THE FIRST STEP: BUILDING A SPECIAL OPERATIONS AVIATION SPECIFIC UNMANNED AIRCRAFT SYSTEM CAPABILITY

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The Army began the testing and development of the unmanned aircraft system (UAS) capability in 1953. Since that point, the UAS has grown exponentially and proven itself as an essential capability on the battlefield in every major conflict since Desert Storm. In 2013, the United States Army Special Operations Command (USASOC) began to employ the first and only Special Operations Aviation (SOA) MQ-1C Gray Eagle UAS unit in the Army. The Army Special Operations Aviation (ARSOA) Gray Eagle unit is organized, trained, and equipped in an almost identical fashion as the conventional force (CF) Gray Eagle units. Conversely, the rotary wing units within ARSOA are organized, trained, and equipped in a very different manner than the CF rotary wing units.
The purpose of this study is to illustrate that capability gaps exist in the domains of organization, training, and equipping of the ARSOA Gray Eagle unit. A comparative analysis of ARSOA rotary wing units in relation to CF rotary wings is used to identify these capability gaps. The study then uses a modified doctrine, organization, training, materiel, leadership and education, personnel, facilities, policy (DOTMLPF-P) analysis and a capabilities-based assessment (CBA) to identify potential materiel and non-materiel solutions.

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ABSTRACT

THE FIRST STEP: BUILDING A SPECIAL OPERATIONS AVIATION SPECIFIC UNMANNED AIRCRAFT SYSTEM CAPABILITY, by Joshua J. Durham, 84 pages.

The Army began the testing and development of the unmanned aircraft system (UAS) capability in 1953. Since that point, the UAS has grown exponentially and proven itself as an essential capability on the battlefield in every major conflict since Desert Storm.

In 2013, the United States Army Special Operations Command (USASOC) began to employ the first and only Special Operations Aviation (SOA) MQ-1C Gray Eagle UAS unit in the Army. The Army Special Operations Aviation (ARSOA) Gray Eagle unit is organized, trained, and equipped in an almost identical fashion as the conventional force (CF) Gray Eagle units. Conversely, the rotary wing units within ARSOA are organized, trained, and equipped in a very different manner than the CF rotary wing units.

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ACRONYMS

ARSOA	Army Special Operations Aviation
CBA	Capabilities-Based Assessment
CF	Conventional Force
DOTMLPF-P	Doctrine, Organization, Materiel, Leadership and Education, Personnel, Facilities, Policy
SOA	Special Operations Aviation
SOF	Special Operations Forces
USASOAC	United States Army Special Operations Aviation Command
USASOC	United States Army Special Operations Command
USSOCOM	United States Special Operations Command
UAS	Unmanned Aircraft System

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CHAPTER 1

INTRODUCTION

Problem Statement

In 2013, Army Special Operations Aviation (ARSOA) began to employ the MQ-1C Gray Eagle Unmanned Aircraft System (UAS), hereafter referred to as Gray Eagle, in support of special operations around the globe. Unlike the rotary wing units within ARSOA, there is not a major difference in the way that the ARSOA Gray Eagle unit is manned, trained, and equipped from that of the Conventional Force (CF) Gray Eagle units. Conversely, the rotary wing units within ARSOA have major differences in the way they are manned, trained, and equipped, in comparison to CF rotary wing units, in order to provide a unique aviation capability in support of Special Operations Aviation (SOA). Therefore, if there currently are no major differences in the way that the ARSOA Gray Eagle unit is manned, trained, and equipped, in comparison to CF Gray Eagle units, then what unique capability does the ARSOA Gray Eagle unit provide SOA? Of note, the terms manning and equipping will be used synonymously throughout this thesis with the terms organization and materiel, respectively.

Background

The concept of unmanned flight was first introduced in 1915, and by 1919 an unmanned aircraft completed a successful engagement on a captured German submarine using gyroscope-guided technology. For the Army specifically, the UAS effort began in 1953, at Fort Huachuca, Arizona, the Army’s first testing and fielding location. By 1979, the Army began its first UAS acquisition program with the Aquila, which completed its operational testing in only 7 of 105 scheduled flights. This led to the Department of

Defense’s first fully operational UAS program, the Pioneer, which successfully sought out SCUD missile systems and high value targets during more than 300 combat missions during Operations Desert Shield and Desert Storm. The Army continued to build its UAS capability and by the time the United States went to war in October 2001, the Army had 54 operational Hunter and Shadow unmanned aircraft in use and that number rapidly grew to over 4,000 unmanned aircraft by 2010 when the Army employed Groups 1-4 types of UAS.

Table 1. Current Systems

UAS Category	Max Gross Takeoff Weight	Normal Operating Altitude (Ft)	Airspeed	Current Army UAS in Operation
Group 1	< 20 pounds	< 1200 above ground level (AGL)	<100 Knots	RQ-11B Raven
Group 2	21-55 pounds	< 3500 AGL	<250 Knots	No current system
Group 3	< 1320 pounds	<18,000 mean sea level (MSL)		RQ-7B Shadow
Group 4	> 1320 pounds		Any Airspeed	MQ-5B, MQ-1C
Group 5		> 18,000 MSL		No current system

Source: Army UAS COE, *UAS Current Systems* (Ft. Rucker, AL. U.S. Army, 2012), 12.

The United States Army has employed the Gray Eagle for more than a decade, but it was not until 2013 that it joined the ranks of ARSOA. In 2013, Company E, 160th Special Operations Aviation Regiment (E/160) stood up as the first and only special operations aviation Gray Eagle company within the Army. Before that time Quick Reaction Capability Companies, made up of different CF UAS units, filled the SOA UAS requirements in both Iraq and Afghanistan. The formation of E/160 brought about an organic, Group 4 UAS capability to the United States Army Special Operations Command (USASOC) to support special operations forces (SOF). A holistic review of ARSOA Gray Eagle operations within SOA has not been written to capture the unique challenges this capability brings with it in terms of manning, training, and equipping. Currently ARSOA UAS is continuing to grow and is fielding a second Gray Eagle company (USA UAS COE 2010, 4-6). Now that the ARSOA Gray Eagle company appears to be a stable and growing capability, it is time to conduct a robust needs analysis to ensure that the unit is properly manned, trained, and equipped, from the SOF end-user perspective and not just utilizing the capabilities driven by CF requirements and analysis.

Primary Research Question

ARSOA does not employ the Gray Eagle like a CF UAS unit. However, the ARSOA Gray Eagle company is manned, trained, and equipped in almost an identical fashion as the CF UAS units. Conversely, the rotary wing ARSOA units are manned, trained, and equipped significantly different from that of rotary wing CF units. ARSOA has specific manning, training, and equipping approaches that enables its rotary wing units to have a unique capability that the CF does not have. This leads to the primary research question: are there organizational (manning), training, and materiel (equipping) capability gaps that are preventing the ARSOA Gray Eagle unit from providing a unique SOA capability? This study will illustrate whether or not the CF force development processes fully exploit the Gray Eagle's capabilities and meet SOF needs. Only by conducting a needs analysis from a SOF perspective can the force development process be reverse-engineered to ensure that ARSOA is fully exploiting the capabilities of their Gray Eagle units.

Primary Research Question

In order to answer the primary question, specific questions must be asked within the DOTMLPF-P domains of organization (manning), training, and materiel (equipping). The secondary questions to be answered in this thesis are:

1. How does ARSOA man, train, and equip their UAS units in comparison to both CF UAS units and rotary wing ARSOA units?
2. Are there capability gaps in terms of manning, training, and equipping of the ARSOA Gray Eagle organization when compared to the rotary wing ARSOA units?
3. What are the potential materiel and non-materiel solutions to the ARSOA Gray Eagle units' domains of manning, training, and equipping, needed to provide a unique capability to SOF?

These secondary questions address specific issues under the DOTMLPF-P domains of organization, training, and materiel. Answering them will help to clearly define and focus the primary research question and this thesis.

Key Assumptions

The author makes two key assumptions in this paper. The first assumption is that the Gray Eagle and the near-term fielding of the MQ-1C Extended Range Gray Eagle UAS are the only Group 4 UAS platforms employed by ARSOA within the foreseeable future. United States Army Special Operations Aviation Command (USASOAC) has other Group 1, 2, and 3 UAS platforms, but for this study, the assumption will remain that the only Group 4 UAS employed by ARSOA is the Gray Eagle company within the 160th Special Operations Aviation Regiment (160th SOAR).

The second assumption is that the selected units used in this study represent their entire community. Specifically, this study used Company B, 3d Battalion, 82d Combat Aviation Brigade (B/3-82) to represent the CF rotary wing community; Company B, 101st Combat Aviation Brigade (B/101) to represent the CF Gray Eagle community;

Company A, 2d Battalion, 160th Special Operations Aviation Regiment (A/2-160) to represent the ARSOA rotary wing community; and Company E, 160th Special Operations Aviation Regiment (E/160) to represent the ARSOA Gray Eagle community.

Definitions and Terms

The Unmanned Aircraft System (UAS) is a complex topic, and coupled with unique aspects of the special operations community, it makes appreciation of the issues identified in this thesis challenging without an understanding of the terms presented. The key terminology in this paper will discuss; the UAS, special operations aviation, general aviation, and key terms for understanding the applied professional case study methodology.

UAS Terms

Unmanned Aircraft System (UAS): The UAS is defined as the unmanned aerial vehicle (UAV), this study will be specifically looking at the MQ-1C Gray Eagle, the ground control station (GCS), and the communications architecture (USA UAS COE 2010, 8-10). This is a key concept to understand since the UAS will commonly be referred to as a UAV, and while the UAV is a component of the overall UAS, it is not the same thing as a UAS. Unlike manned platforms, the UAS requires all the components of the system to be operational, i.e. the UAV, the GCS and the communications architecture, for the UAS to be considered operational.

Unmanned Aircraft Crewmember (UAC): UAS crewmembers will be designated in writing by their unit commander, who will specify the UAS duties and crew stations that the UACs are authorized to occupy (HQDA 2006, 13).

Unmanned Aircraft Operator (AO): The AO controls and/or monitors the actual flight of the UAS from within a GCS or similar device (HQDA 2006, 13).

Mission Payload Operator (PO): The PO is responsible for the operation of the payload sensor (HQDA 2006, 13).

Aircraft Commander (AC): The AC is responsible for control over all flight operations from pre-mission planning through debriefing. The UAS unit commander will designate aircraft commanders in writing. The AC will be responsible and have final authority for operating, servicing, and securing the UAS he or she commands, selected for each flight or series of flights, qualified and current in the UAS mission, type, design, and series (HQDA 2006, 13).

Instructor Operator (IO): The IO will train and evaluate UACs in accordance with the appropriate ATM, IOs must be designated in writing by the unit commander and be qualified and current in the UAS to be flown and must be qualified as an MC and successfully complete a Department of the Army approved IO course (HQDA 2006, 13).

Military Occupational Specialty (MOS): The grouping of duty positions requiring similar qualifications, and the performance of closely related duties (enlisted). It provides the branch, functional area, area of concentration, skill, language identification, and reporting classification used to classify the positions, and to identify individuals qualified to perform in those positions (officer) (DA PAM 611-21 2007, 12).

Additional Skill Identifier (ASI): A two-digit alpha-numeric or numeric-alpha code which identifies specialized skills that are closely related to and in addition to those required by the MOS (DA PAM 611-21 2007, 18).

Enlisted MOS 15W: Unmanned aircraft systems operator.

Remote Split Operations (RSO): Allows operators to fly UASs from stateside locations while smaller in-theater teams control takeoffs and landings. RSO has two elements: a launch and recovery element (LRE) and a mission control element (MCE). The LRE is deployed forward to launch, recover, and conduct maintenance on the UAS. The MCE remains stateside to provide command and control and provides the operators to fly the UAV while on mission.

General Aviation Terms

Pilot (PI): A rated crewmember that is qualified and current in the aircraft mission, type, design, and series (HQDA 2014c, 26).

Pilot-in-Command (PIC): A rated crewmember that is qualified, current, designated Readiness Level (RL) 1 in the aircraft mission, type, design, series, and is the individual responsible and has final authority for operating, servicing, and securing the aircraft he or she pilots (HQDA 2014c, 25).

Unit Trainer (UT): The unit commander may appoint UTs to conduct specialized training to assist in unit training programs. Rated UTs are prohibited from conducting emergency procedures training in the aircraft. UTs are also prohibited from evaluating individual, crew, and maintenance tasks (HQDA 2014c, 26).

Instructor Pilot (IP): The IP will train and evaluate aviators and other personnel in designated aircraft per the aircrew training manual (ATM). To become qualified as an IP, an aviator must be qualified as a PC and must successfully complete an approved Department of the Army instructor pilot course (HQDA 2014c, 27).

