The Mission Command Network

Vision & Narrative

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Foreword: Commander, Combined Arms Center

Our challenge today is to win in a complex world. In order to do so, our leaders must be agile, adaptive, and able to thrive in conditions of chaos. Our soldiers require access to a rich blend of relevant doctrine, education and training wherever they are. The Mission Command Network is the means by which we will achieve a revolution in Army training that fully replicates the complex future environment. Realistic training and expertise will be available at the point of need, increasing the frequency and effectiveness of training events. As we adapt Army learning to fully address the human dimension, we will leverage these capabilities to optimize individual and collective performance. The Mission Command Network is also our means to create synergy between the institution of the Army and deployed forces. It allows us to support theater engagement strategies through increased collaboration, outreach, and sharing of lessons learned. During operations, it allows full cooperation and collaboration between deployed and non-deployed forces, allowing the full employment of capabilities across the Army. In summary, the Mission Command Network is essential to our success, as a critical enabler for optimizing soldier and team performance; developing adaptive and innovative leaders; and fully integrating our institutional and operational capabilities. This Narrative offers the commander's perspective on how the Mission Command Network will enable our Army to prepare, educate, train, and fight. Its vision will help the Army drive our training, organizations, and tactics to a new level of effectiveness.

Robert E. Brown
Lieutenant General, U.S. Army
Commanding

Foreword: Director, Army Capabilities Integration Center

American military power is joint power. Army forces provide foundational capabilities to the joint force that are essential to securing our nation. Regionally aligned and forward positioned forces are essential to assure allies and deter enemies. When called upon, Army forces must be prepared to fight and win as part of joint, interorganizational and multinational teams. In future armed conflict, increasingly capable and elusive enemies will attempt to avoid our strengths, disrupt our advantages, emulate our capabilities, and expand operations beyond the physical battleground to battlegrounds of perception, subversion, and the cyber-electromagnetic spectrum. Army forces will have to deploy rapidly into unexpected locations and transition quickly into high tempo operations across wide areas. Joint, combined arms, air-ground formations will operate dispersed while maintaining mutual support and the ability to concentrate rapidly to take advantage of fleeting opportunities and protect against unanticipated dangers. Forces will task organize on the fly based on changes in mission variables (mission, enemy, terrain and weather, troops, time and civil considerations). Ultimately Army forces must defeat enemy organizations, control terrain, secure populations, consolidate gains, and project power across the land, air, maritime, space and cyberspace domains to preserve joint force freedom of movement and action

We are far from the realization of a network that satisfies the characteristics and design principles in this vision and narrative. Our Army's ability to conduct expeditionary maneuver[1] and Joint Combined Arms Operations[2] depends on a Mission Command Network that is assured, interoperable, tailorable, collaborative, identity based, and accessible at the point of need. Realizing our vision for the Mission Command Network will require focused and sustained collaboration across our Army as well as with the Joint Force and multinational partners. It will not be easy. We must evaluate and prioritize network-related efforts based on the degree to which they contribute to this vision and how network-related capabilities effect our ability to operate consistent with the Army Operating Concept (http://www.tradoc.army.mil/tpubs/pams/TP525-3-1.pdf). We must analyze current and future network requirements, assess requirements against current and planned capabilities, research and develop solutions to capability gaps and implement network solutions across the force. This paper provides a vision as the start point for network design and describes the operational capabilities necessary for Army forces to win in a complex world.

H. R. McMaster
Lieutenant General, U.S. Army
Director

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[1] The rapid deployment of task-organized combined arms forces able to transition quickly and conduct operations of sufficient scale and ample duration to achieve strategic objectives.

[2] Synchronized application of two or more arms or elements of one service, along with unified action capabilities combined with leadership and education to ensure unity of effort and create multiple dilemmas for the enemy

The Mission Command Network

Introduction
This paper defines the Mission Command Network, provides the vision for its design for 2025 and beyond, and describes the operational capabilities it must provide within the context of the Army Operating Concept.

Strategic Context
The Army faces a complex world which demands 'expeditionary' forces – forces task organized and deployed on short notice to austere locations, capable of conducting operations immediately upon arrival. These forces will conduct expeditionary maneuver in order to win against increasingly capable and elusive enemies. Such maneuver will employ joint combined arms, air-ground forces quickly across multiple domains and extended distances. Expeditionary maneuver will combine military, inter-organizational, and multinational capabilities delivered from global, theater, and local resources. Hence we require an approach to mission command that fully integrates unified action partners, and all elements of power they can bring to bear. The Mission Command Network is key to achieving this integration.[3]

Mission Command System and Network Defined
Doctrine defines "Mission Command System (MC System)" as the arrangement of personnel; networks; information systems; processes & procedures; and facilities & equipment that supports the philosophy of mission command as well as the mission command war fighting function. LandWarNet is a critical component of the MC System. It is the Army's *single* network—a system of systems connecting soldiers, platforms, formations, posts, camps, stations, and other facilities.[4]

The "Mission Command Network (MC Network)" is integrated mission command and LandWarNet capabilities, which enable commanders, leaders & soldiers to exercise mission command (the philosophy) and integrate all warfighting functions and Unified Action enablers (the warfighting function). It is an inherent component of the Joint Information Environment. The MC Network allows commanders to develop and maintain situational understanding, maneuver across domains and locations, and conduct joint combined arms operations to accomplish the mission.[5]

Vision
The vision statement for the MC Network is "Achieve expeditionary, uninterrupted mission command; through a network comprised of intuitive, secured, standards-based capabilities adapted to commander's requirements; and integrated into a common operating environment. Network capabilities are assured, interoperable, tailorable, collaborative, identity-based, and accessible at the point of need in operations that include unified action partners."[6]

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[3] The U.S. Army Operating Concept, 31 October 2014, pages 16-20.
[4] Army Doctrinal Reference Publication (ADRP) 6.0, Mission Command, pages 1-2 to 1-3; 3-1 to 3-8.
[5] The U.S. Army Operating Concept, 31 October 2014, pages 17-18.
[6] These terms are defined in the glossary.

