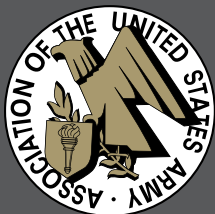




*The U.S. Army Squad:  
Foundation of the Decisive Force*



An AUSA Torchbearer Issue  
October 2011






11 October 2011

The very essence of combat, the tip of the spear, has a timeless characteristic—young leaders in front of small units operating in remote and challenging locations under extreme conditions. This was true at the invasion of Normandy and in the Ia Drang Valley in Vietnam and it is true today in Afghanistan and Iraq. Victories on the battlefield start with small units pressing forward toward an objective; however, on the modern battlefield those small tactical actions have strategic implications. Our Soldiers and small-unit leaders must be prepared not only to win but also to create the conditions for future stability—today’s fight should not be tomorrow’s.

The Army is focused on the squad as a system and as the foundation of the decisive force. A holistic plan that meshes training, equipping and networking is underway so that these small units are resourced and prepared in accordance with their significance on the battlefield. Further, a focus on the human aspects—Soldiers’ skills and attributes—seeks to maximize performance and resilience in difficult environments. Complex hybrid warfare is the new norm; the Army is building lethal, flexible, adaptive and educated squads to meet that challenge, now and in the future.

In this latest installment of AUSA’s signature Torchbearer series, we discuss how the Army is developing its squads to make them a part of the dominant force on the modern battlefield. A historical overview of development, a conceptual framework for operations and a discussion about required capabilities lay out a roadmap to small-unit supremacy. We hope this report is a useful and informative resource and that you will continue to look to AUSA for insightful and credible analysis of contemporary national security issues.



GORDON R. SULLIVAN  
General, USA Retired  
President, AUSA

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## Executive Summary

*A squad is an organizational idea jointly held by its members. It does not exist physically—you can't see a squad—you can only see the individuals who man it.*

Colonel William E. DePuy,  
“Eleven Men—One Mind,”  
*ARMY*, March 1958, p. 24

The United States Army is the premier instrument in the U.S. global strategy of engagement. As the nation's force for decisive action, the Army's ability to project and sustain forces in any location is the essence of strategic flexibility. The modern fight against nontraditional, hybrid enemies in a mass-communications environment means that tactical decisions can have strategic consequences. Those critical strategic actions fall to the Army's smallest unit, the squad—the foundation of the decisive force. It is the building block for all other battlefield organizations and will continue to be so into the future. Its ability to conduct a wide variety of missions must be sustained and improved upon. A holistic, systems approach to training, equipping and networking is an Army imperative.

During the past 60 years the Army has adjusted the composition and organization of the squad to balance firepower, mobility and sustainability in support of the doctrinal tasks of fire and movement. The modern version is composed of nine Soldiers organized into two teams of four and under the direction of a designated leader. The contemporary, distributed battlefield emphasizes small-unit operations that range from active combat to partnership assistance. The squad's versatility has been critical in Iraq and Afghanistan as the United States conducts complex and difficult missions that require a range of skills at the lowest tactical level.

Building the skills and capabilities required to maximize squad effectiveness, now and in the future, necessitates attention to the human dimension. The balance among size, sustainability and controllability requires analysis. The values of trust and understanding are enhanced in small groups, but physical and cognitive burdens are more easily borne by large groups. Building cohesive teams that mitigate the difficulties of group size will be an Army priority. The related goal is to provide combat overmatch—the ability to dominate an opponent of similar size in any condition. Past Army efforts to achieve overmatch have focused on battalions and above; equipping and procurement efforts have matched that focus. Future equipping strategies must make the squad as competitive for resources as major weapon and vehicle programs. To facilitate resourcing the squad as the foundation of the decisive force, the Army is taking a bottom-up approach to codifying requirements and capabilities needed to dominate the current and future fights. The Army is working to improve several key capability areas.

**Training:** The Army is committed to revitalizing and improving its home-station live, virtual and constructive training opportunities for squads that mirror the complexity and enabler availability of combat theaters. Developing nontraditional Soldier skills, such as cultural awareness and ethics, combined with traditional ones such as physical fitness will make Soldiers comfortable and effective in any operating environment.

**Leader Development:** Outcomes-based training that stresses mission command and leader-subordinate trust is essential to empower independent squads. The Army is planning to restore the lengths of its noncommissioned officer education programs, increase throughput in premier leadership schools and implement 360-degree leadership assessments. The goal is to produce well-rounded, experienced leaders who can operate in distributed environments and who are trusted by their leaders to seize the initiative.

**The Network:** The Army network will improve dismounted situational awareness and link each squad to higher-echelon enablers, thereby making it part of the dominant force on the distributed battlefield. Pairing existing evolutions, such as the smartphone, with the technological comfort of the Soldier will fuse different views of the battlefield into one common operating picture. Fusing intelligence and precision enablers will provide squads with fast access to information, early threat warning and responsive fire-support options.



**Mobility:** Soldiers require more capability but less weight. Streamlining equipment and developing multiuse devices and new materials for body armor are required to allow Soldiers to effectively move under fire with both the protection and connectivity needed to survive and win. Moreover, traditional areas of mobility such as mine detection and obstacle breaching require examination to ensure retention of dismounted capability.

**Power and Energy:** The Army is looking to simplify the battery load of a Soldier and reduce the overall number and weight of batteries carried for different devices. Further, forward-area power generation is evolving to reduce the force-wide logistics burden. Development of light-weight batteries, solar chargers and fuel cells is an ongoing effort, but new solutions such as kinetic energy converters are needed.

**The Human Dimension:** Developing trust between leaders and subordinate leaders is an Army imperative. Feedback from combat theaters indicates that restrictive rules are endangering Soldiers; proper training and education will push the decisionmaking level down and empower trusted small-unit leaders with the resources to succeed on the battlefield.

**Lethality:** Squads must be able to find, fix and finish an enemy in any environment. Moreover, they must be able to initiate contact on terms of their choosing substantially more often than they react to contact on enemy terms. Increased sensor capability, versatile weaponry and improved individual equipment are some of the areas in which the Army is investing to give its squads the edge in challenging combat scenarios. Lethality also includes defense; the modern squad's ability to dig fighting positions and emplace obstacles is almost unchanged since World War II and more effort is needed to close this capability gap.

**Force Protection:** Soldiers require layers of protection that follow them around the battlefield. Individual solutions, such as the Enhanced Night-Vision Goggles and modular body armor, are being combined with collective solutions such as the Counter Rocket and Mortar System to maximize survival without hindering mobility.

To fully empower and develop its squads for success in unified land operations, the Army must develop and implement a plan that fuses the focus areas in a holistic manner. Improving Soldier skills, leader education and formation equipping strategies in a synchronized fashion will produce well-led and effective squads for any current or future battlefield. The administration and Congress must support the Army with a properly sized and resourced force, timely and robust funding to execute multiyear development strategies and encouragement of industry investment to lay a foundation on which the Army can build effective units. The Department of Defense must support the Army with a supportive and adaptable acquisition process, an appropriate modernization approach and incentives for industry to pursue squad- and Soldier-level programs and solutions. Finally, industry must support the warfighter through research and development of new materials, light-weight power solutions, improved virtual and constructive training simulations and streamlined network integration hardware/software.

Empowering and trusting small units to operate in a decentralized manner will allow the Army to conduct wide-area security and combined-arms maneuver in any operational environment. Squads, the basis on which rest all other tactical echelons and through which many strategic goals are achieved, are more than the tip of the spear—they are the foundation of victory.