Instrument Examiner (IE): The IE will conduct instrument training and instrument flight evaluations per the ATM. To become qualified as an IE, an aviator must be an IP in either aircraft category, and successfully complete a Department of the Army approved course of instruction for IEs (HQDA 2014c, 27).

Readiness Levels (RLs): Aviation commanders use a series of RLs to develop individual and crew proficiencies that support collective tasks. RLs identify the training phase in which aircrew members (ACM) are participating and measure ACM readiness (HQDA 2016a, 51).

Mission Approval Process: The mission approval process for aviation operations is accomplished in three steps that must be completed prior to mission execution. The three steps are: initial mission approval, mission briefing and planning, and final mission approval authority (HQDA 2014c, 9).

Initial Mission Approval: Commanders or their designated representatives (operations officer, S–3, and so forth) determine the mission feasibility and either accept or reject the mission for the command (HQDA 2014c, 9).

Mission Briefing Officer (MBO): The MBO is the Commander or his/her designated representative that interacts with the mission crew or air mission commander to identify, assess, and mitigate risk for the specific mission. Commanders will select MBOs based on their experience, maturity, judgment, and ability to effectively mitigate risk to the aircrew and designates them by name and in writing (HQDA 2014c, 9).

Final Mission Approval Authority (FMAA/MAA): Members of the chain of command who are responsible for accepting risk and approving all aviation operations (ground and air) within their unit. They approve missions for a specific risk level. FMAAs may only approve those missions whose assessed risk level is commensurate with their command level (HQDA 2014c, 9).

Instrument Flight Rules (IFR): Instrument meteorological conditions is an aviation flight category that describes weather conditions that require pilots to fly primarily by reference to instruments, and therefore under instrument flight rules (IFR), rather than by outside visual references under visual flight rules.

Special Operations Aviation Terms

Army Special Operations Aviation (ARSOA): Designated active component forces and units organized, trained, and equipped specifically to conduct air mobility, close combat attack, and other special air operations (ADRP 3-05 2012, 47). Additionally, it is important to understand that Special Operations Aviation (SOA) supports other special operations forces units by planning and conducting special air operations in all operational environments. These specially organized, trained, and equipped aviation units provide the joint force special operations component commander with the capability to infiltrate, resupply, and exfiltrate SOF elements engaged in all special operations core activities (ADRP 3-05 2012, 47).

Battle-Rostering: Battle-rostering is defined as the designation of two or more individuals to routinely perform as a crew (HQDA 2013a, 12-13).

ARSOA Battle-Rostering: In addition to the practice of battle-rostering, individual crew members and SOA crews are further organized based on the level of mission qualification they have achieved. This modification to the aircrew model can be applied across the spectrum of SOA missions, in both training and combat, and provides the commander a clear tool to control risk while retaining mission flexibility and ensuring successful support of the ground force commander’s intent (HQDA 2013a, 12-13).

Basic Mission Qualified (BMQ): BMQ pilots may perform PC or pilot (PI) duties during internal training or perform PI duties on internal/external training (HQDA 2013a, 14-15).

Fully Mission Qualified (FMQ): FMQ pilots may perform PC or PI duties during the conduct of internal and external training; they may also formally train for Flight Lead (FL) during internal training (HQDA 2013a, 14-15).

Flight Lead Qualified (FLQ/FLD): FLQ pilots may perform FL, PC, or PI duties on any internal or external training as assigned. The FLQ is primarily responsible for the planning and execution of SOA missions (HQDA 2013a, 14-15).

Applied Professional Case Study Methodology Terms

The following professional terms are part of the applied professional case study methodology. They are used by the process operators in the force development community to describe the system utilized for developing capabilities routinely and are used in the methodology of this study.

Joint Capabilities Integration and Development System (JCIDS): The JCIDS is one of DOD's three primary decision support processes for shaping the military forces to support strategic guidance documents. JCIDS is a capabilities-based approach to identify current and future capability gaps in the joint force ability to carry out joint warfighting missions and functions. The objective of JCIDS is to develop a balanced and synchronized Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, Facilities, and Policy (DOTMLPF-P) solution (F102RA 2017, 2).

Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, Facilities, and Policy (DOTMLPF-P): This is the process used to develop change recommendations on how to optimize the joint force's ability to operate as an integrated force. The deliberate process is characterized by the traditional route to identifying capability gaps and proposed solutions, through the use of the capabilities-based assessment process (F102RA 2017, 2).

Capabilities-Based Assessment (CBA): An analytic basis to identify capability requirements and associated capability gaps, as part of a process that produces an integrated set of DOTMLPF-P solution approaches that collectively provide the required capabilities (F102RA 2017, 3).

Functional Area Analysis (FAA): The first analytical phase of the CBA and is strictly a capabilities-based task analysis. The FAA provides the framework to assess required capabilities in the follow-on Functional Needs Assessment (FNA). The FAA is based on professional military knowledge of established doctrine and standards that are modified to account for the projected concept for future operations and organizations (F102RA 2017, 21).

Functional Needs Assessment (FNA): This is the second analytic phase in the CBA. It assesses the ability of current and programmed Army capabilities to accomplish the tasks identified in the FAA and identifies any gaps and overlaps in capabilities and the risk posed by those gaps (F102RA 2017, 22).

Functional Solutions Analysis (FSA): The FSA is the third analytic phase in the CBA. It is an operationally based assessment of potential non-materiel DOTMLPF-P and/or materiel approaches to solving or mitigating one or more of the capability needs determined from the FNA. The FSA describes the ability of each identified approach to satisfy the need. Approaches proposed by an FSA must meet three criteria: first, they must be strategically responsive and deliver approaches when and where they are needed; second, they must be feasible with respect to policy, sustainment, personnel limitations, and technological risk; and third, they must be attainable, in that DOD could actually resource and implement the approaches within the timeframe required (F102RA 2017, 22).

The Kotter Change Model: An eight-step process used for leading change within an organization. The model provides a foundational approach, with each stage building upon the success of the previous stage. The first four stages assist in overcoming the existing status quo and set the conditions for leading change. Stages five through seven are the action stages that move the change effort from words to action by introducing new or different practices into the organization. Without successfully completing these three action stages the effort loses momentum, the sense of urgency dissipates, and the coalition becomes marginalized. Kotter's final stage, stage eight, is reached when the changes are inculcated into the culture of the organization; the change becomes the status quo and accepted within the organization (Miller and Turner 2017, 1-3).

Modification Table of Organization and Equipment (MTOE): A table which prescribes in a single document the modification of a basic table of organization and equipment necessary to adapt it to the needs of a specific unit or type of unit (DA PAM 611-21 2007, 14).

Limitations and Delimitations

The most significant limitation of this study will be the inability to publish classified data regarding the ARSOA Gray Eagle unit of study in this thesis. The study may not clearly depict the employment of this unit without being able to annotate its locations around the globe and effects on the battlefield. Specifically, the study will not assess the unit's current deployed locations or operations within those areas due to classification. This is significant, as one major premise of this paper is to accurately illustrate why the ARSOA UAS unit needs to be manned, trained and equipped differently than the CF to provide a unique capability within SOA. Additionally, the study will identify capability gaps and potential materiel and non-materiel solutions to ensure the Gray Eagle provides SOA with a unique UAS capability. Specific DOTMLPF-P domains that will be addressed are the organization, training, and materiel of the unit as it is currently being employed, which will be difficult to articulate without describing the unit's current and past employment due to classification. However, this study will look at all available unclassified sources pertaining to the primary and secondary research questions.

The next limitation is that there is no research, with regards to specific literature, that addresses the employment of the ARSOA Gray Eagle unit, in relation to UAS employment by the CF. This gives no predictive notion to address going into this study. This is significant, as there is no baseline to determine whether or not changes must be made to the unit's manning, training, and equipping to ensure continued success within the special operations community. To mitigate this limitation, the methodology being used will objectively look at the aspects surrounding this gap in literature, to present a non-biased solution to the key stakeholders. The study will also illustrate that a SOF-specific needs analysis must be conducted so that ARSOA Gray Eagle units are not vulnerable to changes in the CF's force development process and to define what future changes might mean for readiness and training.

Another delimitation for this study is that it will only consider the employment of the ARSOA Gray Eagle as beginning with the creation of E/160 in 2013. The study will not include the employment of the Gray Eagle within special operations during the operations of the Quick Reaction Capability Companies, when they supported special operations forces in Iraq and Afghanistan prior to the creation of E/160.

The last delimitation is that in order to illustrate the difference between ARSOA and CF rotary wing capabilities, this study will only look at the difference between the similar ARSOA multi-mission rotary wing, MH-47, and the CF cargo rotary wing, CH-47 units. This comparison will be used to identify any gaps in the manning, training, and equipping of ARSOA Gray Eagle and the CF Gray Eagle units, in comparison to ARSOA and CF rotary wing units. This delimitation will not take away from the credibility of this study as the only other similar units between ARSOA and the CF would be between the ARSOA multi-mission rotary wing, MH-60, and the CF utility rotary wing, UH-60 units.

Significance of Study

The results of this study will identify any capability gaps in the manning, training, and equipping of the ARSOA Gray Eagle unit that may prevent it from providing a unique UAS SOA capability. This will be based on a comparative analysis of the CF Gray Eagle unit, by comparing the similarities and differences between the ARSOA and CF Gray Eagle units. The study will then look to the ARSOA rotary wing units for potential materiel and non-materiel solutions by analyzing the differences in the ARSOA rotary wing units from those of the CF rotary wing units. This is significant because it will not only identify the domains in which capability gaps exist, but will also look to an established SOA unit for potential solutions.

R1: Initial Personal Recommendation

The applied professional case study is a research methodology that incorporates three different assessments throughout the process, R1, R2, and R3. The initial assessment, or R1, is the author's perspective, bias, and assumptions prior to beginning the review of literature. This initial assessment provides a starting point to the research and gives it credibility throughout the rest of the process.

The first part of the R1 discusses the primary research question and why it is important to the author and the key stakeholders within USASOC. The primary research question in this study is: are there organizational, training, and materiel capability gaps that are preventing the ARSOA Gray Eagle unit from providing a unique SOA capability? The author developed this research question after spending approximately 18 months in the only ARSOA Gray Eagle company, E/160, as the executive officer just prior to beginning this study. In addition to those 18 months in E/160, the author spent over 5 years in the 160th SOAR, primarily within the rotary wing units. This experience gave the author an understanding of the Gray Eagle, its role within the 160th SOAR, and the Soldiers who operate and maintain the Gray Eagle. With that understanding, the author believes there are capability gaps that must be addressed for this platform to perform at the same level as the rotary wing units within the 160th SOAR. The author has a vested interest in this study because he will be returning to the 160th SOAR after this study to work with E/160 and believes that it must begin to mirror the ARSOA rotary wing units in terms of manning, training, and equipping, to provide a unique SOA UAS capability to the special operations community.

This study is important because if E/160 is expected to provide the same unique capabilities as the rotary wing units within the 160th SOAR, then the key stakeholders need to look at the capability gaps that E/160 has in terms of manning, training, and equipping when compared to the rotary wing units in the 160th SOAR. The Gray Eagle is still within its first five years of employment within ARSOA, and the earlier that these capability gaps can be identified and addressed, the easier it will be to define the unique UAS capability that E/160 brings to the special operations community. Additionally, a second Gray Eagle company is currently being fielded with an August 2018 activation date. Any changes to the organization, training, and materiel of this new company will be less intrusive if identified and implemented early during the standing up of this new company.

The second part of the R1 addresses why this study is important and the possible consequences if this topic is not addressed. The demand for combat air patrols provided by ARSOA Gray Eagle is going to increase, as evidenced by the fielding of a second Gray Eagle company within the 160th SOAR. Additionally, the Department of Defense (DOD) is continuing to invest in the advancement of the Gray Eagle with the production of the Extended Range (ER) Gray Eagle, which is scheduled to undergo initial operational testing and evaluation (IOT&E) by ARSOA in fiscal year 2018 (FY18). The United States Special Operations Command (USSOCOM) is investing in the advancement of a unique SOA UAS capability and identifying the capability gaps in terms of organization, training, and materiel will ensure that these investments are made to the most critical capability gaps identified in this study. If this analysis is not done and investment is made in areas that do not truly increase the capability provided, the consequence will be that USSOCOM used constrained fiscal resources without equitable payoff.

The final portion of the R1 identifies the potential for a solution to the problem statement, the methodology by which it could be answered, and the author's initial recommended solutions. The author believes that there are potential solutions to the problem statement and that looking to the ARSOA rotary wing units for these solutions should be the starting point. The 160th SOAR has had 36 years to develop and implement unique SOA capabilities. This is in line with the SOF truth that special operations capabilities cannot be mass produced. E/160 is reaching its 5th year of conducting operations as part of the 160th SOAR and the unit needs to start establishing unique SOA UAS capabilities to support special operations with abilities not offered by CF UAS units. Informing key stakeholders of these potential solutions, with a rich description of the environment, will persuade them to make key changes that will ensure this capability is poised to support the unique requirements of special operations.