Operational View

The MC Network enables globally responsive joint combined arms teams to maneuver across domains and locations. It enables uninterrupted mission command across home station, enroute, and deployed conditions. It matures within a theater, is immediately available upon initial entry (through satellite), and thickens over time with aerial and terrestrial capabilities. It provides a common user experience across echelons, formations, and phases. Command posts function in consolidated and distributed configurations, are able to deploy quickly, and then scale to the desired capacity. MC Network capabilities are tailored to each commander's requirements based on echelon and formation, fully considering the unit mission profile and leader/soldier workload. The MC Network fully supports training and unit readiness.[7]
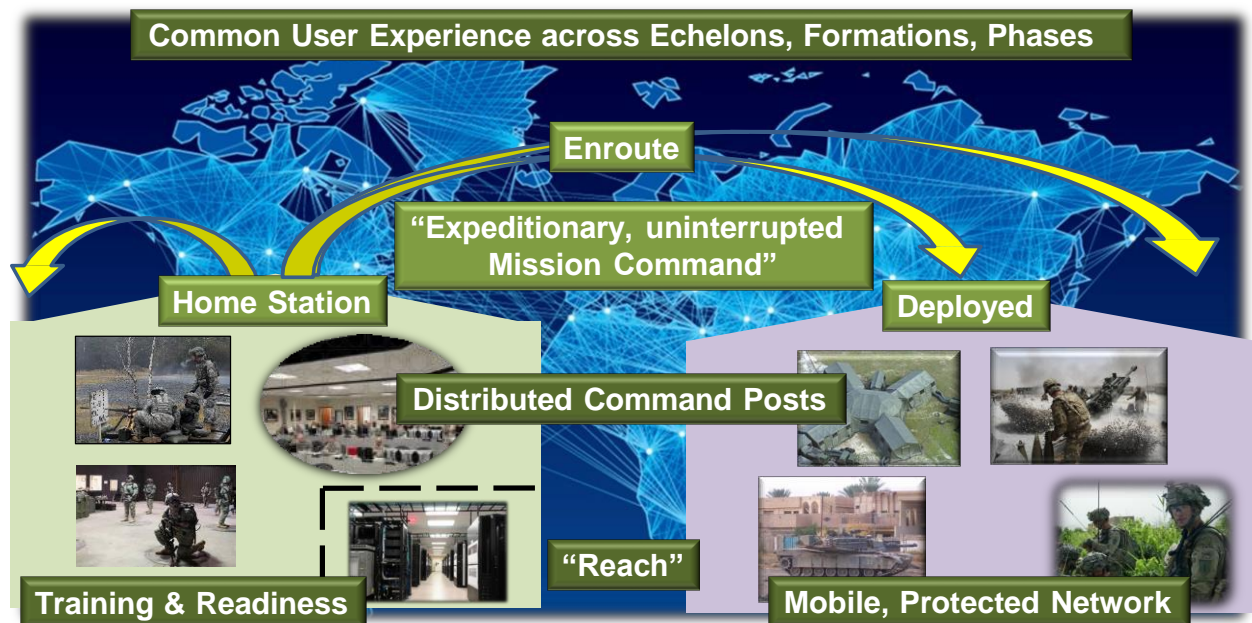

Figure 1. Mission Command Network Operational View

Common User Experience

"Common User Experience" is the idea that MC Network utilization should not change radically across echelons, formations, or phases of the operation. It should facilitate the transmission of information (e.g. voice, video, email, or the capability to control platforms) that warfighters require regardless of echelon. This is achieved through (1) the Common Operating Environment and Joint Information Environment; (2) standard processes for approvals, permissions, authorities, and access across combatant command networks; and (3) a training environment which enables commanders, staffs, and units to train the MC warfighting function, whether at home station or deployed.

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[7] In other words, the MC Network fully enables the "central idea" expressed in the U.S. Army Operating Concept, 31 October 2014, page 17.

Common Operating Environment Implications

As the MC Network transitions to the Common Operating Environment, four fundamental changes occur. The first is a transition to web–based applications and widgets, which break down existing echelon and functional barriers. The second is the adoption of common hardware, providing greater flexibility in the configuration and employment of mission command capabilities. The third is the transition to unified data, which enables the employment of powerful analytic and correlational tools. The fourth is the provision of cross-cutting capabilities, which provide a particular capability in a standard way across the entire network. Taken together, these changes transform how we employ MC Network capabilities to accomplish the mission.

This transformation has several features. The first is increased ability to 'reach' across echelons, locations, and organizations. The second is the unification of MC Network employment across echelons. The third is the transition of data from simple consolidation to a merged condition, eventually achieving fused data. These changes allow us to transition from coordination to collaboration across domains, echelons, and functions. Collaboration will reach across classification levels, connecting the soldier to all individuals and information that he/she needs. As a result, we will redefine roles, responsibilities, and tactics, techniques, and procedures (TTP) for both individuals and organizations.

Expeditionary Maneuver and Mission Command

"Expeditionary" refers to the ability to deploy task-organized forces on short notice to austere locations, capable of conducting operations immediately upon arrival. The Army Operating Concept defines expeditionary maneuver as the rapid deployment of task-organized combined arms forces able to transition quickly and conduct operations of sufficient scale and ample duration to achieve strategic objectives. Expeditionary maneuver enables arrival of follow-on forces and set conditions for subsequent operations. Expeditionary maneuver does not change the nature of mission command itself, but its demands should drive the design of the MC Network and associated TTP. In this context, mission command involves integrating all elements of combat power from multiple locations, across all domains, including the full range of unified action partners in time-sensitive circumstances. It will involve "reach" for a wide range of global and regional capabilities. The essence of mission command is not changed, but within the context of expeditionary maneuver, expeditionary mission command is "mission command of forces conducting expeditionary maneuver from multiple locations and projecting power across all domains; integrating institutional and operational capabilities, with unified action partners, to execute joint combined arms operations."[8]

Mission Command on the Move (MCOTM) is the unit-specific aspect of expeditionary mission command. For the individual commander, MCOTM represents a range of MC Network capabilities which allows command from his current location, whether dismounted, mounted, or in a command post. In its larger sense, MCOTM represents the range of capabilities that allow units to execute the mission command warfighting function while moving, often across extended operational and tactical distances. Each

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[8] The Army Operating Concept, 31 October 2014, pages 17-18.

unit's MCOTM capability allows it to engage in combined arms maneuver, dispersed over long distances, while employing expeditionary, uninterrupted mission command.

Uninterrupted Mission Command
Uninterrupted mission command is the ability to exercise mission command across multiple locations, with continuity of purpose, in spite of discrete breaks in communications. It has two components: (1) a single mobile, protected network which maximizes connectivity and capacity for operations; and (2) leaders and soldiers proficient in leveraging network-delivered capabilities, who are equally able to continue the mission across a range of degraded network conditions. Uninterrupted mission command shapes the design of all elements of the MC System, and unit training.

Uninterrupted mission command requires particular attention during expeditionary maneuver. It requires a clear concept of operations across home station, enroute, and deployed conditions, including improved network configuration management TTP across component commands. For example, it requires fused institutional and operational MC Network capabilities, and integrated command post designs, in order to achieve continuity in purpose across Joint phases of the operation (operational views and vignette are in Enclosures Two and Three).

