

# Division Logistics Organizations and the Ability to Support Sustained Conventional Combat

A Monograph

by

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## Abstract

Division Logistics Organizations and the Ability to Support Sustained Conventional Combat, by LTC Joseph M. Colacicco, US Army, 59 pages.

Under current mission command doctrine, one of the primary decisions made by commanders is the allocation of resources to weight the main effort, extend operational reach, and exploit operational success. These issues were the rationale for the Army of Excellence logistics structure. Following the 2003 invasion of Iraq, the Army transformed the logistics structure to a single supply chain distribution-based system. All logistics organizations were removed from the division structure and placed under command of the theater sustainment command. As the Army returns to a focus on sustained conventional combat, the question becomes can the current division logistics organization properly sustain a division in sustained conventional combat? Comparing the Army of Excellence logistics structure to the modular structure revealed that the most significant difference between the structures was the removal of the Division Support Command which eliminated the division's capability to integrate logistics. Assessing the removal of integration function against the Supply Chain Operations Reference model shows the effects of removing the division's organic logistics capability. The removal of the logistics integration function from the division removes the ability of the commander to balance logistics assets across the formation, removes the habitual logistics relationships that enabled success in the Iraq invasion, and removes the ability to internally synchronize logistics with maneuver. Based on these shortfalls, the current division logistics organization cannot supply the division in sustained conventional combat.

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## Acronyms

AFSB	Army Field Support Brigade
AFSBn	Army Field Support Battalion
ASCC	Army Service Component Command
ASG	Area Support Group
AOE	Army of Excellence
AMC	Army Materiel Command
AMC-LSE	Army Materiel Command Logistics Support Element
BCT	Brigade Combat Team
BLST	Brigade Logistics Support Team
BSB	Brigade Support Battalion
CMMC	Corps Materiel Management Center
CMCC	Corps Movement Control Center
CSB	Corps Support Battalion
CSSB	Combat Sustainment Support Battalion
COP	Common Operating Picture
COSCOM	Corps Support Command
CSG	Corps Support Group
CSG(F)	Corps Support Group, Forward
CSG(R)	Corps Support Group, Rear
DISCOM	Division Support Command
DLA	Defense Logistics Agency
DS	Direct Support
DMMC	Division Materiel Management Center
DOD	Department of Defense
EAB	Echelons Above Brigade

EAC	Echelons Above Corps
ESC	Expeditionary Sustainment Command
FM	Field Manual
FSB	Forward Support Battalion
FSC	Forward Support Company
GAO	General Accounting Office
GS	General Support
JTF	Joint Task Force
MSB	Main Support Battalion
OPCON	Operational Control
SCOR	Supply Chain Operations Reference Model
TDA	Table of Distribution and Allowances
TSC	Theater Sustainment Command

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## Introduction

In the 1990s, the Army began experimenting with a new division force structure known as the Force XXI Division. The Army intended to replace its then current division structure, the Army of Excellence. The Army of Excellence had been designed to fight the Soviet Union, but when used in Operation Desert Storm against the Iraqi army it proved a resounding success. Despite the success in Operation Desert Storm, the Army thought that merging new technologies into the Force XXI Division could provide better battle command and awareness and improve battlefield performance. Within the Force XXI Division were changes to the division support structure. The division support structure replaced the support platoons within the maneuver battalions with Forward Support Companies. However, the Force XXI Division was never fielded. Instead, when the Army transformed into a modular force during the period 2003 to 2008, the Army incorporated some of the technological innovations from the Force XXI concept into the modular force. The modular force used the brigade combat team as the basic combat power building block rather than the division. Building the brigade combat team required reapportioning manpower within the division structure. At the same time, the Army logistics community was working to unify logistics command and control. Unified logistics command and control sought to support a distribution-based supply chain and to make the enterprise more manpower efficient by reducing headquarters and units. This modular structure worked well in the post-invasion phases of both Operations Iraqi Freedom and Enduring Freedom. That said, since then the Army has shifted its focus from counter-insurgency to preparing to fight a near-peer adversary. Army leaders have in turn shifted attention from brigade level operations to corps and division level large-scale combat operations. Consequently, the brigade combat team can no longer be the basic building block for organizing combat power. If the brigade combat team is no longer the basic building block a change in the concept for support may also be needed.

Under current mission command doctrine, commanders allocate resources to weight the main effort, extend operational reach, and exploit operational success. These issues were the

rationale for logistics doctrine and force structure under the 1980s Army model, the Army of Excellence. However, the changes in Army division organizations since then have not focused on that aspect of division operations. Although the modular structure's capability to support large-scale maneuver warfare is untested, reports from the last seven years of Decisive Action rotations at the combat training centers indicate significant distribution challenges within the Brigade Combat Teams.<sup>1</sup> Thus, the data suggest the logistics support structure in divisions organized around brigade combat teams may be inadequate for major conventional combat operations. This leads to the question; can the current Army division logistics organizations properly support a contemporary division in sustained conventional combat?

The question of whether the current Army division logistics organizations can support a contemporary division in sustained combat cannot be answered directly. Simply put, this logistics organization has not yet been tested under the conditions of large-scale combat operations. However, an assessment can be made using qualitative analysis. The first step was to find a divisional structure tested in large-scale combat operations and proven adequate. Analyzing that organization's logistical concepts and the structure provided a base list of logistical functions and the organizations designed to perform those functions. That base list and those organizations could then be compared with the modular structure to determine whether all the functions are addressed and whether there are organizations to provide those functions. The comparison with the modular structure also identified what functions have been removed and where functions have been relocated. Because modular logistics incorporated supply chain management principles, understanding the impact of the missing functions on the untested modular force required comparison against a supply chain model. This allowed for extrapolation of potential effects of

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<sup>1</sup> Decisive action rotations combine brigade force-on-force combat with the need to also conduct security operations.

the functional changes. Finally, comparing the effects with the current doctrine provided insight to the answer of the research question.

Finding a division structure tested in large-scale combat, specifically maneuver warfare, only requires looking back thirty years. Division '86, known as the Army of Excellence (AOE), successfully executed Operation Desert Storm and was the Army organization during the invasion phases of Operations Enduring Freedom and Iraqi Freedom. The AOE incorporated lessons learned about maneuver warfare from the 1973 Mideast war to develop a force with which to fight the Soviet Union in central Europe.<sup>2</sup> Designed to execute rapid maneuver warfare under AirLand Battle doctrine, the AOE division was a fixed structure with all subordinate forces assigned. The logistics system was integrated into corps and divisions to give the commanders the ability to respond and allocate resources rapidly. The Division Support Command (DISCOM) and the Corps Support Command (COSCOM) provided this tactical flexibility for those commanders. Based on mass and redundancy, doctrine stated that efficiency cannot handicap effectiveness.<sup>3</sup>

The Army transitioned to the modular force over a period of fourteen years to improve deployability and to reduce the logistics build-up associated with force deployment. In 2000, Secretary of the Army Caldera and Chief of Staff of the Army General Shinseki described a vision for a responsive, deployable, agile, versatile, lethal, survivable, and sustainable force.<sup>4</sup> Based around the brigade combat team (BCT) rather than the division, the modular force incorporated technology and exploited reach back capability to reduce deployment requirements.<sup>5</sup> With the divisions now serving as plug and play headquarters, the modular force is composed of

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<sup>2</sup> John L. Romjue, *The Army of Excellence: Development of the 1980s Army* (Fort Monroe, VA: Office of the Command Historian, U.S. Army Training and Doctrine Command, 1993), 2.

<sup>3</sup> US Department of the Army, Field Manual (FM) 100-5, Operations (Washington, DC: Government Printing Office, 1993), 12-3.

<sup>4</sup> Louis Caldera and Erik K. Shinseki, "Army Vision: Soldiers on Point for the Nation," *Military Review* 53, no. 5 (September-October 2000): 4.

<sup>5</sup> *Ibid.*, 5.

BCTs and functional brigades that are essentially blocks of capabilities. The supporting logistics concepts transitioned from redundancy and mass to distribution-based logistics with the Theater Sustainment Command solely responsible for theater control. Single theater control removed the COSCOM and DISCOM from the force. When the modular force was compared with the Army of Excellence, it became clear that the principal logistics operator for a division had been removed. There is no organic agency to provide logistics advice to the Division Commander and staff. Materiel management and policy moved to the theater level. Distribution responsibilities were assigned to the Sustainment Brigades and Brigade Combat Teams. These changes were manifestations of the change from the division to the BCT as the central component of the force. This structure successfully sustained the brigade centric and static counterinsurgency fight of Operations Iraqi Freedom and Enduring Freedom. However, questions remain concerning the removed functions impact on sustained conventional combat where the division is the central fighting unit.

Determining the impact is possible by assessing the modular structure against the Supply Chain Operations Reference (SCOR) model. The SCOR model, directed for use by the Department of Defense (DOD) in DOD Manual 4140.01, outlines a theoretical framework for assessing supply chain structures. The framework consists of four processes: plan, source, make, and deliver. In large-scale combat operations the division formations are tactical units of execution for a corps.<sup>6</sup> In this scenario, divisions are responsible for resourcing subordinate brigades and executing operations. Resourcing includes allocation, prioritization, and organization for subordinate units. Executing operations includes synchronizing and integrating the operations of subordinate brigades to mass effects at decisive points.<sup>7</sup> Assessment against the SCOR model shows the modular division has a severe shortfall in its ability to conduct the SCOR

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<sup>6</sup> US Department of the Army, Field Manual (FM) 3-0, Operations (Washington, DC: Government Printing Office, 2017), 2-13.

<sup>7</sup> Ibid.

processes. Under the AOE structure, the DISCOM maintained responsibility for executing the SCOR processes for the Division. With the removal of the DISCOM there is no entity designated as nor resourced to be the principal logistics operator for the division. This implies that the division is not capable of sustaining large-scale combat operations in a high volatility environment.

## The Army of Excellence Concept and Logistics Structure

As previously stated, the Army created the AOE to fight a strong Soviet military on the plains of Central Europe using AirLand Battle doctrine. Focused on rapid maneuver and offensive action, AirLand Battle implemented the principles of corps-directed battle combined with rapidly deployable light infantry.<sup>8</sup> Far from perfect due to congressional force caps, the AOE provided a fitting compromise for fighting a Soviet force, maintaining a global defense mission, and modernizing weaponry.<sup>9</sup> Under the construct, the fixed-structure division served as the base unit for employment. The logistics system, fully integrated within the design, gave commanders the ability to rapidly respond and allocate resources to support the demands of maneuver warfare without having to request support from outside the command.<sup>10</sup>

The AOE logistics structure focused on combat effectiveness and divided functions into tactical, operational, and strategic levels. The tactical logistics structure focused on providing the functions of manning, arming, fixing, fueling, and sustaining in a mobile and responsive manner. The operational level logisticians operated the large-scale supply points and distribution networks with a focus on force reception, infrastructure development, distribution, materiel management, movements, personnel, and health services. At the strategic level the responsibilities included mobilization, acquisition, force projection, strategic mobility, and development of the theater base

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<sup>8</sup> Romjue, *Army of Excellence*, 3.

<sup>9</sup> *Ibid*, xiii.

<sup>10</sup> Robert R. Leonhard, *The Art of Maneuver: Maneuver-Warfare Theory and AirLand Battle* (Novato, CA: Presidio Press, 1991), 42.

and communications zone.<sup>11</sup> The centerpiece of the structure was the Support Command at both the division and corps. Additionally, some Army Service Component Commands, had assigned Support Commands. As a primary responsibility, Support Commands served as the logistics integrators at their respective levels. Each level of maneuver force organization had a logistics unit assigned or in direct support to provide the commander operational flexibility.

After successfully using the AOE structure in Desert Storm, the Army spent the 1990's incorporating technological innovations into the force. The Force XXI Division incorporated improved communications platforms to operate over a wider area and still mass on the enemy. The transition to the design began in the late 1990's with the designation of the 4<sup>th</sup> Infantry Division as the Force XXI experimental division. The other divisions began a limited conversion, primarily reallocating personnel and equipment to add a fourth maneuver company to each battalion. Concurrently, the logistics community relooked the processes of the AOE support structure due to concern over the length of time that had been required to build combat power in Saudi Arabia and the excessive volume of supplies that had been brought into theater. Despite having more than enough supply in theater during Desert Storm, dearth of asset visibility and transportation management had made it nearly impossible to distribute supplies to the user.<sup>12</sup> To solve this problem, the Army logistics community focused on improving the logistics structure with reliable technology, end to end asset visibility, and distribution-based logistics. The logistics community attempted to transition to a demand-based system focused on rapid distribution enabled by automated requisition systems, RF tracking technology, and a complete logistics common operating picture (COP). With these improvements to the force in the transition phase in 2003, the Army invaded Iraq.