This problem will require the methodology to use the correct data to determine possible solutions. To determine the potential capability gaps in E/160's manning, training, and equipping, this study will need to look at data that accurately depicts E/160's current organization structure, training process, and equipping. Additionally, this study will look at this same data from ARSOA rotary wing units, CF rotary wing units, and CF Gray Eagle units. After gathering the right data, an applied professional case study will be used,

> Case studies are a useful method for conducting qualitative research for problem areas that are human-centric, dynamic, volatile, and contain a mix of stakeholders, interests, variables and information concepts that demand a deep understanding of context in order to produce informed policy choices" (Creswell, 2009, 2013, 2014; Yin, 2014).

The study will then use a comparative analysis from the data gathered through the case study and use a modified DOTMLPF-P Capabilities Based Assessment (CBA) to determine the results. A CBA is appropriate since it is a structured three phased process that identifies and documents capability gaps; determines the attributes of a capability or combination of capabilities that would resolve the gaps; and identifies non-materiel as well as materiel approaches for possible solutions. By conducting the applied professional case study and then analyzing it using the CBA, we get the functional solution analysis (FSA). This will identify a resolution, and will look to potential DOTMLPF-P approaches, recommendations, and solutions to mitigate or eliminate the capability gaps and will produce suggestions to implement ideas for non-materiel DOTMLPF-P approaches; and ideas for materiel approaches.

Conclusion

Since its inception in 2013, the ARSOA Gray Eagle unit has enabled special operations across the globe with phenomenal results. This success brought an increased demand within ARSOA which led to the current fielding of another MQ-1C Gray Eagle company within ARSOA. This chapter discussed the background, the problem, and the process by which this study will be conducted. The next chapter will analyze the literature used for this study.

CHAPTER 2

LITERATURE REVIEW

Introduction

The purpose of this research is to gain a rich understanding of the unique capabilities required by the ARSOA Gray Eagle unit to meet special operations specific requirements, and to persuade the Chief Decision Maker (CDM) and key stakeholders to affect change. The literature is primarily from the Department of Defense (DOD) and other federal agencies because the purpose of this study is to persuade key stakeholders within the DOD. By primarily using the professional body of knowledge, it tailors the information and makes it credible to the target audience. This remains in line with the research methodology as a professional applied case study.

The specific areas that will be addressed in this chapter are the manning, training, and equipping of the unit and whether it is specifically designed to support special operations in the same manner as the rotary wing ARSOA units.

Key Literature

The following graph depicts the literature reviewed in this study and how each piece of literature specifically applies to the different aspects of this paper.

Table 2. Literature Analysis

	Organization	Training	Materiel	Primary	Secondary 1	Secondary 2	Secondary 3
USAR 2035	X	X	X	X			X
USIR 2038	X	X	X	X			X
MQ-1C SAR	X		X	X	X		
3255.01		X		X	X		
TC 3-04.63		X		X	X		
TC 3-04.11		X		X	X		
ARSOA TC 3-04.11		X		X	X	X	X
TC 3-04.34		X		X	X		
ARSOA ATM		X		X	X	X	X
MH-47G -10			X	X	X	X	X
CH-47F -10			X	X	X		
AR 95-23	X	X		X			
AR 95-1	X	X		X			
USAFM	X		X	X	X	X	
MQ-1C -10		X	X	X	X	X	
USASOC 2035 ARSOF 2022	X	X	X	X			X

Source: Created by author.

The *United States Army Roadmap for UAS 2010-2035* is the Army's vision to develop, organize, employ, and build a comprehensive strategy for defining future UAS requirements. This publication breaks down this strategy into the time periods of near (2010-2015), mid (2016-2025), and far (2026-2035). Through these different time frames, the document focuses on issues such as identifying current gaps in capabilities, integrating UAS into other Army operations such as networking and cargo capabilities, and increasing the overall capability of the UAS while reducing its size, power, and weight requirements. This roadmap is reviewed every two years, but a new edition has not been published since this initial document. While the document is over seven years out of date, it still provides a good assessment as to whether or not the Army is on the right track to meet its intended goals.

This reference applies to this study as it addresses both the primary and secondary research questions of this thesis. Specifically, it describes the UAS in terms of manning, training, and equipping, and it breaks down the assessment into the DOTMLPF-P domains, which falls directly in line with the methodology used in this study. Additionally, this document discusses the challenges with UAS operations within the NAS and addresses many other issues with the employment of the UAS, which may fall outside the scope of this study, but are still necessary to consider.

The *Unmanned Systems Integrated Roadmap FY2013-2038* is a document intended to "articulate a vision and strategy for the continued development, production, test, training, operation, and sustainment of unmanned systems technology across DoD." It looks at both current and future capabilities in a 25-year window to address where UAS is now, and to develop a strategy to determine where it should go. While this document does not specifically address special operations, it does identify with many of the same gaps in capabilities that could be used within special operations as well as with CFs. Additionally, it addresses the manning, training, and equipping aspects of this thesis.

Much like the *United States Army Roadmap for UAS 2010-2035*, this document discusses UAS operations in terms of near, mid, and far time frames. Unlike the *United States Army Roadmap for UAS 2010-2035*, this publication is not solely focused on the Army UAS program but on the Department of Defense as a whole, which gives this document a more strategic aim. Specifically, the *Unmanned Systems Integrated Roadmap*

FY 2013-2038 discusses strategic planning and policy, combatant commander mission and capability needs, technologies for unmanned systems, operating environment, sustainment and logistics, training, and international cooperation.

Of the topics discussed in this thesis, *The Unmanned Systems Integrated Roadmap FY 2013-2038* addresses the equipping aspect in the most detail. For example, it addresses several types of munitions that could improve the capabilities of the MQ-1C Gray Eagle aerial vehicle. One of which is the Direct Attack Guided Rocket (DAGR). The DAGR is a 2.75-inch laser guided rocket that is fully compatible with the current Hellfire system. This new munition would potentially allow the MQ-1C Gray Eagle to carry up to four times as much payload as its current configuration. Additionally, this document extensively describes the communications architecture and potential use of existing networks, specifically the Defense Information Systems Network (DISN) and the teleport standard tactical entry point (STEP) sites. The ability to plug into these global networks and gain access to satellite coverage around the globe would provide an increased capability for ARSOA UAS in terms of its operational reach. *The Unmanned Systems Integrated Roadmap FY 2013-2038* provides a great deal of information from very specific aircraft-defining characteristics to broad strategic level policy. It provides insight to many of the topics discussed in this thesis and other aspects within the UAS community.

The *MQ-1C Gray Eagle Selected Acquisition Report (SAR),* as of the FY2017 President's budget, discusses several topics relevant to this study. First, it discusses the proposed employment design of Gray Eagle units in terms of organization. Specifically, it addresses how the unit is intended to operate and why it is organized the way that it is. In support of United States Army Divisions, the UAS company is part of the combat aviation brigade (CAB); in support of Intelligence Command (INSCOM), it is part of the 116th Military Intelligence Brigade, and in support of USASOC it is part of the 160th SOAR. Within each of these organizations, the UAS company is broken down into three identical platoons, giving the commander extreme flexibility to employ this asset. This document explains that the intent of the UAS company's structure from inception was for each platoon to be able to operate independently at three geographically dispersed locations.

The Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 3255.01- Joint Unmanned Aircraft System Minimum Training Standards document provides the basis for joint unmanned aircraft system minimum training standards and identifies the training requirements for UAS crewmembers to operate in support of a joint force commander. It breaks the requirements down into three categories: Basic UAS Qualification (possessing the general aviation and UAS knowledge to safely operate a UAS), possessing the skills required to both operate the UAS and maintain situational awareness to execute tasks, and Joint Mission Qualification (understanding the UAS mission/objective and its role in accomplishing the larger military operation). This document directly applies to this thesis as it is essentially a contract between the Department of Defense and the FAA, establishing the minimum training requirements that a UAS operator must possess to operate in the NAS.

The *TC 3-04.63 MQ–1C Unmanned Aircraft System Commander's Aircrew Training Program and Aircrew Training Manual* applies to Gray Eagle crewmembers and their commanders. The purpose of this document is to standardize aircrew training programs and flight evaluation procedures by providing specific guidelines for executing UAS aircrew training. This training circular outlines both the individual and collective training requirements for crewmembers in order to advise the commander on an effective aircrew training program that supports combined arms training. Of note, the *MQ–1C Unmanned Aircraft System Commander's Aircrew Training Program and Aircrew Training Manual* is combined into one document to cover both the Gray Eagle specific aircrew training program and the commander's aircrew training program for individual, crew, and collective training. While the Commander's Aviation Training and Standardization Program incorporates the UAS, it admittedly states that the UAS integration is still developing and needs refinement, which makes the *MQ–1C Unmanned Aircraft System Commander's Aircrew Training Program and Aircrew Training Manual* publication the most relevant document to Gray Eagle operations. This is significant because this study will examine the corresponding CF and ARSOA rotary wing publications as part of the analysis for this thesis. For those elements, there are two distinct publications, an airframe specific aircrew training manual and a general aviation commander's aircrew training program for individual, crew, and collective training. Additionally, it is important to note that the CF and ARSOA Gray Eagle units both use this same document.

The aircrew training program outlined in this publication applies to crewmembers that perform duties controlling the flight of a UAV or the operation of its mission equipment. This includes starting the engine, takeoff and/or landing the UAV and consists of qualification, refresher, mission, and continuation training. It outlines the requirements for qualification in the Gray Eagle, criteria for readiness level progression, flight activity category designation, flight hour/currency requirements and annual task and iteration requirements. This publication also outlines the testing and evaluating requirements for crewmembers during a proficiency flight evaluation, annual proficiency and readiness evaluation, and other crewmember proficiency based testing.

In summary, this document contains the necessary guidance for a Gray Eagle company commander to execute the aircrew training program that covers everything from individual to collective unit training. Additionally, this document is the aircrew training manual for the Gray Eagle and is the basis for the crewmember's training from the individual to collective training levels.

The *TC 3-04.11 Commander's Aviation Training and Standardization Program* is the commander's guidance for implementing a standardized aviation training program. It applies to all individuals flying Army aircraft and for the purposes of this study, it directly applies to CH-47F and Gray Eagle crewmembers. It does not apply to ARSOA MH-47G crewmembers, as ARSOA has its own publication for the execution of the commander's aircrew training program.

This publication focuses on the implementation of an effective, standardized aircrew training program that supports the mission of the combat aviation brigade. It outlines the individual responsibilities in executing the training program from the brigade commander down to the individual crewmember. Like the aircrew training manuals, it addresses individual qualification, currency, and flight hour requirements, but these are not the focus. In contrast to an aircrew training manual, the focus of this document is to serve as a guideline to all Army aircraft as a holistic approach to Army aviation training and standardization. For example, it specifically addresses aircrew training plan management, doctrinal training concepts, unit collective training requirements, and the implementation of the Army standardization program.

The *ARSOA TC 3-04.11 Commander's Aircrew Training Program for Individual, Crew, and Collective Training* is the keystone publication that establishes the requirements for commanders at all levels to develop, manage, and administer a comprehensive aircrew training program. In the context of this study, this publication applies directly to the ARSOA MH-47G crewmembers, but does not address ARSOA Gray Eagle crewmembers.

This reference covers much of the same material as the *TC 3-04.11 Commander's Aviation Training and Standardization Program*, but applies only to ARSOA crewmembers. This publication addresses the responsibilities of the 160th SOAR Commander down to the individual crewmember, aircrew training program administration, risk management, training and evaluation requirements, and standardization for aviation records. The most important element of this publication, with regards to this study, is that it addresses how ARSOA battle rosters their crews in terms of PI, PC, BMQ, FMQ, and FLD designations. This is an important distinction as the *TC 3-04.11 Commander's Aviation Training and Standardization Program* also addresses crew battle rostering but only in terms of PI/AO and PC/AC designations. This distinction will be addressed in chapter four, but it is important to note that while the ARSOA MH-47G crewmembers have additional crewmember designations of BMQ, FMQ, and FLD, the ARSOA Gray Eagle crewmembers only have the designations of AO and AC. *The ARSOA TC 3-04.11 Commander's Aircrew Training Program for Individual Crew, and Collective Training* specifies the type of crew mix (PI, PC, BMQ, FMQ, FLD) required for different mission sets (internal training, external training, administrative support, and tactical).