"Reach"
Recent operations highlight the need for "shared consciousness and purpose" across all unified action partners who play a role in a given area of operations. It is essential to connect all relevant individuals and organizations who have a role - irrespective of size, geographic location or organization. This shared consciousness and purpose is achieved through robust communications, frequent collaboration, shared situational understanding, and effective relationships with key actors. Winning in a complex world requires the united effort of the full team across multiple locations, enabled by a MC network that "…allows its members to see, decide, and effectively act."[9]

There is an imperative to link expeditionary forces to all appropriate analysis, capabilities, and expertise in a timely fashion. This includes 'echelon independent' capabilities (e.g. cyber, electronic warfare) and key functional resources such as processing, exploitation, and dissemination (PED). To gain the necessary shared consciousness and purpose, expeditionary forces require 'reach' to team members and all relevant information sources. The notion of "reach" is defined as "collaboration, information sharing, and capability integration with all relevant organizations and/or individuals, regardless of location, echelon, or affiliation". Although our doctrine defines specific aspects such as intelligence reach, operational reach, and reachback; the MC Network enables all forms of reach across all phases of the operation.

Reach is optimized by (1) a seamless home station and expeditionary interface (i.e. Joint Information Environment, Common Operating Environment); (2) command posts designed to operate in a distributed fashion across home station, enroute, and deployed conditions; (3) the development of an integrated intelligence and operations enterprise

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[9] McChrystal, Stanley A., "It Takes a Network", *Foreign Affairs,* March/April 2011

that links expeditionary formations with all relevant capabilities and information; and (4) maximum interoperability with the full range of unified action partners. These characteristics of the MC Network will enable effective operations.

Early Entry
Early entry operations present unique demands on the MC Network from an expeditionary, uninterrupted mission command perspective. Early entry operations span multiple domains (e.g. land, air, space, and cyber), and unfold quickly. Friendly forces are highly dispersed, in transit, and constrained in numbers and equipment by available lift. These operations require interaction and interoperability with joint forces to the lowest level. Once on the ground, friendly forces must be able to move immediately with communications, and expand operations as additional forces arrive. In these operations, the MC Network must adapt to rapid changes, ensuring capacity and connectivity while minimizing 'blinks' in communications.

Strategic lift constraints require MC network components to 'nest' with the demands placed on early entry forces, emphasizing man-portable and small vehicle configurations. These components will need design features consistent with the demands of airborne, air assault, airmobile, and maritime means of insertion. Quick set-up and operation is a must as well. MC Network components should also be capable of rapid integration with available host nation communications infrastructures (if any exist). These capabilities facilitate expeditionary, uninterrupted mission command even under these demanding circumstances.

Characteristics
The MC Network realizes the vision with (1) a single, protected, and standards-based LandWarNet; with (2) integrated cyber electromagnetic and space capabilities; which enables (3) a coherent, responsive, and tailorable MC System; (4) globally networked teams of unified action partners; and (5) agile, expeditionary command posts.

A single, protected, and standards-based LandWarNet will link leaders, Soldiers, and Civilians; command posts; platforms; and sensors into a synergistic, globally-connected Army. It will allow Army leaders to expand the personnel component of their MC System to link more unified action partners over greater distances and during all phases of an operation. It enables shared understanding, speeds decision-making, enables collaboration, and increases the organization's knowledge and expertise. It is the Army's contribution to, and a component of, the Joint Information Environment.[10]

Cyberspace, space, and the electromagnetic spectrum (EMS), are increasingly congested, contested, and competitive. From a mission command warfighting function perspective, these mediums require knowledgeable, holistic integration; and a combined arms approach to the employment of cyberspace, EMS, and space capabilities—in new and innovative ways that will enable the overall MC System to operate to its fullest advantage.[11]

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[10] The Army Operating Concept, 31 October 2014, Pages 24-29
[11] Mission Command Army Functional Concept (draft v0.7), 25 Mar 15, pages 24-25

The MC Network adapts to meet the commander's requirements and 'style' of mission command. Commanders organize the MC System as a flexible, globally-networked team of superior, supporting, and subordinate leaders—encompassing multiple military and civilian unified action partners. The MC Network connects command posts (CPs), platforms, dismounted Soldiers, and sensors; enabling the MC System to:

- integrate joint combined arms and all elements of combat power;
- support leaders' ability to understand, visualize, and describe the operational environment, problems, and approaches to solving them;
- support commander's ability to make decisions and direct action toward a desired end state; and
- assess understanding of (1) the problem, (2) adequacy of the operational approach and subsequent plans, and (3) level of progress.[12]

The MC network enables the future Army force to achieve flexible, adaptive, mission-tailorable, and globally-networked teams of Army forces and other unified action partners that are agile and responsive to geographic combatant commander needs and Army enduring requirements across the full range of military operations.[13]

Expeditionary CPs feature information technologies and supporting infrastructure that support mobile, agile, and distributed command nodes. Their integrated designs are mobile, deployable, modular, scalable, and survivable.[14] The MC Network provides critical 'bundles' of capability at CPs and their forward extensions (mobile command groups, TACs, and "Mission Command on the Move"). These capabilities enable CPs to coalesce physically, and/or function distributed across diverse locations.[15]

Design Principles
Mission command is a complex human endeavor requiring sophisticated decision tools and capabilities, all supported by the MC Network. As mission command is exercised during the most demanding of conditions, simplicity and interoperability are particularly important. The MC Network must be designed to enable the warfighter, rather than distract or hinder. In order to fully enable leaders and Soldiers, the following design principles guide MC network modernization:

- **Simplicity:** we value the ability to (1) leverage MC network capabilities in intense, time-constrained situations placing significant cognitive and physical demands on leaders and soldiers; and (2) provide for a common user experience across echelons, formations, and phases of the operation
- **Intuitive**: we value the ability to quickly learn MC network capabilities and employment with a minimum of formal training
- **Integrated:** we value a 'system of systems' operational and technical framework that unites the functioning of the MC network, enables MC nodes such as command posts, and fully enables training and readiness

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[12] Ibid., Pages 22-23
[13] Ibid., Page 23
[14] Ibid., Page 24
[15] Command Post Disruptive Technologies White Paper v 1.5, 03 July 2014, page 3

- **Interoperable**: we value integration of all elements of combat power, therefore we seek interoperability across echelons, formations, and unified action partners
- **Assured, reliable, durable**: we value the MC network's ability to function as a mobile, protected network in order to (1) enable distributed, uninterrupted mission command; (2) function in severe terrain, environmental, and threat (combat) conditions, to include cyber electromagnetic threats; and (3) maintain functionality in spite of the loss of key nodes and pathways through redundancy
- **Adaptive, flexible, responsive**: we value the MC network's ability to rapidly adapt and reconfigure itself in response to dynamically changing situations, thus enabling operational and tactical flexibility
- **Scalable, tailorable:** we value the ability to adapt to a wide variety of situation**s**
- **Secure**: we value viability in congested, contested cyberspace and electromagnetic spectrum conditions
- **Affordable**: we value making MC network capabilities available to as much of the force as possible, as quickly as possible, within available resources

Strategic / Enterprise Aspects

The vision of a seamless, standards- based, secure and globally accessible network requires an integrated, coordinated and synchronized approach. As noted in the Army Network Campaign Plan, the future network is "ensures uninterrupted global access and enables collaboration and decisive action throughout all operational phases across all environments." The MC Network will leverage the capacity, security and resilience of the strategic network to fully support expeditionary mission command, as well as home station operations, training and readiness. Enterprise resources will provide key capabilities at operational and tactical levels. The Army will leverage the Joint Information Environment for greater network capability and efficiency to the force.[16]

Interoperability

Expeditionary maneuver with joint combined arms requires the integration of military, inter-organizational, and multinational capabilities delivered from global, theater, and local resources. This can only be achieved if the MC Network provides mission command interoperability with unified action partners in support of Combatant Commands. This is primarily executed through the provision of both enduring and episodic forms of mission partner environments. Part of the Joint Information Environment, this set of capabilities provides the means to clearly communicate commander's intent for desired operational effects with all mission partners - joint, inter-organizational, and multinational.

