

Department of the Army  
Headquarters, United States Army  
Training and Doctrine Command  
Fort Monroe, Virginia 23651-1047

\*TRADOC Pamphlet 525-66

30 January 2003

**Military Operations**  
**FORCE OPERATING CAPABILITIES**

**Summary.** The Force Operating Capabilities (FOCs) contained herein are structured statements of operational capabilities which, when achieved in aggregate, fulfill the vision articulated in the Objective Force Concepts, including the Unit of Employment Concept, and the Maneuver Unit of Action Concept.

**Applicability.** Force Operating Capabilities provide focus to the Army's Science and Technology Master Plan (ASTMP) and warfighting experimentation. They apply to tomorrow's Army, conducting overmatching decisive operations on the Information Age battlefield, and beyond. United States Army Training and Doctrine Command (TRADOC) functional agencies; doctrine, training, and combat developers; as well as Army materiel developers, utilize FOCs.

**Suggested improvements.** The proponent for this pamphlet is the Deputy Chief of Staff for Developments (DCSDEV). Send comments and suggested improvements on Department of the Army (DA) Form 2028 (Recommended Changes to Publications and Blank Forms) through channels to Commander, TRADOC, ATTN: ATCD-B, 10 Whistler Lane, Fort Monroe, VA 23651-1046. Suggested improvements may also be submitted using DA Form 1045 (Army Ideas for Excellence Program (AIEP) Proposal).

**Distribution restriction.** Approved for public release; distribution is unlimited.

**Availability.** This publication is available on the TRADOC Homepage at <http://www.tradoc.army.mil>.

---

<b>Contents</b>	<b>Paragraph</b>	<b>Page</b>
<b>Chapter 1</b>		
<b>Introduction</b>		
Purpose.....	1-1	3
References.....	1-2	4
Explanation of abbreviations and terms.....	1-3	4
The role of FOCs in the Army requirements determination process .....	1-4	4
 <b>Chapter 2</b>		
<b>Strategic Responsiveness and Deployability</b>		
FOC-02-01: Deployability .....	2-1	6

---

\*This pamphlet supersedes TRADOC Pamphlet 525-66, 1 May 1997.

Contents (cont)

	Paragraph	Page
<b>Chapter 3</b>		
<b>Battle Command Construct</b>		
Characteristics.....	3-1	12
FOC-03-01: Command and Control .....	3-2	16
FOC-03-02: Army Client to the Global Information Grid.....	3-3	19
FOC-03-03: Advanced Collection, Processing, Analysis, Management and Sharing of Information.....	3-4	20
FOC-03-04: Network Operations .....	3-5	22
FOC-03-05: Information Protection .....	3-6	24
FOC-03-06: Situational Understanding .....	3-7	25
FOC-03-07: Decision and Planning Support.....	3-8	27
FOC-03-08: Information Operations .....	3-9	28
<b>Chapter 4</b>		
<b>Sensor Fusion</b>		
FOC-04-01: Sensor Fusion .....	4-1	31
<b>Chapter 5</b>		
<b>Mounted/Dismounted Maneuver</b>		
FOC-05-01: Mounted/Dismounted Maneuver.....	5-1	34
FOC-05-02: Mobility.....	5-2	37
FOC-05-03: Operations in Urban and Complex Terrain.....	5-3	38
<b>Chapter 6</b>		
<b>Non-Line of Sight Lethality</b>		
FOC-06-01: NLOS Lethality .....	6-1	47
<b>Chapter 7</b>		
<b>Line of Sight/Beyond Line of Sight Lethality for Mounted/Dismounted</b>		
FOC-07-01: LOS/BLOS Lethality.....	7-1	55
<b>Chapter 8</b>		
<b>Air/Ground Operations</b>		
FOC-08-01: Air/Ground Operations.....	8-1	59
<b>Chapter 9</b>		
<b>Survivability</b>		
Elements of survivability .....	9-1	63
FOC-09-01: Survivability and Force Protection.....	9-2	64
<b>Chapter 10</b>		
<b>Maneuver Support</b>		
FOC-10-01: Understand the Battlespace Environment .....	10-1	71
FOC-10-02: Enable Theater Access .....	10-2	73

**Contents (cont)**

	<b>Paragraph</b>	<b>Page</b>
FOC-10-03: Provide Assured Mobility .....	10-3	74
FOC-10-04: Deny Enemy Freedom of Action.....	10-4	76
FOC-10-05: Enable Force Protection and Security .....	10-5	78
FOC-10-06: Engage and Control Populations .....	10-6	80
FOC-10-07: Neutralize Hazards and Restore the Environment .....	10-7	83
 <b>Chapter 11</b>		
<b>Maneuver Sustainment</b>		
Sustainment objectives .....	11-1	86
FOC-11-01: Sustainability.....	11-2	90
FOC-11-02: Global Precision Delivery .....	11-3	92
FOC-11-03: Global Force Health and Fitness .....	11-4	93
FOC-11-04: Power and Energy .....	11-5	95
FOC-11-05: Global Casualty Care Management and Evacuation.....	11-6	96
FOC-11-06: Global Casualty Prevention.....	11-7	98
FOC-11-07: Readiness, Reliability, Maintainability and Commonality for Sustained Operational Tempo.....	11-8	102
 <b>Chapter 12</b>		
<b>Training and Leader Development</b>		
FOC-12-01: Leader Training and Development.....	12-1	105
FOC-12-02: Training Development and Execution.....	12-2	107
FOC-12-03: Training for Joint and Coalition Operations.....	12-3	109
FOC-12-04: Trainability .....	12-4	110
FOC-12-05: Managing Unit Performance .....	12-5	111
 <b>Chapter 13</b>		
<b>Human Engineering</b>		
FOC-13-01: Human Engineering for the Soldier.....	13-1	112
FOC-13-02: Soldier Support.....	13-2	116
 <b>Appendix A</b>		
References.....		117
 <b>Glossary</b> .....		
		117

**Chapter 1**  
**Introduction**

**1-1. Purpose.** This pamphlet describes Force Operating Capabilities (FOCs) derived from analysis of Objective Force documents developed during the Concepts Based Requirements System process.

**1-2. References.** Appendix A contains a list of documents that influenced the collective development of all FOCs, and this publication.

**1-3. Explanation of abbreviations and terms.** Abbreviations and terms used in this pamphlet are explained in the glossary.

**1-4. The role of FOCs in the Army requirements determination process.**

a. This pamphlet consists of capability statements, defined in measurable terms, for capabilities required by the Army, to fulfill Objective Force Concept documents. It is organized according to the following FOC areas:

- (1) Strategic Responsiveness and Deployability.
- (2) Battle Command Construct (BCC).
- (3) Sensor Fusion.
- (4) Mounted/Dismounted Maneuver.
- (5) Non-Line of Sight (NLOS) Lethality (Net Fires).
- (6) Line of Sight (LOS)/Beyond Line of Sight (BLOS) Lethality for Mounted/Dismounted.
- (7) Air/Ground Operations.
- (8) Survivability.
- (9) Maneuver Support.
- (10) Maneuver Sustainment.
- (11) Training and Leader Development.
- (12) Human Engineering.

b. Force Operating Capabilities address the pursuit of advanced warfighting capabilities and describe them in relevant operational terms. Force Operating Capabilities are derived by an assessment of Objective Force operational concepts developed by the Mission Area Assessments, Mission Needs Assessments, and Mission Solution Assessments of the Requirements Generation System. Inherent in the Objective Force concepts is a full consideration of the Future Operational Environment—the threat. Each FOC includes a detailed, stand-alone narrative of the capability’s utility on the future battlefield. Although focused on the Objective Force, select capabilities can be applied to the Interim Force as technology insertions.

c. Applications.

(1) Force Operating Capabilities articulate force-level capabilities that form the basis for Objective Force warfighting requirements in doctrine, training, leader development, organizations, materiel, personnel and facilities (DTLOMPF) domains. Force Operating Capabilities form the basis for analysis to define and refine requirements, across the full spectrum of operations, throughout the transformation period.

(2) Force Operating Capabilities drive organizational and functional structure changes, through the Force Design Update process, as the institution of the Army transforms to achieve the Army Vision, and support the National Military Strategy.

(3) Force Operating Capabilities establish requirements for the Army Science and Technology. Force Operating Capabilities are employed by TRADOC leadership in the conduct of science and technology (S&T) reviews, Special Access Program reviews, Science and Technology Objective (STO) candidate assessments, Advanced Technology Demonstration (ATD) candidate assessments, Army Science and Technology Work Group processes, and the Army Science and Technology Advisory Group process. Force Operating Capabilities assist in focusing the Army's S&T investment in support of Objective Force overall development and Army transformation.

(a) Advanced Technology Demonstrations address selected high priority FOCs, and demonstrate a capability that does not currently exist. They are resource intensive, and provide the medium to conduct troop interaction with mature technologies. The ATD Plan is jointly developed between TRADOC and the materiel developer, with measures of effectiveness established to successfully execute the ATD. Advanced Technology Demonstration management plans are briefed to a council of colonels, and approved at the Army Science and Technology Working Group.

(b) All warfighting requirements must have linkage through FOCs to a subordinate concept supporting the Army Capstone Concept. Analyses of all FOCs are used to stimulate changes in the various DTLOMPF domains, as the Army seeks to sustain or improve its warfighting advantage over current and evolving threats.

(4) Materiel developers and industry use FOCs as a reference, to maintain responsiveness and viability in independent research and development (R&D).

(5) Force Operating Capabilities are used in the Army Science and Technology Master Plan (ASTMP) process to provide warfighting influence upon technology base funding.

(6) Force Operating Capabilities are employed in the Army STO process as the measure of warfighting relevance. Candidate efforts selected as Army STO are published in the ASTMP as the 200 most important S&T objectives for the Army R&D community. The STO review provides the basis for the construct of ATDs. Army STOs receive senior Army leadership oversight, and have priority for fiscal resourcing.

(7) Affordability is not specifically addressed by the FOCs; however, affordability is inherently considered within the Mission Solution Assessment phase of the Concept Based Requirements System, and integral to eventual acquisition decisions.

d. Format. Force Operating Capabilities are formatted as outlined below.

(1) Force Operating Capability Identifier: Alphanumeric designator and title of the FOC.

(2) Capstone capabilities: Describes the intended capability's end state if fully attained. Describes how the particular capability significantly empowers the force in concise operational terms.

(3) Narrative: Substantive description of the operational background, conceptual rationale, scope and warfighting impact of the required capability.

(4) Linkages to Army Universal Task List (AUTL) contained in FM 7-15 (currently in draft) and the Universal Joint Task List (UJTL) contained in Chairman of the Joint Chiefs of Staff (CJCS) Manual ([CJCSM 3500.04C](#)).

e. Reviews. This pamphlet will be reviewed and updated on a biennial basis.

---

## Chapter 2 Strategic Responsiveness and Deployability

**Meet deployability standard of **brigade on the ground in 96 hours** after liftoff, a **Division in 120 hours** and **5 Divisions in 30 days**. Overwhelm enemy's anti-access efforts. Enter at multiple, **austere, dispersed points of entry**, and employ coherent, combined arms units upon arrival, with a limited pause for Reception, Staging, Onward Movement, and Integration (RSOI). Force must be deployable **within the framework of the C-130 crucible**, and capable of **vertical lift to operational distances**. Objective Force must be capable of rapid transshipment between modes of transportation, without adaptors or need for reconfiguration. Must be capable of conducting **logistics over the shore**. Force is capable of conducting **Enroute Mission Planning and Rehearsal**. **Joint In-Transit Visibility** required throughout deployment.**

### 2-1. FOC-02-01: Deployability.

#### a. CAPSTONE CAPABILITIES:

(1) The Objective Force must, within a joint context, be capable of rapidly deploying worldwide, and arrive ready to fight, or conduct other full spectrum operations, immediately upon arrival. Forces must arrive capable of conducting continuous operations for up to 3 days at

high operational intensity, and up to 7 days in medium to low operational environment, before it must be resupplied. Commonality of systems and components, reduced demand for fuel, ammunition, and power generation, and advanced sustainment technologies, will reduce the logistical footprint in theater. This will reduce the deployment burden, and maximize the mobility of the force in theater. Equipment will be designed and developed having both required warfighting capabilities, and the ability for strategic deployability on existing and emerging Air Force transport aircraft, Civil Reserve Air Fleet (CRAF), and intratheater airlift, via future fixed or rotary wing. By sizing systems and organizations against the C-130, we increase the options available to the combatant commander for entering forces into theater; we can combine available C-130 and C-17s to maximize force flow using multiple entry points to bring in combat configured units. The Objective Force can combine available C-130's and C-17s to maximize force flow using multiple entry points to bring in combat configured units. The operational concept is to 'Fight on Arrival' without traditional support requirements. This does not mean the platforms must 'Fight off the Ramp', but are prepared to quickly fight once off the ramp. Without a substantial assembly or refit process by the crew, the FCS systems must be placed in an Essential Combat Configuration (ECC) to be combat mission ready. A full basic load and full fuel tank is not required, but each vehicle must arrive with a full turret or fighting load of ammunition and 3/4 tank of fuel, with its full crew and passengers with their personal equipment. It must be capable of immediate self-defense, arrive connected to the command, control, communications, computers, intelligence, surveillance and reconnaissance (C4ISR) network, enabling full situational awareness/situational understanding (SA/SU), and able to access networked fires, including joint fires. The UA will be capable of upgrading to Full Combat Configuration within 15 minutes of arrival with all add on armor kits applied. Full Combat Configuration enables the UA to conduct the full spectrum of operations, and adds capabilities like enhanced mine survivability, or add-on armor. Full Combat Configuration includes all of the ECC capabilities, plus full fuel and basic loads, needed for 72 hours of high tempo operations. The future combat system (FCS) family of systems (FoS) must meet the Army force deployment guidelines (Threshold), and be capable of transport on commercial contracted airframes and vessels, in accordance with (IAW) the CRAF guidelines, and the Voluntary Intermodal Shipping Agreement (Objective). The FCS FoS shall be transportable worldwide, without disassembly, at their gross vehicle weights/combat weights by highway, rail, water, and air modes. The FCS FoS must be transportable, without U.S. Air Force airlift waiver, with essential combat load, and with no shoring of any type. It must be transportable on C-130 profile aircraft, maritime prepositioned ships, rail, and ground transport (Threshold), and all current strategic/tactical transport aircraft, shallow draft high-speed sealift, and landing craft (Objective).

(2) Objective Forces must be capable of entry operations, including forcible entry operations. The Future Operational Environment for deployment includes projection into underdeveloped nations, with limited ports, or nations with developed infrastructures, where threat antiaccess actions have degraded or denied seaports. The entry of Objective Forces into the theater, at multiple decisive points, mitigates antiaccess, and places enemy capabilities at risk. This acceleration of the force flow of combat power provides the Joint Task Force (JTF) Commander the flexibility to decide how, where, and when to initiate combat, seize the initiative, and build momentum rapidly, to achieve decisive outcomes.

## TRADOC Pam 525-66

(3) To accomplish strategically responsive, rapid deployability, the Objective Forces will require strategic and operational lift capabilities, to facilitate strategic responsiveness, operational maneuver, and tactical maneuver. The most significant new capabilities required include shallow-draft, high-speed ships, super short take-off and landing (SSTOL) aircraft, and advanced, heavy-lift rotary-wing aircraft. Objective Force units must be transportable by inter/intratheater land, sea vessel, and airlift, anywhere in the world. They are more deployable with reduced deployment tonnage, and must be transportable by C-130 profile aircraft, and advanced vertical lift, such as air maneuver transport, advanced theater transport, ultra-fast shallow draft sealift, or Theater Support Vessel. Additionally, the Objective Force requires advanced over-the-shore capabilities, broader ability to use unimproved ports and airfields, and very rapid positioning of theater-opening enablers. These capabilities permit the joint force/Corps commander to push substantial, ready-to-fight land power ashore through multiple, unimproved entry points. These capabilities are required to enable the deployment of a brigade combat team, anywhere in the world, in 96 hours after liftoff; a warfighting division on the ground in 120 hours; and five divisions in theater in 30 days.

(4) Objective Force Corps headquarters (HQ) will be capable of directing and controlling the deployment of both continental United States (CONUS)-based and forward deployed forces, and will exploit Army prepositioned sets of supplies and equipment, where available. Objective Force units must be capable of rapid intertheater to intratheater transshipment, to gain operational momentum, and meet deployment objectives. Objective Force units will arrive at multiple points of entry, improved and unimproved, to create manifold dilemmas for the enemy, and to avoid reliance upon conventional aerial ports of debarkation (APODs) and sea ports of debarkation (SPODs), where enemy access denial efforts will be focused. The Objective Force will retain capability for conducting forcible entry from strategic and operational distances. Objective Force requires capabilities that, in conjunction with joint capabilities, will defeat or overwhelm an adversary's antiaccess capabilities. The Objective Force will require an enhanced ability to conduct Joint Logistics Over The Shore (JLOTS) to permit operations where deep-water seaports are not available, and to counter an enemy's antiaccess strategy. Enroute Mission Planning and Rehearsal System (EMPRS) will support the Objective Force, to develop situational awareness, conduct planning, prepare and disseminate mission orders, conduct rehearsals at multiple levels, and adjust plans and orders as the situation changes, from alert, through deployment, to employment. The EMPRS will enable the Objective Force to integrate into gaining theater command and control (C2) systems during movement by air, land, and sea. The Objective Force must have an embedded, joint in-transit visibility systems lash-up, for movement planning and tracking. Deployment readiness, and an expeditionary mindset, must be cultivated across all Army institutions as a culture, and as a way of life.

(5) The FCS FoS must enable the Objective Force to conduct full spectrum operations globally, with minimal preparation time, from alert-to-deployment, and from deployment-to-employment. The FCS FoS must be capable of immediately employing over ranges of 750 kilometers (km) (Threshold) and 1000 km (Objective). Upon arrival, the FCS must support the Unit of Action (UA) capability to conduct distributed and continuous 24-hour operations, self-sustained, for a minimum of 3 days, without requiring reception and staging. Upon entry into the area of operations (AO), FCS FoS combat units move over operational maneuver distances (up

to 400 km), to designated area(s) of operation, as a coherent, integrated, combined arms team, with the ability to conduct their core mission tasks.

(6) The FCS information system must provide UAs, down to the battalion nodes (Threshold), and all FCS manned systems (including the individual soldier) (Objective), the ability to integrate into the EMPRS, from alert, through deployment, to employment; and connectivity into the gaining C2 architectures during movement by air, land, and sea.

**b. NARRATIVE:**

(1) Responding to crisis, in the increasingly interconnected and interdependent world, requires a rapid and decisive capability that is relevant to the problem at hand. In all cases, the ability of tailored, joint forces, to be rapidly and effectively projected into the crisis area, can mitigate escalation of the crisis, help reduce human suffering, or lead to more rapid termination of conflict. As part of joint and multinational operations, the Objective Force must have strategic maneuver capabilities that can overcome enemy antiaccess strategies. They must rapidly project and sustain the right mix of mission-tailored, lethal, survivable, mobile forces, and synergized warfighting capabilities, to any point on the globe, to achieve decisive results.

(2) For Entry Operations, the Unit of Employment (UE) introduces combined arms packages, from battalion to brigades, via multiple lift platforms, into multiple entry points. The Objective Force quickly builds up forces, which do not require an extensive reception, staging, onward movement, and integration (RSOI), and rapidly achieves an operational level of warfare capability in the AO. Maneuver support (MS) and sustainment enables this force, permitting rapid transition to offensive operations. When required, the UE conducts CONUS-based forcible entry operations (mounted, dismounted, mounted supported by dismounted, and dismounted supported by mounted) using strategic and theater assets (air and sea lift, precision fires, C4ISR, and other enablers) during any phase of the joint campaign. Units of Employment can also conduct forcible entry from forward operating bases (FOBs) deploying to operational distances, using its organic power projection capabilities, supplemented by joint lift and enablers.

(3) Central tenets for deployment of the Objective Force are:

- Strategically reposition and sustain warfighting, mobility forces.
- Sustainment from CONUS, Army Pre-positioning Stocks, and forward-stationed locations to the theater of operations.
- Ability to overwhelm the enemy's antiaccess strategy, by arriving into theater through multiple austere APODs and SPODs.
- Rapid UA entry into the Defense Transportation System.
- In-transit joint logistics common operational picture (COP).
- Intermodal, distribution-based operations for force projection and sustainment.

(4) Capabilities required to achieve strategic responsiveness and rapid deployability include:

## TRADOC Pam 525-66

(a) Sufficient airlift, and fast-moving sealift assets, to quickly concentrate and sustain combat power in the operational area, though multiple, austere, or degraded points of entry.

(b) Vertical take-off and landing (VTOL) and SSTOL capability, to lift and move mounted and dismounted forces, for tactical three-dimensional maneuver and operational maneuver.

(c) Sea-based platforms for operational agility within littoral regions.

(d) Adequate and robust deployment infrastructure at home stations, APODs, SPODs, and interconnecting transportation.

(e) A distribution management system with intermodal platforms, and common formed packaging, to gain speed and momentum.

(f) Flexible, rapid, and accurate time-phased force deployment data of modular capabilities.

(g) Reliable communications systems for continuous C2 and situational awareness, from alert through arrival.

(h) Information-based distribution capability.

(i) Standardized, preconfigured, modular deployment packages.

(j) Rapid force alert, assemble and loads-out.

(k) Deployment in a ready-to-fight configuration.

(l) Minimum intermediate staging and transshipping (fort to Tactical Assembly Area).

(m) Minimum RSOI.

(n) Easy force flow reconfigurability.

(o) Low vulnerability to flow interruption.

(p) Multiple, secure entry points.

(q) High throughput, including directly-to-forward operating areas.

(r) Use of offset port and airfield facilities.

(s) Enhanced JLOTS capabilities.

(t) Distribution-based logistics in lieu of large in-theater stockpiles.

(5) Strategic maneuver envisions rapid movement, over global distances of highly lethal air, land, sea, and space capabilities, to converge with overwhelming power upon enemy centers of gravity, causing rapid disintegration of the enemy's land force. The goal of Objective Force strategic maneuver is to move sufficient combat power from garrisons, through intermediate staging bases, directly into combat, significantly faster than today's timelines, enabling rapid, decisive maneuver. Deployment of ground forces directly into objective areas denies the enemy their initial objectives, permits friendly forces to occupy or protect key terrain and facilities, and provides areas from which friendly forces can threaten enemy forces and aggression. Explosive ordnance disposal teams, and organic elements within the Objective Force, equipped with advanced explosive detection devices, manned and unmanned, will counter any terrorist attempts to disrupt deployment of the Objective Force, through placement of improvised explosive devices (IED), mines, bombs, or booby-traps.

(6) The Objective Force must have deployable systems that can exploit advances in future air and sealift. This is required to break from the current pattern of sequenced, linear movements (from garrison, to port-to-port, to staging area) accomplished over a long period, extended by a lengthy build-up phase of combat power, prior to the initiation of offensive action.

(7) The Objective Force must have the means to protect critical deployment infrastructure from attack by weapons of mass effects/destruction. This includes the means to restore operations at a port or airfield, and along lines of communication.

(8) The units and systems in the Objective Force must fit the C-130 crucible, and be deployable in projected intratheater air and sealift assets with minimal reconfiguration. The C-130 crucible is defined as weight, width, height, volume, axle weight, safety, and other requirements of the C-130 aircraft. Major equipment, to include the FCS and resupply loads, will be capable of long-range, precision airdrop from Air Force aircraft. The total deployed force will be significantly more responsive strategically, operationally, and tactically. Employing horizontal movement and/or vertical envelopment, the Objective Force will be immediately capable of commencing dominant, distributed combat operations 'off the ramp.' As such, equipment will not require reassembly of major components in order to prepare it for operations. The crew can accomplish any reconfiguration required, after unloading from the aircraft, in minutes, without the assistance of cranes or forklifts. The mission-tailored force will project maximum warfighting capability in the fewest aircraft/ships possible, by utilizing standard containers, palletized cargo, and palletized loading system flat racks. Units will arrive, capable of conducting operations for up to 3 days, at high operational intensity, and up to 7 days in medium to low operational environment, before needing resupply. Equipment will be designed and developed to achieve required warfighting capabilities, and fully exploit existing and emerging Air Force transport aircraft, CRAF, and intratheater airlift, via future fixed or rotary wing.

(9) The Corps will possess inherent advanced vertical lift, enabling limited self-deployment capability for mounted and dismounted forces, from intermediate staging bases (ISBs), or forward presence locations, which are proximate to the conflict joint operational area (JOA).

(10) Objective Force organic aviation assets, required to conduct dominant maneuver, should also have limited self-deployment capabilities. These will reduce the burden on strategic deployment platforms, expand the number of approaches into austere theaters, and provide an enormous degree of operational flexibility, enabling the Objective Force to appear virtually anywhere in the battlespace in a matter of hours, or days.

(11) Objective Force organizations, units, and systems designs must conform to reduced weight and volume standards for military equipment, to expedite strategic maneuver via airlift. The Objective Force requires systems-of-systems with significantly reduced sustainment demands, particularly fuel and ammunition, with corresponding footprint reductions in support processes and infrastructure.

c. **LINKAGE TO AUTL:** Article (ART) 2.1 (Perform Tactical Actions Associated with Force Projection and Deployment); ART 2.1.2 (Conduct Tactical Deployment/Redeployment Activities); ART 2.3 (Conduct Tactical Troop Movements); ART 6.3.1 (Provide Movement Control); ART 6.3.1.4 (Provide In-Transit Visibility); ART 6.3.2 (Conduct Terminal Operations); ART 6.3.2.3 (Conduct Rail Transfer Operations); ART 6.3.2.4 (Conduct Marine Terminal Operations); ART 6.3.3 (Conduct Mode Operations); ART 6.3.3.1 (Move by Surface); ART 6.3.3.2 (Move by Air); ART 6.3.3.3 (Conduct Water Transport Operations); ART 6.4.3 (Conduct Aerial Delivery Support).

d. **LINKAGE TO UJTL:** Strategic National tasks (SN) 1 (Conduct Strategic Deployment and Redeployment); SN 3.5 (Provide Space Capabilities); SN 6 (Conduct Mobilization); Strategic Theater tasks (ST) 1 (Deploy, Concentrate, and Maneuver Theater Forces); Tactical tasks (TA).

---

### Chapter 3 Battle Command Construct

Objective Force is **networked horizontally and vertically**, from strategic to tactical level. Embedded information network is **mission-centric** and **collaboratively 'teams' commanders and staffs**, whether static or on the move. Collaborative decision aids, situational awareness, course of action (COA) and mission rehearsal tools provide commanders and staff with **enhanced situational understanding**, to rapidly find the enemy, discern activity, solve dilemmas, and retain freedom of action in dynamically changing operations. Provide units ability to **see, understand and act first, then finish decisively**. Commanders synchronize all elements of combat power in real-time to shape, close with, and destroy enemy. Networked force is optimized for mobile operations through **dynamic, extended range, self-organizing, and multilayered communications**. Force must be **interoperable** with Legacy, Interim, Joint, and Multinational command, control, communications, and computer (C4) systems.

#### 3-1. Characteristics.

a. Battle Command is the art and science of applying leadership and decisionmaking to achieve mission success. Objective Force Battle Command will enable other advances in the objective force, such as improvements in responsiveness, lethality, survivability, and mobility, to achieve a new way of operating, based on knowledge superior to that of our adversaries. This knowledge-based approach is not better attrition warfare, but rather, a new way of war. It is about getting the right force, at the right time, to the point of decision, in a much more efficient and effective way than achieved before. Battle Command requires emphasis, on both leadership and decisionmaking, to enable the combined arms commander to fight effectively. The characteristics of the Objective Force Battle Command Construct are stated in the following ‘10 big ideas’:

(1) Commander-Driven, Purpose-Oriented, Knowledge-Based Mission Orders. Very high tempo, widely distributed land operations, in a complex environment, will overwhelm any leader or system that attempts to centrally control execution. Decentralized execution by all arms becomes mandatory. Maximum initiative, within commanders’ intent, will allow application of combined arms, at the tempo envisioned.

(2.) Echelonment of Command is not the same as Echelonment of Unit Formation. The completely flexible tailoring of forces is central to combined arms warfare and dominant maneuver. The appropriate mix of Battle Command, maneuver, maneuver sustainment, and MS is mission dependent, and not tied to organizational convenience.

(3) Battle Command Resourced for Sustained Operations. The Battle Command System (BCS) must be structured and resourced for the long haul, in terms of distance and duration.

(4) Battle Command—Anytime, Anywhere. High tempo, fluid maneuver, from strategic distance, will require the commander to exert personal presence, at the points of decision, across vast areas. The BCS must allow commanders to move and command effectively, from alert, through redeployment, from whatever location the circumstances require.

(5) Teaming Commanders and Leaders—On Demand Collaboration. Distributed operations and high tempo maneuver will demand rapid synchronization, swift adaptation of plans and control measures, flexible groupings of distributed staff elements, and direct exchanges between commanders across hierarchies.

(6) Fully Integrated: Space to Mud, Factory to Foxhole. Joint interdependence demands that Army Forces (ARFOR) dominate maneuver, execute precision fires, efficiently support Army and joint elements, and provide full dimensional protection. Army combined arms will complement and reinforce each other, and other joint elements, throughout the campaign. The BCS will become the catalyst for effective multinational operations.

(7) One Battle Command System. A unitary BCS empowers tactical commanders to execute combined arms maneuver more effectively than any in history. The same system that controls wartime operations will regulate activities in garrison, and in training. Because the BCS is part of the joint system, ARFOR will support, and be supported by, joint elements.

(8) Unprecedented Information Network Dependability. A multitiered network will allow commanders to reach across tactical boundaries, and across theater and intercontinental distances, to access and share actionable information. The system will allow humans to apply judgment and experience, exploiting vast amounts of information, managed more effectively. The network will tie global maneuver, MS, and maneuver sustainment, and provide redundancy and security to protect it.

(9) Modular, Scaleable, Tailored Battle Command. Highly tailored and responsive ARFOR will require Battle Command, matched and positioned precisely, for theater needs. Just as ARFOR are task organized, the BCS will constantly adapt, move, expand, and contract in size, and adjust capability, as the situation demands.

(10) Dramatically Smaller Deployed Footprint. The pace and scope of maneuver, in and outside the theater, mandates a BCS that is equally maneuverable. A stretch goal to make the BCS much more tactically, operationally, and strategically responsive is to reduce the footprint of command posts (CPs) at UA level, as well as higher echelon levels, by a factor of ten.

**b. CAPSTONE CAPABILITIES.**

(1) The Objective Force Battle Command Construct (BCC) requires tailorable, highly deployable CPs, which are resourced for sustained operations. The BCC enables the commander to exercise leadership and decisionmaking from anywhere, at anytime, and permits commander, leaders, and staffs to collaborate on mission orders, on demand. Battle Command Construct is one system of Battle Command, vice an aggregation of stovepipes. The BCC must be fully integrated from theater, to operational, to tactical, and across all of the traditional battlefield functional areas (BFAs). Battle Command Construct is enabled by ultrareliable and redundant communications that are modular, scaleable, and tailorable. The BCC of the Objective Force has a dramatically smaller deployment footprint than current constructs. The BCC will be interoperable with joint, national, and multinational C2 infrastructures, enabling the Objective Force to integrate joint and combined military operations. Future Combat System information systems (INFOSYS) must support the simultaneous, multimodal insertion of UA forces into multiple austere points of entry, without reliance on fixed ports and staging bases.

(2) Required capabilities include:

- Common operational picture.
- Timely, relevant, accurate, and predictive intelligence.
- Adaptable presentations tailored to needs of commander based on open architecture.
- Unprecedented information network dependability.
- Mission rehearsal exercises using embedded simulations.
- Greater automation of estimates with more predictive analysis. Deployable CPs, e.g., UE Early Entry Command Post on intratheater air and sealift assets.
- Joint interdependent Battle Command.
- Modular C2 organizations. Ultrareliable communications enabling reach.
- Modular, tailorable UE HQ.

- Reconfigurable UE HQ (mission-dependent fixed site, mobile, or combinations). En route mission planning and rehearsal capability.
- Near real time situational awareness.
  - Shared graphics.
  - Global asset visibility.
  - Platform feeds.
- Global access to Global Information Grid (GIG) knowledge systems and services. Commonality of doctrine, graphics, tactics, techniques, and procedures (TTP), virtual tools. Sensor fusion: manned and unmanned sensors.
- Configurable and sophisticated data architecture.
- Tailored, automated system configuration.
  - Automated network management.
  - Information dissemination management.
  - Command override.
- Airspace control, coordination, and deconfliction of tactical air, Army aviation, fires, unmanned aerial vehicles (UAVs), loitering aerial munitions, and air defense fires.
- Joint interdependence and link to joint database(s).
- Multinational and interagency interoperability.
- Interoperable with Interim/Legacy forces.
- Access to nongovernmental organizations (NGOs) and other entities in the AO common data model.
- Battle Command System that is the same used in garrison, in training, and in war.
- Intuitive interface; with the same look, see, and feel as similar commercial applications.
- Fully integrated staff applications with common services (no stovepipe systems).
- Embedded simulation for training.
- Multiple layers for communications backbone: ground, airborne, and space.
  - UAV with communications packages—surrogate satellites.
  - Advanced satellite communications.
  - No single point of failure.
- Information assurance (IA) ensures the availability, integrity, identification, authentication, confidentiality, and nonrepudiation of friendly information and systems, and forbids access to friendly information and systems by hostile forces. Information assurance includes provisions for protection, detection, and response capabilities. These capabilities include systems that ensure emission security, communications security (COMSEC), computer security, and information security (INFOSEC). Information assurance also includes the detection capability needed to identify attacks, damage, or unauthorized modifications in the network. Information assurance implies a response capability to restore normal network operation, and to initiate a possible follow-on information operations (IO) response.
- Interoperability with joint, interagency, national, multinational, legacy, and interim systems.
- Refined interagency planning, coordination, and collaboration capabilities.
- Automated network management.

- Bandwidth efficient applications and data sharing. Self-healing and self-configuring network. Accommodates multiple security levels.
- Modular design with standardized components. (Not fixed design, but fixed standards, and easily upgraded).
- NLOS communications embedded in platforms.
- Reduced footprint of deployed signal elements.
- Enhanced mobility.
- Deployable by limited intratheater air and sealift assets (fits C-130 crucible).
- Dramatic reduction in power consumption.
- Command posts tailored to Army and joint requirements.
- Battle Command—anytime, anywhere: Commander has continuous battle command capability (from home station operation center (HSOC), to deployed CP, to commander's mobile CP—air and ground to dismounted); provide platform independent, completely portable display of COP permitting Commander to access the GIG from anywhere, including while dismounted.
- Tailored CP facility (expands and contracts).
- Embedded communications components.
- Commonality of doctrine, graphics, and virtual tools.
- Networked fires.
- Integration of nonlethal effects.
- Mission planning and rehearsal with embedded simulations.
- Dramatically smaller mobile CPs.
- Rapidly create and collapse virtual teaming.
- Shared simulations and rehearsals.
- Three-dimensional portrayal of battlespace, including use of terrain data and tools.
- Automated filters and alarms initialized to the commander's guidance and Priority Intelligence Requirements.

### **3-2. FOC-03-01: Command and Control**

a. **CAPSTONE CAPABILITIES.** The UE is capable of C2 of all Army, joint, and multinational forces. It will be organized, designed, and equipped to fulfill C2 functions as the ARFOR component, Joint Force Land Component Command (JFLCC) HQ, or the JTF HQ. Units of Employment are the basis of combined arms air-ground task forces. The UE will also have the inherent capacity to interact effectively with multinational forces, as well as with interagency, NGOs, and private volunteer organizations. The UE is envisioned to consist of a multifunctional HQ nucleus, with embedded joint staff elements and linkages (full joint interoperability), plus a standard base of subordinate communications, sustainment, and reconnaissance, surveillance, and target acquisition (RSTA) commands. Battle Command is a core competency of all Objective Force units, including organic capabilities for collaboration on the move, continuous assessment, and predictive analysis. Units of Employment resource and execute combat operations; designate objectives; coordinate with multiservice, interagency, multinational and nongovernmental activities; and employ long range fires, aviation and sustainment; while enabling C4ISR and tactical direction to UAs. The C4ISR Architecture includes networked communications, sensor, C2, and distributed information management (IM)

and training. The communications architecture is a layered (terrestrial, near-terrestrial, airborne, space-borne) self-forming, self-healing, heterogeneous, mobile ad-hoc network. Sensors provide persistent surveillance through a series of layers of individual soldier systems, vehicle warning and defensive aids, organic UAVs, Unmanned Ground Sensors, and external sensors from the UE, Army, theater, national, and joint assets. The UE attains organic, higher-level Army, joint, and coalition effects to set conditions to enter battle on our terms, seize the initiative before contact, and employ our strengths against enemy weaknesses.

