Enabler or Vulnerability: Operational Contract Support in Large-Scale Combat Operations

A Monograph

by

MAJ Michael A. Cryer
US Army

School of Advanced Military Studies
US Army Command and General Staff College
Fort Leavenworth, KS

2019

11REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. REPORT DATE *(DD-MM-YYYY)*	**2. REPORT TYPE**	**3. DATES COVERED** *(From - To)*
23 05 2019	MONOGRAPH	JUNE 18-MAY 19

4. TITLE AND SUBTITLE
Enabler or Vulnerability: Operational Contract Support in Large Scale Combat Operations

5a. CONTRACT NUMBER

5b. GRANT NUMBER

5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S)
MAJ Michael A. Cryer

5d. PROJECT NUMBER

5e. TASK NUMBER

5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
U.S. Army Command and General Staff College
ATTN: ATZL-SWD-GD
Fort Leavenworth, KS 66027-2301

8. PERFORMING ORG REPORT NUMBER

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)
ADVANCED MILITARY STUDIES PROGRAM

10. SPONSOR/MONITOR'S ACRONYM(S)

11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION / AVAILABILITY STATEMENT
Approved for Public Release; Distribution is Unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT

The US Army's practice of supplementing capabilities with contracted ones has greatly expanded since the end of the Vietnam War and creation of the All-Volunteer Force. Operational Contract Support (OCS), the process of planning for and obtaining supplies, services, and construction from commercial sources in support of combatant commander directed operations, is often the first option a commander turns to in contingency operations. OCS can be the most politically and operationally expedient option for providing the commander with critical, time-sensitive capabilities. However, because of its expedient nature, OCS has taken on an outsized role in US Army operations, reaching a point of over-saturation today. As the US Army transitions its focus to large-scale combat operations (LSCO), it is necessary to examine whether its over-reliance on OCS over the last several decades has left behind any institutional bad habits which might make the force vulnerable in a more lethal type of conflict. This monograph examines OCS in the light of FM 3-0, and against the backdrop of the Gulf War. It concludes that a certain level of OCS will enable future LSCO, but the US Army's current application of OCS will lead to decreased operational readiness in the Active and Reserve components.

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			**17. LIMITATION OF ABSTRACT**	**18. NUMBER OF PAGES**	**19a. NAME OF RESPONSIBLE PERSON**
UNCLASSIFIED					MAJ Michael A. Cryer
a. REPORT	**b. ABSTRACT**	**c. THIS PAGE**			**19b. PHONE NUMBER** *(include area code)*
(U)	(U)	(U)	(U)		913 758-3300

Standard Form 298 (Rev. 8-98)
Prescribed by ANSI Std. Z39.18

Monograph Approval Page

Name of Candidate: MAJ Michael Cryer

Monograph Title: Enabler or Vulnerability: Operational Contract Support in Large-Scale Combat Operations

Approved by:

_____, Monograph Director
Amanda M. Nagel, PhD

_____, Seminar Leader
Charles C. Readinger, LtCol

_____, Director, School of Advanced Military Studies
Kirk C. Dorr, COL

Accepted this 23rd day of May 2019 by:

_____, Director, Graduate Degree Programs
Robert F. Baumann, PhD

Abstract

Enabler or Vulnerability: Operational Contract Support in Large-Scale Combat Operations, by MAJ Michael Cryer, US Army, 37 Pages.

The US Army's practice of supplementing capabilities with contracted ones has greatly expanded since the end of the Vietnam War and creation of the All-Volunteer Force. Operational Contract Support (OCS), the process of planning for and obtaining supplies, services, and construction from commercial sources in support of combatant commander directed operations, is often the first option a commander turns to in contingency operations. OCS can be the most politically and operationally expedient option for providing the commander with critical, time-sensitive capabilities. However, because of its expedient nature, OCS has taken on an outsized role in US Army operations, reaching a point of over-saturation today. As the US Army transitions its focus to large-scale combat operations (LSCO), it is necessary to examine whether its over-reliance on OCS over the last several decades has left behind any institutional bad habits which might make the force vulnerable in a more lethal type of conflict. This monograph examines OCS in the light of FM 3-0, and against the backdrop of the Gulf War. It concludes that a certain level of OCS will enable future LSCO, but the US Army's current application of OCS will lead to decreased operational readiness in the Active and Reserve components.

Contents

Acknowledgments

I'd first like to acknowledge my peers in seminar four. You represent the strength of the AMSP program, in your diverse perspectives, intellectual curiosity, and commitment to excellence in all your pursuits. Thanks for keeping me sharp.

Thanks to both LtCol Clay Readinger and Dr. Amanda Nagel, who helped me get this project over the finish line. Thanks for your patience and dedication.

Finally, thanks to my wife Karen, for making our time at Fort Leavenworth possible.

Acronyms

AOR	Area of Responsibility
AVF	All-Volunteer Force
CENTCOM	US Central Command
DoD	Department of Defense
GEN	General
LOGCAP	Logistics Civil Augmentation Program
LSCO	Large-Scale Combat Operations
OCS	Operational Contract Support
ODS	Operation Desert Shield/Storm
OIF	Operation Iraqi Freedom
OEF	Operation Enduring Freedom
TAA	Tactical Assembly Area
TCN	Third Country National

Illustrations

Tables

Introduction

> Mosul's mid-to-high intensity combat reinforced the challenge of moving field service representatives forward to provide critical services to units. In short, the US Army may be reaching the limits of its approach to contractor support and utilization. The US Army must re-examine the employment of contractors in a high intensity conflict.
>
> — Mosul Study Group

Since the end of the Vietnam War and the creation of the All-Volunteer Force (AVF), the use of contracting to supplement shrinking capabilities expanded greatly. In the past, the US Army could draft personnel according to specific service requirements and authorizations from Congress. The dissolution of the draft and the end of the Cold War set the conditions that allowed the outsourcing of capabilities to contractors for force augmentation to become the norm. In the limited wars the United States has fought since Vietnam in which the military has possessed relative superiority across all domains, the use of contracting to supplement and support land forces was both politically expedient and operationally low-risk.

The Battle for Mosul in 2017 is a continuation of this tradition. The battle saw an Iraqi-led coalition defeat ISIS and reclaim the city of Mosul. Afterwards, the Center for Army Lessons Learned formed a study group to determine recommendations for future actions from the nine-month campaign. The result was a collaborative report designed to feed the US Army with relevant and timely observations that could be inserted back into the force for immediate effect. One of the key observations concerned the limitations of contract support in high-intensity conflict.[1] The Mosul report was written specifically in the context of an advise-and-assist environment, but the risk it highlights will be even greater in large-scale combat operations (LSCO). The new FM 3-0 describes the need to create both an expeditionary capability and

[1] Mosul Study Group, "What the Battle for Mosul Teaches the Force" (Report, Center for Army Lessons Learned, Fort Leavenworth, KS), 26.

mindset in the force.[2] If the Army is going to adopt an expeditionary mindset in an operating environment where all domains are becoming increasingly contested, then finding solutions to the problem posed by the Mosul report is imperative.

The practice of contracting commercial services to augment or supplement the military force in the US is as old as the Revolutionary War,[3] but in the post-Cold War military paradigm, the US developed an unhealthy over-reliance on far too many critical services and capabilities. For instance, in 2010 contractors comprised 39 percent of the total defense workforce.[4] Contracting services and support are not the inherent problem. It is a reality of warfare and, as GEN Martin E. Dempsey explained, "OCS [operational contract support] is no longer a niche capability."[5] The problem the US Army faces now relates to the cognitive and cultural leap in focus and readiness from small-scale contingency operations to large-scale combat operations. The over-reliance on contract support to present options for the sustainment and maneuver of the force in a contested operating environment may lead to a scenario where the US Army finds itself unable to leverage its full combat power in support of joint operations.

Joint doctrine recognizes that ongoing developments in high-tech equipment, fluctuations in the military force structure and manning, operational force cap restrictions, and continuously high operating tempo indicate that military forces will continue to rely heavily on contract support.[6] Those policies and resource shortfalls act as constraints to US Army commanders, which often make contracting the only viable option. The purpose of this study is to determine

---

[2] US Department of the Army, *Field Manual (FM) 3-0, Operations* (Washington, DC: Government Printing Office, 2017), 1-24.

[3] Christopher Kinsey and Malcolm Hugh Patterson, eds., *Contractors and War: The Transformation of US Expeditionary Operations* (Stanford, CA: Stanford University Press, 2012), 2.

[4] US Department of Defense, *Quadrennial Defense Review* (Washington, DC: Government Printing Office, 2010), 55.

[5] US Department of Defense, Joint Staff, *Joint Publication (JP) 4-10, Operational Contract Support* (Washington, DC: Government Printing Office, 2014), I-1.

[6] Ibid.

how the US Army arrived at this point, and to explore whether options exist outside the bounds of those perceived policy and resource constraints. Is there a better way to do business, or will the US Army remain bound to outsourced capabilities in future large-scale combat? If so, what are the implications? Would it take a massive overhaul of Department of Defense (DoD) policy to bring back capabilities into the US Army to maintain and sustain a modern force, or are there more subtle options for winning back self-sufficiency?

This monograph, comprised of five sections, attempts to answer some of these questions. Section one is the introduction, which contextualizes the study in time and space. It describes the purpose for the study and the research question, outlines a hypothesis, and defines key terms that will be used throughout. Finally, it explains the limitations of the study and the key assumptions that will guide the logic of the subsequent arguments. The second section traces the evolution of the US Army's dependence on OCS into the contemporary operating environment. It briefly examines the role OCS played in supporting large-scale combat prior to implementing the AVF, then describes the evolution in US Army doctrine and force structure after the Cold War. This historical review explains the reasons why OCS is so ingrained in the Army Total Force so that later recommendations for change may be understood within their context. The third section reviews the use of OCS in the Gulf War. This case study will first determine the contingent nature of the conflict and explore the advantages, disadvantages, and risks associated with OCS in an expeditionary environment during LSCO. It then provides critical lessons for the reception, staging, and onward movement of troops and equipment, how contracting facilitated that endeavor, and how the use of contracting ran the risk of becoming a single point of failure for US military operations. The fourth section explores the various ways the US Army uses OCS in the contemporary operating environment, in the context of Gulf War lessons learned. The fifth and final section provides recommendations on the employment of OCS in expeditionary operations, LSCO, and general conclusions.

