



# AFFORDABLE AND INTEGRATED ARMY EQUIPMENT MODERNIZATION WHITE PAPER



U.S. ARMY

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## Front Cover

*Photo 1: LOGAR PROVINCE, Afghanistan -U.S. Army Spc. Paul M. Cattorn, a Peru, Ind., native and squad automatic weapon machine gunner assigned to Company C, 2nd Battalion, 30th Infantry Regiment, 4th Brigade Combat Team, 10th Mountain Division, Task Force Storm, provides security for Afghan National Security Forces on day two of a six-day dismounted operation here Dec. 20. Soldiers of Co. C and ANSF pushed through western Baraki Barak on a six-day foot patrol to eliminate Taliban influence and establish a Government of the Islamic Republic of Afghanistan presence. (Photo by U.S. Army Sgt. Cooper T. Cash, Task Force Patriot Public Affairs)*

*Photo 2: Air Force officials are seeking volunteers for future training classes to produce operators of the MQ-1 Predator unmanned aircraft. (U.S. Air Force photo/Lt Col Leslie Pratt)*

*Photo 3: A Bradley fighting vehicle provides security as U.S. Army Soldiers from Alpha Company, 1st Battalion, 15th Infantry Regiment, 3rd Heavy Brigade Combat Team, 3rd Infantry Division conduct a joint clearing operation with local Abna'a Al Iraq (Sons of Iraq) through a group of small villages south of Salman Pak, Iraq, Feb. 16, 2008. The village is known to have recently been occupied by insurgents. (U.S. Army photo by Sgt. Timothy Kingston) National Security Forces in Kharwar District Jan. 11.*

*Photo 4: U.S. Army 1st Lt. Andrew Moehl, of 2nd Platoon, Alpha Company, 1st Battalion, 502nd Parachute Infantry Regiment, 2nd Brigade Combat Team, 101st Airborne Division, radios in his team's status with the help of his Radio Transmitter Operator Spc. Joshua Rachal in Kandalay, Afghanistan, on Sept. 25, 2010. U.S. soldiers worked hard to cut down trees in preparation for a new Command Observation Post being built in the area. DoD photo by Cpl. Carol A. Lehman, U.S. Army.*

*Photo 5: Sgt. Kyle Haggerty, 1st Battalion, 321st Airborne Field Artillery Regiment, 18th Fires Brigade (Airborne), fires a M777A 155mm howitzer Jan. 18 on Fort Bragg, NC. (U.S. Army photo by Sgt. 1st Class Jacob A. McDonald)*



## THE DEPARTMENT OF THE ARMY

WASHINGTON DC 20310

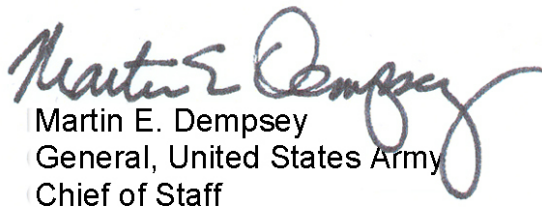
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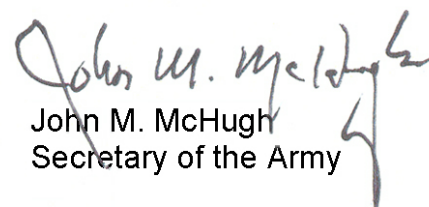
Our Army remains the Nation's decisive land force. After more than nine years of continuous combat, our Army is battle-tested and capable of conducting the full range of military operations in any environment.

Today, we are involved in combat operations around the world against adaptive enemies able to take advantage of the ever-increasing pace of technological change. Concurrently, we are facing an increasingly constrained fiscal environment. To address these challenges and maintain our current technological edge for the future, we must change the way we develop and deliver capabilities.

The Army will leverage the ideas in the enclosed Affordable and Integrated Army Equipment Modernization White Paper to provide current and future capabilities at best value. We have worked to gain consensus across the Army on the governance structures, processes, and relationships needed to implement the 2010 Army Modernization Strategy. The success of this modernization effort will hinge upon clearly defining capability gaps; validating requirements; establishing a clear priority of needs; re-assessing the value of systems in development and in the field; and taking advantage of technological advances and emerging solutions.

We have an obligation to provide our Soldiers with the most effective, high-quality equipment in the most sustainable, cost-effective manner possible. The goal of Army Equipment Modernization is to develop and field a versatile and affordable mix of equipment that will enable Soldiers to succeed in full-spectrum operations today and tomorrow, ensuring that we maintain our decisive advantage over any enemy we face.

