NPS-LM-21-022

ACQUISITION RESEARCH PROGRAM
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U.S. Marine Corps Expeditionary Advanced Base Operations Operational Contract Support

December 2020

Capt. Joshua B. Blythe, USMC

Thesis Advisors: Kelly Poree, Lecturer
Dr. Keebom Kang, Associate Professor

Graduate School of Defense Management

Naval Postgraduate School

The research presented in this report was supported by the Acquisition Research Program of the Graduate School of Defense Management at the Naval Postgraduate School.

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ABSTRACT

Since 1775, the U.S. Marine Corps has been the U.S. premier expeditionary force in readiness and thus is capable of conducting an array of military operations in austere locations. In recent years, the U.S. Marine Corps has employed the Expeditionary Advanced Base Operations (EABO) concept to host, secure, sustain, and maintain warriors and their weapons systems on a more amorphous and difficult-to-target forward-basing infrastructure. The problem is the logistics and operational contract support (OCS) requirements that will be needed to optimize EABO and sustain expeditionary advanced bases in austere locations against a pacing threat has not been identified. The purpose of this project is to develop a model that provides insight into the synchronization and optimization of doctrinal logistics support timelines with those of III Marine Expeditionary Force operational contract support timelines to better optimize the U.S. Marine Corps EABO concept so the warfighter receives supplies and services at—or near—the time when doctrinal days of self-sustainment are due to expire. To this avail, this project provides an abbreviated and foundational understanding of the current Marine Corps organizational structure, an understanding of the Marine Littoral Regiment concept, the notional operational phases of military operations, and a working understanding of EABO and current III Marine Expeditionary Force OCS.

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ABOUT THE AUTHOR

Capt Joshua Blythe is a Marine Corps Ground Supply Officer. Prior to commissioning in 2014 and receiving his Bachelor of Arts in Economics and minor in Political Science from the University of California – San Diego, he graduated from Marine Corps Recruit Depot (MCRD) San Diego in 2007. After graduating from MCRD San Diego, he served as a logistics and combat service support specialist with CLR-37 and the 31st MEU in Okinawa, Japan from 2008 to 2010. Next, he served as a logistics Non-Commissioned Officer for Naval Striking and Support Forces NATO, Naples, Italy from 2010 to 2012. From 2012 to 2014, he participated in the Marine Enlisted Commissioning Program (MECEP) through the NROTC program at the University of San Diego Consortium. After commissioning, he reported to The Basic School (TBS), where he received six months of warfighting skills training. Next, he attended the Ground Supply Officers Course, where he earned the MOS 3002, Ground Supply Officer. As a Ground Supply Officer, from 2016 to 2019, he served with Headquarters Battalion, 1st Marine Division, as well as 1st Battalion, 11th Marine Regiment, 1st Marine Division aboard Camp Pendleton, CA. In 2019, he received a Master of Science with distinction in Logistics and Supply Chain Management from Embry-Riddle Aeronautical University. He is an ultramarathon running enthusiast, and a father. After graduating from the Naval Postgraduate School, he will be reporting to Marine Corps Systems Command (MARCORSYSCOM), MCB Quantico, VA as a Contract Admin Officer in support of the Logistics Combat Element Systems portfolio.

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ACKNOWLEDGMENTS

First and foremost, I would like to thank my project advisors, Professor Kelley Poree and Dr. Keebom Kang. Dr. Kang, you truly made the modeling and simulation process "Marine Proof," and I am genuinely honored to have worked with you throughout the process. Professor Poree, you have been a tremendous help, and your steadfast resolve, patience, and ability to constantly get the "hamster wheel" going is more appreciated than you will ever know. If it were not for you two gentlemen, this project would not have been possible. Next, I want to thank my esteemed colleagues, encouraging peers, and close friends. If it was not for all of you, I would not have benefited from the much appreciated—and often unsolicited—advice that constantly helped grow and evolve my project. Last and most importantly, my thanks go out to my family, especially my daughter. It was you who had to be the most patient, supportive, and loving with me throughout this journey. Words cannot thank all of you enough.

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TABLE OF CONTENTS

LIST OF FIGURES

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LIST OF TABLES

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LIST OF ACRONYMS AND ABBREVIATIONS

A2AD	Anti-Access/Area Denial
ACE	Aviation Combat Element
AO	Approving Official
AOR	Area of Responsibility
ASW	Anti-Submarine Warfare
BPA	Blanket Purchase Agreement
C2	Command and Control
CCR	Capacity Constraint Resource
CE	Command Element
CH	Cardholder
CLB	Combat Logistics Battalion
CLR	Combat Logistics Regiment
CMC	Commandant of the Marine Corps
CO	Certifying Officer
CPG	Commandant Planning Guidance
CSS	Combat Service Support
CST	Contract Support Time Line
DBR	Drum-Buffer-Rope
DFARS	Defense Federal Acquisition Regulation Supplement
DLA	Defense Logistics Agency
DON	Department of the Navy
EAB	Expeditionary Advanced Base
EABO	Expeditionary Advanced Base Operations
ECP	Expeditionary Contract Platoon
ELET	Estimated Logistics Execution Time Line
ELPT	Estimated Logistics Planning Time Line
ELST	Estimated Logistics Support Time Line
EW	Electronic Warfare
FAR	Federal Acquisition Regulation
FARP	Forward Area Refueling Point

FOO	Field Ordering Officer
GCE	Ground Combat Element
GCPC	Government Commercial Purchase Card
GCSS-MC	Global Combat Support System–Marine Corps
GSA	General Services Administration
HA/DR	Humanitarian Assistance/Disaster Relief
HCA	Head of Contracting Authority
HNS	Host Nation Support
IO	Information Operations
IPBO	Installation Property Book Offices
JCS	Joint Chiefs of Staff
JFC	Joint Force Commander
JP	Joint Publication
JPME	Joint Professional Military Education
JTF	Joint Task Force
KO	Contracting Officer
LCE	Logistics Combat Element
MAGTF	Marine Air–Ground Task Force
MARDIV	Marine Division
MAW	Marine Air Wing
MCT	Marine Corps Task
MCWL	Marine Corps Warfighting Lab
MEB	Marine Expeditionary Brigade
MEF	Marine Expeditionary Force
MEU	Marine Expeditionary Unit
MLG	Marine Logistics Group
MLR	Marine Littoral Regiment
MLSR	Mutual Logistics Support Request
MPF	Maritime Prepositioning Force
MPT	Micro-Purchase Threshold
NDS	National Defense Strategy
NEF	Naval Expeditionary Force
NIMS	National Inventory Management Strategy

NSCS	Non-Standardized Contract Support
OCS	Operational Contract Support
PA	Disbursing Agent
PALT	Procurement Action Lead Time
PWS	Performance Work Statement
R3B	Resourcing Review Board
RCO	Regional Contracting Office
ROMO	Range of Military Operations
SAP	Simplified Acquisition Procedures
SAT	Simplified Acquisition Threshold
SecDef	Secretary of Defense
SCS	Standardized Contract Support
SOO	Statement of Objective
SOW	Statement of Work
SPMAGTF	Special Purpose Marine Air–Ground Task Force
SRBM	Short-Range Ballistic Missile
SSSC	Self Service Supply Centers
T-B	Time-Buffer
TOC	Theory of Constraints
TRAP	Tactical Recovery of Aircraft and Personnel
UXX	Unexploded Ordnance
WEZ	Weapons Engagement Zone

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I. INTRODUCTION

This chapter begins with an overview of the research to be conducted, then it follows with a discussion on the purpose of the report, and finally this chapter closes with a discussion of the determined scope of research. In the overview, a brief introduction to the Marine Corps is presented, as well as the problem being faced by today's U.S. Marine Corps. Next, this chapter covers the purpose of this report and presents one primary question to be addressed, followed by two secondary questions. Last, this chapter presents the intended scope of this research report. Ultimately, this information provides context and situational awareness and helps frame the remainder of the research report.

A. OVERVIEW

The U.S. Marine Corps has been the nation's first line of defense since 1775 (Marines, 2020). Organized as an expeditionary force in readiness, the U.S. Marine Corps is enabled to deliver an unparalleled level of versatility, flexibility, expandability, rapid deployability, and sustainability for military operations (U.S. Marine Corps [USMC], 2019, p. 1-1). Moreover, the nation's premier fighting force is scalable, tailorable, self-supported, self-contained, and combat-ready to conduct operations across a range of military operations. These unique capabilities are derived from the U.S. Marine Corps' Marine Air–Ground Task Force (MAGTF) concept of force employment.

The scalable nature of the U.S. Marine Corps is supported by and derived from its ability to deploy task-organized forces that are trained, equipped, and specifically organized to support their assigned mission or intended purpose (i.e., a MAGTF). For large scale responses or major theater wars, the U.S. Marine Corps can deploy as a Marine expeditionary force (MEF). This force brings with it a command element (CE), a Marine division, a Marine air wing, and a Marine logistics group and is purpose-driven to win the nation's heaviest battles. For smaller scale contingencies, the U.S. Marine Corps can deploy as a Marine expeditionary brigade (MEB). This force brings with it the same elements as a MEF; however, their force size is drastically reduced and the primary purpose of this type of organization is to respond to crisis. To promote peace and stability abroad, the U.S. Marine Corps can deploy as a Marine expeditionary unit (MEU). Like the MEF and the MEB, the MEU is task-organized with a division, an airwing, and logistics elements; however, the size of the MEU is much smaller than that of a MEB or a MEF. Last, the U.S. Marine Corps could deploy as a Special Purpose MAGTF (SPMAGTF). SPMAGTFs are designed with a specific mission in mind; however, they are typically established to support humanitarian assistance/disaster relief (HA/DR) requirements.

The tailorable nature of the U.S. Marine Corps is embedded within every MAGTF. This is because each comes with a CE, a ground combat element (GCE), an aviation combat element (ACE), and a logistics combat element (LCE). The CE possesses headquarters assets capable of providing command and control (C2), direction, planning, and coordination. The GCE brings with it an infantry unit augmented with reinforcements from artillery, reconnaissance, engineering, light armored reconnaissance, and various amphibious assault units. The ACE delivers air superiority in the form of combat assault support and air mobility in the form of combat assault transport and requisite aviation logistics assets. Last, the LCE provides the necessary logistics assets and forces to conduct all functions of logistics. As a MAGTF, all of these elements are combined and task-organized to accomplish an assigned mission. Through the effective and efficient deployment of each element's unique capability, combatant commanders have considerable leeway on how to properly tailor the force to optimize force employment.

The self-supported nature of the U.S. Marine Corps is derived from every MAGTF possessing an LCE that brings with its essential combat service support (CSS) capabilities. Each CSS is capable of performing all functions of logistics—engineering, supply, services, transportation, medical/dental, and maintenance. Since the U.S. Marine Corps brings with it its own capabilities, it is completely self-supported and only needs to rely on other services or joint forces when absolutely necessary to accomplish an assigned mission.

The self-contained nature of the U.S. Marine Corps is derived from the MAGTF's organizational structure itself. This is because each MAGTF, from a MEF all the way down to a SPMAGTF, is organized with a command asset, infantry assets, air assets, and logistics assets. Since the U.S. Marine Corps deploys with everything needed to support an assigned mission—forces, ammunition, food, water, and so on—it is capable of executing operations without reliance on other services or joint forces.

The combat-ready nature of the U.S. Marine Corps is derived from the Marine division's mission to be able to provide a ground amphibious forcible-entry capability and the GCE's unique ability to provide self-supporting combat power and abilities for amphibious assaults and other combat related operations. Only when absolutely necessary does the GCE require support from the logistical and CSS elements of the U.S. Marine Corps.

Unfortunately, the U.S. Marine Corps, as a force in readiness, is not designed or equipped to deter potential adversaries in austere locations (Berger, 2019a, p. 1). Moreover, the defining attributes of the current premier fighting force are no longer what the nation requires of its Marine Corps (Berger, 2020, p. 2). Given that mobility inside an adversarial weapons engagement zone (WEZ) will dictate a nation's competitive advantage in the global domain and is an operational imperative (Berger, 2020, p. 5), the commandant of the Marine Corps (CMC) has placed III MEF at the tip of the spear as the U.S. Marine Corps' main focus-of-effort to create mutually contested maritime space and to facilitate larger naval campaigns (Berger, 2019a, p. 3).

Although the U.S. Marine Corps is poised as an expeditionary force in readiness, to remain globally competitive and able to deter or prevent aggression from pacing threats, the U.S. Marine Corps must seek innovative solutions. A good example of this innovation is the expeditionary advanced base operations (EABO) concept. The EABO concept focuses on two primary assumptions:

1. Force resiliency, to persist and operate within range of adversary precision long-range fires, is a fundamental operational assumption; and
2. A portion of naval forces must be regionally aligned and focused on a specific threat (Marine Corps Warfighting Lab, Concepts & Plans Division [MCWL, C&P], 2018, p. 24).

By leveraging *inner-* and *outer-force* qualities and capabilities of EABO, the United States, its naval forces, and the U.S. Marine Corps will be poised to leverage advantages of mass and maneuver necessary to be decisive in battle (MCWL, C&P, 2018, p. 24).

The central idea of EABO is that it "enables naval forces to persist and operate forward within range of adversary long-range precision fires, in order to contest, control or deny sea space" (MCWL, C&P, 2018, p. 25). Moreover, "expeditionary advanced bases (EABs) are designed to host, secure, sustain, and maintain warriors and their weapons systems on a more amorphous and difficult to target forward-basing infrastructure" (MCWL, C&P, 2018, pp. 25–26). Unfortunately, the logistical and operational contract support (OCS) requirements that will be needed to optimize EABO and sustain EABs in austere locations against a pacing threat have not been identified.

B. PURPOSE

This professional report serves multiple purposes. First, it lays out the current Marine Corps organizational structure. Second, it discusses the notional operational phases of military operations. Third, it provides a working understanding of EABOs. Fourth, it provides a summary view of Marine Corps III MEF OCS. Fifth, it attempts to succinctly develop a model that ties together an estimated logistics support timeline (eLST) with a contract support timeline (CST) based on all of the previously discussed purposes. Ultimately, this professional report provides insight via modeling and simulation to inform EABO–OCS decision-making regarding III MEF OCS processes and contracting officer capacity, given future force design and Marine Corps planning guidance.

The primary purpose of this research is to answer the question of whether the current III MEF CST is synchronized with an eLST to support Marine Corps EABO–OCS, given the demands of future force designs and Marine Corps planning guidance. This research question is very broad and difficult to answer, therefore, the following list of secondary questions will govern research and be used to further refine the purpose of this project:

1. What estimated logistics support timeline elements facilitate or inhibit III MEF contracting support beyond the micro-purchase threshold?
2. What contract support timeline elements facilitate or inhibit III MEF contracting support beyond the micro-purchase threshold?

Research for this project started with a review of joint, U.S. Marine Corps, and Navy doctrinal publications. In addition, several past theses and MBA projects similar in concept were reviewed, which provided insight into the methodology of conducting similar operations. An extensive review of the NPS theses archive was conducted; however, considering that the employment of EABO is a nascent concept, little doctrinal writing has occurred over the past few years, especially when it comes to logistical support and OCS. A certain goal of this research is to fill a gap of information that exists on how the Marine Corps conducts and sustains EABO from a combined organic and nonorganic perspective, such that the two are mutually supportive. Moreover, an additional goal of this research is to provide a scenario-based model that can be tailored by capacity (primarily personnel and time) and then run through simulations to identify levels of convergence or divergence between eLSTs and III MEF CSTs when it comes to achieving a specific mission.

The ultimate purpose of this project is to gain a better understanding of how the Marine Corps can leverage the III MEF CST, such that the III MEF CST and eLSTs are optimally synchronized to increase the combat effectiveness of EABO. To do so, the III MEF CST is modeled in Arena modeling software. Next, this model incorporates an eLST. The eLST acts as a vital reference point (in the form of a range of days) for which contracted support will need to be available when it comes to mission execution.

The analysis and aggregation of this information is used to develop a comprehensive—albeit very basic—logistics and contract support model that can then be optimized to enhance OCS. Moreover, from this analysis, modeling, and simulation, recommendations for improvements to current contract support practices and future contract support practices are presented. Finally, additional research requirements are highlighted for future research efforts to address. These recommended future research efforts provide a foundation for follow-on research related to EABO and OCS to be conducted.

C. SCOPE

The U.S. Marine Corps is the U.S. premier expeditionary force in readiness and is capable of conducting an array of military operations in austere locations through the employment of forces via the EABO concept. The problem is that the Marine Corps may not possess the additional and necessary structure required to execute EABO in contested littoral environments against a pacing threat (Berger, 2020, p. 10). This is because the

Marine Corps currently deploys forces using a legacy system of fixed infrastructure and outdated assumptions of likely sea and air control requirements to defend and support forces that are forward deployed. Moreover, the use of legacy systems and infrastructure generates operational vulnerabilities and increased risk aversion when facing off with a pacing threat. According to the *EABO Handbook* (MCWL, C&P, 2018, p. 23), the use of legacy infrastructure, the generation of new requirements for force resiliency, and the needed ability to operate within the range of pacing threats weapons creates disproportionate risk to both the mission and the force when facing off with a peer competitor. Moreover, according to General Berger (2019a, p. 2), in order to facilitate larger naval campaigns and to enable desired levels of sea control or denial, the Marine Corps must integrate new approaches to operations in the maritime domain. As initiatives move beyond concept to implementation, the CMC plans to leverage EABO to complement naval expeditionary warfare and to prepare for missions against peer adversaries (Berger, 2019a, p. 11).

There are significant advantages to be gained by developing and accelerating EABO capabilities. However, to date, the Marine Corps has conducted minimal OCS wargaming efforts for the purpose of better analyzing, understanding, and informing EABO decision-making, especially with regard to OCS and logistical requirements. Considering that the current Marine Corps force design is optimized for large-scale amphibious forcible entry and sustained operations, and the EABO concept requires the employment of two distinct force postures—an *inside force* and an *outside force*—much consideration with regard to OCS and logistical requirements must be given.

