# OPTIMIZING CONTINUATION TRAINING IN OPERATIONAL F-16 SQUADRONS

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The opinions and conclusions expressed herein are those of the student author and do not necessarily represent the views of the U.S. Army Command and General Staff College or any other governmental agency. (References to this study should include the foregoing statement.)

ABSTRACT

OPTIMIZING CONTINUATION TRAINING IN OPERATIONAL F-16 SQUADRONS by Major Jeffrey A. Hausmann, USAF, 117 pages.

This study investigates the problems associated with development of an optimized continuation training (CT) framework in an operational F-16 squadron. The end result of the study is a suggested CT framework that efficiently utilizes the limited training sorties available to operational fighter squadrons.

The study begins by analyzing a spectrum of training syllabi, ranging from introduction to fighter fundamentals to the F-16 weapons instructor course, to determine the optimal number of sorties needed to train specific fighter pilot skills. After determining the optimal number of training sorties needed for each skill, a CT framework is developed by grouping training sorties into a building block training program. This CT framework is then compared with the expeditionary air force (EAF) training timeline to see if the EAF training timeline allocates sufficient time for the proposed CT framework training cycles.

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# LIST OF ABBREVIATIONS

| | |
|---|---|
| ACC | Air Combat Command |
| ACM | Air Combat Maneuvering |
| ACT | Air Combat Tactics |
| BFM | Basic Fighter Maneuvers |
| BSA | Basic Surface Attack |
| CAF | Combat Air Force |
| CAS | Close Air Support |
| CT | Continuation Training |
| CMR | Combat Mission Ready |
| (D)ACT | Dissimilar Air Combat Training |
| DCA | Defensive Counter-Air |
| EAF | Expeditionary Air Force |
| FAC-A | Forward Air Controller-Airborne |
| FLUG | Flight Lead Upgrade |
| FTU | Formal Training Unit |
| FW | Fighter Wing |
| IDA | Institute for Defense Analysis |
| IFF | Introduction to Fighter Fundamentals |
| IP | Instructor Pilot |
| IPUG | Instructor Pilot Upgrade |
| LGB | Laser-Guided Bomb |

| | |
|---|---|
| MR | Mission Ready |
| MQT | Mission Qualification Training |
| NE-SNP | Non-effective Student Non Progression |
| SA | Surface Attack |
| SAT | Surface Attack Tactics |
| SEAD | Suppression of Enemy Air Defenses |
| TGP | Targeting Pod |
| TI | Tactical Intercepts |
| UPT | Undergraduate Pilot Training |
| USAFWS | United States Air Force Weapons School |
| VID | Visual Identification |
| WIC | Weapons Instructor Course |

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# CHAPTER 1

# INTRODUCTION

## Introduction

The majority of flying training conducted in a fighter squadron is continuation training (CT). It is primarily CT that prepares a squadron to execute its wartime missions, so the success or failure of a fighter squadron CT program will have a direct impact on the squadron's combat effectiveness and survivability.

The goal of this thesis is to construct a framework for a fighter squadron CT program that will simultaneously satisfy three criteria. First, the framework should efficiently train pilots, given the limited training resources available today in the United States Air Force (USAF). Second, it must fulfill the flying training requirements set forth in applicable major command (MAJCOM) regulations. Third, the CT framework should also mesh with the larger flying training timelines integral to the Expeditionary Air Force (EAF) concept. The primary research question then is, can a fighter squadron continuation training program framework be designed that is efficient, will satisfy MAJCOM training requirements, and integrate with the proposed EAF training cycle concept?

## Background

Before considering the elements of the primary question, the USAF pilot development process must be examined to understand the training methodology used. Beginning with undergraduate pilot training (UPT), USAF pilots enter a structured training program designed to efficiently teach both the mental and physical skills required to fly the T-37B and T-38 aircraft. Individuals selected for fighters continue their flying

education at two more highly structured programs. The first program Introduction to Fighter Fundamentals (IFF) teaches basic fighter pilot skills in the AT-38. After IFF, a pilot continues training in his specific fighter at a flying training unit (FTU). Following graduation from the FTU, beginning fighter pilots proceed to their first operational assignments. Upon arrival at their operational squadron, they complete mission qualification training (MQT) and then become mission ready (MR) pilots. This F-16 specific training progression is detailed in table 1.

TABLE 1

F-16 PILOT TRAINING PROGRESSION

| **Training Program** | **Aircraft Flown** | **Length In Training Days** | **Location** |
|---|---|---|---|
| UPT | T-37B / T-38 | ~ 210 | Specialized Training Unit |
| IFF | AT-38B | 36 | Specialized Training Unit |
| FTU | F-16 | 86 - 126 | Specialized Training Unit |
| MQT | F-16 | 90 Maximum | Squadron |
| MQT program completion results in a mission-ready F-16 Pilot | | | |

What do UPT, IFF, FTU, and MQT have in common? There are two characteristics shared by each of these programs. First, each of these programs is syllabus based. Second, the training is arranged into related blocks executed in a sequential fashion.

Being syllabus based, each of these programs clearly describes the curriculum of study. Each has specific ground and flight training requirements. Since some of these requirements build on each other, they must be performed in sequential order.

What about the arrangement of the training? As described earlier, the training is grouped into related blocks. The F-16 FTU training program is an example. The new F-16 pilot is first taught the basic required procedures to take off, fly out to a training area, aircraft handling, instrument procedures, and landing. In addition, the pilot is drilled on handling emergency procedures. Once these basic skills are mastered, the air-to-air and air-to-ground blocks of instruction are taught. In general, these training blocks are executed sequentially, not concurrently, since the skills in subsequent blocks build on skills learned in previous blocks.

When fighter pilots arrive at their first operational squadron, they enter a MQT program designed to familiarize them with the local flying area and ensure they possess the necessary baseline skills for the unit squadron commander to certify them as MR and capable of flying combat sorties. After achieving certain experience milestones, typically based on minimum numbers of flying hours, pilots can be considered for various upgrade programs. Two of the most common upgrade programs in an operational squadron are flight lead upgrade (FLUG) and instructor pilot upgrade (IPUG). In addition, special qualification upgrades can also be performed at the squadron level, such as Killer Scout wingman or pilot. Other upgrade programs are of sufficient complexity that they are typically taught only at the FTU. One example of a specialized FTU program in the F-16 is the Low Altitude Navigation Targeting Infrared Night upgrade.

What other training occurs in an operational fighter squadron besides upgrade training? Typically, most pilots in a squadron are not entered in an upgrade program and therefore are flying CT, which should be designed to improve the combat skills of not only the individual pilot but also enhance the combat effectiveness of the entire squadron.

The aforementioned training programs can be grouped in three broad categories. The first category is training programs conducted at a specialized training unit, like UPT, IFF, or the FTU. These programs are executed using a MAJCOM approved syllabus, in a very structured sequential fashion. Since students in these programs are generally present for the entire program without taking leave, interruptions to their training are infrequent and controllable. The sole focus of a student in these formal training programs is the accomplishment of the training.

The second category of training is upgrade training conducted at the unit level. This training, like specialized unit training, is also syllabus driven. The difference is the syllabus is usually designed by the wing, or in some cases by individual squadrons. The syllabus must meet specific minimum requirements established by the MAJCOM, but the number of sorties and their design are left to the discretion of the operations group commander or more typically the squadron commander. These programs are also typically executed in a sequential building block fashion, but not necessarily so. Furthermore, training at the squadron level is more likely to have interruptions due to pilots being on leave or other squadron flying priorities superseding the upgrading pilot's program.

The third and final category of training is the squadron CT program. For this type of training, the squadron is given the most latitude; the squadron itself normally accomplishes the design of the training program. The only requirements given by the MAJCOM are that the squadron CT program must accomplish certain minimum numbers of training events. The CT program has the same characteristics of nonsequential

execution and frequent interruptions like the squadron upgrade programs. These different training programs are summarized in table 2.

TABLE 2

TRAINING PROGRAM SUMMARY

| Training Program | Designed By | Training Methodology | Training Execution | Continuity |
|---|---|---|---|---|
| UPT | MAJCOM | Syllabus based | Sequential | Good |
| IFF | MAJCOM | Syllabus based | Sequential | Good |
| FTU | MAJCOM | Syllabus based | Sequential | Good |
| MQT | Unit | Syllabus based | Sequential preferred | Fair |
| FLUG / IPUG | Unit | Syllabus based | Sequential preferred | Fair |
| CT | Unit | Varies | Non sequential | Problematic |

## Research Questions

What relevance is there between the three components of the research question and the design of a fighter squadron CT program? In the case of the first two components, efficient conduct of training and meeting MAJCOM training requirements, a direct connection can be made between the component of the research question and the CT program design. As for the link between the EAF training cycle and a squadron CT program, the thesis research will attempt to show how tying the CT program into the EAF training cycle can have a synergistic effect and increase the efficiency of CT training across a fighter wing and perhaps even the CAF.

The thesis will begin with MAJCOM training requirements. For each yearlong training cycle, a squadron is expected to accomplish an extensive list of specific training events. Some of these are general requirements, a pilot must fly a certain number of air-

to-air sorties, night sorties, and so on. Some requirements are more detailed and cover specific flying tasks, like flying a simulated flameout pattern or a heads up display (HUD) off nonprecision approach. The specifics of these MAJCOM training requirements vary slightly from command to command, but the differences are slight enough to be inconsequential since the envisioned CT program framework is intended to be general enough to be easily tailored to accomplish specific MAJCOM requirements.

MAJCOM requirements should serve the purposes of enhancing flight safety and providing a measurement of squadron combat readiness. To this end, they should first ensure each pilot flies often enough and accomplishes the proper tasks so he can safely and efficiently operate his aircraft. At the same time, a pilot should attain proficiency in the tactical tasks that he will need to perform combat missions based on his unit's anticipated wartime taskings. The USAF uses a system called the Ready Aircrew Program (RAP) to track fighter training requirements. The RAP probably fulfils the function of directing the minimum requirements to ensure safe, efficient aircraft operation. However, its use as a tool to measure combat readiness is debatable. If a pilot accomplishes a given number of RAP tasks, it does not necessarily follow that he will attain combat readiness. If the supposition that the purpose of the CT program is to prepare a squadron for combat is accepted, then it would be beneficial to have a training requirements program that would somehow measure readiness to perform combat missions and focus training where there are shortcomings. However, the RAP merely measures accomplishment of tasks; there is no feedback loop where the ability to perform those tasks to a certain standard is measured and then subsequent training tailored to address those shortcomings.

The second part of the research question concerns the conduct of efficient training. Efficient training is defined as flying the minimum number of sorties to learn or practice a given flying skill to a specified level. Both the falling fighter mission capable rates and the reduced flying hours for pilots translate into reduced training opportunities, meaning each sortie must be efficiently utilized. In testimony to Congress, General Richard E. Hawley detailed how the average mission capable rate for fighters has dropped from 85 percent to 74 percent in the last two years (Kreisher 1999, 51). Given the importance of the CT program and the constrained training resources provided to squadrons today, it follows that the CT program should be executed as efficiently as possible to maximize the training benefits for the amount of sorties flown.

Inefficiency in the execution of a squadron's CT program will have a direct impact on their combat effectiveness. Efficiency of the CT program encompasses not only how the actual sorties are flown, but also the work that goes into the design and execution of the program itself. The design and execution of a fighter squadron CT program has historically been the responsibility of the squadron itself, although it could also be designed at the wing level. The design of the CT program is constrained by the number of sorties available per year, the MAJCOM training event requirements, and the types of combat missions the squadron expects to perform as specified by the unit's classified design operational capabilities (DOC) statement. A squadron is free to design its CT program within these three constraints. Air Force regulation AFI11-2F-16V1 dated 1 May 1998 charges squadron supervision with ensuring its CT program sorties "are oriented to developing basic combat skills or practicing tactical employment simulating conditions anticipated in the unit mission" (AFI11-2F-16V1 1998, 6).

The CT program design process faces some challenges. Typically, the squadron weapons officer will be responsible for the design and execution of the CT program. The weapons officer has several squadron responsibilities in addition to the CT program, thereby dividing his attention. The high operations tempo in the Air Force today only compounds this problem. Considering the frequent turnover of not only the squadron weapons officer but also squadron leadership, the potential exists for reinventing the wheel each time the CT program needs to be revised. Considering the number of fighter squadrons CAF wide, the likelihood of redundant effort is high. The goal of this thesis is to propose a CT framework that is specific enough to eliminate much of the burden of CT program design at the squadron level, yet general enough so a squadron can tailor the framework to its specific operational mission requirements. It is assumed the framework will resemble those currently used by other USAF flight training programs. In other words, the sorties in the framework will be grouped by the type of skill being trained and then executed in related phases to preserve continuity and unity of effort.

Thus far the first two parts of the primary question, efficient design and execution of the CT program and accomplishment of MAJCOM training requirements, have been examined. The final part of the research question to consider is the relationship between the CT program and the EAF concept. The USAF fighter force is undergoing fundamental changes in the way it accomplishes its mission. One of those fundamental changes is the introduction of the EAF. The EAF outlines in the broadest terms a training cycle structure for a fighter squadron to execute between EAF deployments. The introduction of the EAF training cycle gives the CAF a chance to coordinate the CT

efforts of individual fighter squadrons to maximize the effectiveness of the entire CAF's CT programs.

## Assumptions and Limitations

The author is writing with a background in F-16 Block 25, 30, and 40 operational assignments and as a Block 42 LANTIRN instructor at the FTU. This investigation will be written from the perspective of designing a CT framework for a F-16 Block 40 squadron subject to RAP requirements and scheduled as part of an EAF.

Even with these limitations, the CT program framework should be readily adaptable to any fighter unit with both air-to-air and air-to-ground training responsibilities. In addition, the CT framework will be general, and its relationship to the RAP requirements will be concerned only with the relative weighting of air-to-air to air-to-ground training. That is, the framework will only be concerned about satisfying percentages of air-to-air and air-to-ground sorties required and not at the level of ensuring accomplishment of individual training events like numbers of instrument approaches.

As stated earlier, it would benefit squadron and wing leadership to have an ongoing objective system to evaluate the effectiveness of the squadron CT program so changes could be made to focus subsequent training on squadron weaknesses. The limitations of ACC's RAP system in regards to a lack of feedback in the system have already been discussed. Major John D. Roosa's 1998 thesis, "F-16 Peacetime Training for Combat Operations," covers the merits of RAP versus a more feedback-oriented system called Operations Factors, tested at Hill Air Force Base in the 1996-1997 timeframe. An analysis of the relative merits of the RAP versus Operations Factors is beyond the scope of this project. However, one limitation of the CT program framework

created by this research will be a lack of an objective, performance-based, feedback system incorporated into the framework itself.

This project is primarily directed to the individuals at the wing and squadron level involved with the design and execution of the squadron's CT program. The wing and squadron weapons officers would fit into this category, along with the squadron operations officers, squadron commanders, and the wing leadership involved with flying operations. In addition, this research could be a useful tool for the MAJCOM staff responsible for planning training exercises and EAF deployments for their subordinate units.

Three secondary questions can be developed to help answer the primary research question by considering the primary research question as three separate but related parts.

1. Is the CT conducted efficiently?
    a. How many sorties are needed to learn a given sortie type?
    b. How should those sorties be grouped into phases?
    c. How many different sortie types should be in a training phase?
    d. How long should a training phase last?
    e. How much of a squadrons flying program should be devoted to CT versus upgrade training?
2. Does the proposed CT program framework satisfy RAP training requirements for relative weighting of air-to-air and air-to-ground sorties
3. Does the CT program fit into the EAF training cycle?
    a. How long should the EAF deployment preparation cycle be?

b. Can U.S. Army Green, Amber, and Red training cycle methodology be coordinated at the wing or MAJCOM level to maximize CT program effectiveness for USAF fighter squadrons?

## Key Terms and Definitions

Efficient Training: Flying the minimum number of sorties to learn or practice a given flying skill to a specified level.

Training Cycle: A collection of training phases. A training cycle typically consists of basic, intermediate, and advanced training phases and focuses on preparing a squadron for a capstone event such as a Red Flag deployment or local operational readiness exercise. A squadron CT program will consist of several training cycles over the course of a training year.

Training Phase: The basic building block of a squadron CT program. A training phase consists of air-to-air and/or air-to-ground sorties grouped together. Depending on the sortie type and complexity, the training phase is considered basic, intermediate, or advanced.

# CHAPTER 2

## LITERATURE REVIEW

Given the specific nature of this project, the body of relevant literature is somewhat small. However, a few research papers do illuminate various aspects of the CT problem. This survey will move from the specific to the general. The first two papers are master's theses specifically applicable to F-16 training. The next four have more application to flying training in general.

There have been two master's theses written in the last two years on F-16 training issues. The first was written by Major Christopher P. Weggeman in 1999 and is titled "United States Air Force Weapons School F-16 Division Revised Flying And Academic Syllabus Flow." It addresses the process of optimizing the F-16 Weapons Instructor Course syllabus. The primary research question for his thesis was: "Can establishing a phase based instructional framework while optimizing the order in which the F-16 Division executes its flying and academic syllabus improve the quality of the institution?" (Weggeman 1999, 2). In short, the answer to the research question was yes. In his conclusion, Major Weggeman states, "The combined effects of the instructional block framework, total building block approach . . . set the conditions for maximized flying continuity, increased flying proficiency, and reduced student-based attrition" (Weggeman 1999, 56). He goes on to say, "Survey results show direct relationships between flying event continuity and student air-to-air proficiency. This study furthers these concepts by showing consensus among WSF IP's that the reduction of flying continuity causes reduced student proficiency, which in-turn, creates increased student-based attrition in the current WSF flying syllabus flow" (Weggeman 1999, 57).

What follows is a summary of some of the characteristics of the training structure advocated by Major Weggeman. First, it is phase based. This means like sorties are grouped and flown sequentially, to preserve unity of effort. Second, a building block approach is used, with subsequent sorties building upon the skills learned in earlier sorties. Third, academics specific to the sorties being flown are taught prior to the execution of those sorties. Finally, continuity is emphasized as essential to both increase pilot proficiency and reduce substandard performance on training sorties.

The second pertinent thesis was written by Major John D. Roosa in 1998 and is titled "F-16 Peacetime Training for Combat Operations." It looks at the relationship between F-16 peacetime training and combat readiness. While the results of his thesis were inconclusive, Major Roosa suggests three areas for further study, one of which is applicable to the CT program project and was already discussed in chapter 1. He suggests an analysis of the RAP training tracking system to determine whether the RAP requirements are both scientifically justified and also useful as a measure of squadron combat preparedness. Determining the validity of RAP as a measure of combat readiness is not a part of this research project. The CT program framework resulting from this research will attempt to satisfy the requirements of RAP, without also determining whether RAP provides a valid measurement of squadron combat readiness.

Two other research papers merit mention since they apply to fighter training in general without being limited to a specific airframe. The Institute for Defense Analysis (IDA) provides additional research material in a June 1992 research project titled "Relating Flying Hours to Aircrew Performance: Evidence for Attack and Transport Missions." This study attempted to determine the relationship between flying hours, both

near term and in overall experience with various measures of pilot skill. The study did find a direct correlation between flight hours and pilot proficiency performing tactical flying skills, such as bombing or airdrops. The specific percentage drop in tactical flying skills for a given drop in flying hours is not important for this research project, but the fact that there is a measurable correlation is relevant. As noted in chapter 1, there is competition in the squadron for flying hours between the squadron's continuation training program and the various upgrade programs being conducted. As a squadron is deciding what percentage of its total flying program is devoted to CT versus upgrades, they must realize there is a measurable loss of tactical flying skills as flying hours are taken away to support other upgrade programs.

