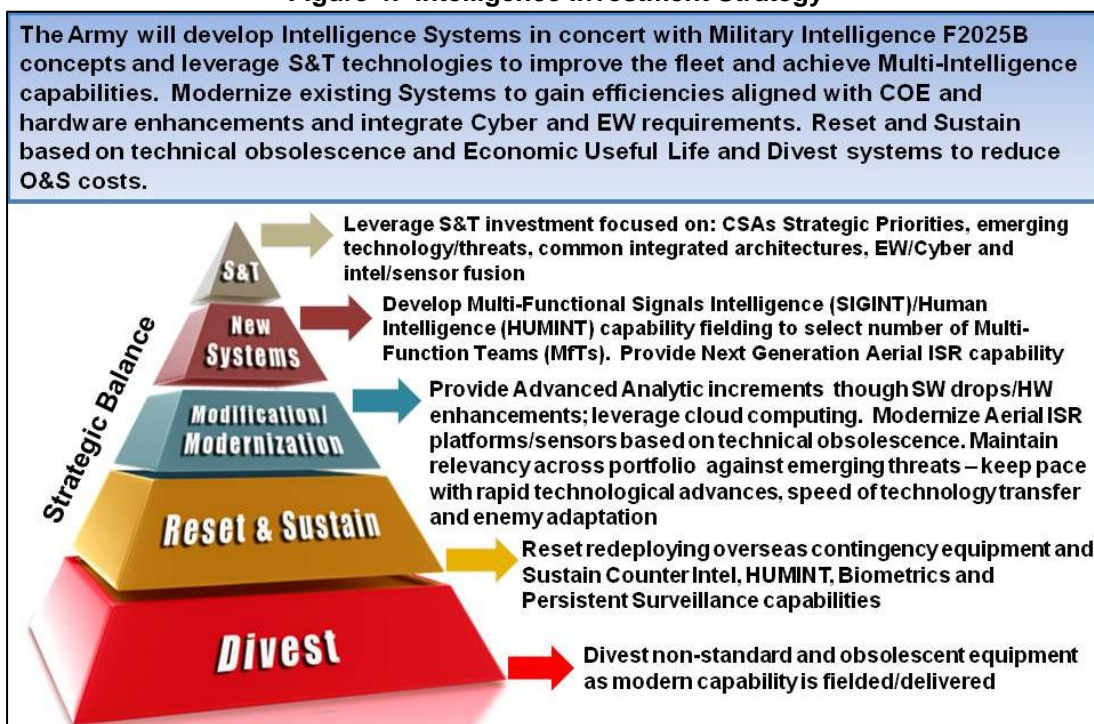
Overall, the Army's Mission Command modernization strategy carefully balances cost-effective incremental solutions that will deliver the network enterprise and increase cyberspace situational awareness to the dismounted and mounted Soldier and leader, focus on reducing complexity to the Soldier, controlling costs through agile development and fielding, convergence of applications and systems and a Common Operating Environment. The end state is a network with agile and expeditionary tactical command posts, supported by a more robust home station architecture, which enable commanders to understand, visualize, describe, direct, lead and assess from home station to a deployed location and through the entire range of military operations. Soldiers, platforms and command posts are linked by an efficient transport network with an enabling suite of applications and the necessary Network Operations (NetOps) tools to allow our Soldiers to manage and defend the network. Key characteristics of the objective network are: scalability and expeditionary with intuitive user interfaces and ease of use; more effective UTR; fully integrated horizontally and vertically; operational resilience; and a single converged transport across all functional capabilities.

## Annex C: Intelligence

### Description

The Intelligence Portfolio integrates requirements and programming strategy to equip the force with tailorable, scalable and multi-disciplined capabilities across four primary layers: Foundation, Terrestrial, Aerial and Space. These layers incorporate key components of intelligence collection, processing, exploitation, dissemination and analytics to ensure that our Soldiers, leaders and teams have the intelligence they need to win in a complex world. The Intelligence Investment Strategy is graphically depicted in figure 4 below:

Figure 4: Intelligence Investment Strategy



This portfolio ensures Army intelligence is globally engaged, regionally responsive and provides foundational capabilities to the Joint Force. The intelligence portfolio delivers scalable and affordable equipping solutions to ensure “No Cold Starts” and “No Military Intelligence (MI) Soldier is at rest.” The Secret/Top Secret-capable Foundation layer is the center of gravity within the intelligence portfolio. It integrates all layers into the Joint Intelligence Enterprise and provides commanders and decision makers the necessary tools to analyze process and exploit information collected from the other layers. It provides the means to turn this information into actionable intelligence and disseminate the intelligence at the appropriate classification level to commanders at all echelons. In the Terrestrial layer, the portfolio equips multi-function teams with terrestrial sensors and systems tailored for unified land operations in any environment. The Aerial layer integrates manned and unmanned airborne sensors to provide tactical,

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*Equipping the Total Force to Win in a Complex World*

operational and strategic intelligence to the force. The portfolio's Space layer leverages and integrates national space-based capabilities to provide commanders with the most advanced and current intelligence products available.

The portfolio provides integrated, interoperable and networked intelligence capabilities to support the full range of operations in all current and future contingencies. The portfolio must equip Soldiers with a versatile mix of capabilities that enhance functional and regional expertise through a collaborative enterprise. This enterprise will ensure operational and global engagement before the first boot ever sets foot on the ground. Current capabilities must be incrementally modernized or replaced.

### **Risks and Challenges**

The Intelligence portfolio faces significant risk across all four layers if its systems do not meet or exceed the rapid pace of technological advances in communications, cyber, electronic warfare, counter-detection and analytics. Failure to keep these system technologies up-to-date will blind future commanders to complex threats and opportunities to exploit the initiative, endangering both lives and mission success. Failure to see at the required granularity and understand complex operating environments across the globe will reduce combatant commander's options to prevent conflict, shape security environments and win wars.

The greatest challenges facing this portfolio are the rapid pace of technological advances and the wide variance of potential operating environments. To maintain overmatch, particularly in Signals Intelligence modernization, Army intelligence will have to develop materiel solutions much faster than in the past due to the ease and speed of technology transfer and adaptation by enemies. The operational environment will continue to grow more complex requiring greater interoperability and collaboration across the force – we must eliminate stove pipes. These challenges are further exacerbated by budget constraints. The Army must continue to provide safe and cost effective incremental and scalable intelligence capabilities able to meet the full scope of operational demands in any environment and in concert with Joint and coalition partners.

### **Near-Term (Fiscal Year 2016-2020) (FY 16-20) Objectives**

This portfolio benefited from investments in overseas contingency operations programs designed to satisfy critical needs over the last decade of war in areas such as advanced analytics, aerial sensors, advanced Signals Intelligence collection devices and biometrics. During this time frame we will focus on providing Soldiers multilevel and multi-intelligence, integrated analytical processing, exploitation and dissemination capabilities to support multi-function intelligence teams in a Joint and collaborative environment. While simultaneously supporting multiple operational contingencies worldwide, we must also integrate the proven quick reaction capabilities developed over the last decade of war to leverage the success of these systems for the future force.



Army Equipment Modernization Strategy  
*Equipping the Total Force to Win in a Complex World*

**Mid-Term (FY 21-29) Objectives**

During this time frame, we will keep pace with technology through modernization and enhancement of both ground and aerial Intelligence, Surveillance and Reconnaissance (ISR) sensor phenomenology and host platforms as they reach the end of their economic useful life. Sensor modernization will focus on a myriad of multidiscipline technologies including individual identity resolution, high definition full motion video, three dimensional imaging, advanced geospatial intelligence, signals intelligence, wide-area and counter-concealment sensing technologies such as foliage penetration (important to non-desert environments such as the Pacific jungle terrain) and hyperspectral imaging radars and light detection and spectral imaging sensors. We will continue to incrementally modernize advanced analytics and processing to provide essential theater foundational and enabling capabilities to combatant commands and we will develop and field electronic warfare capability to the force.

**Long-Term (FY 30-45) Objectives**

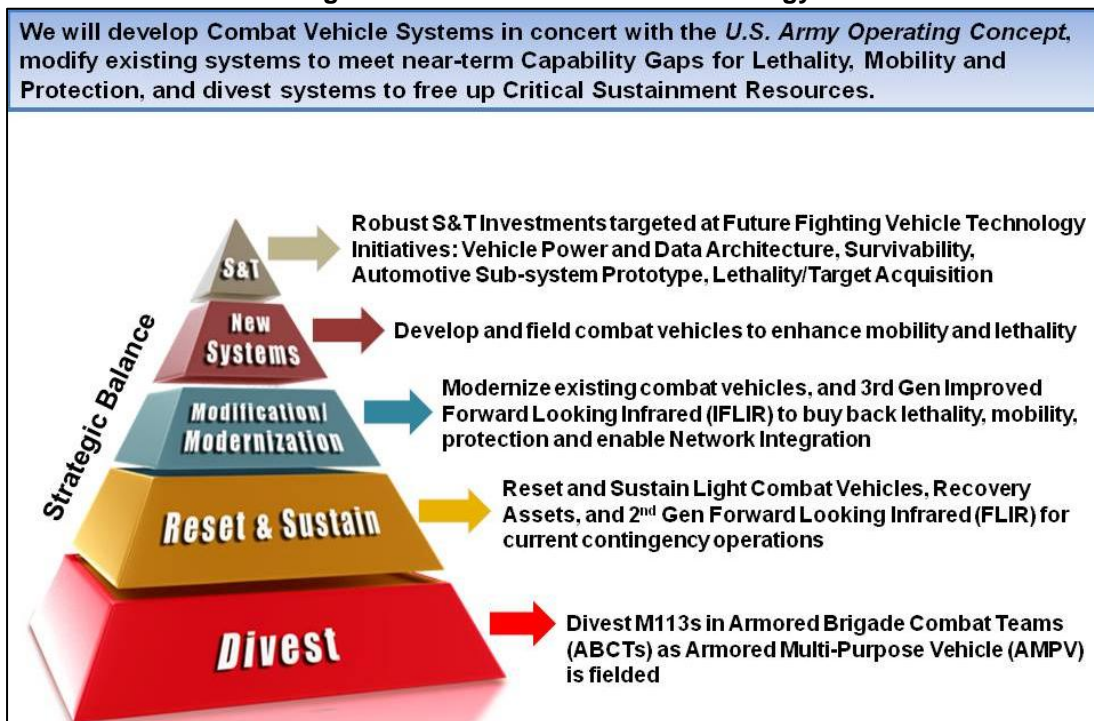
Long-term objectives include the continuation of manned Aerial ISR modernization through system upgrades and replacement of capabilities at the end of their useful lives. We will develop sensors to keep pace with the rapid modernization of communications and expansion into different areas of the electromagnetic spectrum. Finally, we will increase interoperability of national to tactical processing, exploitation and dissemination (PED) and prioritize the introduction of analytical capabilities to enhance Army PED and improve our regional situational awareness.

## **Annex D: Maneuver**

### **Description**

According to the *U.S. Army Operating Concept*, to project power and win decisively, the Army, as the Nation's principal land force, organizes trains and equips forces for prompt and sustained combat on land.<sup>6</sup> The equipment in the Maneuver portfolio provides Army forces the lethality, mobility and protection necessary to conduct combined arms maneuver in support of Joint Combined Arms Operations and Maneuver. It consists of mounted lethality platforms, infantry fighting vehicle platforms and general purpose platforms that provide combatant commanders scalable and tailorable formations of light, medium and heavy forces to defeat peer, hybrid and irregular threats across the range of military operations. The Maneuver Investment Strategy is graphically depicted in figure 5 below:

**Figure 5: Maneuver Investment Strategy**



### **Risks and Challenges**

The Army must be able to conduct sophisticated Expeditionary Maneuver and Joint Combined Arms Operations, as part of joint, interorganizational and multinational teams.<sup>7</sup> As currently constituted, our Brigade Combat Teams (BCT) lack the requisite lethality, mobility and protection necessary to succeed in the complex current and future operational environments. These challenges coupled with fiscal constraints

<sup>6</sup> The *U.S. Army Operating Concept*: Win in a Complex World, 31 October 2014, pp. 7-8.