The large number and complexity of the types of operations likely to be conducted under EABO preclude the study and inclusion of all scenarios or applications within this research project. The primary focus within this project will be on the inside force of EABO. The inside force has been chosen because it is the tactical element of EABO that will be operating within the range of adversary long-range precision fires that will be required to maneuver massed capabilities forward for decisive engagements. The qualities and capabilities of the inside force are only fully realized when the Marine Corps optimizes an EAB's ability to conduct reconnaissance activities, as well as low-signature capabilities using a “more amorphous, distributed, and hard-to-target infrastructure” (MCWL, C&P, 2018, p. 24).

Not only will EABO demand optimized expeditionary advanced basing facilities, it will also demand seamless naval integration. The CMC has stated the future naval force will be purpose built and optimized for naval expeditionary warfare (Berger, 2019a, p. 5). Since naval integration will be vital to EABO success, the scope of this research will be limited to methods of employment that heavily leverage naval capabilities.

The pacing threat is becoming increasingly more disruptive and unsettling. With growing inventories of precision strike short-range ballistic missiles (SRBMs), adversaries will be able to strike EABs within a WEZ despite the EABs’ dispersion and small footprints (Schiff, 2020, p. 74). This places significant risk on Marines deployed in future operations against a pacing threat. In addition, it places increased demand on OCS and logistical requirements to ensure that the Marines operating within these contested environments do not become liabilities or get cut off from vital resources needed to sustain operations. According to the CMC, logistics is both a critical requirement and a critical vulnerability (Berger, 2020, pp. 5–6). Considering that forces rely on logistics and OCS for survivability and that the threat to strike on EABs within a WEZ is increasing, the scope of this research is limited to those areas of responsibility (AORs) that are perceived to be most at risk (i.e., III MEF).

D. SUMMARY

This chapter provided a broad overview of the purpose and scope of this research project. The project provides an abbreviated and foundational understanding of the current Marine Corps organizational structure, the notional operational phases of military operations, and a working understanding of EABO and III MEF OCS. Finally, this project attempts to combine all of the previously discussed purposes to develop a model in attempts to synchronize an eLST with the III MEF CST to enhance EABO. Moreover, this model is then used to simulate changes in CST elements (personnel and time) to identify possible changes in current operations necessary to optimize and synchronize logistics and contract support timelines. The scope of this research was limited based on the capabilities and requirements of the EABO inner force, the demands for naval integration, and the survivability of Marine forces in the WEZs associated with III MEF. Moreover, the scope of this research was limited based on current III MEF CSTs and an eLST. Considerations were given to various methodologies of modeling and simulation available, and a broad overview is given to aid readers in their understanding of the desired outputs that drove the modeling process.

II. BACKGROUND

This section begins with a short history of the Marine Corps and a discussion about the theory of constraints (TOC) and its applicability to supply chain optimization (with a focus on the Marine Corps); then the section delves into a thorough discussion of how the Marine Corps is currently task organized. Following these sections, the operational phases of every operation are discussed. EABO influences, mission types, and end-state are laid out. Finally, an overview of Marine Corps OCS is presented to the reader in order to establish a CST that will be used as a starting point in the development of a model that optimizes just-in-time nonorganic capabilities. By understanding these concepts, the reader is given context to the current operational situation and is informed why supply chain optimization and process improvement is critical to ongoing developments, especially when it comes to ensuring that nonorganic capabilities reach the operational environment at (or near) the execution of a mission. Last, this information helps the reader understand how the Marine Corps has organizationally fought wars in the past and how they plan to task-organize in order to fight future wars. Ultimately, this information provides context and situational awareness and helps build a foundation from which the reader will be able to better understand the model developed in this thesis.

A. HISTORY

Since the 1950s, the current Marine Corps force design has gone unchanged in its essential inspiration (Berger, 2020, p. 2). Although doctrine and technology have been created to support a force design that is optimized for large-scale amphibious forcible entry and sustained operations ashore, much still needs to be accomplished in order to create mutually contested maritime space and to facilitate larger naval campaigns. This is because, since 1995, the Marine Corps has been involved in more than 28 major military operations—each centered around sea-basing and the use of forward-deployed, combat-ready naval forces. In the future fight against a pacing threat, sea-basing and the surrounding concepts might be but one method the Marine Corps can employ to achieve a competitive advantage against adversarial threats.

B. THEORY OF CONSTRAINTS

The theory of constraints (TOC) can be viewed as a comprehensive model for overseeing an organization (Rahman, 1998) and achieving supply chain goals (Perez, 1997). Moreover, the TOC recognizes the impact managerial policy has on organizational constraints and is formed from different links in the supply chain (Perez, 1997). By applying the TOC to organizational policies and procedures, organizations are better equipped to effectively process ongoing improvement, enhance supply chain performance, and optimize delivery, costs, and responsiveness (Perez, 1997). From a Marine Corps perspective, the TOC is important and relevant because nonfinancial competitive advantages (e.g., responsiveness, flexibility, adaptability, etc.) are becoming more important when it comes to dealing with pacing threats, especially if competition were to be handled in contested environments. For example, responsiveness, flexibility, throughput time, inventory turnover, and resource optimization will play a vital role in ensuring the organic capabilities of the Marine Corps are able to survive against adversarial threats in contested environments.

In continuation, the TOC is a set of parametric policies and supply chain practices developed in the early 1980s (Perez, 1997). The premise behind the TOC is that every organization is only as strong as its weakest link (i.e., constraint) and that—if these constraints can be properly identified, safeguarded, and minimized—organizations can more effectively and efficiently optimize throughput, inventory, and operating expenses (Perez, 1997). According to Rahman (1998) and Goldratt & Cox (2012), the process of ongoing improvement focuses on five steps: identify system constraint(s), decide how to exploit system constraint(s), subordinate everything else to the specified exploitation, improve system constraint(s), and repeat to optimize constraint(s). By applying the TOC to Marine Corps operations, one can begin to realize and optimize the operational impact and survivability of forces operating in austere locations—even while being contested.

1. Drum-Buffer-Rope

Rahman (1998) described the drum-buffer-rope (DBR) as a material flow logistical system, wherein the drum represents the system schedule, the buffer consists of inventory and parts—or time buffers (T-Bs) to protect against output variations—and the rope delivers synchronization through the establishment of critical lines of communication between control points. In an organization, the overall system schedule is synchronized and protected through the effective and efficient use of T-Bs and ropes. Furthermore, T-Bs serve as systems of information that successfully enhance and govern throughput. This is referred to as buffer management. In addition, T-Bs provide organizations with planned and actual performance-based information to efficiently monitor actual inventory throughput against planned performance to protect critical resources within the assembly line. Buffer management consists of three types of T-Bs: constraint buffers, assembly buffers, and shipping buffers. Constraint buffers are parts with specified lead times that are placed ahead of capacity constraint resources (CCRs) and serve to protect the constraint's planned schedule. Moreover, assembly buffers are parts or subassemblies of CCRs. Last, shipping buffers are finished and ready-to-ship products that protect an organization's delivery date performance. The purpose of these buffers is to assist with identifying various causes of interruptions without interrupting overall throughput. In addition, these buffers, if continually reduced, help reduce production cycle times and possibly lead times (Rahman, 1998). By identifying T-Bs within the Marine Corps operational timeline, one can begin to develop a model that optimizes the link between organic and nonorganic requirements so that they are efficiently and effectively helping the Marine Corps throughout any given operational environment and under any operational threat.

2. TOC Application to SCM

As previously mentioned, the TOC is a set of parametric policies and supply chain practices developed to address organizational weaknesses in the form of constraints; if these constraints are properly identified, safeguarded, and minimized, organizations can more effectively and efficiently optimize throughput, inventory, and operating expenses (Perez, 1997). Moreover, the TOC is built upon the process of ongoing improvement and can be used to better understand the impact of constraints on factory performance in relation to interlinked input from suppliers, customers, and laborers within the entire supply chain (Perez, 1997). Furthermore, organizational policies and procedures, effectively implemented through the process of ongoing improvement, lead to enhanced supply chain performance and optimized delivery, cost, and responsiveness (Perez, 1997). By focusing on entire system management instead of subsystems isolation, the TOC and the process of ongoing improvement seek to improve organizational supply chain management as well as overall supply chain performance. Applying this thought to the Marine Corps, the TOC will help identify and mitigate risks between logistics support timelines (organic) and CSTs (nonorganic). Moreover, the TOC will help provide a basis from which a model to optimize the link between organic and nonorganic timelines can be achieved to the greatest extent possible.

C. MARINE CORPS TASK ORGANIZATION

The Marine Corps is designed and organized as a "conventional force in readiness" (USMC, 2019, p. 1-1). Through the use of Marine Corps forces, the president and the secretary of defense (SecDef) can leverage a combat-ready, combined-arms responsive force to deal with conflict across a spectrum of operational requirements. As the combat-ready arm of the Department of the Navy (DON), the Marine Corps provides tailorable "self-contained and self-sustained air, land, and sea strike forces" that can be combined with sea-basing operations to meet any contingency or to respond to natural disasters or regional aggression (USMC, 1998, p. 1-1). These tailorable strike forces are formally known as Marine Air-Ground Task Forces (MAGTF).

MAGTFs are the Marine Corps' "principal organization for the conduct of all missions across the range of military operations" (USMC, 1998, p. 2-1). They consist of integrated, combined armed forces that provide combatant commanders or other operational commanders with flexible, task-organized response capabilities in support of contingency requirements anywhere in the world. Due to their versatility and organizational structure, MAGTFs have the capability to contribute as part of naval expeditionary forces, as well as the ability to conduct sustained operations ashore. Moreover, because of their innate ability to operate in permissive, uncertain, and hostile environments, MAGTFs are able to provide a highly visible presence in austere operating environments capable of projecting measurable combat power ashore. In addition, their austere and force projection capability allows them to secure staging areas ashore for follow-on forces.

"MAGTFs deploy as amphibious, air-contingency, or maritime prepositioning forces (MPFs), either as part of a naval expeditionary force or via strategic lift" (USMC, 1998, p. 2-1). MAGTFs can also be employed "as part of larger joint or combined forces" (USMC, 1998, p. 1-1). These forces deploy with everything necessary to accomplish assigned missions. When deployed with naval expeditionary forces, MAGTFs provide continuous presence at strategic locations and are readily available to rapidly deploy upon notification. Last, when conducting joint operations, the MAGTF composition provides the joint force commander (JFC) the capability to "regenerate, reorganize, replenish, and reorient itself for a new mission without having to return to a home base" (USMC, 1998, p. 2-1).

Built on a foundation of six core competencies—expeditionary readiness, combined-arms operations, expeditionary operations, sea-based operations, forcible entry from the sea, and reserve integration—MAGTF operations have the competency to carry out a wide array of mission sets. Moreover, since MAGTFs are scalable, they also possess the ability to "project mobile, reinforceable, and sustainable combat power" across a wide spectrum of military operations (USMC, 2019, pp. 1–3).

Although task organized and reliant upon six core competencies, each MAGTF (regardless of overall size) is comprised of the same structure and core elements—a CE, a GCE, an ACE, and an LCE. The CE acts as the MAGTF's headquarters and provides the necessary staff and capabilities to enable C2 planning and execution of all operations. The GCE conducts ground operations to support the MAGTF mission and is customarily formed around an infantry organization reinforced by artillery, reconnaissance, armor, and engineer forces. The ACE performs the six functions of Marine aviation—offensive air support, anti-air warfare, assault support, air reconnaissance, electronic warfare, and control of aircraft and missiles—in support of the MAGTF mission and is customarily formed around an aviation organization supplemented with air C2, air combat, and air CSS forces. Last, the LCE provides a full range of CSS functions and capabilities in support of continued readiness and sustainability of the MAGTF and is normally formed around a logistics headquarters with support detachments that vary in size and are dependent upon the assigned mission. Figure 1 depicts the typical MAGTF organization (USMC, 2019).

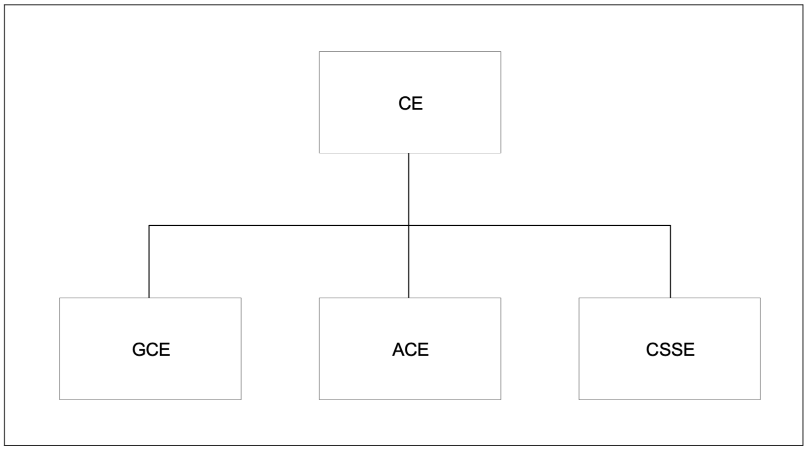

Figure 1. MAGTF Organization. Source: USMC (1998).

The Marine Corps organizational structure can be employed at four individual levels of deployable MAGTF: the MEF, the MEB, the MEU, and the SPMAGTF. All of these units are founded on the standard MAGTF organizational structure; however, they differ when it comes to their concept of employment—size, deployment consideration, and scope of mission. Figure 2 shows the key elements of a MAGTF.

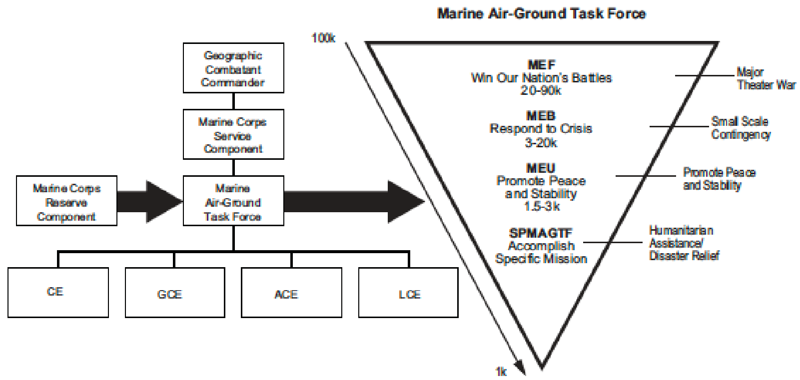

Figure 2. MAGTF Key Elements. Source: USMC (2019).

A MEF is the Marine Corps' principal warfighting organization. It is capable of executing a wide array of military operations and when augmented appropriately, can act as a joint task force (JTF) headquarters. MEFs vary depending on mission requirements and typically deploy by echelon with up to 60 days of sustainment. Moreover, when properly supported with maritime prepositioned equipment and supplies, a MEF may conduct ongoing operations ashore following an amphibious operation (USMC, 2019, pp. 1–3–1-4).

Within the Marine Corps, there are three standing MEFs: I MEF, which is based primarily in southern California; II MEF, which is based primarily in North Carolina; and III MEF, which is primarily based in Okinawa, Japan. Each MEF consists of a "CE, one Marine Division (MARDIV), one Marine aircraft wing (MAW), and one Marine logistics group (MLG)" (USMC, 2019, p. 1-3). When building combat capabilities, the elements of a MEF act as reservoirs from which MAGTFs are designed and developed.

MEBs act as subordinate commands of the MEF and are intended to accomplish operational missions based on augmentation. MEBs are midsize MAGTFs designed to conduct or respond to major security operations, large crises or contingencies, or major campaigns. Moreover, MEBs deploy with up to 30 days of sustainability, and they are oriented around a respective AOR. MEBs provide, at the guidance of a general officer, a foundation for forcible entry and other power projection operations. For example, a MEB can contain the landing forces necessary to conduct amphibious landings, or they can contain fly-in echelons that meet up with MPF equipment and supplies. Moreover, all

MEBs are expeditionary forces capable of rapid deployment and employment. Their expeditionary nature comes from their ability to leverage amphibious ships, strategic lift, and MPF assets to deploy. Last, there are three regionally oriented MEBs: 1st MEB, which is aligned to I MEF; 2nd MEB, which is aligned to II MEF, and 3rd MEB, which is aligned to III MEF. Their regional focus enables the extension of a MEF into forward domains, and their expeditious nature enables them to bridge potential gaps during crisis response (USMC, 2019).

As a standard forward-deployed expeditionary organization, a MEU is capable of conducting missions of narrow scope and duration as an extension of the MEF. MEUs act as a forward-deployed, sea-based, rapid crisis response capability that the president, SecDef, or combatant commanders can call on to conduct a full range of military operations—maritime reconnaissance, surveillance, tactical recovery of aircraft and personnel (TRAP), and search and seizure of vessels. Moreover, a MEU can act as an enabler for larger follow-on forces, and they can provide a visible and credible presence due to their unique deployment capabilities. MEUs undergo intensive 26-week, standardized pre-deployment training programs intended to enable them to deploy within a 6-hour notification under a wide range of mission requirements (USMC, 2019).

SPMAGTFs are MAGTFs designed to conduct a specific mission. SPMAGTFs are not restricted to size; however, they are normally smaller than a MEU and may be task-organized from MEF assets or formed for a contingency purpose. The mission of SPMAGTFs are performed independently from an already deployed MAGTF and are limited in scope and duration. Their missions typically include crisis response, regionally focused training exercises, and peacetime missions. SPMAGTFs are generally employed in a similar manner as a MEU; however, due to the nature of their mission, they may be deployed via other methods and modes of transportation—commercial shipping craft, inter-theater airlift, and organic Marine aviation assets (USMC, 2019).

1. Marine Logistics Group

A Marine Logistics Group (MLG) is task-organized within every MEF and acts as a permanently structured command. The MLG provides direct support to Marine divisions and sustained tactical logistics to support each element of the MEF beyond a supported unit's organic capability (USMC, 2019, p. 7-2). More specifically, an MLG provides logistic services related to maintenance, supply, transportation, general engineering, explosive ordnance disposal, health services, and messing (USMC, 2019, p. 7-2). Figure 3 represents a notional command structure for 3rd Marine Logistics Group (3d MLG).