Another paper related to this research project is from *Derivative Fighter Training Considerations* dated 1986. This study by Ronald G. Hughes and Douglas B Graham explored the projected initial and continuation training requirements for a future multirole fighter. Their conclusion was approximately 200 plus sorties per six-month period would be necessary to train a multirole pilot with air-to-air and air-to-ground skills equivalent to a single role pilot in that respective skill (Hughes and Graham 1986, 1). It is interesting to note a statement in a Tactical Air Command training regulation in effect when this report was written, "The training to properly prepare for all possible missions, especially in multirole aircraft (e.g., F-4/F-16) generally is <u>beyond unit or individual aircrew capability</u>" (Hughes and Graham 1986, 10). F-16 pilots today subject to RAP requirements need either 96 or 116 sorties per year depending on their experience level, which is obviously well below the 400 plus sorties required annually in the study by Hughes and Graham. The implication here is that by flying less than 400 sorties per year,

the multirole pilot is not as capable in tactical flying tasks as his single role counterparts (Hughes and Graham 1986, 10).

Of particular interest in this study is the relative percentage of air-to-air versus air-to-ground sorties in the projected F-16 CT program compared to the current RAP requirements. Out of the semi-annual requirements of 208 total sorties, 126 of them were air-to-ground and 82 of were air-to-air, or 39 percent air-to-air and 61 percent air-to-ground. Eliminating tasks that are no longer performed by F-16 Block 40 units, there are 78 air-to-air and 84 air-to-ground sorties required for a total of 162 sorties per six months, or 48 percent air to air and 51 percent air to ground (Hughes and Graham 1986, 9). Compare those figures to the current RAP requirements of approximately 40 percent for air-to-air sorties and approximately 60 percent for air-to-ground sorties. Adjustment of the proposed CT program framework to match these RAP percentages is discussed in chapter 3.

A thesis written by Major R. Crawford titled "Training For A Secondary Role In The F-16R" designed a training syllabus for a proposed follow-on reconnaissance aircraft for the RF-4. Major Crawford used a methodology of syllabus design that is comparable to the design methodology planned for this research project. For his analysis, Major Crawford looked at syllabi used to train new aircrews for the F-4, RF-4, and F-16. He compared the numbers and types of sorties in the F-4 syllabus and compared that to the RF-4 syllabus. After determining the percentage difference between the numbers of sorties in the F-4 syllabus compared to the RF-4 syllabus, he applied those percentages to the F-16 syllabus to arrive at a proposed number of sorties and types of sorties for the new F-16R syllabus.

To summarize, Major Crawford felt he was able to extrapolate a new syllabus from both a comparison and an analysis of related syllabi. This research project takes a similar approach by examining syllabi related to F-16 training, comparing numbers of sorties and sortie objectives, and attempting to extrapolate numbers of sorties required to learn specific flying skills.

Finally, Lieutenant Colonel Michael E. Heenan's discussion of levels of training in "USAF Night Tactical Warfare Training for the 1990s" is useful for someone designing a squadron training program. He groups pilot learning into three distinct levels, the beginning--unqualified, the intermediate--familiar, and finally the advanced--proficient pilot. He names these three levels cognition, fixation, and response automation. The term overlearning, defined by American Heritage, is to work at a skill after becoming proficient. Criteria for each level are as follows: in the cognition level, a pilot receives technical instruction and performance criteria, and learns rudimentary skills; in the fixation level, task overlearning results in task integration; finally, in the response automation level, mission overlearning results in a pilot capable of anticipation who also possesses a resistance to interference and stress (Heenan 1985, 15). In short, training a pilot to the response automation level should be the goal of a robust CT program, since it is at that level a pilot is best prepared to enter combat. As Lieutenant Colonel Heenan says, "It allows the crewmember's learning and maturation process to be divided into progressive stages of understanding (cognition), task overlearning (fixation) and mission overlearning (response automation). The contention here is that for a crewmember to be 'qualified'--the stated goal of the schoolhouse--he must have progressed into the response automation stage of learning" (Heenan 1985, 15).

Examination of these six research articles reveals desirable characteristics for this research project's proposed CT program framework. It should be phase based, utilizing a building block approach, with relevant academics taught prior to each flying phase. Feedback is essential to determining squadron combat readiness, but RAP as it is configured today is not capable of providing that type of feedback.

To train a pilot in a multirole fighter to the same level of proficiency as a single role fighter is probably not possible, given the amount of sorties a pilot flies in the USAF today. Flight time is critical, since there is a direct correlation between a reduction in flying hours and pilot proficiency in tactical tasks. These two facts imply the CT program should be as focused as possible, maximizing pilot proficiency on a minimal set of core tasks the squadron needs to perform in combat. Devoting the maximum number of sorties possible on a small set of core tasks will also improve the chances of training the pilot to the response automation level.

Finally, extrapolating a new syllabus based on analysis of existing related syllabi was demonstrated as a viable methodology. The extrapolation methodology will be used in this thesis and is discussed more fully in chapter 3.

# CHAPTER 3

## RESEARCH DESIGN

The research will be divided into three phases. The first phase will be an analysis of eight existing training syllabi used for fighter pilot training. The syllabi are IFF, FTU B course, FTU TX course, FTU I course, Hill Air Force Base (AFB) Mission Qualification Training (MQT), Hill AFB FLUG, Hill AFB IPUG, and the F-16 Weapons Instructor Course. The goal of this analysis is to identify trends in the number of sorties it takes to train a skill at a given level of experience, and also in how sortie types are grouped together in a training environment. Table 3 illustrates the structure of the analysis.

TABLE 3

SYLLABUS xxxx

| Sortie Type | Experience Level Of Pilot | Currency Of The Pilot | Performance Level Required | Number Of Sorties Required |
|---|---|---|---|---|
| **BFM** | | | | |
| **ACM** | | | | |
| **TI** | | | | |
| **(D)ACT** | | | | |
| **BSA** | | | | |
| **SAT** | | | | |

Sortie type is self-explanatory. Pilot experience level is measured as experienced or inexperienced, as defined by Air Force regulation AFI11-2F-16V1 dated 1 May 1998. Pilot currency relates to how recently the pilot has flown the F-16. For example, a F-16 Weapons School graduate coming off the staff and entering into a transition course at Luke AFB would be considered experienced in the F-16 but not current. Performance

level required is the numerical grade required to successfully complete a specific training sortie. Grading standards are summarized in table 4.

TABLE 4

GRADING STANDARDS

| Grade | Explanation |
|---|---|
| Unknown | Performance was no observed or the element was not performed. |
| Dangerous | Performance was unsafe (any element marked "Dangerous" requires an overall grade of 0 and NE-SNP). |
| 0 | Performance indicates a lack of ability or knowledge. |
| 1 | Performance is safe, but indicates limited proficiency. Makes errors of omission or commission. |
| 2 | Performance is essentially correct. Recognizes and corrects errors. |
| 3 | Performance is correct, efficient, skillful, and without hesitation. |
| 4 | Performance reflects an unusually high degree of ability. |
| (19 AF SYLLABUS B/F-V5A-I 1997, 4) | |

Formal flying training programs such as IFF or FTU require an overall grade of "2" for a student to pass a syllabus proficiency demonstration. As described in the IFF syllabus, "The overall grade reflects the student's performance in relation to all mission objectives listed in this syllabus. If a student fails to meet standards when proficiency is required, assign an overall grade less than "2" and mark noneffective-student non progress (NE-SNP) on the gradesheet" (19 AF Syllabus B/F-V5A-K 1996, 4). Grading criteria at an operational unit is more variable, but it is still generally true that passing an upgrade sortie where demonstration of proficiency is necessary will require an overall grade of "2".

Finally, the number of sorties required will be the total number of sorties of a particular type that are required to be flown in each syllabus training phase. A training

phase is defined as a grouping of related sortie types, offensive BFM for example, that ends with a demonstration of proficiency.

The end goal of the syllabus analysis is to attempt to quantify the number of sorties of a given type an average pilot in an operational unit will need to fly to attain proficiency in that sortie type. The analysis examines two large scale variables across a spectrum. The first variable is the syllabus complexity. At one end of the spectrum is the IFF syllabus, which only teaches basic fighter skills. At the other end of the spectrum is the F-16 Weapons Instructor Course (WIC) syllabus, which teaches advanced fighter skills and demands a high degree of performance. The second variable is the experience level of the pilot in training program. Again the spectrum ranges from inexperienced pilots in IFF to highly experienced pilots in the F-16 WIC.

The result of the phase one analysis will be a series of tables like table 4 for all 8 syllabi examined. Two trends are hypothesized for the data. The first possible trend is that more inexperienced pilots will take more sorties to train to a overall grade of "2" in a given sortie type. The second potential trend is the number of sorties to train to a "2" level on a given sortie type will remain constant as syllabus complexity increases, due to higher standards being applied to the more experienced pilots.

Phase two of this project will take the numbers of sorties needed to train a pilot to a grading level "2" and develop training phases with a mix of air-to-air and air-to-ground sorties. Knowing the number of sorties required to train to a grading level of "2" will determine how long each training phase needs to be. Since squadrons normally fly air-to-air and air-to-ground sorties at the same time due to aircraft configuration considerations,

each training phase will contain both air-to-air and air-to-ground sorties. Training phases will be designed from less to more complex using a building block training philosophy.

Given this information, a generic building block CT structure usable by a Block 40 F-16 squadron will be designed. These blocks will be arranged into training phases leading up to a training goal. An example will help illustrate this block CT structure. One possible CT structure contains one week of BFM and BSA, followed by one week of TI and unopposed SAT, then one week of (D) ACT and opposed SAT, culminating in the squadron deploying to a Red Flag training exercise. The question is how long should each block last in order to properly train pilots in those particular sortie types? The syllabus analysis attempts to use existing syllabi to answer that question objectively versus subjectively.

Once this basic training structure is determined, it will be measured against the ACC RAP training requirements. As already stated in chapter 1, this comparison will be for general requirements only, to see if the proposed sortie mix will satisfy the RAP air-to-air and air-to-ground sortie weightings. To illustrate more clearly, a potential problem with the first part of the research process will be examined. Most fighter pilots would agree that learning and staying proficient at air-to-air skills takes more time than air-to-ground skills. The sortie analysis in part one might show that 60 percent of the sorties flown should be devoted to air to air, and only 40 percent to air to ground. However, RAP requirements may dictate a different sortie ratio. So, the thesis derived sortie ratio may have to be altered to comply with the MAJCOM sortie requirements.

The final part of the phase two research will take this generic training structure and try to fit it into the overall EAF training concept. The EAF concept has specific large

scale training blocks for squadrons, broken into three major parts. The first part is block leave and reconstitution when the squadron returns from its EAF deployment. This part will typically last two weeks for the projected 90 day deployment. The second is normal squadron training including local exercises and flag level exercises. Finally, the squadron enters a dedicated preparation phase just prior to their deployment, concentrating on training for the specific scenario in which they will deploy. The total amount of time available between EAF deployments is 360 days. The question is, can our generic CT structure be combined with the EAF concept to optimize CT training flow? If the generic structure can be optimized within the EAF concept, it will then be analyzed to see if can satisfy the RAP training requirements required by ACC.

A research survey will comprise the third and final phase of the research. The target audience is highly experienced F-16 pilots who have been involved in the design and execution of squadron CT programs. All are instructor pilots who are graduates of the F-16 WIC and are currently instructing in the USAF Weapons School F-16 Division. The survey will provide the target audience with the results of phase 1 and 2 and ask questions related to the primary and secondary research questions. It will contain definitions of key terms used in the research and list assumptions inherent in the CT program framework design. The IP responses will be measured along a 4-Point Leichert Scale of strongly agree, agree, disagree, and strongly disagree. Survey questions concentrate on gathering IP opinions on proposed research concepts and the following supporting research questions:

1. How many sorties are needed to learn a given sortie type?
2. How long should a training phase last?

3. Does the proposed CT program framework satisfy RAP training requirements for relative weighting of air-to-air and air-to-ground sorties?

4. Can U.S. Army Green, Amber, and Red training cycle methodology be coordinated at the wing or MAJCOM level to maximize CT program effectiveness for USAF fighter squadrons?

# CHAPTER 4

## SYLLABUS ANALYSIS

The thesis research will now use the raw data contained in Appendix C to infer the number of sorties required to train to a given skill level. Not all sorties flown in the various syllabi analyzed will be compared. There are two basic reasons for considering a subset of the total sorties in the syllabus analysis. First, some sorties flown in the more basic syllabi such as IFF and the B course at the FTU are not flown in a CT environment. For example, the transition sorties flown in the B course syllabus are not flown in an operational squadron. Second, some sorties are of a specialized nature and found only in a small sample size of the syllabi analyzed. An example is the SA-3 sortie in the WIC syllabus, a HARM instructional sortie not flown in non-Block 50 units.

The structure of the analysis is presented in table 5. Detailed descriptions of the items in the table immediately follow table 5.

1. Sortie: Type sortie being analyzed, such as Offensive BFM, Defensive BFM etc.

2. Syllabus: Self explanatory.

3. Pilot Experience: Pilot is either experienced or inexperienced in the aircraft flown for the upgrade program, as defined by the MAJCOM regulation governing the syllabus training.

4. Pilot Currency: Pilot is either current or not current in the aircraft flown for the upgrade program, as defined by the MAJCOM regulation governing the syllabus training.

TABLE 5

SORTIE ANALYSIS METHODOLOGY

| Phase [ Air-to-Air or Air-to-Ground ] | | | | | |
|---|---|---|---|---|---|
| **Syllabus** | **Pilot Experience** | **Pilot Currency** | **Sortie Output** | **Skill Level** | **Sorties Required** |
| **IFF** | Experienced<br>Inexperienced | Current<br>Noncurrent | Wingman<br>Flight Lead<br>Instructor | Wingman<br>Flight Lead<br>Instructor | |
| **FTU B Course** | These syllabi are grouped together since they produced by MAJCOM level formal training units. | | | | |
| **FTU TX Track 1** | | | | | |
| **FTU TX Track 2** | | | | | |
| **FTU IPUG** | | | | | |
| **F-16 WIC** | | | | | |
| **HILL MQT** | These syllabi are grouped together since they produced by unit level weapons officers and are not subject to MAJCOM approval. | | | | |
| **HILL FLUG** | | | | | |
| **HILL IPUG** | | | | | |

5. Sortie Output: Each syllabus has the goal of producing a qualified wingman, flight lead, or instructor pilot in the particular aircraft used during the syllabus training.

6. Skill Level: Each syllabus requires knowledge of a skill to a certain level. A wingman is sometimes be required to demonstrate proficiency in a given skill. A pilot in a flight lead upgrade program is required to demonstrate proficiency in leading a specific sortie type, and usually also demonstrate proficiency in the skill that is part of the specific sortie. Finally, an instructor pilot is typically required to demonstrate proficiency in sortie instruction, flight leadership, and performance of the skill that is part of the specific sortie.

7. Sorties required: Number of sorties required to train specified skill.

TABLE 6

SYLLABUS COMPARISON

| Syllabus | Pilot Experience | Pilot Currency | Sortie Output | Skill Level | Sorties Required |
|---|---|---|---|---|---|
| **IFF** | Inexperienced | Current | Wingman | Wingman | See following tables |
| **FTU B Course** | Inexperienced | Noncurrent | Wingman | Wingman | |
| **FTU TX Track 1** | Inexperienced | Noncurrent | Wingman | Wingman | |
| **FTU TX Track 2** | Experienced | Noncurrent | Wingman | Wingman | |
| **FTU IPUG** | Experienced | Current | Instructor | Instructor | |
| **F-16 WIC** | Experienced | Current | Instructor | Instructor | |
| **HILL MQT** | Variable | Current | Variable | Variable | |
| **HILL FLUG** | Variable | Current | Flight Lead | Flight Lead | |
| **HILL IPUG** | Experienced | Current | Instructor | Instructor | |

TABLE 7

AIR TO AIR SYLLABUS ANALYSIS - BFM

| Syllabus | Offensive BFM Sorties | Defensive BFM Sorties | High Aspect BFM Sorties |
|---|---|---|---|
| **IFF** | 4 | 4 | 2[3] |
| **FTU B Course** | 5 | 4 | 3 |
| **FTU TX Track 1** | 4 | 2 | 2 |
| **FTU TX Track 2** | 1[1] | 1[1] | 1[1] |
| **FTU IPUG** | 1[2] | 1[2] | 1[2] |
| **F-16 WIC** | 2 | 2 | 2 |
| **HILL MQT** | 1 | 1 | 0 |
| **HILL FLUG** | 1 | 1 | 1 |
| **HILL IPUG** | 1 | 1 | 1 |

Note 1: FTU TX Track 2 pilots are not required to demonstrate proficiency in offensive, defensive, or high aspect BFM. Sorties are at the introduction level only. Training to BFM proficiency would presumably require a minimum of 1 additional sortie for each type of BFM.

Note 2: The FTU IPUG syllabus does not specifically separate into offensive, defensive, and high aspect BFM. The upgrading pilot is required to demonstrate proficiency in briefing, conducting, and debriefing a B or TX course BFM sortie after 3 total BFM sorties.

Note 3: IFF students are not required to demonstrate proficiency in high aspect BFM. Training to proficiency in high aspect BFM would presumably require a minimum of 1 additional sortie.

TABLE 8

AIR TO AIR SYLLABUS ANALYSIS – ACM / TI / NTI / ACT

| Syllabus | Air Combat Maneuvering Sorties | Tactical Intercepts Sorties | Night Tactical Intercepts Sorties | Air Combat Tactics Sorties |
|---|---|---|---|---|
| **IFF** | 0 | 0 | 0 | 0 |
| **FTU B Course** | 4 | 3 / 6 [3] | 0 | 2 |
| **FTU TX Track 1** | 4 | 4 | 0 | 2 |
| **FTU TX Track 2** | 1 [1] | 2 / 1 [4] | 0 | 1 |
| **FTU IPUG** | 2 | 1 | 0 | 2 |
| **F-16 WIC** | 1 [2] | 2 / 3 / 4 [5] | 1 | 5 [7] |
| **HILL MQT** | 1 | 1 | 0 | 1 |
| **HILL FLUG** | 1 | 1 / 2 [6] | 0 | 1 / 2 [8] |
| **HILL IPUG** | 1 | 1 | 0 | 1 |

Note 1: FTU TX Track 2 students are not required to demonstrate proficiency in air combat maneuvering. Training to proficiency in air combat maneuvering would presumably require a minimum of 1 additional sortie.

Note 2: WIC students receive an introduction only to air combat maneuvering. Training to proficiency in air combat maneuvering would presumably require a minimum of 1 additional sortie.

Note 3: FTU B course students are required to demonstrate proficiency in single ship intercepts after 3 sorties, and proficiency in element maneuvering after 6 sorties.

Note 4: FTU TX Track 2A students, F-16 pilots non current 2 to 5 years, are required to demonstrate proficiency in element tactics after 2 intercept sorties, Track 2B students, F-16 pilots noncurrent 6 to 24 months, demonstrate proficiency after 1 sortie.

Note 5: WIC students have different training objectives during their tactical intercept phase than the other formal course syllabi in this analysis. For demonstrating proficiency in element tactics in a VID scenario, 2 sorties are allotted. This is the most direct

comparison to the other formal course syllabi. An additional 2 sorties are flown to demonstrate proficiency in element tactics in a BVR scenario. Two more sorties are flown to demonstrate proficiency in 4-ship tactics in a BVR scenario.

Note 6: The Hill FLUG student is required to demonstrate proficiency in element employment after 1 sortie, and 4-ship employment after 2 sorties.

Note 7: WIC students have specific training objectives during the air combat tactics phase that do not compare equally with the training objectives of the other syllabi being studied. Only ACT-1 and ACT-2 compare equally with the other syllabi, so a value of 2 sorties will be assigned instead of the 5 sorties actually flown in the ACT phase at WIC.