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<sup>11</sup> US Department of the Army, Field Manual (FM) 100-5, Operations (Washington, DC: Government Printing Office, 1993), 12-2 to 12-3.

<sup>12</sup> Leonhard, *Art of Maneuver*, 297.

## Within the Division

A generic division consisted of three maneuver brigade headquarters with ten maneuver battalions divided between them, an artillery brigade with three firing battalions, an aviation brigade, the Division Support Command (DISCOM), and division troop companies and battalions.<sup>13</sup> The DISCOM was the primary support organization in the Division. The DISCOM Commander served as the principal logistics operator of the Division, responsible for providing division-level logistics and health services support to all organic and attached elements of the division. He managed these tasks through the DISCOM Support Operations Section and Division Materiel Management Center (DMMC). These agencies conducted the planning and support coordination.<sup>14</sup> Figure 1 shows the specific responsibilities of the DISCOM.

- Support of Class I, II, III, IV, V, VI, VII, VIII, and IX supplies.
- Operation of ammunition transfer points within the division.
- DS maintenance and reinforcing unit maintenance support for all common and missile materiel organic to the division, and AVIM support for all aviation materiel.
- Materiel (supply and maintenance) management for the division.
- Transport for personnel, supplies, and equipment to accomplish division logistics and administrative missions. Also provide supplemental ground transportation to support emergency requirements.
- Supervise coordination of DISCOM transportation operations.
- ADP system software support for division logistics activities.
- Materiel salvage facilities.
- A limited capability to carry reserve supplies.
- Logistics information and advice to the division commander and his staff, except construction.
- Planning, coordinating, and conducting rear operations within its assigned areas of responsibility.
- Receipt, storage, and distribution of unclassified maps.

Figure 1. DISCOM Responsibilities. Field Manual (FM) 63-2, Division Support Command, Armored, Infantry, and Mechanized Divisions 1991, 1-1.

To fulfill these responsibilities, the DISCOM had a Headquarters Company, a main support battalion (MSB), and one forward support battalion (FSB) for each assigned maneuver

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<sup>13</sup> Romjue, *Army of Excellence*, 196.

<sup>14</sup> US Department of the Army, Field Manual (FM) 63-2, Division Support Command, Armored, Infantry, and Mechanized Divisions (Washington, DC: Government Printing Office, 1991), 1-1.

brigade headquarters. Within the Headquarters Company, the DMMC implemented the DISCOM commander's policy and advised him on materiel management. The DMMC determined supply requirements, ordered and directed the distribution of supplies received by the division, developed and supervised the division authorized stockage lists and prescribed load lists, maintained the division property book and Army equipment status reporting data, and operated an integrated division maintenance management information program.<sup>15</sup> Covering everything from ammunition to toilet paper, the DMMC was the logistics hub in the AOE division.

The MSB and FSBs executed the distribution and maintenance functions for the DISCOM based on priorities and requirements from the DMMC. Operating in the rear area of the division, the MSB served as the main logistics and medical operator responsible for providing direct support to rear units and reinforcing support to the FSBs. The MSB's capabilities included maintenance, supply, medical, transportation, and water purification.<sup>16</sup> Smaller than the MSB, the FSBs provided direct support supply, maintenance, and medical to the maneuver brigades. Designed to be mobile, the FSB moved with the brigades and provided forward support to the units within their brigade's area of operations. Assigned to the DISCOM and aligned to a maneuver brigade, the FSB was well positioned to plan future support for brigade operations, adjust current support based on the tactical situation, and leverage the DISCOM for additional capability when required.<sup>17</sup> This combination of organizations horizontally and vertically integrated the DISCOM with the division at all levels.

The front end of the AOE structure was the maneuver companies and battalions. Maneuver battalions had organic logistics assets split between the maintenance and support platoons with the responsibility of transporting critical supplies (fuel and ammunition),

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<sup>15</sup> FM 63-2, Division Support Command, Armored, Infantry, and Mechanized Divisions, 1-4.

<sup>16</sup> US Department of the Army, Field Manual (FM) 63-21, Main Support Battalion (Washington, DC: Government Printing Office, 1990), 1-4.

<sup>17</sup> US Department of the Army, Field Manual (FM) 63-20, Forward Support Battalion (Washington, DC: Government Printing Office, 1990), 2-2.

conducting organizational level maintenance, and other basic support functions.<sup>18</sup> The support platoons served as the link between the front-line units and the DISCOM structure. Figure 2 shows the assigned and support relationships within a generic division. These relationships are best illustrated by looking at the flow of fuel support within the AOE division.

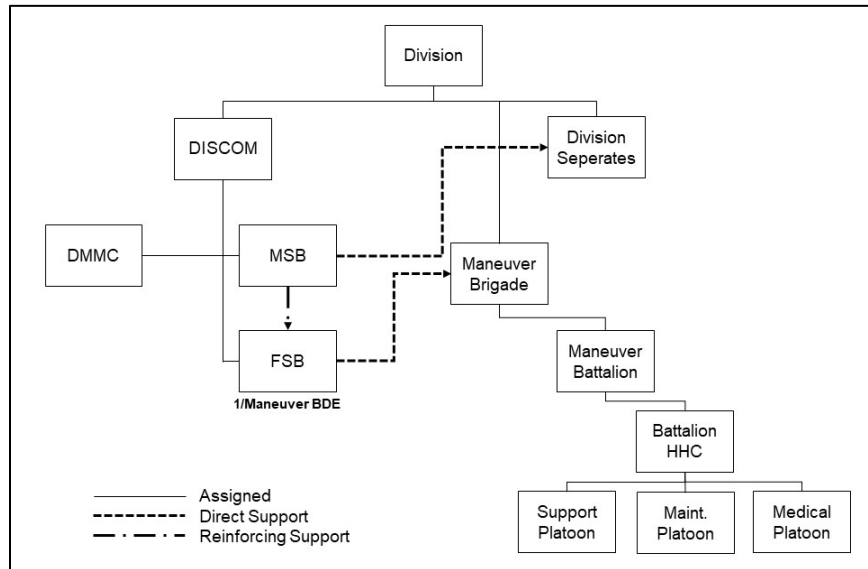


Figure 2. AOE Division Structure and Support Relationships.

An AOE Armor Division consisted of three brigades with a mix of five armor battalions and four mechanized infantry battalions. Fuel support in the division works from the combat platform back through the division support structure. A standard armor battalion consisted of fifty-eight M1 Abrams tanks, each with a 500-gallon fuel capacity. Thus, 29,000 gallons of fuel were required to fill them.<sup>19</sup> The armor battalion's organic support platoon had sixteen 2,500-gallon fuel trucks, providing a capacity of 40,000 gallons.<sup>20</sup> A standard mechanized infantry battalion consisted of fifty-eight M2 Bradley Fighting Vehicles, each with a 175-gallon fuel

<sup>18</sup> US Department of the Army, Field Manual (FM) 100-10, Combat Service Support (Washington, DC: Government Printing Office, 1995), 3-3.

<sup>19</sup> US Command and General Staff College, Student Text (ST) 100-3, Battle Book, (Fort Leavenworth, KS, 2000), 2-5.

<sup>20</sup> John E. Edwards, *Combat Service Support Guide*, 3rd ed. (Mechanicsburg, PA: Stackpole Books, 2000), 71.

capacity, requiring 10,150 gallons of fuel to fill them.<sup>21</sup> The mechanized infantry battalion's organic support platoon had eight 2500-gallon fuel trucks providing a capacity of 20,000 gallons.<sup>22</sup> The FSB had a 55,000 gallon fuel capacity, eleven 5,000-gallon fuel trucks.<sup>23</sup> Thus, for a brigade consisting of two armor battalions and one mechanized infantry battalion, there was a requirement of 68,150 gallons to fill all 174 combat platforms and a refuel capacity of 155,000 gallons. Assuming a tank can operate continuously for eight hours across varied terrain, a brigade had the ability to operate for twenty-four hours internally before needing a full resupply of all combat and support assets.

Resupply would come from the MSB's thirty-four 5,000-gallon fuel trucks able to deliver 170,000 gallons in one move.<sup>24</sup> The notional three brigade division would require 200,000 gallons of fuel every eight hours assuming every platform (minus aviation) was moving for the entire period. The FSBs would plan resupply timing within the brigades based on the operational requirements of the brigade commanders. The FSBs would then coordinate with the MSB and DMMC to deconflict resupply timing based on the DISCOM Commander's guidance developed from the division commander's priorities. Because the DISCOM Commander owned the FSBs and MSBs, he could reallocate fuel assets between them to support the brigades that most needed the support. This ability to redirect and reallocate provided the DISCOM Commander with the ability to support the division commander's allocation of resources to the main effort. For requirements that would exceed the capability of the DISCOM, the DMMC coordinated with Corps Support Command. This link was critical because the planning factor for a full armored division with an aviation brigade in the attack was 420,676 gallons of fuel per day.<sup>25</sup> Providing

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<sup>21</sup> Student Text (ST) 100-3, Battle Book, 2-4.

<sup>22</sup> Edwards, *Combat Service Support Guide*, 71.

<sup>23</sup> US Command and General Staff College, Student Text (ST) 101-6, G1/G4 Battle Book, (Fort Leavenworth, KS, 2000), 4-15.

<sup>24</sup> *Ibid.*, 4-7.

<sup>25</sup> *Ibid.*, 1-4.

that quantity of fuel daily required a continuous flow of fuel into the division and ground storage to sustain.

The 2003 invasion of Iraq made use of this process. Based on the 3<sup>rd</sup> Infantry Division Commander's focus on speed of maneuver, fuel was obviously a critical enabler. The estimate for the attack was 300,000 gallons per day for 3<sup>rd</sup> Infantry Division units. To speed up resupply, the DISCOM Commander directed the 703<sup>rd</sup> MSB to push its fuel assets down to the FSBs moving with the brigades.<sup>26</sup> This reduced the amount of time required to respond to the initial refueling requirements, giving the brigade commanders and the division greater flexibility, extending the brigades' operational reach, and reducing the impact of potentially reduced communications capability. Recalling the earlier doctrinal discussion of fuel capacity and support capabilities, it is obvious that the full requirement was not met internally. The next level of AOE sustainment was critical in extending the division's maneuver as well.

### Within the AOE Corps

The corps support command (COSCOM) supported the AOE corps. No fixed corps table of organization and equipment was ever finalized, but a notional corps was developed for doctrinal purposes. The notional corps structure included three divisions, an aviation brigade, an armored cavalry regiment, two separate brigades, a corps artillery, several enabling brigades, and the COSCOM.<sup>27</sup> The COSCOM, the primary support organization for the corps, coordinated logistics elements in support of the corps and higher command operational plans.<sup>28</sup> COSCOMs had a fluid structure, tailored to meet the corps' mission and needs of the supported forces. Each COSCOM included a headquarters, corps materiel management center (CMMC), corps

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<sup>26</sup> Eric Peltz, John M. Halliday, Marc L. Robbins, and Kenneth J. Giradni, *Sustainment of Army Forces in Operation Iraqi Freedom: Battlefield Logistics and Effects on Operations* (Santa Monica, CA: RAND Corporation, 2005), 15.

<sup>27</sup> Romjue, *Army of Excellence*, 202.

<sup>28</sup> US Department of the Army, Field Manual (FM) 63-3, Corps Support Command (Washington, DC: Government Printing Office, 1993), 1-10.

movement control center (CMCC), a medical brigade, and corps support groups (CSGs).<sup>29</sup> The quantity and composition of the CSGs were based on the mission and the number of divisions supported. Figure 3 shows the functions of the COSCOM by commodity area.

