DOES THE MARINE EXPEDITIONARY FORCE INFORMATION GROUP
SUPPORT THE GROUND COMBAT ELEMENT'S MANEUVER FOR
FUTURE MULTI-DOMAIN CONFLICTS?

A thesis presented to the Faculty of the U.S. Army
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fulfillment of the requirements for the
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MASTER OF MILITARY ART AND SCIENCE
Art of War Scholars

by

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The information function is changing the character of warfare. Peer, near-peer, and hybrid threats are gaining proficiency in the employment of information environment operations to achieve objectives across all levels of war. Many times competitors are leveraging information on the margins beyond peace but short of war. Technologies advancements, proliferation, and the cunning means of its employment are drivers for the U.S. military to innovate with information being the driver for change.

The Marine Corps is developing concepts such as the Marine Corps Operating Concept and the Marine Air Ground Task Force (MAGTF) Information Environment Operations Concept of Employment to sharpen the readiness of the Marine Corps for future multi-domain conflict. The Marine Corps information environment concept has created the Marine Expeditionary Force (MEF) Information Group (MIG). The MIG aggregates information specialties from across the Marine Corps under one commander, in support of the MEF Commanding General. The MAGTF's ground combat element will be at the forward edge of future conflict. In future multi-domain conflict the battlefield will be dynamic and multi-domain combined arms integration will be imperative. Does the current organization of the MIG support the ground combat element's maneuver for future multi-domain conflicts?

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ABSTRACT

DOES THE MARINE EXPEDITIONARY FORCE INFORMATION GROUP
SUPPORT THE GROUND COMBAT ELEMENT'S ABILITY TO MANEUVER?, by
Major Brandon M. Ward, 111 pages.

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current organization of the MIG support the ground combat element's maneuver for
future multi-domain conflicts?

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TABLE OF CONTENTS

ACRONYMS

A2AD	Anti-Access Area Denial
AOI	Area of Interest
BCT	Brigade Combat Team
CBA	Capabilities Based Assessments
CJCS	Chairman of the Joint Chiefs of Staff
CONOP	Concept of Operations
CONPLAN	Contingency Plan
DA	United States Department of the Army
DC CD&I	Deputy Commandant for Combat Development & Integration
DC I	Deputy Commandant for Information
DC PP&O	Deputy Commandant for Plans, Policies, and Operations
DoD	U.S. Department of Defense
DOTMLPF-P	Doctrine, Organization, Training, Materials, Leadership and Education, Personnel, Facilities, and Policy
EF 21	Expeditionary Force 21
EMSO	Electromagnetic Spectrum Operations
FRAGO	Fragmentary Order
IE	Information Environment
IE Concept	MAGTF Information Environment Operations Concept of Employment
IE Ops	Information Environment Operations
IO	Information Operations
ISIS	Islamic State of Iraq and Syria
ISR	Intelligence, Surveillance, and Reconnaissance

IW	Information Warfare
JCIDS	Joint Capabilities Integration and Development System
JFC	Joint Force Commander
JFCOM	Joint Forces Command
JROC	Joint Requirements Oversight Council
JTF	Joint Task Force
MAGTF	Marine Air Ground Task Force
MCDP	Marine Corps Doctrinal Publication
MCO	Marine Corps Order
MCRP	Marine Corps Reference Publication
MCWL	Marine Corps Warfighting Lab
MCWP	Marine Corps Warfighting Publication
MEF	Marine Expeditionary Force
MIG	MEF Information Group
MOC	Marine Corps Operating Concept
MTOE	Modified Table of Organization and Equipment
OE	Operating Environment
OPLAN	Operations Plan
OPORD	Operations Order
SoM	Scheme of Maneuver
UAS	Unmanned Aerial System
USMC	United States Marine Corps
VEO	Violent Extremist Organization

ILLUSTRATIONS

x

TABLES

CHAPTER 1

INTRODUCTION

The Character of War Is Changing

The current and future fight may not be what we experienced in the past. It will encompass not just the domains of land, air and sea, but also space and the cyber domain. It will include information operations and operations across the electromagnetic spectrum. It will involve rapidly changing and evolving technologies and concepts, which will force us to be more agile, flexible and adaptable.
        — General Robert B. Neller, FRAGO 01/2016, *Advance to Contact*

Information impacts military operations across all five domains (air, land, sea, space, and cyberspace) and is changing the character of war by compressing the distance between the tactical, operational, and strategic levels of war. The U.S., their allies, and global competitors are in constant competition with information. This was most evident when Russia employed military tactics integrating multiple domains on July 11, 2014 in Zelenopillya, Ukraine. Based on the U.S. Army's Institute of Land Warfare Papers, their tactical actions consisted of integrating "drones, rocket and artillery fire, special reconnaissance, cyber capabilities and geo-locating technology" (Fox and Rossow 2017, 10). The result was two Ukrainian battalions becoming combat ineffective in minutes with "30 Ukrainian soldiers killed and dozens severely wounded" (Fox and Rossow 2017, 10). This successful information environment operation (IE Ops) demonstrates the capacity the information function has to increase lethality and operational tempo by using its advantages against adversaries across multiple domains.

An example by a non-state actor is by violent extremist organization (VEO) such as the Islamic State of Iraq and Syria (ISIS) use the information related capabilities to

1

recruit, coordinate, and execute operations (Kilcullen 2016, 133-149). During the defense of Mosul ISIS employed unmanned aerial systems (UAS) to target, provide situational awareness, and deliver small-improvised explosive devices (McGarry 2016). These actions were significant because a VEO demonstrated an information environment operation capability normally reserved for nation states.

In its capstone concept the Marine Corps Operating Concept (MOC) describes a future threat posed by a hybrid competitor in 2025. This hybrid force uses anti-access area denial (A2AD) systems, and advanced intelligence, surveillance, and reconnaissance (ISR) capabilities to contest the U.S. joint force in multiple domains in order to control sea lines of communication (USMC 2017c). The concept recognizes the information function is an enabler for cross-domain operations by the U.S., our allies, and global competitors. Information offers asymmetric advantages within multi-domains that permeate all levels of war, and global competitors have been maneuvering within the information environment at the operational and tactical levels of war. The result is the character of war is changing and combat is shifting into all domains.

The application of information in warfare is not new. However, the rapid implementation of emerging technologies and the requirement of the U.S. military to respond rapidly across multiple domains at all levels of war simultaneously is a revolution in military affairs. As off-the-shelf technology proliferates and becomes more accessible by way of cost and availability, the result is more global actors are able to possess and project information related capabilities. Gaining and creating temporary advantages within a domain is possible for the U.S., allies, and competitors, but these advantages are temporal and constantly shifting. Effectively planning and executing

operations in the information environment is essential for future conflict. With the distances between the levels of war shrinking, it is prudent that the capacity to integrate and execute information environment operations exist at the lowest tactical level. This requires organizing the U.S. military to integrate information environment operations effectively with maneuver to enable the ground combat units to close with an adversary in the last 1,000 meters.

<center>The Rise of the Information Function</center>

Recent successes by global competitors have highlighted the application of information environment operations to achieve objectives across all levels of war. Secretary of Defense James N. Mattis aptly identified this new threat in his memorandum that formally elevated information to a joint warfighting function on September 15, 2017 (DoD 2017a, 1). Recent global U.S. military operations drive expose the gap pushing the creation of this directive. The activity of our competitors has demanded the U.S. Department of Defense (DoD) act decisively to innovate and prepare the joint force to fight effectively using the information function so that combat forces can close the last 1,000 meters.

The information function is relevant to all levels of war, joint functions, and has implications throughout the global commons. Information environment operations can facilitate the achievement of strategic, operational, and tactical objectives if properly integrated with the other warfighting functions. Information is changing the operating environments (OE) and will continue to expand rapidly and in complexity. Consequently, the U.S. military must create a flexible and effective structure that incorporates the

information environment in all activities within the Joint Force and throughout the services for future multi-domain conflicts.

As the U.S. develops information capacity, it requires a military strategy that integrates information environment operations that permeates all levels of war to prepare for future multi-domain conflict. The U.S., their allies, and competitors aggressively use information related capabilities to achieve effects across all the levels of war (Deakin 2010, 3-10). Competitors such as Russia have already integrated information environment across all levels of war to support operations. Secretary Mattis wrote in his memorandum, "The elevation of information as a joint function impacts all operations and has implications across doctrine, organization, training, material, leadership and education, personnel, facilities, and policy that must be identified in the months ahead" (DoD 2017a, 1). From the Marine Corps' perspective, the implementation and integration of information as a joint function is critical in its concept development. The Marine Corps is currently developing concepts that enables maneuver and creates advantages that are psychological, technological, temporal, or spatial within all five domains for future multi-domain conflict (USMC 1997, 72-73; USMC 2017b, 2).

<center>The Information Function and the Implications for the Marine Corps</center>

The Marine Corps Operating Concept (MOC) describes the service approach for winning against tomorrow's competitors. In this capstone document, the Commandant of the Marine Corps, General Robert B. Neller outlines the challenges; "The Marine Corps is not organized, trained and equipped to meet the demands of a future operating environment characterized by complex terrain, technology proliferation, information warfare, the need to shield and exploit signatures, and an increasingly non-permissive

<center>4</center>

maritime domain" (USMC 2016b, 8). To address these concerns, the Marine Corps is attempting to gain a comprehensive understanding of the information function for future Marines to fight and win against tomorrow's competitors. Using the service capstone concept as a benchmark to innovate and build readiness in the force for future conflict, the Commandant has already approved force structure modifications to address his concerns and the new challenges posed by information. These changes intend to synchronize and integrate information related capabilities. Today's potential future competitors are employing information related capabilities to achieve effects throughout all levels of war, thus, reinforcing the MOC's purpose and the Commandant's urgency.

The Marine Corps is developing information environment capacity within the MEF to support the MOC and to build readiness for future multi-domain conflicts. As a result, the MEF Headquarters Group was re-structured to form the MEF Information Group (MIG). The Marine Air Ground Task Force (MAGTF) Information Environment Operations Concept of Employment (IE Concept) is the Marine Corps initial concept to address information as a joint function and to enable MOC's purpose (IE Concept discussed further in Chapter 2). The MIG is the key structural change in the IE Concept. The MIG organization is attempting to lead the Marine Corps coordination and integration of information environment operations across all three MEFs.

The MIG's mission is to "coordinate, integrate and employ information environment operations capabilities in order to ensure the MAGTF Commander's ability to facilitate friendly forces maneuver and deny the enemy freedom of action in the information environment. Provide communications, intelligence, supporting arms liaison, and law enforcement capabilities in support of MAGTF operations" (USMC 2017b, 4).

The IE Concept provides the MEF with information environment capacity through the broad range of capabilities within the subordinate commands of the MIG "fusing disparate intelligence and other information about the IE through a near-real time running estimate that feeds the common operational picture/common tactical picture, provides planning support, mission coordination, and supports mission assessment" (USMC 2017b, 2). The key feature of the MIG is the collective information capacity coordinated and integrated under the MIG Commander (see Figure 1. MIG Organization).

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                          ┌─────────────────┐
                          │      MEF        │
                          │  Information    │
                          │  Group (MIG)    │
                          └─────────────────┘
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| Communication Battalion | Intelligence Battalion | Law Enforcement Battalion | MEF Support Battalion | Radio Battalion | Air Naval Gunfire Liaison COmpany | Communication Strategy & Operations Company |
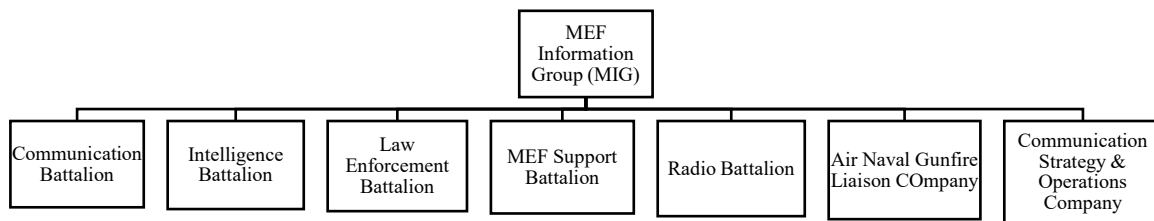
Figure 1.   MIG Organization

Source: Created by author, adapted from USMC 2017b, 4.

The rise of global actors using information related capabilities at the forward line of troops and beyond to shape the OE requires the Marine Corps to prepare to operate against competitors' burgeoning capabilities. The Commandant identifies these challenges in the MOC and in three other messages to the Marine Corps. To address the Commandant's challenges, the IE Concept is a nascent attempt to build capability for the evolving future multi-domain conflict. Tomorrow's competitors will possess and employ a range of information related capabilities from state sponsored operations to regional

organizations. Russia, VEOs, and the hybrid threat described in the MOC are threats that exist today. Future competitors will seek to improve upon their success using the information function for future conflict.

The MIG will support major subordinate commands in the MEF through liaisons and support teams (USMC 2017b, 9, 10, 14, 15, 17). However, due to the dynamic nature of future OEs, this support model may be insufficient. The IE Concept and the structure of the MIG conceptually support the tenants of the Marine Corps Planning Process: top-down planning, single battle concept, and integrated planning (USMC 2010, 1-5-6). However, the major subordinate commands and their staffs require permanent connecting relationships with the MIG to integrate information into planning, training, and execution.

The current gap of information environment operations capability below the MIG diminishes the effectiveness of the IE Concept and the MEF's subordinate units' ability to maneuver. The IE Concept also identifies the scale of integrating this concept across the MEF:

> While the MIG commander is responsible to the commanding general for ensuring IE Ops actions are effectively planned, integrated, and executed across the MEF, the sheer number and dispersion of IE Ops related ground and air capabilities across the battlespace will require a whole-of MAGTF approach to effectively command and control IE Ops. (USMC 2017b, 17)

Further, subordinate units of the MEF do not have organic capability to plan, coordinate, integrate, and execute operations without the MIG's liaisons or support teams. The MEF and the MIG determine which units get information environment operations support. The ability of competitors to rapidly exploit temporary advantages within domains and achieve objectives across the levels of war suggests that the subordinate units of the MEF

need organic information environment operations capability. Russia, VEOs, and the MOC's future hybrid competitor [discussed further in Chapter 2] all demonstrate that actions using the information function happen rapidly and with varying levels of effect and lethality. Consequently, the integration and execution of information environment operations at the tactical level need capabilities development to maneuver against competitors. The increase in capacity and effectiveness to conduct information environment operations across multiple domains requires that subordinate units of the MEF have organic information environment operations capability to fight the last 1,000 meters in future conflicts for the MIG to support the MAGTF's ability to maneuver in all domains.

Primary Research Question

Does the current organization of the MIG support the ground combat element's maneuver for future multi-domain conflicts?

Currently, the IE Concept is for the MIG to augment the MAGTF's subordinate units with liaisons and support teams in direct support of the supported unit (USMC 2017b, 9). The GCE currently does not possess organic capability to plan, train, or integrate information environment operations. As a result, the GCE is entirely reliant upon the capability of the MIG to implement / coordinate information environment operations. Consequently, the GCE units will only integrate information environment operations into planning, training, and execution when the MIG provides them with liaisons and direct support teams. The design of the MIG's support construct does not establish habitual relationships for supporting planning, training, exercises, and operations. The challenge for the Marine Corps is the integration of information

8

environment operations throughout the MAGTF. However, further changes in the MEF are required to support the IE Concept. Otherwise, the GCE will lack effective information environment operations capacity for future multi-domain conflicts.

The Marine Corps is rapidly transitioning how the service will fight and win future battles. The Secretary of Defense and the Commandant both believe that the information function will cause changes in doctrine, organization, training, material, leadership and education, personnel, facilities, and policy (DOTMLPF-P). This is why information is changing the character of warfare. The structure of the U.S. military needs to hyper-innovate to harness the realities of future multi-domain conflict. Russia, VEOs, and the MOC's hybrid competitor are waypoints for addressing change. The MIG is an initial step in transitioning the Marine Corps for future multi-domain conflict. For the MIG to be effective it must support the GCE with information environment operations to enable maneuver warfare against competitors in the last 1,000 meters (see Figure 2. Current MIG Information Support to GCE).