<sup>7</sup> *Ibid.*, pg. 8.

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*Equipping the Total Force to Win in a Complex World*

exacerbate the lethality and mobility issues in our Infantry Brigade Combat Teams (IBCT) and lethality issues in our Stryker Brigade Combat Teams (SBCT).

- Appropriate Mix of Lethality, Mobility and Protection: Adversaries continue to invest in and employ traditional, unconventional and hybrid technologies that challenge the survivability of our combat vehicles. Because it remains cheaper to acquire and employ these technologies than to defend against them, we must carefully examine the requirement for protection in context of the formation rather than the individual system, seeking vehicle improvements in protection that do not detract from, but are enhanced by, lethality and mobility.
- Maintaining Overmatch: Overmatch is the application of capabilities or unique tactics either directly or indirectly, with the intent to prevent or mitigate opposing forces from using their current or projected equipment or tactics. The proliferation of less-expensive capabilities allows adaptive adversaries to challenge our traditional overmatch in capabilities. Countering this threat will remain a priority as we look at innovative ways to maintain overmatch through increased lethality, mobility and protection.
- Mixed Fleets: The current fiscal environment prevents wholesale platform replacement in the combat vehicle fleet. This means that mixed fleets in the maneuver portfolio will be a reality for the foreseeable future. Additionally, the industrial base must be carefully managed as these platforms rely on non-commercial, defense-related technologies and production capacity.

**Near-Term (Fiscal Year 2016-2020) (FY 16-20) Objectives**

The Army ensures that current combat vehicles remain viable and relevant with continued recapitalization of Abrams, Bradley and Stryker vehicles. We will invest in incremental improvements of our current platforms in the management of space, weight and power-cooling to regain design margins lost to protection enhancements and enable the insertion of future technologies, component devices and applications. Focused research efforts must address the lethality and mobility gaps in our IBCTs and the lethality gap in our SBCTs. The design of future combat vehicles focuses on lethality and mobility while incorporating protection upgrades. We will also continue actions to replace our general purpose vehicle, the M113, in the BCTs.

**Mid-Term (FY 21-29) Objectives**

We will continue to invest in critical capabilities to improve lethality, mobility and protection needed to fight and win in a complex world. Other formation improvements will impact current platforms such as the Abrams and Stryker vehicle. The priority is to increase lethality in the IBCT and SBCT through a Mobile Protected Firepower platform and to the Armored Brigade Combat Team (ABCT) with the addition of third generation Forward Looking Infrared (3G IFLIR) technologies. We will focus on providing tactical mobility to the IBCT and increasing survivability of all platforms through investments in

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*Equipping the Total Force to Win in a Complex World*

Active Protective Systems (APS) / and Hostile Fire Detection (HFD). All solutions seek to minimize technological risk to accelerate fielding timelines, minimize development and ensure they are affordable and cost-effective.

**Long-Term (FY 30-45) Objectives**

To support long-term modernization we will invest now in disruptive technologies to facilitate development of next generation platforms that ensure overmatch in the anticipated operational environment. As technology matures, include RAS systems as a means to increase the flexibility of maneuver forces through the application of remote and semi-autonomous technologies for use in maneuver platforms and surrogate “wingman” vehicles. Both manned and unmanned platforms must have growth margins and the flexibility to accept future technologies that provide BCTs capable of conducting Expeditionary Maneuver and Joint Combined Arms Operations in support of Unified Land Operations.

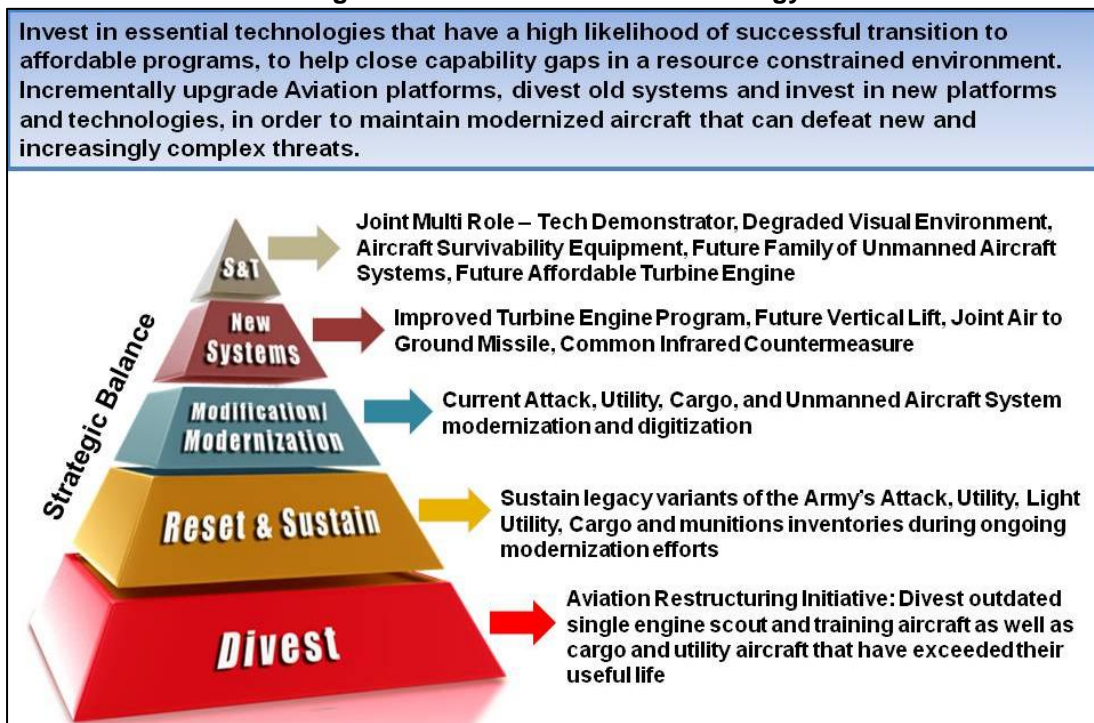
## Annex E: Aviation

### Description

Army Aviation's inherent speed, mobility, lethality and agility uniquely enable combined arms maneuver, wide area security and special operations across the conflict continuum. Since its inception, Army Aviation has been a high demand, ground-centric and globally committed asymmetric capability for our Nation. To fully enable the *U.S. Army Operating Concept*, Army Aviation must be able to cross the line of departure with the ground force regardless of the visual conditions, physical terrain or threats.

As the world becomes more complex and force structure gets smaller, it is critical that we continue to maintain our unique and indispensable aviation maneuver advantage to maximize national options and minimize risk to the Air-Ground Team. In the near-term, the Aviation Restructure Initiative (ARI) sets the *Foundational Aviation Structure* by 2019, providing the *means* to enable modernization of this smaller Aviation structure to meet Combatant Commander (CCDR) requirements. Fully executing the ARI and continuing the development and fielding of disruptive technologies to enable the current modernized aircraft to operate in all environments (threat, visual and physical) will reduce emerging vulnerabilities, increase employment options and enable the Air-Ground Team to dictate the terms of operations at the time and place of our choosing, not just when conditions are favorable. The Aviation Investment Strategy is graphically depicted in figure 6 below:

Figure 6: Aviation Investment Strategy



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## **Risks and Challenges**

The Aviation integrated portfolio overcomes the challenge of projected reductions in the Aviation Total Obligation Authority (TOA) by prioritizing investments that are a balanced combination of new production, remanufacturing and recapitalization to achieve the desired goals in a balanced and affordable portfolio due to ARI savings. The priorities for this portfolio are:

- Complete setting the foundational structure of ARI by FY19 with new Aviation formations and all single engine aircraft divested;
- Complete the equipping of the ARI structure with the current modernized fleet of Attack, Utility, Cargo and unmanned aircraft;
- Concurrently modernize the fleet with disruptive technologies to improve power, survivability and the ability to fly and fight in degraded visual environments;
- Results from the Joint Multi-Role Technology Demonstrator (JMR-TD) S&T efforts inform requirements for Future Vertical Lift (FVL);
- Improvements to the Army's Cargo aircraft fleet buys back performance lost due to Mission Equipment Package (MEP) weight growth;
- The Improved Turbine Engine Program (ITEP) will provide increased power to carry required loads, the ability to maneuver with agility in all environments and fuel efficiency for the Army's attack, utility and Future Vertical Lift fleets;
- Agile development and fielding of Infrared Man Portable Air Defense System (IR MANPAD) countermeasures is essential to enable survivability against current and emerging threats; and
- Full development and fielding of degraded visual environment capabilities enables full operations under all weather and visual conditions.

## **Near-Term (Fiscal Year 2016-2020) (FY 16-20) Objectives**

In the near-term, the Army will begin the upgrade of the cargo portfolio aircraft by modernizing avionics and communications, improving performance and recapitalizing the special operations variants. The Army will continue procurements of the digitized utility aircraft while adding a digital capability to the remaining legacy utility fleet. In the attack and reconnaissance portfolio, the Army will continue fielding a modernized and improved capability equipped with improved avionics and Manned-Unmanned Teaming (MUM-T) capabilities. The Army will complete fielding of current UAS, enhancing MUM-T capability and expanding Army Aviation's ability to conduct reconnaissance and provide actionable intelligence, reaction time and maneuver space to the ground force

Army Equipment Modernization Strategy  
*Equipping the Total Force to Win in a Complex World*

commander. The Army will complete the divestiture of the legacy scout and training aircraft fleets. In the fixed wing portfolio, the Army will begin to procure a future fixed wing utility aircraft to replace the current obsolescent and unsustainable fixed wing platforms. JMR-TD will complete flight testing to inform requirements for FVL.

**Mid-Term (FY 21-29) Objectives**

In the mid-term, the cargo portfolio will complete the special operations variant recapitalization program; and the general purpose cargo aircraft fleet will continue to buy back the mission equipment package weight growth. The utility portfolio will complete the procurement of the digitized rotary fleet and evaluate data for a follow on recapitalization. The fixed wing portfolio will continue to procure a future fixed wing utility aircraft. The recon/attack portfolio will complete the buy of the modernized attack aircraft, while continuing to execute MUM-T. The UAS continue to modernize payloads and mission equipment capabilities to ensure successful manned/unmanned teaming in the networked common operating environment. Aviation enablers will continue to modernize to support all aspects of aviation from survivability to increased attack capability through investments in precision air-to-ground munitions, advanced engine technologies, Aircraft Survivability Equipment (ASE) and degraded visual environment capability.

