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**NAVAL
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MONTEREY, CALIFORNIA

THESIS

**OPTIMIZING PERFORMANCE
OF THE MARINE CORPS FOR OPERATIONS
IN THE INFORMATION ENVIRONMENT**

by

Henry W. Dewing Jr.

June 2022

Thesis Advisor:
Second Reader:

Raymond R. Buettner Jr.
Robert Schotter (USMC)

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**OPTIMIZING PERFORMANCE OF THE MARINE CORPS FOR OPERATIONS
IN THE INFORMATION ENVIRONMENT**

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Captain, United States Marine Corps
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Submitted in partial fulfillment of the
requirements for the degree of

**MASTER OF SCIENCE IN INFORMATION WARFARE SYSTEMS
ENGINEERING**

from the

**NAVAL POSTGRADUATE SCHOOL
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ABSTRACT

The operating concepts and structure of the Marine Expeditionary Force Information Groups (MIG) evolved constantly over the first four years of its existence. To professionalize the Marine Corps approach to the Information Maneuver field, it recently developed new 17XX Marine Occupational Fields. The primary areas of focus will be command structure, manpower sourcing, training, and operational goals for the MIG.

How the Marine Corps sources its manpower for the 17XX Occupational Field and Information Maneuver in general is a crucial piece to its success. The level and quality of training, the types of recruits screened, and the culture subsequently created will be as important to the Marine Corps' success as the equipment it fields. There are many steps required to develop a professional and innovative force that leads from the front in Information Maneuver. By reviewing the current Information Operations billets in the Marine Corps, the recent changes to the 17XX field, and best practices from across the military and private sector alike, this thesis seeks to provide recommendations to optimize future training and performance of information operations Marines. Specifically, this thesis suggests courses of action for Skill Enhancement Courses, greater foreign-language involvement in influence operations training, talent retention refinement, and publication of new warfighting and training publications to standardize Information Maneuver across the force.

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LIST OF ACRONYMS AND ABBREVIATIONS

FINCODA	Framework for Innovation Competencies Development and Assessment
FMOS	free military occupational specialty
IM	Information Maneuver
IRC	Information Related Capability
IW	information warfare
JIOR	Joint Information Operation Range
MAGTF	Marine Corps Air Ground Task Force
MCDP	Marine Corps Doctrinal Publication
MCWP	Marine Corps Warfighting Publication
METL	Mission Essential Task List
MIG	Marine Expeditionary Force Information Group
MOPC	MAGTF Operations in the Information Environment Practitioner Course
MOS	military occupational specialty
OIE	Operations in the Information Environment
PMOS	primary military occupational specialty

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I. INTRODUCTION

A. PURPOSE

Operations in the Information Environment (OIE) is a rapidly evolving field that requires high degrees of technical proficiency in cyberspace operations, information operations, and dominance of the electromagnetic spectrum. The creation of the Marine Expeditionary Force Information Group (MIG) in the formation of the Marine Information Group structure in 2017 created a new and dynamic structure within the Marine Corps to combat a litany of threats, particularly those in the information environment. As with any large-scale organizational structure seeking to keep pace with the rate of technological development and information in the 21st Century, there are leaders in the Marine Corps consistently seeking to improve the quality of manpower, training, operational capability in the MIG. This thesis seeks to provide best practices for future development of the MIG's manpower and structure.

In the first quarter of 2022, the Marine Corps approved the creation of a new direction for 17XX Marine Occupational Specialties (MOS) fields to improve the expertise and capabilities of Marines working together to achieve dominance in OIE. This thesis provides recommendations based on the current training and manpower environment to create a field of dedicated professionals that will provide a solid foundation for supporting Marine Corps operations in the future.

B. THESIS ORGANIZATION

This thesis is organized into five chapters. The first chapter introduces the problem set and recent changes in MIG and OIE manning. Chapter II is a literature review of recent research, of studies in education that aid in the creation of professional experts, and the framework under which the current operating environment of OIE Marines will be assessed. Several Marines studying at the Naval Postgraduate School recently assessed the effectiveness and organizational structure of the MIG and OIE professionals. Building from this research, I introduce The Framework for Innovation Competencies Development and Assessment (FINCODA) model assessing organizational ability to improve and adapt

to new conditions. I will use this framework to assess the current state of Marine training and billeting in Chapter IV.

Chapter III assesses the current operational and training conditions within the Marine Corps. This chapter assesses the doctrinal publications guiding the essential tasks for Marines conducting OIE, undergraduate and graduate educational opportunities for OIE professionals in the Marine Corps, recent changes that will be implemented with the new 17XX MOS occupational fields, and relevant studies and research from external sources that are pioneering success in the information environment. After describing the current state of Marine Corps OIE, this chapter assesses current operations and plans under the framework of the FINCODA model.

Chapter IV assesses the mechanics of improving the Marine Corps' OIE model in the future. It discusses both the importance of foreign language competency in information operations and how to create total force training standards for the Marine Corps in OIE. This chapter uses the identified areas for improvement in OIE from the innovation framework to describe the mechanics of how to close those gaps within the Marine Corps.

Chapter V provides recommendations for future training and manning in the MIG, as well as potential future research topics. There is significant potential for future research as the 17XX occupational field has its initial waves enter the fleet in the coming years. As this thesis will discuss, there is still a long way to go for the Marine Corps to continue to develop and professionalize its operations in the information environment.

II. LITERATURE REVIEW

A. PREVIOUS RESEARCH

The operating concepts and structure of the Marine Information Groups evolved constantly over the first four years of existence. There is significant debate and leadership influence over the structure and manpower sourcing within the MIG. This thesis establishes an unbiased comparative perspective from which to seek effective optimization steps for the Marine Corps Information Group. The primary areas of focus were the command structure, manpower sourcing, training, and operational goals for the MIG. These areas will be compared against comparable organizations in other branches of the Department of Defense and government.

Properly defining the scope of operations and objectives that the Marine Corps Information Group is important to problem framing. As proposed by a RAND Corporation study on IO, a narrow set of ends should be defined for any IO institution.¹ This compared and contrasted the daily aims of MIG operations across the Marine Corps, as well as those in other branches of service. This paper defined priorities more narrowly for the Marine Information Group and provides recommendations for how to maintaining focus on key functional areas.

The thesis work of past Naval Postgraduate School students provides a solid foundation and recommendations that informed the direction of this study. Similar to this thesis, previous research sought ways to improve weaknesses and maximize performance of Marine Corps officers operating in the information environment.

One of the primary inspirations for this thesis is the 2018 NPS thesis by David Burton, “An Analysis of the Marine Corps’ Organizational Fitness for Peak Performance.” This paper conducted an analysis of the Marine Expeditionary Force Command Element (MEF CE) and applied commonly accepted organization analysis tools to recommend organizational design adjustments to the Command Element. One of the most salient

¹ Porche, Isaac, “Redefining Information Warfare Boundaries for an Army in a Wireless World,” *RAND*, 2013, 38.

recommendations from that paper is to “increase the level of education and training of personnel responsible for OIE”.²

The framework through which Major Burton assessed the MIG and its capabilities is also useful to understand when seeking to assess the future of the 17XX community. “An Analysis of the Marine Corps’ Organizational Fitness for Peak Performance in the Future Operating Environment” uses the Galbraith Star Model as a template for assessing the organizational design of the MEF Information Group. The Star Model emphasizes five categories for assessing organizational structure: people, strategy, structure, processes, and rewards, as shown in Figure 1.³



Figure 1. Galbraith’s Star Model. Source: Galbraith (2002, p. 10).

By assessing the MEF Information Group primarily through a structural lens, the question of command hierarchies, design, and task organization became a primary focus for this thesis. Many of the issues asserted by this thesis in regards to the MIG and its composition related to challenges in identifying the “function of the MIG,” “responsibilities for processes,” and inadequate education and training.

² Burton, David, “An Analysis of the Marine Corps Organizational Fitness for Peak Performance in the Future Operating Environment,” Master, thesis Naval Postgraduate School, June 2018, 120.

³ Galbraith, J.R. *Designing Complex Organizations*. Reading, MA: Addison-Wesley Pub Co., 1973, 30.

The primary recommendations from this thesis served as an impetus for the development of this thesis' scope of study. One of its primary recommendations suggests "primary MOS structure for OIE personnel," which coincides with the development of the new 17XX MOS fields in the Marine Corps.⁴ The second recommendation, which is the primary focus of this thesis, is to "increase the level of education and training for personnel responsible for OIE at the MEF CE." The thesis laments that "personnel charged with planning and conducting OIE often receive only ancillary training in their secondary MOS."⁵ It appears that a dearth of training opportunities and seasoned decision-makers in the information operations environment impairs the collective capability of the MEF Information Group. Proposed solutions to the lack of training in Major Burton's thesis include additional school seating and funding for existing schoolhouses in the Marine Corps.

The conclusion of insufficient training and preparation for operations in the information environment are not isolated to the thesis discussed above. In 2019, Captains Cybulski and Yarbrow came to similar conclusions conducting their thesis research while at NPS. Utilizing both quantitative and qualitative research methods, this thesis conducted interviews and designed exercises to test the level of experience and capability of Marines operating in the information environment. The results of the research conducted in this thesis point to similar deficiencies in training and competency within the OIE field.

The theoretical framework used in Burton's thesis is also helpful for considering organizational structure and efficiency. It used Bloom's Taxonomy of Educational Objectives, a system used "for educational goals that could be used in the construction of test items and in the formulation of instructional objectives."⁶ Rather than focusing on the organizational structure, this thesis evaluated the individual capability levels of individuals participating in the information environment field using Bloom's categories of educational

⁴ Burton 118

⁵ Ibid.

⁶ Cybulski, Michael, and Edward Yarbrow Jr, "An Integrated Approach to Enhanced Operations in the Information Environment (OIE) Training and Proficiency," Master's thesis, Naval Postgraduate School, 2019, 20.

objectives. The objectives, often presented in a pyramid design, qualify the levels of proficiency that emerge over time as an individual develops from a trainee to a proficient practitioner of a skill. The levels of ability, in ascending order, are knowledge, comprehension, application, analysis, synthesis, and evaluation. Figure 2 illustrates the taxonomy as it applies to the evaluation of a Marine’s ability.

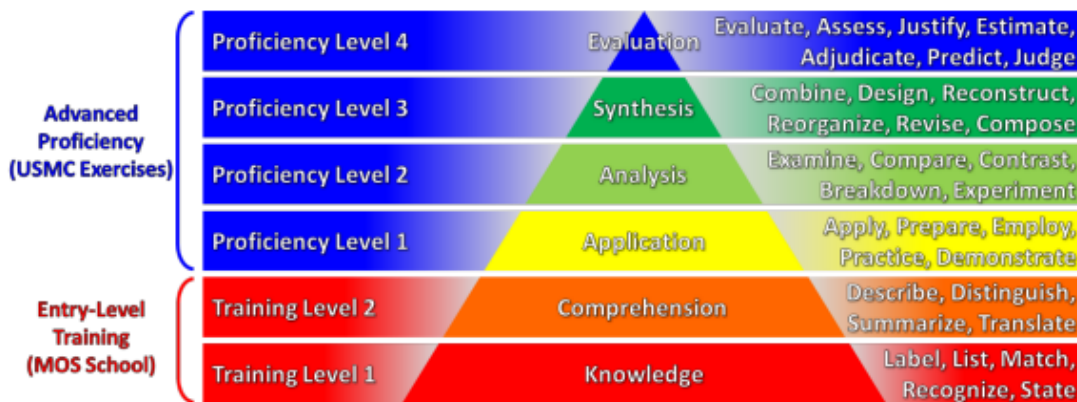


Figure 2. Bloom’s Taxonomy Applied to Marine Corps Training.
Source: Cybulski and Yarbrow (2019).