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                    ┌──────────────┐
                    │     MIG      │
                    └──────────────┘
                      ▲         │
                      │         ▼
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                    │ Liaisons &   │
                    │  Support     │
                    │   Teams      │
                    └──────────────┘
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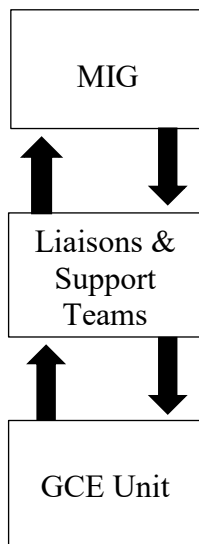
Figure 2.   Current MIG Information Support to GCE

Source: Created by author.

Secondary Research Questions

In order to answer the primary research question the following secondary

questions require consideration:

1. Does the Marine Corps warfighting doctrine enable information environment

    operations at the tactical level?

2. Is the current structure of the ground combat element conducive for

    information environment operations?

3. Can the ground combat element provide a structure to train and sustain

    Marines in information environment operations?

4. Is it realistic, supportable, and suitable to develop information environment

    operations Marines organic to the ground combat element?

10

In Chapter 4, a DOTMLPF-P analysis methodology with an evaluation criterion of effectiveness will provide answers to the secondary questions. Russia, VEOs, and the MOC's hybrid competitor will provide context to highlight multi-domain capabilities of competitors. In Chapter 5, an answer to the primary research question will use the aggregation of the secondary questions findings to identifying if/where a capability gap exists. Then identify recommendations for future research.

<div align="center">Key Terms and Definitions</div>

The Commandant is building readiness in the Marine Corps for future conflict through information initiatives. These initiatives are fostering change across the service. These changes are creating new key terms and creating MAGTF specific definitions for other terms. The following section will provide an explanation of the terms used in this thesis. The IE Concept and joint publications are the principal sources for this section.

Convergence: the integration of capabilities across domains, environments, and functions in time and physical space to achieve a purpose. It is the act of applying a combination of capabilities (lethal and nonlethal, whether within a domain or cross-domain) in time and space for a single purpose. Friendly forces achieve victory through convergence by employing multiple combinations of cross-domain operations that create physical, virtual, and cognitive windows of advantage to enable cross-domain maneuver and fires to achieve objectives (DA 2017d, 3).

Information Environment: the aggregate of individuals, organizations, and systems that collect, process, disseminate, or act on information (DoD 2014b, 138).

Information Operations: the integrated employment, during military operations, of information-related capabilities in concert with other lines of operation to influence,

disrupt, corrupt, or usurp the decision-making of competitors and potential competitors while protecting our own (DoD 2014b, 138).

Information Related Capabilities: tools, techniques, or activities using data, information, or knowledge to create effects and operationally desirable conditions within the physical, informational, and cognitive dimensions of the information environment (DoD 2014b, I-4).

MAGTF Information Environment Operations: the integrated planning and employment of MAGTF, Naval, Joint, and Interagency information capabilities, resources, and activities that enhance the Marine Corps single-battle concept and provide defensive, offensive, exploitative effects and support in order to operate, fight and win in and through a contested information environment. It represents a broad set of activities occurring in or through the IE, conducted at the operational or strategic level to achieve operational or strategic objectives. The MAGTF may support theater or national/strategic objectives by conducting tactical-level information environment operations. The MAGTF information environment operations has seven functional lines of effort: Assure Enterprise Command & Control and Critical Systems; Provide IE Battlespace Awareness; Attack & Exploit Networks, Systems & Information; Inform Domestic & International Audiences; Influence Foreign Target Audiences; Deceive Foreign Target Audiences; Control Information Warfare Capabilities, Resources, & Activities. The operational capability areas groups are Electromagnetic Spectrum Operations (EMSO), Cyberspace Operations, Space Operations, Influence Operations, Deception Operations, and Inform Operations (USMC 2017b, 1, 2, 22).

Maneuver Warfare: a warfighting philosophy that seeks to shatter the enemy's cohesion through a variety of rapid, focused, and unexpected actions that create a turbulent and rapidly deteriorating situation with which the enemy cannot cope (USMC 2011, 76).

> The essence of maneuver is taking action to generate and exploit some kind of advantage over the enemy as a means of accomplishing our objectives as effectively as possible. That advantage may be psychological, technological, or temporal as well as spatial. Especially important is maneuver in time—we generate a faster operating tempo than the enemy to gain a temporal advantage. It is through maneuver in all dimensions that an inferior force can achieve decisive superiority at the necessary time and place. (USMC 1997, 72-73)

Operational Security: a capability that identifies and controls critical information, indicators of friendly force actions attendant to military operations, and incorporates countermeasures to reduce the risk of an adversary exploiting vulnerabilities (DoD 2016b, 75).

Maskirovka: a Russian form of deception that aims to achieve surprise, and espouses exploiting surprise to the maximum extent; this deception is applicable across all levels of war. Measures to achieve surprise include maintenance of secrecy of the aim of upcoming combat, misleading of the enemy as to true intentions, preparing secretly, and camouflaging to deny enemy reconnaissance efforts (Krueger 1987, 16-17).

Single Battle Concept: operations or events in one part of the battlespace often have profound and consequent effects on other areas and events; therefore, a commander must always view the battlespace as an indivisible entity (USMC 2010, 1-6).

Limitations and Delimitations

The limitations and delimitations for this thesis primarily exist for two reasons this is a new topic within the DoD, and this thesis will focus on the Marine Corps'

emerging initiatives to address the information function. First, the announcement of information as a function on September 15, 2017 as a joint function means this is a new paradigm for the U.S. military. The services within the DoD are developing concepts and doctrine to support this new function. Second, the focus for this thesis will be on the Marine Corps' MIG and its ability to support the GCE maneuver. Therefore, the principle taxonomy and lexicon for this thesis question will be from Marine Corps concepts and warfighting publications.

Multiple force structure and concept changes highlight the information functions incipient implementation across the Marine Corps since 2016. The development of the MOC, the establishment of the Deputy Commandant for Information, the IE Concept, and the MIG are new for the Marine Corps. These emerging organizations and concepts have limits to the research available on their application and utility. This is a limitation of the research question but it identifies the timeliness of this research for the Marine Corps. This thesis intends to advance the professional discourse for this topic.

In an attempt to develop professional discourse for this thesis subject there are threats to validity. The threats to validity on this topic are external validity, internal validity, and selection bias. Chapter 3 has a section covering threats to validity.

Classification issues can often occur when dealing with information and topics relating to information environment operations. This thesis will use only unclassified materials for research. Authorities within the information environment are an important aspect of operations. This thesis will not be focusing on questions of authorities. Additionally, there are several after action reports from across the Marine Corps on their

initial attempts to integrate information environmental operations, these reports are marked for official use only and will not be sources for this research.

In future conflict the Marine Corps will always fight as a MAGTF, and will likely always fight as part of a Joint Force. Researching how the MIG interacts with and enables the Joint Force will not be a topic of this thesis.

The methodology for this thesis will be a qualitative DOTMLPF-P analysis, using competitor case studies with an evaluation criterion. The Joint Capabilities Integration and Development System (JCIDS) Manual and the USMC Capabilities Based Assessments (CBA) as described in the Marine Corps Order (MCO) 3900.20 will be references guiding the DOTMLPF-P analysis. The Chapter 2 Literature Review and the answers to the secondary research questions will inform the answers to the primary research question. The DOTMLPF-P analysis will focus on doctrine, organization, training, leadership, and education elements associated with the secondary research questions. The case studies of Russia, VEOs, and the MOC's hybrid threat will provide a benchmark for current threat capabilities across the levels of war and across domains; assumptions may occur when discussing the competitors' capabilities or future capability, the purpose is to identify a capability gap. Additionally, the case studies provide contextual references for the DOTMLPF-P analysis to inform the evaluation criterion of effectiveness. The evaluation criterion will identify the level of change required if a gap exists from the DOTMLPF-P analysis.

Chapter Summary

The character of war is changing. As a result, the U.S. military is innovating to build readiness for future multi-domain conflict. Russia, VEOs, and the MOC's hybrid

competitor demonstrate advancing capabilities to operate in multi-domains and leverage the information environment to achieve objectives across the levels of war. The U.S. military in response is attempting to create readiness for multi-domain fights in the future. The Commandant of the Marine Corps is promoting dynamic changes throughout the service. The IE Concept is just the beginning for solving the information issues at the tactical level. The Commandant's changes are paradigm shifts for how the Marine Corps fights and wins battles at the tactical level. This thesis wants to understand further the MIG's support to the GCE to enable maneuver warfare for future multi-domain conflicts.

Chapter 2 will be an extensive literature review in order to frame the issues surrounding the primary research question, and provide context to the secondary research questions. The literature review takes a broad perspective of issues pertinent to the MIG and describes three competitors' case studies for contextual references to answer the primary and secondary research questions.

CHAPTER 2

LITERATURE REVIEW

He who knows the art of the direct and the indirect approach will be victorious. Such is the art of maneuvering.

— Sun Tzu, *The Art of War*

Chapter Introduction

The Marine Corps has made several changes to build readiness for future conflict within the information environment. The IE Concept attempts to build capacity for information environment operations at the tactical level of war. The MIG is the MEF Commanding General's structure to "coordinate, integrate, and employ IE Ops capabilities" throughout the MAGTF (USMC 2017b, 4). The MIG is a paradigm shift for how the Marine Corps fights; "This creates a potentially significant variation in the way the MAGTF traditionally approaches planning and mission execution. The gaps and unknowns associated with the new command organization and the implications for staff relationships will not likely to be understood fully in the near term (i.e., 1-5 years)" (USMC 2017b, 33). As Pomerleau observes, "The Marine Corps is making a fundamental shift to better posture itself and organize in the emerging information environment" (Pomerleau 2017). However, as the Marine Corps matures their concepts, it is important that the Marine Corps incorporate the right lessons into doctrine to ensure operational and tactical success in the last 1,000 meters.

As the Marine Corps continues to experiment with the structure of the MIG, and how it enables operations throughout the MAGTF, this thesis will focus on the implications for the GCE. The primary research question asks, "Does the current

organization of the MIG support the ground combat element's maneuver for future multi-domain conflicts?" As the Marine Corps determines the implications of this paradigm shift, this chapter will frame the issues driving change.

<u>The U.S. Army's Tactical Level Information Capability</u>

The U.S. Government and the DoD recognized a requirement for increasing information operations capabilities across the joint force. In June 2016, the Secretary of Defense, Ash Carter signed the *Department of Defense Strategy for Operations in the Information Environment*. This strategy was in response to National Defense Authorization Act for Fiscal Year 2014. It stated the following:

> The Secretary of Defense shall develop and implement a strategy for developing and sustaining through fiscal year 2020 information operations capabilities for future contingencies. The Secretary shall submit such strategy to the congressional defense committees by not later than 180 days after the date of the enactment of this Act. (U.S. Congress 2014, 210)

However, this additional requirement for the DoD was not supported adequate funding and the legislation sequestration required a reduction in the U.S. Army's force end strength. Information operations capabilities were an ancillary concern and the U.S. Army could not sustain the implementation of information operations strategy.

The initial response by the U.S. Army to address the information challenge was to create information operations capability at operational and tactical commands. Centers of Excellence and brigade level and above had information operations capability. This capability included a 30A Information Officer. The requirements of sequestration to reduce the end strength of the U.S. Army resulted in the Focus Area Review Group while further eliminating numerous positions and billets across the U.S. Army. This information operation capability from the brigade modified table of organization and

equipment (MTOE), along with other information operations capability in echelons above brigade were targeted (DA 2014). As a result, the U.S. Army had a reduction in its capacity to operate in the information environment with tactical maneuver units.

The result of sequestration, the Focus Area Review Group cuts, and information technologies rapid advances meant the U.S. Army lost capability at the tactical level. Comments made by the 1st Armored Division, Commanding General to the Chief of Staff of the Army after the Army Warfighting Assessment Exercise 16.1 support this statement:

> The division was able to leverage the organic IO teams at BCT level to successfully counter the enemy narrative and avoid making new enemies as we conducted wide area security. However, the new distribution of IO capabilities will remove this capability from BCTs. . . . Return FA30 (Information Operations) to the BCT MTOE to enable synchronized nonlethal execution from Theater to Brigade and ensure divisions' ability to conduct the critical METL task of Execute Stability Operations. (DA 2016, 1)

The U.S. Army is now working to regain this capability at the tactical level. This is evident by the Maneuver Center of Excellence information paper titled, "Force Design Update Implications for accelerated BCT Operational and Organizational Concepts" (DA 2017b, 1). This information paper states to more effectively operate with the current U.S. Army concepts and the multi-domain battle concept, BCT headquarters need a 30A "to integrate Information Operations and enable cross-domain maneuver and integrated reconnaissance and security" (DA 2017b, 2-3). The U.S. Army Field Manual 3-0 *Operations*, validates the requirement for information environment capability in the BCTs for future multi-domain conflict by stating the following:

> Enemies will employ conventional tactics, terror, criminal activity, and information warfare to further complicate operations. To an ever-increasing degree, activities in the information environment are inseparable from ground

19

operations. Large-scale combat operations present the greatest challenge for Army forces. (DA 2017a, 1-2)

FM 3-0 *Operations* reinforce in doctrine information environment operations importance for future multi-domain conflict, this publication is a driver for change in the U.S. Army. Sequestration and the reduction of end strength degraded the U.S. Army's readiness, especially within information for future multi-domain conflict. Doctrine, commanders, and units across the U.S. Army understand now the impact the reductions had on the ability to integrate and coordinate information environment operations at the tactical level.

The U.S. Army is currently pushing for the return of their 30A Information Officer at the brigade level to enable information operations and to integrate information related capabilities with higher echelons. This effort intends is the start for addressing a gap information environment operations capability, and as McGrath observes, "It is well established that both state and nonstate competitors are gaining parity with current U.S. military-technological capabilities, and as a result competitors are eroding the tremendous asymmetrical conventional warfare advantages once exclusively enjoyed by U.S. forces (McGrath 2016, 17). This reality further highlights the urgency of the concern about training at the BCT-level or higher, "Restoring the 30A position (Information Operations Officer) to the BCT MTOEs provides commanders the staff expertise required to maneuver and synchronize actions in the information environment necessary to achieve operational objectives" (DA 2016, 2). The U.S. Army's current information initiatives reveal the importance of integrating and coordinating information environment operations across the levels of war for future multi-domain conflict.

As the U.S. Army develops its forces for future multi-domain conflicts, it is imperative the Marine Corps incorporates lessons learned from the U.S. Army. Despite the services viewing the integration of information differently, both services are looking for methods to harness information environment operations at the tactical level. The subordinate elements of the MEF can develop structure internally to interface with the MIG, but this is not a long-term solution. Since information is a warfighting function, it needs professionalization and a developmental path for information environment operations Marines. Future conflicts only forecast information as being of greater value; therefore, commanders need the ability to integrate information in their planning, training, and operations.

Information environment operations are different in scale, compared to kinetic fires. Information environment operations shrink the distance between the levels of war. Consequently, actions at the tactical level can rapidly affect operational and strategic objectives (McGrath 2016, 21). The execution of information operations and the U.S. Army's current structure are not commensurate for tactical success for future multi-domain conflicts. Similarly, the Marine Corps currently does not have a permanently assigned information operations structure below the MIG to integrate and execute information environment operations. Addressing this creates a critical vulnerability in the MAGTF is an imperative for future multi-domain conflict.

Revisiting the Lessons Learned From Millennium Challenge

Millennium Challenge was a multi-million dollar wargame designed by Joint Forces Command (JFCOM) in 2002 to test warfighting concepts of the future. The hypothesis as stated by JFCOM for the wargame was, "If an enhanced joint force

headquarters is informed by an operational net assessment and employs effects-based operations which utilize the full range of our national capabilities. Then the 2007 joint force will be able to conduct rapid decisive operations against a determined 2007 adversary" (JFCOM 2003, 3). The wargame's purpose was aggressive, but there are lessons from this wargame that inform DoD and service development concept today.