Note 8: The Hill FLUG student is required to demonstrate proficiency in element employment after 1 sortie, and 4-ship employment after 2 sorties.

TABLE 9

AIR TO GROUND SYLLABUS ANALYSIS

| Syllabus | Surface Attack Sorties | Night Surface Attack Sorties | Surface Attack Tactics Sorties | Night Surface Attack Tactics Sorties |
|---|---|---|---|---|
| **IFF** | 2 | 0 | 2 | 0 |
| **FTU B Course** | 4 | 1 | 5 | 0 |
| **FTU TX Track 1** | 5 | 1 | 4 | 0 |
| **FTU TX Track 2** | 2 | 1 | 2 | 0 |
| **FTU IPUG** | 2 | 1 | 2 | 0 |
| **F-16 WIC** | 1 / 2 / 3[1] | 1 | 1 / 2[2] | 1[5] |
| **HILL MQT** | 1 | 0 | 2 | 1 / 2[6] |
| **HILL FLUG** | 1 | 0 | 1 / 2[3] | 1 / 2[7] |
| **HILL IPUG** | 1 | 0 | 1 / 2[4] | 1 |

Note 1: WIC students have different training objectives during their surface attack phase than the other formal course syllabi in this analysis. Only SA-1 closely corresponds to the training objectives of the other syllabi in this comparison. SA-2 trains PGM employment, and SA-3 trains the SEAD mission and HTS employment.

Note 2: WIC students have different training objectives during their surface attack tactics phase than the other formal course syllabi in this analysis. Only SAT-1 closely corresponds to the training objectives of the other syllabi in this comparison. SAT-2 focuses on the SEAD mission and HTS employment.

Note 3: The Hill FLUG SAT-1 sortie requires proficiency in a 4-ship day unopposed scenario. The SAT-2 sortie requires proficiency in a 4-ship day opposed scenario.

Note 4: The Hill IPUG SAT-1 sortie requires proficiency in a 4-ship day unopposed scenario. The SAT-2 sortie requires proficiency in a 4-ship day opposed scenario.

Note 5: WIC students demonstrate proficiency in LANTIRN system employment on the night SAT-3 mission.

Note 6: The Hill MQT SAT-3 sortie requires proficiency in a night unopposed scenario. The SAT-4 sortie requires proficiency in a night opposed scenario.

Note 7: The Hill FLUG SAT-3 sortie requires proficiency in a 4-ship night unopposed scenario. The SAT-4 sortie requires proficiency in a 4-ship night opposed scenario.

The goal of the sortie analysis was to determine if there was a consensus number of sorties in the syllabi being compared that would become the basis for the number of sorties needed to train a specific sortie skill in the proposed CT program. However, fundamental differences in the instructional goals of the syllabi being studied must be considered. The syllabi studied for this project train fighter pilots to three fundamental skill levels. The offensive BFM sortie will be used as an illustration. The most basic skill level is that of a wingman. A wingman is expected to demonstrate proficiency for only offensive BFM skills. A flight lead needs to do everything the wingman is expected to do, plus safely and efficiently lead the sortie. Finally, an instructor pilot is expected to have the skills of the wingman and flight lead, and also instructionally brief and debrief

the sortie. So, the inequality inherent in the skill levels required in each upgrade sortie type makes a simple comparison problematic. However, it is also true that the pilots flying in the squadron CT program are comprised of wingman, flight leads, and instructors, all training to and performing at differing levels. Therefore, the CT program will must cater to a pilot population spanning the skill level spectrum from wingman to instructor.

One possible analysis methodology is to group the syllabi by their target population, and not compare the syllabi as one group. The syllabi used for wingman training will make up one group, and the instructor upgrade syllabi will make up the other. There is only one flight lead upgrade syllabus in the sample group, so a comparative analysis between flight lead upgrade syllabi is not possible. Some syllabi, such as the FTU Track 2 syllabus, do not require a pilot to demonstrate proficiency in some sortie types. In this case, empirical adjustments to the required number of sorties will be made to ensure comparisons between different syllabi training to different levels of proficiency are valid. To illustrate this more clearly, let us consider a comparison between the offensive BFM phase in the FTU Track 1 syllabus versus the FTU Track 2 syllabus. The FTU Track 1 syllabus allocates 4 sorties for the student to demonstrate proficiency in offensive BFM. The FTU Track 2 syllabus only allocates 1, but does not require the student to demonstrate proficiency. Empirically, it is assumed the student will require at least 1 additional sortie to demonstrate proficiency. For the comparative analysis, the offensive BFM phase of the FTU Track 2 syllabus would then require an adjusted value of 2 sorties minimum for a student to demonstrate proficiency comparable to the FTU Track 1 student. The tables that follow are grouped according to target

population and contain adjusted sortie numbers derived from the empirical analysis methodology previously described.

TABLE 10

ADJUSTED AIR TO AIR SYLLABUS ANALYSIS--BFM

| Normal = Original Numbers **Bold = Empirically Adjusted Numbers** | | | |
|---|---|---|---|
| **Wingman Syllabi** | **Offensive BFM Sorties** | **Defensive BFM Sorties** | **High Aspect BFM Sorties** |
| **IFF** | 4 | 4 | 2 **3** [1] |
| **FTU B Course** | 5 | 4 | 3 |
| **FTU TX Track 1** | 4 | 2 | 2 |
| **FTU TX Track 2** | 1 **2** [1] | 1 **2** [1] | 1 **2** [1] |
| **HILL MQT** | 1 **2** [1] | 1 **2** [1] | 0 |
| **Instructor Syllabi** | | | |
| **FTU IPUG** | 1 **2** [2] | 1 **2** [2] | 1 **2** [2] |
| **F-16 WIC** | 2 | 2 | 2 |
| **HILL IPUG** | 1 **2** [3] | 1 **2** [3] | 1 **2** [3] |
| **Flight Lead Syllabus** | | | |
| **HILL FLUG** | 1 | 1 | 1 |

Note 1: Student is not required to demonstrate proficiency in the number of sorties allotted by the syllabus. Therefore, at least one additional sortie will be needed for the student to demonstrate proficiency.

Note 2: Type of BFM the FTU IPUG student flies on BFM 1, 2, and 3 is not specified. The student is only required to demonstrate proficiency on "briefing, conducting, and debriefing a B/TX BFM mission." (AETC SYLLABUS F16C0I00PL 1999, 5-11) In

addition, the syllabus course training standards require certain mission specific tasks be performed at a certain level. BFM is the only phase that does not require the student to perform the BFM skill to a given level. In BFM, only fight setup and bandit simulation must be performed to a standard of "3". (AETC SYLLABUS F16C0I00PL 1999, 2-3) Given this background, it would be reasonable to assume that training to a standard of "2" on offensive, defensive, and high aspect BFM would require a minimum of two sorties for each type of BFM, hence the adjusted number of **2**.

Note 3: The Hill IPUG syllabus only programs 1 BFM sortie of each type. Based on my experience in the upgrade program during 1996-1999, the average student required at least 2 sorties in each BFM type before he had demonstrated proficiency. In addition, given the WIC syllabus schedules two sorties for each BFM type while training more experienced students than the Hill IPUG syllabus, it is reasonable to adjust the number of sorties required to demonstrate proficiency in the Hill IPUG syllabus to **2**.

TABLE 11

ADJUSTED AIR TO AIR SYLLABUS ANALYSIS--ACM / TI / NTI / ACT

| Normal = Original Numbers **Bold = Empirically Adjusted Numbers** | | | |
|---|---|---|---|
| **Wingman Syllabi** | **Air Combat Maneuvering Sorties** | **Tactical Intercepts Sorties** | **Air Combat Tactics Sorties** |
| **IFF** | These sorties are not flown during IFF | | |
| **FTU B Course** | 4 | 6 [2] | 2 |
| **FTU TX Track 1** | 4 | 4 | 2 |
| **FTU TX Track 2** | 1 **2** [1] | 1 [2] | 1 |
| **HILL MQT** | 1 | 1 | 1 |
| **Instructor Syllabi** | | | |
| **FTU IPUG** | 2 | 1 | 2 |
| **F-16 WIC** | 1 **2** [1] | 2 [4] | 2 [6] |
| **HILL IPUG** | 1 | 1 | 1 |
| **Flight Lead Syllabus** | | | |
| **HILL FLUG** | 1 | **1** 2 [5] | 1 / **2** [7] |

Note 1: Student is not required to demonstrate proficiency in the number of sorties allotted by the syllabus. Therefore, at least one additional sortie will be needed for the student to demonstrate proficiency.

Note 2: FTU B course students are required to demonstrate proficiency in single ship intercepts after 3 sorties, and proficiency in element maneuvering after 6 sorties. Since operational units train element tactics as a minimum, 6 sorties will be the number used.

Note 3: Because the required number of sorties is either 1 or 2 depending only on currency, and pilots flying in CT programs are generally current, 1 sortie will be the number used.

Note 4: The most direct correlation between the WIC syllabus and the other syllabi in this comparison is training towards element employment in a VID scenario, for which the WIC syllabus allocates 2 sorties.

Note 5: The Hill FLUG student is required to demonstrate proficiency in element employment after 1 sortie, and 4-ship employment after 2 sorties. Since the other syllabi in the comparison are teaching element tactics, a value of 1 will be used.

Note 6: WIC students have specific training objectives during the air combat tactics phase that do not compare equally with the training objectives of the other syllabi being studied. Only ACT-1 and ACT-2 compare equally with the other syllabi, so a value of 2 sorties will be assigned instead of the 5 sorties actually flown in the ACT phase at WIC.

Note 7: The Hill FLUG student is required to demonstrate proficiency in element employment after 1 sortie, and 4-ship employment after 2 sorties. A value of 2 will be used to most closely correlate with the skills required by the IPUG syllabi.

TABLE 12

ADJUSTED AIR TO GROUND SYLLABUS ANALYSIS

| Normal = Original Numbers **Bold = Empirically Adjusted Numbers** | | | |
|---|---|---|---|
| **Wingman Syllabi** | **Surface Attack Sorties** | **Night Surface Attack Sorties** | **Surface Attack Tactics Sorties** |
| **IFF** | 2 | 0 | 2 |
| **FTU B Course** | 4 | 1 | 5 |
| **FTU TX Track 1** | 5 | 1 | 4 |
| **FTU TX Track 2** | 2 | 1 | 2 |
| **HILL MQT** | 1 | 0 | 2 |
| **Instructor Syllabi** | | | |
| **FTU IPUG** | 2 | 1 | 2 |
| **F-16 WIC** | 2 **1** [1] | 1 | 2 **1** [3] |
| **HILL IPUG** | 1 | 0 | 2 **1** [4] |
| **Flight Lead Syllabus** | | | |
| **HILL FLUG** | 1 | **1** / 2 [2] | **1** / 2 [5] |

Note 1: WIC students have different training objectives during their surface attack phase than the other formal course syllabi in this analysis. Only SA-1 closely corresponds to the training objectives of the other syllabi in this comparison. SA-2 trains PGM employment, and SA-3 trains the SEAD mission and HTS employment. The number of sorties is adjusted to **1**.

Note 2: The Hill FLUG SAT-1 sortie requires proficiency in a 4-ship day unopposed scenario. The SAT-2 sortie requires proficiency in a 4-ship day opposed scenario. The number of sorties is adjusted to **1** to most closely compare to the IPUG syllabi.

Note 3: WIC students have different training objectives during their surface attack tactics phase than the other formal course syllabi in this analysis. Only SAT-1 closely corresponds to the training objectives of the other syllabi in this comparison. SAT-2

focuses on the SEAD mission and HTS employment. The number of sorties is adjusted to **1**.

Note 4: The Hill IPUG SAT-1 sortie requires proficiency in a 4-ship day unopposed scenario. The SAT-2 sortie requires proficiency in a 4-ship day opposed scenario. The other syllabi in this comparison use unopposed SAT in this phase, so the number of sorties is adjusted to **1**.

Note 5: The Hill FLUG SAT-3 sortie requires proficiency in a 4-ship night unopposed scenario. The SAT-4 sortie requires proficiency in a 4-ship night opposed scenario. The other syllabi in this comparison use unopposed SAT in this phase, so the number of sorties is adjusted to **1**.

TABLE 13

SYLLABUS SORTIE TOTALS

| | Offensive Syllabus | Offensive Adjusted | Defensive Syllabus | Defensive Adjusted | High Aspect Syllabus | High Aspect Adjusted |
|---|---|---|---|---|---|---|
| IFF | 4 | 4 | 4 | 4 | 2 | 3 |
| FTU B Course | 5 | 5 | 4 | 4 | 3 | 3 |
| FTU TX Track 1 | 4 | 4 | 2 | 2 | 2 | 2 |
| FTU TX Track 2 | 1 | 2 | 1 | 2 | 1 | 2 |
| Hill MQT | 1 | 2 | 1 | 2 | 0 | 0 |
| Mean | 3 | 3.4 | 2.4 | 2.8 | 1.6 | 2 |
| FTU IPUG | 1 | 2 | 1 | 2 | 1 | 2 |
| F-16 WIC | 2 | 2 | 2 | 2 | 2 | 2 |
| Hill IPUG | 1 | 2 | 1 | 2 | 1 | 2 |
| Mean | 1.3 | 2.0 | 1.3 | 2.0 | 1.3 | 2.0 |
| Hill Flug | 1 | 1 | 1 | 1 | 1 | 1 |
| Syllabi Mean | 2.2 | 2.7 | 1.9 | 2.3 | 1.4 | 1.9 |
| | ACM Syllabus | ACM Adjusted | TI Syllabus | TI Adjusted | ACT Syllabus | ACT Adjusted |
| IFF | 0 | 0 | 0 | 0 | 0 | 0 |
| FTU B Course | 4 | 5 | 6 | 6 | 2 | 2 |
| FTU TX Track 1 | 4 | 4 | 4 | 4 | 2 | 2 |
| FTU TX Track 2 | 1 | 2 | 1 | 1 | 1 | 1 |
| Hill MQT | 1 | 2 | 1 | 1 | 1 | 1 |
| Mean | 2.5 | 3.3 | 3.0 | 3.0 | 1.5 | 1.5 |
| FTU IPUG | 2 | 2 | 1 | 1 | 2 | 2 |
| F-16 WIC | 1 | 2 | 2 | 2 | 2 | 2 |
| Hill IPUG | 1 | 1 | 1 | 1 | 1 | 1 |
| Mean | 1.3 | 1.7 | 1.3 | 1.3 | 1.7 | 1.7 |
| Hill Flug | 1 | 1 | 2 | 1 | 2 | 2 |
| Syllabi Mean | 1.7 | 2.1 | 2.0 | 1.9 | 1.4 | 1.4 |
| | SA Syllabus | SA Adjusted | SAN Syllabus | SAN Adjusted | SAT Syllabus | SAT Adjusted |
| IFF | 2 | 2 | 0 | 0 | 2 | 2 |
| FTU B Course | 4 | 4 | 1 | 1 | 5 | 5 |
| FTU TX Track 1 | 5 | 5 | 1 | 1 | 4 | 4 |
| FTU TX Track 2 | 2 | 2 | 1 | 1 | 2 | 2 |
| Hill MQT | 1 | 1 | 0 | 1 | 2 | 2 |
| Mean | 2.8 | 2.8 | 1 | 1 | 3 | 3 |
| FTU IPUG | 2 | 2 | 1 | 1 | 2 | 2 |
| F-16 WIC | 2 | 1 | 1 | 1 | 2 | 1 |
| Hill IPUG | 1 | 1 | 0 | 0 | 2 | 1 |
| Mean | 1.7 | 1.3 | 1.0 | 1.0 | 2.0 | 1.3 |
| Hill Flug | 1 | 1 | 2 | 1 | 2 | 1 |
| Syllabi Mean | 2.2 | 2.1 | 1.2 | 1.0 | 2.6 | 2.2 |

# CHAPTER 5

## CT PROGRAM FRAMEWORK DEVELOPMENT

Table 14 summarizes the sortie analysis detailed in chapter 4, using the empirically adjusted numbers. The Hill FLUG syllabus is omitted from this summary because the skill level taught in that upgrade program did not compare with either the wingmen or instructor syllabi and therefore exists as a single data point with no other formal training syllabus to compare it with.

TABLE 14

SORTIE ANALYSIS SUMMARY

| **Sortie Type** | **Minimum Sorties Required** | **Maximum Sorties Required** | **Mean Sorties Required** |
|---|---|---|---|
| BFM Offensive | 2 | 5 | 2.9 |
| BFM Defensive | 2 | 4 | 2.5 |
| BFM High Aspect | 2 | 3 | 2.3 |
| ACM | 1 | 5 | 2.6 |
| TI | 1 | 6 | 2.3 |
| ACT | 1 | 2 | 1.6 |
| SA | 1 | 5 | 2.6 |
| SAN | 1 | 1 | 1 |
| SAT | 1 | 5 | 2.4 |
| Air to Air Sorties Required Mean | | 2.4 | |
| Air to Ground Sorties Required Mean | | 2 | |

Table 15 includes all syllabi and illustrates the relative number of sorties spent on training air-to-air skills versus air-to-ground skills. It is interesting to note that no syllabus is weighted heavier in air-to-ground training than air-to-air training. Compare this to the RAP requirement of 46 percent air to air and 54 percent air to ground. If each upgrade syllabus analyzed spends more time training air-to-air skills than air-to-ground,

why should a squadron be required by RAP to do the opposite, and devote more time to air-to-ground training than air-to-air training? In the next chapter, the questionnaire polling USAF Weapons Instructor Course graduates will consider that question.

TABLE 15

SYLLABUS SORTIE TYPE WEIGHTING ANALYSIS SUMMARY

| **Syllabus** | **Percentage of Sorties Devoted to Air to Air** | **Percentage of Sorties Devoted to Air to Ground** |
|---|---|---|
| IFF | 71% | 29% |
| FTU B Course | 57% | 43% |
| FTU TX Track 1A | 63% | 37% |
| FTU TX Track 1B | 64% | 36% |
| FTU TX Track 1C | 60% | 40% |
| FTU TX Track 1D | 50% | 50% |
| FTU TX Track 2A | 54% | 46% |
| FTU TX Track 2B | 46% | 54% |
| FTU IPUG | 53% | 47% |
| Hill MQT | 50% | 50% |
| Hill FLUG | 57% | 43% |
| Hill IPUG | 60% | 40% |
| WIC | 51% | 49% |
| Syllabi Mean | 57% | 43% |
| Ready Aircrew Program | 46% | 54% |

Given the average number of sorties needed to train basic fighter skills contained in table 14, how should the CT program framework be arranged? As previously discussed in chapter 2, a building block structure is optimal for a flying training program. Ideally, a squadron CT program is focused on training one skill at a time, for maximum concentration of effort. However, constraints with aircraft configurations and maintenance usually require squadrons to fly air-to-air and air-to-ground sorties at the

same time. Therefore, the CT building block structure will contain both air-to-air and air-to-ground sorties arranged from basic to intermediate to complex, as detailed in table 16.