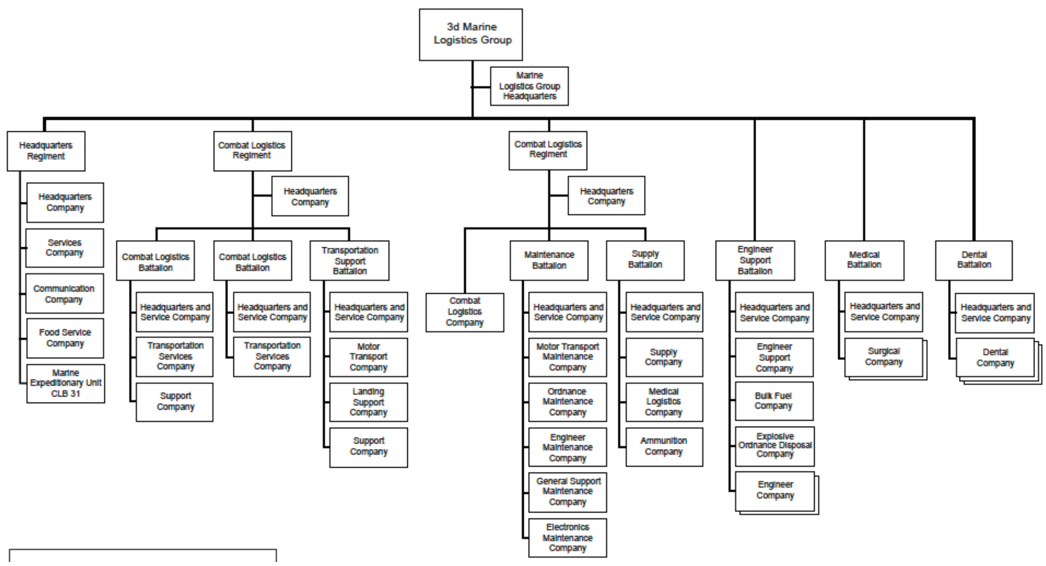

Figure 3. MLG Notional Task Organization. Source: USMC (2019).

2. Combat Logistics Regiment

A Combat Logistics Regiment (CLR) is task-organized within every MLG and acts as a permanently structured command that forms the LCE within the MLG. A CLR, as the LCE headquarters for a MEB-sized MAGTF, provides direct tactical logistics to the Marine infantry division outside its organic capability. More specifically, the CLR provides terminal operations, medium- and heavy-lift transportation support, and landing support to the MEF and smaller MAGTFs within the MEF (USMC, 2019, p. 7-8). Figure 3 represents a notional command structure for a CLR.

3. Combat Logistics Battalion

Combat Logistics Battalion (CLB) is task-organized within every CLR and acts as a permanently structured command that forms the LCE within the CLB. The overarching mission of the CLB is to deliver general and sustained tactical-level logistic support outside a unit's organic supply and maintenance capabilities (USMC, 2019, p. 7-7). More specifically, a CLB contains the necessary organizational and intermediate-level supply and maintenance, medical, motor transport, landing support, and other necessary CSS capabilities that their supported unit does not organically possess (USMC, 2019, p. 3-3). Figure 4 represents a notional command structure for CLB-15 and serves as a model for a traditional CLB.

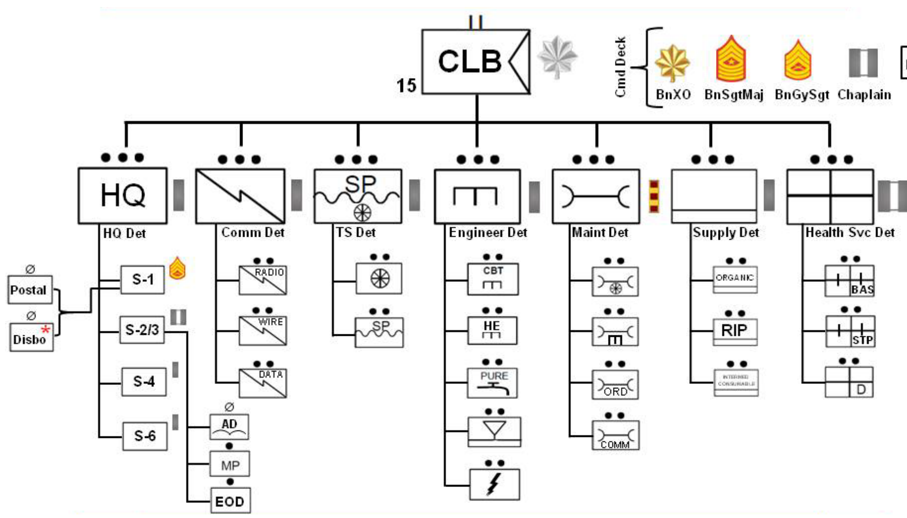

Figure 4. CLB-15 Task Organization. Source: CLB-15 (2020).

4. Marine Littoral Regiment

The Marine littoral regiment (MLR) maneuvers and persists inside a contested maritime environment and conducts sea denial operations as part of the naval expeditionary force (NEF) in order to enable fleet operations. An MLR may be assigned one of the following Marine Corps tasks (MCTs):

- Conduct EABO
- Command and control distributed forces
- Support maritime domain awareness
- Support anti-surface warfare
- Support anti-air warfare
- Plan and direct shore-based tactical logistics
- Conduct fires
- Support operations in the information environment
- Maneuver and persist in key maritime terrain

In order for the MLR to persist inside the WEZ, the MLR must be able to deny the enemy's use of key maritime terrain; degrade the enemy's ability to perform its mission; enable fleet operations through EABO; rapidly deploy and employ forces (e.g., transition or shift from contact to blunt); maintain a high degree of mobility inside key maritime terrain; sustain forces with light, austere, efficient, and self-sufficient forces adept in local foraging; and protect forces by avoiding detection and targeting—all while securing sites and interior lines of communication. Figure 5 represents a notional table of organization for an MLR.

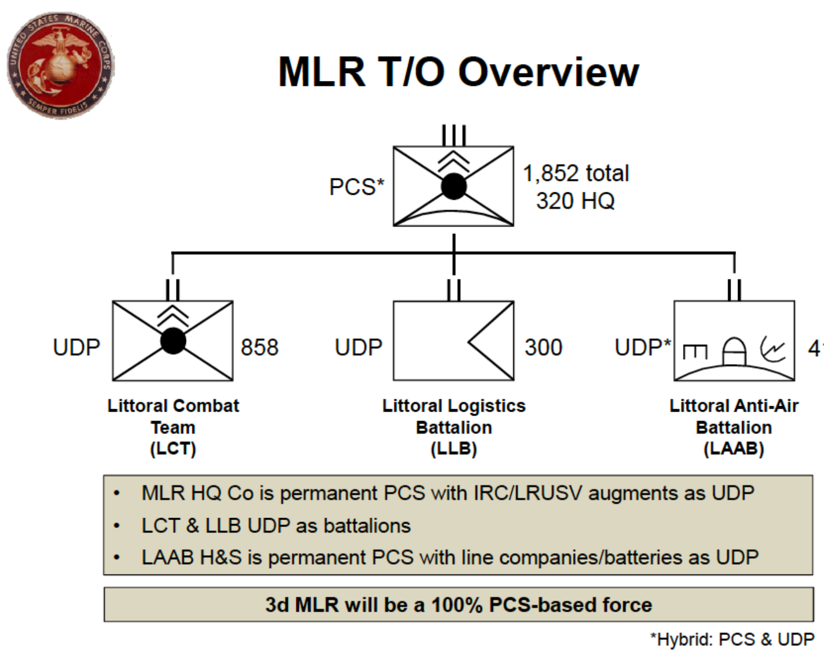

Figure 5. MLR Table of Organization Overview. Source: W. M. Young, personal communication, July 1, 2020.[1]

5. Marine Littoral Regiment–Combat Logistics Battalion

The Marine littoral regiment–combat logistics battalion (MLR–CLB) provides tactical logistics support to the MLR beyond organic capabilities by supporting EABs, managing cache sites, and connecting to operational logistics. Unique aspects of the MLR–

[1] This information was communicated via a PowerPoint presentation attached to a personal email on July 1, 2020

CLR configuration, not common to traditional CLR–CLBs, is the imbedded contracting officer (KO), disbursing agent, and field ordering officers (FOOs). Figure 6 represents a notional table of organization for an MLR–CLB.

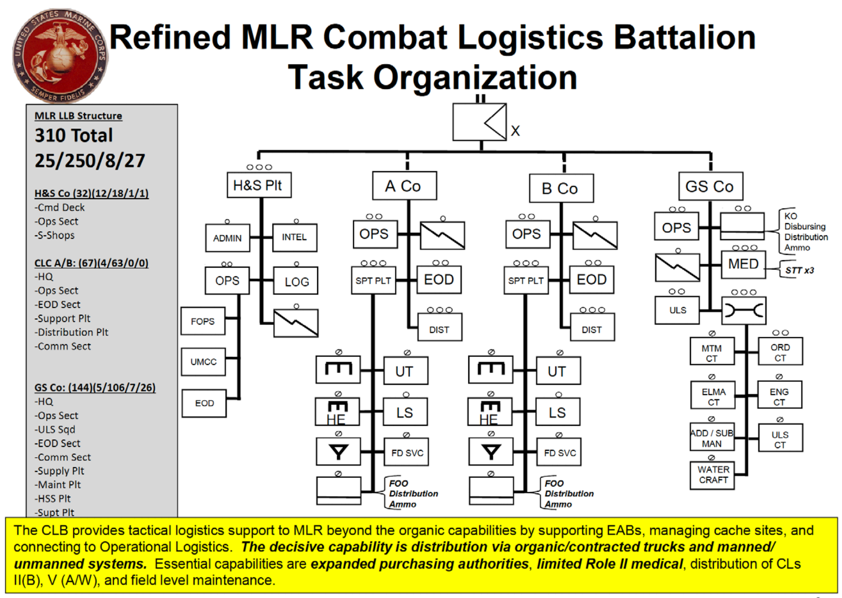

Figure 6. MLR–CLB Notional Task Organization. Source: W. M. Young, personal communication, July 1, 2020.[2]

D. OPERATIONAL PHASES

Phases are distinct in "time, space, and purpose from one another;" however, they should be mutually supportive and represent a "natural progression and subdivision of the campaign" (JCS, 2017, p. xxiii). Moreover, the ending of one phase indicates the starting of the next one. However, on occasion operations may revert to a previous phase wherein a resurgence exists, or the enemy has reengaged with friendly forces. There are six phases in total along the continuum of military operations according to the Joint Chiefs of Staff (JCS, 2017) Joint Publication (JP) 5–10, titled *Joint Planning*. Figure 7 depicts the six notional operational phases of military operations.

[2] This information was communicated via a PowerPoint presentation attached to a personal email on July 1, 2020

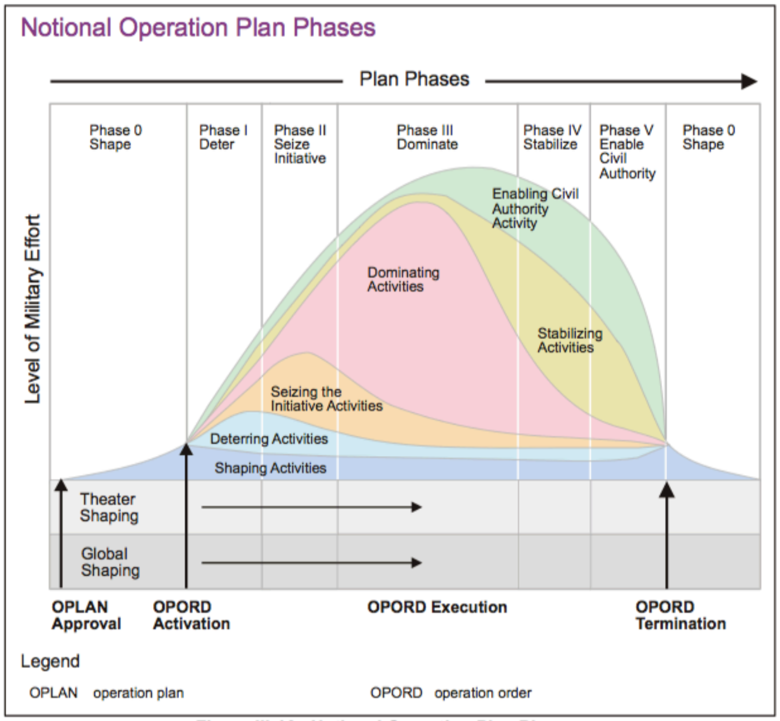

Figure 7. Notional Operation Plan Phases. Source: JCS (2017).

Phase 0: Shape the environment. Activities during this phase are focused around conducting ongoing and routine actions to ensure or solidify friendly and alliance relationships. When necessary, this phase relies on joint, interagency and multinational partnerships to deter potential adversaries.

Phase 1: Deter the enemy. This phase builds upon Phase 0 and focuses on deterring specific adversaries by demonstrating force capabilities or executing show of force initiatives. The primary purpose of this phase is to pursue U.S. interests and to facilitate the deployment, employment, and sustainment of forces in a given region.

Phase 2: Seize the initiative. Hostilities are expected to commence during this phase. During this phase, adversaries are engaged through the use of combat power to delay, halt, or dislodge enemy actions as well as to gain freedom of action or access to critical infrastructure. Last, during this phase, activities are conducted to relieve crisis conditions and to promote regional stability.

Phase 3: Dominate the enemy. All attempts to break the adversary's will for organized resistance is the primary focus of this phase. Combat power is leveraged to exploit, pursue, and destroy enemy resistance. Moreover, friendly forces begin to conduct and transition to stability operations during this phase.

Phase 4: Stabilize the environment. Stability operations take center stage during this phase. Activities include reconstitution of infrastructure and the restoration of services. Last, the transfer of authority to a legitimate civil entity is conducted during this phase.

Phase 5: Enable civil authority. The focus of this phase is to enable legitimate authorities to provide necessary and essential services to the local populace. Activities conducted during this phase require a collective effort between U.S. military force, multinational force, interagency support, and nongovernmental agencies to promote a favorable transition and to generate a favorable attitude among the populace toward U.S. and host nation objectives.

Phasing helps provide perspective and a way of breaking complex operations into manageable parts. The main purpose of phasing is to "integrate and synchronize related activities, thereby enhancing flexibility and unity of effort during execution" (JCS, 2017, p. IV-38). Phases are most often sequential; however, they can also be overlapping or ongoing simultaneously. Moreover, phases can represent a single major campaign, or they can consist of several subordinate operations being conducted in a series of related activities.

The problem with the current phasing construct is that it might be too linear and is not particularly useful for the problems faced by the United States today. For example, the linear progression of conflict implied by JP 5-0 (JCS, 2017) assumes the central decisive point to be in Phase 3 (Scharre, 2016). Furthermore, JP 5-0 (JCS, 2017) also assumes Phase 3 is where the bulk of U.S. military attention for resourcing, modernizing, and allocating risk is demanded (Scharre, 2016). Essentially, the current phasing construct is ineffective at facilitating U.S. understanding of adversarial conflict and the development of solutions because it is too restrictive on planners. Former Chairman of the Joint Chiefs General Joseph Dunford (2016) has stated that he does not believe the current phasing construct is useful because the United States bends authorities and capabilities according to phasing, which he believes is insufficient to deal with adversaries that seek to advance their influence while simultaneously avoiding U.S. strengths.

E. EXPEDITIONARY ADVANCED BASE OPERATIONS

This section begins with the definition of EABO and then discusses EABO influences, mission types, and desired EABO end-states. The purpose of this section is to familiarize the reader with how and why the Marine Corps plans to execute future operational wars. Moreover, this information can be used to help determine any disparities between current logistics support timelines and CSTs—such that they should be equal and or minimized to the greatest extent possible in order to ensure that organic and nonorganic capabilities reach and support the warfighter at the same time and under any operational circumstance.

1. Defined

According to the *Expeditionary Advanced Base Operations (EABO) Handbook* (MCWL, C&P, 2018, p. 5), "EABO is a future naval operational concept that meets the resiliency and forward presence requirements of the next paradigm of U.S. joint expeditionary operations." Moreover, EABO is executed by low-signature naval and joint forces to offensively strike and target adversary positions and to defensively form a maritime defense in depth. The key aspect of EABO is that the concept is meant to generate operational advantages, to expand options during the next paradigm of joint expeditionary operations, and to increase operational agility. Most importantly, the EABO concept is predicated on fundamental assumptions regarding the dynamics of future wars and the likely nature of them being centered around sea and air control. EABO uniquely defines adversaries according to strategic importance and geography to develop generic methods for dealing with fast moving anti-access/area denial (A2AD) challenges, especially as it relates to pacing threats or near peer competitors (MCWL, C&P, 2018).

2. EABO Mission Types

As previously mentioned, the EABO concept is meant to generate operational advantages and expand options in the context of A2AD. Moreover, EABO is designed to provide benefit across the range of military operations (ROMO), including humanitarian assistance/disaster relief (HA/DR), as well as major combat operations, throughout each operational phase of the joint campaign. It is important to note that all EABO missions are conducted by forces on an EAB, and they fall into one of two categories—tactical operations or operational support activities. More specifically, these mission types include

> surveillance and reconnaissance, air interdiction and missile defense, sea control and sea denial, integrated, active, maritime defense to close straights to enemy maritime traffic, land-based rotary-wing anti-submarine warfare (ASW) pouncers, flotilla force operations, swarm missions, mobile FARPS, UXX operations of all types, electronic warfare (EW), information operations (IO), and cyber, decoy and operational deception activities, and last, fleet support activities, battle damage repair, and rearming and refueling of surface ships and flotilla forces. (MCWL, C&P, 2018, pp. 23, 29–30)

3. EABO Optimization

To optimize EABO concepts, EABO capabilities must be operationally relevant, and they must enable naval forces to exploit key maritime terrain. The capabilities must exploit partner proximity, reduce the need for expensive platforms, and place greater emphasis on lethal payloads. All of these requirements must be fulfilled given that "EABO capabilities and systems are designed to complement the resilient, minimal signature, and dispersed nature of EABs," such that the EABs and the forces they support can "persist forward within range of ample adversary long-range precision fires" (MCWL, C&P, 2018, p. x).