**Long-Term (FY 30-45) Objectives**

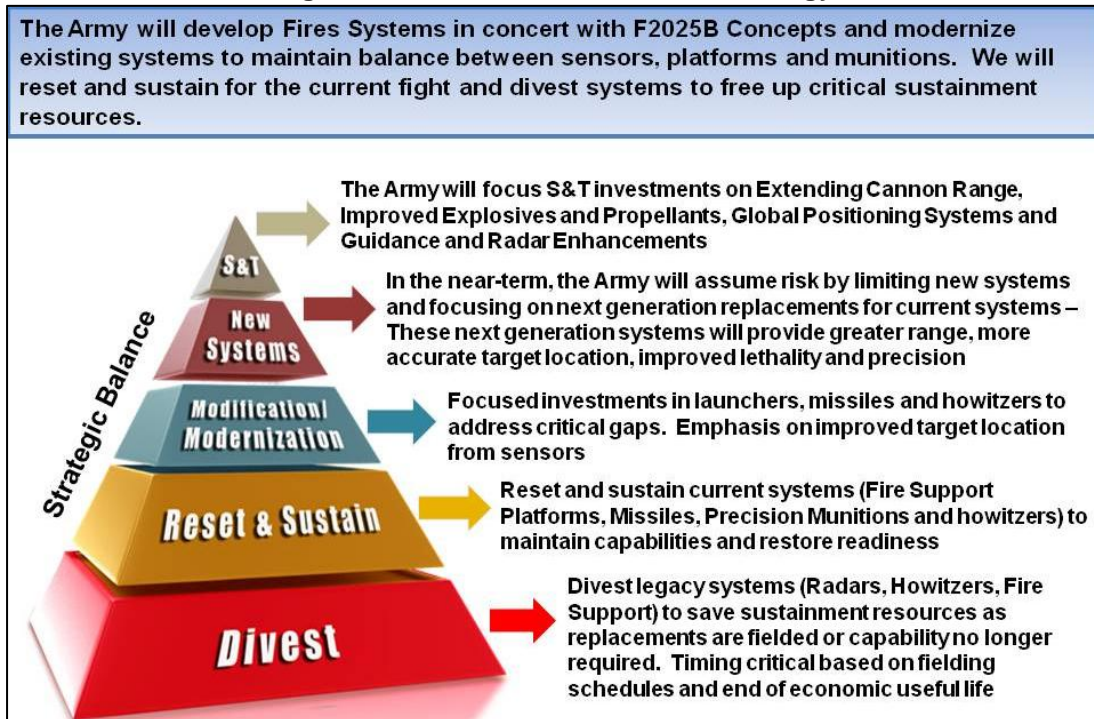
In the long-term, FVL and its associated capabilities will dramatically increase our tactical, operational and strategic capabilities. FVL aircraft will be a game changing capability that provides enhanced speed, range and payload to fully execute all operations specified in the *Army Operating Concept*, allowing Army Aviation to operate in the tactical, operational and strategic levels of war. FVL will enable the Maneuver Commander to dictate the terms of operations and take the fight to the enemy at the time and place of our choosing, not just when conditions are favorable. These new aircraft will focus on airframe technology, power and efficiency, maintainability and a new digital architecture. Sustainment of the current attack and utility aircraft will continue through a recapitalization program designed to insert new technologies and extend the economic useful life of the airframes until replaced with a Future Vertical Lift variant. While advances to integrating ASE abound in the mid-term, it will culminate in the purpose-built ASE suite that will populate the future vertical lift platforms. The ASE suite will allow aircraft an unprecedented level of protection which it is capable of extending to other aircraft in the flight as needed.

## **Annex F: Indirect Fires**

### **Description**

The Indirect Fires integrated portfolio consists of weapons platforms, mission command software, fire support sensors, target locating devices and precision munitions that identify targets to deliver operationally adaptable fires in support of Army, Joint, intergovernmental and multinational combined arms operations. The Indirect Fires Investment Strategy is graphically depicted in figure 7 below:

**Figure 7: Indirect Fires Investment Strategy**



### **Risks and Challenges**

The challenge is to modernize, integrate and transform indirect fire assets in a resource constrained environment while providing operationally adaptable fires to meet the warfighter demands for fires. We will continue to make difficult choices and prioritize our efforts to ensure we maximize every dollar towards putting the best equipment in the hands of our Soldiers. To do this we fully leverage Joint munitions and capabilities because we simply cannot afford redundancies.

Over the past several years our brigade combat team precision fires portfolio focus has been in two areas: accelerating and maintaining precision fires with the procurement of the munitions and lightweight howitzers; and continued development and procurement of key capabilities such as the counter fire radars, lightweight laser designator rangefinders and a handheld precision target location and designation



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*Equipping the Total Force to Win in a Complex World*

devices. We have accepted risk in our infantry brigade combat team precision fires and ability to destroy moving formations. Our tactical missiles will age out of the inventory and we are working options for the way forward on precision long range fires. As we look forward, our priorities are to create a future Field Artillery Force which:

- Provides adaptable fires – a versatile mix of Fires capabilities at the strategic, operational and tactical echelons that are flexible, integrated, precise, responsive and effective;
- Supports Army and Joint, intergovernmental and multinational elements while operating dispersed geographically;
- Provides agile task organized, trained, sustainable and deployable set of capabilities; and
- Targeting process to select and prioritize targets and achieve timely, effective and efficient effects through the full range of operational and environmental conditions.

**Near-Term (Fiscal Year 2016-2020) (FY 16-20) Objectives**

Indirect Fires will change as the Army shifts its focus to emerging threats in accordance with national strategic planning documents. Our challenges involve supporting the commanders in combined arms maneuver and wide area security, while providing our national security decision-makers the flexibility of a worldwide, deployable and capable field artillery arsenal. As the Army must remain able to tailor its versatile mix of fires capabilities and deploy them rapidly for unified land operations of various durations, investments in long-range precision fires capabilities will ensure Force 2025 and Beyond initiatives. Our near-term focus encompasses developing replacements for long-range precision fires, ensuring command and staff elements have ability to maneuver with the supported force, while ensuring availability of more survivable and sustainable self propelled delivery systems and increasing our ability to accurately locate and target threats. We will divest of older, less sustainable radars to reduce sustainment costs and we will also accept near-term risk in the pace of our self-propelled howitzer procurement and our precision munitions inventory.

**Mid-Term (FY 21-29) Objectives**

In the mid-term our challenges will primarily lie in weapons and targeting platform development and the precision munitions portion of the portfolio. To support Army and Joint/multinational commanders across the full range of military operations, improvements in range, responsiveness and accuracy with our precision munitions and platforms ensure our ability to engage targets and to achieve mission success. Achieving greater range in our precision munitions and delivery systems will be

Army Equipment Modernization Strategy  
*Equipping the Total Force to Win in a Complex World*

accomplished by leveraging science and technology efforts in longer range propellants, advances in cannon tube metallurgy and larger caliber cannon efforts. As our launchers approach their end of useful life, we will develop a single launcher module to mount to a wheeled or track vehicle.

We will leverage a new ground combat vehicle to migrate our existing targeting suite to a new platform, while ensuring improvements in our net centric capabilities will enable our indirect fires to expand the battle-space, offer commanders more decision time to select the appropriate response, prevent fratricide and allow any Joint sensor to pair with the best kinetic or non-kinetic weapon. We will determine the best options, service life extension or new procurement to maintain indirect fires capability at operational ranges. We will divest of obsolete targeting platforms and target locating sensors to further reduce costs and we will accept some mid-term risk by sustaining our towed howitzer fleet into the 2030 timeframe.

**Long-Term (FY 30-45) Objectives**

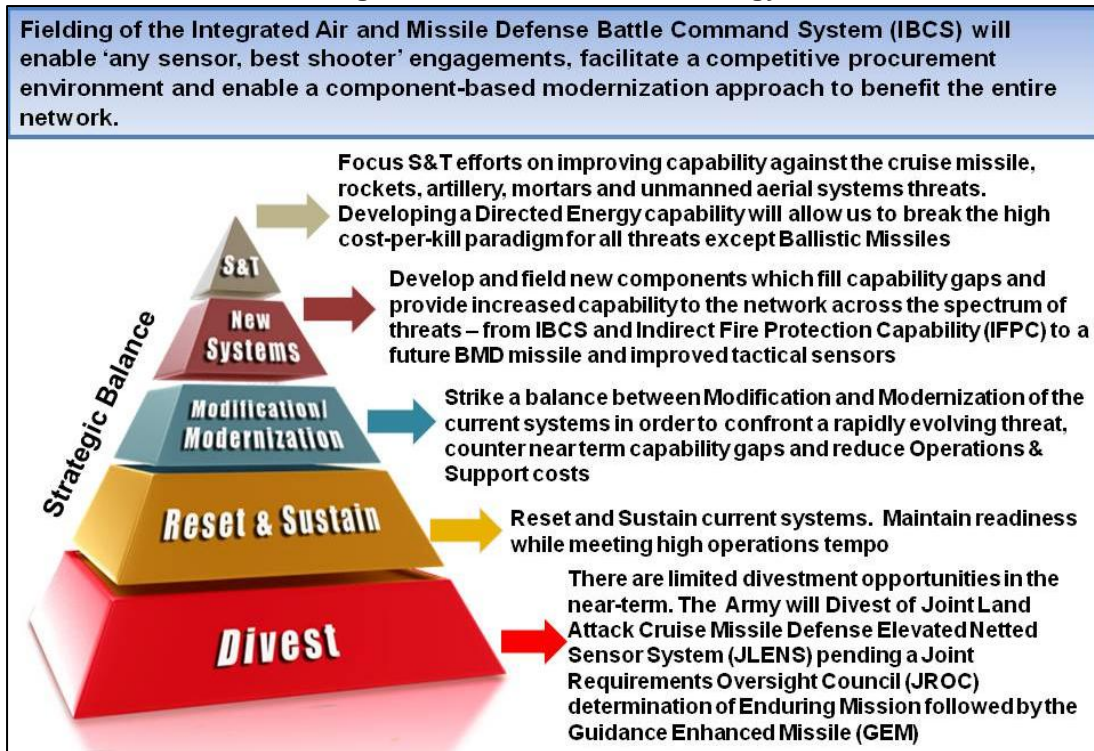
Our future indirect fires focus involves longer range towed artillery delivery systems; enhanced target locating devices; and more synergy with Air and Missile Defense (AMD) in developing better radar capabilities. Fires Mission Control, radar and towed gun platforms lack protection and survivability commensurate with the supported force, thus requiring movement of systems into more capable, armored vehicles for better protection for crews. Continued improvements in Mission Command will allow the achievement of timely, effective and efficient fires and assist in the development of a new, lighter self-propelled howitzer. Indirect Fires must integrate and operate with Joint intergovernmental and multinational partners from the tactical to strategic levels, delivering timely and effective fires to defeat the enemy and preserve freedom of maneuver and action across the range of military operations. The complexity of the environment, the technological advances of the threat and fiscal realities require cost efficient and operationally effective methods of integrating fires into the war fight.

## **Annex G: Air and Missile Defense**

### **Description**

The Air and Missile Defense (AMD) portfolio provides Joint Force commanders with the tactical through strategic capabilities they require to protect the force and ensure freedom of maneuver. Air and Missile Defense Capabilities include mission command capabilities and capabilities to defend against ballistic missiles; manned and unmanned aircraft; rocket artillery and mortar; and cruise missiles. The Air and Missile Defense Investment Strategy is graphically depicted in figure 8 below:

**Figure 8: AMD Investment Strategy**



### **Risks and Challenges**

Army AMD must be a globally responsive force capable of combined arms maneuver, building capabilities from small force packages and with minimal support to accomplish the mission, presenting multiple dilemmas to the enemy. Our AMD Forces must always be balanced, ready and capable of conducting operations in any location and environment while maintaining overmatch against a threat that continues to upgrade/improve their capabilities across multiple venues. Failure to defeat the advanced threat puts forces and defended assets at risk. In conjunction with TRADOC, incorporation of Force 2025 and Beyond will be integral to AMD modernization.

Fires forces must provide adaptable fires; a versatile mix of Fires capabilities at the

Army Equipment Modernization Strategy  
*Equipping the Total Force to Win in a Complex World*

strategic, operational and tactical echelons that are flexible, integrated, precise, responsive and effective. Four objective Fires force characteristics that should guide science and technology, Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, Facilities and Policy (DOTMLPF-P) and Fires modernization efforts: commonality, expeditionary, agile and network enabled all included in a leaner/optimized Army Fires force structure. Networked mission command will enable a future strategy of modernizing components vice entire weapon systems. Future fires forces must be able to be task organized into scalable and tailorable forces with multi-mission sensors and shooters to defeat more complex threats. In addition to delivering fires, Fires forces must be able to integrate all forms of Army joint and multinational fires.