TABLE 16

CT PROGRAM SAMPLE SORTIE GROUPINGS

| **Basic Skill Sorties** | **Intermediate Skill Sorties** | **Complex Skill Sorties** |
|---|---|---|
| **Air-to-Air** | **Air-to-Air** | **Air-to-Air** |
| Offensive BFM | Air Combat Maneuvering | Air Combat Tactics |
| Defensive BFM | Tactical Intercepts - VID | |
| High Aspect BFM | Tactical Intercepts - BVR | |
| | | |
| **Air-to-Ground** | **Air-to-Ground** | **Air-to-Ground** |
| Basic Surface Attack | Close Air Support | Surface Attack Tactics - Opposed |
| Surface Attack Night | Surface Attack Tactics - Unopposed | |

With 52 weeks in the year, and 4 weeks of annual leave, there are nominally 48 weeks per year a pilot can fly. The 1999 RAP requirement for 116 sorties annually for an inexperienced Combat Mission Ready (CMR) and 96 sorties annually for an experienced CMR F-16 Block 40 pilot equates to 2.4 or 2 effective sorties per week, respectively. Effective in this sense means the sortie being counted as a RAP sortie, which does not necessarily imply that the sortie would be an effective upgrade or CT sortie from a training perspective. From table 14, the mean number of sorties needed to train a pilot to a skill level of "2" is 2.4 for air to air and 2 for air to ground. So, in general terms a squadron should devote approximately one week for each skill it wants to train. For example, a basic phase could consist of offensive BFM and basic surface attack. Each skill requires one week to train, so the basic phase itself would last two weeks. Each

additional skill added to the training phase requires an additional week. Therefore, a basic phase consisting of offensive and defensive BFM and basic surface attack should last three weeks to give each pilot the opportunity to fly the desired number of sorties needed to train each skill. There is a drawback to adding too many skills to each training phase. Lengthening a training phase increases the probability each pilot will receive the desired training. However, the increased length also means more time will pass before the squadron returns to the basic phase again, and the additional time elapsed between practicing a given skill will tend to erode that skill further. This increased skill erosion will then require additional sorties to bring the skill up to the desired level.

As previously discussed, the basic training methodology should begin with basic skills and move to more advanced skills as proficiency increases. From the previous paragraph, the length of a training phase can be represented by the following formula:

Length of Training Phase In Weeks = [ Number of skills practiced]

Now those training phases must be grouped into a larger training cycle. Training cycle planning should begin with the end goal and work backwards. For example, a squadron is planning to participate in a Red Flag exercise as a blue air-to-ground participant, thus making Red Flag the capstone event the training cycle planning will be based on. The scenario at Red Flag will require pilots to deliver unguided munitions from medium and low altitude in a high air and ground threat environment while flying in 4-ship and 8-ship formations. Therefore, the air-to-ground training should culminate with an opposed large force employment scenario. A possible training cycle plan might look like the example in table 17.

TABLE 17

EXAMPLE TRAINING CYCLE

| | **Basic Phase** | **Intermediate Phase** | **Advance Phase** |
|---|---|---|---|
| Air to Air Skill | Defensive BFM | Tactical Intercepts - VID | Air Combat Tactics |
| Air to Ground Skill | Basic Surface Attack | Surface Attack Tactics - Unopposed | Surface Attack Tactics - Opposed |
| Length of Phase | 2 Weeks | 2 Weeks | 2 Weeks |
| | | Total Training Cycle Length | 6 Weeks |

A weapons officer developing a squadron training plan should first look at the major capstone events in which his squadron will be participating. Those capstone events might include a wing turkey shoot, a wing operational readiness exercise, a deployment like Red Flag or Maple Flag, or finally a major deployment to an ongoing operation such as Operation Northern Watch or Operation Southern Watch. Once these capstone events are put on the calendar, the weapons officer should develop a training cycle composed of basic, intermediate, and advanced training phases to prepare the squadron for the capstone event. Some capstone events, such as a local turkey shoot, will probably not require a full training cycle, but may only need one training phase as preparation. If there is an extended period of time in between capstone events, the squadron may be able to execute two training cycles, one for general training, then another to specifically prepare for the capstone event. During a general training cycle not tied to a specific capstone event, the squadron can train skills they do not have time to train during other training cycles, such as ACM or CAS.

As previously discussed in chapter 2, the squadron CT program competes most directly with the squadron upgrade program for the fixed number of sorties a fighter

squadron has available to fly each year. There are two specific ways in which the interaction of the upgrade program with the CT program can have a detrimental effect on the squadron CT program and therefore squadron combat readiness. The first way is by support sorties needed for the upgrading pilot. For example, a pilot flying a 4 v 4 tactical intercept sortie requires four dedicated adversaries. If those adversaries come from the squadron, then they are losing at least one sortie that week that should be devoted to CT training. If the squadron is currently flying intercepts in the CT program, at least the blue air 4-ship is receiving the same CT training the rest of the squadron is executing. The second detrimental effect occurs when the CT sorties are changed to a different type than is currently being flown to support the upgrade program. Following the previous example, if the squadron is flying Offensive BFM and BSA, flying a 4 v 4 upgrade of any type will cause the loss of 8 CT sorties. Obviously, a squadron needs to conduct upgrade training. The key for the designer of the squadron CT program is to limit the amount of CT sorties that will be devoted to upgrade training. At some point, reduction of the total number of CT sorties will cause a loss of CT training for some squadron pilots, with a corresponding loss of squadron combat effectiveness. There are a few ways to limit this type of disruption to the squadron CT program. First, limit the number of pilots in squadron upgrade programs at any one time. Second, attempt to sequence upgrade programs with the squadron CT program. For example, start upgrade programs at the beginning of a basic training phase. Finally, due to pilot nonprogression in an upgrade program, weather, maintenance, or other outside interference, a pilot whose upgrade program was properly sequenced with the squadron CT program may fall out of phase. Accommodating the out of phase pilot might require the squadron to change its CT

sorties from the type planned to the type the out of phase pilot needs for his training, changing BSA to TI for example. This conversion of CT sorties from one type to another to support an upgrade can be the most disruptive to the squadron CT program, especially for sorties that require Red Air support. However, whether they require Red Air support or not, the pilots involved in that upgrade sortie are not executing the squadron CT program, and are missing the training the squadron is supposed to be executing. One way to limit the effect of this final type of disruption is set a limit on the number of sorties flown each week by the squadron that can be devoted to any purpose other than CT.

One way to determine how to allocate squadron sorties between the CT program and other needs, such as upgrade programs and incentive rides, is to begin with the number of pilots needing CT training and the type of CT sorties being flown. For this example, assume there are 20 pilots in the squadron needing CT training, and the squadron is in a basic training cycle flying offensive BFM and BSA. From table 14, offensive BFM on average requires 2.9 sorties to train to a "2", and Surface Attack requires 2.6. As previously discussed, this training cycle will require two weeks, and 20*2.9 + 20*2.6 = 110 sorties, assuming no attrition for maintenance or weather. After factoring in attrition, a baseline for the number of CT sorties needed for the two-week period can be determined. Any squadron sortie production above this baseline number can be used for purposes other than CT, such as upgrades and cross country sorties.

How does the information in this chapter on training cycle design affect wing and MAJCOM task scheduling? As noted in the preceding discussion, a training cycle covering basic, intermediate, and advanced skills will last approximately six weeks. Therefore, squadrons should not be scheduled for less than six weeks in between

capstone events. Assuming most squadrons require some regeneration time when returning from a deployment or recovering from an exercise, the time between capstone events should probably be lengthened to a minimum of seven to eight weeks.

Once a squadron designs a CT program, it next needs to execute it. Unfortunately, squadrons do not execute their flying schedule in isolation. Numerous external inputs affect the execution of the flying schedule, some which can be controlled, some which cannot. Weather can obviously greatly affect the squadron flying program, and of course cannot be controlled. Some examples of external inputs that can be controlled are reception and training of new pilots and taskings for the squadron that were not known when the squadron developed their training plan. This thesis will next consider external inputs related to unplanned taskings and describe a methodology to mitigate their effects.

Taskings from the wing or higher levels that were not considered during the squadron CT program planning process can have a profound impact on the CT plan. This impact is particularly pronounced when it occurs during an intermediate training phase. Loss of an intermediate training phase can force a squadron to either accept a lower level of training by abandoning the advanced training phase and substituting an intermediate phase in its place, or cause the squadron to accept risk by executing the advanced training phase with less than desired preparation. One possible solution to this problem is to employ a training concept used by the United State Army, the Green-Amber-Red Time Management System (FM 25-100 1988, Fig 3-7). The Green Period emphasizes collective unit training with “administrative and support requirements that keep personnel from participating in training eliminated to the maximum extent possible” (FM 25-100

1988, Fig 3-7). The Amber Period permits "selected personnel diverted to support requirements when all available personnel in organizations in the red period are completely committed to support requirements" (FM 25-100 1988, Fig 3-7). Otherwise, the unit focuses on small unit, crew, and individual training. Finally, Red Period is used for individual leaves and passes, routine appointments, and supporting administrative and support requirements. Training is focused at the lowest levels, including individual, leader, and crew training (FM 25-100 1988, Fig 3-7).

The Red, Amber, and Green periods can be linked to squadron CT programs depending on which capstone requirements the squadron is training, if any. For those times when a squadron has a long period between capstone events and is just executing a basic training cycle, it could be assigned a Red Period by the wing. If the other squadrons in the wing were preparing for major deployments or inspections, they could be assigned Amber or Green Periods. The squadron in Red Period would be responsible for filling short notice taskings or requirements that do not contribute to the other squadrons CT programs. This training methodology would reduce or eliminate interruptions to unit CT programs when they are in critical training cycles preparing for deployments or inspections, increasing the probability of a squadron being able to execute its planned CT program.

# CHAPTER 6

# CONCLUSIONS AND RECOMMENDATIONS

This chapter presents conclusions from the research project and their connection to the primary and secondary research questions. It then discusses relationships between the conclusions and previous studies. Next, the results of the research survey are related to the thesis findings. Finally, suggestions for further research are presented.

## Conclusions

This research project proposed to answer four secondary questions leading to an answer for the primary research question. First, research conclusions for the secondary questions will be discussed. Then, the results of the secondary question discussion will be used to answer the primary research question.

The first of the secondary research questions asked whether the proposed CT program framework conducted CT efficiently. It also asked how many sorties were needed to learn a given sortie type, how those sorties should be grouped into phases, how many different sortie types should be in a training phase, how long a training phase should last, and finally, how much of a squadrons flying program should be devoted to CT versus upgrade training. Analysis of existing training syllabi produced the data in table 14. This data shows the average number of sorties used by the syllabi in the research sample to train a particular skill, and are inferred by this study to be the optimum and therefore most efficient number of sorties needed. Suggestions are made later this chapter for additional research to further refine the data in table 14.

Once determining the number of sorties needed to train a particular skill, the research asked how those sorties should be grouped into phases. The suggested method

of grouping sorties into phases is shown in table 16. Sorties are grouped into three levels of complexity, which are basic, intermediate, and advanced. Optimally, a squadron should focus on training one skill at a time. This allows squadron academics to focus on instructing one skill prior to the actual flying training. However, maintenance considerations related to aircraft configuration, particularly in a multirole fighter like the F-16CG, typically require a squadron to maintain both air-to-air and air-to-ground configured aircraft. Therefore, each training phase will typically have two different sortie types, one air to air and one air to ground.

After researching the number of sorties to train a particular skill, and the grouping of those sorties into phases, the length of a phase was determined to be represented by the following formula:

Length of Training Phase In Weeks = [ Number of skills practiced]

Therefore, a recommended training phase consisting of two sortie types training two different skills would last two weeks. However, this methodology for determining the length of a training phase does not account for attrition due to weather, maintenance, or other factors. The results of the research survey disagreed with the formula listed above. This disagreement will be discussed further later in this chapter in the research.

With determination made on the number of sorties needed to train a particular skill, the sortie grouping, and training phase length, the research focused on the division of the squadron flying program between CT and upgrade requirements. Attrition to the squadron CT program caused by weather or maintenance is not the only or even most significant loss of CT sorties. The demands of various squadron upgrade programs such as MQT, FLUG, and IPUG typically require significantly more sorties from the CT

program than are lost due to weather or maintenance. Therefore, limits on the percentage of the squadron's total weekly sorties devoted to purposes other than CT flying must be set and adhered to. In one operational ACC F-16 squadron, a limit of 30 percent was successfully tested over a period of three months. Detailed planning and accurate forecasting of upcoming upgrade requirements is essential to permit successful execution of this part of the CT program. A proposed formula used to calculate the number of sorties needed to execute the squadron CT program each week is:

$$[\ (P * MSR_{A/A} + P * MSR_{A/G}\ ) + HA(P * MSR_{A/A} + P * MSR_{A/G)}\ ]\ \text{Sorties}$$

where

| | | |
|---|---|---|
| P | = | Number of pilots flying CT that week |
| $MSR_{A/A}$ | = | Mean Sorties Required for A/A skill trained from Figure 14. |
| $MSR_{A/G}$ | = | Mean Sorties Required for A/G skill trained from Figure 14. |
| HA | = | Historical attrition factor due to maintenance and weather |

The historical attrition factor varies monthly due to local weather conditions and historical maintenance attrition and can be provided by the squadron or wing scheduling shop.

The second of the secondary research questions asked whether the proposed CT program framework satisfied RAP training requirements for relative weighting of air-to-air and air-to-ground sorties. Developing a CT program that complies with RAP requirements for percentage of air-to-air and air-to-ground sorties is not difficult. However, the syllabus analysis clearly shows a discontinuity between formal training syllabi and RAP requirements on the relative weighting of air-to-air versus air-to-ground sorties. Of the 13 separate training tracks shown in table 15, only one has a higher percentage of air-to-ground sorties than air-to-air sorties. However, the RAP

requirements for F-16 Block 40 are weighted heavier for air-to-ground sorties than air-to-air. A 1993 study of Pacific Air Forces F-16 pilots asked them which aspects of their mission needed more emphasis or better training; 43 percent of the pilots named "increased air-to-air combat" and "more multi-ship and dissimilar aircraft" as areas requiring increased emphasis (Gray 1993, 7). The study also explored skill maintenance in the squadron training program. "When the question of what mission-ready skill is most difficult to maintain is asked, a different picture emerges. Air-to-air combat (including dissimilar aircraft) is hardest" (Gray 1993, 8). The results of the Pacific Air Forces study highlight the disparity between the current USAF F-16 RAP weighting towards air-to-ground training, and the emphasis of USAF F-16 training syllabi and pilot surveys towards increased air-to-air training.

The final secondary research question asked how long the deployment preparation cycle for the EAF should be, and whether the US Army Red--Amber--Green training methodology could maximize CT program effectiveness. Fitting the CT program framework within the current EAF training cycle can be justified by the research. Within the 15-month EAF cycle, there is a 10-month training cycle, a 2-month deployment preparation cycle prior to deployment, and a 3-month deployment (AFI 10-400 1999, 4). The research proposes a minimum 6-week training cycle, consisting of basic, intermediate, and advanced phases lasting two weeks each. With an EAF deployment preparation window of 8 weeks, the proposed 6-week training cycle could be accomplished with an attrition factor as high as 33 percent.

An addition consideration for conduct of a CT program within the EAF framework is the scheduling of local exercises, deployments to training exercises, and

other nonflying requirements. Allowing time for the proposed 6-week training cycle implies local exercises and deployments should be scheduled at least 6 weeks apart as an absolute minimum. Since a squadron will typically need to reconstitute after an exercise or deployment, the minimum time between exercises and deployments should probably be increased to 7 weeks. By utilizing the Red--Amber--Green training methodology used by the US Army, wing and MAJCOM schedulers can provide squadrons preparing for exercises or deployments uninterrupted training time needed to ensure adequate preparation for their capstone training event.

In conclusion, this research project set out to answer the following primary research question: Can a fighter squadron continuation training program framework be designed that is efficient, will satisfy MAJCOM training requirements, and integrate with the proposed EAF training cycle concept? The answer to this question is a qualified yes. The main difficulty with the proposed CT framework is the difficulty satisfying MAJCOM training requirements. The research showed the training emphasis should be weighted heavier towards air-to-air training versus air-to-ground training. This does not mean the CT program framework cannot be changed to place more emphasis on air-to-ground training to match MAJCOM RAP requirements. However, addition research is probably needed to address the disparity between formal syllabus training requirements and RAP requirements with regards to air-to-air and air-to-ground weightings. Resolving this disparity will be discussed later in this chapter in the section on suggestions for additional research.

## Relationships to Previous Studies

The proposed CT program framework is based upon four key characteristics of the training structure proposed by Major Weggemen in his thesis. That is, the training structure is phase based, utilizing a building block approach with academics prior to the flying phase focused on the upcoming training. Continuity in the training program is essential to increase pilot proficiency and reduce substandard performance on the training sorties.

As was the case in Major Roosa's study, the limitations of the RAP for measuring squadron combat readiness were confirmed by the research survey used in this project. The research survey results specifically related to measuring squadron combat readiness are discussed later in this chapter.

The IDA research project "Relating Flying Hours to Aircrew Performance: Evidence for Attack And Transport Missions" showed the direct relationship between a drop in flight hours and pilot proficiency in performing tactical flying skills. The CT program framework proposed in this thesis groups related sorties into phases. This provides the potential to focus flight training hours on a minimal group of tactical flying skills at any one time. The discussion in chapter 5 on reducing the impact on the CT program from squadron upgrade programs directly relates to the effects of reducing flying hours spent practicing a particular tactical skill.

Finally, Major R. Crawford's research titled "Training for A Secondary Role In The F-16R" provides justification for the research methodology used in this project for determining the number of sorties needed to train a particular flying skill. Major

Crawford extrapolated a new training syllabus based on analysis of related training syllabi. This was essentially the same methodology used by this research project.

## Research Survey

A fourteen-question survey (appendix A) was used to collect data for the primary and secondary research questions. The survey audience consisted of twenty USAF Weapons School F-16 Division instructors. Each member of the survey audience is a graduate of F-16 WIC and also a current instructor assigned or attached to F-16 Division of the USAF Weapons School. The survey audience is not intended to be representative of the F-16 pilot community. Rather, it represents F-16 pilots with specialized training and experience that can be considered experts among the F-16 pilot community on the topic of F-16 continuation training.

The survey provided each instructor with background information relating to supporting questions for the thesis primary question, which was then followed by one or more questions related to a supporting question. Key terms specific to the research were defined. The IP responses were measured along a 4-Point Leichert Scale of strongly agree, agree, disagree, and strongly disagree. Survey questions concentrated on gathering IP opinions on the thesis research methodology and the following supporting research questions:

1. How many sorties are needed to learn a given sortie type?
2. How many long should a training phase last?
3. Does the proposed CT program framework satisfy RAP training requirements for relative weighting of air-to-air and air-to-ground sorties?

4. Can U.S. Army Green, Amber, and Red training cycle methodology be coordinated at the wing or MAJCOM level to maximize CT program effectiveness for USAF fighter squadrons?

Survey responses were quantified as to the relative percentages of IPs responding with a given answer on the 4-Point Leichert Scale. One potential shortcoming of the research survey is the small sample size queried. To mitigate this potential shortcoming, only questions with a positive or negative response of greater than or equal to 70 percent of the survey population will be considered significant enough to warrant further consideration. A positive response is defined as answering agree or strongly agree. Similarly, a negative response is defined as answering disagree or strongly disagree. Questions meeting this criteria are listed in table 18.

TABLE 18

SURVEY QUESTIONS MEETING RELEVANCE CRITERIA

| Question | Percent Respondents Answering Positive | Percent Respondents Answering Negative |
|---|---|---|
| 3 A | 30.00% | **70.00%** |
| 5 B | 20.00% | **80.00%** |
| 6 B | 5.00% | **90.00%** |
| 7 B | 10.00% | **85.00%** |
| 8 B | **95.00%** | 5.00% |
| 9 C | **85.00%** | 15.00% |
| 10 C | **85.00%** | 15.00% |
| 11 D | **90.00%** | 10.00% |
| 12 D | **95.00%** | 5.00% |

The survey questions meeting the arbitrary 70 percent cutoff for significance can be grouped into four main areas of interest. Those areas are training phase length, CT

program feedback mechanisms, CT air-to-air versus air-to-ground weighting, and CT program management.

