Executive Summary

THE EFFECTS OF AN INCREASE IN DEPLOYMENT LENGTH ON F-15E STRIKE EAGLE AIRCREW PROFICIENCY AND RECOMMENDATIONS TO SQUADRON COMMANDERS TO MITIGATE THESE EFFECTS

By Kellen D. Sick

In 2010, the Air Force adopted a policy increasing the standard deployment length to 179 days. This policy shift aimed to take advantage of cost savings and logistical efficiencies to better support the Combatant Commanders executing the Global War on Terror (GWOT). However, for Strike Eagle Squadron Commanders, this presents the challenge of maintaining the proficiency of their aircrew in the diverse skill sets required to successfully employ the multi-role F-15E. The objective of this research was to determine the effects of this increase in deployment length on Strike Eagle aircrew proficiency and to provide recommendations Squadron Commanders to mitigate these effects.

The literature review sustains the assertion that Strike Eagle aircrew have a diverse spectrum of skills required to successfully execute all of their wartime taskings. This diversity of skill sets requires a significant amount of training time that has been largely unavailable due to a number of factors that have emerged from the increased operations tempo resulting from the GWOT. This, coupled with the narrow mission focus for Strike Eagle aircrew during GWOT deployments portends negative effects from the increase in deployment length.

To determine these effects, 83 aircrew of varying levels of experience, qualification, crew position, squadron, and number of deployments were surveyed to determine their proficiency at each phase of the deployment cycle: just before spin-up, just before deploying, just after returning, and just after a reconstitution plan. Additionally, a Weapons Officer interview was conducted to provide amplifying information on aircrew proficiency from the perspective of
squadron tactical leadership. Aircrew survey data during each phase of the deployment cycle were compared to a measure of the perceived impact that an increase in deployment length had on nine basic skill sets required of Strike Eagle aircrew to determine any relationships between the length of deployment and the effect on skill set proficiency. The results indicate an overall negative effect on aircrew proficiency as a consequence of the increase in deployment length, primarily manifested in the Air-to-Air skill sets and the Surface Attack Tactics skill set. Aircrew proficiency in the skill sets involved in the mission focus of GWOT deployments—CAS & NT-ISR and NIGHT—increased due to the emphasis placed on these skill sets during execution of GWOT combat missions. Additionally, when experience, measured by flight hours, was taken into account, the highest intensity of skill degradation occurred in mid-experienced aircrew (500-1500 hours).

With these effects determined, Squadron Commanders are encouraged to develop deliberate reconstitution and homestation training plans that incorporate flying, simulators, and academics in order to leverage the strengths of each training method to drive synergistic outcomes. Additional focus of these training efforts should be aimed toward mid-experience aircrew in an effort to cement their proficiency across the wide range of required skill sets. Similarly, while the trend of a narrowly focused deployed mission set is changing toward broader, theater-level skill requirements with the drawdown from Afghanistan, Commanders must ensure that deployed training opportunities with coalition nations are maximized and non-theater related learning is regularly challenged and tested. This will ensure the proficiency of Strike Eagle aircrew both today and into the future, regardless of deployment length.
THE EFFECTS OF AN INCREASE IN DEPLOYMENT LENGTH ON F-15E STRIKE EAGLE AIRCREW PROFICIENCY AND RECOMMENDATIONS TO SQUADRON COMMANDERS TO MITIGATE THESE EFFECTS

MSA 699 Project Report

Submitted in Partial Fulfillment of Requirements for the Degree of Master of Science in Administration (Concentration in Leadership)

by:
Kellen D. Sick

Project Instructor:
Dr. Larry L. Smiley

May 3, 2013
Dedication

To Mary Ellen and Axley William.
Acknowledgements

The men and women of the United States Air Force Strike Eagle squadrons selflessly preserve our nation’s freedom on a daily basis; special acknowledgement goes to those Strike Eagle brothers and sisters who provided assistance in completing the research for this report.
# Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dedication</td>
<td>ii</td>
</tr>
<tr>
<td>Acknowledgements</td>
<td>iii</td>
</tr>
<tr>
<td>Table of Contents</td>
<td>iv</td>
</tr>
<tr>
<td>List of Tables</td>
<td>vi</td>
</tr>
<tr>
<td>List of Figures</td>
<td>vii</td>
</tr>
<tr>
<td>Chapter 1 Problem Definition</td>
<td>1</td>
</tr>
<tr>
<td>Background</td>
<td>1</td>
</tr>
<tr>
<td>Research Problem</td>
<td>2</td>
</tr>
<tr>
<td>Research Objective</td>
<td>4</td>
</tr>
<tr>
<td>Scope and Delimitations</td>
<td>5</td>
</tr>
<tr>
<td>Chapter 2 Literature Review</td>
<td>6</td>
</tr>
<tr>
<td>Overview—History of the Current Deployment Length</td>
<td>6</td>
</tr>
<tr>
<td>Diverse Training Requirements Facing Multi-Role Fighters</td>
<td>13</td>
</tr>
<tr>
<td>Specific Effects</td>
<td>16</td>
</tr>
<tr>
<td>Indirect Factors Related to the Psychological Effects of Deployment</td>
<td>21</td>
</tr>
<tr>
<td>Summary and Conclusions of the Literature</td>
<td>23</td>
</tr>
<tr>
<td>Chapter 3 Research Methodology</td>
<td>26</td>
</tr>
<tr>
<td>General Research Overview and Approach</td>
<td>26</td>
</tr>
<tr>
<td>Specific Data Collection Approach and Procedures</td>
<td>28</td>
</tr>
<tr>
<td>Specific Approach to Data Analysis and Synthesis</td>
<td>35</td>
</tr>
<tr>
<td>Methodological Limitations and Scope</td>
<td>36</td>
</tr>
</tbody>
</table>
Chapter 4 Data Analysis........................................................................................................... 38
  Data Presentation and Analysis........................................................................................... 38
  Data Analysis Summary....................................................................................................... 44
Chapter 5 Summary, Conclusions, and Recommendations.................................................. 47
  Summary and Conclusions................................................................................................. 47
  Recommendations to Squadron Commanders................................................................. 49
  Areas for Future Research and Study................................................................................. 54
References............................................................................................................................. 56
Appendices............................................................................................................................ 59
  Appendix A Acronyms, Definitions, and Terminology....................................................... 60
  Appendix B Squadron Approval Letters............................................................................. 61
  Appendix C CMU Approval to Conduct Research............................................................. 67
  Appendix D Survey Consent Form...................................................................................... 68
  Appendix E Survey Questions for Aircrew........................................................................ 70
  Appendix F Interview Consent Form.................................................................................. 73
  Appendix G Interview Questions for Squadron Leadership.............................................. 74
  Appendix H Additional Graphical Results......................................................................... 76
List of Tables

Tables                                      Page Number

Table 1  
*Intensity of skill set degradation or improvement as a function of aircrew experience* ............ 41
List of Figures

<table>
<thead>
<tr>
<th>Figures</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 1. Aircrew perceived impact on proficiency level due to increase in deployment length.</td>
<td>39</td>
</tr>
<tr>
<td>Figure 2. Average aircrew perceived proficiency level throughout the deployment cycle broken down by skill set (total respondents).</td>
<td>40</td>
</tr>
<tr>
<td>Figure 3. Average aircrew perceived proficiency level throughout the deployment cycle broken down by skill set (low-experience respondents: &lt;500 hours).</td>
<td>42</td>
</tr>
<tr>
<td>Figure 4. Average aircrew perceived proficiency level throughout the deployment cycle broken down by skill set (mid-experience respondents: 500-1500 hours).</td>
<td>42</td>
</tr>
<tr>
<td>Figure 5. Average aircrew perceived proficiency level throughout the deployment cycle broken down by skill set (high-experience respondents: &gt;1500 hours).</td>
<td>43</td>
</tr>
<tr>
<td>Figure 6. Relative training required to maintain proficiency in a given skill set using CAS &amp; NT-ISR as the baseline measure.</td>
<td>44</td>
</tr>
<tr>
<td>Figure 7. Average aircrew perceived proficiency level throughout the deployment cycle broken down by skill set (334FS—FTU squadron).</td>
<td>76</td>
</tr>
<tr>
<td>Figure 8. Average aircrew perceived proficiency level throughout the deployment cycle broken down by skill set (335FS—OPS squadron).</td>
<td>77</td>
</tr>
<tr>
<td>Figure 9. Average aircrew perceived proficiency level throughout the deployment cycle broken down by skill set (336FS—OPS squadron).</td>
<td>77</td>
</tr>
<tr>
<td>Figure 10. Average aircrew perceived proficiency level throughout the deployment cycle broken down by skill set (492FS—OPS squadron).</td>
<td>78</td>
</tr>
</tbody>
</table>
Chapter 1

Problem Definition

Background

At 500 feet above the valley floor, amidst towering snowcapped mountains, an F-15E Strike Eagle in full afterburner screams past massing insurgents at over 500 miles an hour in order to suppress enemy fire on friendly ground positions. This show of force is successful and enemy fire ceases before the Ground Commander has to escalate force and call on the Strike Eagles overhead to employ GPS-guided weapons. This scenario drives home the fact that the Strike Eagle and its aircrew of two—Pilot and Weapons System Operator (WSO)—are the ideal choice for the type of mission being flown in support of the Global War on Terror (GWOT) and it is a mission that the F-15E has been supporting for over a decade since the beginning of this war in late 2001. In addition to this mission, the flexibility of the Strike Eagle as a weapons system has wide-reaching applications in other mission sets and in other theaters.

Due to the current operations tempo (OPTEMPO) of the GWOT, the Air Force has recently increased the standard deployment length, with little to no decrease in the expected capability or mission requirements of its combat units. Until 2004, a Strike Eagle squadron would deploy to the Middle East for 90 days at a time, continuously rotating out with the other Strike Eagle squadrons in the Combat Air Force (CAF). In September of 2004, the Air Force extended the standard deployment length to 120 days. General John P. Jumper, then Chief of Staff of the Air Force, stated that the reason for the increase was that the “requirement for deployable forces is not expected to decrease in the foreseeable future” (“Air Force changes deployment length”, 2004, para. 2). This projection has held true, and to meet the continuing demands of Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF), the Air
Force again increased the deployment length in September of 2010, this time to 179 days. Air Force officials cite that “71 percent of Airmen are already deploying outside the 120-day baseline [and] the revised construct will…increase predictability for affected…families while providing better support to Combatant Commanders…at deployed locations” (Powers, 2010, para. 2). The Strike Eagle community has continued to produce, at record rates, world-class support for the Ground Commander as a result of these increases in deployment length. These fighter aircraft represent the workhorse of the CAF, especially in today’s war. However, the Close Air Support (CAS) and Non-Traditional Intelligence, Surveillance, and Reconnaissance (NT-ISR) missions are only one of several diverse mission sets in which F-15E aircrew are required to demonstrate and maintain proficiency.

**Research Problem**

As a multi-role fighter, the F-15E Strike Eagle has designated operational missions in both the Air-to-Air and Air-to-Ground battlefields. While the specific details of these mission sets are generally classified, they can be broken down into a series of nine basic building blocks that form the foundational skill sets required by Strike Eagle aircrew. CAS & NT-ISR comprise only one of these nine basic building blocks. Additionally, until a recent shift in the deployment focus, aircrew were not allowed to explicitly train in most of these other blocks during combat operations; however, the requirement to maintain proficiency in these areas has not diminished.

Air Force Instruction 11-2F-15E Volume 1 (AFI 11-2F-15Ev1, 2011) governs aircrew continuation training for its diverse mission sets through a series of currency requirements for specific events (related to the building blocks already described). Once deemed proficient in a specific event, aircrew must perform that event within a specified timeframe to maintain that currency. The currency expiration timeframe is reset after successful event completion. Of note,
the longest currency timeframe is 180 days, with the majority of the currency requirements falling somewhere around 90 days. This publication states that “if an aircrew loses a particular currency, thereby requiring recurrency, that mission or event may not be performed except for the purpose of regaining currency” (AFI 11-2F-15Ev1, 2011, p. 32). It is important to be aware of the fact that aircrew currency and aircrew proficiency are separate measurements—the latter containing a degree of subjectivity based on the individual and what is deemed the current standard of proficiency by his or her peers and supervisors. However, it is accurate to generalize that aircrew who are out of currency are also out of proficiency (proficiency requires, \textit{at a minimum}, currency).

The recent increase in deployment length to 179 days, coupled with extremely limited or non-existent training opportunities while performing the CAS & NT-ISR missions in combat, present Squadron Commanders of Strike Eagle units with the problem of their aircrew losing most of their currencies—and consequently their proficiency—in many of the requisite skill sets outlined in a unit’s statement of Designed Operational Capabilities (DOC). This, in light of the fact that a requirement to maintain readiness in diverse mission sets has not diminished, provides a unique challenge to maintaining proficiency while deployed, as well as regaining lost proficiency after returning home from a deployment. This issue of aircrew proficiency is amplified given the current context of a fiscally constrained environment.