To avoid confusion, this study defines several key terms discussed frequently throughout the monograph. The first term is large-scale combat operations (LSCO). While there is no doctrinal definition of LSCO, the concept for the Army as described in FM 3-0 implies the application of land power in support of the joint force in the context of a major combat operation or campaign in order to achieve national strategic objectives or protect national interests.[7] It requires leveraging the full weight of the US military's combat power across multiple domains to defeat a conventionally armed, peer enemy and achieve strategic objectives. The concept asserts that the US has largely abandoned LSCO against conventionally armed opponents in favor of limited, small-scale contingency operations post-Vietnam and now finds itself in a readiness crisis, ill-prepared to respond to such a conventional threat.

Another term which needs clarification is tooth-to-tail, a common way of describing the ratio of soldiers used in combat versus non-combat roles, with the tooth being the "warfighter," and the tail being the support element.[8] This term is important to understanding the mentality of military planners and civilian leadership alike. For military leaders, the typical desired effect is to create a tooth-to-tail ratio that frees up as many soldiers as possible for combat duties, essentially generating more lethality up front. For policymakers who are concerned primarily with force caps in expeditionary environments, contracted personnel can take on a heavier support role, freeing up warfighters, and are typically not counted against the force cap, making force employment an easier sell to the public.

Finally, OCS is the process of planning for and obtaining supplies, services, and construction from commercial sources in support of combatant commander directed operations.[9] OCS can refer to external, systems, or theater contract support, meaning that the scope of OCS is

---

[7] US Army, *FM 3-0*, 5-1,

[8] John J. McGrath, *The Other End of the Spear: The Tooth-to-Tail Ratio (T3R) in Modern Military Operations* (Fort Leavenworth, KS: Combat Studies Institute, 2007), 2.

[9] US Department of the Army, *Army Training Publication (ATP) 4-92, Contracting Support to Unified Land Operations* (Washington, DC: Government Printing Office, 2014), iv.

as narrow as a vehicle rental, or as broad as merchant vessel transportation of an Army corps vehicle fleet. In contingency operations, theater support contracts are normally executed under expedited contracting authority and provide supplies, services, and minor construction from commercial sources within a commander's operating area to meet immediate requirements.[10] "Theater support contracts can range from small local contracts for a single unit or operational area-wide contracts in support of the entire force."[11] In the Gulf War case study, theater support contracts were used extensively to provide a critical service the US Army could not provide for itself. External support contracts are pre-arranged, with indefinite delivery and quantity stipulations, and provide logistics and non-combat support when military, host-nation or partner capabilities are not available or adequate for the mission.[12] The Logistics Civil Augmentation Program (LOGCAP) is a key example of an external support contract. For the purposes of this monograph, OCS will refer primarily to theater support contracting services in support of deployed US Army forces, unless otherwise noted.[13]

This study makes two assumptions. The first is that the increased lethality of any future LSCO will strain the principal-agent relationship between Army and contractor, thus limiting a commander's ability to extend his operational reach or maintain a high tempo through OCS. The principal-agent problem on the battlefield refers to the challenge of ensuring the support a commander needs is delivered according to his expectation.[14] For example, the principal-agent relationship between a brigade commander (principal) and a company commander (agent) is easier to manage because it is governed by the Uniformed Code of Military Justice and principles

[10] Joint Staff, *JP 4-10.*

[11] Ibid.

[12] Ibid., B-1.

[13] Ibid., 1-1.

[14] Frank A. Camm and Victoria A. Greenfield, *How Should the Army Use Contractors on the Battlefield? Assessing Comparative Risk in Sourcing Decisions* (Santa Monica, CA: RAND Corporation, 2005), 147.

of mission command. The principal-agent relationship between Army commander and contracted agent is different, in that each have distinct goals and values, and aligning them to achieve the commander's objectives will be harder in future instances of LSCO. The second assumption is that traditional options that OCS has given commanders in the past to maneuver and sustain the force will not be as readily available in an expeditionary operating environment with multiple domains contested by an enemy.

Evolution of OCS

This study seeks to determine if a current over-reliance on contract support will have negative consequences in LSCO. It assumes that the US Army has in fact become over-reliant on contracting to support expeditionary operations. This section will examine key developments within the US Army since the Vietnam War that led to the current model of dependency, to validate that assumption. The US Army has moved from self-sufficiency for various reasons, including economic considerations, statutory requirements, executive policy direction, growing financial constraints, and the nature of the AVF and its present conflicts.[15] The most formative event contributing to this shift was the end of the Cold War, which precipitated a downsizing of the total force and an increased focus on technological solutions to warfighting. The study will examine the circumstances surrounding the creation of the LOGCAP, then explore how unclear policy objectives in both Operation Iraqi Freedom (OIF) and Operation Enduring Freedom (OEF) led to a significant emphasis on contracted civilian capabilities over military options. Finally, it explains how the Gansler Commission on Army Acquisition and Program Management in Expeditionary Operations ushered in the contemporary construct of US Army contracting operations and argues that all these factors contributed to a present unhealthy reliance on civilian OCS.

[15] Kinsey and Patterson, *Contractors and War*, 1.

Given a combination of the military success of Operations Desert Storm and Shield, and the victory over the Soviet Union in the Cold War, a narrative formed amongst military leaders that wars would be more network-centric and technologically driven. The emerging threats in the post-Cold War era were characterized by dispersion, decentralization and adaptability, and the idea that a single giant threat of war is much less likely than a "multitude of niche threats."[16] This meant that a reduction of force was both fiscally responsible and operationally necessary. The US Army set about transforming its force to accommodate this imperative, which led to a massive reduction in the total force, and increased spending on technological solutions to the prosecution of combat. Those two interrelated events helped set the conditions for an over-reliance on contractors.

In 1989, when the fall of the Soviet Union looked to the world like a foregone conclusion, Francis Fukuyama penned an essay entitled "The End of History?" in which he captured a general spirit of liberal transformation.[17] He argued that large-scale conflict between large states would become an obsolete notion. Almost as a response to this sentiment, the US military downsized significantly after the Cold War. The end strength of the US active duty force never dropped below 2 million personnel during the Cold War, and was as high as 3.5 million during the Korean and Vietnam Wars.[18] From 1989 to 1999, the end strength of the active duty component dropped to around 1.4 million, and has consistently been close to that number ever since.[19] The US Army reduced its active divisions from eighteen to ten, and restructured the National Guard and Reserves into divisions with a significant shortfall of combat support and

[16] Kinsey and Patterson, *Contractors and War*, 15.

[17] Francis Fukuyama, "The End of History?" *The National Interest*, no. 16 (1989): 3, accessed March 16, 2019, http://www.jstor.org/stable/24027184.

[18] Congressional Research Service, *Military Forces: What is the Appropriate Size for the United States* (Washington, DC: Government Printing Office, 2008), 1.

[19] Ibid.

combat service support capabilities.[20] Both entities proved invaluable to the success of the Gulf War. At the height of the conflict, over 1,040 reserve and guard units, totaling around 140,000 soldiers supported the campaign.[21] The 1994 Commission on Roles and Missions in the Armed Forces found that a 60,000 soldier shortfall existed within support units, resulting in the commission recommending converting six National Guard combat brigades into support brigades.[22] Combat service support capabilities were gradually phased out of the Active Duty force. By 2005, 75 percent of the combat service support force structure resided in the Reserve component.[23] It is worth noting that this shift in capabilities was a political decision and a by-product of the AVF. In the 1970s, GEN Creighton Abrams, then Army Chief of Staff, enacted this restructuring as a response to President Lyndon B. Johnson's refusal to call up the reserves during the Vietnam War. The political logic behind the decision to push combat service support capabilities into the reserves was to make a future protracted war impossible to fight without them–it was the military's way of ensuring that civilian leadership would not commit the military to a contingency without political consequence.[24] OCS as it turns out, became a way politicians could circumvent this logic.

With the reduction in overall active duty end strength, and the relegation of much of the Army's service and support capabilities to the reserves, there was a certain expectation of an attendant reduction in the Army's operational requirements. This did not occur. "Since 1991, the use of the private sector has allowed the United States to downsize its military . . . while

---

[20] Mark Cancian, "Contractors: The New Element of Military Force Structure," *Parameters* (Autumn 2008): 68.

[21] Richard Stewart, *War in the Persian Gulf: Operations Desert Shield and Desert Storm* (Washington, DC: Center of Military History, 2010), 23.

[22] Commission on Roles and Missions of the Armed Forces, *Directions for Defense: Report of the Commission on Roles and Missions of the Armed Forces* (Arlington, VA: Government Printing Office, May 1995), 2-24.

[23] Camm, *How Should the Army Use Contractors on the Battlefield?*, 175.

[24] Louis G. Yeungert, "America's All Volunteer Force: A Success?," *Parameters* (Winter 2015): 53.

simultaneously expanding its national commitments and influence abroad."[25] During the period of force reduction, the US Army was committed to multiple contingency operations in Somalia, the Persian Gulf, Haiti, the Balkans, and Iraq and Afghanistan after the events of September 11, 2001. The cumulative effect of these changes was the creation of a shortfall of personnel and resident capabilities, coupled with a high demand for both, leading to programs like LOGCAP that gave commanders additional options for force employment. Contracting became not just an operational convenience, but an absolute necessity.