As the thesis describes, the ideal situation for any MEF Information Group would be a task organization sheet filled with Marines capable of operating at proficiency level 4, or the evaluation level of Bloom’s Taxonomy. However, the results of the study, which tested Marines from MOS fields employed in the MEF Information Group, found results that support the argument for improved training and education in the MIG. Using an ‘OIE Proficiency Assessment’, the thesis found that the test subjects used fell short of the knowledge levels desired, with disparity in capability levels based on years of experience. Figure 3 depicts the results of the assessment, categorized by proficiency level and experience level in OIE of the test subjects.

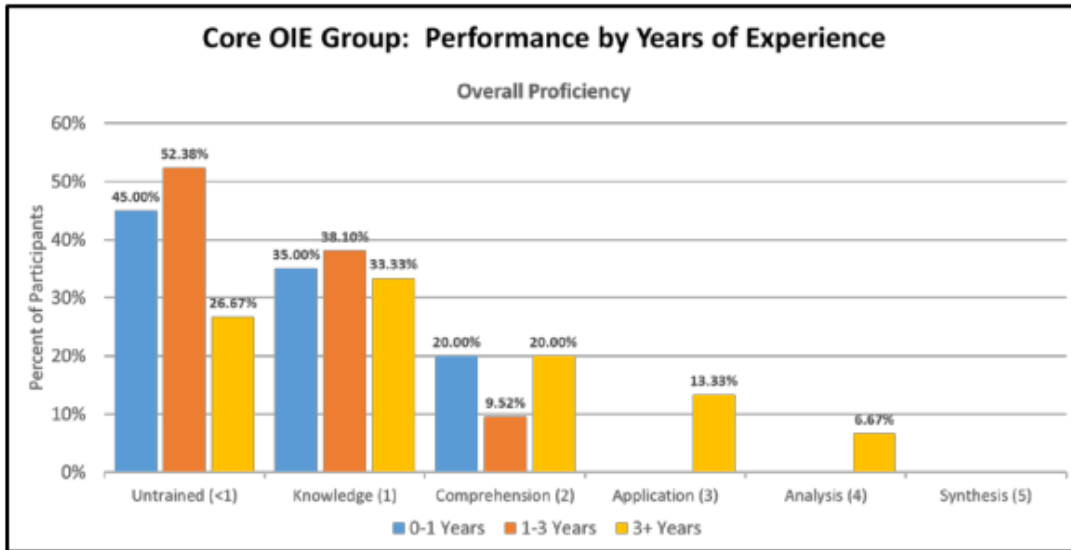


Figure 3. Core OIE Group Performance.
Source: Cybulski and Yarbro (2019).

The results above display both a discouraging level of proficiency in OIE concepts within the operating forces, and a disparity in skill level as years of training increase. Similarly to Major Burton’s thesis, the results of Captains Cybulski and Yarbro’s research yielded conclusions indicating a lack of proficiency and exercise training in the OIE field. The thesis also determined that “insufficient OIE training objectives” also played a role in the poor performance of the Marines studied in the thesis.⁷

The recommendations derived from the above research also provided directions for the research conducted during this thesis. One of the recommendations suggested “Improvement of Existing IO Ranges and Integration into a Joint IO Range Infrastructure.” These suggestions described a lack of adequate training and utilization of available resources across the Department of Defense for Marine Corps OIE operators. The proposed solutions included improved utilization of a Joint Information Operation Range (JIOR) concept, as well as improved definition of information related capabilities (IRCs) in order to create measurable and attainable proficiency goals for Marines conducting tasks in the information environment.

⁷ Cybulski et al, 105

The research conducted by previous students at the Naval Postgraduate School separately arrived at similar conclusions regarding the training and proficiency of Marines seeking to perform information operations. By using different frameworks and methods of study, they provided compelling arguments that lack of adequate training and definition of required proficiencies in the MEF Information Group are preventing optimal performance and the agility to conduct future combat operations within the MIG. The conclusions of these respective theses inspired the primary direction of this thesis: to find actionable solutions that optimize training, education, and performance of individuals working in the MIG. The above recommendation highlights the challenges that the Marine Corps faces, with a smaller officer corps and budget than some of its sister services, to effectively train OIE Marines in a cost-effective manner. As such, this thesis will seek to analyze how the military training pipeline can optimize available resources to create the most proficient OIE units possible.

Another aspect to consider while conducting this research was how friendly information operations compare to those of hostile near peer countries. Countries such as Russia have extensive histories conducting information operations, as well as many cases where they operated with considerable success. One subtle example of the difference in Russian philosophy is that they “[recognize] the increased importance of systems, [and] have focused more attention on the interaction of combat systems instead of focusing on simple force on force (the old correlation of forces) ratios.”⁸ This contrasts with the “US system of systems approach by its dialectical nature, measuring combat systems against one another instead of in isolation.”⁹ Subtle differences such as these could support recommendations for changes in the MIG collective and individual mission statements.

How the Marine Corps sources its manpower for the MEF Information Group and information operations is a crucial aspect of future success. The level and quality of training, type of recruits screened for the necessary MOS fields, and culture subsequently

⁸ Ibid.

⁹ Thomas, Timothy, “Dialectical Versus Empirical Thinking: Ten Key Elements of the Russian Understanding of Information Operations,” *The Journal of Slavic Military Studies* 11, no. 1 (December 2007): 40–62, 56.

created will be as important to the Marine Corps' success as the equipment it fields. There are many theories in both the private sector and the military about how to optimize manpower, training, and command structure. As outlined in "The New Society of Organizations," proper training for a new skill and the proper implementation of that training to provide a product are separate steps. The rapid acceleration in technological capability in the information operations realm means that IO operators must be prepared for constant adjustment to their tasking and capabilities. Proficient Marines will always be the most useful tool to the Marine Corps and providing a training pipeline that is prepared to optimize the skillset of the operator and place them in a solid operational environment is essential. This thesis will analyze the current manpower sourcing for information operations in the Marine Corps and seek to provide recommendations on how to improve these manpower processes.

B. EXPERTISE

One of the most important aspects of creating a group of information operations professionals in the Marine Corps is developing an environment that enables expertise. The development of expertise receives a good deal of discussion and theoretical debate. In "Designing Education for Professional Expertise Development," the researchers seek to identify the qualities of an education that set a proper foundation for an individual to later achieve professional proficiency. This paper points to formal educational environments as critical steps in "[preparing] students for their future professional lives [via] the expertise development process."¹⁰ The paper surveys fields that require years of experience with high stakes tasks, including medicine, law, nursing, and therapy. The paper found several primary principles of formal education which allow it to create a solid foundation for the future work of an expert. The following are principles that will be discussed later in the thesis when discussing how the educational opportunities afforded information operations Marines contribute to expertise in their fields.

¹⁰ Elvira, Quincy, Jeroen Imants, Ben Dankbaar, and Mien Segers, "Designing Education for Professional Expertise Development," *Scandinavian Journal of Educational Research* 61, no. 2 (2017), 187.

- *Practice with a Variety of Problems to Enable Students to Experience Complexity and Ambiguity.*
- *Enable Student to Understand how Particular Concepts are Connected.*
- *Target for Relevance.*

This section explicitly states that, particularly for newcomers in a domain, “repeatedly applying knowledge to real cases is a necessary condition for organizing concepts” and facilitating higher-order thinking and problem solving.¹¹

- *Share Inexpressible Knowledge*

This principle relates to the ability for someone to vocalize and rationalize decision making to “[convert] procedural knowledge into conceptual knowledge.”¹² It involves creating an environment where the thought processes of both newcomers and experts are discussed, and enables the newcomer to identify a framework of thought that they can apply to new problems.

These points regarding professional expertise are valuable landmarks for the analysis of education opportunities provided to information operations Marines. The areas in which 17XX Marines operate are complex and challenging fields, which merit a base of education and learning that competes with that of the professions studied in “Designing Education for Professional Expertise Development.” Current educational opportunities for Marines will be assessed based on the principles stated above. In-person education, relevant curricula, and group discussion to develop a community of experts which can further the experiential knowledge and capabilities of each successive class of 17XX operators. These educational opportunities are especially vital at the beginning of a career in OIE. In line with the recommendations for education, this thesis reinforces the idea that a Marine should begin an intensive education program that specializes them in one of the

¹¹ Ibid., 194.

¹² Ibid., 195.

complex fields of cyberspace, electromagnetic warfare, or influence operations earlier rather than later.

C. FRAMEWORK

To seek solutions for improving manpower and training within the information operations community, this thesis applies the FINCODA (Framework for Innovation Competencies Development and Assessment) Model of Innovation Competence as a method to analyze potential for improvement in the future for MIG Marines. With the rapid development of both the technology and expertise in the areas for which 17XX Marines are responsible, a culture of competency, capability, and teamwork will enable the Marine Corps to keep pace with the foremost experts on the capabilities necessary to compete in OIE. Figure 4 depicts the FINCODA Model.

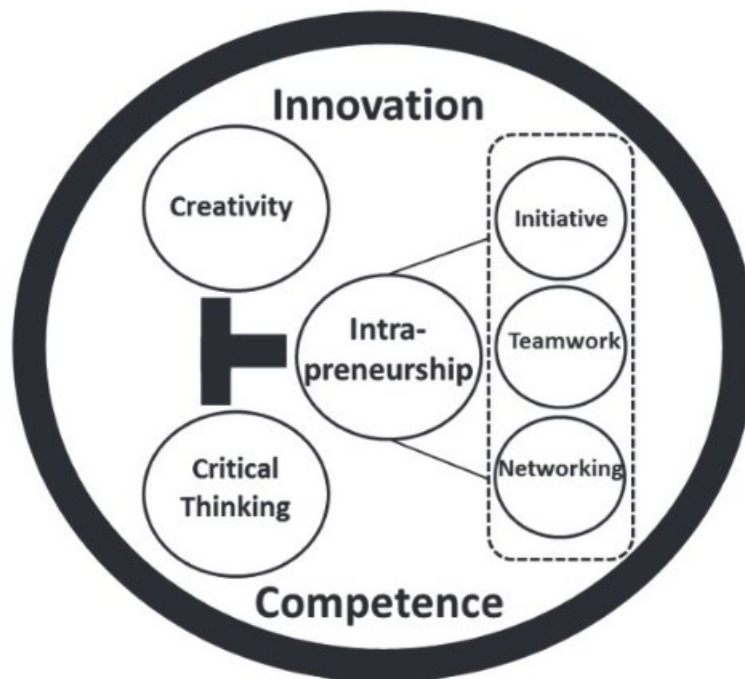


Figure 4. FINCODA Model for Innovation Competence. Source: Andreu-Andres (2016).

The FINCODA model focuses on five major dimensions: creativity, critical thinking, initiative, teamwork, and networking. The model assesses these five areas to interpret an organization's "ability to create, introduce, adapt, and/or apply beneficial novelty at any organizational level."¹³ Each of the individual metrics are interrelated and assess the ability of an organization to flourish in a rapidly changing environment. Due to the constantly evolving cyber, space defense, and information operation areas, applying the FINCODA model is an appropriate match to the research in this thesis. The emphasis on innovation specifically is a good addition to the metrics of proficiency and organizational capability that past researchers utilized while studying the MIG and Marine Corps information operations.

To better understand the model and how I used it to assess the Marine Corps' information operations community, I will define each of the five areas included in the FINCODA model applied to the research.

Creativity – Defined as the "ability to transcend traditional ideas, rules, patterns, or relationships, and to generate or adapt meaningful alternatives."¹⁴ There are multiple ways in which the concept of creativity can be applied to assess Marine Corps operations in the information environment. To assess creativity, I assess organizational ability to adapt new ideas, roles, and training. Institutional flexibility in identifying a new way to train or execute operations in the information environment will be the primary focus of research conducted through the lens of creativity.