4. EABO Operational End-State

The EABO has broad applicability and is designed to accomplish a wide range of mission sets in the most expeditious and agile manner and method possible. In order to accomplish these tasks and the assigned the missions conceptualized by EABO, the Navy and the Marine Corps will require "new types of forces, organizational structures, and capabilities to persist, partner, and fight within range of adversary long-range fires" (MCWL, C&P, 2018, p. 49). More specifically, forces must be holistically designed, functionally complete, fully integrated, and mutually supporting. This will create imperatives and tenets to the naval warfighter challenges that the Marine Corps will have to address in order to guide force development and create future inside-force capabilities. Some of the imperatives include "generating the virtue of mass without vulnerabilities, creating a more dispersed, resilient and hard target forward-basing infrastructure, and creating a more resilient CONUS/sea base-to-shore sustainment infrastructure capable of supporting distributed forces and operations" (MCWL, C&P, 2018, p. 50). In addition to the EABO imperatives just outlined, there are 14 tenets of EABO that have been developed to maximize EABO utility and describe desired force qualities and characteristics. These 14 tenets are

- enable economy of force;
- plan, prepare, and preposition an advantageous force posture;
- expand capacity with partner capabilities;
- invert cost imposition to increase the enemy's relative cost in level of effort, time, and expense;
- enhance relative economy to gain additional capacity;
- leverage partner proximity to reduce size and improve persistence and cost of capabilities;
- make austerity a virtue to maintain persistent presence (this tenet also relies on hearty, user-maintained, logistics-light capabilities and robust, mission-focused forces);
- minimize signature;
- balance the EABO force such that smaller capabilities that are inherently more resilient and risk-worthy are valued over a smaller number of alternatives that are more expensive and maintenance intensive;
- conserve assault shipping and fleet support assets such that EABO capabilities and platforms are capable of conserving the expenditure of forward-deployed assets;
- encourage operational resiliency to operate and flourish under austere conditions and within range of long-range precision fires;
- be naval task force organized; however, be capable of playing host to joint capabilities and forces;
- be mutually supportive of other EABs in order to achieve greater security and resiliency; and
- take calculated risk to provide improved options for commanders to make more informed and risk-worthy decisions. (MCWL, C&P, 2018, pp. 50–53)

5. EABO and Logistics (Deployment, Distribution, and Delivery)

The future battlespace will be complicated by the proliferation of long-range precision fires. This will significantly impact operational requirements as well as demand on logistics. This is primarily due to the "race" that will take place between a "willful adversary attempting to mass forces" at the decisive point of their choosing and "the ability of the defensive forces to supply munitions, relieve forces, and support services to the defenders" (MCWL, C&P, 2018, p. 61).

In today's operational environment, the deploying of naval forces requires large ships. Although these large ships will contribute to valiant but short battle histories in future wars, and will help necessitate sea control and area denial, they pose a credible threat to the persistence and survivability of forward-deployed forces. This is because there currently exists a paradigm shift between the need for large naval vessels and the demand for smaller, more persistent and survivable platforms capable of operating in the littorals. Due to these threats, there will be a shift to smaller, more tactically dispersed platforms throughout the inside battlespace. Optimally, the munitions, platforms, equipment, and other hard-to-transport items that are needed to support future operations will be prepositioned. Success in a future war against a peer competitor is likely to be predicated on the "transportation of things" from CONUS under combat conditions. To succeed, the United States will need to devise new methods for deploying forces, their equipment, and the necessary services needed to support and sustain operations (MCWL, C&P, 2018, p. 62).

To achieve success in a future war against a peer competitor, the logistics distribution and support system must be robust and equally resilient. Moreover, linear logistics concepts will not suffice; rather, the concepts must be dynamic and revolutionary in order to sustain widely distributed forces. On this note, the future logistics distribution system will not consist of distribution centers or intermodal transportation hubs; in the future operating environment, these would constitute single points of failure. The crux of any future EABO logistics distribution concept will be the ability to move all commodities away from logistics hubs and onto smaller (potentially more autonomous) platforms that are then spread throughout contested seas and EABs to support distributed naval forces (MCWL, C&P, 2018, p. 62).

In the near term, the greatest demand on the logistics and supply chain will most likely be for aviation parts, fuel, and maintenance. As time progresses, the demand will likely grow to include ordnance and other miscellaneous repair parts, which will probably prove to be the most challenging commodity, "since other classes of supply can be readily contracted or foraged" (MCWL, C&P, 2018, p. 63). Last, attention must be given to the fact that any future logistics and supply chain concept must be fully integrated with EABO capabilities and concepts of operations (MCWL, C&P, 2018).

F. MARINE CORPS OPERATIONAL CONTRACT SUPPORT

This section begins with the definition of Marine Corps OCS, then goes into more detail regarding dollar thresholds, personnel, and CSTs that the Marine Corps currently has in place to support nonorganic requirements within the Marine Corps. Last, an overview of the current Marine Corps contracting support flow chart is provided in order to provide the reader more context regarding the additional steps that will have to be taken whenever a new requirement is presented to the contracting office for acquisition. Ultimately, the general purpose of this section is to provide the reader overarching context for the Marine Corps CST, which—as it stands—is estimated to take 120 days from the identification of a new requirement to the point at which the warfighter finally receives the goods or services being requested.

The procurement sources at the U.S. Marine Corps' organic disposal are USMC ServMart, base-affiliated fuel farms, Global Combat Support System–Marine Corps (GCSS–MC), and the government commercial purchase card (GCPC) for goods and services below the micro-purchase threshold (MPT). Through these sources, the U.S. Marine Corps units are able to buy routine office supplies and specialty goods and services below the MPT (e.g., construction or construction material, fuel, Class IX repair parts, and other miscellaneous parts associated with major end items). All other requirements must be sourced via nonorganic procurement methods (e.g., contracting).

The GCPC program was developed to streamline small purchases and purchase payments, minimize paperwork, eliminate petty cash, and simplify administrative efforts associated with the purchase of traditional and emergent supplies and services. The support provided by the GCPC comes in the form of a tailored task order and is issued under the General Services Administration (GSA) SmartPay contract. The GCPC program adheres to the acquisition policies identified in the Federal Acquisition Regulation (FAR) and Defense Federal Acquisition Regulation Supplement (DFARS). In addition, the GCPC is only used for purchases and contract payments at or below the MPT. If proper written authority is given, the GCPC may be used to make payments on contracts above the MPT, and it may be used by cardholders (CHs) outside the United States for goods or services acquired or performed outside the United States using the simplified acquisition procedures (SAP). The head of contracting activity (HCA) issues GCPC contract authority to component commands, and the HCA accountable for the performance and management of the command's GCPC program. Among many other GCPC program-related responsibilities, all invoices incurred by the use of the GCPC are certified by an appointed certifying officer (CO) after being reviewed and approved by the CH's approving official (AO)—typically the unit supply officer and the CH's direct supervisor. At the lowest echelon possible, the CH uses the GCPC to acquire authorized supplies or services per their delegated authority and must comply with statutory, contractual, administrative, and locally applicable requirements. Table 1 represents the current dollar MPTs according to FAR 2.101 (2020).

Table 1. Micro-Purchase Thresholds. Source: FAR 2.101 (2020).

Type of Purchase	Micro-Purchase Threshold
Supplies	$10,000
Construction	$2,000
Services	$2,500
Contingency Operation (Inside United States)	$20,000
Contingency Operation (Outside United States)	$30,000
Simplified Acquisition Threshold (SAT)	$250,000 (except for contingency operations)
SAT (Contingency—Inside United States)	$750,000
SAT (Contingency—Outside United States)	$1.5 million
SAT (Humanitarian/Peacekeeping—Outside United States)	$500,000

For all other sourcing requirements that will go through the contracting process, there is an associated CST. The CST involves the unit identifying the requirement(s), the unit obtaining funding, the unit submitting the requirement package to the KO for processing, the contract being awarded, and the contracted requirement being delivered to the customer. In total, the CST can take up to 120 days and can be used as a guideline for workload planning by the unit, the comptroller, the KO, and the customer to manage expectations. Any attempt to truncate the CST may lead to increased risk to contracting supportability. Figure 8 graphically displays a generalizable CST.

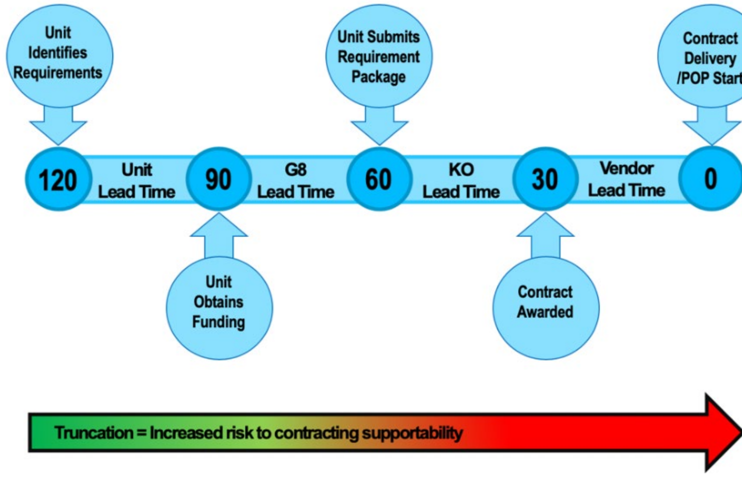

Figure 8. Contract Support Timeline. Source: W. M. Young, personal communication, June 27, 2020.[3]

Imbedded within the CST are various friction points. For example, the following friction points disrupt or delay the CST if not handled accordingly: timely submission and approval of waivers; above-threshold requirements that require Requirements Resourcing Review Board (R3B) approval; requirements for specialty end items; and sufficiently detailed, salient, and timely requirements in the appropriate form (e.g., statement of work [SOW], statement of objective [SOO], or performance work statement [PWS]).

The U.S. Marine Corps Expeditionary Contract Platoon (ECP) serves to provide comprehensive expeditionary contracting support to any size MAGTF or augmentation to a joint contracting agency. This includes contracting and purchasing essential supplies and services that are not readily available through normal logistic channels or through host-nation support (HNS) throughout the full ROMO. Typically, the ECP deploys as a four-Marine team consisting of contracting officers who will perform as both the contracting officer for the MAGTF commander and as the OCS advisor.

Each OCS requirement above the MPT, in the form of a completed requirements package, submitted to the ECP for procurement will go through a generalizable procurement cycle. Moreover, depending on the dollar amount associated with the

[3] This information was communicated via a PowerPoint presentation attached to a personal email on June 27, 2020

requirements package, the amount of time it takes from acceptance of a complete purchase request to the day of award varies. Table 2 can be used as a guideline for workload planning by the KO and the customer to manage expectations:

Table 2. Purchase Request Type with Dollar Amount and Procurement Action Lead Time

Purchase request type	**Dollar Amount ($)**	**Procurement Action Lead Time (PALT)**
Supplies and Services	$10,000 to $250,000	30 Days
Supplies	$250,000 up to $999,999	41 Days
Services	$250,000 up to $999,999	46 Days
Supplies and Services	>$1,000,000	60 Days

To facilitate the handling of procurement requirements below the MPT (minimum $25,000 warrant), the KO can appoint and train FOOs. An FOO is usually an E-7 or above, but a waiver may be granted for a highly qualified E-6. FOOs are authorized to make purchases below the MPT and are allowed to obligate government funds for micro-purchases of supplies and services only. All FOOs remain under the strict operational control and oversight of an FOO manager or the designated KO. Prior to the execution of any purchase, an FOO must have a valid funding document with the specific funding amount and fund citation; a clear description of the supplies, services, or construction being purchased; and a certification of funds availability from a funds certification official. The FOO must request and obtain additional funds prior to making a purchase for any procurement that exceeds the initial amount of the funding document. Last, FOOs may place call orders through vendors with an established blanket purchase agreement (BPA) and should not use funds to pay for equipment or services already provided by another source. These sources include installation property book offices (IPBOs), self- service supply centers (SSSCs), or local contracting offices. A master FOO purchase authorization list is normally given to the FOO upon appointment. This list details how most items or services the FOO is likely to purchase can be obtained.

According to the requirements sourcing logic of the 3d MLG, contracting is considered the last line of logistics support. Before trying to contract a requirement, organic support, GCPC, FOO, and mutual logistics support requests (MLSRs) must first be considered. If contracting is considered, Figure 9 depicts a generalizable contracting flow chart with assigned timelines for each step of the process.

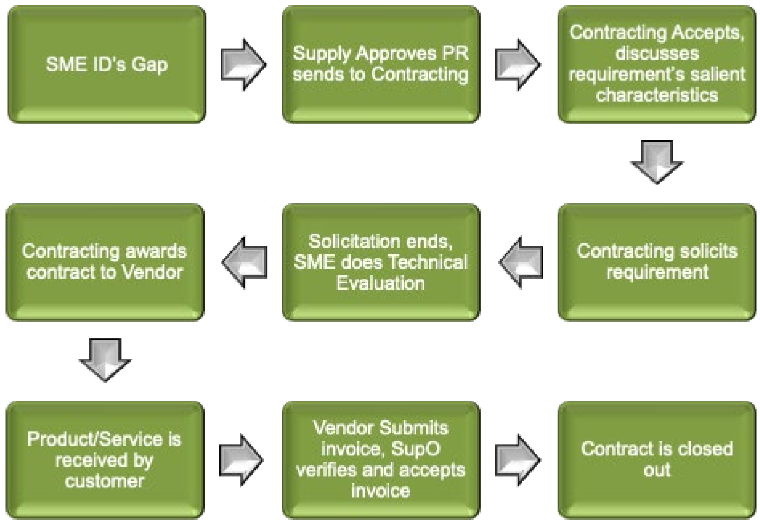

Figure 9. Contracting Flow Chart (Basic)

G. SUMMARY

This chapter provided a broad overview of the background associated with Marine Corps history, a discussion about the theory of constraints (TOC) and its applicability to supply chain optimization (with focus on the Marine Corps), and a discussion of how the Marine Corps is currently task organized. Next, this chapter presented the operational phases of every military operation. Then it went into detail about EABO: its definition, need for optimization, possible mission types, desired end-states, and impacts on logistics. Last, this chapter presented an overview of Marine Corps OCS, which discussed the current III MEF CST, as well as some of the thresholds that affect Marine Corps operations. As previously discussed, by understanding these concepts, the reader is given context and foundational knowledge as to how the Marine Corps currently operates, how they plan to operate, and why logistics and CSTs are vitally important—especially when it comes to ensuring that nonorganic capabilities reach the operational environment at (or near) the execution of EABO.

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III. LITERATURE REVIEW

The literature review is intended to provide the reader a brief overview of the Marine Corps' aiming point for logistics development and contracting support and of the guidance and planning directives that direct it. The first publication of this review is *Sustaining the Force in the 21st Century* (Berger, 2019b). This publication has been written to provide the logistics community with guidance for logistics development, priorities, and direction in support of future supporting actions. The second publication is the *Commandant's Planning Guidance: 38th Commandant of the Marine Corps* (CPG; Berger, 2019a). The CPG provides strategic direction for the Marine Corps and serves as the authoritative planning and priority setting document when it comes to force development. Next, this review explores and discusses the past research conducted at the Naval Postgraduate School on the topic. By understanding the background, research, recommendations, and guidance within these publications and references, a model of current and future Marine Corps OCS can be developed to inform EABO–OCS decision-making from a logistics and contract support timeline synchronization perspective.

A. SUSTAINING THE FORCE IN THE 21st CENTURY

The future of logistics and sustainment of maneuver forces will be greatly impacted by the future challenges the Marine Corps will face across a full range of military operations and in all domains—air, land, sea, space, and cyber. In order to guide the Marine Corps in fighting and winning the nation's battles of the future environment described by the National Defense Strategy (NDS), *Sustaining the Force in the 21st Century* was developed (Berger, 2019b). This document specifically describes the steps the Marine Corps will take to design, develop, and field logistics capabilities in the future.

The "logistics enterprise must be configured to enhance the lethality of the MAGTF through speed, agility, and survivability" (Berger, 2019b, p. 1). On the battlefield of the 21st Century, Marine Corps logisticians provide a unique ability to "generate, train, deploy, execute, and sustain" forces necessary to fight and win (Berger, 2019b, p. 1). This ability requires logisticians and force developers to place a heavy importance on innovation and vision toward the future that looks beyond mere material solutions. The ultimate success of the Marine Corps in the future fight will rely upon and be measured by the ability of the Marine Corps to sustain operating forces in the face of critical-thinking and rapidly-evolving adversaries.

Within *Sustaining the Force in the 21st Century* (Berger, 2019b), there are improvements identified to enhance the lethality of the MAGTF, and it guides the efforts of the Marine Corps to highlight risks, develop mitigation strategies, and find solutions that enable speed, agility, flexibility, and responsiveness across the logistics enterprise. Moreover, this document helps establish a future operating environment to be considered when dealing with challenges and developing solutions. For example, the document states that the future operating environment will be dominated by complex "terrain, technology proliferation, information warfare," signature management, and "increasingly non-permissive or denied environments" in the littorals or in close proximity to coastlines (Berger, 2019b, pp. 2–3).

The central idea of *Sustaining the Force in the 21st Century* is that "Marine Corps logistics must sustain combat power in contested environments" (Berger, 2019b, p. 5) To achieve this end-state, the Marine Corps has identified four lines of effort (LOE): enable global logistics awareness, diversify distribution, improve sustainment, and optimize installations to support sustained operations (Berger, 2019b, p. 5). Last, *Sustaining the Force in the 21st Century* will serve as the overarching framework and provide direction for developing a model within this research that aligns with service guidance and informs logistics force management, force development, and force design.

B. COMMANDANT'S PLANNING GUIDANCE

The CPG (Berger, 2019a) provides "strategic direction" and serves as the authoritative service-level planning document that the Marine Corps must use when navigating the force design and development road map. Within the CPG, there are five priority focus areas identified: force design, warfighting, education and training, core values, and command and leadership. Regardless of institutional changes enacted, each change will be based on a long-term view and singular focus of where the Marine Corps intends to be in the future (Berger, 2019a, p. 1).