  
Martin E. Dempsey  
General, United States Army  
Chief of Staff

  
John M. McHugh  
Secretary of the Army

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## WHITE PAPER: AFFORDABLE AND INTEGRATED ARMY EQUIPMENT MODERNIZATION



*I am directing that any new proposal or initiative – large or small, be it policy, program, or ceremony – come with a cost estimate. That price tag will help us determine whether what we are gaining, or hope to gain, is really worth the cost, either in dollar terms or in the diversion of limited manpower and resources from other missions.*

**—Secretary of Defense Robert M. Gates, 9 August 2010**



### **Forward**

Our Army remains the premier land force in the world – there is none better. After more than nine years of continuous combat, our Army is battle tested and capable of conducting the full range of military operations in any environment.

*Forward Operating Base, Afghanistan. Soldiers observe enemy forces emplacing improvised explosive devices (IEDs). Capitalizing on the networked capabilities provided by Persistent Ground Surveillance System, the Soldiers target and track the enemy and follow their egress back to their safe house. A hasty plan is developed and U.S. Forces assault the objective detaining several insurgents. Exploitation of the site recovers an assortment of bomb making materials and leads to additional IED caches and additional enemy forces.*

While the vignette above offers some insight into an effective new system, we must continue to build upon current and planned capabilities to remain the best manned, trained and equipped Army – now and into the future.

In addition to threats from abroad, our Nation is grappling with an economic downturn resulting in unprecedented challenges which are also considered a potential threat to national security. When these factors are combined with other national priorities, we can expect increased pressure to reduce defense spending and optimize the resources we have.

The purpose of this White Paper is to provide an Army perspective on ways we can maintain our battlefield primacy in an era of persistent conflict with reduced resources. The Army intends to use this paper to discuss potential updates to processes and organizations to help bring together the requirements, programming, acquisition and sustainment communities and look at developing metrics and goals to track and measure progress across the equipment modernization spectrum in order to develop, field and sustain the right equipment to be successful today and into the future.

The Army balances the cost of current operations with a strategy to modernize our forces enabling our Soldiers to fight and win today while preparing for tomorrow. Given projections of the future operational environment, however, equipment modernization efforts must be viewed through lenses more focused on affordability, joint interoperability and flexibility.

While Army Regulation 5-22 provides an overarching definition of Force Modernization as “the process of improving the Army’s force effectiveness and operational capabilities through force development and integration,” this White Paper has been scoped to focus on Army equipment modernization. **The goal of Army equipment modernization is to develop and field a versatile and affordable mix of equipment that will enable Soldiers and units to succeed in full spectrum operations today and tomorrow, ensuring we maintain our decisive advantage over any enemy we face.**

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## Affordable and Integrated Army Equipment Modernization

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Although this paper focuses on equipment, we recognize the importance of providing integrated capabilities within the force. Indeed, the holistic perspective maintained by the U.S. Army Training and Doctrine Command (TRADOC) and our other Stakeholders ensures a synchronized approach to Army equipment modernization.

### *For the purpose of this paper:*

**Equipment Modernization provides new or expanded capabilities.** It addresses current or emerging requirements as well as replacing capabilities outpaced by technology or service life. It includes both deliberate capability development and the exploitation of immediately available commercial technologies.

**Affordable describes fiscally informed investments.** These are derived from critical reviews of costs, benefits, risks as well as requirement and technology trade-offs – balanced against other portfolios and measured against available resources over time.

**Integration results in the fielding of required capabilities to units and Soldiers.** It is a process of synchronizing requirements, programming, acquisition and sustainment and is critical in identifying gaps and redundancies.

*“The evolving operational environment and emerging threats to national security will require continuous assessment of Army modernization”*

*—Army Capstone Concept, 2009*

Increased research, development and acquisition funding over the last decade permitted the Army to fight two wars, to reorganize and to regain some lost ground in equipping our Soldiers; now, as we

go forward, we must do so with an increased need to prioritize, assess risk and determine the right solutions to maximize our resources.

To balance our Warfighting needs, we must calculate the resources necessary to fully fund sustainment as well as Army organic maintenance infrastructure. For example, it makes little sense to procure a new generation of satellite radios if we cannot afford the air time to operate them. It is critical that the Army also invest in improvements to its Industrial Base – as an essential element of overall equipment modernization.

We must routinely invest in science and technology as well as research and development to ensure we retain our technological edge.