Determining the effects on aircrew ability to maintain proficiency due to the increase in deployment length was the basic research problem that was studied. To quantify these effects, several sub-problems were answered by exploring existing literature on related subjects as well as direct data collection from Strike Eagle aircrew and leadership within Strike Eagle squadrons. These sub-problems included:
a. Are their additional considerations that were causal to the Air Force’s decision to increase the standard deployment length? What kind of cost/benefit does the Air Force anticipate due to this increase, and is there any provision for the decline in aircrew proficiency?

b. What is the perception that aircrew have of their own state of proficiency in each of the nine basic building blocks—
   1) before starting the spin-up process for a deployment,
   2) just prior to leaving for the deployment (i.e. after the spin-up),
   3) after returning from the deployment,
   4) and after completing a reconstitution program designed to regain currency?

c. What is the perception of squadron leadership (Commanders, Directors of Operations, and Weapons and Tactics Officers) of the squadron’s state of proficiency in all of the phases listed above?

d. Do these perceptions meet or exceed the requisite proficiency level required to be successful in combat? In other words, in each of the phases listed above, are aircrew proficient enough to successfully complete the DOC missions in combat?

e. Are there any specific mission sets that require more training to maintain proficiency than others?

f. What solutions are currently in place to mitigate the degradation of these skill sets among aircrew?

**Research Objective**

The primary aim of this research was to determine the effects on F-15E aircrew ability to maintain proficiency in all of the required mission sets as a result of the extension of the standard
deployment length to 179 days. Additionally, this research provided a foundation from which to offer Commanders of F-15E squadrons recommendations towards mitigating these effects. Addressing these issues directly correlates to a more efficient home-station training program, innovation in integrating training opportunities during combat deployments, and an overall increase in the ability of Strike Eagle aircrew to maintain cutting edge proficiency in all of the required mission sets, ensuring the continued defense of the United States during tomorrow’s war, while continuing to successfully fight the war of today.

**Scope and Delimitations**

The extent of this research and the resulting conclusions were limited to operational F-15E Strike Eagle squadrons, though the effects on other multi-role fighter communities (like the F-16 Fighting Falcon) may be consistent with these findings. Since the effects on other fighter communities were outside the scope of this research, they were not discussed nor generalized from this research on F-15E squadrons, but previous studies and research were included in the literature review to present similarities that may also affect Strike Eagle squadrons. Additionally, the aim of this research was not to argue the Air Force’s decision to extend the deployment length. Right or wrong, that decision is not likely to be reversed until the political and economic environment has changed, reshaping the environmental context that drives the current military OPTEMPO. Instead, this research was dedicated to determining the effects of this decision and to generate ideas and tools for Commanders to manage these effects while still maintaining both effectiveness and readiness as a fighter squadron.
Chapter 2

Literature Review

The increase in the standard deployment length to 179 days is a relatively recent policy change for the Air Force. The first Strike Eagle squadron affected by this policy change returned from a 179 day deployment in the spring of 2011. Now two years later, several more iterations of the 179 day deployment cycle for Strike Eagle squadrons has transpired and the requisite data to answer this research question can only now begin to be gathered. As a result, there is little specific research currently available to address the effects of this increase in deployment length on Strike Eagle aircrew proficiency. Therefore, it is necessary in reviewing relevant literature to broaden the scope to include the general effects of deployments on combat readiness and training opportunities—including the well documented, but less tangible psychological effects—examining trends in these areas as a function of deployment length. By extension, affects on combat readiness and training are functionally interrelated with aircrew proficiency. Correspondingly, an increase in deployment length only magnifies any trends identified with respect to length of deployment. The literature reviewed in the following discussion focuses on these interrelationships by discussing the diverse requirements facing multi-role fighter squadrons, observing examples from other communities and the specific effects that deployments have on the ability to meet these requirements, as well as a review of the indirect impact on aircrew proficiency due to the psychological effects that accompany a combat deployment.

Overview—History of the Current Deployment Length

The impetus to adjust the standard deployment length to 179 days draws from the Air Force’s desire to manage OPTEMPO to provide for the needs of Combatant Commanders in
support of the GWOT, while simultaneously giving Airmen and their families a greater level of stability and predictability (Hanson, 2010). In the past, combat units have operated on a 1-to-3 deploy-to-dwell timeline. That means, for every day deployed, a unit should be home for three days. Extrapolated out for a 179 day deployment (6 months, for the sake of discussion), this equates to a home station time of 18 months.

These admonitions of “stability and predictability” (Hebert, 2004, p. 60) are echoes of the arguments the Air Force used to support its shift from a 90 day deployment to a 120 day deployment in 2004. Hebert (2004) states, “there was nothing magic about 90 day deployments…those durations were chosen partly to get airmen back to their home bases before their skills got too rusty” (p. 62). This initial model for deployment cycles allowed aircrew a better opportunity to maintain their proficiency, but not without a tradeoff. The price tag of 90 day deployments was manifested in reduced deployment predictability for military families, a lack of continuity for Combatant Commanders who were directing the war effort, and the tangible expense derived from the logistics required to move squadrons and their equipment overseas and back several times a year. General T. Michael Moseley, Chief of Staff of the Air Force in 2007, commented that the “sweet spot for us is between 90 and 120 days on our [tactical] aviation deployments” (Tirpak, 2007, p. 34). Furthermore, “The four month spell is deemed not too arduous for the airmen to rotate in and out…and is the right duration for equipment as well; longer deployments require taking along more spare parts and support gear, and are less efficient” (Tirpak, 2007, p. 34).

However, the production of deployable personnel at this time did not match the deployment requirement under the 90 day deployment construct. Airmen were routinely pulled from future deployment cycles to fill current gaps, leading to shortened dwell times and short-
notice deployment taskings that decreased timeline predictability for Airmen and their families (Tirpak, 2007). Additionally, under a 90 day deployment cycle, Combatant Commanders found it difficult to maintain continuity within their Areas of Responsibility (AORs) with such a rapid turnover of personnel. The 120 day cycle change in 2004, and subsequently the recently implemented 179 day cycle change in 2010, attempted to provide added predictability to families by matching the deployment planning model more closely to the requirements of Combatant Commanders. Continuity issues were still raised under the previous 120 day model, further prompting the change to a 179 day deployment and playing a significant factor in the decision to execute this policy shift (Malloy, 2009). The tradeoff for the benefits associated with a 179 day deployment is found in terms of aircrew proficiency—primarily a factor of the time that elapses while out of proficiency and the time available for regaining proficiency through training upon return.

Currently, the 179 day deployment timeline involves a 24 month cycle: 6 months spent abroad and 18 months spent at home, where squadrons “recuperate, train, take professional military education courses, and then enter an intensive period of exercises, intelligence briefings, and drills before heading out again” (Tirpak, 2007, p. 33). The time available for training activities in this model is deceiving in terms of the actual time spent at home-station training to gain or regain proficiency in all DOC taskings assigned to a squadron. The multi-faceted requirements facing fighter squadrons will be discussed in subsequent sections, but focusing solely on the deployment timeline provides an adequate illustration of the actual time available for gaining proficiency during the 18 month period that is bracketed by 179 day deployments.

Prior to a deployment, a Strike Eagle squadron will undergo nearly 3 months of deployment “spin-up” training—learning theater specific ROE, flying theater related training
DEPLOYMENT EFFECTS ON F-15E AIRCREW PROFICIENCY

scenarios, working with ground forces who will deploy to the same region, attending pre-requisite ground-based combat skills training, etc. The majority of this training focuses on the skills required and used in that specific theater; in the case of OEF and OIF deployments during the last decade, the focus was on CAS & NT-ISR. Additionally, the transition time to and from the AOR (all logistical movement of a squadron’s personnel, aircraft, and equipment) accounts for approximately 1 month (about 2 weeks of phased movements on the front and back end of a deployment period). This transition time permits aircraft beddown at the deployed location as well as a handover of the AOR between departing and incoming squadrons. These and other additional “administrative” periods at the front and back end of a deployment, O’Boyle (2007) notes, turn a 6 month deployment on paper into an 8 month deployment in practice. Upon returning home, all military members are authorized 2 weeks of rest and relaxation (R&R) time. Once returned, approximately 1-2 months are spent regaining expired currencies through a reconstitution program. Taking 1 month as an aggressive reconstitution program, but as a conservative estimate for determining the remaining time available for developing proficiency, nearly 12 months of the 24 month cycle is dedicated to CAS & NT-ISR training and execution (3 month spin-up, 1 month total transition time, 6 months deployed, 0.5 months R&R, 1 month reconstitution). At the completion of the reconstitution program, aircrew are current; however, anecdotal and empirical evidence establishes that they are not proficient. Simply stated, aircrew are capable of safely completing future training flights to gain or regain the required levels of proficiency. The resulting training time available for developing proficiency is at a maximum, 12 months, and any “excess refresher training [required] ties up squadron resources and delays the squadron from achieving higher levels of proficiency” (Sprague, 2008, p. 5). At the end of
these 12 months, the squadron will likely begin the spin-up process for the next deployment cycle, once again focusing on AOR specific skills, repeating the process of DOC skill atrophy.

What is not included in this discussion of the deployment timeline are the effects of additional taskings on the squadron (exercises, inspections, etc), family planning (having/raising children, additional time off for vacations/significant life events, etc), as well as the mass exodus of experienced aircrew that will typically leave a squadron to move on to other career-broadening assignments during the 12 months following a deployment. This creates a challenge in effectively managing the available training time as an influx of inexperienced aircrew join the squadron to replace the experienced aircrew that have recently left or are unavailable. Some of the additional taskings that squadrons must support during this period at home station include large force exercises (LFEs) that provide valuable training opportunities. However, some taskings are generated out of a need to provide support for another unit or agency and they do not directly contribute to the training opportunities of Strike Eagle aircrew or they exercise skills that Strike Eagle aircrew are already proficient at—exercises focused on CAS & NT-ISR, for example, that fall outside of the dedicated OEF deployment spin-up period. Kelly (2001) asserts that peripheral commitments such as these that detract from organizing, equipping, and training aircrew to survive and kill according to the requirements laid out in a squadron’s DOC statement threaten a squadron’s baseline combat capability.

Comparing this timeline to the previous 120-day cycle (4 months for the sake of discussion), assuming the same 1-to-3 deploy-to-dwell ratio, the differences are primarily noted through a shortened reconstitution period. A steeper skill recovery curve is experienced because the requisite skills have not atrophied to the same degree during a 120 day deployment as they have during a 179 day deployment. Additionally, because the total cycle is 16 months instead of
24 months, experience is retained within the squadron after the return from a deployment since the majority of aircrew will remain in their current assignment instead of moving on to a new assignment immediately. This allows the training of inexperienced aircrew to be more efficient by tapping into the broader base of experienced aircrew available. This faster deployment cycle rate and the fewer number of deployment days away from home station provide more time to the squadron to absorb the effects that life events, family planning, and additional vacations have on the ability to adequately train for proficiency in DOC taskings. In effect, the right people to conduct effective training within a squadron are available more often under the shortened construct.

The fundamental factor affecting aircrew proficiency in a multi-role fighter is the amount of time spent training towards specific proficiency objectives. Kelly (2001) notes that, “CAF aviators get virtually no effective training towards the skills required for combat employment during contingency operations” (p. 17). This deficit has been observed in both OIF and OEF due to the limited type of flying accomplished during GWOT missions (almost exclusively CAS & NT-ISR) and the lack of training opportunities to exercise other skill sets that are not required in those specific AORs. As previously described, CAS & NT-ISR comprise only one of nine basic training blocks for Strike Eagle aircrew.

Training flights are structured around specific objectives with measurable outcomes and desired learning points. This allows a logical progression of training, whereby proficiency is gained and measured against definitive standards. The nature of combat operations typically does not allow for such a controlled training environment. Skills used during a combat mission on one day may vary from skills used on another day, though the mission itself may be strikingly similar. Additionally, skills that are used during a GWOT combat mission also vary in terms of
the level to which those skills are exercised. The standard of skill performance need only match the requirement presented by the situation encountered—this situationally dependent requirement is in constant flex due to the contingent nature of combat operations. Skills used may be more or less tasking on aircrew depending on the situation, and therefore may provide more or less training value through actual experience on any given day for the same skill set being performed (Dahlman & Thaler, 2000).

Rightfully so, the focus of combat is on executing the mission from a foundation of previous training, not the inherent training opportunities available from the exercise of skill set or task completion. Since this is the case, some of this combat time is spent “in the desert drilling holes [in the sky] and making people experienced in orbits but not engagements, …develop[ing] bad habits flying similar [missions] every day” (Kelly, 2001, p. 18). This is illustrated by the high level of proficiency that Strike Eagle aircrew have in the CAS & NT-ISR role, at the expense of proficiency in other skill sets.

Increases in deployment length, while they do provide advantages in terms of stability, predictability, and continuity, exacerbate the problem of maintaining aircrew proficiency amidst a diverse set of skill requirements. Reents (2008) states, “The detrimental impact of deployments and long operations on fighter squadrons is not new for the Air Force” (p. 64). As an example of this, Reents (2008) cites that it took over 18 months for the Air Force to recover from the 78-day Balkans operation in 1999 due to lost training time. It seems that the U.S. Military has a history of focusing solely on achieving success in the current campaign (Sprague, 2008); however, the time spent training and executing the CAS & NT-ISR roles required in today’s war risk leaving Strike Eagle aircrew crippled in terms of future combat capability. To remain tactically relevant, Sprague (2008) argues that this “pitfall of investing all training focus
toward today’s battles” (p. 12) must be avoided. Thus, it is essential to understand the multi-faceted elements of Strike Eagle training requirements to allow Commanders to ensure squadron readiness for tomorrow’s war.