## The U.S. Army Squad: Foundation of the Decisive Force

*We are very fortunate; we have incredible junior leaders who have always carried the day. Squads have always been important and those junior leaders out there are making them successful . . . but the only place on the battlefield where we do not have clear overmatch is at the lowest level, at the squad.*

Major General Robert B. Brown, Commanding General,  
U.S. Army Maneuver Center of Excellence, at the  
2011 Maneuver Conference, Columbus, Georgia, 13 September 2011

### Introduction

The national security of the United States rests on a comprehensive global strategy of engagement. This engagement takes many forms—ranging from peace-keeping and partnership-building to combat—and many times overlaps all categories. The premier instrument for global engagement is landpower. The nation’s expansive worldwide missions require a broad set of interactions with diverse groups of people in varied environments. The Army is uniquely suited to carry out these missions because, at its heart, the Army is people. For the United States, the Army is the nation’s force for decisive action. The Army’s ability to project and sustain forces for any mission in any location is the foundation of the nation’s strategic flexibility.

The Army’s endurance and flexibility are critical in the fight against hybrid threats—threats that blend conventional, irregular, terrorist and criminal capabilities and apply them against the United States asymmetrically. The fight against hybrid enemies requires sustained, educated and nuanced engagement at the lowest tactical level. Further, the modern media-enabled and mass communications-based environment means that tactical decisions can have strategic implications. Those critical actions fall on the Army’s smallest unit conducting the daily operations and missions on the ground around the world. **The squad is the foundation of the decisive force;** its actions on the battlefield help achieve the nation’s strategic vision.

The rifle squad is the fundamental organization of Infantry formations, the building block of all higher units. Ultimately, it provides the competitive and tactical edge of the Army’s force. Combat operations in Afghanistan, Iraq and elsewhere highlight the importance and centrality of squad successes to overarching tactical, operational and strategic goals. The squad’s



ability to close with an enemy on the ground, control territory, establish security for friendly populations and then maintain continuous engagement with those populations creates the conditions for success. To ensure these capabilities are carried into the future, the Army must develop a holistic approach to small-unit development that considers training, equipping and networking in light of the squad’s contribution to the overall mission, treating it as a system rather than a collection of individuals.

### Historical Perspective on the Squad

During the past 60 years the Army has studied and analyzed the proper balance of size, composition and armament for its squads. The adjustment process has reflected the constant need to maximize mobility, lethality and controllability in a small package.

After the end of World War II, the Army concluded that a squad should comprise nine Soldiers, with one designated leader and one Browning Automatic Rifle (BAR) to provide fire support. Experience in World War II had shown that leaders frequently became pinned by enemy fire and could not effectively control the 13 Soldiers that, at that time, made up a squad.



Further, the Army did not believe the squad was capable of simultaneous fire and maneuver due to command and control difficulties and enemy action.

The Army employed the nine-Soldier squad in the Korean War; however, the addition of another BAR allowed the unit to operate in two teams, each capable of fire or maneuver. After the war, an Army internal study, titled “A Research Study of Infantry Rifle Squad TOE 1956” (ASIRS), formalized the fire-team concept and recommended that a squad consist of 11 Soldiers organized into two fire teams of five Soldiers each. Each team would have a BAR and a designated team leader; one squad leader would control both teams. The team-leader position was conceived to assist the squad leader with command and control; the ASIRS study concluded that the maximum number of Soldiers that could be employed effectively by one leader was five. The team-leader concept meant the squad leader had to effectively employ only two people—the team leaders. This balanced design reflected the command and control experience from Korea as well as the need to alternatively place a high volume of fire on a target and maneuver quickly against it. The Army also identified the enduring challenge for the squad: sustainability. Specifically, a squad would be forced to be redistributed or absorbed into another unit if it sustained casualties that reduced its strength to seven or eight soldiers. An 11-Soldier unit could sustain three or four casualties before becoming ineffective; a nine-Soldier squad could endure only one or two casualties before combat ineffectiveness.

The Army’s Reorganization Objective Army Division initiative of the early 1960s reduced the squad to 10 Soldiers, due in part to the drive to reduce the Army’s size without reducing capability and in part to the introduction of the M14 select-fire assault rifle as a replacement for the semi-automatic M1 Garand of World War II and Korea. In 1967 the Army tried to capture the lessons of combat in Vietnam to ensure the correct composition of the squad. Drawing on in-depth historical analysis and the extensive survey of combat veterans of Vietnam, the “Infantry Rifle Unit Study” (IRUS) recommended 11 Soldiers comprising two teams, each with a leader and an automatic rifle. Interestingly, the study concluded that nine Soldiers would be acceptable for emerging mechanized infantry units, theorizing that armored fighting vehicles would augment capability and offset the reduction in personnel. Still, the Army entered into the 1980s with the 11-Soldier squad firmly in place.

The post-Vietnam era had two major inputs on squad design: the Army of Excellence (AoE) reorganization and the Force XXI analysis. The AoE reorganization in 1985 sought to reduce the size of Army divisions and units to make them more deployable. The reduction in division strength led to a reduction in squad size from 11 Soldiers to nine for all infantry units—light and mechanized. The Force XXI analysis of the late 1990s aimed to optimize the size of Army units to take advantage of network and friendly-force tracking technology. The Force XXI analysis focused primarily on the battalion level and above but did consider the idea of seven-Soldier squads in mechanized units.<sup>1</sup> Ultimately, the Force XXI analysis concluded that seven-Soldier squads, while granting initial flexibility in planning, were not robust enough to dominate the close fight even with modern technology. Thus, nine Soldiers remained the standard.

Historical precedent demonstrates several consistent themes in U.S. Army squad design. First, it must be small enough to be controllable yet large enough to sustain losses without becoming ineffective. Second, it must possess sufficient firepower to sustain itself during periods of intense combat yet not be so heavily

<sup>1</sup> “Force XXI Division Design Analysis: Evolution of Operational Concept and Division Design,” U.S. Army Training and Doctrine Command Analysis Center, September 1998, p. 69. The seven-Soldier squad was considered in conjunction with smaller platoons but more companies per battalion.



burdened as to limit its maneuverability. Finally, two subordinate elements are essential for effective fire and movement. Infantry organizations of allied armies reflect these themes as well. The Israeli Infantry squad is organized with 10 Soldiers in two teams of four infantrymen, led by a designated leader with an assistant leader. British and Australian infantry squads are organized with two four-man teams. Those of the U.S. Marine Corps are larger—organized with three teams of four infantrymen led by a squad leader—but still reflect the fire and maneuver fundamentals.

### The Squad Today

The rifle squad of today consists of nine Soldiers organized into two teams of four and is capable of fire and movement. Each team is led by a team leader and has a grenade launcher and automatic rifle, but snipers, medium machine guns and other specialized weapons can be attached/substituted to augment firepower on a mission basis. The Soldiers are equipped with night-vision devices, precision optics and body armor; the squad leader is also equipped with a variety of radios to connect him to other echelons and support networks. These advanced technologies make the squad much more capable and lethal than its historic counterparts despite the comparatively smaller size. The rifle squad is also the same size and composition across all brigade combat team (BCT) types—Infantry, Stryker and Heavy. Maintaining one size standard across the Army has advantages: it improves efficiencies in training development, management and delivery and it streamlines—and thus more easily synchronizes—professional development and force manning in support of the Army Force Generation (ARFORGEN) process.

The contemporary operating environment de-emphasizes large mounted formations and forces the Army to fight as dismounted small units. Combat operations have shown the effectiveness, versatility and significance of the rifle squad. Its lethality has been critical in battles across several theaters, from Fallujah and Sadr City, Iraq, to the Korengal Valley and Kunar Province in Afghanistan. Its resiliency has been proven by long-duration operations from small, remote combat outposts in the very heart of enemy territory.

