Focused Logistics: Putting Agility in Agile Logistics

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This monograph describes the evolution of military logistics from 1994 to 2011 within the framework of the tenants of the Focused Logistics concept, assesses the effectiveness of the efforts to transform military logistics from a mass-based into a distribution-based logistics system, describes the implementation of enabling capabilities in support of operation in Afghanistan and Iraq, and finally, delineates the action necessary for the United States (US) military to implement a truly Agile Logistics system. Efforts to revolutionize the military logistics system will be viewed through the lens of Focused Logistics, the overarching Joint concept introduced in the mid-1990s in response to challenges identified as a result of logistics operations during the 1st Gulf War. Military leaders described this period as a Revolution in Military Logistics as they fundamentally changed supply policies, implemented emerging business processes, integrated advanced technologies, and validated enabling capabilities in support of expeditionary operations across the globe.

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Abstract

FOCUSED LOGISTICS: PUTTING AGILITY IN AGILE LOGISTICS by COL Michael W. Snow, United States Army, 72 pages.

This monograph describes the evolution of military logistics from 1994 to 2011 within the framework of the tenants of the Focused Logistics concept, assesses the effectiveness of the efforts to transform military logistics from a mass-based into a distribution-based logistics system, describes the implementation of enabling capabilities in support of operation in Afghanistan and Iraq, and finally, delineates the action necessary for the United States (US) military to implement a truly Agile Logistics system. Efforts to revolutionize the military logistics system will be viewed through the lens of Focused Logistics, the overarching Joint concept introduced in the mid-1990s in response to challenges identified as a result of logistics operations during the 1st Gulf War. Military leaders described this period as a Revolution in Military Logistics as they fundamentally changed supply policies, implemented emerging business processes, integrated advanced technologies, and validated enabling capabilities in support of expeditionary operations across the globe.

The US military has succeeded in creating a robust distribution network that optimizes the tenets of Focused Logistics by leveraging the proven business processes and technologies available within the commercial sector. The military's logistics processes have evolved to meet the challenges presented by operations in Afghanistan and Iraq, however, operational and tactical logistic organizations lack key enabling capabilities, to include an integrated logistics information system, to maximize the capacity of the distribution system. The military has made progress towards creating an Agile Logistics system, but leaders acknowledge that to create an integrated and seamless logistics system, they must complete the development and implementation of the Global Command Support System, effectively maintain visibility of assets in the distribution pipeline, and provide logisticians the tools to effectively participate in operational planning. Finally, logisticians must develop and communicate a more consistent strategic message that effectively articulates why Agile Logistics is important and how the system must evolve to support future operational environments.

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Introduction

Over the last 20 years, military logistics has evolved from a system that relied on massive inventories of supplies spread throughout the battlefield as the primary means to sustain combat operations into an integrated and seamless supply-chain that maximizes the use of improved distribution enablers to deliver supplies when and where needed. Distribution-based logistics has not eliminated the need for critical supplies throughout the joint operating area (JOA), but has certainly resulted in a reduction in both the number of supply points and size of the inventories maintained. With the integration of improved communication systems, in-transit visibility technology, and highly developed strategic and theater distribution networks, materiel managers at all levels can now see a requirement, decide on the most efficient way to fulfill a commander's request, and prioritize and track its movement through the distribution pipeline. Military logisticians have successfully demonstrated the power and effectiveness of a distribution-based logistics system, as they sustain continuous operations around the globe.

Many logistics leaders and operators have written on the success and failure of transformation efforts and the idea of a Revolution in Military Logistics (RML), but few have articulated the essence of the Focused Logistics concept and fewer have clearly defined what it means to be logistically agile. The Department of Defense (DoD) approved the Focused Logistics concept and directed the services to develop and implement its capabilities. Over the last ten years, DoD has left the logistics transformation effort to the services to execute, but until DoD integrates service unique capabilities and synchronizes efforts towards a comprehensive Joint system, the military will struggle to complete logistics transformation. This monograph will describe what has been an evolution of the military logistics system in the context of the overarching Joint Focused Logistics concept, assess these changes in context ongoing operations in Afghanistan and Iraq, and finally, delineate the steps necessary to complete the transformation to a truly Agile Logistics system.

Military operations during Operations Desert Shield and Desert Storm provided the framework from which the United States (US) military leadership viewed future concepts, forces, capabilities, and requirements. The 1st Gulf War highlighted the success of Joint operations, high tech weaponry, and the effectiveness of emerging command and control capabilities. It also illustrated the challenges facing the US military and its ability to rapidly project forces and generate the sustainment infrastructure necessary to support them. Strategic transportation capabilities were not sufficient to move forces simultaneously and this resulted in an extended deployment timeline. It took the military the better part of six months to deploy forces, generate the projected 30-60 days of supplies *required* by those forces, and develop the robust transportation network, comprised of thousands of military and civilian transport vehicles, *needed* to move millions of gallons of fuel and more that 40,000 containers shipped into the theater.[1] At the same time, the end of the Cold War resulted in the call for the redeployment of forward deployed forces to the Continental United States (CONUS) and a reduction in the size of the military and the budgets that supported them. In this constrained environment, the challenge facing military leaders was to create a smaller, more lethal force capable of deploying on a moments notice across the globe. Military logistics leaders therefore sought ways to become more efficient, lighten the sustainment burden on tactical units, and use technology to offset force structure changes.

In 1994, the Joint Staff published *Joint Vision 2010*, which included an assessment of the changing nature of warfare and the emerging operational concepts seen as necessary to winning future conflicts. *Joint Vision 2010* included the requirement to execute integrated joint, and when

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[1] William G. Pagonis, *Moving Mountains: Lessons in Leadership and Logistics from the Gulf War* (Boston, MA: Harvard Business School Press, 1992), 147 and 205-206. Emphasis added – stockage levels and supporting transportation requirements were based on historical factors for major large scale combat operations in Europe and Korea and did not accurately reflect the current enemy requirements coalition forces faced in Iraq.

possible, coalition force operations. It also emphasized the impact of emerging technology on future operations, including increased lethality. Military leaders believed that enhanced command and control systems, as well as advanced weapon technology, would transform traditional military functions into the operational concepts of Dominant Maneuver, Precision Engagement, Full-Dimensional Protection, and Focused Logistics.[2] As a result, the military focused on the development of a Joint force capable of rapidly deploying, decisively engaging the enemy, and sustaining the spectrum of operations.[3] Throughout the remainder of the 1990s, the Services developed supporting concepts, experimented with emerging technology, modified force structure, tested advanced weapon systems, and revolutionized the way the US intended to fight future wars.

Many military experts described what happened in the late 1990s as a Revolution in Military Affairs (RMA) and believed the military's transformation efforts, to include the integration of technology, generation of smaller more lethal forces, and revision of military doctrine fundamentally changed the way the US intended to operate in the future. Nowhere were changes more significant than in the area of logistics. The supply and transportation challenges highlighted during the Desert Storm experience, as well as a period of constrained resources, provided the impetus for the evolution of the military logistics system. This RML encompassed the military's efforts to transform from the Desert Storm, inventory-centric capability, to an expeditionary and deployable distribution-based logistics system. Military logisticians integrated current business sector processes and techniques in an effort to improve the efficiency of the logistics system and reduce the overall size of the logistics infrastructure. Increased

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[2] Office of the Joint Chiefs of Staff, *Joint Vision 2010* (Washington, DC: Government Printing Office, July 1996), 19.

[3] Ibid, 4-5.

responsiveness from the supply and distribution networks, better visibility of assets in the pipeline using emerging radio frequency technology, and assured strategic communications capabilities were all by-products of this new way the military viewed logistics. In 1997, the Joint Staff produced *Joint Vision 2010, Focused Logistics, A Joint Logistics Roadmap* as a means to further articulate previously published literature on Focused Logistics contained in *Joint Vision 2010* and capture the military's ongoing logistics transformation efforts.

As one of four principle concepts of *Joint Vision 2010*, senior military leaders described Focused Logistics as a system that is a "network-centric, distribution-based, anticiparory, demand driven, performance-based appoach to the joint logistic enterprises."[4] They envisioned an agile and adaptable logstics system built around common situational understanding.[5] The Focused Logistics concept specified the requirement to leverage information systems to forecast, predict, and sense requirements. The vision for an agile sustainment system articulated the requirement for improved diagnostics and prognostics capabilities, a logistics common operating picture, and material distribution enablers to anticipate future requirements, make informed resourcing decisions, and ultimately control the movement of assets through the distribution network to the end-user.[6] Military leaders viewed the Focused Logistics concept as an opportunity to optimize inventories maintained throughout DoD and improve supply-chain performance. The post-Cold War environment provided the impetus for many of the changes as services implemented proven business processes and integrated emerging technologies as a means to offset reductions in

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[4] Department of Defense, *Focused Logistics Functional Concept, Version 1.0* (Washington, DC: December 2003), i.

[5] Ibid, ii.

[6] Office of the Joints Chiefs of Staff, *Focused Logistics Campaign Plan, 2004 Edition* (Washington, DC: Defense Acquisition University, 2004), https://acc.dau.mil/CommunityBrowser.aspx?id=32577 (accessed September 21, 2010), 17.

resources, both in dollars and force structure.[7] These changes drove the transformation of the military logistics system from a mass-based to a distribution-based logistics system as logisticians implemented appropriate business processes, integrated emerging technology, modified force structure, resourced required transportation enablers, and documented new doctrine and tactics.

The US military put the Focused Logistics concept to the test when it executed operations in the Middle East in response the events of September 11, 2001. Operation Enduring Freedom and Operation Iraqi Freedom provided the first real test of the military's new logistics paradigm. Though not fully transformed, military logisticians deployed to the theater and employed basic distribution-based logistics capabilities. This initial sustainment infrastructure looked vastly different from previous operations just ten years earlier in that at least initially, there were fewer supply points which contained smaller inventories, logistics units were digitally linked directly with the strategic supply system, and for the first time, materiel managers possessed the capabilities to control the flow of supplies through the distribution pipeline. Operations in Afghanistan and Iraq stressed every aspect of the supply-chain and distribution system resulting in the evolution in how the military conducted logistics in a contingency environment. Logistics forces have adapted to the environment, leveraged technology to develop common understanding, and maximized the transportation system to sustain the two major operations simultaneously.

This monograph will address the impetus for transforming the military logistics system and describe what military and more specifically Army logistics leaders wanted to achieve when they began to transform military sustainment efforts and revolutionize military logistics. The Focused Logistics Joint Functional Concept provides the framework to view the ideas of logistics transformation and the standards from which to assess whether the military transformation efforts

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[7] Office of the Joint Chiefs of Staff, *Joint Vision 2010, Focused Logistics, A Joint Logistics Roadmap* (Washington, DC: Government Printing Office, 1997), 41.

achieved or failed to achieve the desired Focused Logistics capabilities. Finally, this paper will articulate what the military must accomplish to complete the transformation to the Focused Logistics objective capabilities and provide recommendations to senior logisticians on the steps required to create the momentum necessary to leverage current sustainment initiatives and projected processes, procedures, and technology into a future Agile Logistics system.

Literature Review

Transformation

One of the essential characteristics of the US military is that it continuously evolves to meet emerging threats. The military often transforms to take advantage of new technological innovations as well as unique operational capabilities necessary to prosecute future wars and remain relevant. Military transformation is more than modernized equipment, re-organized units, and updated doctrine. Transformation must fundamentally change the capability of the military to deploy, fight, and defeat the enemy.[8] Transformation has occurred continuously over the last 40 years as the US military has evaluated its performance in past conflicts, assessed current and future capabilities, and fielded forces to meet projected threats.

Historians trace the current period of transformation to the late 1970s as the military used the lessons of Vietnam to reorganize units, introduce a new generation of high technology weapon systems, revise existing doctrine, and begin training for the next war. Military operations in the 1980s provided leaders the opportunity to assess transformed organizations, evaluate weapon systems, and develop better ways of executing combat operations. It was not until Operation Desert Storm in 1991, however, that the US fully demonstrated the potential of this

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[8] Paul K. Davis, *Military Transformation? Which Transformation, and What Lies Ahead?* (Santa Monica, CA: RAND Corporation, 2010), http://www.rand.org/pubs/reprints/RP1413 (accessed January 18, 2011), 11.

transformed force.[9] The US military moved forces halfway around the world, conducted Joint and

combined operations using the most advanced weapons available, and destroyed the Iraqi army in

43 days. The 100-hour ground war was the culmination of more than a decade's worth of effort to

generate the capabilities to equip and sustain deployed forces. Military leaders realized, though,

that US could not expect to have six months to prepare for the next war. For the remainder of the

1990s, the US military establishment focused its efforts on generating smaller, more capable

forces while maximizing the use of technological innovations.

With the demise of the Soviet Union as a threat and end of the Cold War in the early

1990s, civilian leaders in both the Bush and Clinton Administrations saw this timeframe as an

opportunity to reduce the size of the military further and achieve what many referred to as a

Peace Dividend. At the same time, the country was in a recession and with no observable threat,

the Congress and President chose to reduce military spending and accepted the risks associated

with those reductions. Senior leaders, both civilian and military, viewed the reduction in force

structure as an opportunity to leverage advanced command and control systems and other

technologies demonstrated during Operation Desert Storm to enable a smaller future force.

Military leaders viewed technology as a means to maintain capability while at the same time

drawing down to a smaller force.[10] In July of 1996, the Joint Staff published *Joint Vision 2010* as

a means to capture the ongoing transformational efforts within the DoD and focused Joint force

efforts on four operational areas as leaders viewed information superiority and technology as a

means to achieve 1) Dominant Maneuver, 2) Precision Engagement, 3) Full-Decisional

Protection, and 4) Focused Logistics.[11] Throughout the remainder of the decade, the military

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[9] Ibid, 12.

[10] Ibid, 11-12.

[11] *Joint Vision 2010*, 19.

services focused their efforts on operationalizing these concepts. To achieve this, the Army initiated the development of what came to be known as *Force XXI* forces to experiment with and validate the effectiveness of improved digital command and control systems, new weapon system, and changes to the force structure.[12]

The George W. Bush administration continued to make transformation a priority as it took office in 2001. The administration "argues(d) that new technologies make defense transformation possible and that new threats to U.S. security make defense transformation necessary."[13] They also believed that future conflict would require the use of smaller, more lethal, and more deployable forces. Top leaders in the DoD saw the days of large Desert Storm-type operations as a thing of the past. As a result, most senior leaders described military transformation as a shift "from an industrial-age approach to war to an information-age approach."[14] The results of a decade of transformation became real and additional transformation efforts took on a new sense of urgency after the attacks of September 11, 2001 as the US forces initiated the operations in Afghanistan.

The US military operated as a Joint force as it attacked Al-Qaida and Taliban forces with a small, lethal ground force utilizing advanced communications and high tech weapons. Sustained combat operations, however, highlighted the shortcoming of conventional Army forces and the sustainment system supporting them. These forces deployed to austere locations that lacked infrastructure, possessed limited contingency communications capabilities to link logistics

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[12] Headquarters, United States Army Training and Doctrine Command, TRADOC Pamphlet 525-5, *Force XXI Operations* (Fort Monroe, VA: Government Publishing Agency, August 1,1994), http://earthops.org/tradoc525/525-5toc.html (accessed 16 Jan 11), Forward.

[13] Ronald O'Rourke, *CRS Report for Congress, Defense Transformation: Background and Oversight Issues for Congress* (Washington, DC: Library of Congress, Updated November 9, 2006), http://www.fas.org/sgp/crs/natsec/RL32238.pdf (accessed December 7, 2010), Summary.