**Diverse Training Requirements Facing Multi-Role Fighters**

According to Bigelow, Taylor, Moore, and Thomas (2003) in their RAND study on fighter training models, operational fighter squadrons have two missions. The primary mission is “to deploy and conduct combat missions during wartime, contingencies, and other engagements” (Bigelow et al., 2003, p. 1). Bigelow et al. (2003) describe the secondary mission as one of sustainment—providing the knowledge and diverse experience to ensure that the primary mission continues to be met and that leaders within the community are continually developed to ensure future capability. Both of these missions are inextricably linked to and mutually supportive of each other. Experience trains and builds up the experience of inexperienced aircrew in a perpetual cycle of learning and development. In their case study of the 388th Fighter Wing, Dahlman and Thaler (2000) expand the first mission described by Bigelow et al. (2003) into two sub-components relating to the readiness of a squadron: *current* and *future* combat capability. These broad categories of fighter squadron priorities dictate that proficiency requirements be derived from a concept of desired readiness to successfully employ in combat against an actual or anticipated threat (Lawhorn, 2001). A squadron’s DOC statement outlines these current and future capability requirements.

For the Strike Eagle, nine different blocks of training encompass the mission sets that aircrew are expected to be proficient in. The study completed by Bigelow et al. (2003) determined that “numerous skills underlie the ability to perform each type of mission” (p. 4) and, specific to the Strike Eagle, Bigelow et al. (2003) identified 133 individual skills required to
accomplish the multi-role missions of the F-15E. For other multi-role fighters such as the F-16 Fighting Falcon, Bigelow et al. (2003) also identified well over 100 individual skill sets. Furthermore, Bigelow et al. (2003) use 21 very specific categories of training to encompass the mission sets required of Strike Eagle aircrew, and these 21 categories can be appropriately combined to derive the nine different training blocks typically used today:

- Basic Fighter Maneuvers (BFM)
- Air Combat Maneuvers (ACM)
- Air Combat Tactics (ACT, comprised of several variations)
- Basic Surface Attack (BSA)
- Close Air Support (CAS, and related NT-ISR)
- Surface Attack Tactics (SAT, also known as Offensive Counter Air-Attack Operations)
- Low Altitude (LOWAT)
- Night (NIGHT)
- Special Weapons (NUCLEAR)

According to Jones (2005), “aircrew training follows the basic pattern of first attaining proficiency in each of the core skills then, when proficiency is attained, maintaining those core skills by [completing] certain flights designed to maintain proficiency in that particular skill” (p. 5). Maintaining proficiency is a function of designing “different types of training sorties [that] enable crew members to practice different skills at different levels of difficulty and realism” (Bigelow et al., 2003, p. x) that can be accurately measured against specific training objectives in order to develop, assess, and provide feedback on skill proficiency.

To provide challenging training that develops the finely honed planning, decision-making, and execution skills needed to maintain combat effectiveness, the blocks listed above
are often combined on training missions to increase the complexity of the tactical scenarios experienced by aircrew. This complexity is added into the training program only after initial proficiency is achieved in an associated block as a standalone module. This approach ensures that any risks associated with a particular block of training, coupled with the inherent dangers of flying, are mitigated to the maximum extent possible before increasing the complexity—and therefore, the realism—of the training. As an example, aircrew would not incorporate skills exercised in a SAT mission (such as weapons targeting, sensor use, and weapons employment) into a LOWAT flight until they have demonstrated that they are proficient in flying in the low altitude structure first. Similar risk-mitigating measures are taken when combining multiple blocks with NIGHT flying, where even basic skills are complicated by performing them in the dark (NIGHT skills—Night ACT, BSA, and SAT, for example, are always performed after the same day skills have been performed to the requisite level of proficiency). Skills related to the handling and flying properties of the aircraft (Advanced Handling Characteristics, Instrument Flying, and Navigation) are not included as separate training blocks, and their impact on specific aircrew proficiency requirements is largely minimal. The blocks included above relate specifically to the employment of F-15E capabilities as they pertain to DOC taskings. Basic flying skills are assumed as inherent at this stage in an aviator’s career—a discussion focusing on tactical training requirements is not relevant if aircrew are unable to complete basic flying tasks.

Bigelow et al. (2003) also found that “different categories of pilots need different combinations of skills and different amounts of practice to maintain those skills” (p. 4). In light of this fact, their study attempts to identify a baseline training need that would allow squadrons to maintain proficiency as a whole. In searching for this baseline threshold, Bigelow et al. (2003) define adequate training as “good enough that the squadron will need no spin-up sorties
before performing any of its assigned missions in combat” (p. 4). This means that a squadron that is proficient in accordance with this definition can be tasked to deploy on one day, and—barring the logistical limitations—could be successfully executing any of its DOC taskings in combat on the following day.

Given the 133 individual skills identified for the Strike Eagle, as well as the nine building blocks listed above, this presents a significant challenge to commanders to not only reach, but also maintain this level of proficiency through adequate training. Bigelow et al. (2003) recognize the lack of training opportunities and limited value that contingency operations like those flown in support of the GWOT provide fighter squadrons. When the detailed and specific training elements required for proficiency are juxtaposed against the availability of these opportunities in combat, Dahlman and Thaler (2000) conclude that aircrew “often do not receive adequate sequences of training events during deployments” (p. 19). They further reinforce, as previously discussed, that training adequacy during combat operations is highly situationally dependent and lacks the necessary control to generate specific and measurable training opportunities (Dahlman & Thaler, 2000). The diverse training requirements needed to reach an adequate level of proficiency in the multi-role Strike Eagle, limited home station training time, and limited deployed training opportunities coalesce with squadron manning that is rarely static, presenting Commanders with an uphill struggle to maintain the tactical edge of their squadron’s aircrew.

**Specific Effects**

The broader effects of the increased OPTEMPO and increased deployment length created by the GWOT are seen in equipment decline and personnel retention, both of which affect the ability of Strike Eagle aircrew to maintain skill proficiency. Ultimately, according to Kelly
(2001), the “net result of a smaller force, higher OPTEMPO, lower aircraft mission capable rates, less experience and less flying is a significant reduction in CAF lethality” (p. 19).

Strike Eagles and their aircrew, flying combat missions over Afghanistan, are performing record levels of support for the Ground Commander, but the resulting flight hours that are applied to aging airframes are staggering and create rippling effects on aircrew proficiency. General Ronald Keys, commander of Air Combat Command in 2007, expressed his concern over the unknown effects this might have on the fighter force when he stated, “We don’t yet know what unseen effect the fine dust and extreme desert heat will have and what kind of toll that’s going to take down the road” (Bosker, 2007, para. 4). The pace at which Strike Eagles are accumulating flying hours has only increased since General Keys made this statement in 2007.

Many of the Air Force’s Strike Eagle airframes, some more than 25 years old, are operating past their designed lifespan, continuing to support the GWOT and other contingency operations day-in and day-out. Aside from the future physical effects on these airframes that are now expected to remain in operation until 2030, this strain on equipment has impacted current aircrew training, and subsequently aircrew proficiency. This ripple effect occurs because a large portion of the finite lifespan of airframes, engines, and parts—measured in terms of flight hours—are being used to support the GWOT and other contingency operations at an extremely rapid rate, leaving less flying hours available for training sorties and airframe longevity. In their case study of the 388th Fighter Wing, Dahlman and Thaler (2000) demonstrate how this training deficit materializes in a practical sense; though their analysis concerns an F-16 Fighting Falcon wing, there are valid parallels for the Strike Eagle where multiple squadrons of aircraft fall under the command of a single wing.
There is anecdotal evidence that units sometimes deploy to contingencies in a “robusted” state, i.e., with assigned resources that meet or even exceed 100 percent of their estimated wartime requirements—what in readiness-reporting language is called high C-1 status. The difficulty arises from the Air Force’s practice of regularly programming for personnel, training, and materiel for all units at low C-1 readiness status, i.e., at around 90 percent of wartime requirements. Thus, in order to fill deploying units at high C-1, home-station units that supply the additional resources to deploying units may fall below C-1 readiness status. (Dahlman & Thaler, 2000, p. 16).

In simplified terms, this means that a given wing may be assigned a specific number of aircraft per squadron, but for the squadron that is deploying, they will likely receive priority to deploy with the most capable aircraft, systems, and parts available across the wing. That is, those aircraft with the highest mission capable rates will be deployed to ensure that the deploying squadron is able to accomplish its missions successfully. What is left at homestation, then, are aircraft whose mission capable rates fall below that of squadrons with the normal mix of strong and weak performing aircraft. Homestation squadrons are forced to absorb the maintenance cost of increased flying hours on airframes and parts stemming from the GWOT and other contingency deployments. Homestation aircraft with broken or degraded systems, aircraft requiring significant off-station depot level maintenance, or any myriad of required inspections that are waived for deployed aircraft until after returning from a deployment reduce the mission capable rate of aircraft at homestation, leaving a deficit in the ability of homestation squadrons to produce flying hours towards proficiency training. Reents (2008) argues that a negative effect on aircrew proficiency is beginning to materialize as a result of the training deficit originating from jets being backed up in depot level maintenance for required inspections and overhauls.
To further this correlation, Junor, Jondrow, Francis, and Oi (1997) explain that the “relationship between flight hours and training readiness is nearly definitional—flight hours are a necessary component of training readiness” (p. 42). As a result of the increased maintenance costs associated with the high OPTEMPO of the GWOT and other contingency deployments, coupled with the austere environment that these aircraft must perform in while deployed, aircrew training is negatively impacted with fewer flying hours produced at home station. Spencer (2000) reveals, “the dramatic increase in the use of America’s armed forces…takes funding away from ongoing expenses such as training, fuel, and supplies” (p. 7). Additionally, Spencer (2000) comments, “people and equipment wear out faster with frequent use…and the stress of frequent and often unexpected deployments can be detrimental to troop morale and jeopardize the armed forces’ ability to retain high-quality people” (p. 7). Reents (2008) adds that “fewer flight hours for training adds additional stress on squadrons who are trying to maintain [aircrew] proficiency” (p. 62). These stressors affect retention of experienced aircrew, which further challenges the sustainment of squadron-wide proficiency levels.

According to Smith (2006), GWOT aircrew are deploying more frequently than aircrew who served in the military before 9/11 and the results of his analysis demonstrate a negative trend in aircrew retention. Belasco (2009) relates, “Another readiness concern is the fact that some active duty members are redeploying with less than a year at home to rest and retrain” (p. 33). This increase in OPTEMPO resulting in more frequent and longer deployments due to the GWOT has caused a decrease in aircrew decision to remain in the military past their commitment, despite economic incentives such as the Aviation Continuation Pay program (McKenzie, 1999). This decrease in retention negatively influences proficiency sustainment within a squadron. Gongora (2002) states that the increased tempo of expeditionary operations
has translated into various problems including declining combat skills, quality-of-life, and personnel retention problems. In the case study of the 388th Fighter Wing, Dahlman and Thaler (2000) found a direct correlation between retention and proficiency. “The dilemma emerges when experienced personnel leave at a faster rate than junior personnel can be adequately trained and promoted” (Dahlman & Thaler, 2000, p. 13). As experienced aircrew become dissatisfied with the demands of an increased OPTEMPO and longer deployments, they are completing their commitments and moving on to other civilian careers. Dahlman and Thaler (2000) observed that “the USAF’s response to diminishing retention rates largely has been to push more new personnel into critical career fields that are losing experienced personnel” (p. 13). However, the influx of inexperienced aircrew actually increases the need for experienced aircrew to train those inexperienced aircrew (Dahlman & Thaler, 2000). This increased workload on experienced aircrew can further exacerbate the OPTEMPO related retention problem. In studying these relationships among Marine Harrier pilots, Cassidy (2008) echoes Dahlman and Thaler’s (2000) “Catch-22” (p. 13). With limited flying hours dedicated to training, a training emphasis on newer aircrew neglects the training needs of experienced aircrew and the “end-state is an under trained, overworked, and unsafe…community” (Cassidy, 2008, p. 1). Unsafe certainly does not contribute to proficient, and the retention problem facing fighter squadrons only adds to the challenge for Commanders left with a “less experienced, less capable force from which to draw” (Dahlman & Thaler, 2000, p. 2).

The issues of equipment and retention are part of the “simultaneous, competing pressures facings wings on a daily basis” (Dahlman & Thaler, 2000, p. 2). They categorize these competing pressures as “(1) strenuous contingency requirements, (2) demanding requirements to maintain current and future readiness, and (3) severe resource and retention problems” (Dahlman
& Thaler, 2000, p. 2) which, when experienced in combination, force units who deploy to “trade off building future capabilities for providing current ones” (Dahlman & Thaler, 2000, p. 2). Reents (2008) argues the need for the Air Force to reassess the balance between the strategic benefit of increasing deployment lengths under the current policy against the cost in terms of dollars and impact on combat capability, both now and into the future. Malloy (2009) reiterates this balancing act by emphasizing the challenging situation facing the Air Force, “one that requires the service to balance its support for GWOT with its preparation for future fights by investing in modernized technology and focusing on innovative solutions to achieve the Air Force mission” (p. 7).