Home Station

The MC Network applies strategic/enterprise and installation aspects of the network to fully enable expeditionary mission command and training and readiness. It does so by providing (1) network support in terms of connectivity and capacity; and (2) the learning infrastructure that provides training and education content tailored to location, device,

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[16] HQDA CIO/G6, The Army Network Campaign Plan, 2 February 2015, page 5.

and audience. Currently this support is termed Installation as a Docking Station (IaaDS), but over time network access (wherever you are) should become seamless.[17]

Critical Locations/Nodes	Conditions
• Home Station Mission Command centers • Commander, Leaders • Unit work & training areas • Mission Training Complex • Education & training facilities	• Information systems in garrison connected to deployed systems (training and/or real-world) • Connection to the Learning Environment (education & training) over the network • Capacity for force projection, operations, Integrated Training Environment • Quality: train as you fight and readiness

Table 1 Home Station

Learning (Training and Education)
The MC Network fully enables learning (training and education) by linking the operating and generating forces with each other, to training support enablers; and a repository of digitized learning content that accurately portrays elements of the operational and mission variables to support on demand training across the three training domains. This includes the ability to distribute training and education through cloud-based resources, to individuals and their devices at the point of need (institutional, operational, and self-development domains).[18]

The MC Network and the learning infrastructure will be deeply blended capabilities, particularly as we field the Common Operating Environment and the Joint Information Environment. The learning infrastructure provides capabilities for (1) career-long learning: (2) individual and collective learning, (3) human capital development, and (4) adaptive application of learning science and technologies. It includes tools that can replicate a realistic complex operational environment in both the live and synthetic domains through the linking of virtual, constructive, and gaming with live training. It also provides training support, learning networks, reach/feedback, training management, learning information, SMEs and authoritative sources, and curriculum development. The MC Network enables the learning infrastructure by linking training and education audiences to the necessary content and expertise, through easy access and sufficient network capacity and connectivity. Lastly, the MC Network supports embedded training on operational systems, linking such capabilities with the larger learning infrastructure.

The MC Network requires proper configuration to create the proper learning experience at the point of need. This will require provision of training resources appropriately at enterprise and local sites. An important aspect is the ability to incorporate Unified Action partners, such as coalition exercises and training events. This will require extension of the network (and the learning environment) to create the right conditions for mission training. The learning environment must be part of the Common Operating

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[17] Installation as a Docking Station Concept of Operations (CONOPS), pages 1-3.
[18] TRADOC Pam 525-8-2 (draft), The U.S. Army Learning Concept for Training and Education, 2 March 2015.

Environment, and accurately represent a complex operational environment across all warfighting domains and the spectrum.[19]

Essential Capabilities
The Network-enabled Mission Command Initial Capabilities Document (ICD) (December 2011), and the LandWarNet ICD (July 2014) identify essential MC Network capabilities. These capabilities apply across echelon, with variance in terms of the 'sophistication' of their delivery, and the conditions under which they are delivered (see table below).

Network-enabled Mission Command ICD	LandWarNet ICD
• A Robust Network Transport Capability • Execute Tactical Network Operations • A Standard & Sharable Geospatial Foundation • Display/Share Relevant Tactical Information • Enable Collaboration • Create, Communicate and Rehearse Orders • Mission Command on the Move • Execute Running Estimate • JIIM Interoperability • Training Support	• Unity of Command and enforced common policies and standards • Enable Army and unified action partners operations across security classifications and organizations • Assured Information and Services • Authentication, Confidentiality, Integrity and Non-Repudiation via Identity Management • Defend the LandWarNet

Table 2 MC Network Essential Capabilities

Mission Command Narrative by Location/Echelon/Node
In general terms commander tasks, staff tasks, and MC System functions apply across echelons. Other constants include access to information, workspace, collaboration capability, and communications. Across echelons, these tasks and functions have four key variables: (1) area of operations; (2) complexity of tasks in terms of the individuals and organizations involved, (3) need for dismounted and mounted tactical mobility; and (4) need for critical services during disrupted, intermittent, limited (DIL) conditions.

Theater Army
The Theater Army is the service component command for the combatant command to which it is assigned. It can act as a Joint Task Force (JTF) and Joint Force Land Component Commander (JFLCC) headquarters when required. It integrates landpower into the combatant command plans for that AOR.[20]

Critical Locations/Nodes	Conditions
• Main CP • TAC CP • Commander, Leaders	• AO – normally vast distances • Complexity of integrating combat power of multiple formations, widely dispersed, significant interaction with Unified Action partners • Limited mobility, with exception of Contingency CP • Least need for critical services during DIL conditions

Table 3 Theater Army

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[19] Network – enabled Mission Command Initial Capabilities Document, page 10. Also see U.S. Army Training and Education Modernization Strategy (Draft), 15 December 2014.
[20] FM 3-94, page 1-6

Corps & Division

The Corps is the principal integrator of landpower into campaigns and spans the operational and tactical levels of war. It can function as a JTF and an Army Force headquarters. The Division acts a tactical headquarters under OPCON of an Army corps or Marine expeditionary force, organizing and supporting brigades and other formations to accomplish assigned missions. Under certain circumstances the Division may act as a JFLCC or JTF. Corps and divisions integrate all elements of power.[21]

Whether dismounted or mounted, leaders at the corps/division level require an integrated network centric capability to quickly and accurately communicate by both voice and data with leaders, subordinates and with all enablers for unit operations. Leaders must maintain the common operational picture (COP), create and disseminate orders and graphics, control and synchronize operations, and share full motion video (FMV). This occurs internal to the command post, across formations, between command posts, and with Unified Action Partners.[22]

Corps and division headquarters are unique among joint forces in their ability to provide Joint mission command – with attributes that allow combatant commands to employ them as JTF or coalition HQs. Corps/division fully realizes the ability to integrate globally responsive, unified action combined arms teams. They need to be expeditionary and scalable; with graduated interoperability that enables all coalition forces. In order to maneuver across domains and locations, leveraging all elements of combat power, the corps/division leader requires (1) the ability to display friendly situational awareness; (2) the COP to visualize and disseminate essential information; and (3) the ability to analyze data and pass relevant information to subordinate leaders.