**b. NARRATIVE.**

(1) Units of Employment are highly tailorable, higher-level echelons that integrate and synchronize ARFOR for full spectrum operations at the higher tactical and operational levels of war/conflict. Focused on major operations and decisive land campaigns in support of joint operational and strategic objectives, UE participate in all phases of joint operations, from initial entry, to conflict termination, in any form of conflict and operating environment. Units of Employment represent the field Army corps and divisions. The UE is capable of C2 of all Army, joint, and multinational forces. It will be organized, designed, and equipped to fulfill C2 functions as the ARFOR Component, JFLCC, or the JTF. The UE will also have the inherent capacity to interact effectively with multinational forces, as well as with interagency, NGOs, and private volunteer organizations.

(2) At the present stage of concept development, the UE is envisioned to consist of a multifunctional HQ nucleus, with embedded joint staff elements and linkages (full joint interoperability), plus a standard base of subordinate communications, sustainment, and reconnaissance, intelligence, surveillance, and target acquisition organizations. This small, organic, organizational base facilitates rapid deployment, for immediate response to contingencies, while facilitating augmentation, when required. The UE base is expanded into a larger formation through force tailoring, per the requirements for each contingency. Subordinate UAs, tailored into the UE for contingency or ongoing stability operations, will include maneuver, fires/effects; intelligence, surveillance and reconnaissance (ISR); MS; force protection (FP); and maneuver sustainment commands.

(3) The Corps organizes and fights Divisions in simultaneous, integrated battles that comprise major operations. Overall Corps operating area is likely to grow to as much as 500 x 500 km, with organic capabilities to conduct long-range strike, or temporarily influence operations out to 1000 km. While it supports current operations, the Corps planning focus is on future operations, with a planning horizon of 96-100 hours. The Corps functions as the primary ISR integrator for ARFOR, committed to joint operations.

(4) The Objective Force Corps will have an operating radius of 150 km, and a planning horizon of approximately 48-72 hours. Organic joint linkages permit the Division to coordinate joint support independently, or through the Corps. A Division can operate as an ARFOR, or JTF HQ, for stability and support operations (SASO), and limited small-scaled contingency (SSC). Corps possess the size, power, reach, inherent tailorability, and organic capability, for integration into the joint framework required to accomplish SSCs, and on-going stability operations tasks, without a Corps C2 echelon, albeit with some minimal staff augmentation.

(5) Battle command, at all echelons within the Objective Force, requires the following capabilities:

- Expanded span of control, enabled by a knowledge backbone.
- Improved horizontal integration of information, based upon multifunctional staff officers in non-traditional staff organizations.
- Highly distributed, mobile CPs that provide Battle Command ‘on the move.’
- In-stride synchronization, permitted by fully networked forces, which can adjust rapidly to changing situations, and synchronize their efforts in-strike, during execution, with minimal intervention or direction.
- Higher levels of battlefield visualization, to anticipate how best to apply forces and means to shape the future battle, while continuing to provide the appropriate level of support to on-going operations.
- Balanced virtual and physical presence of the commander, by providing digital linkages to subordinate commands, for virtual forward presence of the commander, in cases when the commander must be at a CP.
- Airborne C2 provided from UE-level aviation.

(6) Capabilities derived from the Battle Command Construct will enable Objective Force leaders to:

- Know the environment (terrain and weather), and appreciate its tactical implications for tactical concealment, employment of weapons, mobility, and seeking positions of advantage.
- Know the enemy, gray and neutral, their capabilities, composition, and disposition; discern intent, movement, strength, and limitations.
- Know friendly forces’ location and capabilities.
- Control and distribute fires. Know where to establish priorities in fire plans.
- Adapt to emerging situations more quickly than an adversary, and be able to adjust in real time to developing enemy actions, as opposed to merely fighting a plan.
- To direct effective maneuver, and fully integrate fires with maneuver.
- Rapidly resynchronize forces and functions to mitigate the potential loss of combat power.
- Know real-time sustainment posture and anticipate requirements.
- Use predictive planning and decisionmaking tools.

- Employ embedded training (ET).

(7) Army Objective Force C2 capabilities must be developed in synchronization with, and subordination to, the emerging Joint Forces Command (JFCOM) Standing Joint Task Force Command and Control initiative. Joint Task Force Command and Control requires capabilities for the preparation and training of commanders and staff personnel, to achieve and sustain readiness, permitting rapid deployment and employment of the JTF HQ. Capabilities must permit the rapid incorporation of different groups into a coherent organization across echelon, function, and time. Automation processes are required that provide the foundation for timely decisions within a collaborative, networked environment, based on operational net assessment. Capabilities must permit the HQ to disperse and distribute elements geographically, and to exploit reach capabilities. Processes within the HQ must be designed and equipped to permit simultaneous, parallel processing across functional areas. Other capabilities required to synchronize with JFCOM are:

- Universal standing operating procedures to guide JTF staff processes.
- Organizational designs of joint and Army echelon battle staffs that facilitate simultaneous, vice sequential action, and permit rapid decisionmaking, planning, and effective C2 of current operations.
- A standard, deployable JTF C2 capability.
- Organic joint staff elements at the Corps and Corps level, to enhance coordination and exploitation of joint capabilities, to support operations from Corps to battalion level.

c. **LINKAGE TO AUTL:** ART 7.0 (The Command and Control Battlefield Operating System); ART 7.1 (Establish Command Post Operations); ART 7.2 (Manage Tactical Information); ART 7.3 (Assess Tactical Situation and Operations); ART 7.4 (Plan Tactical Operations Using the Military Decisionmaking Process/Troop Leading Procedures); ART 7.4.6. (Provide Space Support).

d. **LINKAGE TO UJTL:** Operational (OP) 5 (Provide Operational Command and Control (C2)); TA 5 (Exercise Command and Control).

### **3-3. FOC-03-02: Army Client to the Global Information Grid.**

a. **CAPSTONE CAPABILITIES.** Establish the architecture for a single, integrated tactical network, with universal, worldwide accessibility to the GIG that links soldiers, units, sensors, weapons, and systems with communications that are unconstrained by terrain. Such a system will provide C2 on the move, achieve information dominance (IS), facilitate the exchange of information between joint, allied, and coalition forces, and support the warfighter with integrated and reliable, real time access to the GIG, anywhere in the world.

b. **NARRATIVE.** The Objective Force will be integrated into the GIG by a highly mobile, self-organizing, self-healing, multilevel secure, resilient network that transports multiple forms of information among Corps, Division, and lower tactical echelons within the UA. It supports C2, situational awareness, sensor-to-shooter, and combat service support (CSS) applications. The network can rapidly deploy, to support a highly mobile force, and facilitates the conduct of en route mission planning and rehearsal. Access through global systems provides use of key INFOSYS to the warfighter, immediately upon arrival in theater. This network can operate in all potential environments, while maneuver platforms, and in some cases the supporting architecture itself, are on the move. It will be dynamically reconfigurable, allowing tailoring of networks for time-critical missions, specifically ensuring uninterrupted communications during decisive and long-range operations. Through the use of ET modules, the network will support individual and collective training, in any environment.

c. **LINKAGE TO AUTL:** ART 7.1 (Establish Command Post Operations); ART 7.2 (Manage Tactical Information); ART 7.5 (Prepare for Tactical Operations); ART 7.6 (Execute Tactical Operations); ART 7.2.1.4 (Establish a Tactical Information Network and System); ART 7.2.5 (Disseminate Common Operational Picture and Execution Information to High, Lower, Adjacent, Supported, and Supporting Organizations).

d. **LINKAGE TO UJTL:** ST 5 (Provide Theater Strategic Command and Control, Communications, and Computers (C4)); OP 5 (Provide Operational Command and Control (C2)).

### **3-4. FOC-03-03: Advanced Collection, Processing, Analysis, Management and Sharing of Information.**

a. **CAPSTONE CAPABILITIES.** A layered network of advanced sensors that sense in multiple domains (e.g., radio frequency, thermal, acoustical, electro-optical (EO), infrared (IR), and seismic) and operate independently, or as components of other systems/platforms, including dismounted soldiers, manned/unmanned ground vehicles (UGVs), manned/unmanned aerial vehicles (UAVs), satellites, and even cyber-based platforms. Networked ISR is linked to all shooters. Soldiers and leaders will be empowered with timely, accurate information about terrain and weather, and will receive accurate, timely, up-to-date digital map information of the battlefield. Units will be able to receive and disseminate terrain and weather information immediately throughout the AO, even while en route, to gain the advantage at all times. The network automatically collaborates raw data to provide actionable/targetable information, directly to soldiers, for immediate action/engagement. The network also provides information for assessment by highly trained intelligence analysts, to generate or refine SU. The network of sensors requires an integrated system-of-systems, with scalable on-board processors, utilizing automated/aided target recognition technology, to rapidly identify, evaluate, and present targets and other streaming video and text information, to commanders and staffs. Adaptive reasoning tools, that automatically collate and transform sensor data into knowledge, support it via accessible national to tactical common databases, capable of providing tailorable intelligence products to users, at all levels. Information management tools are required, permitting the Objective Force to precisely and automatically process, fuse, focus, distribute, and display information in the form most appropriate to the user. Required capabilities include highly

advanced information processing, employing automated filters, decision support aids, comparative analysis, and embedded modeling and simulation capability, distributed over multiple, redundant communications pathways, that enable the force to quickly turn information into knowledge, create SU, and share a COP.

**b. NARRATIVE.**

(1) The Objective Force network of command, control, communications, computers and intelligence (C4I) systems will be vertically and horizontally integrated with legacy and interim force platforms, tactical and logistics C4I systems, and individual BFA systems. Interoperability with joint C4I systems is a requirement. As a full-spectrum force, the UA will be required to interact with other U.S. government agencies, nongovernmental, and private volunteer organizations, as well as local authorities. These required interactions place a much higher premium on INFOSYS interoperability and flexibility than legacy and interim forces of the past.

(2) The network provides connectivity, both between Objective Force formations, and provides the Objective Force with connectivity into the GIG. The GIG consists of information, sensor, engagement, and knowledge grids. The Information Grid provides the infrastructure for network-centric computing and communications. The Information Grid shares information through the use of data protocols and tailored profiles; to receive and access filtered information/intelligence, in the user's desired format. It also facilitates both joint and coalition forces' interoperability, and is multilevel security capable. The Sensor Grid is composed of air, sea, ground, space, and cyberspace-based sensors, that provide the joint force with a high degree of awareness of friendly and adversary forces disposition, and the environment across the battlespace. The Sensor Grid operates as an open architecture that allows data to flow to the next available processor. The Engagement Grid enables the joint warfighter to employ speed of command, and achieve overwhelming effects, at precise places and time. The Knowledge Grid connects adaptive, integrated, and interdependent organizations that support the full spectrum of operations. The Knowledge Grid expands, exploits, and encompasses the Sensor Grid. It provides organizations the capability to collate all types of information available, via seamless web browser-like access, by the integration of data and ISR information on environmental factors, adversarial organizations, neutral elements, and friendly unit formations.

(3) Sensors include ground-based radars within the NLOS Launch System (NLOS LS) organization, which are capable of:

(a) Detecting, locating, classifying, reporting, and communicating the firing locations and impact points of enemy mortars, artillery, rockets, and missiles to generate fire missions, and update the COP.

(b) Detecting, tracking, identifying, reporting, and communicating the position and velocity vector of aerial targets, and alerting Short-Range Air Defense (SHORAD) weapons systems.

(c) Identifying airspace users and exchanging information to assist in the management of Army Airspace Command and Control (A2C2) operations.

(d) Confirming the actual burst location of friendly fires.

(e) Operating within the networked fires application of the Battle Command system.

c. **LINKAGE TO AUTL:** ART 1.0 (The Intelligence Battlefield Operating System); ART 1.1 (Support to Situational Understanding); ART 1.3 (Conduct Intelligence, Surveillance, and Reconnaissance (ISR)); ART 1.4 (Provide Intelligence Support to Effects).

d. **LINKAGE TO UJTL:** ST 2 (Conduct Theater Strategic Intelligence, Surveillance, and Reconnaissance); OP 2 (Provide Operational Intelligence, Surveillance, and Reconnaissance); TA 2 (Develop Intelligence).

**3-5. FOC-03-04: Network Operations.**

a. **CAPSTONE CAPABILITIES.**

(1) Network operations consists of communications, and the means to effectively protect and manage the flow of information, through prevention, monitoring, detection and dynamic prioritization, allocation, and response. Network operations must integrate, direct, and prioritize the information flow between units, decisionmakers, sensors and shooters. It allows seamless operations across, while integrating the full capability of, the GIG. Communications will consist of multiple tiers or layers, including terrestrial, airborne, and space. The Objective Force network must be interoperable. Network components in each layer are interconnected to form a survivable, self-configuring, self-healing backbone. Layered redundancy also ensures there is no single point of failure. Reliance on multiple layers also reduces technological and programmatic risks incurred by over-dependence on communications assets in any single layer. These layers will be combined to operate as a single integrated network, fully integrated with the GIG. Each FCS electronic system must meet Electromagnetic Interference/Electromagnetic Compatibility requirements of MIL STD 464.

(2) Objective Forces must be interoperable with joint forces, and systems consistent with the mission and responsibilities of each echelon of the UA. The FCS must be capable of supporting operations with legacy and interim units, coalition forces, and NGOs. Objective Force network must comply with appropriate requirements in the following Capstone Requirements Documents (CRDs): Global Combat Support System, Global Air Traffic Management, Military Satellite Communications, Unified Cryptological System, Combat Identification, Global Information Grid (GIG), Hard and Deeply Buried Targets, Imagery and Geospatial, Theater Air Missile Defense (TAMD), and Distributed Common Ground Station. Future combat system critical information exchange requirements (IERs), and appropriate requirements defined in the CRDs, primarily drive this requirement.

(3) Objective Force networks and INFOSYS must conform to the Joint Technical Architecture for Information Management, and emerging Army Knowledge Enterprise Architecture, leveraging Warfighter Information Network-Tactical (WIN-T) and Joint Tactical Radio System (JTRS) capabilities. Embedded training system must provide interfaces that allow

interoperability with the legacy and interim synthetic training environment (e.g., Combined Arms Tactical Trainer; Joint Simulation System).

(4) Objective Force systems must comply the IER format and development guidance contained within [CJCS Instruction 6212.01B](#). Objective Force systems must be reasonably hardened (Threshold)/fully hardened (Objective) against the effects of electromagnetic pulse (EMP). Systems must be fully hardened IAW existing Joint Chief of Staff guidance, published Military Standards, and [Executive Order](#) 13231, 16 Oct 01, Critical Infrastructure Protection in the Information Age. Any hardware fielded as a result of this requirement must not produce unacceptable electromagnetic emissions that interfere with, or degrade, the performance of existing platform/dismounted soldier instrumentation, weapons, sensors, or communications subsystems.

(5) Battle Command Systems must process, send, receive, display, and store information classified up to SECRET. Overall, the system must comply with INFOSEC requirements of Army Regulation ([AR](#)) [380-19](#). The system hardware must include the provision of TEMPEST safeguards, applicable to appropriate elements of the FCS system. Many Objective Force systems will exchange both classified and unclassified information among all echelons, horizontally and vertically operating in the AO. Mechanisms are needed to protect data confidentiality from both internal and external sources. Objective Force units must possess embedded capability to encrypt/decrypt, or encode/decode, with existing COMSEC equipment, using National Security Agency-approved techniques. Information safeguards will be a paramount concern for the Objective Force network. Specific techniques must be used in order to protect the network from compromise, or intentional corruption by enemy Information Warfare attacks, to prevent the loss of information/data.

b. **NARRATIVE.** Objective Forces will rely on a knowledge-based C4ISR network, vertically and horizontally integrated from strategic to tactical levels. Objective Forces must be interoperable with joint forces, and systems consistent with the mission and responsibilities of each echelon of the UA. The FCS must be capable of supporting operations with legacy and interim units, coalition forces, and NGOs. Drawing information, updated in near real time, from a wide variety of automated and manual sources, this knowledge backbone will be focused on improving and accelerating the decision-action cycle. Sources include soldier reports, remotely deployed sensors, on-board sensors, UAVs and UGVs, traditional and new ISR means, space platforms, and an assortment of correlated databases. The network will sharply enhance the lethality, survivability, agility, and versatility of the force, enabling more effective and timely application of the elements of combat power. Improved organic and joint sensor-shooter linkages, and rationalized through sensor fusion, and self-synchronization communications networks, will reduce latency, and expand the means and rapidity within which targets can be engaged. Communications networks will have extended range, NLOS, redundant capabilities to assure connectivity of strategic, operational, and tactical echelons—to the lowest tactical echelons, regardless of terrain conditions. Communications networks must have continuous connectivity, through multiple pathways, to provide unity of effort, and extend the commander's reach. Objective Forces will routinely exploit the overhead constellation of military and civilian space platforms for intelligence, focused surveillance, area reconnaissance, long-haul communications, early warning, positioning, timing, navigation, missile defense, and access to

the GIG. Space support will extend to the tactical level, and prove particularly indispensable in immature theaters where existing communications infrastructure may be insufficient, or unreliable. Airborne communications relays will assure NLOS connectivity. Network operations provide the exchange of information over the Army Client Architecture, executed successfully in support of warfighter and functional area applications. Network operations integrate the regulating functions of IA, network management, and information dissemination management to accomplish this task. The network management function monitors and controls the collection of assets that transport, store, process, and provides the human-system interface to information sources. The function monitors network performance and automatically adjusts, or reconfigures, to meet the demands of user systems. Information dissemination management is the set of information awareness, access, delivery and support services, that provide the capability for information producers and users to locate, retrieve, and send/receive information across the Tactical-Global Network, by the most efficient and effective means, consistent with the commander's policy.

c. **LINKAGE TO AUTL:** ART 7.1 (Establish Command Post Operations); ART 7.2 (Manage Tactical Information); ART 7.5 (Prepare for Tactical Operations).

d. **LINKAGE TO UJTL:** ST 5 (Provide Theater Strategic Command and Control, Communications, and Computers (C4)); OP 5 (Provide Operational Command and Control (C2)); TA 5 (Exercise Command and Control).

### **3-6. FOC-03-05: Information Protection.**

#### **a. CAPSTONE CAPABILITIES:**

(1) The Objective Force requires information protection capabilities embedded in its INFOSYS, as well as its organization, doctrine, procedures, and training. Information protection must proactively provide for the continuous availability of INFOSYS, authentication of participating users, confidentiality of transmissions, and non-repudiation of transmitted or received information. The Objective Force will have the capability to guard communications, networks, and computers; detect misuse or intrusion of these systems; and rapidly restore information and INFOSYS if compromised, corrupted, or destroyed. Information protection extends to measures that guard against physical destruction and nonlethal effects (e.g., electronic attack) and mitigates the effects of interruption or corruption of information, and INFOSYS. As a subset of IO, it applies to the assurance of information against threats from a thinking enemy, actively attempting to disrupt, corrupt, or exploit the flow of friendly information.

(2) Objective Force networks must provide Protect, Detect, and React capabilities that protect the system's integrity and confidentiality, prevent unauthorized access, and reduce the probability of intercept and exploitation by hostile forces. The system must provide an automated method to protect against computer viruses, and the capability of being updated to maintain currency. Appropriate security protection mechanisms, to include the Public Key Infrastructure (PKI), will be used in order to ensure the concepts of the DoD Defense in Depth strategy are satisfied IAW the applicable DoD and Army regulations (e.g., AR 380-19), and Army-approved Force XXI Battle Command for Brigade and Below (FBCB2) security policy.

The PKI must consider communication interoperability with commercial and multinational partners. The system must be certified, and accredited. The FCS network(s) will comply with Army and joint guidance on the use and integration of Army common C2 protection tools. The FCS network(s) will depend upon the JTRS and WIN-T systems to provide antijamming capabilities.

b. **NARRATIVE.** The Objective Force gains a significant portion of its combat power from the ability of commanders, at all levels, to gain SU, synchronize maneuver, and integrate both organic and joint fires. Thus, the loss of the ability to communicate across the network, even for short periods, could seriously jeopardize force effectiveness. As information technology (IT) improves, there is an equal proliferation of technologies that can place these systems at risk. Such threats include encryption and access control breaking, malicious software, electronic direction finding, jamming, directed energy (DE), and counterspace platform weapons. However, even low-tech threats, such as the visual identification and destruction of key ground nodes, could seriously disrupt the operations of a network. This requires a robust active protection and redundancy strategy.

c. **LINKAGE TO AUTL:** ART 5.3.8 (Conduct Tactical Counterintelligence in the Area of Operations); ART 5.3.7 (Conduct Defensive Information Operations); ART 5.3.5 (Conduct Security Operations); ART 5.3.7.3 (Conduct Tactical Information Assurance); ART 5.3.7.4 (Employ Signals Security).

d. **LINKAGE TO UJTL:** OP 6 (Provide Operational Force Protection); OP 6.3.2 (Supervise Communications Security (COMSEC)); OP 6.3.3 (Employ Electronics Security in the Joint Operations Area for Operational Forces); OP 6.3.4 (Protect Information Systems in the Joint Operations Area (JOA)).

**3-7. FOC-03-06: Situational Understanding.** Bottom line is to find the enemy, and to understand the situation. The key enabler of the UA concept is the enhanced situational awareness that leads to actionable SU. This is achieved by fusing information obtained through a layered network of soldiers, sensors, and collection platforms, with information on friendly forces, enemy forces, and the environment, to obtain a COP that is shared across the force.

a. **CAPSTONE CAPABILITIES.** ‘Understand First.’ Rapidly process and distribute knowledge; identify a pattern and/or critical elements; understand significance of dispositions, intent, etc.; while denying the same knowledge to the enemy. Understand First is a product of rapid collection, processing, integration, and distribution of information derived from the ‘See First’ element of ISR, and target acquisition’s network of sensors. Distributed analysis, conducted at all echelons, precludes single point intelligence failures and permits information to be directly and precisely delivered to commanders, shooters, MS, and maneuver sustainment forces. Must provide a seamless, fully integrated, multidimensional, and tailorable common relevant operating picture (CROP), which integrates relevant information from all sources, and integrates reports from subordinates. Must provide precision geospatial terrain environment information layers (modifiable digital overlays), which support cognitive and dynamic mission planning/rehearsal, thus creating a real-time virtual decisionmaking capability, based upon the commander’s and battle staff’s detailed ‘knowledge’ of the physical environment. Accurate

terrain representations must be developed with the commanders' needs in mind, and provide expert knowledge at the lowest tactical echelons, providing expert local knowledge exceeding that of the local populace.

**b. NARRATIVE.**

(1) Improved SU will provide the commander and battle staff a real-time, fully automated, multidimensional, tailorable CROP of the battlespace, thus enhancing battlefield visualization and decision determination, mission planning, preparation, and execution. The UE requires the capabilities to identify and understand the enemy's systemology—that is, the enemy's integration of their civil infrastructure, commercial assets, paramilitary formations, civilian populace, procedures and technologies for antiaccess, fires, and their organization of military forces. Situational understanding must provide a high fidelity, common, interoperable, and 'collaborative' picture of the total physical combat environment that permits the warfighter to view the width and depth of the battlespace, permitting early identification of the enemy's Centers of Gravity. This includes knowledge of weather, all operational terrain profiles, and friendly/enemy/noncombatant dispositions. The CROP shall be selectable from ground, air, naval, space, and wargaming nodal options, depending on the mission needs of the viewer. It will also provide the understanding of available information in terms of the six dimensions of the battlespace—width, depth, height, time, electromagnetic, and human. A series of precision terrain overlays will present the battlefield environment from different perspectives to achieve almost absolute battlespace familiarity, to increase battlefield visualization. The CROP will be scaleable to appropriate levels of command, tailorable by function and individual preference (based upon variable user defined parameters), and have decision-oriented software. To effectively utilize the common picture at various echelons, there must be a dynamic, fully interoperable capability to electronically partition, and hand-off, relevant data to the appropriate inter or intraservice user, and for sharing with coalition and multinational forces. The common picture software will be user friendly and require minimal operator and supervisor training. Information displayed must consider man-machine interface, with the goal of reducing the cognitive workload of the viewer. Access to a global virtual data server, with a smart pull/brilliant push capability, and the use of automated multidimensional decision aids to improve the decisionmaking process, is required to arrive at a knowledge-based decision. Decision support tools will enhance the cognitive senses and skills of leaders, to perceive and visualize options, and to accomplish the collaborative, predictive planning and preemption necessary to more efficiently direct actions required in preparing the force. The virtual tool will allow the decisionmaker to actually experience the environment. Sensors will seamlessly provide tailored, filtered information, so the right information is provided, without the need to pause to obtain more. Every aspect of the virtual decisionmaking tool is focused on the support of operational decisions. The mission rehearsal tool will utilize the same embedded visualization capability in training, mission rehearsal, or war. The mission rehearsal tool will also automatically identify and display overmatch gaps between red and blue systems capabilities.

(2) Superior SU will permit the Objective Force to:

- Differentiate and prioritize enemy forces, objectives, and targets for attack.
- Conduct precise battle damage assessment (BDA).

- Sequence, weight, and apportion supporting assets.
- Conduct highly synchronized precise replenishment operations.
- Identify threats and means that must be neutralized to support operational maneuver by ground or air.
- Fully synchronize dominant maneuver with organic and external precision fires.
- Enhance FP at all levels.
- Provide timely actionable information to all elements.
- Rapidly discern between threats, friendly forces, and noncombatants.

c. **LINKAGE TO AUTL:** ART 1.2.1 (Perform Indications and Warnings); ART 1.1.2 (Perform Situation Development); ART 1.3.3 (Conduct Tactical Reconnaissance); ART 1.3.4 (Conduct Surveillance); ART 7.1 (Establish Command Post Operations); ART 7.2 (Manage Tactical Information); ART 7.3 (Assess Tactical Situation and Operations); ART 7.4 (Plan Tactical Operations Using the Military Decisionmaking Process/Troop Leading Procedures); ART 7.5 (Prepare for Tactical Operations).

d. **LINKAGE TO UJTL:** SN 2 (Develop National Strategic Intelligence, Surveillance, and Reconnaissance); ST 2 (Conduct Theater Strategic Intelligence, Surveillance, and Reconnaissance); OP 2 (Provide Operational Intelligence, Surveillance, and Reconnaissance); TA 2 (Develop Intelligence).

### **3-8. FOC-03-07: Decision and Planning Support.**

#### **a. CAPSTONE CAPABILITIES.**

(1) Objective Force commanders require capabilities to enable more rapid decision-action cycles, with much less effort required to understand what is happening. Tools and techniques must provide an automated, running estimate of the situation; an abbreviated, continuous planning cycle incorporating predictive analysis; and the rapid generation and dissemination of mission orders. Commanders practice a continuous, focused intelligence preparation of the battlefield (IPB) and estimate process. The result is increased freedom of action that is preserved longer, and a greater ability to cause the enemy to see and understand last, or wrongly.

(2) More effective IM, accompanied by automated, near-simultaneous updates in current information, will enable battle command. It will also provide commanders and battle staffs with automated cognitive decision aids and real-time distributed, multiechelon collaborative planning support tools, to achieve knowledge-based course(s) of action development, wargaming, and decision support. Systems must be mobile, fully interoperable in the joint, multinational, interagency operational environment, and tied into the protected, network-centric, assured communications architecture to include reach-back. Tools that enable Corps, and Corps reach-back for information and intelligence, also enable 'report-back' of planning, analytical, and targeting information, to supporting HQ and centers external to the JOA, located in adjacent theaters, ISBs, or home station. Reach-back connectivity will permit exploitation of virtual staffs, planning, analytical, and information sources located outside the immediate AO. It will also provide the commander decision aids that provide immediate feedback, based on proposed actions/inaction to assist with rapid mission prioritization and to avoid negatively impacting

regional support for friendly force goals and objectives. Additionally, it aids the commander in rapidly identifying and avoiding issues that are sensitive based upon regional beliefs and customs such as cultural, religious, or political.

**b. NARRATIVE:**

(1) Decision and planning support capabilities assist the commander and battle staff in mission planning, preparation, and execution across the full spectrum of operations. The BCS must be capable of receiving multiple forms of information updates en route (aboard aircraft), and share the information between aircraft. Decisionmaking must take advantage of information available, on seamless information networks, to plan and rehearse operations. Embedded training, simulation tools, and three-dimensional battlespace visualization must be incorporated into decision support software. Decision aids should focus the commander and staff on critical information requirements, and allow collection of relevant information and intelligence to support COA development, and wargaming. Systems support must consider the basic command, control, communications and computers (C4) principles of interoperable, flexible, responsive, mobile, disciplined, survivable, and sustainable. Information display must consider man-machine interface with the goal of reducing cognitive workload for the viewer. Additionally, this capability must automate and streamline the decision process and assist decisionmakers in synchronizing IO capabilities across the full spectrum of operations.

(2) Capabilities for routine planning and integration of joint and coalition support for fires/effects from air and naval platforms, targeting capabilities, and reinforcing IO, permit the seamless combination of mutually supportive dominant precision maneuver and precision engagement.

**c. LINKAGE TO AUTL:** ART 1.1.1 (Perform Intelligence Preparation of the Battlefield); ART 1.4.1 (Provide Intelligence Support to Targeting); ART 4.3.1 (Select Aerial Platforms to Engage/Destroy); ART 5.3.2.1.4 (Report NBC Hazards Throughout the Area of Operations); ART 7.1 (Establish Command Post Operations); ART 7.2 (Manage Tactical Information); ART 7.3 (Assess Tactical Situation and Operations); ART 7.4 (Plan Tactical Operations Using the Military Decisionmaking Process/Troop Leading Procedures); ART 7.4.1 (Conduct the Military Decisionmaking Process); ART 7.5 (Prepare for Tactical Operations).

**d. LINKAGE TO UJTL:** ST 5.3.1.1 (Develop Theater Courses of Action and Prepare Staff Estimates); ST 5.3.1.2 (Analyze and Compare Theater Courses of Action); ST 5.3.1.4 (Conduct Mission Analysis and Prepare Mission Statement); OP 5.3 (Prepare Plans and Orders); TA 5 (Exercise Command and Control).

**3-9. FOC-03-08: Information Operations.**

**a. CAPSTONE CAPABILITIES.** Information dominance is a core competency of the UE that provides comprehensive SU, and generates a strategic-to-tactical infosphere. Information operations provides the Objective Force with the capability to degrade, delay, deceive, disrupt, destroy, exploit, and/or deny an adversary's and other's information and INFOSYS; while protecting friendly information and INFOSYS. This enables the force to shape other's

perceptions, reduce the effectiveness of an adversary's combat capability, reduce the ability of others to influence the success of military operations, and protect friendly and supporting C4ISR and IO systems, and the information that they provide. Information operations include the integration of a deception plan into operational orders, and the execution of the deception plan by techniques such as demonstrations, displays, feints, and ruses, along with the development and use of decoys across the visual and electromagnetic spectrum, to generate false perceptions by the enemy commander. Information operations, when integrated and synchronized with IM and ISR, supports the Objective Force, achieving IS. Information dominance enables effective friendly decisions, based on accurate and timely information, while causing the adversary to make ineffective decisions, based on incomplete, untimely, and/or incorrect information. Information dominance enables the implementation of information as one of the five elements of combat power. It enables the commander to achieve freedom of maneuver and action in the battlespace, at the critical time and place of the commander's choosing, and/or shape the perceptions of the target audience(s), to cause them to act according to commander's intent. Information operations requires capabilities for blinding the enemy, through use of obscurants, jamming, signature reduction, deception, decoys, and pattern avoidance techniques, permitting the Objective Force to see and understand first.

**b. NARRATIVE.**

(1) Information dominance enables an information advantage that renders combat power more effective. Information dominance in the Objective Force will be achieved by the synchronization of IO, IM, and ISR, using high performance technology, people, and organizations to shape operations. Information operations are conducted to impact the perceptions and decisions of adversary and other influential leaders; impact the C4ISR and IO capabilities of adversaries and other military and nonmilitary organizations, which can negatively impact our operations; and protect friendly C4ISR, to include information itself.

(2) Information operations capabilities and related activities are used to achieve offensive and defensive IO objectives. Offensive objectives include affecting adversary leader perceptions and decisions; attacking enemy information, IO, decisionmaking, and communication processes; and impacting nonaligned and/or potential adversary leaders to support our operations, or stay neutral. Defensive objectives include protecting our C4ISR capabilities, focusing on C2 nodes, computer networks, and other means, including soldiers, who collect information about the adversary and others in the battlespace. Additionally, defensive objectives include countering or blinding adversary and others C4ISR capabilities. These objectives may also focus on protection of information, especially essential elements of friendly information.

(3) Information operations elements include synchronized computer network attacks (CNA)/computer network defense (CND), psychological operations (PSYOP), military deception, electronic warfare (EW), special information operations (SIO), physical destruction, operational security, counterpropaganda, counterdeception, physical security of C2, IA, counterintelligence, and related activities, such as civil affairs (CA) and public affairs (PA). Using CNA, PSYOP, military deception, EW, SIO, physical destruction, and other capabilities, IO can be used offensively to influence ideas, perceptions, beliefs, decisions, and communication of information of enemy. Using IA, CND, PSYOP, military deception, counterdeception, EW,

and other capabilities, IO can be used to defend decisionmaking processes, by neutralizing adversary perception management and intelligence collection efforts, and attacks on our INFOSYS.

(4) Soon, IT-based tools will increase U.S. Army commanders' IO capabilities and combat power. Examples of such tools include the Internet, global broadcast television, network attack techniques (corruption of data or denial of service), electro-optic, electromagnetic, high power radio frequency, audio, and seismic weapons; special purpose/multispectral obscurants, advanced INFOSYS and network security, and 'intelligent agents.'

(5) Space control plays an important role in the preparations for decisive tactical combat. The elements of space control capabilities are surveillance, negation, protection, and prevention. Space control negation methods are further categorized as denial, disruption, deception, degradation, and destruction. The Objective Force will employ far more sophisticated space control capabilities to negate adversary benefit from valuable space-derived and space-reliant information. Through electronics, kinetic or DE means, and other capabilities under development, the adversary's military decision process will be degraded.

c. **LINKAGE TO AUTL:** ART 1.4.2 (Provide Intelligence Support to Information Operations).

d. **LINKAGE TO UJTL:** OP 5.6 (Coordinate Operational Information Operations (IO)); TA 5.6 (Employ Tactical Information Operations).

---

## Chapter 4 Sensor Fusion

**Integrate National, Joint, and Army (UE and UA) sensors into a single network. Infuse the battle space with RSTA organic and external to see the full range of operational variables—terrain, weather, friendly and enemy force noncombatants, and detect threat actions in all environments. Provide vital quality combat information directly to users in a timely, actionable manner, on networks tailored to unit task and purpose. Standard is see first, understand first, act first, and finish decisively. Infuse critical areas with sensors, and imbed sensors in formations. Architecture rapidly fuses and routes information in real-time to users. Requires improved multispectral sensors, on-board processing, automated pattern analysis, and sensor collaboration. Provide **Target Location Accuracy** required for precision strike. Employ unmanned ground, air, and space means to **extend vision BLOS to gain timely combat information** through passive and aggressive RSTA, networked into an integrated COP for unprecedented situational awareness and understanding. Employs robotics to **perform manpower intensive, high-risk functions such as RSTA missions** in urban operations**

**4-1. FOC-04-01: Sensor Fusion.** Fusion is the process in which data generated by multiple sources is correlated, to find the enemy, and create information and knowledge. The chain of command decides what information is required for tactical operations. There are several requirements for fusion. First is to gather information. The fusion process, operating over integrated communications networks, includes accepting data from all ISR sources, organic and external. Sensors include combat platforms and soldiers, organic manned and unmanned reconnaissance and surveillance platforms, and external constellations. The second requirement is to draw relationships between source inputs. Fusion ensures that information is not stove-piped, but is fully exploitable across the entire force. The final requirement of fusion is to provide meaning to the information that has been acquired. This—the most important function of fusion—ensures that information gets converted as quickly as possible into actionable information.

a. **CAPSTONE CAPABILITIES.** ‘See First’—see/sense the entire environment before, and more clearly, than the enemy, while countering the enemy’s ability to do the same. The network of integrated manned and unmanned sensors, at all points of the battlefield, from tactical through operational and strategic levels, provides the ability to develop the situation out of physical contact, and continue developing the situation when in contact, to retain situational dominance. Combat battalions perform reconnaissance and surveillance with their reconnaissance detachments, as well as troops in contact, to retain situational understanding. The UA has a strengthened ability to understand its environment, and then seek advantage. It uses automated pattern analysis, and has the ability to rapidly prioritize information and targets of highest value. Near real time transmission of targetable information, directly into the sensor-to-shooter communications linkages; rapid integration of information from all sources—organic, higher echelon Army, joint, coalition, and interagency—and the aggregate ability of joint-integrated C4ISR capabilities, provides for IS and a COP. Near real time identification of friend or foe (IFF), and neutral elements, is required. Future combat systems must provide combat identification (CID) of friend, foe, and noncombatant in a joint, allied/coalition environment, through platform-to-platform (manned and unmanned, ground and air), platform-to-soldier, soldier-to-platform, and soldier-to-soldier, under all battlefield and weather conditions, across the spectrum of operations. Combat identification systems must interface with the C4ISR communications network for development and maintenance of the COP. They must be compatible with the Land Warrior/Objective Force Warrior (OFW) CID system, and North Atlantic Treaty Organization (NATO)/Allied Battlefield Target Identification (BTID), and accurately characterize friendly, enemy, and noncombatant entities, throughout the battlespace. Future combat systems must be compliant with the CID CRD. Objective Force target acquisition systems must be capable to see farther than the enemy, in all conditions and environments, and have timely, reliable BDA. The product of these capabilities permit Objective Force commanders and formations to synchronize operations based on better, more timely decisions, at a pace the enemy cannot match. It also provides the ability to detect the presence of hazardous materials, in all environments, and under adverse weather conditions, and provide early warning to forces.

b. **NARRATIVE.**

## TRADOC Pam 525-66

(1) Sensor Fusion exploits a layered constellation of advanced sensors, target acquisition, and C2 enablers, permitting maneuver UA to see first, understand first, act first, and finish decisively. Intelligence, surveillance, and reconnaissance/target acquisition (ISR/TA) sensors see the full range of operational variables—terrain, weather, friendly and enemy force noncombatants—and detect threat actions in all environments. Manned and unmanned ground, air, and space means extend vision BLOS to gain timely combat information, through passive and aggressive RSTA, networked into an integrated COP, for unprecedented situational awareness and understanding. Requires the ability to perform automated pattern analysis to detect, locate, and identify enemy combatants and systems. Network of ISR/TA sensors eliminates unique single-point ground control, and fusion stations. Intelligence, surveillance, and reconnaissance/tactical enables SU by standoff staring (loitering capability) to gain indications:

- Moving and stationary entities that are mounted, dismounted or hidden.
- Signatures as acoustic, signal, glint, and flash.
- Under all terrain and weather conditions.
- Against enemy entities that are dispersed, covered and concealed, masked, and fleeting.
- Sort through decoys, deception, and disinformation.
- Ability to detect, identify, and track individual components of enemy units.
- Sense through walls in urban operations.
- See terrain and identify obstacles.