Indirect Factors Related to the Psychological Effects of Deployment

As previously identified, issues surrounding equipment and retention negatively impact the ability of aircrew to train to proficiency for the varied mission sets of the Strike Eagle; analogously, there is also evidence of an indirect relationship between aircrew proficiency and the psychological effects of deployment. Smith (2006) notes that family separation and deployment hardship—perceived or actual—affect aircrew decision to remain in the service, but for those aircrew that elect to continue their military career, these affects can be detrimental to motivation and morale. Flying is an inherently dangerous business and any detractors from aircrew focus and attention during flying operations can cause a mis-prioritization that yields deadly consequences. These detractors include (but are not limited to) Post-Traumatic Stress Disorder (PTSD) and Domestic Violence and Spousal abuse, manifested upon return from deployment.

Shen, Arkes, Wah Kwan, Yee Tan, and Williams (2010) studied the effects of OEF deployments on the expression of PTSD for active duty personnel and found that, comparing all
of the military’s services, the Air Force had the lowest incidence of PTSD. However, among the Air Force members studied, PTSD occurred at a higher rate for OEF combat deployments to Iraq and Afghanistan as compared to other deployed locations, as well as a higher rate of PTSD for individuals who served longer deployments as compared to those with shorter deployment commitments (Shen et al., 2010). For Strike Eagle aircrew, the increase in deployment length to 179 days, coupled with deployment locations in the Middle East, put F-15E aircrew at risk for PTSD. These symptoms manifest themselves upon return from deployment during the time when aircrew should be taking advantage of R&R and the subsequent reconstitution period intended to refocus their efforts towards homestation requirements. These symptoms become distractions that adversely affect the safety of flight operations and training quality.

Spencer (2000) notes that over half of U.S. troops are married, and long deployments place strain on family life, negatively impacting morale and motivation upon return from deployment, leading to an indirect decrease in readiness. Similarly, Flowers, Heren, and Holliday (2008) assert, “numerous and longer deployments and escalating home-station requirements are taking a toll on Airmen’s relationships” (p. 1). Flowers et al. (2008) further affirm, “longer deployments or increased operational tempo may also have substantial effects on family conflict and domestic violence” (p. 23) and found a positive correlation between length of deployment and the number of reported cases of spousal abuse and violence in the year following a deployment. McCarroll et al. (2010) reinforce the increased probability of spousal aggression as a function deployment length by summarizing this interrelationship, “thus, it is not solely the fact of deployment that is associated with severe spousal aggression, but the longer the deployment, the more likely severe spousal aggression becomes” (p. 355).
While studies of PTSD and domestic violence among returning GWOT veterans have been widely documented in recent years, the specific effects on aircrew proficiency are not as well understood. Tangible effects include an inability to complete training sorties due to specific legal or psychological proceedings associated with domestic violence and PTSD cases. Yet, the intangible effects of these psychological factors relating to deployment and deployment length contribute to degradation in the ability of aircrew to maintain proficiency. Mastery of the diverse skills required of Strike Eagle aircrew necessitates intense concentration and focus during the limited training opportunities provided. Therefore, whether officially diagnosed with a psychological condition or not, the emotional strains that aircrew experience within the family after returning from a deployment serve as a distraction that is counter to focus and concentration. At the far extreme, these distractions can be deadly even in a training environment. More common is the fact that training is negatively influenced by these psychological effects, manifested as a decrease in the ability to regain proficiency following a deployment. Flowers et al. (2008) suggest that the “Air Force needs to focus on reintegration training with all [of] the issues families have upon reunion” (p. 69) in order to mitigate these psychological influences affecting aircrew proficiency.

**Summary and Conclusions of the Literature**

In response to increased OPTEMPO and its effects, the Air Force must take more care to train core war-fighting competencies, as well as provide the resources to sustain multiple deployments in order to decisively win future combat engagements in major theaters of war (Lawhorn, 2001). For Strike Eagles, as well as other multi-role fighters, Bigelow et al. (2003) determined that these core war-fighting competencies are extremely diverse, necessitating a diverse training program that enables aircrew to maintain proficiency in all required skill sets.
According to Lawhorn (2001), though, the existing force is not “capable of executing decisive operations in two near-simultaneous major theaters of war while engaged in multiple, long term deployments” (p. 34). Therefore, a lack of proficiency stems from an inability to generate the requisite training on several fronts. The nature of current combat operations in support of the GWOT and other contingency operations does not exercise the wide range of skills required of Strike Eagle aircrew. Reents (2008) adds, “the critical skills necessary for combat proficiency will atrophy without constant training” (p. 61), leading to a “negative impact on the…readiness of the pilots, jets, and squadrons involved” (Reents, 2008, p. 2). Dahlman and Thaler (2000) further this argument by demonstrating that hours flown during a deployment are less relevant to gaining proficiency and may lead to a pilot who is experienced in terms of flying hours in accordance with Air Force criteria, but not proficient from the perspective of a diverse series of training experiences. Campbell, Quinkert, and Burnside (2000) describe the elements of a structured training program as explicit task focus, realistic scenario, focused task performance feedback, a training support package, and linkage to the larger training strategy, all of which are variables that are difficult to control in the situationally dependent scenarios of actual combat. Therefore, length of deployment exacerbates these issues and has a negative effect on aircrew ability to maintain proficiency.

Length of deployment also has a negative effect on the aircraft themselves. Equipment readiness decreases because of the wear and tear on airframes, engines, and parts. Junor et al. (1997) assess that this directly and indirectly affects personnel readiness, worsened with increasing deployment length. Equipment unavailable for use further reduces training opportunities for aircrew.
Similar to equipment availability, personnel availability also affects training opportunities. Retention rates among aircrew decrease as a function of deployment frequency and deployment length (Junor et al., 1997). The result is an influx of inexperienced personnel to fill the void left by vacating experienced aircrew—yet this paradoxically requires more experienced aircrew to train those who are inexperienced (Dahlman & Thaler, 2000). Dahlman and Thaler (2000) assess a healthy unit to be “one that is composed of an adequate number of people at all skill levels” (p. 4). Longer deployments detract from this model of a healthy unit by creating a retention problem that affects a squadron’s ability to gain, maintain, and sustain proficiency by retaining their experienced aircrew.

Lastly, Flowers et al. (2008), McCarroll et al. (2010), and Shen et al. (2010), in studying PTSD and domestic violence among veterans, relate the intangible outcomes on aircrew proficiency associated with the psychological effects accompanying deployment and deployment length. “Repeated deployments to Iraq and Afghanistan cause enormous stress on…families” (Flower et al., 2008, p. 17) and this serves as a distraction from the efficiency and effectiveness of aircrew training programs.

While there is little research on the specific effects of an increase in the standard deployment length to 179 days on Strike Eagle aircrew proficiency, there is significant research that predicts a negative impact. The literature reviewed illustrates this prediction through the related effects of deployment and deployment length on aircrew ability to be emotionally ready to train for proficiency in all mission sets, as well as have the opportunities to conduct and participate in the diverse training experiences required to maintain Strike Eagle aircrew proficiency.
Chapter 3

Research Methodology

The Air Force implemented a policy change in 2010 that increased the standard deployment length to 179 days. In its decision to implement this change, the Air Force considered both the positive and negative effects that would result. This increase to the standard deployment length has specific implications for Strike Eagle aircrew that, as determined from the literature review and anecdotal evidence, have a diverse set of skills in which they are required to maintain proficiency. The purpose of this research was to determine what effects this increase in deployment length has had on aircrew proficiency in the Strike Eagle, as well as any correlation between these effects and the mission focus of recent deployment cycles. Subsequently, this research sought to explore potential solutions to mitigate any negative effects that were identified.

General Research Overview and Approach

The research approach used in this study is a hybrid of policy analysis and case study. This research considered only F-15E Strike Eagle squadrons that operationally deploy or those squadrons who train aircrew that will operationally deploy, lending itself to the specificity of a case study. However, this research was framed by the Air Force’s policy shift to longer deployments; blending case study with policy analysis methods created flexibility during data collection and data analysis. In this research, the policy shift towards longer deployments was not being critiqued or studied in order to determine its pros or cons. Instead, this research explored the impact of this policy shift within the specific case of Strike Eagle squadrons who
were affected by it—that is, operational Strike Eagle squadrons and the squadrons who train new
Strike Eagle aircrew that feed the pipeline of operational squadrons.

Operational Strike Eagle squadrons are located at Mountain Home AFB in Idaho, Lakenheath AB in the United Kingdom, and Seymour Johnson AFB in North Carolina—each of these bases is home to two operational squadrons each. Additionally, the Formal Training Units (FTUs) for the F-15E are also located at Seymour Johnson AFB in North Carolina and consist of two squadrons. This results in a potential subject pool of eight squadrons who operationally deploy or train aircrew that will operationally deploy. Other F-15E squadrons not considered in this study include the Strike Eagle Weapons School squadron and two Strike Eagle Test and Evaluation squadrons; these squadrons have a much more narrowly focused purpose within the Strike Eagle community and consist of significantly fewer aircrew. Therefore, including them was beyond the scope and intent of this study.

As a subsequent objective, this research also contained an exploratory element. The literature review suggests that an increase in deployment length will have a negative impact on the ability of Strike Eagle aircrew to maintain proficiency given the nature of current deployments and the diverse requirements placed on Strike Eagle aircrew. However, in order to reduce data collection bias, a negative effect was not assumed and the instruments used for data collection aimed to explore any effects of the policy change on operational Strike Eagle aircrew.

Data collected was of both a quantitative and a qualitative nature. The primary method for collecting data was through survey of aircrew. This survey instrument contained both quantitative and qualitative components. These data were augmented by an interview of a squadron Weapons Officer that provided a qualitative perspective to the results gathered from the aircrew survey. The quantitative data were used to calculate response averages as well as
identify trends based on demographic delineators such as aircrew experience level. The specific results are discussed in Chapter 4. The qualitative components provided additional information to support the trends and results that were identified with the quantitative component of the survey responses. Additionally, the qualitative component provided the opportunity for aircrew and squadron leadership to generate solutions to mitigate any negative effects identified from the quantitative data, creating the starting point from which to propose viable courses of action to Squadron Commanders to address and mitigate these effects. Lastly, the limitations of the quantitative component of the survey instrument, coupled with the qualitative components drove the discussion of areas for future research topics outlined in Chapter 5.

**Specific Data Collection Approach and Procedures**

This research consisted of a survey that was administered online and a telephone interview; 83 responses to the aircrew survey were received and one interview was conducted with a Weapons Officer. The survey targeted all Strike Eagle aircrew that are in operational flying squadrons, as well as those instructors and recent graduates of the two Formal Training Unit (FTU) squadrons who already have or will have operational experience. Widening the target audience to include recent graduates of the training pipeline, though lacking operational experience, allowed a comparative *control group* of aircrew proficiency. After graduating from the FTU, these young aircrew should be able to demonstrate proficiency in all of the skill sets required in the Strike Eagle. Having not deployed, these graduates provided an average baseline for comparison with more experienced aircrew that had deployed at least once. The interview targeted squadron leadership in the form of the Squadron Commander, the Director of Operations, or the Weapons Officer. These individuals were selected for interview because of their primary role and responsibility in maintaining their squadron’s proficiency in all skill sets.
required to meet or exceed DOC statement expectations—Squadron Commanders and Directors of Operations from a leadership standpoint and Weapons Officers from a tactics and training implementation standpoint. Therefore, these individuals were best positioned to assess their squadron’s proficiency in each of the skill sets during each of the four phases previously discussed. Additionally, the qualitative information received from these individuals was used to validate trends identified from the aircrew survey responses.

The survey itself was designed and proctored by the researcher through an online survey creation and distribution service called Survey Monkey. This survey, shown in Appendix E, consisted of three parts: a demographic section, a quantitative section involving aircrew selection of perceived proficiency on a numbered scale, and a qualitative section that asked for open-ended responses. At a minimum, all aircrew who participated in this research had obtained a Bachelor’s degree as a pre-requisite for officership, and had also completed the rigorous training pipeline for fighter aircrew. Therefore, basic reading, writing, and English skills were assumed in this research. Coupled with the high use of email and computers for daily tasks, an electronic survey format distributed via email was used to address the geographical separation of squadrons in the most efficient method available.

Part I of the survey was an aircrew demographic section that allowed subsequent responses to be analyzed and categorized according to these demographic categories. Overall, the objective of the research was to determine any effects on aircrew proficiency due to the increased deployment length, but the demographic data received allowed an analysis to determine if different magnitudes of effects were present among particular demographic categories. These demographic categories included assigned squadron, crew position (Pilot or WSO), experience level as determined by Strike Eagle flight hours (broken down into three
categories that typify experience milestones), current qualification level, and number of deployments. Delineating by squadron ensured that a representative sample of each squadron was achieved and provided an opportunity to assess whether or not squadron specific trends could be identified. Similarly, the demographic discriminators of crew position and experience/qualification level allowed trends associated with these demographics to be identified. For example, some skill sets were found to be more or less affected by the longer deployment length as a function of experience level. Age, while generally correlated with aircrew experience level (older aircrew should have more flight hours and be more experienced), was not deemed to be of significant interest to the research and therefore was not included in the demographic section of the survey instrument.