Force design is the 38th CMC's number one priority. He wants to maintain the current MEF structure; however, he realizes that each MEF does not have to be task-organized the same way. The intent for each MEF is that each one will be designed, equipped, and trained to fight and provide stand-in force capability in the MEF's assigned region. Moreover, each MEF will be designed with the inherent capability to persist inside adversary WEZs, create a mutually contested space, and enhance naval campaign engagement (Berger, 2019a, pp. 2–3).

To accomplish his force design goals, the 38th CMC wants to model future MEUs beyond the traditional three ship model. This is because there is no one-size-fits-all approach to the operational challenges likely to be faced by the Marine Corps in the future. Moreover, the CMC wants to possess a new fleet that has been designed to be smaller, more lethal, and more risk worthy. To achieve this, mission agility must be possessed across "sea control, littoral, and amphibious operations" and the force must be enhanced for naval expeditionary warfare in contested spaces with purpose-built capabilities designed to enable sea denial and guaranteed access (Berger, 2019a, pp. 3–5).

As the Marine Corps moves beyond concept to implementation, the CMC intends to employ the EABO concept to inform how missions against pacing threats will be approached. Future force design and development will require force options and capabilities consisting of a wider range of advantages to deliver mass, elite warriors, innovation, and adaptability. Part of achieving this end-state will be the reliance on logistics and security throughout the operating environment. The CMC's planning guidance will serve as a supplemental document to *Sustaining the Force in the 21st Century* (Berger, 2019b) and will provide direction for developing a model within this research report that aligns the CMC's planning guidance with modeled logistics force management, force development, and force design (Berger, 2019a, pp. 11–12).

C. FORCE DESIGN 2030

Force Design 2030 (Berger, 2020) is supplemental to the CPG disseminated in 2019 and is intended to describe the progress the Marine Corps must make in order to meet principal challenges inherent with designing and developing a future force. In addition, *Force Design 2030* provides methodology and organization insight and the steps the

Marine Corps is taking to move current force design efforts forward into the future (Berger, 2020, p. 1).

As a consequence of likely future challenges, the Marine Corps must transform traditional models for "organizing, training, and equipping the force to meet new desired ends" (Berger, 2020, p. 2) This transformation will have implications for the size and capacity of current forces in order to free resources to meet necessary capacities and capabilities and to make these resources more affordable, distributable, and resilient when it comes to operating in complex environments and logistical support.

From a logistics standpoint, *Force Design 2030* recognizes the criticality of logistics and the vulnerability impact that logistics support will have on future forces operating in contested environments. This is because forces that cannot sustain themselves become liabilities. Conversely, *Force Design 2030* recognizes that forces that can sustain themselves contribute to the Marine Corps' ability to achieve and maintain a competitive advantage while operating in a complex operating environment (Berger, 2020, pp. 5–6).

Within *Force Design 2030*, the 38th CMC explicitly states that modeling and simulation is necessary to inform logistical requirements and to determine probabilistic success in various types of engagements. Moreover, any type of modeling must be considerate of "full-scale, empirically based experimentation of the future force in realistic maritime and littoral terrain" (Berger, 2020, p. 6). In addition, any modeling and simulation must take into consideration the 2019 CPG, must use only approved naval concepts (e.g., distributed maritime operations, EABO, and littoral operations in contested environments [LOCE] concept), must not be constrained by legacy platforms or programs of record, and must be threat-informed from a naval warfare perspective.

D. NAVAL POSTGRADUATE THESES

The following keyword searches were conducted via the NPS Dudley Knox Library Theses archive. An asterisk (*) denotes that the keyword search returned a result.

- Marine Corps contract support timeline
- Marine Corps logistics support timeline
- Logistics support timeline
- *Contract support timeline

- Logistics and contract support timeline
- *Logistics support optimization
- Contract support optimization
- Logistics support synchronization
- *Contract support synchronization
- Logistics and contract support synchronization
- Logistics and contract support optimization
- Expeditionary Advanced Base Operations timeline
- Expeditionary Advanced Base Operations optimization
- Expeditionary Advanced Base Operations synchronization
- EABO timeline
- EABO optimization
- EABO synchronization

The reason these keywords were selected is that each is related to the primary focus of this research: logistics and contract support timeline synchronization and optimization, as well as EABO timeline synchronization and optimization. Of all of the key word searches, the only three keywords to return any results were "contract support timeline," "logistics support optimization," and "contract support synchronization"; all three returned one result each. For the keywords "contract support timeline," the MBA professional report titled *An Analysis of Current Operational Contract Support Planning Doctrine* (Kimsey, 2015) was returned. For the keywords "logistics support optimization," the MBA professional report titled *Implementing the National Inventory Management Strategy: A Case Study of DLA's National Inventory Management Strategy (NIMS*; Diaz et al., 2006) was returned. Last, for the keywords "contract support synchronization," the combined MBA professional report and joint professional military education (JPME) supplemental title *A Collection of JPME Operational Contract Support Case Studies and Vignettes* (Gilbreath & Moore, 2016) was returned.

First, with regard to the MBA professional report returned by the keyword search "contract support timeline," the purpose of this research was to analyze OCS "planning doctrine for maturity and applicability to singe services" (Kimsey, 2015, p. 1). In summary, the MBA professional report argued "for the balanced development of OCS planning acquisition and non-acquisition focused resources to effectively integrate this function across disciplines" (Kimsey, 2015, p. 74). Within this research report, a notional CST is presented; however, it is specific to Army contracting, as it stood in 2011, and does not graphically represent the contracting requirements, capabilities, and capacities of the III MEF CST presented within this thesis. Moreover, since the MBA professional report is focused solely on the application of OCS planning doctrine for maturity and applicability to single services, this research report is beyond scope.

Second, with regard to the MBA professional report returned by the keyword search "logistics support optimization," the purpose of this research was to "analyze NIMS preliminary performance metrics in terms of effectiveness and its impact on supply chain management within the Navy and DLA" (Diaz et al., 2006, p. i). Presented within the research, the DLA NIMS initiative "seeks to manage consumable items from the point of acquisition to the point of consumption for the services" (Diaz et al., 2006, p. i). In summary, the report concluded that continued progress is being made in the implementation of NIMS; however, DLA delays and backorders caused the researchers to conclude that supply chain management in the Navy and DLA has not seen much improvement because of NIMS. One of the suggestions for future research contained within the professional report indicated that the measures presented may not be reflective of the performance of their research, considering their research was specific to their test site. Because of this, and the level of location uncertainty inherent with EABO, this research is also beyond scope.

Last, with regard to the MBA professional report and JPME supplemental returned by the keyword search "contract support synchronization," the purpose of this supplemental is to "educate joint senior leaders on the importance of the strategic effects of operational contract support" (OCS; Gilbreath & Moore, 2016, p. i). Moreover, the research presents the concern for OCS as it relates to analyzing the strategic effects of contracting, which the researchers state is rarely understood or practiced. The final outcome of the MBA professional research report is the development of case studies and vignettes to "examine how second- and third-order effects impact the United States' military mission and general interests" (Gilbreath & Moore, 2016, p. i) which are intended for use in NPS JPME coursework. Exploring the MBA professional report in more detail shows that the keywords "contract support synchronization" only appear in the list of acronyms and abbreviations section. Moreover, the actual case studies and vignettes developed by the research are only accessed via permission granted by JPME instructors, employees of the J4 Logistics Directorate, and NPS faculty. That being said, although the outputs of the research are case studies and vignettes designed to educate joint leaders at each JPME level, this research is beyond scope because, according to the research methodology, "the guides represent a sample of possible questions and potential student responses" as of 2016, and the EABO concept is dated 2018 (Gilbreath & Moore, 2016, p. 23). Therefore, the questions and responses may yield minimal insight into the optimization and synchronization of logistics and contract support timelines associated with EABO.

E. CONCLUSION

This chapter presented a literature review with the intent to provide the reader with a brief overview of the Marine Corps' aiming point for logistics development and contracting support in the future. This information provides guidance regarding logistics development, known priorities, and direction in support of future supporting actions. Moreover, the information presented in this chapter provides strategic direction for the development of a model that supports future force design and development. Lastly, this chapter explored the NPS Theses archive in the attempt to discover past research that could be used to support, refine, or enhance this intended purpose of this research project. That being said, the results—albeit important in their rights—were found to be beyond scope for this research project. Moreover, this chapter has demonstrated a gap in the body of knowledge to investigate optimizing estimated logistics support and OCS timelines exists. Last, by understanding the information presented within this chapter, the reader is more aware of the strategic focus, direction, and priorities, as well as limitations, restraints, and constraints that will be used to help model current and future Marine Corps OCS—which can then be used, modified, or manipulated to inform EABO-OCS decision-making from a logistics and contract support timeline synchronization perspective.

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IV. MODELING METHODOLOGY

The purpose of this project is to develop a model that can be used to gain insight into the integration, synchronization, and optimization of logistics support and contract support such that the warfighter receives concurrent and consistent support on the battlefield. This chapter starts with the estimated Logistics Support Timeline—Contract Support Timeline (eLST–CST) modeling plan, then it discusses the eLST–CST model in a general context. The chapter closes with a discussion on how the eLST–CST model will be represented in Arena Simulation software in preparation for the next chapter—simulation results and analysis. As this chapter progresses, the various inputs and desirable outputs will be presented and discussed to show their validity and importance. In the end, this chapter provides the reader with an understanding of the general eLST–CST model and various inputs and outputs, and discusses the programming of the eLST-CST model into the Arena Simulation software.

A. PLAN

The simulation model developed in this chapter provides the Marine Corps with information that can help inform decision-makers regarding future force designs, organizational structures, and organic as well as non-organic support requirements for logistics and contract support. The model begins with the identification of a Marine Corps mission type, notional steady-state of baseline contracting, and personnel requirements. Contracting personnel requirements are based on the personnel planning factors associated with a CLB-CLR. With regard to timelines, this information is based (logistically) on established Marine Corps self-sustainment rates and 3d MLG contract support timelines, which this research report labels as the non-standardized CST. In addition to the non-standardized CST, this report presents and discusses the inclusion of a standardized CST for incorporation into the final model before running simulations. The purpose of the standardized CST is to compare requirements delivery average wait time differences between a non-standard CST and a standard CST. Also, the simulation results of the non-standardized CST can be compared with the simulated results of a standardized CST as it relates to synchronization with the LST.

To accomplish this analysis, baseline information related to contracting support personnel and logistics and contract support timelines is discussed in more detail in the following sections and modeled using Arena simulation software. A full simulation will capture baseline differences between the LST and the non-standardized and standardized CSTs. In addition to the baseline differences, desirable outputs to this model will be the number of contracting personnel and time necessary to synchronize the LST and CSTs, as well as to optimize Marine Corps contracting support. In the end, the eLST-CST model will provide insight into how the Marine Corps can reduce contracting complexity and increase contracting support efficiency and effectiveness in the form of time and contracting personnel.

B. BASIC MODEL DESIGN

In this section, an estimated Logistics Support Timeline (eLST) and contract support timeline (CST) will be discussed. The eLST subsection will present background information, as well as doctrinal guidelines that were used in the development of an eLST model. The CST subsection will present the III MEF OCS process and timelines used in the development of a III MEF OCS CST model. Last, this section shows what the eLST and CST models graphically look like before attempting to combine the two in a singular model or before attempting to standardize a portion of the CST.

1. Estimated Logistics Support Timeline (eLST)

The estimated Logistics Support Timeline (eLST) serves as the benchmark timeline for which all non-organic support must, to the greatest extent possible, be consistent with, aligned to, or optimized to support. This is because the eLST is established based on organic capabilities common to all Marine Corps elements (SPMAGTF, MEU, MEB, and MEF) and will set the range of days that non-organic capabilities must be ready to support Marine Corps operations beyond those of an organic nature. Although the range of days inherent with an eLST entails quite a few intricacies of the organic operating environment that can dramatically impact range outcomes, for this thesis, exploration of such variables or variances will not be considered. Alternatively, the organic eLST will be standardized to mirror the accepted planned days of self-sustainment common to each MAGTF sized element within the Marine Corps.

As previously mentioned, the establishment of eLST date ranges is consistent with current Marine Corps days of organic supplies and support sustainment common to each MAGTF sized element of the Marine Corps. For example, a MEU deploys with up to 15 days of self-sustainment, a MEB deploys with up to 30 days of self-sustainment, and a MEF deploys with up to 60 days of self-sustainment (MCRP 5–12D, 2016, pp. 1–3, 1–6, 1–9). Last, for SPMAGTFs, considering they are normally the size of a MEU or smaller depending on their assigned mission, their self-sustainment capability is assumed to be similar to that of a MEU or shorter due to potentially conducting missions of limited scope or duration. That being said, for this research, no less than 15 days will be considered when it comes to modeling the synchronization of the eLST and the contract support timeline.

2. Contract Support Timeline

The CST serves as the piece of the modeling process that will be modeled in accordance with current III MEF contracting capacities, with attention given to the number of personnel and time necessary to execute the contract support process. Moreover, it will also be the piece of the model that will be manipulated to identify aspects for optimization and synchronization as it relates to the eLST. Recall that the CST is the process associated with sourcing requirements beyond the micro-purchase thresholds established by the FAR. In addition, recall that any requirement beyond organic capabilities—for example, purchases made with the GCPC—must go through the contracting process. Last, it is important to remember that under current III MEF standard contracting timelines, requirements can take up to 120 days from the initial identification of requirements to the delivery of the supplies or services to the warfighter. Equally important to remember is that any attempts to expedite the current CST, without some form of standardization, is likely to delay the overall CST (W. M. Young, personal communication, June 27, 2020). As is discussed in more detail in the following section, this will be considered a non-standardized CST. This is because nothing has been put into place or standardized when it comes to contracting support.

Next, this research report details the input timelines and personnel requirements necessary to execute the current 3d MLG CST. Figure 10 depicts a very broad representation of the eLST that is used in the modeling process. Again, it is important to acknowledge that this timeline does not take into account the planning intricacies of operational variables that may override, alter, or modify timelines associated with operational tempo; rather, this timeline assumes a planning window of 30 to 45 days and is strictly representative of self-sustainment days at each level of the MAGTF. Although future research efforts might focus on a more detailed version of the proposed eLST, for this research report, these timelines are considered acceptable based on Marine Corps doctrine for organic support.

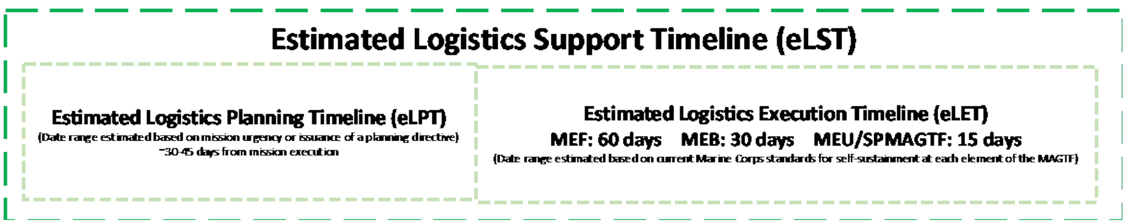

Figure 10. Estimated Logistics Support Timeline (eLST).

Presented earlier in this research report is the current 3d MLGs CST. As discussed, this timeline demonstrated that it would take approximately 120 days for the unit to identify requirements for delivering physical goods or services to warfighters. Regional Contracting Offices typically use 120 days as a non-standardized requirement planning factor. For example, the 3d MLG plans for a 90-day lead time for units to obtain funding from comptrollers, a 60-day lead time for units to submit a completed requirements packages to the RCO, and a 30-day lead time for requirements to be awarded contracts and for vendors to take action on awarded contracts. Figure 11 represents the CST as used in this report.

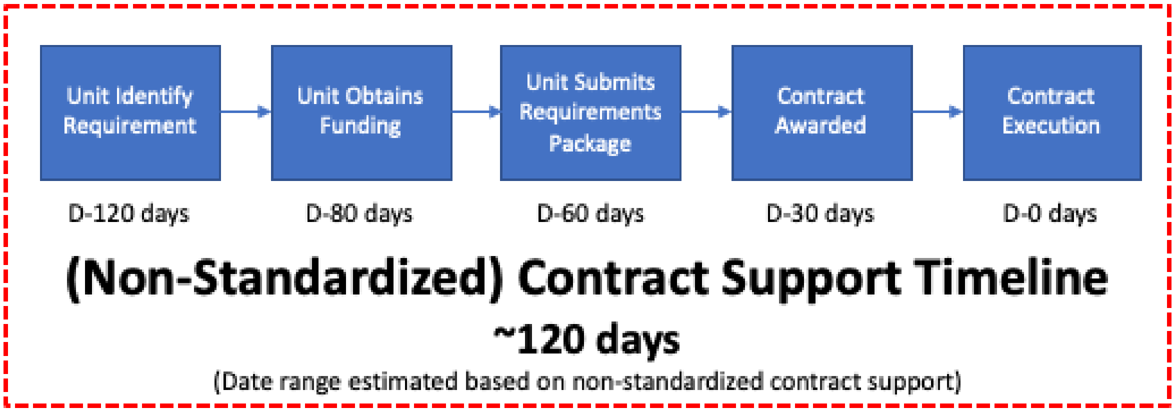

Figure 11. Non-Standardized Contract Support Timeline

In the next section, this research report discusses how the eLST and the current "non-standardized" CST can be modeled to better understand how the two can be synchronized to enhance operational effectiveness and then potentially optimized to facilitate operational efficiencies. For the remainder of this research report, this model is referred to as the eLST-CST model. The next section adds to the eLST-CST model by incorporating a "standardized" CST. The purpose of incorporating this information is to demonstrate the potential opportunities for standardizing parts of the current CST through standardized, non-organic OCS supplies and services.

C. ESTIMATE LOGISTICS SUPPORT TIMELINE—CONTRACT SUPPORT TIMELINE (ELST-CST) MODEL

Although the self-supported nature of the Marine Corps' LCE brings with it the essential CSS capabilities, it is not without limitations, especially when it comes to non-organic support beyond anticipated days of self-sustainment. By first recognizing that the LCE organic capabilities are finite and not easily replenished under various operational conditions, it is easily understood and recognized that non-organic requirements will be an inherent aspect of any mission. The problem is that the eLST and CST are often not looked at together to ensure that, when the finite limitations of the LCE CSS are exhausted or restricted, or when replenishments cannot make it to the warfighter, the non-organic requirements can reduce friction and continue to sustain operations. Moreover, by combining both the eLST and CST into one model, one can then begin to more holistically recognize the potential future force design and development opportunities that will help deliver a wider range of advantages to deliver mass, elite warriors, innovation, and adaptability for any assigned mission. Moreover, it may provide insight into the development of optimized contracting organizational structures and capabilities necessary to execute any Marine Corps mission.