Critical thinking – Defined as the "ability to analyze and deconstruct issues with a purpose."¹⁵ To assess critical thinking, I assess the overall framing of the problem of information operations within the Marine Corps. In assessing critical thinking, I will seek to identify which challenges and solutions are central to effective information operations. Evaluation of critical thinking seeks to identify the competencies needed for Marines to

¹³ Andreu-Andres, M.A., Fernando Guevara, Begona Montero-Fleta, and M.J. Perez, "Proposal of a Framework for Innovation Competencies Development and Assessment (FINCODA)," *Working Papers on Operations Management* 7, no. 2 (September 2016), 119.

¹⁴ *Ibid.*, 121.

¹⁵ *Ibid.*, 121.

succeed in information operations tasks, and compare them to the resources, training, and manpower that are provided by the Marine Corps.

Initiative – Defined as the “ability to take decisions or carry out actions to operationalize ideas that foster positive changes.”¹⁶ Initiative is the first of the three interrelated areas of study that relate to ‘intrapreneurship.’ These metrics assess how a team or organization are equipped to work together to implement their creativity and critical thinking. Initiative can be influenced factors, such as the incentives for strong performance, familiarity of individuals with the units in which they operate, career experience, and others that pertain to the command climate and individual competence of those within an organization.

Teamwork – Defined as “the ability to work efficiently with others in a group.”¹⁷ To assess teamwork, factors that will be assessed are the amount of time individuals spend within the MEF Information Group, the training received, and the command structure. Teamwork is another factor of ‘intrapreneurship’ that is required in order to apply creativity and critical thinking, ultimately enabling innovation. Cohesive units with experienced leaders and well-trained Marines are all essential factors to ensure teamwork.

Networking – Defined as the “ability to involve external/outside stakeholders (outside the work group).”¹⁸ The final piece of the intrapreneurship puzzle, networking will be analyzed to assess how the concepts and capabilities of Marines tasked with operations in the information environment complement the rest of the Marine Corps. Involvement of different units and MOS fields in the application of OIE and Information Maneuver, joint training and schooling with other services, and educational/training opportunities outside of the Marine Corps. In assessing networking, this effort assesses whether the Marine Corps can optimize its involvement with outside services and the rest of the Marine Corps to improve its capabilities in the information environment.

¹⁶ Ibid, 122.

¹⁷ Ibid, 122.

¹⁸ Ibid, 123.

The literature review describes past research conducted regarding MEF Information Groups and information operations military occupational specialties in the Marine Corps. It also outlined the framework used in the thesis to assess Marine Corps OIE, the Framework for Innovation Competencies Development and Assessment (FINCODA). The framework introduced in this chapter is used to assess the Marine Corps' information operations based on the current state of Marine Corps information operations in Chapter III.

III. CURRENT APPROACHES TO OIE

A. DOCTRINE

Operations in the information environment are a constantly evolving domain that is challenging to encapsulate in standardized doctrinal publications. Relevant doctrinal publications include Joint Publication 3-13 *Information Operations*, Joint Publication 3-12 *Cyberspace Operations*, and Joint Publication 3-85 *Joint Electromagnetic Spectrum Operations*. As the range of topics in these documents show, an operator in the information operations environment is entering a technical and complex environment. Cyberspace, electromagnetic warfare, military deception, and civil-military relations all fall within the realm of knowledge necessary for success as an information operations Marine. This section of the thesis identifies the salient factors that make a Marine effective in the information operations environment, and outlines what the appropriate scope of knowledge and capability should be for a Marine engaging in information operations.

JP 3-12 *Cyberspace Operations* outlines the Department of Defense's employment, authorities, roles, and responsibilities related to cyberspace. The publication outlines the core activities for military cyberspace operations as military operations in and through cyberspace, national intelligence operations in and through cyberspace, Department of Defense ordinary business operations in and through cyberspace, and joint functions of cyberspace to include movement and maneuver, intelligence, sustainment, and information.¹⁹ The document outlines the priorities when operating in cyberspace, which include the ability to maintain operations, exploit enemy vulnerabilities, and properly coordinate military actions. Cyberspace operations interact with the operating environment (OE) continuously, providing a ubiquitous and essential part of the battlespace and national security strategy.

Joint Publication 3-85 *Joint Electromagnetic Spectrum Operations*, outlines the responsibilities, organization, and execution of electromagnetic warfare in cyberspace,

¹⁹ JP 3-12, *Information Operations*, Department of Defense, November 20, 2014, xii.

space, air, land, and maritime operations.²⁰ This doctrine applies anywhere that an electromagnetic signal is used for detection, communication, or transmission of any kind. It outlines the procedures for offensive and defensive actions in the electromagnetic spectrum. Anti-jamming, signature management, proper configuration of communication networks, sustainment, and protection of communications networks are all technical aspects of electromagnetic warfare that require experts for military units to outmaneuver enemy forces in the operating environment. The goal for the Department of Defense is to maintain information dominance in the operating environment by controlling the electromagnetic spectrum on which all communications signals are sent.

Joint Publication 3-13 *Information Operations* the Department of Defense's framework, authorities, responsibilities, and integration of information and influence operations conducted by the military. It also outlines the "Information Operations Assessment" framework, which is a multi-step process designed to structure a commander's decision cycle and refine planning as well as decision making.²¹ The publication details the various methods by which information and influence operations can be coordinated. Assets and knowledge should be utilized within an IO cell include strategic communication, public affairs, civil-military operations, cyberspace operations, space operations, intelligence, electromagnetic spectrum operations, and military deception. This document and its discussion of information and influence show how a expert level of knowledge in the various fields discussed in the previous doctrinal publications are combined to achieve information dominance. Experts from various technical and cultural fields must combine in a nuanced fashion to plan operations and achieve effects in the information domain.

Marines in the OIE are expected to be competent in a wide array of technical nature fields covered in OIE doctrinal publications. Cyberspace, complex communications systems, and influencing the enemy and civilian actors alike require a high degree of proficiency. Producing basic code in Python is vastly different from the process of finding

²⁰ JP 3-85, *Joint Electromagnetic Spectrum Operations*, Joint Chiefs of Staff, May 2020, xi.

²¹ JP 3-12, *Information Operations*, Department of Defense, November 20, 2014, xiv.

and exploiting vulnerabilities in an enemy computer network. Being able to set the timing on a PRC-152 radio is several degrees of proficiency lower than being able to orchestrate a battalion-sized high-frequency communications network with advanced signature management to avoid detection. Understanding that some media outlets may have differing objectives in how they portray American politics is rudimentary compared to persuading a reluctant foreign population to cooperate with your military operations. Marines who conduct information operations should be trained and educated in the previously listed areas of expertise from the beginning of their Marine Corps career.

B. EDUCATION AND BILLETING

Effectively utilizing training and schoolhouse pipelines within the Marine Corps is essential to maximizing the manpower available for operations in the information environment. The Naval Postgraduate School (NPS) offers a unique opportunity to create programs which benefit these primary MOS fields. While there are several Free Military Occupational Specialties (FMOS, or a secondary billet vice a Primary MOS) produced by courses of study at NPS, this thesis will focus on the 595 program, a master's course of study in Information Warfare Systems which produces 8834 Marines (Technical Information Operations Officers).

Currently, NPS executes the 595 Curriculum, which creates an 8834 secondary MOS for Marine Corps officers from different primary MOS fields. These Marines then have the option to conduct a payback tour for the educational field and can then return to their primary MOS fields. This curriculum currently only serves Marines, with the sole selection criterion stemming from the 'Academic Profile Code' score generated when assessing potential student information sheets. The Academic Profile Code is a score which represents the undergraduate education a candidate received in calculus, physics, and engineering to predict preparedness for certain programs at NPS. It is worth noting that the talent pool from which the 8834 program is selected is further constrained to Commandant's Career-Level Education Board (CCLEB) and Commandant's Professional Intermediate-Level Board (CPIB) designees who can begin programs in June. Both of these boards are methods through which Marine Corps officers are placed in graduate-level and

professional education programs. This means that in some cases officers that do not desire a secondary MOS, or to attend the Naval Postgraduate School, can be placed in the 8834-producing curriculum based on an Academic Profile Code. As the Marine Corps seeks to professionalize the OIE Marine field, the potential for pulling from a pool of Marines that did not volunteer or desire the career path could be problematic.

As it currently stands, the 8834 program is the subject of several reviews which have already suggested improvements to the curriculum. In 2012, Northrop Grumman conducted a study which highlighted several areas in which the information warfare program can improve. The study focuses on four primary areas in which 8834 students should focus: electronic warfare, computer network operations, psychological operations, and military deception. Ranking these areas of study against the Naval Postgraduate School curriculum, Northrop Grumman found that with the exception of electronic warfare, the knowledge provided by the 595 program in 2012 scored 6.55/10 or lower in all listed categories. The Northrop Grumman study suggested several improvements within the framework of the Naval Postgraduate School's curriculum which could improve the program.

Upon graduation, programs such as those that produce the 8834 program fill billets based on the Authorized Strength Report (ASR), which dictates the total number of billets filled by Marines each year and which MOS fields are authorized to fill them. The most recent ASR lists less than 50 billets which the 8834 FMOS can fill. These are provided in Figure 5.