Part II of the survey provided a quantitative method for data collection of perceived effects on each skill set during four phases of the deployment cycle: just before starting the spin-up process for a deployment, just before leaving for a deployment, just after returning from a deployment, and just after completing a reconstitution program following a deployment. A five-point Likert scale from (1) through (5) was used, and the definition of a (3) response was provided within the survey to present a framework for aircrew from which they could judge their proficiency. This design aimed to minimize the amount of “firewalled” responses—that is, extreme responses of all (5)’s or all (1)’s. The starting point for basic proficiency was a (3), and aircrew chose to increase or decrease the response level based on their perceptions of their proficiency during each of the four phases. Aircrew were asked to rate their perceived proficiency during each of the four phases of the deployment cycle described above across the nine skill sets required of Strike Eagle aircrew identified in the literature review of Chapter 2.
Part III consisted of two quantitative and two qualitative questions. The first question was designed to illicit a “gut feel” from aircrew about the impact of longer deployments on the nine skill sets listed and the second question was designed to compare the relative training requirements to maintain proficiency in these skill sets using the training requirement for proficiency in CAS & NT-ISR as a baseline. Given the deployment environment in support of the GWOT in recent years, CAS & NT-ISR were emphasized as the primary deployed skill set. Therefore, using CAS & NT-ISR as a baseline allowed aircrew to have an accurate measuring tool to assess the training requirement of the other skill sets using a scale of More, Less, or Same relative to the CAS & NT-ISR baseline. Lastly, questions three and four of Part III were open-ended and asked participants to describe any solutions currently in place to maintain proficiency in all skill sets, as well as any suggestions or recommendations they had for accomplishing skill set maintenance in light of the increased deployment length. These open-ended questions were designed to allow aircrew to further express their opinions on the subject and they provided the starting point for determining solutions and potential future research questions related to the topics being studied.

Like the aircrew survey, the researcher created the interview questions to determine what, if any, effects this increase in deployment length has had on aircrew proficiency. The interview questions closely mirror the content and form of the aircrew survey, but were designed with the entire squadron in mind. The interviewee was not asked to assess their individual proficiency levels; instead, he was asked to assess squadrons as a whole. This interview was conducted via telephone due to geographic separation of the researcher and the interviewee.

In contrast to the quantitative components of the aircrew survey, the interview was primarily a qualitative discussion of similar topics and is shown in Appendix G. Part I consisted
of a demographic section, most of which was collected prior to the interview to maximize the use of available interview time. The interview questions in Part II asked the interviewee to assess the squadron’s proficiency in each of the nine individual skill sets at each of the four phases of the deployment cycle. Unlike the aircrew survey, a numerical value was not requested or required. The desired response was simply an honest answer to these open-ended questions.

Part III consisted entirely of open-ended questions that pertained to the perceived impact of the increase in deployment length, potential challenges that squadron leadership foresees or has experienced firsthand, solutions currently in place to mitigate any negative effects, and the sustainability of Strike Eagle combat capability within this deployment cycle.

Both the survey and interview instruments were tested for validity and reliability prior to their use in the research. The survey instrument was designed using terms and language that aircrew were already familiar with to reduce confusion in the questions being asked. The researcher addressed accessibility to the survey instrument by using an online survey proctor service that allowed for maximum participation of aircrew across geographically separated areas. Additionally, an attempt was made during design to reduce any bias in the questions that would influence the results. The interview questions were designed to illicit thought and opinion from the decision makers within the squadron who must manage any challenges presented by the increase in deployment length. With these design characteristics in place, a panel of three Strike Eagle aircrew were formed to review both the survey and interview instruments for reliability and validity. These aircrew did not participate as survey respondents in the research, but provided feedback on the effectiveness of these two instruments in drawing out the desired data based on the questions being asked. After several minor modifications to the original
instruments, the survey and interview questions reflected in Appendix E and G, respectively, were determined by the panel to measure what the researcher intended to measure.

Prior to data collection, approval to administer the survey instrument to the squadron’s aircrew and to interview squadron leadership was obtained from the Squadron Commander. Of the eight squadrons considered, five squadrons provided signed approval letters (shown in Appendix B) and three squadrons provided verbal denial of the use of their aircrew and squadron leadership for the research. These denials included both of the operational squadrons at Mountain Home AFB and one of FTU squadrons at Seymour Johnson AFB.

A link to the online survey was distributed via email to the government email accounts of the aircrew in each of the squadrons. The body of this email included the survey link as well as a brief description of the survey, emphasizing the anonymity of the results and that participation was voluntary. The Survey Consent Form, shown in Appendix D, was attached to this email, and detailed that participation in the survey indicated consent to be included in this research. Though survey completion was anonymous, participants were provided with the researcher’s contact information if they desired to request an electronic copy of this research report or if they had specific questions related to the research.

The desired sample size for this research was approximately 50% of the target audience spanning the six operational squadrons and two FTU squadrons being considered. Within each of these squadrons, there is a capacity for approximately 60 aircrew positions; given current Air Force manning levels for Strike Eagle Pilots and WSOs, these positions were conservatively estimated to be manned at approximately 70%. Therefore, the total pool of available aircrew was approximately 336 participants, with a target of 168 responses to reach the desired 50% threshold. With the denial of research participation from three squadrons, the available number
of aircrew was reduced to 210. This pool of potential participants was further reduced to 168 when one of the five squadrons that had granted written approval was unable to administer the survey due to the combination of timing of the survey and real-world operational constraints. Of the remaining pool of 168 available and approved respondents, 83 responses were received, falling just short of the 50% threshold with 49.4% response rate. Despite falling short of the desired response rate, the researcher analyzed aircrew demographics within the response pool to verify that a representative sample of Strike Eagle aircrew were captured in the data received. Of the 83 respondents, 72.3% were currently stationed at Seymour Johnson AFB (8.4% were from the 334 FS, 38.6% were from the 335 FS, and 25.3% were from the 336 FS). The remaining 27.7% were from Lakenheath AB. Distinguishing between crew positions, 44.6% of respondents were Pilots and 55.4% of respondents were WSOs. Using flight hours as a measure of experience level, 27.7% of respondents had less than 500 flight hours in the F-15E (low-experience), 44.6% of respondents had between 500 and 1500 hours in the F-15E (mid-experience), and 27.7% of respondents had more than 1500 hours in the F-15E (high-experience). This measure of experience had moderate to strong correlations with aircrew qualification and number of deployments. That is, as a general trend, those with higher qualifications (such as Instructor and Evaluator) predominantly had at least mid-level experience (97.5% of respondents indicating a qualification level of Instructor or Evaluator). Correspondingly, those with multiple deployments (two, three, or more than three deployments) also had at least mid-level experience (93.7% of respondents who indicated two, three, or more than three deployments).

In addition to the survey in Appendix E, one interview was conducted with a squadron Weapons Officer. The combination of operational constraints, time zone differences, and
scheduling conflicts precluded more interviews from being conducted. The data received from
the single interview were used to support or provide an alternative perspective to the trends
identified from the survey responses. The interviewee was a mid-experience WSO with multiple
deployments and a unique perspective with respect to the research problem. Since the
introduction of the Air Force policy change to a longer deployment length, this individual had
flown as a non-squadron member with three different squadrons during multiple phases of the
deployment cycle. Though interview data were isolated to the perspective of one person, the
breadth of experience and knowledge of this individual provided a valuable accompaniment to
the survey response data.

**Specific Approach to Data Analysis and Synthesis**

Once the data were collected, they were systematically analyzed to determine the effects
of an increase in deployment length using the quantitative results of the aircrew survey. As
previously discussed, the following demographic variables were cross-correlated:

a. Squadron  
b. Crew Position  
c. Experience Level  
d. Qualification Level  
e. Phase of Deployment Cycle.

The results of this cross-correlation reflected a representative sample of responses across the
Strike Eagle community and identified aircrew experience level, as measured by flight hours, as
a broad descriptor for number of deployments and qualification. Based on the correlation
between experience level, qualification level, and number of deployments, the relationship
identified between the proficiency effects and flight hours was extended to apply to qualification
level and number of deployments. Therefore, experience level, as measured by flight hours, was used to simplify the data analysis and presentation in Chapter 4. Measuring the effects on aircrew proficiency throughout the four phases of the deployment cycle revealed the impact that the policy change to increase the deployment length had on aircrew proficiency in each of the nine basic skill sets.

The results of these measurements were charted on several iterations of a multi-series bar graph to visually depict these effects. The data presented in these charts were a quantitative average of the five-point Likert scale responses, categorized based on the demographic variable in use. The qualitative results for both the aircrew survey and the interview were used to determine the conceptual trends that are discussed in the conclusions and recommendations made to Squadron Commanders found in Chapter 5.

**Methodological Limitations and Scope**

Though the research methodology was designed to identify the effects of an increase in deployment length on aircrew proficiency, it was not void of specific limitations in methodology, scope, and received responses. The fact that the researcher is also an F-15E instructor pilot had the potential to introduce bias into the data collection procedures and analysis. Additionally, since the researcher developed the survey and interview instruments, there is the potential for bias to be present in each of these instruments. An attempt was made to mitigate this risk of inherent bias by forming a panel to ensure reliability and validity of each of these instruments. However, by nature of the fact that the researcher originated from within the Strike Eagle community, inherent bias cannot be entirely mitigated.

Subsequently, the research aimed to gain maximum participation from the respective target audiences in both the survey and the interviews from across eight Strike Eagle squadrons
located at three different bases. The actual survey responses received came only from four squadrons located at only two of the three bases. The third base, Mountain Home AFB, has historically supported deployments concentrated towards the Pacific Theater that involve a different mission focus than those in support of the GWOT. Without the input of the squadrons located at this base, caution must be used when generalizing across the Strike Eagle community given the limited scope of data received. This was mitigated to some degree by the Air Force’s routine movement of Strike Eagle aircrew among the three bases. Additionally, the Weapons Officer who was interviewed has experience flying with one of the Mountain Home AFB squadrons shortly after their return from a 179 day deployment; however, the corresponding effect of a limited data response cannot be overemphasized.

Expanding the discussion of scope, since the research only considers Strike Eagle aircrew, the direct application of these research results cannot be extended to squadrons flying different aircraft or to any of the other military services. However, based on the literature review, if research of a related nature were conducted within other multi-role fighter communities, the results are expected to be similar.
Chapter 4

Data Analysis

From an estimated pool of 168 Strike Eagle aircrew with varying levels of experience, qualification, crew position, and squadron, 83 responses to the survey instrument were received. In analyzing this data, the intent was to determine the effects that an increase in the standard deployment length to 179 days would have on aircrew proficiency. Experience, as measured by flight hours, was found to be reflective of aircrew qualification and number of deployments. Additionally, trends in the identified effects of the increase in deployment length across squadrons were found to be consistent when considering aircrew survey responses and are supported by the Weapons Officer interview. Therefore, the following data are presented primarily with respect to aircrew experience level across the four phases of the deployment cycle, regardless of squadron or crew position.

Data Presentation and Analysis

Since the end of major combat operations in Iraq and Afghanistan during 2003, Strike Eagle deployments have been focused on supporting the GWOT by primarily exercising the CAS & NT-ISR skill set. With this framework of mission focus in place, the aircrew participating in this research were asked to rate the impact of an increase in deployment length to 179 days in each of the nine skill sets previously described. The percentages of responses in each rating category are shown in Figure 1 and indicate that a majority of aircrew perceived a negative impact on their proficiency in most of the nine skill sets as a result of the increase in deployment length. Specifically, the Air-to-Air skill sets of BFM, ACM, and ACT (DCA) show extremely high percentages of perceived negative impact, followed by SAT, the multi-role
mission set that contains fundamental Air-to-Air skills, which also reflects a high degree of negative impact in response to the change in deployment length. Less affected, though still significant, were BSA and LOWAT. According to the survey respondents, the majority of those currently or previously NUCLEAR certified felt that this increase in deployment length had no impact on proficiency in that skill set. In contrast, proficiency in CAS & NT-ISR were positively influenced by the increase in deployment length. Similarly, NIGHT skill sets were also positively influenced.

![Figure 1](image)

*Figure 1.* Aircrew perceived impact on proficiency level due to increase in deployment length.

With a perceived negative impact established for six of the nine mission sets, it is important to identify at what point in the deployment cycle where this impact occurs. Figure 2 shows the average score of perceived proficiency from the five-point Likert scale for all respondents in each of the nine skill sets. With the exception of CAS & NT-ISR and NIGHT, this figure reflects that the highest degree of proficiency occurred prior to beginning the spin-up...
process for a deployment. Furthermore, proficiency began to atrophy during the spin-up and was at its lowest point during the deployment itself.

![Figure 2](image)

*Figure 2.* Average aircrew perceived proficiency level throughout the deployment cycle broken down by skill set (total respondents).

After returning from a deployment, aircrew regained some proficiency by completing a reconstitution program, though to a lesser degree than possessed prior to starting the spin-up process before a deployment. The largest differential in proficiency levels is seen in those skill sets that the highest percentage of aircrew identified as having been negatively impacted by the increase in deployment length—these included the Air-to-Air skill sets of BFM, ACM, ACT (DCA), and the multi-role skill set of SAT (see Figure 1). In contrast, CAS & NT-ISR and NIGHT reflected an increase in proficiency during the spin-up process, and ultimately reached a maximum during the deployment.