The one piece of the model currently not presented or discussed in this research report is that of a “standardized” CST. The only major difference between the non-standardized CST and the standardized CST is that the standardized CST takes the initiative to establish operational phase phase-0 contracts based on historical spend data. The benefit of these phase-0 contracts is that it removes the 60-day lead-time associated with a unit identifying requirements, obtaining funding, and submitting the requirements package to the RCO for fulfillment. For example, RAND (2008) identified construction supplies, vehicles, and construction services that were common supplies and services throughout all phases of Operation Iraqi Freedom. Figure 12 identifies various spend categories and applicable contracting transactions common to Operation Iraqi Freedom for Fiscal Year (FY) 2003 and FY2004. Although some of these supplies and services may not be applicable to all operations, they do provide insight into the types of supplies and services most suited for contract standardization.

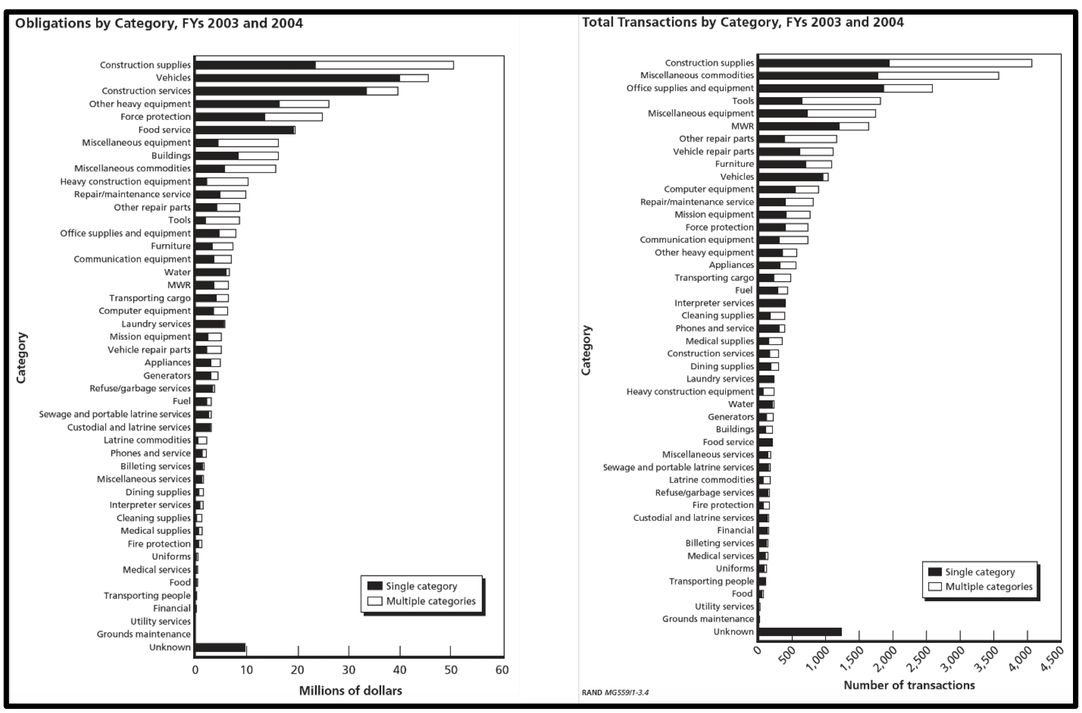

Figure 12. Obligations and Total Transactions by Category, Operation Iraqi Freedom FY2003 and FY2004. Source: RAND (2008).

The downside to this reduction in lead-time is the intrinsic cost associated with establishing readily executable contracts. However, it should be worth considering the unmeasurable extrinsic cost associated with mission delay or interruption, especially when conducting operations in austere locations against a peer adversary. Figure 13 depicts the "standardized" CST that is incorporated into the model developed by this research report.

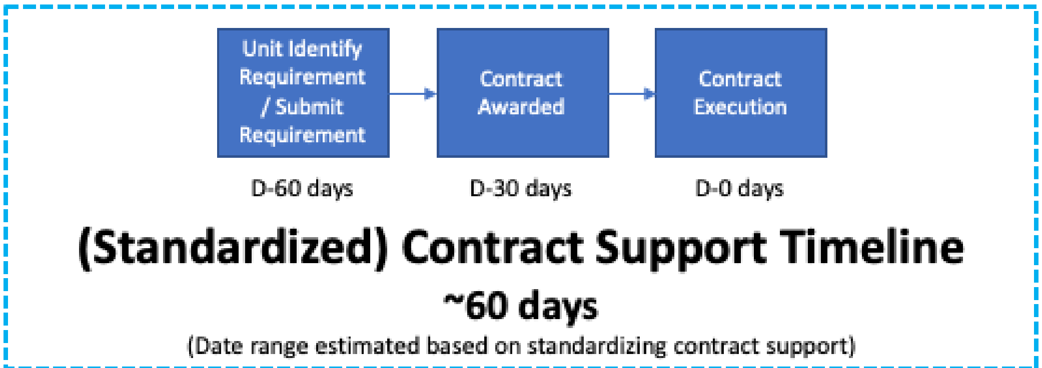

Figure 13. Standardized Contract Support Timeline

1. Defined

The eLST-CST model consists of three integral parts. The eLST, a non-standardized CST, and a standardized CST. As previously discussed, the eLST represents the organic capabilities of the Marine Corps LCE and is established based on current planning estimates and days of self-sustainment at each level of the MAGTF. Next, the non-standardized CST is the timeline associated with placing new unit requirements on contract that exceed the current MPT as established by the FAR. Last, the standardized CST is a new concept and is incorporated within the eLST-CST model to demonstrate one step in reducing capacity requirements, while at the same time taking steps toward optimizing and synchronizing the eLST and the CST. Figure 14 depicts the developed eLST-CST model that will be used as a reference to develop the Arena Simulation model in the next section.

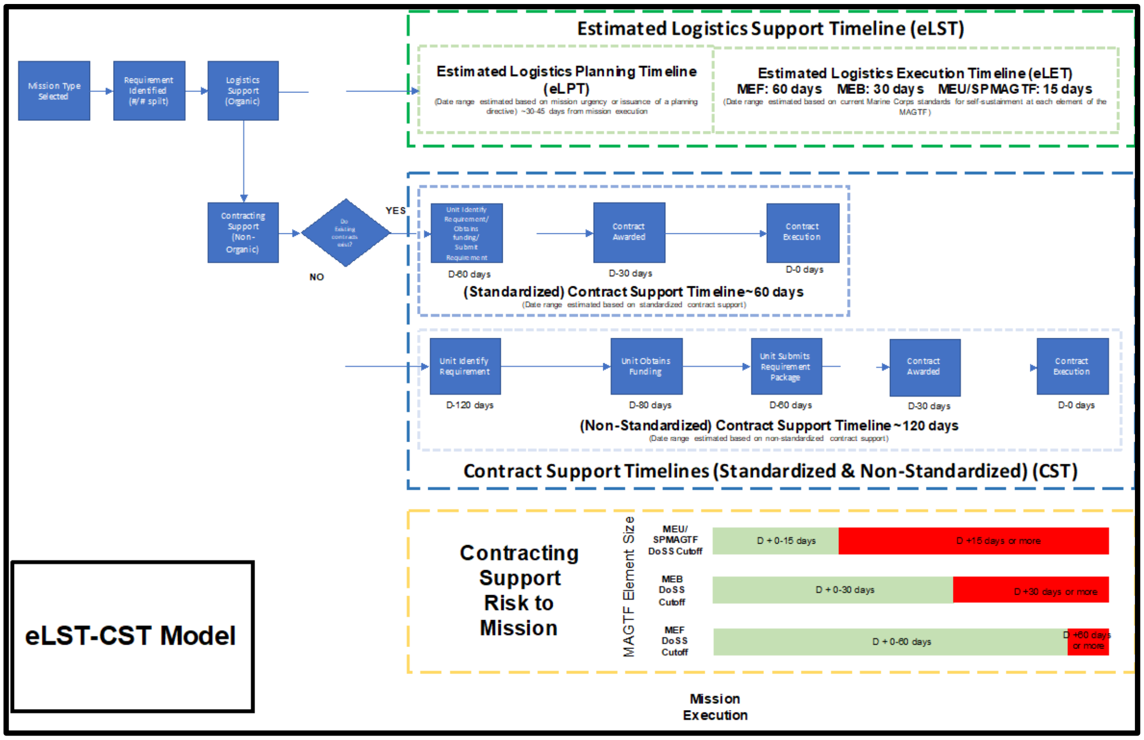

Figure 14. LST-CST Model

Taking a further look at the eLST-CST model, it will start with the type of mission selected or assigned, and then it will naturally progress through the remainder of the model traveling down its respective path. For this research report, the assigned mission will remain within the realm of EABO; however, the model is generic enough to support any possible Marine Corps mission. Based on this information, it will naturally flow into the requirements normally required during that type of mission. Although the split between organic and non-organic requirements will be dictated by the risk and duration of an assigned mission, it is understood that at a minimum some form of contracted support will be necessary for all operations, such as construction material, rental vehicles, and restroom facilities, among many others. Based on this understanding, a generic split in requirements will be assigned to the various mission selected or deemed appropriate. Next, the model splits between organic logistics support and non-organic contracting support. Advancing along the organic logistics support section of the model, it will immediately be assigned a date range based on basic planning factors and the size of the element executing the type of mission selected. Again, the planning factor will be between 30 and 45 days, and the self-sustainment range will be 60 days for a MEF, 30 days for a MEB, and 15 days for a MEU or SPMAGTF. As for the contracted support delay range, it will be based on whether or not the requirement is already on a contract or not. For those requirements not on contract, the delay will be 120 days. For those requirements already on contract, the delay will be 60 days. The 60-day delay is assigned because it removes the lead-times associated with a unit identifying new requirements and the comptrollers approving funding—30 days, respectively, for both lead times, for an overall total reduction in CST delay of 60 days.

The first question the model asks when looking at contracted requirements is whether or not the requirement is already on an existing contract. As previously discussed, the answer to this question will dictate the estimated CST delay, which is driven by the steps necessary to acquire the identified mission requirement. If the identified requirement is on an existing contract, the CST is estimated to take 60 days and will consist of a unit identifying and submitting requirements in the same step, a contract being awarded, and the contract executed. Alternatively, if the identified requirement is not on an existing contract, the CST is estimated to take 120 days and will consist of a unit identifying the requirement, comptrollers approving funds, a complete requirements package being delivered to an RCO, a contract awarded, and the vendor finally delivering the requirement to the warfighter.

2. Inputs

The inputs to the model are (1) the unit S4, (2) the unit's respective G8 comptroller, (3) the number of contracting personnel, and (4) time as it relates to logistics (organic) and contracted (non-organic) support. First, with regard to contracting personnel, it is assumed for the purposes of this model and based on the CLB-CLR concept that each element of the MAGTF will be accompanied by one KO, two FOO, and two PA. However, for simulation purposes, a single KO will act as the input, considering they will be the only ones able to award contracts, even though they are supported by a staff of FOOs and PAs. Although deviations are likely to occur based on actual manpower figures, for simulation purposes, these numbers will serve as the baseline input parameters for contracting personnel. Second, and as previously discussed, time for logistics support is established based on days of self-sustainment at each element of the MAGTF, and time for contracted support is based on whether the requirement is on an existing contract and has to go through a complete contracting process.

3. Outputs

The outputs to the model are the average wait time for contracted goods or services to be delivered to the warfighter, as well as the impact to the average wait time based on (1) the number of warranted contracting officers working to award contracts, (2) a delay in contract planning and execution, and (3) the standardization of contracting support. In addition, an output to the model will be the maximum, minimum, and average wait time expected for goods or services to be delivered to the warfighter depending on the level of MAGTF submitting the contracting requirement. From these outputs, the CMC, commanders, and other Marine Corps leadership alike can begin to develop and potentially implement changes to the current III MEF contracting organizational structure, manpower, or contracting capabilities. In addition, the Marine Corps can use the outputs generated to standardize III MEF OCS processes so that the eLST and the CSTs are aligned, synchronized, and optimized to support assigned missions, especially EABO.

D. ARENA MODEL DESIGN

The next logical step in the modeling process is to program the basic model presented in the last section in the modeling and simulation software. For this research project, Arena Simulation software by Rockwell Automation was chosen because of its user-friendly interface. The software is flexible enough for future use in that it allows for the incorporation of additional hierarchical structures to increase (or decrease) the complexity of the developed model.

Throughout this section, each component of the Arena model is presented and discussed in a manner that makes the process generalizable and repeatable. First, the programming of the eLST is discussed. Second, the non-standardized CST is discussed. Last, a standardized CST is discussed. Along the way, a graphical representation of each portion of the arena model is presented to show what it would look like before running simulations. Table 3 later in this chapter summarizes how to program each portion of the model. The next few sections provide more detail and clarification to support modeling parameter decision-making.

1. Arena Model—eLST

To start this portion of the model, bear in mind that there are three different MAGTF element sizes—a MEF, a MEB, and a MEU (SPMAGTF included). Recall also that each element size is assigned the same planning timeline of 30 to 45 days for modeling purposes only, and actual time may be different based on planning guidance or criticality of an assigned mission. Figure 15 represents a basic Marine Corps eLST for each MAGTF size and is based on information contained within this research report.

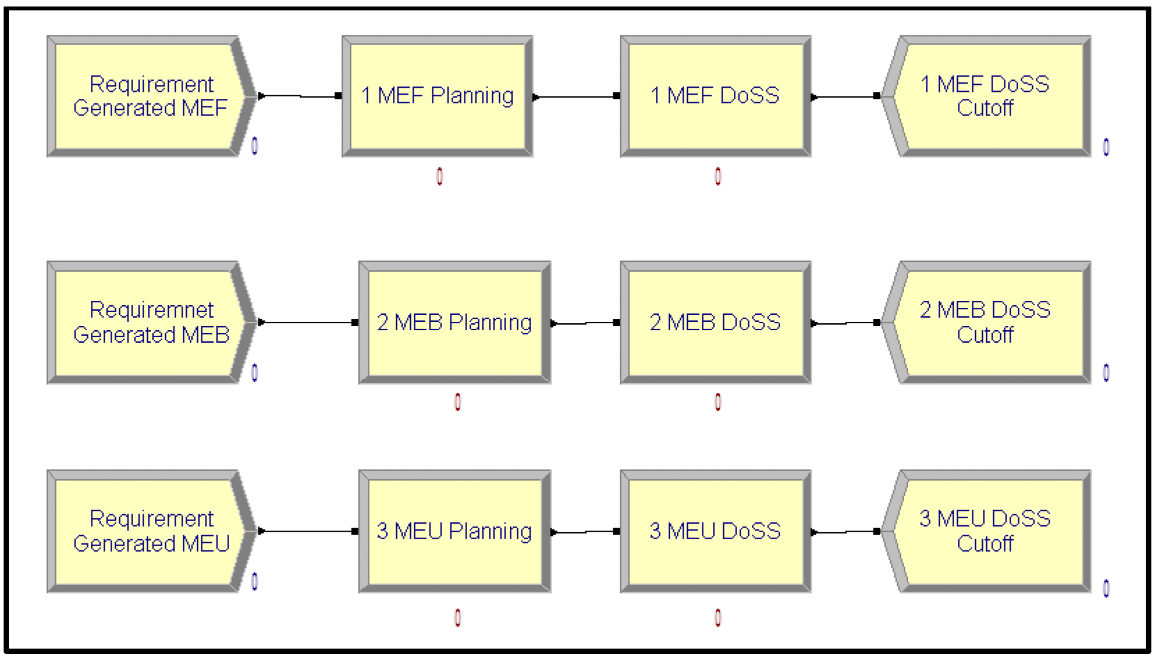

Figure 15. Estimated Logistics Support Time Line Arena Overview

One focus area of this project is to synchronize the eLST and CST to support EABO. In the future it is anticipated that smaller and smaller footprints will be the norm; therefore, the focus here will be on programming a MEU level requirement. To alternate between MAGTF element sizes, the only required changes will be to the arrival rate (60 days for a MEF, or 30 days for a MEB) and the entity type so that the requirement may be tracked throughout the simulation. All other parameters are common to all.

2. Arena Model—CST (Non-Standardized)

Next, how the non-standardized CST was constructed in the arena model will be discussed. Recall that the process being modeled is that of III MEF Marine Corps and is representative, in the most basic sense, of the environment the CMC has identified as the point of focus for future combat development. Against this background, the model is generalizable enough that slight modifications can be made to easily represent the CSTs associated with other MAGTF elements. Figure 16 captures the basic non-standardized CST modeled within the arena model.

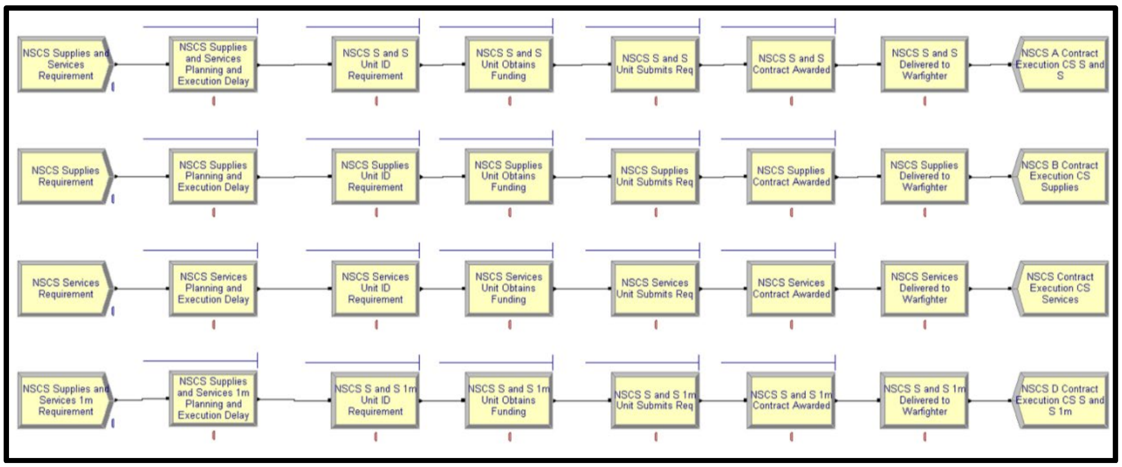

Figure 16. Contract Support Time Line (Non-Standardized)

Regardless of the assigned mission, requirements could be generated in one of four categories:

1. Requirements for supplies and services between $10,000 and $249,999
2. Requirements for supplies between $250,000 and $999,999
3. Requirements for services between $250,000 and $999,999
4. Requirements for supplies or services greater than $1,000,000

For this research project, each requirement is independent of the other; therefore, each requirement is represented by a single server model. As a whole, each process represents the entire non-standardized CST model.