<p><u>Supply Support:</u> DS and GS supply support to nondivision units. Provide GS supplies to divisions, separate brigades, and ACRs.</p> <ul style="list-style-type: none"> <li>• DS and GS ammunition supply</li> <li>• DS and GS Class III support</li> <li>• DS and GS water supply</li> <li>• DS and GS Class I, II, and IV supply</li> <li>• DS and GS repair parts supply</li> <li>• Major end item replacement</li> <li>• Airdrop supply</li> <li>• Reinforcing supply support to FSBs/MSB</li> <li>• Local Procurement</li> <li>• Materiel Management</li> </ul>	<p><u>Service Support:</u> Provides the following service support functions on a corpswide basis.</p> <ul style="list-style-type: none"> <li>• Mortuary affairs support</li> <li>• Shower, laundry, and textile renovation support</li> <li>• Tactical post exchange with or without AAFES augmentation</li> <li>• Salvage support</li> </ul>
<p><u>Maintenance Support:</u></p> <ul style="list-style-type: none"> <li>• Maintenance Management performed by the CMMC</li> <li>• DS maintenance and AVIM to nondivision units</li> <li>• Reinforcing DS maintenance and AVIM to the divisions, separate brigades, and ACRs</li> <li>• Missile-rocket maintenance support</li> <li>• Calibration support</li> </ul>	<p><u>Transportation Support:</u> Corpswide transportation support functions.</p> <ul style="list-style-type: none"> <li>• Movement control</li> <li>• Mode operations</li> <li>• Cargo transfer operations</li> <li>• Terminal operations (to include water terminals when augmenting EAC)</li> <li>• Airdrop support</li> </ul>

Figure 3. COSCOM Responsibilities. Field Manual (FM) 63-3, Corps Support Command 1993, 1-10.

Due to the breadth of responsibilities and mission, COSCOMs operated on the principal of centralized control and decentralized execution. The COSCOM support operations officer supervised both the CMMC and CMCC, giving guidance and policy based on the COSCOM commander's guidance and the corps commander's intent. Specifically, the CMMC provided centralized control of all general support (GS) supply, maintained asset visibility of selected DS stocks, and managed DS maintenance operations. The CMCC controlled movement and provided highway regulation, committed and allocated corps transportation assets through its subordinate movement control teams, and coordinated for outside transportation support. These agencies primarily focused on actions forty-eight to seventy-two hours in the future, leaving daily operations to the Corps Support Groups.<sup>30</sup> This allowed the COSCOM headquarters to focus on

<sup>29</sup> FM 100-10, Combat Service Support, 3-5.

<sup>30</sup> FM 63-3, Corps Support Command, 3-1.

anticipating and planning the support for future operations vice being consumed in the crisis of the day.

Corps Support Groups (CSGs) performed three general logistic roles: corps wide support, area support, and area support within the division area. The assigned role determined the mix of Corps Support Battalions (CSBs) and functional battalions. The rear Corps Support Group (CSG(R)), consisting of functional battalions, provided corps-wide support. Examples of functional battalions include transportation, petroleum supply, ammunition, and supply and services. Functional battalions provided large-scale capabilities in their respective functions with the ability to provide corps-wide support for to forward units. Their value was their ability to be tailored based on the corps mission, coalition support requirements, and joint support requirements. As the top level of the tactical logistics chain, the CSG(R) tied in to the operational and strategic logistics organizations.<sup>31</sup>

Forward Corps Support Groups (CSG(F)) normally provided area support and support within the division area. The CSG(F) contained CSBs tailored with support companies based on the mission and role. A COSCOM had one CSG(F) per supported division. The CSG(F) and one of the CSBs would remain behind the Division to provide area support for non-divisional units in the Corps area as well provide reinforcing support to the other CSB operating in the supported Division's area. The CSB in the Division area primarily supported forward Corps enablers, but also provided reinforcing support to the MSB and FSBs.<sup>32</sup> Figure 4 shows a typical task organization of a CSG(F) with its CSBs The COSCOM provided the corps commander the ability to extend the duration and distance that his assigned divisions could operate and fight. Continuing the Iraq fuel narrative demonstrates the process.

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<sup>31</sup> Ibid., 1-11.

<sup>32</sup> Ibid., 1-11.

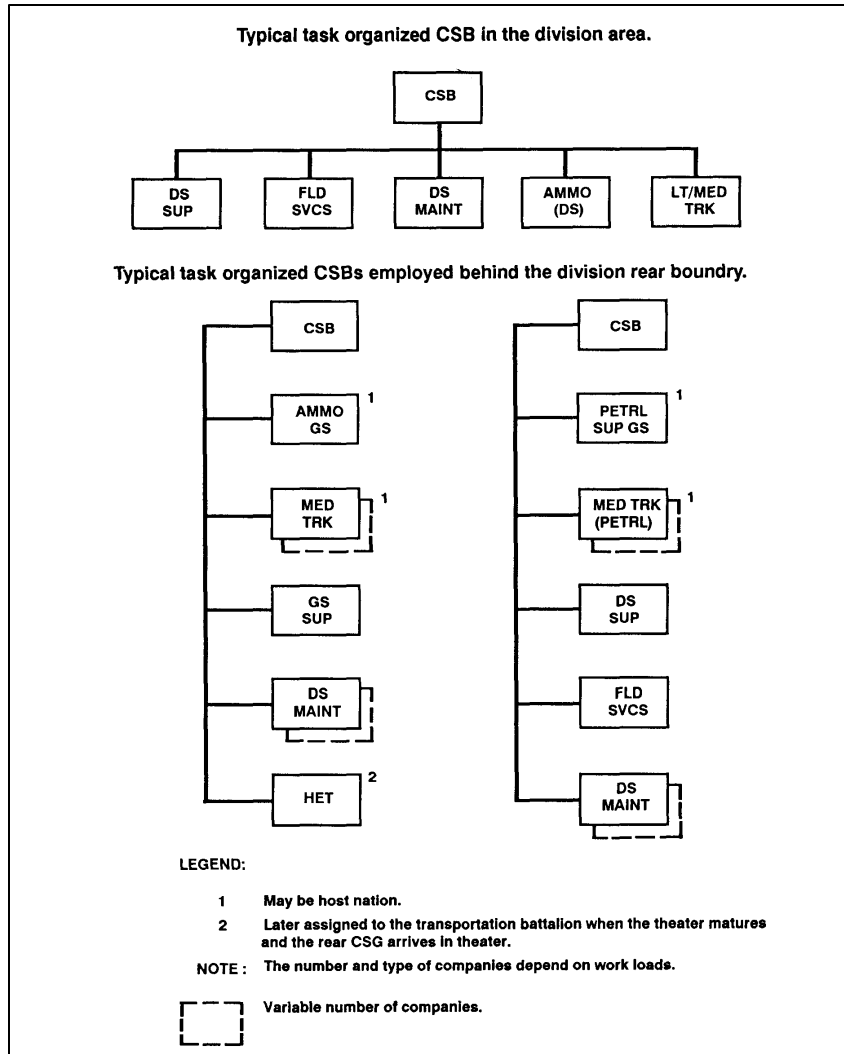


Figure 4. Typical Task Organized CSBs. Field Manual (FM) 63-3, Corps Support Command 1993, 1-22.

3<sup>rd</sup> COSCOM was under operational control (OPCON) of V Corps during the invasion of Iraq. The divisions under V Corps included 3<sup>rd</sup> Infantry Division, 4<sup>th</sup> Infantry Division, 101<sup>st</sup> Air Assault Division, and the 82<sup>nd</sup> Airborne Division. The 3<sup>rd</sup> Infantry, 4<sup>th</sup> Infantry, and 101<sup>st</sup> Infantry

Divisions each had their habitual CSG(F) from their home station. Figure 5 shows 3<sup>rd</sup> COSCOM's structure and relationships.

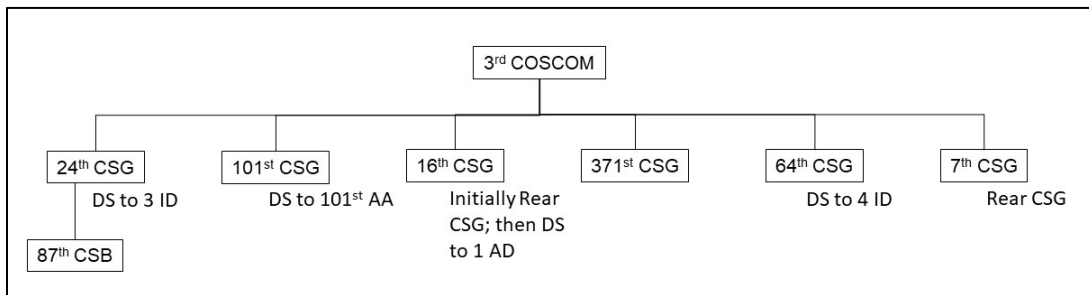


Figure 5. 3rd COSCOM Task Organization.

The planning problem that the 3<sup>rd</sup> COSCOM faced was how to sustain the corps in 570-mile attack from Kuwait to Baghdad. The solution was to move forward with the V Corps combat units and leapfrog CSBs to establish logistics bases.<sup>33</sup> Additionally, the COSCOM augmented 3<sup>rd</sup> ID with two POL truck companies to sustain resupply requirements during the establishment of the bases.<sup>34</sup> The plan for the bases in sequence was logistics support area (LSA) CEDAR, vicinity An Nasariyah; LSA BUSHMASTER, vicinity An Najaf; LSA DOGWOOD, between Karbala and Baghdad; and LSA ANACONDA, vicinity Balad Airbase north of Baghdad. These bases echeloned support capability forward, minimizing the transportation requirements to the elements of 3<sup>rd</sup> Infantry. The LSAs were established in phases. Their establishment demonstrated the ability of the COSCOM to reconfigure its units to meet the support requirements. The establishment of LSA BUSHMASTER reflects this process.

3<sup>rd</sup> COSCOM tasked 24<sup>th</sup> CSG to establish LSA BUSHMASTER as 3<sup>rd</sup> ID advanced towards Baghdad. To meet the requirement for establishing a 1.2-million-gallon fuel farm, the 3<sup>rd</sup> COSCOM moved tactical control of a GS Petroleum Company from the CSG(R) to the 24<sup>th</sup> CSG's 87<sup>th</sup> CSB. The 87<sup>th</sup> CSB moved with 2<sup>nd</sup> Brigade, 3<sup>rd</sup> Infantry Division during the attacks

<sup>33</sup> Donald P. Wright and Timothy R. Reese, *On Point II: Transition to the New Campaign* (Fort Leavenworth, KS: Combat Studies Institute Press, 2008), 499.

<sup>34</sup> Peltz et al., *Sustainment of Army Forces*, 14.

towards An Najaf. Once the objective was secured, the CSB began establishment of LSA BUSHMASTER. After crossing the border on 21 March, the CSB had the fuel site established and received 288,000 gallons of fuel on 25 March.<sup>35</sup> By 28 March, the fuel site had its full capacity of 1.2 million gallons. Resupply for both the 3<sup>rd</sup> and 101<sup>st</sup> Divisions came from BUSHMASTER, reducing the resupply distance by 220 miles.<sup>36</sup> 7<sup>th</sup> CSG(R) then took control of the LSA and the 24<sup>th</sup> CSG prepared its CSB for movement with 2/3 ID past Karbala to Objective Chargers.<sup>37</sup> Once Chargers was secured, the 87<sup>th</sup> CSB then established LSA DOGWOOD which would support 3<sup>rd</sup> ID's attack into Baghdad. This example shows the flexibility provided by the COSCOM to the Corps Commander. As a major element of the Corps, the COSCOM was able to extend the Corps operational reach and provide logistics support across more than 500 miles. The COSCOM's role was facilitated by the flow of support from the Echelons Above Corps logistics network.

### AOE Echelons Above Corps Support Structure

Under the AOE design, the Army Service Component Commander supported and employed Army forces in theater and forces outside the theater tasked to support theater operations. As one of three Army Service Component Command (ASCC) roles, he provided Title 10 support through service channels or delegated that responsibility to a subordinate headquarters. The ASCC would normally establish a support command in the communications zone to control Title 10 support. The support command responsibilities included receiving forces; conducting reception, staging, and onward movement operations; providing efficient sustainment of army forces; establishing and adjusting theater lines of communication; and providing

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<sup>35</sup> Andrew W. Bowes and Kimberly J. Daub, "A Corps Support Battalion's Experience in Operation Iraqi Freedom," *Army Logistician* 36, no. 4 (July-August 2004): 30.

<sup>36</sup> Peltz et al., *Sustainment of Army Forces*, 14.