(2) Objective Force Sensor Fusion capabilities enable commanders to rapidly develop the situation, out of contact, with sufficient fidelity to initiate combat on our terms, engage at tactical standoff, and maneuver to positions of advantage, prior to contact. Intelligence, surveillance, and reconnaissance capabilities enable the ground commander to operate nonlinearly, bypassing what is less important or nonthreatening, to focus operations against forces and capabilities that are most critical to the enemy. Product of the ISR/TA network is precise targetable data delivered in near real time from sensor to shooter. Enable reliable, timely BDA. This capability must also provide the commander with an ability to identify heavily fortified areas and battle positions providing the commander to decide whether to attack these areas by fires and maneuver or to attack these positions by fires to destroy or isolate them.

(3) Measure of effectiveness of Objective Force Sensor Fusion is the capability to sort out from a variety of enemy data entries what is most dangerous and high payoff for engagement at tactical standoff to set favorable conditions for tactical maneuver. Objective Force ISR/TA must integrate joint and Army manned and unmanned, air and ground RSTA to gain and maintain contact with enemy elements, and to provide high-resolution combat information on terrain and weather.

(4) The Division air-ground task force retains core responsibility for aerial reconnaissance, within its AO to support engaged forces, and conducts independent reconnaissance operations to a depth of 300 km. Man-in-the-loop, deep, air reconnaissance must be fully integrated with other sources, such as Joint Surveillance Targeting Attack Radar System, and unmanned air vehicles. Integration of external and on-board sensors, by manned air reconnaissance and communications

linkages, provides information and targeting data to Army and joint fires. In addition to deep reconnaissance, with organic on-board lethality, manned air reconnaissance platform also provides for armed escort, route security and reconnaissance, screening, and combined arms precision strike in support of ground maneuver.

(5) Brigades and battalions conduct three-dimensional reconnaissance with organic UAVs, supplemented by Division aerial reconnaissance assets. Unit of Employment aerial reconnaissance links directly to joint and Army fire support networks, to provide targeting combat assessment, and eyes on target/man-in-the-loop decision capability for all source fires.

(6) Decision aids are required to assist in the planning of sensor placement, and to support the dynamic tasking and reorganization of sensors, to adjust to losses of sensors, and to cover the changing areas of interest, as Objective Force units are on the move. Decision aids for sensor coverage facilitates the C2 of RSTA capabilities, to maximize understanding of the battlefield.

(7) Area sensors are used to cue more discrete sensors. Sensors employed on-board robotic platforms are used for high-risk situations. Joint and national assets are accessed through reach-back. Information from external sources is correlated with information from organic sensors. Objective Force ISR provides near-real time combat IFF and noncombatant, across the spectrum of operations, through platform-to-platform, platform-to-soldier, soldier-to-platform, and soldier-to-soldier interrogation, seamlessly integrating joint CID measures.

c. **LINKAGE TO AUTL:** ART 1.0 (The Intelligence Battlefield Operating System); ART 1.1 (Support to Situational Understanding); ART 1.3.2 (Perform ISR Integration); ART 1.3.3 (Conduct Tactical Reconnaissance); ART 1.3.4 (Conduct Surveillance); ART 1.4.1 (Provide Intelligence Support to Targeting).

d. **LINKAGE TO UJTL:** ST 2 (Conduct Theater Strategic Intelligence, Surveillance, and Reconnaissance); OP 2 (Provide Operational Intelligence, Surveillance, and Reconnaissance); TA 2 (Develop Intelligence).

Chapter 5  
Mounted/Dismounted Maneuver

**FCS equipped units must achieve unsurpassed mobility over operational distances as an integrated combined arms unit. Achieve superior tactical maneuverability in all terrain and weather as a dismounted and mounted combined arms force without compromising tactical unit integrity. Provide means of gaining and maintaining initiative and momentum. Assure the ability to maneuver where and when the commander desires without interruption or delay in intent. Negotiate all-surfaces on and off road, improved or unimproved trails. Enable water crossing and gap crossing. Conduct route reconnaissance and avoid or clear obstacles at greatly improved speeds. Exploit unmanned technology to enhance continuous dismounted 24-7 operations and to aid with reconnaissance inside buildings and the subterranean dimension. Provide enhancements that enable soldiers to conduct dismounted maneuver with load bearing equipment not to exceed 40 pounds.**

**5-1. FOC-05-01: Mounted/Dismounted Maneuver.**

**a. CAPSTONE CAPABILITIES:**

(1) ‘Act First’ and ‘Finish Decisively’. The defining capability of the Objective Force is strategic, operational, and tactical maneuver. Capabilities are required for precise, decisive maneuver, horizontal and vertical, day and night, in all terrain and weather conditions, synchronized with Army and joint fires, and RSTA. In future operations, decisive maneuver will be central to entering the fight on our terms, seizing and retaining the initiative, and finishing rapidly. Advanced ground and air mobility systems will enhance movement, and provide agile forces and systems ready to fight, immediately upon arrival in theater. These future mobility capabilities will also enable the Objective Force to simultaneously exploit joint fires to gain positional advantage, and cause the rapid dislocation and disintegration of enemy forces. The Objective Force’s ability to exploit the air and ground dimensions, to maneuver highly capable combined arms forces throughout the depth of enemy territory, provides the versatility required to achieve dominate maneuver, anywhere on the battlefield, across the full spectrum of operations.

(2) Maneuver provides the ability to retain freedom of action—that is, to shoot, move, and reengage—while denying the enemy freedom to act, or even to respond, effectively (Act First). Maneuver permits destroying the enemy in detail, through combinations of mounted; mounted supported by dismounted; dismounted supported by mounted; and dismounted assaults (Finish Decisively).

(3) Units of Employment are capable of conducting simultaneous and sequential, noncontiguous offensive operations, distributed throughout the battlespace; speed to enable maneuver to positions of advantage, simultaneous with fires from tactical standoff; and dash speed, enabling survivability during final tactical assaults. Units of Employment are able to conduct operational maneuver from strategic distances, by forces capable of immediate ground

maneuver, to deter, preclude, shape the battlespace, or seize an objective supported by organic and reach-back fires. Units of Action are able to conduct exploitation of the vertical dimension through vertical maneuver, to tactical and operational distances supported by the UE. The UA must be capable of an intratheater aerial envelopment of at least 750 nautical miles (NM) (1389 km) on C-130 profile aircraft. After moving 750 NM by air or sea to an austere port of entry, the UA will be able to make a 400 km operational move by ground, and fight for 72 hours without resupply. What enables this depth is the requirement for FCS vehicles to be able to move 1000 km without refueling. Objective Forces require shallow-draft, high-speed ships, SSTOL aircraft, and advanced, heavy-lift rotary-wing aircraft to provide superior tactical maneuverability in all terrain (open, complex and urban) and weather, as a dismounted and mounted combined arms force, without compromising tactical unit integrity. Objective Forces:

- Provide rapid tempo for gaining and maintaining initiative and momentum.
- Negotiate all-surfaces—on and off-road, improved or unimproved trails.
- FCS systems must accomplish position/navigation to a 1 meter Circular Error Probable without continuous electronic emission.
- Enable water crossing without loss of operational or tactical momentum.
- Provide enhancement that will enable soldiers to conduct dismounted movement with load bearing equipment and load not to exceed 40 pounds, and a goal of 15 pounds as a fighting load.
- Support combined arms maneuver of combat tactical units to execute:
  - Mounted operations enabled by dismounted forces.
  - Dismounted operations enabled by mounted forces.
  - On occasion, dismounted operations.
  - On occasion, mounted operations.

(4) Objective Forces will possess organic capability to conduct tactical, vertical envelopment and air assault, in both independent actions, and as complementary maneuver in support of committed ground forces. The Corps will direct and support vertical maneuver to operational distances, synchronizing attack, reconnaissance, and lift operations with Corps resources, for fully integrated operations. Objective Forces will be capable of simultaneous engagements by air-ground maneuver elements, employing future advanced lift, reconnaissance, and attack aviation assets, supported by joint fires and suppression of enemy air defenses. Corps will have the organic capability to conduct operational maneuver by ground, and when provided with air assets by Corps and/or joint support, the ability to conduct operational maneuver by air. Aviation assets, mission-tailored to the Corps, provide multidimensional aviation support, including sufficient mission-tailored capability to conduct battalion-sized vertical maneuver, and aerial sustainment. Operational Maneuver requires the near-simultaneous movement and support of multiple tactical formations by ground and air, from separate staging areas, to locations in depth from which their combat power can be focused against critical enemy forces and facilities. The Objective Force structure will include sufficient advanced rotary wing capability, to conduct maneuver and sustainment to operational depth by multiple UAs (overall, brigade-sized capability), in a single lift; mounted, dismounted, or mixed in nature. Corps operational maneuver may be extended further, through allocation of nonorganic fixed wing (short take-off and landing (STOL), SSTOL, and legacy fixed wing).

(5) The Corps executes *joint-enabled* operational movement or maneuver, to extend the reach of the joint force commander, and enable response to opportunity or uncertainty; isolate portions of the battlefield; exploit success; and accomplish key campaign objectives.

*Multimodal* operational *movement* of the force will position, or reposition, formations to secured assembly areas, to dislocate enemy forces, or place them at a disadvantage for subsequent operations. Operational *maneuver* repositions forces in depth for immediate operations, exposing the entire enemy AO to direct attack, separating enemy echelons, preventing massing and resynchronization of combat power, and denying reinforcement and sustainment.

Operational maneuver can also be focused on seizing key terrain and decisive points in depth, and destroying key enemy forces and capabilities. Operational maneuver requires the near-simultaneous movement and support of multiple tactical formations, by ground and air, from separate staging areas, to locations in depth, from which their combat power can be focused against critical enemy forces and facilities. The Objective Force Corps force structure will include sufficient advanced rotary wing capability, to conduct maneuver and sustainment to operational depth, by multiple UAs (overall, brigade-sized capability), in a single lift, mounted, dismounted, or mixed in nature. Corps operational maneuver may be extended farther, through allocation of nonorganic fixed wing (STOL, SSTOL, and legacy fixed wing).

(6) Vertical maneuver, as noted earlier, is critical to both operational disintegration and dislocation of the enemy force. The Corps air-ground task force will possess inherent command, control, and communications (C3), and mission-tailored lift capability, to conduct battalion-sized vertical maneuver operations.

**b. NARRATIVE.**

(1) Operating as part of an integrated joint/multinational/ interagency team, the Objective Force must be capable of conducting rapid and decisive offense, defense, stability, and support operations. The Objective Force must be strategically responsive and operationally and tactically agile, using its inherent horizontal and vertical mobility in all types of terrain, under all weather conditions, and against enemy obstacles and defenses.

(2) The mobility capabilities for the Objective Force must facilitate its freedom from sequenced, linear movements, extended timeframes, and prolonged force build-ups, in order to speed closure and decision. Free from these constraints, an interdependent force, synchronous and complementary to our joint partners, will be capable of conducting strategic maneuver, in order to seize the initiative, and render initial enemy intentions irrelevant.

(3) The mobility capabilities of the Objective Force will generate tremendous velocity and deliver dominant maneuver combat power to exploit simultaneous joint fires, and enable decisive attacks throughout the depth of the enemy area, to defeat strategic and operational centers of gravity. Ultimately, Objective Forces will conduct operational maneuver at strike depths exceeding 1000 km. The Objective Force employs organic VTOL capabilities, and nonorganic Air Force lift assets, to exploit the air dimension at strategic, operational, and tactical ranges. Major equipment in the Force is capable of precision airdrop, to permit both airborne, as well as air assault operations, across the full spectrum of operations, and to harness the full potential of Air Force lift assets.

(4) To complement advanced tactical mobility in the distributed battlespace, the Force will leverage C2 on the move, assured connectivity, superior situational understanding, network-centric sensor technology, remote precision fires and effects, unmanned systems, and responsive CSS (battlefield distribution), to conduct dominant maneuver and precision engagement. This hybrid combination will allow the commander, and multifunctional staffs, to mass synergistic effects at the decisive time and place, anywhere in the battlespace. Emerging air and ground system platforms must provide the core of this capability, while still affording the crew and payload units maximum survivability and mobile lethality.

(5) In terms of mobility, FCS will reduce the impact of geography on operations, by providing dramatic increases in tactical mobility, compared to the current force. These systems will be capable of traversing all anticipated land environments, including complex terrain, and restricted and/or open terrain, without compromising tactical unit integrity, or hindering the progress of operations. Future combat systems will have revolutionary battlefield agility in terms of maneuver, cross-country, and hard surface speeds. An in-stride water obstacle, and gap crossing capability, will be considered for selective applications. Maneuver Battalions can accomplish gap and obstacle crossing with augmentation, and can breach or neutralize obstacles in-stride, from standoff, when they cannot be bypassed.

(6) Objective Force aviation will be a critical part of achieving a strategically responsive Army required to dominate the full spectrum of operations. Organic Objective Force aviation, combined with Air Force lift and precision airdrop capabilities, will enable the rapid deployment of the Objective Force to quickly dominate the situation, contain, stabilize, or terminate conflict. Objective Force aviation provides the means to achieve nonlinear, noncontiguous, and distributed operations, across an expanded battlespace, to achieve vertical envelopment and enable 'joint' simultaneous engagement in depth. Objective Force aviation also provides an intratheater lift capability, to bypass traditional ports of debarkation, and to serve as an intermodal transportation.

(7) The Objective Force will also have capabilities to enhance the mobility of the soldier in urban and complex terrain, and will exploit the unique mobility options afforded by unmanned systems, to facilitate continuous maneuver operations, carry mission packages, and perform high-risk tasks, thus mitigating the risk to the soldier.

c. **LINKAGE TO AUTL:** ART 2.2 (Conduct Tactical Maneuver); ART 2.3 (Conduct Tactical Troop Movements); ART 8.0 (Conduct Tactical Mission Tasks and Operations); ART 8.1 (Conduct Offensive Operations); ART 8.2.2 (Conduct a Mobile Defense); ART 8.5 (Conduct Tactical Mission Tasks).

d. **LINKAGE TO UJTL:** ST 1 (Deploy, Concentrate, and Maneuver Theater Forces); OP 1 (Conduct Operational Movement and Maneuver); TA 1 (Develop/Conduct Maneuver).

## **5-2. FOC-05-02: Mobility.**

a. **CAPSTONE CAPABILITIES.** Objective Force units will possess superior tactical mobility. Platforms will negotiate the majority of surfaces—road, off-road, trails, water crossing, and narrow gaps. Units must possess superior capability to detect presence, identify disposition, and counter antitank and antipersonnel (AT/AP) mines, above and below surface, and booby traps, such as side-charge and remote detonated mines. Mounted units require the ability to conduct route reconnaissance with forward looking and off-road sensors, to clear at greatly improved speeds (at least 50 kilometers per hour (kph)). Objective Forces must have standoff means for detection and defeat of obstacles, the ability to mark or perform in-stride counters to neutralize mines at a distance, and the ability to detect and locate other man-made obstacles. Objective Force operational architecture must enable real-time dissemination of reported obstacles throughout the force; provide capability, organic to tactical units, to breach disrupting and fixing obstacles in-stride, and to simultaneously engage enemy forces conducting overwatch of the obstacles. The Objective Force must provide organic capabilities to cross narrow gaps, such as streams and irrigation ditches, without loss in operational momentum, and enable dismounted assaults in urban terrain:

- Multistory building entry through roofs and upper floors.
- Entry into, and through, subterranean complexes.
- Wall breaching (50 inch x 70 inch holes, all types of construction).
- Enable protective countermobility and survivability position support available at transition to defensive operation.

b. **LINKAGE TO AUTL:** ART 2.2 (Conduct Tactical Maneuver); ART 2.3 (Conduct Tactical Troop Movements); ART 8.0 (Conduct Tactical Mission Tasks and Operations); ART 8.1 (Conduct Offensive Operations); ART 8.2.2 (Conduct a Mobile Defense); ART 8.5 (Conduct Tactical Mission Tasks).

c. **LINKAGE TO UJTL:** ST 1 (Deploy, Concentrate, and Maneuver Theater Forces); OP 1 (Conduct Operational Movement and Maneuver); TA 1 (Develop/Conduct Maneuver).

### **5-3. FOC-05-03: Operations in Urban and Complex Terrain.**

#### **a. CAPSTONE CAPABILITIES.**

(1) The U.S. military structure, organization, doctrine, and technical capabilities are subjects of study by most nations of the world. These nations understand how our forces will fight, and what type of environments our forces are best suited. Using this knowledge, future opponents will seek to avoid operations in environments for which our forces are optimized. Thus, our adversaries will seek cover and concealment in complex terrain and urban environments, to offset standoff of U.S. Forces, and exploit the reduced intervisibility ranges, to negate technological overmatch of standoff RSTA and lethal effects.

(2) Today we can win in a complex terrain or urban fight, but with a high price, in terms of casualties and infrastructure damage. The Army does not currently dominate the complex terrain/urban battlespace. Our forces have limited ability to see into it, have limited ability to communicate and move within it, and because of the requirement to limit noncombatant

casualties and physical damage, have limited means to shoot into it. The Objective Force must be able to overcome these limitations, across the entire spectrum of operations, and dominate combat in urban and complex terrain, to the same degree present day U.S. Forces dominate the open maneuver battle. This includes operations from stability and support, to small-scale contingencies, and urban operations in a major combat operation (MCO). Objective Forces must be capable of rapidly transitioning across the full spectrum of operations, and transitioning, without pause, between open and rolling to urban and complex terrain.

**b. NARRATIVE.**

(1) There are several characteristics that define complex terrain and urban operations, and make them far different than operations on less restrictive terrain. These differences include short ranges of intervisibility, presence of manmade structures, multidimensional battlespace, difficult target identification in limited engagement areas, restrictive maneuver space, toxic industrial material (TIM), and the presence of noncombatants. Additionally, some complex terrain is densely vegetated, providing numerous positions for enemy concealment. Urban operations are made even more difficult due to the restrictive rules of engagement (ROE). Urban battles of the future will continue to challenge the joint force commander and staff to avoid excessive collateral damage, and limit the number of noncombatant casualties. The FCS FoS must provide the capability for dismounted soldiers to enter into, and move through, subterranean complexes to support squad and larger unit assault, and clearing operations. Operations in urban and complex terrain require the Objective Force to aggressively accomplish a multitude of complex warfighting tasks:

(a) The first, and quite possibly the most difficult, operational challenge for the Objective Force will be the collection of intelligence. Intelligence collection is often hindered by limited LOS, the inability for the collection teams to see in densely vegetated, complex terrain, and the inability for collection teams to map structure interiors and subterranean passageways in urban terrain. As a rule, reconnaissance teams do not conduct extended surveillance operations due to sustainment issues, and the increased probability of detection over time. The presence of an enemy force that may be family or clan-based may inhibit the teams' ability to 'fit in' or 'hide' within the urban area. To enable the force to perform intelligence collection and mission planning, the Objective Force will require several enabling technologies and capabilities, which include:

- The extensive use of Special Operations Forces (SOF), or the ability to tap into this resource and other intelligence sources, will assist with urban mapping, understanding the cultural aspects of the environment, identification of enemy weaknesses, route reconnaissance, and performing shaping activities preceding decisive operations.
- The employment of UAV/UGV, as well as spaced-based assets, to assist with deep reconnaissance within the objective area(s). These systems will also be utilized to reconnaissance complex terrain, and map high-risk areas, such as subterranean complexes, TIM locations and minefields. Manned surveillance elements will remain on the periphery of the urban area, and collect intelligence through the insertion of unmanned systems.

- Computer-based, three-dimensional mission planning and area mapping tools. These tools will assist the Force with en route mission planning, building area databases during the intelligence collection process, and improved situational awareness. The versatility to ‘feed or download’ data from intelligence collection teams and systems, directly into the common database with minimal ‘handling’, will greatly enhance the utility of these tools. The ability to transmit large amounts of data, from forward reconnaissance forces, to the intelligence processing staff section, will provide the commander with near real-time situation reports, thus improving situational awareness, and effective mission planning.
- The development of computer-based, urban-specific IPB analytical tools, to assist with staff planning, and the development of friendly courses of action, provide for intelligence direction and synchronization, to support the commander’s chosen course(s) of action, identify intelligence gaps, and generally support mission planning. This tool should include data that identifies unique customs and beliefs of designated enemy forces, and noncombatants within the AO. Ground sensors will monitor activity/inactivity within the urban environment, and detect the presence of TIM. These sensors can also assist with target identification, urban navigation, and communications relay.
- In complex and urban terrain, ISR is not just about LOS sensing; it must include a capability to see enemy elements through walls and thick foliage, in buildings, caves, or subterranean infrastructure. The ability to ‘sense-through-walls’ will provide Objective Force reconnaissance teams with a significant advantage on the urban battlefield. This capability would significantly improve battlefield awareness, force survivability, and hit avoidance; and assist the commander in focusing combat power, reduce the likelihood of fratricide and noncombatant casualties, and assist the Force with avoiding potentially hazardous areas. Similarly, in complex terrain, with dense vegetation, the ability to ‘sense through foliage’ will improve awareness and survivability in that environment.
- The ability to intercept, track, locate, and rapidly interpret enemy communications (telephonic, cellular, radio, and computer), regardless of language and dialect, within the area of interest. Intelligence collection can also serve a secondary purpose in areas where war crimes/crimes against noncombatants are being perpetrated. The data collected can be used later, to convict war criminals, and protect friendly force interests.

(b) The second operational challenge for the Objective Force is the ability to move undetected to the AO. The assembling of a large force can send signals of possible invasion to an enemy (or their allies) that possesses advanced intelligence collection capability. Additionally, movement around the periphery of the targeted urban area can be detected by individuals, which may not reside in the target area, but are sympathetic, have family within the city, or may benefit (financially or politically) from the enemy force cause. Positioning is further complicated if the target areas (critical nodes and key terrain) are located deep within the city

core. To enable the Objective Force to conduct movement operations will require several enabling technologies and capabilities, which include:

- The ability to interdict enemy intelligence collection capabilities. The Force must have the ability to move, without the threat of enemy long-range detection and interdiction. This capability must serve the Objective Force from the point of departure, to within the objective area.
- The ability to perform deception operations, requiring the use of unmanned systems (often equipped with acoustics), PSYOP, and the employment of SOF.
- Obscurant delivery systems that are capable of rapidly covering large areas, and maintaining effects for extended periods.
- The ability of the Force to move under limited visibility conditions. This will require the development of advanced optical capabilities, which will allow Objective Forces to move under all weather and light conditions, regardless of ambient lighting conditions. These systems must have the ability to adjust rapidly to changes in lighting conditions, negating ‘white out’ effects normally experienced during close quarter urban operations.
- Systems must have the ability to move rapidly across open areas, and be highly maneuverable within the confines of the urban battlespace. Systems must have the ability to rapidly negotiate rubble, and reduce/negotiate obstacles, while on the move, and provide in-stride or rapid detection and protection against TIM in the battlespace.
- Vertical takeoff and landing capability will be critical for the insertion and extraction of forces in the urban environment. Individual soldiers will benefit from individual lift systems, which will allow them to rapidly ascend structures, overcome barriers, and bypass hazardous areas. While individual lift systems will never substitute for larger air delivery platforms, they will provide the Force (or a section of the Force) with a mobility advantage in the vertical plane during special missions, and under unique battlefield conditions, as required.

(c) The third operational challenge for the Objective Force is the isolation of the urban objective(s). Isolation can involve an entire urban area, a specific point within the urban environment, or multiple points within the built-up area. It is extremely difficult to completely isolate an urban area. Cities often have multiple points of entry and exit—Grozny had 123 roads leading into the city—which may involve multiple levels (subterranean passageways). Major cities can also occupy a considerable amount of space, often extending force requirements to the breaking point. Isolation requirements include both physical and information isolation. Once isolation is obtained, it remains a critical task throughout the conduct of the operation. Total isolation may diminish to entry/exit control, as the mission transitions from warfighting to peace operations. Actions during isolation operations will also serve to ‘set conditions’ for successful decisive operations. To enable the Force to conduct isolation operations, several enabling technologies and capabilities are essential. They include:

- Unmanned aerial, ground, and space platforms to assist with area isolation. These systems can be used to monitor large areas of concern, assist with target identification/engagement (lethal and nonlethal), and employ sensors in remote areas. Their presence may psychologically deter enemy infiltration, exfiltration, and resupply operations. These systems will be linked to precision fires (lethal/nonlethal), or have built-in lethal capability that provides rapid response to enemy actions.
- A wide array of sensors to ‘fill gaps’ during large urban area operations. This capability will help to conserve Objective Forces, by allowing the commander(s) to ‘monitor and control’ areas they choose not to physically occupy. These systems will be linked to precision fires (lethal and nonlethal) that will provide for rapid response to enemy actions.
- Large area nonlethal effects employed utilizing long-range precision fires and unmanned systems, to facilitate area denial, or to force the enemy into less restrictive engagement areas.
- The ability to effect resource denial to enemy forces occupying the urban area, without completely destroying the resource infrastructure. This capability allows the commander to deny the enemy military or civil resources, while minimizing the time, finances, and other assets required restoring these resources at the conclusion of hostilities.
- The ability to perform surgical personnel and equipment engagements, counter-sniper operations, intelligence collection, target interdiction, and movement denial operations, both on the periphery, and within the urban core, make snipers a tremendous asset during full spectrum urban operations. Snipers will significantly impact isolation operations during the urban fight as a whole. Snipers also have a significant psychological effect on enemy forces.
  - Snipers will be provided with state-of-the-art optical devices, allowing operation in all light and weather conditions.
  - Optical systems utilized by ‘Sniper Spotters’ will be linked to a computer database, providing the sniper team with immediate notification, once priority targets have been selected.
  - Security for sniper teams will be accomplished with a wide array of deployed sensors and unmanned systems. These systems will alert the team of an approaching enemy, interdict the threat, and provide overwatch, should the team’s escape and evasion plan have to be implemented.

- ‘Chameleon-like’ camouflage equipment will allow the sniper to quickly adapt to any environment and remain undetected. These advanced ‘hide systems’ must be lightweight, easily transportable, and deployable.
- Weapons systems, utilized by sniper teams, will be low signature (acoustic and visual) systems that will provide all terrain/target/weather engagement capability.
- A computerized database will allow a sniper to ‘insert’ his personal data into any sniper weapons system, and the system will automatically adjust (zero) to the individual. This allows the sniper to rapidly calibrate or recalibrate any system, at any time, on the battlefield.
- Sensors within the weapons system will automatically adjust the point of aim based on distance, windage, target data, deflection, and other individual shooter input, allowing for rapid target engagement and transition.

(d) The fourth operational challenge for the Objective Force will be the conduct of decisive operations to destroy or remove enemy forces, secure the safety of U. S. citizens or interests (Panama/Grenada), and enforce or maintain peace. Additionally, decisive operations may further deny the enemy resources and decisive terrain, deceive or divert the enemy, further develop intelligence, or simply fix the enemy in position. The end state for this phase of the operation is to set the conditions for successful offensive operations, and impose the will of the commander on the enemy. A large presence, or mass exodus (voluntary/involuntary), of noncombatants may further complicate decisive operations. The Objective Force will have the ability to enter the urban battlespace and conduct full spectrum operations; however, it must be capable of transitioning rapidly across this spectrum, and operating at the various interim levels simultaneously. The Objective Force must be capable of fighting in close quarters, as a member of a joint, multinational, combined arms team, during urban and complex terrain operations. To enable the Force to conduct decisive operations, the Objective Force will require several enabling technologies and capabilities, which include:

- The ability to conduct decisive operations, under all weather and light conditions. All systems and capabilities within the Objective Force must be capable of functioning at full potential, without degradation resulting from environmental effects.
- Superior C3 capabilities. Decisive operations require the ability to communicate effectively in real time, across the entire force, regardless of terrain, environmental conditions, organization, or operational distance.
- The option to employ precision lethal and nonlethal systems, while avoiding excessive collateral damage and negative effects on noncombatants. Precision-effects munitions must have the ability to penetrate deep within structures and subterranean battlespaces, to destroy or incapacitate enemy forces, without causing over-pressurization or other undesired effects to adjacent structures.

- Aerial launched and high-angle fires to engage targets, while overcoming the restrictive nature of the terrain. These systems will employ brilliant munitions to achieve precision effects.
- Dominant situational understanding in urban combat for the Objective Force. The Force must be able to establish and maintain near real-time visibility of key enemy positions and activities within, and between, positions. Commanders and staffs must have precise and constantly updated information about key enemy assets, the status of critical physical structures within the city, and the migration of militarily significant noncombatant populations. Additionally, the Objective Force must be able to acquire precise, real-time positional and status information on its own widely dispersed subordinate elements.
- Standoff breaching and obstacle reduction that will enable the Force to maintain operational momentum, and rapidly transition through the battlespace, with minimal exposure to enemy fires.
- A variety of robotic platforms, UAVs, and UGVs, which will assist with clearing operations. These systems will allow for greater soldier standoff, provide early threat and hazard detection, conduct breaching operations, assist in reconnaissance, and perform high-risk clearing operations. These systems will have the ability to employ a wide variety of nonlethal effects. During deception operations, these systems can confuse enemy forces, and draw fires away from friendly assault forces. Unmanned systems will also perform a variety of casualty evacuation tasks.
- Unmanned systems, assisting soldiers and other systems by carrying additional equipment and supplies that are mission essential, but not immediately required. These systems will also perform resupply operations during high-risk operational periods. Each of these capabilities will allow forces to move lighter and more rapidly during the conduct of operations, allowing the force to maintain its tactical momentum.
- Weapons systems that have the ability to perform within the constraints of urban and complex terrain, without sacrificing their effectiveness on less restrictive terrain. Mounted weapons systems must have the ability to elevate sufficiently to engage enemy positions on upper-levels of structures, as well as at ground level. Some munitions utilized during urban operations will require adjustable settings, to compensate for limited ranges of engagement. Weapons systems will have significantly reduced over-pressurization effects that will allow them to be fired from structures. Minimum safe distances will be significantly reduced, which allow for employment of effects within close proximity to dismounted forces; this benefits soldiers by allowing them to take full advantage of the munitions effect, especially during breaching and clearing operations.

(2) The Force will have the ability to physically mark TIM, mined, cleared, and restricted (safe) areas. These standardized marking systems will be visible under all weather and lighting

conditions. Forces will be capable of ‘uploading’ newly marked areas to the higher headquarters’ database and ‘downloading’ the same. These capabilities will allow for improved battlefield situational understanding, and the avoidance of friendly force casualties.

(3) Future soldiers must be trained and equipped to address the operational and tactically medical challenges associated with noncontiguous operations. While specially trained medical personnel will be present on the battlefield, the soldier will serve as the ‘First Responder’, as opposed to the unit combat medic. As a ‘First Responder’, all soldiers must be trained as combat lifesavers, and be capable of restoring airways, stopping bleeding, and performing cardiopulmonary resuscitation (CPR). Additionally, the soldier must be capable of preventing shock, protecting the wound or injured area, and evacuation (under a variety of conditions and environments) for further treatment.

(4) Soldiers will be trained as combat lifesavers and equipped to provide advanced first aid (First Responder), with the focus on the stoppage of bleeding, airway restoration, and CPR. Each soldier will carry a lightweight individual ‘aid pack’, which will include intravenous fluids and intravenous starter kits, advanced ‘hemorrhage control’ bandages, individual oropharyngeal airways, and limited over-the-counter medicines. Additionally, each soldier will carry chemical antidotes, to counter accidental exposure and contamination. Each soldier will carry revolutionary nutrient packs for individual sustainment until ‘real food’ becomes available. Lightweight, personal, water filtration devices will facilitate rapid on-site water purification from a variety of sources, thereby significantly reducing sustainment requirements.

(5) Future soldiers will utilize unmanned vehicles, robotics, and advanced standoff equipment to recover wounded and injured soldiers from high-risk areas, with minimal exposure. These systems will facilitate immediate evacuation and transport, under even the harshest combat or environmental hazard conditions.

(6) Casualty collection points (CCP) will be equipped with state-of-the-art treatment equipment. The ability to provide advanced battlefield diagnosis, initial treatment, and rapidly evacuate soldiers to/from the collection point, will greatly improve survivability. Computer-based monitoring systems will allow combat medical personnel to evaluate the patient, before reaching the rearward care facility. It will also be possible for a soldier to be evacuated directly from the battlefield, to advanced treatment facilities outside the theater of operations.

(7) Force monitoring will aid medical personnel in providing the commander with relevant, decision-point medical information, thereby permitting timely assessments and decisions regarding Force preparedness, and employment of reserve forces.

(8) The transition from offensive (decisive) urban operations to defensive operations will be a significant challenge. Units will continue to conduct FP activities; however, the shift from offensive actions to defense will most likely impact the ROE, placing even more restrictions upon the Force. Additionally, there may be an attempt by the noncombatant population to immediately return to their residences once hostilities have subsided. Noncombatants that were hiding during the hostilities will reemerge, adding confusion and congestion to the battlefield.

## TRADOC Pam 525-66

Those enemy forces and sympathizers, that have yet to be identified, will certainly try to ‘blend’ into the civilian population.

(9) Successful transition from decisive operations to defensive operations will require the Objective Force to:

(a) Employ a significant number of sensors and unmanned systems within the urban core, and on the periphery, to monitor noncombatant activities, and provide early warning against enemy activities. Unmanned systems and sensors, equipped with explosive and gunpowder detection capability, will assist in identifying enemy forces trying to ‘blend’ with the noncombatant population. Multidimensional sensors will assist the commander in monitoring significantly more of the battlespace, while allowing the majority of the maneuver force to continue mission preparation, and other essential tasks.

(b) Communicate with, and control, the returning noncombatant population. Translation devices will allow the Force to effectively communicate with the populace. Unmanned systems can be deployed to meet returning noncombatants and guide them to ‘control’ areas, minimizing mass reentry chaos and confusion.

(c) Repair critical infrastructure to support the returning population. Limiting collateral damage during decisive operations will assist with this mission requirement. The identification of noncombatants, with the skills to assist with repairs, will expedite the rebuilding process; the ability to tap in to the urban database will assist with this identification process and the identification of infrastructure control grids.

c. **LINKAGE TO AUTL:** ART 2.2 (Conduct Tactical Maneuver); ART 2.3 (Conduct Tactical Troop Movements); ART 8.0 (Conduct Tactical Mission Tasks and Operations); ART 8.1 (Conduct Offensive Operations); ART 8.2.2 (Conduct a Mobile Defense); ART 8.5 (Conduct Tactical Mission Tasks).

d. **LINKAGE TO UJTL:** ST 1 (Deploy, Concentrate, and Maneuver Theater Forces); OP 1 (Conduct Operational Movement and Maneuver); TA 1 (Develop/Conduct Maneuver).

## Chapter 6

### Non-Line of Sight (NLOS) Lethality

Provide **joint, UA and UE lethal and non-lethal effects** that are responsive and precise from a fire support system that is closely networked to RSTA against dynamic, sophisticated adversaries. Achieve far greater lethality at **extended range** to shape beyond tactical engagements, mass effects and support maneuver from disparate locations to lessen over-reliance on direct fires. **Decentralized fire control** and direct **sensor-to-shooter architectures** will allow very responsive support on demand to small tactical units. **Accurate, real-time Blue Force tracking allows automated clearance of fires.** Provide decisive precision or area effects on-demand from dispersed locations. Need suppression and obscuration to protect maneuver forces. **Standard is see first, fire first, with assured first round kill.** Continue to improve efficiency per target to reduce Class V logistics burden.