The *TC 3-04.34 Aircrew Training Manual, Cargo Rotary wing, CH-47D/F* applies to all CH-47 crewmembers and their commanders in the active Army, the Army National Guard Bureau/United States Army National Guard, the United States Army Reserve, and provides specific guidelines for executing CH-47D/F aircrew training. This publication is the basis for crewmember qualification training, refresher training, mission training, and continuation training and evaluation requirements.

This reference is used in conjunction with the *TC 3-04.11 Commander's Aviation Training and Standardization Program* publication to help commanders and crewmembers execute the aviation training program. The main difference is that the *TC 3-04.34 Aircrew Training Manual, Cargo Rotary wing, CH-47D/F*, provides the performance standards and evaluation guidelines for every individual/mission/collective task, so that crewmembers know the level of performance expected. It is the primary tool used by commanders and standardization officers to implement the aircrew training program. This manual is intended to support the unit's mission essential task list by enhancing training in individual and aircrew proficiency.

The *ARSOA Aircrew Training Program Aircrew Training Manual Multi-Mission Rotary wing MH-47*, much like the *TC 3-04.34 Aircrew Training Manual, Cargo Rotary wing, CH-47D/F*, is the basis for crewmember qualification training, refresher training, mission training, and continuation training and evaluation requirements. It applies to all MH-47 crewmembers, their commanders, and standardization officers. It is used in conjunction with the *ARSOA TC 3-04.11 Commander's Aircrew Training Program for*

Individual Crew, and Collective Training and other applicable publications to aid both the individual and commander in developing an effective and standardized aircrew training program for the unit. It establishes the task, conditions, and standards for all individual and collective tasks for employment of the MH-47 aircraft. Specific to this study, the *ARSOA TC 3-04.11 Commander's Aircrew Training Program for Individual Crew, and Collective Training* outlines specific special operations aviation tasks that are not listed in the CF *TC 3-04.34 Aircrew Training Manual, Cargo Rotary wing, CH-47D/F*. These tasks provide additional capabilities to the special operations community that the CF cargo rotary wing, CH-47D/F, units cannot provide.

After reviewing the applicable aircrew training documents for the ARSOA and CF units used in this study, the following discussion on aircrew training progression and crewmember designations is necessary to understand the results of this study described in chapter four. This discussion will begin with describing the aircrew training program, which is almost identical for manned and unmanned airframes, and will conclude with aircrew member designations that distinguish the ARSOA process from the CF process, and is a key point to understand for this study.

Readiness levels (RLs) are used by aviation commanders to determine the proficiency of crewmembers in their base, mission, and additional tasks. RLs are designated progression points that range from RL1 to RL3, with RL3 being the designation for a crewmember focusing on base tasks, to a mission ready crewmember with an RL1 designation (HQDA 2016a, 51). Base tasks, or 1000 series tasks, are made up of individual tasks or maneuvers that a crewmember is expected to be able to perform, both in and out of the airframe. An example of a base task for a CH-47F rated crewmember would be to perform hovering flight, task #1038 (HQDA 2013b, 101). Once the crewmember demonstrates proficiency in all base tasks listed in that airframes applicable aircrew training manual, they are designated RL2. During RL2 training, the crewmember must demonstrate proficiency in all mission and additional tasks (or 2000 series and 3000 series tasks, respectively) that support the unit's mission essential task list, as assigned by that crewmember's aircrew training program commander. An example of a mission task for a Gray Eagle operator would be to operate synthetic aperture radar, task #2305 (HQDA 2014b, 200). Once a crewmember completes all RL2 training requirements, they are designated RL1.

Once a crewmember is designated RL1, they continue their flight training through continuation training which has different requirements based on that crewmembers Flight Activity Category (FAC). FAC levels are designated by the brigade level commander and are based on flight task requirements and the proficiency required by the individual crewmember's MTOE or TDA position. FAC levels are broken down into FAC 1 through FAC 3. A FAC 1 position requires a high degree of proficiency in the tactical employment of the assigned airframe. A FAC 2 position requires the same proficiency in individual and crew tasks as a FAC 1 position but does not necessarily require the same collective proficiency in unit tasks. FAC 3 positions are not authorized to perform crewmember duties in their assigned airframes but must complete applicable simulator hour requirements, if a compatible simulator is available. Each FAC level has a corresponding semi-annual flight hour requirement, that is considered the continuation training as previously discussed (HQDA 2016a, 66-67). For example, an RL1, FAC 1, MH-47G rated crewmember has a semi-annual flight hour requirement of 60 hours, 30 of which must be completed using night vision goggles. An RL1, FAC 2, MH-47G rated crewmember has a semi-annual flight hour requirement of 33 hours, 18 of which must be completed using night vision goggles (HQDA 2013a, 47; ATM 2014, 19). In addition to semi-annual flight hour requirements, crewmembers have an annual requirement to complete an annual proficiency and readiness test (APART). The APART is conducted each year during a crewmember's APART window which is based on their birth month. The APART is slightly different for each airframe, but it essentially consists of a hands-on evaluation, a written evaluation, and a flight physical (DD Form 2992, Medical Recommendation for Flying Duty) (HQDA 2016a, 71).

Crewmembers have an obligation to complete applicable RL progression and continuation training but are also required to progress in their crewmember designation. In the Gray Eagle community, UAS crewmembers (UACs) have the following designations; unmanned aircraft operator (AO), mission payload operator, (PO), aircraft commander (AC), unit trainer (UT), instructor operator (IO), standardization instructor operator (SO), and mission commander (MC). Upon successful completion of a Department of the Army approved Gray Eagle qualification course and designation in writing from the aircrew training program commander, UACs begin their aviation careers with the designation as an AO, and a PO.

An AO is responsible to control the flight of an UAS or the operation of its mission equipment and remain tactically and technically proficient as an UAC. The individual operator should have the ultimate goal of achieving AC status (HQDA 2016a, 51). An AC has the same requirements as an AO, but additionally they are responsible for the overall safety of the UAV, be proficient in the UAV and all aspects of the unit mission essential task list, the conduct of all operational and training aspects of a specific mission, all actions of the crew, assigning duties to the crew, and for accomplishing the assigned missions.

From there, the UAC looks to progress to a UT, who has all the responsibilities of an AC but is additionally responsible to instruct in appropriate tasks and subjects, recognize errors in performance or understanding, make recommendations for improvement, train to standards, and document training (HQDA 2014b, 24-32). After designation as a UT, and with input and concurrence of the command level leadership, a UT will attend an approved Department of the Army Gray Eagle Instructor Operator (IO) course to undergo training. Of note, a UAC does not have to be designated as a UT to be sent to the IO course, this just represents a normal progression for a UAC from initial assignment to designation as an IO.

After successful completion of the IO course and designation in writing from the aircrew training program commander, that UAC is designated as an IO. The IO has all the requirements of a UT and is the unit's primary trainer and evaluator of all UACs. The SO is the final aircrew designation for a UAC. Normally, an IO will train for multiple years before being recommended by the command to be designated as an SO. After designation in writing by an aircrew training program commander, an IO is authorized to perform SO duties. An SO has all the responsibilities of an IO and primarily trains and evaluates the unit's IO. Additionally, an SO is the primary advisor to the commander on all aspects of the unit's aircrew training program (HQDA 2006, 14).

The CH-47F and MH-47G rated aviators used in this study have the following aircrew designations; Pilot (PI), Pilot in Command (PC), Unit Trainer (UT), Instructor

Pilot (IP), Instrument Examiner or Instrument Flight Examiner (IE or IFE), and Standardization Instructor Pilot (SP). Of note, rated aviators have other aircrew designations, but those are not applicable for the purposes of this study (HQDA 2014c, 27).

Upon successful completion of a Department of an Army approved qualification course, and designation in writing by the ATP commander, new rated aviators begin their aviation career with the designation as a PI. A PI has the responsibility to remain tactically and technically proficient in all aircrew member tasks as dictated by the applicable aircraft training manual. PIs should take advantage of every training opportunity with the goal of attaining designation as a PC.

After demonstrating proficiency in all required aircraft tasks, successfully completing a PC evaluation in accordance with applicable publications, displaying proper judgement and maturity, and being designated in writing by the ATP commander, a rated aviator is then designated as a PC. A PC has all the responsibilities as a PI, but is additionally responsible to ensure the overall safe and effective operation of the aircraft, to serve as the unit's first-level trainer, be proficient in the aircraft and all aspects of the unit's collective tasks. The PC is responsible for the safety of all occupants, and the conduct of all operational and training aspects of a specific mission, responsible for all actions of the crew, responsible for assigning duties to the crew, and responsible for accomplishing assigned missions (HQDA 2014c, 26).

At this point in the aircrew progression process, it is important to note several significant differences between rotary wing pilots and UAS operators. First, the Army's rotary wing pilots are primarily warrant officers and the Army's UAS operators are primarily enlisted soldiers and non-commissioned officers. To be clear, there are also commissioned officers that are rated aviators and there are warrant officers that are UAS operators, but for the purposes of this study, they are not included in the discussion. The next significant difference is that warrant officers track different career paths during their professional careers. Unlike UAS operators, a warrant officer's progression to IP is dependent upon the career path they decide to track. For example, a warrant officer may decide that they would like to track safety to become an aviation safety officer and because of that, they would never achieve an aircrew designation as an IP. There are a few warrant officers that track multiple career paths, but it is not the norm. In contrast, UAS operators do not have multiple career track options like warrant officers and because of this each UAS operator should strive to progress to IO.

For comparison in this study, a warrant officer who decides to career track IP would look to progress to the designation of a UT after achieving PC status. A UT has the same responsibilities as a PC; but in addition, a UT has demonstrated the ability to train other pilots and focuses primarily on RL 2 and RL 1 progression training. At some point in the warrant officer's career and service as a UT, they will attend a Department of the Army instructor pilot qualification course resulting in designation as a unit IP by the ATP commander. IPs have the same responsibilities as a PC, but in addition, they serve as the primary instructors and evaluators for the unit. Normally after a few years as an IP, the command will determine whether or not to give an IP an SP evaluation based on their performance as an IP. After successfully completing an SP evaluation in accordance with applicable publications and a designation in writing by the ATP commander, an IP is designated as an SP. An SP has all the responsibilities of an IP but SPs are also primarily responsible for the training and evaluation of IPs, and serve as the primary advisor to the commander on all matters pertaining to the unit's ATP.

The final aircrew designation for this study is the designation as an IE or IFE. There is not a correlating designation within the UAS community but it is still relevant for the purpose of this study. The reason is that the Gray Eagle is not rated for IFR flight, and because of that, there is no need to designate UACs as IEs. To be designated as an IE, an aircrew member must already be designated as an IP and successfully complete a Department of the Army approved IE qualification course and be designated in writing by the ATP commander. An IE has the primary responsibility to administer instrument flight evaluations within the unit. The designation as an IE is not airframe specific like the other aircrew designations; for example, an IE whose primary aircraft is a CH-47 can give an instrument evaluation to an aviator whose primary aircraft is a UH-60 (HQDA 2014c, 27).

An understanding of the aircrew member training, progression, and aircrew designation processes of both the manned and unmanned platforms discussed in this study is essential to gain an understanding of the unique ARSOA mission qualification and battle-rostering process discussed in the next section.

ARSOA rotary wing units use a unique battle-rostering process that is based on mission qualification. This process is unique to ARSOA and is not used by CFs rotary wing units, B/101, or by E/160, that is key to note for the purposes of this study. The intent of this unique battle-rostering process is to ensure successful accomplishment with the minimum amount of risk to the force and to the SOA mission. ARSOA has the following mission qualification designations; basic mission qualified (BMQ), fully mission qualified (FMQ), and flight lead qualified (FLD). Once a rated crewmember successfully completes the special operations basic mission qualification course conducted by the 160th Special Operations Aviation Training Battalion, that crewmember is designated as an RL 1, PI, BMQ, and assigned to an operational company within the 160th SOAR. The rated crewmember then conducts mission training with the goal of achieving FMQ designation. After extensive training and successful completion of an FMQ evaluation and designation in writing by the ATP commander, that crewmember is designated as an FMQ. The final mission qualification is that of FLD. Significant to this study, the FLD qualification usually takes many years to achieve, and is a designation that not every rated crewmember in the 160th SOAR will achieve. It illustrates mastery of all SOA required mission sets and the highest degree of tactical and technical proficiency. After many years of extensive training, successful completion of a FLD evaluation, and designation in writing by the 160th SOAR Commander, that crewmember is designated as a FLD. These mission qualifications are used to determine the right battle-rostering based on mission requirements.

The *Technical Manual Operator's Manual for the MH-47G, TM 1-1520-272-10-1* provides complete operating instructions and procedures for the multi-mission rotary wing, MH-47G. Specifically, it covers aircraft and systems description and operation, avionics, mission equipment, operating limits and restrictions, weight/balance and loading, performance data, normal procedures, and emergency procedures for the MH-47G.