Squads offer more than just lethality, however. They are executing the day-to-day requirements of security force assistance and providing security to



noncombatant civilian and nongovernmental organizations and combat service support forces. They conduct missions with allied and host-nation partners, man checkpoints and secure local populations, all in support of effective governance and the overall plan for Afghanistan and Iraq. Well-trained and well-led squads, imbued with the Warrior Ethos, are fundamental to mission success.

### The Human Dimension of Today's Battlefield

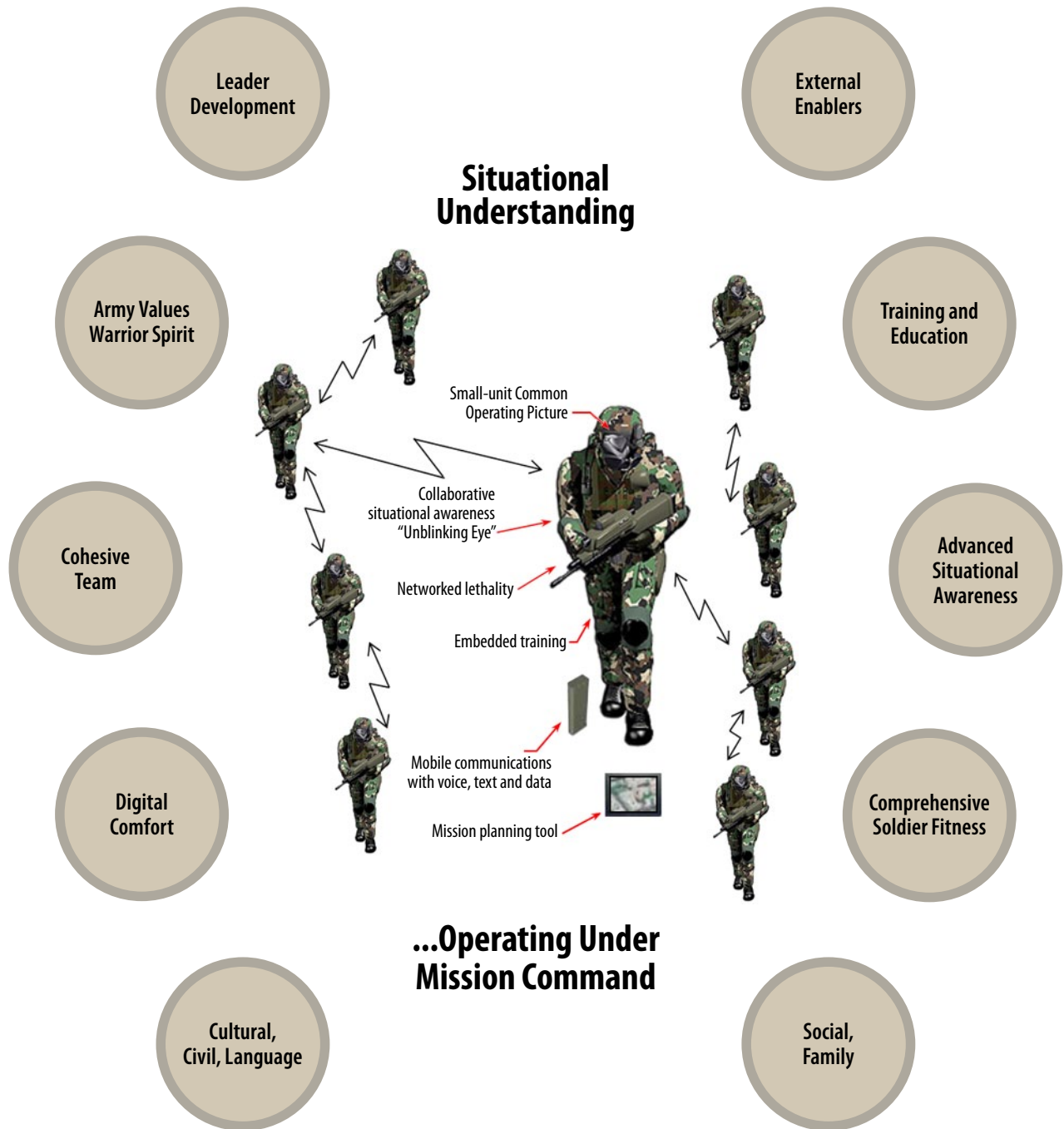
A decade of combat experience has shown that it is difficult to keep squads fully manned. Injuries—combat and noncombat—illness and other attritive effects accumulate over time and can be mitigated only so much. Analysis of more than 2,000 post-combat surveys indicates that squads have deployed below authorized strength on over 50 percent of assigned missions. This undermanning can make them combat-ineffective much more quickly during operations.

Because of the importance of the squad's effectiveness to overall mission success and the thin margin for loss, careful consideration must be given to the human dimension. **Trust and understanding among Soldiers and leaders, learning and adapting to the environment and physical and cognitive load-sharing are essential for successful performance in training and operations.** There is a complicated balance between maximizing positive human dimensions, such as trust, and maximizing battlefield dimensions, such as controllability and effectiveness. Trust is enhanced in smaller groups, but too small a group is ineffective on the battlefield. In contrast, individual cognitive load for problem-solving is increased as the size of the squad is decreased. Distribution of human senses is also reduced as size is reduced, thereby



# Human Dimension of the Squad

Determine Human Capacity/Limits:  
Cognitive, Physical, Social-Cultural, Moral-Ethical



Tactically and technically proficient, fully trained and empowered

Source: U.S. Army Maneuver Center of Excellence





decreasing collective situational understanding and overall organizational effectiveness. The enduring challenge to measuring effectiveness is simple metrics; lethality is readily modeled and measured, leadership and cohesion are not.

The collective physical burden on a rifle squad is also significant. Members must carry their individual weapons and equipment as well as shared radios, night-vision devices, ammunition and robotic systems. The larger a squad the lower the burden; squads of sufficient size are also able to more effectively manage the work/rest cycle and can endure more casualties before losing effectiveness. The social aspects of trust, adaptation and coherence are critical to developing the required knowledge and skills of all members. However, they must be considered in the context of physical requirements and the sheer numbers of Soldiers needed to sustain a mission.

**Technological development will continue to impact Soldiers in the squad.** Evolving battle command systems will provide access to more information and greater capabilities from higher echelons, increasing the cognitive loads on leaders and members alike. The proliferation of robotic systems and remote sensors will also tend to increase both physical and cognitive loads on the squad. Technology alone will not reduce the incredible complexity, constant change and surprises associated with close combat. The tasks associated with combat operations among populations will still fall to superbly trained, cohesive and well-led combat units that must be prepared for more information input and cognitive prioritization.

### **Toward the Future**

**The Army's goal is to develop capabilities that provide squads with combat overmatch.** Overmatch is the ability to successfully execute critical tasks against projected threat forces in all operational environments, concluding with decisive operations that drive the adversary to culmination and achieving the operational objective while retaining the capability to continue with subsequent missions.<sup>2</sup> In simpler terms it means dominating the battlefield against a similarly sized opponent, regardless of time, place or conditions. Empowering the squad to dominate in all operational



environments is an imperative for current and future missions. It is essential for effective wide-area security operations, operating at the tactical edge of decentralized operations and forming the foundation of combined-arms maneuver at higher echelons.