#### 6-1. FOC-06-01: NLOS Lethality.

##### a. CAPSTONE CAPABILITIES:

(1) Extended range NLOS lethality overmatch is a key component required for all potentially hostile operations, and provides the means to achieve decisive operations, freedom of maneuver, and FP in highly volatile, distributed environments. Capabilities for NLOS fires and effects must extend seamlessly, from tactical to operational distances, with no gaps in coverage, or loss of timeliness. Units of Action and UEs apply fire control and distribution of NLOS fires against enemy targets. Advanced, automated fire control and distribution means must sort out high payoff and most dangerous targets rapidly in depth, amongst the vast array of threat intelligence. Aerial platforms add an accurate and immediate third-dimensional sensor and shooter capability to the building fight.

(2) Future combat system FoS must be capable of automated precision engagements, with automated fire control, and distribution and clearance procedures, with a manual backup. The FCS FoS must be capable of precision, cooperative, and autonomous NLOS fires. Future combat system sensor-to-shooter linkages enable lethal overmatch, by engaging enemy target sets, near-instantaneously in seconds, using automated, semiautomated, or manual fire control and distribution procedures; and provide automated target identification, to reduce latency in providing effects. Structurally, and throughout the network, sensor-shooter relationships begin at the squad and platoon level, to direct effects from internal UA elements, supporting UE forces, and joint assets, with unprecedented speed and accuracy. Networked fires facilitate clearance of fires, and discern high payoff and most dangerous targets rapidly, in depth, while static or moving, and direct the most appropriate fires to destroy them. Timely, accurate BDA is required to ensure intent of the fires has been achieved, and to reduce the consumption of Class V, a major contributor to logistics footprint. Ground-based, long-range precision engagement is required to complement joint counterprecision and counter-antiaccess capabilities, and is particularly important for entry operations, and to shape the battlespace.

(3) Every element in the warfighting formation must be capable of contributing to the long-range projection of dominant combat power, throughout the depth of the battlespace, as prescribed by the maneuver commander. The UE will be the focal point for the continuous integration of networked NLOS fires. The UE will orchestrate continuous shaping operations, with extended-range precision fires, selected air-ground maneuver operations, and the full range of Army and joint capabilities. The process of shaping will set conditions for follow-on tactical engagements, or battles. Among the most critical shaping tasks will be achieving favorable force ratios to enable tactical maneuver. The UE isolates the battlefield, by employing fires to eliminate an enemy's ability to synchronize action, by attacking mobile reserves, or by blinding the enemy through the disablement of their C2 capabilities. Shielding fires include the capability to eliminate the enemy's long-range precision fires. To accomplish these tasks, the UE requires 'reach' to joint sensors and fires, and organic precision, extended range fires capabilities, linked to precise sensors. Unit of Employment echelons must be provided with capabilities for long range shaping and interdiction. Of particular importance, is the ability to destroy the enemy's long-range ballistic and cruise missiles, rockets, artillery, mortars, UAVs, and command systems. Objective Force Corps will have organic capabilities to conduct long-range strike, or temporarily influence operations within the UE's operational area. Fire UAs, located with the UE, will provide a broad array of lethal and nonlethal precision munitions, with ranges extending beyond 40 km.

(4) Units of Action must have an organic ability to deliver destructive fires, point and area, protective and suppressive fires, in quantity and duration, and special munitions, such as obscurants, illumination, and obstacles, in a fully networked architecture. The UA has an unprecedented capability to fully integrate fires and maneuver. The UA employs responsive and effective fires to enable maneuver, to rapidly move to positions of advantage. From positions of tactical advantage, the UA employs destructive fires, with great precision at extended ranges, against High Payoff Targets (HPTs), in order to eliminate enemy combat capabilities at decisive points, or centers of gravity. Prior to forces being joined, the increased long-range killing capability of fires will be employed, to fix and destroy the enemy. By achieving greater destruction at standoff, fires ensure freedom of action and maneuver. Fires will dislocate, disintegrate, or destroy the enemy, creating the opportunity for maneuver to transition to exploitation, or move to other positions of advantage. Once contact occurs, fires will remain fully integrated with maneuver. To enable this, fires must be continuously available on demand, tailored to mission requirements, and scaleable to achieve the desired effects. Fires will continue to be employed against HPTs. However, the UA has significantly improved ability to respond, with fires, to those enemy forces and systems that present themselves as 'most dangerous' targets, demand an immediate response, or face unacceptable risk at the lowest tactical echelon of the UA. If required, the UA conducts tactical assault, while leveraging all combined arms fires, to achieve the destructive effects that lead to decisive outcomes.

(5) Fires must be reliable, timely, and accurate—able to sustain rates of fire and rates of kill continuously—and available in all weather and terrain conditions. Unit of Action organic fires must be able to deliver effects, at extended ranges beyond 40 km, to deny sanctuary in the OA. They must provide mutual support from dispersed locations, rapidly shift striking power across the battlefield, and apply the full range of effects—from precision discrete to area—to assure

mission end state. Fire support must be agile to support forces in contact. It must provide greater target location, and weapon delivery accuracy and rates of fire, to get the job done quicker, with smaller firing teams, and with less exposure; as well as rapidly deliver scaleable munitions effects to destroy, disintegrate, or dislocate enemy forces. Fire support must have the ability to shift fires and **mission types** very quickly (**destructive, protective and suppressive, and special purpose**).

(6) Destructive fires include precise or area fires, to shape engagements by striking the enemy before forces are joined. Destructive fires are also employed in conjunction with direct fires, after forces are joined, to present the enemy with multiple lethal challenges. Destructive fires are employed to enable tactical maneuver. These include precise or area long-range fires, Army and joint, to deliver killing blows on enemy capabilities, such as mobile frameworks, indirect fire, and air defense assets, C4ISR, support systems, etc. Destructive fires may also be employed in combination with maneuver, to gain synergistic effects, and present the enemy with multiple, lethal problems to enable tactical maneuver.

(7) Protective and suppressive indirect fires may be lethal or nonlethal fires in close support of tactical maneuver. These include suppression, to fix or isolate an enemy, and prevent them from emplacing accurate lethal fires on the formation; obscuration or screening smoke to preclude observation by enemy, and protection of friendly flanks with smart mines. Protective fires may be lethal or nonlethal, and are oriented on the friendly force in order to facilitate our ability to maneuver. Ultimately, protective fires for the UA may include danger-close missions and final protective fires. Suppressive fires also protect friendly forces, but are oriented on proactively attacking targets, such as enemy indirect fires or air defenses. Suppressive fires may be employed to facilitate ground maneuver, and the employment of Army or joint aviation assets. Inaccurate or unconfirmed target locations may dictate the employment of suppressive fires.

(8) Special purpose fires add to full spectrum capability. These fires may include munitions that provide obscurants, multiple means of illumination, countermobility capabilities, thermobaric effects, incapacitation, and munitions that blind, or disable, enemy acquisition and observation.

(9) Networked fires change the dynamics of indirect fire support. Networked fires is the triad of relevant sensors, effects capabilities, and battle command, that enables dynamic application of lethal and nonlethal destructive and suppressive effects, to achieve the commander's tactical and operational objectives. Networked fires are a component of the battle command construct, and supporting communications architecture. This network capability enables the dynamic application of the UA commander's intent for the employment of fires and effects, at the time and place of the commander's choosing. Networked fires are fully integrated from theater to platform, allowing it to rapidly establish, alter, and terminate linkages to all relevant sensors and LOS, BLOS and NLOS, external and joint systems, with a wide set of lethal and nonlethal effects. The network allows the UA commander to dynamically tailor guidance, and refocus and task sensors and effects capabilities, to meet the requirements of changing situations.

(10) With all elements of the UA fully networked, the UA can achieve virtual teaming, mutual support, and the ability to rapidly mass effects when required, without massing forces. Networked fires enable detection, delivery, and assessment, in near real time, with every platform and soldier having the ability to be a sensor. The network is capable of rapid fusion of sensor inputs to produce targetable data. It is also capable of routing and rerouting of targeting data to sensors or shooters, when established sensor-to-shooter linkages become inappropriate. Networked fires balance the need for responsiveness against producing tactical solutions, with the most effective application of systems and munitions. It facilitates rapid clearance of fires and airspace coordination.

(11) Networked fires is a system-of-systems that will provide future commanders real-time capability to apply full dimension effects solutions, across the battlespace. It is fully integrated and interdependent with Army, joint, multinational, and interagency sensors, effects-generating systems and capabilities, and IT systems. Networked fires is a purpose-oriented, execution-focused, networked capability optimized to provide a broad range of lethal and nonlethal effects, against enemy decisive points and centers of gravity, in concert with maneuver and support operations. It enables the commander to dynamically apply fires and effects, on demand, to any echelon, in support of combined arms and joint operations, in any operating environment.

(12) Teaming by ISR and indirect fire systems, dispersed throughout the battlespace, and by small tactical units fully integrated with maneuver, is critical. A system-of-systems framework must achieve the requirements for such a capability. It is critical that an enabling, integrated networked fires system-of-systems solution, leveraging a wider set of capabilities, including sensors, C2, and attack means from Army, joint and multinational forces, be pursued to provide the operational capability required today, and in the future. Protective fires can also support maneuver by suppressing enemy air defenses, and countering the fires from enemy indirect fire systems. Close support may involve danger-close missions and final protective fires that are designed to bring fires especially close to maneuver formations for ultimate protection.

(13) Special purpose fires include artillery raids, illumination of enemy positions, and neutralization of minefields with NLOS-delivered thermobaric effects. Objective Force NLOS lethality capabilities will include:

(a) Centralized planning of fires and effects that fuses sensors, effects capabilities, and battle command.

(b) Automated coordination and deconfliction in all dimensions.

(c) Capability to mass fires, without having to mass the units themselves.

(d) Sensors providing target acquisition, at extended ranges and sufficient target location accuracy, permitting the networked fires system to rapidly optimize target-weapon pairing and rapid delivery of effects.

(e) Advanced fire direction, extended ranges, and position locating and orientation capabilities, to enable firing systems to be highly dispersed, and permit the conduct of fire missions by single platforms.

(f) All-weather, all-terrain fires, enabled by pervasive, redundant target acquisition and ISR means:

- High-angle fires to engage targets, while overcoming the restrictive nature of terrain.
- Brilliant and precision munitions.
- Improved nonlethal effects.
- Preemptive counterfire.

(14) The traditional roles of indirect fire—strike, close supporting fires, and special fires—remain relevant for Objective Force NLOS lethality. These roles require 24-7, adverse weather, all-terrain, all ROE availability, volume, and rate of fires for:

(a) Suppression of enemy activities for extended duration, as ground maneuver force conducts movements to positions of advantage, and conducts final decisive assault.

(b) Isolation of the battlefield once forces are joined, by eliminating an enemy's ability to synchronize actions, and by attacking mobile reserves, or C2.

(c) Shielding critical assets or population centers from enemy long-range fires.

(d) Simultaneous, multitarget set engagement.

(e) Continuous integration of fires and maneuver, by providing precise or area fires before forces are joined, obscuring enemy observation capabilities, protecting friendly flanks, suppressing enemy air defenses, and countering enemy indirect fire systems.

(f) Obscuration effects over wide areas, for extended periods, to support ground maneuver.

(g) Close support of ground maneuver force in contact with the enemy, including danger-close missions, and final protective fires.

(h) Special tasks of illumination during night operations, emplacing minefields, attacking and neutralizing enemy networks and C4ISR systems, and other nonlethal effects.

(15) Future Combat System NLOS Cannon. The NLOS Cannon System provides networked, extended-range fires for precision attack of point and area targets, in support of the UA, with a suite of munitions that include special purpose capabilities. The NLOS Cannon provides sustained fires, both in quantity and duration, for close support and destructive fires for tactical stand off engagement. These fires are readily available 24 hours a day, in all terrain, and under all weather conditions. The system's primary purpose is to provide responsive fires in support of Combined Arms Battalions and their subordinate units, in concert with other LOS,

BLOS, NLOS, external, and joint capabilities. The system provides flexible support through the ability to change the effects round-by-round, and mission-by-mission. These capabilities, combined with rapid response to calls for fire and rate of fire, provide a variety of effects on demand. Non-Line of Sight Cannon Batteries will be capable of dispersed platoon or lower level operations. Cannons offer a wide range of trajectory options, from direct fire to high angle, to support the diversity of the operating environment. Additionally, precision munitions, with course correction capabilities, must be accelerated for incorporation into FCS cannon munitions, FCS mortars, and NLOS LS.

(16) Non-Line of Sight Launch System. The NLOS Launch System provides networked, extended-range targeting and precision attack of armored, lightly armored, and other stationary and moving targets during day, night, obscured, and adverse weather conditions. The system's primary purpose is to provide responsive, precision attack of HPTs in support of the UA, in concert with other UA NLOS, external, and joint capabilities. The system also provides 'discriminating' capability via automatic target recognition, and limited BDA. Non-Line of Sight Launch System permits the UA to shape and isolate the battle space by destroying enemy forces out of contact. It provides precision destructive and protective/suppressive fires, while avoiding noncombatant casualties, and minimizing collateral damage. It provides close supporting fires for friendly forces joined in contact, enabling freedom of action, while denying options to the enemy. It also provides a counterair capability, to accurately destroy low and slow moving enemy aircraft and enemy UAVs through the use of onboard munitions.

(17) Future combat system mortars, with precision munitions, must be accelerated, to provide added capability to attack targets precisely in support of the close fight. The NLOS Mortar provides responsive, sustained fires in support of the Combined Arms Battalion and subordinate companies. These fires provide complementary capabilities to the other UA NLOS systems. Mortars provide the ability for 24-7 availability, in all weather and terrain conditions. They also provide destructive fires that complement maneuver, by destroying targets of opportunity with precision-guided fires. Mortars provide responsiveness, with on-demand fires to engage complex and simultaneous target sets; protective fires for overwatch, screen and final protective fires; suppressive fires for suppression and obscuration; special fires that provide illumination (white and infrared) and nonlethal. The destructive, protective, suppressive, and special fires are for close support of maneuver units. Guided long-range rocket munitions must be accelerated to enable engagement at the upper end of NLOS range requirements. Existing High Mobility Artillery Rocket Systems must be upgraded, to incorporate the C3 within the networked fires of the Objective Force. Networked fires must be accelerated in concept and development; and networking links to Comanche and other joint fires platforms are required. Development and procurement of new nonlethal effects must be accelerated. Finally, reconnaissance and surveillance assets, including joint assets and UAVs, must provide acceptable target location accuracy. All these capabilities must be nested in the networked architecture that allows Objective Forces to rapidly pair joint and Army sensors, delivery systems, and munitions to the needs of the moment, and the demands of the supported force.

**b. NARRATIVE.**

(1) Army forces dominate land operations by employing fires and maneuver, during combat operations, to accomplish the task of controlling the ground environment, its populations, and enemy centers of gravity. Fires enable maneuver, and maneuver enables fires—there is a symbiotic relationship between these elements that demands synchronization and integration, if the commander is to achieve maximum effectiveness. Non-line of sight fires will play an ever-increasing role in support of maneuver, as The Army transitions to the Objective Force. New enhanced capabilities will provide the ability to routinely destroy and disorganize enemy formations at extended ranges, before forces become engaged in close combat. Non-line of sight indirect fires are higher trajectory fires, that emanate from both inside the maneuver commander's formations (mortars, cannons, some rockets), and from supporting elements (cannons, rockets, missiles, attack helicopters, high performance fixed wing aircraft, etc.). It is the ground maneuver commander's responsibility to synchronize the maneuver elements with all available direct, indirect, organic, and joint fires. To set the maneuver conditions, commanders must be able to employ destructive, suppressive (area suppression missions against imprecise or fleeting targets, to fix them, and keep them from maneuvering), and protective (smoke, artillery delivered mines, illumination for night operations) fires to facilitate maneuver in the close battle. Non-line of sight fires must provide responsive—immediately available on demand, timely, continuous, unhampered by terrain, 24 hours a day, all weather—fire support. These fires must be agile and flexible enough to fire on multiple, disparate, disconnected, point, and area targets, simultaneously. Networked fires must provide greater access to other Army, joint, and multinational fires.

(2) Non-line of sight fires must provide mutual support, by virtually teaming dispersed systems to mass effects, as needed, and be agile enough to shift quickly over an expanded battle space. Fires must be tailorable to meet the demands of mission and effects, whether destruction at depth, or support of the assault. In either case, missions must be achieved under a widely varying set of environmental and threat conditions. To achieve the requisite effects, fire support must provide accurate target locations and munitions that are delivered responsively and accurately. The ultimate lethality of fires is a function of munitions' effects, discrete or volume of fires, target location and weapon delivery accuracy, and response time, from target detection, to assessment of effects. While the roles of NLOS fires have evolved over time, there have been some constants. Today, there are three major roles that NLOS fires routinely provide, in support of maneuver brigades at the tactical level. Each of these roles is critical in enabling and retaining freedom of maneuver, through suppression or destruction of enemy forces, or protection of U.S. Forces. These **enduring functions** are:

- First, to **strike** the enemy with killing blows prior to forces being joined in contact. This includes gaining the synergistic effects of combining BLOS and NLOS fires to present the enemy with multiple, lethal problems to enable tactical maneuver. Efforts are predominantly preemptive, to attack the enemy's total strike system-of-systems, including their mobile framework, indirect fire and air defense artillery, C4ISR, support systems, and logistics support areas.
- Second is **close supporting fires**, to protect U.S. Forces through such means as suppression or obscuration of enemy forces and air defenses, isolate the current close fight, or counter fires to defeat enemy indirect fire systems, such as the mortars AI

Qaeda forces used against the coalition in Operation Anaconda. This provides U.S. Forces freedom of action, while denying options to the enemy—absolutely critical to gaining and maintaining the initiative in any battle—and allows U.S. Forces to close with, and destroy, an enemy through assault. Danger-close missions, and final protective fires, are designed to bring fires especially close to maneuver formations for ultimate protection.

- Third are *special tasks*, such as employing illumination during night operations, or emplacing minefields, and the use of other nonlethal effects.

(3) These functions will not only endure, based on Objective Force operational concepts, their importance will increase. Objective Forces will have freedom of maneuver, and the ability to deliver killing blows, without having to become decisively engaged. Based upon situational awareness, and the connectivity of networked fires in support of tactical maneuver, the Objective Force will be capable of greater destruction at standoff. In some cases, formations will be able to destroy the enemy, without having to tactical assault; however, UA will be exceptionally capable in the tactical assault supported by networked fires, when required to conduct tactical assault to achieve decision.

(4) The most demanding role for NLOS fires is support for the close fight, where forces are in immediate contact with the enemy, and the fighting between the committed forces and readily available tactical reserves of both combatants is occurring. The dynamic nature of the close fight demands very responsive and agile fires, to ensure maneuver and fires remain synchronized. Cannons, in direct support of maneuver, provide the ability to scale (through massing and number of rounds delivered) and tailor (through munitions selection) effects, to those required by the supported maneuver force. Additionally, cannons can most easily overcome changes in target environment conditions (minimization of collateral damage, target latency, target location accuracy, weather, terrain), by adjustment of fires, if required.

(5) The Objective Force must orchestrate and synchronize a diverse and versatile mix of fires and fused effects capabilities in real time. It must rapidly set the conditions to overwhelmingly defeat enemy conventional forces and asymmetrical threats, in all environments and dimensions, including austere theaters of operations.

(6) The ability of NLOS platforms to couple large area nonlethal effects, with precision delivery, will provide the Objective Force with an improved range of options for precise and measured control of target effects, to avoid attrition warfare, and to reduce noncombatant casualties. Non-line of sight fires will employ large area nonlethal effects to suppress or neutralize large enemy formations, and prevent their ability to interfere with maneuver elements, as they seek to gain dominant positional advantage. They will have the ability to employ nonlethal capabilities to attack and neutralize the enemy's networks and C4ISR capabilities, to provide for area denial, and to degrade the enemy's night fighting systems.

c. **LINKAGE TO AUTL:** ART 3.0 (The Fire Support Battlefield Operating System); ART 3.1 (Decide Surface Targets to Attack); ART 3.2 (Detect and Locate Surface Targets); ART 3.3 (Employ Fires to Influence the Will and Destroy, Neutralize, or Suppress Enemy Forces); ART

7.2 (Manage Tactical Information); ART 8.0 (Conduct Tactical Mission Tasks and Operations); ART 8.1 (Conduct Offensive Operations); ART 8.2 (Conduct Defensive Operations); ART 8.5.1 (Attack By Fire an Enemy Force/Position); ART 8.5.2 (Block an Enemy Force); ART 8.5.5. (Canalize Enemy Movement); ART 8.5.10 (Defeat an Enemy Force); ART 8.5.11 (Destroy a Designated Enemy Force/Position).

d. **LINKAGE TO UJTL:** OP 1 (Conduct Operational Movement and Maneuver); OP 3 (Employ Operational Firepower); TA 3 (Employ Firepower).

## Chapter 7

### Line of Sight/Beyond Line of Sight Lethality for Mounted/Dismounted

**FCS formations are networked to see first, understand first, act first, and finish decisively. They are capable of closing with and destroying enemy through synergistic teaming of leadership, capabilities, and units. Mounted and dismounted elements are closely synchronized with fires, air, and other key enablers. Network enables force cohesion to common purpose though dispersed, cooperative action. FCS has lethality overmatch to destroy any projected adversary at longer ranges, with greater precision, and more devastating target effects. Advanced fire control and distribution of responsive fires in contact enable 'shoot first' with assured first round kill. Highly mobile, rapid gunfires, and responsive suppressive fires, are required during fire and maneuver and tactical assault. Employ smaller calibers with increased lethality that reduce weight, and enable system and unit agility.**

#### 7-1. FOC-07-01: LOS/BLOS Lethality.

##### a. CAPSTONE CAPABILITIES.

(1) Fires are categorized as LOS, BLOS, or NLOS. Engagement range is not directly tied to the definitions of LOS, BLOS, and NLOS fires. Thus, the method used, rather than the range, determines the type of engagement. However, as a general guideline, LOS engagements occur at a maximum range of 5 km, BLOS engagements occur up to 16 km. Some future combat systems may have the ability for more than one method (e.g., LOS and BLOS). Unit of Action fire control and distribution requires responsiveness with fires on-demand, to engage complex and simultaneous target sets, executed as preplanned or opportunity engagements. Future combat system FoS must be capable of automated precision engagements, with automated fire control, and distribution and clearance procedures with a manual backup. The FCS FoS must provide the UA a LOS and BLOS capability that achieves Kinetic Energy (KE) and Chemical Energy (CE) overmatch, on the complete variety of target sets outlined in the FCS Systems Threat Assessment Report. The FCS FoS must be capable of precision, cooperative, and autonomous LOS and BLOS; and be able to defeat helicopters and UAVs.

(2) The Objective Force must possess the capability to destroy and/or neutralize the adversary and their capabilities, at any time, and in any place, while minimizing fratricide and noncombatant casualties. At the UA level, the lethality capabilities must provide for extended range lethality overmatch. These capabilities will be centered on direct BLOS and LOS fires, aided by joint and fused fire support multieffects, to include nonlethal. The Objective Force seeks not only to attain decisive weapon system-of-systems lethality overmatch, but also to achieve comprehensive operational advantages in battle command, tactical maneuver and mobility, maneuver sustainment, MS, and FP, which permit the application of precision engagement, and dominant maneuver. Aggressive, adaptive, situationally aware leaders, highly trained, multifunctional soldiers, and the massing of lethal fires and precision effects are fundamental to obtaining, and maintaining, this full spectrum overmatch. Every element in the warfighting formation must be capable of contributing to the long-range projection of dominant combat power, throughout the depth of the battlespace, as prescribed by the maneuver commander. Extended range lethality LOS/BLOS overmatch is a key component required for all potentially hostile operations, and provides the means to achieve decisive operations, freedom of maneuver, and FP, in highly volatile, distributed environments.

(3) Line of Sight Fires are direct fires from mounted and dismounted, air-ground and unmanned system-of-systems, optimized for the offense. Line of Sight is the traditional form of fire used by assaulting elements, as they conduct fire and movement to close with, and destroy, an enemy. The target, in a direct LOS engagement, is not masked from the soldier manning the weapon. The sensor, shooter, and decider are all resident with the combat system engaging the enemy target. Line-of-sight fires characterize most dismounted weapons, and weapons employed by elements in the assault; they have the advantage of 'Point and Shoot' immediacy against targets that can be directly seen, or sensed, from the combat platform. Point and Shoot is a subset of Cooperative Engagement, and allows a soldier or platform to designate a target for engagement by another platform in the same echelon. Point and Shoot implies the immediacy of effects, and occurs within the same echelon. Immediate in this construct is highly responsive (5 seconds or less) first round effects against the target. Mounted and dismounted elements possess Point and Shoot capability, to designate targets they cannot engage with organic weapon systems. This capability is networked such that a sensor-to-shooter relationship results in responsive and precise fires. The masking effects of terrain, however, limit both the range and fields of fire available for LOS engagements. Line of sight fires are specially designed to support fire and maneuver, tactical assault, and actions on contact. Key required capabilities are rapid KE gunfiring capability, with high rate of fire, to quickly kill multiple moving and stationary targets, with increased accuracy and stowed kills; overmatch at extended ranges; hunter-killer relationships between systems; and ability to fire first, with improved first-round kill.

(4) Beyond line of sight fires are fired over the horizon from systems optimized for LOS, and will be employed at extended ranges, out to 10-12 km for ground, and 16-20 km for aerial engagements. Beyond line of sight is an extension of the traditional direct fire. Direct fire BLOS enables standoff engagements at greater ranges, and also opens up fields of fire previously denied to elements conducting the assault, due to the restrictions of intervening terrain. Beyond line of sight fires permit UAs to conduct mutual support and cooperative engagements between platoons, companies, and battalions. To achieve direct fire BLOS, the soldier or crew exploits

mobile or other sensors, organic to their echelon, to extend their direct vision to BLOS. Advanced sensor capabilities networked to soldiers and crews enable target acquisition, identification, and engagement, without LOS visual confirmation. This allows the direct fire method to be employed, with high angle weapons that fly over terrain masking. The extension of direct vision, combined with weapons that fire both BLOS and LOS, permits the soldier or crew to close with the enemy. It also permits engaging targets in the assault, at greater standoff range, and without the need for adjusting fires onto a target, or deciding what targets to engage. Assault platforms conducting these types of engagements also exploit targeting information, generated from external sensors, and available on the COP of the battlefield, to further enable direct BLOS engagements. Beyond line of sight fires allow the combat battalion's fighting teams and systems to use terrain masking for protection. Acquisition, delivery, and control are done organically in small tactical units, and fires are delivered by ground or air systems. Since BLOS fires are backup to NLOS systems, they attack most dangerous or high payoff targets, and provide mutual support and over watching fires. Beyond line of sight fires must be capable of high angle fire, to overcome the restrictive nature of complex and urban terrain. Objective Force lethality capabilities will include reactive counterfire, conducted by UAs equipped with organic, networked, target acquisition for immediate response. The dismounted platoon will have a BLOS capability able to kill a T-72 tank with Explosive Reactive Armor and an Active Protective System.

**b. NARRATIVE.**

(1) The Objective Force must generate dominant lethality overmatch across the full spectrum of operations, particularly in urban and complex terrain environments. The Objective Force will harness a balance of organic direct fires, BLOS and LOS, and joint and Army fire support capabilities, to ensure the success of early entry, forced entry (opposed/unopposed), shaping, decisive offense/defense, and SASO. By orchestrating and synchronizing in real time this diverse and versatile mix of fires and fused effects capabilities, the Objective Force can rapidly set the conditions to overwhelmingly defeat enemy conventional forces, and asymmetrical threats, in all environments, including austere theaters of operations.

(2) The Objective Force will have the required direct fire capabilities to dominate and extend the close combat battle to BLOS. These capabilities will include real-time target detection and identification BLOS, together with the ability to conduct a first strike/kill beyond range of threat direct fire, KE, and CE munitions platforms. The FCS FoS must have a predictive and standoff detection capability against dismounted enemy forces. This requires employment of intelligent 'assistants', throughout the force, that are able to quickly correlate, and employ, artificial intelligence-based learning algorithms, that compare this data to a historical repository, for pattern and predictive profiling. Future combat system standoff detection capability must exceed the effective range of the enemy's primary antitank guided missile (ATGM) systems.

(3) Combat maneuver systems in the Objective Force will have onboard weapons, equally effective in immediate BLOS and LOS point engagements. In order to exploit these weapons, the crews onboard these system-of-systems will extend their direct vision to BLOS, by linking to the 'GIG', as well as by employing their own organic sensors. The result is that the Objective

Force's maneuver systems, exploiting the suppression effects from the force's organic fire support systems and joint fires, will initiate the direct close combat fight from BLOS. They will then seamlessly transition into LOS engagements, to ultimately bring about the defeat of an enemy force, and seize the objective. Future technologies, for the soldier manned and unmanned systems, will permit the Objective Force to maintain its lethality overmatch/standoff advantage in urban operations as well.

(4) The Objective Force will possess a wide range of organic and highly deployable fire support systems, that are able to deliver advanced and fused fire support effects, out to operational distances. Together with joint fires, these organic fire support capabilities will generate an efficient and dominant suppression umbrella of multieffects (e.g., nonlethals, EW, fire support, counter IO, etc.) that maneuver elements can exploit, to gain positional advantage. This fusion of fire support effects will permit the Objective Force to conduct decisive maneuver, and cause the rapid disintegration and destruction of enemy forces of significantly larger size, without having to employ attrition techniques. These same advanced fire support capabilities will have the range, versatility, and flexibility to protect combat support (CS) and CSS elements, throughout the depth of the extended and nonlinear battlespace, to include protection from enemy long-range precision missiles.

(5) The ability to couple large area, nonlethal effects, with precision delivery, will provide the Objective Force with an improved range of options for precise and measured control of target effects, to avoid attrition warfare, and reduce noncombatant casualties. The Objective Force will employ nonlethal capabilities, to attack and neutralize the enemy's networks and C4ISR capabilities, provide for area denial, and degrade the enemy's night fighting systems. Nonlethal capabilities are required to cause enemy hiding in defilade, cover, and concealment; or hiding amid the nonbelligerent populace, to have to move from hiding, and thereby be exposed to lethal effects.

c. **LINKAGE TO AUTL:** ART 2.4 (Conduct Direct Fires); ART 3.1 (Decide Surface Targets to Attack); ART 3.2 (Detect and Locate Surface Targets); ART 3.3 (Employ Fires to Influence the Will and Destroy, Neutralize, or Suppress Enemy Forces); ART 8.0 (Conduct Tactical Mission Tasks and Operations); ART 8.1 (Conduct Offensive Operations); ART 8.2 (Conduct Defensive Operations); ART 8.5 (Conduct Tactical Mission Tasks); ART 8.5.1 (Attack By Fire an Enemy Force/Position); ART 8.5.2 (Block an Enemy Force); ART 8.5.3 (Breach Enemy Defensive Positions); ART 8.5.5 (Canalize Enemy Movement); ART 8.5.10 (Defeat an Enemy Force); ART 8.5.11 (Destroy a Designated Enemy Force/Position).

d. **LINKAGE TO UJTL:** OP 1 (Conduct Operational Movement and Maneuver); OP 3 (Employ Operational Firepower); TA 3 (Employ Firepower).

## Chapter 8

### Air/Ground Operations

Objective Force Units of Action **integrate Joint and Army manned/unmanned aviation assets**, provided from the Unit of Employment, **into the ground maneuver scheme**. Aviation based RSTA, attack, lift, and unmanned are combined with the UA to develop the situation out of contact, for engagement of the enemy out of contact, for movement to positions of advantage, and to **provide precision fires in close support of the final ground assault**. Objective Force employs lift assets to conduct **vertical maneuver and maneuver to operational distances**. Objective Force units are designed from inception for lift within the **C-130 and future intratheater fixed and rotary wing profiles**. Aviation based RSTA provides targetable data for fires and exploitation by the ground maneuver force. Unit of Action organic unmanned systems provide lower tactical echelon commanders with dedicated sensors and communications relay. Units of Employment aviation assets provide medical evacuation (MEDEVAC).

#### 8-1. FOC-08-01: Air/Ground Operations.

##### a. CAPSTONE CAPABILITIES.

(1) Army Aviation, and joint tactical air support, must be closely integrated into ground maneuver operations. Aviation plays a major role in each type of the Objective Force operations of operational movement and maneuver, tactical maneuver/traditional forms of maneuver, vertical envelopment, mobile strike, and close combat. Traditional aviation missions of RSTA, attack, and lift, continue to be vital in the Objective Force. Objective Force UAs integrate joint and Army manned/unmanned aviation assets, provided from the UE, into the ground maneuver scheme. Aviation-based RSTA, attack, lift, and unmanned, are combined with the UA, to develop the situation out of contact out to 75 km, and engage the enemy out of contact; for move to positions of advantage, and provide precision fires, in close support of the final ground assault. Objective Force employs lift assets, to conduct vertical maneuver and maneuver, to operational distances. Objective Force units are designed, from inception, for lift within the C-130, and future intratheater fixed and rotary wing profiles. Manned and unmanned aviation-based RSTA provides targetable data, for fires and exploitation by the ground maneuver force. Unit of Action organic, unmanned systems provide lower tactical echelon commanders with dedicated sensors and communications relay. Unit of Employment aviation assets provides MEDEVAC.

(2) To enable vertical maneuver and maneuver to operational distances, Objective Force equipment must be transportable by intertheater and intratheater airlift, and must fit the profile of the C-130, and advanced vertical/SSTOL capabilities.

##### b. NARRATIVE.

(1) Aviation will continue to provide essential capabilities, to fulfill the Objective Force and FCS operational concepts, in joint and combined arms operations. While manned aviation continues to have primacy, UAVs will provide synergy with, and extension of, capabilities for

both manned aviation and ground maneuver forces. Aviation plays a major role in each type of the Objective Force operations of operational movement and maneuver, tactical maneuver/traditional forms of maneuver, vertical envelopment, mobile strike, and close combat.

(2) Operational movement and maneuver will employ manned aviation for movement of ground maneuver forces, unconstrained by terrain, to operational ranges. Operational movement and maneuver provides for entry operations, and also for vertical envelopment operations. Future intratheater fixed and rotary wing aircraft will provide both speed of movement, and versatility, through their ability to use unimproved landing sites, to place an enemy at risk of decisive ground maneuver, throughout the JOA. Intratheater airlift will permit direct entry into the JOA, from multiple staging sites, avoiding reliance upon an APOD, and reception, staging, and onward movement, and integration within the AOR. Enemy centers of gravity and decisive points are subject to rapid, direct attacks by ground maneuver forces, delivered by air, within proximity of the objective. The RAH-66, teamed with UAVs, will conduct detailed reconnaissance, to develop and confirm enemy battlefield disposition.

(3) Situational Understanding. Manned rotary wing and reconnaissance UAVs will improve SU, and function as sensors for mutually supporting long-range Army and joint fires. Man-in-the-loop Army aviation provides advantages throughout the JOA, for engaging fleeting targets, focusing terminal effects, assessing results, and controlling effects after munitions are in flight. Unmanned aerial vehicles may be under direct control of the RAH-66, and others may be controlled from ground stations. Manned and unmanned aerial reconnaissance will team to locate threats, for hand-off to long-range artillery, or tactical air. RAH-66 and UAVs may also designate targets for off-board munitions, and may directly engage critical targets with on-board munitions. Of particular interest during operational movement and maneuver, is the ability of the team to engage enemy air defenses and selective ground forces along the aerial routes of ingress/egress, in proximity to landing sites, and in the objective area. Unmanned aerial vehicles may provide communications relays for extended distances, or provide NLOS communications connectivity for ground maneuver forces in urban and restricted terrain. Distributed operations conducted at operational depths will be replenished and sustained with manned, and conceivably, with unmanned aviation assets. Aviation supporting operational movement and maneuver will be under control of the UE conducting the operation.