DC CD&I QUANTICO VA	COMPUTER NETWORK ATTACK INTEGRATION OFFICER	04	MAJ	QUANTICO
EXPED WARFARE TRNG GRP (EWTG) LANT	TECHNICAL INFORMATION OPERATION OFFICER/TASK ANALYST	03	CAPT	LITTLE CREEK
MARCOR UNIV EDCOM TECOM QUANTICO VA	TECHNICAL INFORMATION OPERATION OFFICER/TASK ANALYST	03	CAPT	QUANTICO
MAGTF STAFF TRNG PROG (MSTP) TECOM	INFORMATION OPERATIONS OFFICER	04	MAJ	QUANTICO
HQTRS CO 1ST RAD BN MIG I MEF	COMMANDING OFFICER	05	LTCOL	CP PENDELTON
HQTRS CO 2D RAD BN MIG II MEF	COMMANDING OFFICER	05	LTCOL	CP LEJEUNE
CE I MEF	TECHNICAL INFORMATION OPERATIONS OFFICER	04	MAJ	CP PENDELTON
CE III MEF	TECHNICAL INFORMATION OPERATIONS OFFICER	04	MAJ	CP COURTNEY
CE III MEF	TECHNICAL INFORMATION OPERATIONS OFFICER	04	MAJ	CP COURTNEY
CE 31ST MEU III MEF	TECHNICAL INFORMATION OPERATIONS OFFICER	03	CAPT	CP HANSEN
CE 24TH MEU II MEF	TECHNICAL INFORMATION OPERATIONS OFFICER	03	CAPT	CP LEJEUNE
CE 13TH MEU I MEF	TECHNICAL INFORMATION OPERATIONS OFFICER	03	CAPT	CP PENDELTON
CE 13TH MEU I MEF	TECHNICAL INFORMATION OPERATIONS OFFICER	04	MAJ	CP PENDELTON
CE II MEF	TECHNICAL INFORMATION OPERATIONS OFFICER	04	MAJ	CP LEJEUNE
CE II MEF	TECHNICAL NON-LETHAL EFFECTS PLANNER	04	MAJ	CP LEJEUNE
CE II MEF	INFORMATION PLANS/STRATEGY OFFICER (TECH IO)	04	MAJ	CP LEJEUNE
HQTRS MIG II MEF	TECHNICAL INFORMATION OPERATIONS OFFICER	04	MAJ	CP LEJEUNE
HQTRS MIG I MEF	TECHNICAL INFORMATION OPERATIONS OFFICER	04	MAJ	CP PENDELTON
HQTRS MIG III MEF	TECHNICAL INFORMATION OPERATIONS OFFICER	04	MAJ	CP HANSEN
CE 15TH MEU I MEF	TECHNICAL INFORMATION OPERATIONS OFFICER	03	CAPT	CP PENDELTON
CE 15TH MEU I MEF	TECHNICAL INFORMATION OPERATIONS OFFICER	04	MAJ	CP PENDELTON
CE 26TH MEU II MEF	TECHNICAL INFORMATION OPERATIONS OFFICER	03	CAPT	CP LEJEUNE
CE 26TH MEU II MEF	TECHNICAL INFORMATION OPERATIONS OFFICER	04	MAJ	CP LEJEUNE
CE 22D MEU II MEF	TECHNICAL INFORMATION OPERATIONS OFFICER	03	CAPT	CP LEJEUNE
CE 22D MEU II MEF	TECHNICAL INFORMATION OPERATIONS OFFICER	04	MAJ	CP LEJEUNE
CE 2D MEB II MEF	TECHNICAL INFORMATION OPERATIONS OFFICER	04	MAJ	CP LEJEUNE
CO B MARINE CRYPTO SPT BN MCIA	CYBERSPACE PLANNER	03	CAPT	FT GEORGE MEADE
US STRAT COM (USSTRATCOM)	CHIEF EUCCOM TEAM	04	MAJ	OFFUTT AFB
DC PLANS POLICIES & OPS (PP&O) DEPT HQMC	TECHNICAL INFORMATION ENVIRONMENT OPERATIONS OFFICER	04	MAJ	ARLINGTON
DC INFORMATION	INFORMATION PLANS/STRATEGY OFFICER (TECH IO)	04	MAJ	ARLINGTON
JOINT HQTRS US CYBERCOM (JFHQ-C)	ASSESSMENTS OFFICER	03	CAPT	FT GEORGE MEADE
JOINT HQTRS US CYBERCOM (JFHQ-C)	INFORMATION WARFARE BRANCH HEAD	04	MAJ	FT GEORGE MEADE
JOINT HQTRS US CYBERCOM (JFHQ-C)	EW PLANS OFFICER	03	CAPT	FT GEORGE MEADE
MARINE CORPS INFO OPS CENTER (MCIOC)	TECHNICAL INFORMATION OPERATIONS OFFICER	04	MAJ	QUANTICO
MARINE CORPS INFO OPS CENTER (MCIOC)	TECHNICAL INFORMATION OPERATIONS OFFICER	04	MAJ	QUANTICO
MARINE CORPS INFO OPS CENTER (MCIOC)	TECHNICAL INFORMATION OPERATIONS OFFICER	04	MAJ	QUANTICO
MARINE CORPS INFO OPS CENTER (MCIOC)	TECHNICAL INFORMATION OPERATIONS OFFICER	04	MAJ	QUANTICO
MARINE CORPS INFO OPS CENTER (MCIOC)	TECHNICAL INFORMATION OPERATIONS OFFICER	03	CAPT	QUANTICO
DC CD&I QUANTICO VA	COMPUTER NETWORK ATTACK INTEGRATION OFFICER	04	MAJ	QUANTICO
EXPED WARFARE TRNG GRP (EWTG) LANT	TECHNICAL INFORMATION OPERATION OFFICER/TASK ANALYST	03	CAPT	LITTLE CREEK

Figure 5. 8834 Billets. Source: Authorized Strength Report for USMC (2022).

Reviewing the billeting of 8834 officers post-graduation from the Naval Postgraduate School, there are several notable characteristics of the billet slating. The first is the small number of billets which this FMOS can fill. Additionally, the allocation of individuals across the Marine Corps is rather diffuse. This sparsity differs from an infantry officer who remains amongst a large amount of peers while holding their first billet, or even an individual like a 7204 Low Altitude Air Defense Officer, who will be attached/ in direct support of units before returning to a parent unit which consists primarily of their MOS. The diaspora of 8834 officers following their graduation, coupled with the possibility that their payback tour for receiving the MOS could be their last before returning

to a primary MOS, provide clear challenges to the maintenance of a seasoned and professional Information Maneuver community.

The current funding and allocations provided to the 8834 program have considerable overlap with the new 17XX program's vision for the future. The possibilities for innovation and adjustment of the course of study could enable optimization of both the 8834 and 17XX programs in the future. This period of time coincides with a crossroads in the future of the Naval Postgraduate School which encourages improvement and modernization of the graduate-level education provided by the school.

In the undergraduate realm, the Marine Corps has a valuable new tool in the undergraduate realm. In 2020, the United States Naval Academy opened the Naval Academy Center for Cyber Security Studies, Hopper Hall. The construction of the new building coincides with the reinforcement of the importance of operations in the cyber domain for both the United States Navy and Marine Corps. The Center for Cyber Security Studies in Annapolis offers a Cyber Operations Major produces close to 100 commissioned officers a year that have a four-year foundation in cyberoperations which provides a solid basis for future actions as experts in this domain.²² As will be discussed later in this thesis, identifying future Marine officers which excel in the cyber realm could be an essential step towards maximizing the potential of those serving in the 1702 Cyberspace MOS in the future.

C. 17XX PROGRAM

In March 2022, the Marine Corps officially announced its consolidation of Operations in the Information Environment (OIE) military occupational specialties. This adjustment, which occurred through research and study conducted by the Deputy Commandant for Information's office, seeks to professionalize the OIE field in the Marine Corps by improving training and the staffing of these fields. The Military Occupational Specialty Fields that will be established as Primary MOS (PMOS) fields, vice Free MOS (FMOS) fields like 8834 officers. The MOS fields that will be established are as follows.

²² 2020 Capstone Projects, https://www.usna.edu/CyberDept/Capstone_Projects/2020-projects.php.

MOS Summary

MOS	Type	Title	Rank
Cyber Enlisted			
1721	PMOS	Cyber Warfare Operator	GySgt-Pvt
1712	NMOS	Interactive On-Net Operator	GySgt-Pvt
1713	NMOS	Exploitation Analyst	GySgt-Pvt
1722	NMOS	Host Analyst	GySgt-Pvt
1723	NMOS	Network Analyst	GySgt-Pvt
1799	PMOS	Cyber Warfare Chief	MGySgt-MSgt
Civil Affairs Operations			
1730	FMOS	Civil Affairs Officer (Current 0530)	LtCol-Capt
1732	PMOS	Civil Affairs Specialist (Current 0532)	MGySgt-Cpl
1739	NMOS	CMO Chief (Current 0539)	MGySgt-SSgt
Influence Operations			
1751	PMOS	Influence Operator (Current 0521/0531)	GySgt-Cpl
1757	NMOS	Enhanced Influence Planner (Billets, No MOS)	LtCol-Maj MGySgt-SSgt
1795	PMOS	Influence Chief (Current 0551)	MGySgt-SSgt

MOS	Type	Title	Rank
Information Maneuver Officers			
1702	PMOS	Cyberspace Officer	LtCol-Lt
1705	PMOS	Cyber Warfare Development Officer	LtCol-Capt (LDO)
1706	PMOS	Space Officer (0545 Initiative)	LtCol-Capt
1707	PMOS	Influence Officer (Current 0510/0520/0530)	LtCol-Capt
1708	NMOS	CMO Officer (Current 0535)	LtCol-Capt
1709	NMOS	ICC Coordinator (Current 0550)	LtCol-Maj
1710	PMOS	Offensive Cyber Warfare Officer	CWO5-WO
1720	PMOS	Defensive Cyber Warfare Officer	CWO5-WO
Staff Planners			
1781	FMOS	Basic IO Staff Officer (0510 ASD)	LtCol-Capt
1786	FMOS	Space Operations Staff Officer (C 0540 ASD)	LtCol-Capt
8017	EMOS	OIE Officer (Billet Designator)	LtCol-Capt
Masters Programs			
8834	FMOS	Technical Information Operations Officer	LtCol-Capt
8866	FMOS	Space Operations Officer	LtCol-Capt

Figure 6. 17XX Billets. Source: MARADMIN 102/22 (2022).

The rationale for this adjustment is articulated in an article written by Major Audrey Callanan and Colonel Jordan Walzer, who were involved in the formulation of the new 17XX MOS structure. In the article, the Information Maneuver (IM) Occupational Field is described as a field in the Marine Corps which needs improvements in the professionalization of the force. The article laments the use of FMOS Marines to fill billets within the MEF Information Group citing that thirty-two of the thirty-nine Marines serving in III MIG in Okinawa were serving their first tours ever in that billet (the rest being on their second).²³ The article then goes on to compare the current employment of Marines in secondary MOS fields in the MIG to using a non-infantry Marine as the officer in an infantry regiment. The adjustment of the 17XX field expresses a clear intent to professionalize and prioritize the field for future operations in the information environment. The path outlined for the professionalization of the Marine Corps' information operations via the professionalization of 17XX Marines is outlined in Figure 7.

²³ Callanan, Audrey, and Jordan Walzer, "Our Belleau Wood Moment," *Marine Corps Gazette*, April 2022, 13.

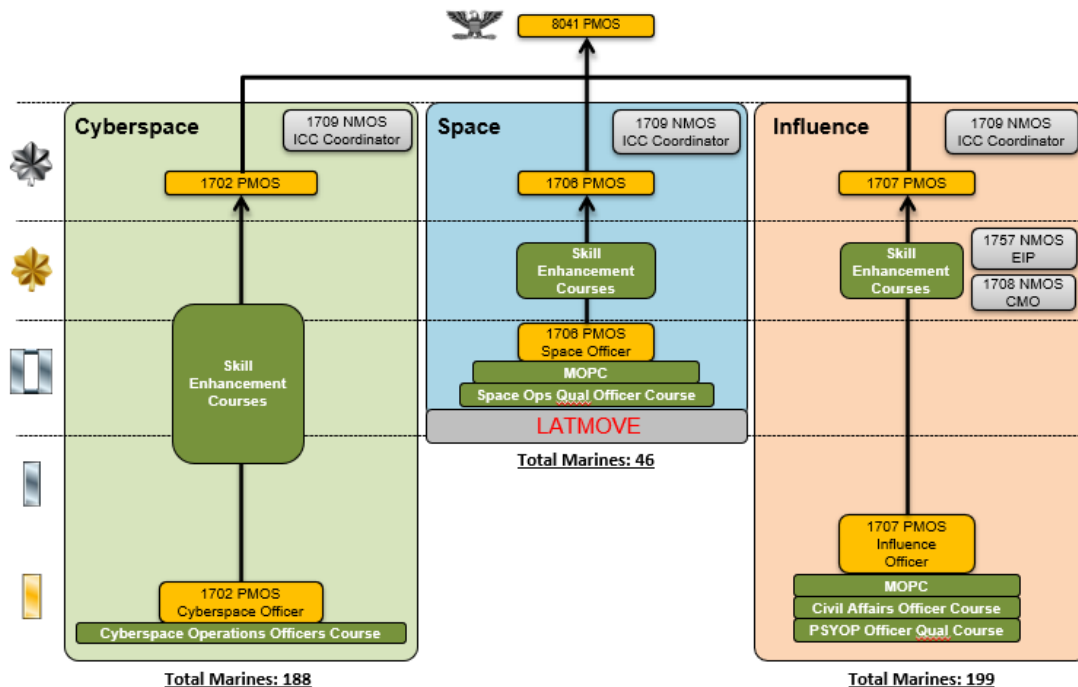


Figure 7. Information Maneuver Occupational Field Career Progression.
Source: 17XX Placemat, DC I (2022).

As identified in Figure 7, there are several entry level schoolhouses for the 1702, 1706, and 1707 PMOS fields. These include the Cyberspace Operations Officers Course, MAGTF Operation in the Information Environment Practitioner Course (IMIOPC), Civil Affairs Officer Course, Space Operations Officer Qualification Course, and the Psychological Operations (PSYOP) Officer Qual Course.