[14] Ibid, CRS-6.

operations directly to the national-level sustainment systems, and relied solely on the strategic distribution network to provide meet emergent operational requirements. General Shinseki, the Army Chief of Staff from 1999-2003, was critical of the Army's transformation efforts and understood that "without a transformation in logistics, there will be no transformation in the Army."[15] In 2003, President Bush initiated operations in Iraq that added to the logistics challenges faced by US Central Command (CENTCOM), and it was the magnitude of Army efforts in the region that forced the Army to transform into the lighter, more capable modular force. This transformation brought with it plethora of new technologies that fundamentally changed how the Army deploys, operates, and sustains itself. Joint forces have applied the concepts and capabilities identified as parts of *Joint Vision 2010,* Dominant Maneuver, Precision Engagement, Full-Dimensional Protection, and Focused Logistics in combat and they have met generally with success.[16]

Revolution in Military Affairs (RMA)

Followers of Colin S. Grey, a leading author on the subject of Revolution in Military Affairs (RMA), argued that the US military was in the midst of an RMA as it transformed and integrated capabilities that "radical(ly) change in the character or conduct of war."[17] Richard Hundley, a leading RAND expert on national security and transformation related issues, agreed and highlighted that an RMA is "a paradigm shift in the nature and conduct of military operations which either renders obsolete or irrelevant one or more core competencies of a dominant player,

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[15] David A. Anderson and Dale L. Farrand, "An Army Revolution in Military Logistics?" *Army Logistician Magazine* (July-August 2007), http://www.almc.army.mil/alog/issues/JulAug07/log_revolution.html (accessed September 23, 2010).

[16] *Joint Vision 2010*, 19-25.

[17] Colin S. Grey, *Strategy for Chaos, Revolutions in Military Affairs and the Evidence of History*, (London, England: Frank Cass Publishers, 2002), 4.

or creates one or more new competencies, in some new dimension of warfare, or both."[18] The US military successfully demonstrated the effectiveness of high-tech weaponry, computers networks, and a myriad of supporting enablers during Desert Storm. This success led many to characterize the changes that occurred within the US military during the remainder of the 1990s as a revolution in military affairs.

Integrating new capabilities throughout the military reflected how the US intended to fight future wars; these changes, however, were not necessarily revolutionary when viewed in isolation. An RMA requires changes not only in technology but in doctrine and organization as well.[19] Grey argued that an RMA is more than just improved military effectiveness. RMA focuses on the larger strategy that a nation employs to defeat its adversaries.[20] In order to capitalize on these new capabilities, military services reorganized forces and disseminated doctrine throughout the organizations and across to sister services. In the later part of the 1990s, the Army initiated *Force XXI* and *Army After Next* concepts as a means to develop and evaluate the capabilities of digitally connected units, evolve current organizational structures, demonstrate the utility of available technology, and document doctrinal changes for the future force. These initiatives not only changed the way the Army expected to fight the next war, but also highlighted the need to transform logistics processes, units, and equipment to meet emerging requirements. General Dennis J. Reimer, Chief of Staff of the Army from 1995-1999, commonly stated, "there can be no

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[18] Richard Hundley, *Past RMAs, Future Transformations: What Can History Tell Us About Transforming the U.S. Military?* (Santa Monica, CA: RAND Corporation, 1999), http://www.rand.org/pubs/research_briefs/RB7108 (accessed December 8, 2010), 9.

[19] Davis, *Military Transformation?* 12.

[20] Grey, *Strategy for Chaos*, 5-9.

revolution in military affairs without a revolution in military logistics."[21] Changes in technology

affected every aspect of the military, but none more so than logistics.

Revolution in Military Logistics (RML)

The RMA impacted not only how the military fought, but also how the forces sustained

themselves. The DoD intended to revolutionize the military logistics system as it transformed

military logistics from a mass-based to a distribution-based logistics system. Desert Storm

illustrated how the military sustained operations by massing mountains of supplies throughout the

battlefield as a "hedge against the uncertainties" of what units might actually need to accomplish

the mission. Massing supplies helped logisticians "compensate for a slow and unreliable system"

that lacked the ability to anticipate requirements, to support the depth and complexity of military

weapon systems and equipment, as well as challenges posed in a combat environment.[22] In a

mass-based logistics system, inventories are layered throughout the organization, support

relationships are fixed, and the system relies on redundancy within the system to fulfill

requirements. Customer requests follow a linear path through the system to the organization that

can fill the request and required supplies travel a similar path back to the requesting unit. Using

the lessons of Desert Storm, military logisticians focused on transforming the military supply

system into a more efficient and less cumbersome process centered on a distribution-based

network that "replace(d) bulk and redundancy with velocity and control."[23] Distribution-based

[21] Dennis J. Reimer, "A Note from the Chief of Staff of the Army on The Revolution in Military Logistics," *Army Logistician Magazine* (January-February 1999), http://www.almc/army.mil/alog/issues/JanFeb99/MS402 (accessed: September 6, 2010).

[22] John Dumond et al., *Velocity Management: The Business Paradigm that has Transformed U.S. Army Logistics* (Santa Monica, CA: RAND Corporation, 2001), http:/www.rand.org/pubs/monograph_reports/MR1108.html (accessed February 5, 2011), 1-2.

[23] Department of the Army, Field Manual 4-0 (FM 100-10), *Combat Service Support* (Washington, DC: Government Printing Office, August 29, 2003), 1-10.

logistics focuses on the movement of materiel from the manufacturer to the customer, modes of transportation, critical storage facilities, and the command and control architecture necessary to manage the flow of supplies within the pipeline.[24]

A distribution-based logistics system reduces the amount of inventory in forward supply points, maintains critical supplies necessary to meet potential requirements, and leverages all assets within the network to fulfill a customer requirement. Supply requests flow directly to a strategic gateway that allows national-level managers to fill requirements from the optimal supply source and by the most appropriate means available. FM 100-10-1, *Theater Distribution*, identified visibility, management, transportation, and the distribution networks as key components of a distribution-based Combat Service Support (CSS) system.[25] This transformational effort has been described by many as the beginning of the RML with a goal of creating an integrated system that provides a common operational picture capable of enabling logisticians to forecast requirements, manage supplies and transportation assets, and intervene when required to sustain the Joint fight.[26]

The proponents of RML strove to further the integration efforts between the domains of "technology application and acquisition agility, force projection, and force sustainment."[27] FM 100-10, *Combat Service Support*, further described the challenge of sustaining a force projection

[24] Eric Peltz, "Commentary - Logistics: Supply Based or Distribution Based?" *Army Logistician Magazine* (March-April 2007), http://www.almc.army.mil/alog/issues/Mar-Apr07/supply_vs_dist .html (accessed January 14, 2011), 1.

[25] Department of the Army, Field Manual 100-10-1, *Theater Distribution* (Washington, DC: Government Printing Office, October 1,1999), http://www.globalsecuity.org/military/library/policy/army/fm/100-10-1.htm (accessed September 21, 2010), 3-4.

[26] Mark J. O'Konski, "Revolution in Military Logistics: An Overview," *Army Logistician Magazine* (January-/February1999), http://www.almc.army.mil/alog/issues/JanFeb99/MS 364.htm (accessed November 17, 2010), 1.

[27] Ibid, 1.

Army and articulated the need to integrate emerging technology as a means to become more efficient in achieving mission success.[28] Tenants of the RML included a "seamless logistics system, distribution-based logistics, agile infrastructure, total asset visibility, rapid force projection, (and an) adequate logistics footprint."[29] Adherents of the RML sought to make fundamental changes to military sustainment operations by creating a seamless logistics system that leveraged "modern information systems and the networks that connect them."[30] As the logistics system evolved, managers at all levels benefitted from increased situational understanding as they leveraged automated tools to track, manage, and make decisions on how best to accomplish the sustainment mission. In 1999, after more than five years of experimentation, transformation, and system redesign, senior Army logisticians publically added to the RML discourse when they described Army logistics transformation efforts to date and laid out what the Army needed to accomplish over the next ten years. They published an article titled "Our Revolution in Military Logistics – Supporting the 21st Century Soldier" in *Army Logistician Magazine*, in which they placed specific emphasis on "exploiting improvements in automation, communications, and business practices; reshaping command and control relationships to provide better unity of command; and purchasing distribution technologies that facilitate rapid throughput and follow-on sustainment."[31]

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[28] Department of the Army, Field Manual 100-10, *Combat Service Support* (Washington, DC: Government Printing Office, 3 October 1995), http://.www.cgsc.edu/carl/docrepository/FM100-10-1995.pdf (accessed September 20, 2010), 1-1.

[29] O'Konski, "Revolution in Military Logistics," 8.

[30] Ibid, 2.

[31] Daniel G. Brown, John G. Coburn, and Jonnie E. Wilson, "Our Revolution in Military Logistics – Supporting the 21st Century Soldier," *Army Logistician Magazine* (January-February1999), http://www.almc.army.mil/alog/issues/janfeb99/ms 401.htm (accessed December 10, 2010), 1.

During this period of tight budgets, reduced force structure, and a focus on the integration of emerging technology, civilian and military leaders seized on the opportunity to streamline processes and reduce the size of the military logistics system. These leaders assessed business sector practices to understand how to integrate emerging technology, drive down logistics costs, improve supply-chain processes, and redesign logistics force structure. Researchers highlighted the transformation efforts of businesses like Cummins Diesel, Detroit Diesel Remanufacturing, Titeflex, FMC (the original manufacturer of the Bradley Fighting Vehicle), and Hewlett Packard to make their case.[32] As a result, DoD directed the logistics community to improve supply-chain management, reduce the Iron Mountains, both the number of supply points and the inventories maintained in each, improve the management of the smaller inventories that would remain, leverage information technologies, and utilize improved transportation enablers to meet future logistics requirements. Implementation of distribution-based logistics was a central requirement to achieving an RML and fundamentally changed the military logistics system.

Distribution-based logistics, in theory, reduced the requirement for large inventories throughout the battle space and replaced it with distribution capacity that delivers customer requirements when and where needed – the pipeline becomes the warehouse.[33] The Army validated distribution-based logistics using metrics like *order ship time,* the time it takes to get an item after it is requested, to show a substantial decrease in the time required to support requests for forces operating in Korea, Bosnia, and locations in CONUS, like Fort Hood, Texas.[34] The terms velocity management and just-in-time logistics became part of the logistics lexicon and

[32] John Dumond, Rick Eden, and John Folkeson, *Velocity Management: An Approach for Improving the Responsiveness and Efficiency of Army Logistics Processes* (Santa Monica, CA: RAND Corporation, 1994), http://handle.dtic.mil/100.2/ADA289264 (accessed January 16, 2011), 13-14.

[33] O'Konski, "Revolution in Military Logistics: An Overview," 3.

[34] Brown, Coburn, and Wilson, "Our Revolution in Military Logistics," 4-5.

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were essential terms of reference in understanding the new logistics system. Velocity management focuses on fulfilling the customer requirements using agile and responsive processes rather than maintaining large inventories of supplies, and moves away from articulating success in terms of days of supply and identifies reliability and responsiveness as better indicators.[35] Just-in-time logistics is a proven business model that attempts to limit the quantity of inventory on hand in warehouses by producing and distributing required supplies directly to the user when the user needs them. The just-in-time logistics concept focuses on streamlining the supply-chain and distribution network to make the entire system as efficient as possible. Managers of just-in-time systems measure performance not in days of supply, but rather the time it takes for the distribution system to fulfill the customer's requirement.[36]

Focused Logistics

In the April 6, 2000 version of Joint Publication 4-0, Lieutenant General John Cusick, the Joint Staff Director for Logistics, described Focused Logistics as "the fusion of logistics information and transportation technologies for rapid crisis response, deployment and sustainment, the ability to track and shift units, equipment and supplies even while en-route, and

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[35] Dumond et al., *Velocity Management*, 5. "Under the velocity-based approach to logistics, the logistics system satisfies the support needs of the customers through the agility and responsiveness of its processes rather than through massive stockpiles and other resources kept on hand "just in case." Both information and material flows faster and more accurately and at a lower total cost. Customers primarily measure performance not in terms of days of supply, but in terms of response time and reliability; not how much a unit lugs about, but how quickly and certainly the system can deliver what is needed."

[36] Laurel K. Myers, "Eliminating the Iron Mountain," *Army Logistician Magazine* (July-August 2004), http://www.almc.army.mil/alog/issues/JulAug04/C_iron.html (accessed January 16, 2011), Commentary. Just-in-Time logistics is a "velocity-based logistics system that closely parallels the distribution system used in the commercial sector. With this system, known as just-in-time distribution, buyers communicate with suppliers electronically to order needed supplies that are shipped directly to the user without the need for warehouse storage. Just-in-time distribution replenishes needed items as consumption occurs and substantially reduces the inventory. An electronic supplier-buyer interface also eliminates several steps in the ordering process, thereby speeding delivery of supplies."

delivery of tailored logistics packages and sustainment directly to the warfighter."[37] As one of the four key operational concepts in *Joint Vision 2010*, Focused Logistics highlighted the need for future military logistics to be responsive, flexible, and precise. Future logistics systems required the capabilities to manage available information, leverage all resources throughout the logistics pipeline, and respond to changing requirements in real time.[38] The services viewed the continued refinement of a distribution-based logistics system as an essential element of future logistics efforts and targeted their energy on identifying and integrating required capabilities into the evolving sustainment infrastructure. The Army specifically looked to industry to find better ways of doing business and evaluated available and emerging technology that it could adapt for military use. Efforts included improving supply-chain management, developing flexible logistics organizations capable of supporting future forces, changing how units deploy and sustain operations, and finally, integrating digital technologies to allow for visibility of resources making their way through the distribution pipeline. Logistics leaders in each of the services focused their efforts on becoming more responsive by reducing the time it took to meet the customer's requirement.[39]

The Joint logistics community developed the Focused Logistics concept with three main goals in mind, which were to "enhance strategic responsiveness, reduce logistics costs, and

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[37] Office of the Joint Chiefs of Staff, Joint Publication 4-0, *Doctrine for Logistics Support of Joint Operations* (Washington, DC: Government Printing Office, April 6, 2000), D-1.

[38] *Joint Vision 2010*, 24.

[39] *Joint Vision 2010, Focused Logistics,* 41. Service specific Focused Logistics supporting concepts included: Army - Velocity Management, Navy - Expeditionary Logistics, Air Force - Lean Logistics, and Marine Corps - Precision Logistics. Also during this timeframe, DoD directed the consolidation of common repair parts under the auspices of Defense Logistics Agency (DLA).

reduce the logprint."[40] Logisticians focused becoming responsive to the needs of deployed forces

and organized their efforts around the tenants of Joint Deployment/Rapid Distribution,

Information Fusion, Joint Theater Logistics Command and Control, Multinational Logistics, Joint

Health Services Support, and Agile Infrastructure. [41] Logisticians believed that applying these

tenants effectively would generate forces capable of executing sustained operations across the

globe. They developed the Focused Logistics concept to respond to a commander's requirement

using improved distribution processes that ultimately reduce the need for prepositioning large

inventories and other logistics resources forward on the battlefield. The military looked to

accomplish this task by using improved decision support tools (DST), automated information

technologies, and distribution capabilities.[42] Maintaining visibility throughout the system was

also an essential attribute of the concept. To manage and control the movement of supplies,

sustainment leaders identified the requirement for the Global Combat Support System (GCSS), a

DoD-level initiative to integrate combat service support functions across the services and within

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[40] Department of the Army, "The Army Modernization Plan 2002," *The Army Web Page* (Washington, DC: United States Army, 2002), http://www.army.mil/features/MODPlan/2002/w4_FLv03a.pdf (accessed September 21, 2010), A-55.

