WEAPON SYSTEMS 2012

AMERICA'S ARMY: THE STRENGTH OF THE NATION

U.S.ARMY

DESIGN, DEVELOP, DELIVER, DOMINATE

SOLDIERS AS THE DECISIVE EDGE

Dear Reader:

In the Army Acquisition community, it is our solemn responsibility to enable Soldiers to dominate the battlespace safely and securely by achieving the first look, first strike advantage with unprecedented speed, accuracy, and lethality.

Soldiers are our most important customers. They are the focus of all our plans and are central to all that we accomplish. We are a workforce that is dedicated to meeting the needs of Soldiers around the clock and around the world. We are an organization comprised of 10 Program Executive Offices, two Joint Program Executive Offices, eight Deputy Assistant Secretaries, one Deputy for Acquisition and Systems Management, and several major subordinate commands of the U.S. Army Materiel Command.

The Army Acquisition, Logistics, and Technology community joins with our key stakeholders to develop and field a versatile and affordable mix of weapon systems and equipment to allow Soldiers and units to succeed in full-spectrum operations and maintain our decisive advantage over any enemy we face. We make Soldiers strong by providing them with leading-edge technologies and advanced capabilities to dominate in our current operations across the battlespace, while simultaneously preparing them to respond decisively to future threats.

In providing our Soldiers with world-class capabilities, we remain aware that our most important asset is our people. Our skilled and dedicated professionals execute diverse responsibilities on a daily basis to enable the disciplined management of an extensive acquisition portfolio of programs that include tactical wheeled vehicles; Soldier systems; air and missile defense; network; simulation; aviation; ground combat systems; intelligence, surveillance, and reconnaissance; and precision fires. These responsibilities include science and technology as well as research and development, program management, contracting, systems engineering, procurement policy, logistics policy, chemical weapons destruction and demilitarization, defense exports and international cooperation, and other areas.

As we move forward, I will continue to emphasize sound business practices, program management, and effective execution of major weapons systems while we help the Army to prioritize capabilities and modify existing programs to achieve long-term success. With this in mind, I think all of you realize the future resource environment will be challenging. We can expect that budgets are going to be tighter, which means we have to become a lot more efficient in the way we do business.

Every day America's Soldiers put mission, unit, and country first. They serve with distinction in nearly 135 countries worldwide: Afghanistan, Iraq, Bosnia, Kuwait, the Sinai, South Korea, the Philippines, and on every continent. They face threats that constantly evolve, and their skill and courage in meeting these challenges is second to none. As you read this publication and learn more about the Acquisition, Logistics, and Technology community and our major acquisition programs, you will understand that our highest priority is to continually improve force protection and Soldier survivability. Soldiers are our most important customers. We will not let them down.

Heidi Shyu
Acting Assistant Secretary of the Army
(Acquisition, Logistics, and Technology)
and Army Acquisition Executive

Table of Contents

How to Use this Book VI

Introduction 1

Weapon Systems 19

2.75 Inch Rocket Systems (Hydra-70) 20
Abrams Tank Upgrade 22
Advanced Field Artillery Tactical Data System (AFATDS) 24
Advanced Threat Infrared Countermeasure/Common Missile Warning System (ATIRCM/CMWS) 26
Air Warrior (AW) 28
Air/Missile Defense Planning and Control System (AMDPCS) 30
Airborne Reconnaissance Low (ARL) 32
All Terrain Lifter Army System (ATLAS) 34
Armored Knight 36
Army Key Management System (AKMS) 38
Artillery Ammunition 40
Aviation Combined Arms Tactical Trainer (AVCATT) 42
Battle Command Sustainment Support System (BCS3) 44
Biometric Enabling Capability (BEC) 46
Black Hawk/UH/HH-60 48
Bradley Fighting Vehicle Systems Upgrade 50
Calibration Sets Equipment (CALSETS) 52
CH-47F Chinook 54
Chemical Biological Medical Systems-Diagnostics 56
Chemical Biological Medical Systems-Prophylaxis 58
Chemical Biological Medical Systems-Therapeutics 60
Chemical Biological Protective Shelter (CBPS) M8E1 62
Chemical, Biological, Radiological, Nuclear Dismounted Reconnaissance Sets, Kits, and Outfits (CBRN DR SKO) 64
Chemical Demilitarization 66
Clip-on Sniper Night Sight (SNS) 68
Close Combat Tactical Trainer (CCTT) 70
Combat Service Support Communications (CSS Comms) 72
Command Post Systems and Integration (CPS&I) Standardized Integrated Command Post Systems (SICPS) 74
Common Hardware Systems (CHS) 76
Common Remotely Operated Weapon Station (CROWS) 78
Countermine 80
Counter-Rocket, Artillery, Mortar (C-RAM)/Indirect Fire Protection Capability (IFPC) 82
Cryptographic Systems 84
Defense Enterprise Wideband SATCOM System (DEWSS) 86
Distributed Common Ground System-Army (DCGS-A) 88
Distributed Learning System (DLS) 90
Dry Support Bridge (DSB) 92
Enhanced Medium Altitude Reconnaissance and Surveillance System (EMARSS) 94
Enhanced Q-36 96
Excalibur (M982) 98
Family of Medium Tactical Vehicles (FMTV) 100
Fixed Wing 102
Force Protection Systems 104
Force Provider (FP) 106
Force XXI Battle Command Brigade and Below (FBCB2) 108
Forward Area Air Defense Command and Control (FAAD C2) 110
Future Tank Main Gun Ammunition (FTMGA) 112
General Fund Enterprise Business Systems (GFEBS) 114
Global Combat Support System-Army (GCSS-Army) 116
Global Command and Control System-Army (GCCS-A) 118
Ground Combat Vehicle (GCV) 120