The Marine Corps Civil-Military Operations Course, generally intended for Civil Affairs and Civil Reconnaissance Marines, is run aboard Marine Corps Base Quantico, historically at Camp Upshur. The course is four weeks in length and includes the following training objectives:

- Provide Civil Military Operations (CMO) training and education resources
- Execute all Civil Affairs MOS-related training

Facilitate doctrinal development and integration of “Green Cell” (Green Cell references planners advising commanders on civil affairs)

- Facilitate doctrinal development of Civil Preparation of the Battlespace²⁴

The purpose of this course is to enable Marines to conduct all types of civil-military actions, including civil engagement, transitional military authority, and foreign humanitarian assistance. The schoolhouse is generally an MOS-producing school and is open to any MOS.

IMIOPC is run by Expeditionary Warfare Training Group, Atlantic and occurs in Little Creek, Virginia. It is a four-week course which “ facilitate an intermediate level of understanding of information activities, related capabilities, and associated effects and their integration into MAGTF staff planning, execution, and assessment.”²⁵

There are also courses which are coordinated by services other than the Marine Corps or Navy. The PSYOP Qualification Course is an Army-run course conducted at the U.S. Army John F. Kennedy Special Warfare Center and Schools in Fort Bragg, North Carolina. The Cyberspace Operations Officer Course is also run by the Army and is located in Fort Gordon, Georgia.

Although the schoolhouses at the beginning of these career progression have already received discussion, an important piece of the planned career progression path is the presence of undefined ‘skill enhancement courses’ placed in the range typically reserved for CPIB/CCLEB education. These as yet undesignated spaces could take many forms, and the graduate or professional military education which could take place in these time periods is a keystone to development of an expert group of professionals. With primary MOS fields that now all lead to an 8041 ground Colonel MOS makes the entire field of 17XX billets more competitive than the previous FMOS models for Information Operations/Information Maneuver.

One of the most significant differences from previous iterations of Information Maneuver MOS fields is the greater amount of OIE Marines billeted in the same

²⁴ *Weapons Training Battalion Course Dates & Information*, trngcmd.marines.mil.

²⁵ MARADMIN 055/22.

operational units. As evidenced from Figure 8, the number of Marines slated to serve in future 17XX slots is greater than the number serving in these billets as FMOS fills.

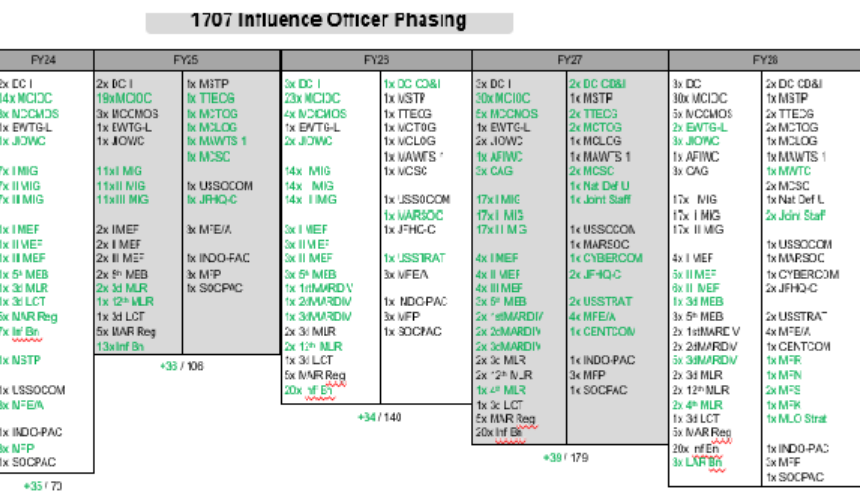
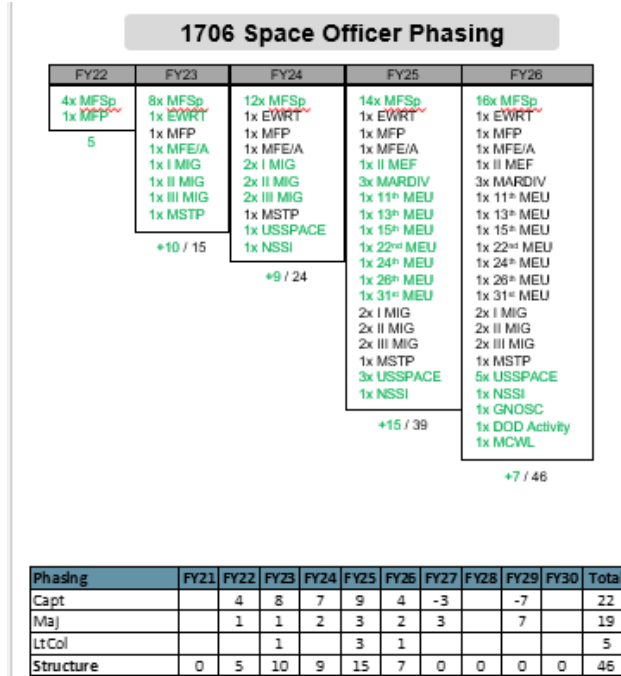


Figure 8. 1706, 1707 Phasing Plan. Source: 17XX Placemat (2022)

As seen in Figure 8, it is evident that the 1706 and 1707 programs seek to replace the 8834 and 8866 Tech IO and Space Operations FMOS fields. The greater size and similar units receiving billets indicates that these fields will soon be filled by PMOS Marines prior to FMOS billets. One interesting feature to note in the 1706 field is that the current billeting plan is for the 1706 field to be filled entire by Marines laterally moving into Captain/O-3 billets.

In all, there is a clear vision for the future of Marines conducting OIE. Research conducted by the office of the Deputy Commandant for Information generated revitalized MOS fields seeking to professionalize the community of Marines filling these billets and preparing to give the United States an edge in information dominance on future battlefields. As the Marine Corps moves forward with this critical step in changing its approach to OIE, there are many opportunities and variables which remain that can improve the Marine Corps' ability to control the information domain.

There are still many variables and decisions to make in the process of professionalizing the 17XX field. Some of the primary questions which remain include what will occur during the "Skill Enhancement Course" periods of the occupational field's career progression, total force education/standardization of exercise-style training in the Marine Corps, and how 17XX Marines will be sourced in the future. The selection of appropriate training schoolhouses and opportunities for Marine Corps officers will be essential to supplement initial training and field experience to professionalize the occupational field. Total force education reaches beyond the focus on strictly 17XX Marines and examines how the entire force can be educated, trained, and evaluated on OIE training objectives

Inherently, total force education will require the institution of training & readiness (T&R) tasks, Mission Essential Task Lists (METLs), and MCCRE (Marine Corps Combat Readiness Evaluation) objectives for the force as a whole. While there are many doctrinal concepts about how to properly conduct OIE, the standardization of training expectations within the Marine Corps will allow the force to maintain pace with the learning and improvement of OIE that will occur within the MIG and 17XX community.

Sourcing of Marines in the future for the 17XX community will be important to identify and retain individuals that will be able to understand the complex information environment, operate effectively within the fleet, and remain within the community to continue to enhance the Marine Corps' OIE capabilities. There are several methods by which selection and retention can be established which enables Marines best suited to conduct OIE to thrive and provide the Marine Corps an operational edge.

There are many CCLEB and CPIB schooling opportunities which mirror what could be possible for 17XX professionals when conducting Skill Enhancement Courses. Some of these programs are conducted in concurrence with a B Billet which enhances the learning experience for the Marine. To illustrate, I will use the Congressional Fellowship Program offered to a small group of Marines per year and propose a similar program which could provide further opportunities for expertise development.

The Congressional Fellowship Program provides a billet for Marines of any MOS in the office of either a Senator or congressman, while concurrently receives a Master's in Public Policy from George Mason University. This unique program is available to Marines of any MOS that qualify for CCLEB or CPIB boards and selection. The combination of receiving a graduate-level education with the opportunity to serve in a billet outside of Marine Corps commands is a potential model for 17XX Skill Enhancement to emulate.

Within the National Capital Region, there are many opportunities for space and cyber officers to receive follow-on education while serving in billets which further their knowledge and the operational goals of the Marine Corps. There are various cybersecurity education programs in the area within both the Department of Defense, in graduate-level learning environments, and in other departments under the control of the Director of National Intelligence.

There are also ample opportunities for Skill Enhancement Programs on the West Coast. The most obvious of graduate education opportunities on the West Coast remains in Monterey at the Naval Postgraduate School. As previously discussed, there are currently FMOS producing programs at NPS including the 8834 Technical Information Operations Officer and 8866 Space Operations Officer. The infrastructure currently exists at NPS to

support Skill Enhancement Courses for 17XX officers in Monterey with several practical changes to operational logistics at the school.

The introduction of the new 17XX Occupational Fields coincides with a systemic adjustment to overall operations at NPS that is titled ‘NPS Next.’ Recently, operations at the Naval Postgraduate School are receiving budget scrutiny that could result in significant reductions to direct funding in the future.²⁶ As a result, the school’s administration is responding with ‘NPS Next’ as a way to evaluate school operations and streamline the education and training efficiency of the school. As a result, the school administration developed several lines of effort to increase administrative and academic efficiency within NPS. This initiative is an ideal time to review the efficacy of OIE related training for Marine Corps students in Monterey and identify lines of effort which could make the school a viable asset for 17XX Skill Enhancement Courses.

This chapter described the current operating environment and future vision of OIE for the Marine Corps. There are currently several professional military schoolhouses, undergraduate, and graduate education programs which facilitate the development of Marines trained in the core areas defined by joint doctrine to conduct OIE. Additionally, the Marine Corps recently created the 17XX MOS field to further professionalize and develop the Information Maneuver space, with the intent of creating a field with improved training and Marines that are likely to remain in the Information Maneuver community for longer. In the next section, I will assess information operations training outside of the Marine Corps and apply the FINCODA framework to both the Marine Corps and external group’s IO training.

D. ASSESSMENT OF CURRENT OIE STRUCTURE

Now that the current operating environment for OIE and 17XX Marines has been described, this chapter assesses the Marine Corps’ ability to operate in the information environment using the FINCODA model. This chapter evaluates the information provided above in terms of creativity, critical thinking, initiative, teamwork, and networking.

²⁶ Marino, Pam, “Naval Postgraduate School Faces Big Budget Cuts and Possible Reorganization,” *Monterey County Weekly*, April 8, 2021.

Initiative, teamwork, and networking will be the three areas of the model described in the most detail, since they can be described more objectively and pertain more directly to organizational structure, manpower retention, and training. By evaluating the current structure of OIE in the Marine Corps using this model, this thesis will seek to evaluate gaps in the plans for future OIE Marine fielding that can be filled to best suit the MIG for innovation in the future. While there are many positive outcomes from recent developments in the Marine Corps' development of OIE professionalization, this section will highlight areas in which potential improvement can occur.

1. Initiative

The primary area for improvement in initiative discussed in the current state of Marine Corps OIE is the graduate education and FMOS system. As evidenced from the discussion above, the conversion of Marines into FMOS fields via selection to the Naval Postgraduate School can sometimes miss the mark on ensuring initiative within the ranks of OIE Marines. The 17XX program is a positive step forward for the professionalization of information operations in the Marine Corps, but the programs which produced Marines for these billets previously still exist and, as I will argue later, can be improved.

In a similar vein of talent retention management, the absence of foreign language expertise as a consideration in OIE billeting denies a possibility for increased initiative from foreign language proficient Marines. As will be discussed in the next chapter, foreign language plays a key role in influence operations and currently is a primary factor in manpower decisions for the MIG. Language skills typically do not play a primary factor in manpower or billeting in the Marine Corps in general, but future OIE programs could benefit greatly from an emphasis on foreign language capabilities.