The squad operates in a tiered environment construct that applies to all operations—current and future. There are three tiers, each corresponding to a different degree of austerity and environmental development. Tier 1 is the most austere—in Tier 1 squads conduct dismounted operations in restrictive terrain with great risk acceptance; an example of Tier 1 is forcible-entry operations, such as airborne or air assault, into urban, mountainous or jungle terrain. Tier 2 represents operations with armored, mechanized or wheeled forces; examples include airlanding vehicles, heavy landing zones and company forward operating bases. Tier 3, the most robust environment, represents operations from secure forward operating bases; Tier 3 is characterized by a well-established presence and long-term occupation with contractor support. An important goal of the squad-as-a-system concept is transitioning from each tier to the next—up and down—with minimal disruption or loss of capability. Inherent in that transition is linking the assets available at all three levels to maximize effects at the lowest tactical level.

Today, the Army has companies operating in battlespace for which battalions were responsible ten years ago. In the 1999–2000 time frame, a brigade combat team was responsible for approximately 2,700 square kilometers of battlefield. However, in 2011 4th BCT, 10th Mountain Division was responsible for

<sup>2</sup> Derived from Joint Publication 3-0, *Joint Operations*, 11 August 2011, p. V-8.



## TIERed Environments

Tier 1 (Most austere)	Tier 2	Tier 3 (Most robust)
<p>Dismounted operations in complex, restrictive terrain. Greatest risk acceptance.</p> <p>Example: Forced entry operations in urban, mountain or jungle terrain. Airborne and air assault operations. Search and attack.</p>	<p>Operations with armored, mechanized or wheeled forces.</p> <p>Example: Airlift vehicles, heavy landing zone, convoy link-up. Company forward operating bases in Operation Enduring Freedom.</p>	<p>Operations from secure forward operating base.</p> <p>Example: Well-established presence and long-term occupation. Additional consecutive overseas tours with contractors to sustain them.</p>

Source: U.S. Army Maneuver Center of Excellence

approximately 13,000 square kilometers in Logar and Wardak provinces in Afghanistan.<sup>3</sup> This increased distribution requires empowerment of the squad; the Army must provide the right training, equipment and network capability. Small units must be not only lethal and survivable but also a conduit for quickly vectoring additional combat power or enablers to a specific place and time to achieve overmatch or seize initiative through noncombat assistance. The desired endstate of the future squad is to be physically fit, agile, culturally and environmentally aware and rigorously tested through immersive training.

In the past, the Army equipping, procurement and modernization strategy has been aimed at attaining combat overmatch at the BCT level. This model has been extremely successful; the first Gulf War and the invasion of Iraq in 2003 demonstrated the superiority of American combat brigades. However, in the protracted, close fight against the Taliban and al Qaeda, in both Iraq and Afghanistan, Army squads and their foes are almost evenly matched in terms of capabilities; it is too

much of a fair fight at the squad level with regard to enemy detection and lethality. Previous Army studies have either focused on individual Soldiers or on higher echelons (Army of Excellence, Force XXI and Modularity); Army procurement strategy, of necessity, has also focused on major weapon systems programs. The Army's most decisive, lethal and vulnerable units have been excluded from the technological development process that has provided higher elements with unrivaled overmatch. Just 10 percent of the Army's equipping investment budget for fiscal year 2012 is dedicated to maneuver, and just 1.5 percent of the total Army budget is dedicated to Soldier programs. The Army must resource the squad as the foundation of the decisive force; enabling efforts must be as competitive as major weapon systems and vehicle programs for resources.

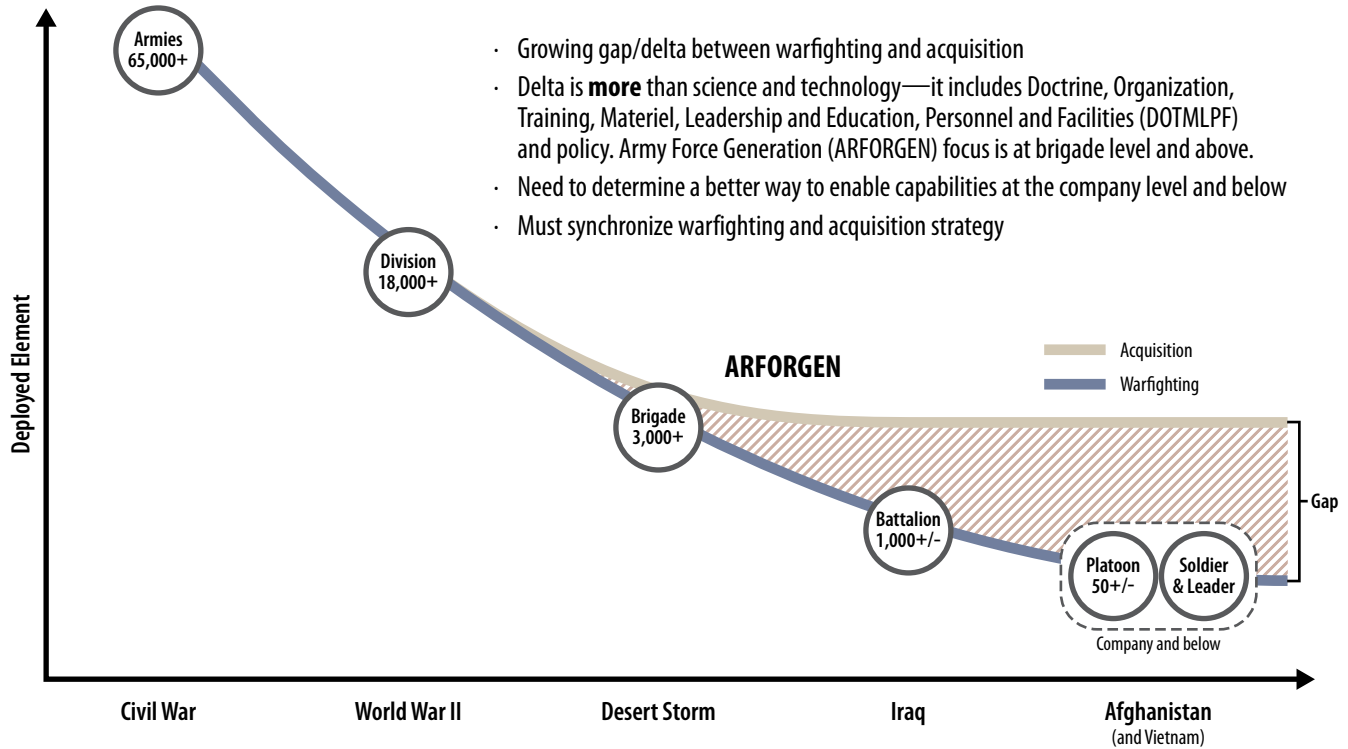
### Required Squad Capabilities

The current and future operational environments present an asymmetric and ambiguous battlefield with an intelligent and adaptive enemy. The Army is taking a bottom-up approach to codifying requirements and

<sup>3</sup> From LTC Jeffrey R. Witsken, "Network-Centric Warfare: Implications for Operational Design," School of Advanced Military Studies, United States Army Command and General Staff College, Fort Leavenworth, Kansas, 2001, p. 8; Wesley Morgan, "Coalition Combat Forces in Afghanistan, Afghanistan Order of Battle," UnderstandingWar.org, August 2011.



## Where Should the Army's Focus Be?



Source: Headquarters, Department of the Army

capabilities to provide its squads with the resources they need to dominate the fight and then carry on to the next mission; accordingly, the Army is focusing on the following key areas to improve capability.