Guardrail Common Sensor (GR/CS) 122
Guided Multiple Launch Rocket System (GMLRS) DPICM/Unitary/ Alternative Warhead (Tactical Rockets) 124
Harbormaster Command and Control Center (HCCC) 126
Heavy Expanded Mobility Tactical Truck (HEMTT)/ HEMTT Extended Service Program (ESP) 128
Heavy Loader 130
HELLFIRE Family of Missiles 132
Helmet Mounted Night Vision Devices (HMNVD) 134
High Mobility Artillery Rocket System (HIMARS) 136
High Mobility Engineer Excavator (HMEE) I and III 138
High Mobility Multipurpose Wheeled Vehicle (HMMWV) Recapitalization (RECAP) Program 140
Improved Environmental Control Units (IECU) 142
Improved Ribbon Bridge 144
Improved Target Acquisition System (ITAS) 146
Improvised Explosive Device (IEDD) 148
Individual Semi-Automatic Airburst System (ISAAS)-XM25 150
Installation Protection Program (IPP) 152
Instrumentable-Multiple Integrated Laser Engagement System (I-MILES) 154
Integrated Air and Missile Defense (IAMD) 156
Integrated Family of Test Equipment (IFTE) 158
Interceptor Body Armor 160
Javelin 162
Joint Air-to-Ground Missile (JAGM) 164
Joint Battle Command-Platform (JBC-P) 166
Joint Biological Point Detection System (JBPDS) 168
Joint Biological Standoff Detection System (JBSDS) 170
Joint Biological Tactical Detection System (JBTDS) 172
Joint Chem/Bio Coverall for Combat Vehicle Crewman (JC3) 174
Joint Chemical Agent Detector (JCAD) M4E1 176
Joint Chemical, Biological, Radiological Agent Water Monitor (JCBRAWM) 178
Joint Effects Model (JEM) 180
Joint Effects Targeting System (JETS) Target Location Designation System (TLDS) 182
Joint Land Attack Cruise Missile Defense Elevated Netted Sensor System (JLENS) 184
Joint Land Component Constructive Training Capability (JLCCTC) 186
Joint Light Tactical Vehicle (JLTV) 188
Joint Personnel Identification Version 2 (JPIv2) 190
Joint Precision Airdrop System (JPADS) 192
Joint Service General Purpose Mask (JSGPM) M-50/M-51 194
Joint Service Transportable Small Scale Decontaminating Apparatus (JSTSS DA) M26 196
Joint Tactical Ground Station (JTAGS) 198
Joint Tactical Radio System Airborne and Maritime/Fixed Station (JTRS AMF) 200
Joint Tactical Radio System Ground Mobile Radios (JTRS GMR) 202
Joint Tactical Radio System Handheld, Manpack, Small Form Fit (JTRS HMS) 204
Joint Tactical Radio System Multifunctional Information Distribution System (MIDS) 206
Joint Tactical Radio System, Network Enterprise Domain (JTRS NED) 208
Joint Warning and Reporting Network (JWARN) 210
Joint-Automatic Identification Technology (J-AIT) 212
Kiowa Warrior 214
Light Utility Helicopter (LUH)/UH-72A Lakota 216
Lightweight 155mm Howitzer System (LW155) 218
Lightweight Counter Mortar Radar (LCMR) 220
Lightweight Laser Designator/Rangefinder (LLDR) AN/PED-1 222
Line Haul Tractor 224
Load Handling System Compatible Water Tank Rack (Hippo) 226
Longbow Apache (AH-64D) (LBA) 228

Table of Contents

M106 Screening Obscuration Device (SOD)-Visual Restricted Terrain (Vr) 230
Medical Communications for Combat Casualty Care (MC4) 232
Medical Simulation Training Center (MSTC) 234
Medium Caliber Ammunition (MCA) 236
Medium Extended Air Defense System (MEADS) 238
Meteorological Measuring Set-Profiler (MMS-P)/
Computer Meteorological Data-Profiler (CMD-P) 240
Mine Protection Vehicle Family (MPVF) 242
Mine Resistant Ambush Protected Vehicles (MRAP) 244
Mobile Maintenance Equipment Systems (MMES) 246
Modular Fuel System (MFS) 248
Mortar Systems 250
Movement Tracking System (MTS) 252
MQ-1C Gray Eagle Unmanned Aircraft System (UAS) 254
Multiple Launch Rocket System (MLRS) M270A1 256
NAVSTAR Global Positioning System (GPS) 258
Nett Warrior (NW) 260
Night Vision Thermal Systems-Thermal Weapon Sight (TWS) 262
Non-Intrusive Inspection Systems (NIIS) 264
Nuclear Biological Chemical Reconnaissance Vehicle (NBCRV)-
Stryker Sensor Suites 266
One Semi-Automated Force (OneSAF) 268
Paladin/Field Artillery Ammunition Supply Vehicle (FAASV) 270
Palletized Load System (PLS) and PLS Extended Service Program (ESP) 272
PATRIOT Advanced Capability-Three (PAC-3) 274
Precision Guidance Kit (PGK) 276
Prophet 278
Rough Terrain Container Handler (RTCH) 280
RQ-7B Shadow Tactical Unmanned Aircraft System (TUAS) 282
RQ-11B Raven Small Unmanned Aircraft System (SUAS) 284
Secure Mobile Anti-Jam Reliable Tactical Terminal (SMART-T) 286
Sentinel 288
Single Channel Ground and Airborne Radio System (SINCGARS) 290
Small Arms-Crew Served Weapons 292
Small Arms-Individual Weapons 294
Small Caliber Ammunition 296
Spider 298
Stryker Family of Vehicles 300
Tactical Electric Power (TEP) 302
Tactical Mission Command (TMC)/Maneuver Control System (MCS) 304
Tank Ammunition 306
Test Equipment Modernization (TEMOD) 308
Transportation Coordinators' Automated Information for
Movement System II (TC-AIMS II) 310
Tube-Launched, Optically-Tracked, Wire-Guided (TOW) Missiles 312
Unit Water Pod System (Camel II) 314
Warfighter Information Network-Tactical (WIN-T) Increment 1 316
Warfighter Information Network-Tactical (WIN-T) Increment 2 318
Warfighter Information Network-Tactical (WIN-T) Increment 3 320
Weapons of Mass Destruction Elimination (WMD-E) 322
XM806 .50 Caliber Machine Gun 324

Science & Technology 326
Force Protection 327
Advanced Aircraft Survivability 327
Threat Detection and Neutralization for Route Clearance 327
Defense Against Rockets, Artillery, and Mortars (RAM) Technologies 327
Intelligence, Surveillance, and Reconnaissance 328
Advanced Common Sensor Payload 328
Integrated Radio-frequency Operations Network (IRON) Symphony 328