In 2002, the U.S. military was breaking free from the bi-polar world strategies. The War on Terrorism and the rapid advancement of technology was driving the U.S. military to innovate through concepts and technology integration and the Millennium Challenge wargame was testing these innovations. A principal concern for the wargame stemmed from the accelerated pace of technology development, its rapid proliferation, and global accessibility. JFCOM's belief that "Technological advances offer unprecedented capabilities to friendly and enemy forces alike. Political, economic, cultural, and other pressures in the post-colonial, post-Cold War environment make conflict more likely. Globalization seeds unrest in distant lands that is potentially damaging to national interests" (Myers 2003, 24). This assessment of the impact of technology on competitors, geo-politics, and the increasing inter-connectedness of the world through globalization is similar to the problem statement in 2018 facing the DoD.

The Millennium Challenge wargame was testing multiple concepts for addressing these bourgeoning challenges. The DoD and JFCOM principally tested the following overarching concepts during the Millennium Challenge wargame.

1. Do operational net assessments increase a commander's options to achieve desired effects through a system-of-systems analysis (Myers 2003, 27)?

2. Can a standing JFCOM effectively establish a joint command staff during a time of crisis?

3. Are effects-based operations an effective method for achieving objectives?

4. Can technology provide a holistic understanding of the operating environment to inform decision-making?

5. Will unity of effort between the military and the civilian elements of government be effective through a joint interagency coordination group structure?

These concepts intended to focus the commander on leveraging technology and task organization to aid in their understanding. Unfortunately, the Red Force and counter-insurgency operations over-shadowed the momentum of Millennium Challenge.

Since the end of the Cold War, the U.S. military had a series of military accomplishments that demonstrated its status as the world's sole superpower. The Global War on Terrorism and the rising tensions with Saddam Hussein, the DoD, and JFCOM wanted to demonstrate through the Millennium Challenge wargame how the U.S. military's technological developments would influence future conflicts. As Malcolm Gladwell writes, "The point of Millennium Challenge was to show that, with the full benefit of high-powered satellites and sensors and super-computers that the fog could be lifted" (Gladwell 2007, 106). The Blue Team was supported with the best technology money could buy; they had every reason to believe in a successful outcome in a free-play wargame scenario.

> With Millennium Challenge, then, Blue Team was given greater intellectual resources than perhaps any army in history. . . . They were given a comprehensive, real-time map of the combat situation called the Common Relevant Operational Picture (CROP). They were given an unprecedented amount of information and intelligence from every corner of the U.S. government and a

methodology that was logical and systematic and rational and rigorous. They had every toy in the Pentagon's arsenal. (Gladwell 2007, 105)

Despite the Blue Team's technological advantages, the Red Force defeated the Blue Team by using innovative combined arms methods within multiple domains. The Red Force's employment of a preemptive land, air, and sea attack surprised the Blue Team through disciplined communications, swarming small-boat tactics, and cruise missiles strikes that sunk the Blue Team's naval fleet at the start of the wargame (Zenko 2015). This success was a distraction for the overall outcome of the wargame and frustrated proponents of the wargame. However, it does indicate that investment in technology, sensors, artificial intelligence, and the best algorithms mathematicians can devise cannot always expose a thinking enemy's intentions. Even in with their information related capabilities, the fog of war is persistent.

The Millennium Challenge wargame in retrospect was at a transition point. As the U.S. transitioned from the collapse of the bi-polar world to becoming temporarily the world's sole superpower, many questions about the military's requirements arose: what threat did the warfighting concepts need to focus on; and what structure did the U.S. military need to operate effectively in this new post bi-polar world paradigm.

> Millennium Challenge made significant progress in validating several new concepts and paved the way for others. It established the initial mark for joint force transformation. Now the onus on the joint community is incorporating new concepts into doctrine in order to conduct true rapid decisive operations in 2007. The question is whether doctrinal development will be able to keep apace of change and meet that deadline. (Myers 2003, 29)

The onset of Operation Iraqi Freedom in 2003 negatively influenced the joint forces ability to absorb conclusions from Millennium Challenge. Iraq was a large-scale combat operation that would quickly change to counter-insurgency operations within the opening

months of the operation (Malkasian 2008, 241). The joint force's intellectual and operational focus on counterinsurgency took resources away from maintaining the U.S. military's advantages within the information environment.

The U.S. military's counterinsurgency focus provided global competitors time to reduce the asymmetric technology advantages the U.S. military had demonstrated in the post-Cold War period. A 2017 U.S. Army and Marine Corps white paper titled, "Multi-Domain Battle: Combined Arms for the 21st Century" summarizes the effect the counterinsurgency focus by the U.S. military is having on the readiness of the force today against global competitors.

> When coupled with the loss of assured superiority in other domains and more than a decade focusing on counterinsurgency, U.S. ground combat capabilities and capacities are out of balance to effectively confront emerging conditions presented by potential adversaries. Aging ground combat assets and the limited procurement of technologically advanced systems have created a situation in which adversary ground formations now have parity or overmatch with U.S. forces in capability and capacity. (DA 2017c, 5)

Thus, the Millennium Challenge problems manifest themselves again today. As the U.S. military transitions from counterinsurgency operations to a focus on large-scale combat operations, peer competitors have capabilities equal to or greater than the Red Force. Therefore, the DoD must develop information concepts to address our global competitors' capabilities. As a result, of information becoming a joint function and Secretary Mattis calling for DOTMLPF-P changes the Millennium Challenge lessons remain relevant.

The U.S. military did not innovate for future conflicts as the wargame suggested. Instead, the U.S. military focused on adaptations to the counterinsurgency problems. The competitors of tomorrow successfully developed conventional and hybrid approaches to

the U.S. military advantages, many of these solutions harness information related

capabilities. Then-Secretary of Defense Chuck Hagel described the effects of the

counterinsurgency focus on September 3, 2014.

> I am greatly concerned that our military's technological superiority is being challenged in ways we have never experience before. . . . As the United States emerges from more than 13 years of grinding warfare and large-scale counterinsurgency operations, we are seeing first-hand that the rest of the world has not stood still. Disruptive technologies and destructive weapons once solely possessed by only advanced nations, have proliferated widely, and are being sought or acquired by unsophisticated militaries and terrorist groups. Meanwhile, China and Russia have been trying to close the technology gap by pursuing and funding long-term, comprehensive military modernization programs. (DoD 2014a)

Today, Millennium Challenge lessons remain relevant for the DoD as it begins to address

tomorrow's conflicts through information concept developments. Technological

advantage does not discount critical thinking. Any technology advancement must include

robust training of the men and women who employ and analyze its output. The

integration of information environment operations capabilities must be throughout the

levels of war within the U.S. military, not doing so has negative strategic, operational,

and tactical implications across the DOTMLPF-P. Millennium Challenge demonstrated

technology cannot wipe away the nature of war. The friction, uncertainty, fluidity,

disorder, complexity, and the human dimensions will always be present in war and have

effects on decision-making (USMC 1997, 1-20). The DoD must focus its capabilities

development on integrating information across multi-domains and in all levels of war to

begin developing readiness for future multi-domain conflict.

As the Marine Corps continues experimenting with the IE Concept in the MIGs,

the Millennium Challenge lesson to remember is how the Blue Team was defeated

despite information superiority. Information is pervasive across the OE for all

belligerents and non-combatants. The operational tempo generated through information and the situational awareness information provides identifies how time is on a different scale than in previous conflicts (Redden and Hughes 2011, 66). As a result, information environment operations capacity must exist throughout the MAGTF. The subordinate units of the MEF need capacity to plan, coordinate, and integrate with the MIG to begin to develop the full potential of information environment operations within the MAGTF. Building information capacity in tactical units will enrich the information to the MIG, and create a more accurate understanding for the MEF Commanding General. Technology and investment in Marines to understand its outputs, and synthesize the information are essential to reducing gaps exploited by the Millennium Challenge's Red Force.

Integration of Information into Multi-Domain Operations

> Although operations are conducted in and occasionally across these five domains, the promise of a concept that makes domain integration the norm and not the exception is a tall order. Extraordinary claims require extraordinary evidence. The logic of [multi-domain battle's] underlying tenants is widely accepted, but that is not the same as demonstrating the concept's viability.
> — Kevin M. Woods and Thomas C. Greenwood, "Multidomain Battle"

An operation in multiple domains is not new. However, the rapid ability to integrate effects across multiple domains requires that DoD advance the pace of innovations across DOTMLPF-P to enable the U.S. military for future multi-domain conflicts. Since the founding years of the United States, multi-domain operations are increasingly a part of the American way of war. These operations are gaining in sophistication and regularity.

As an example, in 1776, the U.S. Navy and Marine Corps conducted multi-domain operations by the way of an amphibious assault at New Providence in the Bahamas (Krulak 1999, 2). The incipient harnessing of the airplane as a tool of war in World War I set the stage for the air domain, and "the promise of technological advances that would make air power's potential in future conflict limitless" (Murray 2009, 111). The development of anti-submarine warfare in World War II demonstrates the effectiveness air, land, sea, and radar to defeat the U-boat threat of Germany (Beyerchen 2009, 295). Overtime, the advancements in technology increased operational tempo, precision, and collaboration. However, the proliferation of these technologies now enables multi-domain integration for state and non-state actors to achieve rapid effects in multiple domains.

Today global competitors use information to achieve objectives through all domains, and at all levels of war. The evidence of this is Russia's actions in Zelenopillya, Ukraine. The global recruiting ability of ISIS in *Dabiq* and *Rumiyah* magazines and other social media forums are further examples. These and other global competitors' actions influenced the *Department of Defense Strategy for Operations in the Information Environment*:

> With the advent of the internet, the expansion of information technology, the widespread availability of wireless communications, and the far-reaching impact of social media, today's information environment poses new and complex challenges for military operations. This networked environment has enabled both state and non-state actors to employ activities in the IE to achieve their objectives effectively. . . . These actors, and their supporters and surrogates, can now access the IE with ease and at relatively low cost, using it to advance their objectives and influence audiences around the globe. (DoD 2016, foreword)

The ability to operate across multi-domains has come a long way from the amphibious assault on Fort Montagu and Fort Nassau in 1776 (Simmons 2003, 3-6). Today the

information environment continuously gains in complexity and integrates multi-domain operations. The integration provides temporal advantages across any or all domains. To address this effect of the information environment on multi-domain operations the U.S. military needs to build readiness for threats from multiple domains indefinitely, whether at home in the United States or forward deployed in combat.

The proliferation and rapid development of information technology, coupled with the increase in global competitors' conventional capabilities precipitated the U.S. military to develop new operational concepts for future multi-domain conflicts. In order to develop a concept for readiness against a future competitor in multi-domain conflict, the U.S. Army and Marine Corps co-wrote a white paper titled "Multi-Domain Battle: Combined Arms for the 21st Century" (DA 2017c, 1). The white paper supported the Army Operating Concept and the Marine Corps Operating Concept. Both the Army and Marine Corps clearly see a need to build readiness and to address the complexities of future multi-domain conflict in 2025-2040, future competitors will be attempting to gain advantages using information in multi-domains. Specifically, competitors will be leveraging information to create "parity or overmatch with U.S. forces in many weapons systems' range, lethality, protection, and mobility" (DA 2017c, 3).

The anticipation of this reality drives the recommendation for a new operational framework for multi-domain for the commander to understand their area of operation. This new framework is a requirement that the information environment imposes on planning, coordinating, integrating, and executing operations. In addition, this supports the white paper's concept of convergence. In the multi-domain battle concept, the convergence of cross-domain fires to enable operations across the levels of war

demonstrates the increasing sophistication of integrating information for multi-domain

operations (DA 2017d, 2-3). The multi-domain battle concept's focus on "restoring

capability balance and building flexible, resilient formations in the Joint Force; and

altering force posture to enhance deterrence" implies the importance of information

environment operations capability throughout all levels of war (DA 2017c, 4). The U.S.

Army and Marine Corps are developing concepts enabled by information to maneuver,

fight, and win throughout multi-domains and defeat global competitors' advantages

within the information environment.

    The Marine Corps is building readiness across the force to address specifically

information's impact on multi-domain operations. The Commandant expresses concern

for the Marine Corps' readiness for future multi-domain conflict in "Seize the Initiative:"

> From now on, we will have to fight not only in the domains of land, sea, and air,
> but also in space and cyberspace. We will have to fight for and with information
> on the battleground of perceptions and ideas. And we will have to win the battle
> of electromagnetic signatures in which to be detected is to be killed. We can never
> take our enemies for granted. We will be tested. (USMC 2017a, 2)

The character of warfare is evolving. Captain Redden, U.S. Navy and Colonel Hughes

U.S. Air Force, describe how the global commons are changing due to information; "The

growth of cross-domain interrelationships brings a concomitant increase in the number of

seams between the domains – seams that offer large numbers of vulnerabilities and

opportunities" (Redden and Hughes 2011, 64). To address these changes the Marine

Corps has formed the Deputy Commandant for Information (DC I), and has developed

and begun experimentation with the IE Concept within the MEF.

    The DC I is a watershed approach for the Marine Corps to implement the

information function as a whole rather than in stovepipe capabilities. The Marine Corps'

maneuver warfare warfighting philosophy, the single battle concept, and the MAGTF task organization all support a single advocate for information (USMC 2010, 1-6; USMC 2011, 76). Captain Redden, U.S. Navy and Colonel Hughes U.S. Air Force state that a holistic view across all domains is an essential requirement for future conflicts, the OE is "a complex, interactive system" (Redden and Hughes 2011, 65). The warfighting philosophy seeks to defeat the enemy by exploiting gaps; the single battle concept sees the OE as a whole and any action can affect the entire OE; and Marines fight as a cohesive whole the MAGTF. Major Jared Blake explains in the *Marine Corps Gazette*, "The DC I model provides unity of effort by looking across functional areas, synchronizing efforts, and providing a holistic vision for the information environment" (Blake 2017, 33). The Commandant's creative forward thinking on the impact of information for future multi-domain conflict is evident by supporting this line of effort in all levels of war. The DC I as an integrator for the service and an advocate of the information function will develop service doctrine and concepts, while ensuring the Marine Corps is prepared for the requirements of the joint force for future multi-domain conflict. The IE Concept is the Marine Corps tactical level approach to integrate information environment capability throughout the MAGTF.

The Commandant's IE Concept changes the structure of the MEF for fighting and winning battles. It highlights the significance of fusing intelligence and information for multi-domain conflicts of the future. The information function will affect all warfighting functions in planning, training, organization, and execution. The IE Concept developed by the Deputy Commandant of Combat Development and Integration (DC CD&I), "introduces a comprehensive approach to fighting and winning in and through the

information environment" (USMC 2017b, Foreword). The IE Concept principal

DOTMLPF-P initiative is the establishment of the MIG (USMC 2017b, 2). The MIG

creates unity of command and unit of effort for information environment operations

within the MEF. A key design of the MIG is the broad information environment

operations capacity under one commander. The IE Concept describes the MIG's purpose

as:

> The MIG is established as a MEF command element (CE) subordinate command
> dedicated to planning, conducting, coordinating, and/or supporting IE Ops
> missions across the MEF's area of interest (AOI). Given specified IE Ops tasks
> from an OPLAN, CONPLAN, OPORD, FRAGO, or other authoritative directive,
> the MIG develops an integrated IE Ops plan and coordinates IE Ops missions and
> tasks within the larger MEF concept of operations (CONOPS) and scheme of
> maneuver (SoM)." (USMC 2017b, 4)

Stated simply, the MIG resides in the MAGTF's command element and supports the

MEF Commanding General employment of the MAGTF. The IE Concept and the MIG

are important organizational changes for how the Marine Corps fights and wins battles.

The IE Concept addresses the challenges outlined by the Commandant in the MOC. The

battle for information will exist in all domains. The information environment is pervasive

and the Marine Corps is attempting to integrate information environment operations

capabilities to the lowest tactical level. The IE Concept and the MIG are just the first

steps by the service to address the challenges posed by future multi-domain conflict.