<sup>37</sup> Bowes and Daub, "Corps Support Battalion's Experience," 30.

integrated distribution management for Army forces in theater.<sup>38</sup> The purpose of the support command was to handle the strategic-operational-tactical linkage, enabling the COSCOMs to focus on the tactical support to their respective Corps. In the case of Operation Iraqi Freedom, the 377<sup>th</sup> Theater Support Command filled this role with the responsibility of coordinating the overall logistics effort for Army, joint, and coalition forces.<sup>39</sup>

Multiple functional and multifunctional organizations could align underneath the TSC. Area Support Groups (ASG) provided support to units in the theater staging areas, allowing their assigned support units to focus on preparing to support tactical fight. ASG functions included intermediate staging base establishment, port operations, logistics to transiting units, host nation support management, and ammunition support.<sup>40</sup> The Army Materiel Command Logistics Support Elements (AMC-LSE) supported the TSC by providing limited depot level logistics, management of army prepositioned stocks, and management of logistics civil augmentation program (LOGCAP) contracts.<sup>41</sup> Additional organizations could include a theater transportation command, petroleum operations group, personnel commands, and others. Essentially, the TSC received the major organizations to manage Title X support for army forces in the theater.

For OIF, the 377<sup>th</sup> TSC had a wide variety of organizations with which the command managed sustainment operations in Kuwait and for the theater. Of note for completing the OIF fuel description was the 49<sup>th</sup> Quartermaster Group. The 49<sup>th</sup> Quartermaster Group managed all petroleum for the theater. Prior to the beginning of ground operations, the group had close to 7.2 million gallons of fuel in northern Kuwait, a pipeline from the Kuwait refineries to the main storage points, and the assets to continue the pipeline into Iraq.<sup>42</sup> Once ground forces moved into

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<sup>38</sup> FM 100-10, Combat Service Support, 3-7.

<sup>39</sup> Wright and Reese, *On Point II*, 495.

<sup>40</sup> US Department of the Army, Field Manual (FM) 54-40, Area Support Group (Washington, DC: Government Printing Office, 1995), 2-1 to 2-3.

<sup>41</sup> FM 100-10, Combat Service Support, 3-8.

<sup>42</sup> Peltz et al., *Sustainment of Army Forces*, 13.

Iraq, the 49<sup>th</sup> Quartermaster Group managed the flow of fuel to the LSA fuel farms established by 3<sup>rd</sup> COSCOM. With visibility of all the major fuel sites, the 49<sup>th</sup> Commander could ensure assets remained balanced. The AOE structure served well for fuel support. From end to end each level of command had a support unit focused on fuel support. The plan for refueling was integrated and rehearsed at each level. This provided flexibility to the V Corps and 3 ID commanders by ensuring fuel continued to move forward in synch with maneuver.<sup>43</sup>

### AOE Logistics Summary

The AOE logistics structure was deliberately designed to preserve as much flexibility for Corps and Division Commanders to allocate resources based on opportunities that arose during combat. The AOE successfully fought Desert Storm and, with some minor changes, repeated the success with the 2003 Iraq invasion. The logistics organizations at the EAC level served to provide the linkage between the industrial base and the combat forces, setting the conditions for the theater logistics network. Figure 6 shows the structure and command and control relationships

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<sup>43</sup> Ibid., 15.

from the ASCC down to the Brigade level. However, despite the integration there were problems with the sustainment structure during the 2003 invasion.

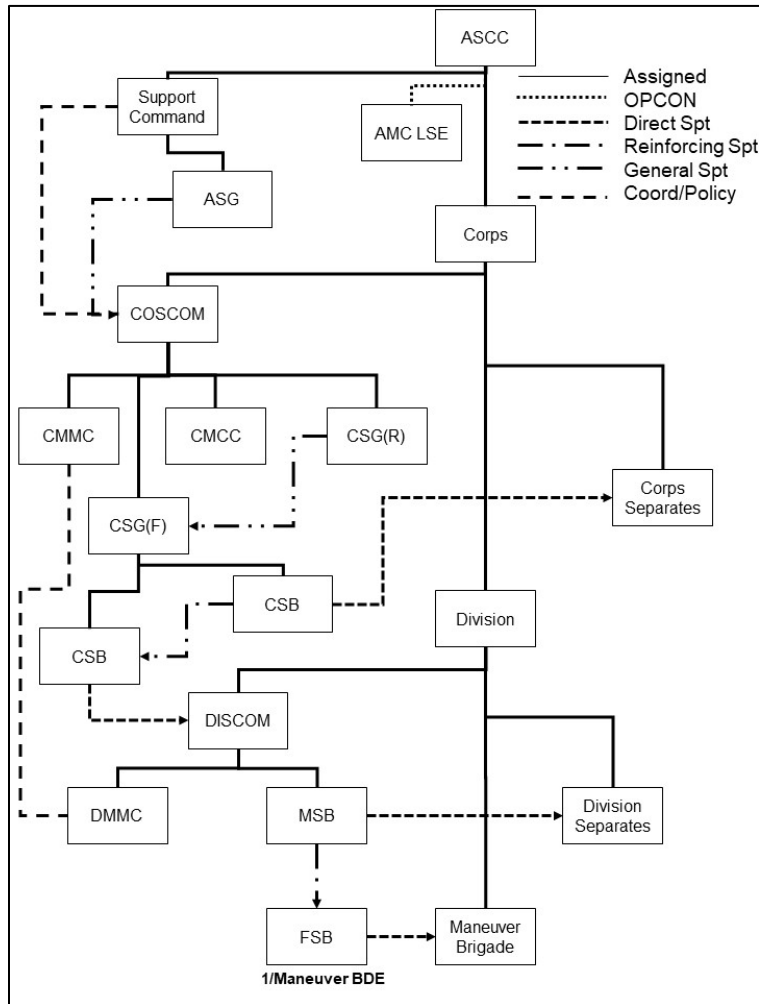


Figure 6. AOE Theater Support Structure.

## Comparing Modular Force Logistics

### OIF Logistics Challenges

In *On Point: The United States Army in Operation Iraqi Freedom*, the author claimed that logistics doctrine and systems in OIF could not support offensive operations across distributed battlespace.<sup>44</sup> However, the authors of a 2005 RAND study stated they could not, “document supply shortfall-driven delays in the advance from Kuwait to Baghdad or an inability

<sup>44</sup> Fontenot, Degen, and Tohn, *On Point*, 409.

to accomplish a mission because of a logistics problem.”<sup>45</sup> Following Desert Storm, the Army had worked on moving to distribution-based logistics (DBL). DBL relies on visibility of stocks in the pipeline to reduce inventory size at the various storage nodes. Inventory is limited to the amount required to cover small disruptions in the distribution flow plus enough to cover consumption between replenishments.<sup>46</sup> Ration stocks highlights the difference best: twenty-nine days on-hand at forward logistics bases in Desert Storm versus less than five days on-hand across the theater in Operation Iraqi Freedom.<sup>47</sup> Successful DBL requires full in-transit visibility, real-time automated information systems, and distribution assets distribution; i.e., transportation. The logistics challenges in OIF fell into two categories, distribution and forces available.

The distribution challenges resulted from primarily communications and transportation shortfalls. The goal of end-to-end ITV had not been realized because there were too few RFID readers across the distribution network and insufficient long-range communications in logistics units.<sup>48</sup> These shortfalls prevented sharing logistics status data and the passing of requisitions. For example, during the attack the 87<sup>th</sup> CSB only successfully operated its logistics systems for one day during the march towards Baghdad.<sup>49</sup> This problem occurred across all of the logistics units in 3<sup>rd</sup> ID as well. Movement prevented the requisitioning of parts, a problem not resolved until the attack into Baghdad was completed.<sup>50</sup> The lack of asset visibility is evidenced by the discrepancy between 3<sup>rd</sup> COSCOM reports and reports from 3 ID’s 3<sup>rd</sup> Brigade for the period of 4-5 April. 3<sup>rd</sup> COSCOM was tracking 4-5 days of rations in the brigades, while 3<sup>rd</sup> Brigade was reporting under two days on-hand. When the initial resupply scheduled for the second day of the attack was

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<sup>45</sup> Peltz et al., *Sustainment of Army Forces*, 62.

<sup>46</sup> *Ibid.*, xi.

<sup>47</sup> *Ibid.*, xii.

<sup>48</sup> Wright and Reese, *On Point II*, 501.

<sup>49</sup> Bowes and Daub, “Corps Support Battalion’s Experience,” 33.

<sup>50</sup> Peltz et al., *Sustainment of Army Forces*, 42.

delayed until the sixth day due to weather and enemy activity, stocks remained behind the planning levels. As logisticians adjusted, the system could only meet the daily requirement because the logistics system lacked the capacity to bring stocks back to the objective level.<sup>51</sup> Comparing the capacity for dry cargo movement between Desert Storm and Iraqi Freedom highlights the issue. In Desert Storm there was one medium truck equivalent for every seventy-three Soldiers and 210 miles between the forward logistics base and the farthest point. In Iraqi Freedom, during the invasion, there was only one medium truck company equivalent per 194 soldiers providing support across 344 miles.<sup>52</sup> This distribution capacity shortage was simple: too few trucks. The truck shortage derived from problems in the force flow.

Force flow issues created the problem with logistics force availability in theater. That should not have been a surprise. In 1999, the General Accounting Office (GAO) designated the Army as a high-risk defense issue, specifically referring to Total Army Analysis 2005. The report showed an increase in late arrivals of support forces over previous years' analyses despite being done with the assumption that ports and airfields would be immediately available.<sup>53</sup> The GAO prediction proved true in OIF. Mobilization and deployment issues resulted in the late arrival of many logistics units, including the 377<sup>th</sup> Theater Support Command which was not fully operational until after combat operations had ended.<sup>54</sup> The original deliberate planning for the invasion synchronized operations and logistics. However, the original associated deployment plan was discarded as a consequence of Department of Defense decisions. Since deploying units were listed by, type rather than grouped as sets of capabilities associated with enabling operations, they were deleted or delayed. The success of fuel distribution versus the failure of dry cargo

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<sup>51</sup> Peltz et al., *Sustainment of Army Forces*, xvi-xvii.

<sup>52</sup> *Ibid.*, 18.

<sup>53</sup> US General Accounting Office, *Report to Congressional Committees Force Structure: Opportunities for the Army to Reduce Risk in Executing the Military Strategy* (GAO/NSIAD-99-47, 1999), 5.

<sup>54</sup> Fontenot, Degen, and Tohn, *On Point*, 408.

transportation began with this deployment process. All levels of command focused heavily on fuel and it was easy to show additional capability by unit. The same level of fidelity was not available for dry cargo distribution, and resulted in 3<sup>rd</sup> COSCOM having only twenty percent of its required dry cargo assets available when the invasion began.<sup>55</sup> Where the original plan had called for COSCOM delivery to the FSBs, truck shortages caused distribution to only go to the MSB.<sup>56</sup> Intense management and creativity by logisticians at all levels became key to maintaining minimal levels in units. For example, forward units used their internal support platoon and FSB assets to move back to the LSAs to draw necessary items.<sup>57</sup> These transportation shortfalls caused the logistics community to relook processes and structure for supporting large-scale operations. Concurrent with the logistics community's self-examination, the Army conducted a relook of its force design.

## Transition to Modularity

The projected duration and rotational nature of operations in Iraq and Afghanistan combined with projected budgets led the Army to relook the design of the force. Operational concepts had changed since the era that brought the Army of Excellence. Desert Storm consisted of sequential, contiguous, linear operations with a large logistics tail and a large forward footprint. The experiences of the 1990's and the missions in Iraq and Afghanistan showed that future operations required simultaneous, distributed, non-linear operations with a small logistics footprint and a heavy reliance on reach back.<sup>58</sup> The Army Transformation Roadmap 2003 described the requirement for "modular forces tailored for self-sufficiency and endurance."<sup>59</sup> The corresponding logistics capability was characterized by "speed, adaptability, flexibility, shared

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<sup>55</sup> Peltz et al., *Sustainment of Army Forces*, 20.

<sup>56</sup> *Ibid.*, 14.

<sup>57</sup> *Ibid.*, xviii.

<sup>58</sup> US Department of the Army, *United States Army Transformation Roadmap 2003* (Washington, DC: Government Printing Office, 1995), 1-8.