Air and Missile Defense modernization strategy seeks to reduce risk by filling capability gaps across multiple threats while meeting the current demands from the warfighter. With increases in ballistic missile technical sophistication, inventories, advancement of countermeasures and proliferation, our known and potential adversaries will continue to challenge both the sufficiency and proficiency aspects of our air and missile defense forces. Our adversaries have access to an easily attainable and lethal range of cruise missiles, UAS, RAS and rockets, artillery and mortars. Prioritization of AMD activities remains consistent with the signed AMD Strategy document as well as the Capability Portfolio Review. Focus areas include: 1) combatant commanders' demand for AMD capabilities is high and growing; 2) maintaining readiness while keeping pace with the threat and high Operations Tempo (OPTEMPO); 3) affording the high cost of AMD equipment within the current fiscal environment; and 4) recent congressional marks. The challenge will be to balance attainment of a networked Mission Control capability enabling defeat of the full range of air and missile threats, building capacity while maintaining forward presence and transforming the Air and Missile Defense force.

**Near-Term (Fiscal Year 2016-2020) (FY 16-20) Objectives**

Our near-term objectives are: maintaining readiness; defeating current and advanced threats; sustaining and improving legacy components; increasing sufficiency with modernized missile capability; fielding a networked, open architecture mission command capability IBCS which improves expeditionary capability while increasing our engagement battle space; and beginning development of critical capabilities such as the lower tier AMD sensor and Indirect Fire Protection Capability (IFPC) to fill capability gaps.

**Mid-Term (FY 21-29) Objectives**

In the mid-term, we will continue focusing on a net centric capability enabling increased situational awareness and beyond-line-of-sight engagements to provide commanders more decision time to select the appropriate response, prevent fratricide, overcome defense design single points of failure and allow any sensor to pair with the best available shooter. Our incremental modernization strategy will enable us to sustain

Army Equipment Modernization Strategy  
*Equipping the Total Force to Win in a Complex World*

readiness and replace selected legacy components while improving the network's capability against a wide range of threats. Maintaining an effective AMD capability for the warfighter remains an imperative, other objectives for this period are:

- Completing IBCS fielding which allows us to achieve an integrated fire control capability that can conduct advanced engagements from any direction against our adversary's most stressing threats, reduces the potential for fratricide while moving away from closed loop, stove-piped command and control platforms; and
- Developing and fielding upgraded ground-based radars. Using technology advances allows us to improve the capability of multiple radars; providing increased detection, tracking, discrimination capability while improving our electronic protection capability.
- Developing and fielding a multi-mission launcher to fill the cruise missile and Counter Unmanned Aircraft System (CUAS) capability gap while developing an improved counter rockets, artillery and mortar (RAM) missile to provide an associated mix of intercept capability.

**Long-Term (FY 30-45) Objectives**

Future challenges necessitate transforming the force to one that is more capable, affordable and better able to execute operations as part of Joint and coalition forces. Air and Missile Defense must continue to explore integrating non-kinetic defeat mechanisms into the architecture to stay on the right side of this cost-imposing strategy. Additionally, development of a common Fires capability should be addressed to expand capabilities between the two, closely aligned, portfolios.

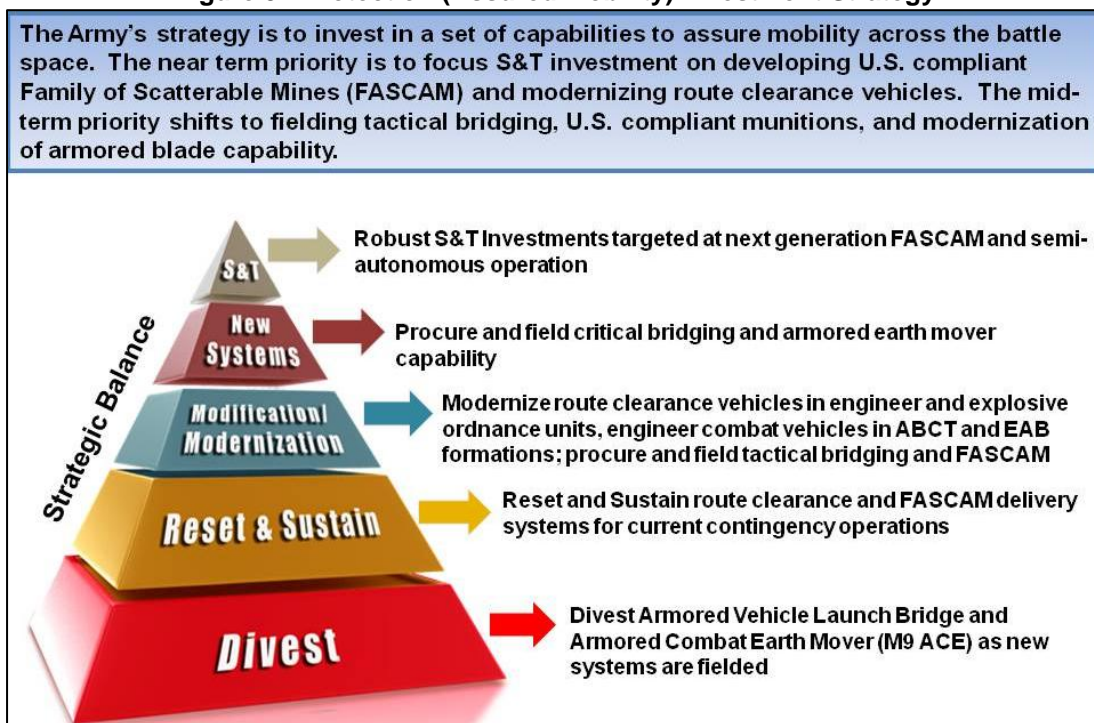
Our long-term efforts focus on leveraging science and technological improvements, such as low-cost interceptors; directed energy weapons; and sensors. If technology matures earlier than projected, solutions will be assessed for acceleration into the mid-long-term. Modernization of the missile fleet must expand engagement battle space while reducing Operations and Support (O&S) and per unit cost. Joint integration must expand beyond Army-only AMD components and include Joint assets that are fully integrated within the IBCS network. We must capitalize on Joint capabilities and interdependencies to add depth to our defense, extend our battle space, preserve interceptors and enhance air-ground coordination.

## **Annex H: Protection (Assured Mobility)**

### **Description**

This portfolio provides the Army with a versatile mix of capabilities enabling Engineer formations to provide support throughout the range of military operations to include Homeland Response and Domestic Support to Civil Authorities. This portfolio includes counter explosive hazard, construction, bridging, mobility, counter mobility, mines and munitions, engineer support systems and protection specific Remote and Autonomous Systems (RAS) ground systems. The Protection (Assured Mobility) Investment Strategy is graphically depicted in figure 9 below:

**Figure 9: Protection (Assured Mobility) Investment Strategy**



### **Risks and Challenges**

This portfolio's challenge is to stay ahead of threat adaptation while simultaneously developing systems in support of the new *U.S. Army Operating Concept*. As we continue to address the improvised explosive device (IED) threats of today, we must simultaneously prepare for future IED threats as part of the overall Counter-Explosive Hazards (CEH) focusing on the development of future and enduring CEH capabilities. This portfolio will execute a continuous modernization strategy across the Total Army by:

- Recapitalizing existing equipment to new condition; procuring new capabilities to meet operational requirements; and divesting of equipment which has limited ability to adapt to new requirements at a reasonable cost;

Army Equipment Modernization Strategy  
*Equipping the Total Force to Win in a Complex World*

- Leveraging advancements in mature technologies to reduce defense funded research and development for construction and unique engineer support capabilities such as underwater construction and firefighting;
- Assuming risk in the modernization of construction and engineer support equipment while maintaining legacy bridging, mines and munitions;
- Procuring and maintaining a limited quantity of modern Family of Scatterable Mines (FASCAM) systems while maintaining legacy FASCAM systems with expiring shelf life; and
- Balancing equipment Basis of Issue across the Total Army to include Army Prepositioned Stocks (APS).

**Near-Term (Fiscal Year 2016-2020) (FY 16-20) Objectives**

Our top priority is the establishment of the CEH program of record by recapitalizing mine protected vehicles used in support of Iraq and Afghanistan contingencies. Next, we will focus efforts toward seeking mature technologies and incremental improvements to address capability gaps for deep buried, non-metallic IEDs and semi-autonomous route clearance capabilities to improve crew protection. Due to the high density of construction equipment, we will balance new procurement with the use of the Service Life Extension Program to defer modernization. To become more cost effective, we will continue extending the service life for select systems nearing the end of their useful life such as the Deuce. New procurements nearing the end of their acquisition cycle include earthmoving and finishing systems.

Modernization efforts focus on in-stride breaching operations and assault gap crossing support. Near-term efforts will focus on the replacement of the legacy assault and line of communication bridging (LOC-B), identified gaps for a Light Assault Gap crossing capability and the development of an improved Armored Combat Earthmoving capability.

Other key modernization efforts include development of a network munitions systems to replace anti-personnel and anti-vehicle landmines focusing first on developing a long-range solution to replace the Gator munitions in the FASCAM family, while future research efforts focus on replacement solutions for close and mid-range FASCAM capabilities.

**Mid-Term (FY 21-29) Objectives**

We will complete the recapitalization of current route-clearance platforms and procurement of enablers which provide Soldiers with semi-autonomous and autonomous route clearance capabilities which enhance the forces' ability to identify detect and mitigate explosive hazards while increasing Soldier protection. We will ensure our

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critical earth moving capabilities, line of communication bridging and light assault gap crossing capability are being fielded and we will complete our tactical bridging fielding to allow the divestiture of legacy capabilities. A key technology research effort will focus on the development of a terrain shaping capability to replace close and mid-range FASCAM capabilities. Ultimately this effort will improve delivery systems to include multi-mode sensors and provide networked munitions to meet requirements for man-in-the-loop command and control.

**Long-Term (FY 30-45) Objectives**

Our top priority is the completion of assault bridging procurement and the majority of Line of Communication bridging capability. Our next priority is the fielding of the next generation mobility systems including autonomous route clearance platform capability along with associated counter-explosive enabler capabilities needed to mitigate emerging and evolving explosive hazard threats. Long-term CEH objectives include developing improved capabilities to clear wide and deep paths containing explosive hazards along convoy/maneuver routes and detection hazards while traveling at convoy speeds. We will also conduct a Service Life Extension Program along with upgrades for fuel efficiency technology to maintain critical earth moving capabilities.

Overall, this portfolio leverages advancements in the commercial sector, Service Life Extension Programs and procurement opportunities to ensure technological overmatch is maintained in the most cost-effective manner. Continuous investment in CEH ensures technological overmatch is achieved resulting in reduced effectiveness and lethality of explosive hazards, increased freedom of maneuver for U.S. forces and increased protection for our Soldiers.