Critical Locations/Nodes	Conditions
• Main CP • TAC CP • Mobile Command Group • Commander, Leaders	• AO – significant distances, noncontiguous operations • Corps – operational and tactical headquarters – integrates combat power and sustains multiple formations, widely dispersed, significant interaction with Unified Action partners • Division – tactical headquarters, integrates combat power and sustains multiple formations, widely dispersed, significant interaction with Unified Action partners • High degree of tactical mobility for TACs and mobile command groups • Moderate need for critical services during DIL conditions

Table 4 Corps/Division

Brigade

The Brigade Combat Team is the Army's core building block for maneuver, capable of independent operations. The core mission of the BCT is to close with the enemy by means of fire and maneuver to destroy or capture enemy forces, or to repel enemy attacks by fire, close combat, and counterattack. BCTs often operate as part of divisions, and are often augmented with additional supporting elements.[23]

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[21] FM 3-94 pages 1-6 to 1-7

[22] Full details are laid out in the Network – enabled Mission Command Initial Capabilities Document

[23] FM 3-90.6, page 1-1

Command posts, mounted and dismounted leaders at the brigade level require the MC Network to quickly and accurately communicate by both voice and data with higher headquarters, subordinates and tactical enablers to integrate and synchronize resources and operations and support the doctrinal requirement to fight two levels down. The commander must be able to position himself forward with a command group in the area of operations to gain understanding, prioritize resources, influence others and mitigate risk. Leaders and staff sections must exchange C2 messages (orders, overlays, SPOT reports, call for fire, medical evacuation, etc.) internal to the brigade and the division, across mounted and dismounted formations, and with command post systems. Commanders must visualize and disseminate essential information for display on the COP to provide timely and accurate knowledge of enemy locations and survivability information at operationally relevant distances. This is critical for executing any form of maneuver in conjunction with direct and indirect fires.

Critical Locations/Nodes	Essential Conditions
• Main CP • TAC CP • Mobile Command Group • Commander, Leaders	• AO – routinely conduct noncontiguous operations • tactical headquarters, integrates combat power employs battalions and companies, widely dispersed, significant interaction with Unified Action partners (e.g. fires, ISR) • High degree of tactical mobility required • Significant need for critical services during DIL conditions

Table 5 Brigade

Battalion

Battalions are organic elements of a brigade that perform specific functions. They are frequently employed in noncontiguous fashion within the brigade AO.[24] Battalion command posts, mounted, and dismounted leaders require the MC Network to quickly and accurately communicate by both voice and data with higher headquarters, subordinates and enablers to integrate and synchronize resources and operations and support the doctrinal requirement to fight two levels down. The commander must be able to position himself forward with a command group to receive reports on key indicators discussed with his subordinates and, upon receipt of these reports, order decisive action. Leaders and staff sections must exchange C2 messages (orders, overlays, SPOT reports, call for fire, medical evacuation, etc.) internal to the battalion and the brigade, across mounted and dismounted formations, and with command post systems. Commanders use the COP to visualize and share essential information.

Critical Locations/Nodes	Conditions
• Main CP • TAC CP • Commander, Leaders	• AO – routinely conduct noncontiguous operations • tactical headquarters, integrates combat power employs battalions and companies, widely dispersed, significant interaction with Unified Action partners (e.g. fires, ISR) • High degree of tactical mobility required • Significant need for critical services during DIL conditions

Table 6 Battalion

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[24] FM 3-90.6, pages 1-8 to 1-11

Company

Companies are organic elements of a battalion that accomplish a specific task within that larger formation. At this echelon, operations and intelligence functions must be highly integrated given the dynamic conditions of combat, in order to provide actionable information to companies and platoons. They are frequently employed in noncontiguous operations within the battalion or brigade AO. Subordinate elements are frequently dispersed.[25]

Whether dismounted or mounted, leaders at the company level through squad/team level require the MC Network to quickly and accurately communicate by both voice and data with leaders, subordinates and with tactical enablers (fires and aviation) to enable small unit tactical operations. Leaders must exchange C2 messages (orders, overlays, SPOT reports, call for fire, call for medic, etc.) internal to the dismounted formation, and with mounted and command post systems. The dismounted/mounted leader requires the ability to display friendly situational awareness for the small unit tactical fight and support the doctrinal requirement to fight two levels down, enabling multi-echelon mission command and maneuver. The dismounted/mounted leader must disseminate essential information to provide timely and accurate knowledge of enemy locations, and survivability information at operationally relevant distances which is critical at all echelons of command for executing any form of maneuver in conjunction with direct and indirect fires. A dismounted/mounted leader, or small unit, absent from the network relies on other less-timely and less-accurate methods for information and improved situational awareness, increasing the tactical risk to Soldiers and mission success.

Critical Locations/Nodes	Essential Capabilities
• Commander, Leaders	• AO – some noncontiguous operations • Integrates supporting combat power such as fires and aviation, some interaction with Unified Action partners (e.g. fires, ISR) • High degree of tactical mobility required • Highest need for critical services during DIL conditions

Table 7 Company and Below

Air Ground Operations

Aviation and ground units work together as members of the combined arms team. During the conduct of air-ground operations, the MC network must enable full integration of their maneuver and fires. This is particularly true at the "forward edge" for company and below, requiring voice communications and the exchange of data. To this end, air and ground radios need the ability to dynamically form a network, reestablish themselves when breaks occur, and dynamically discover routing to the intended receiver. Automated configuration will allow better efficiency and speed. Aerial and terrestrial network components should (1) extend and thicken the network, (2) facilitate air ground operations, and (3) lessen satellite dependence.

The MC network 'system of systems' will use aerial platforms as nodes to extend and/or strengthen the network when required. However, the use of a manned aircraft to "strengthen or thicken" a network is rarely optimal. Also, the transient nature of aviation

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[25] FM 3-90.6, pages 1-8 to 1-11

missions preclude dependable or persistent thickening over a single locale. Network extension or thickening is not a mission of tactical rotary wing aircraft and better served by unmanned aircraft systems (UASs). However, while UASs can support network thickening or extension, they are multi-role aircraft and the decision to primarily support the MC network is determined by the commander. Future technology may enable aircraft to extend and strengthen the network without affecting their primary missions.

Mobile, Protected Network
The MC Network must facilitate operational agility and possess resiliency in a dynamic and contested environment. As a matter of design, MC Network nodes must 'nest' within each formation's mission profile, enhancing agility and tactical mobility. MC Network components must fit equipment and personnel constraints, meeting size, weight, and power (SWaP) limitations. Operational security (OPSEC) and communications security (COMSEC) become important in order to lessen the signature of the unit. From a larger 'system of systems' perspective, the MC Network requires nodes extant across land, air, space, and cyber domains, providing flexibility for rapid changes, ensuring capacity and connectivity during fluid and non-contiguous operations (e.g. air ground operations).[26]

The demand for relevant, timely information is intense at the forward edge of the network. Lower echelons encounter high-intensity situations where timely access to communications and information is critical. At the same time, the challenges for the MC Network are severe in terms of capacity, connectivity, range, and SWaP (e.g. what a soldier can carry, space within an armored vehicle). These limitations impact the performance of network components, resulting in significant capacity and connectivity challenges (DIL conditions). The MC Network must provide critical, essential services in such circumstances. The Mission Command Information Services CONOPS identifies critical services for effective mission command in a DIL environment (by echelon).