<sup>59</sup> *Transformation Roadmap 2003*, 3-8.

situational awareness and understanding, a logistics COP, a robust communications infrastructure, all of which provide for rapid replanning, execution, and sustainment of military operations in complex, uncertain environments.”<sup>60</sup> This new concept coupled with the lessons learned from the Iraq invasion led to a renewed emphasis on enabling distribution-based logistics and the reconfiguration of the logistics structure into a single-supply chain.

The reconfiguration into a single supply chain resulted from lessons learned in Iraq. The logistics community determined that distribution problems arose from there being no single owner for the entire distribution network from theater entry to the user level.<sup>61</sup> The lack of a single process owner led to no one having the responsibility for looking across the theater to establish a complete and detailed distribution plan built on requirements down to the maneuver brigade level. This fact combined with ITV and transportation shortfalls created the impression that logistics had failed. The resultant change consolidated capabilities that had been distributed to various echelons into a single supply chain as defined by “all the activities involved in getting materiel to a final customer for use.”<sup>62</sup> The transition to a single supply chain concept led to the biggest logistics change. The single supply chain concept moved mission command for logistics from the various maneuver command levels to a theater logistics structure.<sup>63</sup> Additionally, the logistics community placed renewed emphasis on developing a single software solution for managing and tracking all commodities within a theater down to the user level. Corresponding to these changes, the logistics community changed its units into modular capability packages for deployment into theater based on the operational requirements.

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<sup>60</sup> *Transformation Roadmap 2003*, 3-8.

<sup>61</sup> Peltz et al., *Sustainment of Army Forces*, 20.

<sup>62</sup> Eric Peltz, Marc Robbins, and Geoffrey McGovern, *Integrating the Department of Defense Supply Chain* (Santa Monica, CA: RAND Corporation, 2012), 2.

<sup>63</sup> US Army Combined Arms Support Command, *Army Logistics Quick Reference* (Fort Lee, VA, 2014), 13, accessed on April 2, 2018, <https://www.dau.mil/cop/ammo/DAU%20Sponsored%20Documents/US%20Army%20Logistics%20Quick%20Reference%20Guide%2018Feb14.pdf>.

The Army transitioned to the modular force and the revised logistics system from 2003-2008. The centerpiece of the modular force is the BCT, a fixed structure with organic maneuver, artillery, engineer, reconnaissance, and logistics organizations designed to be self-sustained for short durations, around seventy-two hours. The BCT comes in three types: armored, light, and Stryker, selected for employment based on the mission considerations. Other types of brigades, both functional and multifunctional, include combat aviation brigades, signal brigades, sustainment brigades, military intelligence brigades, and fires brigades. The next echelon is the division headquarters with brigades attached based on operational requirements. The modular corps headquarters is an operational level headquarters capable of serving as the army forces component of a joint task force (JTF) or as a JTF with augmentation. Modularity presents a set of Legos assembled based on the mission requirements at the time of employment.

With logistics under single logistics command and control as a single supply chain, layers were removed and reconfigured. COSCOMs and DISCOMs were removed, BCTs gained organic support battalions, and the Theater Sustainment Command (TSC) controlled the above brigade sustainment forces. The key components of the modular force logistics structure became the brigade support battalions (BSBs), the tailorable sustainment brigades, and the TSC. The BSB is assigned to the brigade combat team. Sustainment brigades are assigned to the theater sustainment command, and the theater sustainment command is assigned to the ASCC. An examination of the modular structure allows for understanding the new support concept and view the reallocation of logistics functions.

## Within the Division

The most obvious difference between the modular logistics structure and that of the AOE is the elimination of DISCOMs. The functions executed by the DISCOM headquarters and the assigned support battalions were spread across the logistics formations. The division has no assigned logistics units. Each BCT has an assigned BSB which incorporates the functions of the

support platoons, the FSB, and some MSB functions. Occupying the bottom rung of the supply chain, the BSB sustains BCT operations by providing logistics support through providing task organizable capabilities in support of decisive action tasks.<sup>64</sup> These capabilities include fuel, maintenance, medical, and supply support. This pooling of assets and centralized control in the BSB is directly related to the way the AOE support structure worked with the DISCOM. Essentially “ownership” moved from the division to the brigade level. Where previously the DISCOM was assigned to the division and the FSBs were in direct support of brigades, the BSB is assigned to the BCT and the FSCs are in direct support of battalions.

The BSB provides logistics capabilities to its assigned brigade through a headquarters company, a distribution company, a maintenance company, a medical company, and multiple forward support companies with each tailored to a specific battalion within the BCT.<sup>65</sup> The functions of distribution management, field level maintenance with no reinforcing capability, and ammunition point operations transferred from the CSG(F), the DISCOM, and the support platoons. Combined with the FSB tasks, the BSB executes the functions outlined in figure 7.

- Plan, coordinate, synchronize, and execute replenishment operations in support of brigade operations.
- Distribute supply classes I, II, III, IV, VII, VIII, and IX.
- Operate the Supply Support Activity (SSA).
- Operate the Ammunition Transfer Holding Point (ATHP).
- Provide food service.
- Provide Role 1 and 2 Army Health Services Support.
- Provide field maintenance and recovery.
- Maintain visibility of the distribution network within their area of operations and synchronize the flow of throughput into the brigade's operational area.

Figure 7. BSB Responsibilities. Army Techniques Publication (ATP) 4-90, Brigade Support Battalion, 2016.

Figure 8 below shows a notional modular brigade’s structure and support relationships. The FSCs, designed to support specific battalion types, operate in a direct support role. This

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<sup>64</sup>US Department of the Army, Army Techniques Publication (ATP) 4-90, Brigade Support Battalion (Washington, DC: Government Printing Office, 2016), 1-1.

<sup>65</sup> ADRP 4-0, Sustainment, 2-12.

means the FSC remains under the command of the BSB while taking support priorities and positioning requirements from the supported battalion. This allows for the BSB commander to retain control of excess capacity and use the assets where best needed. Using fuel as an example, if one of the maneuver battalion's mission is a security operation requiring little movement the battalion's fuel requirement would be drastically lower. The BSB commander could direct assets from the supporting FSC to augment an FSC supporting a battalion with a higher fuel requirement. The purpose of the direct support relationship is to maximize effectiveness while avoiding creation of excess overall capacity.

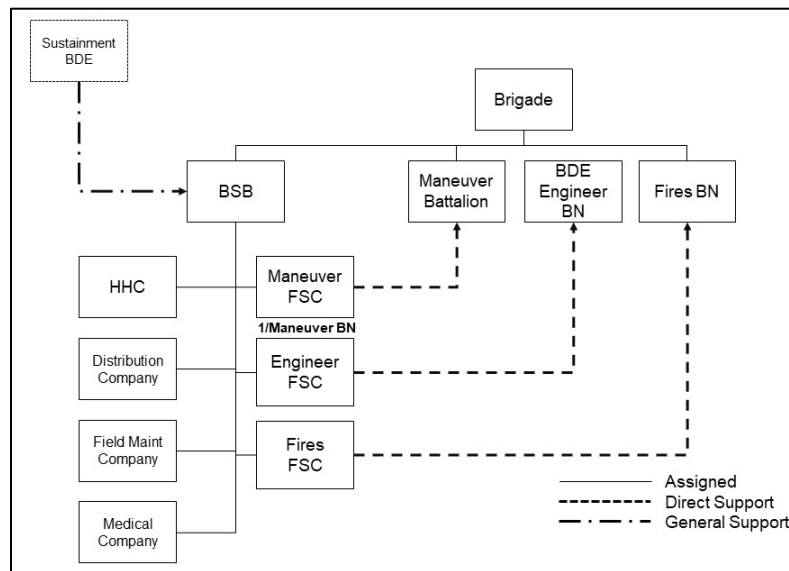


Figure 8. Modular Brigade Structure and Support Relationships.

The combination of the BSB functions makes the BCT self-sustaining for short durations. With the emphasis on brigade vice division maneuver, the BSB commander provides the same service for a BCT commander that the DISCOM commander provided the division commander. The BSB commander must understand the BCT commander's plan and provide support in a way that allows the BCT to maintain freedom of action and maneuver.<sup>66</sup> By employing the FSCs with the supported battalions, the BSB extends the BCT commander's operational reach and provides

<sup>66</sup> ATP 4-90, Brigade Support Battalion, 1-1.

tactical flexibility. Requirements that exceed the BSB capabilities are passed directly to the sustainment brigade from the BSB.<sup>67</sup> The BCT's ability to self-sustain is best seen through continuing the fuel discussion from the AOE brigade.

Recall that an AOE brigade with its supporting FSB could operate approximately twenty-four hours across varied terrain before needing a complete refueling of its vehicles and fuel trucks. In the Armored BCT this period extends to approximately forty hours. An Armored BCT with three combined arms battalions has 112 Bradley fighting vehicles and seventy-three Abrams tanks.<sup>68</sup> This creates a fuel requirement of 56,100 gallons to fill the fuel tanks, rounding to account for the other vehicles in the BCT the fuel requirement is 60,000 gallons. The combined BSB fuel assets consisting of thirty-six 2500-gallon tankers and thirty-six 2500-gallon fuel pods provides 240,000 gallons of refuel capacity.<sup>69</sup> Assuming 8-hours of continuous operations between refuels, internally the Armored BCT can operate for forty hours before needing a complete resupply of 300,000 gallons. Whereas in the AOE division this resupply would come from the internal MSB, under the modular design this resupply now comes from the sustainment brigade which is outside of the division.

## Echelons Above Brigade

The sustainment brigade is the next link in the supply chain. Replacing CSGs and DISCOM headquarters, but under command of neither the division nor the corps, the sustainment brigade controls sustainment operations and distribution management within its area of

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<sup>67</sup> ATP 4-90, Brigade Support Battalion, 1-6.

<sup>68</sup> US Army Maneuver Center of Excellence, Supplemental Manual (MCoESM) 3-90, Force Structure Reference Data: Armored Brigade Combat Team (Fort Benning, GA, 2015), accessed on April 2, 2008, [https://cgsc.blackboard.com/bbcswebdav/library/Library%20Content/Master%20Library/Maneuver\\_Center/MCoE\\_SM\\_3-90\\_ABCT\\_Oct15.pdf](https://cgsc.blackboard.com/bbcswebdav/library/Library%20Content/Master%20Library/Maneuver_Center/MCoE_SM_3-90_ABCT_Oct15.pdf).

<sup>69</sup> US Army Combined Arms Support Command, *Sustainment Force Structure Book* (Fort Lee, VA, 2017), 1150, accessed on April 2, 2018, [http://www.cascom.army.mil/g\\_staff/g3/SUOS/site-sustainment/pages/other\\_units.htm](http://www.cascom.army.mil/g_staff/g3/SUOS/site-sustainment/pages/other_units.htm).

operations.<sup>70</sup> Organically the sustainment brigade consists of a headquarters and a special troops battalion. The specific operational role determines the combination of combat sustainment support battalions (CSSB) and functional logistics battalions.<sup>71</sup> The sustainment brigade “supports Army forces at the tactical and operational levels, providing support to Brigade Combat Teams (BCTs), multifunctional and functional support brigades, deployable, self-contained division and corps headquarters, and other units operating in its assigned support area.”<sup>72</sup> The phrase “assigned support area” shows the significant change. DISCOMs and CSG(F) were assigned to support specific units with area support as a secondary task. CSG(R)s and ASGs provided area support.

When employed, the sustainment brigade performs one of three roles: theater opening, theater distribution, or area support. Executing theater opening and theater distribution roles requires headquarters augmentation to provide movement control, port management, ammunition management and other functions inherent in those roles. In the area support role, a sustainment brigade performs missions like those of the DISCOM with two key differences. First, the sustainment brigade structure adjusts based on the support requirements. The biggest difference is the relationship to the division. Rather than being assigned or habitually attached to a division, the sustainment brigade normally stays attached to the TSC and keeps a support relationship with the division. The TSC sets and controls materiel and distribution policies for the sustainment brigade. The division may have temporary operational control in the conduct of large-scale exploitation or pursuit operations.<sup>73</sup> In 2008, Major General Stevenson, then Combined Arms Support Command Commander, summarized the role of the sustainment brigade. The

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<sup>70</sup> ADRP 4-0, Sustainment, 2-11.

<sup>71</sup> US Department of the Army, Army Techniques Publication (ATP) 4-93, Sustainment Brigade (Washington, DC: Government Printing Office, 2016), 1-1.

<sup>72</sup> ATP 4-93, Sustainment Brigade, 1-1.