Another major factor contributing to the over-reliance on civilian contractors after the Cold War was the technological transformation of the US Army. Some refer to this transformation as a revolution in military affairs, beginning in the 1970s. Policymakers, industry, and academia focused on developing superior technology over the Soviet conventional threat to offset their advantage in raw numbers. This resulted in the procurement of precision-guided munitions, more lethal munitions, and the Army's "Big 5." In 1983, the Pentagon issued DoD directive 1130.2, which required the military to retain organic support of all newly fielded weapons systems to minimize civilian involvement and build self-sufficiency.[26] The directive, quickly rescinded in 1990, allowed what the Government Accountability Office estimated as 9,200 contractor employees to deploy in support of Operation Desert Storm. The bulk of these US civilian contract personnel were systems contractors who repaired and maintained "high tech" systems like the Patriot Missile Battery.[27] The general philosophy of self-sufficiency shifted after

[25] Industrial College of the Armed Forces, "Spring 2008 Industry Study Privatized Military Operations Industry" (Report, National Defense University, Fort McNair, Washington, DC, 2008), 1, accessed December 11, 2018, http://www.ndu.edu/ICAF/Industry/reports/2008/pdf/icaf-is-report-pmo-ay08.pdf.

[26] Paula Rebar, "Contractor Support on the Battlefield" (Strategy Research Project, US Army War College. Carlisle Barracks, PA, 2002), 11. The "Big 5" refer to the M1A1 Abrams main battle tank, the Bradley Fighting Vehicle, the Patriot air-defense system, the AH-64 Apache attack helicopter, and the UH-60 Black Hawk utility helicopter.

[27] LCDR John C. Campbell, "Outsourcing and the Global War on Terrorism (GWOT): Contractors on the Battlefield" (Monograph, School of Advanced Military Studies, Fort Leavenworth, KS, 2005), 65.

the Gulf War, in which the US Army's experience in large-scale combat seemed to validate the necessity of contractors on the battlefield. This new philosophy was expressed in the logistics after-action report for Operation Desert Storm, which stated that "there is a role for contractors on the battlefield, particularly when tasks are so complex that it is not economically beneficial for the Army to maintain needed capability within the force."[28] Modern technology has become more advanced, and more expensive. The evolution can be tracked from the advent of the US Army's Big 5 and a shift towards network-centric warfare in the 1990's to the increased complexity of modern intelligence, surveillance, and reconnaissance systems and the proliferation of unmanned aerial systems. It became more cost effective to contract for the maintenance and operation of many of these systems than to grow the capability within the military.

A historic turning point in the Army's relationship with contract support came with the implementation of LOGCAP. It marked the first time the US military contracted with the private sector to plan for logistics in future contingency operations.[29] LOGCAP began as a concept in 1985 that in theory gave each Army Service Component Command the ability to contract supply and service requirements which could not be met through normal channels.[30] The program expanded after Desert Storm, when planners concluded that the level of host nation support from Saudi Arabia would not be available in future contingency operations. In 1992, Brown and Root Services was awarded a $3.9 million consulting contract to develop a plan to privatize logistics operations during military operations and led to the company supporting Operation Restore Hope in Somalia.[31] Brown and Root, now known as KBR, was eventually awarded a $546 million

---

[28] George Dibble, Charles L. Horne III, and William E. Lindsay, "Army Contractors and Civilian Maintenance, Supply and Transportation Support During Operations Desert Shield and Desert Storm. Volume 1: Study Report" (Logistics Management Institute, Bethesda, MD, June 1993). G-6.

[29] P. W. Singer, *Corporate Warriors: The Rise of the Privatized Military Industry*, updated ed. (Ithaca, NY: Cornell University Press, 2008), 138.

[30] David W. Russell, "Understanding the Application of the Army's Logistics Civil Augmentation Program (LOGCAP)" (Strategy Research Project, US Army War College, Carlisle, PA, 1997), 4.

[31] LTC Dave M. Hammons, "At What Cost Indeed: Contractor Indispensability in Army Logistics" (Program Research Project, US Army War College, Carlisle Barracks, PA, 2010), 2.

contract under LOGCAP, for the support of operations in the Balkans.[32] The central idea behind LOGCAP was to reduce the impact of the post-Cold War reforms which drained the active duty Army of so much organic support capability. This is evidenced by the 1:10 ratio of privately employed citizens to military personnel deployed to Bosnia between 1995 and 1996, down from 1:50 in the Gulf War.[33] In short, the structural reforms to the US Army previously described left a gap, and civilian contractors became a way to fill it. That dependence would grow as LOGCAP underwent four separate iterations, and ballooned to unprecedented levels in support of OIF and OEF.

The massive change to US Army force structure, coupled with the increasingly complex technological advancements in military equipment, paved the way for a rise in the number of contractors on the battlefield. That number would grow by an order of magnitude when the United States committed the military to the conflicts in Afghanistan and Iraq. The scope of this monograph is not wide enough to describe the operational and policy decisions that led to a shift from conventional combat operations to protracted counterinsurgency and stability operations in both OIF and OEF. Rather, it argues that because the nature of those campaigns changed, the use of contractors became more practical and politically expedient given the constraints of the mission. Commanders grappled with vague stability tasks like empowerment of the government and security force assistance and spent an exorbitant amount of money in the process. From 2002 to 2013, DoD obligated nearly $300 million for contingency contracts for equipment, supplies, and support services. The US Army spent the majority of those funds.[34] By 2008, contractors in OIF and OEF outnumbered uniformed military personnel 218,000 to 195,000, and a 1:1 ratio in

---

[32] LTC Dave M. Hammons, "At What Cost Indeed: Contractor Indispensability in Army Logistics" (Program Research Project, US Army War College, Carlisle Barracks, PA, 2010), 2.

[33] Stephen Zamperelli, "Contractors on the Battlefield: What Have We Signed Up For?" (Research Report, Air War College, Maxwell Air Force Base, AL, 1999), 8.

[34] US Commission on Wartime Contracting in Iraq and Afghanistan, *"At What Risk?" Correcting Over-Reliance on Contractors in Contingency Operations* (Arlington, VA: Government Printing Office, 2011), 6.

both theaters plus the Balkans has been consistently maintained (figure 1).[35] The US Army poorly planned for this astronomical surge in the demand for contracting and massive amounts of fraud, waste, and abuse occurred. The Army sent what amounted to a "skeleton contracting force" into OIF without the training, knowledge or skills, needed to better support the warfighter.[36] The Secretary of the Army established the Ganlser Commission in 2007, and tasked it with determining the institutional failings behind the Army's collective failure to better manage the increased demand for contract support.[37] The commission recommended a series of cultural and institutional changes to the way the Army approached contracting, including the stand-up of US Army Contracting Command. The contemporary approach to contracting was born out of the reforms of the Gansler Commission.

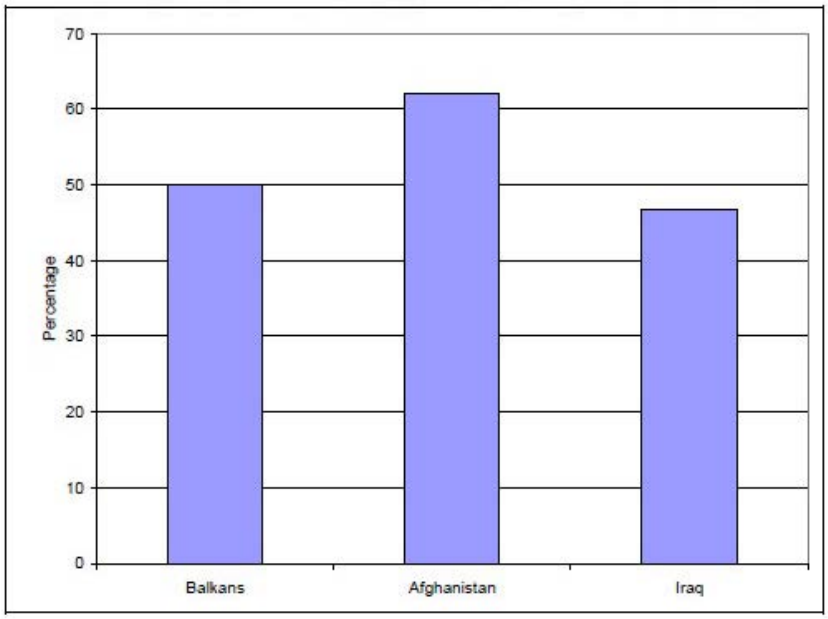

Figure 1. Contractors as Percentage of Workforce in Recent Operations. Moshe Schwartz, Department of Defense Contractors in Iraq and Afghanistan: Background and Analysis (Washington, DC: Congressional Research Service, 2009), 2.

[35] Moshe Schwartz, *Department of Defense Contractors in Iraq and Afghanistan: Background and Analysis* (Washington, DC: Congressional Research Service, December 2009), 2.

[36] Dr. Jacques S. Gansler, David J. Berteau, David M. Maddox, David R. Oliver Jr., Leon E. Salomon, and George T. Singley III, *Urgent Reform Required: Army Expeditionary Contracting Report of the Commission on Army Acquisition and Program Management in Expeditionary Operations* (Washington, DC: Government Printing Office, 2007), 8.

[37] Ibid.