[41] *Joint Vision 2010, Focused Logistics,* 5, 16, 25, 30,34. Focused Logistics Tenants include "Joint Deployment/Rapid Distribution - the process of moving multi-Service forces to an operational area coupled with the accelerated delivery of logistics resources through improved transportation and information networks providing the warfighter with vastly improved visibility and accessibility of assets from source of supply to point of need; Information Fusion - the timely and accurate access and integration of logistics data across units and combat support agencies throughout the world providing reliable asset visibility and access to logistics resources in support of the warfighter; Joint Theater Logistics Command and Control (JT LOG C2) - a concept to make clear lines of authority, through a single entity in a joint warfighting environment responsible for logistics support; Multinational Logistics - mutual logistics support relationships between the United States and allied/coalition partners; Joint Health Services Support (JHSS) - strategy that maximizes the synergistic effects of the services medical elements through jointly coordinated, comprehensively planned, and mutually supportive medical operations; and Agile Infrastructure - will result in right-sizing of the logistics footprint through reductions in logistics forces, facilities, equipment and supplies. These reductions will be enabled through significant enhancements to joint logistics policies, structures and processes in inventory management, engineering, maintenance, and infrastructure improvements."

[42] Ibid, 1-2.

the operational command and control architecture.[43] Logisticians focused on developing the

capability within the GCSS architecture to provide near real-time Logistics Common Operations

Picture (LCOP) through an internet-type environment.[44] Senior Army logisticians initiated the

development of GCSS-Army as a means to leverage current and future information technologies

to evolve current Standard Army Management Information Systems (STAMIS) into a common

interface to DoD's GCSS capability. Materiel managers would use GCSS-Army to view available

assets within the theater as well as those in transit to a destination. This tool would provide

materiel managers at any level the necessary functional capabilities to fuse the appropriate

information necessary to make decisions. By accessing the data resident in the Logistics

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[43] Ibid, 16-17.

[44] The Global Combat Support System – Joint (GCSS-J) is an information technology (IT) application that continues to transition to a service oriented architecture to deliver asset visibility to the joint logistician (i.e., essential capabilities, functions, activities, and tasks necessary to sustain all elements of operating forces in theater at all levels), and facilitates information interoperability across and between Combat Support and Command and Control functions. In conjunction with other Global Information Grid elements including Global Command and Control System-Joint, Defense Information Systems Network, Defense Message System, Computing Services, and combatant commands, services, agencies information architectures, GCSS-J will provide the IT capabilities required to move and sustain joint forces throughout the spectrum of military operations. Access http://www.disa.mil/news/pressresources/factsheets/gcss_jtf.html for more information.

Global Combat Support System – Joint (GCSS-J) is the System of Record for the joint logistics warfighter as identified in the Joint Publication 4-0 dated 18 July 2008. GCSS-J is evolving to a more Service Oriented Architecture, and currently includes a portal and Web-based applications that deliver enhanced visibility to the joint logistician (e.g., essential capabilities, functions, activities, and tasks necessary to sustain all elements of operating forces in theater at all levels), and facilitates information interoperability across and between Combat Support and Command and Control (C2) functions. In conjunction with other Global Information Grid (GIG) elements' and Combatant Commands' (COCOMs) / Services' / Agencies' information architectures, GCSS-J will continue to provide capabilities required to move and sustain joint forces throughout the spectrum of military operations (e.g., maps, reports, watchboards, and knowledge management). Access http://www.disa.mil/gcssj for more information.

The Logistics Common Operating Picture (LCOP) is essentially a function of the common operational picture (COP). Field Manual 3–0, Operations, defines a COP as "a single display of relevant information within a commander's area of interest tailored to the user's requirements and based on common data and information shared by more than one command." Similarly, an LCOP is a single and identical accounting of the logistics capabilities, requirements, and shortfalls in an area of operations shared between the supporting and supported elements. The LCOP allows the supporting elements to determine unit capabilities, forecast logistics requirements, synchronize logistics movements, and publish information that improves situational awareness at multiple echelons of support.

Integrated Data Base (LIDB), GCSS-Army user could view a near-real time common operations picture and have the ability to identify and decide on how best to meet future mission requirements.[45] GCSS goes a long way to providing asset visibility throughout the supply system, but to get required materiel to the right location at the right time, Focused Logistics developers needed to improve the distribution capabilities.

The Theater Distribution (TD) concept provides the means through which the military attempts to efficiently execute the tasks of deploying, sustaining, and redeploying forces and materiel. TD accounts for all distribution resources within the theater in an effort to maximize capabilities and reduce inefficiencies within the transportation system.[46] The TD concept fundamentally changed military sustainment from a supply to distribution-based system that demands time-definite delivery of materiel and potentially reduces supply inventories throughout the battle space.[47] Concept developers envisioned a seamless logistics system in which tactical units communicate requirements directly to strategic logistics managers who are in a position to direct delivery of materiel from the most readily available logistics activity. In addition, managers throughout the distribution process could leverage available technologies such as Joint Total Asset Visibility (JTAV), In-Transit Visibility (ITV), Automated Identification Technology (AIT) [48], and Movement Tracking Systems (MTS)[49] to provide situational awareness of materiel

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[45] "The Army Modernization Plan 2002," A-58.

[46] *Joint Vision 2010, Focused Logistics*, 13.

[47] Ibid, 13.

[48] Office of the Joint Chiefs of Staff, "Dictionary of Military Terms," *Joint Electronics Library* (Washington, DC: Joint Staff, 2011), http://www.dtic/doctrine/dod_dictionary/index.html (accessed January 19, 2011). "Joint Total Asset Visibility (JTAV) – The capability designed to consolidate source data from a variety of joint and Service automated information systems to provide joint force commanders with visibility over assets in-storage, in-process, and in-transit; In-Transit Visibility (ITV) – The ability to track the identity, status, and location of Department of Defense units, and non-unit cargo (excluding bulk petroleum, oils, and lubricants) and passengers; patients; and personal property from origin to consignee or destination across the range of military operation*s*; Automated Identification Technology (AIT) – A suite of

within the distribution pipeline.[50] The Focused Logistics concept also highlighted the need to leverage suitable commercial business applications to improve the effectiveness of the logistics system.

Developers of the Focused Logistics concept derived key business practices from within DoD enterprise activities as well as from the commercial business sector. The Defense Logistics Agency (DLA),[51] as well as service component materiel commands,[52] developed acquisition and

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tools for facilitating total asset visibility source data capture and transfer. Automated identification technology includes a variety of devices, such as bar codes, magnetic strips, optical memory cards, and radio frequency tags for marking or "tagging" individual items, multi-packs, equipment, air pallets, or containers, along with the hardware and software required to create the devices, read the information on them, and integrate that information with other logistic information."

[49] Department of the Army, Field Manual 4-0, *Sustainment* (Washington, DC: Reimer Digital Library, April 2009), https://rdl.train.army.mil/soldierPortal/atia/adlsc/view/public/6718-1/fm/4-0/toc.htm#toc (accessed September 20, 2010), A-4. Movement Tracking Systems (MTS) – "A vehicle based tracking and messaging system using commercial satellites (L-band), two-way free text messaging, digital maps, encryption, military Global positioning System, and R(adio) F(requency) ID(entification) interrogation."

[50] *Joint Vision 2010, Focused Logistics*, 14.

[51] "The Defense Logistics Agency (DLA) provides the Army, Navy, Air Force, Marine Corps, other federal agencies, and joint and allied forces with a variety of logistics, acquisition and technical services. The Agency sources and provides nearly 100 percent of the consumable items America's military forces need to operate. DLA also supplies about 84 percent of the military's spare parts. In addition, the Agency manages the reutilization of military equipment, provides catalogs and other logistics information products, and offers document automation and production services. Defense Logistics Agency is headquartered at Fort Belvoir, VA. For Fiscal Year 2010, DLA revenues of nearly $41 billion would put DLA in the top 60 of the Fortune 500 list, ahead of companies like American Express, DuPont and Coca Cola; Supports nearly 1,900 weapon systems; DLA manages eight supply chains and nearly five million items, processes 116,000 requisitions and nearly 10,000 contract actions a day, manages 26 distribution depots worldwide, and maintains the third largest storage capacity of the top 50 distribution warehouses (behind FedEx and UPS)." To view additional information on DLA access *http://www.dla.mil/ataglance.aspx.*

[52] Component Materiel Commands include the US Army Materiel Command (AMC) serving as Army's "provider of materiel readiness – technology, acquisition support, materiel development, logistics power projection, and sustainment – to the total force, across the spectrum of joint military operations." More information on AMC can be found at www.amc.army.mil; The Air Force Materiel Command (AFMC) with the mission to "deliver war-winning expeditionary capabilities to the warfighter through development and transition of technology, professional acquisition management, exacting test and evaluation, and world-class sustainment of all Air Force weapon systems." More information on AFMC can be found at http://www.afmc.af.mil/shared/media/document/AFD-101013-049.pdf; The Navy Sea Systems Command (NAVSEA) is composed of "numerous field activities geographically dispersed throughout the country that are providing the engineering, scientific, technical and logistical expertise,

distribution capabilities that maximized the procurement and delivery of supplies directly from sources of supply to the end-user, similar to how many private businesses currently operate. In addition, they focused efforts on providing improved automation and digital connectivity that allows for better situational understanding, which enables a manager to make better decisions with respect to inventory levels.[53] The use of diagnostics and prognostics capabilities within the weapon systems and support vehicles allows maintenance units to anticipate requirements and order items prior to the equipment failing.[54] Units continue to stock critical, high demand items forward and allow the supply system to fulfill emergent demands. Finally, the military uses available business models to understand how effectively it is supporting the force and take advantage of opportunities to improve the quality of its system.[55]

In 2004, the Joint Staff published the *Focused Logistics Campaign Plan*, which articulated the way ahead for the continued transformation of military logistics. Included in this document was the Secretary of Defense's Guidance concerning logistics and supply-chain management. The Secretary identified the Under Secretary of Defense for Acquisition, Technology, and Logistics as the Defense Logistics Executive (DLE) with the responsibility of integrating the supply-chain from end-to-end. In addition, the Secretary also designated the Commander, United States Transportation Command (USTRANSCOM) as the Distribution Process Owner (DPO) responsible for all distribution-related activities, including deployment,

products and support to the Fleet, Department of Defense, and other customers." More information on NAVSEA can be found at http://www.navsea.navy.mil/FieldActivities.aspx; and The Marine Corps Logistics Command (MCLC) serves as "the Marine Corps' Operational Logistics solution for fielded weapons systems and support services and supplies...provid(ing) competitive, comprehensive, and integrated solutions by being "the best" or sourcing from the best commercial, organic and/or DoD providers." More information on MCLC can be found at http://www.logcom.usmc.mil/aboutlogcom.asp.

[53] *Joint Vision 2010, Focused Logistics*, 36-37.

[54] "The Army Modernization Plan, 2002," A-57.

[55] *Joint Vision 2010, Focused Logistics*, 37.

sustainment, and redeployment actions as well as directing and supervising the Strategic Distribution System.[56] Commander, USTRANSCOM is responsible for ensuring "interoperability, synchronization, and alignment of DoD wide, end-to-end distribution."[57] The DLE receives advice from the Defense Logistics Board (DLB) on DoD logistics matters and uses the DLB to provide oversight of the DPO.[58] By formally declaring a DLE and a DPO, the Secretary of Defense highlighted the need to resolve the fractured nature of logistics operations and to move closer to a Joint sustainment system. DoD Transformation Planning Guidance further emphasized this point as it articulated that future Joint transformation efforts focus on the seamless integration of operations, intelligence, and *logistics* as forces rapidly deploy, employ forces, and execute sustainment operations.[59]

In 2003, the Joint Readiness Oversight Council (JROC) approved the *Focused Logistics Functional Concept* that defined and described seven capabilities of which four specifically described military logistics requirements for the 2015 timeframe. The Joint Deployment/Rapid Distribution capability described TRANSCOM's ability to deploy and sustain operating forces throughout the globe in accordance with the priorities established by the National Command Authority.[60] Agile Sustainment capabilities included the requirement for a seamless logistics system capable of acquiring and distributing supplies to the end-user and leveraging the collective efforts of commercial business partners, sister services, and coalition partners.[61] Logistics

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[56] *Focused Logistics Campaign Plan, 2004 Edition,* 8.

[57] Joint Chiefs of Staff, Joint Publication 4-0, *Joint Logistics* (Washington, DC: Government Printing Office, July 18, 2008), II-7.

[58] *Focused Logistics Campaign Plan, 2004 Edition,* 8.

[59] Ibid, 9.

[60] *Focused Logistics Functional Concept, Version 1.0*, 23.

[61] *Focused Logistics Campaign Plan, 2004 Edition*, 17.

Information Fusion capabilities included hardware and network architecture necessary to support worldwide sustainment operations as well as the organizations and the people required to manage and control sustainment and distribution efforts. Finally, the Joint Theater Logistics Management capabilities directed military services to operate as part of a Joint team by utilizing a common management information system and facilitating cross-service support requirements.[62] To achieve these capabilities, the Joint logistics community implemented metrics to evaluate progress, improved transportation capabilities to meet time-definite delivery requirements, integrated available technology to maintain visibility of the distribution system, and incrementally upgraded the distribution manager's ability to view information and make decisions on how best to support requirements. The transformed logistics system has demonstrated its agility as it has supported global operations and the wars in Afghanistan and Iraq.[63]

Agile Sustainment / Agile Logistics

As described in the *Focused Logistics Joint Functional Concept,* military leaders sought to create "an agile logistics sustainment and distribution system with unparalleled reach," capable of supporting the full spectrum of joint operations.[64] To create an Agile Sustainment system, logistics leaders articulated the requirement to "transform sustainment policies, processes, and capabilities to improve the flexibility, agility, and precision with which we sustain the warfighter."[65] Their efforts focused on making the manner in which forces received sustainment more efficient by improving supply-chain processes, reducing inventories throughout the battle

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[62] *Focused Logistics Functional Concept, Version 1.0*, 25-26.

[63] Office of the Joint Chiefs of Staff, "Joint Vision 2020," *Joint Forces Quarterly* (Summer 2000), http://www.dtic.mil/doctrine/jel/jfq_pubs/1225.pdf (accessed December 10, 2010), 70.

[64] Ibid, 10.

[65] *Focused Logistics Campaign Plan, 2004 Edition*, 34.

space, replacing on-hand supplies with speed by tailoring the support requirements, reducing

sustainment force structure, integrating available technologies, and, finally building confidence

throughout the formation that this new approach works.[66] Focused Logistics specifically

identified the need for agile sustainment organizations and the infrastructure that supports them.

The 2011 National Military Strategy continues to describe the employment of modular and more

expeditionary Joint forces that ultimately "require a smaller logistical footprint."[67] Optimizing

and streamlining military logistics processes continues to be an essential criterion to meet the

demands of a globally deployed force.[68]

     Army concepts described the agile nature of future sustainment operations as they

articulated the requirements for "agile and precise support system with unparalleled multi-

directional reach to sustain continuous and distributed operations."[69] To sustain future

expeditionary forces, the Army needed to design modular and tailored organizations to provide

the agility and flexibility necessary to sustain the deployed forces with the minimum force

structure required. These sustainment forces would possess the digital enablers necessary to

maintain a logistics common operational picture and manage advanced distribution capabilities

intended to speed supplies through the distribution pipeline to the end-user.[70] Army doctrine went

further as it described the essential characteristics of force agility as trading a robust logistics

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[66] Ibid, 35-37.

[67] Office of the Joint Chiefs of Staff, *National Military Strategy of the United States of America, 2011, Redefining America's Military Leadership* (Washington, DC: Joint Chiefs of Staff, February 8, 2011), 18.

[68] *Joint Vision 2010, Focused Logistics*, 34.