The MC Network needs viability in the contested, congested, and competitive mediums of cyberspace and the electromagnetic spectrum. Therefore, MC Network design must (1) minimize the impact of DIL conditions; (2) be capable of rapid adaption and reconfiguration as cyberspace and electromagnetic spectrum conditions change; and (3) enable critical cyber and electronic warfare capabilities. Interoperability in this case extends to Department of Defense contractors and the private sector.

Network architecture must allow individuals and units to be disconnected from the network, continue operations, reconnect when possible, and resynchronize with the network. Formations must remain mission-capable during DIL conditions, and cannot become dependent on the connectivity to conduct operations. Services should be designed to operate in a 'plug-in' and 'plug-out' manner to allow continued functionality when disconnected and support minimum data transfer to maintain and re-establish data consistency. Cloud architectures must be designed to function in DIL conditions.[27]

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[26] Cloud-enabled Network CONOPS, pages 35-37
[27] Cloud CONOPS, pages 40-41

Conclusion

The vision for the MC Network is "Achieve expeditionary, uninterrupted mission command; through a network comprised of intuitive, secured, standards-based capabilities adapted to commander's requirements; and integrated into a common operating environment. Network capabilities are assured, interoperable, tailorable, collaborative, identity-based, and accessible at the point of need in operations that include unified action partners."

Reaching this vision will fully enable the central idea of the Army Operating Concept - globally responsive joint combined arms teams using expeditionary maneuver across domains and locations. Internal to the Army, the MC Network will fully integrate its institutional and operational components, ensuring fully trained and ready forces. Current modernization efforts are important steps forward, but will need to be refined and augmented by new opportunities, in order to achieve the MC Network vision.

Enclosures

Enclosure One: References
Enclosure Two: Supporting Operational Views
Enclosure Three: Uninterrupted Mission Command Vignette
Glossary
Terms

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Enclosure Two: Supporting Operational Views
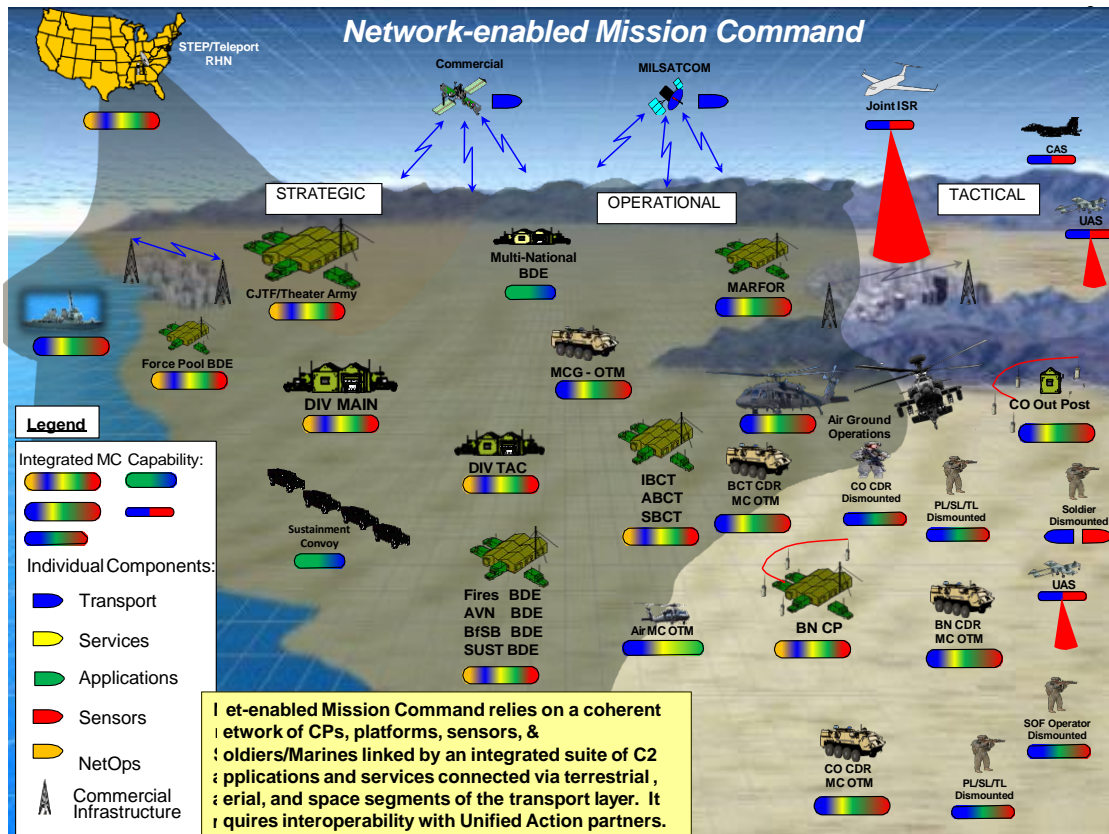
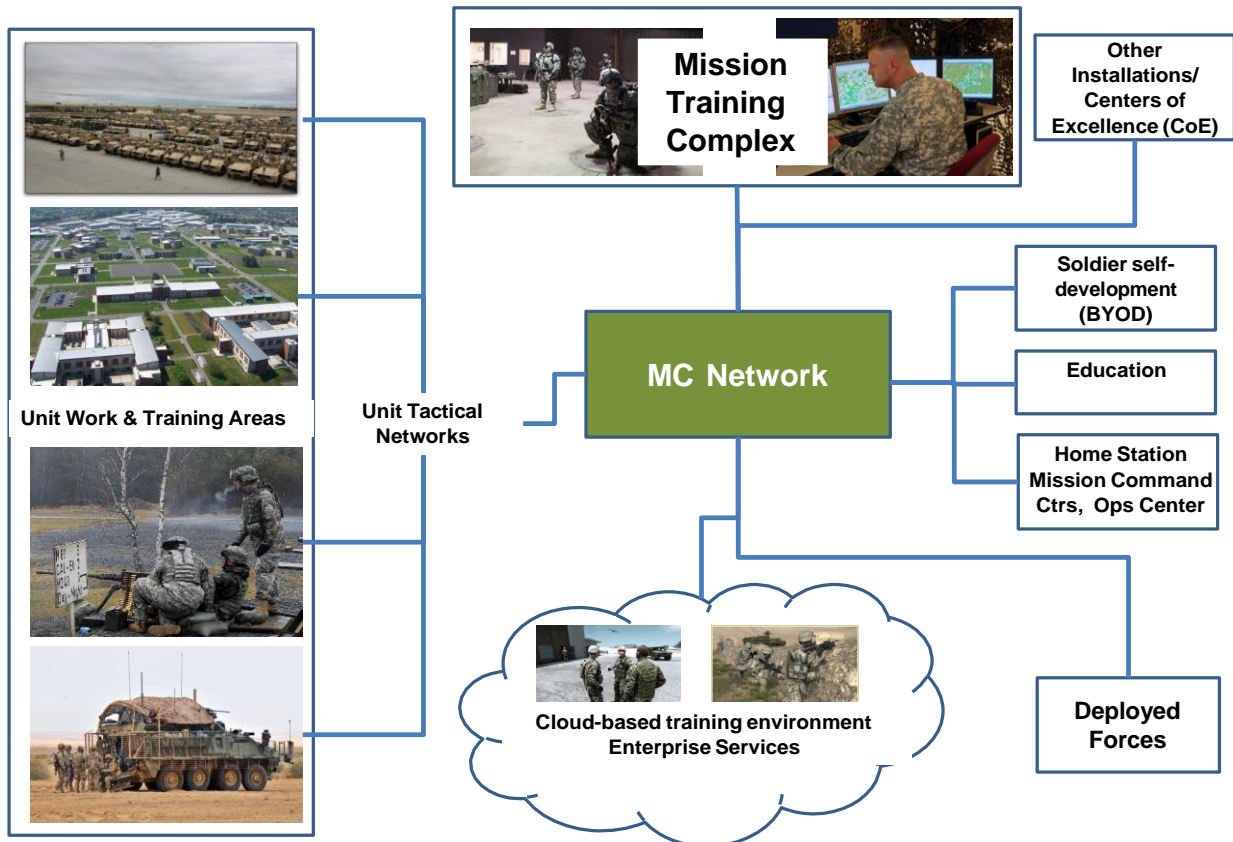Network-enabled Mission Command Operational View