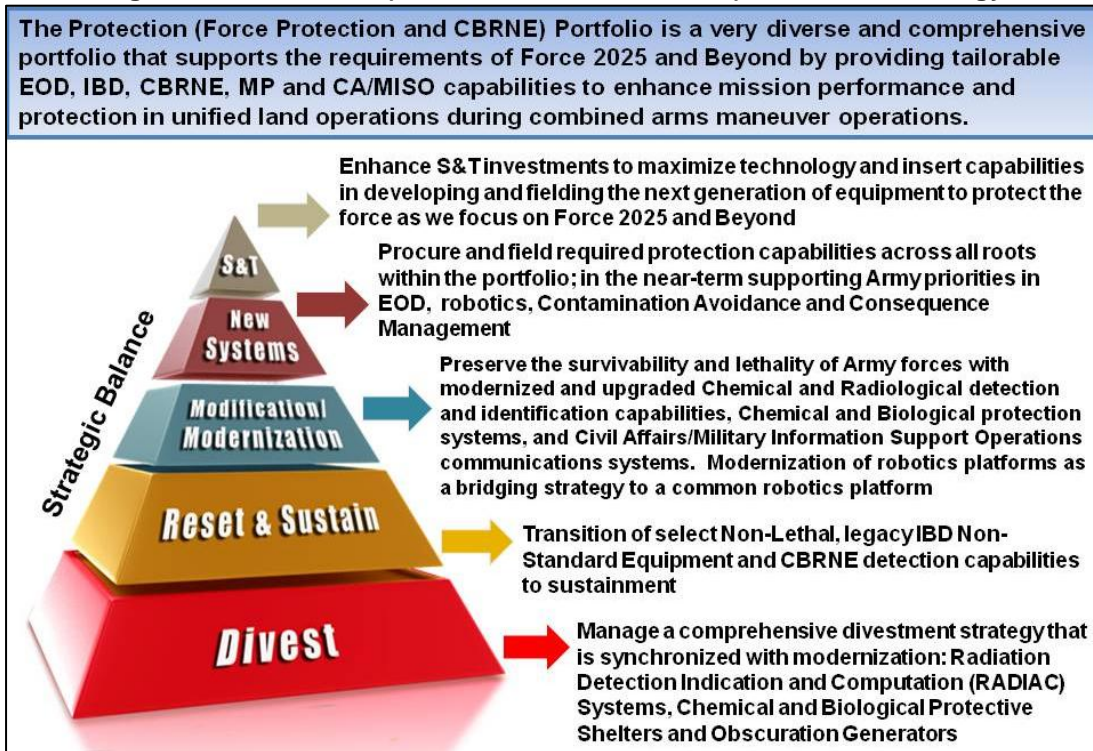


## **Annex I: Protection (Force Protection and Chemical, Biological, Radiological, Nuclear and High Yield Explosive (CBRNE))**

### **Description**

This portfolio provides for the procurement of a wide range of diverse capabilities including selected base defense; CBRNE; Explosive Ordnance Disposal (EOD); Policing; Civil Affairs/Military Information Support Operations (CA/MISO); and non-lethal systems that are affordable and provides our force with levels of force protection consistent with the anticipated threat and capabilities required to support the Countering Weapons of Mass Destruction mission. The Protection (Force Protection and CBRNE) Investment Strategy is graphically depicted in figure 10 below:

**Figure 10: Protection (Force Protection & CBRNE) Investment Strategy**



### **Risks and Challenges**

This portfolio is responsive to an adaptive threat where proliferation of CBRNE technologies and the rise of global terrorism increase and diversify the number of CBRNE adversaries. Today's rapidly changing operational environment involves a broad array of traditional threats including diverse hazards such as toxic industrial materials as well as emerging threats of non-traditional agents. Technology proliferation

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is enabling the rapid evolution of low-cost threat capabilities that have the potential to impose upon us costly protection solutions. We must not get on the wrong side of this cost-imposing strategy.

This portfolio accepts risks by extending timelines for technological development and upgrades to CA/MISO, base defense and EOD capabilities. We will execute a continuous modernization strategy by recapitalizing existing equipment to new condition; procuring new capabilities to meet operational requirements; and divesting of equipment which has limited ability to adapt to new requirements at a reasonable cost.

**Near-Term (Fiscal Year 2016-2020) (FY 16-20) Objectives**

Key objectives are resetting base defense equipment returning from Contingency Operations and establishing base defense capability sets to meet small, medium and large contingency base requirements. Integrated Base Defense (IBD) core capability packages, which are scalable and tailorable and reduce requirements to deliver/distribute fuel and water, will be created and serve as a bridge-to meet contingency requirements until enduring capabilities are procured to support contingency basing.

Current EOD robotic capability will be extended through reset to bridge the gap until a common medium robotic platform capability is developed and procured to support EOD operations. Procurement of a small robotic platform capability will be completed in the near-term while the service life for the large robotic platform will be extended until the mid-term for EOD formations. We will field CA/MISO equipment for general purpose forces by completing initial procurement of communication, media and print capability to seamlessly integrate with Special Operations Forces and Brigade Combat Teams. We will complete initial non-lethal fielding and invest in efforts to develop scalable non-lethal capabilities required to support entry control operations and all formations requiring nonlethal weapons capability. Finally, our CBRNE near-term modernization efforts include investing in research to improve the stand-off and remote detection capabilities and the sensor suite capabilities of the specialty CBRNE vehicles. We will also continue to resource the standardizations of our commercial-off-the-shelf capabilities through the Dismounted Reconnaissance – Sets, Kits and Outfits program.

**Mid-Term (FY 21-29) Objectives**

In the mid-term, our focus is on outpacing threat adaptation through modernization, replacing outdated platforms and ensuring increased force protection. Our efforts include the development of a protection robotic capability; enhanced capabilities to locate weapons of mass destruction, the means for their production and proliferation; the continued transition to enduring IBD capability and the replacement of the Military Police Armored Security Vehicle (ASV). Research investments and technology advancements will dictate upgrades or replacements to selected CBRNE, IBD, RAS and CA/MISO capabilities.

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Additionally, we will prioritize CBRNE research investments and procurement of protection and detection capabilities to mitigate the threat posed by non-traditional agents. Through the efforts of the Chemical Biological Defense Program (CBDP), we will see the procurement of improved diagnostic, field analytics, detection and protection capabilities to not only counter traditional chemical and biological warfare agents but to also mitigate the impact of non-traditional agents and emerging infectious diseases. Other critical mid-term research efforts focus on enhancing the decontamination capability for sensitive military equipment and improving our projected and generated obscuration capabilities.

**Long-Term (FY 30-45) Objectives**

In the long-term, the portfolio, supported by advancements in technology, focuses on acquiring the next generation of protection and non-lethal systems. We will continue to leverage the CBDP to ensure science and technology investments address evolving CBRNE defense missions and future CBRNE threats.

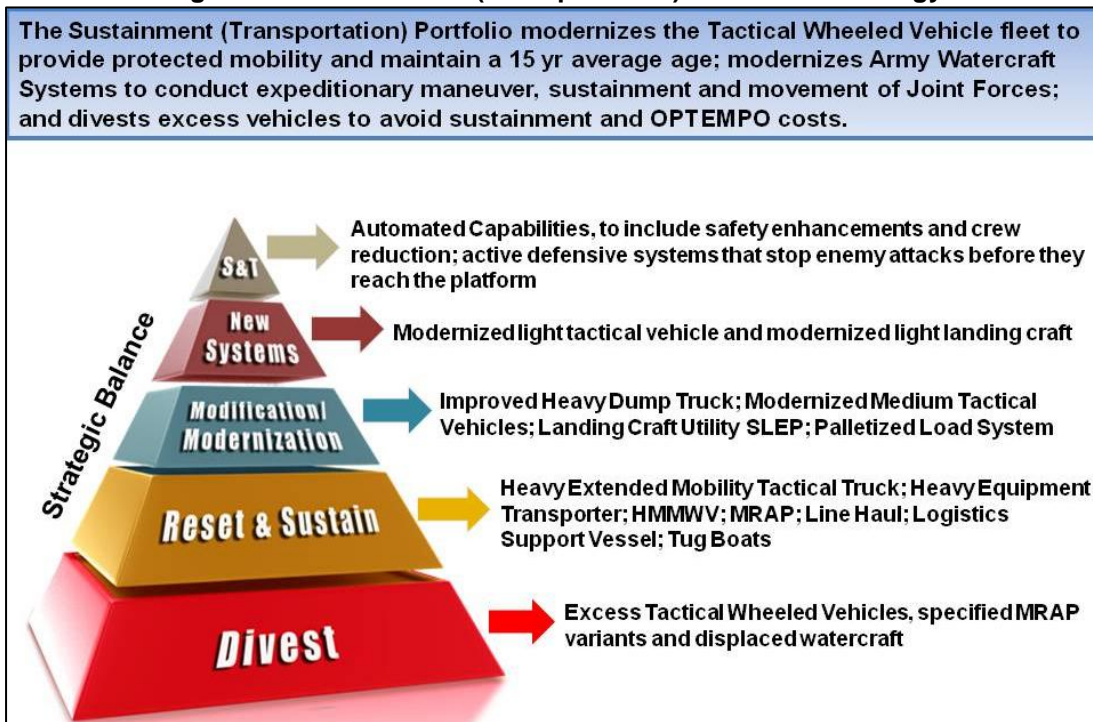
Threats to the deployed force are constantly changing in scope, character and intensity. In response to continued threats from IEDs, weapons of mass destruction and other traditional threats, this portfolio is committed to pursuing innovative force protection and base defense capabilities that protects our formations.

## **Annex J: Sustainment (Transportation)**

### **Description**

The Sustainment (Transportation) portfolio supports the *U.S. Army Operating Concept* by providing the Army with strategic agility and freedom of movement through equipping the Force with tactical wheeled vehicles, associated trailers and Army watercraft systems. This diverse assortment of equipment supports all warfighting functions and provides the combatant commander with a broad range of capabilities to include: battle command on the move, reconnaissance, communications, sustainment, medical evacuation, maintenance, recovery support, protected troop transport and a versatile platform to mount various direct fire weapon systems and fire support equipment. Army watercraft also have a unique capability to provide commanders additional options for entry in austere coastal areas; they can be used to negate an enemy's anti-access and area denial capabilities; provide operational maneuver from the sea over strategic distances; and to increase lines of communication in both coastal areas and along inland waterways. The Sustainment (Transportation) Investment Strategy is graphically depicted in figure 11 below:

**Figure 11: Sustainment (Transportation) Investment Strategy**



### **Risks and Challenges**

The risks faced by the Army's tactical wheeled vehicle fleet vary greatly from the tactical to the operational and strategic levels. At the tactical level, recent wars showed us the enemy's continual adaptations in their efforts to damage or destroy vehicles. The

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*Equipping the Total Force to Win in a Complex World*

challenge posed at the tactical level is to continue to improve the “iron triangle” of protection, performance and payload. Unfortunately, mitigating risks at the tactical level through armor and vehicle size impacts operational and strategic logistics requirements and challenge our ability to sustain high tempo operations at the end of long and contested supply lines.

Age is an inherent risk to proper function of any equipment, due to wear and tear, increased operating costs and reduced ability to interface with more modern systems. Declining interface with modern systems capabilities is especially significant regarding Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR) equipment, which upgrade more quickly than the vehicles and vessels on which they are used. Because the tactical wheeled vehicle fleet is relatively young, age is not a high risk in the tactical wheeled vehicle fleet. This is not true for the Army watercraft fleet, which based largely on designs from the 1960s and 1970s. Nearly all vessels in the landing craft fleet were built in the early 1990s or earlier. The specific risks associated with vessel age include hull failure, major component failure, obsolescence and inability to communicate due to aging equipment and inability of the system to support more modern communications equipment. The current Army watercraft fleet is slow and lacks the capacity to deliver tailorable, combat configured force elements.

Affordability is at the forefront of all decisions in this portfolio. Solutions must carefully balance protection against cost and mobility. The Army’s comprehensive review of both the Light Tactical Wheeled Vehicle (TWV) and trailer fleets validates requirements and adjusts to more affordable materiel solutions where possible. We will leverage commercial platforms for watercraft where possible and divest thousands of wheeled vehicles to reduce sustainment costs and further decrease average fleet ages. The Army is also developing an Army Watercraft Fleet Study to determine the proper fleet mix and optimal configurations.

**Near-Term (Fiscal Year 2016-2020) (FY 16-20) Objectives**

The Army remains on schedule for the development of the Joint Light Tactical Vehicle (JLTV). The JLTV will provide the same level of protection as the base model Mine Resistant Ambush Protected All Terrain Vehicle (MATV). Additionally, the JLTV will have better mobility and transportability than the MATV and improved network integration over the High Mobility Multipurpose Wheeled Vehicle (HMMWV).

The Army will continue analysis on a materiel solution to the protected ground ambulance capability gap within the Infantry Brigade Combat Team (IBCT) and Echelons Above Brigade (EAB). To mitigate this capability gap, the Army will rely on the Vice Chief of Staff, Army approved interim solution, the MaxxPro Plus Survivability Upgrade Long Wheel Base (LWB) Ambulances from Army Prepositioned Stocks (APS), as well as, non-materiel Doctrine, Organization, Training, Leadership and Education, Personnel, Facilities and Policy (DOTmLPP-P) solutions to bridge the capability gap.