### Training

Training is the base of all Army units; proper training is the foundation to which all other enabling technologies are applied. Squads require appropriate and modernized home-station facilities to fully train on the intricacies of combat, to include employment of higher-echelon supporting assets normally seen only in theater. All of the equipment used in combat must be used in simulation and training to streamline and reduce risk in the peace-to-war transition period. Squads need a blended training model that balances live, virtual and constructive training to maximize time spent training and minimize resource conflicts between units.<sup>4</sup>

Currently, home-station resources such as ranges and live-fire complexes are strained to accommodate the high volume of units preparing to deploy overseas; the home-station virtual and constructive facilities are improving but are not yet at the level of fidelity truly needed. The development of a Squad Combat Training Center with a live opposing force could better replicate the complex environment squads face on the battlefield.

The Army Learning Concept for 2015 outlines a set of Soldier competencies geared toward 21st century missions. The concept places emphasis on well-rounded Soldiers who have well-developed skills in nontraditional areas, such as moral-ethical decisionmaking, social-cultural awareness and cognitive reasoning. These “smart-power” attributes complement long-standing skill areas such as physical strength and stamina, technical and tactical competence and teamwork.

<sup>4</sup> For more information on live, virtual and constructive training, see AUSA Torchbearer National Security Report “U.S. Army Training for Unified Land Operations,” September 2011, [http://www.ausa.org/publications/ilw/Documents/TB\\_Full-Spectrum\\_web.pdf](http://www.ausa.org/publications/ilw/Documents/TB_Full-Spectrum_web.pdf).



## Squad Priorities Over Time

	FY12	Near Term	Far Term
<b>Network</b>	<ul style="list-style-type: none"> <li>• Nett Warrior</li> <li>• Company intelligence support team</li> </ul>	<ul style="list-style-type: none"> <li>• Access to precision targeting and fires</li> <li>• Connecting Soldiers to digital applications</li> </ul>	<ul style="list-style-type: none"> <li>• “Push-down” SA/SU</li> <li>• Reachback to support weapons platforms</li> <li>• Direct linkage to higher echelons</li> </ul>
<b>Mobility (Load)</b>	<ul style="list-style-type: none"> <li>• Squad multipurpose equipment transport</li> <li>• Working dogs</li> </ul>	<ul style="list-style-type: none"> <li>• Portable mine clearing</li> <li>• Enhanced working dogs</li> </ul>	<ul style="list-style-type: none"> <li>• Portable mine clearing</li> <li>• Portable robotics</li> <li>• “Push-down” improvised explosive device detection/identification</li> <li>• Light weight ammunition</li> </ul>
<b>Power and Energy</b>	<ul style="list-style-type: none"> <li>• Auxiliary power unit – fuel cell</li> <li>• Squad mission equipment transport</li> </ul>	<ul style="list-style-type: none"> <li>• Batteries/power generation</li> <li>• Longer life, reduced weight, commonality</li> </ul>	<ul style="list-style-type: none"> <li>• Embedded batteries/power into existing uniforms and equipment</li> </ul>
<b>Human Dimension</b>	<ul style="list-style-type: none"> <li>• Dismounted Soldier System (Immersive Squad-Level Trainer)</li> <li>• 360° assessment</li> <li>• Squad/Team Leader Course</li> <li>• Warrior Leader Course, Advanced Leader Course, Senior Leader Course adjustments</li> <li>• Ranger School increase</li> </ul>	<ul style="list-style-type: none"> <li>• Blended live/virtual/constructive and gaming simulations training</li> <li>• Digital Soldier avatar</li> <li>• Digital Soldier book/tracker</li> </ul>	<ul style="list-style-type: none"> <li>• Embedded training capability</li> <li>• Avatar linked to simulation performance</li> </ul>
<b>Lethality</b>	<ul style="list-style-type: none"> <li>• XM25 Counter Defilade Target Engagement System</li> <li>• Laser Target Locator Module</li> <li>• Small Tactical Optical Rifle Mounted Micro-laser Rangefinder</li> <li>• Accelerated Precision Mortar Initiative</li> </ul>	<ul style="list-style-type: none"> <li>• Nonlethal capability</li> <li>• Individual carbine</li> <li>• Precision sniper rifle</li> </ul>	<ul style="list-style-type: none"> <li>• Connectivity to all supporting platforms</li> <li>• Lethal-to-nonlethal conversion</li> <li>• Sensor-to-shooter linkage/Pass targets</li> </ul>
<b>Force Protection</b>	<ul style="list-style-type: none"> <li>• Enhanced Night-Vision Goggles</li> <li>• Individual Gunshot Detection</li> <li>• Individual Soldier Protection               <ul style="list-style-type: none"> <li>◦ Enhanced Combat Helmet, pelvic protection, body armor</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Robotic explosive detection</li> <li>• Unmanned aerial system</li> <li>• Sense-through-the-wall</li> </ul>	<ul style="list-style-type: none"> <li>• Lightweight body armor</li> <li>• E-Tool Replacement</li> <li>• Bio monitoring and reporting capability</li> <li>• Combat ID</li> </ul>

SA – Situational Awareness

SU – Situational Understanding

Source: U.S. Army Maneuver Center of Excellence

For individual Soldiers, the Army is considering the use of individual training avatars—virtual representations of individual Soldiers created at initial entry and staying with the Soldiers through their careers. The avatar would mirror the Soldier’s training metrics, such as physical fitness test scores and marksmanship qualifications. The avatar would then

perform in a gaming environment to the Soldier’s level of ability, thus exposing strengths and weaknesses to be addressed. The avatar concept would allow leaders and Soldiers to more quickly identify and address specific issues related to performance. It would also allow multi-echelon training in simulations and significantly enhance squad performance.



Further, the Army is pursuing Advanced Situational Awareness Training (ASAT) for Soldiers. ASAT is focused on the human terrain of combat; behavior recognition, combat profiling, overcoming observation biases and recognizing behavior anomalies are all focus areas for making every Soldier a sensor.

### *Leader Development*

One of the eight leader-development imperatives stated in the Army Leader Development Strategy for a 21st Century Army (2011) is that the Army must prepare its leaders for hybrid threats and unified land operations through outcomes-based training and education. Outcome-based training emphasizes the mission command concept for leaders and subordinate leaders; leaders provide intent and subordinate leaders determine how to achieve that intent. To be successful, squads must be led by adaptive leaders who are comfortable operating in ambiguity and complexity. The squad leader must be empowered to execute the commander's intent and commanders at all levels must trust that leader's technical and tactical capability to execute. The Army institutional training centers for officer and noncommissioned officer education must transform into "warrior universities" that prepare small-unit leaders for the challenges of combined-arms maneuver and wide-area security missions in the conduct of unified land operations.

Part of that transformation is a restoration of course length within the Noncommissioned Officer Education System (NCOES). To meet the force demand for noncommissioned leaders since 9/11, the Army has had to shorten the course time for its NCOES programs. The average course time for junior, mid-level and senior noncommissioned officers (NCOs) has been reduced by almost half, but NCO responsibilities continue to grow.<sup>5</sup> The dispersed, decentralized fight requires appropriate professional education that properly prepares Army NCOs for the demands of modern war. Coupled with the length restoration must be an emphasis on unit-level leader development. Unit-level development must be constant; unit leaders must mentor and guide subordinate leaders throughout the development process and allow the NCOES to provide capstone training. To paint

a clearer picture of the leadership climate and highlight areas for sustainment or improvement, the Army will implement 360-degree leader assessments that provide leaders with feedback from subordinates as well as superiors. Additionally, the Army is considering increasing the throughput of its premier small-unit leadership course, Ranger School, to provide world-class training to a larger percentage of the total force. The endstate is an integrated educational system that meshes with the ARFORGEN cycle, provides the proper training at the correct time in a Soldier's career and builds effectively on previous training and experience.