The Gansler reforms helped the Army centralize OCS integration and demanded better incorporation of OCS into the operational plans of combatant commanders. They heightened awareness of fraud waste and abuse. They also mandated that DoD increase contractor management and oversight. As a response, US Central Command (CENTCOM) published quarterly census reports on contractors operating in its area of responsibility.[38] The Gansler Commission's recommendations did not slow down US Army reliance on OCS. If anything, they made the Army's use of OCS more efficient. In 2008 it established the US Army Contracting Command as a major subordinate command of US Army Materiel Command. The purpose was to provide general officer oversight of contracting activity in the wake of years of fraud, waste, and abuse that precipitated the Gansler commission.[39] Subordinate contracting support brigades were established and regionally aligned with Army Service Component Commands to facilitate expeditionary contracting capability.[40] Since then, commanders are still reliant on OCS in operations in the CENTCOM Area of Responsibility (AOR), and contractors often represent the most continuity in theater. One general officer told the US commission on wartime contracting that given a perceived unconstrained funding source, like the overseas contingency operations budget, he felt no obligation to consider costs when contracting for support requirements.[41] This represents a cultural attitude that is still prevalent. OCS is expected to cover the gaps in force structure between what commanders are asked to do and what they are given to do it. Indeed, contractors still make up the bulk of personnel in the CENTCOM AOR, with 49,245 in 2018's

[38] Heidi M. Peters, Moshe Schwartz, and Lawrence Kapp, *Department of Defense Contractor and Troop Levels in Iraq and Afghanistan: 2007-2017* (Washington, DC: Congressional Research Service, April 2017), 1.

[39] Gansler et al., *Urgent Reform Required,* 10.

[40] Ibid., 11.

[41] US Commission on Wartime Contracting in Iraq and Afghanistan, *At What Risk?,*" 22.

third fiscal quarter.[42] It is unlikely the US Army will completely reverse course on its reliance on contract support, nor does it need to. Highly technical weapons systems, Total Force structure, the nature of the AVF, and persistent US commitment to global contingency operations have made OCS an operational necessity. However, the US Army needs to identify areas where reliance on OCS in persistent contingency operations may represent a vulnerability in LSCO. Examining the Army's use of OCS during the Gulf War exposes some of those vulnerabilities.

Case Study – The Gulf War

In *The Landscape of History,* John Lewis Gaddis describes the differences between continuities and contingencies. He explains that continuities are patterns that form across time and occur regularly enough to make phenomena recognizable and predictable, while contingencies are phenomena that do not form patterns.[43] This idea is best expressed in the debate on the nature versus the character of war. There is continuity in the *nature* of war; at its heart is the interplay between enmity, reason, and chance. The *character* of war is contingent. It changes with social or military revolutions or with new technologies and tactics. Military planners are susceptible to the logic of continuities, believing the next war will look much like the last. They analogize present circumstances with the past, drawing out patterns where they can find them, hoping for insight into the future. However, every war contains its own set of circumstances, political and strategic contexts, leadership and technology. Therefore, it is important to highlight some of the unique contingent characteristics of Operations Desert Shield and Desert Storm (ODS), before looking for continuities which might inform planners on the role of OCS in future LSCO.

---

[42] ODASD (Program Support), "Contractor Support of U.S. Operations in the USCENTCOM Area of Responsibility," July 2018, accessed January 24, 2019, https://www.acq.osd.mil/log/PS /.CENTCOM_reports.html/5A_July%202018_Final.pdf.

[43] John Lewis Gaddis, *The Landscape of History: How Historians Map the Past* (New York: Oxford University Press, 2002), 31.

First, the American build-up of forces in the Gulf War was uncontested. This is critical to understanding the nature of the conflict, and why ODS will most likely not represent a continuity in the employment of US military force in LSCO. The United States was able to surge prepositioned supply ships from Diego Garcia into the eastern ports of Ad Dammam and Al Jubayl with complete impunity because Saddam Hussein had no naval force.[44] This gave LTG Gus Pagonis, the overall chief of logistics for ODS, a hub from which sustainment operations could expand, and all logistical support was centralized under his unified command.[45] His sustainment hubs were critically vulnerable to anti-access/area denial attacks in the form of surface-to-surface missiles and chemical or biological attacks. Pagonis, acutely aware of the threat, created redundant command centers in anticipation of a major disruptive attack, but he never needed to activate them.[46] Hussein waited until after the coalition transitioned from defense to offense on 18 January 1991 to use his limited Scud missile arsenal, thereby missing an opportunity to strike vulnerable ports and airfields during the buildup of combat power.[47] Planners anticipating future LSCO against a near-peer adversary cannot assume this same level of restraint will be replicated due to the proliferation and increased lethality of long-range precision fires.

Second, the initial nature of ODS was defensive. Specifically, Saudi Arabia asked the United States to assist in their defense of an impending Iraqi invasion. This gave the United States a willing partner to facilitate access into the operating environment. Future LSCO may require the United States to diplomatically navigate issues of overflight, basing, status-of-forces agreements and host nation support in the context of a more politically complex theater of

---

[44] William Pagonis and Jeffrey L. Cruikshank, *Moving Mountains* (Boston, MA: Harvard Business School Press. 1992), 71.

[45] Ibid., XIV.

[46] Pagonis and Cruikshank, *Moving Mountains*, 135.

[47] Bernard Rostker, "Iraq's Scuds Ballistic Missiles," July 25, 2000, accessed February 4, 2019, https://gulflink.health.mil/scud_info/scud_info_s04.htm.

operations. In the case of ODS, King Faud gave the United States complete access to Saudi resources and attenuated many of those historically complicated issues.

Third, the Saudi people and third country nationals (TCN) enabled the US mission. Most importantly, the Saudi government financed operations. If a service was needed, US servicemembers were empowered to contract for it in the local economy, pay for the service in cash, and wait for reimbursement from the Saudi government. That reimbursement was guaranteed in writing on October 30, 1990, and backed by a 760 million-dollar check.[48] Food, water, transportation and other essential services were made available to the US military by the host nation. As GEN John Yeosock, commander of Third US Army said, the US needed only to provide a "shopping list fit for a king."[49]

Recognizing the contingent nature of ODS will assist planners in anticipating the future. One of the problems identified by the US Army Training and Doctrine Command in *The US Army in Multi-Domain Operations 2028* is the reality that near-peer adversaries have realized how predictable the United States has become through its reliance on a time-phased approach to armed conflict, predicated on naval and air supremacy, and have developed anti-access and area denial systems to contest United States operations.[50] ODS exposed those vulnerabilities, even as Hussein failed to exploit them. The US should not assume future conflict will be defensive in nature. Also, host-nation capabilities may not be available to dramatically augment the theater logistics system, as seen in ODS. Many of the critical capabilities the US Army used civilian contractors for during the reception and staging phase of ODS, such as port offload and heavy equipment transfer, may not be as readily available in the next theater of operations. That said,

[48] Frank N. Schubert and Theresa L. Kraus, *Whirlwind War: The United States Army in Operations Desert Shield and Desert Storm* (Washington, DC: US Army Center of Military History, January 1992), 62.

[49] Pagonis and Cruikshank, *Moving Mountains*, 67.

[50] US Army Training and Doctrine Command, TRADOC Pamphlet 525-3-1, *The US Army in Multi-Domain Operations 2028* (Fort Eustis, VA: Government Printing Office, 2018), 2.

the Gulf War offers unique insight into the advantages, disadvantages, and risks associated with expeditionary contracting in LSCO.

Due to ODS's uniqueness, the opening moves allow researchers to appreciate the scale of the logistics system that eventually sustained combat operations for over 400,000 military personnel in Saudi Arabia. On the morning of August 1, 1990, Saddam Hussein ordered the Iraqi military to invade Kuwait. By sundown, the lead elements of the Iraqi Republican Guard seized Kuwait City. President George H.W. Bush and his principal advisors began to weigh diplomatic options in partnership with Saudi Arabia. Concurrently, Secretary of Defense Richard Cheney directed GEN Colin Powell, the Chairman of the Joint Chiefs of Staff, to generate military options. On August 4, GEN Norman Schwarzkopf, CENTCOM commander, briefed President Bush on Operation Plan (OPLAN) 90-1002, the only plan CENTCOM had available that introduced numerous US soldiers into the Middle East.[51] The plan included what Powell called a "deterrence" component and a "warfighting" component. The deterrence component evolved into Operation Desert Shield, which intended to protect Saudi Arabia from an Iraqi invasion by means of a 120-day US troop buildup. The warfighting component became Operation Desert Storm, the offensive phase of ODS. Bush approved the OPLAN in theory, and directed Cheney to inform King Faud and secure Saudi permission.[52] Concurrently, Schwarzkopf had directed GEN Yeosock, commander of Army Central Command, to assemble a team to identify immediate requirements if the Saudi's acquiesced to US intervention. The team, led by Pagonis, would establish the bare minimum requirements needed to establish a logistics system from scratch that could handle the implementation of OPLAN 90-1002 in Saudi Arabia. Pagonis eventually divided the war into four logistical phases, which will be referenced repeatedly going forward, and listed here for clarity. He characterized the Initial phase by the early deployment of coalition forces,

[51] Bob Woodward, *The Commanders* (New York: Simon and Schuster, 1991), 234.

[52] Bob Woodward, *The Commanders* (New York: Simon and Schuster, 1991), 248.

from August 8, 1990 to October 31, 1990. The Alpha phase, preparation and positioning, spanned November 1, 1990 to January 15, 1991. The Bravo phase, movement of the Corps, continued from January 16, 1991 to February 22, 1991. Finally, the Charlie phase, which was the ground offensive, lasted only four days, February 23, 1991 to February 28, 1991.[53]

With King Faud's official acceptance of US support on August 6, 1990, the initial phase of the war began. Cheney gave the order to execute OPLAN 90-1002, and on August 8, Pagonis and a handpicked logistics team traveled as an advance party to assess the Saudi's logistics infrastructure and to sort out the initial deployment of troops.[54] Pagonis eventually became the Deputy Commanding General for Logistics, which gave him responsibility for fuel, water, food, vehicles, ammunition, and all classes of supply except class IX, for the entire joint force.[55] He framed the problem for Yeosock based on the Return of Forces to Germany exercises the US Army practiced regularly in the 1980s. To successfully establish a theater logistics system, he needed to accomplish three essential tasks: reception, onward movement, and sustainment of soldiers, equipment, and supplies.[56] OCS was a vital component for each of those tasks.