3. Arena Model—CST (Standardized)

In the previous section, the non-standardized CST modeling process was discussed. In this section, the standardized CST is presented. The only major difference between the two is that the "Unit ID Requirements," "Unit Obtains Funding," and "Unit Submits Requirement" process blocks have been consolidated into one process block. The process blocks have been consolidated based on the assumption that standing contracts exist within the system that are fully funded and orders (task or delivery) can be made against the contracts without additional steps being required in the process. Also, the "Execution and Delay," "Delivered to Warfighter," and "Contract Execution" blocks have not changed with regard to the parameters programmed. Figure 17 represents the basic standardized CST modeled within the arena model.

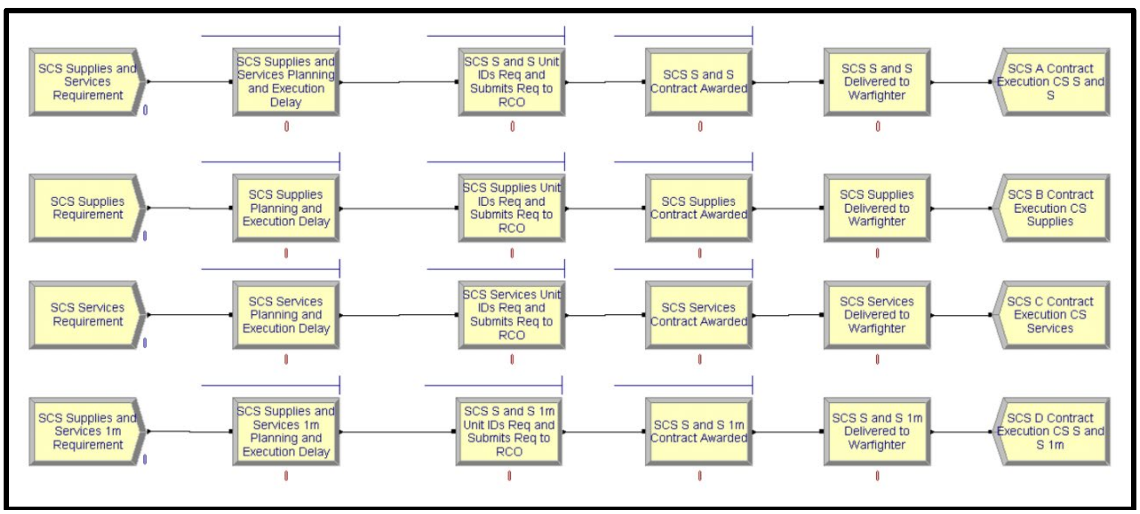

Figure 17. Contract Support Time Line (Standardized)

As with the non-standard Contract Support Time Line arena model, regardless of the assigned mission, requirements could be generated in one of four categories:

1. Requirements for supplies and services between $10,000 and $249,999
2. Requirements for supplies between $250,000 and $999,999
3. Requirements for services between $250,000 and $999,999
4. Requirements for supplies or services greater than $1,000,000

In addition, for this research project, each standardized requirement is independent of the other; therefore, each requirement is represented by a single server model. As a whole, each process represents the entire standardized CST model.

E. SUMMARY

This chapter outlined the methodology used to develop the eLST-CST model, both from a general perspective, as well as within the Arena Simulation software. First, this chapter presented a plan for model development and discussed the eLST. Second, this chapter presented the non-standardized and standardized CST, with focus and attention on the processes and day ranges associated with each timeline. Third, this chapter combined everything—the eLST and the two CSTs—to present the eLST-CST model. Fourth, this chapter discussed the various inputs and desirable outputs of the developed model. Last, this chapter explained how the model will be programmed in Arena Simulation software. The eLST-CST model presented within this chapter provides a graphical representation of the whole Marine Corps logistics (organic and non-organic) in an extremely simplified form.

V. SIMULATION RESULTS AND ANALYSIS

The eLST-CST model developed in Chapter IV allowed for comparative analysis between the proposed and existing non-organic OCS processes. The results were then compared and analyzed with an emphasis toward synchronizing the eLST with the CST so that the time between when the requirement identified by the warfighter to when the warfighter might expect to receive said requirement in the operating environment are near equal. To improve the measurement of timeliness, throughput, and synchronization, the theory of constraints was used in the model. The measurements are defined for use herein as

Timeliness: Meets or exceeds warfighter requirement demand or is earlier than their required delivery date. The outcome for timeliness to be measured by the model is a delivery time to the warfighter that is less than, equal to, or greater than the accumulated average number of days considered between the number of planning days and days when self-sustainment expires.

Throughput: The quantity of warfighter requirements of a specified type being fulfilled by the system over a given period. The outcome for throughput to be assessed by the model is the difference between the average requirement type output of the existing process and of the average requirement type output when the process is altered, or an additional capacity is added to the system.

The purpose of the proposed model is to demonstrate that (1) the current Marine Corps eLST and III MEF OCS CST are not currently aligned to meet warfighter needs, and (2) the existing eLST-CST process, informed by standardized supplies and services requirements in Phase-0, can be optimized to increase timeliness and throughput throughout the remaining phases of EABO.

The data presented in this chapter shows, through the standardization of the eLST-CST model, significant savings in the time it takes to fulfill requirements. This results in quicker delivery of organic and non-organic operational requirements to the warfighter. The data also shows that an increase in the number of contracting officers working on requirements does not improve the timeliness of requirements being delivered to the warfighter. Last, the data shows that, although there are slight increases in throughput when the number of contracting officers required to work increases to two, there are marginal increases to non-organic requirements throughput when the number of contracting officers is increased further.

A. RESULTS

The eLST and the NSCS model represent the current Marine Corps logistics planning and support cycle, as well as the current III MEF OCS process. For all experiments, the NSCS model is defined as the base model since it represents to the best extent possible the current III MEF OCS process. In total, there are three simulations run with multiple different scenarios each. The simulations focused on (1) total time in the system or time it takes to deliver requirements to the warfighter, (2) contracting officer throughput capacity, and (3) the non-organic support synchronization with organic support at the MEF, MEB, and MEU levels. Within each of these simulations, scenarios were developed based on changes in personnel and changes in contracting support planning and execution delay.

B. TOTAL TIME IN SYSTEM/TIME TO THE WARFIGHTER

The total time in the system is the same as the time to the warfighter and was expressed in days. Each scenario is compared to the base eLST-CST model. The model identifies the total time each requirement type or "entity" spends within the system. For example, prior to process standardization, the baseline eLST-CST model data showed it would take the current OCS process 148 days on average for routine supplies and services between $10,000 and $249,999 to be delivered to the warfighter. It would take 164 days on average for supplies between $250,000 and $999,999, 156 days on average for services between $250,000 and $999,999, and 176 days on average for supplies or services greater than $1,000,000. Now, when the current operational contract support (OCS) requirements are standardized, the average total time in the system for each requirement type *decreases*. For example, standardizing the current OCS process decreased the average time it took to deliver requirements to warfighters by 87 days for standardized routine supplies and services between $10,000 and $249,000, 66 days for supplies between $250,000 and

$999,999, 53 days for services between $250,000 and $999,999, and an average decrease of 47 days for supplies and services greater than $1,000,000.

Another aspect that was considered is the impact a delay in OCS planning and execution had on the total time in the system each type of requirement takes before anticipated arrival to the warfighter. To measure the impact in timeliness, six different scenarios were developed, each relating to delays of 1 day, 1–4 weeks, and 1–3 months in contracting planning and execution. The data shows that a delay in contracting planning and execution has varied results. What is certain is that standardizing the Marine Corps contracting support requirements does have an overall positive impact on decreasing the average time it takes to fulfill warfighter operational requirements, regardless of the delay in OCS planning and execution. What is less certain is the degree of timeliness at which requirements can be delivered to the warfighter when OCS planning and execution is delayed. For example, when the OCS process is delayed by a single day, the average time it takes to get a requirement to the warfighter ranges between 61 days and 130 days (a spread of 69 days), depending on the type of requirement and dollar value. When the process is delayed by 7–14 days, the average wait time range varies between 74 days and 133 days (a spread of 59 days). By delaying the OCS process by up to 1 month (21–30 days), the average wait time for delivery of requirements to the warfighter is anticipated to range between 94 days and 149 days (a spread of 55 days) depending on the requirement type. Table 3 shows in greater detail all scenarios simulated and the impact that standardizing, as well as delaying OCS, has on delivering a specific type of requirement to the warfighter.

Table 3. Average Time in Days for Requirement to be Delivered to the Warfighter Based on OCS Delay

Average Time in Days for Requirement to be Delivered to the Warfighter based on OCS Delay												
Planning and Execution Delay	NSCS S and S	SCS S and S	Difference	NSCS Supplies	SCS Supplies	Difference	NSCS Services	SCS Services	Difference	NSCS S and S $1m	SCS S and S $1m	Difference
0-1 Days	148	61	87	164	98	66	156	103	53	176	130	47
1-7 Days	144	66	77	153	105	47	168	111	57	185	121	64
7-14 Days	126	74	52	165	109	56	185	121	64	181	133	49
14-21 Days	141	76	65	175	123	52	192	120	72	178	152	27
21-30 Days	148	94	54	196	127	69	188	134	54	188	149	38
30-90 Days	194	118	76	195	184	11	206	185	21	UNK	160	UNK

C. CONTRACTING OFFICER THROUGHPUT CAPACITY

Contracting officer throughput capacity is the measurement of how many of a given requirement type can be fulfilled over a predetermined period. For this research, the period was established as 270 workdays out of a 365-day year, with a prescribed 12-hour workday. The data shows that under the current contracting support timelines, a single contracting officer (KO) can theoretically only fulfill at most over the simulated time frame one supply and service requirement between $10,000 and $249,999, two supply type requirements between $250,000 and $999,999, one service type requirement between $250,000 and $999,999, and two supply and service type requirements greater than $1,000,000. Moreover, the data also shows that regardless of the extent of the delay, a contracting support planning and execution delay has a negligible impact on the throughput of requirements to the warfighter for all types of requirements.

In addition, simulations were run to compare the impact that adding additional KOs to the current OCS process would have on requirements throughput. The data shows that by adding one or more additional KOs into the system, there is *minimal to no impact* on requirements throughput.

Next, simulations were run to compare the impact that standardizing some of the current III MEF OCS process would have on requirements throughput. The data shows there is a significant *increase* in requirements throughput for all types of requirements, where the greatest increases in throughput were seen for supplies and services between $10,000 and $249,999 and supplies or services between $250,000 and $999,999. The throughput for supplies and services greater than $1,000,000 only marginally increased with the standardization of the current III MEF OCS process.

Last, simulations were run to compare the difference in requirement throughput when the current III MEF OCS process was standardized, as well as when additional KOs were added to the system. The data shows there were additional increases in requirement throughput for all types of requirements, excluding supplies and services greater than $1,000,000, wherein increases in requirement throughput was only marginal when compared to standardizing the requirements alone. Tables 4 and 5 summarize all of the simulations and results discussed within this section.

Table 4. Requirement Throughput with **1** KO based on OCS Delay

Requirement Throughput with 1 KO based on OCS Delay												
Planning and Execution Delay	NSCS S and S Throughput	SCS S and S Throughput	Difference	NSCS Supplies Throughput	SCS Supplies Throughput	Difference	NSCS Services Throughput	SCS Services Throughput	Difference	NSCS S and S $1m Throughput	SCS S and S $1m Throughput	Difference
0-1 Days	1	6	5	2	5	3	1	4	3	2	3	1
1-7 Days	1	8	7	1	5	4	2	4	2	1	3	2
7-14 Days	3	3	0	1	4	3	1	4	3	1	3	2
14-21 Days	2	7	5	1	4	3	1	4	3	1	3	2
21-30 Days	2	7	5	1	4	3	2	3	1	1	2	1
30-90 Days	2	3	1	1	2	1	1	2	1	0	2	2

Table 5. Requirement Throughput with **2** KOs based on OCS Delay

Requirement Throughput with 2 KO based on OCS Delay												
Planning and Execution Delay	NSCS S and S Throughput	SCS S and S Throughput	Difference	NSCS Supplies Throughput	SCS Supplies Throughput	Difference	NSCS Services Throughput	SCS Services Throughput	Difference	NSCS S and S $1m Throughput	SCS S and S $1m Throughput	Difference
0-1 Days	1	7	6	1	8	7	1	8	7	1	3	2
1-7 Days	0	10	10	1	8	7	2	8	6	2	5	3
7-14 Days	1	10	9	1	7	6	2	7	5	1	5	4
14-21 Days	3	9	6	1	8	7	1	7	6	1	4	3
21-30 Days	2	8	6	1	6	5	2	5	3	1	4	3
30-90 Days	2	2	0	2	2	0	1	1	0	1	3	2

D. NON-ORGANIC SUPPORT FOR MEF, MEB, AND MEU

The last section of this chapter focuses on determining the degree to which the eLST and CST are synchronized so that the warfighter is receiving their requirement, regardless of type and dollar value, when they are anticipated to need it based on the days of self-sustainment for each MAGTF size. The data shows that the current III MEF OCS CST is not able to fulfill warfighter non-organic requirements at the point when days of self-sustainment expires, regardless of the size of the MAGTF being supported. Also, the data showed that a delay in OCS planning and execution up to 0–1 days after the original identification of a requirement in the mission planning cycle was optimal when it came to minimizing average days the warfighter was likely to wait before their operational requirement was received.

Next, simulations were run to compare the difference in eLST and CST synchronization and warfighter requirement supportability when the current III MEF OCS requirements were standardized. The data showed a significant *increase* in synchronization and supportability, as well as a significant *decrease* in average days of waiting for requirements faced by the warfighter. Furthermore, although requirements related to supplies or services beyond the $249,999 threshold were still found to result in significant wait times for the warfighter, supply and service requirements between $10,000 and $249,999 were found to arrive close to the time the warfighter was likely to need them, especially when the delay in contracting support planning and execution was delayed no more than 1–7 days. From an EABO support perspective, assuming that a portion of requirements will be non-organic, only when the OCS process is standardized does the non-organic support come even close to being available to support the warfighter's needs at the point when days of self-sustainment are anticipated to expire. This is applicable across all requirement types and is suitable for any assigned mission, which is why the model developed within this research report is suitable to support EABO-OCS optimization, enhance EABO endstate, and support the deployment, distribution, and delivery of requirements in support of EABO at all levels of the MAGTF. Tables 6 and 7 summarize all of the simulations and results discussed within this section.

Table 6. Non-Standardized CST Impact to Delivery of Supplies and Services Summary

		Planning (# Days)	Self Sustainment (# Days)	Days before Needed Resupply
MAGTF Element Size	MEU	30-45	15	45-60
	MEB	30-45	30	60-75
	MEF	30-45	60	90-105
Contracting Support Type	NON-Standardized			
Workdays	270			
Work hours/day	12			

Purchase Type	Supplies and Services										
Threshold	$10,000-$249,999	Time to Warfighter (Avg # Days)	MEU			MEB			MEF		
Scenario	Planning/Execution Delay		Delay (MAX)	Delay (MIN)	Delay (Avg)	Delay (MAX)	Delay (MIN)	Delay (Avg)	Delay (MAX)	Delay (MIN)	Delay (Avg)
1	0-1 (immediately)	148	-103	-88	-95	-88	-73	-80	-58	-43	-50
2	1-7 (within a week)	144	-99	-84	-91	-84	-69	-76	-54	-39	-46
3	7-14 (within 2 weeks)	126	-81	-66	-74	-66	-51	-59	-36	-21	-29
4	14-21 (within 3 weeks)	141	-96	-81	-89	-81	-66	-74	-51	-36	-44
5	21-30 (within a month)	148	-103	-88	-95	-88	-73	-80	-58	-43	-50
6	30-90 (within 1 to 3 months)	194	-149	-134	-141	-134	-119	-126	-104	-89	-96

Purchase Type	Supplies										
Threshold	$250,000-$999,999	Time to Warfighter (Avg # Days)	MEU			MEB			MEF		
Scenario	Planning/Execution Delay		Delay (MAX)	Delay (MIN)	Delay (Avg)	Delay (MAX)	Delay (MIN)	Delay (Avg)	Delay (MAX)	Delay (MIN)	Delay (Avg)
1	0-1 (immediately)	164	-119	-104	-111	-104	-89	-96	-74	-59	-66
2	1-7 (within a week)	153	-108	-93	-100	-93	-78	-85	-63	-48	-55
3	7-14 (within 2 weeks)	165	-120	-105	-113	-105	-90	-98	-75	-60	-68
4	14-21 (within 3 weeks)	175	-130	-115	-123	-115	-100	-108	-85	-70	-78
5	21-30 (within a month)	196	-151	-136	-144	-136	-121	-129	-106	-91	-99
6	30-90 (within 1 to 3 months)	195	-150	-135	-142	-135	-120	-127	-105	-90	-97

Purchase Type	Services										
Threshold	$250,000-$999,999	Time to Warfighter (Avg # Days)	MEU			MEB			MEF		
Scenario	Planning/Execution Delay		Delay (MAX)	Delay (MIN)	Delay (Avg)	Delay (MAX)	Delay (MIN)	Delay (Avg)	Delay (MAX)	Delay (MIN)	Delay (Avg)
1	0-1 (immediately)	156	-111	-96	-103	-96	-81	-88	-66	-51	-58
2	1-7 (within a week)	168	-123	-108	-115	-108	-93	-100	-78	-63	-70
3	7-14 (within 2 weeks)	185	-140	-125	-133	-125	-110	-118	-95	-80	-88
4	14-21 (within 3 weeks)	192	-147	-132	-139	-132	-117	-124	-102	-87	-94
5	21-30 (within a month)	188	-143	-128	-135	-128	-113	-120	-98	-83	-90
6	30-90 (within 1 to 3 months)	206	-161	-146	-153	-146	-131	-138	-116	-101	-108

Purchase Type	Supplies and Services >$1M										
Threshold	$1,000,000+	Time to Warfighter (Avg # Days)	MEU			MEB			MEF		
Scenario	Planning/Execution Delay		Delay (MAX)	Delay (MIN)	Delay (Avg)	Delay (MAX)	Delay (MIN)	Delay (Avg)	Delay (MAX)	Delay (MIN)	Delay (Avg)
1	0-1 (immediately)	176	-131	-116	-124	-116	-101	-109	-86	-71	-79
2	1-7 (within a week)	185	-140	-125	-132	-125	-110	-117	-95	-80	-87
3	7-14 (within 2 weeks)	181	-136	-121	-129	-121	-106	-114	-91	-76	-84
4	14-21 (within 3 weeks)	178	-133	-118	-126	-118	-103	-111	-88	-73	-81
5	21-30 (within a month)	188	-143	-128	-135	-128	-113	-120	-98	-83	-90
6	30-90 (within 1 to 3 months)	UNK	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!