2. Teamwork and Networking

Teamwork and networking are some of the most significant areas in which the Marine Corps can potentially improve its OIE approach to maximize the potential for future innovation. As the 17XX MOS field moves to professionalize and increase its expertise in the field, building a network of knowledgeable operators is essential to success. This network should include internal actors within the Marine Corps, as well as external actors

in the OIE environment from other sources. These external actors can include individuals from other services, other government entities such as the National Security Agency, and international partners. As the 17XX occupational field has its first waves of newly trained Marines reach the fleet, training opportunities with other services and nations could enhance the knowledge base and network of individuals invested in improving Marine Corps OIE. For example, the U.S. Army has a longstanding information operations training pipeline and command that could provide interesting insights to the Marine Corps. The 1st Information Operations Command in Fort Belvoir, Virginia fields officers with the primary MOS of 30A and has years of experience fielding soldiers with information operations as their primary MOS. Work with other DOD partners, as well as bi-lateral interaction with allied nations, are examples of areas in which the networking for OIE Marines can improve.

3. Creativity and Critical Thinking

These two necessities for innovation will be assessed primarily through the lens of the formal education and training in the Marines Corps. As shown in the research done by Cybulski and Yarbrow, the educational foundation for developing OIE expertise did not appear to exist in the previous iterations of OIE billets. The framework for creativity and critical thinking in the OIE field for the Marine Corps will come from its schoolhouses and the doctrinal basis for total force training in OIE. An increased institutional foundation in the technical skills required to conduct information operations can be developed via additional training, screening, selection, and retention of Marines with aptitude for the highly technical fields required for OIE. Additionally, the development of new Marine Corps doctrine and training standards specific to the 17XX fields will be essential to the development of force-wide expertise in the fields that compose OIE. The largest takeaway regarding creativity and critical thinking is that the development of new Marine Corps Training and Warfighting Publications as well as the development of Training & Readiness manuals for 17XX Marines are vital to defining the direction and appropriate levels of expertise for Marines conducting OIE (these documents will be discussed at length later in the thesis).

By identifying the above areas which could benefit from changes to current operating standards, this thesis will make recommendations which can enable the operating forces to maintain pace with the rapid technological and conceptual developments in the field of information operations. Now that the current operating environment and the key areas that could be improved to facilitate innovation are identified, Chapter IV will discuss the methods by which the Marine Corps' capacity for innovation in information operations can be improved.

IV. ASSESSMENT OF FUTURE IMPROVEMENT METHODS

In Chapter III, this thesis assessed the current state of Marine Corps OIE training and education through the framework of the FINCODA Innovation Model. This assessment identified several conceptual areas in which the Marine Corps can improve its training and manpower billeting for Operations in the Information Environment. In this chapter, I discuss several methods by which the conceptual innovation shortcomings identified could improve. To do so, this chapter explores training and education not currently included in Marine Corps OIE curricula that meets the conceptual requirements for future innovation. The purpose of discussing these alternative training and education methods is to show existing programs and frames of thought that could provide realistic and practical differences to Marine Corps OIE implementation in the future.

Additionally, the topic of total force education in the Marine Corps will be discussed to explore the potential of innovations occurring within the 17XX and OIE community to permeate throughout the Marine Corps. The long process of codifying training requirements, particularly for the rapidly developing fields that constitute the information environment, provide a unique challenge for ensuring the continuation of professionalization and innovation in the fields of influence operations, cyber, and the electromagnetic spectrum. Discussing these topics in detail provides the requisite background information and justification for this thesis to make recommendations in Chapter V for future actions by the Marine Corps to continue improving its OIE capabilities.

A. LANGUAGE CONSIDERATIONS

Outside of the military, information operations, cyberspace, and electromagnetic warfare are also rapidly developing fields worthy of discussion and research. This section seeks to outline useful research and theory in the civilian domain which can be applied to recommend optimization processes for Marine Corps OIE.

One aspect of information warfare and influence operations which is not commonly discussed in the Marine Corps is that of foreign languages. While a vast amount of technical

expertise training is necessary for MIG personnel, the importance of cultural and language expertise is not often factored into considerations for manpower allocation in the MIG. This section will explore academic and military thought on the importance of understanding foreign language and culture. Subsequently, I will assess possible training and manpower options that could better support the MIG to conduct influence and information operations in non-English languages.

While considering the importance of language, it is important to remember its doctrinal grounding in the definition of deception operations. *Joint Publication 3-13.4 Military Deception*, psychological operations and civil affairs play a key role in the achieving the doctrinal goals for deception. When conducting military deception, all efforts “should be coordinated with civil affairs and with those psychological operations activities that support civil affairs to ensure that deception does not undermine the relationships with the civilian population or with host-nation military authorities”²⁷ The attitudes and perceptions of both host-nation military members and the civilians in the operating environment are integral to the success of any military deception or influence operation. As such, the understanding of the native languages and colloquial connotations spoken where influence operations are occurring remain crucial to the planning and effects assessment of the process.

One of the more famous recent examples of poorly executed influence operations by the United States helps to illustrate the importance of understanding foreign language and culture in influence operations. This example relates to a pamphlet dropped in Afghanistan in 2017. The pamphlet seems plain enough to the common eye, asking in Pashto for the local community to assist in eliminating the “terrorist dogs” in the region. The reaction from the pamphlet was overwhelmingly negative. In it, the Shahada, or Islamic profession of faith, is imposed over the image of a dog that is meant to represent the terrorists. The imposition of the profession of faith over a dog, which is seen as an unclean animal by many in the region, was overwhelmingly negative and resulted in an

²⁷ “Joint Publication 3–13.4, Military Deception,” January 26, 2012, I-4.

apology from the general commanding forces in Afghanistan at the time.²⁸ This anecdote is one of numerous examples where a fundamental misunderstanding of the language and cultural cues in an operational area derailed information and influence operations.

There is a substantial amount of research both within military and academic circles supporting the importance of foreign language competency to achieve influence goals abroad. From a non-military perspective, foreign language competence supports the ability to cooperate with native speakers and improves the odds of achieving desired business-related results. Common language between two parties greatly increases their ability to cooperate. Studies observing the impact of shared language and trade find evidence that this commonality can increase commercial trade flows by as much as 44 percent.²⁹ This increased ability to share complex thoughts, negotiate, and understand other parties' opinions greatly improves cooperation.

Similarly, it is commonly understood that language plays an essential role in cultural and social identity formation. The creation of separate zeitgeists and understanding from the use of language or another plays a role in the amount of trust an individual puts in receiving information from non-fluent sources. The importance placed on language means that the method in which information is presented to an individual "can substantially influence team communication, knowledge sharing, and other processes."³⁰ While there is not a direct parallel between business and military aims in language, the multi-national support and international influence missions described by JP 3- are both instances where this research supports increased foreign language proficiency within the MIG.

Additional research focused on expatriate adjustment to host countries emphasizes the importance of foreign language proficiency. In the study, the researchers observed a large sample size of expatriates living in China to assess their professional and non-work-related adjustment. The article shows that foreign language proficiency, or the absence of

²⁸ Faizy, Sultan, "U.S. Military Apologizes for 'Highly Offensive' Leaflets It Distributed in Afghanistan," *Los Angeles Times*, September 6, 2017.

²⁹ Tenzer, Helene, Siri Terjesen, and Anne-Will Harzing, "Language in International Business: A Review and Agenda for Future Research," *Management International Review* 57, no. 6 (2017): 824.

³⁰ *Ibid.*, 838.

it, impacts the professional and personal livelihood of an individual functioning in a foreign country. The study noted that “Chinese-proficient expatriates were able to develop work-related networks,” while those not as fluent struggled to form professional and personal networks.³¹ The lack of language knowledge hindered these expatriates in multiple facets of their life, resulting in barriers to productivity and livelihood. The article determined that the lack of host nation language knowledge “acts as a natural barrier to intercultural communication and information flow in subsidiaries”³² These pieces of research provide compelling evidence that organizations and individuals are likely to have more success with their goals in a foreign community with increased knowledge of said language. It is clear, from a personal or business perspective, that language plays a vital role.

More specific to the goals of the MEF Information Group, deception and influence itself lie primarily in a thorough understanding of the nuances of language. More specifically, high-stakes deception can often be directly correlated to specific linguistic cues. By assessing real life case studies of deception action (in a military environment), the researchers provided statistical validation for the Zhou Linguistic-Based Cues Framework. This framework focuses on several areas of language construction, which include types of speech such as passive voice, negative statements, self-reference, uncertainties, and temporal or spatial information.³³

These frameworks for deception language are key to understanding the importance of the nuances in language. Additional evidence that the manipulation of language plays a key role in deception actions is the use of euphemistic versus dysphemistic language. This research investigates how the manipulation of the packaging of a message (positive versus negative connotations) can influence the reception of a message. The article discusses the use of doublespeak, an homage to Orwell’s 1984, which they define as “the purposeful use

³¹ Zhang, Ling, and Vesa Peltokorpi, “Multifaceted Effects of Host Country Language Proficiency in Expatriate Cross-Cultural Adjustments: A Qualitative Study in China,” *The International Journal of Human Resource Management* 27, no. 13 (2016): 1461.

³² Ibid.

³³ Zhou, Linda, Judee Burgoon, and Jay Nunamaker Jr, “Automating Linguistics-Based Cues for Detecting Deception in Text-Based Asynchronous Computer-Mediated Communication,” *Group Decision and Negotiation*, no. 13 (2004): 88.

of language to distort, obscure, or misrepresent an event or piece of information.”³⁴ By studying research subject’s reactions to different forms of description for an event (truthful with negative connotation, truthful with positive, inaccurate description) the researchers found that a “speaker can, through the careful use of language, sway the opinions of others in a direction congruent with their individual goals while avoiding the risks associated with less subtle forms of linguistic manipulation.”³⁵ To properly apply these subtleties to messaging in another language, the balance of connotation and euphemistic expression must be adequately understood. Packaging of information in an agreeable and familiar fashion greatly increase the chances of success of an influence operation.

There are several examples specific to a military context which support increased foreign language proficiency to support information operations. There are programs within the Department of Defense geared specifically towards language and culture training to support information warfare. The Air Force Culture and Language Center began in 2005 to “meet the demand for linguistic and cultural competency in the Middle East.”³⁶ A common talking point amongst military theorists is the asymmetric level of English-language speakers in China compared to the dearth of Mandarin-speakers in the United States and its national defense structure. The concern for the development of “language-enabled information warfare” is found throughout the armed services.³⁷

There is also lively discussion in the Marine Corps about foreign language capabilities. In a September 2021 *Marine Corps Gazette* article, a Language Operational Planning Team assessed Marine Corps foreign language utilization and found “the Marine Corps is unable to effectively and accurately identify language requirements, which results in validation and management gaps for foreign language capability at every Marine

³⁴ Walker, Alexander, Martin Turpin, Ethan Meyers, and Jennifer Stolz, “Controlling the Narrative: Euphemistic Language Affects Judgments of Actions While Avoiding Perceptions of Dishonesty,” *Cognition*, no. 211 (2021), 2.

³⁵ *Ibid.*, 10.

³⁶ Loftus, Peter, Jon Nesselhuf, and Howard Ward, “A War by Words: Language and Cultural Understanding in the Age of Information Warfare,” *Journal of Indo-Pacific Affairs*, Air University Press, November 2020.

³⁷ *Ibid.*

command echelon.”³⁸ To improve on this deficiency, the article recommends more strictly defining the Marine Corps’ system for identifying Marines with foreign language capability and subsequently improve its identification, tracking, and retention of Marines which possess these capabilities.³⁹ There are various methods in which the training, identification, and retention of language specialists can be improved in the Marine Corps. Now that the underlying argument for the importance of foreign language capabilities in information operations is established, I will discuss the next important area in which the Marine Corps can make improvements to lay the groundwork for professionalization of the OIE field: doctrine and total force training.

B. TOTAL FORCE EDUCATION AND TRAINING STANDARDIZATION

This section will discuss the framework in which total force education and training can be standardized to improve the expertise in the OIE field throughout the Marine Corps. The development of the 17XX program establishes a framework for expertise in OIE, however with the limited number of billets in these fields a concerted effort is required to educate the operating force on topics in OIE. Signature Management, cyber security, and including deception planning for operations from the platoon-level up require a uniform approach to OIE education. This section will discuss the framework that exists within the Marine Corps for standardizing training and education.