Flexible Display Initiative 328
Command, Control, Communications, and Computers 329
Collaborative Battlespace Reasoning and Awareness (COBRA) 329
Multi-Access Cellular Extension (MACE) 329
Lethalty 330
Small Organic Precision Munitions 330
Medium Caliber Weapon and Ammunition 330
Next-Generation Kinetic Energy Cartridge 330
Medical 331
Advanced Transition Training Strategies for Post-Deployment: ArmySMART 331
Detection and Treatment of Traumatic Brain Injury (TBI) 331
Alternative Dengue Fever Vaccine Strategy 331
Candidate Multivalent Vaccine Against HIV-1 332
Damage Control Resuscitation 332
Unmanned Systems 333
Safe Operations of Unmanned Systems for Reconnaissance in Complex Environments 333
Soldier Systems 334
Soldier Planning Interfaces and Networked Electronics 334
Helmet Electronics and Display System-Upgradeable Protection (HEADS-UP) 334
Reducing Soldier and Small Combat Unit Load 334
Aviation 335
Advanced Rotary Wing Vehicle Technology 335
Logistics 336
Advanced Affordable Engine Technology 336
Transformational Vehicle Management System 336
Basic Research 337
Summary 339

Appendices 341
Glossary of Terms 342
Systems by Contractors 346
Contractors by State 359
Points of Contact 364

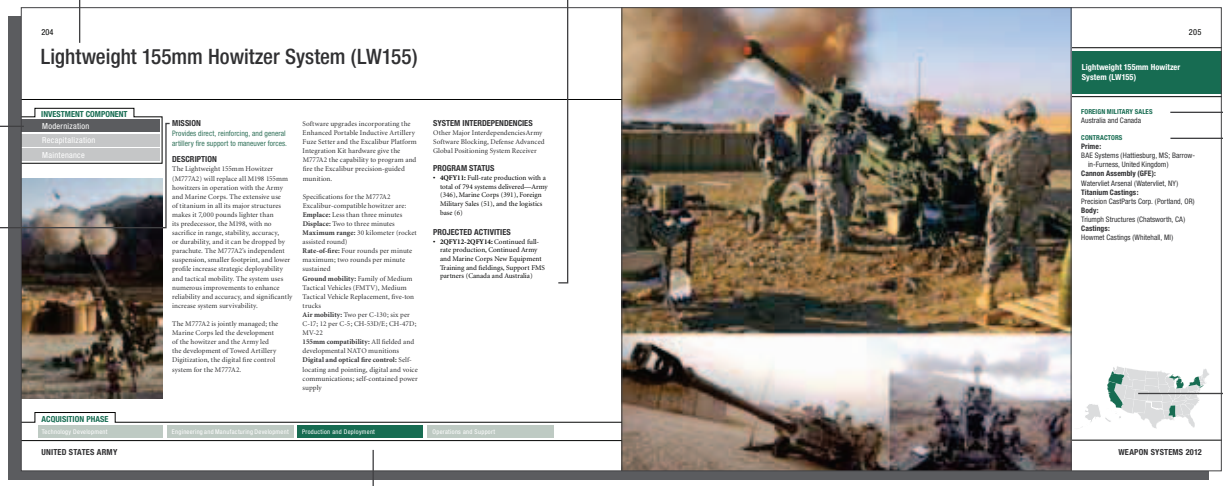
How to Use this Book

All systems are in alphabetical order

System interdependencies

Highlighted rectangles indicate investment component

Mission statement: How the system benefits Warfighters, combatant commanders, and support personnel



Foreign military sales

Contractor information

Contractor locations are highlighted

Highlighted rectangles indicate acquisition phase

WHAT ARE SYSTEM INTERDEPENDENCIES?

The purpose of the **System Interdependencies** section is to identify which other weapon systems or components (if any) the main system works in concert with or relies upon for its operation. We categorize the interdependencies in two ways: 1) under the heading "In this Publication," which is a listing of systems in this 2012 edition and 2) "Other Major Interdependencies," which is a listing of systems that are not included in this publication.

WHAT ARE INVESTMENT COMPONENTS?

Modernization programs develop and/or procure new systems with improved warfighting capabilities.

Recapitalization programs rebuild or provide selected upgrades to currently fielded systems to ensure operational readiness and a zero-time, zero-mile system.

Maintenance programs include the repair or replacement of end items, parts, assemblies, and subassemblies that wear out or break.

WHAT ARE ACQUISITION PHASES?

Technology Development refers to the development of a materiel solution to an identified, validated need. During this phase, the Mission Needs Statement is approved, technology issues are considered, and possible alternatives are identified. This phase includes:

- Concept exploration
- Decision review
- Component advanced development

Engineering and Manufacturing Development is the phase in which a system is developed, program risk is reduced, operational supportability and design feasibility are ensured, and feasibility and affordability are demonstrated. This is also the phase in which system integration, interoperability, and utility are demonstrated. It includes:

- System integration
- System demonstration
- Interim progress review

Production and Deployment achieves an operational capability that satisfies mission needs. Components of this phase are:

- Low-rate initial production
- Full-rate production criteria
- Full-rate production and deployment
- Military equipment valuation

Operations and Support ensures that operational support performance requirements and life cycle sustainment of systems are met in the most cost-effective manner. Support varies but generally includes:

- Supply
- Maintenance
- Transportation
- Sustaining engineering
- Data management
- Configuration management
- Human factors engineering
- Personnel
- Manpower
- Training
- Habitability
- Survivability
- Safety and occupational health
- Information technology supportability
- Environmental management functions
- Anti-tamper provisions
- Interoperability
- Disposal/demilitarization

Because the Army is spiraling technology to the troops as soon as it is feasible, some programs and systems may be in all four phases at the same time. Mature programs are often only in one phase, such as operations and support, while newer systems are only in technology development.

For additional information and definitions of these categories and terms, please see the Glossary.