Table 7. Standardized CST Impact to Delivery of Supplies and Services Summary

		Planning (# Days)	Self Sustainment (# Days)	Days before Needed Resupply
MAGTF Element Size	MEU	30-45	15	45-60
	MEB	30-45	30	60-75
	MEF	30-45	60	90-105
Contracting Support Type	Standardized			
Workdays	270			
Work hours/day	12			

Purchase Type	Supplies and Services										
Threshold	$10,000-$249,999	Time to Warfighter (Avg # Days)	MEU			MEB			MEF		
Scenario	Planning/Execution Delay		Delay (MAX)	Delay (MIN)	Delay (Avg)	Delay (MAX)	Delay (MIN)	Delay (Avg)	Delay (MAX)	Delay (MIN)	Delay (Avg)
1	0-1 (immediately)	61	-16	-1	-9	-1	14	6	29	44	36
2	1-7 (within a week)	66	-21	-6	-14	-6	9	1	24	39	31
3	7-14 (within 2 weeks)	74	-29	-14	-21	-14	1	-6	16	31	24
4	14-21 (within 3 weeks)	76	-31	-16	-24	-16	-1	-9	14	29	21
5	21-30 (within a month)	94	-49	-34	-42	-34	-19	-27	-4	11	3
6	30-90 (within 1 to 3 months)	118	-73	-58	-65	-58	-43	-50	-28	-13	-20

Purchase Type	Supplies										
Threshold	$250,000-$999,999	Time to Warfighter (Avg # Days)	MEU			MEB			MEF		
Scenario	Planning/Execution Delay		Delay (MAX)	Delay (MIN)	Delay (Avg)	Delay (MAX)	Delay (MIN)	Delay (Avg)	Delay (MAX)	Delay (MIN)	Delay (Avg)
1	0-1 (immediately)	98	-53	-38	-46	-38	-23	-31	-8	7	-1
2	1-7 (within a week)	105	-60	-45	-53	-45	-30	-38	-15	0	-8
3	7-14 (within 2 weeks)	109	-64	-49	-56	-49	-34	-41	-19	-4	-11
4	14-21 (within 3 weeks)	123	-78	-63	-71	-63	-48	-56	-33	-18	-26
5	21-30 (within a month)	127	-82	-67	-74	-67	-52	-59	-37	-22	-29
6	30-90 (within 1 to 3 months)	184	-139	-124	-131	-124	-109	-116	-94	-79	-86

Purchase Type	Services										
Threshold	$250,000-$999,999	Time to Warfighter (Avg # Days)	MEU			MEB			MEF		
Scenario	Planning/Execution Delay		Delay (MAX)	Delay (MIN)	Delay (Avg)	Delay (MAX)	Delay (MIN)	Delay (Avg)	Delay (MAX)	Delay (MIN)	Delay (Avg)
1	0-1 (immediately)	103	-58	-43	-50	-43	-28	-35	-13	2	-5
2	1-7 (within a week)	111	-66	-51	-58	-51	-36	-43	-21	-6	-13
3	7-14 (within 2 weeks)	121	-76	-61	-69	-61	-46	-54	-31	-16	-24
4	14-21 (within 3 weeks)	120	-75	-60	-67	-60	-45	-52	-30	-15	-22
5	21-30 (within a month)	134	-89	-74	-81	-74	-59	-66	-44	-29	-36
6	30-90 (within 1 to 3 months)	185	-140	-125	-132	-125	-110	-117	-95	-80	-87

Purchase Type	Supplies and Services >$1M										
Threshold	$1,000,000+	Time to Warfighter (Avg # Days)	MEU			MEB			MEF		
Scenario	Planning/Execution Delay		Delay (MAX)	Delay (MIN)	Delay (Avg)	Delay (MAX)	Delay (MIN)	Delay (Avg)	Delay (MAX)	Delay (MIN)	Delay (Avg)
1	0-1 (immediately)	130	-85	-70	-77	-70	-55	-62	-40	-25	-32
2	1-7 (within a week)	121	-76	-61	-68	-61	-46	-53	-31	-16	-23
3	7-14 (within 2 weeks)	133	-88	-73	-80	-73	-58	-65	-43	-28	-35
4	14-21 (within 3 weeks)	152	-107	-92	-99	-92	-77	-84	-62	-47	-54
5	21-30 (within a month)	149	-104	-89	-97	-89	-74	-82	-59	-44	-52
6	30-90 (within 1 to 3 months)	160	-115	-100	-107	-100	-85	-92	-70	-55	-62

E. SUMMARY

This chapter demonstrated that when standardizing the current III MEF OCS process, the eLST and CST can become more synchronized, and when additional KOs are added to the system, requirement throughput increases, although only marginally for some requirements. Also, this chapter demonstrates that there are additional increases in throughput and decreases in time for requirements to be delivered to the warfighter when the CST is standardized, and additional KOs are within the system. Last, this chapter showed that the current Marine Corps eLST and III MEF OCS CST are not in alignment and that the warfighter is incapable of receiving requirements beyond the $10,000 threshold on time. In the next chapter, conclusions and recommendations for further research are presented.

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VI. SUMMARY, CONCLUSIONS, AND AREAS FOR FURTHER RESEARCH

This chapter provides a summary of the material used to conduct research, the methodology used to model and simulate EABO-OCS scenarios from a contracting process and personnel perspective, and the results of the simulations. This chapter also provides conclusions based on research and answers to the research questions proposed in the first chapter. Finally, this chapter concludes with recommendations and areas of future research.

A. SUMMARY OF RESEARCH REPORT

Chapter II provided a broad overview of Marine Corps history, a discussion about the theory of constraints (TOC) and its applicability to supply chain optimization (with a focus on Marine Corps), and then it discussed how the Marine Corps is currently task organized to support assigned missions. Next, Chapter II presented the operational phases of every military operation before going into great detail about EABO, its definition, need for optimization, possible mission types, desired end-states, and impacts on logistics. Chapter II also presented an overview of Marine Corps OCS, which discussed the current III MEF OCS CST as well as some of the thresholds that the Marine Corps must consider when choosing to contract out operational requirements. Finally, Chapter II provided context and foundational knowledge as to how the Marine Corps currently operates, how they plan to operate, and why logistics and contract support timelines are vitally important, especially when it comes to ensuring non-organic capabilities reach the operational environment at (or near) the execution of an assigned mission.

Chapter III presented a literature review with the intent to provide the reader with a brief overview of the Marine Corps' aiming point for logistics development and contracting support in the future. Moreover, Chapter III provided information and guidance regarding logistics development, known Marine Corps logistics and contracting priorities, and direction in support of future logistics and contracting efforts. Next, Chapter III presented information that provided strategic direction for the development of a model that supports future force design and development from a contracting support perspective. Last, Chapter III explored the NPS Theses archive in an attempt to discover past research that could be used to support, refine, or enhance the intended purpose of this research project.

Chapter IV outlined the methodology used to develop the eLST-CST model, both from a general perspective and within the Arena Simulation software. First, Chapter IV provided a plan for model development, then it presented and discussed the eLST. Second, Chapter IV presented the non-standardized and standardized CST, with focus and attention given to the processes and day ranges associated with each timeline. Third, Chapter IV combined the eLST and the two CSTs to present the eLST-CST model. Fourth, Chapter IV discussed in detail how the model will be programmed in preparation for simulation. Last, Chapter IV provided a graphical representation of what the current III MEF eLST-CST model looks like in an extremely simplified form.

Chapter V demonstrated that when standardizing the current III MEF OCS process, the eLST and CST can become more synchronized, and when additional KOs are added to the system, requirement throughput increases, if only marginally for some types of requirements. Also, Chapter V demonstrated that there are additional increases in throughput and decreases in time for requirements to be delivered to the warfighter when both the CST is standardized and additional KOs are within the system. Last, Chapter V showed that the current Marine Corps eLST and III MEF OCS CST are not in alignment and that the warfighter is incapable of receiving requirements beyond the $10,000 threshold promptly.

B. CONCLUSIONS

This report presented an estimated Logistics Support Timeline and Contract Support Timeline (eLST-CST) model and proposed standardization of the current III MEF OCS process—with the TOC concept in mind—to optimize delivery costs in the form of time, reduce cycle-time of generated operational requirements above the micro-purchase threshold (MPT), improve requirements throughput, and provide process improvement steps that can decrease the average wait time for delivery of generated requirements to the warfighter.

Conclusion 1:

The current III MEF organic support and non-organic support functions are out of alignment when it comes to delivering goods or services beyond the MPT to the warfighter at each MAGTF size—MEF, MEB, and MEU. Analysis of the outputs in Chapter IV revealed a significant misalignment between when an operational requirement would be available to meet warfighter needs and when the days of self-sustainment expired, which is the point at which their organic capability would need to be resupplied, or the unit would require non-organic support. In addition, even when a portion of the OCS process is standardized and removes a theoretical 60-day window from the current III MEF OCS process, there is still a misalignment between the two support timelines.

Conclusion 2:

Standardizing a portion of the current III MEF OCS process timeline takes steps towards synchronizing organic and non-organic warfighter support; however, only the MEB and MEF elements are likely to realize synchronization between organic and non-organic support before days of self-sustainment expire, with MEU elements likely to receive non-organic support within a week of days of self-sustainment expiring. Analysis of the outputs showed that standardizing Marine Corps OCS requirements does decrease the time it takes to deliver operational requirements to the warfighter; however, the benefits from the standardization are only fully realized at the MEF and MEB level, which means there are additional steps necessary to further support non-organic operational requirements at the MEU level.

Conclusion 3:

A delay in OCS planning and execution has the greatest impact in prolonging delivery of requirements to the warfighter when the delay in OCS planning and execution exceeds 14 days (or 2 weeks). Analysis of the outputs revealed that any delay in OCS planning and execution increased the average wait time for warfighters looking to receive non-organic support. Interestingly, the data showed a delay of 0–1 days was optimal when it came to delaying the OCS process. One suggestion as to why the data indicates this is due to the necessity for contracting specialists to be present early on, directly involved, and continuously engaged in the operational planning process. Early on involvement and engagement of contracting specialists would translate into a more refined requirement being delivered to contracting for fulfillment and would ultimately make the entire OCS process that much smoother.

Conclusion 4:

Adding additional KOs to the current III MEF OCS process increases throughput for operational requirements beyond the MPT; however, there are only marginal gains to throughput by going beyond two KOs working requirements simultaneously. The data showed that increasing the number of KOs to two KOs working operational requirements increased total requirements throughput; however, the data showed that any additional KO after that only marginally increased requirements throughput.

Conclusion 5:

The misalignment between organic and non-organic support timelines can be mitigated by increasing the number of KOs; however, synchronization between organic and non-organic support functions is still lacking, which suggests that the problem is process-related, or product related. Analysis of the data showed that the organic eLST and the non-organic CST are not in alignment with each other; therefore, it may be concluded that if non-organic support was required at the point when days of self-sustainment was set to expire, it should not expect non-organic support to be available until sometime after. This waiting period extends for each level of the MAGTF submitting the requirement, starting with the longest delay being at the MEU level, and the shortest delay at the MEF level. The data showed that standardizing a portion of the OCS process decreases these wait times; however, they are only fully realized at the MEF and MEB level alone, and the MEU level still experienced up to a week delay in supplies or services being made available.

C. RECOMMENDATIONS

Specific recommendations to implement and realize increased efficiencies in the synchronization of current Marine Corps logistics support and III MEF OCS efforts are described in this section. The recommendations listed are not necessarily all-inclusive; however, they serve as a basis for taking further steps toward posturing a more lethal and mutually supported warfighter. Depending on additional information or foreseeable conditions, the recommendations provided here are validated through this research.

Recommendation 1:

Standardize, to the maximum extent possible and with cost versus benefit in mind, as much of the current III MEF OCS process as possible. The purpose of this recommendation is to take steps toward synchronizing the organic support and non-organic support to the warfighter. As the operational environment becomes more complex, we can better serve the warfighter by simplifying and standardizing the machine that is intended to deliver goods or services to them at the point and time they need it most. Under the current process structure, we are doing the warfighter a potential disservice by not ensuring non-organic support (if operationally required) is not readily available at the point when their days of self-sustainment run dry and they are operationally incapable of an organic resupply.

Recommendation 2:

Incorporate KOs as soon as possible in the development of non-organic OCS requirements. The model showed that a delay in the contract support planning and execution phase led to decreased wait time to delivery of goods or services to the warfighter. Although the data does not explicitly state it is due to a greater degree of well-defined, non-organic OCS requirements, it is likely the case considering a more refined package can be handled more efficiently and effectively, which means it can transition throughout the procurement process with less friction, delay, or disruption.

Recommendation 3:

Incorporate typical EABO scenarios, along with common logistics and non-organic OCS requirements, into Marine Corps KO formal education and formal training systems. This recommendation comes from the notion that educating and training additional KOs on common EABO mission types and corresponding logistics and non-organic OCS requirements better aligns education, training, and practice. Thus, it equips the future workforce to handle the rigorous demand of EABO-OCS requirements in the future.

D. RESEARCH QUESTIONS ADDRESSED

The primary research question is:

Are the current III MEF Contract Support Timeline and an estimated Marine Corps Logistics Support Timeline synchronized to meet the demands of future force designs and Marine Corps planning guidance? This research report, through modeling and simulation, shows the current III MEF Contract Support Timeline and an estimated Marine Corps Logistics Support Timeline are not synchronized to meet the demands of future force designs and Marine Corps planning guidance. The model that was developed herein shows conclusively that through standardization and expedient initiation of the OCS process the two timelines can be more closely brought into alignment.

The secondary research questions are addressed here:

1. **What estimated logistics support timeline elements facilitate or inhibit III MEF contracting support beyond the micro-purchase threshold?** The elements of an estimated logistics support timeline are those elements related to time—planning and execution—and days of self-sustainment associated with each level of an MAGTF (MEF, MEB, or MEU). The model developed here concluded it was these elements that either facilitated or inhibited the III MEF contracting support timeline being able to provide necessary non-organic support at the point in time when days of self-sustainment were to expire. If the time to plan and execute a mission is truncated, the ability of a non-organic contracting support timeline is stressed to meet operational demand. Conversely, if the time to plan and execute a mission is extended, the ability of non-organic contracting support to meet operational demand is enhanced.
2. **What contract support timeline elements facilitate or inhibit III MEF contracting support beyond the micro-purchase threshold?** The elements of a contract support timeline that facilitate or inhibit III MEF OCS is related to people, processes, and products. The model developed showed that the current III MEF OCS process is inhibited by the current OCS process in place. Moreover, the model showed the number of KOs within the system neither facilitated nor inhibited the time it took to fulfill requirements and get them to the warfighter. Only when the current III MEF OCS process was standardized

did the average wait time for goods or services to be delivered to the warfighter decrease. In addition, even with the addition of KOs, the capacity to fulfill requirements only grew substantially when there were two KOs at one time, and only marginally when the number of KOs in the system exceeded two. Essentially, the contract support timeline is inhibited by the contracting process itself and only slightly facilitated by the number of KOs working to fulfill operational requirements.

E. AREAS FOR FURTHER RESEARCH

During research and analysis, the following areas were identified for further research that was outside the scope of this project:

1. Explore a more robust estimated Logistics Support Timeline (eLST). The model developed in this research project took a very basic approach toward this aspect of supportability; wherein, in reality, the logistics support timeline is likely to be more robust and dynamic when it comes to ensuring the warfighter is provided the necessary support needed for the mission assigned. Further research in this area may prove beneficial in that there may be ways to increase organic supportability without inherently needing to contract out support, which will be of great concern as the Marine Corps postures itself for future operations.

2. Develop a model that looks at the current Marine Corps OCS process from a "products" perspective to identify tools of contracting that are facilitating or inhibiting contracting support beyond the micro-purchase threshold, not just III MEF. Further research in this area may prove beneficial because the current contracting process may not need to be standardized if the appropriate contracting tools can be fielded.

3. Explore mission-based scenarios using the model developed in this research report. The model herein was focused on operational requirements beyond the micro-purchase threshold and did not consider the type and quantity of operational requirements typical of various Marine Corps missions. Further research in this area may prove beneficial in that it may contribute to a more effective and efficient standardized contracting support structure, which would help reduce average wait times for the delivery

of routine goods and services to the warfighter. To this end, a more comprehensive simulation model should be developed.

4. Conduct a cost-benefit analysis of making the recommended changes provided within this research. Further research in this area may prove beneficial in that the recommended changes provided herein may be in reality too costly to implement when compared to the benefits to be gained. Only a cost-benefit analysis would provide the necessary insight before any real changes or steps to standardize the current Marine Corps OCS process should be taken.

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