(4) Tactical Maneuver and Traditional Forms of Maneuver. Aviation provides mutual support for the conduct of tactical maneuver and traditional forms of maneuver by ground forces. Envelopment, penetration, frontal attack, turning movement, and infiltration by ground maneuver forces are supported by manned air maneuver systems, teamed with UAVs. Unmanned aerial vehicles, designed for modular mission payloads, will support tactical maneuver and traditional forms of maneuver with attack, ISR, target designator, communications relay, and cargo payloads. Manned and unmanned aviation assets provide ISR support, to develop SU critical to the objective force requirement, to ‘See First—Understand First—Act First—and Finish Decisively.’ The air maneuver team provides mutual support, to eliminate enemy fires, designate targets for FCS fire systems, provide complementary and reinforcing fires in close support, extend the range of standoff engagement, and support C2. They also seed an area with unattended ground sensors, deliver obstacles for isolating enemy forces, provide security in noncontiguous areas, sustain operational momentum with replenishment of ground forces, and

evacuate casualties. They will exploit their speed and terrain independence for direct attack of the enemy in pursuit and exploitation operations. At the tactical level, the UA can execute a ground pursuit operation (horizontal maneuver) over a 400 km distance, against a mobile enemy force, in conjunction with an aerial envelopment. Unit of Employment utility aviation aircraft will conduct vertical maneuver operations, at the tactical level, with dismounted forces aggregated from FCS combat battalions, to seize objectives that support the commander's scheme of maneuver. Future combat system maneuver battalions conduct air assault by dismounted elements, and manned/unmanned mission equipment packages dismounted from platforms. These organizations can either air assault one dismounted company under the C2 of the UA brigade, or air assault of a battalion under the C2 of the division.

(5) Vertical Envelopment. Vertical envelopment combines future intratheater fixed and rotary wing aircraft, RAH-66, and UAVs, with reconnaissance, target designation, attack, communications relay, and cargo mission payloads similar to operational movement and maneuver above. With manned and unmanned air maneuver assets, Objective Forces will possess the capability to conduct vertical envelopment and air assault, with mounted and dismounted elements, during tactical and operational maneuver. Executed rapidly, vertical maneuver gains positional advantage, exposes enemy capabilities to destruction across the JOA, and dislocates enemy forces. Conscious of the risks associated with these operations, Objective Force units will exploit surprise, deception, detailed reconnaissance, and suppression of enemy air and local ground defenses, and dispersed entry.

(6) Mobile Strike. Objective Force units will conduct mobile strike operations, at tactical and operational distances, by exploiting advanced situational understanding, fires, and Army and joint aviation. Mobile strike operations combine ground-based fires, manned and unmanned attack aviation, and ISR systems, to mass effects without massing forces, deny the enemy freedom of maneuver, prevent reinforcement, support friendly maneuver, and destroy key enemy forces and capabilities. Manned air maneuver assets, teamed with reconnaissance UAVs, will improve situational awareness, and function as sensors for mutually supporting long-range (Army and joint) fires. Man-in-the-loop Army aviation systems provide advantages, throughout the JOA, for controlling coordinated strikes against fleeting targets, focusing terminal effects, assessing results, and controlling effects after munitions are in flight. Manned air maneuver platforms also provide for avoidance of collateral damage and fratricide.

(7) Close Support to Ground Maneuver Forces in the Final Assault. Close combat destroys or defeats enemy forces in the final assault, to decisively win battles and engagements. Future combat system combat battalions will conduct close combat, by developing the situation out of contact, minimizing chance engagements and surprise, and by rapidly moving to a position of advantage and initiating contact, with overwhelming combat power, at the time and place of our choosing. Synchronized firepower, maneuver, and final decisive assault characterize close combat, such that the enemy perceives no transition between these elements of decisive combat action. Ground maneuver forces execute close combat with organic direct fire LOS, direct fire BLOS, and indirect fire support. They also employ mounted and dismounted assault, with responsive support from air maneuver assets, provided by the UE. The FCS combat battalion employs organic UAVs to help develop and refine the local situation, provide NLOS communications connectivity, and designate targets for organic FCS ground fire systems. Corps

aviation assets support the FCS combat battalions, and will consist of manned and unmanned aviation platforms for ISR, attack, communications relay, mobility support, replenishment, PSYOP, and medical evacuation. Close combat by FCS combat battalions will be shielded by manned and unmanned, reconnaissance and attack Aviation assets, provided from higher echelons, which isolate the red zone fight, eliminate enemy fires, prevent enemy reinforcements, and provide security in noncontiguous areas. Manned attack aviation platforms will extend the stand-off engagement capabilities of FCS ground forces, locate targets for FCS NLOS and BLOS fires, designate targets for munitions launched from ground platforms, and provide organic, on-board fires, to complement and reinforce FCS ground maneuver fires during the final assault.

(8) Army Aviation. Army Aviation, manned and unmanned, plays a vital role in the fulfillment of the Objective Force concept, and the Maneuver UA Operational and Organizational Plan. Aviation missions of reconnaissance, surveillance, attack, lift, and C2, endure to provide maneuver, MS, and maneuver sustainment of Objective Forces. Comanche is the linchpin capability for aviation reconnaissance and attack in the Objective Force. Comanche and armed UAVs may replace current manned aviation attack in the Divisions. Unmanned aerial vehicles will use tailorable, modular mission payloads, providing synergy and extension of capabilities for manned air maneuver systems, and for FCS ground maneuver and fire support systems.

c. **LINKAGE TO AUTL:** ART 1.3 (Conduct Intelligence, Surveillance, Reconnaissance (ISR)); ART 6.1 (Provide Supplies); ART 8.1 (Conduct Offensive Operations); ART 8.5 (Conduct Tactical Mission Tasks).

d. **LINKAGE TO UJTL:** OP 1.2.4 (Conduct Operations in Depth); OP 1.2.4.3 (Conduct Forcible Entry: Airborne, Amphibious, and Air Assault); OP 1.2.4.5 (Conduct Raids in the Joint Operations Area (JOA)); OP 3.2 (Attack Operational Targets); TA 1.1.1 (Conduct Tactical Airlift); TA 1.2.1 (Conduct Air Assault Operations and Air Assault); TA 4.2 (Distribute Supplies and Provide Transport Services).

## Chapter 9 Survivability

**Objective Force combines systems, tactics, operations, and processes that afford optimum protection to deployed units. Speed and lethality are essential characteristics for achieving survivable forces. Detect and neutralize enemy ability to emplace or use mines and booby traps at standoff. Ground and air platforms employ best combinations of low observability, ballistic projection, long-range acquisition and targeting, with early attack. Networked imbedded/external sensors, linked to autonomous lethality, allow units to see first and act first—shoot first with assured first round kill each time we pull a trigger. Proactive means will prevent an adversary from detecting, acquiring, and engaging U.S. forces. Hit, penetration, and kill avoidance capabilities complete the holistic, integrated approach to survivability. Units must be survivable across the spectrum of operations and range of operational environments.**

### 9-1. Elements of survivability.

a. Survivability includes providing maximum protection at the individual soldier level, whether mounted or dismounted, to include protecting soldiers from ballistic, flame, thermal, and chemical biological threat, and toxic chemicals that may be present in urban or industrial areas. It also includes leveraging integration of lighter, more effective ballistic protection (composite materials), with active and passive protection systems, to enhance survivability against KE, and current and projected enemy lethal effects. Future combat system platforms must be capable of stopping penetration against 14.5 millimeter (mm) all around, and with add-on armor, to stop penetration against 30 mm. Platforms must be able to withstand antipersonnel and antitank effects. For ground platforms, it involves leveraging the best combination of:

- Low observable technologies, to degrade enemy detection and terminal targeting from all spectrums, by signature management, and stealth capabilities.
- Ballistic protection.
- Dash speed from cover to cover.
- On-board immediate multispectral capabilities, as well as the ability to employ wide area, long duration, multispectral obscurants.
- Long-range acquisition.
- Early discrete targeting, ‘shoot first’ every time, and improved first round kill.
- Highly responsive suppressive fires.
- Camouflage.

b. Future combat system equipped maneuver units must be provided with cooperative direct counterfire systems to ‘revenge’ kill enemy systems engaging, or preparing to engage, friendly systems. These systems provide improved standoff sensor/detector capability to provide real-time warning and dissemination, to protect the force against nuclear, biological, and chemical (NBC) hazards. They require multiple multifunctional networked sensors for appropriate

situation awareness, and must be capable of plugging into homeland FP systems. Future combat system FoS signature management must reduce the enemy's ability to acquire and engage forces. They must have passive and active survivability capabilities, to detect and counter an enemy's acoustic, visual, and electromagnetic acquisition means. The FCS FoS must provide improved early warning and defeat of enemy ground and air launched conventional and smart weapons—rockets, cannon, and smart munitions—by proactive precision strikes, and active protection systems with defensive interception, disruption, deflection, or jamming mechanisms. They must gain improved early warning from TAMD sources, and have the ability to intercept enemy air threats, primarily helicopters and UAVs, in multifunctional, all-arms approach. Unit of Employment is responsible for more dangerous air threats, such as cruise missiles and fixed wing aircraft. They support counter-reconnaissance effort to defeat enemy RSTA, through use of obscurants, jamming, signature reduction, deception, disinformation, and pattern avoidance techniques. The UE employs RSTA to detect and find, then defeat, disrupt, or neutralize enemy sensors through security operations. Future combat systems must have sufficient hardening from DE weapons, such as EMP, and high-powered microwave; and employ robots to perform manpower intensive, high-risk functions such as RSTA missions in urban operations (inside buildings and the subterranean dimension) and reconnaissance/reduction of minefields. They must have standoff means to detect and neutralize mines and booby traps.

c. The FCS FoS must enable the performance of manpower intensive, or high-risk functions (i.e., urban ISR missions, minefield and obstacle reduction, chemical/toxic industrial chemicals (TICs)/TIM, reconnaissance, etc.), without exposing soldiers directly to the hazard. The FCS FoS must enable the performance of these functions semiautonomously (Threshold), and autonomously (Objective).

## **9-2. FOC-09-01: Survivability and Force Protection.**

### **a. CAPSTONE CAPABILITIES.**

(1) Objective Force survivability is derived from the holistic integration of organizational, materiel, and doctrinal solutions. The concept for survivability is a layered approach, that begins with 'Seeing First-Understanding First-Acting First' to kill the enemy, and thereby precluding the ability of the enemy to deliver effects against the Objective Force. Situational awareness, the Battle Command Construct, extended range NLOS lethality, and overmatching LOS/BLOS lethality, are major contributors to Objective Force survivability. Future combat system FoS must have a predictive and standoff detection capability against dismounted enemy forces. This requires the employment of intelligent 'assistants', throughout the force, that are able to quickly correlate, and employ artificial intelligence-based learning algorithms that compare this data to a historical repository for pattern and predictive profiling. FCS standoff detection capability must exceed the effective range of the enemy's primary ATGM systems. These contributors are addressed in detail in other chapters. Additional layers of survivability measures, present within units and equipment, include the means to avoid being seen, acquired, tracked, engaged, hit, penetrated, and killed. This holistic approach to survivability must protect American soldiers, units, information, and equipment, in all terrain, environments, and weather conditions.

(2) The Objective Force employs joint, national, and multinational resources for early warning on the use of weapons of mass destruction (WMD), TAMD, and asymmetric threats. Objective Forces employ 'See-Understand-Act First' methodology to kill the enemy as a proactive means of FP. The holistic FP construct includes capabilities for detection and hit avoidance, and ultimately advanced passive ballistic and active protection measures, to ensure their survivability to continue the mission.

(3) At the UE level, capabilities are required to defend the force against diverse threat capabilities, including chemical and biological attack, and enemy antiaccess means, including long distance ballistic and cruise missile attack. A comprehensive FP umbrella will include air and missile defense for security of APODs and SPODs.

(4) Future combat system-based combat battalions will have organic capabilities for IFF, air/missile defense, early warning, surprise-avoidance, active and passive protection systems, and operational shielding from unconventional approaches. Future combat systems must provide CID of friend, foe, and noncombatant in a joint, allied/coalition environment, through platform-to-platform (manned and unmanned, ground and air), platform-to-soldier, soldier-to-platform, and soldier-to-soldier, under all battlefield and weather conditions, across the spectrum of operations. Combat identification systems must interface with the C4ISR communications network, for development and maintenance of the COP, and must be compatible with the Land Warrior/OFW CID system and NATO/Allied BTID, and accurately characterize friendly, enemy and noncombatant entities, throughout the battlespace. Future combat system must be compliant with the CID CRD. Use of robotic systems, in appropriate situations, will also reduce exposure of manned elements. Proliferation, in the use of mines, requires capabilities for mine identification, countermine, and standoff neutralization, or avoidance. The advantage to FP, provided through superior knowledge, requires survivability of the knowledge backbone via IA means.

(5) The UA's networked, integrated approach to counterair will enable all FCS platforms to receive early warning, and conduct self-defense counterair engagements against low and slow moving portions of the rotary wing and UAV threat. Selected platforms will be equipped to defeat rotary wing and UAVs at longer range. The UA will depend on the United States Air Force to defeat the fixed wing threat, and will depend on UE Air and Missile Defense (AMD) for proactive fires and area defense against the full range of faster air and missile threats. Unit of Employment AMD will also provide some active defense capabilities against incoming rockets, artillery, and mortars. The UA will be capable of receiving and integrating air defense augmentation. It must have organic battle command capabilities necessary to provide third dimension situational awareness, situational understanding, and battle management, for both organic UA and supporting UE AMD fires. The UA must enable its commanders to effectively orchestrate integrated air and ground maneuver, fires, and air defenses in support of sustainment, shaping, and decisive operations, within their respective AOs.

**b. NARRATIVE.**

(1) Objective Forces and FCS will face a wide variety of advanced three-dimensional threats from enemy land, air, and space assets. The primary threat to the UA FCS and its user

## TRADOC Pam 525-66

are fragments, bullets, blast, thermobaric, flame, AT and ATGM system (especially man-portable system), electronic attack, and incendiary weapons. These threats include, but are not limited to:

- rocket propelled grenades
- thermobaric/flame weapons
- heavy machine guns
- heavy sniper weapons (12.7 mm and above)
- antimateriel rifles
- improvised antiarmor munitions
- mines (top, side, bottom attack)
- antiarmor and blast hand grenades
- most anti-aircraft gun systems
- other medium cannon
- artillery systems (both indirect and direct fire)
- guided munitions
- AT guns
- tank fired munitions, including KE, high explosive AT
- tube launched ATGMs

(2) Threat artillery will employ a full range of ordnance, including use of chemical, biological, precision munitions, and scatterable mines. Threat systems and technologies may include DE weapons (lasers and high-powered microwave laser range finders, image intensification, active and passive IR, millimeter-wave radar, electronic countermeasures (radio, digital, and Global Positioning System), and other improved RSTA measures. Threat forces will have significant UAV resources, and will use them extensively to maintain SA/SU. Threat will attack C4ISR systems ('systemology' attacks) to degrade or defeat the system-of-systems synergy of the FCS. The UA FCS may have to operate in an EMP and chemical, biological, radiological, nuclear (CBRN) environment.

(3) Transforming to a single force, capable of maintaining the dominant survivability of present day heavy forces, while achieving the rapid deployability of present day light forces, is the greatest challenge to development of truly viable, integrated leap-ahead operational capabilities. The Objective Force will achieve dominant survivability, through a joint and holistic approach, that leverages and synchronizes joint, networked forces, and systems capabilities, to bring about the rapid defeat of an enemy, while minimizing the damage to friendly and coalition forces, and noncombatants. The Objective Force must employ a networked system-of-systems approach to achieve dramatic increases in overall FP, and must account for the vulnerability of CS and CSS elements on the distributed and noncontiguous future battlefield.

(4) Organizational synergy and interdependent operations are key to the dominant survivability of the Force. The Objective Force will exploit the ability of the joint team to fight and win the air, sea, and space superiority battles, to enhance the freedom to maneuver directly into theater, and conduct decisive combat operations. Objective Force Corps will apply fires to shield engaged forces, and isolating the battlespace with fires and blocking forces, to prevent

enemy reinforcement or resynchronization. Objective Force Corps' fire assets are primarily responsible for the counterfire role, to support and protect brigade and battalion maneuver. The Objective Force will contribute to the air superiority battle by providing capabilities to defeat enemy ballistic and long-range, precision missile attacks. The elements of this antimissile umbrella must be rapidly deployable, mobile, offer layered and redundant protection, and be capable of expanding rapidly, to provide protection to coalition and regional partners. It also must ensure the survivability of maneuver, MS, maneuver sustainment, and other vital assets in theater from this lethal threat.

(5) The Objective Force will further increase its survivability by having a tactical component to the joint GIG that links to all of its units, systems, and soldiers. This capability will provide dominant situational understanding in all terrain, environments, and weather conditions. It will also provide superior C2, to allow the Objective Force to operate at operational tempo (OPTEMPO) beyond the enemy's ability to respond. This capability will promote responsiveness and initiative, to focus on identifying and defeating the enemy's center of gravity, versus taking a prolonged attrition warfare approach to destroy every enemy unit in turn. The GIG will also help facilitate the joint simultaneous engagements necessary to bring about the rapid defeat of the enemy. From the systems and soldier perspective, the GIG, as well as the Objective Force's organic sensing capabilities to detect and identify enemy forces in all terrain, before being detected, will increase the ability to survive engagements, by minimizing unanticipated engagements, and facilitating standoff attacks BLOS.

(6) To increase survivability, the Objective Force will have lethality overmatch, second to none, at all levels, thus achieving enemy destruction before they can respond effectively. These capabilities are articulated in the NLOS Lethality and LOS/BLOS Lethality FOCs. They include direct BLOS and LOS capabilities on all maneuver systems, advanced fire support systems with operational ranges and large area effects, capabilities to network and fuse joint effects, and the ability of the soldier to instantly command joint and Army fire support, while remaining stealthy and undetected. The Objective Force will also enhance its survivability by having the means to directly blind enemy C4ISR and night fighting capabilities, while protecting its own capabilities from DE and other forms of attack. Automated target recognition capabilities will be critical for the Objective Force, to prevent potential fratricide, resulting from the dramatic increase in lethality ranges of the Objective Force, as well as joint systems.

(7) The Objective Force will be designed as an organization, with units and systems capable of superior mobility at the tactical, operational, and strategic levels. Mobility superiority will permit the Objective Force to gain positional advantage, at all levels of operations, and cycle fires and maneuver, at a dominant tempo that cannot be matched by the enemy. Strategic maneuver capabilities, that free the Objective Force from being tied to ports and airfields, will also significantly increase the Force's survivability, by reducing the predictability of its deployment options into theater. The Objective Force's superior mobility and exploitation of the air dimension, once in theater, combined with its lethality overmatch, will cause the enemy's rapid defeat. This will increase the survivability of the Objective Force overall, by precluding protracted engagements. Finally, all manned systems will have autopilot/autonomous mobility modes, to enhance crew optimization for continuous operations.

(8) An additional key capability in the Objective Force's survivability approach is hit avoidance, which includes both avoiding acquisition or tracking by enemy fire control, and avoiding being struck by enemy weapons, once they have been fired. Active protection measures and signature management are critical capabilities for Objective Force systems.

(9) The Objective Force will have a wide range of active protection capabilities to increase survivability at the system and force levels. Objective Force air and ground systems will have onboard active protection measures to defeat enemy KE, CE, and missile attacks, from all directions. At the force level, linkage to the GIG will facilitate collaboration within a network-centric, joint force, active protection system that provides collective protection for all air and ground assets.

(10) Some organic air defense capability will be embedded within Objective Force combat battalions for mounted and dismounted teams. There will be a robust air defense planning element at brigade level. Division is the first level at which mission-tailored air defense UAs, capable of both point, and area defense, are located. The division integrates air defense capabilities, across its AO, to ensure early warning and continuous coverage within a division umbrella. However, the Corps holds primary responsibility for integrating land-based air defense UAs and UEs into the theater air and missile defense network.

(11) The Objective Force, its systems, and soldiers will have advanced signature management and stealth capabilities to degrade enemy detection, and terminal targeting. Detection avoidance capabilities include technologies and strategies used to mitigate or disguise signature emissions of all types (visual, audio, seismic, radar, electronic, and thermal) associated with maneuver combat. In conjunction with advanced RSTA assets, suppression of these signatures, to the extent that soldiers and future weapon system-of-systems are indistinguishable from their surroundings, provides the warfighter with the ultimate advantage of battlefield surprise. This capability provides a major reduction in the probability of being detected by the enemy, prior to an engagement. In some cases, obscuration will be required, to assist with movement of ground maneuver forces into positions of advantage, from which the final tactical assault will be conducted. Other situations requiring obscurations include urban operations, and the actual final assault on objectives. Accordingly, the Objective Force requires new multispectral smokes to counter advanced enemy sensors. These same smokes will also be needed onboard organic maneuver systems, for immediate use in an unanticipated LOS engagement.

(12) The Objective Force will make use of advanced composite materiel and armor, to provide leap-ahead passive ballistic protection for soldiers and systems from enemy weapons, to include mines. If detected, acquired, and hit, a system must be capable of minimizing and/or preventing full penetration, to protect the individual or crew first, and provide equipment survivability second. Vehicle penetration avoidance has previously been achieved by heavy ballistic armor plating that included active, reactive, or passive armor suites on primary ground maneuver systems. Smaller platforms with innate, dynamic survivability schemes, augmented by durable, lightweight add-on protection (when necessary), will be required in the future. In addition, personnel survivability may be optimized through the use of individual protective ensembles, and improved egress avenues from vehicles and aircraft. Combat vehicles must also

have NBC filtration systems, and the Force must have advanced NBC detection capabilities at standoff ranges.

(13) Enabling technologies to achieve this include advanced NBC protection, selective location, and compartmentalization ‘cocooning’ of the crew, ammunition, and fuel, automatic fire suppression systems, countermine regimens, spall and nuclear shielding, optics, electronic hardening, and ballistic shock protection. Kill avoidance measures, not only potential countermeasures, must be engineered from the onset of system design, by minimizing size and weight; number, size, and location of critical components; and/or selectively hardening them, in addition to signature management, and mobility enhancements.

(14) Objective Force survivability will be enhanced by exploiting unmanned ground, air, space, and VTOL systems, and advanced sensors capabilities, to facilitate standoff engagements in all types of terrain, and for defense against chemical and biological threats. Robotic systems must possess sufficient artificial intelligence, and self-defense capabilities, to prevent being easily defeated by enemy countermeasures. The Objective Force must also have capabilities to protect all soldiers, systems, and equipment from DE threats, and prognostic avoidance of WMD.

(15) The survivability of Objective Force soldiers will be optimized by:

- Deploying a physically fit soldier that is able to withstand the environmental stressors associated with the battlespace,
- Supporting soldiers with advanced capabilities to initially detect and prevent environmental/occupational hazards, plus
- Ensuring minimum, essential, medical capabilities, including Level I care, Level II care (Medical Company, Far Forward Resuscitative Surgical capabilities, ground and air medical evacuation, and hospitalization are available continuously (including the first 72 hours of the Brigade’s initial deployment), and that they are an exception to ‘pulsed logistics’).

These capabilities will range from technologies that significantly enhance the provision of self-aid and buddy-aid, to advanced hazard detection devices. Increased repair efficiency for system-of-systems will be facilitated by modular designs, and replacement protocols. Such modular designs will also improve survivability, by permitting continuous technology upgrades to the add-on armors for FCS, throughout their service life. Modular resupply operations will decrease the amount of time that FCS is vulnerable, while awaiting parts, and conducting sustainment transfers.

(16) Combined into a holistic joint force via a robust, networked system-of-systems at all levels, the capabilities outlined in this FOC will significantly provide the Objective Force with unmatched survivability, across the full spectrum of operations. The outcome will protect both mounted and dismounted soldiers from being effectively detected and/or engaged by threat forces, employing a wide range of weapons: KE and CE munitions, DE, and chemical/biological/radiological hazards.

c. **LINKAGE TO AUTL:** ART 1.1.3 (Provide Intelligence Support to Force Protection); ART 1.3 (Conduct Intelligence, Surveillance, and Reconnaissance (ISR)); ART 2.2.11 (Conduct a Survivability Move); ART 4.0 (The Air Defense Battlefield Operating System); ART 5.3 (Conduct Survivability Operations).

d. **LINKAGE TO UJTL:** ST 6 (Coordinate Theater Force Protection); OP 6 (Provide Operational Force Protection); TA 6 (Protect the Force).

---

## Chapter 10 Maneuver Support

Maneuver Support encompasses the means to enable, enhance, and protect the strategic, operational, and tactical freedom of action of the force, as well as the denial of comparable freedom of action to the adversary. Maneuver Support accomplishes this by shaping, leveraging, or mitigating the effects of the environment. For an offensively oriented, maneuver-based force, the focus is on enabling force movement and maneuver at all levels of war and echelons, and across the full spectrum of military operations. This is critical with the increased emphasis on operational and strategic maneuver of ground forces for the Objective Force. Maneuver Support concentrates on two interrelated components: **force protection** and **freedom of maneuver**, with significant overlap and synergy between these two components. Maneuver Support assets, systems, and soldiers are readily able to support both simultaneously. This translates into an effective and efficient application of forces. Maneuver Support takes on added dimensions and significance with the increasing emphasis on battlefield frameworks that encompass extended, dispersed, distributed, noncontiguous, and three-dimensional battlespaces and nonlinear operations, to include forcible and early entry operations, and operational maneuver. In addition, the Army's vision of the operational environment recognizes that adversaries will apply a wide array of conventional and unconventional, or asymmetric, means to deny access to, and movement of, friendly forces, starting with their strategic deployment platforms, and continuing within the theater of operations and in individual tactical battlespaces. Finally, the physical environment, to include terrain, infrastructure, weather, hazards, and the presence of the local populace, will affect any ground force, sometimes even more than enemy actions. The seven MS imperatives are: **Understand the Battlespace Environment, Enable Theater Access, Provide Assured Mobility, Deny Enemy Freedom of Action, Enable Force Protection and Security, Engage and Control Populations, and Neutralize Hazards and Restore the Environment** through established minefields, and dissemination of information in usable form, for exploitation by ground maneuver forces. Ability to **digitally mark and report** mines. Capabilities for the conduct of in-stride breach. **Mine resistance**, designed into platforms, permitting personnel survivability and rapid repair of mine damaged components.

**10-1. FOC-10-01: Understand the Battlespace Environment.****a. CAPSTONE CAPABILITIES.**

(1) The Battlespace Environment includes physical, informational, and human dimensions. All of these are dynamic—they change over time, often in difficult to predict ways. Understanding the Battlespace Environment is real-time understanding of the environment (space, air, water, land, subterranean), including terrain, weather, infrastructure, hazards, populations, and their interaction, impact on operations, and options to leverage or mitigate effects, tailored to the commander's needs. The five basic functions required to fully Understand the Battlespace Environment are: Data Acquisition, Data Exploitation, Data Management, Data Representation, and Data Dissemination.

(2) Required capabilities include:

(a) Collection and fusion of high-resolution geospatial data, and comprehensive battlespace environment information, that includes real time collection of new data, as well as supplementing existing data sets with more detail.

(b) Sensor cueing and placement.

(c) Stand-off wide area ISR.

(d) Tailored, digitized, and usable battlespace environment data that is timely, and compatible with the network-centric environment.

(e) Actionable and scalable visualization products to mitigate the threat's 'home-court' advantage, displayed either visually, or in some other form that is compatible with the user needs.

(f) Computer-aided analysis and reasoning tools that enable prediction and understanding, and provide actionable advice.

(g) Reach to national and other sources, when needed.

(h) Data storage, retrieval, and update capabilities.

**b. NARRATIVE.**

(1) The threat will stress adaptation and flexibility. Our adversaries will understand their battlespace, and seek to deny the same understanding to us. They will seek advantages of weather, terrain, and light conditions; take sanctuary in urban and other complex terrain, and employ terrain masking; and protect high-payoff targets, by shielding these amongst noncombatants. They will leverage terrain by using natural and manmade obstacles, terrain compartments, and population centers—further complicated with mines and booby traps—to deny U.S. Forces freedom of movement. They will protect themselves from targeting, using

cover and concealment, deception, and terrain masking. They will employ special purpose forces, terror, long-range strikes, weapons of mass effects, and information capabilities. The enemy will attempt attacks on our homeland, friendly points of embarkation (POEs)/points of debarkation (PODs), intermediate bases of operations, and key deployment nodes and routes. Opponents will try to counter U.S. strengths by attacking, or exploiting, our weaknesses, especially our critical dependence on C4ISR, so vital to our synergistic, system-of-systems approach. Simple and effective ISR means will allow them to leverage advanced technologies, developed by others, with a focus on their force effectiveness, rather than a competitive system overmatch with the United States. Commanders at all levels must know how the environment, across the full range of natural and man-made elements, will impact their operations, as well as the operations of the enemy, and be able to use this knowledge to gain military advantage. Objective Force units will dominate land operations, providing the decisive complement to sea, air, and space operations. Soldiers and leaders, integrated through an information network, while operationally dispersed across the battlespace, will provide the joint force commander situational understanding. The ability to both predict and understand, in real time, the impact of the environment on friendly and enemy systems—including personnel, tactics, platforms, sensors and weapons—is critical.

(2) Leaders will conduct rapid, tactical decisionmaking, commander action-centric operations, from physical rehearsals, to virtual, and from static CPs, to battle command on-the-move. Terrain and weather form the foundation of the COP, the summation of critical combat information within the battlespace. The ability to achieve IS, conduct precision engagement, and execute rapid, violent decisive engagements, will hinge on the quality, fidelity, and freshness of the COP. Accurate terrain and weather products, with great spatial and temporal detail, will be a necessity for supporting network sensing, mission analysis, and the military decisionmaking process.

(3) In order to achieve unprecedented momentum, and freedom of maneuver, the Objective Force must *see* the complete picture of the operating environment, in all of its aspects. Further, the Objective Force must have an *understanding* of this picture that allows it to take away the enemy's 'home court advantage,' and give our leaders a better understanding of the environment than our adversaries. Objective Force units will *see first* by detecting, identifying, and tracking the individual components of enemy units. Advanced technologies, that lead to unprecedented ISR capabilities, coupled with other ground, air, and space sensors, are networked to provide a common, integrated operational picture that will enable seeing the enemy, both in whole, and in part, as a complex, adaptive organization.

c. **LINKAGE TO AUTL:** ART 1.0 (The Intelligence Battlefield Operating System); ART 1.1 (Support to Situational Understanding); ART 1.1.1 (Perform Intelligence Preparation of the Battlefield); ART 1.1.1.1 (Define the Operational Environment); ART 1.1.1.2 (Describe the Environmental Effects on Operations); ART 1.1.1.5 (Conduct Geospatial Engineering Operations and Functions); ART 1.1.2 (Perform Situation Development); ART 1.5 (Conduct Police Intelligence Operations); ART 1.3.1 (Perform Intelligence Synchronization); ART 1.3.1.1 (Develop Information Requirements); ART 1.3.1.2 (Develop the Intelligence Synchronization Plan); ART 2.2.5 (Exploit Terrain to Expedite Tactical Movements); ART 7.0 (The Command and Control Battlefield Operating System); ART 7.2 (Manage Tactical Information); ART 7.2.1

(Collect Relevant Information); ART 7.2.2 (Process Relevant Information to Create A Common Operational Picture); ART 7.2.3 (Display a Common Operational Picture (COP) Tailored to User Needs); ART 7.2.4 (Store Relevant Information); ART 7.2.5 (Disseminate Common Operational Picture and Execution Information to High, Lower, Adjacent, Supported, and Supporting Organizations).

d. **LINKAGE TO UJTL:** OP 2 (Provide Operational Intelligence, Surveillance, and Reconnaissance); ST 2 (Conduct Theater Strategic Intelligence, Surveillance, and Reconnaissance); TA 2 (Develop Intelligence).

## **10-2. FOC-10-02: Enable Theater Access.**

### **a. CAPSTONE CAPABILITIES.**

(1) Enabling theater access provides proactive means to ensure forces can deploy, and freely enter the theater of operations, by enhancing entry capabilities and infrastructure, mitigating adverse effects of the environment (terrain, weather, enemy action, infrastructure, hazards, and local population), and protecting/facilitating multiple PODs, lines of communications (LOCs), and theater entry points. Once the foothold is established, the focus of Enable Theater Access changes to continuing the flow into, and out of, the theater, as well as enabling ‘intratheater access’ in support of operational maneuver. The continued flow of forces and the sustainment footprint, required for continued operations development of base camps and sustainment LOCs, becomes vital.

(2) Required capabilities include:

(a) Construction and general engineering support, including a rapidly deployable capability to expand operating capacities of Aerial Ports of Embarkation/Sea Ports of Embarkation, Intermediate Staging Bases/Forward Operating Bases, and APODs/SPODs.

(b) Means for identification of multiple, simultaneous, unimproved, or minimally improved, departure points and entry points.

(c) Standoff infrastructure assessment.

(d) Means to protect, preserve, enhance, and maintain deployment and employment infrastructure, to include power projection platforms.

(e) Enhanced over-the-shore delivery of personnel, equipment, and materiel; and controlling and managing property.

### **b. NARRATIVE.**

(1) Army forces must rapidly deploy alone, or as part of a fully integrated JTF, in response to crisis situations, to any part of the world. Such deployments will likely be into areas with poor infrastructure, limited points of entry, and little host-nation support, and widely disparate

climates, terrain, and cultures. The ability of U.S. Forces to gain and sustain access into the theater, to facilitate the appropriate flow of forces, will be vital to the success of future operations, and perhaps the center of gravity in the opening phases. Likewise, denying or impeding theater access will be a chief aim of any threat force, whether it is a state-sponsored force, or transnational actors, such as cultural or political factions. The threat's overall strategy to preclude theater access will take many forms, and likely comprise varied and simultaneous operations across the theater. United States Forces can expect indirect attacks by asymmetric means, direct attacks using special purpose forces, and major terrorist attacks, potentially employing weapons of mass destruction or effects. These attacks will be designed to deny the use of, or disable, transportation infrastructure, manipulate the population, or attrition of U.S. combat power. The threat's effort to deny theater access will not be geographically limited to the theater of operation, but will likely extend to our homeland operating bases, and homeland infrastructure. Denying the enemy the capability to influence departure and entry points, and preventing or mitigating enemy antiaccess strategies, is key to our Objective Force strategy.

(2) Maneuver Support organizations will aim to achieve 'prompt' and 'sustained' operations in enabling theater access. Enabling 'prompt' theater access focuses on those activities maneuver support organizations must accomplish, to enable deployment of a UA brigade in 96 hours, and a UE division (or equivalent) in 120 hours. Enabling 'sustained' theater access encompasses those activities that enable sustainment of deployed U.S. Forces in theater after 96 hours, as well as those activities that maintain the flow of combat forces to achieve deployment of 5 divisions within 30 days. In addition to support to the Objective Force, Maneuver Support organizations must be capable of providing support to Interim and Legacy Army organizations, allied and coalition forces, Other Governmental Organizations, such as the State Department, and NGOs, such as the American Red Cross.

c. **LINKAGE TO AUTL:** ART 2.1 (Perform Tactical Actions Associated with Force Projection and Deployment); ART 2.1.2 (Conduct Tactical Deployment/Redeployment Activities); ART 6.10 (Provide General Engineer Support); ART 6.10.1 (Restore Damaged Areas); ART 6.10.2 (Construct and Maintain Sustainment Lines of Communications); ART 6.10.3 (Provide Engineer Construction Support); ART 6.10.4 (Supply Mobile Electric Power); ART 6.10.5 (Provide Facilities Engineering Support).

d. **LINKAGE TO UJTL:** SN 1 (Conduct Strategic Deployment and Redeployment); SN 1.1.5 (Determine Impact of Environmental Conditions on Strategic Mobility); ST 4.2.6 (Determine Theater Residual Capabilities); ST 4.4. (Develop and Maintain Sustainment Bases); TA 1 (Develop/Conduct Maneuver); TA 1.1.1 (Conduct Tactical Airlift); TA 1.1.4 (Conduct Sea and Air Deployment Operations); TA 4.4 (Conduct Joint Logistics-Over-the-Shore Operations (JLOTS)).

### **10-3. FOC-10-03: Provide Assured Mobility.**

#### **a. CAPSTONE CAPABILITIES.**

(1) Assured Mobility includes all those actions that guarantee the force commander the ability to deploy, move, and maneuver, by ground or vertical means, where and when desired,

without interruption or delay, to achieve the intent. The countermine and counter booby trap missions are both critical aspects of Assured Mobility. The fundamentals of Assured Mobility are: Predict, Detect, Prevent, Avoid, Neutralize, and Protect. These six fundamentals represent overlapping and concurrent tasks that must be accomplished, allowing the commander to mitigate impediments to mobility from standoff, and greatly reduce the likelihood of traditional breaching or neutralization requirements. Their application leads to: 1) Establish the Mobility COP; 2) Select, establish and maintaining the operating area; 3) Attack the enemy's ability to influence the operating area; and 4) Maintain mobility and momentum.