THE AMERICAN SOLDIER IS
OUR HIGHEST PRIORITY AND MOST PRECIOUS ASSET
UNITED STATES ARMY

ASA(ALT)

MISSION

Provide our Soldiers a decisive advantage in any mission by developing, acquiring, fielding, and sustaining the world's best equipment and services and leveraging technologies and capabilities to meet current and future Army needs

VISION

Highly efficient, effective, agile organization responsible for acquiring, developing, delivering, supporting, and sustaining the most capable affordable systems and services for our Soldiers:

- Enabling our Soldiers to dominate the battlespace, safely and securely
- Enabling our Soldiers to achieve first look, first strike advantage with unprecedented speed and accuracy

STRATEGIC CONTEXT

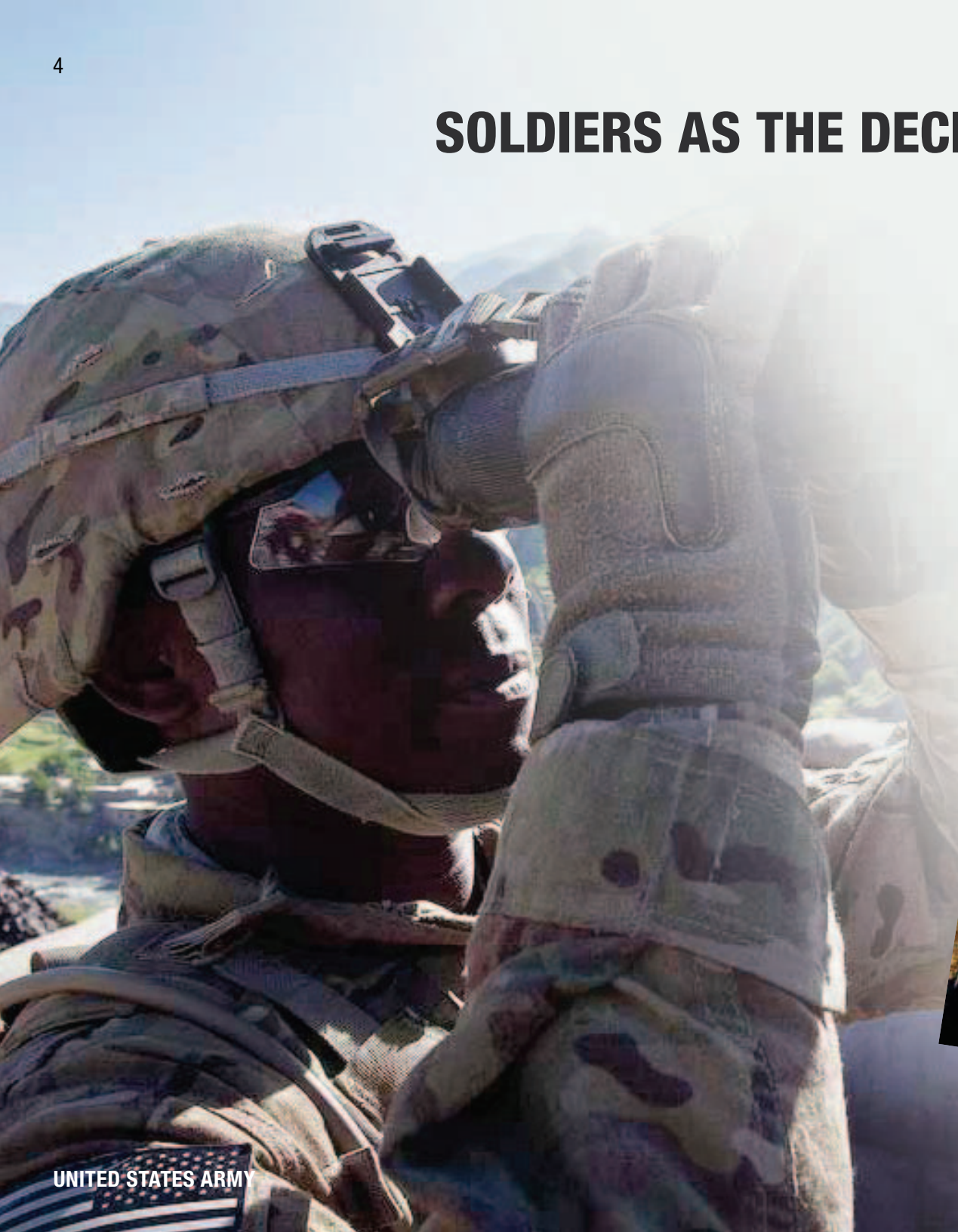
The U.S. Army is involved in combat operations around the world against adaptive enemies able to take advantage of the ever-increasing pace of technological change. Concurrently, we are facing an increasingly constrained fiscal environment. In this challenging environment, our goal in the Acquisition, Logistics, and Technology community is to do everything we can to provide the best equipment and services to our Soldiers, to enable them to be successful across the full range of military operations today and into the future. Our Soldiers need the fire and maneuver capabilities that allow them to communicate, engage, and disengage. Our troops must continue to operate with confidence in their equipment, operational capabilities, communication, enhanced situational awareness, and force protection. We must provide our Soldiers a decisive advantage in every fight so they return safely from every operation and engagement.

Modernizing the Army enables us to counter rapidly emerging threats that change the nature of battlefield operations. This is accomplished by capturing lessons learned from the range of combat to include close combat and improved explosive devices. The Army must develop and field new capabilities or sustain, improve, or divest current systems based on operational value, capabilities shortfalls, and available resources. These decisions are based on the principles identified in the Army's Modernization and Equipping Strategies and are influenced by the results of detailed deliberations within the Army's maturing Capability Portfolio Reviews.

Decentralized operations are required within the context of Mission Command. The complex and uncertain strategic environment dictates the need for capabilities and weapon systems that provide the essential qualities of adaptability and versatility to operate in current and future environments across the full spectrum of military operations.

Lessons learned from the current operating environment and a capability-based assessment revealed that some current capabilities do not adequately counter the current threats and lack the capability needed to adequately meet the operational requirements of future warfighting concepts and threats. We are working with key stakeholders to build a versatile mix of tailorable and networked organizations, operating on a rotational cycle, to provide a sustained flow of trained, equipped, and ready forces for full-spectrum operations and to hedge against unexpected contingencies—at a tempo that is predictable and sustainable for our all-volunteer force.

SOLDIERS AS THE DECISIVE EDGE



The Assistant Secretary of the Army for Acquisition, Logistics, and Technology (ASA(ALT)) is deeply invested in developing, delivering, and sustaining the best weapons technology available to assist Soldiers in executing the myriad of operational requirements in a fluid and volatile strategic environment. With the Soldier as the key focus, ASA(ALT) seeks to equip Soldiers with the best in cutting-edge technology and effectively manage up to 600+ programs that are vital to success in combat.