The *Operator's Manual for the CH-47F, TM 1-1520-271-10-1* provides complete operating instructions and procedures for the cargo rotary wing, CH-47F. Specifically, it covers aircraft and systems description and operation, avionics, mission equipment, operating limits and restrictions, weight/balance and loading, performance data, normal procedures, and emergency procedures for the CH-47F.

The *Operator's Manual for the MQ-1C Unmanned Aircraft System, TM DTM 1-1550-697-10-1*, provides complete operating instructions and procedures for the unmanned aircraft system, MQ-1C. Specifically, it covers aircraft and systems description and operation, avionics, mission equipment, operating limits and restrictions, weight/balance and loading, performance data, normal procedures, and emergency procedures for the MQ-1C.

The *Unmanned Aircraft System Flight Regulations, AR 95-23*, much like the *TC 3-04.11 Commander's Aviation Training and Standardization Program*, provides guidance on UAS crewmember training, risk management, currency requirements, training and standardization. In addition, this regulation also covers flight rules, UAS general provisions, and management of UAS resources. It is not specific to the Gray Eagle, but applies to all categories of UAS employed by the United States Army active duty/reserve/national guard units and supporting civilian contractors.

Flight Regulations, AR 95-1, covers the same topics and is applicable to the same organizations as the *Unmanned Aircraft System Flight Regulations, AR 95-23*, but while it is applicable to UAS, it is not specific to UAS and does not address UAS specific policy. The only UAS specific guidance in this publication is guidance that addresses the recovery operations associated with unmanned aircraft. For the purposes of this study, *Flight Regulations, AR 95-1*, applies directly to the CH-47 and MH-47 units used for this thesis.

The United States Army Force Management Support Agency (USAFMSA) provides online access to the *Force Management System* website that provides extensive information on how Army units are manned and equipped. For this study, the website was used to access the Modification Table of Organization and Equipment (MTOE) for the Army units used in this study: Company B, 3d Battalion, 82d Combat Aviation Brigade (CF CH-47F unit); Company A, 2d Battalion, 160th Special Operations Aviation Regiment (ARSOA MH-47G unit); Company B, 101st Aviation Regiment (CF MQ-1C unit); and Company E, 160th Special Operations Aviation Regiment (ARSOA MQ-1C unit).

An MTOE is an authorization document that prescribes the modification of a basic Table of Organization and Equipment (TOE). It is a document that prescribes the wartime mission, capabilities, organizational structure, and mission essential personnel and equipment requirements for military units, and adjusts it as necessary to adapt it to the needs of a specific unit or type of unit. For example, the MTOE for an MQ-1C Gray Eagle company shows how many personnel, by grade, and how many airframes, by type, would be required for a company to conduct its wartime mission. For the purposes of this thesis, the different MTOE documents for each of the units being analyzed in this study clearly depicts the differences and similarities between the CF and ARSOA units.

The documents *USASOC Strategy 2035* and *ARSOF 2022* provide guidance for the development of future ARSOF operational and institutional capabilities. For the purposes of this study, these two documents were used to form the basis by which the Chief Decision Maker (CDM) for this study would evaluate the proposed results of this thesis, through the R3: Stakeholder Recommended Solution.

Conclusion

The review of the cited literature primarily from the military's professional body of knowledge offers insight into the primary and secondary research questions, and also establishes the foundation for the remainder of this thesis. Additionally, this review of literature was conducted in line with the research methodology, using sources from the professional body of knowledge, applicable to the CDM. The next chapter, Chapter 3, will outline the research methodology for this study.

CHAPTER 3

RESEARCH METHODOLOGY

Purpose of the Research and the Research Questions

The purpose of this study is to persuade the Chief Decision Maker (CDM), the commander of USASOC, that the proposed solutions to E/160's manning, training, and equipping capability gaps, would enable E/160 to provide a unique UAS capability to special operations. The main concerns of the CDM are to obtain next generation unmanned aircraft systems that provide longer operational range and over horizon observation; can be launched and recovered by tactical units; and employ advanced unmanned aircraft systems and intelligence collection capabilities at the tactical level. This includes the concern to provide joint force commanders with professionals who are agile, adaptive, flexible, bold, innovative, and possess a high degree of advanced training; provide the nation with premier special operations forces; and deliver appropriate and effective capabilities to joint force commanders and interagency leaders across the entire spectrum of conflict under any operating conditions. The CDM must broaden the range of special operations aviation-related individual training and education including unmanned aerial systems; and improve army unmanned aerial-system programs of record (Raven, Shadow and Gray Eagle) to meet joint expeditionary tactics, techniques, procedures, forward-based networking and sensor requirements (HQDA 2014a, 24; ARSOF 2035 2017, 3-6).

In order to implement the findings from this research, the CDM would have to utilize the Army Joint Capabilities Integration Development System (JCIDS), the Defense Acquisition System (DAS), and the Planning, Programming, Budgeting, and

Execution (PPBE) process to develop new solutions to the organization, training, and equipping of USASOC Gray Eagle units (F102Ra 2017, 2). The USASOAC Commander, the 160th SOAR Regimental Commander and the 160th SOAR Battalion Commanders are the other stakeholders who will be influenced by the changes to the units' organization, training, and equipping and who will also be the ones to implement these changes. Additionally, the research findings would have to be in line with current national strategic guidance to include the National Security Strategy (NSS), the National Defense Strategy (NDS), and the National Military Strategy (NMS). The CDM's primary evaluation criteria to assess the results of this research will be based on these available resources: the NSS, the NDS, and the NMS.

In order to answer the primary research question, three secondary questions were developed: (1) How does ARSOA man, train, and equip their UAS units in comparison to both CFs UAS units, and rotary wing ARSOA units? (2) Are there capability gaps in terms of manning, training, and equipping of the ARSOA Gray Eagle organization when compared to the rotary wing ARSOA units? (3) What are the potential materiel and non-materiel solutions to the ARSOA Gray Eagle units' domains of manning, training, and equipping, needed to provide a unique capability to SOF?

To answer these questions, the author conducted a comparative analysis of the literature within the professional body of knowledge dealing with the organization, training, and equipping of ARSOA UAS and rotary wing units, and CF UAS and rotary wing units. The professional body of knowledge primarily included training manuals, technical manuals, Army and Joint Publications, MTOE documents, and Army regulations. This literature illustrated how the units used in this study were organized, trained and equipped. The units were then compared and contrasted to determine capability gaps within the ARSOA Gray Eagle unit. These capability gaps were based on capabilities provided by ARSOA rotary wing units that their CF counterparts were unable to provide. The same analysis was then done with the ARSOA and CF UAS units to determine whether or not ARSOA UAS provided additional capabilities like those provided by the ARSOA rotary wings units.

Research Methodology

The author used an applied professional case study methodology for the study. The applied professional case study is a method of research which is systematic, disciplined, multi-perspective, critical, and designed to both solve a problem and incorporate a research perspective. This case study will inform decision making through the rich description of the environment and recommend a policy by persuasion, reason, and evidence (Long 2016).

This research is an applied professional case study with a modified DOTMLPF-P analysis utilizing a capabilities-based assessment (CBA) to determine potential materiel and non-materiel solutions. The modified DOTMLPF-P analysis utilized the organization, training, and materiel (OTM) domains. The CBA used the professional body of knowledge in the literature review to identify capability gaps and propose material and non-material solutions. The figure and paragraphs below describe the five-chapter format used for this applied professional case study.

Table 3. Research Methodology Flow Chart

Starting Position	Review of Literature		Informed Position	Potential Solutions	Stakeholder Position	Recommended Solution
R1	Aviation Resources	Aircrew Training	R2	Modified DOTMLPF Analysis	R3	Chapter 5
		Commander's Guide				
		Airframe Manuals				
		Army Regulations				
	Unit MTOEs					
	Unit SOPs					
	UAS Roadmap			Capabilities Based Assessment		
	DoD UAS Policy					
	ARSOF 2022-2035					
	Remote Split Operations					

Source: Created by author.

In Chapter 1, the initial going-in position is captured through the first assessment in the three-part reflective process of the professional applied case study. The R1 assessment, or the initial, personal disposition on the subject is captured in this chapter. This assessment establishes the author's perspective going in and gives credibility to the research by defining what the author knew and felt about the topic prior to conducting the research, as well as establishing any pre-conceived biases going into the literature review.

In Chapter 2, the focus is to review literature from the professional body of knowledge that is both relevant to addressing the research question, and credible to the key stakeholders that the author is trying to persuade. The majority of literature for this research will come from sources within the DOD. These sources of information give the research instant credibility as they come from recognized, credible sources within the same community as the stakeholders the author is trying to persuade.

Chapter 3 describes how the study takes the "raw material" from the literature review and compares the manning, training, and equipping of the ARSOA Gray Eagle unit against ARSOA rotary wing units and CF UAS and rotary wing units. Once the relevant information is broken down and categorized, the study is able to conduct a CBA, focused on a modified DOTMLPF-P analysis, only utilizing the domains of organization, training, and materiel. This process will produce the results necessary to publish the findings in the next chapter.

In Chapter 4, after conducting an objective review of the literature and analyzing the relevant data, the author is able to complete the second assessment, R2. In contrast to the initial assessment, R1 in Chapter 1, the R2 assessment is an updated personal recommendation based on the author's review of the literature (Long 2016).

In Chapter 5, the study makes the final assessment, R3, that are the results from Chapter 4 examined through the lens of the pre-identified CDM and stakeholders that the study is trying to persuade. After the R3, the study takes these findings and uses the Kotter Change Model to address their implementation. Within this process, the research will also identify any new requirements that emerged as a result of the findings. Lastly, the study will address any lessons learned throughout the process. This personal reflection will also address any significant findings throughout the research that fell outside the scope of the research, but are areas that may be worth addressing in a future study.

Conclusion

This chapter provided the background and description of the applied professional case study used to answer the primary and secondary research questions. The benefit of using an applied professional case study as the methodology for this study is that it is a qualitative, complex, and human-centric topic, and it requires a deep understanding of the environment to produce informed decision-making. Specifically, this methodology results in compelling and supported recommendations through the process of organizing and analyzing different types of knowledge/information in a defined setting to enable informed action to improve the current conditions. In the case of this thesis, the research will result in recommendations to enhance the manning, training and equipping of the Gray Eagle company within special operations (Hancock and Algozzine 2011; Gagnon 2010). The next chapter contains the findings of the data collected within this study.

CHAPTER 4

RESEARCH FINDINGS

Introduction

The purpose of this chapter is to explain the findings of the research and to apply those findings to the applied professional case study methodology. The chapter will be broken down into three parts: the DOTMLPF-P type analysis focused on the domains of organization, materiel, training, and using the capabilities based assessment with the results expressed in the terms of a functional area analysis (FAA), functional needs analysis (FNA), and a functional solutions analysis (FSA); the R2 assessment; and a key stakeholder analysis resulting in the final assessment, R3.

Organization (Manning), Training, Materiel (Equipping) Analysis

The following table depicts the domains of organization, training, and materiel of the components that makeup the CBA, which are functional area analysis, functional needs analysis, and a functional solutions analysis.

Table 4. Organization (Manning), Training, Materiel (Equipping) Analysis

	ORGANIZATION	TRAINING	MATERIEL
FAA (Needs)	• Task- Provide C2 for ARSOA UAS employment IAW unit MTOE • Condition- Three simultaneous missions in separate locations • Standard- IAW ARSOA detachment C2 requirements	• Task- Provide specially selected, highly trained, ARSOA 15W operators to support special operations forces • Condition- In support of SOA missions requiring a unique skill or capability to complete. • Standard- IAW ARSOA TC 3-04.11 battle rostering requirements	• Task- Provide a UAS platform with a unique capability to support SOA • Condition- ISO SOA missions conducted outside of current MQ-1C Grey Eagle UAS capabilities • Standard- To support mission sets IAW ARSOA MTOE narrative
FNA (Gaps and Risks)	• Gap- CW4 MTOE allocation as C2 node for 3x separate locations (CONUS/OCONUS) does not meet ARSOA C2 requirements • Risk- UAS detachments in austere locations operating without commissioned, company grade C2	• Gap- ARSOA 15W operators do not have an ARSOA specific training plan or battle rostering process. • Risk- ARSOA 15W operators do not provide a unique skill or capability to support SOA.	• Gap- ARSOA MQ-1C Grey Eagle UAS platform does not provide a unique or additional capability to SOA • Risk- ARSOA MQ-1C Grey Eagle UAS unit unable to support unique SOA missions
FSA (Solution Approaches)	• Non-materiel- Increase O3 MTOE billets to 5x O3 to support C2 requirements for up to 3x simultaneous missions in separate locations • Materiel- Conduct UAS operations through use of RSO with a central MCE	• Non-materiel- Implement a BMQ, FMQ, FLD training equivalent to the ARSOA 15W operator training process.	• Materiel- Modification of MQ-1C Grey Eagle UAS to support expeditionary operations.