(2) Required capabilities to achieve Assured Mobility include:

- (a) Common Operational Picture for Mobility.
- (b) Means to provide early warning for soldiers, platforms, and forces, focusing on avoidance (i.e., mines and other obstacles, NBC hazards, missiles, and air threats).
- (c) Means to rapidly 'breach ahead' in open, restricted, and urban terrain.
- (d) Means to rapidly cross wet and dry gaps.
- (e) Embedded, standoff, forward- and side-looking remote detection, and neutralization of hazards such as mines, booby traps, and IEDs.
- (f) Detection from other platforms, at tactical and operational ranges.
- (g) Route security and clearance (route reconnaissance and surveillance, LOC/main supply route (MSR) regulation enforcement; river and obstacle crossings, and passage of lines) to include control and maintenance of LOCs to, and within, the AO.
- (h) Circulation/traffic control measures.
- (i) Visual and virtual obstacle marking system for point and area CBRN/hazardous material detection, decontamination, and hazard area marking.
- (j) Computer-aided analysis, to enable prediction of enemy efforts to impede maneuver, based on terrain reasoning, threat capabilities, and employment patterns.
- (k) Reach-back for technical expertise and enablers.
- (l) Area/route clearance at operating speeds.
- (m) Rapid construction and repair of routes and trails.
- (n) Trafficability enhancers.

b. **NARRATIVE.** The mobility of the Objective Force is critical, to maintain the high tempo, and operate over the extended distances dictated by this concept. Assured mobility is one of several key maneuver support enablers of the Objective Force, and must be developed to its full potential. Assured mobility extends the concept of air corridor suppression of enemy air defense, to ground mobility routes, or corridors. A blanket of sensor coverage will encompass the selected course of action, allowing assured route mobility. Sensors will maintain current, updated SU, and sensor-effects links will preclude the enemy from modifying the current mobility situation. The current operational pictures will be fed continuously to commanders, and area denial systems will prevent enemy alteration. Future requirements for the ISR system include sensors that can distinguish between friendly, enemy, and civilian activities; integration of battlefield sensors; mobility decision aids; and denying enemy forces the opportunity to apply countermobility measures.

c. **LINKAGE TO AUTL:** ART 5.0 (The Mobility/Countermobility/Survivability Battlefield Operating System); ART 5.1 (Conduct Mobility Operations); ART 5.1.1 (Overcome Barriers/Obstacles/Mines); ART 5.1.1.1 (Conduct Breaching Operations); ART 5.1.1.2 (Clear Obstacles); ART 5.1.1.2.1 (Conduct Area Clearance); ART 5.1.1.2.2 (Conduct Route Clearance); ART 5.1.1.3 (Conduct River Crossing Operations); ART 5.1.2 (Enhance Movement and Maneuver); ART 5.1.2.1 (Construct/Maintain Combat Roads and Trails); ART 5.1.2.2 (Construct/Maintain Forward Airfields and Landing Zones); ART 5.2. (Conduct Countermobility Operations); ART 5.2.1 (Site Obstacles); ART 5.2.2 (Construct, Emplace, or Detonate Obstacles); ART 5.2.3 (Mark, Report, and Record Obstacles); ART 5.2.4 (Maintain Obstacle Integration); ART 5.3.5 (Conduct Security Operations); ART 6.3.1.3 (Conduct Maneuver and Mobility Support Operations); ART 8.5.4 (Bypass Enemy Obstacles/Forces/Positions).

d. **LINKAGE TO UJTL:** OP 1 (Conduct Operational Movement and Maneuver); OP 1.3.1 (Overcome Operationally Significant Barriers, Obstacles, and Mines); OP 1.3.2. (Enhance Movement of Operational Forces); OP 1.4 (Provide Operational Countermobility); OP 6.2.13 (Conduct Countermine Activities); ST 1 (Deploy, Concentrate, and Maneuver Theater Forces); TA 1 (Develop/Conduct Maneuver); TA 1.3 (Conduct Countermine Operations); TA 1.4 (Conduct Mine Operations).

**10-4. FOC-10-04: Deny Enemy Freedom of Action.**

a. **CAPSTONE CAPABILITIES.**

(1) Key to the success of the Objective Force will be its ability to maintain an unprecedented level of freedom of maneuver at the strategic, operational, and tactical levels, in all environments. Equally as critical, is denying the enemy the freedom of action. Denying the enemy freedom of action includes proactive measures to leverage the physical environment to isolate enemy forces, deny key terrain, and deny, impede, or canalize enemy movement, in order to protect friendly forces and their freedom of action, and to place enemy forces in positions of disadvantage.

(2) Required capabilities include:

(a) Countermobility means to reinforce friendly fires (intelligent sensor/munitions fields, and the means to employ them).

(b) Terrain modification/obstacle emplacement capability, to fix enemy forces, or disrupt enemy operations.

(c) Effective isolation during Military Operations in Urban Terrain, and operations in complex terrain, to shield friendly forces, or fix enemy forces.

(d) Tunable on/off munitions; intelligent integrated sensor-munitions—tunable, positive on/off, IFF, self-destruct, with standoff delivery.

(e) Sensor/effects packages, to deny access to critical points.

(f) Autonomous minefield/mine emplacement and/or recovery.

(g) Dynamic, self-healing minefields, and other ‘obstacles on demand.’

(h) Nonlethal capabilities for point and area denial, trafficability, and traction reduction and counter-materiel.

(i) Jamming/C2 disruption.

(j) Decoys and other deception tools.

**b. NARRATIVE.**

1) This aspect of maneuver support focuses on enabling our maneuver commanders, and formations, to seize the initiative in achieving a position of decisive advantage, from the very outset, and sustaining the initiative throughout a campaign, operation, or engagement. However, the Objective Force Commander will almost always face a threat that is empowered by the ‘home court’ advantage. The threat commander’s intimate knowledge of the battlespace, and its effects (advantages and disadvantages), will give the threat commander the upper hand in maintaining freedom of maneuver—at least initially. The home court mobility advantage will be the centerpiece of the threat’s adaptive strategies, to draw UA formations into dangerous close combat situations where the threat has the opportunity to mass, attack, and then quickly disperse. The enemy’s offensive tactical actions will be opportunistic. Surprise, combined with asymmetric capabilities, will frequently be a central theme in the design of the threat’s tactical operations. To succeed, threat forces at all levels must maintain freedom of mounted, and dismounted maneuver, throughout the battlespace, particularly in urban and complex terrain, where the standoff/long-range precision fires of the UA may be degraded.

(2) At the strategic and operational level, denying enemy freedom of action is an integral part of shaping operations, with a chief aim of creating and/or sustaining opportunities for subordinate formations to achieve a position of advantage. At the tactical level, denying enemy freedom of action is more directly tied to shaping tactical engagements. Denying enemy

freedom of action focuses on the employment of maneuver support organizations and assets, to achieve any combination of five specific effects: Deny Use of Facilities/Areas, Fix Enemy Forces, Disrupt Enemy Operations, Shield Friendly Forces, and Reinforce Fires.

c. **LINKAGE TO AUTL:** ART 2.4.2 (Conduct Nonlethal Direct Fire Against a Surface Target); ART 3.0 (The Fire Support Battlefield Operating System); ART 3.1 (Decide Surface Targets to Attack); ART 3.2 (Detect and Locate Surface Targets); ART 3.3 (Employ Fires to Influence the Will and Destroy, Neutralize, or Suppress Enemy Forces); ART 5.3.5 (Conduct Security Operations); ART 5.3.5.7 (Employ Obscurants); ART 8.5 (Conduct Tactical Mission Tasks); ART 8.5.2 (Block an Enemy Force); ART 8.5.3 (Breach Enemy Defensive Positions); ART 8.5.5. (Canalize Enemy Movement); ART 8.5.8 (Contain an Enemy Force); ART 8.5.9 (Control an Area); ART 8.5.13 (Disrupt a Designated Enemy Force's Formation/Tempo/Timetable); ART 8.5.15 (Fix an Enemy Force); ART 8.5.18 (Interdict an Area/Route to Prevent/Disrupt/Delay its Use by an Enemy Force); ART 8.5.19 (Isolate an Enemy Force); ART 8.5.20 (Neutralize an Enemy Force); ART 8.5.21 (Occupy an Area); ART 8.5.28 (Turn an Enemy Force).

d. **LINKAGE TO UJTL:** OP 1 (Conduct Operational Movement and Maneuver); OP 3 (Employ Operational Firepower); TA 3 (Employ Firepower).

#### **10-5. FOC-10-05: Enable Force Protection and Security.**

##### **a. CAPSTONE CAPABILITIES.**

(1) Provide layered and integrated actions, to prevent or mitigate hostile actions against joint and Army forces, resources, facilities, and critical information, through proactive attack, defensive, and standoff measures, that tie together point and area protection of nodes and operating areas. These actions conserve the force's fighting potential, so it can be applied at the decisive time and place, and incorporates the coordinated and synchronized offensive and defensive measures, to enable the effective employment of the joint and Army force, while degrading opportunities for the enemy. Provide full range of security operations, including proactive measures and response forces, to foster protected movement of forces between operating areas in 'gray spaces' (includes cueing and early warning to the lowest levels). Capabilities must facilitate the FP and security of the UA/UE units operating within the battlespace.

(2) Required capabilities include:

(a) Means to obscure the full range of RSTA and electromagnetic threats, both to protect friendly forces, and to attack enemy forces.

(b) Means to isolate the immediate battlespace, dynamically and nonlethally, to prevent interference in friendly operations by noncombatants.

(c) Means to retain control of, and maintain, LOC, to and within the AO.

(d) Combat Identification, Friend-Foe, Neutral information, in support of current and future operations.

(e) Antiterrorism and FP equipment and vulnerability assessment planning tools.

(f) Objective, Legacy, and Interim force interoperability, in the areas of communications, COP, and system-of-systems compatibility, to facilitate FP and security operations.

(g) Integrated ISR, and dynamic sensors, for standoff detection/assessment, to aggressively perform FP and security operations.

(h) Tailored obscurants, long duration obscurants, intelligent, sensor-based munitions, and nonlethal effects, to alter the tactical environment.

(i) Detection, prediction, and warning of threats from population, asymmetrical, or unconventional forces.

(j) Means to harden facilities.

(k) Robotic support for currently manpower-intensive, or dangerous tasks, such as route clearance and minefield clearing. Likewise, robotic or automation of appropriate tactical tasks, such as SHORAD, and security of point and area targets, will be important.

(l) Improved camouflage, concealment, and deception tools.

**b. NARRATIVE.**

(1) While our operational environment will certainly be influenced by weather, terrain, and infrastructure challenges, the enemy will further complicate our missions by actual or threatened attacks on our homeland, friendly POD/POE, bases of operation, key nodes and routes, and C4ISR networks. The enemy will employ terrorists, special purpose forces, and heavily armed criminal elements, operating in a widely dispersed manner, to exploit our own doctrinal dispersion, and take advantage of the terrain we choose to leave uncovered. When given the opportunity, the enemy will exploit the ability to camouflage and shield their forces and operations, by utilizing hugging techniques, embedding them in high concentrations of noncombatants, and/or areas identified as sanctuaries. The enemy will attempt to capitalize on their availability of long-range fires, CBRN, and medical threats.

(2) Operational Concepts that mitigate these operational dilemmas will rely on FP and security, from the strategic, down to the tactical levels. Concepts will include improving the security posture of our power projection platforms, denying the enemy an understanding of our entire environment, and integrating interagency, foreign-nation, multi-national, and coalition security capabilities, when available. Employing maneuver support enablers, from the UE force pools in FP, and security operations in the noncontiguous battlespace, or in direct support of UA maneuver operations, will contribute to shaping the FP and security environment, and help deny that gray space advantage to the threat commander. Security-related operations, such as area

security, installation/base base-cluster physical security posture, populace and resource control operations, enemy prisoner of war (EPW) operations, civilian control operations, and noncombatant evacuation operations, which directly impact the security responsibilities of the commander. United States Forces are frequently involved in these types of operations, and should be prepared to provide assistance, as necessary. While all of the MS functions are important to the overall success of assigned missions, the mission of area security, and its ability to enhance maneuver unit operations, is critical. Area security operations assist in protecting the force, and enhancing the freedom of units to conduct their assigned missions. Maneuver Support roles include the ability to provide response forces and obstacles that delay and defeat the enemy's attempts to disrupt, or demoralize, military operations in the AO. Area security operations provide an economy of force option to the battlespace commander. The MS units conducting Area Security provide the ability to engage in an aggressive patrolling within the AO including MSRs and key terrain. Units conducting area security are capable of reinforcing defenses of critical assets.

c. **LINKAGE TO AUTL:** ART 1.3 (Conduct Intelligence, Surveillance, and Reconnaissance (ISR)); ART 2.2.11 (Conduct a Survivability Move); ART 4.0 (The Air Defense Battlefield Operating System); ART 5.3 (Conduct Survivability Operations); ART 5.3.5 (Conduct Security Operations); ART 6.3.1.3 (Conduct Maneuver and Mobility Support Operations); ART 6.10.3 (Provide Engineer Construction Support); ART 6.13 (Conduct Internment and Resettlement Activities); ART 6.13.1 (Perform Enemy Prisoners of War/Civilian Internment); ART 6.13.2 (Conduct Populace and Resource Control); ART 7.7.2.2 (Provide Law and Order).

d. **LINKAGE TO UJTL:** OP 6 (Provide Operational Force Protection); ST 6 (Coordinate Theater Force Protection); TA 6 (Protect the Force); OP 6.5.2 (Protect and Secure Flanks, Rear Areas, and COMMZ in the Joint Operations Area (JOA)); OP 6.5.3 (Protect/Secure Operationally Critical Installations, Facilities, and Systems); OP 6.5.4 (Protect and Secure Air, Land, and Sea LOCs in the Joint Operations Area (JOA)); SN 8.1.10 (Coordinate Actions to Combat Terrorism); ST 6.2.6.3 (Establish and Coordinate Protection of Theater Air, Land, and Sea LOCs); ST 6.2.6.4 (Establish and Coordinate Theater-Wide Counterintelligence Requirements); ST 8.4.1 (Advise and Support Counterdrug Operations in Theater); ST 8.4.2 (Assist in Combating Terrorism); TA 1.2.4 (Conduct Counterdrug Operations); TA 6.3 (Conduct Rear Area Security).

## **10-6. FOC-10-06: Engage and Control Populations.**

### **a. CAPSTONE CAPABILITIES.**

(1) Population engagement is the ability to proactively provide the necessary control, over demographically diverse populations, to ensure maneuver, MS, and maneuver sustainment forces are unencumbered in the conduct of their respective operations. Populations are most often classified as EPWs, civilian internees (CIs), detainees, refugees, displaced persons, stateless persons, war victims, evacuees, resident stay-put populations, or mass transiting civilian populations. They can also include local insurgent groups, organized crime syndicates, and other governmental, law enforcement, political, informational, military, economic, religious, and social leaders (legitimate or otherwise).

(2) Capabilities must facilitate the (UA) commander's ability to conduct rapid and decisive combat operations; deter, mitigate, and defeat threats to populations that may result in conflict; reverse conditions of human suffering; and build the capacity of a foreign government to effectively care for, and govern, its population.

(3) Required capabilities include:

(a) Population movement, collection, evacuation, and resettlement controls.

(b) Means to shelter, sustain, guard, protect, and account for EPWs, CIs, retained personnel, and other detainees.

(c) General engineering support to construct, maintain, and repair camps, facilities, and/or (necessary or essential) infrastructure for varying populations.

(d) Means to assist civil authorities to restore basic services, and critical infrastructure (e.g., 'prime power,' security, safety, utilities, etc.).

(e) Means to detect, track, and group populations into four broad categories, for identification and subsequent disposition:

- EPWs, CIs, and detainees;
- resident populations, refugees, displaced persons, stateless persons, war victims, and evacuees;
- insurgent groups and organized crime syndicates;
- governmental, law enforcement, political, informational, military, economic, religious, and social leaders (legitimate or otherwise).

(f) Means to mitigate and defeat threats to civil society that may result in conflict; and establish Civilian-Military Operations Center operations.

(g) Means to generate, and deliver, propaganda and counter-propaganda products at targeted populations.

(h) Interoperability with multinational organizations, indigenous populations and institutions (IPIs), international organizations, NGOs, and other government agencies (OGAs), and control humanitarian assistance related to population movement.

(i) Proactive and nonlethal crisis responses to mitigate long-term negative impacts.

(j) Universal language translation capabilities.

(k) Biometrics for positive identification, detection, database recall, and intelligence fusion.

(l) Increased theater and battlefield access to worldwide police and intelligence databases.

(m) Analytical tools for pattern analysis, to support police/criminal intelligence efforts.

**b. NARRATIVE.**

(1) Population dynamics are among the most destabilizing forces in the world today. In light of persistent armed conflict, and social turmoil throughout our multipolar world, the effects on populations remain a compelling issue. Many cities are overwhelmed by an increasingly growing citizenry and the presence of rural refugees. The potential for instability in the largest cities is undeniable. The world population will increase, from 6 billion to 9 billion, in the next two decades, with 95 percent of the growth occurring in the developing world. By 2020, 60 percent of the world's population will live in urban areas. Coexisting, demographically and ethnically diverse societies will aggressively compete for limited resources, such as individual freedoms, employment, economic benefits, clean water, productive soils, desirable living conditions, mature infrastructure, political autonomy, and natural resources. Typically, overpopulated third world societies suffer from a lack of legitimate and effective enforcement mechanisms—generally accepted as one of the cornerstones of a stable society. Only in the most advanced societies, where supporting governments make a genuine attempt to care for all of their diverse population groups, will the competition be less than chaotic. In this rapidly changing and dynamic operational environment, U.S. Forces will compete with local populations for the same space, routes, and resources. As displaced noncombatant populations create an increased demand for humanitarian assistance resources, the control of their movement and activity is expected to exceed the capability of foreign-nation, international organization's, NGO's, and OGA's means. The likelihood for uncontrolled populations to impede U.S. military operations is always present, and can overwhelm an advancing force. Ultimately, the swelling number of competing groups creates an environment conducive to interference with maneuver, MS, and maneuver sustainment forces.

(2) An adaptive enemy will manipulate populations, hostile to our intent, by instigating mass civil disobedience, directing criminal activity, masking their operations in urban and complex terrain, maintaining an indistinguishable presence through cultural anonymity, and actively seeking the traditional sanctuary of protected areas, as defined by the rules of land warfare. Such actions will facilitate dispersal of threat forces, negate technological overmatches, and degrade our targeting opportunities. Therefore, employment concepts will include leveraging technology to influence and control populations, maximizing use of ISR sensors and CIFFN to differentiate between combatants and noncombatants, and friendly forces from threat forces, evacuating and resettling EPWs and CIs, and conclusively transitioning humanitarian assistance operations to other functional agencies. The (UA) commander can mitigate, or defeat, threats to civil society, by conducting cooperative operations with multinational organizations, international organizations, NGOs, OGAs, and IPIs. These represent the aggregate of the people, organizations, and structures that comprise an operational area's governmental, political, informational, military, economic, religious, and social systems. The operational benefits are realized by employing MS enablers, from UE force pools, to set the conditions that unburden the military commander, prevent uncontrolled population movement or action from influencing the

commander's maneuver, and enabling an unconstrained attack, without fear of friendly or noncombatant interference.

c. **LINKAGE TO AUTL:** ART 2.4.2 (Conduct Nonlethal Direct Fire Against a Surface Target); ART 6.10.3 (Provide Engineer Construction Support); ART 6.13 (Conduct Internment and Resettlement Activities); ART 6.13.1 (Perform Enemy Prisoners of War/Civilian Internment); ART 6.13.2 (Conduct Populace and Resource Control); ART 6.14 (Conduct Civil-Military Operations); ART 6.14.1 (Provide Interface/Liaison Between U.S. Military Forces and Local Authorities/Nongovernmental Organizations); ART 6.14.2 (Locate and Identify Population Centers); ART 6.14.3 (Identify Local Resources/Facilities/Support); ART 6.14.4 (Advise Commanders of Obligations to Civilian Population); ART 6.14.5 (Resettle Refugees and Displaced Civilians); ART 6.14.6 (Establish Temporary Civil Administration (Friendly, Allied, and Occupied Enemy Territory)); ART 6.14.6.7 (Provide Public Safety Support).

d. **LINKAGE TO UJTL:** OP 4.6.4 (Provide Law Enforcement and Prisoner Control); SN 8.1.10 (Coordinate Actions to Combat Terrorism); ST 4.4.3 (Coordinate Law Enforcement and Prisoner Control); ST 6.2.6.3 (Establish and Coordinate Protection of Theater Air, Land, and Sea LOCs); ST 6.2.6.4 (Establish and Coordinate Theater-Wide Counterintelligence Requirements); ST 8.4.1 (Advise and Support Counterdrug Operations in Theater); ST 8.4.2 (Assist in Combating Terrorism); TA 1.2.4 (Conduct Counterdrug Operations); TA 6.3 (Conduct Rear Area Security).

#### **10-7. FOC-10-07: Neutralize Hazards and Restore the Environment.**

##### **a. CAPSTONE CAPABILITIES.**

(1) Neutralize Hazards and Restore the Environment includes those efforts to reduce, or eliminate, the operational impact and effects of a full range of environment-based hazards, through avoidance, mitigation, neutralization and, when necessary, restoration of the environment to acceptable safety levels. Capabilities and enablers must exist to avoid, mitigate effects, and neutralize hazards of all types, including industrial hazards, and WMD.

(2) Required capabilities include:

(a) Means to perform environmental risk assessment, including establishment of the environmental baseline.

(b) Means to conduct consequence management, when hazards cannot be avoided, or when hazards result from interception.

(c) Means to detect and neutralize hazards, such as toxic substances and pollutants, and CBRN weapons/munitions, mines, and improvised explosive devices; and conduct point/area decontamination of all sorts of hazards, to include the decontamination of vehicles, troops, equipment, supplies, and critical infrastructure.

(d) Means to perform area damage control.

(e) Means to provide preventative medicine, and environmental surveillance.

(f) Disposal of unexploded ordnance (UXO).

(g) Visual and virtual obstacle marking system or systems.

(h) General engineering construction support, to restore the environment.

(i) Means to conduct denial operations, to eliminate potential CBRN hazards, to include TICs and TIMs.

**b. NARRATIVE.**

(1) Enemy forces are likely to have access to, and be willing to employ, WMD, including the use of CBRN weapons, as well as TICs/TIMs, and conventional mines and minefields. The enemy will use CBRN to shape the battlefield, inflict casualties, and disrupt access to ports and airfields against targets of opportunity, or even against the threat's own people, to create the perception that American forces employed them against civilians. United States Forces could become exposed to CBRN hazards, used as a weapon of opportunity, anywhere on the battlefield, and in any phase of conflict. Exposure could occur as a result of an intentional enemy attack, through an attack on a production or storage facility, as the result of collateral damage, or through catastrophic releases of toxic or contaminated materials. Delivery means vary, and can range in technological sophistication from a bicycle, to a ballistic missile.

(2) The Objective Force will be prepared to identify and deal with a wide variety of incidental and accidental hazards, and will practice sound environmental stewardship, consistent with the military situation. Neutralizing hazards, and restoring the environment, consists of many military tasks, ranging from identifying and mitigating toxic substances, pollutants, and CBRN hazards; to military construction and repairs; clearing mines and other obstacles; decontaminating vehicles, equipment, and infrastructure; and destroying UXO. It also includes preventive medicine, environmental surveillance, identification of chemical, biological, and nuclear agents, environmental safety precautions, and protection or elimination of potential hazard sources. Neutralizing hazards, and restoring the environment, occurs across the full spectrum of military operations, from disaster relief, to major combat operations, in any phase of an operation, in CONUS and abroad. It supports Homeland Security, force projection, assured theater access, and preserves combat power, sustaining operational and logistical distribution, and minimizing casualties, both military and civilian.

(3) The Objective Force will minimize damage to soil, air, and water, in a manner consistent with the military mission. The Army's responsibility is to minimize health and occupational risks to soldiers, while minimizing environmental impacts. Military operations are inherently harmful to the human and natural environment. The policy of the United States military is that incidental and collateral damage to the environment will be minimized. The United States will not deliberately, and without compelling military necessity, damage the soil, air, water, or cultural or socioeconomic entities of any nation, on any battlefield. The Army

recognizes that minimizing incidental and collateral environmental damage, to the natural environment, is clearly the most responsible, cost-effective, and long-term solution for reducing risks to human health, and the natural environment. By minimizing these damaging environmental impacts, the Army reduces compliance violations, and the costs of restoration.

c. **LINKAGE TO AUTL:** ART 5.1.1 (Overcome Barriers/Obstacles/Mines); ART 5.1.1.2 (Clear Obstacles); ART 5.1.1.2.1 (Conduct Area Clearance); ART 5.1.1.2.2. (Conduct Route Clearance); ART 5.3 (Conduct Survivability Operations); ART 5.3.1 (Protect Against Enemy Hazards within the Area of Operations); ART 5.3.1.1 (Protect Individuals and Systems); ART 5.3.1.4 (Employ Protective Equipment); ART 5.3.2 (Conduct Nuclear, Biological, and Chemical (NBC) Defense); ART 5.3.2.1 (Provide NBC Protection to Friendly Forces); ART 5.3.2.1.1 (Employ Contamination Avoidance); ART 5.3.2.1.2 (Identify Nuclear, Biological, and Chemical Hazards); ART 5.3.2.1.3 (Warn Personnel/Units of Contaminated Areas); ART 5.3.2.1.4 (Report NBC Hazards Throughout the Area of Operations); ART 5.3.2.1.5 (Use Individual/Collective Nuclear, Biological, and Chemical Protective Equipment); ART 5.3.2.1.6 (Prepare for a Nuclear Strike); ART 5.3.2.2 (Decontaminate Personnel and Systems); ART 5.3.2.2.1 (Perform Immediate Decontamination); ART 5.3.2.2.2 (Perform Operational Decontamination); ART 5.3.2.2.3 (Perform Thorough Decontamination); ART 5.3.2.2.4 (Perform Area Decontamination); ART 5.3.2.2.5 (Perform Patient Decontamination); ART 5.3.4 (Provide Explosive Ordnance Disposal Support); ART 6.10 (Provide General Engineer Support); ART 6.10.1 (Restore Damaged Areas); ART 6.10.2 (Construct and Maintain Sustainment Lines of Communications); ART 6.10.3 (Provide Engineer Construction Support); ART 6.10.4 (Supply Mobile Electric Power); ART 6.10.5 (Provide Facilities Engineering Support).

d. **LINKAGE TO UJTL:** OP 1.3.1 (Overcome Operationally Significant Barriers, Obstacles, and Mines); OP 1.4 (Provide Operational Countermobility); OP 6 (Provide Operational Force Protection); OP 6.2 (Provide Protection for Operational Forces, Means, and Noncombatants); OP 6.2.8 (Establish NBC Protection in the Joint Operations Area (JOA)); OP 6.2.13 (Conduct Countermine Activities).

## Chapter 11 Maneuver Sustainment

Objective Force **aggressively reduces logistics footprints** and replenishment demand. Sustaining base will be **agile and tailorable** to mission. Maneuver Support 'reach' capabilities will be leveraged from higher echelons to reduce stockpiles in theater. Capabilities include rapid deployment of forces by air, land, and sea; employable on arrival for **up to 72 hours, without resupply**. Deployment does not initially rely on an intermediate staging base/FOB. Forces enter **at austere, dispersed points, and employ upon arrival**. To reduce log footprints and improve velocity management, initiatives such as 'reach', **rapid transshipment, and in-transit visibility** of commodities through a **robust C4I architecture**, will be employed. Provide revolutionary means to **transport and sustain people and materiel**, by leveraging new ground and aerial concepts for delivery that use standard/nonstandard, unmanned organic and joint systems. **Improved diagnostics and prognostics** allow greatly improved repair time and reduced part stockage. **Better reliability, high fuel efficiency**, and employment of a combination of **improved targeting and precision munitions**, help reduce demand, and enable forces to maintain a 3-day, high OPTEMPO, without replenishment. **Improved, far-forward medical care** will reduce casualties, and enable soldiers to receive timely care and evacuation.

### 11-1. Sustainment objectives.

a. The battlefield maneuver sustainment footprint of the Objective Force, and demand for replenishment, is aggressively reduced, especially for the Maneuver UA. Unit of Action will have fewer vehicles and leverage reach capabilities. The UA can organically sustain itself for 3 days of high OPTEMPO, without replenishment from external sources, in continuous combat, in mid to high intensity conflict; and be self-sustainable for up to 7 days in low-end conflict and peacetime military engagement. Future combat system sustainment systems must support the simultaneous, multimodal insertion of UA forces into multiple austere points of entry, without reliance on fixed ports and staging bases. The Objective Force will achieve significant sustainment effectiveness and efficiencies through:

- Innovative, multimodal distribution concepts.
- Improved reliability and/or redundant components, to remain operationally effective for the full 3 to 7-day mission period.
- Commonality across formations, in platforms and components, to simplify and reduce sustainment, support multifunctionality, reduce the many personnel and skills required in today's organizations, and contribute to simplification of deployment, maintenance and training.
- New power generation and high fuel efficiency, with reduced dependence on petroleum products, to minimize use of external power generators.
- Simplified systems maintainability, to reduce maintenance and replenishment requirements.
- Like and self-recoverability of platforms that enables rapid evacuation.

- Capability of the FCS FoS for open port refueling and compatibility with the FCS refueling system, incorporating a locking fast-refueling capability and the ability to draw fuel from a fuel cell. Future combat system FoS must be interoperable with legacy and interim systems.

b. Acquire reduced demand, and minimize the maneuver sustainment burden on unit effectiveness, through balanced system reliability, and redundancy and repair, to include embedded diagnostics and prognostics, as well as modular component design. Responsive and on-demand sustainment is centralized at UE level. A system of potable water generation and replenishment, at every echelon, must be provided, to minimize the need for special-purpose units and demands. Modularity can be enabled, by accepting rapid force tailoring for increasing force versatility, operational flexibility, and agility in the UA AO. Integrate maneuver sustainment into a single, integrated, knowledge-based C4ISR architecture that supports reach to local, regional, and nondeployed sources, both governmental and nongovernmental. Provide secure capability, passively and actively, to monitor, report and submit requests to facilitate anticipatory sustainment, enhance situational understanding, and build, generate, and sustain maximum combat power during military operations.

c. Provide revolutionary means of transporting and sustaining people and materiel, to leverage new ground and aerial concepts for delivery. Transport and sustain using standard/nonstandard, manned and unmanned, organic, joint, and multinational systems, including precision airdrop. Maneuver sustainment functions that require organic mobility will not degrade deployability, agility, and maneuverability of combat forces.

d. Enable quick cross-leveling of supplies, between platforms and units, in contact, and on the move. Leverage preconfigured packaging and platform-embedded materiel handling and lift for rapid, accurate, and agile resupply that minimizes demand on soldiers. Provide for dynamic rerouting and tracking of supply delivery as priorities dictate.

e. Dismounted forces must be self-sustaining, during continuous operations, for at least 24 hours. Enable increased endurance, and cognitive awareness of soldiers for the assault, by removing many functions from the soldier's back, to systems or platforms. Employ robotic systems to perform redundant and appropriate maneuver sustainment tasks, in order to enhance continuous operations. Modular Universal Laser Equipment-like robotic capability will perform a variety of sustainment/replenishment functions on a highly agile, light, but survivable platform, to include:

- Carrying dismounted soldier loads.
- Operating in terrain requiring dismounted operations.
- Performing nonstandard casualty evacuation and services, such as battery recharging.
- Performing combat tasks, such as reconnaissance of high-risk areas.

f. The FCS FoS must incorporate an embedded prognostics and embedded diagnostics system that identifies and displays fault data to the individual component/Line Replaceable Unit (LRU)/Line Replaceable Module (LRM) level. Both prognostics and diagnostics must provide

the level of detection and/or isolation required, to meet the stated reliability and maintainability requirements.

(1) *Prognostics*: All FCS platforms will incorporate an embedded prognostics capability that will accurately predict pending critical system failures, that might occur in a 72 hour mission, to the appropriate LRU, early enough to allow corrective action, before the unit begins the mission. (*NOTE*: A 'critical system failure' is any failure that causes system aborts IAW the reliability definition. Any part of component that field maintenance personnel can replace is defined as LRU.)

(2) *Diagnostics*: All FCS platforms will incorporate an embedded diagnostics capability that will identify the system failures accurately to the appropriate LRU, with notification first to the crew, then to the supporting maintenance personnel (through the logistics STAMIS). (*NOTE*: Any card, module, or component that field maintenance personnel can replace is defined as LRU.)

g. A reliable, embedded prognostics and diagnostics system will provide accurate and timely information to the crew and maintenance personnel. This is a primary enabler for the crew chief to be able to do the majority of the on-system maintenance tasks. Prognostics are a combat effectiveness enabler, and not a logistics enabler. The contribution of the prognostics system is dependent upon the coverage, accuracy, and lead-time of the applied sensors. Prognostics will provide increased system health awareness, and enable increased combat effectiveness, by reducing the risk of unexpected critical failures during a mission pulse. However, misprognosis does lead to unnecessary maintenance actions, and therefore, contributes to the requirement for a larger than necessary logistics footprint. For that reason, reliable and accurate prognostics are critical. Diagnostics, on the other hand, is both a combat effectiveness and logistics enabler. The value of diagnostics is a function of coverage and accuracy. Diagnostics will reduce the time required of the crew chief and/or maintainers to identify and isolate a fault, which will enable the proper maintenance action to occur more quickly. Misdiagnosis, like a misprognosis, will lead to an unnecessary maintenance action, and adversely impact logistics footprint. The FCS maintenance concept, with a heavy reliance on 'replace forward' by the crew chief or Contact Repair Team, requires accurate and timely troubleshooting of system failures, and reduction in the removal and replacement of incorrect components. Prognostics and diagnostics values will be developed, based on future modeling of technological maturity estimates.

h. Future combat system FoS must incorporate an embedded potable water generation and storage capability, that allows the FCS and assigned crew to operate without external water resupply for a period of 3 days of high intensity, or 7 days of low intensity operations. Each FCS FoS platform-embedded water production capability enhances flexibility of supply operations, and increases available combat power. Future combat system must provide a system of potable water generation, purification, and replenishment, minimizing the need for special purpose (water) units and demands.

i. Future adversaries will certainly seek to exploit a perceived center of gravity for U.S. Forces, an aversion to significant numbers of casualties. Accordingly, any future conflict will likely be characterized by operations intended to inflict large numbers of U.S. casualties quickly.

Force Health Protection (FHP) (formerly known as Combat Health Support) to the Objective Force, will be built on three pillars: (1) provide a healthy and fit force, (2) casualty prevention, and (3) casualty care and management to rapidly stabilize wounds/injuries and provide early casualty evacuation. Force Health Protection efforts must address the needs, and coordinate care, of the entire joint deployed force, including contractors and civilians on the battlefield. Close coordination with allies, coalition forces, and nongovernmental agencies will be essential to meet the overwhelming FHP requirements. The time-sensitive nature of casualty management necessitates that FHP is an exception to the 3-7 day 'pulsed logistics' concept.

j. Critical patients cannot be held far forward for 3-7 days without evacuation to higher echelon healthcare. Science and technology is not expected to provide a solution to this problem in the early Objective Force timeframe (2008-2015). Future advances in S&T may provide solutions, in the later Objective Force timeframe (2015-2030), that will allow the merging of Echelon I and Echelon II medical support. Medical evacuation and emergency resupply of Class VIII supplies must be on demand. However, the increased distances of operations and dispersion of troops will lend significant challenges. Whenever the UA Brigade deploys, the minimum essential, medical capabilities required to support it must include Level I care, Level II care (medical company), Far Forward Resuscitative Surgical capability, ground and air medical evacuation, and hospitalization. These capabilities are required continually (to include the first 72 hours), from the beginning of the deployment. Additional surgical, air medical evacuation, and hospitalization capabilities will be moved forward from the Objective Force UE FHP elements, in support of the Objective Force UA Brigade, as required.

k. Medical units in the UA will have two distinct FCS variants, including a FCS-medical treatment vehicle (FCS-MTV)(for casualty treatment), and a FCS-medical evacuation vehicle (FCS-MEV)(for casualty evacuation). Both will have deployability, mobility, survivability, and situational awareness equal to that of other FCS variants, and be capable of supporting the full spectrum of operations, in all forms of terrain and climactic conditions. Having a designated MEV has several benefits: medics will not occupy space on a nonmedical platform, and medics will have better mobility to go where the commander needs them. Treatment squads and evaluation teams will provide the principal FHP support to forward combat elements. Treatment squads will be capable of splitting into two teams, with two FCS-MTVs, one crew having a physician and three 91Ws, and one crew having a Physician Assistant and three 91Ws. The evacuation teams will have a crew of three 91Ws, utilizing FCS-MEVs. The treatment squad will form the base of the Battalion Aid Station. The FCS-MEVs and crews will function as mounted company and platoon combat medics. They will provide initial treatment and stabilization, and if possible, will return patients to duty. They will evacuate any casualties back to the Battalion Aid Station that cannot return to duty (RTD). From there, they will either be RTD, or evacuated to the Brigade Medical Company. Augmentation by a Forward Surgical Team is critical, in order to provide far forward resuscitative surgery, allowing stabilization of casualties for further evacuation to the next level of care.

l. Enable medical treatment and evacuation of wounded soldiers across echelons to standard. Future combat system enables rapid medical diagnosis and triage, and commander estimate of soldier medical status, while providing standard medical support. Platforms capable of carrying dismounted soldiers must have the ability to carry litter patients for extraction, transportation of

severely injured casualties, and execution of in-stride casualty transfer to FCS medical variants. All manned FCS platforms, capable of transporting and extracting casualties, will have the ability of performing telemedicine/teleconsultation support between FCS personnel, combat lifesavers, combat medics, unit medical elements, and higher-level medical treatment facilities. Enable the ability to treat on the move, hold, and transport casualties until evacuation or extraction. This ability provides far forward resuscitation and stabilization, with an internal 'stabilized' area for surgical intervention, and treatment on the move. It also includes the ability to provide a fully automated, self-contained intensive care environment, capable of maintaining a stable casualty for up to 72 hours.

m. Medical companies will have medical laboratory and radiological service capabilities.

n. **LINKAGE TO AUTL:** 6.0 (The Combat Service Support Battlefield Operating System).

o. **LINKAGE TO UJTL:** SN 4 (Provide Sustainment); ST 4 (Sustain Theater Forces); OP 4 (Provide Operational Logistics and Personnel Support); TA 4 (Perform Logistics and Combat Service Support).