Pagonis first tackled the reception of combat troops and equipment into an immature theater. Soldiers from the 82nd Airborne Division were the first to arrive and Pagonis's team had nowhere to put them. The problem compounded as each day passed and thousands more arrived according to a deployment timetable that frontloaded combat troops at the expense of support units to help set the theater. GEN Schwarzkopf imposed this constraint on Pagonis because of his desire to maintain a high tooth-to-tail ratio. Schwarzkopf's guidance was to reserve available seats on flights into the Kuwaiti theater of operations for combat troops because he needed a

---

[53] George Dibble, Charles L. Horne III, and William E. Lindsay, "Army Contractors and Civilian Maintenance, Supply and Transportation Support During Operations Desert Shield and Desert Storm. Volume 1: Study Report" (Logistics Management Institute, Bethesda, MD, June 1993). 1-2.

[54] Schubert and Kraus, *Whirlwind War*, 56.

[55] Pagonis and Cruikshank, *Moving Mountains*, 97.

[56] Schubert and Kraus, *Whirlwind War*, 56.

credible deterrent to the Iraqi military. Pre-war planning had set the required support structure troop figure at 120,000 personnel. The actual number at the height of the war was closer to 38,000, a third of projected requirements.[57] Sustainers on the ground turned to OCS to fill in the gaps between the plan and reality, highlighting the value and expedient nature of contracting to mitigate a substandard support structure. Before experienced contracting officers from XVIII Airborne Corps deployed to augment Pagonis's Provisional Support Command, untrained junior officers were empowered to negotiate for critical services and supplies.[58] One officer in Pagonis's command recalled paying $40,000 to a Saudi entrepreneur he found on the streets of Dhahran for bus transportation, because US troops were landing at the airport with no plan in place to move them out into living spaces.[59]

In addition, the Saudis provided warehouses at Ad Dammam and Al Jubayl to house thousands of soldiers involved in port operations, but massive shortages of living spaces in the early months of ODS still existed because personnel arrived generally weeks ahead of their equipment. Soldiers landed in theater with a sleeping bag and a shelter-half, which was not sufficient to sustain them for weeks at a time in an austere location. As VII Corps began to filter in by the tens of thousands during Phase Alpha, Third Army contracted for the use of the Khobar Towers, a recently constructed yet vacant apartment complex originally built to house migrant workers. The towers provided nearly 20,000 soldiers with temporary lodging before they were moved out to their tactical assembly areas (TAAs).[60] OCS allowed Pagonis's command to tap into a spirit of improvisation, characterizing the Army's entire approach to solving its major logistical problems before offensive operations. This spirit would continue to manifest itself as

---

[57] Robert H. Scales, *Certain Victory: The US Army in the Gulf War* (Fort Leavenworth, KS: Command and General Staff College Press, 1994), 60.

[58] Schubert and Kraus, *Whirlwind War*, 61.

[59] Stewart, *War in the Persian Gulf*, 12.

[60] Stephen Bourque, *Jayhawk: The VII Corps in the Persian Gulf War* (Washington, DC: Army Center of Military History, 2002), 61.

his team turned its attention towards moving everything coming into the Kuwaiti Theater of Operations out into assembly areas.

Pagonis relied completely on OCS to perform the second task of onward movement, from port to assembly area. One of the tradeoffs for maintaining a high tooth-to-tail ratio in the early build-up of combat power manifested in the lack of organic transportation for personnel and equipment. Realistically, the US Army could not manage this problem without host nation support. The Army's most pressing transportation concern was its lack of heavy equipment transporters to bring M1A1 tanks and M2 Bradleys to their TAAs. Frontloading these fighting vehicles into theater would have been pointless if they could not be positioned somewhere to have a credible deterrent effect. The road network inside Saudi Arabia would have been crippled if tracked vehicles attempted to get there on their own power. Pagonis's 22nd Provisional Support Command addressed this problem by contracting for 333 Saudi-owned transporters to supplement US stocks.[61] On the personnel side, contracted buses allowed coalition forces to build combat power by moving all personnel from the port and airfield areas into their respective assembly areas. VII Corps alone accumulated 290 buses meant for civilian transportation on city streets, and ran the fleet to the ground shuttling over 2,000 personnel per day in the months prior to Desert Storm.[62] Transition to LSCO after the buildup of personnel and equipment during Phases Alpha and Bravo could not have occurred inside the original timeline were it not for the transportation contracts the US Army put in place with host nation vendors.

After he opened the theater and lines of communication were busy with the daily movement of troops and equipment, Pagonis turned to sustainment, the third key task of his logistics system. Evidence suggests that sustainment, like reception and onward movement, would not have been possible without relying on OCS. Foreign contractors played a larger role in

[61] Scales, *Certain Victory,* 80.

[62] Bourque, *Jayhawk*, 66.

this task than any other provider. Local vendors were contracted to provide all manner of services and infrastructure the US Army could not deliver for itself on time to meet operational demands. Table 1 illustrates the magnitude of sustainment resources Pagonis tapped into to mitigate his command's own material shortfalls just during the initial phase of the war until more organic resources arrived in theater. Chief Warrant Officer 4 Wesley Wolf, LTG Pagonis's food service adviser for the theater, remarked that in the first few weeks, coalition forces were in danger of running out of food, and would have, were it not for the A-rations Saudi Arabia provided.[63] Wolf worked with a local contractor to provide fresh food distribution for the entire theater, through the duration of the campaign. Contractors established dining facilities at all VII Corps transient camps in the vicinity of Al Jubbayl and Ad Dammam, sustaining port operations and facilitating the buildup of combat power.[64]

In one other crucial instance of OCS reliance, Pagonis built several logistics bases in the middle of the desert to sustain the long lines of communication from port to TAA, and to build up stocks of supply for Phase Charlie. The bases became makeshift truck stops for all units deploying into their TAAs, housing contracted food distribution centers, and facilitating the stockpiling of all classes of supply.[65] During Phase Bravo, the flow of movement of personnel, tanks, weapons, and classes of supply into corps attack positions was extraordinary. At the height of this phase, an average of eighteen trucks per minute crossed through a single point on a northern supply route and the rate was sustained for a month.[66] All of this activity was designed to position VII Corps and XVIII ABN Corps to assume the offensive, and to supply two logistics bases, Logbase Charlie and Logbase Echo, with enough class I, III and V to sustain operations

[63] Schubert and Kraus, *Whirlwind War,* 66.

[64] Bourque, *Jayhawk*, 60.

[65] Scales, *Certain Victory,* 78.

[66] William G Pagonis, *Moving Mountains: Lessons in Leadership and Logistics from the Gulf War* (Cambridge: Harvard Business School, 1994), 146.

indefinitely. Stocks of food remained constant and fuel stocks increased during Phase Bravo, even though fuel consumption by both corps approached 4.5 million gallons per day.[67] When Phase Charlie began, there was enough class I positioned in forward logbases to sustain operations for twenty-nine days, and enough fuel on hand to drive operations for over five days.[68] This impressive operational reach could not have occurred without the surge of civilian contractors who provided the overwhelming majority of personnel and trucks to keep the lines of communication open, a fact that Pagonis acknowledges in his memoir and for which he thanked all involved.

Table 1. For period C+12 (19 Aug 90) to C+56 (2 Oct 90) based on a force of 135,000

Host Nation Support Requirements	
Products/Services	**Quantity**
Water	1.5 million gallons/day
Ice	95 short tons/day
Subsistence (A-rations)	270,000 meals/day
Tents	8,416
Fuel	
Gasoline	181,000 gallons/day
Diesel	120,000 gallons/day
Jet	52,000 gallons/day
Vehicles	
Buses	700 each
Trucks	12,150 (various sizes)
POL	380 (various types)
Water tankers	300 (various types)
Hygiene	
Latrines	2,700 units
Showers	2,250 units
Laundry	40,000 bundles/day
Refuse collection	145,000 short tons/day

Source: Frank N. Schubert and Theresa L. Kraus, *Whirlwind War: The United States Army in Operations Desert Shield and Desert Storm* (Washington, DC: US Army Center of Military History, January 1992), 62.

[67] William G Pagonis, *Moving Mountains: Lessons in Leadership and Logistics from the Gulf War* (Cambridge: Harvard Business School, 1994), 147.

[68] Ibid.

As stated above, theater support contracting performed the heaviest lifting during ODS in terms of setting the theater and sustaining the force. However, most studies about the Gulf War focus on the contribution of the limited number of US contractors who deployed in support of major weapons systems. It is important to this study to acknowledge their role in the context of the emergent complexity of the technology associated with US military equipment, as that trend has continued to grow by an order of magnitude. The number of US contracted personnel deployed in support of ODS was indeed small, and most were deployed to support major military weapons systems. Commanders often praised their effectiveness, and a narrative emerged from ODS that systems contractors were vital to the success of the entire campaign. However, no contractor performance reports or other evaluative data was collected, so this is a highly subjective assessment.[69] Most reports put the number of contracted personnel in theater during ODS as between three and four thousand, while some estimate over nine thousand.[70] Almost all US contracted personnel were at echelons above corps, and were positioned at permanent installations in the rear to provide maintenance and systems operations for the most technical equipment. For instance, US civilians were vital in the M1A1 "rollover" program. Contracted personnel from General Dynamics deployed to the port of Ad Dammam to perform significant upgrades to the Abrams tank before they were released to their gaining unit, securing a technological edge for the US Army in ground combat.[71] Systems contractors were essential for maintaining an aircraft availability rate of nearly 90 percent during Desert Storm.[72]

---

[69] Dibble, Horne, and Lindsay, "Army Contractors and Civilian Maintenance, Supply and Transportation Support During Operations Desert Shield and Desert Storm," 2-6.