<div align="center">Is the MIG Flat Enough?</div>

The information environment is driving the Marine Corps to develop innovative

new structures and concepts, but it is doing this on old hierarchical foundations. In

Thomas Friedman's *The World is Flat*, he discusses three ideas that influence the Marine

Corps' ability to harness the potential of the information function; these ideas are what

Friedman describes as "the triple convergence," adaptability across disciplines, and the importance of creativity (Friedman 2007, 207, 320, 327). These ideas can influence the MIG by increasing the speed and value of information within the military hierarchical structure, increase the value of the organization people through broadening experiences, and develop Marines who can plan information environment operations in an efficient, effective, and holistic method.

The information environment is a system-of-systems, and future competitors will operate in and through this environment. Maneuver warfare espouses, "to understand the unique characteristics that make the enemy system function. . . . We should seek to identify and attack critical vulnerabilities and those centers of gravity without which the enemy cannot function effectively" (USMC 1997, 77). The Marine Corps to fight effectively in future conflict needs to act faster than our future competitors do.

"The triple convergence" is creating speed and value through horizontal integration and collaboration by changing the structure of the organization (Friedman 2007, 207).This idea is important for the MIG so that subordinate units within the MAGTF can input and receive information with the MIG to increase operational tempo across the MAGTF. As a finite resource, the liaison and support teams will not be capable of supporting all subordinate units within the MAGTF, but information environment operations will persist throughout the AO. The pervasiveness of the information environment within all domains requires the integration and collaboration of all subordinate units at all times with the MIG to exploit temporal advantages in future multi-domain conflicts. Therefore, the current hierarchical structure of the MIG will be less effective due to the increase in the value of time caused by information technologies.

"The triple convergence" suggests that flatter organizational structures are faster and more responsive to change brought about by technology (Friedman 2007, 208). Creating flatter organizations requires increasing collaboration; the result is creating value greater than the sum of its parts. If the MIG flattens its structure to integrate information environment operations capability from across the MAGTF, this would generate operational tempo and enable subordinate units to respond rapidly to changes in multi-domains through intelligence generated from the information environment. However, if the MIG accepts only inputs from liaison and support teams, it is operating in a linear fashion and constraining operational effectiveness through old hierarchical structure (Friedman 2007, 210). Adding information environment operations structure to the subordinate units of the MEF will enable the MIG to flatten its structure, and improve information environmental operations capacity by adding value through increasing collaboration across disaggregated units across the complex OE in future multi-domain conflicts (Friedman 2007, 457).

To harness "the triple convergence" concept the MIG must engineer adaptability across all disciplines to increase a more holistic information environment operations understanding across the command. The MIG commander's span of control includes seven subordinate commanders responsible for fusing information and intelligence activities across the information environment in support of the commander. Increasing adaptability across these disciplines would prepare the MIG for multi-domain conflict by developing a shared understanding and inter-discipline operability among the seven subordinate commands. Adding breadth to the Marines' experiences in the information environment prevents stovepipe thinking, planning, and integration.

34

One model may provide insight for the emerging MIG concept. Georgia Tech's College of Computing requires students working towards a computer science degree to take classes in liberal arts, performing arts, or humanities (Friedman 2007, 327). The concept "allows graduates to create value in ways beyond what would be possible with only a narrowly focused tool set – and that skill set is certain to have value in the emerging flat-world marketplace" (Friedman 2007, 329).

> [T]he computer science major at Georgia Tech [has] around nine "threads," as they refer to them. Each thread is a combination of computing with another field, producing a synthesis of knowledge – where the real value is going to be created. Threads represent a departure from a vertically oriented curriculum whose goal is the creation of students with a fixed set of skills and knowledge . . . A thread is a fundamentally horizontal idea whose goal is to give students the broad collection of skills and learning experiences they need to thrive in the globally competitive Conceptual Age. A thread provides an intuitive, flexible, and mutually strengthening set of courses that allows a student to craft his or her own distinctive future. (Friedman 2007, 327-328)

This concept applied to the MIG would result in Marines working within the MIG to receive crossed-training with other subordinate commands. In future multi-domain conflicts, how the integration, coordination, and execution occur will determine the effectiveness of the MIG's actions. Developing adaptability across disciplines within the MIG's individual Marines will also increase the cross-pollination of ideas MIG due to a shared understanding. Increasing a shared understanding for Marine in the information environment will decrease stovepipe thinking, encourage lateral collaboration, and better integrate information environment operations capabilities. This is how the MIG can provide a temporal advantage to the MAGTF commander.

"The triple convergence" and the adoption of adaptability across disciplines increase the value of the MIG by creating horizontal structure changes while diversifying Marine skill sets. These changes to the MIG enable the third idea. Creativity will allow

the MIG to apply inventive solutions for information environment operations. Future multi-domain conflicts will have increasingly complicated OEs that will involve multiple systems operating across the global commons. The belligerent who is able to gain advantages within the OE using the creative employment of information environment operations will have an advantage.

The information environment operations is an art and science that requires creativity. Thomas Friedman writes, "One thing we know about creativity is that it typically occurs when people who have mastered two or more quite different fields use the framework in one to think afresh about the other" (Friedman 2007, 316). The information environment is technical and it uses people, sensors, computers, and artificial intelligence to obtain information; the MIG fuses this information with intelligence. Enabling creativity with the MIG's structure and adaptability across disciplines will create cascading advantages from within the MIG and throughout the MAGTF.

Future multi-domain conflicts will occur in the information environment and will have impacts on the physical battlefield. It will not be enough to get information quickly, or to understand what the MIG is doing, it will require a horizontal structure, across discipline acumen, and creative convergence. Thomas Friedman summarizes these ideas in writing, "if creativity depends on connecting disparate dots, then we need to be educating our young people not only in more dots, á la the liberal arts, but also in the ability to think horizontally – to mesh together different perspectives and disciplines to produce a third thing" (Friedman 2007, 320). The importance of "the triple convergence," adaptability across disciplines, and creativity in future conflict could be the difference in winning and losing. Russia, VEOs, and the MOC hybrid competitor have shown they are

always looking to exploit gaps. If the application of information environment operations is too rigid, predictable, or prescriptive the effects will be minimal, and the objectives not accomplished.

<div align="center">Russia</div>

Russia's hybrid method of warfare in the 21st Century is a "whole-of-government approach" (Fox and Rossow 2017, 1). Russia is marshalling in a new era of global tension through deliberate maneuvering using all elements of national power, specifically the information environment to achieve objectives across the levels of war. The combination of Russian special forces (*Spetsnatz*), and other enabling information related capabilities to accomplish limited objectives demonstrates Russia's capacity to blend information environment operations with conventional warfare (Fox and Rossow 207, v). Russia is also using the information environment to influence "the narrative dimensions of war" creating tensions and cascading advantages for Russian interests (Patrikarakos 2017, 5). Russia's ability to exploit the information environment is an example of the changing character of warfare and highlights the emergent need to counter information environment operations by competitors.

Russia is a global competitor that is actively seeking to exploit seams using the information environment. They are demonstrating parity with leading nation-states and intimidating regional nation-states. Information environment operations are a central component to the Russian way of war. The hybrid warfare Russia promotes reveals war's changing character intensified by information. Nadia Schadlow writes, "Hybrid warfare is a term that sought to capture the blurring and blending of previously separate categories of conflict. It uses a blend of military, economic, diplomatic, criminal, and

informational means to achieve desired political goals" (Schadlow 2015). Russia's

coupling of *maskirovka* (defined in Chapter 1) within a hybrid warfare paradigm

facilitates Russian to "move quickly, seize the objective and reinforce it with sizeable

combat power before the adversary or international community has time to realize what

has occurred and provide an adequate response to stop the advance" (Fox and Rossow

2017, 1). Russia's 2014 operations within the Ukraine demonstrate its *maskirovka*

doctrine, hybrid warfare paradigm, and the value of information and time in multi-

domain conflict.

As discussed in Chapter 1, the Ukraine is an example of Russia integrating

information environment operations to achieve national and military objectives. In 2014,

Russia used special forces integrated with information related capabilities in the Ukraine

to control messaging, target, and to shape the OE (DA 2016, 48). Russian actions in the

Donbass region of Ukraine mixed conventional forces and information environment

operations with state-supported information operations to achieve objectives across the

levels of war. Russia skillfully demonstrated its hybrid warfare effectiveness on July 11,

2014 in Zelenopillya, Ukraine.

> The July 11, 2014 strike at Zelenopillya is perhaps the most noticeable example to emerge from the war of the combined effects of tactical drones with the battalion tactical group — a task-organized force designed to achieve tactical overmatch against opponents — and its organic fires capabilities. The attack was a preemptive undertaking against Ukrainian brigades, postured in assembly areas, which were preparing to conduct offensive action against Russian and partisan forces. The buzzing of tactical drones and cyber-attacks targeting Ukrainian communications preceded the strike. An onslaught of rockets and artillery fell on the Ukrainian position shortly after the drones arrived, leaving thirty Ukrainian soldiers dead, hundreds more wounded, and over two battalions' worth of combat vehicles destroyed (Fox 2017).

Russia's operations in the Ukraine validate its ability to use information rapidly at the operational and tactical level to achieve strategic effects. An essential supporting component of Russia's information environment operations is controlling the narrative.

The control of the narrative is an intrinsic facet of Russia's *maskirovka* doctrine and hybrid warfare paradigm. In today's information environment, control of the narrative can have impacts across the levels of war. Russia's actions in the Ukraine in 2014 were to destabilize the North Atlantic Treaty Organization alliance, prove Russian conventional power, and create uncertainty among Russia's western-leaning border nations. David Patrikarakos writes in *War in 140 Characters*:

> Whereas in war as it is traditionally understood, information operations support military action on the battlefield, in Ukraine it became clear that military operations on the ground were supporting information operations on TV and in cyberspace. The boundaries between politics and war, it appeared to me, had been blurred – and the boundaries between war and peace even more so (Patrikarakos 2017, 7).

Russia combines advances in technology, the information environment, and integrated information environment operations with conventional forces to achieve political and military objectives. Their operations are intentionally limited, well calculated, and centrally controlled by the state. Political and military leaders must understand the integration of the narrative with *maskirovka* doctrine and their hybrid warfare paradigm. Russian's actions in the Ukraine demonstrate convergence in action; the multi-domain white paper discusses this idea as a concept for future multi-domain conflicts. Multi-domain conflict uses information to create cascading effects through the prudent use of information environment operations and conventional forces is today's reality, not a reality for future warfighting concepts.

Future multi-domain conflicts will have an aggressive application of information technology, information environment operations, and conventional forces to create advantages throughout the OE. Information environment operations will have objectives across the levels of war in order to create maximum chaos, and surprise for Russia to employ *maskirovka* doctrine to gain a limited position of advantage.

Planners from the strategic to the lowest tactical levels must prepare for the changing character of war. The MIG will have challenges fusing information and intelligence against a Russian competitor. The OE will be global, but tactical level units will be vulnerable targets for Russian-style convergence (defined in Chapter 1) of information environment operations and conventional forces within their emerging hybrid warfare practices.

<u>Violent Extremist Organizations</u>

VEOs such as the Islamic State of Iraq and Syria (ISIS) use information and information related capabilities to gain global prominence. ISIS demonstrated an effective ability to recruit and unify their followers with social media and in published magazines like *Dabiq* and *Rumiyah*. Additionally, they utilized information related capabilities for ISR, limited kinetic strikes, and coordinating and executing operations. ISIS represents the initial evolution of non-state actor's capacity to harness the information environment to achieve organizational and military objectives.

ISIS's skilled exploitation of social media to recruit global followers is remarkable and a prescient warning for future multi-domain conflict. The speed that social media and information technology allowed ISIS to propagate their message coupled with the organizations ability to grow rapidly is an indicator of future VEOs

means to achieve followers (Patrikarakos 2017, 205). Abdel Bari Atwan writes about the impact information technology had in facilitating ISIS's rise:

> Without digital technology it is highly unlikely that Islamic State would ever have come into existence, let alone been able to survive and expand…from recruitment and propaganda, to directing simultaneous military actions at great distances apart and consolidating allegiances with like-minded groups, ISIS has used the Internet and digital communications with great skill and inventiveness, competently fending off threats from global intelligence bodies and military opponents. (Atwan 2015, 9)

ISIS understood that their target recruiting audience was using social media. More importantly, they were using social media and messaging applications on their cell phone. ISIS had a global reach by simply using hashtags and a smart phone (Steed 2016, 63). ISIS's success in recruiting globally identifies how quickly VEO become a threat within a region or to U.S. interests.

ISIS combines conventional warfare, irregular warfare, and information related capabilities to accomplish objectives. The coordination and execution of ISIS attacks on Ramadi 2015, demonstrate the maturation of ISIS's command and control. These attacks were combined arms attacks principally synchronized on military targets through their high quality recruits (Kilcullen 2016, 143-5). ISIS continued to show an increasing level of sophistication with the use of unmanned aerial systems (UAS). UAS are an information related capability employed by ISIS to provide aerial reconnaissance, forward observation, and an aerial platform for limited scale attacks (Tucker 2016). An example of ISIS's operations in Mosul, Iraq reveals their developing military capacity using information related capabilities.

> When the siege of Mosul began in the fall, Islamic State fighters stepped up their use of small surveillance drones to gather intelligence and showcase their efforts to defend the city, producing mini-documentaries with aerial footage of successful suicide attacks on Iraqi troops. The shift to weaponized drone attacks began late

last year and was ramping up dramatically at the time of the group's formal announcement of the program on Jan. 24. "The army of the Islamic State has revealed its use of the unmanned aircraft weapon for the first time," the group's al-Naba newsletter said. It described an "aerial bombardment" of Iraqi forces around Mosul and said that "most of the hits were precise, and inflicted losses in the ranks of the apostates." (Warrick 2017)

ISIS's demonstrated ability to operate in multi-domains and use the information related capabilities to support objectives across the levels of war are just the beginning. The ability of VEOs like ISIS to use the Internet, social media, and off the shelf technology to gain and control urban cities is a new paradigm. ISIS is just the new standard for VEO. VEOs of the future will continue to operating in complex terrain, taking advantage of technology proliferation, and using information related capabilities as a weapon in multi-domains; it will be the battle of signatures against future competitors (USMC 2016b, 5-6).

VEOs are non-state actors that employ violence, and create tension to achieve regional or global objectives that threaten the interests of the U.S. and its allies. As technology continues to proliferate and become increasingly more capable the ability of global actors to harness advantages with the application of information environment operations will continue to expand. The scale of their capabilities is not equal to a nation-state like Russia, but they represent a growing and persistent threat seeking advantages in the information environment to achieve objectives across the levels of war.

ISIS is an important case study for the MIG, it identifies the importance of fusing information and intelligence that "provides planning support, mission coordination, and supports mission assessment" in support of MAGTF operations (USMC 2017b, 2). Through planning, coordination, and integration the MIG will use subordinate units in the MEF to validate and gain information to build an understanding of actions occurring at

the operational and tactical levels. Since the information environment condenses the

levels of war, the MIG will be an essential node to for subordinate units of the MEF to

understand the OE. VEOs in the future will use ISIS as a model and will attempt to

leverage an increase in information related capabilities that ISIS used with some success.

The MIG and the MEF's subordinate commands must have to prepare all units to operate

against VEOs utilizing multi-domains to maneuver.

<u>The Marine Corps Operating Concept's Hybrid Adversary Force</u>

The MOC is the current service concept for how the Marine Corps wants to

prepare the service to fight and win battles against tomorrow's competitors. The MOC

postulates a possible scenario that identifies a near-peer hybrid adversary with

mechanized infantry, anti-access area denial (A2AD) capability, electronic warfare

capability, advanced weapons, and ISR (USMC 2016b, 1-3). Against this future

competitor in the 2025 vignette, the Marine Corps will operate as part of a joint task force

(JTF) to establish a lodgment in a maritime domain. This vignette describes how

simultaneous and sequential actions from across the MAGTF support accomplishing the

Joint Force commander (JFC) objectives. The Marine Corps will operate "through a

combined arms approach that embraces information warfare (IW) as indispensable. It

achieves complementary effects as it executes maneuver warfare across all domains"

(USMC 2017c).