**11-2. FOC-11-01: Sustainability.** The Army's unique contribution to national security is prompt sustained land dominance, across the range of military operations and the spectrum of conflict. The Objective Force must retain the Army's capability for sustained ground combat, enabling the joint force to achieve decisive outcomes. At the same time, Objective Forces must be unburdened of significant deployment and sustainment tonnage. Sharp reductions are required in sustainment demand, with significant improvements in reliability, split-based operations, and refined capabilities for accelerated throughput, battlefield distribution, and mission staging. The Army will aggressively reduce its logistics footprint and replenishment demand. This means that the Objective Force will deploy fewer vehicles and leverage CSS reach capabilities that allow commanders to reduce stockpiles in theater, while relying on technology to provide sustained velocity management and real-time tracking of supplies and equipment. The Objective Force will use reach capabilities to include physical and informational resources. The former is represented by hospital ships, air evacuation, and similar joint or coalition assets, and the latter is represented by 'report-back' of logistical status and needs, such as telemedicine/consultation and telemaintenance. The Objective Force design parameters will seek to achieve maintenance efficiencies, through more reliable systems, and commonality across joint formations—in chassis, repair parts, fuel, munitions, and components. Units must be capable of organically sustaining themselves for 3 days of high tempo operations without replenishment from external sources, in continuous combat, in mid-to-high intensity conflict; or be self-sustainable for up to 7 days in low-end conflict and peacetime military engagement. Requirement includes sufficient quantity of organic Class I, III, V and water. Future combat system FoS must automatically collect critical sustainment data, and have the capability to report sustainment data automatically, or upon request. Automated status reporting permits sustainment of forces, with supplies they need, when they need them, and facilitates cross leveling of supplies when required. Commanders at all levels must be provided simply displayed, but comprehensive, pictures of their sustainment status. This information must be tailorable to display all or a portion of the COP as relevant to the various echelons and functions.

The UE is the echelon responsible for ensuring sustained ground operations; UAs depend on capabilities at the UE level to continue operations beyond 3-day autonomy. Organizational designs and operational planning must provide for cyclical logistical replenishment and reconstitution. There will be little discernible break between decisive tactical engagement, tactical exploitation and pursuit, or staging for the next mission. In fact, within a combat battalion, the next mission will often be a continuation of its current fight—an anticipated branch or sequel. When more preparation is required (substantial mission change, fulfilling sustainment requirements, rest, etc.), mission staging is the way the combat battalion could conduct transition, while maintaining pressure on the enemy. It could include a limited action to refit or restore critical supplies or capabilities—such as today’s refuel-on-the-move operation. Mission staging could likewise be an intense, time-sensitive operation that includes all preparations for an upcoming mission—planning, troop leading, rehearsals, training (often virtual), resupply of mission load, and unit reconfiguration. The combat battalion’s tactical pattern of operation is a cycle within a larger operational context. These cycles enable forces at all levels to cycle in and out of combat, allowing the UA to maintain relentless and continuous pressure on the enemy. Mission staging is the approach to rapidly executing necessary mission and sustainment transitions that are a part of all operations. Initial mission staging coincides with initial operational-level preparations, but thereafter the tactical cycle turns more rapidly. Once the battle commences, the tempo of operations produces a cascade of increasingly intense engagements until the enemy is destroyed, or is dislocated, or the coherence of its organizations and operations disintegrates.

Tactical formations must be designed with enough subordinate units to rotate them regularly into and out of action, without diminishing engagement tempo and intensity. Objective Force units must possess a system of potable water generation and replenishment, at every echelon, to minimize the need for special-purpose units and demands. Soldiers must have the ability to purify water, from a variety of sources, while on the move. Objective Force units will maximize commonality of platforms, ammunition, C4ISR, and components to reduce the sustainment load, and simplify logistics management. Aerial sustainment will be required in greater degree to support Objective Force mobility and agility, especially given Objective Force dispersion, high operational tempo, noncontiguous operations, and expanding operational radii, all of which impact the sustainment time/distance paradigm.

**a. CAPSTONE CAPABILITIES.**

(1) Improve both strategic responsiveness and core warfighting abilities to effectively fight as an integral component of a joint, interdependent, full-spectrum, mission-tailored force, by substantially reducing overall sustainment demand (by ultimately up to 90 percent, compared to previously envisioned Force XXI/AXXI levels) while retaining an overmatching and robust operational posture. The goals and objectives of CSS will remain to provide the necessary support at the right time, in the right quantities, and at the right location.

(2) Objective Force must build upon new sustainment concepts that are emerging in support of the Interim Force, including:

- Split-based sustainment.

- Distribution-based sustainment—delivering the right support, to the right place, at the right time, over extended distances.
- Rising significance of precision air-delivered/dropped sustainment.
- Sustainment and operations integration.
- Medical treatment on the move.

b. **NARRATIVE.** Revolutionary logistical improvements, required to support the Objective Force, are among the most challenging goals of transformation, but are indeed critical to achieving the envisioned operational posture. Aggressive goals of reducing overall operational sustainment demand will not be easily achieved, but are vital to future warfighting success in the distributed battlespace. Demand for power, fuel, ammunition, repair parts, and other consumables, must be optimized across the battlespace footprint, to validate strategic responsiveness, and achieve effective force projection worldwide. The Army can no longer routinely incur the expense of sustaining a largely heavy force, either at home station or deployed. More efficient, alternative fuels, improved reliability, multifunctional system-of-systems components, and lightweight, mobile, hybrid power generation must become the norm. In addition, the warfighting support apparatus must be capable of maintaining the same OPTEMPO as maneuver forces, in all weather and battlespace conditions. Sustainment must become an integral part of the maneuver commander's battle rhythm, vice an adjunct appendage. Efficiencies are also required in providing designated support to other services within the joint warfighting team, and to other lead federal agencies, when conducting interagency operations. Mechanisms developed for the Objective Force by The Army, to achieve reductions in logistics demand and footprint, must be migrated to other supported services and federal agencies, to achieve like degree of reductions.

c. **LINKAGE TO AUTL:** ART 6.0 (The Combat Service Support Battlefield Operating System); ART 6.1 (Provide Supplies); ART 6.2 (Provide Maintenance); ART 6.5 (Provide Force Health Protection in a Global Environment); ART 6.11 (Provide Contracting Support); ART 6.12 (Provide Distribution Management).

d. **LINKAGE TO UJTL:** SN 4 (Provide Sustainment); ST 4 (Sustain Theater Forces); OP 4 (Provide Operational Logistics and Personnel Support); TA 4 (Perform Logistics and Combat Service Support).

### **11-3. FOC-11-02: Global Precision Delivery.**

a. **CAPSTONE CAPABILITIES.** Improve both strategic responsiveness, and core warfighting abilities, to effectively fight as an integral component of a joint, interdependent, full-spectrum, mission-tailored force.

(1) Provide real-time IM, graphically and/or digitally, of asset availability, throughout the CSS pipeline, from point-of-origin to delivery at final destination, allowing the logistician to effectively and efficiently support the warfighter within and beyond the defined battlespace.

(2) Deploy an operationally effective force, anywhere in the world, with capability to 'fight off the ramp' with minimal RSOI upon receipt of Joint Chiefs of Staff deployment orders. The

ability to ‘fight upon arrival’ requires that equipment will not require reassembly of major components in order to prepare it for operations. The crew can accomplish any reconfiguration required, after unloading from the aircraft, in minutes, without the assistance of cranes or forklifts.

**b. NARRATIVE.**

(1) The warfighter’s ultimate effectiveness depends on the CSS capability to deliver (project, receive, and stage, onward move, sustain, and redeploy) the necessary forces and materiel to a joint/multinational force, at successful corresponding mission velocity. A CROP of the defined battlespace/sustainment data, and an optimized seamless CSS system will allow the CSS manager to anticipate requirements, and provide focused support, when and where needed, including austere battlespace locations.

(2) Speed and precision are replacing sustainment by mass. Velocity, coupled with managed distribution and responsive transportation, is replacing stockpiles of supplies and lessening needed services. Reducing the ‘logistics footprint’ will give way to rightsizing the ‘sustainment footprint’ in the Objective Force. The transactions-based environment of today may be replaced by instantaneous, query-based, ‘web-based’ systems, enabling the force to carry fewer supplies, and streamlining overly complex and duplicative organizational structures. Supply inventory will be moving in the pipeline with definite time delivery goals. Customer wait time will be significantly reduced. Stock levels will be measured in relevant operational parameters, not hours or days of supply. Likewise, human resource support will be directed by task organizing and tailoring from the national provider level.

(3) Along with optimizing CSS information and reporting, there must be significant improvements in deployment execution systems, planning and decision support tools; asset visibility; packaging; reliability and efficiency; intermodal transfers; inter- and intratheater lift assets; and reductions in the weight and volume of equipment and supplies, specifically fuel and ammunition required for contingency and initial flow forces. Changes in force design through modularity, and split-based operations, are required to achieve this goal. Upgrading mechanisms, such as engineering change proposals, preplanned product improvement proposals, and block improvements and multistage improvement programs support the transition.

**c. LINKAGE TO AUTL:** ART 6.0 (The Combat Service Support Battlefield Operating System); ART 6.1 (Provide Supplies); ART 6.3 (Provide Transportation Support); ART 6.12 (Provide Distribution Management).

**d. LINKAGE TO UJTL:** SN 4 (Provide Sustainment); ST 4 (Sustain Theater Forces); OP 4 (Provide Operational Logistics and Personnel Support); TA 4 (Perform Logistics and Combat Service Support).

**11-4. FOC-11-03: Global Force Health and Fitness.**

**a. CAPSTONE CAPABILITIES.** Improve both strategic responsiveness, and core warfighting abilities, to effectively fight as an integral component of a joint, interdependent, full

spectrum, mission-tailored force, by maintaining the health and medical readiness of individual soldiers and units, under all geographic operational conditions.

**b. NARRATIVE.**

(1) Global Force Health and Fitness emphasizes physical and mental fitness, preparedness, and preventive health measures; it is based upon the premise that a healthy and fit force is the necessary precondition for all other elements of global FHP. Because the most important weapons system in the Objective Force are warfighters, their health and fitness are the basic guarantor of military success, across all spectrums of the operation. The goal is to provide optimally fit warfighters that are able to better withstand the physical, mental, and environmental stressors of any contingency deployment, across the full spectrum of operations, in support of the combatant commander. The further into a deployment, the more the opportunities and resources to enhance and maintain soldier health and effectiveness decrease. This makes the emphasis upon preventive medical steps, employed before departure in support of a contingency deployment, more important.

(2) The modern day geostrategic environment mandates a viable force projection Army. Frequent and lengthy major deployments have become the rule. Physically fit soldiers must be truly physiologically adaptable, and capable of serving relatively long periods of time in austere and harsh environments, with little or no prior acclimation preparation. To fulfill full-spectrum mission requirements, soldiers must be able to operate under a variety of different operational environments, exposing them to numerous health hazards.

(3) Deployed soldiers must be protected against major endemic diseases, the increasing threat of occupational and environmental health (OEH) threats, and CBRN/NBC agents. Given the intensity of future full-spectrum operations, the soldier must be able to adapt to highly stressful operational environments, with increased mental and physical demands. This capability necessitates greater institutional emphasis on preventive medical strategies that promote overall soldier health and wellness as the foundation of operational readiness, and precursor to contingency deployment. The proposed capability actively benefits all soldiers in the Objective Force. This capability is specifically directed at early interventions (before deployment) that maximally ensures immediate and longer-term health of each soldier, and provides the combatant commander with the ability to withstand both physical and mental health hazards.

(4) Cutting broadly across the challenges in this FOC will be a set of products and technologies, developed or codeveloped by the biotechnology and biomedical engineering communities.

**c. LINKAGE TO AUTL:** ART 6.0 (The Combat Service Support Battlefield Operating System); ART 6.1.8 (Provide Medical Material and Repair Parts (Class VIII)); ART 6.4 (Provide Sustainment Support); ART 6.5 (Provide Force Health Protection in a Global Environment).

**d. LINKAGE TO UJTL:** SN 4 (Provide Sustainment); ST 4 (Sustain Theater Forces); OP 4 (Provide Operational Logistics and Personnel Support); TA 4 (Perform Logistics and Combat Service Support).

**11-5. FOC-11-04: Power and Energy.**

a. **CAPSTONE CAPABILITIES.** Improve both strategic responsiveness and core warfighting abilities to effectively fight as an integral component of a joint, interdependent, full spectrum, mission-tailored force, by optimizing combat effectiveness via consumption reduction, alternative generation, management, and distribution of power and energy across the force, for all systems—automotive, electrical and soldier.

**b. NARRATIVE.**

(1) Current power and energy consumption rates across the force result in a significant logistical burden for both the warfighter and sustainment force. The viability of many proposed FOCs is dependent upon the significant reduction of power and energy consumption rates, parallel improvements in distribution means, evolutionary generation processes, and incorporation of embedded power management, into all components and systems. This requires leap-ahead optimization of portable power source output, versus size and weight, in all applications.

(2) Providing bulk fuels and packaged oils and lubricants to the Objective Force represents a significant, continuing (though reduced), mission for the sustainment force. The use of a single fuel for both ground and aviation will simplify support operations. Efficiencies gained through improvements in the engineering and manufacturing processes will lessen fuel requirements for ground vehicles. Fuel cells and other in-place technologies will negate the need for storage of large quantities of bulk fuels for ground vehicles alone.

(3) Logistical planners will still have to consider the full range of fuel and energy sources. Fossil fuels are still the major source of fuel for The Army. Power trains must evolve into more efficient devices that will burn less fossil fuel, while pushing lighter, stronger equipment at greater distances across the battlefield. The use of alternatives to fossil fuel, including fuel cells, fusion, fission, hydrogen energy, renewable sources, biomass, and magnetohydrodynamic thrusters, must be pursued for significant advances in efficiency to be made. Systems of the future will look at power storage and distribution as two halves of the same whole, rather than as disparate systems.

(4) Additionally, as highly technical soldier systems continue to evolve, The Army will place increased priority upon viable lightweight, high-output power sources. Land Warrior-type integrated ensemble soldier systems are only the beginning of what is possible in the digital age. The Army must leverage lessons learned from industry, and apply them toward improving sustainment of the individual soldier, as it has already done in organizational design and heavy weapons platform engineering. Ruggedized micro/miniature power sources to enable cooling, heating, communications, target designation, weapons firing, assisted breathing, strength amplification, local sensing, operation of small tools, etc., are required to support the Objective Force soldier. Soldiers must be capable of 'plugging in' to a variety of common energy supply sources. Objective Force platforms must provide interface for soldiers to replenish soldier borne power storage devices.

c. **LINKAGE TO AUTL:** ART 6.1.3. (Provide Petroleum, Oil, and Lubricants (Class III B/P)); ART 6.10.4 (Supply Mobile Electric Power).

d. **LINKAGE TO UJTL:** SN 4 (Provide Sustainment); ST 4 (Sustain Theater Forces); OP 4 (Provide Operational Logistics and Personnel Support); TA 4 (Perform Logistics and Combat Service Support).

**11-6. FOC-11-05: Global Casualty Care Management and Evacuation.**

a. **CAPSTONE CAPABILITIES.** Improve both strategic responsiveness and core warfighting abilities, to effectively fight as an integral component of a joint, interdependent, full-spectrum, mission-tailored force, by improvements in combat lifesaving diagnosis, treatment, and stabilization of casualties for further evacuation to the next level of care.

b. **NARRATIVE.**

(1) Global casualty care management and evacuation provides continuous essential care, to treat casualties and return them to duty, or stabilize them in theater and evacuate to the appropriate level of care. Treatment begins with the 'First Responder' (self-aid/buddy-aid, combat lifesaver advanced first aid, combat medic care), supporting basic prevention and caring, for both disease and nonbattle injury (DNBI) and combat casualties, as quickly and as close to the point of injury as possible. Subsequent to the First Responder are prehospital treatments designed to initiate life-and limb-saving essential care, and forward resuscitative care designed to triage, resuscitate, and prepare casualties for evacuation to theater hospitals. The ability to rapidly detect, assess, and diagnose disease and illness is critical to effective and timely treatment of soldiers exposed to a chemical, biological, or radioactive health hazard. All components are fused together by a critical-care-capable evacuation system that is able to maintain effective, continuous operations, under all battlefield conditions.

(2) The preponderance of soldiers that die in combat does so within minutes of experiencing penetrating trauma and hemorrhage. Prompt localization, resuscitation and stabilization, followed by expedient evacuation of casualties, are essential in order to save lives. While the importance of these tenets of combat casualty care management has been demonstrated throughout the history of warfare, the nature and character of future full-spectrum operations will place even greater demands upon this aspect of warfighter support. Casualties will be more dispersed; thus the length of time required for evacuation will potentially increase. As the premier force projection Army, U.S. Forces must deploy worldwide, and conduct dominant full-spectrum operations, day and night, in all environments, without degradation of this critical element of battlefield support. Inversely, these services must be provided without disrupting operational and/or tactical momentum.

(3) Distributed operations, as envisioned in the next major theater war, will require warfighting support of all types, to be conducted increasingly forward of present day norms. Chief among these is the requirement for the Army Medical Department to effectively provide individual relief, while clearing the battlefield of all casualties, thus permitting the warfighter to

continue the battle unencumbered. Responsive far-forward resuscitation, stabilization, and timely/rapid evacuation, particularly casualties with major trauma, not only affect the availability of the fighting force, but also impact the morale and readiness of the unit at large. Capabilities are required that improve combat lifesaving diagnosis, treatment, and stabilization of casualties, for further evacuation to the next level of care, utilizing technology to enhance forward treatment to greatly improve casualty survivability. These capabilities must also significantly improve the ability of the soldier to perform self-aid, buddy-aid, and combat lifesaver advanced first aid, in the more dispersed and nonlinear battlespace.

(4) The Objective Force can improve casualty survivability through responsive medical resuscitation, stabilization, and timely evacuation. Critical challenges are self-aid and buddy-aid, casualty acquisition, casualty assessment, casualty stabilization, status reporting, and evacuation. Key technologies to facilitate these capabilities include:

(a) *Physiologic sensors and databases.* Develop physiological sensors, to gather/collect data on the soldier's health status, organized and reduced through algorithms and knowledge management, and used to generate operationally relevant performance and health status indicators, and to refine predictive models for use by commanders and medical personnel. These sensors will ultimately be integrated into a noninvasive, wear-and-forget Warfighter Physiological Status Monitor. These include multivariate databases containing:

- animal and human physiological, immunological, biochemical, and performance information;
- medium- to large-scale real-time analysis and modeling;
- miniaturization and microminiaturization of diverse sensors and effectors/actuators (mechanical and chemical);
- bioengineered materials;
- real-time medical, occupational, and environmental surveillance and monitoring; and
- high efficiency medical and personal wellness training.

Diverse hardware and software teaching systems that provide immediate, detailed feedback, plus high-speed communications and Internet connections support these databases.

(b) *Recognize casualty.* This primary requirement involves both locating the soldiers in three-dimensional space, and determining whether they are well, injured, or dead. In addition to nonmedical communication and locator technologies, this requirement involves capturing, analyzing, and interpreting signals from biological sensors on, in, or near the soldier. This complex detection task requires most of the technologies noted in the preceding paragraph.

(c) *Assess casualty.* Although partly overlapping the casualty identification requirement, this element more specifically concerns assistance to the on-site medic, by providing significantly more detailed information on casualty status. The ability to diagnose the injury or illness as a result of a chemical, biological, and radiation exposure is paramount to effective treatment. This requires real-time detection and monitoring capabilities throughout the operational environment. Relevant technologies will include high fidelity, noninvasive imaging; employing diverse energy spectra to identify internal trauma; microanalytic techniques to assess

metabolic parameters in blood and tissue; plus noninvasive instrumentation, to assess internal pressure in the brain, chest, and abdomen.

(d) *Stabilize casualty.* Although potentially addressing multiple issues, stabilizing severely injured casualties primarily concerns management of hemorrhage, replacement of fluids, replacement of blood components, and stabilization of vital functions. Needed products include:

- Naturally enhanced and synthetic materials to promote blood clotting, whether externally applied or injected into the body.
- Intelligent tourniquets to limit blood loss, without irreparable tissue damage.
- Noninvasive cauterization of small blood vessels with focally applied energy.
- Liquid compounds to restore fluid and electrolyte balance, including some that may eliminate the need to transfuse with human blood.
- Automated and semiautomated servo-controlled sensor/actuator systems for life support.
- Injectable drugs, to limit and stop secondary metabolic damage to tissue.
- Improved drugs to manage pain.
- Lyophilized and viral inactivated blood products that carry oxygen and promote clotting to injured area.
- Advanced storage systems and transportation devices to ensure temperature integrity and in-transit visibility.

Critical technologies include drug and protein analysis and synthesis, materials science, and the biomedical engineering technologies noted above.

c. **LINKAGE TO AUTL:** ART 6.1.8 (Provide Medical Material and Repair Parts (Class VIII)); ART 6.5 (Provide Force Health Protection in a Global Environment); ART 6.5.1 (Provide Combat Casualty Care); ART 6.5.2 (Provide Medical Evacuation (Air/Ground)); ART 6.5.3 (Provide Medical Logistics).

d. **LINKAGE TO UJTL:** SN 4 (Provide Sustainment); ST 4 (Sustain Theater Forces); OP 4 (Provide Operational Logistics and Personnel Support); TA 4 (Perform Logistics and Combat Service Support).

#### **11-7. FOC-11-06: Global Casualty Prevention.**

a. **CAPSTONE CAPABILITIES.** Improve both strategic responsiveness and core warfighting abilities, to effectively fight as an integral component of a joint, interdependent, full spectrum, mission-tailored force, through the prevention of casualties. Advanced medical, occupational, and environmental surveillance will allow real-time detection of chemical, biological, and radiation health hazards. This will minimize health impacts by exploiting preventive measure and controls, and by providing forward interim essential diagnosis and treatment of patients prior to strategic evacuation, as well as other critical health care support services in theater.

**b. NARRATIVE.**

(1) Global casualty prevention concentrates on countering two types of threats: OEH hazards, and those imposed by the enemy. Rapid detection of chemical, biological, and radiation health hazards, on the job or in the environment, can result in a substantial reduction in fighting strength due to a large number of DNBI. Disease and nonbattle injuries can result from drinking chemically contaminated water, to being subjected to an enteric disease transferred by a mosquito bite. Industrial pollutants, as well as low-level chemical or other NBC agents, can also attribute to any number of illnesses.

(2) Combat/operational stress reactions also can comprise large number of casualties in intense combat, most of whom RTD quickly, if properly treated. The threat of chemical, biological, and radiation health hazards add an extra dimension of stress. Uncontrolled stress also endangers the mission, through impaired duty performance, and by stimulating misconduct that requires disciplinary action.

(3) Because the opportunities and resources to maintain soldier health and effectiveness nearly always decrease as deployments progress, providing efficient, effective prevention control measures, to reduce the health risk posed by medical, OEH hazards in theater, is critical. Proper health risk assessment is key to implementing any control measure, since control measures often have a direct impact on the mission. The main thrust is directed at preventing casualties, reducing morbidity and mortality, and ensuring soldier health, while successfully completing the mission objectives. The following are key elements to preventing casualties:

(a) *Predeployment:*

- Rapid health diagnostic tests, to screen soldiers for exiting and potential medical conditions.
- Rapidly assess and document soldier's health status, to establish baseline prior to deployment.
- Administer vaccines and chemoprophylaxis protecting soldiers from full spectrum of medical threat.
- Provide Personnel Protective Equipment that will significantly reduce exposure to health threat.
- Comprehensive training in protective measures to minimize health threat.

(b) *During Deployment:*

- Remote sensors will rapidly detect presence of chemical, biological, and radiation hazard at all echelons.
- Echelon I & II will have 'real time' point and standoff detection capabilities for most environmental hazards.
- Echelon III capabilities will provide 'real-time' health risk assessment and COA for unit commanders.
- Echelon IV & V will provide rapid 'reach-back' capabilities to assess health risk and countermeasures.

## TRADOC Pam 525-66

- All Echelons will have comprehensive systems to protect or avoid OEH hazards.
- Automated medical surveillance system will rapidly identify disease outbreak and document hazard exposure.

### (c) *Redeployment:*

- Rapid diagnostic tests to screen soldiers for potential hazard exposure or medical conditions.
- Automated medical records system to all potential health care providers documenting hazard exposure or illness.
- Chemoprophylaxis or treatment to mitigate health effects after hazard exposure.
- Automated OEHS tracking system to minimize soldier's risk of additional exposures increasing health risk.

Significant support is required by S&T objectives under development to attain this capability.

(4) Cutting broadly across the many challenges will be a set of products and technologies developed or codeveloped by the engineering community. These include:

- Multivariate databases containing animal and human physiological, immunological, biochemical, and performance information;
- Medium- to large-scale real-time analysis and modeling;
- Miniaturization and microminiaturization of diverse sensors and effectors/actuators, mechanical and chemical;
- Bioengineered materials;
- High-efficiency medical and personal wellness training, supported by diverse hardware and software teaching systems that provide immediate, detailed feedback; plus high-speed communications and Internet connections.

(5) Key technologies to facilitate these capabilities include:

(a) Integration of all the various individual soldier medically oriented, advanced technology, and routing the data gathering, calculation, decisionmaking, and communication through the soldier's individual computer, common to all 21<sup>st</sup> Century Land Warriors. Development of communications-enabled advanced technologies (both sensor and microprocessing) to support triage, diagnosis, treatment, casualty monitoring, and patient status awareness during en route care/evacuation.

- *Biomolecular threats* include the small or large molecules or complexes that enter the body and interact with cells and tissues, to cause injury or death. Primary examples are chemical and biological warfare agents, infectious diseases, and toxic environmental contaminants. The ability to rapidly detect these hazards, and implement protective measures, will significantly reduce DNBI. Critical medical products for successfully addressing these threats include vaccines and biomolecular scavengers, given pre-engagement, to enhance the body's internal defense mechanisms; and drugs to treat casualties. Barrier chemicals and repellants will be

used on or near the body to deflect some kinds of agents and infections. A wide variety of individual and local area medical diagnostics will be used to rapidly recognize and identify biomolecular threats. Requisite technologies include molecular and receptor structural analysis; genetic, binding, immunological, and other assays; chemical synthesis and high throughput drug screening; pharmacokinetic modeling; genetic and protein engineering; protein synthesis; small-and large-scale drug and vaccine production; animal and human safety and efficacy testing; molecular reference libraries; plus the analytic and communications technologies noted above. Develop diagnostic assays and reagents that will provide rapid laboratory diagnosis for broad array of biological threats and infectious diseases, using common diagnostic technologies. Identify technologies that allow for forward and confirmatory laboratory diagnosis, regardless of the etiological agent.

- *Traumatic energy threats* include the numerous, diverse ways that large amounts of energy are deposited in the body, usually in a short time span, causing small-and large-scale tissue damage leading to injury or death. Primary examples include blunt or penetrating trauma, blast, burn, heat, cold, pressure, noise, vibration, plus laser and microwave radiation. The ability to rapidly detect these hazards, and implement protective measures, will significantly reduce DNBI. Critical products for addressing these threats include extensive animal and human exposure data upon which safe equipment, training, and doctrine can be developed. Individual and local area sensors will provide both early threat alerts, and remote casualty identification. A variety of chemical and other biological products will include some that can be administered before injury, to potentially limit later damage. Required technologies include remote physiological instrumentation, generation and characterization of complex energy fields/waves, light and electron microscopic tissue pathology, biomedical risk assessment, plus most of the protein and drug analytic and development techniques mentioned above.
- *Stress threats* include those performance-degrading challenges to the ‘human dimension’ that affect the body diffusely, working through poorly understood mechanisms that often involve the nervous system. Operational stress reflects degraded physical and mental performance from sleep deprivation and schedule irregularity, metabolic depletion from extended and strenuous operations, boredom, fear, etc. Training and behavior stress concerns less than optimal performance, possibly reflecting the inadequacy of formal instruction, or the maladaptive elements in individual behavior. Unit, leader, and family stress concerns performance decrements related to the demands of group participation. Critical medical products for addressing these threats include recommendations for health promoting personal behavior; performance-sustaining ration supplements; injury-reducing training regimens; optimal sleep-wake schedules; performance-sustaining drugs; evolving recommendations for in-theater stress management teams; plus individual, unit, and family stress diagnostics, based partly on medical data. Beyond those noted previously, requisite technologies include behavioral epidemiology, brain and muscle metabolic imaging, individual soldier status monitoring, plus cognitive and psychomotor performance assessment technologies.

(b) Rapidly developing biomedical technologies, teamed with parallel developments in computer, engineering, and materials sciences, will significantly transform the Army's capacity to establish and maintain soldiers' health, as they operate in increasingly diverse and dangerous environments.

c. **LINKAGE TO AUTL:** ART 6.5 (Provide Force Health Protection in a Global Environment).

d. **LINKAGE TO UJTL:** SN 4 (Provide Sustainment); ST 4 (Sustain Theater Forces); OP 4 (Provide Operational Logistics and Personnel Support); TA 4 (Perform Logistics and Combat Service Support).

**11-8. FOC-11-07: Readiness, Reliability, Maintainability and Commonality for Sustained Operational Tempo.**

a. **CAPSTONE CAPABILITIES.** Improve both strategic responsiveness, and core warfighting abilities, e.g., to effectively fight as an integral component of a joint, interdependent, full-spectrum, mission-tailored force, through optimized application of individual component, and system-of-systems reliability, for combat and support equipment mission profiles and weapons systems. Achieving leap-ahead reliability will greatly support the Objective Force's charter to decisively conduct the varied missions involved in full-spectrum operations, anywhere in the world, in any battlefield condition.

b. **NARRATIVE.**

(1) Current battlefield 'down time' for maintenance renders the most lethal combat systems unacceptably exposed and vulnerable to inferior threat platforms. Commanders must have confidence that all fielded systems will perform the combat mission, without routinely experiencing maintenance problems during the execution phase. Existing vulnerabilities can be mitigated and battlefield effectiveness (e.g., mission performance) optimized, by embedding improved system-of-systems ultrareliability into the new generation of combat vehicles and weapon systems. This desired improved reliability effect consists of systems, subsystems, and components that do not fail catastrophically during the applicable mission profile. This empowering capability can be achieved through optimized application of selective mechanical, electrical and electronic redundancy, self-healing technology, and onboard diagnostic/prognostic components, leveraged from commercial technology and manufacturing processes. It can also be achieved by utilizing materials that provide quantum increases in strength, and are noncorrosive and nonerosive. The improved reliability effect is bolstered by leveraging the application of human factors technologies and practices into the analyses and execution of logistics processes, to significantly reduce manpower, operations, and training costs, while increasing responsiveness, flexibility, and agility.

(a) System Reliability. Future combat system platforms must achieve the following system (total mission package, less directed government furnished equipment (GFE)) reliability benchmarks:

- Mean Time Between System Abort (MTBSA) - failures that deadline a platform, result in unsafe operation, or make it nonmission capable. FCS ORD Annexes specify individual MTBSA values that range from 741 hours to 2733 hours.
- 250 Hours Mean Time Between Essential Function Failure (MTBEFF) - failure that results in system degradation. MTBEFF will range from 195-675 hours.
- Mean Time Between System Abort–Mobility (MTBSA-M) - failures that affect a platform’s mobility system, resulting in unsafe operation, or making it noncombat capable. MTBSA-M for a 72-hour, high OPTEMPO mission-pulse must be greater than or equal to 6450 hours.

The platform crew chief and organic UA maintenance assets that are able to return ground platforms to operational condition will support inherent platform reliability. The MTBEFF reliability value enables the crew chief and maintainers to return platforms to fully mission capable status during maintenance/logistics pulses and enable pulsed reliability. Mean Time Between System Abort-Mobility enhances FP by maintaining integrity of combat formations, and minimizing exposure and dispersion requirements for crews and maintenance personnel. Reliability requirements ensure that at least a 95 percent operational availability is maintained over extended operational periods/pulses. To meet required OPTEMPO, it is expected that the FCS will be developed using ultra-reliable and/or redundant components, and perhaps have some on-board spares, in order to enable it to remain operationally effective for the full 3 to 7-day mission period. This will reduce demand, and minimize the maneuver sustainment burden on unit effectiveness, through balanced system reliability, redundancy, and repair, to include embedded diagnostics and prognostics on soldiers and platforms, as well as modular component design.

(b) System Maintainability. Future combat system platform designs should integrate pit stop-like efficiencies for repairing failed systems, with an ultimate goal of rapid return to combat capability. Future combat system platforms must achieve the following minimum maintainability benchmarks:

- Maintenance Ratio will not exceed 0.05 Maintenance Man-Hours/Operating Hour (MMH/OH).
- Platform crews must be able to repair/replace at least 80 percent of system aborts, 80 percent essential functional failures, and 80 percent of non-essential functional failures.
- Mean time to repair must not exceed 0.5 hours.
- Each FCS system must provide the capability for automated preventive maintenance checks.

(2) Future combat system must minimize the requirement for special tools and external test equipment. The system must be supportable by the emerging Two Level Maintenance System (on-system field maintenance and off-system sustainment maintenance) that will be in place at the time of fielding. The system will consist of a 'replace forward, repair rear' process. The crew or supporting Contact Repair Team replaces components and LRUs/LRMs in the UA, with component repairs conducted by UE units (military, government, or contractors) potentially as far back as CONUS. Low cost, discard-upon-failure components are preferred. As the maintenance requirements for the digitized force become clearer, and hard estimates of workload requirements are available, the sparing percentage should be reviewed in context with the overall maintenance plan. All Technical Manuals must be Class V, or higher, Interactive Electronic Technical Manuals.

(a) Maintenance Concept. The maintenance concept for the FCS includes a high reliance on:

- Very high reliability levels.
- A modular, 'plug and play' design that facilitate ease of maintenance at the lowest levels.
- A 'crew chief' concept for manned platforms, that place a large percentage of Field Maintenance tasks maintained by multicapable operators and maintainers at unit level.
- A high degree of commonality in components.

(b) Commonality. Unit of Action FCS will enable significant sustainment effectiveness and efficiencies, through commonality in platforms and components, to simplify and reduce sustainment, support multifunctionality, reduce personnel and skills required, and contribute to simplification of deployment. Commonality across formations, in platforms and components, is required to simplify and reduce sustainment requirements, support multifunctional soldiers, reduce the many personnel and skills required in today's organizations, and contribute to simplification of deployment, maintenance and training, and reduce equipment and other resource requirements.

(c) System Readiness. The net result of reliability, maintainability, and commonality must achieve high levels of system readiness. Future combat system platforms must achieve an Operational Readiness Rate of 95 percent (Threshold) and 99 percent (Objective). System Readiness is determined as the percent of systems and GFE available during the rating period. The operational readiness rate is a function of system reliability, and reduction of time to repair through ease of maintenance, redundancy, commonality, and modularity. The ease of maintainability of the system will allow the UA to achieve high readiness levels, with an austere logistics footprint, while increasing combat power by ensuring systems are operationally ready. Additionally, high Operational Readiness rates decrease the maintenance requirements on mechanics and the crew chief.

c. **LINKAGE TO AUTL:** ART 6.0 (The Combat Service Support Battlefield Operating System).

d. **LINKAGE TO UJTL:** SN 4 (Provide Sustainment); ST 4 (Sustain Theater Forces); OP 4 (Provide Operational Logistics and Personnel Support); TA 4 (Perform Logistics and Combat Service Support).

## Chapter 12 Training and Leader Development

Objective Force ***soldiers and leaders*** must be multifunctional, and capable of fighting and winning decisively on the full-spectrum battlefields of the future. Future training concepts will enable soldiers and leaders to physically and mentally ***execute doctrine and warfighting skills to standard***. Training will enable operators, maintainers, unit leaders, and staff planners to be ***trained in system-of-systems functions***, by leveraging ***networked, embedded, virtual, constructive, and live training modes anywhere, anytime***. Units perform ***mission rehearsals*** en route or in theater. Training regimens will develop thinking, confident, versatile, adaptive, and seasoned leaders. Training focus on developing concepts and requirements that achieve individual and collective competencies in ***integrated combined arms tasks***.