Breaking out the average scores from all respondents by experience level revealed differences in the intensity of the proficiency degradation or improvement that aircrew
encountered. Figure 3 shows proficiency for low-experience aircrew (<500 hours) across the nine skill sets during the four phases of the deployment cycle. Figures 4 and 5 show the same data, but consider only mid-experience aircrew (500-1500 hours) and high-experience aircrew (>1500 hours), respectively. Comparing these charts, the average proficiency indicated by aircrew was generally higher in each of the skill sets as experience increased. However, the intensity of skill set degradation for those skills determined to be negatively impacted by the increase in deployment length was highest for the mid-experience aircrew category (specifically in BFM, ACM, BSA, SAT, and NUCLEAR; additionally, mid-experience aircrew were a close second to the high-experience category in the degradation identified in ACT proficiency). In contrast, low-experience aircrew reflected the highest intensity of proficiency improvement in those skill sets identified as being positively impacted by the increase in deployment length to 179 days. This measure of intensity was calculated by subtracting the proficiency level reported just after returning from a deployment from the proficiency level reported just prior to starting the spin-up process for a deployment; these results are summarized in Table 1. Negative values indicate a skill set degradation while positive values indicate skill set improvement; red indicates the experience level that encountered the highest intensity of skill set degradation and blue indicates the experience level that encountered the highest intensity of skill set improvement.

Table 1

<table>
<thead>
<tr>
<th>SKILL SET</th>
<th>Low (&lt;500 hours)</th>
<th>Mid (500-1500 hours)</th>
<th>High (&gt;1500 hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BFM</td>
<td>-1.62</td>
<td>-1.78</td>
<td>-1.68</td>
</tr>
<tr>
<td>ACM</td>
<td>-1.41</td>
<td>-1.82</td>
<td>-1.54</td>
</tr>
<tr>
<td>ACT (DCA)</td>
<td>-1.48</td>
<td>-1.84</td>
<td>-1.86</td>
</tr>
<tr>
<td>BSA</td>
<td>-0.47</td>
<td>-1.43</td>
<td>-1.22</td>
</tr>
<tr>
<td>CAS &amp; NT-ISR</td>
<td>0.95</td>
<td>0.83</td>
<td>0.49</td>
</tr>
<tr>
<td>SAT</td>
<td>-1.53</td>
<td>-1.92</td>
<td>-1.46</td>
</tr>
<tr>
<td>LOWAT</td>
<td>-0.91</td>
<td>-0.91</td>
<td>-0.97</td>
</tr>
<tr>
<td>NIGHT</td>
<td>0.96</td>
<td>0.66</td>
<td>0.46</td>
</tr>
<tr>
<td>NUCLEAR</td>
<td>1.00</td>
<td>-1.80</td>
<td>-0.80</td>
</tr>
</tbody>
</table>
Figure 3. Average aircrew perceived proficiency level throughout the deployment cycle broken down by skill set (low-experience respondents: <500 hours).

Figure 4. Average aircrew perceived proficiency level throughout the deployment cycle broken down by skill set (mid-experience respondents: 500-1500 hours).
Lastly, since the mission focus of deployments for the Strike Eagle in the past decade has been on CAS & NT-ISR, the training required to maintain proficiency in each of the skill sets other than CAS & NT-ISR was determined using a relative comparison to the training requirements for CAS & NT-ISR. The percentage of aircrew who felt the training required for each skill set was more, less, or the same as that required for CAS & NT-ISR is displayed in Figure 6. Of note, a majority of the survey respondents identified the fundamental Air-to-Air skill sets of BFM, ACM, and ACT (DCA), as well as the multi-role skill set of SAT as requiring more training than CAS & NT-ISR. There were no skill sets identified by a majority of respondents as requiring less training than CAS & NT-ISR. For the skill sets of BSA, LOWAT, NIGHT, and NUCLEAR, the highest percentage of aircrew identified these skills as requiring the same amount of training as CAS & NT-ISR.
Figure 6. Relative training required to maintain proficiency in a given skill set using CAS & NT-ISR as the baseline measure.

Data Analysis Summary

The above presentation of data reveals several important findings. First, a negative impact on aircrew proficiency was identified in many of the skill sets required of Strike Eagle aircrew as a result of the increase in deployment length. Taking into account the qualitative responses of the survey data and the interview of the Weapons Officer, this is likely due to the mission focus of deployments that emphasized CAS & NT-ISR at the expense of many of the other skill sets. Additionally, the data above submits that the negative impact generated by the increase in deployment length within an environment of such a narrowly focused deployment mission begins to occur during the spin-up process. The interview with the Weapons Officer confirms that, prior to this point, aircrew were assessed to be generally proficient in most skill sets before beginning a spin-up program focused on the deployment mission.
This negative impact continued to manifest itself in degrading proficiency throughout the spin-up process and during the deployment, resulting in the lowest proficiency levels experienced at the completion of a deployment—just after returning. Coupling the data presented in Figure 2 over the phases of the deployment cycle with the skill set impacts presented in Figure 1, the largest negative impacts from the increase in the deployment length were seen in the Air-to-Air skill sets of BFM, ACM, and ACT (DCA). Correspondingly, the multi-role skill set of SAT also experienced significant degradation in proficiency level as a result of the increase in deployment length. This is largely due to the inherent Air-to-Air components that are interleaved within the Air-to-Ground elements of the SAT skill set.

After isolating experience levels, where negative effects were present, the greatest intensity of degradation was encountered by mid-experience aircrew. In contrast, where correspondingly positive effects were present (as occurred over the last decade when a deployment mission focus that emphasized CAS & NT-ISR, executed at night, resulted in increased proficiency in the CAS & NT-ISR and NIGHT skill sets), the intensity of skill set improvement was greatest among low-experience aircrew. The interview with the Weapons Officer revealed a differing perspective on this trend; throughout a deployment, aircrew increased their proficiency in theater specific CAS & NT-ISR procedures under theater specific ROE and operational structures, at the expense of maintaining high levels of proficiency when considering broader, non-theater specific aspects of the CAS & NT-ISR skill set. Additionally, this interview revealed an assessment by the Weapons Officer that execution of the degraded Air-to-Air skill sets, when at their lowest points of proficiency during a deployment, would border the realm of being dangerous to execute.
Lastly, the data support a positive impact on proficiency after completing a reconstitution plan designed to rehabilitate skills that have atrophied in the face of a narrow deployment mission focus. The Weapons Officer interviewed confirmed this analysis and assessed that a squadron could regain initial proficiency of atrophied skill sets in as little as two months provided the reconstitution plan was focused and deliberate.
Summary and Conclusions

One of the key advantages that the Air Force brings to the joint military force is flexibility—an ability to redirect focus within and according to a dynamic environment to generate maximum effectiveness. The Air Force policy shift to increase the deployment length to 179 days in 2010 is a reflection of this ongoing environmental and situational assessment. At the time of this policy shift, the joint warfighting environment for Strike Eagle aircrew was one that continued to emphasize the CAS & NT-ISR skills sets that emerged as primary missions required to support the GWOT following the end of major combat operations in Iraq and Afghanistan during 2003. Pairing these factors with the diverse set of skills required of Strike Eagle aircrew to be able to successfully execute DOC statement taskings in combat has resulted in a negative effect on the proficiency of Strike Eagle aircrew.

The narrow focus of the mission sets assigned to Strike Eagle squadrons supporting the GWOT has caused a degradation of proficiency that is primarily manifested in Air-to-Air related skill sets. Additionally, a lack of training opportunities in the deployed environment has created the unique challenge of preventing skill atrophy while deployed and regaining proficiency upon return from deployment. The increase in deployment length has only served to amplify this degradation in many skill sets while only marginally improving other skill sets. As previously discussed, the greatest intensity in skill set degradation is encountered by mid-experience aircrew—those aircrew with 500-1500 hours. This is likely because low-experience aircrew have less proficiency to lose, while high-experience aircrew have enough experience to dampen the negative effects of a long, and narrowly focused deployment. This leaves mid-experience
aircrew with the largest bill to pay in proficiency degradation. These individuals have a strong foundation of experience, but not necessarily enough experience to protect that foundation from atrophy due to underuse. This is the case that has occurred as a result of 179 day deployments in support of the GWOT and other contingency operations where the mission focus incorporates few of the diverse skill sets required of Strike Eagle aircrew. Additionally, insufficient training opportunities exist in these combat environments to retain proficiency in the other skill sets.

However, the environmental context continues to evolve. As the military presence in Afghanistan shrinks, Strike Eagle deployments have shifted from the narrow mission focus of CAS & NT-ISR in support of the GWOT, to a broader mission focus that encompasses the theater level objectives and readiness requirements of the Combatant Commander. These theater support package (TSP) commitments require Strike Eagle squadrons to spin-up and train to the diverse skill sets necessary to conduct major combat operations that exercise many, if not all, of the warfighting competencies required for successful DOC employment. Once deployed, nearly all of the nine basic skill sets can continue to be exercised.

Based on discussion during the Weapons Officer interview, the shift in focus under this emerging setup still causes proficiency degradation, but significantly less so than did the previous construct of a 179 day deployment during OEF or OIF where CAS & NT-ISR were the focus. One area in which this degradation is experienced is the time lost during spin-up accomplishing the personnel readiness requirements that must be completed prior to deploying. While these requirements take time away from training during spin-up, these elements remain largely unchanged from those that existed under the previous construct. The other area in which degradation is experienced is the theater specific mission focus. Though this focus is significantly broadened compared to the focus of GWOT deployments, any focus towards theater
specific ROE or theater specific threats and operational plans causes a loss of proficiency in those areas that are not emphasized within this mission focus. In commenting on this, one respondent stated that it might be impossible to maintain proficiency in all skill sets at all times. Instead, this respondent argued that accepting some degradation in some skills was necessary to increasing proficiency in others and that it was up to Squadron Commanders, Directors of Operations, and Weapons Officers to determine, set, and articulate the priority of these skill sets during training, spin-up, deployment, and reconstitution in order to continually balance these competing requirements. The Weapons Officer that was interviewed echoed this need for squadron leadership to present a joint and coordinated effort in order to maximize the proficiency of its aircrew. Additionally, the current shift from a niche mission focus during deployments to a broader range of skill sets, coupled with increasing opportunities for training during deployed operations, has facilitated a greater degree of flexibility in achieving sustained proficiency throughout the squadron.

**Recommendations to Squadron Commanders**

Despite the current shift in deployment focus, Squadron Commanders still face competing requirements, fiscal constraints that limit training resources, and high OPTEMPO that threaten the proficiency of their aircrew. Though the current mission focus of deployments has been broadened, the increase in deployment length to 179 days still creates a challenge for squadron leadership to maintain the proficiency of their Strike Eagle aircrew across the wide range of skills sets required for combat. One of the original objectives of this research was to offer Commanders recommendations to mitigate this degradation in proficiency to ensure that the CAF retain their supremacy as the undisputed champion when assessing the effectiveness of a nation’s military instrument of power. The recommendations that follow aim to address the
challenge of maintaining proficiency by applying a deliberate and targeted approach to homestation training and a broad and varied approach to continuation training during deployed operations. These recommendations are the sum of the qualitative responses of the aircrew survey, the Weapons Officer interview, and the researcher’s own interpretation of the research data.

The process of building a squadron’s proficiency begins during the reconstitution phase immediately following a return from a deployment. Like most reconstitution plans, a phased—or focus-week—approach is most appropriate to take advantage of the building block nature of skills sets that increase complexity from BFM to ACM to ACT (DCA). A minimum of one week should be spent on each of these skill sets. Arguably, depending on the maintenance status of the aircraft and the ability to generate an appropriate number of flying hours to support training requirements, as much as two full weeks should be spent on BFM and ACM. Using even modern simulator technology, these skill sets are replicated less accurately than some of the others. This rebuilds the foundation for operating the aircraft at maximum performance in 1v1 and 2v1 scenarios. The weapons and tactics shop, led by the Weapons Officer should publish explicit learning objectives for these focus weeks to ensure that the desired level of proficiency is regained in a systematic manner. This should occur in coordination with the scheduling and training functions within the squadrons to ensure that all aircrew have the opportunity to regain proficiency. Additionally, training against dissimilar aircraft should be incorporated into the second week of ACM to continue to challenge aircrew. Following these two to four weeks, ACT (DCA) should be incorporated in both simulator and real aircraft missions, once again leveraging dissimilar aircraft support where possible to maximize the number of aircraft that are generated
for training. Additionally, the fidelity of the simulator for this skill set is adequate for valuable training opportunities.

Coincident with these focus weeks, an academic plan should be employed that emphasizes aircraft performance as well as threat aircraft and missile capabilities. Historically, these academics plans typically leverage the enthusiasm of low-experience aircrew to study and learn about a system or threat and then prepare a brief to educate the rest of the squadron; instead, mid-experience aircrew should be targeted to lead these briefings. Based on the data presented in Chapter 4, this category of aircrew is at the highest risk for proficiency loss. Achieving this level of experience occurs concurrently with increasing ground and administrative responsibilities within the squadron, leaving less time to solidify proficiency at a time when it is most critical. This is also the time when Strike Eagle aircrew, both Pilots and WSOs, will first enter the upgrade program to increase their qualification level as either a Flight Lead or Instructor. Therefore, having the mid-experience group of aircrew lead these academics has the highest potential in sustaining proficiency and simultaneously prepares these aircrew for anticipated qualification upgrades.