[69] Headquarters, United States ArmyTraining and Doctrine Command. TRADOC Pamphlet 525-4-1. *The United States Army Functional Concept for Sustain, 2014-2024,* (Fort Monroe, VA: United States Army Training and Doctrine Command, April 30, 2007), 13.

[70] Ibid, 19.

footprint within the joint operational area for the ability to leverage all available resources, from the strategic, operational, and tactical level to support ongoing operations.[71]

To reduce the logistics footprint within the battle space, the Army designed modular logistical organizations, specifically support companies, with a full complement of sustainment capabilities and digital enablers to deploy with and sustain battalion-size maneuver forces.[72] Modularity standardized the sustainment support for these maneuver elements, eliminated the deployment of ad hoc sustainment organizations during contingency operations, and streamlined sustainment operations by eliminating the need for traditional general support structures.[73] The integrated nature of the current sustainment system demanded the close cooperation of strategic, operational, and tactical level sustainment providers. Utilizing improved communications capabilities and logistics decision support tools, deployed forces possess the ability to reach back to CONUS, if necessary, to request support, receive status on requests resident in the system, and resolve ongoing sustainment issues. In addition, the logistics system is now flexible enough to deploy requisite expertise and capability to theater to provide both long-term sustainment and short-term targeted support.[74] The creation of this seamless and integrated sustainment system from the strategic to tactical level created the potential to reduce the theater logistics footprint and the forward positioning of supplies necessary to sustain operations.

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[71] FM 4-0, *Combat Service Support,* 2003, 3-17.

[72] Army of Excellence logistics support structures are included in FM 71-2, *The Armor and Mechanized Infantry Task Force*, Chapter 7, dated 27 September 1988 and FM 63-20, *Forward Support Battalion*, Chapter 1 and 2, dated 26 February 1990. Modular logistics organizational structure and functions are found in FM 4-90 (4-90.7), *Brigade Support Battalion*, Chapter 6, dated 31 August 2010. For general discussion of Army of Excellence and Modular Sustainment structures and concepts see Appendix 1.

[73] Ibid, 1-36.

[74] Ibid, 1-9-1-10.

Agile sustainment forces require an Agile ogistics system to support operations. This idea flows naturally from the Army's doctrinal discussion of tailored force structures, integrated and seamless support, and reduction of the logistics footprint in the joint operating area. Agile Logistics is nothing more than maximizing the capability of the *supply-chain* to fulfill customer requirements in order to reduce the amount of inventory maintained.[75] The military looked to the business community to identify key processes necessary to transform the military supply system and service efforts in this area have met with mixed results. The move towards a just-in-time logistics system in the mid-1990s achieved an initial reduction in the inventories across the force, but did not necessarily build confidence in military leaders that the supply system would meet their requirements to train, let alone support global operations. New business processes fundamentally changed what units maintained in local warehouses and eliminated much of the supply redundancy that existed within organizations. DLA and service National Inventory Control Points (NICP) also supported unit requests using an under resourced distribution network. Operations in Afghanistan and Iraq have done a great deal to streamline the supply system by connecting all aspects of the national system with tactical units. Services continue to integrate emerging technology to provide visibility of the entire system thereby decreasing the dependence on local inventories and increasing the confidence in the logistics system.

Doctrine developers embedded Agile Logistics concepts in many operations and sustainment publications. JP 4-0, Joint Logistics highlighted the need for a logistics system capable of a rapid and precise response and describes system requirement in terms of speed,

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[75] Paul M. Needham, "Chapter 15 - Getting There: Focused Logistics," in *Transforming America's Military* (Washington, DC: National Defense University Press, 2002), http://www.au.af.mil/au/awcgate/ndu/tam/17_ch15.htm (accessed 9 December 2010), 371.

reliability, and efficiency.[76] *The Army Functional Concept for Sustainment* established the requirement for a logistics system that possesses "speed, precision, accuracy, visibility, and centralized supply chain management with minimum essential forward stockage and reachback capabilities."[77] Army logisticians further described the need to develop a more effective distribution process along with the situational understanding necessary to meet the commander's delivery timelines.[78] The Army's transformation discussion mirrored those found in the Air Force's Logistics Transformation Program and the underlining concept of an Agile Logistics system. Both viewed transformation as a means to optimize the distribution process, improve system reliability, reduce inventories, and minimize the deployed logistic footprint. As envisioned, Agile Logistics offsets inventory requirements because of the availability of real-time information of what is required, what is available in the system, and the ability to deliver supplies on time.[79]

Sense and Respond Logistics

In November 2003, the Office of Force Transformation published the concept document titled, *Operational Sense and Respond Logistics: Coevolution of an Adaptive Capability*. This document highlighted the continued evolution of Sense and Respond Logistics as well as the development of a predictive and anticipatory logistics system that integrates all aspects of logistics, takes advantage of the entire supply-chain from the factory through to customer, and

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[76] JP 4-0, *Joint Logistics*, 18 July 2008, I-8.

[77] TRADOC Pamphlet 525-4-1, *The United States Army Functional Concept for Sustain, 2014-2024*, 16.

[78] FM 4-0 (FM 100-10), *Combat Service Support*, 1-11-1-13.

[79] Needham, *Transforming America's Military*, 371.

offsets large inventories by using an effective distribution system.[80] The Sense and Respond concept described the need to evolve current technologies and enablers in operation in today's logistics environment into the objective "network-centric concept that enables Joint effects-based operations and provides precise, agile support."[81] Developers of Sense and Respond Logistics capabilities sought to overcome the historical shortfalls of responsiveness, reliability, and inefficiency inherent in a mass-based system and achieve a balance between effectiveness and efficiency provided in just-in-time logistics by leveraging information technology, improving situational awareness, and utilizing next generation transportation enablers.[82] Sense and Respond Logistics technologies ultimately reduce the expense of maintaining Iron Mountains and the inefficiency that type of system produces.[83] Future logistics operators will possess the capabilities to *sense* future requirements by utilize information provided by sensors embedded on weapon systems and *respond* accordingly to meet the customer's requirement. Future diagnostics and prognostics capabilities will predict maintenance failures and allow maintenance manager to pre-position necessary supplies and maintenance assets to facilitate repairs. The concept of Sense and

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[80] Department of Defense, Office of Force Transformation, *Operational Sense and Respond Logistics: Coevolution of an Adaptive Capability Concept Document* (Washington DC: Department of Defense, November 17, 2003), 2. Sense and Respond Logistics is defined as "a transformational network-centric concept that enables Joint effects-based operations and provides precise, agile support. Sense and Respond Logistics relies upon highly adaptive, self-synchronizing, and dynamic physical and functional processes. It predicts, anticipates, and coordinates actions that provide competitive advantage spanning the full range of military operations across the strategic, operational, and tactical levels of war. Sense and Respond Logistics promotes doctrinal and organizational transformation, and supports scalable coherence of command and control, operations, logistics, intelligence, surveillance, and reconnaissance. Implemented as a cross-service, cross-organizational capability, Sense and Respond Logistics provides an end-to-end, point-of-effect to source-of-support network of logistics resources and capabilities. Within Sense and Respond Logistics, every entity, whether military, government, or commercial, is both a potential consumer and a potential provider of logistics. It delivers flexibility, robustness, and scalability for Joint expeditionary warfare through adaptive, responsive, real-time, demand and support networks within U.S., allied, and coalition operations."

[81] Ibid, 5.

[82] Dumond, Eden, and Folkeson, *Velocity Management*, 2.

[83] Ibid, 2-4.

Respond Logistics allows the commander to trade inventory for visibility of requirements and the ability to move supplies quickly and effectively through the distribution pipeline.[84]

The *Focused Logistics Campaign Plan, 2004 Edition* identified Sense and Respond Logistics as one of two Focused Logistics emerging concepts, the other being Joint Force Projection and Sustainment for Full Spectrum Operations. The campaign plan described Sense and Respond Logistics "as a transformational, network-centric, knowledge driven concept that enables joint and coalition effects-based operations and provides precise, adaptable, agile support."[85] Sense and Respond Logistics predicts, anticipates, and coordinates actions that facilitate future operations. It will require continued logistics system transformation, both in organizational structure and the policies and procedures necessary to provide logistics support. Employment of advanced sensors and more powerful communications capabilities has the ability to reduce the number of forces required to execute and manage the sustainment effort.[86]

Transforming to a Sense and Respond system continued the ongoing efforts to increase efficiency in logistics system by creating a supply system that is adaptable to customer requirements, taking advantage of the existing worldwide distribution network, and when appropriate, possessing the capability to mass resources.[87] In 2005, IBM added its voice to the Sense and Respond discussion as it described the effects of using sense and respond techniques within its own organization during the 1990s. IBM developed a web-based system to improve its capability to optimize on-hand inventory levels and forecast future requirements. Embedded within the system was a new demand algorithm that supply and distribution managers used to

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[84] *Joint Vision 2010, Focused Logistics*, 2.

[85] *Focused Logistics Campaign Plan*, 16.

[86] Ibid, 16.

[87] *Operational Sense and Respond Logistics*, 3-4.

view historical information and trend analysis. The web portal provided decision-makers with real-time information necessary to make decisions.[88] Military leaders viewed IBM's knowledge management techniques and technology integration as a way to improve the overall capability of the logistics system and decided to integrate web-portal capabilities throughout the logistics enterprise.

Objective Logistics System Requirements

The origins of the Focused Logistics concept can be traced to the 1996 version of *Joint Vision 2010* and 1997 companion document *Joint Vision 2010, Focused Logistics, A Joint Logistics Roadmap* in which the Joint Staff began to describe ongoing logistics transformation efforts and articulate the objective capabilities of a distribution-based logistics system. In its earliest form, senior logisticians viewed Focused Logistics as "the fusion of information, logistics, and transportation technologies to provide rapid crisis response, to track and shift assets even while enroute, and to deliver tailored logistics packages and sustainment directly at the strategic, operational, and tactical level of operations."[89] This theme resonated in the 2003 *Focused Logistics Joint Functional Concept* and 2004 *Focused Logistics Campaign Plan* that articulated 2015 requirements. Military leaders highlighted the need to develop sufficient capacity in the military distribution system, integrate readily available information systems to control the distribution of supplies through the distribution pipeline, and demonstrate the effectiveness of distribution-based logistics to generate certainty about ongoing logistics efforts in the mind of the operational commander.[90]

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[88] Grace Y Lin and Robert E. Luby Jr., *Transforming the Military Through Sense and Respond* (Somers, NY: IBM Business Consulting Services, 2005), 8-10.

[89] *Joint Vision 2010*, 24.

[90] *Focused Logistics Functional Concept*, 7-8.

Focused Logistics Capabilities

The Focused Logistics concept is composed of seven capabilities that interact in an integrated manner to deliver agile and responsive support. These capabilities include Joint Deployment/Rapid Distribution, Agile Sustainment, Logistics Information Fusion, and Theater Logistics Management, Operational Engineering, Multinational Logistics, and Force health Protection. *The Focused Logistics Joint Functional Concept* defines the capabilities and describes the required characteristics of each.

1) Joint Deployment/Rapid Distribution

Joint Deployment/Rapid Distribution provides the capability to "deliver combat forces to the joint force commander and link operating forces with viable sustainment systems."[91] This capability is focused on the ability of the distribution network to rapidly project forces and sustainment resources to meet the requirements of the joint force commander.[92] To achieve this capability, transportation and distribution managers focused on developing an effective and efficient distribution network from the strategic to tactical levels, enabled with emerging information technologies, possessing global reach, and inculcated throughout military organizations, doctrine, and training. Since its designation as the DPO, TRANSCOM has taken the lead in improving all aspects of the strategic and theater distribution networks. TRANSCOM leverages strategic and theater transportation asset, both air and sea, to deploy, sustain, and redeploy more than one hundred and fifty thousand Soldiers annually to the CENTCOM Area of Responsibility (AOR). In addition, TRANSCOM utilizes military and civilian transportation capabilities to move high priority equipment and supplies to the theater. Working with

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[91] Ibid, 10.

[92] Ibid, 22.

CENTCOM and ARCENT, TRANSCOM expanded strategic and theater distribution network capacity, incorporated host-nation and other civilian capabilities, and improved overall visibility throughout the network. Commanders rely on emerging Radio Frequency Identification (RFID) technology and a robust interrogator network to provide the near-real time in-transit-visibility and continue to take action to expand its use.

2) Agile Sustainment

Agile Sustainment "transforms sustainment policies, processes, and capabilities to improve the flexibility, agility, and precision" of the logistics system.[93] This capability is focused on transitioning to a Joint seamless and integrated supply-chain from strategic to tactical level, leveraging civilian business processes and capabilities, anticipating future support requirements, and reducing overall sustainment costs.[94] DoD led the effort to establish agile logistic requirements and directed the development of service-specific system solutions. DoD's efforts to generate an integrated supply-chain included a directive to consolidate supplies common within all services under DLA, which made DLA a key player in providing operational support to the services. For their part, the services initiated changes to supply policies, implemented proven commercial business models to achieve initial inventory reductions, and continuously modified processes to match emerging logistics requirements. Both DoD and the services developed numerous automated systems to provide visibility of assets within the supply-chain, but the military has yet to develop a single JTAV capability. Lack of accurate logistics information forces many commanders to request supplies numerous times and generates inefficiencies in the logistics system.

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[93] Ibid, 11.

[94] Ibid, 23.

3) Logistics Information Fusion

Logistics Information Fusion "provide(s) logisticians and operators with a shared understanding of an integrated operational picture that offers reliable asset visibility and access to logistics resources."[95] This capability is defined as a robust communications and network architecture that provides near real-time visibility of the sustainment system to facilitates situational understanding, aids in resourcing decisions, and supports the operational planning process.[96] Operations in Afghanistan and Iraq highlighted the criticality of possessing strategic communications capabilities and the importance of linking logisticians to the national service providers. Service leaders have equipped tactical logistics units with organic satellite-based communications capabilities to improve a unit's ability to maintain its own situational understanding as well as to add to the overall theater logistics common operational picture. However, the combatant commander still lacks the automated capabilities to view theater-wide integrated logistics picture. The Joint Staff as well as the services continue to work towards GCSS and supporting service capabilities, but to date, situational understanding remains resident in hundreds of service-specific functional management information systems.

4) Theater Logistics Management

Theater Logistics Management focuses on the development of the "tools that give the joint force commander the capability to effectively oversee the management of logistics throughout the range of military operations."[97] This capability highlights the requirement to leverage information technology to control the movement of logistics through the distribution pipeline and integrate logistics actions with the operational requirements as it provides the means

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[95] Ibid, 13.

[96] Ibid, 25.

[97] *Focused Logistics Functional Concept*, 13.

to view unit requests and decide how to best to fulfill them.[98] The goal of Theater Logistics Management is to provide combatant commanders with the capabilities to synchronize logistics in support of ongoing operations. The strategy for achieving this capability included creating the policies, identifying the processes, and developing the tools required to execute logistics functions at the combatant command level.[99]

5) Operational Engineering

Operational Engineering describes efforts to "improve engineer response, to include developing tool for rapid engineer assessments and contingency planning, enabling combat service support forces to be tailored to reduce strategic lift requirements and minimizing footprint in the joint or combined operations area."[100] This capability highlights efforts to reduce deployed forces structure by tailoring capabilities to align more closely with operational requirements, maximizing the use of pre-positioned assets and other host-nation capabilities, making use of improved materials to support expeditionary operations, and leveraging the strategic distribution system to fill requirements.[101] The goal for Operational Engineering includes designing light, modular, and deployable forces capable of integrating information technology and material advances into all aspects of engineer support. The strategy to achieve this capability includes transforming organizations, doctrine, and technology that supports engineer operations.[102]

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[98] Ibid, 26.

[99] *Focused Logistics Campaign Plan*, 73-74.

[100] *Focused Logistics Functional Concept*, 11.