Concerning training cycle length, survey respondents were asked if making a training phase equal in length to the number of skills to be trained would provide the squadron pilots an opportunity to receive sufficient training in those skills. For example, a training phase would be three weeks long if a squadron was training three different skills. In the survey, 70 percent of the respondents disagreed with this proposal. It is reasonable to assume the survey audience felt that a longer training period would be required, however, no follow up questions were asked on this topic so this would be conjecture. As discussed in chapter 5, the length of a training phase is a compromise between having a training phase long enough to ensure everyone in the squadron receives training but not so long that the length of time between practicing a given skill becomes excessive. Since there is compromise associated with the length of a training phase, it is not surprising there was disagreement with the survey audience on this topic. One potential solution would be to modify the training phase length formula

Length of Training Phase In Weeks = [ Number of skills practiced]

to read

Length of Training Phase In Weeks = [ Number of skills practiced]+$A_F$

by adding a factor to the end, [$A_F$ ], the decimal equivalent of an attrition factor accounting for sortie losses due to weather, maintenance, and other situations that would make the training sortie noneffective. This factor would probably be on the order of 5 percent to 25 percent and while lengthening the training phases slightly, would not

increase the length so much as to cause excessive loss of skill until that skill was revisited in a subsequent training cycle.

The next significant area of interest from the survey was CT program feedback mechanisms. In summary, 80 percent of the respondents felt their last squadron did not have an useful feedback mechanism for determining the effectiveness of their squadron CT program. Furthermore, 90 percent felt that RAP did not provide useful feedback to the squadron CT program effectiveness, and 85 percent felt that RAP did not provide valid feedback as to the squadron's combat readiness. Finally, 95 percent of the F-16 WIC instructors indicated a performance based feedback system versus a numbers of events accomplished system like RAP would better help a squadron judge their combat readiness. Clearly, a better system of CT program assessment is needed, and this will be discussed further in the next section on suggestions for further research.

The third survey area of interest was in CT program air-to-air versus air-to-ground weighting. Most respondents, 85 percent, felt it required more sorties to train air-to-air skills versus air-to-ground skills and the same percentage felt RAP sortie weightings should be changed to place more emphasis on air-to-air training versus air-to-ground training, along the lines of the weightings found in the formal training syllabi.

The final area of interest in the survey responses was CT program management. A strong majority of 90 percent of the respondents said external interruptions to their CT program had a significant impact on their ability to effectively train. Furthermore, 95 percent felt the Red--Amber--Green training cycle system could have a significant positive impact on a squadron CT program. It bears mentioning that the respondents were fairly evenly split over implementation of the Red--Amber--Green training cycle

system. Half of the survey population agreed it would be realistic for a wing to coordinate the Red--Amber--Green training cycles amongst its own squadrons, and half disagreed. A somewhat stronger percentage, 60 percent, disagreed that it would be realistic to expect a MAJCOM to coordinate the Red--Amber--Green training cycles amongst its own wings.

## Suggestions for Further Research

This research project highlighted three areas that could benefit from further research. Those areas are CT program effectiveness feedback, CT program development, and USAF training requirements development.

This thesis used analysis of existing USAF F-16 training syllabi as a method of determining the number of sorties needed to train a pilot in a specified skill. Two other research methodologies could be used to confirm or disprove the results of the thesis research. The first and most scientific method would require analysis of a controlled group of beginning fighter pilots. This group would receive differing amounts of training in each skill, to quantify the amount of training the average pilot requires to train a specified skill to a given performance level. The difficulty in isolating a group of pilots for the study, along with the cost of running the study, would probably make this type of study unfeasible. Another possible research methodology would expand the pool of training syllabi examined to include all USAF fighter training syllabi, and perhaps even fighter training syllabi of other Western countries. Examining a larger pool of syllabi could help reduce any biases induced by the small sample size examined in this study.

Determining the effectiveness of a squadron CT program requires some feedback mechanism, either formal or informal. A shortcoming of RAP, currently the only formal

feedback system provided by the USAF for fighter squadrons, is that it only provides feedback on the number of training events accomplished, which does not necessarily correlate to attainment of a certain level of combat capability. Major Roosa briefly explored the subject of feedback systems in his thesis, "F-16 Peacetime Training for Combat Operations." A more extensive survey of feedback systems in use by other fighter forces could provide a more useful, performance based system to allow more focused use of limited training resources.

The final suggested research project is examination of the origin of the relative weighting of RAP air-to-air and air-to-ground training requirements. The analysis of training syllabi in this study showed a heavier weighting of air-to-air training versus air-to-ground training. The RAP training requirements are weighted opposite. A study of the historical weighting of training requirements for multirole fighters and specifically of the origin of RAP requirements could help reconcile this apparent disparity.

## Summary

This research project provides some basic tools that the designer of a squadron CT program can use to design an efficient training program that will provide pilots a reasonable probability of mastering the skills they need for success in combat. CT program design has historically been an art, with no reference manuals for guidance, and only experience and creativity to turn to for help. Hopefully this thesis will serve as a starting point for further research and discussion to provide CT program designers and executers the information they need to make the best use of the limited training assets and time provided to them.

# APPENDIX A

## SURVEY

SURVEY ON OPTIMIZING CONTINUATION TRAINING IN OPERATIONAL F-16 SQUADRONS for Master of Military Art and Science Thesis

POC: Major Jeff A. Hausmann, USACGSC student, Ft. Leavenworth KS

The purpose of this survey is to evaluate concepts associated with the development of a F-16 squadron continuation training program. When completing this survey evaluate the proposed continuation training program framework *solely* on its ability to answer the Thesis primary and supporting questions. Other considerations such as maintenance supportability etc. must be left out. The relevant Thesis questions follow.

**Primary Question:**

Can a fighter squadron continuation training program framework be designed that is efficient, will satisfy MAJCOM training requirements, and integrate with the proposed EAF training cycle concept?

**Secondary Questions:**

1. How many sorties are needed to learn a given sortie type?
2. How long should a training phase last?
3. Does the proposed CT program framework satisfy RAP training requirements for relative weighting of air-to-air and air-to-ground sorties?
4. Can U.S. Army Green, Amber, and Red training cycle methodology be coordinated at the wing or MAJCOM level to maximize CT program effectiveness for USAF fighter squadrons?

**Definitions:**

Efficient Training: Flying the minimum number of sorties to learn or practice a given flying skill to a specified level.

Training Phase: The basic building block of a squadron CT program. A training phase consists of air-to-air and/or air-to-ground sorties grouped together. Depending on the sortie type and complexity, the training phase is considered basic, intermediate, or advanced.

Training Cycle: A collection of training phases. A training cycle will typically consist of basic, intermediate, and advanced training phases and focus on preparing a squadron for a capstone event such as a Red Flag deployment or local operational readiness exercise. A squadron CT program will consist of several training cycles over the course of a training year.

SURVEY QUESTIONS RESPONSES: (Circle one)
**SA**- Strongly Agree **A**- Agree **D**- Disagree **SD**- Strongly Disagree

Eight training syllabi used by the F-16 FTU, F-16 WIC, and an operational F-16 squadron were examined to see if trends or consensus on the number of sorties it takes to train a pilot in a given skill, such as offensive BFM, to a skill level of "2" [Performance is essentially correct. Recognizes and corrects errors] could be found. This number of sorties would become a starting point for determining how many sorties to allocate in a squadron CT program for training the various fighter skills, such as offensive BFM

**1. Do you think the research methodology described above is a viable way to determine the number of sorties required to train a pilot to a skill level of "2" in a squadron CT program?**

**SA A D SD**

| Sortie Analysis Summary | | | |
|---|---|---|---|
| Sortie Type | Minimum Sorties Required | Maximum Sorties Required | Mean Sorties Required |
| BFM Offensive | 2 | 5 | 2.9 |
| BFM Defensive | 2 | 4 | 2.5 |
| BFM High Aspect | 2 | 3 | 2.3 |
| ACM | 1 | 5 | 2.6 |
| TI | 1 | 6 | 2.3 |
| ACT | 1 | 2 | 1.6 |
| SA | 1 | 5 | 2.6 |
| SAN | 1 | 1 | 1 |
| SAT | 1 | 5 | 2.4 |
| Air to Air Sortie Mean | | 2.4 | |
| Air to Ground Sortie Mean | | 2 | |

Table 1

Table 1 shows the data resulting from the syllabus analysis. Again, the number of sorties listed is the number required to train a pilot to a skill level of "2" in that sortie type. Some syllabi required more or less sorties than others, as shown by the minimum and maximum sorties required columns.

**2. Refer to the data in Table 1 to answer this question. Based on my experience, it seems reasonable that, on average, 20% more sorties are needed to train air-to-air skills versus air-to-ground skills.**

**SA A D SD**

Based on the number of days a pilot can fly a year assuming they took 30 days of leave and the number of sorties per year required by RAP for an experienced pilot, on average a pilot needs to fly approximately 2 sorties per week to meet RAP minimum sortie requirements. Since it also took approximately 2 sorties to train a pilot in a given sortie skill, the length of a training phase in weeks was set as the number of skills to be trained. For example, a training phase consisting of Offensive BFM and Basic Surface Attack would require two weeks, not including attrition for maintenance or weather.

**3. Based on my experience, having the length of a training phase equal to the number of skills to be trained would provide the majority of squadron pilots an opportunity to receive sufficient training in those skills.**

**SA A D SD**

| **CT Program Sample Sortie Groupings** | | |
|---|---|---|
| **Basic Skill Sorties** | **Intermediate Skill Sorties** | **Complex Skill Sorties** |
| **Air-to-Air** | **Air-to-Air** | **Air-to-Air** |
| Offensive BFM | Air Combat Maneuvering | Air Combat Tactics |
| Defensive BFM | Tactical Intercepts - VID | |
| High Aspect BFM | Tactical Intercepts - BVR | |
| **Air-to-Ground** | **Air-to-Ground** | **Air-to-Ground** |
| Basic Surface Attack | Close Air Support | Surface Attack Tactics - Opposed |
| Surface Attack Night | Surface Attack Tactics - Unopposed | |

Table 2

| **Example Training Cycle** | | | |
|---|---|---|---|
| | **Basic Phase** | **Intermediate Phase** | **Advance Phase** |
| Air to Air Skill | Defensive BFM | Tactical Intercepts - VID | Air Combat Tactics |
| Air to Ground Skill | Basic Surface Attack | Surface Attack Tactics - Unopposed | Surface Attack Tactics - Opposed |
| Length of Phase | 2 Weeks | 2 Weeks | 2 Weeks |
| | | Total Training Cycle Length | 6 Weeks |

Table 3

Table 2 shows proposed groupings of basic, intermediate, and advanced sorties. Table 3 shows a sample training cycle consisting of a basic, intermediate, and advanced training phase. Each training phase will be preceded by academics specific to the training phase.

**4. The CT program framework described by Table 2 and 3 is an effective and efficient means of conducting CT training**

**SA A D SD**

Proper execution of a squadron CT program requires some means of judging the effectiveness of the training if the CT program is to provide proper training to the squadron. The next four questions address CT program feedback.

**5. My last squadron had an effective feedback system in place to assess the effectiveness of our CT program in preparing the squadron for combat.**

SA A D SD

**6. In my last squadron, the Ready Aircrew Program (RAP) provided useful feedback on the effectiveness of our squadron CT program.**

SA A D SD

**7. In my last squadron, the Ready Aircrew Program (RAP) provided valid feedback as to the squadron's combat readiness.**

SA A D SD

**8. I think a performance based feedback system versus a number of events accomplished system like RAP would better help a squadron judge their combat readiness.**

SA A D SD

| Syllabus Sortie Type Weighting Analysis Summary | | |
|---|---|---|
| Syllabus | Percentage of Sorties Devoted to Air to Air | Percentage of Sorties Devoted to Air to Ground |
| IFF | 71% | 29% |
| FTU B Course | 57% | 43% |
| FTU TX Track 1A | 63% | 37% |
| FTU TX Track 1B | 64% | 36% |
| FTU TX Track 1C | 60% | 40% |
| FTU TX Track 1D | 50% | 50% |
| FTU TX Track 2A | 54% | 46% |
| FTU TX Track 2B | 46% | 54% |
| FTU IPUG | 53% | 47% |
| Hill MQT | 50% | 50% |
| Hill FLUG | 57% | 43% |
| Hill IPUG | 60% | 40% |
| WIC | 51% | 49% |
| Syllabi Mean | 57% | 43% |
| Ready Aircrew Program | 46% | 54% |

Table 4

Table 4 shows the relative weight of air-to-air versus air-to-ground training in the syllabi examined. The Ready Aircrew Program for F-16 Block 40 requires 46 percent of the sorties flown to be air-to-air and 54 percent to be air-to-ground. The following questions concern relative training emphasis.

**9. Based on my experience, training air-to-air skills requires more sorties than training air-to-ground skills.**

**SA A D SD**

**10. Air Force RAP requirements should be changed to more closely reflect the relative weighting of air-to-air versus air-to-ground training found in formal training syllabi.**

**SA A D SD**

Squadron CT programs are not executed in a vacuum, and are subject to change by factors that are not controllable by the squadron. Some factors, like weather, cannot be controlled at all. However, some factors like short notice taskings can be controlled. I will use the following illustration for the next series of questions. Assume you are one of three squadrons in a wing. Each squadron is assigned a training status of Green, Amber, or Red. The squadron in Green training status is not subject to any external taskings that would interrupt their training program. The squadron in Red time is primarily responsible for filling external taskings, such as Red Air support or sending pilots to non-flying taskings. The squadron in Amber time is somewhere in between these two extremes. The objective is to provide the squadron in the Green training cycle the ability to execute its training plan without interruption, thereby allowing maximum concentration on preparation for some capstone event like a deployment to Southwest Asia or Red Flag.

**11. In my last squadron, external interruptions to our squadron CT program had a significant effect on our ability to train effectively.**

**SA A D SD**

**12. The Red / Amber / Green training cycle described above could have a significant positive impact on a squadron's CT program.**

**SA A D SD**

**13. It would be realistic to expect a wing to be able to coordinate the Red / Amber / Green training cycles among its own squadrons.**

**SA A D SD**

**14. It would be realistic to expect a MAJCOM to be able to coordinate the Red / Amber / Green training cycles among its own wings.**

**SA A D SD**

APPENDIX B

TABLE 19

RESEARCH SURVEY RAW DATA

| Question | Strongly Agree | Agree | Disagree | Strongly Disagree | No Response | Total Respondents |
|---|---|---|---|---|---|---|
| 1 | | 8 | 10 | 1 | 1 | 20 |
| 2 | | 12 | 8 | | | 20 |
| 3 | | 6 | 8 | 6 | | 20 |
| 4 | | 9 | 5 | 6 | | 20 |
| 5 | 1 | 3 | 15 | 1 | | 20 |
| 6 | | 1 | 6 | 12 | 1 | 20 |
| 7 | | 2 | 9 | 8 | 1 | 20 |
| 8 | 6 | 13 | 1 | | | 20 |
| 9 | 4 | 13 | 3 | | | 20 |
| 10 | 2 | 15 | 3 | | | 20 |
| 11 | 15 | 3 | 2 | | | 20 |
| 12 | | 19 | 1 | | | 20 |
| 13 | | 10 | 10 | | | 20 |
| 14 | 1 | 7 | 2 | 10 | | 20 |

TABLE 20

RESEARCH SURVEY RESPONSE PERCENTAGES

| Question | % Positive | % Negative | % Strongly Agree | % Agree | % Disagree | % Strongly Disagree |
|---|---|---|---|---|---|---|
| 1 | 40.00% | 55.00% | 0.00% | 40.00% | 50.00% | 5.00% |
| 2 | 60.00% | 40.00% | 0.00% | 60.00% | 40.00% | 0.00% |
| 3 | 30.00% | **70.00%** | 0.00% | 30.00% | 40.00% | 30.00% |
| 4 | 45.00% | 55.00% | 0.00% | 45.00% | 25.00% | 30.00% |
| 5 | 20.00% | **80.00%** | 5.00% | 15.00% | 75.00% | 5.00% |
| 6 | 5.00% | **90.00%** | 0.00% | 5.00% | 30.00% | 60.00% |
| 7 | 10.00% | **85.00%** | 0.00% | 10.00% | 45.00% | 40.00% |
| 8 | **95.00%** | 5.00% | 30.00% | 65.00% | 5.00% | 0.00% |
| 9 | **85.00%** | 15.00% | 20.00% | 65.00% | 15.00% | 0.00% |
| 10 | **85.00%** | 15.00% | 10.00% | 75.00% | 15.00% | 0.00% |
| 11 | **90.00%** | 10.00% | 75.00% | 15.00% | 10.00% | 0.00% |
| 12 | **95.00%** | 5.00% | 0.00% | 95.00% | 5.00% | 0.00% |
| 13 | 50.00% | 50.00% | 0.00% | 50.00% | 50.00% | 0.00% |
| 14 | 40.00% | 60.00% | 5.00% | 35.00% | 10.00% | 50.00% |

APPENDIX C

RAW DATA FOR SYLLABUS ANALYSIS IN CHAPTER 4

SYLLABUS 19AF B/F-V5A-K
INTRODUCTION TO FIGHTER FUNDAMENTALS
October 1996
Track B – Follow on pilot training in the F-16A/C or F-15E (dual-role mission)

**Course Objectives**: "The objective of IFF is to graduate a pilot or WSO with a basic understanding of fighter fundamentals qualified to enter and graduate from fighter formal training" (19AF Syllabus B/F-V5A-K 1996, 1).

**Course Description**: "This course is the transition course between UPT/ENJJPT/SUPT and fighter formal training unit (FTU). Specifically, the graduate will be proficient in all basic conversion, formation, emergency, and instrument tasks. Emphasis will be on developing wingman responsibilities, flight discipline, situation awareness and judgment. Depending on the flying track the graduate will also be proficient in the flowing air-to-air and / or air-to-ground tasks" (19AF Syllabus B/F-V5A-K 1996, 1).