The Vice Chief of Staff of the Army (VCSA) defines the LandWarNet (LWN) as the Army's enterprise network, a secure, standards-based, versatile infrastructure linked by networked, redundant transport systems, sensors, warfighting and business applications, and data to provide our Soldiers, civilians and unified action partners the information they need, when they need it, in any environment.
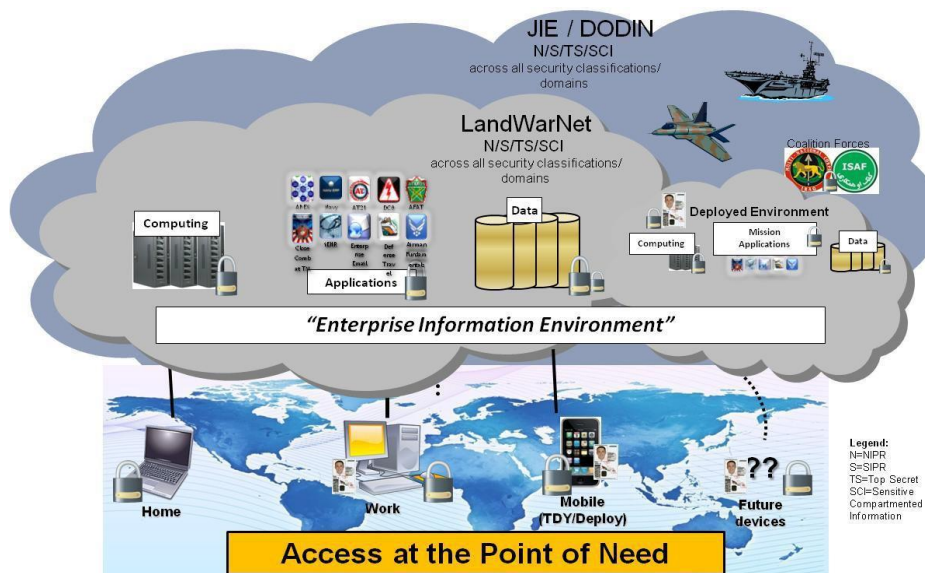
LandWarNet Operational View
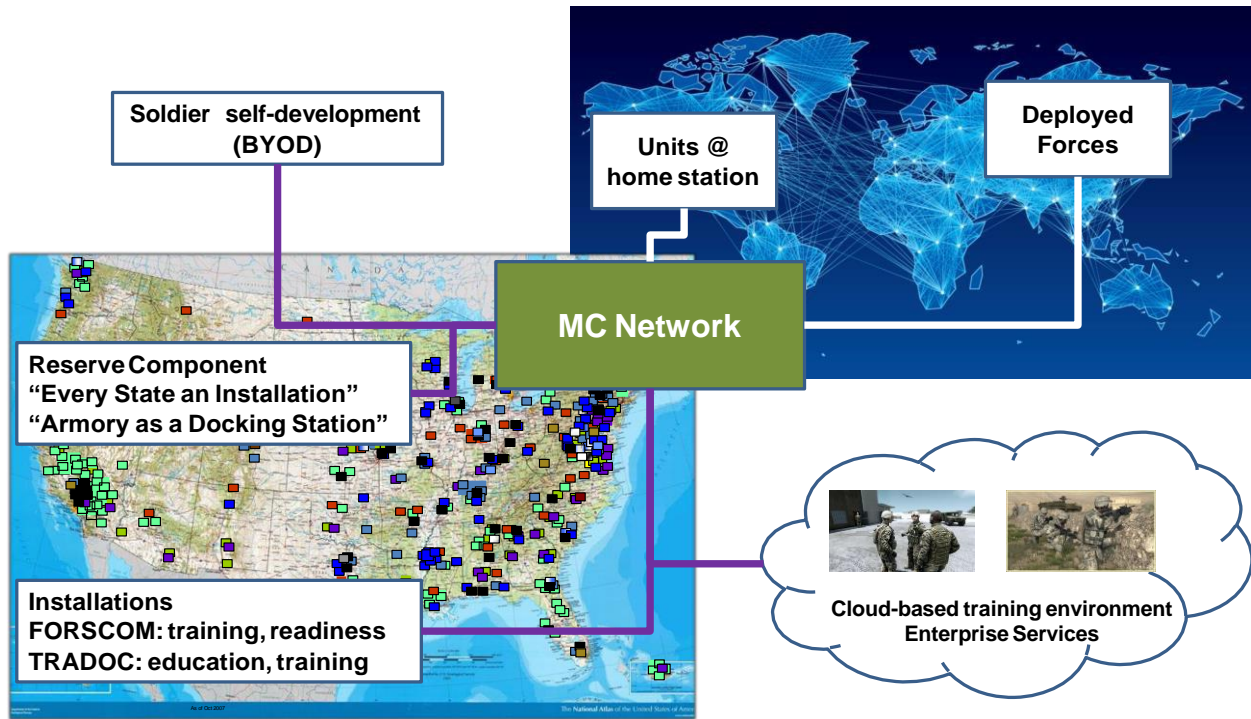
MC Network Strategic / Enterprise Operational View