[101] Ibid, 23-24.

[102] *Focused Logistics Campaign Plan*, 47-48.

6) Multinational Logistics

Multinational Logistics focuses on "strengthening the support relationships between the US, its allies, and coalition partners."[103] The US military rarely operates alone and must develop processes and tools necessary to facilitate operations between elements of the US government, non-governmental organizations, and other nations.[104] The goals for Multinational Logistics were to develop betters ways to provide logistics to organizations outside the US military and improve the digital exchange of logistics information to those who require it. The strategy to achieve this capability included developing guidance to steer multinational logistics operations, leveraging pre-established agreements outlining resources available between agencies, allies, and non-governmental organizations, and developing common information technology systems that would be available for all to use.[105]

7) Force Health Protection

Force Health Protection emphasizes the need to "protect Service members from all health and environmental hazards associated with military services."[106] This capability is centered on ability of the medical system to protect against and when necessary take action to stabilize and evacuate forces to out of the theater for appropriate care. This is achieved by integrating improved diagnostics, information technology, and communications capabilities.[107] The strategy necessary to achieve Force Health Protection included maintaining a healthy force, taking proactive measures to reduce the incidences of Disease Non-Battle Injuries (DNBI), providing

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[103] *Focused Logistics Functional Concept*, 12.

[104] Ibid, 24.

[105] *Focused Logistics Campaign Plan*, 52-53.

[106] *Focused Logistics Functional Concept*, 12.

[107] Ibid, 24-25.

appropriate casualty and long-term care for injured Service members, and partnering with non-military resources to maximize the services available to force.[108]

Enabling Capabilities and Concepts

The transition from a massed-based to distribution-centric logistics forced military logisticians to transform every aspect of the military's sustainment structure. Developing an effective distribution system challenged leaders to streamline the manner in which the military acquired and managed inventories, integrate emerging information technology and improved distribution platforms, and finally, maintain visibility of entire logistics pipeline to facilitate the decision-making process. The tenants of the Focused Logistics concept provided the outline from which the military leadership sought to transform military logistics. Embedded within those overarching capabilities were enabling requirements and concepts necessary to create an agile logistics capability. Focused Logistics provided a description of each of these enabling capabilities as well as the means for achieving the desired capability.

Focused Logistics described TD as the movement of supplies from the theater point of entry to the final destination. The TD capability is focused on providing distribution managers the ability to oversee the logistics pipeline and maximizing the use of available transportation resources, people, and information technologies to prioritize and execute distribution operations. Within the CENTCOM AOR, TD is characterized by centralized distribution management, reduced supply inventories, improved communications, and near real-time asset visibility. Distribution managers leverage information technologies in an attempt to provide a logistic

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[108] *Focused Logistics Campaign Plan*, 58-60.

common operational picture and situational understanding necessary to control the flow of resources through the distribution system.[109]

To achieve a common understanding of the distribution network, developers of the Focused Logistics concept established the requirement for an integrated logistics command and control system capable of fusing functional logistics data into a common picture. Unlike legacy functional logistics information systems, the Global Combat Support System (GCSS) design leverages advanced communications platforms and automation infrastructures to allow anyone to access the network-based system from any computer. Logistics and distribution managers use GCSS to view what is available within the distribution pipeline and decide on the best means to support ongoing operations. The objective system provides near real-time visibility of all aspects of the distribution system, generates a single common logistics picture, and interfaces with service-level GCSS to facilitate operational sustainment efforts. An essential element of GCSS is a suite of Joint DSTs that provide a means to organize and view data, collaboratively plan, assess the sustainability of operational requirements.[110] DoD's efforts to achieve an objective situational awareness capability have met with mixed results. Services have fielded a robust communications capability that allows tactical units to rapidly transfer of data from tactical units to NICPs. Logisticians with access to the Internet can connect to the various DoD and service portals and websites created to provide distribution managers and customer units the current status of their requests. The services continue to develop and demonstrate supporting GCSS capabilities, but as late as 2009, a DoD-wide GCSS capability was not available to support ongoing operations and logisticians continue to use functional logistics information systems to generate situational understanding. Emerging information technologies continue to improve visibility of materiel in

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[109] *Joint Vision 2010, Focused Logistics*, 13-15.

[110] Ibid, 6-17 and 21.

the logistics pipeline and will continue to add to the effectiveness of the evolving GCSS capability.

Distribution managers viewed advances in information technology as key to providing operators and logisticians the capability to see, manage, and decide on how to support ongoing operations. JTAV provides customer units and distribution managers the ability to identify what resources are available within military depots. JTAV leverages service-level logistics information systems to generate DoD-wide asset status and facilitate a more comprehensive approach to military acquisition and allocation of limited resources.[111] ITV "specifically refers to the ability to track the identity, status, and location of cargo, passengers, and medical patients."[112] TRANSCOM developed the Global Transportation Network (GTN) as a means to command and control strategic distribution operations. Embedded within GTN is the ITV capability that distribution managers and customer units leverage to track in-bound shipments of supplies. Improvements in tracking technologies has added to the array of resources available to monitor the specific location of critical items across the battlefield, including the use of MTS to provide near real-time position data for convoys and RFID tags to track the movement of cargo through the system.[113] The Army equipped many logistics platforms with MTS as a means to monitor distribution operations within the battle space and provide redundant communications capabilities. The military also continued to integrate improved RFID technology and the CENTCOM commander directed the use of RFID tags for all assets entering the AOR. TRANSCOM, in conjunction with theater logisticians, created an integrated interrogation network that facilitates the tracking of resources moving through the TD network. As a result,

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[111] Ibid, 18-19.

[112] Ibid, 20.

[113] Ibid, 18-20.

distribution centers tagged inbound cargo, both supplies and equipment, with battery-operated

tags that emit a radio signals picked up as those tags pass through the theater interrogation

network. Finally, tactical logistics units leverage AIT capabilities such as bar coding and smart

card technology to improve inventory accuracy. The military turned to the business sector to meet

many of its information technology needs and would do the same as it transformed sustainment

and distribution processes.

Focused Logistics highlighted the need to improve all aspects of the sustainment

infrastructure through the application of proven commercial business practices. DoD viewed the

migration of the military distribution and supply-chains to commercial business methods as an

effective means to "continuously improve logistics operations, reduce overall costs, and minimize

process cycle times."[114] As the DPO, TRANSCOM evolved distribution processes by

streamlining organizations, improving system management, and integrating available commercial

technology to enhance overall situational awareness. DoD and the services took multiple

approaches to reducing inventories within the military supply-chain. DoD focused on reducing

the size and ultimately the cost of DoD inventories by consolidating and centrally managing

common supply items under the Defense Logistics Agency (DLA). In addition to streamlining

supply and distribution procedures, DLA improved its acquisition processes and leveraged

information technologies to sustain operations and designated weapon system through Direct

Vendor Delivery and Prime Vendor programs.[115] Reducing inventories and improving

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[114] Ibid, 36.

[115] Ibid, 40. Direct Vendor Delivery is a program used by the NICP to reduce the amount of inventory and better manage low-density items by passing requests directly from the customer directly to the manufacturer of the item who then within a prescribed contractual timeline delivers the requested item(s) to a DLA consolidation and containerization point (CCP) for onward delivery to the customer. Prime Vendor is a program used by equipment/weapons Program Managers to reduce the overhead incurred by the military to stock and maintain inventory for major programs and leverage equipment manufacturer's capabilities to provide system specific supplies.

responsiveness was the objective for all the services as they each integrated commercial business approaches, including Lean Logistics, Precision Logistics, Velocity Management, and now Agile Logistics to meet service-unique requirements.[116] Implementing agile logistics management processes resulted in even greater changes to the structure of tactical logistics organizations and the manner in which they now operate.

The current operating environment coupled with the evolution in military logistics processes fundamentally changed the manner in which tactical forces operate in the Joint Operating Area. An essential element of the *Focused Logistics* tenants was the need for flexibility in developing and documenting changes to military doctrine, tactics, techniques, and procedures, as well as the flexibility to redesign tactical units. Revolutionizing the military logistics system resulted in the strategic to tactical level changes that logistics leaders had to articulate throughout the military. Logistics leaders created a seamless and interconnected system that linked the logistics community into single network and reduced the linear nature of the mass-based system. In addition, the Army specifically reorganized tactical logistics forces, added capability, technology, and management responsibility to the modular brigade combat team (BCT). The Joint Staff, in conjunction with the service proponents made extensive revisions to existing Sustainment and Theater Distribution Publications to provide operators an updated baseline from which to operate. Current doctrine describes the requirements for an agile and adaptable logistics system capable of delivering supplies when and where needed, with a tailored logistics force and minimum logistics footprint.[117] Doctrine developers must continue to provide relevant doctrinal publications as the military adapts emerging processes and capabilities.

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[116] Ibid, 39.

[117] FM 4-0 (FM 100-10), *Combat Service Support*, 1-9-1-10.

Future Focused Logistics transformational efforts will include the emerging concepts of Joint Force Projection and Sustainment for Full Spectrum Operations and Sense and Respond Logistics. These concepts describe the need for a seamless and integrated logistics network flexible enough to anticipate and respond appropriately to emerging requirements. Future weapon systems will be outfitted with sensors, diagnostics, and prognostics that are digitally linked to the logistics network. Distribution managers will sense requirements and take action to repair the system becomes non-operational.[118]

Focused Logistics Attributes

The Focused Logistics Campaign Plan specifically states future "logistics capabilities must share many of the attributes of the forces they support."[119] The Joint Operations Capability documents also addressed the desired attributes required of future logistics operators as it described the need for logistics forces to remain fully integrated with other functions and capabilities. The future logistics system must possess the ability to deploy and sustain forces worldwide, leverage information networks to develop a common operational picture, enable subordinate leaders to operate effectively in a decentralized manner, generate adaptable and agile organizations capable of sustaining contingency operations with the minimum appropriate force, and provide managers at all levels with the tools necessary to generate better decisions and execute those decisions faster.[120]

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[118] *Focused Logistics Campaign Plan*, 16.

[119] Ibid, 20.

[120] *Focused Logistics Functional Concept*, 26.

Current Operational Logistics Capabilities

The US responded to the events of September 11, 2001 by initiating operations in the Middle East with a lighter, more agile combat force sustained by robust strategic and regionally aligned distribution networks, rather than the heavy maneuver units and cumbersome logistics tail that executed and supported operations during the 1st Gulf War. The initial sustainment concept in Afghanistan and eventually Iraq was nothing like Operations Desert Shield and Desert Storm. Logisticians did not have six months to deploy forces and build up 30-60 days of sustainment stocks and instead, operational forces relied on transformed logistics capabilities for the timely delivery of required resources. Military logisticians were challenged a) to develop a distribution system that stretched halfway around the globe leveraging available military and civilian capabilities, b) to integrate emerging information technologies to improve visibility of the pipeline and the system's effectiveness, c) to communicate effectively, both at the tactical and strategic levels, and d) to develop improved logistics command and control systems.

Operation Enduring Freedom (OEF) forced TRANSCOM to realign distribution networks to improve its capability to operate in an austere environment comprised of limited air and ground transportation infrastructure. As a result, the US supported initial operations in Afghanistan predominantly by air because of the limited size of ground forces in the operations area, the relatively small requirements of those forces, and the tenuous ground lines of communications (LOC) through Pakistan. Currently, TRANSCOM supports approximately thirty percent of the OEF high priority logistics requirements by air. As the size of the forces increased, so did the requirements for an increased use of ground LOCs from port facilities at Karachi inland through Pakistan. TRANSCOM continuously upgraded network capabilities to meet growing demands, took advantage of untapped transportation capabilities and expertise, and reduced the

overall risk to distribution operations.[121] The Northern Distribution Network (NDN), "a series of commercially-based logistical arrangements connecting Baltic and Caspian ports with Afghanistan via Russia, Central Asia, and the Caucasus"[122] is one example of TRANSCOM's efforts to provide this expanded distribution capability and reduce the impact of the environment and enemy activities on the network.

Initial reflections from Operation Iraqi Freedom (OIF) indicated that senior leaders made a conscious decision to sustain forces utilizing emerging TD capabilities even though most operational forces lacked the ITV, enabling command and control systems, and transportation resources necessary to maximize the capacity of the distribution system.[123] Leaders envisioned TD as a way to reduce the requirements for large inventories throughout the operating area by replacing them with a robust transportation network capable of delivering supplies when users required them. Initial efforts to establish the TD capability were disjointed and resulted in reduced system capacity. Distribution planning was fragmented as each support echelon independently generated their own set of requirements with little cross talk or coordination between echelons. There was no single organization responsible for developing an integrated distribution plan for the theater, which resulted in limited visibility of unit transportation requirements and shortfalls within the system.[124] Many argue that had the United States' advance to Baghdad not been slowed by extreme weather conditions, Army and Marine forces would have

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[121] Doug Noble, "Meeting the Challenges of Logistics Support," *The Navy Supply Corps Newsletter* (Washington, DC: Naval Supply Systems Command, May/June 2009), https://www.navsup.navy.mil/scnewsletter/2009/may-june/cover4 (accessed on February 3, 2011).

[122] Center for Strategic and International Studies, "Northern Distribution Network," *Center for Strategic and International Studies,* http://csis.org/program/northern-distribution-network-ndn (accessed on April 1, 2011).

[123] Eric Peltz et al.*, Sustainment of Army Forces in Operation Iraqi Freedom, Battlefield Logistics and Effects on Operations* (Santa Monica, CA: RAND Corporation, 2005*)*, http://www.rand.org/pubs/monographs/MG344 (accessed February 4, 2011), 9.

[124] Ibid*,* 20-21.

been forced to execute an operational pause to allow logistics forces to catch up and generate appropriate stockage objectives to support future operations. Initial assessments of distribution process performance highlighted this issue and in September of 2003, the Secretary of Defense designated TRANSCOM the DPO and made Commander, USTRANSCOM responsible for developing a Joint distribution capability with standardized processes, organizations, systems, and technologies to control "end-to-end distribution process."[125]

Iraq suffered from similar distribution network issues plaguing logistics operations in Afghanistan. Lack of access to overland routes from the north and west initially limited the transportation planners' distribution network to a single supply route from Kuwait in the South. TRANSCOM, in conjunction with CENTCOM and the US Army Component to CENTCOM (ARCENT), worked closely to refine the requirements, gain access through neighboring countries, and procure additional distribution resources necessary to support the evolution of a robust distribution network. Distribution operations were complex and coordination between the theater managers in Kuwait and tactical units in Iraq was critical to ensure high priority supplies arrived when required. Increased enemy activity, road serviceability, environmental impacts, and additional contractor support requirements strained an already overtaxed system.[126] Many commanders compensated for delivery challenges by increasing stockage objective for food items, ammunition, and construction materials. Over time, this increase in demand forced Multi-National Forces-Iraq, in conjunction with TRANSCOM, to implement initiatives to expand the TD network, to include providing additional supply routes from the Jordan and Turkey that facilitated the movement of unit equipment and sustainment supplies, negotiating with Iraqi tribal

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[125] Science Applications International Corporation, *Objective Assessment of Logistics Operations Iraqi Freedom* (Washington, DC: Deputy Under Secretary of Defense for Science and Technology, March 2004), 2.

[126] Peltz et al., *Sustainment of Army Forces in Operation Iraqi Freedom,* 26.

leaders to develop the Iraqi Transportation Network that provided line-haul transportation of non-critical assets within Iraq, and finally, developing the capacity at the Iraqi port of Um Qsar to facilitate the movement of redeploying equipment through multiple ports and reducing the amount of materiel transported through Kuwait.[127] The most daunting challenge faced by logisticians during the early stages of OEF and OIF was the reality that deploying forces lacked improved information technologies and transportation enablers to generate requests, maintain in-transit-visibility of critical assets, and manage the efficient delivery of supplies to the end-user.