[70] Ibid., 2-4. This US Army report identified 969 US contractor personnel in theater at the height of the conflict and separately listed 2,925 foreign contracted personnel. Other reports have estimated nearly 9,000 in theater, but this discrepancy may be explained if Department of the Army civilians were counted against contractor numbers. Many reports also overinflated the numbers of host-nation and third country nationals, who the provisional support command did not adequately track in the early stages of ODS when contract authorities were still very decentralized.

[71] Bourque, *Jayhawk*, 94.

[72] Schubert and Kraus, *Whirlwind War,* 223.

Unlike theater support contractors, some systems contractor personnel actually crossed the berm when the offensive began, and directly supported combat operations. A total of thirty-four US civilian contractors were embedded with the multiple divisions that crossed into Kuwait and Iraq when Desert Storm commenced as field service representatives responsible for the maintenance and operation of critical systems like the M1A1, Bradley Fighting Vehicle, and Patriot missile system.[73] Had Phase Charlie lasted longer, the performance and effectiveness of systems contractors actively participating in large-scale ground combat may have been better evaluated. As it turned out, their impact on the hundred-hour ground war was minimal. It is interesting to note however, that these contractors volunteered to go forward understanding the nature of the mission, while also distinguishing them from US Army civilian logistics assistant representatives who routinely accompany units forward and fall under Army Material Command. Ultimately, the advantage of having contractors forward with life-cycle weapons systems was apparent. They gave unit commanders an assurance that their most critical systems had a subject-matter expert on hand to maintain operational readiness. It would have been more beneficial if the maintenance and operational expertise they provided had been a resident capability, because contractors were not obligated to cross the berm. If the ground war had been less one-sided or had lasted significantly longer than one hundred hours, the approach the US Army took to systems contracting integration may have been inadequate. The intersection of Army requirements and contractor safety is where the risks of OCS integration are manifested, and will be explored further in the next section.

Pagonis did a remarkable job setting the theater, but his efforts would not matter if they could not stand up to the stress of large-scale combat. Due to these circumstances, GEN Schwarzkopf asked Pagonis in January 1991 if the theater logistics system could provide

[73] Dibble, Horne, and Lindsay, "Army Contractors and Civilian Maintenance, Supply and Transportation Support During Operations Desert Shield and Desert Storm," 2-17.

coalition forces the operational reach they needed to carry out a two-corps offensive. Already, the system had allowed Schwarzkopf to elevate the operational tempo to an almost unrealistic pace. Sustainment doctrine during the 1980s had pointed Pagonis towards host-nation contracted solutions to fill in sustainment gaps, but that was in the context of the Return of Forces to Germany exercise, in which supply lines and infrastructure were already established to accommodate the influx of 10,000 soldiers per month.[74] There were periods during Desert Shield where 10,000 soldiers filtered through the theater daily. The fact that Schwarzkopf believed conditions were set to transition into Phase Bravo after only four months is a testament to the high tempo enabled by Pagonis's logistics system. Theater support contracts made this system functional. Buses loaned out to the US Army driven by TCNs, facilities built from the ground up to house personnel and equipment, local stevedores to work the roll-off of equipment at the ports, a transportation network designed around log base depots to provide ground troops with immediate resupply on the move combined with host nation support to enable the transition into LSCO at a rapid tempo.

The US Army's approach to the use of OCS in large-scale combat proved successful in the hundred hours of fighting, but likely would have exposed vulnerabilities if the fighting had lasted longer. Therefore, the most relevant lessons are found outside of Phase Charlie. First, the reception, onward movement, and sustainment model that Pagonis used to establish a logistics system in theater could not have worked without contract support. Further, the coalition's transition to LSCO would not have been feasible in the given timeframe. Contractors were vital to bringing all personnel and equipment into TAAs, for constructing the logbases used to stock supplies used to generate swift resupply during offensive maneuver, and for sustaining the force across hundreds of miles of desolate supply routes. Second, the contingent nature of ODS makes it unlikely that the same level of contract support would be available in future LSCO. The

[74] Pagonis, *Moving Mountains: Lessons in Leadership and Logistics from the Gulf War*, 108.

uncontested access to theater, the unchallenged buildup of combat power over an extended timeframe, and the vital cooperation from a host nation are conditions unlikely to be replicated. Finally, the tooth-to-tail deployment considerations of ODS persist today. The ratio of contractor-to-soldier in contingency operations has continued to shrink over the last twenty-five years, ensuring that OCS remains a resource that commanders can leverage when conditions on the ground require improvisation. These lessons warrant further exploration in order to draw out recommendations for a different approach to OCS integration in the future.

Lessons Learned

There is clear evidence OCS proved to be a logistics multiplier for the US Army during the Gulf War, and that OCS can enable conditions for success in LSCO. However, a critical lens reveals how tenuous the link was, and that some of the features of OCS which enabled successful operations in Desert Storm may have detrimental results if applied to future US Army operations. Some lessons learned found their way into current US Army doctrine or have perpetuated in other ways. Using the case study as a comparative lens for today's practice may determine if the US Army has established policies, procedures, or doctrine on poor assumptions, or has misapplied some lessons from ODS. It is just as important to avoid learning the wrong lessons from success as it is to learn the right ones from failure.

One echo of the Gulf War which lingers today is the tooth-to-tail considerations which pervade doctrine and strategic guidance. The same mindset that guided Schwarzkopf's decision-making for force mixture during Desert Storm prevails today. US Army doctrine is centered on trying to keep the ratio as high as feasibly possible. Force tailoring considerations in FM 3-0 emphasize minimizing the sustainment footprint by finding available resources already in an area of operations. For instance, it advises commanders to negotiate within a projected area of operations for transportation and supplies, so that a commander can preclude the need to deploy

US military capabilities.[75] This is an echo of the force tailoring guidance Schwarzkopf gave to his sustainment planners. The result was a completely ad hoc logistics system that Pagonis recognized relied on contracted capabilities to operate.

One reason force tailoring considerations always emphasize maximizing combat capability is because the "tail" component simply is not available in time. In contingency operations, speed is key. GEN Mark Milley, current Chief of Staff of the Army, continuously stresses the need for the Army to be able to "fight tonight."[76] That mentality is important as the Army looks ahead towards the future of LSCO, but there is a disconnect between intent and reality when 70 percent of US Army logistics capabilities reside in the Reserve Component, and most units take sixty to ninety days to mobilize.[77] This reality means that doctrine has to constantly keep up with senior level force structure decisions. If the experience of contractors augmenting the logistics system in ODS should have taught senior leaders and politicians anything, its that continuing to divest the active component of sustainment capabilities would lead to major capability gaps. Instead of reversing the trend, the US Army doubled down after the Gulf War and restructured the force in a manner which has led to contemporary dependence. A brief look at contemporary operations reveals how this trend has continued.

OCS remains a convenient option for sustaining US Army expeditionary operations today, to the detriment of its long-term readiness. At the height of the surge during OIF, the "number of U.S.-employed contractors in Iraq exceeded the strength of U.S. military forces in the country, demonstrating the degree to which [coalition] operations depended on civilian manpower

[75] US Army *FM 3-0*, 4-9.

[76] Association of the United States Army, "Milley: Readiness Wins, Deters Wars," February 29, 2016, accessed March 18, 2019, https://www.ausa.org/news/milley-readiness-wins-deters-wars.

[77] LTC Scott B. Kindberg, "Accumulation of Degradation Sustainment Force Structure Imbalance" (Strategic Research Project, US Army War College, Carlisle, PA, 2018).

and support."[78] Contractor numbers in the CENTCOM AOR previously described further demonstrates the outsized impact OCS has had on OIF and OEF. More recently during Exercise Anakonda 16, a multi-national exercise involving 25,000 participants from over 20 nations, US Army Europe practiced setting the theater and sustaining expeditionary operations in Europe. In a study of the exercise, a review found the reliance on contracted solutions for sustainment indicated a lack of readiness at echelons above brigade.[79] The after action report indicated many of the services used, such as water acquisition, tactical vehicle recovery, and shower facilities could have been provided by the military. The fall back onto contracted solutions was due to simple expediency.[80] This pointed to a missed opportunity that came at the cost of future readiness in expeditionary operations, and came at a greater cost than if it had been resourced internally. If the Army is trying to cultivate a "fight tonight" mentality, its continued over-reliance on OCS to sustain operations in contemporary theaters should be alarming.[81]

One lesson ODS should have imparted was the recognition that OCS is a critical component of combat readiness. The lesson still eludes the US Army today. In 2014, the Defense Science Board found that despite the years of poor contract management and the subsequent Gansler commission reforms, OCS remains poorly integrated at the strategic level.[82] Striking the right balance between reliance and over-reliance is key, and planning for OCS smartly and in the context of providing capabilities that will not leave the US Army completely vulnerable is the challenge. The same model of ad hoc contractor support identified in the Gansler commission

[78] COL Joel D. Rayburn and COL Frank K. Sobchak, eds., *The U.S. Army in the Iraq War: Volume 2, Surge and Withdrawal, 2007-2011* (Carlisle, PA: US Army War College Press, 2019), 310.

[79] Center for Army Lessons Learned (CALL), "Special Study No. 18-05, Strategic Landpower in Europe," December 2017, accessed March 10, 2019, http://call.army.mil, 42.

[80] Ibid.

[81] Association of the United States Army, "Milley: Readiness Wins, Deters Wars."

[82] Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics, "Task Force on Contractor Logistics in Support of Contingency Operations" (Report of the Defense Science Board, Washington, DC, June 2014), 1, accessed February 19, 2019, https://apps.dtic.mil/dtic /tr/fulltext/u2/a608736.pdf.

report, where the US Army employed a skeleton crew of contractors during the early phase of OIF, echoed the approach taken by Pagonis during the Initial Phase of Desert Shield. A by-product of poor integration that is not always immediately evident is the lack of accountability many contractors have to the US government. In 2009, the Commission on Wartime Contracting in Iraq and Afghanistan found that 80 percent of DoD contracted employees in those two countries were foreign nationals, and outlined the difficulty the United States would have holding them accountable through US courts.[83] The report illustrates the difficulties associated with accountability in war zones, and the risk to taxpayer dollars this has.[84] When contractors defraud the US government, the taxpayer pays the bill, but the warfighter suffers the effects of the misconduct.