MC Network 'Home Station' Operational View

Enclosure Three: Uninterrupted Mission Command Vignette

Uninterrupted Mission Command
Uninterrupted mission command is the ability to exercise mission command across multiple locations, with continuity of purpose, in spite of discrete breaks in communications. It has two components: (1) a single mobile, protected network which maximizes connectivity and capacity for operations; and (2) leaders and soldiers proficient in leveraging network-delivered capabilities, who are equally able to continue the mission across a range of degraded network conditions. This vignette is drawn from the vignettes provided in the U. S. Army Cloud-enabled Network CONOPS.[28]

Phase 0 Shape
During Phase 0, units will connect to the Integrated Training Environment (ITE), and to deployed forces through Installation as a Docking Station (IaaDS), which provides a standardized capability across installations. Regionally Aligned Forces (RAF) located at their home station will be in contact with the theater, adapting their training to potential missions in theater. Other units will conduct training and day-to-day operations as normal, using IaaDS to maintain operational and training readiness. While normal day-to-day training routinely occurs in Phase 0, network requirements for training and readiness will increase as units shift to pre-deployment and deployment operations. Distributed training is a key requirement while units are still in their garrison locations.

Commanders require a training environment at home station that enables daily training with the Mission Command System, including both enterprise and tactical aspects of the network. The idea is the unit has its data centers and mission command applications fully operational at home station. The unit network is therefore constantly in use, constantly refreshed with the latest data, upgraded with software upgrades and security patches resulting in constant operational readiness. Furthermore, the enterprise level of the network enables training at home station and pre-deployment training at local training areas, Combat Training Centers, Mission Training Complexes, and Regional Training Centers. Unit training addresses both full network capabilities, as well as operations during DIL conditions.

Phase I Deter
The network will provide home station connectivity and also extend to theater providing access for the ASCC and its supported regional forces deployed forward. The network allows access, at any location, the ability to access home station training services and applications such as Army Training Network, Enterprise Email and any other services provided through the cloud-enabled network. Forces located in forward areas are supported by the access provided by the ASCC.

JTF units will rely on operational and local network assets for connection to the network. While enroute, these assets will be limited to varying degrees dependent on the modes of transportation, geographic dispersion and environmental factors. Forward deployed mobiloperational/regional network connectivity, possibly employing host nation assets.

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[28] See Cloud CONOPS, Appendix A, pages 43-68

As the operation transitions through the decisive point of initial entry and into high intensity conflict, units must be prepared to rely exclusively on local, unit organic, assets.

Phases II-III Seize Initiative, Dominate
The focus of the network in these phases is on satisfying warfighter, intelligence and sustainment requirements for quality-of-service, capacity, and connectivity during fluid tactical operations. Unit networks must be designed to sustain independent and localized actions of units at each echelon until bandwidth and entry points become available to enable a more favorable network structure. Particular attention will be needed to minimize the occurrence of DIL situations for units in theater. In each case, supporting Theater Signal Brigade and assigned Expeditionary Signal Battalions configure their networks into operational assets, to ensure mission requirements are met at critical times and locations. The operational level of the network reconfigures dynamically to meet changing requirements.

The focus of the tactical levels of the network during Phases II-III is ensuring that critical Mission Command tasks continue, regardless of overall network status. This includes supporting units with information products and services with frequent occurrences of DIL network situations. The tactical network must seek to support critical mission capabilities, and permit seamless execution of the mission regardless of the state of connectivity to other portions of the network. The dynamic demands of combat, combined with rapid changes in operational conditions, makes adaptation, flexibility and mental agility key attributes of network consumers and providers alike.

Enterprise Level support continues to provide normal services, and additional support as needed to support ASCC and JFC requirements. The amount of intelligence and other mission related information from unified action sources will increase during Phase II, placing additional demands on the enterprise network to make this information accessible. The enterprise network may need to reconfigure physically and virtually to support Phase II and III operations in order to enable enroute mission command.

Phase VI-V Stabilize, Enable Civil Authority
During Phase IV the enterprise portion of the network continues to provide normal services, adapting to the need to link all the appropriate members of the JIM team for the stability and restoration efforts. The enterprise continues to seek to improve its quality-of-service in spite of these challenges, particularly in the areas of accessibility and throughput. Cyber electromagnetic attacks which reached their peak during Phases II-III can be expected to persist throughout Phase IV.

Bandwidth requirements will decrease over time as units redeploy. Incorporation of regional host-nation assets are increasingly leveraged to satisfy the bandwidth requirements of the units remaining in the AOR.

Glossary

Acronyms

ASCC   army service component command

BYOD   bring your own device

COMSEC   communications security

CONOPS   concept of operations

CP   command post

DIL   disrupted, intermittent, limited

EMS   electromagnetic spectrum

ICD   initial capabilities document

ITE   integrated training environment

JTF   joint task force

JFLCC   joint force land component commander

MC   mission command

MC Network   mission command network

MC System   mission command system

OPSEC   operational security

PED   processing, exploitation, and dissemination

RAF   regionally aligned forces

SWaP   size, weight, and power

TTP   tactics, techniques, and procedures

UAS   unmanned aircraft system

Terms

Accessible- easy to approach, reach, enter, speak with, or use

Adaptive- to adjust or modify to changing requirements or conditions

Assured - guaranteed; sure; certain; secure:

Collaborative- sharing information, knowledge, perceptions, ideas, and concepts regardless of physical location**.**

Distributed- accessible at all geographic locations, garrison or deployed.

Expeditionary- the ability to deploy task-organized forces on short notice to austere locations, capable of conducting operations immediately upon arrival.

Expeditionary Maneuver- the rapid deployment of task-organized combined arms forces able to transition quickly and conduct operations of sufficient scale and ample duration to achieve strategic objectives.

Identity-based- capable of assigning an identity to individual nodes; facilitates mission command and security.

Integrated- the process of linking together different computing systems, software applications, business processes, and functionally to act as a coordinated whole.

Interoperability- 1. The ability to operate in synergy in the execution of assigned tasks (JP 3-0). 2. The condition achieved when information or services can be exchanged directly and satisfactorily between them and/or their users (JP 6-0).

Intuitive- understandable to the intended user with a reasonable amount of training.

Reach- collaboration, information sharing, and capability integration with any organization and/or individuals, regardless of location, echelon, or affiliation.

Secured- assured confidentiality and integrity of data

Standard-based- built on a common technical foundation; enables interoperability.

Tailorable- adjustable to different missions, conditions, and task organization in a reasonable period of time.

Uninterrupted- having an arrangement of capabilities that supports continuity in purpose in spite of discrete breaks in service or priority; continuous.