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Several actions will be accomplished to allow the Transportation Portfolio to better support the *U.S. Army Operating Concept*. We will procure protection kits to move toward the protection goal established in the Tactical Wheeled Vehicle Strategy and modernize the Heavy Tactical Vehicle fleet through recapitalization of Palletized Load System and procurement of the Heavy Dump Truck. We will minimize threats by removing Soldiers from vehicles through the development of automated capabilities. The age of the Medium Tactical Vehicle fleet will continue to decrease through procurement and we will continue to reduce the overall fleet size and age through divestment of older vehicles. We will continue to field MATV and begin fielding of other Mine Resistant Ambush Protected (MRAP) versions as they finish their upgrade.

Watercraft efforts will focus on Service Life Extension Program (SLEP) and network upgrades for the medium vessels (Landing Craft Utility). We will also look to begin RDT&E on Maneuver Support Vessel – Light (MSV-L), moving toward procurement in the mid-term.

**Mid-Term (FY 21-29) Objectives**

Our wheeled fleet focus will be on the continued modernization of our Light Tactical Fleet and the continued production of crew protection kits for medium and heavy vehicles. We will complete platform procurement of the Light Engineer Utility Trailer and Heavy Dump Truck. Procurement of Medium Tactical Vehicles will help to maintain the wheeled fleet average age of 15 years. We will conduct research on the viability of a system which would ideally replace current Medium and Heavy Tactical Vehicles, reducing lifecycle costs through reduced models and increased parts commonality. In the watercraft fleet, we will complete the SLEP on Landing Craft Utility and place significant focus on procurement of MSV-L. We will also look to procure a medium tug boat to replace both tug boat varieties and begin looking for a replacement for the large landing craft, Logistics Support Vessel.

**Long-Term (FY 30-45) Objectives**

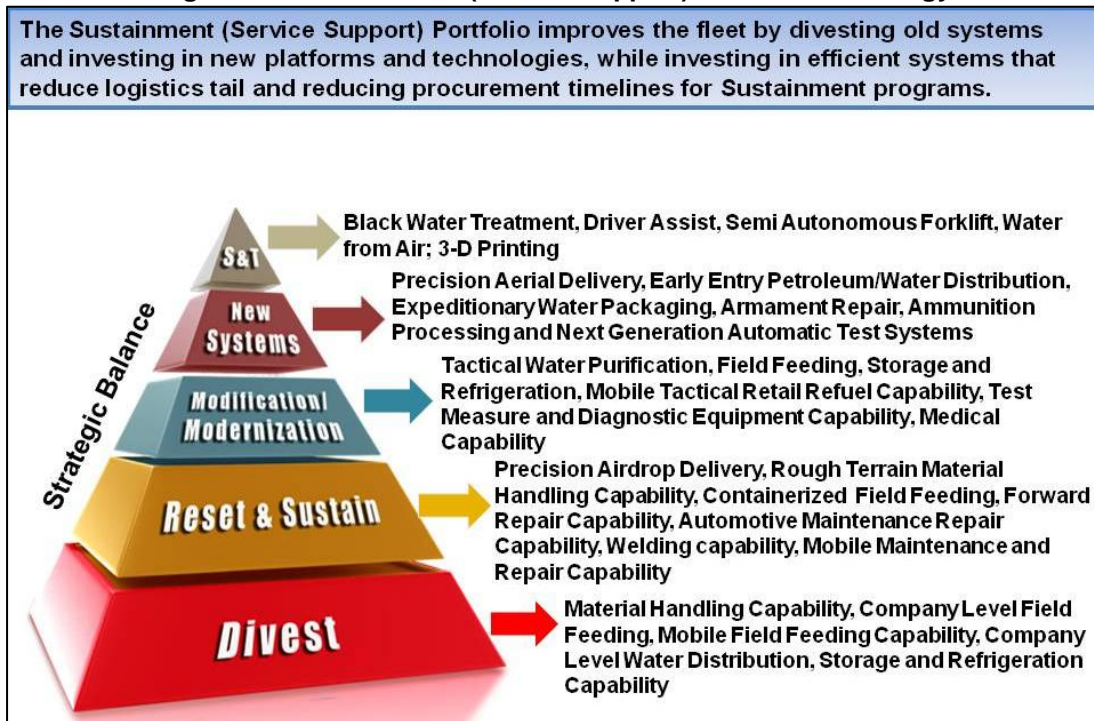
By FY 30, we will require a new program to replace the HMMWVs that remain in the Light Tactical Fleet. We will continue to fund research on armor protection for all vehicle fleets and continue to procure up-to-date armor kits to keep the production lines open. A procurement action will be required in the heavy fleet to bring down average ages. We will continue to procure JLTV thru FY 42, after which we will be able to focus more fully on other aspects of the wheeled vehicle fleet. Watercraft focus in the long-term will support expeditionary maneuver with procurement of heavy and medium landing craft, as well as procurements to replace modular causeway systems and the Barge Derrick, while SLEP is likely for the small landing craft.

## **Annex K: Sustainment (Service Support)**

### **Description**

This integrated portfolio gives the Army flexibility by providing commanders with required capabilities to conduct a wide range of sustainment operations. The sustainment portfolio supports Soldier health and subsistence and maintains Army equipment operational availability, resupplying forces in austere locations. Additionally, this portfolio provides logistical support to move equipment, to store and transport fuel and water and to purify and reuse water. The portfolio seeks incremental and cost effective solutions to mitigate risks and to provide tailorable, decentralized sustainment support, improving equipment reliability, availability and maintainability improving readiness and health care services. The Sustainment (Service Support) Investment Strategy is graphically depicted in figure 12 below:

**Figure 12: Sustainment (Service Support) Investment Strategy**



### **Risks and Challenges**

Affordability is a key challenge within this portfolio. To remain affordable, we will delay and stagger program starts; reduce procurement rates and assume risk of using legacy systems for longer periods of time; assume a moderate risk of obsolescence and sustainment cost increases; and shift programs to sustainment when possible.

The portfolio is challenged with the ability to Conduct Entry Operations; Adapt the Institutional Army, Ensure Interoperability and Operate in Joint Interagency,

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Intergovernmental and Multinational (JIIM) Environment, Set the Theater; Sustain Operations and Maintain Freedom of Movement; and Exercise Mission Command. We can overcome these challenges through interdependencies with other programs and staying ahead of technological obsolescence of these systems. This strategy requires continuous coordination, collaboration and synchronization with other portfolios. Specifically, coordination: with Tactical Wheeled Vehicles; mission command and intelligence capabilities in the watercraft fleet; and chemical, biological, radiation and nuclear capabilities for integrated basing systems.

**Near-Term (Fiscal Year 2016-2020) (FY 16-20) Objectives**

- **Medical**: Prioritize commercial solutions to ensure we have the best medical care from point of injury to combat support hospital; invest research funding to ensure we have Food and Drug Administration approved vaccinations and preventive medicine against infectious diseases.
- **Delivery and Storage**: Field a more capable precision airdrop capability to more accurately deliver supplies to forward-deployed forces in austere locations and to reduce costs associated with recovery of air items; focus on liquid delivery by improving our fuel and water storage to reduce resupply requirements and develop water reuse systems to allow for units to self-support far-forward on the battlefield, further reducing the requirement for additional bulk water transport and large purification systems. Allow for man-portable water purification systems utilization at the small unit level at remote and austere locations, nullifying the requirement for additional bottled water or bulk water delivery to support operations reducing the manpower and costs involved in providing logistics to independent operating units over long lines of communication. Establish water packaging systems that allow for easy distribution to the small unit level and reduces additional commercial contracting support. Provide rapid distribution of fuel requirements to the lowest level while maintaining throughput from the main sources of supply and flexibility for the operational commander. Improve materiel handling with more rugged and capable forklifts with the ability for use in more austere environments to allow for greater operational flexibility and maneuverability on the battlefield. Establish mobile ammunition processing facilities to remove unsafe or recalled ammunition from the battle space.
- **Food**: Modernize our field feeding systems and refrigeration capability to support battalion and below while reducing costs and providing quality subsistence support to remote operating units for extended periods of time.
- **Maintenance**: Improve operational readiness and efficiencies by divesting legacy test sets and tools, upgrading maintenance support devices, fielding mobile repair stations as well as sets, kits and outfits, thus reducing the unit maintenance footprint.



Army Equipment Modernization Strategy  
*Equipping the Total Force to Win in a Complex World*

- Energy and Water: Provide improved energy reliability, flexibility and efficiency and reduce logistical support requirements by improving power, shelter and water technologies in our base camp Force Provider systems and selected formations. Improve operational energy for sustained ground operations through materiel and doctrinal actions.

**Mid-Term (FY 21-29) Objectives**

- Medical: Improve Soldier protection through partnerships with industry on new advancements in drugs and vaccines and new medical equipment for fielding to medical units and medical evacuation platforms.
- Delivery and Storage: Improve our precision airdrop accuracy and terrain avoidance; begin research investments for future precision airdrop systems and autonomous aerial delivery systems to reduce costs, manpower and logistics footprint and to allow for precision delivery of supplies far forward over hostile terrain; accept risk by relying on legacy water trailers through 2030; legacy water purification systems and fuel support systems through 2035. Continue technological development to reuse waste water as a source of supply to the individual Soldier on the battlefield, increasing efficiencies and further reducing the transportation, distribution and storage requirements for operations.
- Food: Continue our reliance on legacy feeding systems for 20 percent of the requirement for company feeding through 2048; begin an investment for new research into enhanced energy efficient and modular cooking systems to enable the procurement of a future field feeding kitchen.
- Maintenance: Slow procurement of certain sets and kits, while recognizing the need to synchronize upgrades necessary to keep pace with autonomous technologies being applied to Army ground and air platforms. Delay the start of future maintenance systems until the long-term.
- Energy and Water: Improve energy and water management, networking. Examine alternative solutions to increase flexibility for operational forces to sustain Soldiers, vehicle systems and contingency basing components as part of globally-integrated operations.

**Long-Term (FY 30-45) Objectives**

We will procure next generation solutions to support sustainment operations. To do this we will invest our research dollars to meet the warfighting challenges, close capability gaps, partner with industry and simplify our equipment to ensure ease of use and maintainability and reduce the demand characteristics of the force and improve equipment readiness rates. Continue to challenge industry for sustainable energy and water solutions that enable greater force projection and flexibility will allow the Army to reduce logistics footprint while overcoming limitations of access, resources and vulnerability to disruption and achieving greater freedom of maneuver.

## ***Annex L: Operational Energy***

### **Description**

Operational Energy is the energy and associated systems, information and processes required to train, move and sustain forces and systems for military operations. Operational Energy is critical to the force's ability to conduct and support operations, enabling maneuver and freedom of action and providing operational reach and endurance. Improving the energy efficiency of devices, platforms and equipment, developing alternative energy capabilities and interoperability and effectiveness of energy use reduces sustainment demands and builds flexibility and resilience into the force and increases its ability to respond to changes in operational demands and adapt to changes in the operational environment. New technologies enable increased efficiency and reduced demand through lower fuel consumption, decreased waste generation, efficient power and energy generation, distribution and storage and timely and agile logistics and precision resupply. Advanced and efficient power saving and generation technologies will reduce sustainment and lift requirements. Improved power efficiency, storage and generation from traditional and renewable sources will provide power under austere conditions.

### **Risks and Challenges**

Future Army forces will operate in an increasingly complex environment. Technological proliferation leads to an increasingly sophisticated threat, while the increasing speed of human interactions and spread of information will compress events in time. To win, the force must be able to deploy to multiple locations and operate effectively with less notice while sustaining operations over strategic distance. This future faces significant risks from outdated and inefficient energy capabilities. The availability of energy constrains the range and endurance of mounted and dismounted formations and challenges our ability to integrate new capabilities. Protecting long fossil fuel supply lines places Soldiers at risk and constrains commanders' freedom of action. Experience indicates a lack of sufficient power generation, energy storage, energy conversion and power distribution systems to meet the demands of distributed operations in harsh environments. Leaders at all levels require the ability to manage energy resources to maximize combat effectiveness and systems need to become more efficient overall.