<sup>73</sup> ADRP 4-0, Sustainment, 2-9.

sustainment brigade is the one-stop shop for echelons above brigade support. If the sustainment brigade needs help they coordinate with the parent sustainment command.<sup>74</sup>

The CSSB performs the sustainment brigade's physical logistics mission. Mission requirements determine the number of CSSBs attached to the sustainment brigade and their composition.<sup>75</sup> Some view the CSSB in support of a division as the equivalent of the MSB. However, the CSSB does not have a fixed organizational structure beyond its organic headquarters company. The CSSB is tailored to current or planned assigned mission and roles.<sup>76</sup> The only fixed role for the CSSB is to "execute mission command for task organized companies, teams, and detachments executing logistics operations" with a core competency of executing the operations process for logistics support.<sup>77</sup> Operational missions range from supporting theater opening and closing to distribution operations to area support for echelon above brigade units, with each requiring a different configuration. With this range of mission sets, the only guarantee is that the "deployed organization will not be identical to their home station organization."<sup>78</sup> CSSB task organization normally combines habitually attached units and unfamiliar units, as well as a combination of force components. This reinforces the difference between the sustainment brigade and its CSSBs from the fixed DISCOM and its MSB. The 15<sup>th</sup> Sustainment Brigade's 2006-2007 deployment to Iraq highlights this tailoring of the structure for the mission.

In July 2006, the 15<sup>th</sup> Sustainment Brigade deployed to Iraq to provide direct support to Multinational Division Baghdad and area support for Multinational Division Center. In this role the brigade supported thirteen BCTs and numerous echelons above brigade units with

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<sup>74</sup> "Thoughts for Sustainment Brigade Commanders," *Army Logistician* 39, no. 5 (September-October 2007): 1.

<sup>75</sup> ADRP 4-0, Sustainment, 2-11.

<sup>76</sup> US Department of the Army, Army Techniques Publication (ATP) 4-93.1, Combat Sustainment Support Battalion (Washington, DC: Government Printing Office, 2017), 1-1.

<sup>77</sup> ATP 4-93.1, Combat Sustainment Support Battalion, 1-1.

<sup>78</sup> *Ibid.*, 1-11.

maintenance, supply, transportation, distribution, contract management, logistics automation, and ammunition. To fulfill this role the brigade deployed with its special troops battalion and personnel services battalion. Once in Iraq, the 15<sup>th</sup> Sustainment Brigade assumed command of three CSSBs.<sup>79</sup> The CSSBs came from Fort Carson, Fort Riley, and the Nebraska Army National Guard. Each of the CSSBs consisted of units from all three Army components and included Kellogg Brown and Root contractors. During the deployment, the companies in the CSSBs were on their own deployment schedules and continued to rotate in and out of theater. Executing an area support role, the brigade supported units from multiple divisions. Planning, policy, and management of the sustainment structure comes from the sustainment command to which the brigade is assigned.

## Theater Level Support

Under modular logistics structure, the TSC serves as the senior logistics headquarters in the theater of operations and is assigned to the ASCC.<sup>80</sup> The TSC provides “mission command and operational-level sustainment support to an Army, joint or multinational force in support of unified land operations.”<sup>81</sup> Primarily responsible for executing the sustainment portions of the ASCC’s Title X requirements, the TSC commands the units executing theater opening, theater distribution and sustainment operations to include supply, maintenance, transportation, petroleum, and terminal operations. The TSC absorbed most of the COSCOM and DISCOM roles.

The TSC primarily provides materiel management with the intent of maximizing strategic, operational, and tactical reach.<sup>82</sup> The TSC is responsible for theater logistics planning,

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<sup>79</sup> Aundre F. Piggee, “The 15<sup>th</sup> Sustainment Brigade in Iraq,” *Army Logistician* 39, no.5 (September-October 2007): 10.

<sup>80</sup> ADRP 4-0, Sustainment, 2-8.

<sup>81</sup> US Department of the Army, Army Techniques Publication (ATP) 4-94, Theater Sustainment Command (Washington, DC: Government Printing Office, 2013), 1-1.

<sup>82</sup> ATP 4-94, Theater Sustainment Command, 2-12.

determining requirements and the required capabilities to meet the requirements. It also oversees the development and implementation of the theater movement program, monitors ports of debarkation and the theater distribution network to identify bottlenecks and solve the associated issues.<sup>83</sup> Additionally, the TSC provides mission command for operational logistics in the area of responsibility.<sup>84</sup> It executes these functions through attached sustainment brigades and functional brigades. Additionally, if situationally required, the TSC can employ an Expeditionary Sustainment Command (ESC) to execute similar functions for army forces in a Joint Operations Area. For example, in the CENTCOM area of responsibility, the 1<sup>st</sup> Theater Sustainment Command has responsibility for supporting army forces. Due to the breadth of the region and level of activity, an ESC deployed to both Iraq and Afghanistan. This provided a lower level sustainment headquarters to work directly with the ARFOR in each of those AORs.

The removal of the COSCOM and DISCOM also removed the materiel management capabilities at the division and corps levels. To fill the gap in maintenance and supply requisition support, AMC transitioned the AOE LSEs to Army Field Support Brigades (AFSBs). The AFSB is assigned to AMC's Army Sustainment Command and is placed under operational control of the TSC or ESC serving in a direct support role to each active Corps or theater Army.<sup>85</sup> In addition to serving as the "key bridge between the generating force and the operational force," the AFSB is also responsible for theater logistics civil augmentation program support.<sup>86</sup> In the case of Iraq, an AFSB under the operational control of the ESC. The AFSB extends its reach down into the divisions through the Army Field Support Battalions (AFSBn's). One AFSB operates in direct support of each active division and provides logistics assistance and planning for AMC support.<sup>87</sup>

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<sup>83</sup> Ibid., 2-13.

<sup>84</sup> ATP 4-94, Theater Sustainment Command, 2-1.

<sup>85</sup> US Department of the Army, Army Techniques Publication (ATP) 4-91 Ch. 2, Army Field Support Brigade (Washington, DC: Government Printing Office, 2014), 1-1.

<sup>86</sup> ATP 4-91 Ch. 2, Army Field Support Brigade, 1-1.

<sup>87</sup> Ibid.

At the bottom rung of the AMC chain is the Brigade Logistics Support Team (BLST), attached to the AFSBn and in direct support of a BCT. The BLST serves as the primary interface between the brigade combat team and AMC for sustainment maintenance, logistics assistance, and technology support for contract-maintained software.<sup>88</sup>

Designed to reduce command and structural layers, the modular logistics structure was a response to the distribution challenges in both Desert Storm and Operation Iraqi Freedom. It reduced the logistics tail by streamlining formations to create single supply chain management in theater from the TSC through the sustainment brigade to the supported BCTs. Tailorable by the TSC in response to changing conditions and operational requirements, the structure provides a solution to the modular Army's design for being prepared for multiple and diverse mission sets

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<sup>88</sup> ATP 4-90, Brigade Support Battalion, 1-7.

though it is yet untested outside of the irregular warfare environment. Figure 9 shows a notional structure for a generic theater of operations from the ASCC down to the BCT.

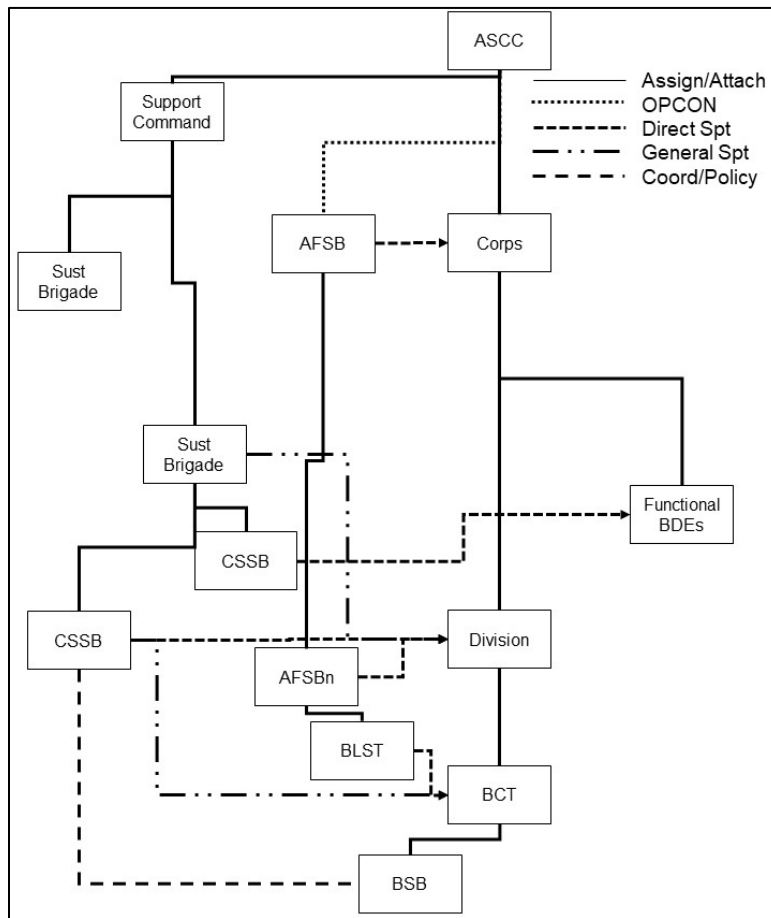


Figure 9. Modular Theater Support Structure.

Figure 9 also shows the drastic difference from the AOE structure. In simple terms, under the AOE design, the Division and Corps Commanders owned their sustainment organizations while under the modular design only the Brigade and ASCC commanders own their sustainment organizations. Under the AOE design, the Division Commander had a robust logistics organization with a fixed structure under his command for providing tactical reach and able to react to changing situations. With the modular design, Corps and Division commanders maintain informal or at best temporary relationships with the organizations providing logistics support. The ability to react logistically to an evolving situation moved up to the ASCC's TSC. Specific to the Division and the subject of this paper, the removal of the DISCOM also removed the DISCOM

commander as the principal logistics operator in the Division. It had been his task to provide logistics information and advice to the division commander and staff. Figure 10 shows the full redistribution of DISCOM tasks through the modular structure. Besides the removal of the DISCOM commander tasks, the figure highlights the collapsing of the AOE logistics structure under the single control of the TSC. The only functions not under control of the TSC are those within a BCT's BSB.

Removed Functions	<ul style="list-style-type: none"> <li>• Commander is principal logistics operator of the Division.</li> <li>• Logistics information and advice to the division commander and his staff, except construction.</li> <li>• Planning, coordinating, and conducting rear operations within its assigned areas of responsibility.</li> <li>• Receipt, storage, and distribution of unclassified maps</li> </ul>
Moved to TSC	<ul style="list-style-type: none"> <li>• Materiel (supply and maintenance) management for the division.</li> </ul>
Moved to Sust. BDE	<ul style="list-style-type: none"> <li>• ADP system software support for division logistics activities.</li> <li>• Materiel salvage facilities.</li> <li>• A limited capability to carry reserve supplies.</li> </ul>
TSC/Sust BDE/BSB	<ul style="list-style-type: none"> <li>• Supervise coordination of DISCOM transportation operations.</li> </ul>
BSB (internal BDE) CSSB (external) No reinforcing maintenance support	<ul style="list-style-type: none"> <li>• Support of Class I, II, III, IV, V, VI, VII, VIII, and IX supplies.</li> <li>• Operation of ammunition transfer points within the division.</li> <li>• DS maintenance and reinforcing unit maintenance support for all common and missile materiel organic to the division, and AVIM support for all aviation materiel.</li> <li>• Transport for personnel, supplies, and equipment to accomplish division logistics and administrative missions. Also provide supplemental ground transportation to support emergency requirements.</li> </ul>

Figure 10. Relocation of DISCOM functions.

## Assessing the Impact

The modular logistics system worked well for the low-intensity, nearly-static counterinsurgency operations in Iraq and Afghanistan. Brigades operated nearly autonomously in their assigned areas from fixed bases with minimal use of their high requirement producing tracked vehicles, maintaining loose relationships with a division or corps headquarters for coordination. However, the army is changing focus. Russian operations in the Ukraine and threats in Europe, China's strengthening and expansionist moves in the Pacific, and the nuclear rise of North Korea have led the Army to look at large-scale combat operations and the force's ability to

fight a near-peer or peer military. The modular logistics system has not been tried under these conditions.