Source: Created by author.

Organization (Manning) Analysis

The first FAA on E/160's organization used the unit's MTOE narrative as the basis to determine the task and condition for this analysis. The MTOE narrative states that this unit has the task of supporting up to three simultaneous missions. This narrative also defines the conditions of the task by stating that the unit must be able to support these three simultaneous missions in three separate locations. In order to meet this requirement, E/160 is configured to deploy one CW4 and one E7 as the command and control node for each of the three separate locations. To determine the ARSOA command and control requirements for detached elements conducting operations, this study used a comparative analysis of the MTOE and MTOE narratives from the ARSOA rotary wing company, A/2-160, against the MTOE of E/160. The MTOE narrative for 2-160, which is the battalion that A/2-160 falls under, states that the battalion is not designed to deploy as a whole battalion, but rather as slice elements as part of a Joint Task Force, or as part of a Joint Special Operations Air Component. It also states that the battalion is responsible to provide up to five mission command nodes to simultaneously support split geographic locations. To support this requirement, the MTOE of 2-160 has six commissioned officers, one major and 5 captains, assigned to each rotary wing flight company. E/160's MTOE only has two commissioned officers, one major and one captain. This analysis was used to establish the criteria for commissioned officers in the grade of captain or above and was the standard for geographically dispersed detachment command and control requirements. Additionally, the majority of the battalions in the 160th SOAR mirror the MTOE of 2-160, which reinforced the standard used during the FAA. Importantly, the personal experience of the author attests that CW4s do not serve in a command and control capacity within the 160th SOAR at geographically dispersed locations.

The FNA took the analysis from the FAA to determine any potential capability gaps in the organization of the unit. The first premise that determined the gap in the organization of E/160 was the MTOE comparative analysis. The ARSOA rotary wing companies are manned with an appropriate amount of commissioned officers in the rank of O3 and above to support the detachment command and control requirement as stated in their MTOE narrative. E/160 is manned with CW4s to fulfill their command and control requirement for three geographically dispersed missions. This analysis concludes that the 160th SOAR requires commissioned officers in the rank of O3 and above to act as the command and control elements of geographically dispersed detachments, and identifies a gap in E/160's organization, as E/160 is not able to organically support three geographically dispersed missions with an O3 or above as the command and control element.

This capability gap results in operational risk because it does not give E/160 the organic capability to conduct three geographically dispersed mission sets with a command and control element that meets the requirements of the 160th SOAR. Additionally, this presents risk in the mission approval process for aviation operations at geographically dispersed locations. The final portion of the aviation mission approval process requires the signatures of a mission briefing officer (MBO) and a final mission approval authority (FMAA). The FMAA is the individual that assumes the overall risk of the mission, and assuming risk is primarily the responsibility of commanders in the grade of O3 and above. A CW4 can have FMAA, but it is not the normal process for aviation operations and for that reason it is not included in this analysis of the risk.

The FSA identified a materiel and non-materiel solution to this capability gap. The non-materiel solution would re-allocate MTOE personnel billets of existing human resources in order to fill this capability gap and ensure no increase to the current E/160 MTOE of 165 personnel. The proposed solution would change the five CW4 personnel billets on E/160's MTOE to the grade of O3. This would change paragraph number 102, line number 01, UAS OPERATIONS OFFICER and paragraph number 105, line number 01, UAS PLATOON LEADER, from CW4 allocated billets to O3 billets, which would add five additional O3s to E/160's MTOE. This change would align E/160's MTOE to mirror the rotary wing companies' MTOEs that have six O3 MTOE billets each. This solution would enable E/160 to organically provide a command and control element with an O3 or above to support three geographically dispersed locations at a 1:2 deployment ratio.

The proposed materiel solution to this capability gap would be for E/160 to conduct remote split operations (RSO). RSO would solve this capability gap by providing a central mission control element (MCE) at E/160's home station to provide command and control of three geographically dispersed locations. E/160 would have two commissioned officers in the grade of O3 and above to provide command and control of three launch and recovery elements (LRE) at three geographically dispersed locations. This is a materiel solution because it would require an investment to the current communications architecture in order for E/160 to conduct RSO.

The second FAA on E/160's organization used Army doctrine, *ADRP 3-05 Special Operations,* and Joint doctrine, *JP 3-05 Special Operations,* to establish the task for this analysis. Of note, the author did not include this second analysis in the table at the beginning of this chapter because while the following analysis is relevant and identified a follow-on research question in chapter five, it did not make it past the author's updated individual recommendation and would not be brought before the CDM in the R3. These guiding doctrinal references state that in order to be a special operations unit, the unit must be specially organized, trained, and equipped. The FAA task in terms of organization is that E/160 must have more senior and experienced 15W Gray Eagle operators. Army and Joint doctrine also provide the condition for this analysis, that E/160 must be able to provide special operations forces with a unique capability in terms of employment, tactics, techniques, procedures, and equipment. An increase in the grade of

15Ws assigned to E/160 would provide this unique capability, differentiating E/160 from conventional MQ-1C Gray Eagle units. To determine the standard for the FAA, this study used an MTOE comparative analysis of ARSOA rotary wings units to CF rotary wing units and compared them to ARSOA Gray Eagle in relation to CF Gray Eagle formations. This established the standard set for this study. The graphs below illustrate that airframe operators, in this case MH-47/CH-47 pilots and MQ-1C Gray Eagle 15W operators, are more senior in ARSOA rotary wings units compared to CF rotary wing units, but that is not the case for ARSOA Gray Eagle operators.

The number of personnel must be taken into account when viewing this graph since the ARSOA units have a higher overall number of personnel assigned than the CF units.

Table 5. Operator and Pilot Analysis

MQ-1C OPERATORS BY GRADE	E/160TH SOAR	B/101ST ABN
E-7	4	3
E-6	8	6
E-5	16	9
E-4	24	16

H-47 PILOTS BY GRADE	A/2-160TH SOAR	B/3-82ND
W4	8	0
W3	13	3
W2	0	17

Source: Created by author.

The A/2-160's MTOE total is 139 personnel, compared to B/3-82's MTOE of 52 personnel, and E/160's MTOE total of 165 personnel, compared to B/101's MTOE of

127 personnel. Even with the overall MTOE number taken into account, it is clear that A/2-160 has more senior pilots than B/3-82. A/2-160 has no CW2s assigned while the majority of pilots assigned to B/3-82 are made up of CW2s. Conversely, B/3-82 has zero CW4s assigned while A/2-160 has eight. When looking at the MTOEs of E/160 and B/101, the same differences are not evident. When the difference in overall MTOE personnel assigned is taken into account, the operators by grade are essentially the same for E/160 and B/101. Since the overall majority of ARSOA has MTOEs that mirror A/2-160, this analysis determined that the standard for ARSOA is to have more senior pilots and operators than the CF counterparts.

The FNA took the analysis from the FAA to determine any potential capability gaps in the organization of the unit. The first premise that determined this gap in E/160's organization was the MTOE comparative analysis. The ARSOA rotary wing companies are manned with pilots of a higher grade than the CF rotary wing units. This comparison illustrated a gap in E/160's capability because when compared to the MTOE of B/101, the operator by grade, is essentially the same. This is a capability gap, because E/160 is not specially manned to support special operations, as compared to ARSOA units.

This capability gap results in operational risk by not providing a unique capability in terms of organization to special operations because E/160 does not have more senior Gray Eagle operators than CF Gray Eagle units. Part of ARSOA's ability to provide a unique aviation capability to special operations is by manning the rotary wing units with more senior pilots to conduct ARSOA missions. ARSOA mitigates risk and is able to conduct operations that CFs are unable to accomplish, in part, because ARSOA has deliberately organized its rotary wing units with senior grade pilots. E/160 does not have this same organization, which increases the risk of conducting unique missions in support of special operations.

The FSA used the analysis of the ARSOA rotary wing unit, A/2-160, presented in this study, as the basis for the recommended materiel solution. The materiel solution would be to increase MTOE billets of the enlisted Gray Eagle 15W operators in the grades of E5, E6, and E7. This solution would not add additional personnel to E/160's overall personnel count of 165, but would take those billets from the E4 15W billets. This change is in line with the organization of A/2-160, as that unit's pilot billets have no CW2s, and only have MTOE billets in the grade of CW3 and above. The increase of E5, E6, and E7 15W MTOE billets would increase the overall experience level of 15W operators to match the capabilities provided by ARSOA rotary wing units. Additionally, increasing E7 15W MTOE billets within E/160 will enable experienced operators to remain within the unit, increasing the unit's capability. Currently, E/160 only has four E7 15W MTOE billets, as UAS PLATOON SERGEANTS, that focuses those E7 15W operators on the leadership and administrative requirements of the platoon. In comparison, A/2-160 has CW4 MTOE billets at the platoon level as SR IP/IFE, which is a position that focuses on the tactical employment of the MH-47G. This analysis illustrates that ARSOA rotary wing units have MTOE billets that enable their most experienced pilots to remain at the platoon level that adds a unique capability in terms of organization and manning, that the CF does not. This materiel solution to E/160's manning would enable them to provide the same capability as the ARSOA rotary wing units.

Training Analysis

The FAA on E/160's training also used Army doctrine, *ADRP 3-05 Special Operations,* and Joint doctrine, *JP 3-05 Special Operations,* to establish the condition for analysis focused on distinctive capabilities required of special operations forces. This study used the unique ARSOA mission battle-rostering requirements in accordance with *ARSOA 3-04.11* as the basis for the standard in the FAA. This standard determined that battle-rostering within special operations aviation is unique and ensures the ground force commander has support by providing a clear tool to control risk while retaining mission flexibility. ARSOA accomplishes this through its unique battle-rostering, which organizes crews by mission qualification.

The FNA took the analysis from the FAA to determine potential capability gaps in unit training. The analysis determined that E/160 does not have an ARSOA specific mission training process for 15W Gray Eagle operators. The ARSOA rotary wings units have a unique training and battle-rostering process that uses the aircrew mission designations of BMQ, FMQ, and FLD to provide a unique, special operations specific, capability. E/160 uses the same battle-rostering process as conventional Gray Eagle units and does not have unique, special operations aviation specific aircrew designation of BMQ, FMQ, and FLD. This study used this analysis to define this as a training capability gap within E/160.

The risk associated with this capability gap is that there is an expectation from supported special operations forces that ARSOA provides a unique Gray Eagle capability, and part of that expectation involves uniquely trained 15W operators. This expectation is determined by both the doctrinal definition of a special operations unit and by the precedent set by ARSOA rotary wing over the past 36 years. ARSOA rotary wing units use their unique battle-rostering process to reduce risk for the ground force commander during aviation operations. Without a unique, mission tailored battle-rostering process, E/160 cannot provide the same risk reduction capability to the ground force commander that the ARSOA rotary wing units provide.

The FSA used the unique ARSOA rotary wing mission training process as the basis for this solution. The proposed non-materiel solution to this capability gap would be for E/160 to implement an ARSOA specific 15W operator training and mission battle-rostering process that mirrors the ARSOA rotary wing units. This would include adding additional aircrew designations, like BMQ, FMQ, and FLD, to the unit's aircrew training programs that would enable E/160 to battle-roster their crews to tailor specific mission requirements. This would enable E/160 to provide a unique special operations Gray Eagle capability to the ground force commander that would enable them to control risk while retaining mission flexibility.

Materiel (Equipping) Analysis

The FAA related to materiel (equipping) also used Army doctrine, *ADRP 3-05 Special Operations,* and Joint doctrine, *JP 3-05 Special Operations,* to establish the task for analysis focused on distinctive capabilities required of special operations forces. To define the standard for the FAA, this study used a comparative analysis of the airframe operator's manuals from the different units included in this study. This comparison illustrated that the ARSOA rotary wing unit, A/2-160, has a modified version of the CF Army CH-47F Chinook, heavy lift rotary wing. A/2-160 employs the MH-47G Chinook, a heavy assault rotary wing which provides special operations forces with a unique piece of equipment that provides additional capability to special operations. For example, the

MH-47G has an in-flight refuel capability that provides special operations forces with a long-range infiltration capability not provided by the CF's CH-47F. When this same comparison is made between the ARSOA and CFs Gray Eagle units, there is no specialized equipment that enables E/160 to provide an additional capability to special operations forces. The Gray Eagle employed by E/160 is identical to the one employed by the CF Gray Eagle unit, B/101. Given the results of this comparison, this study then used the MTOE narrative of the ARSOA rotary wing units to define the standard that states the unit has unique equipment, tailored to support specific mission profiles.