Upon completion of the BFM, ACM, and ACT (DCA) skill set blocks, aircrew should have regained their Air-to-Air proficiency. A similar process should be repeated with the BSA and SAT skill sets. A minimum of two weeks should be spent building BSA skill set proficiency and specific elements of the LOWAT skill set should be incorporated into the training objectives for these two weeks. Many LOWAT currencies can be regained and BSA skills practiced in the simulator and these should be leveraged methodically during the week prior to flying to maximize the training received during real aircraft sorties. Like the Air-to-Air phases, academics should be focused on munitions and munitions planning, as well as surface-to-air
threats and associated countercalculations—once again, these academics should be led by mid-experience aircrew, mentored by high-experience aircrew (who presumably have obtained higher qualification levels as the data suggest). After completion of the BSA/LOWAT phase, a two-week SAT phase should be accomplished that focuses on standard threats during the first week with an increasing emphasis on contested and degraded operations. The scenarios involved should be simple, varied, and include elements of CAS and dynamic targeting in an opposed environment to develop aircrew proficiency in effectively transitioning between Air-to-Air and Air-to-Ground roles. Once again, maximum dissimilar aircraft support is desired, coupled with the identification of specific learning objectives to be achieved, and a tailored academic and simulator plan to augment individual study.

After nine weeks, if the longest approach to this reconstitution plan was implemented, aircrew should have regained proficiency in all skill sets except for NIGHT and NUCLEAR. This is acceptable as these skills can be addressed later on once the reconstitution training plan is complete. From this point, a deliberate transition back through each skill set will allow proficiency to be retained and even increased. The focus of the training, however, needs to be maintained after the reconstitution plan is completed. This requires close coordination between the Director of Operations, the scheduling and training shops, and the weapons and tactics shop as squadron proficiency, aircrew upgrades, and off-station trips compete for the limited amount of training time available within a squadron. Squadrons will benefit significantly by finding opportunities to efficiently exercise multiple skill sets during a single flight. An example of this is the transition from the ACT (DCA) skill set to the 2v1 maneuvering of ACM or the transition between the 2v1 maneuvering of ACM to an Air-to-Ground role of dynamic targeting or CAS.
With this flying, simulator, and academic plan creating training synergy, squadrons should look to test their proficiency through LFEs. Once again, with a high premium placed on available training time, mid-experience aircrew should be the focus for participation in these LFEs. Most Weapons Officers fall into this category, but unlike their peers with similar levels of flight hours, their proficiency has been forged in the crucibles of large force employment and integration in a contested and degraded environment—giving their status as mid-experience aircrew an exponential learning curve. Anecdotally, their mid-experience characterization based on flight hours equates to the planning, decision-making, and execution that characterizes high-experience aircrew. The opportunity for similar crucible type experiences is available for other mid-experience aircrew through participation in LFEs.

Lastly, while the focus for development and learning is on mid-experience aircrew, learning must be engaged at all levels. Aircrew must be challenged to excel and tested in the air and on the ground to provide actionable feedback on their current level of proficiency. This extends in the deployed environment where continuation training may be acceptable during a TSP deployment. Skill sets and general knowledge outside of the mission focus of the deployment should be emphasized to retain the broad knowledge required of Strike Eagle aircrew. For the Air-to-Ground skill sets, this involves mission planning to scenarios outside of theater specific expectations, complete with academics on threats pertaining to these non-theater scenarios. For the Air-to-Air skill sets, TSP type of deployments may present more opportunities for dissimilar training than available at homestation—even if these opportunities are forced to be heavily scripted based on international integration limitations. By continuing to stretch and challenge aircrew to work and think outside the comfort zone of the theater specific skill sets,
ROE, and special instructions, aircrew will be better positioned to retain their proficiency despite the increase in deployment length to 179 days.

**Areas for Future Research and Study**

This research aimed to identify any effects on proficiency experienced by Strike Eagle aircrew as a result of a policy change to increase the standard deployment length to 179 days. Within a context of the limited mission focus surrounding deployments in support of the GWOT, significant negative effects were realized in the proficiency of F-15E aircrew, primarily in the Air-to-Air arena. Yet, just as flying is dynamic and ever changing, so too the environmental context consistently changes, yielding more questions than answers and opening the door to future research opportunities. These include re-examining the effects of a 179 day deployment on aircrew proficiency under the emerging TSP construct as well as implementing a coordinated, community wide proficiency plan for deploying squadrons and subsequently measuring its effectiveness in achieving sustained proficiency across the range of required skill sets.

An additional area with significant potential for future research opportunities are the psychological effects on Strike Eagle aircrew of the increase in deployment length to 179 days. Empirical evidence, relayed from the Weapons Officer interview, demonstrated that the 179 day TSP deployment seems to have a significant impact on aircrew motivation upon return from deployment. As discussed in the literature review in Chapter 2, many studies have been conducted on PTSD in relation to OEF and OIF, but these primarily involve Army subjects. The stressors of flight operations, while arguably less than ground combat, are unique enough to merit individualized research on the effects that they have on Strike Eagle aircrew over the course of a 179 day deployment.
One final subject for future research exists in the area of optimizing training plans for aircrew proficiency in a resource-limited environment. This would include research into the appropriateness and feasibility of using alternate methods of experiential learning for specific flying-related tasks.
References


Appendices

Appendix A  Acronyms, Definitions, and Terminology
Appendix B  Squadron Approval Letters
Appendix C  CMU Approval to Conduct Research
Appendix D  Survey Consent Form
Appendix E  Survey Questions for Aircrew
Appendix F  Interview Consent Form
Appendix G  Interview Questions for Squadron Leadership
Appendix H  Additional Graphical Results
Appendix A

Acronyms, Definitions, and Terminology

AB—Airbase (the typical nomenclature for foreign basing, such as in the United Kingdom)
ACM—Air Combat Maneuvers
ACT—Air Combat Tactics
AFB—Air Force Base
AFI—Air Force Instruction
AOR—Area of Responsibility
BFM—Basic Fighter Maneuvers
BMC—Basic Mission Capable
BSA—Basic Surface Attack
CAF—Combat Air Force
CAS—Close Air Support
CMR—Combat Mission Ready
DCA—Defensive Counterair
DOC—Designed Operational Capability
FTU—Formal Training Unit
GWOT—Global War on Terror
LFE—Large Force Exercise
LOWAT—Low Altitude Training
NT-ISR—Non-Traditional Intelligence, Surveillance, and Reconnaissance
NUCLEAR—A special weapons qualification for employing nuclear weapons
OCA-AO—Offensive Counterair-Attack Operations
OEF—Operation Enduring Freedom (Afghanistan)
OIF—Operation Iraqi Freedom (Iraq)
OPTEMPO—Operations Tempo
R&R—Rest and Relaxation
SAT—Surface Attack Tactics
WSO—Weapons System Operator
Appendix B

Squadron Approval Letters

A draft version of the approval letters that follow was sent to eight F-15E Strike Eagle squadrons. Of the eight letters sent, all eight were received by the squadron, and five of the eight were finalized, signed, and returned with approval to use that squadron’s aircrew as part of the research sample size. A copy of their approval letter is included for reference. These five squadrons include the following:

a) 334th Fighter Squadron
b) 335th Fighter Squadron
c) 336th Fighter Squadron
d) 492nd Fighter Squadron
e) 494th Fighter Squadron.

The three remaining squadrons who did not return a signed approval letter provided verbal denial of the use of their squadron’s aircrew as part of the research sample size. These three squadrons include the following:

a) 333d Fighter Squadron
b) 389th Fighter Squadron
c) 391th Fighter Squadron.
DEPARTMENT OF THE AIR FORCE
4TH FIGHTER WING (ACC)
SEYMOUR-JOHNSON AIR FORCE BASE, NC

19 February 2013

Lieutenant Colonel Brian S. Armstrong, USAF
334th Fighter Squadron
1115 Brooks Street
Seymour Johnson AFB, NC 27531

Captain Kellen D. Sick, USAF
115 North Marion Drive
Goldsboro, NC 27534

Dear Captain Sick,

I have reviewed your request to conduct a research project involving the 334th Fighter Squadron as well as the survey and interview material that will be used for this project. I feel that this project will be beneficial to the squadron as well as the participants. You have my permission to conduct the associated interviews with myself, the Director of Operations, and the Weapons Officer(s) as well as use the 334th Fighter Squadron and its Aircrew as the subject pool for your research.

If you have any questions regarding this letter of approval, please contact my office staff at (919) 722-3082.

Sincerely,

Brian S. Armstrong, Lt Col, USAF
Commander

4 Attachments:
1. Survey Consent and Information Form
2. Survey Questions for Aircrew
3. Interview Consent and Information Form
4. Interview Questions for Squadron Commander, Director of Operations, Weapons Officer(s)
Lieutenant Colonel David K. Moeller, USAF
335th Fighter Squadron
1155 Brooks Street Suite 230
Seymour Johnson AFB NC 27531

Captain Keller D. Sicc, USAF
115 North Marlow Drive
Goldsboro NC 27534

Dear Captain Sick

I have reviewed your request to conduct a research project involving the 335th Fighter Squadron as well as the survey and interview material that will be used for this project. I feel that this project will be beneficial to the squadron as well as the participants. You have my permission to conduct the associated interviews with myself, the Director of Operations, and the Weapons Officer(s) as well as use the 335th Fighter Squadron and its Aircrew as the subject pool for your research.

If you have any questions regarding this letter of approval, please contact my office staff at (919) 722-3057.

Sincerely

DAVID K. MOELLER, L. Col. USAF
Commander, 335th Fighter Squadron

4 Attachments:
1. Survey Consent and Information Form
2. Survey Questions for Aircrew
3. Interview Consent and Information Form
4. Interview Questions for Squadron Commander, Director of Operations, Weapons Officer(s)
19 February 2013

Lieutenant Colonel James C. Howard, USAF
336th Fighter Squadron
1155 Brooks Street Suite 100
Seymour Johnson AFB NC 27531

Captain Kellen D. Sick, USAF
115 North Marion Drive
Goldsboro NC 27534

Dear Captain Sick,

I have reviewed your request to conduct a research project involving the 336th Fighter Squadron as well as the survey and interview material that will be used for this project. I feel that this project will be beneficial to the squadron as well as the participants. You have my permission to conduct the associated interviews with myself, the Director of Operations, and the Weapons Officer(s) as well as use the 336th Fighter Squadron and its Aircrew as the subject pool for your research.

If you have any questions regarding this letter of approval, please contact my office staff at (919) 722-3926.

Sincerely

[Signature]

JAMES C. HOWARD, Lt Col, USAF
Commander, 336 FS

4 Attachments:
1. Survey Consent and Information Form
2. Survey Questions for Aircrew
3. Interview Consent and Information Form
4. Interview Questions for Squadron Commander, Director of Operations, Weapons Officer(s)
DEPARTMENT OF THE AIR FORCE
48TH FIGHTER WING (USAFE)

Lieutenant Colonel John T. Orchard Jr.
492d Fighter Squadron
Unit 5215 Box 365
APO AE 09461

Captain Kellen D. Sick
115 North Marion Drive
Goldsboro, NC 27534

19 February 2013

Dear Captain Sick,

I have reviewed your request to conduct a research project involving the 492d Fighter Squadron as well as the survey and interview material that will be used for this project. I feel that this project could be beneficial to the squadron as well as the participants. You have my permission to conduct the associated interviews with myself, the Director of Operations, and the Weapons Officers, pending their availability. You may also use the 492d Fighter Squadron Aircrrew as part of the subject pool for your research.

If you have any questions regarding this letter of approval, please contact my office staff at DSN 314-226-0301.

//SIGNED, JTO, 19 Feb 13//
JOHN T. ORCHARD, JR., Lt Col, USAF
Commander

4 Attachments:
1. Survey Consent and Information Form
2. Survey Questions for Aircrrew
3. Interview Consent and Information Form
4. Interview Questions for Squadron Commander, Direction of Operations, Weapons Officers
Lieutenant Colonel Daniel F. Rauch, USAF
494th Fighter Squadron
Unit 5225 Box 370
APO AE 09461

Captain Kellen D. Sick, USAF
115 North Marion Drive
Goldsboro NC 27534

Dear Captain Sick

I have reviewed your request to conduct a research project involving the 494th Fighter Squadron as well as the survey and interview material that will be used for this project. I feel that this project will be beneficial to the squadron as well as the participants. You have my permission to conduct the associated interviews with myself, the Director of Operations, and the Weapons Officer(s) as well as use the 494th Fighter Squadron and its Aircrew as the subject pool for your research.

If you have any questions regarding this letter of approval, please contact my office staff at DSN 51 226 0551.

Sincerely

[Signature]

DANIEL F. RAUCH, Lt Col, USAF
Commander

4 Attachments:
1. Survey Consent and Information Form
2. Survey Questions for Aircrew
3. Interview Consent and Information Form
4. Interview Questions for Squadron Commander, Director of Operations, Weapons Officer(s)
Appendix C

CMU Approval to Conduct Research

Your Research Review Application has been reviewed and approved. You may start your data collection. This approval will not expire as long as your topic and methodology remain unchanged. If your topic or methodology changes, please submit a new Research Review Application and supporting documents to your instructor by e-mail.

Please contact your instructor if you have any questions. Also, be sure to check with your instructor concerning the due dates for your project.

Good luck with your project.

Kim Gribben

Assistant Director, MSA Program

Carol Kross

Master of Science in Administration Program Secretary

Rowe Hall 222 – Central Michigan University

(989) 774-6525

(989) 774-2575 (Fax)

www.grad.cmich.edu/msa
Appendix D

Survey Consent Form

Survey Consent and Information Form

Research Title:

The Effects of an Increase in Deployment Length on F-15E Strike Eagle Aircrew Proficiency and Recommendations to Squadron Commanders to Mitigate these Effects.