We have achieved some tremendous equipment modernization successes over the past decade – the fielding of large quantities of unmanned systems provides unprecedented real-time intelligence to our tactical commanders; precision weapons provide accurate fires while mitigating collateral damage; and the Mine Resistant Ambush Protected (MRAP) vehicles provide a level of protection to our Soldiers unheard of in past generations. In many areas, we have done very well.

Unfortunately, in some areas – for a variety of reasons – we continue to struggle and remain challenged to achieve our established objectives. While we expend tremendous resources in moving technologies beyond current thresholds, in some cases we changed requirements resulting in higher costs and making new systems unaffordable. In addition, we have been challenged by optimistic expectations in terms of technology, cost or performance and have been unable to exploit the rapidly changing operational or technological environments. In still other cases the operational environment changed faster than our requirements process could accommodate.

## Introduction

The 2010 Army Modernization Strategy (AMS) was published as a short-term document describing the ways and means to develop and field an affordable and interoperable mix of the best equipment available for Soldiers to succeed in the current and future complex operational environments. It discusses three major lines of effort: 1) develop and field new capabilities to meet specific gaps through traditional and rapid acquisition processes; 2) modernize existing equipment continuously to adapt to future needs through upgraded capabilities, recapitalization and divestment; and 3) field and distribute capabilities in accordance with Army priorities and the Army Force Generation (ARFORGEN) model.

This White Paper expands upon the 2010 AMS by describing potential ways to implement the AMS lines of effort and helping enable capability development, programming, acquisition and sustainment in an integrated and synchronized manner. It includes the development of metrics and goals that the Army may use to track and measure progress across the equipment modernization spectrum.

## What needs to be done?

The ideas in this paper are intended to help the Army provide relevant capabilities for today's operations and develop systems for the future at the best value given the available resources. This approach provides us the flexibility we need in a rapidly changing operational environment by embracing ideas which may inform both rapid and deliberate acquisition equipping processes as ways to ensure all necessary capabilities are delivered. Key to this effort is clearly defining gaps, validating requirements, disciplining requirements growth, establishing a clear priority of needs, routinely re-assessing the value of systems in development and in the field and taking advantage of technological advances as well as emerging solutions.

## So what are we trying to accomplish?

**As an endstate, we must develop, field and sustain the right equipment in an incremental manner to ensure our Soldiers and units have the capabilities they need to be successful across the full-range of military operations today and into the future.**

Today, we are involved in combat operations around the world against adaptive enemies able to take advantage of the ever-increasing pace of technological change. To address this, the Army has the opportunity to change the way it develops and delivers capabilities and manage the duality of winning the current wars while preparing for future contingencies.



Kris Osborn photo

*The MRAP All-Terrain Vehicle (ATV) was built specifically for the mountainous Afghan terrain.*

This change is necessary even though the Army is better equipped now than it has probably ever been in our history. Our requirements process must be disciplined as our needs far outstrip our means to afford everything. In addition, as increased law, policy and oversight of acquisition, logistics and technology are implemented, it is imperative that we remain accountable for how we manage and employ our resources.





Gregory Gieske photo

The earth shakes as an M109A6 Paladin fires a 155mm round through the cannon as 1st Battalion, 9th Field Artillery, 2nd Heavy Brigade Combat Team, 3rd Infantry Division, conducts their gun calibration at Destiny Range in Mosul, Iraq.

## To achieve this endstate, the Army will:

- 1. Assess.** Assess current and proposed programs vigorously against our key national and defense strategies – and conduct these assessments on a predictable, defined schedule.
- 2. Align.** Look at ways to fuse and align the modernization community as never before to prevent stovepipes and ensure integration across the requirements, acquisition and resourcing communities.
- 3. Innovate.** Develop and employ new and innovative ways to equip the Army – saving resources in some areas to allow investments in others.

Let's look at each of these ways in detail:

### 1. Assess to see ourselves better.

Vigorously assess current and proposed programs against our key national and defense strategies – and conduct these assessments on a predictable, defined schedule.

**Portfolios.** To manage programs from inception through divestment and inform our

investment decisions better, we are considering the establishment of portfolios which “bin” all materiel programs providing an Army view of programs, flexibility to make resource informed capabilities-based decisions, establish priorities for investment and plan for the future. A potential break out of portfolios, based on the Required Capability Areas from the 2010 Army Operating Concept, and representative programs is found at *Annex A*.

**Portfolio Strategies.** As we continue to explore the institutionalization of our materiel portfolios in fiscal year 2011, portfolio strategies are envisioned to provide direction, synchronize programs, agencies and resources over program life cycles.