Every day the Army trains soldiers and units while developing leaders. Effective training is the cornerstone of operational success. It is a full-time job for commanders in peacetime, and continues when units deploy. *Training* high standards is essential for a full spectrum force; Army forces must train to, and maintain, the highest readiness levels. Battle-focused training on combat tasks prepares soldiers, units, and leaders to deploy, fight, and win. (FM 3-0)

### 12-1. FOC-12-01: Leader Training and Development.

#### a. CAPSTONE CAPABILITIES.

(1) This capability will achieve, through training and experience, the truly effective multifaceted leaders required at all levels of the Objective Force. To command with confidence, Objective Force leaders must have simultaneous strengths in several critical leadership dimensions. First and foremost, Objective Force leaders must excel in the human dimension of leadership. They must possess both the ability to build cohesive teams rapidly, and the essential interpersonal skills needed to communicate and work effectively with diverse groups of people, ranging from joint, coalition, and interagency personnel, U.S. and foreign civilians, to the media. Objective Force leaders also must excel at critical thinking. They must possess higher order cognitive skills that enable them to adjust and adapt their thinking and tactical decisions, to rapidly changing operational situations and conditions. Leaders must be trained to be able to clearly define their information requirements, and educated to develop and effectively communicate their intent. Leaders must be trained to synthesize understanding of the situation from information provided by the Battle Command Construct. They must have the range of operational experiences, as well as the tactical and technical expertise, to lead a force optimized for the entire range of military missions, including humanitarian assistance, peacekeeping, peace enforcement, and low or high intensity conflict, as part of a joint, combined, or interagency

operation. Objective Force leaders also must competently employ a wide range of new information technologies and data systems. To support this capability, cognitive decision support and planning aids will be required, to help commanders avoid cognitive overload, and to ensure the increased availability of information is efficiently processed in real time, understood, and disseminated, to maintain dominant situational understanding.

(2) The Objective Force will need young leaders at all levels to assume command of their units, already capable of performing all of the tasks to accomplish a full spectrum of operational missions. This will necessitate a shortened leader training and development timeline. The training and leader development process must extend from the institution, to home station, to deployment, enabling Objective Force leaders to gain, reinforce, advance, and accelerate the learning of essential battle command skills, when and where needed. Objective Force leaders must be trained for expanded decisionmaking and leadership skills, to operate seamlessly within interagency operations. They must be capable of developing mission-type orders that enable decentralized small unit initiative. They must be trained to possess the technical, tactical, and psychological training readiness for urban operations. Also, Objective Force leaders will need to play an increasingly more important role in their own development. To sustain their skills and enhance their readiness for future operations, Objective Force leaders must be self-aware, committed to excellence, and highly motivated to use self-development tools to enhance their readiness for future assignments.

(3) In addition to training and leader development of tactical and technical proficiency, training systems must prepare leaders and soldiers to master the transition from fort to foxhole. Individual and unit training must encompass psychological preparedness, as well as the physical and cognitive preparedness for contingency deployments.

**b. NARRATIVE.**

(1) While leadership will remain the essential dynamic in the application of combat power, changes to the strategic environment will have major implications for the Army's leader development and training requirements. An escalating tempo of operations will demand higher order cognitive skills, including the rapid synthesis of information, intuitive assessments of situations, and rapid conceptualization of friendly courses of action. Team members will be geographically distributed, heightening the need for a shared conceptualization of the commander's intent, and teamwork built on trust. Operations will change from plan-centric to intent-centric; rehearsals will change from physical to virtual; and static CPs will give way to situational awareness on the move. In this operational environment, leaders must be able to think critically, define their information requirements clearly, and most importantly, develop and effectively communicate their intent.

(2) Along with communication skills, the importance of interpersonal skills will grow as young leaders increasingly deal with the mass media, and carry out multinational collaboration. Rapid personnel turnover, and distributed operational environments, will necessitate that Objective Force leaders possess the attributes and interpersonal skills needed for effective team building and team performance.

(3) Future warfare will also require Objective Force leaders to operate more independently as the battle space expands, and units operate on a more sparsely populated battlefield under increasingly demanding conditions. Operational success will demand that even very young leaders have mature judgment, be self-aware, possess excellent interpersonal and communication skills, and above all, be adaptive. Objective Force leaders must be trained to do more and be more, earlier in their careers, and after less institutional and operational training time. All pillars of the Army's leader training and development process will need to be strengthened to deal with these operational challenges.

c. **LINKAGE TO AUTL:** ART 7.7.3 (Train Subordinates and Units).

d. **LINKAGE TO UJTL:** SN 4.1.2 (Procure, Train, Supply, Transport, and Maintain Personnel); ST 4.2.4 (Establish and Coordinate Training of Joint and Combined Forces and Conditions/Standards); SN 3.1.4 (Coordinate Joint/Multinational Training Events); SN 6.3.2 (Conduct Specified Training); SN 6.5.4 (Train Units and Individuals to Minimum Operationally Ready/POR Status); SN 7.4 (Educate and Train the Force).

## **12-2. FOC-12-02: Training Development and Execution.**

a. **CAPSTONE CAPABILITIES.**

(1) The training system must be as responsive as the Objective Force. The overall training capability must be on-demand and just-in-time, reflecting the global nature of Army missions. It needs to deliver, on a push and pull basis, appropriate, dynamic, tactically realistic training to units during deployment, redeployment, and reconstitution, as well as to soldiers in the institution, and at home station. Training must be distributed using a common operating environment that can be accessed by Objective Force soldiers, whenever and wherever training is needed to acquire skills, sustain combat readiness, and rehearse combat missions. Advanced training technologies and processes must be exploited to permit the integration of individual and collective training during routine operations, and other training-hostile environments. Training strategies and tools must address geographic dispersion, both during operations, and at the home station of units. Objective Force training must provide realistic, real time replication of weapon effects, with commonality at the institution, home station, and deployed (operational theater and combat training center (CTC)).

(2) Objective Force training must be sufficiently responsive and robust, to ensure that units accommodate rapid changes in doctrine, organization, and equipment, while maintaining readiness and meeting current operational requirements. This will necessitate links between units, schools, and training centers, to enable collaborative training development, delivery, testing, and evaluation, as well as rapid feedback on training requirements.

b. **NARRATIVE.**

(1) Responsiveness must characterize Objective Force training development, as well as training execution. All Army trainers, regardless of component or location, must have the capability to prepare, produce, and rapidly reconfigure individual soldier and unit performance-

oriented, standards-based, and realistic multi-echelon training. Technology permits multi-echelon training without all participants physically collated. This will require that the training system provide trainers the tools and decision support systems needed to analyze, design, develop, and execute training, efficiently and effectively. Quality assurance mechanisms and other feedback capabilities will be critical to ensure that training planning and development addresses the most critical Objective Force training requirements. All aspects of the training system must be 'user friendly.' To achieve this end, a formal and accountable 'Usability Engineering' process must be incorporated into the developmental process for training products and systems.

(2) Analysis of Objective Force functions, jobs, tasks, skill, and knowledge requirements will be a crucial early phase of training development for the Objective Force. The Objective Force will incorporate sophisticated technologies such as robotic vehicles, advanced sensors, and information technologies into the FCS, OFW, and other equipment systems. Changes in force designs and missions will introduce more collective/team tasks, and increase task performance requirements. Objective Force soldiers will need to be 'multiskilled', capable of performing a wider range of tasks than today's soldiers perform, and adaptive, able to apply their skills in a wide range of possible situations. Many Objective Force jobs and tasks will be complex and/or difficult to train, thus creating a significant technical and intellectual challenge to the training system.

(3) The successful execution of training for the Objective Force will require the capability to seamlessly link live, virtual, and constructive simulations, to present the best environment for training individuals, leaders, staffs, and units on the right tasks, at the right place and time. To create this interactive 'synthetic training environment', all simulation systems, instrumentation systems, C4I, and weapons systems must operate and interoperate, using common databases that accurately represent human and group behaviors, atmospheric and ground effects, and include virtual terrain that replicates the actual theater of operation. This synthetic training environment must be able to accommodate the full spectrum of war, from special operations to logistics to combat, and be sufficiently interactive to allow combined training of the different elements. This capability must also allow leaders to choose from a range of available operational environments, for precisely training their soldiers, staffs, and units on specific shortcomings, or tasks relevant to an upcoming mission.

(4) To ensure maximum flexibility in execution of training, Objective Force commanders must have the capability to train their units without significant external support. Embedding training and performance support systems into the Objective Force's concept, organizational, and system designs will provide this flexibility, and further enhance readiness. Objective Force weapons platforms and equipment will have a common set of operational and user interfaces that look, feel, and function in a similar fashion, whether training or conducting combat operations. Intrinsic feedback must generate stimuli that simulate C4ISR feeds from notional entities, readouts and sensors indications on systems and weapon platforms, weapon effects and battle damage, and visual/aural cues. The FCS FoS embedded training (ET) system must provide virtual and constructive multiechelon combined arms training capability for leader, staffs, and units to build functional, combined arms teams. Embedded training will support multiechelon training and rapid teaming, including integration of Reserve Component (RC) and Joint,

Interagency and Multinational (JIM) capabilities at brigade (UA) and below (Threshold) and above (Objective). The ET will provide brigade and lower units with the capability to conduct a full range of collective training events. Any brigade leader, staff element, or unit will be able to conduct full combined arms training without the physical participation of any other unit. Embedded Computer Generated Forces will provide UA, UE, JIM/SOF, neutral and opposing forces necessary to represent the brigade Operational Environment. The ET system will include a full scenario development product, Training Support Packages (TSPs), and AAR production tools. This embedded capability will be High Level Architecture compliant. This capability provides a means to sustain/improve unit performance with an immediate retraining capability anywhere, anytime. Leaders and units can rapidly resource and execute training with organic assets; saving time, and permitting focus on execution and retraining instead of time on extensive planning and coordination, unit training support, resources, and movement. It also facilitates training en route during alert/deployment, and enhances leader training and rehearsal opportunities while dispersed.

c. **LINKAGE TO AUTL:** ART 7.7.3 (Train Subordinates and Units).

d. **LINKAGE TO UJTL:** SN 4.1.2 (Procure, Train, Supply, Transport, and Maintain Personnel); ST 4.2.4 (Establish and Coordinate Training of Joint and Combined Forces and Conditions/Standards); SN 3.1.4 (Coordinate Joint/Multinational Training Events); SN 6.3.2 (Conduct Specified Training); SN 6.5.4 (Train Units and Individuals to Minimum Operationally Ready/POR Status); SN 7.4 (Educate and Train the Force).

### **12-3. FOC-12-03: Training for Joint and Coalition Operations.**

a. **CAPSTONE CAPABILITIES.** As Objective Force operations will often have significant joint, interagency, and multinational aspects, effective, well-integrated training will be vital to ensure the readiness of the entire team, to respond to crisis, and conduct operations throughout the full spectrum of conflict. The training system must provide commanders the capability to conduct training or mission rehearsals simultaneously, at widespread geographic locations, using different simulation systems, on an interactive basis, in preparation for single service, joint, combined, or interagency operations. These same capabilities must be utilized to facilitate the routine integration of the RC into live, virtual, and constructive exercises, thereby enhancing readiness. Joint and multinational doctrine and training programs must perpetuate strategically responsive, rapid deployment TSPs and other training support products, to augment the use of advanced simulations.

b. **NARRATIVE.** Given the requirement for Objective Force corps to function as ARFOR Commands, Joint Force Land Component Commands, and JTF HQ, capabilities are required for the preparation and training of JTF commanders and staff elements, beyond the inherent Army-based expertise. Training simulations and capabilities, to link to other services for geographically dispersed training, are needed to develop and sustain JTF HQ training readiness. Simulations and linkages are also needed, to train JTF augmentation elements to perform duties for which they have been designated. Leader development standards must be developed to define what is required of JTF commanders and staffs. Objective Force leaders require training aids and capabilities that will facilitate the integration and training of dissimilar forces,

particularly with respect to different levels of C4 capabilities that complicate information interoperability.

c. **LINKAGE TO AUTL:** ART 7.7.3 (Train Subordinates and Units).

d. **LINKAGE TO UJTL:** SN 4.1.2 (Procure, Train, Supply, Transport, and Maintain Personnel); ST 4.2.4 (Establish and Coordinate Training of Joint and Combined Forces and Conditions/Standards); SN 3.1.4 (Coordinate Joint/Multinational Training Events); SN 6.3.2 (Conduct Specified Training); SN 6.5.4 (Train Units and Individuals to Minimum Operationally Ready/POR Status); SN 7.4 (Educate and Train the Force).

#### **12-4. FOC-12-04: Trainability.**

##### **a. CAPSTONE CAPABILITIES.**

(1) The Objective Force must have the capability to provide soldiers new equipment systems that have been human-engineered, to optimize both soldier performance, and the ease of training and sustaining equipment-related skills. This capability must enable soldiers to operate new equipment quickly, easily, and effectively, with only the minimum essential new equipment training (NET), sustainment training, experience, or reliance on mentoring or performance support systems. All aspects of the system-of-systems must be easy to learn, user friendly, preclude catastrophic mistakes, and facilitate operational competence. System-of-systems must support adaptive training, enabling team proficiency with a common set of operational user interfaces (look, feel, and function). The training construct must be validated through user trials during the acquisition process, simultaneously engineering functionally sound and reliable training systems. A formal and accountable 'Usability Engineering' process must be rigorously and systematically incorporated into the system-of-systems developmental process. Capability must enable soldiers to operate equipment reliably and effectively, under high workload and other high stress conditions, when Objective Force performance problems will most frequently occur.

(2) The Objective Force must also have the capability to provide soldiers distributed technical assistance (e.g., electronic performance support systems) as required, to achieve and maintain readiness on mission essential tasks, while minimizing reliance on training. Capability must enable soldiers to use and/or maintain equipment effectively and efficiently, and assist soldiers, as needed, to do other essential job tasks. This capability must assist multiskilled soldiers to perform mission essential tasks that are inherently difficult, complex, and/or multistep, performed infrequently, or have not been previously performed.

b. **NARRATIVE.** Objective Force soldiers are characterized by 'multiskilling'; the capability to perform a wider range of tasks than today's soldiers; and adaptability, the ability to apply their skills in a wide range of operations. Similarly, Objective Force battle command and battle staff operations are increasingly characterized by the cognitive skill proficiency of leaders and battle staffs. These increases in skill demands must be fully considered in Objective Force weapons/equipment system design, to ensure optimal soldier and equipment performance. Effective man-machine interface and human engineering will be essential, in order for the

Objective Force soldier to operate the most advanced equipment, under high workload and other stressful conditions, quickly, easily, and effectively, with minimum initial skills, sustainment training, and performance support. The direct benefit to the Objective Force will be the reduction of soldier and unit operational ‘down-time’ due to extended NET requirements. By embedding performance support systems into equipment from the onset, The Army will further reduce the negative impact of increased cognitive demands placed upon leaders and soldiers.

c. **LINKAGE TO AUTL:** ART 7.7.3 (Train Subordinates and Units).

d. **LINKAGE TO UJTL:** SN 4.1.2 (Procure, Train, Supply, Transport, and Maintain Personnel); ST 4.2.4 (Establish and Coordinate Training of Joint and Combined Forces and Conditions/Standards); SN 3.1.4 (Coordinate Joint/Multinational Training Events); SN 6.3.2 (Conduct Specified Training); SN 6.5.4 (Train Units and Individuals to Minimum Operationally Ready/POR Status); SN 7.4 (Educate and Train the Force).

## 12-5. FOC-12-05: Managing Unit Performance.

a. **CAPSTONE CAPABILITIES.** Objective Force commanders must have the ability to tailor designated units, and the training/performance support strategies for those units, to the tasks and unique conditions of the immediate mission. This capability must enable commanders to select soldiers for units, task forces, special team assignments, and duty assignments, based on soldiers’ skills and proficiency on mission-relevant tasks, prioritize and allocate tasks, select scenarios and other required training, and assess training outcomes. Capability must contribute to commander’s assessment of unit readiness for current or predicted mission contingencies.

b. **NARRATIVE.**

(1) Objective Force commanders must be able to identify any soldier and unit capabilities required to accomplish a mission. They must also rapidly create the optimal team or unit; diagnose performance shortfalls; develop near, short and long-range individual and collective training plans; and quickly provide training and performance support needed to reach the required level of readiness. Training management strategies must optimize the time warfighters spend participating in training, vice preparing for training or conducting administrative duties, and must support institution, unit, and deployed (operational theater and CTC) training. A training management system must assess, document, and report individual and collective training status and requirements, providing feedback on training needs and assisting trainers, soldiers, and leaders in identifying training events and resources required to carry out training plans. Once performance deficiencies have been identified, commanders will require rapid teaming and mission preparation programs to insure that mission-tailored units achieve the level of readiness needed for rapid deployment. Commanders will also need capabilities to do collaborative training of those active component and RC soldiers and units considered most likely to deploy together, based on contingency planning.

c. **LINKAGE TO AUTL:** ART 7.7.3 (Train Subordinates and Units).

d. **LINKAGE TO UJTL:** SN 4.1.2 (Procure, Train, Supply, Transport, and Maintain Personnel); ST 4.2.4 (Establish and Coordinate Training of Joint and Combined Forces and Conditions/Standards); SN 3.1.4 (Coordinate Joint/Multinational Training Events); SN 6.3.2 (Conduct Specified Training); SN 6.5.4 (Train Units and Individuals to Minimum Operationally Ready/POR Status); SN 7.4 (Educate and Train the Force).

---

## Chapter 13 Human Engineering

**Soldiers, not equipment, accomplish missions and win wars. Develop physically and mentally tough soldiers capable of executing a multitude of skills, across a wide spectrum of operations, to gain dominance over an adversary. Human engineering decreases task complexity and execution times to improve performance while minimizing sensory, cognitive, and physical demands on the soldier. Enhance soldier endurance and stamina, to fight effectively in all environmental conditions, including full-spectrum operations; range of conflict, terrain, and weather; and NBC, mounted or dismounted. Incorporate manpower and personnel integration and usability approaches that reduce soldier load through task transfer, and assist accomplishment of tasks.**

**13-1. FOC 13-01: Human Engineering for the Soldier.** Regardless of the importance of equipment, or the expansion of technological capabilities, soldiers are more important than machines. Soldiers, not equipment, accomplish missions and win wars. They continue to be the centerpiece of the UA formation. Reduce soldier dismounted movement approach load to no more than 40 pounds. Reduce dismounted soldier's fighting load to 15 pounds. Decrease task complexity and execution times to improve performance, while minimizing sensory, cognitive, and physical demands on the soldier. Enhance soldier endurance and stamina, to fight effectively under all environmental conditions of:

- Full spectrum operations—offensive, defensive, stability and support
- Full range of conflict—MCO, SSC, Peacetime Military Engagement
- Varied terrain
- All-weather
- NBC
- Mounted or dismounted

Provide mobility enhancements to reduce soldier workload through environmental ride quality and task automation. Exploit unmanned technology in manned systems, to enhance continuous 24-7 operations.

a. **CAPSTONE CAPABILITIES.** Soldiers are the enduring hallmark of The Army. To achieve revolutionary effectiveness across the full spectrum of conflict, the Objective Force will consist of high quality, multifunctional soldiers, supported by state-of-the-art weapons and equipment, to engage BLOS, dominate close combat, and ultimately seize and control an

objective, on any terrain, anywhere in the world. The U.S. soldier will stand as the premier warfighter, capable of effectively employing digitized, computer-based planning, decision, combat, communication, and service support aids, to overwhelm the enemy in any battlespace condition. The Army seeks to optimize the mutual operational benefits of soldiers enabled by systems, and systems enabled by soldiers.

**b. NARRATIVE.**

(1) The warrior soldier is the single most important aspect of the Objective Force combat power. The Objective Force soldier is a combat soldier first and foremost. Despite the expected proliferation of unmanned systems, the significant role that soldiers will have in the future battlespace demands that they remain the cornerstone for force design and employment. Technology is merely a tool to be utilized by a thinking soldier, to enhance human characteristics such as common sense, battlefield instinct, and the warrior ethos. Soldiers must react to issues of morality, and exercise mature judgment, while decisively wielding highly lethal weapons in the demanding, chaotic environment of war.

(2) The need for soldiers to close with the enemy, by fire and maneuver, remains a critical requirement for the Objective Force, regardless of the introduction of advanced technologies and the desire for sterile long-range precision warfare. Only a ground force can deny the enemy the option to pursue a protracted stalemate, and only the soldier can effectively control populations, and take terrain. This is especially true for operations in urban and complex terrain, which many military experts believe to be the most likely battlefield of the future. Additionally, the nature of the environment, and the ROE, may limit other options available to the commander. For the foreseeable future—as throughout all of the recorded history of warfare—a soldier on the ground, winning the close fight, is our defining capability, and an indispensable resource for the nation.

(3) The Objective Force soldier will experience a paradigm shift from a linear, contiguous battlefield, to a more distributed noncontiguous, nonlinear battlefield. Transitions from peace, to deployment, to warfighting, will be compressed. Psychological preparedness will be as important as physical and cognitive preparedness for contingency deployments. Objective Force soldiers must exercise judgment and initiative under stressful circumstances, and be capable of learning and adapting to the demands of full spectrum operations.

(4) The Army must aggressively recruit high quality individuals who can meet the training and operational demands required in information age warfare. Both officer and enlisted recruits must possess a strong aptitude for computer-based learning, and must be comfortable working with advanced computer-based technologies. All soldiers—not only leaders—must have the ability to make rapid decisions, while under stresses normally not realized by present day personnel. They must demonstrate an above average maturity level, as these individuals will have access to more firepower and lethality than did their predecessors in history. Objective Force leaders and soldiers must clearly demonstrate the ability to handle that responsibility.

(5) On the multidimensional battlefield, the soldier will require near absolute situational awareness. Soldiers will need to be fully integrated into the battlefield information flow with

their C4I suite. This capability will permit the soldier to positively know their own location, the location of team members, and the location of other friendly forces (e.g., resupply points, CCP, coalition forces, etc.), enemy locations, and noncombatants. Soldiers must have the ability to physically ‘see’ the battlefield with great fidelity in all light, weather, and temperature conditions, as well as manmade obscuration, and to rapidly transition across these varied conditions.

(6) Future soldiers will have a microcomputer capability that is small, lightweight, powerful, voice-activated and responsive, and will facilitate the soldiers’ ability to push/pull information from the GIG. Unlike the systems of today, this system will not have ‘visible’ reception and transmitting devices (e.g., antennas, etc.), reducing the enemy’s ability to discern the location of key leaders/personnel. The ability of the soldier to communicate must be unencumbered by terrain, manmade structures and other influences (to include subterranean), units equipped with legacy systems, and languages. The system will feature a two-way translation device, an earpiece for improved listening, and ‘whisper microphone’ capability for improved verbal communications, reducing battlefield confusion, and the possibility of enemy detection.

(7) The placement of advanced and fused sensors will also contribute to improving battlefield awareness. These sensors will provide the soldier with the ability to ‘see’ through obstacles, e.g., buildings and complex terrain. These sensors will be deployed through the employment of a wide array of manned/unmanned ground, aerial, and space platforms, as well as robotics.

(8) Additionally, robotics and UGVs will provide greater soldier standoff during operations that are inherently close quarters in nature, such as operations in urban and complex terrain. Augmented with a wide array of ‘tools’, unmanned systems can assist with obstacle/structure breaching, providing the soldier with improved mobility. Unmanned systems will also provide the soldier with the ability to avoid/detect hazardous areas like minefields, subterranean passages, and contaminated areas. These systems will be value-added for security operations; filling gaps, and providing early warning/detection, will assist with force conservation—the ability to do more with the same size force. Additionally, unmanned systems can support by carrying gear and conducting resupply operations.

(9) Future soldiers will have the capability to directly command remote precision fire support, without compromising their location. Soldiers will have the ability to ‘call for fire’ from a wide array of autonomous, semiautonomous, and manned fire support platforms. This capability will extend to close air support as well. Although more restrictive, soldiers and air platforms (manned and unmanned) will have improved interoperability, which will allow them to work closely with regard to target identification and interdiction. This teaming will improve ‘Soldier Lethality’ at greater target standoff, and enhance system survivability for the aerial platform.

(10) The Objective Force soldier will employ advanced individual and crew-served weapons with LOS and bursting munitions capabilities. These lethal capabilities will allow the soldier to rapidly suppress and kill enemy forces, engage and defeat light armored vehicles,

defeat/reduce 'light' obstacles, and facilitate greater standoff, while breaching larger structures during operations in urban and complex terrain.

(11) The Objective Force soldier will have the ability to employ a wide array of lethal and nonlethal munitions, based upon mission need, FP, and ROE. Nonlethal munitions will include antimaterial, chemical, electromagnetic, obscurants, DE, thermal, marking, acoustic, incapacitating electric, kinetic, optical, and informational. This nonlethal capability will be essential for improved situational awareness, FP, limiting collateral damage, and reducing noncombatant and friendly force deaths, especially during operations in urban and complex terrain.

(12) Future soldiers must be trained and equipped to address the operational and tactical medical challenges associated with noncontiguous combat operations. While specially trained medical personnel will be present on the battlefield, the soldier will serve as the 'First Responder' as opposed to the unit combat medic. As a 'First Responder', all soldiers must be trained as combat lifesavers, and be capable of restoring airways, stopping bleeding, and performing CPR. Additionally, the soldier must be capable of preventing shock, protecting the wound/injured area, and evacuation (under a variety of conditions and environments) for further treatment. Each soldier will carry a lightweight individual 'aid pack', which will include an intravenous fluids and intravenous starter kits, advanced 'hemorrhage control' bandages, individual oropharyngeal airways, and limited over-the-counter medicines. Additionally, each soldier will carry chemical and biological antidotes to counter accidental exposure and contamination. Each soldier will carry revolutionary nutrient packs for individual sustainment until 'real food' becomes available. Lightweight, personal, water filtration devices will facilitate rapid on-site water purification from a variety of sources.

(13) Soldiers will utilize unmanned vehicles, robotics, and advanced (standoff) recovery equipment to 'recover' wounded and injured soldiers from high-risk areas, with minimal exposure. These systems will also be utilized to evacuate the wounded/injured under extremely hazardous conditions.

(14) Future soldiers will need a light, non-bulky 'smart' uniform/suit/ensemble that will provide a 'chameleon-like' camouflage capability, and physical and respiratory protection from ballistic threats, chemical and biological agents, as well as environmental effects (heat, cold, wind, rain, snow). The suit will provide protection from those hazards normally associated with the urban environment, (e.g., glass, rubble, steel shards, etc.), and will be durable enough to withstand the demands of close quarters combat operations in urban and complex terrain. The flexible, full spectrum protection offered by the suit will allow the soldier to adapt to dynamic threats. If exposed to chemical, biological, or TIM, the suit will have the ability to detoxify itself. It will also provide signature reduction from a variety of enemy detection systems.

(15) The Objective Force soldier will require superior mobility capabilities. Advanced 'all condition' optical devices will allow movement on the battlefield under the most extreme conditions. The soldier's assured link to the GIG will enable navigation through the most restrictive terrain, including surface and subterranean corridors. The soldier's weapon systems and links to fires/effects and MS platforms will aid the in-stride reduction of obstacles, allowing

the Force to maintain momentum, significantly reducing the possibility of becoming decisively engaged by the enemy. Access to individual lift systems will aid in reaching upper levels of urban structures, bypass manmade and natural obstacles, and quickly negotiate restricted areas of the battlefield. Additionally, the soldier will utilize precision airdrop to facilitate rapid entry operations.

c. **LINKAGE TO AUTL:** ART 6.6 (Provide Human Resource Support); ART 7.7 (Support the Commander's Leadership Responsibilities for Morale, Welfare, and Discipline); ART 7.8 (Conduct Continuous Operations).

d. **LINKAGE TO UJTL:** No UJTL task is specific to the topic of Human Engineering.

### **13-2. FOC-13-02: Soldier Support.**

a. **CAPSTONE CAPABILITIES.** Improve both strategic responsiveness and core warfighting abilities to effectively fight as an integral component of a joint, interdependent, full-spectrum, mission-tailored force, by enhancing the individual and collective soldiers' operational quality of life, directly impacting their confidence, motivation, and fundamental ability to accomplish the mission. Provide responsive, quality support, in both the combat and noncombat areas of general administration (finance, mail, legal) and other services. For example, religious support; individual protection and survivability; soldier sustainment; equipment endurance and functionality; and morale and welfare operations adaptable to all echelons and environments within the battlespace.

b. **NARRATIVE.** Sustaining the warfighter is the paramount maneuver sustainment mission. The pursuit of mature leap-ahead technologies, advanced warfighting concepts, and increased vulnerability in the battlespace has increased overall soldier support demands. Soldier capabilities are evolving over time, and keeping pace with the rapid advance of soldier systems technology. Increased power density demand is the result of increased soldier systems capabilities; from proficiency with global positioning location and tracking equipment, to an array of thermal imaging devices, laser range finders and pointers, image intensifiers, target designators, and sophisticated communications equipment. Emerging subordinate concepts responding to self-sustainment challenges in rapid deployment, early entry, minimized foot-print, asymmetric warfare, nonlinear three-dimensional battlespace, and urban and complex terrain will dictate new, more efficient strategies in power and endurance management, and production, storage, and distribution of even basic human sustainment items such as water, food, and shelter. The advancement and proliferation of threat sensors and weapons have resulted in increased vulnerability of all soldiers, even when sheltered, resulting from thermal, radar, visual, electronic, and acoustic emissions signatures. Efficient maneuver sustainment and overall support of the warfighter are paramount maneuver sustainment missions. The application of advanced technology in power, distribution, soldier sustainment, ammunition, and C4I—all integral subsets of soldier support—will allow the warfighting soldier to keep pace with emerging state-of-the-art combat systems.

c. **LINKAGE TO AUTL:** ART 6.4 (Provide Sustainment Support); ART 6.5.4 (Provide Casualty Prevention); ART 6.6 (Provide Human Resource Support); ART 6.7 (Provide Finance

and Resource Management Services); ART 6.8 (Provide Religious Support); ART 7.7 (Support the Commander's Leadership Responsibilities for Morale, Welfare, and Discipline).

---

## Appendix A References

CJCSI 6212.01B  
Interoperability and Supportability of National Security Systems, and Information Technology Systems

CJCSM 3500.04C  
Universal Joint Task List (UJTL)

AR 380-19  
Information Systems Security

FM 1-0  
The Army

FM 3-0  
Operations

---

## Glossary

### Section I Abbreviations

AAR	After Action Review
AIEP	Army Idea for Excellence Program
AO	area of operations
AMD	Air and Missile Defense
AP	antipersonnel
APOD	aerial port of debarkation
AR	army regulation
ARFOR	Army Forces
ART	Article
ASTMP	Army Science and Technology Master Plan
AT	antitank
ATCP	Army Transformation Campaign Plan
ATD	Advanced Technology Demonstration
ATGM	antitank guided missile
AUTL	Army Universal Task List
BCC	battle command construct

## TRADOC Pam 525-66

BCS	battle command system
BDA	battle damage assessment
BFA	battlefield functional area
BLOS	beyond line of sight
BTID	Battlefield Target Identification
C2	command and control
C3	command, control, and communications
C4	command, control, communications and computers
C4I	command, control, communications, computers and intelligence
C4ISR	command, control, communications, computers, intelligence, surveillance and reconnaissance
CA	civil affairs
CBRN	chemical, biological, radiological, nuclear
CCD	cover, concealment, and deception
CCP	casualty collection point
CE	chemical energy
CGF	computer generated forces
CID	combat identification
CI	civilian internee
CIFFN	combat identification friend-, foe-, neutral
CJCS	Chairman of the Joint Chiefs
CJCSM	Chairman of the Joint Chiefs Manual
CNA	computer network attack
CND	computer network defense
CMOC	civil military operations center
COA	course of action
COMSEC	communications security
CONUS	continental United States
COP	common operational picture
CP	command post
CPR	cardiopulmonary resuscitation
CRAF	Civil Reserve Air Fleet
CRD	Capstone Requirements Document
CROP	common relevant operating picture
CS	combat support
CSS	combat service support
CTC	combat training center
DA	Department of the Army
DCSDEV	Deputy Chief of Staff for Developments
DE	directed energy
DNBI	disease and nonbattle injury
DoD	Department of Defense
DTLOMPF	Doctrine, Training, Leader Development, Organization, Materiel, Personnel, and Facilities
EMP	electromagnetic pulse
EMPRS	En Route Mission Planning and Rehearsal System

EO	electro-optical
EPW	enemy prisoner of war
ET	embedded training
EW	electronic warfare
FBCB2	FXXI Battle Command for Brigade and Below
FCS	future combat system
FHP	Force Health Protection
FOB	forward operating base
FOC	Force Operating Capability
FP	force protection
FoS	family of systems
FM	field manual
GFE	government furnished equipment
GIG	Global Information Grid
HQ	headquarters
HPT	High Payoff Target
HSOC	home station operation center
IA	information assurance
IAW	in accordance with
IED	improvised explosive device
IER	information exchange requirement
IFF	identification of friend or foe
IM	information management
INFOSEC	information security
INFOSYS	information systems
IO	information operations
IPB	intelligence preparation of the battlefield
IPI	indigenous populations and institutions
IR	infrared
IS	information dominance
ISB	intermediate staging base
ISR	intelligence, surveillance, and reconnaissance
ISR/TA	intelligence, surveillance, and reconnaissance / target acquisition
IT	information technology
JFCOM	Joint Forces Command
JFLCC	Joint Force Land Component Command
JIM	Joint Improvements and Modernization
JLOTS	Joint Logistics Over The Shore
JOA	joint operational area
JTF	Joint Task Force
JTRS	Joint Tactical Radio System
KE	kinetic energy
km	kilometers
kph	kilometers per hour
LOC	line of communications
LOS	line-of-sight

## TRADOC Pam 525-66

LRM	Line Replacement Module
LRU	Line Replacement Unit
MCO	major combat operations
MEDEVAC	medical evacuation
MEV	medical evacuation vehicle
mm	millimeter
MMH/OH	maintenance man-hours / operating hours
MTV	medical treatment vehicle
MP	military police
MS	maneuver support
MTBSA	Mean Time Between System Abort
MTBSA-M	Mean Time Between System Abort-Mobility
MTBEFF	Mean Time Between Essential Function Failure
NATO	North Atlantic Treaty Organization
NBC	nuclear, biological, and chemical
NET	new equipment training
NLOS	non-line of sight
NLOS LS	NLOS Launch System (networked fires)
NGO	nongovernmental organization
NLOS	non-line of sight
OEH	occupational and environmental health
OFW	Objective Force Warrior
OGA	other government agencies
OP	operational task
OPSEC	operations security
OPTEMPO	operational tempo
PA	public affairs
PKI	public key infrastructure
POD	point of debarkation
POE	point of embarkation
PSYOP	psychological operations
R&D	research and development
RC	reserve component
ROE	rules of engagement
RSTA	reconnaissance, surveillance and target acquisition
RSOI	reception, staging, onward movement, and integration
RTD	return to duty
S&T	science and technology
SA	situational awareness
SASO	stability and support operations
SHORAD	Short-Range Air Defense
SIO	special information operations
SN	strategic national
SOF	Special Operations Forces
SPOD	sea port of debarkation
SSC	small-scaled contingency

STOL	short take-off and landing
SSTOL	super short take-off and landing
ST	strategic theater
STO	Science and Technology Objectives
STOL	short take-off and landing
SU	situational understanding
TA	tactical task
TAA	tactical assembly area
TAMD	Theater Air and Missile Defense
TIC	toxic industrial chemicals
TIM	toxic industrial material
TRADOC	(United States Army) Training and Doctrine Command
TSP	Training Support Package
TTP	tactics, techniques, and procedures
UA	Unit of Action
UAV	unmanned aerial vehicle
UE	Unit of Employment
UGV	Unmanned Ground Vehicle
UJTL	Universal Joint Task List
UXO	unexploded ordnance
VTOL	vertical take-off and landing
WIN-T	Warfighter Information Network-Tactical
WMD	weapons of mass destruction

## Section II

### Terms

#### Global Information Grid

A globally interconnected, end-to-end set of information capabilities, associated processes, and personnel for collecting, processing, storing, disseminating, and managing information, on demand, to warfighters, policy makers, and support personnel.

#### reach or reach-back

The application of communications and/or computer connectivity from a commander, staff, or unit to rapidly obtain a service or capability located at a distance. The service or capability may be information, analysis, a staff product, fires, maneuver support capability, or maneuver sustainment capability. The availability of the service or capability by reach obviates the need for the commander, staff, or unit to physically carry this capability on the battlefield, thereby reducing its organizational footprint

#### See First

See/sense the entire environment before and more clearly than the enemy, while countering the enemy's ability to do the same. Network of integrated manned and unmanned sensors, at all points of the battlefield, from tactical through operational and strategic levels.

**TRADOC Pam 525-66**

FOR THE COMMANDER:

OFFICIAL:

LARRY R. JORDAN  
Lieutenant General, U.S. Army  
Deputy Commanding General/  
Chief of Staff

/signed/  
GREGORY J. PREMO  
Brigadier General, GS  
Deputy Chief of Staff  
for Command, Control,  
Communications & Computers