In December 2003, the General Accounting Office (GAO) published its observations of the effectiveness of OIF logistics activities in which it highlighted the failure of the military to maintain adequate visibility of assets in the distribution pipeline because an inadequate communications network, the failure of logistics system to share data, and the sporadic use of RFID technology. The report also described the challenge faced by distribution managers to prioritize cargo on the limited theater transportation assets available to support operations.[128] As a result, tactical units continued to suffer from the distribution system's inability to provide time-definite delivery of supplies and effectively control the physical movements of transportation

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[127] This observation is based on personal reflections of the author while serving within the Iraqi Theater of Operation (ITO) as a BSB Commander in 2005 and as the Multi-National Division-Baghdad Assistant Chief of Staff G4 in 2007 during the surge and in 2009 when US forces initiated Responsible Drawdown of Forces (RDOF). A major focus of the Multi-National Forces-Iraq (MNF-I) J4 and Multi-National Corps-Iraq (MNC-I) C4 during this period was the development of alternate lines of communications (LOC) to relieve the quantity of materiel moving both north and south from Kuwait. With the support of CENTCOM and TRANSCOM, forces in Iraq received supplies from Jordan and Turkey and as part of redeployment of forces, they ship equipment through ports in Jordan and Iraq itself. With an improved security environment, MNF-I developed requirements and contracted for what would be known as the Iraqi Transportation Network, a group of truck drivers controlled by various sheiks initially in western Iraq and eventually throughout the country. These truck drivers could transport non-sensitive military materiel throughout the country using local vehicles, reducing US military presence on the heavily travelled routes and developing local national distribution capabilities in the process.

[128] US General Accounting Office, *Preliminary GAO Observations on Effectiveness of Logistics Activities during Operation Iraqi Freedom* (Washington, DC, General Accounting Office, November 6, 2003), 20-21.

assets within the Joint Operating Area (JOA). In 2004, Lieutenant General Claude Christianson, the Army G4, highlighted in the *Army Logistics White Paper* that the only way to increase confidence in the current logistics system was to improve visibility and establish flexible, responsive distribution capabilities.[129] CENTCOM and TRANSCOM focused their efforts on gaining and maintaining visibility of assets in the system and controlling the flow of materiel through the pipeline. The CENTCOM commander continued to mandate the use of RFID technology for all shipments entering the theater. TRANSCOM used the GTN to provide near real-time data for items within the pipeline by using reliable RFID and AIT. Generating a common picture of the distribution network remained the biggest challenge as efforts to develop GCSS continued and reliability of the interrogator network was questionable as the system's accuracy depended on properly in-gating and out-gating cargo along the route and RFID battery life challenges impacted a tag's operational readiness.[130] Today, Afghanistan and Iraq have robust communications infrastructure that play an essential role in improved visibility throughout the distribution system and provide logistics leaders the capabilities to control the TD process.

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[129] Claude V. Christianson, *Army Logistics White Paper: Delivering Materiel Readiness to the Army* (Washington, DC, Department of the Army, March 1, 2004), http://www.army.mil/features/LogWhitePaper2004/LogWhitePaper.pdf (accessed September 21, 2010), 1.

[130] This observation is based on personal reflections of the author while serving within the Iraqi Theater of Operation (ITO) as a BSB Commander in 2005 and as the Multi-National Division-Baghdad Assistant Chief of Staff G4 in 2007 during the surge and in 2009 when US forces initiated Responsible Drawdown of Forces (RDOF). Senior logisticians in the ITO emphasized the importance of in-transit visibility and mandated its use throughout the theater. Tracking materiel within the theater was problematic because of the lack of a GCSS type capability to provide a logistics common operating picture. SCoE identified Battle Command Sustainment Support System (BCS3) as an Army command and control solution, but as late as December 2009, BCS3 had yet to be fully implemented across the theater. For transporters to make ITV an effective tool, they developed and managed a robust interrogator network that spread the length of the LOCs. The system evolved over time through the incremental changes to business processes and the tactics, techniques, and procedures used for tracking the flow of materiel through distribution hubs. Addition of more reliable technology and additional training for units execution the distribution operations also positively influenced operations.

Early logistics forces in both Afghanistan and Iraq also identified communications, both tactical and strategic capabilities as critical challenges. Initially, many units had not been equipped with the assured long-range communications capabilities and associated bandwidth necessary to facilitate sustainment operations. Units supporting OEF rapidly identified the requirement for deployable satellite-based systems that possessed the necessary bandwidth to facilitate distributed operations across the mountains of Afghanistan and link to national level sustainment systems.[131] Initial findings in Iraq highlighted similar communications challenges and "logistics communications was cited as one of the most pervasive weaknesses of OIF."[132] During the advance to Baghdad, logistics elements were unable to digitally transfer requests through the supply support activities because units lacked mobile, over the horizon communications capabilities necessary to facilitate operations. The supply system only began to function again as direct support logistics units stopped moving, established operations in Baghdad, and Division and Corps communications architectures became operational.[133] In 2004, the Army G4 identified the lack of assured communications as one of the services most significant logistics challenges as it limited the ability of the logistical units to communicate routinely and "see requirements on the battlefield."[134]

In 2004, the Army had yet to field a large number of Very Small Aperture Terminals (VSAT), a satellite-based communications systems capable of providing assured communications and bandwidth for logistics information systems primarily in division and corps support

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[131] Conrad C. Crane, *The US Army's Initial Impressions of Operations Enduring Freedom and Noble Eagle, Final Report*, (Carlisle Barracks, PA: Center for Strategic Leadership, US Army War College, September 2002), 3.

[132] SAIC, *Objective Assessment of Logistics Operations Iraqi Freedom*, 38.

[133] Peltz et al., *Sustainment of Army Forces in Operation Iraqi Freedom*, 41-42.

[134] Christianson, *Army Logistics White Paper,* 1.

battalions. VSAT linked Standard Army Management Information Systems (STAMIS) together with other functional like systems as well as with the strategic logistics networks. 3rd Infantry Division (3ID) units were the first units equipped with the capability and received the hardware while conducting pre-deployment training at the National Training Center.[135] 3ID deployed VSAT to Iraq, which resulted in improved situational awareness and responsiveness of the logistics system. In 2005 and 2006, all modular brigade support battalions (BSB) received VSAT capabilities as they reset and refitted for future deployments to Afghanistan and Iraq. In addition to the new organizational equipment, in Iraq, most units received additional commercial capabilities as Theater Provided Equipment (TPE) to augment organic assets. VSAT, in addition to other redundant capabilities provided as part of the BCT's communications architecture effectively resolved the support battalion's communications shortfalls. Also during the timeframe, the US Army Combined Arms Support Center (CASCOM) continued the development of desioon support tools like Battle Command Sustainment and Support System (BCS3) and the Army's contribution to GCSS known as Global Combat Support System – Army (GCSS-Army) to provide a Logistics Common Operating Picture (LCOP) and improve logistics decision-making.[136] As late as 2009, efforts by the Joint and Army Staffs have yet to yield an improved Joint or Army logistics command and control capability. Logistics units still lacked the digital command and control system envisioned to provide a LCOP, create situational understanding, and more effectively integrate the logistics decision-making with the operations process.

Joint Total Asset Visibility, an essential capability of the *Focused Logistics* concept was not available to those planning the drawdown from Iraq. Force, corps, and division headquarters

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[135] Editor, Army Logistician Magazine, "CSS VSAT Connects Logisticians" *Army Logistician Magazine* (September-October 2004), http://www.almc.army.mil/alog/issues/sepoct04/pdf/ALOG_Sept_Oct.pdf (accessed February 21, 2011), 57-58.

[136] Christianson *Army Logistics White Paper,* 1.

lacked a Joint logistics information system to provide operational decision-makers a snapshot of what was on-hand in the theater, what deployed forces still required, and what units would eventually have to redeploy. Planning for the drawdown of forces from Iraq highlighted the importance of possessing a JTAV capability, and the lack of this capability forced many organizations to develop estimates and retrograde requirements independently from one another using service specific systems, periodically consolidating and negotiating differences in data at the corps-level synchronization events, and then repetitively updating the data manually to maintain a common situational understanding.[137]

The Army's transformation from a massed-based to distribution-based logistics system achieved the initial goal of an overall reduction in inventories, but the Army did little to offset those reductions with projected upgrades to the tactical distribution assets or improved information capabilities. Units ultimately deployed to Afghanistan and Iraq with less inventories and inadequate distribution assets. The Army's efforts mirrored closely the *Focused Logistics* concept by developing an integrated logistics network from strategic to the tactical level that provided visibility of assets in the pipeline.[138] In 2004, DoD emphasized the need for a comprehensive military supply-chain solution, especially in the theater of operation.[139] In 2009 and 2010, the Army had yet to achieve its goal to provide total asset visibility of theater assets nor

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[137] This observation is based on personal reflections of the author while serving within the ITO as the Multi-National Division-Baghdad Assistant Chief of Staff G4 during 2009 when US forces initiated RDOF planning and execution. RDOF planning was a complicated event due to the plethora of accountability systems in use by the services and lack of an overarching system to aggregate, validate requirements, and generate disposition instruction for materiel identified as excess. Intensive management at all levels improved the overall integrity of the logistics databases, but the amount of materiel not properly accounted for within appropriate logistics system required logisticians at all levels as to track, manage, and report the status of operations to the corps manually to maintain common understanding ongoing RDOF operations.

[138] Christianson, Claude V., *Army Logistics White Paper,* 2.

[139] SAIC, *Objective Assessment of Logistics Operations Iraqi Freedom*, 59.

had the Army linked functional STAMIS together to provide a real time logistics common operating picture. This lack of asset visibility, coupled with limited management controls and long lines of communications, forced military commanders to question the effectiveness of distribution-based logistics and many returned to their mass-based roots. Inventories at all levels became excessive, supply points lacked appropriate accountability and inventory controls measures, and because of perceived lack of control within the pipeline, most units submitted multiple requests for critical resources resulting in inefficiencies within the system. It was not until forces began to responsibly withdraw from Iraq that commanders began to understand the magnitude of the inventory issues and began demand better visibility and implement necessary policies to better control the system.[140]

Existing Logistics Challenges

Gaps in Capabilities

After almost ten years of supporting contingency operations predominantly in the Middle East, the US military has validated the underlying tenants of the *Focused Logistics* concept. The military logistics system becomes more agile as the system matures, organizational changes take hold, and leaders develop an increased understanding and appreciation of distribution-based logistics. That said, logisticians have much work remaining to implement fully the objective enabling capabilities necessary to provide distribution managers the tools required to manage and optimize sustainment operations within an agile logistics network. Efforts within DoD to develop an integrated logistics information system have improved asset visibility and situational understanding of the activities within the distribution pipeline. However, those development

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[140] Gustave F. Perna, "Sustaining the Responsible Drawdown of Forces," *Army Sustainment Magazine*, (March-April 2011), http://www.almc.army.mil/alog/pdf/mar_apr11.pdf (accessed March 17, 2011), 10.

efforts have not resulted in a fully integrated joint system capable of providing a real-time common logistics picture that possesses appropriate DSTs and maintains asset visibility necessary to enable the operational decision-making process. Operational forces continue to maintain asset visibility, manage resources, and make decisions using service-specific management information system because of the lack of an integrated Global Combat Support System capability. Finally, incremental fielding of advanced transportation tracking technology has improved in-transit-visibility, but inconsistent use of technology as well as system architecture limitations negatively impacts ITV effectiveness.

The Joint-level GCSS capability combined with the supporting service component GCSS development efforts collectively represent the envisioned *Focused Logistics* concept objective Joint logistics information system.[141] Joint Staff and service efforts, however, have yet to yield an operational GCSS capability that today's agile logistics organizations require to manage distribution operations and facilitate operational decision-making. Development of GCSS remains a work-in-progress as the system's proponents adjust requirements, identify improved technological solutions, and incrementally field capabilities to deploying forces. DoD entities have expanded their capacity to receive, store, and access data from central repositories through web portals, but linking service-specific legacy systems together to generate a DoD-wide logistics common operating picture and situational understanding remains problematic. The services continue to face issues with differing hardware, software, and underlying system design. Services have continued to incrementally transform logistics information systems with varying degrees of

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[141] SAIC, *Objective Assessment of Logistics Operations Iraqi Freedom*, 59-60.

success and efforts to complete the development and fielding of GCSS will continue for the foreseeable future.[142]

DoD efforts have led to the aggregation of data within service-level repositories that receive routine data updates directly from units in the field, item managers, and distribution managers on a recurring schedule. Senior logisticians continue to emphasize the need for universal access to logistics information through web-based applications, which has resulted in a series of logistics-specific portals from which distribution managers and customer units can view elements of the logistics common operating picture in near-real time. However, logisticians continue to have a limited number of tools available to aggregate available data and create a real-time common operating picture because logistics information systems do not interface directly with each other because of the way the systems were originally designed. To bridge this current capability gap, the Army continues to refine its BCS3 as a means to aggregate and view a user-specified LCOP and provide logistics planners a DST to support operational and tactical logistics planning.[143] In close coordination with deployed and deploying forces, the Army G4 and Sustainment Center of Excellence (SCoE) continuously refine and update logistics information system requirements, develop and implement GCSS-Army capabilities, and evolve the theater-wide information architecture. For its part, the Army Staff utilizes the Army Force Generation (ARFORGEN) process to equip and coordinate applicable training for deploying forces in

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[142] Mitchell H. Stevenson, "A Vision of Army Logistics with 20/20 Hindsight," *Army Sustainment Magazine* (March-April 2011), http://www.almc.army.mil/alog/pdf/mar_apr11.pdf (accessed March 17, 2011), 8.

[143] Tapestry Solutions, "Battle Command Sustainment Support System,*" Tapestry Solutions, Products, Command – Control Website*, http://www.tapestrysolutions.com/products/command--control/bcs3.aspx (accessed April 2, 2011).

accordance with the Army's unit priority listings.[144] These efforts serve as a primary means to provide to sustainment organizations with the latest automation, communications, and logistics information systems and incrementally upgrade unit logistics management capabilities.

As late as 2008, logisticians continued to identify asset visibility as one of the high priorities for distribution-based logistics and highlighted the importance of continued efforts to implement a Joint-level asset visibility capability. JTAV remains a cornerstone of the Focused Logistics concept, yet asset visibility remains embedded within numerous service-specific information systems that are not fully integrated at the Joint-level. Services have made little progress in developing an asset visibility capability and it is not unusual for supply managers to access to multiple property accountability systems depending on the type of organization and echelon working a requirement. DoD remains committed to developing a Joint asset visibility capability and understands the importance of reengineering the information architecture in a manner that links services under this single umbrella, unlike the current architecture.[145] DoD continues to make progress in improving the visibility of resources within the distribution pipeline. TRANSCOM, DLA, and each of the services have integrated emerging RFID and AIT technologies within their supply and distribution networks and processes. Services have incrementally improved their capabilities by integrating proven technology into the existing information architecture and modifying policies and directives that mandate its use.[146] The evolution of asset visibility and ITV capabilities has improved the situational understanding of operating forces as they are now equipped with the tools necessary to maintain real-time visibility

[144] Department of the Army, Army Regulation (AR) 525-29, *Military Operations, Army Force Generation* (Washington, DC: Government Printing Office, March 14, 2011), 10-11 and 22.

[145] Banks, James C., "Joint Asset Visibility: Why So Hard? The Way Ahead," *Army Logistician Magazine* (January-February 2008), http://www.almc.army.mil/alog/issues/JanFeb08/pdf/alog_jan_feb08.pdf (accessed April 2, 2011), 30.