ASA(ALT)'s focus is closely aligned with the Army Modernization Strategy, which outlines a series of key goals—such as the continued development of new technologies engineered to provide Soldiers with the decisive edge in battle. These technologies in development span a range of new capability to include robots, sensors, Unmanned Aircraft Systems, missiles and missile guidance systems, emerging combat platforms such as the Ground Combat Vehicle, and key technologies such as the Army's maturing network, designed to connect Soldiers, sensors, and multiple nodes to one another in real-time to improve operational effectiveness across the full spectrum of combat operations.

At the same time, the modernization strategy places a premium on finding affordable solutions, identifying and applying efficiencies designed to maximize the value of dollars spent on development, and more rapidly delivering greater technological capability within an increasingly constrained fiscal environment. To this end, the Army has developed an Affordable Modernization Strategy that seeks to develop needed systems while ever mindful of budgetary responsibility. Part of this involves synchronizing and integrating programs, platforms, and systems in relation to one another from a system-of-systems point of view in order to maximize interoperability, reduce redundancy, and prioritize an acquisition strategy that correctly organizes and develops technologies as interconnected systems.

- ASA(ALT) is working vigorously to implement guidance from the office of the Secretary of Defense, which calls upon the Services to sustain Current Force structure and needed modernization by achieving two to three percent real growth. The current and planned base defense budget has steady but modest growth of one percent per year, necessitating innovative processes and doing more without more.
- To make up the difference and preclude reductions in needed military capability, the difference of one to two percent per year will be made up elsewhere across the Department of Defense and the Services. The goal is to significantly reduce excess overhead costs and apply savings to force structure and modernization.
- The structural approach to achieve these savings includes the application of Lean Six Sigma methodologies and Continuous Process Improvement guidelines.

This modernization process success—emphasizing this system-of-systems engineering and validation of core-required capabilities—hinges upon the results of the Army's Capability Portfolio Reviews (CPRs). These CPRs are designed to conduct a detailed examination of groups of technologies and systems from a portfolio perspective—with a focus on perceiving how they relate to one another and the full capability perspective of the operating force. A key emphasis of the CPRs is to identify areas where efficiencies can be increased and redundancies can be eliminated. The reviews are grounded in the reality that the defense budget will not increase nor be sustained at the levels it has in recent years, therefore creating an uncertain fiscal and geo-political environment that demands strict discipline in developing and preserving battlefield dominance in a time of reduced resources.

The CPRs include Aviation; Network; Radios; Precision Fires; Air and Missile Defense; Tactical Wheeled Vehicles; Combat Vehicle Modernization; Soldier Systems; Engineer Mobility/Countermobility; Intelligence, Surveillance, and Reconnaissance (ISR); Training Ammunition; Software/Hardware; and Watercraft.

The CPRs are also aimed at informing the Army's overarching investment strategy that seeks to effectively manage taxpayer dollars, and provide the best technologies to our Soldiers while maintaining affordability. For instance, the Precision Fires CPR determined that the Army no longer needed to develop the Non-Line-of-Sight Launch System (NLOS-LS) because it already has similar capabilities in its arsenal. As a result of the CPR, the requirement for the NLOS-LS was cancelled in an effort to remove redundancy while still developing the best capabilities for Soldiers in combat.

LEADING ARMY MODERNIZATION SO OUR SOLDIERS DOMINATE THE BATTLEFIELD TODAY AND TOMORROW

UNITED STATES ARMY

ASA(ALT) is developing technologies that will successfully counter the ever-changing contingencies in today's combat environment. Soldiers are the decisive edge in a wide range of potential conflict scenarios ranging from peacekeeping and nation-building to fighting conventional, irregular, or hybrid enemies. Army doctrine calls upon the force to be prepared for what is called full-spectrum operations, meaning they must be equipped for all potential scenarios to include high-, medium-, and low-intensity conflict. The Army's acquisition strategy and weapons platforms must accommodate this operational reality and prepare Soldiers to be adaptive to an entire range of potential operations. We must make sure that the equipment we provide Soldiers is the best hedge against the wide range of threats that will be a central feature of an uncertain strategic environment in the coming decades, particularly existential threats to our Nation or allies that only a ground force can counter.

For this reason, acquisition processes need to be synchronized with the requirements process to best identify needs and capability gaps experienced by Soldiers in battle today; ASA(ALT) will continue to work closely with the Army's Training and Doctrine Command to ensure that the requirements development process is deeply interwoven with weapon systems modernization. There are times when systems in development need to change, adjust, and tailor their requirements to meet with current capabilities and urgent needs coming from combatant commanders in theater. This process is one that requires continuous evaluation and reassessment throughout the weapon systems development process.

Also for this reason, the Army's acquisition strategy is designed to counter changing threats and addresses the emergence of hybrid threats—the dynamic combination of conventional, irregular, terrorist, and criminal capabilities. The Army seeks to train, develop, and equip Soldiers who are able to stay in front of an adaptive, fast-changing adversary. By emphasizing the best design, delivery, and sustainment of Army equipment, ASA(ALT) will remain focused on harnessing scientific innovations in order to identify and develop the most promising new technologies.

THE ARMY MODERNIZATION STRATEGY

The primary goal of ASA(ALT) is to ensure that America's Army remains the world's most capable and decisive force by equipping and sustaining Soldiers in a timely and responsible manner with the best technologies available. The Army's Modernization Strategy is squarely aimed at supporting this goal; ASA(ALT) is constantly working to identify and develop emerging technologies that have the potential to strengthen Soldiers. As a result, continued scientific and technological innovation is a constant Army focus; the Army works to preserve and build upon its relationships with its partners in academia and industry to enhance the learning curve and advance technology for the benefit of Soldiers. A key focus of the modernization effort is the need to prepare Soldiers for the fast pace of change on today's battlefield by keeping abreast of the latest in scientific discovery.

A centerpiece of this strategy is the recognition that many of the systems in this handbook are interdependent, meaning they rely upon and reinforce one another. For this reason, ASA(ALT) approaches acquisition from a system-of-systems point of view that places a premium upon looking at how technologies work in tandem as part of a larger system. Modernization and development of new capability must accommodate this system-of-systems approach.

For instance, the Army is changing the way it supplies network systems and capabilities to operational units by incrementally aligning the delivery of new technology with the Army Force Generation process. This effort will drive networked and non-networked capabilities to the Small Unit and Soldier level—those that need these critical capabilities the most.