For large-scale combat operations, the division has a much greater role than in counterinsurgency operations. The division headquarters is responsible for orchestrating the sustainment and protection tasks necessary to ensure freedom of action, to include “coordinating the anticipatory sustainment necessary for maneuver in the deep area as conditions rapidly change.”<sup>89</sup> In this regard, “sustainment assists the tactical commander in maintaining the tempo of operations.”<sup>90</sup> Essentially the responsibilities equate to what 3<sup>rd</sup> Infantry Division and V Corps executed in the Iraq invasion, but now with a very different logistics structure and philosophy. Assessing the impact requires both an understanding of supply chain management and an understanding of the environment in which the supply chain will operate.

## Supply Chain Management and Distribution-Based Logistics

Simply put, supply chain management is a paradigm shift from logistics management focused on “stuff” to creating a process-oriented, cross-functional design spanning from point of raw material acquisition to the consumer at the end of the chain. Supply chain models incorporate the processes of customer relationship management, customer service management, demand management, order fulfillment, manufacturing flow management, supplier relationship management, product development/commercialization, and returns management.<sup>91</sup> The processes cross the traditional functions of marketing, sales, research and development, logistics, production, purchasing, and finance to create an integrated system within an entity.<sup>92</sup> Additionally all supply chain models incorporate the management components of planning and control, work

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<sup>89</sup> FM 3-0, Operations, 1-34.

<sup>90</sup> Ibid., 2-47.

<sup>91</sup> Douglas M. Lambert, ed., *Supply Chain Management: Processes, Partnerships, Performance*, 2<sup>nd</sup> ed (Sarasota, FL: Supply Chain Management Institute, 2006), 13.

<sup>92</sup> Ibid., 23.

structure, organization structure, product flow structure, information flow structure, management methods, power and leadership structure, risk and reward structure, and culture and attitude.<sup>93</sup> How this is incorporated depends on the supply chain members' needs and the environment in which he operates. Meeting the needs of the customer at the end of the supply chain is the measure of an effective supply chain.<sup>94</sup> Under the modular logistics structure the supply chain begins with Army Materiel Command and Defense Logistics Agency as suppliers to the TSC with the chain extending through the sustainment brigades to the supported BCTs.

The Department of Defense uses the Supply Chain Operational Reference Model (SCOR). Use of the model is directed by DOD Manual 4140.01 which states, "use the supply chain operational reference processes of plan, source, make and maintain, deliver and return as a framework for developing, improving, and conducting materiel management activities to satisfy customer support requirements as efficiently as possible."<sup>95</sup> DoD omits the sixth process Enable and thus, DoD does not use the complete SCOR model.<sup>96</sup> SCOR is a process reference model that essentially replicates the six processes across each member of a supply chain to integrate the entire system.<sup>97</sup> Only the first four processes are required for evaluating the ability to support sustained conventional combat operations.

The first two processes are plan and source. Plan focuses on developing the best overall course of action for meeting the requirements. Source involves the steps to procure goods and

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<sup>93</sup> Lambert, *Supply Chain Management*, 19.

<sup>94</sup> Michael B. Siegl, "Understanding the Supply Chain Operations Reference Model," *Army Logistician* 40, no. 3 (May-June 2008): 19.

<sup>95</sup> US Department of Defense, Manual Number 4140.01 Volume 1, DoD Supply Chain Materiel Management Procedures: Operational Requirements, Change 1 (Washington, DC: Government Printing Office, 2017), 5.

<sup>96</sup> APICS, *Quick Reference Guide: SCOR, Version 12.0*, (2017), 3. Accessed January 10, 2018. [http://www.apics.org/docs/default-source/scc-non-research/apicsscc\\_scor\\_quick\\_reference\\_guide.pdf](http://www.apics.org/docs/default-source/scc-non-research/apicsscc_scor_quick_reference_guide.pdf).

<sup>97</sup> Siegl, "Understanding the Supply Chain," 19.

services based on planned or actual requirements.<sup>98</sup> The plan and source steps work together. Requirements analysis informs the need for outside sourcing to meet requirements exceeding the organization's capabilities. These two steps work together with the requirements analysis with planning informing the sourcing requirements to meet requirements beyond an organization's capabilities. In Army terms, the plan and source steps are known as balancing requirements and capabilities to identify shortfalls to pass up as requirements. In both Army and civilian supply chains real time information and an ability to rebalance the supply chain are critical. This supports efficient use of on-hand assets and provides only the minimal amount necessary to meet the demand without building excess stocks. Having a scenario planning ability allows identification of potential future needs and mitigation strategies to deal with disruptions or surges in the supply chain. These requirements for planning and sourcing necessitate having a coordinated supply chain planning team with cross-functional representation along with a long-term relationship between buyers and sellers.<sup>99</sup>

Make and deliver are the third and fourth processes. Make involves the steps that transform a product into its finished state.<sup>100</sup> In the theater of operations examples include building ammunition loads for artillery, engineer configured loads, refurbishment of repair parts, and water purification. Efficiently executing the make process to minimize large on-hand inventories is production based on demand. The amount of inventory to maintain on-hand is determined by projected variance in demand and the cost of not having the item when requested. Deliver includes all the processes which provide the finished goods and services to the customer. Capabilities required include real-time order taking and tracking, agility in delivery modes, and

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<sup>98</sup> Honggeng Zhou, W.C. Benton, Jr, David A. Schilling, and Glen W. Milligan, "Supply Chain Integration and the SCOR Model," *Journal of Business Logistics* 32, no. 4 (2011): 333.

<sup>99</sup> Zhou et al., "Supply Chain Integration," 334.

<sup>100</sup> *Ibid.*, 333.

providing a single customer contact point.<sup>101</sup> All four of the SCOR processes work together to synchronize an organization's ability to efficiently meet customer demands. The full supply chain is linked through real-time asset visibility and integrated communications between a support organization, its suppliers, and its customers. The needs of the customer are one component that assists in linking the supply chain. The other major component is the environment in which the supply chain will provide support.

## Defining the Environment

As stated in the discussion on supply chain models, the environment and the needs of the customer are the key components of developing and evaluating a supply chain. The most common argument in the military against adopting civilian models is that nothing is the same. However, there are multiple similarities and all the nodes exist in both civilian and military structures. In both there are suppliers and customers. In both there are constraints and limitations put on both suppliers and customers. In both the environment affects modes and speed of delivery. In both there is a need to minimize waste while covering variance in demand. The difference is in defining success. Lieutenant General, Retired, Pagonis described: "the military focuses on life and death, whereas business measures profit."<sup>102</sup> Profit determines whether a company survives, but "real life and death, tend to change the calculations. We in the military must sacrifice some measure of efficiency to maintain a higher margin of safety. We stockpile a little (or a lot) extra just in case."<sup>103</sup> Redundancy and slack must be built in to the system to ensure variance in demand or delivery does not cause operational failure.

For the military, large-scale combat operations represents the worst-case scenario and poses the most difficult set of conditions. The difficulty derives from the constantly changing

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<sup>101</sup> Zhou et al., "Supply Chain Integration," 335.

<sup>102</sup> William G. Pagonis, *Moving Mountains: Lessons in Leadership and Logistics from the Gulf War*, with Jeffrey L. Cruikshank (Boston: Harvard Business School Press, 1992), 210.

<sup>103</sup> Pagonis, *Moving Mountains*, 210.

conditions, uncertain outcomes, and complexity introduced by enemy action.<sup>104</sup> The logistics requirements, the customer base, and the cost of failure are dramatically different when comparing between large-scale combat operations, counterinsurgency operations, and civilian logistics operations. Fuel requirements reflect best the differences between large-scale combat and counterinsurgency. The fuel estimate for 3<sup>rd</sup> Infantry Division was 300,000 gallons per day for the Iraq invasion.<sup>105</sup> The planning factor for an Armored Brigade Combat Team in the attack is between 65,000 and 130,000 gallons per day depending on the terrain and distances. For a Stryker Brigade Combat Team, the requirement is between 30,000 and 40,000 gallons per day.<sup>106</sup> This contrasts with the requirements in counterinsurgency. A SBCT in Iraq in 2007 averaged only 6,459 gallons per day.<sup>107</sup> Armored Brigades in the counterinsurgency phase in Iraq transitioned to using MRAPs to save on maintenance and fuel. A BCT using MRAPs would average approximately 13,000 gallons per day for counterinsurgency operations. The cost of failure is also very different. In large-scale combat the failure to provide sufficient fuel can result in defeat. In counterinsurgency such a failure results in delays or reduced operations, while in the civilian community fuel shortage results in profit losses because the customer goes to another supplier. With these conditions in mind, it is time to assess the modular logistics structure that was designed to provide support in a period of mostly static operations against the requirement to support large scale operations.

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<sup>104</sup> FM 3-0, Operations, 1-2.

<sup>105</sup> Peltz et al., *Sustainment of Army Forces*, 15.

<sup>106</sup> US Army Command and General Staff College, Student Text (ST) 4-1, Theater Sustainment Battle Book (Fort Leavenworth, KS, 2016), 4-6.

<sup>107</sup> Army Environmental Policy Institute, *Sustain the Mission Project: Casualty Factors for Fuel and Water Resupply Convoys Final Technical Report*, by David S. Eady, Steven B. Siegl, R. Steven Bell, and Scott H. Dicke (Arlington, VA, 2009), 6, accessed April 7, 2018, <http://www.dtic.mil/dtic/tr/fulltext/u2/b356341.pdf>.

## SCOR and the Modular Structure

The modular structure was designed with the BCTs and Special Brigades as the building blocks for employing Army forces. This is an important reference point in laying out the supply chain in relation to the SCOR model. The generic SCOR model consists of a series of supplier and customer relationships with the five SCOR processes replicated in each entity to synchronize and link the full supply chain. In the case of the modular force, the structure spans from the industrial base to the BCT as depicted in figure 11. The sustainment brigade is a subset of the TSC, serving as the customer support interface with the BCT. Below the BCT level, sustainment is internal to the organization which is why DOD metrics do not measure all the way to the individual Soldier.

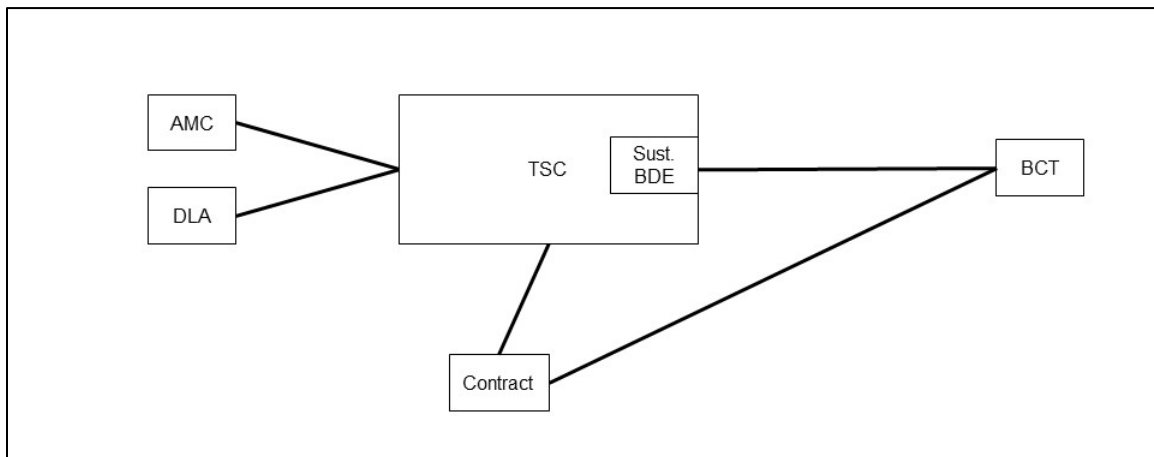


Figure 11. Simplified Modular Supply Chain

Under modular sustainment doctrine, the BCT's BSB executes the logistics support within the BCT and serves as the bottom rung of the supply chain. The BSB, however, is organic to the brigade, so in effect it is an in-house logistics agency responsible for executing logistics for the BCT commander. Therefore, the BCT is the lowest rung in the supply chain; everything below that is internal and not affected by DOD policy. In supply chain language, the BCT's product is combat ready battalions capable of executing decisive action operations.