The process of developing a standardized concept for training and education required for an occupational field is extensive and includes a significant number of participants in Quantico and the Pentagon. To understand the amount of coordination that must be done to standardize training expectations, this section will describe the documents required to establish training expectations for an occupational field by comparing it with the infantry MOS. The process for standardizing education for the total force in the Marine Corps begins with doctrine. As previously discussed, there are multiple joint publications outline the objectives the Department of Defense seeks to accomplish in certain fields. The

³⁸ Durish, John, Kevin Johnston, and Genevieve Studer, “Foreign Language Capabilities: Improved Talent Management Is Needed,” *Marine Corps Gazette*, September 2021, 38.

³⁹ *Ibid.*, 39.

next step for the Marine Corps is to develop Marine Corps Doctrinal or Warfighting Publications which provide the service's specific philosophy on how to approach the tasks in a specific occupational field. While Marine Corps Doctrinal Publications (MCDPs) number in the single digits and tend to apply to the force as a whole, Marine Corps Warfighting Publications (MCWPs) or Marine Corps Training Publications (MCTPs) are greater in quantity and can apply to more narrow fields of focus. For example, in the infantry community, various MCWP documents serve as the basis for a cornucopia of training events. These MCWPs and MCTPS include *MCTP 3-01C/MCWP 3-15.1 Machineguns and Machinegun Gunnery, 3-11.1 Marine Rifle Company/Platoon*, and *MCWP 3-16.2 Procedures for the Marine Corps Fire Support*. These documents take DOD direction in specific warfighting areas and add detail to the requirements for Marine Corps forces. A sample of the level of detail in MCWP and MCTP documents appears in Figure 9, which is a small sampling of technical information required to operate machineguns in a specific instance.

Overhead fire is fire delivered over the heads of friendly troops. A machine gun on a tripod is capable of delivering this type of fire because of the small and uniform dispersion of the cone of fire. In the attack, the use of overhead fire permits the machine gun to support the advance of rifle units.

NOTE

Overhead fire is not delivered when the gun is mounted on the bipod, unless the vertical interval of the troops below the gun target line is such as to make safety obvious.

The center of the cone of fire must clear the heads of the friendly troops by a prescribed distance. See figure 6-22. This distance, known as minimum clearance, is found by adding together the following elements:

- The height of a man, standing, taken as 1.8 meters.
- Half the vertical dimension of the 100 percent cone of fire at the range to the troops.
- A margin of safety equal to the vertical distance which extends a 5-mil angle at the gun or 3 meters, whichever is greater.

Figure 9. Excerpt of Technical Machinegunnery Information.
Source: MCTP 3-01C (2016).

As it currently stands, there are no MCWP or MCTP documents which apply specifically to the 17XX field. That being said, *MCWP 3-32 Marine Air-Ground Task Force Information Operations* (published in 2018) provides an introductory baseline to Information Operations in the Marine Corps. More thorough joint doctrinal guidance does exist, the process to create Marine Corps specific doctrine has not yet occurred. As the rest of this section will demonstrate, this means that the first step in a mandatory series of events has yet to occur to standardize the Marine Corps' approach to OIE. The importance of beginning this process for total force training cannot be overstated.

Once doctrinal standards are established in MCWP and MCTP documents, the process of establishing training requirements can begin. Training and Readiness (T&R) Manuals are MOS specific manuals that establish the regulations and standards for training of Marines in specific occupational fields. These manuals, which are developed and evaluated by Marine Corps Combat Development and Integration (CD&I), become the strategic guidance for all Marines within a specific occupational field. Figure 10 illuminates the evaluation process, which can necessitate several years, to create new training requirements.

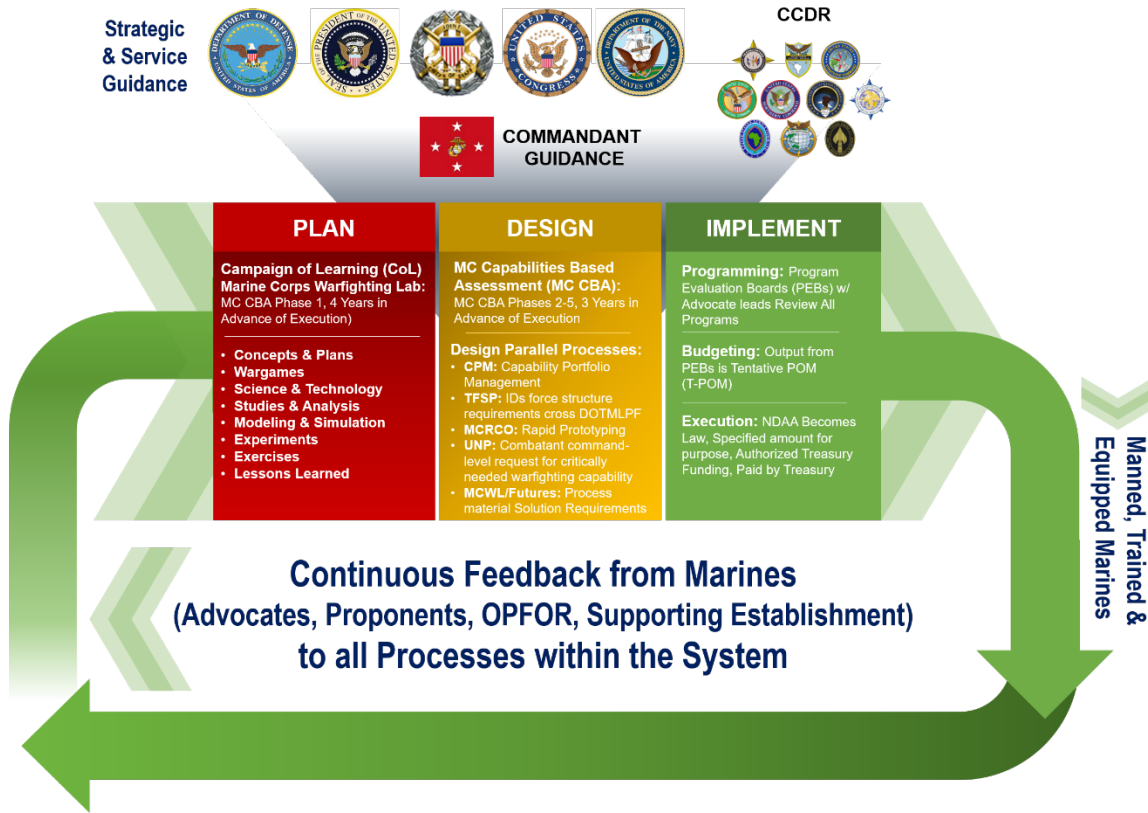


Figure 10. CD&I Feedback Loop for Determination of Programming and Budgeting. Source: CD&I Placemat (2022).

Training and Readiness Manuals are thorough documents which detail specific steps of training evaluations Marines of specific MOS fields must complete. A typical T&R Task will include event components, sustainment intervals (length of time until event must be re-trained), pre-requisite events, the grades of Marines required to conduct the training, the MCWPs and MCTPs they reference to create the task, and the type of supporting requirements or training areas required to conduct this training. Figure 11 provides an example of a relatively basic task that must be trained for 0311 Infantry Marines.

0300-M203-1001: Maintain an M203 grenade launcher

EVALUATION-CODED: NO **SUSTAINMENT INTERVAL:** 6 months

MOS PERFORMING: 0300, 0311, 0317

GRADES: PVT, PFC, LCPL, CPL

INITIAL TRAINING SETTING: FORMAL

CONDITION: Given a service rifle with a mounted M203 Grenade Launcher, cleaning gear, and lubricant

STANDARD: To ensure the weapon is complete, clean, and serviceable.

PERFORMANCE STEPS:

1. Clear the rifle.
2. Clear the M203 Grenade Launcher.
3. Disassemble the grenade launcher.
4. Clean the grenade launcher.
5. Inspect the grenade launcher.
6. Lubricate the grenade launcher.
7. Assemble the grenade launcher.
8. Conduct a function check.

REFERENCES:

1. TM 07700B-10 Operator's Manual, 40mm Grenade Launcher, M203 (Ch 1&2)
2. TM 3-22.31 40mm Grenade Launcher, M203

Figure 11. Sample T&R Task. Source: Infantry T&R Manual (2013).

Since Marine Corps T&R Manual publication requires doctrinal references, the new 17XX field Marines will also not graduate with specified T&R tasks for their occupational field. T&R tasks, while mandatory only for the MOS fields specified in relation to the task, are useful aids for the total force as aids for cross-training in other areas. The practicality of simple ‘performance steps’ such as those present in T&R tasks for any Marine Corps unit to train OIE is high.

Once one moves beyond T&R task evaluation, larger scale iterations of training requirements include those present in a Mission Essential Task List (METL). Mission Essential Task Lists are assigned to specific units prior to deployments with tasks that must be required in an operating environment. These tasks are given to units in accordance with their mission for a future deployment, and a unit (such as an infantry battalion) must verify competency in completing these tasks before conducting a deployment. One of the primary ways in which the Marine Corps evaluates a unit’s capability in METL categories is through a Marine Corps Combat Readiness Evaluation Exercise (MCCREE), a multi-day

training event evaluated by outside observers which creates conditions that force a Marine Corps unit to show proficiency in large unit tasks which are derived from the T&R and doctrinal responsibilities. This model provides a format for evaluation which OIE Marines will be expected to utilize once present in the operating forces. However, if there is minimal doctrinal basis for Marine Corps 17XX and OIE activities, these evaluations will not be thorough in a manner which ensures the Marine Corps can maintain an operational edge on the battlefield when Information Operations come into play.

The process of developing training events with doctrinal justification is a long one for the Marine Corps. The establishment of technical manuals, doctrinal publications, and eventually training tasks can take several years. The creation of a new 17XX field, with many of the Marines training in schoolhouses outside of the Corps prior to fleet service, means that the initial wave of 17XX Marines will be developing the Marine Corps' expertise in this new OIE service without the guidance of a large deal of necessary Marine Corps doctrine. The creation of Marine Corps doctrine in OIE will be illuminated by this new 17XX field and will establish the basis for future training to produce experts in the field.

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V. RECOMMENDATIONS AND CONCLUSION

This thesis described the current OIE environment in the Marine Corps, and the plans for its continued improvement in the future via the 17XX occupational field. The emphasis on information operations, cyber, and electromagnetic warfare continue to increase for Marines as the fields become increasingly complex and crucial to success on the battlefield. By assessing the training, doctrine, and future plans for manpower in the OIE field, this thesis assessed the strengths and shortcomings of the Marine Corps vision for OIE. Utilizing the Framework for Innovation Competencies Development and Assessment (FINCODA), I assessed the ability of the Marine Corps to continue to keep pace with the technological and doctrinal developments in Information Maneuver. This analysis identified conceptual areas of focus that could guide the Marine Corps to continue improving and fielding OIE and 17XX occupational field Marines in the future.

From this analysis, this thesis recommends five future actions for the Marine Corps to continue developing its capabilities in the information domain. These recommendations seek to keep pace with the developing plans for the first group of fielded 17XX Marines, which will occur shortly after publication of this thesis. Due to the imminent influx of feedback on the fielding of these new MOS fields and the subsequent adjustments that will be made, this thesis has the potential to provide a foundation for future research. This chapter seeks to outline actionable adjustments which can be made by the Marine Corps to improve its OIE capabilities, and suggests future research opportunities based on the planned rollout of 17XX Marines from entry-level training into fleet billets.