As the Army aligns network programs and developmental efforts, it will rely on a series of coordinated, Soldier-driven Network Integration Evaluations (NIEs) that will help solidify the integrated network baseline and help to validate the Capability Sets.

In July 2011 the Army concluded the first NIE. The NIE is the first in a series of semi-annual evaluations designed to integrate and mature the Army's tactical network and is a key element of the Army's emerging Network Strategy. The evaluation was a six week effort conducted at White Sands Missile Range, NM, involving the 2nd Brigade Combat Team, 1st Armored Division. Its primary purpose was to conduct formal tests of acquisition programs of record, with a secondary purpose to less formally evaluate developmental and emerging network and non-networked capabilities. The 2011 exercise was the first of this type of combined test and evaluation, which brought together the doctrine, acquisition, and test communities as part of a new process to demonstrate the Army's holistic focus to integrate network components simultaneously in one operational venue.

The June-July 2011 NIE at White Sands Missile Range put a large number of emerging systems in combat-like scenarios for the purpose of assessing their utility to Soldiers. The NIE placed six systems under test and as many as 29 systems under evaluation. This was the first in a series of semi-annual exercises aimed at assessing and integrating emerging and developmental technologies before they are deployed in theater. At the heart of the exercise is an overarching effort to develop a single battlefield network able to push key information to the Soldier, linking them to command posts, vehicles on-the-move, and higher headquarters. The idea is to use the best available technologies to move information, voice, video, data, and images faster, further, and more efficiently across the force, and develop systems within a Common Operating Environment (COE), meaning they are built on software foundations that enable the maximum amount of interoperability.

By utilizing an "open architecture" and building systems to operate within the aforementioned COE, we intend to not only improve interoperability but increase efficiency. A COE means that there will no longer be as many independent, stove-piped software systems separately developed in isolation; rather, new systems will be built to work within a common foundation or common computing environment. New applications can be built to operate within an existing framework, using common Internet Protocol standards, thus speeding up development and maximizing interoperability, while also driving down costs and increasing efficiency.

During 2012 the Army will continue to conduct NIEs. A triad—the Brigade Modernization Command, Army Test and Evaluation Command, and ASA(ALT)—will assess network and non-network capabilities and determine their implications across the force. The evaluations will also begin to establish the Objective Integrated Network Baseline and common connectivity across the Brigade Combat Team structure, and introduce industry participation in the NIE evaluation cycle.

Central to the network baseline is the continued evaluation of non-proprietary high-bandwidth waveforms such as Soldier Radio Waveform and Wideband Networking Waveform. These use a larger portion of the available spectrum than legacy waveforms to move voice, video, images, and data in real-time across multiple nodes in the force.

The NIE provided Army testers and program managers the advantage of assessing how new and emerging technologies work in relation to one another from a system-of-systems perspective. The NIE is aimed at refining the acquisition of new technologies and blending programs of record with commercial-off-the-shelf solutions as part of a process designed to keep pace with rapid technological change. Some of the promising technologies demonstrated at the NIE include: Joint Tactical Radio Systems, software-programmable radios; Connecting Soldiers to Digital Apps, smartphones placed in the hands of Soldiers to pass combat-relevant information in real-time; and Joint Capabilities Release, software with digital mapping technology designed to provide forces with position-location information.

UNITED STATES ARMY

THE NETWORK AND ARMY MODERNIZATION

The idea of the Army network is to connect multiple echelons and move information from the dismounted Soldier on the tactical edge, up to the platoon and company level, and all the way up to higher headquarters. The Army's network will make it possible for Soldiers in a vehicle on-the-move to view and share real-time feeds from a nearby robot, ground sensor, or Unmanned Aircraft System (UAS)—instantaneously providing them combat-relevant information and enabling them to share that information with other units on-the-move, dismounted Soldiers, and higher echelons of the force.

The technologies and systems are being developed in tandem with one another; a sensor feed needs a network to travel through for Soldiers to gain the benefit of accessing real-time, battle-relevant information across the force at the battalion level, above and below. The network uses high-bandwidth waveforms to move more information faster and more efficiently across the force in real-time—marking a substantial technological leap beyond the capabilities on today's battlefields.

The information travels through a terrestrial network able to send voice, video, data, and imagery through Joint Tactical Radio Systems (JTRS), software-programmable radios, using high-bandwidth waveforms such as Soldier Radio Waveform and Wideband Networking Waveform. Information sent and received by the terrestrial layer is connected to Warfighter Information Network-Tactical (WIN-T), a satellite network able to send information over long distances using fixed nodes as well as vehicles on-the-move.

The Army's "network" can use the terrestrial layer in addition to beyond-line-of-sight satellite connections; the line-of-sight radio connections can be extended through use of an "aerial layer" that places JTRS Rifleman Radios on aircraft such as Aerostat blimps, UH-60 Black Hawks, AH-64 Apaches, and Shadow UAS. With the aerial layer, units do not have to place a relay team on the top of a mountain ridge or reposition a command post to ensure communication between ground units over extended distances.

The "aerial layer" connects multiple nodes in a mobile-ad hoc network able to move voice, video, data, and images across the force in real-time. The aerial layer is an example of extending a terrestrial line-of-sight network for Soldiers who might be operating in an austere environment and not be able to rely on satellites. As demonstrated during the June-July 2011 NIE, there is tremendous value in being able to move combat-relevant information across the force in real-time. JTRS uses encryption so that information can be safeguarded.

COMBAT VEHICLE MODERNIZATION

The Combat Vehicle Modernization Capability Portfolio Review functions to provide a holistic view of the combat vehicles in the Heavy Brigade Combat Team and Stryker Brigade Combat Team formations in order to maintain portfolio health, set vehicle priorities for modernization, and ensure portfolio affordability.

Within the portfolio, the Armored Multi-Purpose Vehicle represents the Army's ongoing effort to find a suitable replacement for the aging M113 inventory of vehicles, which are slated to be divested from the fleet. The Army is currently exploring a range of vehicles that might be capable of performing the mission sets required for the M113s.

Other areas of the modernization strategy include modifications to the existing Stryker fleet of vehicles, such as the addition of the Double V-Hull (DVH), engineered to improve Soldier protection by building in a blast-debris-deflecting V-shaped hull. The first Stryker DVH vehicles, which were delivered in 2011, have performed well in combat. The vehicles have been built with a stronger suspension designed to accommodate the extra weight of the DVH.