The BCT incorporates the SCOR processes of plan, source, make, and deliver. The BSB, with input from the Brigade S4 for priorities and future plans, balances requirements of the

supported battalions with the internal BSB capabilities. The balancing is done to ensure that the demand is met to allow for the BCT to conduct operations. Balancing includes synchronizing deliveries and forward positioning stocks. When the BSB determines a shortfall in capabilities, the BSB passes the requirement to the TSC's sustainment brigade. This is the primary sourcing link for the BCT. However, some services and supplies are acquired from contracted sources. In terms of making a product, the BSB primarily configures supply loads based on the needs of the supported battalions. The BCT can and does deliver required items and services with a focus on internal distribution to ensure the organic units are resourced to execute the brigade's assigned mission. Maintaining the relationship and sharing information with the TSC's sustainment brigade is critical for supporting the BCT.

The TSC receives its information for planning from the BCTs, the ASCC, and through liaisons with other operational headquarters. As discussed previously, the TSC is the single logistics manager for a theater. Designed as part of a single supply-chain, the TSC executes the SCOR processes through its headquarters and the sustainment brigades. In terms of plan, the TSC integrates the requirements of the BCTs with the ASCC commander's priorities. Integration into the theater planning process is critical because theater planning drives the capabilities required within the sustainment brigades. The number of sustainment brigades and their composition then must be sourced through the Department of Defense global force management process. BCTs provide real-time information to the TSC through the logistics information systems. With this visibility, the TSC can view stocks on hand at all levels, location of stocks in the distribution pipeline, and projected shipments from the industrial base. Coupling this with projected operations, the TSC can rebalance the supply chain. Rebalancing is done primarily through adjusting the capabilities of the sustainment brigades through task organization changes. However, rebalancing can also include changing stockage objectives at the sustainment brigades or BCTs by changing theater logistics policy. The TSC sources requirements by either passing requirements back to AMC and DLA or using theater contracts. The TSC integrates AMC and

DLA through liaison officers within the distribution management center. The TSC provides support to units through its sustainment brigades. The TSC does make products within the sustainment brigades in terms of configured loads, water purification, and refurbishment of repair parts. The distribution management center manages the TSC delivery process through the sustainment brigades. As the TSC's face to the supported units, the sustainment brigades then schedule final delivery. Through the sustainment brigades, the TSC provides fuel, supply, maintenance, water, and transportation support to the BCTs and other units. The modular logistics structure under single command and control was designed to avoid maintaining multiple large, fixed sustainment structures. Capabilities are created only when required at a given point in time. Unfortunately, the system has only operated in a less than dynamic warfighting environment. Operations Iraqi Freedom and Enduring Freedom were BCT centric and the nodes were relatively fixed. Even the reconfiguration of the theater in Iraq during the drawdown was slow and deliberate, executed over a period of months. Hence, there is no solid evidence that the system can meet the more demanding requirements of conventional war.

## The Division

Conventional war with large-scale operations against a peer or near-peer adversary in sustained land combat would be more dynamic. Based on current Army doctrine, operations would be division centric, with several brigades fighting under the direct control of a division headquarters. In OIF and OEF, the division headquarters coordinated the activities of multiple brigades. The division was not the primary organizer of combat operations. The 2003 invasion of Iraq was the last time that the division filled that role. As discussed, the AOE structure was very different from the current modular structure. It should be possible to assess the impact of the removal of the DISCOM by using the SCOR model to assess the division's ability to integrate logistics to sustain its brigades.

## Assessment

In terms of the planning process, the division has limited ability to develop courses of action that best meet sourcing, production, and delivery requirements. The division G4 section is primarily designed for managing information and participating in the division planning process. The DISCOM previously managed the internal supply chain and rebalanced assets based on demand. A prime example was the forward positioning of the MSB's fuel and transportation assets with the maneuver brigades during 3<sup>rd</sup> Infantry Division's attack to Baghdad. Under the modular structure the division relies on the TSC and its supporting sustainment brigade to manage the logistics assets outside of the BCTs which can reduce the responsiveness of the EAB logistics structure to rapidly changing operational requirements. Under the AOE construct, integration of requirements and capabilities was the role of the DISCOM Commander and his materiel management center.

The DMMC was the primary sourcing agent for the division under the AOE. Under the modular design, the division headquarters does have the ability to procure required commodities and services to meet planned or actual demand. The G4 section maintains a coordinating relationship with the supporting sustainment brigade and the division has the capability to enter into limited operational contract depending on the theater policies. The limits for sourcing come into play by looking at defined industry best practices for sourcing which include long-term buyer-supplier relationships.<sup>108</sup> Modularity itself imposes limits on the relationships. There is no long-term relationship between a division headquarters and any BCT or sustainment brigade. Temporary relationships reduce the opportunity to build the trust needed to deal with high intensity operations such as the Iraq invasion. Despite the near-misses with supply shortfalls during the invasion, the relationship between the Division Commander and the DISCOM helped alleviate some of the problems. Supply chain and business academic literature document the

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<sup>108</sup> Zhou et al., "Supply Chain Integration," 334.

impacts of the lack of a trust and developed relationships between customer and supplier. The effects of lost confidence include customers and suppliers at each echelon creating buffer stock and hidden stock, which increases the lack of visibility and reinforces the informal over the formal systems.<sup>109</sup> The lack of visibility would then create similar problems with distribution management as seen in OIF and Desert Storm. Sourcing under the principles of distribution-based logistics links directly to when the requirement needs fulfilling.

Fulfilling subordinate unit requirements is the purpose of the make and delivery processes. The modular division has no organic ability to synchronize the delivery of supplies or surge capabilities such as fuel. The division is entirely reliant on the TSC's supporting sustainment brigade to ensure the right supplies get to the right place at the right time. The sustainment brigade's distribution cycle is based on the priorities and policy imposed by the TSC. If the division wants support outside of the TSC priorities and policy, the division must go through the ASCC to the TSC. In a rapidly evolving combat operation, this bureaucratic process reduces the ability of the division to support its BCTs.

### Impacts on Large-Scale Combat Operations

The division needs control over its logistics to synchronize its operations. Divisions develop operations using the elements of the operational art, of which tempo, operational reach, culmination point, and basing are most relevant to sustainment. Specifically, FM 3-0, Operations states "sustainment assists the tactical commander in maintaining the tempo of operations."<sup>110</sup> While preparing for the invasion of Iraq, 3<sup>rd</sup> Infantry Division extended its operational reach by nearly doubling the rations and water carried by its units from three to five days of supply. Not doing this would have created a shortage by three days in food and water due to the four day

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<sup>109</sup> Martin Christopher and Hau Lee, "Mitigating supply chain risk through improved confidence," *International Journal of Physical Distribution and Logistics Management* 35, no. 5 (2004): 389.

<sup>110</sup> FM 3-0, Operations, 2-47.

delay in resupply to the division.<sup>111</sup> Additionally, as previously discussed, the MSB positioned its refuel assets with the maneuver brigades to minimize the response time for refueling during the attack. Habitual support relationships facilitate the ability to anticipate in this fashion.<sup>112</sup> The permanence of the DISCOM relationship with the division also enabled the in-depth planning and synchronization of fuel operations during the invasion. The division no longer has this ability because there is no habitual and sustained relationship with both its supplier (sustainment brigade) and its customers (BCTs).

The lack of the habitual relationship also affects the division's ability to rapidly transition between types of operations. Specifically in the defense, the success of a division's defensive effort relies on the ability of the sustainment organization to rapidly respond to evolving need based on enemy actions and maintain the distribution network.<sup>113</sup> In the event of a rapid transition to the offense the sustainment structure must be able to rapidly respond with the fuel and ammunition resupply to enable the BCTs to sustain the attack. Anticipating these requirements is based on understanding how the supported units fight. This requires a high level of trust built on a sustained relationship between the supplier (sustainment brigade) and the customer (division). The DISCOM Commander had a permanent relationship with both the division and its brigades. Through training exercises and shared experiences, the DISCOM Commander learned how the division commander and the brigade commanders preferred to conduct operations. This understanding enabled the DISCOM Commander to anticipate the transitions and the associated requirements.

Additionally, under mission command doctrine outlined in ADRP 6-0, "commanders constantly use their judgement for such things as delegating authority, making decisions,

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<sup>111</sup> Peltz et al., *Sustainment of Army Forces*, 28.

<sup>112</sup> FM 3-0, Operations, 2-48.

<sup>113</sup> ATP 3-91, Division Operations, 5-37.

determining the appropriate degree of control, and allocating resources.”<sup>114</sup> Under the modular sustainment structure, the division commander does not own any resource capability and, at most, can only set priorities for the supporting sustainment brigade which executes within the priorities also established by the TSC. If the division is third in the theater priority support, then the division commander’s top priority is at best the third priority for a sustainment brigade supporting more than one division. Furthermore, the division commander does not have the ability to cross-level support between subordinate BCTs. Though an armored brigade combat team has almost twice the fuel capacity of an AOE armored brigade, there is less flexibility across the division because the capacity is organic to the BCT. Under the AOE structure, the FSBs and MSB provided the division commander the ability to redirect fuel assets where needed. Thus, the division commander is not the resource allocator which impacts his ability to exercise the art of command.

In conjunction with the impact on the art of command, the division commander lost an aspect of the science of control. Mission command doctrine defines the science of control as “the regulation of forces and warfighting functions to accomplish the mission within the commander’s intent.”<sup>115</sup> At best, the division has an influencing relationship on the sustainment warfighting function as defined by the modular structure. This limits the division commander’s ability to rapidly task organize and synchronize the elements of combat power to exploit enemy weaknesses or counter enemy strengths. Simply put, the current sustainment doctrine and structure will not work in supporting large-scale combat operations.

## Conclusion

Current Army logistics organizations cannot properly support a contemporary division in sustained conventional combat. The AOE structure based on a fixed division structure provided

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<sup>114</sup> US Department of the Army, Army Doctrine Reference Publication (ADRP) 6-0, Ch. 2, Mission Command (Washington, DC: Government Printing Office, 2014), 2-5.

<sup>115</sup> ADRP 6-0, Ch. 2, Mission Command, 2-12.

all of the warfighting functions to the division commander. The DISCOM provided the division commander the capability to rapidly respond and allocate resources. Despite the logistics shortfalls in the 2003 invasion of Iraq, the internal division assets provided the capability to help mitigate the resource shortfalls and delays.

The implementation of the modular logistics structure aimed to correct the perceived causes of the 2003 deficiencies. Specifically, the Army's intent was gaining end-to-end asset visibility, reorganizing sustainment forces in capability sets, reducing layers of management, and designating a single owner for the distribution network from theater entry to the user level. These changes resulted in moving mission command of all EAB sustainment forces from the division and corps to the TSC. Thus, the DISCOM and COSCOM were removed from the structure. Viewed as a success in support of the counterinsurgency fight in Iraq and Afghanistan, the Army and logistics community view modular logistics as a long-term solution adaptable to conventional, large-scale combat operations. However, the Army has pivoted focus to large-scale conventional combat based on the changing international security environment. The counterinsurgency logistics requirements do not even approach the requirements of large-scale combat operations. Single point distribution management cannot support the tempo, distances, and synchronization.

Sustained conventional combat relies on the division as a tactical headquarters. In this role, the division is responsible for enabling and resourcing BCTs. With the removal of the DISCOM and DMMC, the division lost its ability to integrate logistics with operations. This created three key shortfalls. The first, the division lacks the ability to balance logistics across the subordinate brigades based on changing mission or situations. The second shortfall is the lack of habitual support and command relationships. This reduces the ability to conduct in-depth planning and synchronization. The lack of habitual relationships also harms the ability of the supporting logistics unit to anticipate the needs of the supported force. The third shortfall is the absence of an internal capability to synchronize sustainment with maneuver. This reduces the

ability of the division commander to bring together the elements of combat power to conduct operations successfully. Based on these shortfalls, the obvious solution for mitigation centers on getting the relationships right.

Getting the relationships right may not require the return to the AOE structure with fixed DISCOMs assigned to support divisions. Business literature though suggests that a long-term relationship is needed between customers and suppliers. The relationship shortfall might be solved by making the sustainment brigade an organic element of the division. Making the sustainment brigade organic to the division would allow for the long-term relationship to be established. The division commander would also have the ability to synchronize logistics operations with maneuver. That was the very ability that enabled 3<sup>rd</sup> Infantry Division to sustain its forces during the Iraq invasion until the higher supply chain could overcome the difficulties in moving resupply forward.

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