**Capability Portfolio Reviews.** In early 2010, the Secretary of the Army instituted a Capability Portfolio Review (CPR) pilot process to holistically examine the requirements that drive capability development, acquisition and sustainment within a series of portfolios. Since the inception of CPRs, the Army's senior leaders have chaired over 25 reviews covering 12 equipment and other portfolios. By identifying redundant or unneeded systems, areas requiring

*The Non-Line of Sight Launch System (NLOS-LS) program was reviewed as part of the CPR on Precision Fires. As designed, the NLOS-LS provided precision fires for the Brigade Combat Team. In preparation for the CPR, analysis of the family of air-ground munitions showed that NLOS-LS provided a redundant capability – other programs could mitigate the NLOS-LS capability at less cost. The CPR concluded that the NLOS-LS requirement should be rescinded in favor of pursuing existing means to provide fires for the BCT allowing over \$3.4 billion to be reinvested in other Army priorities.*



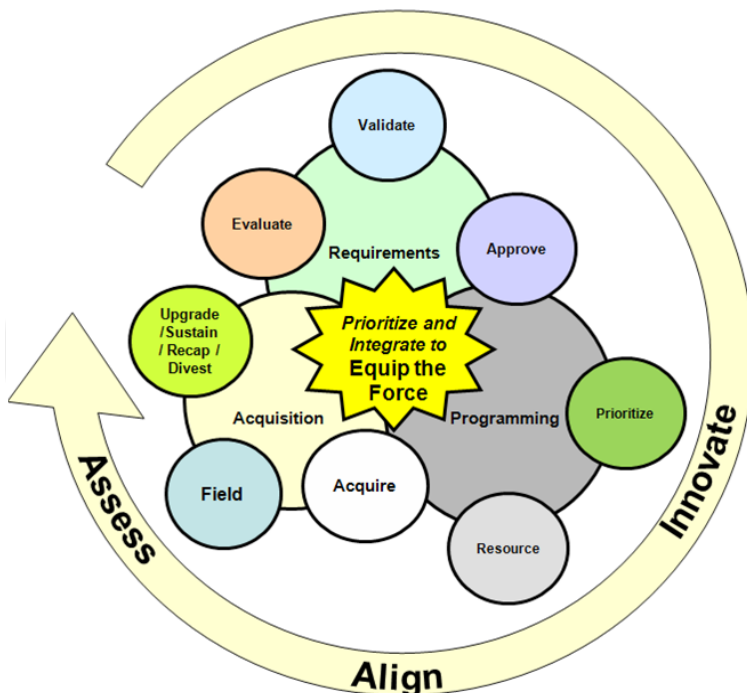
further review and programs which require increased investments, the Army has been able to re-invest almost \$6.6 billion in other Army priority programs. Following a review of the CPR process by the Army senior leadership, the Secretary of the Army will determine whether we should institutionalize the CPR process. If approved, we would tie this effort to The Army Plan, Army Strategic Planning Guidance and the Army's Programming Guidance Memorandum which will identify targets for capability improvements against the Army's overall missions.

The CPR pilot process shows promise as a means to re-validate current requirements as well as develop goals and metrics to analyze and compare programs in the context of joint portfolios to ensure proper balance and to understand how gaps will be mitigated or closed. If institutionalized, this common framework could be used to review requirements, materiel solutions and sustainment costs as well as the associated risk to establish, maintain or terminate a program.

## 2. Align the Equipment Modernization Community.

We will look at ways to fuse and align the equipment modernization community as never before to ensure integration across the requirements, acquisition, sustainment and resourcing communities.

**Align Stakeholders** Our goal is to align the Requirements, Programming, Acquisition as well as Research and Development and Life Cycle Management communities to develop a truly collaborative process, prevent stovepipes, reduce redundancies and determine areas for tradespace as well as areas to re-look our investment strategies. Using the portfolio construct, we will make recommendations to establish formal lines of communication between the designated portfolio leads for **Requirements** (residing in the TRADOC Centers of Excellence), **Programming** (at Headquarters Department of the Army), **Acquisition Logistics and Technology** (with the Assistant Secretary of the Army for Acquisition, Logistics and Technology or ASA(ALT)), and **Life Cycle Management**



*This illustration depicts the range of processes we seek to align with our Requirements, Programming and Acquisition leads to provide the right equipment for our Soldiers and units. This alignment relies on collaboration to determine what is best for our Army and will allow our leadership to make informed choices on the equipment modernization way ahead.*



- When the Vice Chief of Staff Army and the members of the Army Requirements Oversight Council evaluate capability documents, they will include a full cost benefit analysis as well as review of the joint interoperability and interdependencies and discuss them in the context of other systems providing the same or similar capabilities.
- For programs in development, the Army Acquisition Executive and Defense Acquisition Executive provide direct oversight of program acquisition.