- Soldier Power and Energy: Soldier systems must be sustainable, interoperable and flexible and enable the Soldier to operate independently for extended periods. Systems must be developed to reduce energy consumption, improve operating efficiencies and increase the operational availability of the Soldier.
- Aviation Systems Power and Energy: Future aerial systems require greater lift, range and endurance without increasing logistical requirements. More efficient

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*Equipping the Total Force to Win in a Complex World*

components, energy management processes and reduced size, weight and power demands of supporting sensors and engagement systems are essential.

- Surface Systems Power and Energy: The force is challenged to provide mobility and power for an ever-increasing array of sensors, communications systems, computers, weapons and environmental systems. The force needs additional tools and training to effectively plan and manage tactical power requirements and use current and emerging power production, distribution, conditioning and storage equipment. Future vehicles require sufficient power, power distribution and management, heating/cooling of hosted systems and sufficient exportable power to meet the needs of the tactical commander. Increased system fuel efficiency overall is required with less reliance on fossil fuel.
- Contingency Base Camps Power, Energy and Water: Our challenge is to design and establish modular, flexible, sustainable, scalable and adaptable base camps that include innovative energy and water sources and planning for water reuse, and power generation and management which provides the commander with the means to accomplish base camp operations while minimizing resource consumption through efficiency.

### **Near-Term (Fiscal Year 2016-2020) (FY 16-20) Objectives**

Phase I, Initial Operating Capability (underway), is improving energy and water capabilities and management in current operations, with corresponding net improvements to force mobility, agility, flexibility, lethality and protection. Improve Soldier mobility and endurance, increase resource availability and reduce force vulnerabilities by: creating awareness and establishing energy-related roles, training, education and accountabilities; fielding flexible and networked energy technologies; identifying and eliminating waste; increasing efficiency of energy delivery; and establishing mechanisms to enable and incentivize performance improvement. This will improve performance in current operations by increasing the availability and reliability of energy to support the mission, while reducing Soldier's loads, overall fuel consumption and manpower requirements.

### **Mid-Term (FY 21-29) Objectives**

Phase II, Interim Operating Capability, will integrate energy/water-informed concepts into Army formations and force generation processes and provides flexible, scalable energy and water capabilities to support the range of military operations to support the Force of 2025. This requires systematic mission and capability analysis of energy/water-related contributions and liabilities; development of plans and modular/interoperable energy and water capabilities to support task organization; tailoring of energy and water capabilities within force generation processes; and application of mission-oriented energy and water performance management. This will enable the Army to design, deploy and manage energy and water capabilities as an

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*Equipping the Total Force to Win in a Complex World*

integral component of task-organized, globally integrated formations.

**Long-Term (FY 30-45) Objectives**

Phase III, Final Operating Capability, will build energy considerations into culture, behavior, operating and business processes to seamlessly inform Army decisions and behaviors. This phase requires comprehensive analysis of energy and water use cases and architectures; establishment of enterprise-wide energy and water information requirements and metrics; integration of energy and water concepts into Army and Joint training and education curricula and visibility of energy and water investments, costs and benefits within planning, programming, budget and performance management processes. As a desired outcome, this phase will instill within the Total Army, an enterprise ability to value energy and water attributes and to consider the range of possible future conditions, contributing to near and long-term decisions that manage risks to our sustained readiness into the future.

## **Annex M: Army Medicine**

### **Description**

The Army Medicine portfolio protects treats and optimizes the health and performance of Soldiers. One of our top priorities is providing Soldiers on the battlefield with the most modern, quality driven, evidenced-based standard of care. Medical materiel includes supplies, equipment, specialized surgical items, pharmaceuticals, narcotics, vaccines and blood products.

Continued investment in the medical sciences allows improved Soldier resiliency, quicker physical and mental healing, smoother integration back into society and improved quality of life for the Soldier. Industry provides more than 95 percent of medical supplies and equipment. The remaining five percent requires research and development (R&D) to provide military capabilities that industry does not address. Our strategy focuses primarily on future medical needs of Soldiers and sustaining medical R&D of core capabilities such as neuroscience, hemorrhage control, performance and resilience, thermal stress, infectious diseases, drug design and medicinal chemistry.

### **Risks and Challenges**

Army Medicine employs Army and Defense Health Program Research, Development, Test and Evaluation funds to support rapid development and insertion of Food and Drug Administration (FDA)-approved medical technologies, vaccines, drugs and biologics to support Soldier medical needs. Evolving clinical practices and rapid improvements in technology can accelerate requirements, which often increases equipping costs. We must balance technology changes with limited resources and a complex array of medical capabilities required during Joint Combined Arms Operations. Looking forward, we must investigate innovative equipping and delivery strategies to support the Sustainable Readiness Model.

Implementation of Force Design Updates (FDU) will present unique challenges as we convert the current 248-bed Combat Support Hospital (CSH) to a new Field Hospital (FH) Design consisting of five separate units. The Headquarters and Headquarters Detachment plus 32-bed Field Hospital elements dramatically improve the Army's ability to field Level III (Hospital) medical care. Hospital capabilities can be augmented with 32-bed Surgical, 24-bed Medical and 60-bed Intermediate Care Ward (ICW) detachments. The FH Design improves modularity and supports the Army's goals of being more Expeditionary Efficient.

In 2009, Army Medicine began the Medical Materiel Readiness Program by centrally managing medical equipment for 4 x 248-bed CSHs at high readiness levels, available to deploy with active or reserve component personnel. As a result, Component (COMPO) III hospitals maintain minimal medical equipment for training only and

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Continental United States (CONUS) COMPO I hospitals are issued 84 of their 248-bed requirements. This reduced equipping strategy was identified in the 2012 and 2013 *Army Equipment Modernization Strategies* which focused on sustainment and modernization of 17 CSHs (Table of Organization and Equipment (TOE) and Army Prepositioned Stocks (APS)) of the 33 CSHs currently in the Army structure.

Army Medicine, in conjunction with TRADOC, is conducting a review to identify solutions to solve complex capability gaps and challenges inherent in developing a cross Army Warfighting Function portfolio, Army Warfighting Challenge synchronized way ahead in support of air and ground medical evacuation and enroute care requirements. Improved casualty evacuation and treatment at the point of injury increase the number of 'golden hour' survivors to unprecedented levels.

**Near-Term (Fiscal Year 2016-2020) (FY 16-20) Objectives**

- Army Medicine Equipping Strategy: Develop and expand innovative medical equipping solutions, derived from addressing the Army Warfighting Challenges, Capability Needs Analysis and Force 2025 requirements, to increase efficiency and readiness across the Force; modernize and field medical equipment and Sets, Kits and Outfits; and begin conversion to Field Hospital FDU;
- Drugs and Vaccines: Complete development and field a topical Leishmania treatment; field an FDA-approved drug to treat severe/complicated Malaria (Artesunate); field a prophylactic drugs to prevent Malaria (Tafenoquine); continue development of a Dengue vaccine, anti-Diarrheal vaccines, a regional Human Immunodeficiency Virus (HIV) vaccine, Rapid Diagnostic and Detection Devices, bacterial resistant wound infection solutions; and continue to work with partners to reduce development costs for medical drugs and vaccines;
- Medical Field Systems: Complete development and field a Traumatic Brain Injury (TBI) test to diagnose TBI in the field; complete development of Freeze-Dried Plasma and Cryopreserved Platelets which provide life-saving blood products further on the battlefield; complete the Hydration Status Monitor; improve wound dressings; and continue work with partners to keep cost low for relevant medical products; and
- Medical Air Evacuation: Complete the equipping of 279 legacy Medical Evacuation (MEDEVAC) UH-60 Blackhawks with Equipment Package upgrades to ensure maximum capability for patient evacuation and enroute care. Equip UH-72A Lakota's, which perform aeromedical evacuation missions, with Lakota specific medical equipment sets.

Army Equipment Modernization Strategy  
*Equipping the Total Force to Win in a Complex World*

**Mid-Term (FY 21-29) Objectives**

- Army Medicine Equipping Strategy: Continue to provide medical materiel solutions for Army deployed, home station and contingency forces; continue the development, sustainment and modernization based on a modular force design; achieve end state for the Field Hospital conversion;
- Drugs and Vaccines: Field game-changing drugs and vaccines including those to prevent or treat Dengue, Bacterial Diarrhea, Hemorrhagic Fever and Staph; field the next generation Malarial Prophylaxis (prevention) and the capability for a single infectious disease diagnostics; continue development efforts on a Chikungunya vaccine and begin the development of a next generation Malaria vaccine; and
- Medical Field Systems: Field a handheld TBI diagnostic device and develop drug therapies for TBI and psychological health (post-traumatic stress disorder/suicide); and begin the development of medical products such as miniaturized vital signs monitors and a portable “Heart/Lung machine.” Development of robotic evacuation capability and tele-mentoring capabilities; complete development and field an Integrated Physiological Status Monitor that interfaces with the telemedicine infrastructure; and begin development of the next generation of hemorrhage control products.

**Long-Term (FY 30-45) Objectives**

- Monitor, sustain and improve Soldier readiness and health damage through R&D, implementation of new technologies and creation of medical systems to support the Soldier and provide immediate feedback to commanders.

## **Annex N: Science and Technology**

### **Description**

Army Science and Technology (S&T) supports the Army Equipment Modernization Strategy by aligning basic and applied research and advanced technology development efforts to acquisition programs of record (PoRs) using the Long-Range Investment Requirements Analysis (LIRA) process. By exploring technology and pursuing new capabilities, the Army S&T Enterprise informs reasonable and realistic requirements and enables the Army to field affordable solutions for the current and future fight. The efforts of the S&T Enterprise are managed by portfolio to ensure maximum synergy of efforts and reduction of unnecessary duplication. The S&T program is organized into eight investment portfolios that address challenges across six Army-wide capability areas (Soldier/Squad; Air; Ground Maneuver; Command, Control, Communications and Intelligence (C3I); Lethality; and Medical) and two S&T enabling areas (Basic Research and Innovation Enablers).

Army S&T is the cornerstone of the Army of the future. Our mission is to identify, develop and demonstrate technology options that inform and enable effective and affordable capabilities for the Soldier. Army S&T delivers these capabilities through effective partnerships synchronized with Army processes. The S&T Enterprise is made up of the Deputy Assistant Secretary of the Army for Research and Technology (DASA(R&T)) whose mission is to lead, develop and advocate for the Army S&T Enterprise, programs and budget and the S&T executing organizations. They include: Army Materiel Command (AMC), Research, Development and Engineering Command (RDECOM) and its six Research, Development and Engineering Centers (RDECs) and the Army Research Laboratory; the U.S. Army Medical Command's Medical Research and Materiel Command (USAMRMC); the U.S. Army Corps of Engineers' Engineer Research and Development Command (ERDC); the Space and Missile Defense Command/Army Forces Strategic Command's Technology Center (SMDC-TC); and the Army G-1's Research Institute for the Behavioral and Social Sciences (ARI). The Army Capabilities Integration Center (ARCIC) works collaboratively with the S&T enterprise to communicate Warfighter capability needs and validate key S&T priorities. The Army's strong support of the S&T Enterprise and the continued investment in technology ensure that the Army remains the pre-eminent force throughout the world.

### **Risks and Challenges**

Army S&T is responding to direction from the Chief of Staff, Army, to make the Army leaner, more lethal, expeditionary and agile, with greater capability to conduct decentralized, distributed and integrated operations. Force 2025 and Beyond is the Army's strategic effort to integrate and synchronize activities across the Army over the near, mid and long-term to develop the future force that achieves these capabilities within the constraints of current policy and the realities of the operational environment.