The advantages the U.S. military has benefitted from past conflicts are

increasingly diminishing as future competitors develop A2AD capabilities, improve

military technology, the ability to detect, and communicate (Deakin 2010, 11). The goal

of the MOC's adversary is to overthrow the government, and control the sea lines of

communication around the notional country. First, they use the country's integrated A2AD systems to defend in multi-domains the notional country. Second, one can imply the adversary force effectively mobilized their operations using the internet and social media applications (USMC 2017co). The adversary force of 2025 will operate in multi-domains to accomplish its objectives. Thus, any operations by the Marine Corps or any service in this notional country will require an inventive doctrine, an appropriate task organization, cutting-edge training, and service members capable of operating using mission command.

The MOC adversary force provides the MIG a metric to determine their readiness for future multi-domain conflicts and should be the basis for wargaming. The vignette requires the GCE to operate dispersed across the AO in a contested OE. The ability of the MOC adversary to operate in multi-domains, and coordinate actions within the information environment will strain the MIG's ability to support the subordinate unit's within the scenario. The MIG does not have the ability to surge information environment operations support to the MAGTF in the MOC's vignette. Once the GCE lands in the notional country, it is essential for the MIG to continue to benefit from their ground perspective, and the GCE to benefit from the MIG's fused information and intelligence of the OE. This interaction will drive tempo and support exploiting gaps in the adversary's operations.

<u>Chapter Summary</u>

The Commandant is driving change across the Marine Corps to build readiness for information environment operations in future multi-domain conflicts. The MIG is a paradigm shift for how the Marine Corps fights. This chapter discusses identified gaps at

the tactical level for the U.S. Army to plan effectively for information environment operations. The lessons from Millennium Challenge remain pertinent today as the Marine Corps seeks to develop structures that balance the benefits of technology, drive the operational tempo, and empower units at the lowest tactical level. Multi-domain operations highlight the importance of fusing information and intelligence due to the pervasiveness of the information environment and its affects in future OE. *The World is Flat*, identifies ideas they could improve the MIG and the Marine Corps ability to conduct information environment operations. Finally, Russia, VEOs, and the MOC's adversary force demonstrate current and developing capacity of future competitors. They provide a benchmark for analysis in Chapter 4, for answering the primary research question, "Does the current organization of the MIG support the ground combat element's' maneuver for future multi-domain conflicts?"

The next chapter, Research Methodology, describes the seven-step research design for answering the primary research question. The research design will use this literature review, a DOTMLPF-P analysis, and an evaluation criterion of effectiveness from Chapter 3, to will answer the four secondary questions and derive an answer to the primary research question in Chapter 4.

CHAPTER 3

RESEARCH METHODOLOGY

War is always an equation of men and machines. Efficiency comes of a proper balancing of the equation.

— S. L. A. Marshall, *Men Against Fire*

Chapter Introduction

The Literature Review in Chapter 2 provided a broad perspective of contemporary issues about the secondary research questions. The literature review will be a component of the research design to answer the primary research question, "Does the current organization of the MIG support the ground combat element's maneuver for future multi-domain conflicts?" The primary research question is attempting to identify gaps, specifically within the GCE's capability to conduct information environment operations when integrating with the MIG. The methodology for analyzing the primary research question will be a DOTMLPF-P analysis. The specific elements of focus for DOTMLPF-P will be doctrine, organization, training, leadership, and education.

The Marine Corps has several concepts that attempt to build the Corps' readiness for conflicts of the future. The "Multi-Domain Battle: Combined Arms for the 21st Century" white paper describes a coordinated Army and Marine Corps approach for ground combat operations against a sophisticated competitor in the 2025-2040 timeframe (DA 2017c, 1). The Marine Corps Operating Concept (MOC) anticipates DOTMLPF-P changes for the Marine Corps in order to build readiness for future multi-domain conflict for 2015-2025 (USMC 2016b, 5). The MAGTF Information Environment Operations Concept of Employment (IE Concept) is how the Marine Corps will build readiness to

fight and win in future multi-domain conflicts. The IE Concept's initial initiative was to

establish the MIG. The Marine Corps Warfighting Lab (MCWL) and MEFs continue

experimenting with the integration of the MIG in support of the MAGTF's subordinate

units in information environment operations. This research question will use a

DOTMLPF-P analysis to enrich the discussions on integrating information environment

operations at the lowest tactical levels. The Marine Corps anticipates DOTMLPF-P

solutions, specifically within the GCE.

A DOTMLPF-P and Capabilities Based Assessments Overview

> The [Marine Corps] CBA will annually identify and refine Marine Corps and
> associated naval capabilities, capability gaps and overlaps/redundancies,
> solutions, and risks within the Future Years Defense Program pertaining to the
> Program Objective Memorandum year of analysis. Results of MC CBA analysis
> will translate Service guidance and the Marine Corps' 10-year objectives into
> capability development actions and priorities.
> — Marine Corps Order 3900.30, *Marine Corps Capabilities Based Assessments*

The Office of the Secretary of the Defense, the Chairman of the Joint Chiefs of

Staff, and the Joint Requirements Oversight Council (JROC) identify the requirements

for the force using JCIDS. The JCIDS along with the Defense Acquisition System and

the Planning, Programming, Budgeting, and Execution process form the primary decision

support process for developing and acquiring capabilities required by the DoD to support

the National Defense Strategy (DoD 2015a, 2). In Secretary Mattis' memorandum

making information a joint function he states, "The elevation of Information to a joint

function impacts all operations and has implications across doctrine, organization,

training, material, leadership and education, personnel, facilities, and policy that must be

identified in the months ahead" (DoD 2017a, 1). The JCIDS process outlines how the

joint force develops capabilities. Each service has their own methods for developing capability that are specific to their Title X requirements. The MOC is the Marine Corps current service-level concept driving the development of the IE Concept. The Marine Corps is using the CBA process to develop DOTMLPF-P solutions to address the service's information environment operations capability gaps.

The Marine Corps has a five-phase CBA process that enables capabilities development in support of strategic plans and future forces posturing. Primarily the Deputy Commandant of Combat Development and Integration (DC CD&I) leads the CBA process for the Marine Corps. However, the Deputy Commandant of Plans, Policies, and Operations (DC PP&O) and DC CD&I share responsibility for Phase 1 output product the Marine Corps capstone concept.

> The MOC builds on proven concepts and practices such as Operational Maneuver from the Sea, Ship-to-Objective Maneuver, Seabasing, and Expeditionary Force 21 (EF 21)…Two years later, in the face of emerging threats and adaptive adversaries, the MOC supersedes EF 21. The MOC reflects the Commandant's guidance to leverage the full capabilities of the MEF to support Naval maneuver and Combined/Joint operations, reinvigorate our emphasis on maneuver warfare, and integrate information warfare into our combined arms approach. The MOC will drive capability and capacity decisions to produce the future force. (USMC 2016b, 4)

DC CD&I takes a whole of MAGTF approach to CBA. This is essential; the Marine Corps' design is to fight as an expeditionary MAGTF that is tailorable and scalable force for any mission. Therefore, when the Marine Corps identifies gaps for requirements, it is essential to create integrated MAGTF solutions.

Table 1.   USMC Capabilities Based Assessment Phases

Phase	Name	Output	Lead
Phase 1	Planning	USMC Capstone Concept	DC CD&I & DC PP&O
Phase 2	Capabilities Analysis	USMC Capabilities List	DC CD&I
Phase 3	Gap Analysis	USMC Gap List	DC CD&I
Phase 4	Solution Analysis	USMC Solutions Development Directive	DC CD&I
Phase 5	Risk Analysis	USMC Capabilities Investment Plan	DC CD&I

Source: Created by author (USMC 2016c, 3).

Research Methodology

However, material superiority alone is not sufficient. Of greater importance is the development of doctrine, organizations, training and education, leaders, and people that effectively take advantage of the technology.
— CJCS, *Joint Vision 2020-Preparing for Tomorrow*

The purpose of this qualitative research is to conduct a DOTMLPF-P analysis by using the literature review to inform answers to the secondary questions. Russia, VEOs, and the MOC's adversary force are competitor case studies that demonstrate current and developing capacity of competitors. They provide a benchmark for analysis in Chapter 4, and inform the evaluation criterion of effectiveness. The evaluation criterion will identify the level of change required if a gap exists from the DOTMLPF-P analysis. The aggregate analysis of the secondary questions will inform recommendations for the primary research question of, "Does the current organization of the MIG support the ground combat element's maneuver for future multi-domain conflicts?"

<u>Research Design</u>

A seven-step research design will provide the structure to answer the primary research question. The qualitative design of this research attempts to be inclusive of broad perspectives on the topic, and address the external threats, internal threats, and bias threats to validity. Step-1 will be the literature review in Chapter 2. Steps-2 – 5 will analyze the secondary question using the literature review, and evaluate the secondary questions against the evaluation criterion of effectiveness in Chapter 4. Step-6 is to synthesize the findings of steps 2 – 5 in order to provide an answer to the primary research question in Chapter 4. Step-7 will be to propose solutions to the primary research question, and provide recommendations for further research in Chapter 5.

Table 2.   7- Steps of Research Design

Step #	Action	Location of Step
1	Conduct a literature review (Ch. 2) and provide a summary analysis (Ch. 4)	Chapter 2 & 4
2	Evaluate first secondary question against evaluation criterion	Chapter 4
3	Evaluate second secondary question against evaluation criterion	Chapter 4
4	Evaluate third secondary question against evaluation criterion	Chapter4
5	Evaluate fourth secondary question against evaluation criterion	Chapter 4
6	Aggregate findings of steps 2 – 5 in order to provide an answer to the primary research question	Chapter 4
7	Propose solutions, and recommendations for further research in research topic	Chapter 5

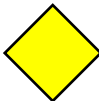*Source*: Created by the author.

<u>Evaluation Criterion</u>

Effectiveness is the evaluation criterion for the secondary questions. Effectiveness will identify if no change, change at the MEF-level, or a DOTMLPF-P change is required based on the secondary question. The Marine Corps' current capstone concept the MOC led to the development of the IE Concept. The IE Concept is a Marine Corps requirement for building readiness for future multi-domain conflict. The MIG is the critical element of the IE Concept. Therefore, understanding the effectiveness of the MIG support to the subordinate elements of the MAGTF influences the primary research question.

The Marine Corps will not win with structure changes alone. These changes must nest within the subordinate elements of the MAGTF, and the MEF's GCE will be an essential element to integrate with the MIG to harness information environment operations at the tactical level. This is the concern raised by Secretary Mattis regarding information as a joint function, "It signals a fundamental appreciation for the military role of information at the strategic, operational and tactical levels within today's complex operating environment" (DoD 2017a, 1). Thus, the evaluation criterion of effectiveness will attempt to determine the level of change appropriate based on the DOTMLPF-P analysis with the analysis of the competitor case studies.

The Marine Corps is anticipating DOTMLPF-P changes from experimentation with the IE Concept. The secondary questions for addressing the primary research question focus on doctrine, organization, training, leadership, and education. The evaluation criterion is effectiveness. This thesis proposes a correlation exists between effectiveness and change as the criterion relates to the secondary questions. The DoD and the Marine Corps believe that the information function will bring about DOTMLPF-P

changes. For each secondary question, qualitative analysis will determine whether no change, minimal change, or a DOTMLPF-P change is required. If no change is required, the criterion concludes no change is required from the MEF, and doctrine, organization, training, leadership, and education are sufficient for supporting the secondary question. A minimal change suggests that the criterion concludes change internal to the MEF will be sufficient to support the secondary question, but doctrine, organization, training, leadership, and education are sufficient for supporting the secondary question. A DOTMLPF-P change suggests that the criterion concludes an element of doctrine, organization, training, leadership, and education does not support the secondary question, and a change within the MEF will not be sufficient.

Table 3.   Evaluation Criterion

Effectiveness -
With the distances between the levels of war shrinking, it is prudent that capacity to integrate and execute information environment operations exist at the lowest tactical level. This requires organizing the Marine Corps to integrate information environment operations effectively with maneuver to enable the ground combat element units to close with an adversary in the last 1,000 meters. The effectiveness criteria will identify at what level change is required to address any gaps identified during the DOTMLPF-P analysis.

DOTMLPF-P Changes The MIG's support to the GCE has gaps that must be addressed with DOTMLPF-P solutions.	**Minimal Changes** The MIG's support to the GCE could be more effective with changes internal to the MEF.	**No Change** The MIG supports the GCE, there is no gap or innovation required.

Source: Created by author; adapted from Kem 2013, 276.

Step-1 of the research design is to conduct a literature review of the resources germane to the secondary and primary research questions (see Chapter 2). Then conduct a summary analysis of the literature review for contextual purpose answer the secondary research questions (see Chapter 4).

Step-2 of the research design is to evaluate the first secondary question against the evaluation criterion in Chapter 4. This secondary question focus is on doctrine. The doctrinal foundation for the way the Marine Corps fights is maneuver warfare. The supporting maneuver warfare philosophy for the Marine Corps is Marine Corp Doctrinal Publication (MCDP) 1, *Warfighting*, and MCDP 1-0 *Marine Corps Operations*. Additionally, the Marine Corps' single battle concept is an important component of answering secondary question 1.

Table 4.   Evaluation Criterion Chart for Secondary Question 1

Does the Marine Corps warfighting doctrine enable information environment operations at the tactical level?		
DOTMLPF-P: Doctrine		
❌	🔶	➕
DOTMLPF-P Changes	**Minimal Changes**	**No Change**

Source: Created by author; adapted from Kem 2013, 276.

Step-3 of the research design is to evaluate the second secondary question against the evaluation criterion in Chapter 4. This secondary question focus is on the organization of the GCE in relation with the MIG. Currently, to support information environment

operations the MIG provides liaisons and support teams to the subordinate commands of the MEF. Given the growing complexity of the OE does the GCE require organic information environment operations capabilities?

Table 5.   Evaluation Criterion Chart for Secondary Question 2

Is the current structure of the ground combat element conducive for information environment operations?		
DOTMLPF-P: Organization		
❌ **DOTMLPF-P Changes**	🔶 **Minimal Changes**	➕ **No Change**

Source: Created by author; adapted from Kem 2013, 276.

Step-4 of the research design is to evaluate the third secondary question against the evaluation criterion in Chapter 4. This secondary question focus is on the training of the GCE Marines in information environment operations. The MIG is a dynamic command with responsibilities across the MEF. Thus, the GCE must be able to training across all seven warfighting functions despite the MIG's myriad of priorities.

Table 6.   Evaluation Criterion Chart for Secondary Question 3

Can the ground combat element provide a structure to train and sustain Marines in information environment operations?		
DOTMLPF-P: Training -		
❌	🔶	➕
DOTMLPF-P Changes	**Minimal Changes**	**No Change**

Source: Created by author; adapted from Kem 2013, 276.

Step-5 of the research design is to evaluate the fourth secondary question against the evaluation criterion in Chapter 4. This secondary question focus is on leadership and education of information environment operations Marines in the GCE. The future multi-domain conflicts will require functional representation for planning across the GCE. The current MIG relationship with the subordinate elements of the MAGTF based on the IE Concept does not address this possibility, but the GCE is always training for tomorrow's mission. The evaluation criterion will provide insight to the efficacy of the current MIG support.

Table 7.   Evaluation Criterion Chart for Secondary Question 4

Is it realistic, supportable, and suitable to develop information environment operations Marines organic to the ground combat element?		
DOTMLPF-P: Leadership and Education -		
❌	🔶	➕
DOTMLPF-P Changes	**Minimal Changes**	**No Change**

Source: Created by author; adapted from Kem 2013, 276.

Step-6 of the research design will include aggregating steps 2 – 5 using the
evaluation criterion. The result of this analysis will derive an answer to the primary
research question in the last step of the research design

Table 8.   Secondary Question Level of Change Chart

Secondary Questions	DOTMLPF-P Changes	Minimal Changes	No Change
1 – Does the Marine Corps warfighting doctrine enable information environment operations at the tactical level?			
2 – Is the current structure of the ground combat element conducive for information environment operations?			
3 – Can the ground combat element provide a structure to train and sustain Marines in information environment operations?			
4 – Is it realistic, supportable, and suitable to develop information environment operations Marines organic to the ground combat element?			
Total			

Source: Created by author; adapted from Kem 2013, 276.

Step-7 will answer the primary research, "Does the current organization of the
MIG support the ground combat element's maneuver for future multi-domain conflict
[see Table 9, in Ch.4]?"