### *The Network*

The Army network will bring together small units and allow them to collaborate to develop shared situational understanding and fuse access to intelligence and precision enablers across echelons. Improvements to the Army network need to address capability gaps in unit collaboration, fast access to intelligence and more responsive sensor systems that can provide continuous early warning to small tactical units. **With direct linkages to BCT-level assets, the squad becomes part of the dominant force on a decentralized battlefield.** A perfect example is initial operations in Afghanistan in late 2001; small Special Forces units linked to high-level fire support assets completely routed al Qaeda and the Taliban in a matter of weeks. The Army needs to replicate that connectivity and responsiveness for all its small units.

The network needs to be pushed down to the individual dismounted Soldier level. Once a squad dismounts from basing platforms or vehicles, its situational awareness begins to decay at a rapid pace. Dismounted Soldiers today fight at nearly the same technology level as in World War II—with paper maps and eyeballs. Nonetheless, U.S. Soldiers have a comfort level with technology that provides an advantage to network integration. Harnessing the so-called smartphone revolution will push capability and customization to every Soldier. Repetitive live, virtual and constructive training will prepare Soldiers to deal with the amount of information on the tactical network, preventing sensory overload.

<sup>5</sup> Warrior Leader Course (E-5)—from 30 to 17 days; Advanced Leader Course (E-6)—from 8 to 5 weeks; and Senior Leader Course (E-7)—from 11 to 7 weeks.



In the near term, the continual evolution of the Army's Nett Warrior Program will push handheld data/voice/location/situational awareness connectivity to the individual Soldier through lightweight smartphone-like devices. The Nett Warrior program also has the potential to close the surveillance-domination capability gap. A small, streamlined link to a dismounted squad from higher echelons could alert the squad leader to potential hazards and allow the leader to select from a menu of fires or effects provided by an assortment of supporting weapons platforms. For vehicle-mounted Soldiers, the development of the Mounted Soldier System—a combat vehicle crewman system that integrates communications, heads-up displays, microclimate cooling technology and body armor into one ensemble—will provide better situational awareness and protection while decreasing the difficulty of operations in confined vehicle spaces.

In the long term, the Army is seeking to harness the network to enable more refined situational awareness and friendly-unit tracking as well as more responsive reachback capability to supporting weapons platforms such as mortars and artillery.

### **Mobility**

Mobility is the ability to deploy individual and squad equipment into operations and sustain those operations over distance and elevation. Mobility has been a continual challenge in the modern era, especially in the difficult terrain of Afghanistan. The balance between mobility and protection is critical. The Army has taken several steps already in acknowledgment of the importance of Soldier mobility, such as purchasing lighter individual body armor and granting commanders some discretion as to the type of armor worn on

operations—for instance ballistic-plate carriers versus full Kevlar vests.

Dismounted Soldier mobility can also be improved through the use of robotic cargo systems such as the Squad Multipurpose Equipment Transport. Despite technological advancements, however, the discussion about equipping must shift from simply adding items to adding capability through efficiencies and multiuse devices. Moreover, traditional mobility issues such as breaching capability and mine/improvised explosive device detection must be addressed. Solutions may not necessarily be technological but rather a matter of accessibility to existing assets such as military working dogs. Going forward, the Army must examine every area, from ammunition and weapons to equipment and batteries, to reduce the overall load a squad carries into combat and maximize a Soldier's ability to move under fire.

### **Power and Energy**

The Army must focus on efficient use of available power and the ability to regenerate power in forward locations to reduce the logistics burden. A major challenge in current theaters is battery use. Currently, a platoon on a 72-hour combat mission requires, on average, approximately 1,400 individual batteries—comprising 11 different types and weighing some 430 pounds—to sustain operations. This immense requirement illustrates two central issues: power usage and power management. The level of power usage for modern operations is significant, and the Army is implementing changes to make more efficient use of multifunctional systems and invest in improved energy efficiency for its devices, tools and enablers. Furthermore, battery commonality and universality must be expanded to simplify the Soldier load and the sustaining logistics chain. The



Army is examining the concept of conformal batteries that are embedded in clothing and equipment to reduce the bulk of batteries. New, lighter-weight batteries are a step in the right direction, but new solutions such as kinetic-energy conversion are needed to truly free the Soldier from the logistical constraints of battery reliance. Simultaneously, forward-area power generation and base/outpost self-sufficiency are being addressed through the use of solar power, waste regeneration, fuel cells and more efficient generators.<sup>6</sup>

### *Human Dimension*

Some of the changes and developments the Army is implementing involve the organizational culture that inhibits decentralized command and control and restricts the authority of subordinate leaders to make decisions. Soldiers returning from combat theaters have indicated that overly restrictive rules of engagement require far too much time to clear and employ supporting fires. When Soldiers are committed to combat, the Army needs to instill a climate that errs on the side of Soldier protection and entrusts critical decision-making authority to small-unit leaders. **Some capability gaps identified by the Army, such as the excessive response time for supporting fires, can be solved by simply entrusting junior leaders to make decisions at the lowest tactical level.** Trust in subordinate leaders' abilities to make sound decisions can also be cultivated through improvements to Army junior NCO education programs. Small-unit tactical leader training that produces highly professional and technically competent leaders will encourage senior leaders to enable decisionmaking at the lowest possible level, which will greatly enhance supporting fires' response times and Soldier protection.

### *Lethality*

The squad on the modern battlefield must be able to employ precision targeting to leverage joint fires and be able to instantly achieve direct-fire range and effects overmatch at the small-unit level. It must be able to initiate contact more often than it reacts to contact. Reacting to contact is a tactical disadvantage and not substantively different from tactics in World War II, Korea

and Vietnam. **Today's squad needs increased sensor capability to detect enemy presence before contact is initiated.** Moreover, it needs a dismounted system that links it to the Common Operating Picture (COP), providing the location of friendly units and available enablers. Now, when a squad dismounts, it loses access to the COP, unmanned aerial system feeds, unit intelligence databases and updated information—all of which reduce the lethality and effectiveness of the squad.

Often sidestepped in favor of offense-focused training and operations, defense is a core competency of all tactical units. The squad's ability to emplace obstacles, dig fighting positions and establish engagement areas needs to be examined. The standard entrenching tool is almost unchanged from World War II and provides the same level of capability. Future research and development efforts must include new and improved means to quickly establish defensive positions.

The ability to find, fix and finish an enemy is the essence of combat; Army squad capabilities need to be maintained and improved upon. Weapon systems must complement one another and the squad must be able to leverage precision direct fires and counter-defilade fire. It also needs to be able to engage armored as well as unarmored enemies. Several lethality improvements are already in use in combat theaters. The XM25 Counter Defilade Target Engagement System is in limited but effective use in Afghanistan. It fires a 25mm exploding projectile that can be set by the user to detonate on enemies behind cover or dug into the ground. The Army is planning to field more than 12,000 XM25s—enough to equip every squad and Special Forces team. The Laser Target Locator Module and the Small Tactical Optical Rifle Mounted Micro laser rangefinder allow Soldiers to rapidly mark enemy positions with visible/nonvisible light and, when paired with a global positioning system, accurately determine enemy geographic positions. Finally, the Accelerated Precision Mortar Initiative (APMI) is giving Soldiers in Afghanistan the capability to employ GPS-guided 120mm mortar rounds in support of small-unit actions. The APMI is 76 times more accurate than any previous mortar system; it provides precision indirect fire capability to the lowest

<sup>6</sup> For more information on Army energy-related initiatives, see AUSA's Torchbearer National Security Report "U.S. Army Energy Security and Sustainability: Vital to National Defense," April 2011, [http://www.ousa.org/publications/torchbearer-campaign/tnsr/Documents/TB\\_Energy\\_web.pdf](http://www.ousa.org/publications/torchbearer-campaign/tnsr/Documents/TB_Energy_web.pdf).



level ever—reducing collateral damage, ammunition expenditure and tactical risk.