The FNA used the analysis from the FAA to determine any potential capability gaps in the equipping of the unit. The analysis determined that E/160 does not have equipment that provides a unique capability to the ground force commander like the ARSOA rotary wing units. To further define the possible equipment capability gaps, this study used three unique capabilities provided by ARSOA rotary wing units in comparison to CF's rotary wing units. These capabilities are extended range, advanced aircraft survivability equipment, and advanced onboard radar allowing rotary wing operations in degraded environmental conditions. These equipment capabilities provide a unique capability to support the ground force commander over those that exist within the conventional forces (CF). This illustrates an equipment capability gap for E/160, because their equipment does not provide a unique capability in comparison to the CF Gray Eagle units.

The risk associated with the identified equipment capability gap is that E/160, in terms of UAS support, does not offer the ground force commander a unique capability to execute missions that are outside of the CF's Gray Eagle capability. Special operations require a unique equipment capability because they are often conducted in denied or hostile environments, under unfavorable weather and environmental conditions, and require real time intelligence. As an intelligence, surveillance, and reconnaissance platform in support of special operations, E/160 has to have a unique capability that can operate in conditions that exceed the ability of those found in the CF units.

The FSA used the unique capabilities provided by the ARSOA rotary wing units as the basis for this solution. The proposed materiel solution would be for ARSOA to invest in research and development to modify the Gray Eagle to provide a unique UAV platform capability specifically designed to support the special operations community. The specific modifications should be the focus of a follow-on study; however, based on the author's operational experience, the author would recommend two potential materiel solutions to the current Gray Eagle company equipment resources to enhance its ability to support special operations. First, the engineers should reduce the size of the ground control station, satellite and ground data terminals, and secondly, they should reduce the total amount of ground support equipment required to operate the Gray Eagle to improve the company's expeditionary capability.

R2: The Updated Individual Recommendation

The R2: Updated Individual Recommendation is composed of the same questions that were answered in the R1: Initial Personal Recommendation. The difference is that these same questions will be answered after conducting the literature review. This illustrates the changes in opinion and recommendation after completing a review of the relevant literature. The R2 provides credibility to the applied professional case study methodology by demonstrating to the reader the changes in perception by the author after completing the literature review. The R2: Updated Individual Recommendation will only address significant changes from the R1: Initial Personal Recommendation.

The first part of the R2 discusses the primary research question and why it is important to the author and the key stakeholders within the United States Army Special Operations Command (USASOC). When this research effort was initiated the primary research question in this study was framed as: how should United States Special Operations Command adapt manning, training, and equipping of the ARSOA Gray Eagle unit to provide the unique capabilities required by the special operations community? Joint and Army doctrine both define special operations as activities requiring unique capabilities not provided by the CF. Doctrine also affirms that special operations forces must be specially organized, trained, and equipped to provide this unique capability (ADRP 3-05, 2012; JCS 2011). After analyzing the similarities and differences of a CF Gray Eagle company to an ARSOA Gray Eagle company and comparing them to the similarities and differences between a CF rotary wing company and an ARSOA rotary wing company, it is evident that there are gaps in capabilities provided by the ARSOA Gray Eagle company. Specifically, the manned ARSOA rotary wing company analyzed in this study provides unique special operations capabilities because it is specifically manned, trained, and equipped differently than the CF rotary wing company analyzed in this study. However, the same cannot be said about the ARSOA MQ-1C Gray Eagle company in comparison to the CF MQ-1C Gray Eagle company. This new knowledge and understanding led the author to update the primary research question to: are there organizational (manning), training, and materiel (equipping) capability gaps that are preventing the ARSOA Gray Eagle unit from providing a unique special operations aviation capability?

During the course of this study, the author was informed that upon completion of the Command and General Staff College, he would be taking command of the newly fielded ARSOA Gray Eagle company, Company F, 160th Special Operations Aviation Regiment, scheduled to officially activate in August of 2018. In turn, this made the author a stakeholder in this research at the tactical level and more invested than at the beginning. The review of literature also defined the stakeholders' position and established the basis that the CDM will evaluate this study through the R3: Stakeholder Recommended Solution, presented in the final assessment.

The second part of the R2 addresses why this study is important and the possible consequences if this topic is not addressed. The new ARSOA Gray Eagle company, F/160, is scheduled to activate in August 2018 and results in the fielding of two ARSOA Gray Eagle companies within a five-year period. This highlights the importance that the DOD is placing on the development of UAS within ARSOA. The review of literature confirmed the author's initial position and opinion that the UAS capability provided to special operations aviation must provide a unique capability not provided by the CF Gray Eagle units. Additionally, the earlier that these gaps can be identified and validated by the CDM, the earlier the solutions can be implemented.

The final portion of the R2 identifies the potential solutions to the problem statement identified through the review of literature. The review of literature identified gaps within the manning, training, and equipping of the ARSOA Gray Eagle company. The primary sources of data for this study were DOD publications. The MTOE documents for the four units used in this study provided a clear comparison of the CF and ARSOA Gray Eagle companies in relation to the ARSOA and CF rotary wing companies. This analysis provided evidence to support a capability gap in the manning of the ARSOA MQ-1C Gray Eagle company. The MTOE narrative and aircrew training publications provided the necessary information to compare and contrast the training requirements and processes within the different ARSOA and CF companies used in this study. This provided insight on gaps within the training domain of the ARSOA Gray Eagle company. Lastly, by comparing airframe specific technical manuals, it was evident that there was no unique equipping capability provided by the ARSOA Gray Eagle company in comparison to the CF's UAS company. In contrast, by comparing the airframe specific technical manuals of the ARSOA and CFs rotary wing companies, ARSOA aircraft provided a unique equipping capability when compared to the CF's. By identifying these gaps and the risks associated with them, the potential materiel and non-materiel solutions for each were identified and explained earlier in this chapter.

R3: Stakeholder Recommended Solution

To determine the R3: Stakeholder Recommended Solution, the author evaluated the R2 through the lens of the Chief Decision Maker (CDM) and the stakeholders. The CDM for this applied professional case study is the Commander of the United States Army Special Operations Command (USASOC), the stakeholders include the 160th SOAR Regimental Commander, and to a smaller extent, the 160th SOAR Battalion Commanders. The USASOC Commander was chosen as the CDM as opposed to the Commander of United States Special Operations Command (USSOCOM) because the purpose of this applied professional case study is to persuade the CDM in order to affect change. The USSOCOM Commander already employs Group 4 UAS within the other services, but this study is specific to employment of the Gray Eagle within ARSOA, which is focused on the Army and its mission of unified land operations, "to apply land power as part of unified action to defeat an enemy on land and establish conditions that achieve the JFC's commander's end state" (FM 3-0 2017, 34; USSOCOM Fact Book 2017, 49). This means that the USASOC Commander must be persuaded that the ARSOA Gray Eagle needs to provide a unique UAS capability to enhance ARSOA before these potential solutions are presented to the USSOCOM Commander.

ARSOF 2022 and *USASOC Strategy-2035* comprised the literature used as the basis for the CDM's concerns. Additionally, the concerns presented were compared to the 2018 USSOCOM Posture Statement made by the Commander, General Raymond A. Thomas, on February 15, 2018 before the House Armed Services Committee, to ensure that these concerns are nested within the next higher echelon of command. The main concerns of the CDM were to:

- Obtain next generation unmanned aircraft systems that provide longer operational range, over horizon observation, and can be launched and recovered by tactical units;
- Employ advanced unmanned aircraft systems and intelligence collection capabilities at the tactical level; provide joint force commanders with professionals who are agile, adaptive, flexible, bold, innovative, and possess a high degree of advanced training;
- Provide the nation's premier special operations forces, delivering appropriate and effective capabilities to joint force commanders and interagency leaders across the entire spectrum of conflict and under any operating conditions;
- Broaden the range of special operations aviation-related individual training and education including unmanned aircraft systems; and
- Improve army unmanned aircraft system programs of record (Raven, Shadow and Gray Eagle) to meet joint expeditionary tactics, techniques, procedures, forward-

based networking, and sensor requirements (HQDA 2014a, 24; ARSOF 2035 2017, 3-6).

The first part of the R3 will discuss the primary research question and why it is important to the CDM, the Commander of United States Army Special Operations Command (USSOCOM). The primary research question for this study is: are there organizational (manning), training, and materiel (equipping) capability gaps that are preventing the ARSOA Gray Eagle unit from providing a unique special operations aviation capability? The primary research question in this study is directly in line with the CDM's position because it specifically addresses the objectives for improved UAS capabilities within special operations as defined in *ARSOF 2022* and *USASOC Strategy-2035*. However, the CDM would disagree with the premise that E/160 does not provide a unique special operations aviation capability. The CDM would argue that the unique capability provided by E/160 is that it is manned and equipped to support three geographically dispersed mission sets simultaneously, as stated in the MTOE narrative, "this unit was specifically designed to meet SOA requirements for multiple simultaneous deployments to widely separated areas." From a manning perspective this is clearly evidenced by E/160's MTOE total of 165 personnel, compared to B/101's MTOE of 127 personnel. However, from an equipping perspective, both E/160 and B/101 are supplied with the same amount of equipment that makes up the UAS company; 12 x unmanned aerial vehicles (UAVs), 6 x ground control stations (GCSs), 6 x ground data terminals, and 3 x satellite ground data terminals. E/160 is equipped with slightly more ground support equipment, specific to the UAS, and has three additional generators. This means that from a purely equipment perspective, B/101 could support three geographically dispersed mission sets simultaneously, just like E/160.

The second part of the R3 addresses why this study is important and the possible consequences if this topic is not addressed. In contrast to the author, the CDM would have to take into account competing resources when reviewing the results of this study. The CDM is responsible for a much bigger organization than what the author addresses in the R2, meaning that this study would have to persuade him to believe that the capability gaps addressed in this study outweigh other requirements in the USASOC enterprise. This would make the consequences to the CDM very different than the consequences stated by the author, while acknowledging that the CDM may face other consequences in the USASOC enterprise by electing to use valuable resources to pursue any of these proposed materiel solutions.

The final portion of the R3 takes the recommended solutions from this study and filters them through the lens of the CDM. The first organizational (manning) capability gap identified in this study was the lack of commissioned, company grade and above officers to perform the command and control requirement for three geographically dispersed mission sets. The two recommended solutions to this capability gap were to conduct RSO or to increase the O3 MTOE billets to six. The CDM views RSO as a viable option for ARSOA to employ its Gray Eagle assets. The author's personal operational experience attests that DOD conducted a study into RSO for ARSOA, but due to classification cannot disclose the findings or implications for future ARSOA employment.

The second recommended solution, to increase O3 MTOE billets, would not be accepted by the CDM for two reasons. First, this solution does not address any of the CDM's chief concerns. Second, it would not be feasible with respect to personnel limitations within ARSOA. Additionally, E/160 is attached to 2d Battalion, 160th SOAR, that the CDM would argue has the ability to support E/160 with its O3 command and control requirements to support three simultaneous, geographically dispersed missions. The second organizational (manning) gap addressed by the author was the need to increase the 15W MTOE billets of E5, E6, E7, and to reduce the number of E4s. The CDM would not approve this solution because it does not fall within his main concerns. The CDM is concerned with broadening the range of special operations aviation-related individual training and education including unmanned aerial systems, and would invest in that as opposed to the additional cost of increasing the rank structure of the 15Ws.

The training capability gap addressed in this study is that E/160 does not have an ARSOA specific mission training process for 15W Gray Eagle operators. The proposed non-materiel solution to this capability gap would be for E/160 to implement an ARSOA specific 15W operator training and mission battle-rostering process that mirrors the ARSOA rotary wing units. The CDM would approve this proposed solution because it meets all the criteria of an FSA, is non-materiel, and is in-line with his concern of broadening the range of special operations aviation-related individual training and education including unmanned aerial systems.

The materiel capability gap addressed in this study is that E/160 is not equipped to provide a unique ARSOA UAS capability. The proposed materiel solution would be for ARSOA to invest in research and development to modify the Gray Eagle to provide a unique aviation capability. The author recommended a modification to the Gray Eagle that increases its expeditionary capability by reducing the physical size of the ground control station, and satellite and ground data terminals as well as reducing the total amount of ground support equipment required to operate the Gray Eagle. The CDM would agree with the author's recommendation to conduct research and development into the modification of the Gray Eagle to increase its expeditionary capability. This recommendation is in-line with the CDM's concern of improving Army unmanned aircraft-system programs of record (Raven, Shadow and Gray Eagle) to meet joint expeditionary tactics, techniques, procedures, forward-based networking, and sensor requirements.