Lt Col/Leslie Pratt photo

The Army's newest unmanned aircraft, the MQ-1C Gray Eagle, will start fielding at Fort Hood in the summer of 2011.

**Stabilize funding.** Stable funding is essential to overall program health from an affordability perspective. Before trades-offs are made, all Stakeholders must understand the cost and the

*In 2010, Army testing revealed that the Small Unmanned Ground Vehicle (SUGV) did not meet its requirement to recognize a person out to 100m at night – although it met the required capability during the day. While analyzing the results, we reviewed the requirement and questioned whether we had it right and whether the current capability would meet Soldier needs. We determined that the SUGV had sufficient military utility to field and agreed to look at improving the capability in a future increment. Assessments and flexibility allow us to provide incremental capabilities to our Soldiers over time. In fact, an improved night recognition capability is on track for fielding in the 2nd increment of the SUGV.*

second- and third-order effects of decrementing a program or changing the acquisition plan. Our programmers will look at developing ways to stabilize funding levels and requirements

to minimize production rate instability by including affordability assessments in our process.

### 3. Innovate to improve.

Develop and employ new and innovative ways to equip the Army – saving resources in some areas to allow investments in others.

**ARFORGEN Equipping.** As we continue to institutionalize ARFORGEN, our Stakeholders will determine the feasibility of implementing incremental ARFORGEN-based Equipping Strategies for select Army systems so as not to over invest in high dollar equipment and free investment capital for other compelling equipment or non-materiel needs – or even new technologies.

**Program Risk.** The ASA(ALT) continuously monitors program risks to include the potential of failing to achieve technical maturity, effects of schedule changes, and the risk of not achieving the requirements identified.

When programs are at significant risk of not meeting cost, schedule or performance parameters, we will work with the AAE to review these issues and examine the feasibility



of taking the investment from one area to allow a better investment in another.

We will ask the ASA(ALT) to examine the means to provide the flexibility to insert technology into current programs as the technology matures to ensure continued relevance.

**Capability Packages.** Our Army Campaign Plan developers are reviewing the potential for institutionalizing the Capability Package construct to provide incremental increases in capabilities every two years to “buy less more often.” Indeed, this initiative has the potential to provide the most modern equipment for our forces without committing to long-term investments prematurely.



Photo courtesy of General Dynamics

The Warfighter Information Network - Tactical (Win-T) Increment 2 Tactical Communications Node provides on-the-move communications support to Battalion/Brigade/Division Headquarters.

**Tests and Experiments.** We are consolidating and integrating our test schedules to leverage

*While “Try Before You Buy” is not a new construct, we need to invigorate this process. In fact, today’s One System Remote Video Terminal (OSRVT), currently undergoing a Military User Assessment was adapted from earlier test systems. OSRVT is a small, portable receiver and displays live video and telemetry data from an array of manned and unmanned aircraft systems. It can be used to identify aggressor units, vehicles, facilities and natural landscape features overlaid on a geo-location map, enabling swift target identification, decision making and response. Positive feedback and lessons learned from earlier deployments were used to accelerate this capability. Getting equipment into the hands of our Soldiers early allows critical assessments on equipment effectiveness in meeting the needs of our operators in a field environment.*

our scarce testing resources better and fully utilize Soldiers and units conducting the tests.

We will also look at the potential of giving our Soldiers more opportunities to “experiment” with new equipment before making long-term acquisition decisions. Based on the Joint Improvised Explosive Device Defeat Organization construct, this would get equipment to the field quickly and allow our Soldiers to determine its effectiveness.

**Rapid Development.** Rapid development is an integral component of our deliberate processes and is necessary to ensure the Army has the most relevant equipment.

We need flexible and adaptable means to buy and develop capabilities in rapidly changing industries (Information Technology, robotics, networks, etc). In addition, we need improved processes to either bring this equipment into

# Assess, Align, Innovate

an acquisition program or to divest it quickly. Sustainment of these items – even if short-term – must also be factored into these efforts and resourced appropriately.