A. RECOMMENDATIONS

This section seeks to provide recommendations for how to best situate the Marine Corps for future innovation and professionalization of the MIG and Marines conducting OIE. Based on the areas for improvement identified using the FINCODA model, these recommendations are designed to support the 17XX field by making administrative and conceptual adjustments to operations in the Marine Corps. These adjustments all seek to improve the expertise, professionalism, and teamwork with sources outside of the Marine

Corps which can allow the USMC to be on the leading edge of OIE capabilities in any battlespace.

Naval Postgraduate School Education Program Adjustments

The introduction of the 'NPS Next' philosophy coincides with a time in which the Marine Corps could benefit from adjustments to the school's approach to the curricula and placement of Marine Corps master's candidates. These changes include altering the Authorized Strength Report requirement for 8834 production at NPS, and the adjustment of the Academic Profile Code system to ensure students at NPS are willing attendees and competing for 17XX billeting.

One of the larger structural changes NPS should conduct is the removal of mandatory application and the Academic Profile Code system for admitting students. Captains and Majors in the Marine Corps with specific timing in grade are currently mandated to apply to NPS, and then are sorted into fields of study based on an Academic Profile Code (which scores a student's knowledge based on a review of their undergraduate transcript). This system, while well-intentioned, can result in students who desired to pursue other paths in their career to receive a master's degree in a field largely determined for them. This formula does not ensure the entrance of motivated individuals to the fields of study required to increase the professionalization of Marine Corps OIE. A method of adjusting the admittance of Marines to OIE related programs at NPS could be to tie these programs to the Skill Enhancement Course period of 17XX officer career progression. By being able to select officers from within the OIE community, and screen applicants who desire to receive the education from other MOS fields, the competitiveness and prospect of a motivated student body increases.

As discussed previously, the courses of study in fields such as the 8834 program are in need of significant improvement to maintain pace with the OIE field. However, the programs have not updated their core curriculum despite studies (such as that conducted by Northrop Grumman) which support this idea. The advent of the new 17XX field, coupled with the need for Skill Enhancement Courses in the CCLEB/CPIB time frame of officer career progression for the Marines in these new occupational fields, provides a clear

path for improving the educational experience for OIE Marines at NPS. The outdated curriculum for future 8834s continues to exist in its current form because the Marine Corps requires 8834 Marines in its Authorized Strength Report. The only manner in which Marines can obtain the 8834 FMOS is through the curriculum previously described. By removing the 8834 FMOS from the Marine Corps' Authorized Strength Report, or allowing the creation of the FMOS by taking a new curriculum at NPS designed for 17XX Marines which aligns with the goals of 'NPS Next,' is a move which makes educational and budgetary sense. The bureaucratic constraints which preserve the 8834 curriculum are a direct affront to the necessity for innovation for which this thesis argues.

Total Force Training and Education

The challenge of total force training and education is exacerbated by the absence of Marine Corps doctrinal and training standards for OIE. The Marine Corps should prioritize its establishment of its conceptual framework and standardized training for Information Maneuver. As the first 17XX Marines begin to reach the fleet in 2023, the training and readiness guidance expected for any Marine Corps occupational fields should be available for Information Maneuver as well.

The standardization of Marine Corps expectations for OIE is essential to ensuring that the total force understands training expectations and standards to maintain a proficient force in Information Operations. The publication of Marine Corps Training and Warfighting Publications, as well as the subsequent Training & Readiness Manuals, is an important step to enable total force education. MCCREE evaluations and Mission Essential Task List development for units (particularly ones that possess 17XX Marines) should include evaluations on core OIE skills in the future. These skills include deception and influence operations, electromagnetic signature management, and cyberspace capabilities. The development of training standards for OIE within the Marine Corps is the next step to professionalize and further refine skills within the field.

Greater Integration of Language Considerations into OIE

The need for language skills to conduct effective influence operations and interact with multi-national partners is important, yet the MIG and OIE community do not place a

premium on language skills. There is ample evidence that inclusion of language specialists would improve information operations capabilities. Additionally, Marines that enter Skill Enhancement Courses knowing the geographic locations they will be responsible for in future billets have the Defense Language Institute at their disposal. The inclusion of language capabilities, and improved identification of Marines with specific language skills that can benefit specific missions and geographic stations, could greatly benefit OIE proficiency.

The difficulty of training Marines in languages they do not know prior to joining the Marine Corps is a considerable training and budgetary hurdle for the Marine Corps. As such, in some instances the Marine Corps may not be able to source its language experts in the MIG from active-duty Marines. As such, in some cases in the future the use of external language experts via civilian contracts could also increase the operational effectiveness of MIGs operating in areas with foreign languages.

Greater Integration with Other Services and OIE Professionals

Joint training and increased multilateral cooperation in OIE will improve the Marine Corps' ability to stay abreast of developments in the field and expand the network necessary for innovation. More than some other occupational fields, the current dearth of OIE experts within the ranks of the Marine Corps means that interactions with other services and experts in the field could serve as a foundation to frame problem-solving for 17XX Marines in the proper way. Joint training exercises, command visits, and inclusion of OIE Marines in training conducted with multi-national partners are all methods which can improve the training quality for the Information Maneuver field.

Another method to improve integration is educational opportunities with non-Department of Defense entities. The pace of innovation and development in some cyberspace and influence areas in other areas of the government and civilian entities outpaces that of the innovation in OIE conducted by the Marine Corps. Whether through B billeting or Skill Enhancement Course opportunities, providing 17XX Marines with the opportunity to see different approaches to the cyberspace, the electromagnetic spectrum, and influence operations. A CCLEB or CPIB opportunity with the same template as the

Congressional Fellowship Program, where 17XX officers receive education in one of the doctrinal fields of OIE while working in a U.S. government office outside of the USMC, is an example of greater integration and networking in the career progressions of 17XX Marines.

Identification and Selection of OIE Officers

There are currently two military occupational specialties with which a Marine Second Lieutenant enters the Basic School, ground and air contracts. To match the need for the high amount of technical proficiency required by the Marine Corps, special attention should be paid to the 17XX fields during officer selection at The Basic School. There are several possible routes that can be taken in terms of manpower sourcing to better identify and recruit information operations officers.

There is a precedent for certain ground contracts being pre-selected prior to beginning The Basic School. Judge Advocate Generals (JAGs) are pre-identified due to the required legal training and schooling they must undergo to serve as JAGs. While the circumstances are not precisely similar, the level of formal education required to be an expert in the space, cyber, and information operations fields are directly correlated to some undergraduate fields of study. If the Marine Corps were able to offer MOS contracts to individuals that excel in undergraduate studies in programs such as space systems and cybersecurity, a strong base of knowledge could be assured for new 17XX officers entering these fields. This pre-screening and selection could be added for other MOS fields which cater to OIE, such as the Human Intelligence MOS (0211).

B. FUTURE RESEARCH

Research and publication of this thesis coincided with the publication of MARADMIN 102/22, the Establishment of the Information Maneuver 1700 Occupational Field. The concept of professionalizing information maneuver and refining the approach to training and manpower for Marine Corps OIE was the inspiration for the thesis, and the 17XX fielding seeks to accomplish many of the objectives around which the thesis research focused. Due to these concurrent circumstances, this thesis has the potential to serve as a solid foundation for future research on the progress of the 17XX field from an academic

standpoint. Provided below are ideas for future research that could contribute to the forward progress of Marine Corps OIE and the 17XX MOS fields.

Coordination with the office of the Deputy Commandant for Information (DC I) is strongly recommended for any future analysis. Over the course of this thesis, the subject matter experts at DC I, many of whom conducted the analysis and managed the programs to make the 17XX Occupational Field a reality, were immensely helpful. Their knowledge of the subject matter and the challenges the Marine Corps faces in professionalization of the OIE field is unmatched. Additionally, remaining current with Headquarters Marine Corps while conducting this style of thesis research ensures that work done is not redundant or outside of the scope of actionable recommendations.

Revisiting Cybulski and Yarbrow (2019)

As described in the literature review, Cybulski and Yarbrow conducted an evaluation of individuals assigned to OIE billets in the Marine Corps to assess the proficiency of the force. In this thesis, the researchers found gaps in the doctrinal knowledge expected of OIE operators by conducting quantitative analysis of a capability assessment completed voluntarily by individuals in OIE related billets.

By revisiting this thesis and its research methodology, future research could produce a comparable quantitative analysis of Marine Corps OIE once the 17XX billets begin to reach the fleet. A future assessment could be used to compare future performance with that provided by Cybulski and Yarbrow to provide a measuring stick for the progress of OIE expertise within the Marine Corps. The rapid changes to the structure of the MIG and the other commands which expect to receive 17XX Marines in the future will be most likely result in growing pains as commanders seek to best utilize this new occupational field. A thesis in this area of study could provide feedback on the progress of 17XX integration into the operating forces, as well as the efficacy of its training programs.

Assessment of Other Force/Other Nation Operations in the Information Environment

While the focus of this thesis remained narrowly on OIE within the Marine Corps, there are many other areas in the Department of Defense, the United States, and in other

countries that provide valuable lessons learned for Information Maneuver. A comparative analysis of training pipelines, manpower sourcing, educational objectives, and competency is a tool which could provide useful feedback for the Marine Corps, or any other branch of service. The doctrinal approaches of other nations to OIE and how they train are also sources of knowledge for future progress in understanding how to effectively train OIE operators.

Considering the discussions of teamwork in this thesis with respect to the FINCODA model, a comparative study of different approaches to OIE could also yield results to outline how service branches can use training methodologies and schools from other branches, departments of the government, or allied nations to improve training capabilities and the doctrinal requirements of supporting multi-national actions in the information domain.

Doctrine, METL, T&R Task Development

The development of doctrine and subsequent training standards in the Marine Corps is a long and constantly evolving process. It is a lengthy process, which in the case of the 17XX field will be influenced by the experiences of the new 17XX Marines when they enter the fleet around Fiscal Year 2023. A future thesis could study and suggest recommended topics for inclusion in Technical Manuals, MCWPs and MCTPs to align Marine Corps doctrine with the new 17XX field. Similarly, there will be METL conferences, training and readiness standards to develop, and discussions throughout the Marine Corps on how to best employ and train OIE Marines. While CD&I, DC I, and a plethora of other decision makers research to develop the foundations for the doctrinal future of Marine Corps OIE, the perspective of individuals in an academic environment to provide recommendations for the creation of these training documents could be useful for the process. Analysis of the doctrinal approach of other services, other nations, and civilian companies which operate in the information environment all provide tools to support the creation of the 17XX T&R Tasks, warfighting publications, and training events.

Other Methods of Continual Assessment of OIE Goals

There are various research methods by which future analysis of OIE can be conducted. The use of comparative studies with other OIE training programs, surveys such as that discussed in the literature review conducted by Burton, and the application of Operations Research optimization models to assess the efficacy of the training pipeline are all starting points for different methods of assessing Marine Corps OIE in the future.

C. CONCLUSION

The creation of the new 17XX occupational field coincides with an exciting time in the development of information operations capabilities in the Marine Corps. The Corps clearly stated the importance of Information Maneuver with the formation of a new occupational field. There is a great deal of work left to be done to lay a foundation for the future success of 17XX Marines. As the first waves of 17XX Marines enter the fleet in the coming year, there will be many challenges to creating a professional and innovative force that can lead the Marine Corps in Information Maneuver. By prioritizing talent management, identifying and training the appropriate skills to succeed in information operations, and learning from the precedents of other forces that have formalized OIE programs, the Marine Corps can continue to innovate and use OIE to produce a strategic edge on the battlefield.

This thesis provides recommendations that seek to maximize the potential for future innovation and improvement for conducting OIE. The general theme of the recommendations is to adjust training and graduate level schooling to increase professionalization of the force, increase teamwork and networking with sources of knowledge outside of the Marine Corps, and include new fields such as foreign language proficiency as identified requirements for capable OIE units. The cultivation of a motivated, professional group of OIE practitioners is the first step in building a dynamic, innovative occupational field that can benefit the Marine Corps as a whole.

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