[146] Stevenson, "A Vision of Army Logistics with 20/20 Hindsight," 5

of resources within the Joint operating area. As these capabilities continue to evolve, so too must the military leader's understanding of the agile logistics organization.

Gaps in Understanding

Over the last fifteen years, the military has fundamentally transformed the manner in which it provides logistics and has taken advantage of ongoing operations to evolve the processes and capabilities to support these missions. Logistics formations have become more agile and now possess digital enablers to connect the tactical to strategic-level logistics systems. Commanders have witnessed these changes and most have adapted operations to include new logistics structures and processes that better facilitate the distribution processes. However, there remains a deficit in understanding at the operational and tactical levels as to the overall intent of Focused Logistics and DoD's ultimate objectives. Military logistics leaders fundamentally transformed military logistics into a distribution-based logistics system, both from a process and organizational design perspective. However, there remains a general lack of understanding within the operating forces, which leads to an inconsistent implementation of processes, policies, and organizations that has resulted in a less than fully integrated system. Finally, many tactical leaders lack confidence in the capacity of the system to sustain operations partially as a result of not fully understanding the principles of distribution-based logistics. Sustainment operations in Afghanistan and Iraq provide examples of how many commanders reverted to a mass-based logistics approach because that is what they know and understand.

Distribution-based logistics has become a reality as the US military sustains operations across the globe. DoD has implemented and evolved the tenants of Focused Logistics to take advantage of appropriate business processes, advanced technology, and improved transportation enablers. Strategically, the logistics system functions very much as described in the overarching concept documents and logistics leaders possess a thorough understanding of current shortfalls of

the distribution system and necessary changes required to generate objective system capabilities. DLA, in conjunction with service materiel commands, continue to refine business processes and implement web-based business enterprise solutions to support customer requirements.[147] At the operational and tactical level, services have equipped most units with transportation and communications enablers and have established the links to the strategic-level distribution apparatus. Deployed logisticians, however, still lack some of the improved automation capabilities and a reasonable understanding of the overarching processes necessary to tie into the integrated logistics system.[148] Until recently, operational logisticians have struggled to clearly articulate the necessity for a single distribution manager and a centrally managed Joint theater logistics system. In addition, services have yet to totally refine the capabilities necessary to provide a LCOP and operational planning tools, which further limits a logistician's ability to respond effectively to the commander's critical information requirements. Most operational commanders acknowledge the change from a supply to distribution-based approach to logistics, but many fail to grasp the integrated nature of the current distribution processes and to accept less direct control of logistics resources maintained within the area of operation. This has resulted in many tactical commanders directing subordinate logisticians to maintain excessive quantities of safety stocks to meet perceived mission requirements. Improving operational leader knowledge of distribution-based logistics is essential to optimizing the effectiveness of the sustainment system.

Services continue to modify and reorganize logistics force structures in an effort to streamline sustainment efforts, reduce the deployed logistics footprints, and generate agile logistics formations. Nowhere has reorganization been greater than Army efforts to

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[147] Ibid, 4.

[148] G4, Strategic Communications, *Connect Army Logisticians, Army Logistics White Paper, Delivering Materiel Readiness to the Army* (Washington, DC, Army G4, October 2004), 2-6.

fundamentally change the logistics structures within maneuver formations by removing organizational-level support capabilities from the maneuver battalion and reorganizing those functions within the modular Brigade Support Battalion's (BSB) Forward Support Company (FSC). Doctrine identifies the modular BCT's BSB as the primary organization responsible for sustaining the brigade with supply and distribution, maintenance, medical, and forward support companies providing direct support to the maneuver elements.[149] Most maneuver battalion commanders, in theory, readily approve of the FSC as their required sustainment capability; however, they appear less agreeable to the doctrinal command relationship between the FSC and the maneuver battalion because they viewed the change to the logistics structure as a loss of capability and, ultimately, loss of control.[150] The Army assigned FSCs to the BSB with the intent to have the company commander, a Logistics Captain, work for the BSB commander who serves as the single logistics operator for the BCT and ultimately responsible for the effectiveness of the BCT's logistics effort.[151] In the current environment, many BSB commanders have lost direct command and control of the FSCs as division and brigade commanders routinely attach FSCs to maneuver battalions. This has resulted in an inconsistent application of distribution concepts, disjointed logistics execution, and a less-than-optimal logistics system. Until the logistics community succeeds in the battle of ideas with respect to developing a totally integrated logistics system, maintaining unity of the logistics effort, and empowering the BSB commanders as the single logistics operator for the BCT, maneuver commanders will remain leery of ongoing logistics initiatives.

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[149] Department of the Army, Field Manual 4-90 ((FM 4-90.7), *Brigade Support Battalion* (Washington, D.C.: Reimer Digital Library, 31 August 2010), 2-1 – 2-3.

[150] Poling, Kevin D., 'Making the Forward Support Company Work," *Army Logistician Magazine* (September-October 2001), http://www.almc.army.mil/alog/issues/SepOct01/Final.pdf (accessed April 3, 2011), 28-29.

[151] FM 4-90 (FM 4-90.7), *Brigade Support Battalion*, 6-1 - 6-2 and 2-3.

Some might argue that operational leaders have a right to remain somewhat skeptical about Focused Logistics and the change it represents. The Joint Staff published *Joint Vision 2010, Focused Logistics* with much fanfare as they distributed a nice shiny book that encapsulated the way ahead for military logistics. Logisticians viewed this new concept as a panacea that would cure all the sustainment ills identified during the 1st Gulf War while many operational commanders saw it as logisticians replacing a tried-and-tested system with a process focused on efficiency and not effectiveness. The Focused Logistics concept quickly became known as the military's just-in-time logistics system. In and effort to become more efficient and integrate the national supply-chain, troops in the field saw an immediate reduction in supply stocks, longer customer wait times, and lower readiness rates. Leaders quickly developed a general lack of confidence in the supply system and as a result fought to retain as much control over the system as possible. This lack of confidence carried over into Operations in Afghanistan and Iraq as units reverted to a supply-based logistics approach as DoD and the services ferreted out distribution system issues. Units placed extraordinary demands on the supply system, distribution capacity expanded to service the increased requirements, and supply points and containers began to litter the battlefield. Planning for Responsible Drawdown of Forces from Iraq highlighted the magnitude of logistics efforts that would be required of follow-on forces to remove the Iron Mountain of supplies passed from unit to unit over the years of military operations in the theater.[152] However, logistics efforts in theater have not been in vain. Over the last ten years, distribution-based logistics capabilities have improved markedly and distribution operations have done a great deal generate confidence that the system can effectively meet known mission requirements. Logistics efforts have gone a long way to remove the stigma associated with

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[152] Perna, "Sustaining the Responsible Drawdown of Forces," 9-10.

military's foray with just-in-time logistics. The logistics community has demonstrated the effectiveness of Focused Logistics and must now provide a concise strategic message that clearly articulates the next steps in the evolution of military logistics.

Conclusions and Recommendations

The Focused Logistics concept provided an effective framework at which to look and understand the evolution of the military's distribution-based logistics system. Developed as the result of logistics challenges identified during Operations Desert Shield and Desert Storm, Focused Logistics has evolved over the last two decades to incorporate appropriate commercial business practices and advances in technology that enable logisticians to support continuous operations around the globe. Operations in Afghanistan and Iraq, as well as support to a globally - deployed force, have thoroughly tested the distribution system's capabilities, and by all accounts, the system has met the challenge. Logisticians have demonstrated the effectiveness of a distribution-based approach, but they must not stop there. They must to strive to become more agile as they optimize their efforts across the battlefield.

Focused Logistics concept documents as well as Joint and service logistics doctrine clearly articulated the objectives on which the military intended to focus logistics system transform. DoD succeeded in revolutionizing the manner in which the military provided logistics when it initiated the transition the from the Cold War supply-based model to the current global distribution network. However, logistics transformation efforts became more evolutionary as the services led in the development and employment of agile and responsive organizations. These forces possessed the capabilities to effectively sustain forces in the most austere locations utilizing the minimum required resources. After years of experimentation and support to contingency operations, the military logistics system has evolved into an effective global distribution network capable of meeting continuous operational requirements of he US military. Service leaders have incorporated requirements identified by operational commanders, included

improved capabilities resulting from changes in technology, and leveraged lessons learned from units in the field. The services have also succeeded in demonstrating the agile nature and capabilities of modular logistics force structure; much of the enabling capabilities that power the system, however, remain incomplete.

Both *Joint Vision 2010* and *Joint Vision 2020*, described Focused Logistics as a key element of successful Joint operations. Senior logisticians developed Focused Logistics to provide a seamless and integrated network capable of leveraging available information systems to view what is available in the supply and distribution network, anticipate future demands, and decide how best to fulfill the requirements. DoD did not dictate a single solution to achieve the desired Focused Logistics capabilities and allowed services the autonomy to develop supporting programs. Service efforts to date have yet to yield a seamless and integrated logistics system capable of enabling the execution of Joint logistics operations. Impeding progress towards a Joint logistics capability is the development and fielding of Joint and service-specific GCSS capabilities that provide theater-wide visibility of the logistics system. Logisticians continue to lack the ability to develop situational understanding of current logistics operation as well as to leverage a set of tools necessary to fully integrate logistics into the operational planning process. In addition, creating effective distribution capabilities relies on a thorough and consistent understanding of the processes, policies and capabilities available to support operations. Logisticians have demonstrated the effectiveness of the Focused Logistics tenants, but to optimize the logistics system, they must continue their efforts to educate and inform operating forces on the implementation of applicable processes and policies as well as the employment of emerging technology.

To achieve fully the desired Focused Logistics capabilities and create the desired agile logistic structure, the military must continue to evolve its processes, policies, and organizations as described in the following recommendations. First, DoD must develop an integrated logistics

capability to provide oversight of Joint sustainment requirements. This Joint activity would leverage approved DoD logistics information systems to direct theater-wide logistics operations, much like logistics staffs within CENTCOM and operational headquarters Afghanistan and Iraq attempt to accomplish today. As a supporting effort, services must complete development and field service-specific GCSS capabilities. These systems enable logisticians at all levels with the ability to aggregate Joint and service-specific data, depict a common logistics picture within an operational theater, and provide appropriate decision support tools necessary to facilitate logistics input to operational planning efforts.

Second, military logisticians must refine the Focused Logistics strategic messaging and clearly articulate the nature and impact of the changes to date and concisely describe future challenges that DoD must address. The current message has not filtered down to many of the leaders in the field and, as a result, tactical execution and management of sustainment activities have becomes disjointed. Senior logisticians must simplify how they describe the current system and effectively communicate what future changes are required to continue optimizing the logistics system. Discussions must include adjustments necessary to processes, policies, and organizations that support the development of a seamless and integrated logistics system from the tactical to strategic level and generates confidence in distribution system as well as the organizations and service members that execute the logistics mission. The continued evolution of agile logistics capabilities hinges on the ability of logistician to communicate why the system must continue to change and how logisticians propose to accomplish these efforts.

Focused Logistics is more than two words on a bumper sticker. The Focused Logistics concepts fundamentally transformed military logistics from a reactive industrial-based supply system into a responsive global distribution network capable of sustaining the expeditionary operations across the globe. Over the last ten years, the military has demonstrated the power of this new approach and fine-tuned these capabilities while supporting the operations in

Afghanistan and Iraq. The military logistics system will continue to evolve with the integration of advanced technology and improved information systems, however, it is now time for every logistician to describe clearly and concisely future military distribution efforts and articulate the importance of these capabilities to expeditionary sustainment operations. Military logisticians have gone a long way to leverage Focused Logistics capabilities but much remains to make Agile Logistics a reality.

APPENDIX 1

The Army of Excellence (AOE) support concept is broken up in multiple field manuals.
FM 71-2 described how the AOE concept resourced maneuver battalions to provide
organizational-level supply, transportation, and maintenance support to organic and attached
units. Each maneuver battalion contained a support platoon and a maintenance platoon within the
Headquarters and Headquarters Company (HHC) responsible for the logistics mission of the
battalion.[153] FM 63-20 articulated the manner in which a Forward Support Battalion in direct
support of the maneuver brigade routinely augmented each maneuver battalion with a
Maintenance Support Team as well as any other logistics capabilities when the mission
dictated.[154] As the Army converted from AOE to Modularity, it moved these organizational
logistics assets from the maneuver battalion to the BSB to resource the FSC. The designers for
the BSB resourced the FSC with the many of the same capabilities previously resident in the
HHC of the maneuver battalion as well as the BSB's direct support maintenance assets habitually
collocated with the maintenance section and placed the FSC under the command and control of a
Logistics Captain.

FM 4-90 (FM 4-90.7) *Brigade Support Battalion*, Chapter 6 provides an overview of the
FSC's mission, structure, and functions. The FSC is a multifunctional organization specifically
designed and organized to support an Armored Reconnaissance Squadron, Combined Arms
Battalion, or Field Artillery Battalion.

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[153] Department of the Army, Field Manual 71-2, *The Armor and Mechanized Infantry Task Force*
(Washington, DC: Government Printing Office, September 27, 1988), www.enlisted.info/field-manuals/fm-
71-2-tank-and-mechanized-infantry-battalion-task-force.shtml (accessed March 21, 2011), 7-6 – 7-7.

[154] Department of the Army, Field Manual 63-20, *Forward Support Battalion* (Washington, DC:
Government Printing Office, February 29, 1990), www.enlisted.info/field-manuals/fm-63-20-forward-
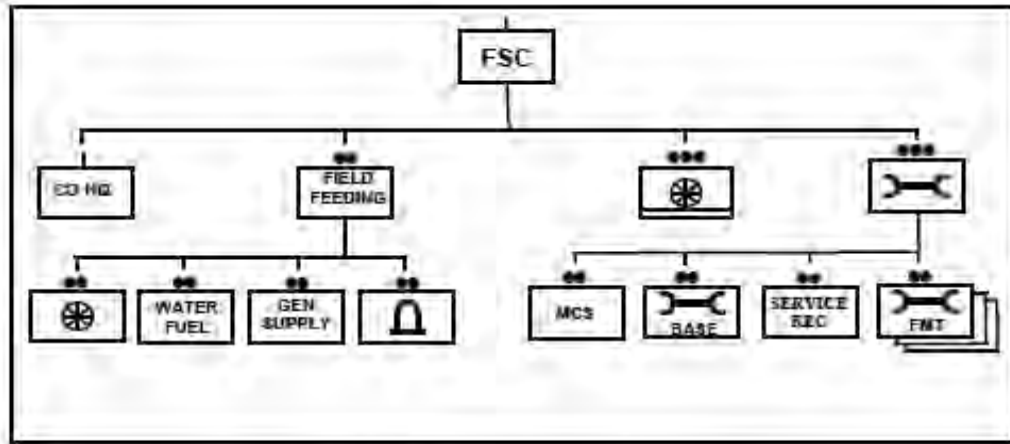support-battalion.shtml (accessed March 21, 2011), 6-1-6-2.

Figure 6-1. The Forward Support Company

FSCs are organic units of the BSB. FSCs provide field feeding, fuel, ammunition, field maintenance, and distribution support for a combat arms battalion. While designed to be under the command of the BSB, an FSC may operate in either a direct support role or under a specific command relationship with its supported battalion. Command relationships, such as OPCON or TACON, are generally limited in duration and focused on the completion of a particular operational task or mission. The FSC provides direct and habitual logistics support to the supported battalion. The FSC provides each maneuver battalion commander with dedicated logistics assets organized specifically to meet his battalion's requirements. FSCs are structured similarly with the most significant differences found in the force structure of the maintenance sections. Maintenance sections vary based upon the equipment and major weapon systems of the supported battalion. Also, distribution platoons in the airborne IBCT also includes transportation section to support the movement of infantry Soldiers.[155] The FSC commander receives technical logistics oversight from the BSB commander.