Finally, the most ignored lesson of the use of contract support in Desert Storm is contractor reliability, the principle at the heart of the principal-agent problem. When a contractor is the source of a capability, a commander is constrained in his ability to control them by various factors. They can only ask for things identified within the scope of a statement of work, must use a contract officer as an intermediary, and cannot compel the contract employee to act outside the authority of their own chain of command.[85] Moreover, contracted personnel are not subject to the Uniformed Code of Military Justice in an undeclared war.[86] US Army personnel have worried that when a battlefield becomes more chaotic or violent, the risk of mission success increases when a contractor is used in place of a military source.[87] This concern is particularly relevant in light of the Chief of Staff of the Army's vision of future LSCO. He explains that future warfare will be highly lethal, and that "on the future battlefield if you stay in one place for longer than

[83] Kinsey and Patterson, *Contractors and War*, 18.

[84] US Commission on Wartime Contracting in Iraq and Afghanistan, *"At What Risk?,"* 48.

[85] Camm and Greenfield, *How Should the Army Use Contractors on the Battlefield?*, 28.

[86] Ibid., 29.

[87] Ibid.

two or three hours, you will be dead."[88] In ODS, most contractors performed well, but there are plenty of instances of unreliability, especially as the potential danger increased. Pagonis commissioned a report on contractor activities in the Gulf War that concluded it was questionable whether civilians would have remained in theater if the danger increased and identified several instances of contractors wanting to leave regardless.[89] The US Marine Corps experienced their own setbacks with contractors. When the Iraqi military first began launching Scud missile attacks at coalition forces during Phase Bravo, problems with contracted personnel began to surface. Many of the TCN personnel left the trucks they were driving, and local vendors left as well, making it difficult to procure services and supplies that the 1st Marine Expeditionary Force counted on.[90] In some cases, marines took over responsibility for driving and maintaining vehicles that were abandoned. Of the forty-two Scud missile attacks into Saudi Arabia, only one caused significant casualties: one missile directly struck a US military barracks in Dhahran, killing twenty-eight US Army soldiers.[91] The picture of contractors fleeing from this relatively benign threat stands in stark contrast to the picture of contractors operating on the battlefield GEN Milley describes and raises questions about their performance in the face of increased lethality. In a report addressing these concerns immediately following the Gulf War, the DoD Inspector General concluded that if "contractors leave their jobs during a crisis or hostile situation, the readiness of vital defense systems and the ability of the Armed Forces to perform

[88] Matthew Cox, "Army Chief Issues Stark Warning to Potential Enemies," Military Daily News, October 5, 2016, accessed February 12, 2019, http://www.military.com/daily-news/2016/10/05/army-chief-issues-stark-warning-to-potentialenemies.html.

[89] Dibble, Horne, and Lindsay, "Army Contractors and Civilian Maintenance, Supply and Transportation Support During Operations Desert Shield and Desert Storm," G-5.

[90] Gregory Caldwell, "An Analysis of United States Marine Corps Contracting During Operations Desert Shield and Desert Storm" (Thesis, Naval Postgraduate School, Monterey, CA, 1995), 41.

[91] George N. Lewis, Steve Fetter, and Lisbeth Gronlund, "Casualties and Damage from Scud Attacks in the 1991 Gulf War" (DACS Working Paper, Massachusetts Institute of Technology Defense and Arms Control Studies Program, March 1993).

their assigned missions would be jeopardized."[92] How much more does this appear true today, and how appropriate to ask whether the current level of dependence on OCS will leave the US Army more vulnerable in the future.

Conclusion

One recommendation for the US Army writ large is to train with scarcity. The US Army wants to inculcate an "expeditionary mindset."[93] To do this it needs to prepare for sustained operations without the lifeline of OCS. Regionally aligned forces deploying in support of theater security cooperation exercises should deliberately plan to use OCS as little as possible, to identify what areas of sustainment risk being single points of failure. These exercises should also integrate the US Army reserve component. In Exercise Anakonda 16, 24% of participating US soldiers came from the reserves.[94] This was an opportunity to integrate many of the sustainment capabilities the US Army has defaulted to contracting in recent years into a large-scale training exercise. Unfortunately, policy limitations constrained the duration of time reservists were permitted to train to twenty-three days. This meant the reserve units fluctuated between one-third and one-half strength through the duration of the exercise.[95] If the US Army is serious about cultivating an expeditionary mindset, it needs to set conditions for exceptions to policy that allows the reserve component to commit to theater security cooperation exercises from start to finish.

US Army commands typically conduct OCS in an up-tempo environment, usually in the early stages of an operation.[96] Peter Singer noted that the expansion of the use of contractors

---

[92] Zamperelli, "Contractors on the Battlefield," viii.

[93] US Army, *FM 3-0*, 1-22.

[94] Center for Army Lessons Learned (CALL), "Special Study No. 18-05," 43.

[95] Ibid.

[96] Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics, "Task Force on Contractor Logistics in Support of Contingency Operations," 3.

during the early years of OIF was not the product of a well-planned strategy, but of an ad hoc process of short-term problem solving.[97] Since the stand-up of the Army Contracting Command and the implantation of JP 4-10, planning for those early stages has become better integrated at the operational level. Currently, joint doctrine instructs OCS integration cells to integrate with planners during joint intelligence preparation of the operating environment activities, specifically for Phase 0 operations.[98] JP 4-10 emphasizes the importance of OCS planning in Phase 0 to set conditions for subsequent phases of the operation. One recommendation is to anticipate the need for OCS specifically during Phase III: Dominate. The Gulf War case study proved how instrumental OCS was for supporting both Phase Bravo and Charlie, or what the current operational construct would consider as Phase III activities. It also showed how the planning for the vital services OCS provided were not well integrated into the offensive plan–they simply persisted. Planners need to understand that complete self-sufficiency is unrealistic, and make choices for force tailoring based on what is available in the AOR, as stipulated in FM 3-0. They should identify which of the requirements they satisfy through OCS in Phase 0 are likely to persist into Phase III. The task will be to identify early whether that represents too high a risk, and to plan for redundancies if it is.

[97] Steven L. Schooner, "Why Contractor Fatalities Matter," *Parameters* (Autumn 2008): 84.

[98] Joint Staff, *JP 4-10*, iii.

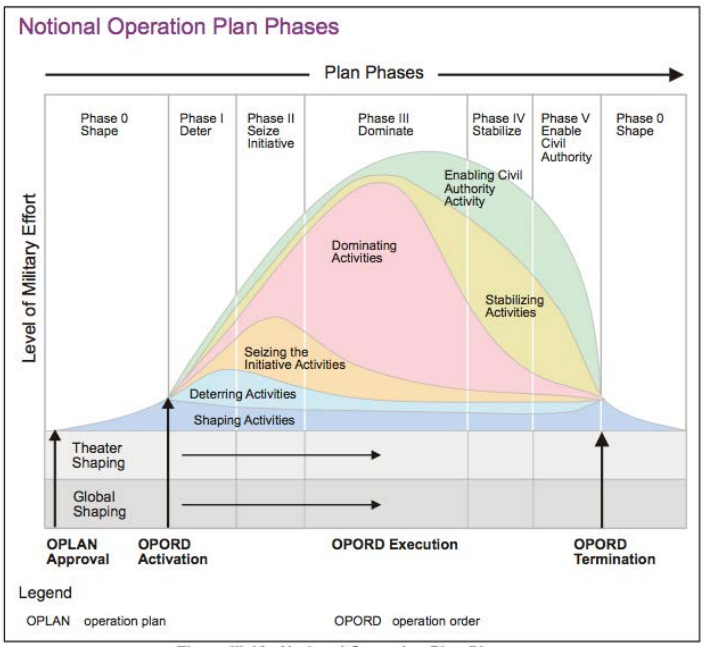

Figure 2. Six-phase joint phasing model. US Department of Defense, Joint Staff, *Joint Publication (JP) 5-0, Joint Planning* (Washington, DC: Government Printing Office, 2011), III-39.[99]

The US Army will never return to the levels of self-sufficiency it previously enjoyed. There are too many deeply ingrained economic and parochial interests, statutory requirements, and policy constraints which have led to the current business model. Additionally, the United States' appetite for overseas commitments coupled with the expansion of LOGCAP makes reliance on OCS easier to perpetuate. This is not an inherently disadvantageous position, but it carries risks. The Gulf War showed what a force multiplier OCS could be during LSCO, but it also exposed how tenuously held together the theater logistics system was. The US Army needs to expose similar vulnerabilities in its practices today, if it wants to successfully fight tonight.

[99] The updated 2017 JP 5-0 removed the phasing model, but kept the definition of phases intact, as well as the use of phasing as a planning tool. The phasing model is useful in illustrating the recommendation that planners must plan for OCS integration into "dominating activities." *Phase Bravo* and *Charlie* during the Gulf War represent "dominating activities."

Bibliography

Association of the United States Army. “Milley: Readiness Wins, Deters Wars.” February 29, 2016. Accessed March 18, 2019. https://www.ausa.org/news/milley-readiness-wins-deters-wars.

Bourque, Stephen. *Jayhawk: The VII Corps in the Persian Gulf War*. Washington, DC: Army Center of Military History, 2002.

Caldwell, Gregory. “An Analysis of United States Marine Corps Contracting During Operations Desert Shield and Desert Storm.” Thesis, Naval Postgraduate School, Monterey, CA, 1995.