The Army has also initiated elements of the Combat Vehicle Modernization strategy to upgrade and sustain its fleet through at least 2050. Efforts include improving the protection, space utilization, weight capacity, and power generation capabilities resident in existing vehicles in the fleet, specifically the Abrams and Bradley, to more closely match emerging development of the Ground Combat Vehicle. The idea is to engineer, upgrade, and modernize the formations to meet a range of capability gaps identified for the force to include such areas as force protection, mobility, and networking.

The Ground Combat Vehicle represents a leap forward in the area of protected mobility, networking, and space, weight, and power capabilities, and is engineered as a single vehicle able to deliver a full nine-man squad under armor into the full spectrum of potential combat scenarios. It is being designed with growth potential so as to have the ability to accept technological innovations as they emerge in such areas as networking and lighter weight armor composites, among others.

MRAP FORCE PROTECTION SAVING LIVES

As further force protection, ASA(ALT) has continued investment in proven technologies such as Mine Resistant Ambush Protected (MRAP) vehicles. MRAPs are engineered with a blast-debris deflecting V-shaped hull and an armored capsule to protect Soldiers from roadside bombs and improvised explosive devices (IEDs). The MRAPs, and the lighter weight more mobile MRAP All Terrain Vehicles, have proven their ability to save Soldiers' lives in combat. As a result of their performance in battle and proven value to Soldiers, MRAPs will remain a vital part of the Army's Tactical Wheeled Vehicle fleet for years to come. MRAPs will be assigned to specific Brigade Combat Teams so that they are available to perform key functions such as route clearance and Soldier transportation when needed.

Also, some MRAPs have been outfitted with the latest in Army networking technology. Using a software-programmable radio such as JTRS and satellite technology such as WIN-T, the networked MRAPs are able to share real-time information, such as sensor feeds from nearby robots and UAS across the force, while on-the-move. This new capability—validated in technical field tests and network exercises such as the NIE—connects units at the battalion and company levels and below to one another and to higher headquarters in real-time using Force XXI Battle Command Brigade and Below display screens.

MRAPs and other vehicles in the Army fleet will take advantage of lighter weight armor composites as they become available. The Army Research Laboratory is testing combinations of lighter weight materials that can out-perform traditional steel; these technologies will spin out into the force as they become available.

A prime example of the search for efficiencies within major programs, the Department of Defense, Army, and Marine Corps have succeeded in achieving a $2 billion cost avoidance on the MRAP program by applying systems engineering techniques and Lean Six Sigma practices to the program. The thrust of the cost avoidance was achieved through several key methodologies; MRAP program managers streamlined and coordinated the requirements process to better determine which vehicles to upgrade and developed a database portal aimed at sharing key information across the 25,000-strong fleet of vehicles.

PAVING THE WAY FOR THE GROUND COMBAT VEHICLE (GCV)

The Army is developing a GCV Infantry Fighting Vehicle (IFV) as a centerpiece of its combat vehicle modernization strategy. The Army requires an IFV that can deliver a squad to the battlefield in a full-spectrum operation under armor. Plans for the vehicle include development of a system that has abilities equivalent to or surpassing the mobility of the Stryker and the protection of an MRAP.

Based on lessons learned in over ten years of war, the Army has confirmed that the existing fleets, including the Bradley IFV, cannot provide the needed combination of space, weight, and power, advanced force protection, and mobility needed to prevail in 21st century full-spectrum operations.

The Ground Combat Vehicle will be able to maneuver in urban environments, withstand IED attacks, and house the state of-the-art in vehicle computing technology—all while delivering a squad to the battlefield under the best armor protection available. Further, it will be engineered in an incremental fashion with built-in growth potential so that it can accommodate new technologies as they emerge, such as advances in networking and lighter-weight armor composites.

The Army's GCV acquisition strategy, which emphasizes affordability and a seven-year schedule, calls for aggressive exploration of GCV IFV capabilities trade-space via continued requirements and affordability analysis during a 24-month Technology Development Phase. These efforts will help the Army realize program schedule and affordability objectives as GCV requirements are finalized prior to the next major program milestone. The Army remains committed to a seven-year schedule as the appropriate amount of time necessary to design, develop, build, and test the next-generation IFV.

To support well-informed decision points prior to Milestone B, the Army has undertaken a three-pronged approach. First, contractors will work collaboratively with the Army to develop competitive, best-value engineering designs to meet critical Army needs. At the same time, the Army has initiated an update to its GCV IFV analysis of alternatives and is conducting a separate technical and operational assessment of existing non-developmental vehicles. Results from this assessment, along with contractors design efforts, will inform final GCV requirements and facilitate a full and open competition for the next phase of the GCV program.

GRAY EAGLE UAS QUICK REACTION CAPABILITY

The Army has deployed two "Quick Reaction Capabilities" (QRC) of its MC-1Q Gray Eagle UAS, a 28-foot-long surveillance aircraft with a 56-foot wingspan that is capable of beaming images from up to 29,000 feet for more than 24 consecutive hours.

The QRCs are designed to bring valuable emerging technologies to theater while simultaneously developing a formal program of record; they consist of four aircraft and two ground stations each. The QRC concept is intended to sharpen requirements for the program and get desired capability in the hands of Soldiers sooner for the benefit of the war effort.

One QRC is deployed with Army Soldiers in Iraq and another is with U.S. Special Operations Forces in Afghanistan.

The Gray Eagle aircraft are equipped with a laser designator, signals intelligence capability, and an electro-optical/infrared camera designed to survey the ground below, track enemy movements, and hone in on targets. They are also equipped to carry HELLFIRE missiles.

The Gray Eagle addresses an ever-increasing demand for greater range, altitude, endurance, and payload flexibility. At 3,200 pounds, this UAS has improved take-off and landing performance, coupled with the flexibility to operate with or without satellite communications data links.

TRANSFORMING ARMY ACQUISITION AND BUSINESS PRACTICES

The Army remains sharply focused on finding ways to continually examine and improve the acquisition process while increasing efficiency and serving as a full partner in the Department of Defense's Better Buying Power Initiatives. For instance, at the request of the Secretary of the Army, an independent panel of experts has completed a 120-day study—an Army Acquisition Review—aimed at assessing the strengths and weaknesses implicitly woven into the acquisition processes with the intent to further transformation; the idea of the study was to take a holistic look at the many nuances of acquisition management to include policy, funding, requirements, major programs, and synchronization with the Army Force Generation process.