In Chapter 5, Conclusions and Recommendations, discusses conclusions about the
analysis and primary research question. Additionally, the thesis will identify areas for
future research for the subject area of the primary research question that this research
question did not address, or based on the conclusion of the thesis need additional study.

Threats to Validity

The purpose of this research is to produce recommendation for the Marine Corps for the IE Concept, and develop the body of research on the MIG's support to the GCE as it relates to information environment operations. The threats to validity can undermine this purpose. G. David Garson writes in *Validity & Reliability*, "There are a great many labels for different types of validity, but they all have to do with threats and biases which would undermine the meaningfulness of research," ultimately, the recommendations for this thesis need to derive at logical conclusions through the seven-step research design (Garson 2016, 11). Using qualitative information from the literature review in order to conduct a DOTMLPF-P analysis to derive an answer to the primary research question implies there are threats to the validity in the thesis. The three significant threats to validity are external validity, internal validity, and selection bias.

The presence of external validity in this thesis may exist. The lack of substantive research on the emerging concepts in this thesis like the MOC, IE Concept, and the MIG expose the research to the possibilities for external generalizations. Generalization was a delimitation discussed in Chapter 1 due to the fact there is no historical evidence to evaluate the concepts in the research question. Additionally, external validity issues can cause over generalizations of complex and technical topics, and cause the development of empty solutions and recommendations. Russian, VEO, and MOC competitors provide mitigation to external validity. Together they create a competitor model that establishes the current capability benchmarks for analysis the Marine Corps has to compete against in future multi-domain conflicts.

The presence of internal validity in this thesis can exist. The information function is highly technical and a dynamic subject constantly evolving. Once the information function goes beyond a contextual discussion, classification issues become a concern (see Chapter 1 Limitations and Delimitations). Many key documents on the subject are classified. This exposes internal validity concerns with the research. The broad aperture of scholarship for secondary sources in the Chapter 2 Literature Review will facilitate guarding against internal validity threats. Additionally, a use of the Marine Corps' terms for information environment operations will be the primary source to keep the thesis conclusion and recommendations relevant for the service. The result of internal and external validity concerns for over generalizations could exacerbate selection bias as a threat to validity.

An inherent threat to validity in qualitative research is selection bias. The selection of the competitor case studies and the elements of DOTMLPF-P impose a potential for selection bias in the research that fits the need of the researcher, not the research. The Chapter 2 Literature Review is intentionally broad and inclusive of many ideas stemming from the primary and secondary research questions. The selection of the three competitor case studies focus the thesis, and attempt to prevent a broader discussion of peer, near-peer, and hybrid threats potential abilities to utilize information related capabilities for information environment operations. The selection of the three competitors provides a representative sample of current or notional competitor actions and potential actions for future multi-domain conflict. The selection of the elements for DOTMLPF-P analysis are biases identified in the Limitations and Delimitations section of Chapter 1.

Using a DOTMLPF-P analysis does suggest the thesis anticipates finding capability gaps. However, the Secretary of Defense expects impacts across DOTMLPF-P; therefore, there is an expectation for innovation from concepts integrating the information function (DoD 2017a, 1). The selection of the elements of doctrine, organization, training, leadership, and education focus the research, a holistic DOTMLPF-P analysis may be a recommendation for future research in Chapter 5.

Chapter Summary

The methodology for answering a research question is essential for the credibility of the conclusions, and recommendations for future research. The qualitative methods applied to this research question provide relevant and timely analysis for a complex topic. The MCWL and the MEFs are designing experiments to improve capacity and improve integration of information across the MAGTF. The qualitative research methodology needs to be robust to provide rich data for analysis. Next in Chapter 4, using steps 1 – 7 of the seven-step research design that includes: a literature review, three competitor case studies for a threat model, a DOTMLPF-P analysis of secondary questions, and the application of an evaluation criterion will provide answers to the secondary questions.

CHAPTER 4

DATA PRESENTATION AND ANALYSIS

There will be an increasing need for highly qualified and individually trained men—and women—to sabotage vital installations, to spread rumours, to misdirect the enemy, to transmit intelligence, to kill or kidnap individuals, and to inspire resistance movements. They will be troops, though they will require many qualities and skills not to be expected of the ordinary soldier and they will use many methods beyond his capacity.
— Field Marshal William Slim, *Defeat into Victory*

Chapter Introduction

This chapter, Data Presentation and Analysis, will use the seven-step research design to analyze the four secondary research questions. The aggregation of the secondary research questions and analysis will provide an answer to the primary research, "Does the current organization of the MIG support the ground combat element's maneuver for future multi-domain conflicts?" Step 1, of the research design will provide an analysis of the Chapter 2, Literature Review. Steps 2 – 5, will answer the following secondary research questions:

1. Does the Marine Corps warfighting doctrine enable information environment operations at the tactical level?

2. Is the current structure of the ground combat element conducive for information environment operations?

3. Can the ground combat element provide a structure to train and sustain Marines in information environment operations?

4. Is it realistic, supportable, and suitable to develop information environment operations Marines organic to the ground combat element?

The research methodology for answering the research questions will be a qualitative

DOTMLPF-P analysis and competitor case studies with an evaluation criterion of

effectiveness. Step 6, will aggregate and analyze the literature review and steps 2 – 5,

using the evaluation criterion. Step 7, will conclude the chapter by providing and answer

to the primary research question.

<p align="center"><u>Step 1: Summary of the Literature Review</u></p>

The Literature Review in Chapter 2 provided a broad perspective on the issues

regarding the information function. Information is changing the character of war by

compressing the distances between the levels of war. This causes actions taken in the IE,

through information environment operations to increase the operational tempo, thus,

making time increasingly valuable for multi-domain operations. The three competitor

case studies of Russia, ISIS, and the MOC's hybrid adversary vignette provide a

benchmark for what the MAGTF needs to be able to operate against at the tactical level

in future multi-domain conflicts.

The literature review reveals the U.S. Army and Marine Corps both believe there

is a capability requirement for information environment operations at the tactical level in

future multi-domain conflicts. The U.S. Army wants the ability to integrate and

coordinate information environment operations at the BCT-level. This capability will

assist in advising, training, planning, integration, and execution of operations.

Information capability enables the BCT to plan across the warfighting functions.

Therefore, actions in future multi-domain conflict need synchronization and integration

to achieve objectives across the warfighting functions and the levels of war.

Units at the tactical level can have strategic impacts, and this occurs by information shrinking the separation between the levels of war. The Marine Corps' IE Concept addresses this gap with the MIG. However, the subordinate units of the MEF do not have organic information environment operations capacity to benefit from the MIG's fusion of information and intelligence. Additionally, they do not possess organic ability to train, plan, and execute within the IE for future multi-domain conflict. As the Marine Corps continues to experiment and drive changes to support information initiatives, it is pertinent to reflect on Millennium Challenge, piecemeal change is not sufficient; it must be a balanced holistic capabilities development across the DOTMLPF-P.

The lessons from Millennium Challenge have validity today as the Marine Corps experiments with capabilities for future multi-domain conflict. The fog of war is persistent, and it will get thicker if the U.S. military cannot operate effectively against future competitors exploiting seams created in and through the information environment. In addition, the information function permeates all the levels of war and is a line of effort that influences the other warfighting functions. As the Marine Corps develops readiness for future multi-domain conflicts, altering capacity within the tactical level units is central to enabling the MIG's success. The MIG is a connecting-file for extending information environment operations capacity throughout the MAGTF.

Technology and unit organization changes are not the only requirements for achieving successful integration of information at the tactical level. The increasing value of time in the information environment with the growing complexities of the OE identifies the requirements for the training and education of Marines for future conflicts (Redden and Hughes 2011, 66). Coupling training and education with the development of

technology and organizational changes will enable the Marine Corps to maximize the value of the MIG by fostering collaboration and creativity in both individuals and units. Future competitors are and will operate in multi-domains and the capability to fight rapidly and competently in this OE must be resident throughout the MAGTF. As the Millennium Challenge highlights, a failure to understand the systems a future competitor can operate in and through will create seams they can exploit. The information environment creates broader and complex systems; the future multi-domain OE will require investing in critical thinking Marines as much as cutting-edge technology.

The information environment is enabling competitors to achieve objectives across the levels of war fast, effectively, and on an unprecedented scale. Russia's actions in Zelenopillya, Ukraine combined information environment operations with intelligence to achieve objectives rapidly across the levels of war. ISIS globally radicalized several hundred thousand people using information technology and social media applications within months (Patrikarakos 2017, 228-229). The MOC's hybrid adversary force mobilized, and employed an A2AD network of systems, and advanced ISR capabilities to contest the U.S. joint force in multi-domains in order to control sea lines of communication (USMC 2017c). Information is enabling global competitors to integrate operations across multi-domains, creating temporal advantages exploited by global competitors.

In order to develop a concept for readiness against a future competitor in multi-domain conflict, the U.S. Army and Marine Corps co-authored a white paper titled "Multi-Domain Battle: Combined Arms for the 21st Century" (DA 2017c, 1). The multi-domain battle white paper reinforces the Marine Corps' current capstone concept the

MOC. The MOC identifies for the service the requirement to operate effectively in the information environment to win future multi-domain conflicts.

> Marines must understand that controlling physical terrain is no longer a sufficient condition for battlefield success; we must also navigate the landscape of knowledge and perception. Operating in the information domain will not only require us to protect our networks but take actions that inform, promote, persuade, coerce, dissuade, convince, compel, deceive, mask, and intimidate (USMC 2016b, 6).

The MOC's mandate manifested into two essential developments; the DC I and the IE Concept. These are just the first bow waves for the Marine Corps in addressing information environment operations throughout the MAGTF. The Marine Corps is currently experimenting how to integrate the MIG within the MAGTF to support information environment operations for future multi-domain conflicts. The Millennium Challenge lessons reveal that change must be intrinsically holistic, and not just technologically innovative. Thomas Freidman suggests that the military hierarchical structure is a hindrance to information environmental operations, and not supportive of collaboration of ideas (Friedman 2007, 39). These structures in the information age are slower from stove-piping communication, do not enable collaboration across commands, and unnecessarily hinder information flow throughout the OE impeding operational tempo.

The World is Flat, identifies three ideas that reveal what the MIG can become if it flattens the hierarchical structures restraining it, and adds value to Marines within the MAGTF through collaboration. The three ideas are "the triple convergence," adaptability across disciplines, and the importance of creativity (Friedman 2007, 207, 320, 327). "The triple convergence" makes organizations faster, and efficient through flattening the hierarchical structure. The MIG is a flat structure with its seven subordinate units, but its

ability to fuse information and intelligence is limited to the number of liaisons and support teams it has to task. By developing information environment operations capacity within subordinate units in the MEF that can interact with the MIG not encumbered by hierarchy, this will increase collaboration, time, and operational tempo throughout the MAGTF. Moreover, by building adaptability across disciplines for Marines in information environment operations, they will add value to their organization and information to the MIG. Exposure to the multiple information disciplines within the MIG helps foster collaboration, which in turn drives faster and more effective solutions for future multi-domain conflict.

Russia, ISIS, and the MOC hybrid adversary form a threat model for the thesis' primary and secondary research questions. They are representative of competitors for future multi-domain conflict. Russia demonstrates an ability to harness information environment operations with conventional operations to achieve objectives rapidly across all levels of war. VEOs such as ISIS demonstrate bourgeoning information environment operations capability. However, their ability to mobilize across the globe using information technology must be something the MIG and subordinate units are prepared to address for future conflicts. The MOC hybrid adversary uses A2AD systems, and other information related capabilities for their integrated defenses. This threat identifies the dispersed nature of operations in future OE. For the GCE to train for maneuver warfare in this OE, it must have the ability to disrupt threats in an AO to enable maneuver while communicating in an A2AD OE. Information environmental operations will be instrumental in future multi-domain operations. The MIG must have the ability to collaborate and support contingencies despite the complex nature of the future OE.

Step 2: Secondary Question 1

The second step of the research design is to evaluate the first secondary question using a DOTMLPF-P analysis with competitor case studies, against the evaluation criterion of effectiveness. The DOTMLPF-P analysis focus is on the doctrine element of the secondary question, "Does the Marine Corps warfighting doctrine enable information environment operations at the tactical level?" An analysis of the Marine Corps IE Concept, the U.S. Army's information operation initiatives, and the multi-domain battle white paper inform the answer for this secondary question.

The Marine Corps' warfighting philosophy of maneuver warfare defines how the Marine Corps fights. The Marine Corps current capstone concept is the MOC. The IE Concept is the result of the MOC's problem statement.

> The Marine Corps is currently not organized, trained, and equipped to meet the demands of a future operating environment characterized by complex terrain, technology proliferation, information warfare, the need to shield and exploit signatures, and an increasingly non-permissive maritime domain. (USMC 2016b, 8)

The MIG is an initial step in transitioning the Marine Corps for future multi-domain conflict. However, for the MIG to be effective it must enable maneuver warfare with information environment operations against future competitors in the last 1,000 meters.

Maneuver warfare seeks advantages across the warfighting functions, mission variables, and operational variables. The philosophy seeks to match a strength against a competitor's weakness and exploit the gains produced. Maneuver warfare exploits gaps and seams in a competitors system, while simultaneously gaining advantages that are, "psychological, technological, or temporal as well as spatial. Especially important is maneuver in time – we generate a faster operating tempo than the enemy to gain a

temporal advantage" (USMC 1997, 72). The single battle concept sees the OE as a whole and any action can affect the entire OE (USMC 2010, 1-6). Maneuver warfare and information environment operations seek to create or exploit advantages in a competitors system, and see the OE as a holistic entity.

Information environment operations occur across all levels of war. As information technology proliferates, there will be an increase in the requirement for information environment operations at the tactical level. This observation links with the idea that information shrinks the distance between the levels of war, and tactical level maneuver warfare will become increasingly lethal and faster. Therefore, require information environment operations capability to maneuver in future multi-domain conflicts.

The typical conduct of information environment operations by definition (see Chapter 1, Key Terms and Definitions) are at the strategic and operational levels of war. Nevertheless, the U.S. Army sees a gap in capability without information operations in the BCTs. The Marine Corps also sees a capability gap in information operations at the tactical level to address future multi-domain conflicts. The result is the IE Concept and the creation of the MIG. Both the BCTs and the MIG are tactical level organizations. Moreover, the U.S. Army and the Marine Corps co-wrote the white paper titled "Multi-Domain Battle: Combined Arms for the 21st Century" (DA 2017c, 1). This document stresses the importance of creating advantages using multi-domains, and maximizing advantages in the information environment with combined arms that occur at the tactical level of war. Secretary Mattis, the U.S. Army, and the Marine Corps believe information is changing the character of war. The initial attempts to address this change is the service-

level operating concepts identify readiness requirements in information at the tactical level for future multi-domain conflict.

Russia's operations in the Ukraine demonstrate information environment operations and its ability to achieve cascading effects across all levels of war and in multiple domains. Other competitors like VEOs use information technology to exploit seams in the OE to gain advantages. David Patrikarakos highlights in his book *War in 140 Characters*, "they are an underground organization [that uses] social media to reach people. They have no other options" (Patrikarakos 2017, 228). ISIS's ability to mobilize global to grow their organization is unprecedented, and demonstrates the potential for success with other information related capabilities. ISIS is one of the first VEOs to realize the potential of information related capabilities to achieve organizational objectives beyond recruiting and spreading propaganda, but to occupying and controlling territory. They bellicosely pursued new methods using information related capabilities to improve tactical control, coordinate fighting, and attack targets. ISIS's successes across the levels of war couple with successful integration of information related capabilities. VEOs in future multi-domain conflicts will advance the methods of ISIS to gain advantages. Consequently, information environment operations across the levels of war require unity of effort for future multi-domain conflicts.

In the MOC hybrid adversary vignette the battalion landing teams conducted disaggregated operations across the notional objective area. The battalion landing teams maneuver and information environmental operations were complimentary and reinforcing of each other in the 2025 MOC scenario. These units were capable of maneuvering through a robust use of information environment operations that provided a sensor line,

provided over-watch for the amphibious operating area, enabled a deception on adjacent islands, and unmanned swarming boats provide flank security (USMC 2017c). Information environment operations enable the MAGTF in the MOC vignette to exploit gaps and conduct their operations using maneuver warfare.