Camm, Frank A., and Victoria A. Greenfield. *How Should the Army Use Contractors on the Battlefield? Assessing Comparative Risk in Sourcing Decisions.* Santa Monica, CA: RAND Corporation, 2005.

Campbell, LCDR John C. “Outsourcing and the Global War on Terrorism (GWOT): Contractors on the Battlefield.” Monograph, School of Advanced Military Studies, Fort Leavenworth, KS, 2005.

Cancian, Mark. “Contractors: The New Element of Military Force Structure.” *Parameters* (Autumn 2008): 61-76.

Center for Army Lessons Learned (CALL). “Special Study No. 18-05, Strategic Landpower in Europe.” December 2017. Accessed March 10, 2019. http://call.army.mil.

Commission on Roles and Missions of the Armed Forces. *Directions for Defense: Report of the Commission on Roles and Missions of the Armed Forces.* Arlington, VA: Government Printing Office, May 1995.

Congressional Research Service. *Military Forces: What is the Appropriate Size for the United States.* Washington, DC: Government Printing Office, 2008.

Cox, Matthew. “Army Chief Issues Stark Warning to Potential Enemies.” Military Daily News. October 5, 2016. Accessed February 12, 2019. http://www.military.com/daily-news/2016/10/05/army-chief-issues-stark-warning-to-potentialenemies.html.

Dibble, George B., Charles L. Horne, III, and William E. Lindsay. “Army Contractors and Civilian Maintenance, Supply and Transportation Support During Operations Desert Shield and Desert Storm. Volume 1: Study Report.” Logistics Management Institute, Bethesda, MD, June 1993.

Dunn, Richard. “Contractors on the 21st Century Battlefield.” Excerpt from the Proceedings of the Second Annual Acquisition Research Symposium. Monterey, CA, May 18-19, 2005.

Fukuyama, Francis. “The End of History?” *The National Interest*, no. 16 (1989): 3-18. Accessed March 16, 2019. http://www.jstor.org/stable/24027184.

Gaddis, John Lewis. *The Landscape of History: How Historians Map the Past.* New York: Oxford University Press, 2002.

Gansler, Dr. Jacques S., David J. Berteau, David M. Maddox, David R. Oliver Jr., Leon E. Salomon, and George T. Singley III. *Urgent Reform Required: Army Expeditionary Contracting Report of the Commission on Army Acquisition and Program Management in Expeditionary Operations*. Washington, DC: Government Printing Office, 2007.

Government Accountability Office. GAO-11-580, *Contingency Contracting: Observations on Actions Needed to Address Systemic Challenges*. Statement of Paul L. Francis. Last modified April 25, 2011. Accessed March 16, 2019. http://www.gao.gov/products/GAO-11-580.

———. GAO-17-428, *Operational Contract Support: Actions Needed to Enhance Capabilities in the Pacific Region*. Washington, DC: Government Printing Office, June 2017.

Hammons, LTC Dave M. "At What Cost Indeed: Contractor Indispensability in Army Logistics." Program Research Project, US Army War College, Carlisle Barracks, PA, 2010.

Hunt, Richard A. *Melvin Laird and the Foundation of the Post-Vietnam Military, 1969-1973*. Washington, DC: Historical Office, Office of the Secretary of Defense, 2015.

Huntington, Samuel P. *The Soldier and the State: The Theory and Politics of Civil-Military Relations*. Cambridge, MA: Belknap Press, 2002.

Industrial College of the Armed Forces. "Spring 2008 Industry Study Privatized Military Operations Industry." Report, National Defense University, Fort McNair, Washington, DC, 2008. Accessed December 11, 2018. http://www.ndu.edu/ICAF/Industry/reports/2008/pdf/icaf-is-report-pmo-ay08.pdf.

Kindberg, LTC Scott B. "Accumulation of Degradation Sustainment Force Structure Imbalance." Strategic Research Project, US Army War College, Carlisle, PA, 2018.

Kinsey, Christopher, and Malcolm Hugh Patterson, eds. *Contractors and War: The Transformation of US Expeditionary Operations*. Stanford, CA: Stanford University Press, 2012.

Lewis, George N., Steve Fetter, and Lisbeth Gronlund. "Casualties and Damage from Scud Attacks in the 1991 Gulf War." DACS Working Paper, Massachusetts Institute of Technology Defense and Arms Control Studies Program, March 1993.

McGrath, John J. *The Other End of the Spear: The Tooth-to-Tail Ratio (T3R) in Modern Military Operations.* Fort Leavenworth, KS: Combat Studies Institute, 2007.

Mosul Study Group. "What the Battle for Mosul Teaches the Force." Report, Center for Army Lessons Learned, Fort Leavenworth, KS.

ODASD (Program Support). "Contractor Support of U.S. Operations in the USCENTCOM Area of Responsibility." July 2018. Accessed January 24, 2019. https://www.acq.osd.mil/log/PS/.CENTCOM_reports.html/5A_July%202018_Final.pdf.

Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics. "Task Force on Contractor Logistics in Support of Contingency Operations." Report of the

Defense Science Board, Washington, DC, June 2014. Accessed February 19, 2019. https://apps.dtic.mil/dtic/tr/fulltext/u2/a608736.pdf.

Pagonis, William G. *Moving Mountains: Lessons in Leadership and Logistics from the Gulf War.* Cambridge: Harvard Business School, 1994.

Pagonis, William, and Jeffrey L. Cruikshank. *Moving Mountains.* Boston, MA: Harvard Business School Press. 1992.

Perry, Mark. *The Pentagon's Wars: The Military's Undeclared War against America's Presidents.* New York: Basic Books. 2017.

Peters, Heidi M., Moshe Schwartz, and Lawrence Kapp. *Department of Defense Contractor and Troop Levels in Iraq and Afghanistan: 2007-2017*. Washington, DC: Congressional Research Service, April 2017.

Rayburn, COL Joel D., and COL Frank K. Sobchak, eds. *The U.S. Army in the Iraq War: Volume 2, Surge and Withdrawal, 2007-2011*. Carlisle, PA: US Army War College Press, 2019.

Rebar, Paula. "Contractor Support on the Battlefield." Strategy Research Project, US Army War College. Carlisle Barracks, PA, 2002.

Rostker, Bernard. "Iraq's Scuds Ballistic Missiles." July 25, 2000. Accessed February 4, 2019. https://gulflink.health.mil/scud_info/scud_info_s04.htm.

Russell, David W. "Understanding the Application of the Army's Logistics Civil Augmentation Program (LOGCAP)." Strategy Research Project, US Army War College, Carlisle, PA, 1997.

Scales, Robert H. *Certain Victory: The US Army in the Gulf War.* Fort Leavenworth, KS: Command and General Staff College Press, 1994.

Schaub, Gary, and Volker Franke. "Contractors as Military Professionals?" *Parameters* (Winter, 2010): 88-102.

Schooner, Steven L. "Why Contractor Fatalities Matter." *Parameters* (Autumn, 2008): 78-89.

Schubert, Frank N., and Theresa L. Kraus. *Whirlwind War: The United States Army in Operations Desert Shield and Desert Storm.* Washington, DC: US Army Center of Military History, January 1992.

Schwartz, Moshe. *Department of Defense Contractors in Iraq and Afghanistan: Background and Analysis*. Washington, DC: Congressional Research Service, December 2009.

Schwartz, Moshe, and Joyprada Swain. *Department of Defense Contractors in Afghanistan and Iraq: Background and Analysis*. Washington, DC: Congressional Research Service, May 2011.

Shrader, Dr Charles R. "Contractors on the Battlefield." *Landpower Essay Series*, no. 99-6 (May, 1999.): 1-15.

Singer, P. W. *Corporate Warriors: The Rise of the Privatized Military Industry*. Updated ed. Ithaca, NY: Cornell University Press, 2008.

Stewart, Richard. *War in the Persian Gulf: Operations Desert Shield and Desert Storm.* Washington, DC: Center of Military History, 2010.

Taggart, Scott F., Jacob Ledford, and Melissa Blyleven. "Flawed Execution: A Case Study in Operational Contract Support." Technical Report, Naval Postgraduate School, Monterey, CA, 2016.

US Army Training and Doctrine Command. *TRADOC Pamphlet 525-3-1, The US Army in Multi-Domain Operations 2028*. Fort Eustis, VA: Government Printing Office, 2018.

US Commission on Wartime Contracting in Iraq and Afghanistan. *"At What Risk?" Correcting Over-Reliance on Contractors in Contingency Operations*. Arlington, VA: Government Printing Office, 2011.

US Department of the Army. *Army Doctrine Publication (ADP) 6-0, Mission Command*. Washington, DC: Government Printing Office, 2012.

———. *Army Training Publication (ATP) 4-92, Contracting Support to Unified Land Operations*. Washington, DC: Government Printing Office, 2014.

———. *Field Manual (FM) 3-0, Operations*. Washington, DC: Government Printing Office, 2017.

———. *Field Manual (FM) 100-10-2, Contracting Support on the Battlefield*. Washington, DC: Government Printing Office, 1999.

———. *Field Manual (FM) 100-21, Contractors on the Battlefield.* Washington, DC: Government Printing Office, 2003.

US Department of Defense, Joint Staff. *Joint Publication (JP) 4-10, Operational Contract Support.* Washington, DC: Government Printing Office, 2014.

———. *Joint Publication (JP) 5-0, Joint Planning*. Washington, DC: Government Printing Office, 2011.

———. *Quadrennial Defense Review.* Washington, DC: Government Printing Office, 2010.

Woodward, Bob. *The Commanders.* New York: Simon and Schuster, 1991.

Yuengert, Louis G. "America's All Volunteer Force: A Success?" *Parameters* (Winter, 2015): 53-64.

Zamperelli, Stephen. "Contractors on the Battlefield: What Have We Signed Up For?" Research Report, Air War College, Maxwell AFB, AL, 1999.