Conclusion

This chapter explained the findings of the research and applied those findings to the applied professional case study methodology. The modified DOTMLPF-P analysis provided recommended solutions to the CDM through the use of a CBA. These proposed solutions were then vetted by the CDM, through the final assessment, the R3. The next chapter, Chapter 5, will address the final recommendations of this study.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

Recommended Solutions

This section will discuss the implementation plan for the two recommended solutions proposed by this study. The implementation plan is broken down into short term (one to two years) and long term (three to five years) time frames and will use the principles of the Kotter Change Model for implementation. The two proposed solutions are a direct result of the author's professional operational experience in ARSOA, extensive literature review based in the professional body of knowledge that exists for this topic, and the analysis of that knowledge through the use of the applied professional case study methodology.

The United States Army is an organization that is not always willing to acknowledge and embrace the need for change. There are many ways to accomplish change within an organization and one that is both appropriate for this study and used in Army doctrine is the Kotter Change Model, hereafter referred to as the Kotter Model. This model uses the following eight-step process to affect change within an organization.

The first step in the Kotter Model is to establish a sense of urgency. This is done by creating a climate within the organization that is dissatisfied with the status quo by setting aggressive goals and objectives that force the organization to make significant change and overcome complacency.

The second step is to create the guiding coalition. After establishing a sense of urgency, a group of senior, influential, and respected individuals within the organization that support and are fully committed to implementing the change must be formed to propel the change forward.

The third step is to develop a vision and a strategy. Once the guiding coalition is formed, that group is used to develop a feasible vision and strategy that is imaginable, desirable, feasible, focused, flexible, communicable, provides an imaginable picture of the future, a shared sense of purpose, focuses efforts, aligns priorities, and sparks excitement for members of the organization.

The fourth step is to communicate the change vision. This is one of the most important stages within the process. Simply creating a vision and strategy to affect change accomplishes nothing unless the entire organization knows what the vision is and why it is so important for the organization to undertake.

The fifth step is to empower broad-based action. This involves empowering subordinate leaders that are committed to the change, potentially removing leaders that oppose it, creating an environment of decentralized control, and developing a shared understanding with mutual trust.

The sixth step is to generate short term wins. These accomplishments enable the organization to see tangible results toward accomplishing the desired change, which in some cases could take years to complete. Identifying and rewarding these short term gains helps to maintain the momentum of the change effort.

The seventh step is to consolidate gains and produce more change. Consolidating the effects garnished from the short terms wins will open the change initiative to other areas within the organization that were not evident at the start of the change process.

Identifying these other changes and capitalizing on them during the process is essential to preventing regression while maintaining the momentum for further change.

The eighth and final step is to anchor the new approach into the culture. Kotter defines culture as, “norms of behavior and shared values among a group of people”. This final step is vital as it is the point where the organization as a whole, believes that the new process is the way the organization now does business and ensures the practice remains even if the current leadership at the time of the change, switches out (Miller and Turner 2017, 1-8)

The proposed solution identified for short term implementation (one to two years) is to implement an ARSOA-specific 15W operator training and mission battle-rostering process that mirrors the ARSOA rotary wing units. This change to the training domain of ARSOA Gray Eagle units would be a fairly simple change to make. This is because the process for this type of training plan is already in place for the ARSOA rotary wing units. This is a mission specific training program and could theoretically be implemented with minimal increase to the individual operator required flight hours. Affecting this change would not necessarily have to be approved by the Chief Decision Maker (CDM), but could be implemented by the other stakeholders, most likely by the 160th SOAR Commander. Additionally, because this is a non-materiel solution, it is very realistic for short term implementation. This proposed solution was recommended because it is nested within the main concerns of the CDM, as stated in *ARSOF 2022* and *USASOC Strategy-2035*, that include: (1) provide joint force commanders with professionals who are agile, adaptive, flexible, bold, innovative, and possess a high degree of advanced training, and

(2) broaden the range of special operations aviation-related individual training and education including unmanned aircraft systems.

Using the principles of the Kotter Model, the author recommends the following short term implementation plan for the proposed change to the training domain of the ARSOA Gray Eagle units. It is once again important to note that the author will be taking command of the newly fielded ARSOA Gray Eagle company, F/160, with an activation date set for August 2018, and will attempt to affect this proposed change to the training domain of F/160. The author's professional operational experience attests that the biggest obstacles to implementing this change will be with steps one and two of the Kotter Model. The first ARSOA Gray Eagle company, E/160, is viewed as a critical capability within the SOF community, and because of that, the author believes that establishing a sense of urgency, as well as forming a guiding coalition will be difficult. The argument to overcome this is that the ARSOA rotary wings success over the past 36 years is directly attributed to this process of training. Additionally, because this process is already in use by the ARSOA rotary wing units, step three of the Kotter Model will be extremely easy to produce, since it already exists. That is also why the author believes that this recommendation is so viable, because the organization has already bought into the process and can easily identify with it. The challenge will be in convincing the other stakeholders, as well as the senior members of the unit, that this process can be as beneficial for the ARSOA Gray Eagle community as it is for the ARSOA rotary wing community.

After garnishing support for this recommended change, the next biggest task will be to generate short term wins in order to ensure this change gains momentum and becomes part of the established training process within the organization. The immediate result of applying this training process within the organization, will be the increased confidence that the individual operators will have when conducting their mission and specifically with their ability to conduct professional air mission briefs. The ARSOA mission training process involves extensive training in the process of conducting professional military air mission briefings. Making that a part of the ARSOA 15W training process will dramatically increase their confidence in their briefing abilities and propel this change forward from the bottom up. With a bottom up approach, this will ensure the majority of the company buys into the new training process which will help to confirm this solution with the organization's leadership and stakeholders.

Once the recommended training process is established at the company level, this implementation plan will look to consolidate gains and further the change process by establishing this recommended change at the battalion and regimental levels. To accomplish this, the training process will first need to be standardized within the battalion and then, to anchor the change, written into the regimental standard operating procedure. Once the process is refined and standardized enough to be written into the official regimental standing operating procedure, it will ensure that this process is the approved way that the organization does business, and will remain in place once the implementing leadership switches out.

The proposed solution identified for long term implementation (three to five years) would be for ARSOA to invest in research and development to modify the Gray Eagle to provide a unique aviation capability to the SOF community. It is important to note that this recommendation was selected for long term implementation because

ARSOA is currently scheduled to conduct the full operational testing and evaluation of the MQ-1C Gray Eagle Extended Range UAS in July of 2018. This new version of the Gray Eagle will provide additional capabilities and, because of this, it is unlikely that the CDM will have an appetite for any additional investment into research and development of the Gray Eagle until the added benefits of this new version are fully understood. It is also important to note that while ARSOA is conducting the full operational testing and development of the MQ-1C Gray Eagle Extended Range UAS, this new version will be fielded to both ARSOA and CF Gray Eagle units and the new capability will not be unique to the SOF community.

The specific modification to the Gray Eagle should be the focus of a follow-on study. Based on the author's operational experience, the author would recommend a modification that would increase its expeditionary capability, specifically by reducing the size of the ground control station, satellite and ground data terminals, and reducing the total amount of ground support equipment required to operate the Gray Eagle. This proposed solution was recommended because it is nested within the main concerns of the CDM, as stated in *ARSOF 2022* and *USASOC Strategy-2035*, that include: (1) obtain next generation unmanned aircraft systems that provide longer operational range, over horizon observation, and can be launched and recovered by tactical units, and to (2) improve army unmanned aircraft system programs of record (Raven, Shadow and Gray Eagle) to meet joint expeditionary tactics, techniques, procedures, forward-based networking, and sensor requirements.

Using the principles of the Kotter Model, the author recommends the following long term implementation plan for the proposed change to the materiel domain of the

ARSOA Gray Eagle units. Unlike the proposed short term solution, the identified long term solution is simply a recommendation to invest in research that will lead to a change in the future. For this reason, the implementation plan will not use all eight steps of the Kotter Model, but will focus on Steps One and Two. The author believes that creating a sense of urgency and building a guiding coalition among the CDM and stakeholders for this recommended solution will be difficult, given the fact that a new version of the MQ-1C Gray UAS is currently being fielded. The key to overcoming this obstacle is to emphasize to the CDM and stakeholders the fact that the new version of the Gray Eagle was based upon the needs of the CF, and that a SOA specific research and development process has not been conducted to meet SOF specific UAS needs. This will remain in line with ARSOA common practice, as the rotary wings employed by ARSOA were modified based on SOF specific operational needs, and that the same should hold true for the platform employed by the ARSOA UAS units.

Recommendations for Further Study

The first recommendation for further study would be to increase the expeditionary capability of the Gray Eagle by reducing the size of the ground control station, satellite and ground data terminals, and the amount of ground support equipment required to operate the Gray Eagle. The study would need to focus on the current breakdown and buildup times of the Gray Eagle in its current configuration as well as the amount of pallet space aboard United States Air Force (USAF) aircraft that is required to move one Gray Eagle flight platoon from one location to another. The study would then need to establish the timeline and cargo requirements needed to support United States Special Operations Command (USSOCOM) type of mission sets. Once this baseline is established, the study would be able to determine the specific requirements needed to publish the Operational Needs Statements (ONS) request to industry leaders and produce a modified version of the Gray Eagle to address the capability gap in supporting this USSOCOM mission set.

The second recommendation for further study would be to further research the capability provided by using Remote Split Operations (RSO) to employ ARSOA UAS. As stated earlier in this thesis, the professional operational experience of the author attests that there has been a study conducted on RSO, but due to classification cannot publish the results. However, the author would argue that another study needs to be conducted looking specifically at the benefits gained by the communication architecture needed to conduct RSO. In addition to the expeditionary and manning benefits of RSO, the author believes that RSO would also benefit the training level of 15W operators.

Affording 15W operators different training environments is difficult due to the fact that UAS operations within the national airspace are very hard to conduct. Currently, the process involved with transiting the national airspace with a UAV is next to impossible because of the restrictions imposed by the Federal Aviation Administration (FAA). This forces ARSOA Gray Eagle units to exclusively train at their home base or incur the high costs of transporting all the equipment necessary to operate at another US location. The author believes that these costs could be greatly reduced by the infrastructure associated with conducting RSO, which would make training at different locations within the United States more of a reality. The study would need to look at a cost analysis of being able to move a relatively small UAS package, due to the communication architecture of RSO, from one location to another, in order to train with different SOF units across the United States. The author believes that by conducting this analysis, the CDM and stakeholders would see another benefit of RSO that has not been previously addressed.

The final recommendation for further study would be to further research small precision guided munitions. The Gray Eagle needs to have the ability to tailor its payload based on the mission set. Weight will always be a factor regarding UAS operations and further research needs to be conducted to find an alternate payload for the Gray Eagle other than its current restriction to the Hellfire missile. This is not to say that the Hellfire is not an effective munition for the Gray Eagle, but in its current configuration, it can only carry up to four Hellfire missiles. This recommendation for further study would be to give the Gray Eagle an alternate, lighter, precision guided munition that would provide the ground force commander with more options when supporting different mission sets.

In addition to the aforementioned recommendations, the author and his thesis committee members developed four additional recommendations for further study after conducting the formal thesis defense. The four recommendations for further study are: (1) What are the training requirements that will be driven by an upgraded Gray Eagle materiel solution? (2) Perform a manpower grade analysis to document personnel requirements in the grades of O3 and CW4, for six MTOE positions. (3) Determine if ARSOA manning policy needs to be amended to account for UAS needs. (4) Conduct a SOF specific mission analysis for UAS platforms to define materiel key performance parameters.

Personal Learning Reflections

By conducting this research, the author gained a clear understanding of the current capabilities of the ARSOA Gray Eagle units, and more importantly, an understanding of the current capability gaps in the domains of organization, training, and materiel. As a future stakeholder in this community, this research enabled the author to develop a vision and strategy for commanding the newly fielded ARSOA Gray Eagle company, F/160. Additionally, by focusing this study within the professional body of knowledge associated with this topic, the author was able to both confirm and reject various biases that were held prior to conducting this study. This is significant, as the applied professional case study methodology ensured that the author's understanding of this topic moving forward is objective and based solely on the credible literature that was reviewed during the study.

In addition to his own professional growth, the author believes that this study is the first step for the ARSOA UAS community to begin to define its role within SOA. The Gray Eagle platform was designed to meet the needs of the CF and this paper has illustrated the fact that while this current capability is successful in ARSOA, it is now at the point where ARSOA needs to modify the current capability for SOA. Just like the ARSOA rotary wing units took CF rotary wing organizations and modified them to meet SOA specific needs, the ARSOA Gray Eagle units need to begin making the same organizational, training, and materiel modifications to support specific SOA needs.

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