Student: Kellen D. Sick, MSA Program
115 N. Marion Drive
Goldsboro, NC 27534
(213) 804-7443
sick1k@cmich.edu
d.sick@gmail.com

Faculty Monitor: Dr. Larry L. Smiley
(479) 268-4282
smile1ll@cmich.edu

Introduction to the Study

In recent years, the Air Force increased the standard deployment length to 179 days. This survey is part of a research project aimed at determining the effects of this increase on aircrew proficiency in the various skill sets required of Strike Eagle aircrew. Your participation, while voluntary, is requested in order to gather first-hand data on your perceptions of these effects on your own skill proficiency.

What will you do in this study?

If you decide to participate in this study, please complete the survey that follows.

How long will it take me to do this?

This survey consists of a total of five demographic questions and eight questions related to the research study. You should expect to spend between 10 and 15 minutes to complete this survey.
Are there any risks of participating in this study?

This survey is both voluntary and anonymous. Your responses will not be associated with your identity in any way. Additionally, completion of this survey has no bearing on your career in the United States Air Force or your assignment in the F-15E Strike Eagle.

What are the benefits of participating in this study?

This study aims to determine any effects on aircrew proficiency due to the increase in deployment length. Once trends are identified, a secondary aim is to find solutions to mitigate any negative effects that are discovered. Your participation in this survey will help to ensure the continued combat capability of the Strike Eagle and its aircrew.

Who can I contact for information about this study?

Contact information for the researcher and research monitor are provided above. Please feel free to contact either individual with any questions regarding this study. If you would like an electronic copy of the results of this research, please send a request by email to the researcher using the contact information above.

You are free to refuse to participate in this research project or to withdraw your consent and discontinue participation in the project at any time without penalty or loss of benefits to which you are otherwise entitled. Your participation will not affect your relationship with the institution(s) involved in this project.

Your completion of this survey implies your consent to participate in this research. A copy of this form will be made available to you, upon request, from the researcher listed above.

If you are not satisfied with the manner in which this study is being conducted, you may report any complaints to Central Michigan University’s MSA Program (anonymously, if you so choose) by telephone at (989) 774-6525.

To complete this survey, please click the link below and follow the instructions provided for each section, answering the questions as accurately and appropriately as you can. Thank you for your time in completing this survey.

https://www.surveymonkey.com/s/trump_masters
Appendix E

Survey Questions for Aircrew

PART I: General Demographic Information

1. What flying squadron are you currently assigned or attached to?
   - □ 333rd Fighter Squadron, Lancers (Seymour Johnson AFB, NC)
   - □ 334th Fighter Squadron, Eagles (Seymour Johnson AFB, NC)
   - □ 335th Fighter Squadron, Chiefs (Seymour Johnson AFB, NC)
   - □ 336th Fighter Squadron, Rocketeers (Seymour Johnson AFB, NC)
   - □ 389th Fighter Squadron, T-Bolts (Mountain Home AFB, ID)
   - □ 391st Fighter Squadron, Bold Tigers (Mountain Home AFB, ID)
   - □ 492nd Fighter Squadron, Bolars (RAF Lakenheath, UK)
   - □ 494nd Fighter Squadron, Panthers (RAF Lakenheath, UK)

2. What is your crew position in the F-15E Strike Eagle?
   - □ Pilot
   - □ Weapons System Operator (WSO)

3. How many flying hours do you currently have in the Strike Eagle in this crew position?
   - □ <500 hours
   - □ 500 to 1500 hours
   - □ >1500 hours

4. What is your current qualification level obtained in the Strike Eagle (select all that apply)?
   - □ Recent FTU Graduate, not Combat Mission Ready (CMR)
   - □ Wingman-Basic Mission Capable (BMC)/Combat Mission Ready (CMR)
   - □ 2-Ship Flight Lead
   - □ Multi-Ship Flight Lead
   - □ Mission Commander
   - □ Instructor
   - □ Evaluator
   - □ Nuclear Certified

5. How many times have you deployed in the Strike Eagle (i.e. deployments where you flew missions in the F-15E in support of OEF, OIF, TSP, or other non-releasable deployments)?
   - □ I have never deployed in the Strike Eagle.
   - □ 1 Deployment
   - □ 2 Deployments
   - □ 3 Deployments
   - □ >3 Deployments (4 or more)

PART II: A Self-Assessment of Your Proficiency in the Strike Eagle

For the following questions, please select a response based on a self-assessment of your proficiency in each skill set listed. Basic proficiency, a (3), is defined as meeting the requisite
proficiency level required to be successful in combat. In other words, a choice of (3) indicates that you are proficient enough in the block listed to adequately perform the skill set as it relates to executing DOC statement missions in combat.

1. What is your assessment of your proficiency in the following skill sets just before starting the spin-up process for a deployment (select the appropriate number)?

<table>
<thead>
<tr>
<th>(1) Lacks Proficiency</th>
<th>(2) Demonstrates Proficiency</th>
<th>(3) Demonstrates Proficiency</th>
<th>(4) Above Average Proficiency</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>BFM</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>ACM</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>ACT (DCA)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>BSA</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>CAS &amp; NT-ISR</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>SAT</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>LOWAT</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>NIGHT</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>NUCLEAR</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

2. What is your assessment of your proficiency in the following skill sets just before leaving for a deployment (select the appropriate number)?

<table>
<thead>
<tr>
<th>(1) Lacks Proficiency</th>
<th>(2) Demonstrates Proficiency</th>
<th>(3) Demonstrates Proficiency</th>
<th>(4) Above Average Proficiency</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>BFM</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>ACM</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>ACT (DCA)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>BSA</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>CAS &amp; NT-ISR</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>SAT</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>LOWAT</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>NIGHT</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>NUCLEAR</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

3. What is your assessment of your proficiency in the following skill sets just after returning from a deployment (select appropriate number)?

<table>
<thead>
<tr>
<th>(1) Lacks Proficiency</th>
<th>(2) Demonstrates Proficiency</th>
<th>(3) Demonstrates Proficiency</th>
<th>(4) Above Average Proficiency</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>BFM</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>ACM</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>ACT (DCA)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>BSA</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>CAS &amp; NT-ISR</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>SAT</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>LOWAT</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>NIGHT</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>NUCLEAR</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
4. What is your assessment of your proficiency in the following skill sets just after completing a reconstitution program following a deployment (select appropriate number)?

<table>
<thead>
<tr>
<th>Skill Set</th>
<th>(1) Lacks Proficiency</th>
<th>(2) Demonstrates Proficiency</th>
<th>(3) Demonstrates Proficiency</th>
<th>(4) Demonstrates Proficiency</th>
<th>(5) Above Average Proficiency</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>BFM</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>N/A</td>
</tr>
<tr>
<td>ACM</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>N/A</td>
</tr>
<tr>
<td>ACT (DCA)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>N/A</td>
</tr>
<tr>
<td>BSA</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>N/A</td>
</tr>
<tr>
<td>CAS &amp; NT-ISR</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>N/A</td>
</tr>
<tr>
<td>SAT</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>N/A</td>
</tr>
<tr>
<td>LOWAT</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>N/A</td>
</tr>
<tr>
<td>NIGHT</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>N/A</td>
</tr>
<tr>
<td>NUCLEAR</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**PART III: Thoughts and Opinions on Increasing the Deployment Length to 179 Days**

1. Do you think that the increase to a 179 day deployment has had a positive, negative, or no impact on aircrew proficiency in the following skill sets:

<table>
<thead>
<tr>
<th>Skill Set</th>
<th>Positive</th>
<th>Negative</th>
<th>No Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>BFM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACT (DCA)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BSA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAS &amp; NT-ISR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SAT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LOWAT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NIGHT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NUCLEAR</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Using CAS & NT-ISR as your baseline, please assess whether the other skill sets listed require more, less, or the same training to maintain aircrew proficiency.

<table>
<thead>
<tr>
<th>Skill Set</th>
<th>More</th>
<th>Less</th>
<th>Same</th>
</tr>
</thead>
<tbody>
<tr>
<td>BFM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACT (DCA)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BSA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAS &amp; NT-ISR</td>
<td>--</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>SAT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LOWAT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NIGHT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NUCLEAR</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. What solutions are currently in place to enable aircrew to maintain an appropriate level of proficiency in all of the skill sets listed above in light of the increase in deployment length to 179 days (open-ended, please provide response below)?

4. What recommendations or suggestions for programs or methods can you provide by which aircrew can maintain an appropriate level of proficiency in all of the skill sets listed above in light of the increase in deployment length to 179 days (open-ended, please provide response below)?
Appendix F

Interview Consent Form

Hello, my name is Kellen D. Sick and I am a graduate student at Central Michigan University. I am conducting research on the effects of an increase in deployment length to 179 days on Strike Eagle Aircrew proficiency. This research will fulfill the completion of my master’s degree requirements. You were selected to participate in this study because you are a Squadron Commander, Director of Operations, or Weapons Officer in a Strike Eagle squadron.

I anticipate that this interview will take less than 30 minutes to complete. There is no compensation for responding nor is there any known risk. In order to ensure that all information will remain confidential, I will not associate your name with the results or analysis. If you desire, I will include your name in the acknowledgements section of the final project. In the results and analysis, I will only categorize your response as that of a Squadron Commander, Director of Operations, or Weapons Officer. Copies of the project will be provided to my faculty monitor at Central Michigan University as well as any aircrew who request an electronic copy to be emailed to them once the project is complete. Participation is strictly voluntary and you may refuse to participate at any time.

I appreciate your willingness to help with my project. The data collected will provide useful information regarding the effects on proficiency that the increase in deployment length to 179 days has had on Strike Eagle aircrew, as well as aid in determining solutions to mitigate any negative effects that are discovered. If you would like a copy of this study please let me know at the end of the interview and I will add your name to a list that I will maintain separately from my interview notes. If you have questions about the research later, please contact me by telephone at (213) 804-7443 or by email at k.d.sick@gmail.com. My faculty monitor is Dr. Larry L. Smiley and he can be reached by telephone at (479) 268-4282 or by email at smile1ll@cmich.edu.

If you are not satisfied with the manner in which this study is being conducted, you may report any complaints to Central Michigan University’s MSA Program (anonymously, if you so choose) by telephone at (989) 774-6525.

Lastly, this interview may be recorded for later analysis. Let us begin with the first question.
Appendix G

Interview Questions for Squadron Leadership

Interview Questions for:

Squadron Commander
Director of Operations
Weapons Officer(s)

PART I: General Demographic Information—Known Prior to Conducting Interview

1. Assigned Squadron.
2. Current title (Commander, Director of Operations, Weapons Officer).
3. Has interviewee deployed with the squadron in which they hold their current title?
4. Experience and Qualification level to determine a baseline for each of the titles listed above.

PART II: Assessment of Squadron Proficiency in the Strike Eagle

For the following questions, we will define basic proficiency as meeting the requisite proficiency level required to be successful in combat. In other words, proficient enough in the skill set listed to adequately perform the skill as it relates to executing DOC statement missions in combat.

[If required, interviewer can provide the guidelines of below average, basic, and above average. However, the intent is for the question to be open-ended and to generate additional commentary by the interviewee.]

1. What is your assessment of the squadron’s proficiency in the following skill sets just before starting the spin-up process for a deployment?
   a. BFM
   b. ACM
   c. ACT (DCA)
   d. BSA
   e. CAS & NT-ISR
   f. SAT
   g. LOWAT
   h. NIGHT
   i. NUCLEAR

2. What is your assessment of the squadron’s proficiency in the following skill sets just before leaving for a deployment?
   See a. – i. above.
3. What is your assessment of the squadron’s proficiency in the following skill sets just after returning from a deployment? See a. – i. above.

4. What is your assessment of the squadron’s proficiency in the following skill sets just after completing a reconstitution program following a deployment? See a. – i. above.

PART III: Thoughts and Opinions on Increasing the Deployment Length to 179 Days

1. What impact do you think that the increase to a 179 day deployment has had on aircrew proficiency? Have you observed, or do you foresee, any skill sets that are affected more than others? Are these effects positive or negative? Do these effects present any challenges to you as a leader in the squadron? If so, describe those challenges.

2. What solutions are currently in place to enable aircrew to maintain an appropriate level of proficiency in all of the skill sets listed above in light of this increase in deployment length to 179 days?

3. Is the current deployment cycle, coupled with this increase in deployment length, sustainable for fighter squadrons? Do you foresee any long-term effects for our fighter forces in 5 years? 10 years? Please describe any of these effects.
Appendix H

Additional Graphical Results

The following additional results are provided for reference and illustrate that the differences found between the squadrons considered in this research were minimal. That is, with few exceptions, the effects of the increase in deployment length on each of the skill sets were consistent from squadron to squadron. These data, therefore, were not directly included in Chapter 4.

Figure 7. Average aircrew perceived proficiency level throughout the deployment cycle broken down by skill set (334FS—FTU squadron).
Figure 8. Average aircrew perceived proficiency level throughout the deployment cycle broken down by skill set (335FS—OPS squadron).

Figure 9. Average aircrew perceived proficiency level throughout the deployment cycle broken down by skill set (336FS—OPS squadron).
Figure 10. Average aircrew perceived proficiency level throughout the deployment cycle broken down by skill set (492FS—OPS squadron).