The DOTMLPF-P analysis focus for this secondary question is doctrine. The Marine Corps warfighting doctrine enables information environment operations at the tactical level. Maneuver warfare and information environmental operations are complimentary methods for future multi-domain conflicts. As a result, the effectiveness criterion concludes that no change is required for the first secondary question.

Table 9.   Evaluation of Secondary Question 1

Does the Marine Corps warfighting doctrine enable information environment operations at the tactical level?		
DOTMLPF-P: Doctrine		
✖	🔶	➕
DOTMLPF-P Changes	**Minimal Changes**	**No Change**
		X

Source: Created by author; adapted from Kem 2013, 276.

Step 3: Secondary Question 2

The third step of the research design is to evaluate the second secondary question using a DOTMLPF-P analysis with competitor case studies, against the evaluation criterion of effectiveness. The DOTMLPF-P analysis focus is on the organization element of the secondary question, "Is the current structure of the ground combat element

conducive for information environment operations?" An analysis of the Marine Corps IE Concept, the U.S. Army's information operation initiatives, the Millennium Challenge, the multi-domain battle white paper, and ideas from *The World is Flat* inform the answer for this secondary question.

The GCE is one of four elements that form the MAGTF. It can range in scale from a division to a platoon. Accordingly, the GCE is scalable and tailorable for a range of military operations in conjunction with the other elements of the MAGTF. As information environment operations increase due to global competitors exploiting seams across multi-domains to gain advantages, the GCE must prepare to support these operations at the tactical level. The MOC identifies numerous information related capabilities that are going to enable the future force to apply maneuver warfare in multi-domain conflicts. The IE Concept's initial method for support to subordinate elements of the MEF is through liaison and support teams – this is not sufficient solution for future conflict.

No organizational structure exists within the GCE's for advising commanders on matters pertaining to the information environment, or supporting training, planning, coordinating, and executing operations. The liaisons and support teams from the MIG only support a specific information environment function for an operation or objective. The U.S. Army's experience with information capability at the tactical level is pertinent for discussing the structure of the GCE.

The U.S. Army had information operations capacity at the tactical level. The requirements imposed by sequestration required a reduction in the U.S. Army's force end strength and information operation capability in the BCTs went away. The U.S. Army

current information initiatives reveal the importance of integrating and coordinating information environment operations across the levels of war for future multi-domain conflict. Empowering tactical level units with capabilities to operate in multi-domains, and support large-scale combat operations is the U.S. Army's current initiatives for information operations. Convergence as the multi-domain battle concept describes requires synergy of the warfighting functions at the tactical level. The creation of this synergy for information environment operations requires doctrine, organization, training, leadership, and education. These are the lingering lessons from Millennium Challenge.

The current organizational structure of the GCE leaves commanders ill prepared for the complex realities of future conflicts. The Millennium Challenge provided the Blue Team with a technological advantage over the Red Force. Similar to the advantages described in the MOC's vignette. The Blue Team lost in the early stages of the Millennium Challenge wargame. It was not due to the lack of technology, it was how the Blue Team perceived their OE. The GCE's structure deficiency for information environment operations may result in the commanders not receiving a full analysis of the AOs OE. The information environment drives thinking about the OE as a complex interactive system. The MOC states:

> Tomorrow's fights will involve conditions in which "to be detected is to be targeted is to be killed." Adversaries will routinely net together sensors, spies, UAS, and space imagery to form sophisticated "ISR-strike systems" that are able to locate, track, target, and attack an opposing force. In complex terrain, adversaries will collect targeting information through eyes and ears and spread it through social media. No matter the means of detection, unmanaged signatures will increasingly become a critical vulnerability. (USMC 2016b, 6)

This assertion from the MOC outlines the urgency from an operational security perspective to have information environment operations in the GCE. Moreover,

information environmental operations capability in the GCE will encourage system thinking across the warfighting functions. This is important for multi-domain battle in future conflict, the pervasiveness of information causes each function to have a line of effort related to information within its analysis of the OE.

The multi-domain battle white paper and the IE Concept intend to inform readiness decisions in the Marine Corps against future competitors. If information is changing the character of war, organizational structures need to adjust to become faster and more responsive. In information environment operations, time is critical. Thomas Friedman proposes "the triple convergence," that hierarchical organizations need to flatten their structures to be more resilient, responsive, and efficient in an information age were advantages are temporal (Friedman 2007, 209-210). This organizational structure change places the MIG as a connecting file for operational and strategic operations, directly tasking liaisons, support teams, and organic GCE information environment operators within the GCE (see Chapter 5, Figure 3).

Flattening the structure of the MIG is all about creating a temporal advantage that leverages information for future multi-domain conflicts. Russia demonstrates an ability to exploit rapidly seams in the information environment. VEOs like ISIS will continue to look for methods to exploit with information related capabilities. ISIS's actions in Mosul, Iraq demonstrate attempts to fuse information and intelligence, with information related capabilities to gain operational tempo. The MOC vignette describes the hybrid competitor using multiple systems to create multi-domain effects. The MOC's hybrid competitor attempts to fuse information related capabilities, information environment operations, with conventional capabilities to achieve their ends across the levels of war.

The DOTMLPF-P analysis focus for this secondary question is organization. The GCE's current structure is not conducive for information environment operations. The inability of the GCE's structure to train, plan, coordinate, or execute information environment operations is a capability gap. The MOC introduces numerous technologies to enable maneuver warfare at the tactical level, but does not mention an information function representative to advise the commander about the technology enabling their actions. Future multi-domain operations will see operational tempo through the application of information environment operations. In future conflict, an organization's structure that is more resilient, responsive, and efficient will gain temporal advantages, thus, creating seams to exploit in order to win future multi-domain conflicts. The effectiveness criterion concludes that DOTMLPF-P changes are required for the second secondary question in order for the GCE to conduct effectively information environment operations.

Table 10. Evaluation of Secondary Question 2

Is the current structure of the ground combat element conducive for information environment operations?		
DOTMLPF-P: Organization		
❌	🔶	➕
DOTMLPF-P Changes	**Minimal Changes**	**No Change**
X		

Source: Created by author; adapted from Kem 2013, 276.

The fourth step of the research design is to evaluate the third secondary question using a DOTMLPF-P analysis with competitor case studies, against the evaluation criterion of effectiveness. The DOTMLPF-P analysis focus is on the training element of the secondary question, "Can the ground combat element provide a structure to train and sustain Marines in information environment operations? An analysis of the Marine Corps IE Concept, the U.S. Army's information operation initiatives, the multi-domain battle white paper, and the lessons from the Millennium Challenge wargame inform the answer for this secondary question.

The third step of the research design answers the first half of this secondary question. No, the GCE currently does not have the structure to support information environment operations. However, the GCE is a rich training environment from the division-level to the squad, and can provide training opportunities to develop Marines in information environment operations.

When the U.S. Army's BCT lost their capacity to conduct information operations, commanders lost an essential component of their understanding of the OE (DA 2016, 1). The U.S. Army's initiatives to regain this capacity should be an indicator of the importance of training with information environmental operations at the tactical level. If information in future multi-domain conflicts has the ubiquitous impact as the white paper titled "Multi-Domain Battle: Combined Arms for the 21st Century," the MOC, or IE Concept advocate then the Marine Corps needs to train like it is going to fight.

The MOC describes providing the Marine Corps with numerous information related capabilities in the hybrid competitor vignette. The MOC video highlights:

The smaller units not only had more organic combined arms capabilities like Group-1 UAS munitions, EW, and ISR. They also had the connectivity to reach out for almost every capability in the joint force, and more importantly, they had already trained with it. The squad leaders and platoon commanders employed assets capabilities that only a few years ago resided only in battalions, regiments, and brigade levels (USMC 2017c).

This statement from the MOC video, relates to lessons learned from the Millennium Challenge wargame. The Millennium Challenge's Blue Team possessed the best technology the U.S. military could provide and yet they lost to the Red Force. This example is a large-scale joint force wargame, but it is an example of training with information environment operations needs organizational structure to effectively train.

Russia, VEOs, and the MOC hybrid competitors demonstrate they are actively seeking advantages in the information environment. Their efforts in the information environment will be holistic to determine seams across the OE to exploit. Russia's actions in the Ukraine demonstrate their information environment operations capabilities. The U.S. military cannot allow VEOs such as ISIS to gain a strategic advantage through successful information environment operations. The MOC hybrid competitor's A2AD systems and conflict in the global commons exists today. In order to sharpen the ability of the GCE to face future competitors operating in the information environment changing the organization of the GCE will enable training.

Information has a technical aspect, with impacts that cross all domains and all levels of war. It is essential that we train Marines to integrate their craft within the confines of exercises, and not rely solely on ad hoc liaisons and support teams for advising, planning, training, execution, and operations. Information environment operations affects across the OE require the commander to trust the Marines supporting

their operations. Without aggressive, realistic training, a commander will not be able to understand their unit's capabilities or prepare them to fight future multi-domain conflicts.

The DOTMLPF-P analysis focus for this secondary question is training. The GCE's current structure does not enable training in information environment operations. The inability of the GCE to train, as it will fight in future multi-domain conflict in offense, defense, stability, and amphibious operations is a gap. The MOC's initiatives to push information related capabilities to the GCE for future conflict is only beneficial if realistic training is conducted on individual and collective tasks. The advantages of information related capabilities, and information environment operations are marginal if Marines and units do not conduct realistic training for future multi-domain conflict. The effectiveness criterion concludes that DOTMLPF-P changes are required for the third secondary question in order for the GCE to conduct effectively information environment operations. A caveat for this secondary question is that DOTMLPF-P changes to organization structure will change the mark to minimal change. This is due to the MIG and GCE coordination is still in the experimental stages.

Table 11. Evaluation of Secondary Question 3

Can the ground combat element provide a structure to train and sustain Marines in information environment operations?		
DOTMLPF-P: Training		
❌	🔶	➕
DOTMLPF-P Changes	**Minimal Changes**	**No Change**
X		

Source: Created by author; adapted from Kem 2013, 276.

<u>Step 5: Secondary Question 4</u>

The fifth step of the research design is to evaluate the fourth secondary question using a DOTMLPF-P analysis with competitor case studies, against the evaluation criterion of effectiveness. The DOTMLPF-P analysis focus is on the leadership and education element of the secondary question, "Is it realistic, supportable, and suitable to develop information environment operations Marines organic to the ground combat element? An analysis of the multi-domain battle white paper, the U.S. Army's information operation initiatives, and *The World is Flat* inform the answer for this secondary question.

It is realistic to develop information environment operations Marines organic to the GCE, but the organizational structure of the GCE needs a DOTMLPF-P change (Refer to Chapter 4, Step 3 of the Research Design). The MOC and the multi-domain battle white paper spearhead this concept and drive for change. The MOC's increase in the application of information related capabilities at the tactical level necessitates information environment operations Marines. This military occupational specialty focuses on the integration of information technology to enable offense, defense, stability, and amphibious operations. The GCE's information environment operations Marines can provide responsive information updates, or feedback to the MIG to increase quality of fusing information and intelligence, and the operational tempo of the MAGTF.

Future multi-domain battle will require information environment operations Marines who can advise, plan, train, coordinate, and execute convergence (Chapter 1 Key Terms & Definitions). Their role will be similar to a forward air controllers or fire support teams in the GCE today. These Marines will conduct the "integration of

capabilities across domains, environments, and functions in time and physical space to achieve a purpose. . . . by employing multiple combinations of cross-domain operations that create physical, virtual, and cognitive windows of advantage to enable cross-domain maneuver and fires to achieve objectives" (DA 2017c, 3). The GCE can no longer think of the mission and operational variables in their OE in isolation. It is a realistic requirement for information environment operations Marines to provide analysis to the commander on the information environment within the GCE's AO. Moreover, the GCE cannot think of their actions affecting operations at the tactical level of war. The single battle concept now means that actions anywhere within a level of war will have affects throughout all the levels of war. This reality makes information operations Marines a realistic reality and necessity for the GCE.

Information environment operations Marines in the GCE are supportable. The GCE provides a vast opportunity to experience tactical level operations at that will enhance the career development by exposing them to the information environment at the tip of the spear. The U.S. Army's experiences with information operations capability at the BCTs prior to sequestration demonstrate the idea is supportable. This is reinforced by their current initiatives to return this capability to the BCTs; according to a memorandum to the Maneuver Center of Excellence information operations, "enable synchronized nonlethal execution from Theater to Brigade and ensure divisions' ability to conduct the critical METL task of Execute Stability Operations" (DA 2016, 1). The U.S. Army believes there is a gap in the commander's understanding of the OE without information operations capability. Thus, the U.S. Army believes increasing information capability at the tactical level is supportable. For the Marine Corps, the MIG is an attempt to harness

information environment operations at the tactical level. Increasing the GCE's information environment operations ability would support the MAGTF and MEF Commanding General's ability to understanding the AO. Information environment operations Marines in the GCE would build essential foundations for the application of information environment operations that would enhance their professional maturation and sharpen their ability to advise, train, plan, coordinate, and execute in support of MAGTF operations. GCE information environment operations will be essential in building and sustaining operational tempo for future multi-domain conflicts through direct interface with the MIG. Information environment operations Marines can support subordinate units in the MEF, but since information is a function, it has additional leadership and education requirements.

To fully harness the benefits of creating a flat organization leadership and education require a professionalization of the military occupational specialty through formal schools, and an understood career progression to enable the development of the Marine's career. As information continuously gains significance for future multi-domain conflicts commanders will increase their demand for information environment operation options for maneuver. These increases in demand and skill sophistication require the Marine Corps to address this gap, and need to consider the ability to integrate information in their planning, training, and operations due to adaptability across disciplines, and the importance of creativity (Friedman 2007, 320, 327).

The leadership and education opportunities the GCE provides information environment operations Marines builds adaptability across disciplines by creating understanding of the rifleman's requirements to close with and destroy the enemy at the
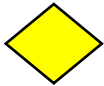
tactical level. Understanding the problems associated with the integration of information related capabilities, and the nature of war effecting the rifle squad is essential for developing methods for more effective means for conducting information environment operations with the MIG. Moreover, the GCE provides information environment operations Marines the ability to integrate creatively information related capabilities to achieve objectives. This experience will enhance their overall maturation within their military occupational specialty through collaboration with the Marines executing maneuver warfare operations and convergence at the tactical level.

It is suitable to develop information environment operations Marines organic to the GCE. The multi-domain battle and the MOC demonstrate the efficacy of information environment operations Marines organic to the GCE. The multi-domain battle and the MOC identify the requirements to understand the OE holistically. These concepts also require tactical level units to increase proficiency with information related capabilities in order to conduct operations across the warfighting functions, across the domains, and across the levels of war. Therefore, organic information environment operations capability in the GCE is suitable due to how the Marine Corps anticipates fighting future multi-domain conflicts.

Russia, ISIS, and the MOC's hybrid competitor collectively demonstrate an ability to conduct information environment operations across the warfighting functions, across the domains, and across the levels of war. Consequently, it is suitable for the GCE to develop organic information environmental operations for achieving the MOC's vision for future multi-domain conflicts, and building readiness with the MAGTF for any potential conflict with a future competitor.

The DOTMLPF-P analysis focus for this secondary question is leadership and education. The GCE is the element of the MAGTF that closes with and destroys the enemy. Using the GCE to develop information environment operations Marines will build an increase in understanding for how information environment operations integrate from the MIG to the GCE. Developing information environment operations Marines will require DOTMLPF-P changes in leadership and education to develop military occupation specialty schools to establish a baseline breadth of knowledge to assist the Marines with advising, training, planning, coordinating, and executing information environment operations. The effectiveness criterion concludes that DOTMLPF-P changes are required for the fourth secondary question in order to develop organic information environment operations Marines in the GCE.

Table 12. Evaluation of Secondary Question 4

Is it realistic, supportable, and suitable to develop information environment operations Marines organic to the ground combat element?		
DOTMLPF-P: Leadership and Education -		
❌	🔶	➕
DOTMLPF-P Changes	**Minimal Changes**	**No Change**
X		

Source: Created by author; adapted from Kem 2013, 276.