To provide new capabilities quickly to the Warfighter, we will ask ASA(ALT) to look at developing a process or an acquisition strategy which can invest in promising or off-the-shelf technologies for quick fielding to the force. New capabilities must be based on competing gaps and, in all cases, full life cycle costs must be considered.

## Conclusions

The Army has the obligation to provide the right equipment for our fighting Soldiers. Our Affordable and Integrated Army Equipment Modernization White Paper is aligned with ARFORGEN and is focused on our deploying units to provide the

flexibility we need to adapt to the changing world. While our strategy must be resource informed, it is focused on the equipment we intend to develop and provide for our Soldiers and units. To this end, we must determine how best to modernize our forces and:

- **Assess** by critically reviewing and prioritizing our requirements and materiel development processes to ensure they meet our future capability needs.
- **Align** our equipment modernization communities to ensure integration across the requirements, programming and acquisition communities.
- **Innovate** by developing and employing new and innovative ways to equip the Army.

*Our Soldiers deserve nothing less.*



U.S. Army Sgt. Cooper T. Cash photo

## Afghanistan Security

U.S. Army Pfc. Ryan B. Stuart of Brooklyn Park, Minn., assigned to Company D, 2nd Battalion, 30th Infantry Regiment, 4th Brigade Combat Team, 10th Mountain Division, Task Force Storm, provides security for Afghan National Security Forces in Kharwar District Jan. 11.

# Affordable and Integrated Army Equipment Modernization

## ANNEX A, NOTIONAL PORTFOLIOS TO WHITE PAPER: AFFORDABLE AND INTEGRATED ARMY EQUIPMENT MODERNIZATION PORTFOLIOS

Army Capstone Concept Required Capability Areas	Portfolio	Example Programs
Mission Command		
	Mission Command	Radios, TACSAT, MC Apps, IA/ Cyber/EW/IO
	Strategic Network	I3MP, GNEC, NetCom
Intelligence		
	Intelligence	Sensors; Processors; Biometrics; Forensics
Movement and Maneuver		
	Ground	Ground Combat Vehicles, UGV, GCV Ammo
	Air	Atk, Recon, Lift, UAS, Avn Ammo
	Soldier	Close Combat, Combat ID, Accessories, Human Dimension, Soldier Weapons Ammo
Fires		
	Indirect	Cannon, Missile, Fires Apps, Indirect Ammo
Protection		
	Air Missile Defense	SMDC, Upper Tier, Lower Tier, ADA Apps, AMD Ammo
	Protection	Mobility, Counter Mobility, EOD, CBRN, MRAP, MP
Sustainment		
	Transport	Tactical Wheeled Vehicles, Watercraft
	Sustainment	Sustainment Systems, Medical, Log Apps
Special Operating Forces		
	SOF	Civil Affairs, MISO, Special Forces



## ANNEX B, NOTIONAL ALIGNMENT WHITE PAPER: AFFORDABLE AND INTEGRATED ARMY EQUIPMENT MODERNIZATION\*

*Draft Alignment - Example only*

Army Operating Concept Required Capability Areas	Portfolio	Requirements COE	Programming HQDA	Acquisition PEO	Sustainment LCMC	S&T
Mission Command						
	Mission Command	Mission Command	HQDA	C3T	CECOM	RDECOM
	Strategic Network	Mission Command	HQDA	EIS	AMCOM	RDECOM
Intelligence						
	Intelligence	Intel	HQDA	IEW&S	CECOM	RDECOM
Movement and Maneuver						
	Ground	Maneuver	HQDA	Ground Combat Systems	TACOM	RDECOM
	Air	Aviation	HQDA	Aviation	AMCOM	RDECOM
	Soldier	Maneuver	HQDA	Soldier	TACOM	RDECOM
Fires						
	Indirect	Fires	HQDA	Missiles and Space, C3T, Ground Combat Systems, Soldier, IEW&S	TACOM	RDECOM
Protection						
	Air Missile Defense	Fires	HQDA	Missiles & Space, C3T	AMCOM	RDECOM
	Protection	Maneuver Support	HQDA	CS&CSS, IEW&S	TACOM	RDECOM
Sustainment						
	Transport	Sustainment	HQDA	CS&CSS	TACOM	RDECOM
	Sustainment	Sustainment	HQDA	CS&CSS	TACOM	RDECOM
Special Operating Forces						
	SOF	JFKSFWCS	TDB	TDB	TBD	TBD

\*Alignment reflects current organizational constructs. Adjustments may be made to achieve more direct and exclusive alignments.



For more information contact:  
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