(1) Offensive BFM (OBFM)
(2) Defensive BFM (DBFM)
(3) SA Range Patterns and Procedures

**Course Grading:** "If a student fails to meet standards when proficiency is required, assign an overall grade less than "2" and mark noneffective-student non progress (NE-SNP) on the gradesheet." A grade of "2" means the "Performance is essentially correct. Recognizes and corrects errors" (19AF Syllabus B/F-V5A-K 1996, 4).

| **Pilot Experience Level: Inexperienced** | | **Planned Noneffective Refly Rate = 10%** | |
|---|---|---|---|
| **Pilot Currency Level: Current** | | | |
| **FORMATION PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **F-1** | Demonstrate proficiency in emergency procedures | | |
| **F-2** | Demonstrate proficiency in normal takeoff | | |
| **F-3** | Demonstrate proficiency in rejoin, pattern and landing, and two-ship basic formation | | |
| **F-4** | Demonstrate proficiency in mission preparation, ground operations/checks, checklist procedures, radio procedures, fuel management, departure, fence/trigger check, heat/guns tracking exercise, range estimation, visual search, battle damage check, SA, judgment, and flight discipline | | |
| **END OF FORMATION PHASE** | | **TOTAL SORTIES** | **4** |

| HANDLING PHASE | | | |
|---|---|---|---|
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **H-1** | Demonstrate proficiency in G-awareness turns/AGSM. Demonstrate proficiency in penetration, instrument approaches. | | |
| **END OF HANDLING PHASE** | | **TOTAL SORTIES** | **1** |

| BASIC FIGHTER MANEUVERS PHASE | | | |
|---|---|---|---|
| **OFFENSIVE BFM** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **B-1** | Introduce turn circle entry exercise.<br>Introduce high-angle gun/separation exercises.<br>Introduce OBFM from medium-range setups. | | |
| **B-2** | Introduce quarter plane.<br>Introduce short range offensive BFM. | | |
| **B-3** | Demonstrate proficiency in formation approach and landing. | | |
| **B-4** | Demonstrate proficiency in OBFM from short and medium range setups.<br>Demonstrate proficiency in SA and judgment. | | |
| **END OF OFFENSIVE BFM** | | **TOTAL SORTIES** | **4** |
| **DEFENSIVE BFM** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **B-5** | Demonstrate proficiency in wing formation takeoff. Introduce pursuit curves / ranging exercise, defensive break turn and guns jink exercises. Introduce DBFM from medium range setups. | | |
| **B-6** | Introduce reversal / scissors exercise.<br>Introduce DBFM from short range setups. | | |
| **B-7** | Practice DBFM from short and medium range setups. | | |
| **B-8** | Demonstrate proficiency in DBFM from short and medium range setups.<br>Demonstrate proficiency in SA and judgment. | | |
| **END OF DEFENSIVE BFM** | | **TOTAL SORTIES** | **4** |
| **HIGH ASPECT BFM** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **B-9** | Introduce lead turn exercise.<br>Introduce HABFM. | | |
| **B-10** | Practice HABFM | | |
| **END OF HIGH ASPECT BFM**<br>**[Note: Track B students are not required to demonstrate proficiency in HABFM. ]** | | **TOTAL SORTIES** | **2** |
| **END OF BFM PHASE** | | **TOTAL SORTIES** | **10** |
| **END OF AIR TO AIR PHASE** | | | |

| START OF AIR TO GROUND PHASE | | | |
|---|---|---|---|
| **SURFACE ATTACK PHASE** | | | |
| **CONVENTIONAL RANGE DELIVERIES** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **S-1** | Introduce SUU-20 ordnance/sight preflight and armament switchology. Introduce conventional range procedures and patterns. Introduce conventional weapons delivery events/parameters, safe escape, and error analysis. | | |
| **S-2** | Demonstrate proficiency in ordnance/sight preflight.<br>Demonstrate proficiency in conventional range procedures and patterns.<br>Demonstrate proficiency in conventional weapons delivery events/parameters.<br>Demonstrate proficiency in safe escape. | | |
| **END OF CONVENTIONAL DELIVERIES** | | **TOTAL SORTIES** | **2** |
| **S-3** | Demonstrate proficiency in armament switchology / FENCE check.<br>Introduce level deliveries and tactical range procedures and patterns. | | |
| **S-4** | Demonstrate proficiency in tactical range procedures and patterns.<br>Demonstrate proficiency in weapons delivery events/parameters.<br>Demonstrate proficiency in SA and judgment. | | |
| **END OF TACTICAL DELIVERIES** | | **TOTAL SORTIES** | **2** |
| **END OF SURFACE ATTACK PHASE** | | **TOTAL SORTIES** | **4** |

SYLLABUS AETC F16C0B00PL

USAF Basic Operational Training Course, F-16C/D
February 1999, with IMC 99-01, May 1999

**Course Objectives**: "Produces qualified F-16C pilots with basic proficiency in air-to-air and air-to-surface mission tasks" (AETC Syllabus F16C0B00PL 1999a, 1-1).

**Course Grading:** "Overall grade "2" is required for demonstrate proficiency sorties." A grade of "2" means the "Performance is almost correct. Makes errors that *impact mission/task effectiveness but recognizes and corrects them*" (AETC Syllabus F16C0B00PL 1999a, 2-4).

| **Pilot Experience Level: Inexperienced Planned Noneffective Refly Rate = 8%** | | | |
|---|---|---|---|
| **Pilot Currency Level: Not Current [ New to F-16 ]** | | | |
| **TRANSITION PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **TR-1** | Introduce Combat Edge, G-awareness exercise, aircraft performance and handling demonstrations, nose-high recovery, horn demonstration maneuver, vertical recovery demonstration, instrument Procedures and approaches, VFR patterns, and landings. | | |
| **TR-2** | Introduce advanced handling, aerobatics, dive recoveries, stick interference demonstration, and SFO. Practice horn demonstration maneuver, instrument approaches, VFR patterns, and landings. | | |
| **TR-3** | Introduce AB takeoff, two-ship formation, G-awareness exercise from line abreast formation, HUD-off landing. Practice SFO, VFR patterns, and landings. | | |
| **TR-4** | Practice two-ship formation, transition airwork, instrument approaches, VFR patterns, and SFO. | | |
| **TR-5** | Review ride in preparation for TR-6. | | |
| **TR-6** | Stan/eval initial qualification/instrument checkride flown IAW AFI 11-202,Vol 2. | | |
| **NTR-1** | Introduce night formation, night air refueling, night instrument approaches, and night landings. Practice stern conversion intercepts against a non-maneuvering target and BVR AIM-120 employment. | | |
| **END OF TRANSITION PHASE** | | **TOTAL SORTIES** | **7** |

| INSTRUMENT PHASE | | | |
|---|---|---|---|
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **I-1** | Practice instrument procedures, navigation, and approaches. | | |
| **I-2** | Practice instrument procedures, navigation, and approaches. | | |
| **I-3** | Practice instrument procedures, navigation, and approaches. | | |
| **END OF INSTRUMENT PHASE** | | **TOTAL SORTIES** | **3** |

| ADVANCED HANDLING PHASE | | | |
|---|---|---|---|
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **AHC-1** | Introduce HAVE QUICK and KY-58 procedures, weapons system/fence checks, fighting wing, air-to-air avionics/ordnance employment, advanced handling and formation approach. | | |
| **END OF ADVANCED HANDLING PHASE** | | **TOTAL SORTIES** | **1** |

| AIR TO AIR PHASE | | | |
|---|---|---|---|
| **BASIC FIGHTER MANEUVERS PHASE** | | | |
| **OFFENSIVE BFM PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **BFM-1** | Introduce formation takeoff and landing, short and medium-range offensive BFM. Practice weapon systems check, heat-to-guns exercise, cine track exercise, and roll slides. Demonstrate proficiency in anti-G straining maneuver (AGSM). | | |
| **BFM-2** | Practice formation takeoff, heat-to-guns exercise, short and medium range offensive BFM, and formation landing. Introduce long-range offensive BFM (proficiency permitting). | | |
| **BFM-3** | Introduce offensive maneuvering using the vertical and simulated minimum fuel recovery. Practice long-range offensive BFM (introduce if not done on BFM-2).. | | |
| **BFM-4** | Practice offensive BFM. | | |
| **BFM-5** | Demonstrate proficiency in offensive BFM. | | |
| **END OF OFFENSIVE BFM PHASE** | | **TOTAL SORTIES** | **5** |
| **DEFENSIVE BFM PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **BFM-6** | Introduce long- and medium-range defensive BFM. | | |
| **BFM-7** | Introduce guns defense, overshoots, and scissors/stacks. Practice long- and medium-range defensive BFM. | | |
| **BFM-8** | Practice defensive BFM. | | |
| **BFM-9** | Demonstrate proficiency in defensive BFM and floor awareness. | | |
| **END OF DEFENSIVE BFM PHASE** | | **TOTAL SORTIES** | **4** |

| HIGH ASPECT BFM PHASE | | | |
|---|---|---|---|
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **BFM-10** | Introduce high-aspect BFM (visual setups) and 5,000-ft AGL unlimited maneuvering floor. | | |
| **BFM-11** | Introduce beam perch setups and tactical intercepts to high-aspect BFM engagements. | | |
| **BFM-12** | Demonstrate proficiency in high-aspect BFM. | | |
| **END OF HIGH ASPECT BFM PHASE** | | **TOTAL SORTIES** | **3** |
| **UPDATE ACBT CURRENCY BFM PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **BFM-13** | Practice offensive and defensive perch setups, and or intercepts to engagements. Update ACBT currency. | | |
| **END OF UPDATE ACBT CURRENCY BFM PHASE** | | **TOTAL SORTIES** | **1** |

| INTERCEPT PHASE | | | |
|---|---|---|---|
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **INT-1** | Introduce radar-assisted trail departure, stern conversions, and vertical conversions. | | |
| **INT-2** | Introduce AAR (if not previously introduced) and RMD. Practice radar-assisted trail departure, stern and vertical conversions. | | |
| **INT-3** | Demonstrate proficiency in stern and vertical conversions against a restricted maneuvering target. Practice RMD. | | |
| **INT-4** | Introduce fluid four formation and element intercepts in a BVR weapons tight scenario. Practice trail departure. | | |
| **INT-5** | Practice element intercepts and RMD. | | |
| **INT-6** | Demonstrate proficiency in element intercepts against multiple bandits and RMD. | | |
| **END OF INTERCEPT PHASE** | | **TOTAL SORTIES** | **6** |
| **AIR COMBAT MANEUVERING PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **ACM-1** | Introduce two-ship defensive ACM and visual lookout. | | |
| **ACM –2** | Introduce high-aspect ACM. Practice visual lookout, element intercepts, and both engaged and supporting fighter contracts. | | |
| **ACM –3** | Introduce two-ship tactical intercept to high-aspect ACM in a radar threat environment and practice fluid four formation. | | |
| **ACM –4** | Demonstrate proficiency as a wingman during execution of element tactics. | | |
| **END OF AIR COMBAT MANEUVERING PHASE** | | **TOTAL SORTIES** | **4** |
| **AIR COMBAT TACTICS PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **ACT-1** | Introduce element employment in a multi-bogey environment against an all-aspect IR threat. | | |
| **ACT –2** | Introduce element employment in a multi-bogey environment against an all-aspect radar threat | | |
| **END OF AIR COMBAT TACTICS PHASE** | | **TOTAL SORTIES** | **2** |

| LOW ALTITUDE STEP DOWN TRAINING PHASE | | | |
|---|---|---|---|
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **LASDT A/A-1** | Introduce low-altitude single-ship intercepts and visual lookout exercise. Practice low altitude awareness training. Demonstrate proficiency in single-ship maneuvering in the low altitude environment to a minimum of 500 ft AGL. | | |
| **LASDT A/A-2** | Introduce low-altitude two-ship intercepts and trail recovery. Demonstrate proficiency in low altitude two-ship maneuvering down to 500 ft AGL. | | |
| **END OF LOW ALTITUDE STEP DOWN TRAINING PHASE** | | **TOTAL SORTIES** | **2** |
| **END OF AIR TO AIR PHASE** | | | |

| START OF AIR TO GROUND PHASE | | | |
|---|---|---|---|
| **SURFACE ATTACK PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **SA-1** | Introduce low altitude operations to a minimum altitude of 500 ft AGL, basic range procedures, visual diving deliveries, LAS, and hung ordnance procedures. Demonstrate proficiency in single-ship maneuvering between 5,000 and 1,000 ft AGL. | | |
| **SA-2** | Introduce LATF, overfly INS updates, LAT, and straight-in/random entry SFO (if not previously introduced). Practice four-ship radar-assisted trail departure. | | |
| **SA-3** | Introduce HUD INS updates. Practice four-ship trail departure, LATF, and diving deliveries. | | |
| **SA-4** | Practice LATF and HUD INS updates. Demonstrate proficiency in box patterns/procedures and diving deliveries. | | |
| **SA-5** | Introduce LATN with TOT, FCR INS updates, and visual/radar level deliveries. | | |
| **SA-6** | Introduce visual and radar loft deliveries. Practice FCR INS updates, and LATN to a TOT. | | |
| **SA-7** | Demonstrate proficiency in LATN and level/loft deliveries. | | |
| **SA-8** | Introduce tactical pop-up patterns and TMLT safe escape. Practice LATN/LATF, threat reactions, and range procedures. | | |
| **SA-9** | Introduce four-ship medium-altitude ingress with threat reactions. Practice pop patterns, TMLT safe escapes, and HADB/HARB from the box pattern. | | |
| **SA-10** | Demonstrate proficiency in weapon deliveries from tactical patterns and TMLT safe escapes. Practice four-ship medium-altitude ingress with threat reactions, LAT, and LAS. | | |
| **END OF SURFACE ATTACK PHASE** | | **TOTAL SORTIES** | **10** |

| SURFACE ATTACK NIGHT PHASE | | | |
|---|---|---|---|
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **SAN-1** | Introduce night weapons employment. Practice radar-assisted trail departure, NAAR, medium-altitude radar navigation, instrument approaches, and night landings. | | |
| **END OF SURFACE ATTACK NIGHT PHASE** | | **TOTAL SORTIES** | **1** |
| **SURFACE ATTACK TACTICS PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **SAT-1** | Introduce auto IFF, tactical range procedures, two-ship echelon pop-up attacks, and target area egress as an element. Practice LATF, RWR/OBCM, and two-ship threat reaction. | | |
| **SAT-2** | Introduce four-ship coordinated low-altitude attacks. Practice LATF, target area egress, threat reactions, auto-IFF, and RWR/OBCM. | | |
| **SAT-3** | Introduce four-ship medium altitude coordinated attack and target egress, and HADB pop-up attack. Practice four-ship medium altitude ingress and threat reaction, auto-IFF, and RWR/OBCM. | | |
| **SAT-4** | Introduce large force employment (LFE). Practice mission planning and coordinated attacks. | | |
| **SAT-5** | Demonstrate proficiency in tactical ingress, weapon delivery against a preplanned target, and tactical egress. | | |
| **END OF SURFACE ATTACK TACTICS PHASE** | | **TOTAL SORTIES** | **5** |
| **MAVERICK PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **MAV-1** | Introduce GMT radar mode, Maverick switchology, and Maverick employment from the radar box pattern. | | |
| **MAV-2** | Introduce tactical Maverick employment. Demonstrate proficiency in preflight, switchology, and boresight procedures. | | |
| **END OF MAVERICK PHASE** | | **TOTAL SORTIES** | **2** |
| **CLOSE AIR SUPPORT PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **CAS-1** | Introduce low intensity CAS, FAC(A) communication, medium-altitude weapons deliveries from a floating wheel, and HAS. | | |
| **CAS-2** | Introduce increased intensity CAS, J-Fire brief, and Shooter/Cover. Practice low altitude deliveries. | | |
| **END OF CLOSE AIR SUPPORT PHASE** | | **TOTAL SORTIES** | **2** |

SYLLABUS AETC F16C0TX0PL

USAF Transition/Requalification Training Course, F-16C/D
October 1998, with Change 1, February 1999

**Course Overview:** This syllabus is used to train several types of students. Of interest to this project are Track 1 and Track 2 students. The background and qualifications of those students are listed in the table below:

| Track | Background/Qualifications | Syllabus Flying Sorties |
|---|---|---|
| 1A | F-4/F-15E/F-18 | 38 |
| 1B | A-7/A-10/F-111/F-117/AV-8 | 39 |
| 1C | EF-111/RF-4/International | 41 |
| 1D | F-14/F-15A/F-15C | 38 |
| 2A | F-16 (noncurrent 2–5 years) | 17 |
| 2B | F-16 (noncurrent 6–24 months) | 15 |

**Course Objectives – Track 1 and Track 2:** " . . . requalifies F-16C pilots in basic proficiency in air-to-air and air-to-surface tasks" (AETC Syllabus F16C0TX0PL 1999b, 6-1).

**Course Grading:** "Overall grade "2" is required for demonstrate proficiency sorties." A grade of "2" means the "Performance is almost correct. Makes errors that *impact mission/task effectiveness but recognizes and corrects them*" (AETC Syllabus F16C0TX0PL 1999b, 2-1).

**Track 1**

| **Pilot Experience Level: Inexperienced** | **Planned Noneffective Refly Rate = 8%** |
|---|---|
| **Pilot Currency Level: Not Current** | |
| **TRANSITION PHASE – TRACK 1** | |
| **SORTIE** | **MISSION OBJECTIVES** |
| **TR-1** | Introduce Combat Edge, G-awareness exercise, aircraft performance and handling demonstrations, nose-high recovery, horn demonstration maneuver, vertical recovery demonstration, instrument procedures and approaches, VFR patterns, and landings. |
| **TR-2** | Introduce AB takeoff, two-ship formation, two-ship G-awareness exercise, advanced handling, HARTS, G-limiter demonstration, aerobatics, dive recoveries, stick interference demonstration, and HUD-off landing. Practice horn demonstration maneuver, instrument approaches, SFO, VFR patterns, and landings. |
| **TR-3** | Review ride in preparation for TR-4. |
| **TR-4** | Stan/eval initial qualification/instrument checkride flown IAW applicable AF instructions. |

| | | | |
|---|---|---|---|
| **NTR-1** | Introduce night formation, night air refueling, night instrument approaches, and night landings. Practice stern conversion intercepts against a non-maneuvering target and BVR AMRAAM employment. | | |
| **END OF TRANSITION PHASE** | | **TOTAL SORTIES** | **5** |
| **INSTRUMENT PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **I-1** | Practice SFO, instrument procedures, HARTS, navigation, and approaches. | | |
| **END OF INSTRUMENT PHASE** | | **TOTAL SORTIES** | **1** |
| **AIR TO AIR PHASE** | | | |
| **BASIC FIGHTER MANEUVERS PHASE** | | | |
| **OFFENSIVE BFM PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **BFM-1** | Introduce HAVE QUICK and KY-58 procedures, formation takeoff and landing, AAR, weapon systems check, roll slides, heat-to-guns exercise, cine track exercise, and short-and medium-range offensive BFM. Demonstrate proficiency in anti-G straining maneuver (AGSM). | | |
| **BFM-2** | Introduce long-range offensive BFM and simulated minimum fuel recovery. Practice formation takeoff, heat-to-guns exercise, short- and medium- range offensive BFM, and formation landing. | | |
| **BFM-3** | Introduce high aspect gun exercise and offensive maneuvering using the vertical. Practice offensive BFM. | | |
| **BFM-4** | Demonstrate proficiency in offensive BFM. | | |
| **END OF OFFENSIVE BFM PHASE** | | **TOTAL SORTIES** | **4** |
| **DEFENSIVE BFM PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **BFM-5** | Introduce defensive BFM and chaff/flare employment. | | |
| **BFM-6** | Demonstrate proficiency in defensive BFM and floor awareness.<br>Track 1D: Demonstrate proficiency in defensive BFM and floor awareness. Introduce high aspect BFM. | | |
| **END OF DEFENSIVE BFM PHASE** | | **TOTAL SORTIES** | **2** |
| **HIGH ASPECT BFM PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **BFM-7** | Introduce high aspect BFM, tactical intercept to engagement, and 5,000-ft AGL unlimited maneuvering floor. Practice AMRAAM employment. | | |
| **BFM-8** | Demonstrate proficiency in high aspect BFM. | | |
| **END OF HIGH ASPECT BFM PHASE** | | **TOTAL SORTIES** | **2** |

| UPDATE ACBT CURRENCY BFM PHASE | | | |
|---|---|---|---|
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **BFM-9** | Practice offensive and defensive perch set ups, and or intercepts to high aspect BFM engagements. Update ACBT currency. | | |
| **END OF UPDATE ACBT CURRENCY BFM PHASE** | | **TOTAL SORTIES** | **1** |
| **INTERCEPT PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **INT-1** | Introduce trail departure, stern and vertical conversions, AMRAAM in a VID environment, and RMD. | | |
| **INT-2** | Introduce element intercepts against a single group, AMRAAM employment in a PID environment, and element RMD. Practice trail departure. | | |
| **INT-3** | Introduce fluid four tactical formation, element intercepts against multi-group targets, and split criteria. Practice PID for BVR AMRAAM employment, RMD, and AAR. | | |
| **INT-4** | Demonstrate proficiency in element intercepts against multiple bandits and RMD. | | |
| **END OF INTERCEPT PHASE** | | **TOTAL SORTIES** | **4** |
| **AIR COMBAT MANEUVERING PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **ACM-1** | Introduce two-ship defensive ACM and visual lookout. | | |
| **ACM –2** | Introduce high aspect ACM. Practice visual lookout, element intercepts, and both engaged and supporting fighter contracts. | | |
| **ACM –3** | Introduce RMD in an ACM environment. | | |
| **ACM –4** | Demonstrate proficiency as a wingman executing element tactics (ACM). | | |
| **END OF AIR COMBAT MANEUVERING PHASE** | | **TOTAL SORTIES** | **4** |
| **AIR COMBAT TACTICS PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **ACT-1** | Introduce element employment in a multi-bogey environment against an all-aspect IR threat. | | |
| **ACT –2** | Practice element employment in a multi-bogey environment against an all-aspect radar threat. . | | |
| **END OF AIR COMBAT TACTICS PHASE** | | **TOTAL SORTIES** | **2** |