Army Equipment Modernization Strategy  
*Equipping the Total Force to Win in a Complex World*

Over the next five years, we face a situation where modernization will be slowed, new programs will not be initiated as originally envisioned and the Army's S&T Enterprise will be challenged to better prepare for the programs and capabilities of the future. We will focus on maturing technology, reducing program risk, developing prototypes that can be used to better define requirements and conducting experimentation with Soldiers to refine new operational concepts. The S&T community will be challenged to bring forward not only new capabilities, but capabilities that are affordable for the Army of the future.

Our emphasis is placed on S&T areas that address Army Enduring Challenges, as defined by the Army Acquisition Executive, with collaboration across Services, industry, academia and partner Nations, to solve common challenges. Army S&T is challenged to prevent operational surprise. It cannot be limited to addressing what is probable based on the emerging threats. Army S&T must also plan for the improbable and the unthinkable. Army S&T is postured to address these emerging threats and capitalizes on opportunities—focusing not only on developing more capable and affordable systems, but also on understanding the complexity of the future environment. Army S&T is committed to maintaining a leading edge in technology and remaining flexible and agile enough to respond to the unexpected. Army S&T maintains a broad investment strategy across multiple technical areas, many of which require significant time to conduct research and develop technological solutions to difficult problems. These investments support the development of technologies that will enable capabilities needed to fulfill the *U.S. Army Operating Concept's* imperative of winning in a complex world, address the Army Warfighting Challenges (AWFC) and are aligned with the TRADOC commander's Five S&T Imperatives: Grow Adaptive Army Leaders and Optimize Human Performance; Maximize Demand Reduction and Improve Reliability; Maintain Overmatch; Enhance Expeditionary Capabilities; and Continuously Upgrade, Protect and Simplify the Network.

By its nature, S&T development often requires sustained, long-term investment to realize new technology enabled solutions to difficult Army problems. The S&T Enterprise uses the LIRA to help ensure alignment to existing and future acquisition programs or other transition customers in near, mid and long-term timeframes.

**Near-Term (Fiscal Year 2016-2020) (FY 16-20) Objectives**

As Army modernization funding becomes constrained there will be fewer transition opportunities for S&T products to impact acquisition PoR. Therefore, in the near-term, Army S&T is placing emphasis on exploring innovative concepts by building working prototypes that can demonstrate potential warfighting payoff and reduce risk for possible transition to future acquisition programs. The Combat Vehicle Prototyping (CVP) Program, initiated in FY 15, matures technologies to address technical and integration challenges facing the ground combat fleet in the areas of mobility, survivability, lethality and vehicle architecture. CVP focuses on maturation and demonstration of technologies such as engines, transmissions, ballistic protection, blast mitigation, lethality subsystems

Army Equipment Modernization Strategy  
*Equipping the Total Force to Win in a Complex World*

and advanced fire controls. The goal is to mature and demonstrate by FY 19 a series of subsystem demonstrators that inform the next generation of combat vehicle design and requirement. The Joint Multi-Role Technology Demonstration whose first flight is in FY 17, supports the next generation helicopter platform to provide 50 percent greater speed, twice the range and up to a 25 percent increase in reliability. Red Teaming and Vulnerability Assessments are near-term S&T efforts that identify potential vulnerabilities early in the materiel development lifecycle and are intended to provide timely feedback to technology and materiel developers, increasing awareness of potential technology risks and identifying tradeoffs or opportunities for design improvements that may not have been considered. These efforts allow the S&T community to serve an important role by helping the Army maintain a leading edge in technology by capitalizing on S&T investments when acquisition funding becomes available.

### **Mid-Term (FY 21-29) Objectives**

Army S&T will enable Force 2025 capabilities. One of the priorities in the mid-term is focused on those efforts that will enable capabilities to allow us to maintain overmatch, such as the High Energy Laser Mobile Demonstrator. The plan is to integrate advanced power, thermal management, beam control and laser subsystems of increasing power levels. This S&T effort will culminate in FY 22 with a demonstration of an operational capability to defeat rockets, artillery and mortar (RAM), Unmanned Aircraft Systems (UAS), Remote and Autonomous Systems (RAS) and cruise missile threats before transitioning to a future increment of the Indirect Fire Protection Capability (IFPC) Program. In the mid-term, Disruptive Energetics is a high risk/high payoff investment to achieve 3-10x in energetic materiel yield. Additional S&T efforts include Degraded Visual Environment mitigation technologies and Assured Position Navigation and Timing (PNT) enablers. Today's on-going efforts in cognitive resilience and human performance will advance mental and physical health and fitness in the force by 2025. Through the development of health and performance metrics, Army S&T will inform strategies tailored to the individual and allow for assessment, monitoring and intervention throughout a Soldier's career.

### **Long-Term (FY 30-45) Objectives**

A priority for the long-term is to focus on those efforts that will change the nature of the force and the way we fight, enabling us to be more expeditionary. Examples of S&T efforts aimed at the long-term include: looking at survivability holistically, combining such technologies as multi-threat armors, electromagnetic armor, active protection systems and active blast mitigation. As the pace of technological change accelerates, there is a need to understand the S&T trends that may generate revolutionary or disruptive technology of interest to the Army over the next 30 years. Major efforts in the area of Basic Research include: multi-scale modeling of materials where S&T aims to create a transformational, comprehensive "materials-by-design" capability – establishing an ability to design materials with the desired properties, which is a critical enabler in developing lightweight vehicle and Soldier protection; research in human-systems integration to

Army Equipment Modernization Strategy  
*Equipping the Total Force to Win in a Complex World*

better manage Soldier emotion and fatigue states and improve cognitive performance; Quantum Effects and Information Science to provide efficient transfer of data and knowledge over communication, information and social/cognitive networks; Intelligent Autonomous Systems where S&T aims to expand autonomous capabilities, utility and portability of small robotic systems, with a focus on enhanced intelligence, biomimetic functionality (mimicking things that occur in nature – fiber as strong as spider silk, adaptive camouflage as effective as an octopus, etc.) and robust mobility.

## ***Annex O: References***

2014 Quadrennial Defense Review, 4MAR14

*Army Strategic Planning Guidance*, 2014

Force 2025 and Beyond Integration and Synchronization Plan, 30SEP14

*National Security Strategy*, FEB15

*Sustaining U.S. Global Leadership: Priorities for 21<sup>st</sup> Century Defense*, JAN12

*The U.S. Army Operating Concept: Win in a Complex World*, 31OCT14

U.S. Army Science and Technology Strategic Implementation Plan, 17OCT14

## **Annex P: Acronyms**

ABCT	Armored Brigade Combat Team
AMC	Army Materiel Command
AMD	Air and Missile Defense
AMPV	Armored Multi-Purpose Vehicle
ARI	Army Research Institute
ARI	Aviation Restructure Initiative
AO	Area of Operation
APS	Army Prepositioned Stocks
APS	Active Protective Systems
ARCIC	Army Capabilities Integration Center
ASE	Aircraft Survivability Equipment
ASPG	Army Strategic Planning Guidance
ASV	Armored Security Vehicle
AWA	Army Warfighting Assessment
AWFC	Army Warfighting Challenges
BCT	Brigade Combat Team
BMD	Ballistic Missile Defense
CA	Civil Affairs
CBDP	Chemical Biological Defense Program
CBRNE	Chemical, Biological, Radiological, Nuclear and High Yield Explosive
CCDR	Combatant Commander
CEH	Counter-Explosive Hazards
C3I	Command, Control, Communications and Intelligence
C4ISR	Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance
COCOM	Combatant Command
COE	Common Operating Environment
CoL	Campaign of Learning
COMPO	Army Components
CONUS	Continental United States
CS	Capability Sets
CSA	Chief of Staff of the Army
CSH	Combat Support Hospital
CT	Computed Tomography
CUAS	Counter Unmanned Aircraft System

Army Equipment Modernization Strategy  
*Equipping the Total Force to Win in a Complex World*

CVP	Combat Vehicle Prototyping
DASA(R&T)	Deputy Assistant Secretary of the Army for Research and Technology
DHP	Defense Health Program
DOTMLPF-P	Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, Facilities and Policy
DOTmLPF-P	Doctrine, Organization, Training, Leadership and Education, Personnel, Facilities and Policy (Non-Materiel)
EAB	Echelons Above Brigade
ECP	Engineering Change Proposal
EOD	Explosive Ordnance Disposal
EPP	Extended Planning Period
ERDC	Engineer Research and Development Command
EW	Electronic Warfare
F2025B	Force 2025 and Beyond
FASCAM	Family of Scatterable Mines
FDA	Food and Drug Administration
FDU	Force Design Updates
FH	Field Hospital
FLIR	Forward Looking Infrared
FVL	Future Vertical Lift
FYDP	Future Years Defense Program
GEM	Guidance Enhanced Missile
HFD	Hostile Fire Detection
HMMWV	High Mobility Multipurpose Wheeled Vehicle
HSI	Human-Systems Integration
HUMINT	Human Intelligence
IBCS	Integrated Battle Command System
IBCT	Infantry Brigade Combat Team
IBD	Integrated Base Defense
ICW	Intermediate Care Ward
IED	Improvised Explosive Device
IFLIR	Improved Forward Looking Infrared
IFPC	Indirect Fire Protection Capability
ISR	Intelligence, Surveillance and Reconnaissance
ITEP	Improved Turbine Engine Program
JIIM	Joint Interagency, Intergovernmental and Multinational
JLENS	Joint Land Attack Cruise Missile Defense Elevated Netted Sensor System
JLTV	Joint Light Tactical Vehicle

Army Equipment Modernization Strategy  
*Equipping the Total Force to Win in a Complex World*

JMR-TD	Joint Multi-Role Technology Demonstrator
JROC	Joint Requirements Oversight Council
LIRA	Long-Range Investment Requirements Analysis
LOC-B	Line of Communication Bridging
LWB	Long Wheel Base
MATV	Mine Resistant Ambush Protected All Terrain Vehicle
MC	Mission Command
MEDEVAC	Medical Evacuation
MEP	Mission Equipment Package
MfT	Multi-function Team
MI	Military Intelligence
MISO	Military Information Support Operations
MP	Military Police
MSV-L	Maneuver Support Vessel- Light
MUM-T	Manned-Unmanned Teaming
NIE	Network Integration Evaluation
NetOps	Network Operations
O&S	Operations and Support
OPTEMPO	Operations Tempo
OSD	Office of the Secretary of Defense
PED	Processing, exploitation and dissemination
PEG	Program Evaluation Group
PNT	Position Navigation and Timing
POM	Program Objective Memorandum
PoR	Program of Record
PTSD	Post-Traumatic Stress Disorder
RADIAC	Radiation Detection Indication and Computation
RAM	Rockets, Artillery and Mortars
RAS	Remote and Autonomous Systems
RDEC	Research, Development and Engineering Center
RDECOM	Research, Development and Engineering Command
RDT&E	Research, Development, Testing and Evaluation
S&T	Science and Technology
SAAC	Small Arms and Ammunition Configurations
SATCOM	Satellite Communications
SBCT	Stryker Brigade Combat Team
SIGINT	Signals Intelligence
SLEP	Service Life Extension Program
SMDC-TC	Space and Missile Defense Command Technology Center

Army Equipment Modernization Strategy  
*Equipping the Total Force to Win in a Complex World*

SOP	Standard Operating Procedure
SWaP	Size, Weight and Power
TOA	Total Obligation Authority
TOE	Table of Organization and Equipment
TRADOC	Training and Doctrine Command
TWV	Tactical Wheeled Vehicle
UAS	Unmanned Aircraft System
UAV	Unmanned Air Vehicles
USAMRMC	U.S. Army Medical Command Medical Research and Materiel Command
UTR	Unit Task Reorganization
WMD	Weapons of Mass Destruction



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For more information contact: Headquarters, Department of the Army, Office of the Deputy Chief of Staff, G-8 Future Force Division (FDF), 700 Army Pentagon, Washington, D.C. 20310. Electronic copies of the strategy are available at [www.g8.army.mil](http://www.g8.army.mil)