Step 6: Aggregation and Analysis of Steps 2 – 5 and the Literature Review

The sixth step in the research design is to aggregate the answers from steps 2 – 5 of the research design with the application of the evaluation criteria. Then apply the results from aggregating the secondary questions with the an analysis of the literature

81

review to provide an answer to the primary research question, "Does the current organization of the MIG support the ground combat element's maneuver for future multi-domain conflict?"

1. Does the Marine Corps warfighting doctrine enable information environment operations at the tactical level?

Answer: The Marine Corps warfighting doctrine enables information environment operations at the tactical level. Maneuver warfare and information environmental operations are complimentary methods for future multi-domain conflicts.

2. Is the current structure of the ground combat element conducive for information environment operations?

Answer: The inability of the GCE's structure to train, plan, coordinate, or execute information environment operations is a capability gap. The MOC introduces numerous technologies to enable maneuver warfare at the tactical level, but does not mention an information function representative to advise the commander about the technology enabling their actions. Future multi-domain operations will achieve operational tempo through the application of information environment operations. Thus, in future conflict an organization's structure that is more resilient, responsive, and efficient will gain temporal advantages, creating seams to exploit in order to fight and win future multi-domain conflicts.

3. Can the ground combat element provide a structure to train and sustain Marines in information environment operations?

Answer: The GCE's current structure does not enable training in information environment operations. The inability of the GCE to train, as it will fight in future multi-

domain conflict in offense, defense, stability, and amphibious operations is a gap. The MOC's initiatives to push information related capabilities to the GCE for future conflict is only beneficial if realistic training is conducted on individual and collective tasks. The advantages of information related capabilities, and information environment operations are marginal if Marines and units do not conduct realistic training for future multi-domain conflict. The effectiveness criterion concludes that DOTMLPF-P changes are required for the third secondary question in order for the GCE to conduct effectively information environment operations. A caveat for this secondary question is that DOTMLPF-P changes to organization structure will change the mark to minimal change. This is due to the MIG and GCE coordination are still in the experimental stages.

4. Is it realistic, supportable, and suitable to develop information environment operations Marines organic to the ground combat element?

Answer: The GCE is the element of the MAGTF that closes with and destroys the enemy. Using the GCE to develop information environment operations Marines will build an increase in understanding for how information environment operations integrate from the MIG to the GCE. Developing information environment operations Marines will require DOTMLPF-P changes in leadership and education to develop military occupation specialty schools to establish a baseline breadth of knowledge to assist the Marines with advising, training, planning, coordinating, and executing information environment operations.

The combination of two qualitative research methods a DOTMLPF-P analysis, and the competitor case studies with the application of the evaluation criteria of effectiveness conclude the following analysis. The Marine Corps' doctrine enables

information environment operations, but the current organization of the GCE needs

DOTMLPF-P changes to support, train, and develop information environment operations

at the tactical level. If the organization of the GCE has the ability to receive support from

the MIG without liaison and support teams, this will enable the subordinate units of the

MEF to maximize the structure of the MIG through increasing collaboration and

operational tempo. The collective analyses of the secondary questions provide an answer

to the primary research question.

Table 13.   Aggregated Secondary Questions Level of Change Chart

Secondary Questions	DOTMLPF-P Changes	Minimal Changes	No Change
1 – Does the Marine Corps warfighting doctrine enable information environment operations at the tactical level?			X
2 – Is the current structure of the ground combat element conducive for information environment operations?	X		
3 – Can the ground combat element provide a structure to train and sustain Marines in information environment operations?	X		
4 – Is it realistic, supportable, and suitable to develop information environment operations Marines organic to the ground combat element?	X		
Total	3	0	1

Source: Created by author; adapted from Kem 2013, 276.

Step 7: Answer to the Primary Research Question

The seventh and final step in the research design is to answer the primary research

question, "Does the current organization of the MIG support the ground combat

element's maneuver for future multi-domain conflicts?" The answer to the research question is no, the current organization of the MIG does not support the GCE's ability maneuver for future multi-domain conflicts. Chapter 5 Conclusions provides recommendations for further research on this topic.

Chapter Summary

This chapter's application of a seven-step research design provided analysis to answer the primary research question. The qualitative methods of the DOTMLPF-P analysis and the competitor case studies identify gaps with the MIG, the GCE, and information environment operations at the tactical level. The next chapter, Conclusions and Recommendations, will provide additional context for the answer to the primary research question by discussing the gaps in the DOTMLPF-P analysis. These gaps in organization, training, leadership, and education require resolution to integrate successfully information environmental operations for future multi-domain conflicts.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

In this new era, the initiative will be owned by the side that controls time.
— MajGen Bob Scales, USA (Ret), *Scales on War*

Chapter Introduction

The increase of global competitors such as Russia, ISIS, and the MOC's hybrid adversary to conduct operations in and through the information environment is an essential aspect to the changing character of war. The growing capacity of competitors to operate using information related capabilities was a driver for Secretary Mattis to elevate information as a joint function (DoD 2017a, 1). The information function implications for the Marine Corps are the MOC, the creation of the DC I, and the IE Concept. The Commandant believes the Marine Corps needs to build readiness for future multi-domain conflict, and a keystone for building readiness is the MIG. The MIG is the first step in enabling Marines to fight the last 1,000 meters in future multi-domain conflicts. Therefore, this thesis primary research questions asks, "Does the current organization of the MIG support the ground combat element's maneuver for future multi-domain conflicts?"

The current organization of the MIG does not support the GCE's ability maneuver for future multi-domain conflicts, but an understanding of the conclusions from the DOTMLPF-P analysis suggests it can be supportable. This optimism derives from the DOTMLPF-P analysis that Marine Corps' warfighting doctrine enables information environment operations. Therefore, changes in organization, training, leadership, and

education will be essential in increasing effectiveness of and synergizing the MIG and the GCE for future multi-domain conflicts.

<div align="center">Conclusions</div>

This thesis determined there are organization, training, leadership, and education gaps in the MIG's support to the GCE for multi-domain conflicts in the future. The organization element of the DOTMLPF-P analysis is the first step in correcting this capability gap. The U.S. Army's lessons learned are an excellent resource to understand what GCE commanders lack in multi-domain OE without information environment operations structure to advise, plan, train, coordinate, and execute operations. The case studies identify that today's competitors operate using information. The competitors are using information related capabilities to support operations in multiple domains.

The IE Concept's plan to have liaison and support teams support operations throughout the MAGTF is an initial attempt to operationalize the MIG's abilities, but it is not a realistic or sustainable solution to integrating information environment operations throughout the GCE and the MAGTF. Liaisons and support teams temporary support to GCE units does not enable trust or interoperability, an essential component in maneuver warfare and for conducting information environment operations. Since the distances between the levels of war diminishing, a commander will take greater risk with their actions. Therefore, having an organic information environment operations capacity within the GCE adds understanding of the information environment, and empowers maneuver warfare through trust. Establishing this trust will be an essential element in flattening the hierarchical structure of the MIG and GCE relationship as part of the "triple convergence" (Friedman 2007, 207).

The MOC describes numerous information related capabilities that the GCE will operate with against a hybrid adversary. The MOC does not discuss the management of these new information related capabilities. Additionally, it does not discuss how the commander receives advice on its integration into the scheme of maneuver to achieve an effect and maximize its capability. Since information is a function, it does not need to be a collateral duty for Marines within a unit. Additionally, the GCE has a requirement to understand, plan, train, coordinate, or execute operations in the information environment. Therefore, organizational structure within the GCE needs to include information environment operations Marines, but this requires coupling with the training, leadership, and education elements of DOTMLPF-P.

The lack of organic organization structure for information environment operations highlights the gap the GCE has in training for building readiness for future multi-domain conflict. The U.S. Army after actions identify planning shortfalls for tactical level units to operate effectively with organic information operations integrating plans across functions. However, when supported with information operations capability tactical level units were able conduct multiple domain maneuver and enhance the commander's understanding the OE (DA 2017b, 2-3). The lesson for the Marine Corps is if the GCE cannot train as it will fight in future multi-domain conflict in offense, defense, stability, and amphibious operations it is a capability gap that a future adversary will expose.

If the Marine Corps is advocating in the MOC that the MAGTF needs to prepare to fight against a hybrid force with A2AD capabilities, ISR, and advanced weapons then the GCE needs to train with the capabilities we are going to fight with for multi-domain conflicts of the future (USMC 2017c). The Millennium Challenge wargame should

remind the Marine Corps that technology alone would not defeat a thinking enemy in future multi-domain conflict. Training with the gear and team you are going to fight with is a critical aspect of building readiness. Organizational structures and training gaps only achieve a partial solution to the primary research question. The leadership and education of the information environment operations Marines is essential for creating capability greater than the sum of its parts.

Given the current structure of the GCE is not realistic, supportable, or suitable to develop Marines in information environment operations. This is analysis is supported by the fact there is not currently structure in the GCE to teach, train, and mentor Marines in information environment operations in the GCE. Building structure in the GCE is not the only requirement for making information environment operations in the GCE realistic, supportable, and suitable. The commander has representation advising them from across the other warfighting functions, it is essential to professionalize the information function too. The information function has a wide breadth. Therefore, the GCE will be an essential component to professionalize the information environment operations military occupational specialty. The GCE will allow for adaptability across disciplines, and the importance of creativity (Friedman 2007, 320, 327). These ideas will increase the value of the Marines through broadening their experiences at the tactical level, and develop Marines who can plan information environment operations in an efficient, effective, and holistic method as they progress in their careers.

Recommendations for the Marine Corps

The DOTMLPF-P analysis provides three recommendations for the Marine Corps to enable the MIG to support GCE's maneuver for future multi-domain conflicts. The

changes focus on the DOTMLPF-P elements of organization, training leadership, and education.

The IE Concept of supporting subordinate units of the MEF with liaison and support teams is not always going to be a pragmatic solution. Additionally, in multi-domain conflict maneuver warfare relies on gaining and maintaining operational tempo. To achieve understanding of information operations throughout the GCE organic information environment operations capability must exist in the division, regiments, and battalions. These information environment operations teams will support their commander, collaborate within the GCE, and collaborate with the MIG. Consequently, providing the MIG with access to information across the AO to fuse with intelligence, while reciprocally maintaining an understanding of the constant and dynamic threats in the information environment in their OE (see Figure 3).
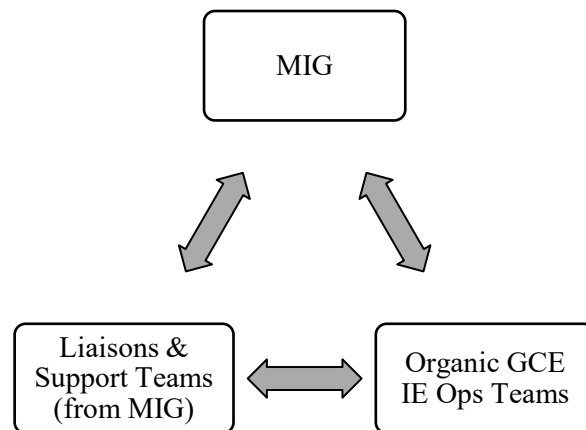

Figure 3.   Flattening the MIG and GCE IE Ops Organizational Structure

Source: Created by author.

Organic information environment operations Marines in the GCE will enable training for future multi-domain conflicts. The Russia, ISIS, and the MOC adversary have emerging capabilities that the GCE must train to fight. The liaison and support teams from the MIG will not be sufficient in building the appropriate importance of information environment across functions, and across domains. The Marine Corps needs to incorporate annual wargames to test the MIG and the GCE's ability to operate with a flattened information environment operations structure, and develop the MAGTF's ability to fight in a future multi-domain OE.

The third recommendation focuses on the leadership and education of the information environment Marines. The Marine Corps needs to adapt the ideas of adaptability across disciplines, and creativity from Thomas Friedman's *The World is Flat* for educating information environment operations Marines (Friedman 2007, 320, 327). These two concepts stress the importance of cross-training. The broader the Marines perspective the more utility they provide a commander with understanding the OE, and creatively recommending solutions. In future multi-domain conflicts how integration, coordination, and execution occurs will determine the effectiveness of the MIG's actions. Consequently, the more diversified and unique the experience-levels of training within the GCE, the higher quality the bottom-up information will be from the GCE to the MIG. Ensuring adaptability across disciplines and fostering creativity will allow for a deeper understanding of the numerous systems operating and interacting within the OE. This will encourage collaborative and inventive solutions for the MAGTF, and deny future competitors the ability to apply a framework to our problem solving within the information environment.

The recommendations derived from DOTMLPF-P analysis from this thesis want

to create an information environment operations military occupational specialty; assign

organic information environment operations Marines to the division, regiments, and

battalions in the GCE; and diversify training to increase their collective value for solving

information environment problems in future multi-domain conflicts. The conflicts against

future competitors are going to require a whole of MAGTF approach to fight and win. It

is essential to develop capacity within the information function to address the current

gaps in the MOC, IE Concept, MIG, and GCE for future multi-domain conflicts.

Recommendations for Future Research

The recommendations for future research stem from remaining elements of a

DOTMLPF-P analysis not applied to this thesis, and from concerns that spur out of the

answers to the secondary questions. The material element of DOTMLPF-P is important

for the MOC endstate. Researching the holistic impact of these new information related

capabilities to the GCE is important to understand where capability, maintenance,

manpower, and training requirements will reside for future planning, training, and

execution of multi-domain operations. Moreover, how are these new technologies going

to integrate into the MAGTF execution of amphibious operations in support of the joint

force as described in the MOC vignette?

During Step3 of the research design, the organization element of the DOTMLPF-

P analysis conclusion was to create structure within the GCE for information

environment operations Marines. By providing, a recommendation to add end strength to

an organization a recommendation for the removal of a capability is customary.

Therefore, additional research focusing on the implications of this additional force

structure using DOTMLPF-P analysis will advance the discussion on the organization for the GCE for future multi-domain conflicts.

In Step 5 of the research design the leadership and education element of the DOTMLPF-P analysis conclusion was to increase the breadth of education for information environment operations Marines to create greater value in the individual and the unit. This recommendation for leadership and education will have affects in recruitment and retention of Marines. Additional research to understand how to recruit and retain information environment operations Marines is essential for maintaining readiness for future multi-domain conflict.

Information environment operations are highly technical and have multiple levels of approval, and authorities to execute operations reside at senior levels in the DoD up to the President of the United States. Therefore, a comprehensive research of policies to understand the MIG's authorities to enable maneuver warfare across the MAGTF is essential for the Marine Corps. Moreover, if changes in policy are identified what are the ethical considerations for these changes?

Finally, the Marine Corps will likely fight as part of a JTF in future multi-domain conflict. Researching how the MIG will integrate with the joint force will be essential for enabling the MAGTF in information environment operations against tomorrow's competitors and have cascading benefits across the DoD.

Final Thoughts

The Marine Corps' design is to fight as an expeditionary MAGTF that is tailorable and scalable force for any mission. Therefore, when the Marine Corps identifies gaps for requirements, it is essential to create integrated MAGTF solutions. The

Marine Corps needs to continue to take bold adjustments to encapsulate the information

function to power, and create synergistic effects across all warfighting functions and

future multi-domain conflicts. The MOC is pushing the MAGTF to develop creative

solutions for complex problems. Information environment operations teams in the GCE

will enhance the MIG's capacity, and enrich the GCE's understanding of the OE. The

endstate will be empowering the Marines to close with and destroy the enemy in the last

1,000 meters in future multi-domain conflict.

> The very disrespect of Russians for objective truth-indeed, their disbelief in its existence--leads them to view all stated facts as instruments for furtherance of one ulterior purpose or another.
>
> — George Kennan, "Long Telegram"

> This increasingly complex security environment is defined by rapid technological change, challenges from adversaries in every operating domain, and the impact on current readiness from the longest continuous stretch of armed conflict in our Nation's history. In this environment, there can be no complacency—we must make difficult choices and prioritize what is most important to field a lethal, resilient, and rapidly adapting Joint Force. America's military has no preordained right to victory on the battlefield.
>
> — *Summary of the 2018 National Defense Strategy*

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