| LOW ALTITUDE STEP DOWN TRAINING PHASE | | | |
|---|---|---|---|
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **LASDT A/A-1** | Introduce low-altitude single-ship intercepts. Practice low altitude awareness training. Demonstrate proficiency in single-ship maneuvering in the low altitude environment to a minimum of 500 ft AGL. | | |
| **LASDT A/A-2** | Introduce low altitude two-ship intercepts. Demonstrate proficiency in low altitude two-ship maneuvering down to 500 ft AGL. | | |
| **END OF LOW ALTITUDE STEP DOWN TRAINING PHASE** | | **TOTAL SORTIES** | **2** |
| **END OF AIR TO AIR PHASE** | | | |

| START OF AIR TO GROUND PHASE | | | |
|---|---|---|---|
| SURFACE ATTACK PHASE | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **SA-1** | Introduce low altitude operations to a minimum altitude of 500 ft AGL, overfly avionics updates, threat reactions, basic range procedures, visual diving deliveries, LAS, and hung ordnance procedures. Demonstrate proficiency in single-ship maneuvering in the low altitude environment between 5,000 and 1,000 ft AGL. | | |
| **SA-2** | Introduce two-ship LATF, visual lookout exercise, HUD avionics updates, HARB, and straight-in/random entry SFO. Practice four-ship trail departure, diving deliveries, TMLT, and LAS. | | |
| **SA-3** | Introduce four-ship LATN/LATF, four-ship threat reactions, tactical pop-up weapons deliveries, LAT, and trail recovery. Practice avionics updates and diving deliveries. | | |
| **SA-4** | Introduce LATN with TOD, FCR avionics updates, visual/radar level and loft deliveries, and VLD. | | |
| **SA-5** | Demonstrate proficiency in box patterns. Introduce four-ship medium altitude ingress with threat reactions. Practice tactical pop patterns and SLD/loft. | | |
| **SA-6** | Practice weapons delivery events as required for proficiency/qualification and TMLT safe escapes. | | |
| **SA-7** | Demonstrate proficiency in weapon deliveries from tactical patterns and TMLT safe escapes. Practice four-ship low altitude ingress with threat reactions and deliveries required for qualification/proficiency. | | |
| **SA-8** | Practice two- or four-ship low or medium altitude ingress with threat reactions and deliveries required for qualification/proficiency. | | |
| **END OF SURFACE ATTACK PHASE** | | **TOTAL SORTIES** | **8** |

| SURFACE ATTACK NIGHT PHASE | | | |
|---|---|---|---|
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **SAN-1** | Introduce night weapons employment. Practice trail departure, NAAR, medium altitude radar navigation, instrument approaches, and night landings. | | |
| **END OF SURFACE ATTACK NIGHT PHASE** | | **TOTAL SORTIES** | **1** |
| **SURFACE ATTACK TACTICS PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **SAT-1** | Introduce auto IFF, tactical range procedures, two-ship echelon pop-up attacks, and target area egress as an element. Practice LATF, RWR/OBCM, and two-ship threat reaction. | | |
| **SAT-2** | Introduce four-ship low altitude coordinated attacks. Practice LATF, target area egress, threat reactions, and auto IFF. | | |
| **SAT-3** | Demonstrate proficiency in tactical ingress, weapon delivery against a preplanned target, and tactical egress. Introduce four-ship medium altitude coordinated attacks. | | |
| **SAT-4** | Practice tactical ingress, coordinated low or medium altitude attacks against a preplanned target, and tactical egress as required for proficiency. | | |
| **END OF SURFACE ATTACK TACTICS PHASE** | | **TOTAL SORTIES** | **4** |
| **MAVERICK PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **MAV-1** | Introduce GMT radar mode, Maverick switchology, and Maverick employment from the radar box pattern. | | |
| **MAV-2** | Introduce tactical Maverick employment. Practice preflight, switchology, and boresight procedures. | | |
| **END OF MAVERICK PHASE** | | **TOTAL SORTIES** | **2** |
| **CLOSE AIR SUPPORT PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **CAS-1** | Introduce CAS, FAC(A) communication, medium-altitude weapons deliveries from a floating wheel, shooter/cover attack, and HAS. | | |
| **CAS-2** | Introduce increased intensity CAS, J-Fire brief, and Shooter/Cover. Practice low altitude deliveries. | | |
| **END OF CLOSE AIR SUPPORT PHASE** | | **TOTAL SORTIES** | **2** |

## Track 2

| | | | |
|---|---|---|---|
| **Pilot Experience Level: Experienced** | | **Planned Noneffective Refly Rate = 8%** | |
| **Pilot Currency Level: Not Current** | | | |
| **TRANSITION PHASE – TRACK 2** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **TR-1** | Introduce Combat Edge, G-awareness exercise, aircraft performance and handling demonstrations, nose-high recovery, horn demonstration maneuver, vertical recovery demonstration, high-and low-speed dive recoveries, instrument procedures and approaches, VFR patterns, SFO, and landings. | | |
| **TR-2** | Introduce AB takeoff, two-ship formation, G-awareness exercise from line-abreast formation, aerobatics, advanced handling maneuvers, stick interference demonstration, and HUD-off landing. Practice nose high recovery, horn demonstration maneuver, instrument approaches, VFR patterns and landings, and SFO. | | |
| **TR-3** | Review ride in preparation for TR-4. | | |
| **TR-4** | Stan/eval initial qualification/instrument checkride flown IAW applicable USAF instructions. | | |
| **END OF TRANSITION PHASE** | | **TOTAL SORTIES** | **4** |

| | | | |
|---|---|---|---|
| **AIR TO AIR PHASE** | | | |
| **BASIC FIGHTER MANEUVERS PHASE** | | | |
| **OFFENSIVE BFM PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **BFM-1** | Introduce formation takeoff, BFM exercises, offensive BFM, missile gun employment, and formation landing. Practice weapon systems check. | | |
| **END OF OFFENSIVE BFM PHASE** | | **TOTAL SORTIES** | **1** |
| **DEFENSIVE BFM PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **BFM-2** | Introduce defensive BFM, flare employment. | | |
| **END OF DEFENSIVE BFM PHASE** | | **TOTAL SORTIES** | **1** |
| **HIGH ASPECT BFM PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **BFM-3** | Introduce a tactical intercept to a BFM engagement and high aspect BFM, and AMRAAM employment. | | |
| **END OF HIGH ASPECT BFM PHASE** | | **TOTAL SORTIES** | **1** |

| INTERCEPT PHASE | | | |
|---|---|---|---|
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **INT-1** | **Track 2A:**Introduce fluid four tactical formation, two-ship intercepts against multigroup targets, and split. Practice AAR, PID for BVR AMRAAM employment, and RMD.<br>**Track 2B**: Demonstrate proficiency in element intercept employment. | | |
| **INT-2** | **Track 2A:**Demonstrate proficiency in element intercepts against multiple bandits, correct use of GCI/AWACS, weapons employment, RWR/OBCM, and RMD. | | |
| **END OF INTERCEPT PHASE** | | **TOTAL SORTIES** | **2-2A<br>1-2B** |
| **AIR COMBAT MANEUVERING PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **ACM-1** | Introduce two-ship defensive ACM, element tactical intercept to a high aspect ACM, and visual lookout. | | |
| **END OF AIR COMBAT MANEUVERING PHASE** | | **TOTAL SORTIES** | **1** |
| **AIR COMBAT TACTICS PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **ACT-1** | **Track 2A:**Introduce element employment in a multi-bogey environment against an all-aspect IR and radar threat. | | |
| **END OF AIR COMBAT TACTICS PHASE** | | **TOTAL SORTIES** | **1-2A** |
| **END OF AIR TO AIR PHASE** | | | |

| START OF AIR TO GROUND PHASE | | | |
|---|---|---|---|
| **SURFACE ATTACK PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **SA-1** | Introduce LAAT, visual and radar LATN, FCR avionics updates, level and loft deliveries using radar and visual references, and random-entry SFO. | | |
| **SA-2** | Introduce two-ship LATF and LATN, overfly avionics updates, visual weapons deliveries (box and pop patterns), and turning maneuver (level turn) safe escape. | | |
| **END OF SURFACE ATTACK PHASE** | | **TOTAL SORTIES** | **2** |
| **SURFACE ATTACK NIGHT PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **SAN-1** | Introduce night formation, NAAR, night weapons employment, instrument approaches, and landings. | | |
| **END OF SURFACE ATTACK NIGHT PHASE** | | **TOTAL SORTIES** | **1** |

| SURFACE ATTACK TACTICS PHASE | | | |
|---|---|---|---|
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **SAT-1** | Introduce mission planning; four-ship coordinated attacks; auto-IFF, RWR/OBCM; and target egress. Practice LATF and threat reactions. | | |
| **SAT-2** | Introduce four-ship medium altitude maneuvering and attacks. Practice mission planning; auto IFF; RWR/OBCM; target egress; and threat reactions. | | |
| **END OF SURFACE ATTACK TACTICS PHASE** | | **TOTAL SORTIES** | **2** |
| **MAVERICK PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **MAV-1** | Introduce GMT radar mode, Maverick switchology, and Maverick employment from the radar box pattern. | | |
| **END OF MAVERICK PHASE** | | **TOTAL SORTIES** | **1** |

SYLLABUS AETC F16C0I00PL

USAF Instructor Pilot Upgrade Training, F-16C/D
August 1998, with Change 1, June 1999

**Course Overview:** This syllabus is used to train Track 1 and Track 2 students. The background and qualifications of those students are listed in the table below:

| Track | Background/Qualifications | Syllabus Flying Sorties |
|---|---|---|
| 1 | 1. Qualified and current F-16C four-ship flight lead (both air-to-air and air-to-ground) with ***90 days post-certification, operational 4 FL experience*** **or**<br>2. Former F-16 FTU IP or WIC graduate with greater than 3 years 3 months since loss of IP status | 22 |
| 2 | 1. Qualified and current F-16 operational IP **or**<br>2. Former F-16 FTU IP or WIC graduate with less than 3 year 3 months since loss of IP status. | 19 |

**Course Objectives**: "This course produces qualified Ips capable of performing instructor duty in F-16C/D formal training courses. USAF graduates receive AFSC T11F3H" (AETC Syllabus F16C0I00PL 1999c, 1-2).

**Course Grading:** "Overall grade "2" is required for demonstrate proficiency sorties." A grade of "2" means the "Performance is almost correct. Makes errors that *impact mission/task effectiveness but recognizes and corrects them*" (AETC Syllabus F16C0I00PL 1999c, 2-1).

| **Pilot Experience Level: Experienced Planned Noneffective Refly Rate = Not Specified** | | | |
|---|---|---|---|
| **Pilot Currency Level: Current** | | | |
| **TRANSITION PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **TR-1** | Observe a typical transition briefing and debriefing. Introduce local area procedures, navigation, transition airwork, HARTS, approaches, patterns, and landings. | | |
| **END OF TRANSITION PHASE** | | **TOTAL SORTIES** | **1** |

| ADVANCED HANDLING PHASE | | | |
|---|---|---|---|
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **AHC-1** | Introduce RCP air refueling. Practice briefing and debriefing a typical AHC / TR mission, basic formation, transition airwork, paddle-off exercise, instrument approaches, patterns, and landings. Observe airwork chase procedures and techniques. | | |
| **END OF ADVANCED HANDLING PHASE** | | **TOTAL SORTIES** | **1** |

| AIR TO AIR PHASE | | | |
|---|---|---|---|
| **BASIC FIGHTER MANEUVERS PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **BFM-1** | Practice briefing, conducting and debriefing a B/TX BFM mission. Practice lead formation takeoff, and overhead pattern chase. | | |
| **BFM-2** | Practice briefing, conducting, and debriefing a B/TX BFM mission. Practice lead formation landing. | | |
| **BFM-3** | Demonstrate proficiency in briefing, conducting, and debriefing a B/TX BFM mission. | | |
| **END OF BFM PHASE** | | **TOTAL SORTIES** | **3** |
| **INTERCEPT PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **INT-1** | Practice briefing, conducting, and debriefing a B/TX 2 v 2 intercept mission. | | |
| **END OF INTERCEPT PHASE** | | **TOTAL SORTIES** | **1** |
| **AIR COMBAT MANEUVERING PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **ACM-1** | Practice briefing, conducting, and debriefing any B/TX ACM mission. | | |
| **ACM -2** | Demonstrate proficiency in briefing, conducting, and debriefing any B/TX ACM mission. | | |
| **END OF AIR COMBAT MANEUVERING PHASE** | | **TOTAL SORTIES** | **2** |
| **AIR COMBAT TACTICS PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **ACT-1** | Practice briefing, conducting, and debriefing any B/TX ACT mission. | | |
| **ACT -2** | Demonstrate proficiency in briefing, conducting, and debriefing any B/TX ACT mission. | | |
| **END OF AIR COMBAT TACTICS PHASE** | | **TOTAL SORTIES** | **2** |
| **END OF AIR TO AIR PHASE** | | | |
| **START OF AIR TO GROUND PHASE** | | | |
| **SURFACE ATTACK PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **SA-1** | Practice briefing, conducting, and debriefing a typical B/TX surface attack mission. | | |
| **SA-2** | Demonstrate proficiency in briefing, conducting, and debriefing a typical B/TX surface attack mission. | | |
| **END OF SURFACE ATTACK PHASE** | | **TOTAL SORTIES** | **2** |

| SURFACE ATTACK NIGHT PHASE | | | |
|---|---|---|---|
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **SAN-1** | Observe a typical B/TX SAN mission. Practice RCP night air refueling, formation, Maverick employment, and patterns and landings. | | |
| **END OF SURFACE ATTACK NIGHT PHASE** | | **TOTAL SORTIES** | **1** |
| **SURFACE ATTACK TACTICS PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **SAT-1** | Practice planning, briefing, conducting, and debriefing a B/TX SAT mission. | | |
| **SAT-2** | Demonstrate proficiency in planning, briefing, conducting, and debriefing a B/TX SAT mission. | | |
| **END OF SURFACE ATTACK TACTICS PHASE** | | **TOTAL SORTIES** | **2** |
| **MAVERICK PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **MAV-1** | Introduce Maverick operations and single-ship attacks. | | |
| **MAV-2** | Demonstrate proficiency in briefing, conducting, and debriefing a B-course MAV-2 sortie. | | |
| **END OF MAVERICK PHASE** | | **TOTAL SORTIES** | **2** |
| **CLOSE AIR SUPPORT PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **CAS-1** | Practice planning, briefing ,conducting, and debriefing a typical B/TX CAS mission. | | |
| **END OF CLOSE AIR SUPPORT PHASE** | | **TOTAL SORTIES** | **1** |

ACC SYLLABUS F1600IDOPN

USAF WEAPONS INSTRUCTOR COURSE, F-16
January 1998

**Course Overview:** This syllabus is used for the F-16 Weapons Instructor Course at Nellis Air Force Base.

**Course Objectives**: "The WS graduate possesses the knowledge and skills necessary to provide weapons, weapons related systems, and tactics expertise at the squadron, wing, and headquarters level" (ACC SYLLABUS F1600IDOPN 1998, 9).

**Course Grading:** "2—Performance is essentially correct. Recognizes and corrects errors" (ACC SYLLABUS F1600IDOPN 1998, 17).

| | | | |
|---|---|---|---|
| **Pilot Experience Level: Experienced Planned Noneffective Refly Rate = Approx. 25%** | | | |
| **Pilot Currency Level: Current** | | | |
| **AIR TO AIR PHASE** | | | |
| **BASIC FIGHTER MANEUVERS PHASE** | | | |
| **OFFENSIVE BFM PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **BFM-1** | Mission objectives. Observe briefing, in-flight control, and debriefing of an aircraft handling characteristics (AHC) and offensive BFM training mission. Student will perform AHC maneuvers designed to gain proficiency in exploiting the flight envelope. Students will demonstrate effective 1v1 offensive maneuvering from progressive visual perch setups. IP will demo local area procedures going to and from the working airspace. | | |
| **BFM-2** | Mission objectives. The student will present an instructional-level 1v1 offensive BFM briefing and debriefing. Student will lead the mission and demonstrate proficiency in 1v1 offensive maneuvering from progressive visual perch setups. | | |
| **END OF OFFENSIVE BFM PHASE** | | **TOTAL SORTIES** | **2** |
| **DEFENSIVE BFM PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **BFM-3** | Mission objectives. Student will observe the briefing, in-flight control, and debriefing of a 1v1 defensive BFM training mission. Student will demonstrate effective 1v1 defensive maneuvering from progressive visual perch setups | | |
| **BFM-4** | Mission objectives. The student will present an instructional-level 1v1 defensive BFM briefing and debriefing. Student will lead the mission and demonstrate proficiency in 1v1 defensive maneuvering from progressive visual perch setups. | | |
| **END OF DEFENSIVE BFM PHASE** | | **TOTAL SORTIES** | **2** |

| HIGH ASPECT BFM PHASE | | | |
|---|---|---|---|
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **BFM-5** | Mission objectives. The student will present an instructional-level 1v1 BFM briefing and debriefing on high aspect considerations and maneuvers. Student will lead the mission and demonstrate proficiency in 1v1 maneuvering against a high aspect positioned adversary. | | |
| **BFM-6** | Mission objectives. The student will present an instructional-level 1v1 BFM briefing and debriefing on high aspect considerations and maneuvers against an all-aspect dissimilar adversary. Student will lead the mission and demonstrate proficiency in 1v1 maneuvering against a high aspect position adversary. | | |
| **END OF HIGH ASPECT BFM PHASE** | | **TOTAL SORTIES** | **2** |
| **AIR COMBAT MANEUVERING PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **ACM-1** | Mission objectives. The student will observe briefing, in-flight control, and debriefing of a two-ship offensive and defensive postmerge maneuvering mission. The student will demonstrate effective two-ship fluid attack employment and mutual support. The student will demonstrate successful disengagement/withdrawal maneuvering if mutual support is lost. The adversaries will employ two group formations to reinforce multi-bogey considerations. | | |
| **END OF AIR COMBAT MANEUVERING PHASE** | | **TOTAL SORTIES** | **1** |
| **INTERCEPT PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **TI-1** | Mission objectives. The student will observe briefing, in-flight control, and debriefing of a single-ship mission against a two-ship formation employing a variety of formations and tactics. Student will demonstrate proper radar employment and intercept execution. | | |
| **TI-2** | Mission objectives. The student will brief, control, and debrief a two-ship tactical intercept mission. The student will demonstrate an instructional-level understanding of tactical two-ship employment against multiple groups. The student will also accurately reconstruct and extract applicable lessons learned. | | |
| **TI-3** | Mission objectives. The student will observe briefing, in-flight control, and debriefing of a two-ship intercept mission emphasizing the BVR use of AMRAAM against a radar missile capable adversary employing various formations. The student will demonstrate proper radar and IR missile employment techniques. | | |

| | | | |
|---|---|---|---|
| **TI-4** | Mission objectives. The student will observe briefing, in-flight control, and debriefing of a four-ship intercept mission emphasizing the BVR use of AMRAAM against a radar missile capable adversary employing various formations. The student will demonstrate proper radar and IR missile employment techniques. | | |
| **NTI-5** | Mission objectives. The student will brief, control, and debrief a two-ship tactical **night** intercept mission. The student will demonstrate an instructional-level understanding of tactical two-ship employment against multiple groups. The student will also accurately reconstruct and extract applicable lessons learned. | | |
| | | | |
| **END OF INTERCEPT PHASE** | | **TOTAL SORTIES** | **5** |
| **AIR COMBAT TACTICS PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **ACT-1** | Mission objectives. The student will observe an instructional-level briefing, in-flight control, and debriefing of an air-to-air lane defense mission. The student will demonstrate an understanding of CAP, commit, intercept, and four-ship employment considerations in a lane defense scenario against an all-aspect radar missile capable adversary. | | |
| **ACT -2** | Mission objectives. The student will brief, control, and debrief a four-ship lane defense mission. The student will demonstrate an understanding of CAP, commit, intercept, and four-ship engagement considerations in a lane defense scenario against a low technology (heat only) capable adversary. As a minimum each student will fly in the flight lead position on either ACT-2 or ACT-3. | | |
| **ACT-3** | Mission objectives. The student will brief, control, and debrief a four-ship lane defense mission. The student will demonstrate an understanding of CAP, commit, intercept, and four-ship engagement considerations in a lane defense scenario against an all-aspect radar missile capable adversary. As a minimum each student will fly in the flight lead position on either ACT-2 or ACT-3. | | |
| **ACT-4** | Mission objectives. The student will observe an instructional-level brief, control, and debrief of a four-ship point defense against an unknown number of bombers and air escort. The student will demonstrate an understanding of CAP, commit, intercept, and four-ship employment considerations in an all-altitude, multi-bogey environment, using AMRAAM employment tactics. | | |