### **Force Protection**

Force protection encompasses all aspects of a mission. From a combat outpost to contact on patrol, the Army must provide the maximum complementary protection to its Soldiers. The ever-present challenge is balancing the demands of protection with those of other functional areas such as mobility. The other capability areas overlap with force protection in a number of ways. Networking Soldiers can improve situational awareness and reduce the risk of fratricide. Improved materials will reduce body armor and helmet weight while adding protection for extremities and the pelvic area. However, the Army cannot just address existing threats; it must contemplate possible future ones as well. The squad must be able to mitigate chemical, biological, radiological and nuclear effects in a manner that complements mobility.

Examples of individual force-protection initiatives are the fielding of Enhanced Night-Vision Goggles—lightweight night-vision devices that combine conventional light amplification with infrared technology to deliver a clearer picture in low-light conditions; the Soldier Protection System—a modular, scalable body armor system that allows multiple configurations based on mission set and anticipated threat and maximizes protection and mobility; and the Individual Gunshot Detection System, an electronic monitor that records the sound of bullets passing nearby and determines the direction of origin. The Army is also developing portable sense-through-the-wall radar imaging capability to reduce risk in urban operations. These individual-focused efforts are paired with base/camp protection

efforts such as the Counter Rocket and Mortar system, which detects incoming indirect fire with radar and then engages the incoming munitions with precision cannon fire. Pushing counter-indirect fire systems down to battalion/company/platoon outposts is a next step. The squad needs to have layers of protection that cover it at all times.

To capitalize on and sustain combat performance, the Army must empower its small-unit leaders with trust, training and technology to ensure they have the most relevant and effective capabilities possible on future battlefields. Investing in home-station live, virtual and constructive training environments will provide the most challenging and realistic scenarios for training; prioritizing procurement strategies and emphasizing the squad-level systems will provide the tools needed to fight, win and sustain operations anywhere in the world; and reinvigorating junior-leader education courses will develop the professionalism and technical competence that engenders trust at all levels. The end result will be overmatch—the ability to fight and win against any enemy in any environment.

### **What is Needed**

Today's small unit has a critical presence on the modern battlefield. It serves as the focal point of tactics, operations and strategy in pursuit of the national mission. Accordingly, the Army needs to implement a force-wide plan that makes it the centerpiece of education, training, equipping and resourcing.

At the individual level, the Army needs to emphasize a broad set of skills that make each Soldier more effective on the battlefield and as part of a team. Cognitive reasoning, physical fitness, mental stamina and cultural sensitivity are just a few of the areas in which Soldiers must excel. The Army needs to provide the tools for Soldiers to measure and evaluate themselves in the context of goals and missions; Soldiers must take it upon themselves to improve their skill sets.

At the unit level, the Army must ensure that squads and other small units receive the very best of integrated live, virtual and constructive training. A restoration of professional development course lengths must be paired with committed unit-level leader development and mentorship. The Army must also increase use of





its premier leadership courses to spread technical and tactical competence around the force.

Force-wide, the Army must adjust its procurement and equipping strategy to reflect the focus on capability. **The squad-as-a-system concept must be embraced, and corresponding purchases for Soldiers and small units must be as competitive in the resource arena as major weapon systems and vehicle programs.** The Army cannot just provide more equipment for Soldiers and call it an increase in capability; the acquired equipment and enablers must also be integrated in a more coherent fashion. To achieve this, the Army must partner with industry to develop new technologies, materials and systems in a timely, responsive and cost-effective manner that reflects a deliberate plan and desirable endstate.

### What Must Be Done

#### The administration and Congress must:

- fully fund an operational force sufficient to sustain the Army's daily mission requirements throughout the Army Force Generation process (AUSA Resolution 11-07);
- authorize and appropriate annual funding in a timely and predictable manner to allow the Army to modernize without disruption according to multiyear strategies (AUSA Resolution 11-07); and
- encourage private industry to invest in research involving technologies to reduce the weight of Soldier equipment and improve power consumption and generation capabilities.

#### The Department of Defense must:

- support force modernization efforts from a collective, unit-effectiveness approach;
- build greater flexibility in the acquisition process to allow the service to rapidly adapt emerging technologies for battlefield capabilities;
- reinforce the goals of initiatives that revitalize and reenergize blended home-station live, virtual and constructive training and encourage innovative solutions for improving combat unit effectiveness (AUSA Resolution 11-10); and
- support industry efforts to develop and implement new network and robotic technologies to push connectivity down to the lowest tactical level.

#### The Army must:

- continue to improve its training and leader development approaches, leveraging live, virtual and constructive opportunities and technologies to provide realistic, effective home-station training (AUSA Resolution 11-10);
- advance network development and integrate new devices in a coherent and systemic manner (AUSA Resolution 11-14);
- improve its ability to rapidly integrate operational lessons from the battlefield into institutional training (AUSA Resolution 11-10);
- transform its professional education system into a holistic model that is correctly sized and timed to build on the experience and prior education of Soldiers;
- develop a procurement strategy that emphasizes the squad as much as other major programs (AUSA Resolution 11-15); and
- support the continued fielding of small-unit enablers, such as the XM25, Enhanced Night-Vision Goggles and Accelerated Precision Mortar Initiative (AUSA Resolution 11-15).