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[155] Field Manual 4-90 (4-90.7), *Brigade Support Battalion*, 6-1-6-2.

BIBLIOGRAPHY

Anderson, David A., and Dale L. Farrand. "An Army Revolution in Military Logistics?" *Army Logistician Magazine.* July-August 2007. http://www.almc.army.mil/alog/issues/JulAug07/log_revolution.html (accessed September 23, 2010).

Banks, James C. "Joint Asset Visbility: Why So Hard? The Way Ahead." *Army Logistician Magazine*, January-February 2008: 30-31.

Bell, Jack. "Department of Defense Logistics Roadmap Volume 1, July 2008." *ACQWeb - Office of the Under Secretary of Defense for Acquisition, Techology, and Logistics.* July 2008. http://www.acq.osd.mil/log/sci/roadmap.html (accessed September 22, 2010).

Brown, Daniel G., John G. Coburn, and Jonnie E. Wilson. "Our Revolution in Military Logistics - Supporting the 21st Century Soldier." *Army Logistician Magazine.* January-February 1999. http://www.almc/alog/issues/JanFeb99/MS 401.htm (accessed December 10, 2010).

Center for Strategic and International Studies. *Northern Distribution Network.* April 1, 2011. http://csis.org/ptogram/morther-distribution-network-ndn (accessed April 1, 2011).

Christianson, Claude V. *Army Logistics White Paper: Delivering Materiel Readiness to the Army.* March 1, 2004. http://www.army.mil/features/LogWhitePaper2004/LogWhitePaper.pdf (accessed September 21, 2010).

Cougaar Software, Inc. *Sense and Respond Logistics Technonolgy Roadmap March 2009.* White Paper, Washington, DC: Under Secretary of Defense for Logistics and Material Readiness, 2009, 55-58.

Cook, Katherine. *Transforming the Force and Logistics Transformation.* Strategy Research Project, Strategy, United States Army War College, Carlisle Barracks, PA: United States Army War College, 2006.

Crane, Conrad C. *The US Army's Initial Impressions of Operations Enduring Freedom and Noble Eagle, Final Report.* Carlisle Barracks, PA: United States Army War College, September 2002.

Dumond, John, et al. "Velocity Management: The Business Paradigm that as Transformed U.S Army Logistics." *RAND Corporation.* 2001. http://www.rand.org/pubs/monograph_reports/MR1108 (accessed February 5, 2011).

Dumond, John, Rick Eden, and John Folkeson. "Velocty Management: An Approach for Improving Responsivess and Efficiency in Army Logistics Processes." *Defense Technical Information Center.* December 21, 1994. http://handle.dtic.mil/100.2/ADA289264 (accessed January 16, 2011).

Davis, Paul K. "Military Transformation? Which Transformation, and What Lies Ahead?" *RAND Corporation.* 2010. http://rand.org/pubs/reprints/RP1413 (accessed January 18, 2011).

Defense Information Systems Agency, Department of Defense. *Defense Information Systems Agency, Department of Defense Home Page.* March 9, 2011. http://www.disa.mil/ (accessed March 9, 2011).

Department of Defense. *Focused Logistics Joint Functional Concept Version 1.0.* Washington, DC: Department of Defense, December 2003.

Department of Defense, Office of Force Transformation. *Operational Sense and Respond Logistics: Coevolution of an Adaptive Enterprise Capability.* Concept Document, Washington: Department of Defense, 2003, 3-4.

Department of the Army. *2004 Army Transformation Roadmap.* Strategy Paper, Washington, DC: United States Army, 2004.

Department of the Army. *Army Regulation 525-29, Military Operations, Army Force Generation.* Washington, DC, DC: Department of the Army, March 14, 2011.

—. "Field Manual (FM) 4-0, Sustainment." *Reimer Digital Library.* April 30, 2009. https://rdl.train.army.mil/soldierPortal/atia/adlsc/view/public/6718-1/fm/4-0/toc.htm#toc (accessed September 20, 2010).

—. "Field Manual 100-10, Combat Service Support." *Combined Arms Research Library.* October 03, 1995. www.cgsc.edu/carl/docrepository/FM100-10-1995.pdf (accessed September 20, 2010).

—. "Field Manual 100-10-1, Theater Distribution." *Global Security.Org.* October 1, 1999. http://www.globalsecuity.org/military/library/policy/army/fm/100-10-1.htm (accessed September 21, 2010).

Department of the Army. "Field Manual 4-0 (FM 100-10)." *Combat Service Support.* Washington, DC: Government Printing Office, August 29, 2003.

Department of the Army. *Field Manual 4-90 (FM 4-90.7), Brigade Support Battalion.* Washington, DC: Reimer Digital Library, August 31, 2010.

—. "Field Manual 63-20, Forward Support Battalion ." *Enlisted.Info.* February 26, 1990. http://www.enlisted.info/field-manuals/FM-63-20-forward-support-battalion.shtml (accessed March 21, 2011).

—. "Field Manual 71-2, The Tank and Mechanized Infantry Task Force." *Enlisted.Info.* September 27, 1988. www.enlisted.info/field-manuals/fm-71-2-tank-and-mechanized-infantry-battalion-task-force.shtml (accessed March 21, 2011).

—. "The Army Modernization Plan 2002." *The Army Web Page.* 2002. http://www.army.mil/features/MODPlan/2002/w4_FLv03a.pdf (accessed September 21, 2010).

Department of the Army, G4, Strategic Communications. *Connect Army Logisticians - Army Logistics White Paper, Delivering Materiel Readiness to the Army.* Washington, DC, October 2004.

Editor - Army Logistican Magazine. "ALOG News - CSS VSAT Connects Logisticians." *Army Logistician Magazine.* September-October 2004. http://www/almc.army.mil/alog/issues/SepOct04/pdf/ALOG_Sept_Oct.pdf (accessed February 21, 2011).

Farrand, Dale Lee. *The "Revolution in Military Logistics", Is It Enough?* Masters Thesis, Strategic Arts and Military Science, United States Army Command and General Staff College, Fort Leavenworth, KS: United States Command and General Staff, 2006.

Grey, Colin S. *Strategy for Chaos, Revolutions in Military Affairs and the Evidence of History.* London: Frank Cass Publishers, 2002.

Griffin, Wes. *The Future of Integrated Supply Chain Management Utilizing Performance Based Logistics.* Defense A R Journal. April 1, 2008. http://www.freelibrary.com/The+future+of+integrated+supply+chain+management+utilizing...-a0194548454 (accessed September 21, 2010).

Hall, MAJ, and COL McClendon. *Army Functional Concept-Sustainment.* Fort Monroe, VA: U.S. Army Capabilities Integration Center's Concepts Development and Experimentation Directorate, 2010.

Headquarters, United States Air Force Materiel Command. *United States Air Force Materiel Command Home Page.* April 1, 2011. http://www.afmc.af.mil (accessed April 01, 2011).

Headquarters, United States Army Materiel Command. *United States Army Materiel Command Home Page.* April 1, 2011. www.amc.army.mil (accessed April 1, 2011).

Headquarters, United States Army Training and Doctrine Command. "TRADOC Pamphlet 525-5, Force XXI Operations." *earthops.org.* August 1, 1994. http://earthops.org/tradoc525/525-5toc.html (accessed January 16, 2011).

Headquarters, United States ArmyTraining and Doctrine Command. "TRADOC Pamphlet 525-4-1." *The United States Army Functional Concept for Sustain, 2014-2024.* Fort Monroe, VA: United States Army Training and Doctrine Command, April 30, 2007.

Headquarters, United States Navy Sea Systems Command. *United States Navy Sea Systems Command.* April 1, 2011. http://www.navsea.navy.mil (accessed April 1, 2011).

Headquarters, United States Marine Corps Logistics Command. *United States Marine Corps Logistics Command.* April 1, 2011. http://www.logcom.usmc.mil (accessed April 1, 2011).

Headquarters, United States Training and Doctrine Command. "TRADOC Pamphlet 525-3-1." *The United States Army Operating Concept 2016-2028.* Fort Monroe, VA: Headquarters, United States Army Training and Doctrine Command, August 19, 2010.

Hundley, Richard. "Past RMAs, Future Transformations: What Can History Tell Us About Transforming the U.S. Military?" *RAND Corporation.* 1999. http://www.rand.org/pubs/research_briefs/RB7108 (accessed December 8, 2010).

Joint Chiefs or Staff. "Joint Publication 4-01.4." *Joint Tactics, Techniques, and Procedures for Joint Theater Distribution.* Washington, DC: Government Printing Office, August 22, 2000.

Keeney, Miranda. "Common Logistics Operating Environment." *Army Knowledge On-Line.* May 7, 2009. http://www.us.army.mil/aps/09/information_papers/common_logostics_operating_environment.html (accessed September 21, 2010).

Lin, Grace Y., and Jr., Robert E. Luby. *Transforming the Military Through Sense and Respond.* White Paper, IBM Business Consulting Services, Somers, NY: IBM Business Consulting Services, 2005, 8 & 10.

Lofgren, Joseph B. "Operation Iraqi Freedom and Logistics Transformation." *Defense Technical Information Center Online.* March 31, 2007. http://handle.dtic.mil/100.2/ADA469592 (accessed December 21, 2010).

Needham, Paul M. "Chapter 15 - Transforming America's Military in Transforming America's Military." *National Defense University Press.* October 2002.

http://www.au.af.mil/au/awc/awcgate/ndu/tam/17_ch15.htm (accessed December 09, 2010).

Noble, Doug. "Meeting the Challenges of Logistics Support." *The Navy Supply Corps Newsletter.* May/June 2009. https://www.navsup.navy.mil/scnewsletter/2009/may-june/cover4 (accessed February 3, 2011).

Myers, Laurel . "Eliminating the Iron Mountain." *Army Logisicistician Magazine.* July-August 2004. http://www/almc.army.mil/alog/issues/JulAug04/C_iron.html (accessed January 16, 2011).

Maccagnan, Victor. *Logistics Transformation--Restarting a Stalled Process.* Strategy Paper, United States Army War College, Carlisle Barracks, PA: United Staes Army War College, 2005.

Matthews, James K., and Cora Holt. *So Many, So Much, So Far, So Fast: United States Transportation Command and Strategic Deployment for Operations Desert Shield/Desert Storm.* Pittsburgh, PA: Government Printing Office, 2007.

McCormick, Mark A. *An Integrated Supply Chain Solution for Theater Distribution.* Strategy Paper, Strategy, United States Army War College, Carlisle Barracks, PA: United States Army War College, 2009, 1-5.

Morales, Diane K. "DOD 4140.1 DoD Supply Chain Materiel Management." *ACQWeb - Office of the Under Secretary od Defense for Acqusition, Technology, and Logistics.* May 23, 2003. www.acq.osd.mil/log/sci/exec_infor/drid/P1401r.pdf (accessed September 22, 2010).

Office of the Joint Chiefs of Staff. *DoD Dictionary of Military Terms.* January 19, 2011. http://www.dtic/doctrine/dod_dictionary/index.html (accessed January 19, 2011).

—. "Focused Logistics Campaign Plan, 2004 Edition." *Defense Acquisition University.* 2004. https://acc.dau.mil/CommunityBrowser.aspx?id=32577 (accessed September 21, 2010).

Office of the Joint Chiefs of Staff. *Joint Vision 2010.* Washington, DC: Government Printing Office, July 1996.

Office of the Joint Chiefs of Staff. *Joint Vision 2010, Focused Logistics, A Joint Logistics Roadmap .* Pamphlet, Washington, DC: Government Printing Office, 1997.

—. "Joint Vision 2020." *Joint Forces Quarterly.* 2000. http://www.dtic.mil/doctrine/jel/jfq_pubs/1225.pdf (accessed December 10, 2010).

Office of the Joint Chiefs of Staff. "Joint Publication 4-0." *Doctrine for Logistics Support of Joint Operations.* Washington, DC: Government Printing Office, April 6, 2000.

Office of the Joint Chiefs of Staff. "Joint Publication 4-0." *Joint Logistics.* Washington, DC: Government Printing Office, July 18, 2008.

Office of the Joint Chiefs of Staff. *National Military Strategy of the United States of America, 2011, Redefining America's Leadership.* Washington, DC, February 8, 2011.

O'Konski, Mark J. "Revolution in Military Logistics: An Overview." *Army Logistcian Magazine.* Jan/Feb 1999. http://www.almc.army.mil/alog/issues/JanFeb99/MS 364.htm (accessed November 17, 2010).

O'Rourke, Ronald. "Congressional Research Service Reports, Defense Transformation: Background and Oversight Issues for Congress." *Federation of American Scientists.*

November 9, 2006. www.fas.org/sgp/crs/natsec/RS20852.pdf (accessed December 7, 2010).

Pagonis, William G. *Moving Mountains: Lessons in Leadership and Logistics from the Gulf War.* Boston, MA: Harvard Business School Press, 1992.

Peltz, Eric. "Commentary - Logistics: Supply Based or Distribution Based." *Army Logistician Magazine.* March-April 2007. http://www.almc.army.mil/alog/issues/Mar-Apr07/supply_vs_dist.html (accessed January 14, 2011).

Peltz, Eric, John M. Halliday, Marc L. Robbins, and Kenneth J. Girardini. *Sustainment of Army Forces in Operation Iraqi Freedom, Battleffield Logistics and Effects on Operations.* Monograph, Santa Monica, CA: RAND--Arroyo Center, 2003, 8-10.

Perna, Gustave F. "Sustaining the Responsible Drawdown fo Forces." *Army Sustainment Magazine.* March-April 2011. http://www.almc.army.mil/alog/pdf/mar_apr11.pdf (accessed March 17, 2011).

Poling, Kevin D. "Making the Forward Support Company Work." *Army Logistician Magazine.* September-October 2001. http://www.almc.army.mil/alog/issues/SepOct01/Final.pdf (accessed April 3, 2011).

Reimer, Dennis J. "A Note from the Chief of Staff of the Army on the Revolution in Military Logistics." *Army Logistician Magazine.* Jan-Feb 1999. http://www.almc/army.mil/alog/issues/JanFeb99/MS402 (accessed September 6, 2010).

Robbins, Marc, Patricia Boren, and Kristen Leuschner. *The Strategic Distribution System in Support of Operation Enduring Freedom.* Documented Briefing, Santa Monica, CA: RAND Corporation, 2004.

Science Applications International Corporation. *Objective Assessment of Logistics Operations Iraqi Freedom.* Assessment, Washington, DC: Deputy Under Secretary of Defense for Science and Technology, March 2004.

Solis, William M. *Defense logistics: Preliminary Observations on the Effectiveness of Logistics Activities during Operation Iraqi Freedom.* Report for Congress, Washington, DC: United States Government Accounting Office, 2003, 2-5.

Stevenson, Mitchell H. "A Vision of Army Logistics with 20/20 Hindsight." *Army Sustainment Magazine.* March-April 2011. http://www/almc.army.mil/alog/pdf.mar_apr11.pdf (accessed March 17, 2011).

Tapestry Solutions. *Tapestry Solutions Products Page - Battle Command Sustainment Support Systems (BSC3).* http://www.tapestrysolutions.com/products/command--control/bcs3.apsx (accessed April 2, 2011).

Tripp, Robert S., Mahyar A. Amouzegar, Ronald G. McGarvey, Rick Bereit, David George, and Joan Cornuet. *Sense and Respond Logistics, Integrating Prediction, Responsiveness, and Control Capabilities.* Research Monograph, Santa Monica, CA: RAND--Project Air Force, 2006, 8-15.

United States General Accounting Office. *Preliminary GAO Observations on Effectivness of Logistics Activities during Operation Iraqi Freedom.* Preliminary Observations, Washington, DC: General Accounting Office, 2003.