As a result of this Army Acquisition Review, the Secretary of the Army and ASA(ALT) are implementing 63 specific recommendations aimed at improving the acquisition process. Among the many reforms being implemented are: streamlining the requirements process to focus on more collaboration in order to properly align requirements and ensure greater affordability, technological maturity, and realistic "achievability" of program goals; more widespread Army purchasing of Technical Data Packages in order to encourage competition and drive down prices; better codifying of rapid acquisition procedures; and increasing testing and prototyping earlier in the developmental cycle as a way to reduce costs and risks.

A major challenge to acquisition continues to be the need to properly prioritize, streamline, and collaborate on requirements at the front end of the process in order to emphasize technological maturity, affordability, and productivity. The revised Request for Proposal for the Ground Combat Vehicle is an excellent demonstration of how we approached reform in this area; requirements were properly "tiered" and industry was given "trade space" designed to encourage innovation.

Also, the Army continues to build upon the challenge area of codifying rapid acquisition procedures with more traditional approaches, with Quick Reaction Capabilities (QRC) such as the Army's Gray Eagle Unmanned Aircraft Systems program. QRCs place emerging technologies in the hands of Soldiers to address requirements while simultaneously developing a longer-term program of record complete with milestones and various check and balances.

The ultimate goal of acquisition reform is for ASA(ALT) to work with our industry and academic partners to more efficiently develop and deliver capabilities needed by the Soldier. A key aspect of this is an effort to identify and address inefficiencies discovered in the acquisition process. The rationale for this effort is based on the idea of accomplishing more acquisition objectives without necessarily receiving more financial resources. ASA(ALT) continuously seeks to improve its capacity to Design, Develop, Deliver, Dominate—and Sustain. We must do more without more.

In addition, the Army is emphasizing Lean Six Sigma business practices in many of its programs. These are specific, business-proven methods aimed at identifying ways to streamline productivity and reduce overhead costs. Applying these methods recently resulted in a $2 billion cost-avoidance on the MRAP program because program managers found ways to consolidate and streamline vehicle upgrade requirements.

A system-of-systems approach is vital to these ongoing efforts to transform business practices. The Army must look at developing, managing, and acquiring technologies in the most efficient way possible, an approach which includes the need to understand the interdependencies among systems. There must be an emphasis upon maturing the capability to synchronize programs and integrate schedules, deliveries, and other developments across the acquisition process.

As a result of these and other practices, the acquisition community remains acutely aware of its need to further the transformation of its business efforts. These initiatives help the Army transform as an institution and ensure that the best value possible is provided to the taxpayer and the Soldier—who is at the very center of these efforts.

COMMUNICATING AND COLLABORATING WITH INDUSTRY

The Army must continue to foster, develop, and enhance its relationships with vital industry partners as a way to ensure the best possible development of new and emerging systems. With this as an organizing principle, ASA(ALT) has created an industry outreach engagement program squarely focused on furthering partnerships with industry and facilitating constructive dialogue designed to achieve the best results for Soldiers in combat. Recognizing the importance of revitalizing industry engagement, the Army continues to nurture this outreach program, fostering and preserving strong relationships between the Army and its key industry partners.

Often there are circumstances where procurement sensitivities and ongoing competition may preclude the occasion to dialogue with industry. There are, nonetheless, ample opportunities for positive, proactive, and constructive engagement with industry partners. While placing a premium upon the importance of properly defining the parameters for discussion with industry partners, ASA(ALT) seeks to foster an environment of open dialogue.

The ASA(ALT) industry engagement program brings leaders of industry together with key Army decision makers in an effort to facilitate dialogue and collaboration; both the Army and its industry partners benefit from this forum. The rationale behind such an approach is based on the effort to minimize misunderstandings and "eleventh hour" reactions. This industry program is designed to anticipate future developments, recognize and communicate industry trends, and identify the evolution of key technologies that will support and protect our Soldiers in combat.

ELIMINATING CHEMICAL WEAPONS

Achieving excellence in acquisition involves continuous stewardship and superb management of highly sensitive and visible programs for which ASA(ALT) has executive agent authority, such as the Nation's chemical weapons disposal program.

The U.S. Army Chemical Materials Agency (CMA), using acquisition processes as its baseline, works with private industry, academia, and other interested policy and environmental stakeholders to eliminate America's obsolete chemical weapons.

Overall, CMA has destroyed 88 percent of the Nation's obsolete chemical weapons stockpile and anticipates that it will reach at least 90 percent destruction by 2012.

So far, four sites have completed operations: Johnston Atoll Chemical Agent Disposal System, Newport Chemical Agent Disposal Facility in Indiana, Aberdeen Chemical Agent Disposal Facility in Maryland, and Pine Bluff Chemical Agent Disposal Facility in Arkansas.

Operations continue at Tooele Chemical Agent Disposal Facility in Utah, Anniston Chemical Agent Disposal Facility in Alabama, and Umatilla Chemical Agent Disposal Facility in Oregon.

CMA also responds to discoveries of non-stockpile chemical weapons and safely stores those weapons until their disposal. Moreover, CMA partners with the Federal Emergency Management Agency to prepare local communities to deal with potential emergencies involving those weapons.

PATH FORWARD

We will provide whatever it takes to achieve the Nation's objectives in the current fight. At the same time, we will develop a shared vision to build the Army of 2020—designing and preparing units, developing Soldiers, and growing leaders to win in an increasingly competitive learning environment. We will continue to maintain battlefield dominance but remain versatile and adaptable to any task our Nation may call upon us to perform. Continuous modernization is key to transforming Army capabilities and maintaining a technological advantage over our adversaries across the full spectrum of operations. ASA(ALT) looks forward to continued support from members of Congress to achieve its broad modernization goals while supporting a cost-conscious culture.

The systems listed in this book are not isolated, individual products. Rather, they are part of an integrated system-of-systems investment approach designed to make the Army of the future able to deal successfully with the challenges it will face. Each system and capability is important. We have an obligation to provide our Soldiers with the most effective, high-quality equipment in the most sustainable, cost-effective manner. Our goal 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.

WEAPON SYSTEMS

LISTED IN ALPHABETICAL ORDER