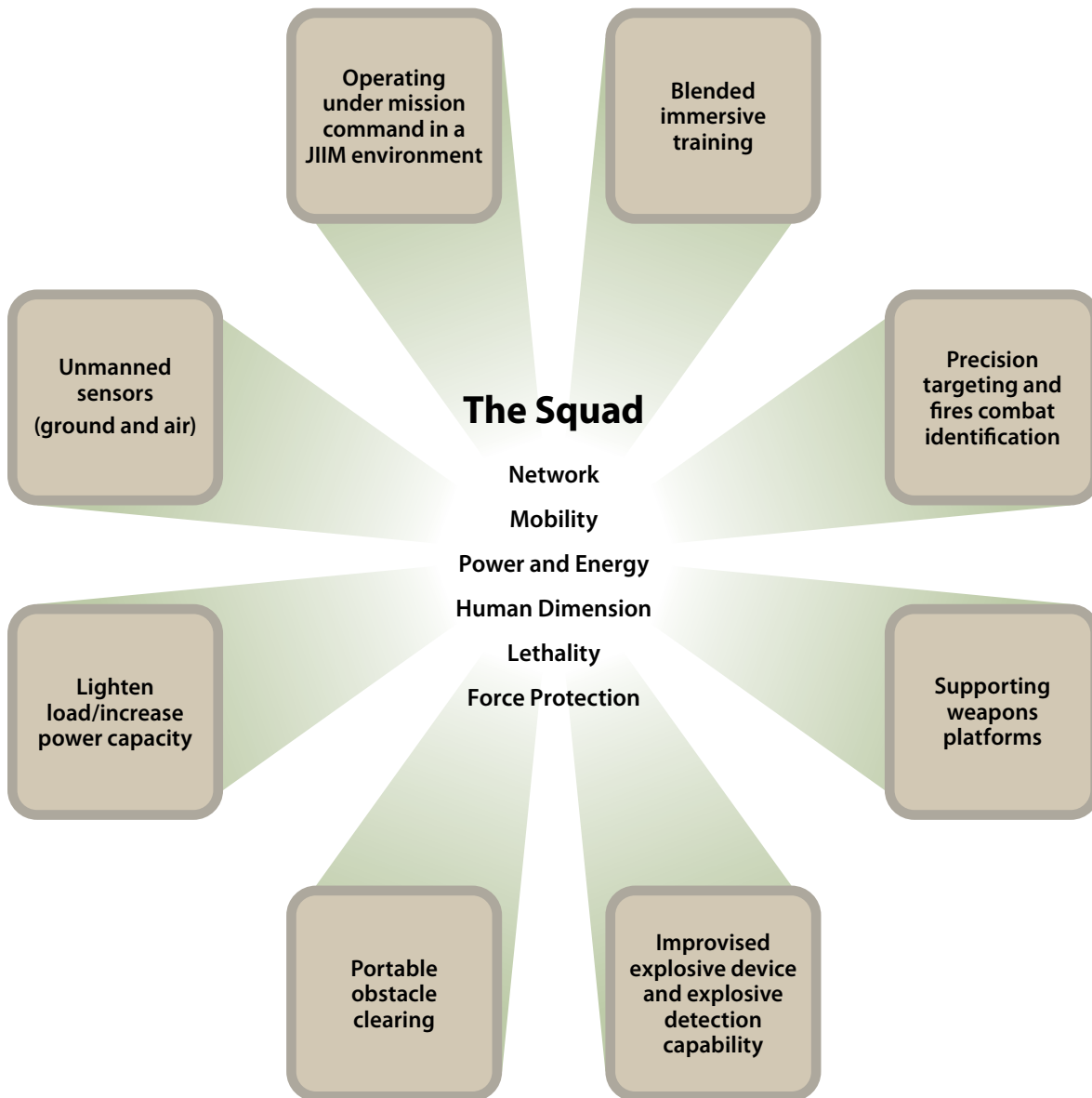
#### Industry must:

- develop lighter-weight materials for body armor and helmets to increase Soldier mobility and decrease load;
- invest in methods to reduce battery weight without sacrificing power;
- refine and improve portable network architecture to allow warfighter connectivity on the move and in remote locations (AUSA Resolution 11-15);
- enhance virtual and constructive training simulations to reflect even greater levels of realism and complexity for both mounted and dismounted scenarios; and
- prioritize dismounted connectivity, situational awareness and enabler integration in research and development efforts (AUSA Resolution 11-14).

The squad is the foundation of Army tactical units; as such it is at the very forward edge of the nation's conflicts. In the modern era of instant communications and complex battlefields, squads are sometimes functioning



## Future Squad Concept



JIIM – Joint, Interagency, Intergovernmental and Multinational

Source: U.S. Army Maneuver Center of Excellence

as a strategic force. Whether engaging the enemy in combat, protecting populations or partnering with allied nations, their actions have global implications for the United States. The Army’s small units have performed admirably in the remote and challenging arenas of Iraq and Afghanistan. Modular and adaptable, the squad provides operational versatility, enhanced sustainment and endurance for an expeditionary force in austere theaters of operation. The commitment to the squad as the

foundation of the decisive force will allow the Army to meet the challenges of today’s operating environment while remaining versatile and adaptable for future uncertainties. The squad, the base on which all other tactical echelons rest, will execute the core competencies of wide-area security and combined-arms maneuver through leadership, adaptability, resourcing and empowerment. When the Army answers the nation’s call, the squad will be at the very front.



## Torchbearer Message

The United States relies on the U.S. Army, the decisive force for action, to execute national strategy. In turn, the Army relies on its smallest unit—the squad—to perform daily missions in environments that range from peace to war. The mass-media environment means that tactical decisions can have strategic implications; the squad is the foundation of the decisive force. Against a hybrid enemy, it must be trained, equipped and networked in a holistic manner that allows for sustained and effective performance at the lowest tactical level. Successful squads, the base on which all other tactical formations are built, will enable effective combined-arms maneuver and wide-area security for the larger force.

The squad is a flexible unit that reflects the historical need for fire and movement capability balanced against mobility, protection and firepower. Its resiliency and lethality have been proven in combat; however, more needs to be done to ensure small-unit dominance. The desired endstate is overmatch—the ability to dominate a similarly-sized enemy under any circumstances. The Army seeks to provide the squad the capabilities to detect and destroy adversaries as its higher formations are able to do. Accordingly, the Army is studying and investing in several key areas.

Improving home-station live, virtual and constructive training focused on squad performance is a priority. Upgraded range complexes and virtual simulations that achieve greater realism are required to provide the most immersive training possible; training at home stations on enablers available in combat theaters will minimize initial operational friction. Building Soldier cultural, ethical and reasoning skills alongside traditional physical and operational skills will enable squads to engage people in any setting. Refocusing on professional education for Army small-unit leaders will ensure squads are led by competent and professional leaders who can operate in decentralized environments.

Developing squads also means equipping them with tools that maximize lethality, force protection and energy without decreasing mobility. The Army is undertaking efforts to research new materials, find new power solutions and develop multiuse devices to improve the Soldier's ability to move under fire. New technologies such as gunshot detection systems, counter mortar systems and advanced night-vision devices, which increase Soldier protection, are already being fielded in combat theaters. Further evolution in force protection systems will seek to provide layers of defense that go where Soldiers go.

Finally, networking will mesh intelligence, surveillance and fire support enablers to make the squad the dominant force on the distributed battlefield. Pairing technological evolutions with Soldiers' technology comfort level will generate a more accurate common operational picture that is accessible to all units. Handheld network connections will also provide more responsive reachback to supporting weapon systems such as mortars and artillery. Friendly-force tracking and connection through network technologies will allow small-unit leaders to vector enablers to critical points faster and with more situational clarity.

The unifying human principle of the training, equipping and networking focus areas is trust. Leaders must be able to trust subordinate leaders to execute the mission and make sound decisions in difficult circumstances; subordinate leaders must trust that they are sufficiently resourced and connected to accomplish the mission; and the nation must trust that the Army has educated, trained and equipped its squads to conduct the complex tasks required by national strategy.

To support the Army's efforts to maximize squad capability in the challenging fight against a hybrid enemy, the administration and Congress must authorize an appropriate endstrength that allows the Army to project and sustain well-trained forces to the location and at the time required. Furthermore, timely and predictable funding that supports multi-year modernization and investment in capability is required. The Department of Defense (DoD) must develop a responsive acquisition system that allows for rapid adoption of emerging technologies. DoD must also support incentives for industry to develop the required network and robotic technologies needed on the battlefield. Finally, industry must invest in squad-level energy, material, training and network improvements on an equal basis with traditional programs.

The squad must be empowered to meet the challenges of today's operational environment while remaining flexible to meet future unknowns. Moving into the second decade of the 21st century, the squad's ability to shoot, move, communicate, survive and engage at all levels of conflict and in all locations will continue to be the bedrock of the nation's decisive force—the Army.

*As we build Army 2020, we will begin by looking at the force from the bottom up with the squad as the foundation. Within this focus area, we will examine the required capabilities at the squad level to achieve overmatch including but not limited to lethality, mobility, access to information, emerging power and energy demands, protection, and sustainment. We will also explore options for improving our ability to train squads both at home station and at the combat training centers.*

General Martin E. Dempsey,  
"37th CSA Thoughts on the Future of the Army,"  
14 June 2011



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