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| **ACT-5** | Mission objectives. The student will brief, control, and debrief a four-ship lane defense against an unknown number of bombers and air escort. The student will demonstrate an understanding of CAP, commit, intercept, and four-ship employment considerations in an all altitude, multi-bogey environment, using AMRAAM employment tactics. | | |
| **END OF AIR COMBAT TACTICS PHASE** | | **TOTAL SORTIES** | **5** |
| **FORCE PROTECTION PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **FP-1** | Mission objectives. The student will present an instructional-level brief and debrief of a four-ship force protection mission against an IADS with all aspect air-to-air and surface-to-air capabilities. The student will demonstrate an understanding of OCA principles in an all altitude air-to-air multi-bogey and dense surface-to-air environment. This mission will be flown in conjunction with WPN-6 and FP-1CJ. | | |
| **FP -2** | Mission objectives. The student will present an instructional-level brief and debrief of a four-ship force protection mission against an IADS with all aspect air-to-air and surface-to-air capabilities. The student will demonstrate an understanding of Suppression of Enemy Air Defenses (SEAD) and OCA principles in an all altitude air-to-air multi-bogey and dense surface-to-air environment. This mission will be flown in conjunction with WPN-6 and FP-1CG. | | |
| **END OF FORCE PROTECTION PHASE** | | **TOTAL SORTIES** | **2** |
| **END OF AIR TO AIR PHASE** | | | |
| **START OF AIR TO GROUND PHASE** | | | |
| **SURFACE ATTACK PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **SA-1** | Mission objectives. The student will present an instructional-level brief, in-flight control, and debrief of a radar and computed weapons delivery mission. The student will demonstrate understanding and effective employment of radar deliveries and computed deliveries from pop up attacks. The student will complete single-ship LASDT in the 300 to 500 feet AGL and familiarization in the 100 to 300 feet blocks. | | |
| **SA-2** | Mission objectives. The student will observe the brief, in-flight control, and debrief of a two-ship Maverick/LGB employment mission. The student will demonstrate an instructor-level understanding of AGM/TGM-65 employment with and without the targeting pod and LGB employment. The student will accomplish an AGM-65 live fire. The student will accomplish two and four-ship LASDT. | | |

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|---|---|---|---|
| **SA-3** | Mission objectives. The student will observe the brief, in-flight control, and debrief of a four-ship SEAD mission. The student will participate in mission planning for the mission. The student will demonstrate proficiency in HARM employment using the HTS pod. The student will demonstrate proficiency in surface-to-air threat reactions. | | |
| | | | |
| **END OF SURFACE ATTACK PHASE** | | **TOTAL SORTIES** | **3** |
| **SURFACE ATTACK NIGHT PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **SA-4** | Mission objectives. The instructor will plan, brief, and lead a night surface attack sortie. The instructor will use a building block approach to night procedures. LANTIRN pod and employment altitudes will be based on student qualifications. The student will demonstrate proficiency in night low-level (LANTIRN night low altitude navigation pod qualified pilots only) and night medium altitude (at or above 5,000 feet AGL) procedures and night attack procedures. | | |
| **END OF SURFACE ATTACK NIGHT PHASE** | | **TOTAL SORTIES** | **1** |
| **SURFACE ATTACK TACTICS PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **SAT-1** | Mission objectives. The student will observe the brief, in-flight control, and debrief of a two-ship air-to-surface mission. The student will demonstrate an understanding of low altitude detection and defense against an airborne threat, various techniques for single-ship and element IP-to-target navigation and element weapons/aircraft deconfliction. | | |
| **SAT-2** | Mission objectives. The student will observe the brief, in-flight control, and debrief of a two-ship HARM employment SEAD mission using the HTS pod and a coordinated two-ship DEAD attack on a strategic SAM sight. The student will demonstrate an understanding of techniques for attacking and defending against surface-to-air threats. | | |
| **END OF SURFACE ATTACK TACTICS PHASE** | | **TOTAL SORTIES** | **2** |
| **SURFACE ATTACK NIGHT PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **SAT-3** | Mission objectives. The student will present an instructional brief and debrief of a night two-ship surface attack tactics sortie. LANTIRN night low altitude navigation pod qualified pilots will demonstrate proficiency in formation low-level, threat reactions, and element attack procedures. Non-LANTIRN students will demonstrate proficiency in the same areas at or above 5,000 feet AGL. | | |
| **END OF SURFACE ATTACK NIGHT PHASE** | | **TOTAL SORTIES** | **1** |

| MAVERICK PHASE | | | |
|---|---|---|---|
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **MAV-1** | Introduce Maverick operations and single-ship attacks. | | |
| **MAV-2** | Demonstrate proficiency in briefing, conducting, and debriefing a B-course MAV-2 sortie. | | |
| **END OF MAVERICK PHASE** | | **TOTAL SORTIES** | **2** |
| **CLOSE AIR SUPPORT PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **CAS-1** | Mission objectives. The student will observe the brief, in-flight control, and debrief of a two-ship reduced threat CAS mission employing Maverick. The student will demonstrate an instructor-level understanding of the Theater Air Control System (TACS) procedures, four-ship ingress/egress, threat reactions, wounded aircraft procedures, and Maverick attacks in a reduced threat CAS scenario. Two rides during the CAS or SA phase will include low altitude recurrency profiles (LRP) using the LANTIRN system for LANTIRN qualified pilots. Non-LANTIRN students will perform FLIR turn on and tuning before the sortie using the LANTIRN HUD bonnet. | | |
| **CAS-2** | Mission objectives. The student will present an instructional-level brief, in-flight control, and debrief of a two-ship high threat CAS mission employing MK-82 Air. The student will demonstrate an instructor-level understanding of the TACS procedures, two-ship ingress/egress, threat reactions, wounded aircraft procedures, and primary and backup MK-82 Air attacks in a high threat CAS scenario. Two rides during the CAS phase will include LRP using the LANTIRN system for LANTIRN qualified pilots. | | |
| **CAS-2A** | Mission objectives. The student will present an instructional-level brief, in-flight control, and debrief of a two-ship high threat Airborne Forward Air Control (FAC-A) CAS mission. The student will demonstrate an instructor-level understanding of the TACS procedures, FAC-A control of flights, threat reactions, and MK-82 Air attacks in a high threat CAS scenario. | | |
| **CAS-3** | Mission objectives. The student will present an instructional-level brief, in-flight control, and debrief of a two-ship night reduced threat CAS mission employing GBU-12. The student will demonstrate an instructor-level understanding of the TACS procedures, two-ship ingress/egress, threat reactions, and primary and backup LGB attacks in a night reduced threat CAS scenario. | | |

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| **CAS-3A** | Mission objectives. The student will present an instructional-level brief, in-flight control, and debrief of a two-ship night Airborne Forward Air Control (FAC-A) CAS mission. The student will demonstrate an instructor-level understanding of the TACS procedures, FAC-A control of fighters, threat reactions, and LGB attacks in a night CAS scenario. | | |
| **END OF CLOSE AIR SUPPORT PHASE** | | **TOTAL SORTIES** | **3*** |
| *Either CAS 1, 2, and 3 or CAS 1, 2A, and 3A will be flown for 3 total sorties. | | | |
| **WEAPONS PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **WPN-1** | Mission objectives. The student will observe an instructional-level brief, in-flight control, and debrief of a four-ship ingress, GBU-12 attack and egress in a tactical environment. | | |
| **WPN-2** | Mission objectives. The student will present an instructional-level brief and debrief of an OCA SEAD conventional mission. The student will demonstrate an instructional-level understanding of two-ship and four-ship tactics, threat reactions, and CBU-87 employment in a high threat environment. | | |
| **WPN-3** | Mission objectives. The student will present an instructional-level brief and debrief of a SEAD mission employing AGM-88 with the HTS pod. The student will demonstrate an instructional-level understanding of SEAD mission planning, four-ship SEAD tactics, threat reactions, and AGM-88 employment using the HTS pod. | | |
| **WPN-4** | Mission objectives. The student will present an instructional-level brief and debrief for employing in an OCA role. The student will demonstrate an instructional-level understanding of eight-ship tactics, threat reactions, and MK-84 employment in a high threat environment. | | |
| **WPN-5CG Night** | Mission objectives. The student will present an instructional-level brief and debrief of a four-ship interdiction mission. The student will demonstrate an instructional-level understanding of four-ship night tactics, threat reactions, and GBU-10 employment in a medium/high threat environment. Non-LANTIRN students will complete this ride at or above 5,000 feet AGL. | | |
| **WPN-5CJ Night** | Mission objectives. The student will present an instructional-level brief and debrief of a four-ship force protection mission. The student will demonstrate an instructional-level understanding of four-ship night tactics, threat reactions, and AGM-88 employment using the HTS pod in a medium/high threat environment. | | |

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|---|---|---|---|
| **WPN-6** | Mission objectives. The student will present an instructional-level brief and debrief of a strategic attack mission. The student will demonstrate an instructional-level understanding of two-ship and four-ship tactics, threat reactions, and live ordnance employment in a high threat environment. This mission will be flown in conjunction with the FP-ICJ and FP-ICG Force Protection mission. | | |
| **END OF WEAPONS PHASE** | | **TOTAL SORTIES** | **6** |
| **MISSION EMPLOYMENT PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **ME-1** | Mission objectives. The student will plan, coordinate, brief, lead, and debrief a composite force mission. The student will present an instructional-level understanding of night composite force employment, four-ship tactics, and threat reactions. LANTIRN CAT II qualified students may complete this sortie at low altitude. Non-LANTIRN students in the F-16CG will complete this sortie at or above 5,000 feet AGL. | | |
| **END OF MISSION EMPLOYMENT PHASE** | | **TOTAL SORTIES** | **1** |

Hill AFB Mission Qualification Syllabus

Syllabus Not Dated

**Course Overview:** This syllabus is used for mission qualification training for pilots just assigned to Hill AFB.

**Course Objectives**: "MQT provides the training necessary to initially qualify or requalify pilots in a specific position and flying duties to perform the missions assigned to a specific unit" (AFI11-2F-16V1 1998, 7).

**Course Grading:** "2"—Performance is essentially correct. Recognizes and corrects errors.

| | | | |
|---|---|---|---|
| **Pilot Experience Level: Varies** | | **Planned Noneffective Refly Rate = Unknown%** | |
| **Pilot Currency Level: Current** | | | |
| **LOCAL AREA ORIENTATION PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **MQT LAO** | ▪ Become familiar with Hill AFB local area procedures orientation / GE 100 Engine<br>▪ Become familiar with UTTR range procedures<br>▪ Demonstrate proficiency in instrument navigation and approaches<br>▪ Practice orientation passes at Eagle Range**<br>▪ Demonstrate proficiency in HARTS and vertical recovery maneuvers***<br>▪ Practice instrument / VFR approaches at Hill AFB, Wendover, and Michaels AAF | | |
| **END OF LOCAL AREA ORIENTATION PHASE** | | **TOTAL SORTIES** | **1** |
| **AIR TO AIR PHASE** | | | |
| **BASIC FIGHTER MANEUVERS PHASE** | | | |
| **OFFENSIVE BFM PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **MQT BFM-1** | ▪ Observe an instructional briefing, in-flight control, and debriefing of offensive BFM<br>▪ Demonstrate proficiency in HARTS and vertical recovery maneuvers*<br>▪ Demonstrate proficiency in effective 1 v 1 offensive maneuvering from progressive visual perches<br>▪ Maintain the offensive advantage<br>▪ Recognize the T.C. entry<br>▪ Proper energy management<br>▪ Control overtake, angle off, and range to close to a WEZ<br>▪ Employ valid ordnance to kill | | |
| **END OF OFFENSIVE BFM PHASE** | | **TOTAL SORTIES** | **1** |

| DEFENSIVE BFM PHASE | | | |
|---|---|---|---|
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **MQT BFM-2** | ▪ Observe an instructional briefing, in-flight control, and debriefing of defensive BFM<br>▪ Demonstrate proficiency in effective 1 v 1 defensive maneuvering from progressive visual perches<br>▪ Employ defensive BFM to deny / negate WEZ / Ordnance / Range to the bandit<br>▪ Proper Lift Vector Control<br>▪ Properly use IRMD to deny / defeat weapons<br>▪ Exploit bandit errors<br>▪ Employ timely, effective guns jinks / reversals<br>▪ Maintain Sight! | | |
| **END OF DEFENSIVE BFM PHASE** | | **TOTAL SORTIES** | **1** |
| **HIGH ASPECT BFM PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| | No High Aspect BFM in the MQT program | | |
| **END OF HIGH ASPECT BFM PHASE** | | **TOTAL SORTIES** | **0** |
| **INTERCEPT PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **MQT TI** | ▪ Observe an instructional briefing, in-flight control, and debriefing of a 2 ship sweep v. sweep intercept mission emphasizing WEZ-in-Depth (WID) tactics<br>▪ Demonstrate proficiency on a Tactical Intercept sortie<br>▪ Proper Radar Mech and sort contracts<br>▪ Correct WID formation<br>▪ Clear, Concise 3-1 STD comm.<br>▪ 100% valid ID's, shots, and kills | | |
| **END OF INTERCEPT PHASE** | | **TOTAL SORTIES** | **1** |
| **AIR COMBAT MANEUVERING PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **MQT (D)ACM** | ▪ Observe an instructional briefing, in-flight control, and debriefing of ACM concepts<br>▪ Demonstrate proficiency in 2 v 1 coordinated maneuvering<br>▪ Execute ACM roles and contracts<br>▪ 100% valid ID's, shots, and kills with no missed shots<br>▪ Maintain / Maximize mutual support<br>▪ 3-1 Brevity, SA building comm | | |
| **END OF AIR COMBAT MANEUVERING PHASE** | | **TOTAL SORTIES** | **1** |

| AIR COMBAT TACTICS PHASE | | | |
|---|---|---|---|
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **MQT (D)ACT** | ▪ Observe an instructional briefing, in-flight control, and debriefing of a 2-ship DCA mission emphasizing WEZ-in-Depth (WID) tactics<br>▪ Demonstrate a basic understanding of CAP tactics, commit criteria, commit abort criteria, and engagement wingman considerations and techniques<br>▪ Utilize WID tactics against aware adversaries<br>▪ Clear, Concise 3-1 STD Comm<br>▪ 100% valid ID's, shots, and kills | | |
| **END OF AIR COMBAT TACTICS PHASE** | | **TOTAL SORTIES** | **1** |
| **END OF AIR TO AIR PHASE** | | | |
| **START OF AIR TO GROUND PHASE** | | | |
| **SURFACE ATTACK PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **MQT BSA** | ▪ Practice conventional weapons deliveries and complete weapons qualifications<br>▪ Accomplish weapons events that require QUAL completion from FTU<br>▪ Pipper within 6 mils of TGT<br>▪ Minimum Top Gun gross errors<br>▪ Apply error analysis to improve success | | |
| **END OF SURFACE ATTACK PHASE** | | **TOTAL SORTIES** | **1** |
| **SURFACE ATTACK TACTICS PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **MQT SAT-1** | ▪ Demonstrate knowledge of mission planning, switchology, system checks, and employment<br>▪ Find and Destroy an assigned target, 100% valid attacks, using the aircraft avionics and employing LDGP munitions<br>▪ Perform threat reactions to avoid / defeat surface-to-air threats<br>▪ Maintain / Maximize / Regain mutual support<br>▪ Clear / Concise 3-1 STD Comm<br>▪ No Duds / Frags | | |

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|---|---|---|---|
| **MQT SAT-2** | ▪ Observe an instructional briefing, in-flight control, and debriefing of a tactical opposed SAT mission<br>▪ Demonstrate knowledge of PWII mission planning, bomb switchology, system checks, TGP operations, and employment considerations<br>▪ Find and Destroy an assigned target, 100% valid attacks, using the aircraft avionics and employing PWII munitions<br>▪ Perform threat reactions to avoid / defeat surface-to-air / air-to-air threats<br>▪ Maintain / Maximize / Regain mutual support<br>▪ Clear / Concise 3-1 STD Comm<br>▪ No Duds / Frats / Frags | | |
| **MQT SAT-3 Night** | ▪ Demonstrate knowledge of PWII / PWIII planning, bomb switchology, system checks, TGP operations, and employment considerations<br>▪ Find and Destroy an assigned target at night using the aircraft avionics and employing PWII and PWIII munitions<br>▪ Perform night threat reactions to avoid / defeat surface-to-air threats while flying night trail formation<br>▪ Introduce UP to night element attacks employing PWII and PWIII weapons<br>▪ Practice wingman contracts and responsibilities at night<br>▪ Maintain / Maximize / Regain mutual support<br>▪ Clear / Concise 3-1 STD Comm | | |
| **MQT SAT-4 Night** | ▪ Observe an instructional briefing, in-flight control, and debriefing of a tactical night opposed SAT mission<br>▪ Find and Destroy an assigned target, 100% valid attacks, using the aircraft avionics and employing PWII munitions<br>▪ Perform night threat reactions to avoid / defeat surface-to-air / air-to-air threats while flying night trail formation<br>▪ Practice wingman contracts and responsibilities at night<br>▪ Maintain / Maximize / Regain mutual support<br>▪ Clear / Concise 3-1 STD Comm<br>▪ No Frats | | |
| **END OF SURFACE ATTACK TACTICS PHASE** | | **TOTAL SORTIES** | **4** |

Hill AFB Flight Lead Upgrade Syllabus

Syllabus Not Dated

**Course Overview:** This syllabus is used for flight lead upgrade training for pilots assigned to Hill AFB.

**Course Objectives**: Upgrade wingman to 4-ship flight lead.

**Course Grading:** "2"—Performance is essentially correct. Recognizes and corrects errors.

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|---|---|---|---|
| **Pilot Experience Level: Varies** | | **Planned Noneffective Refly Rate = Unknown%** | |
| **Pilot Currency Level: Current** | | | |
| **AIR TO AIR PHASE** | | | |
| **BASIC FIGHTER MANEUVERS PHASE** | | | |
| **OFFENSIVE BFM PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **FLUG BFM-1** | ▪ Demonstrate proficiency in briefing, controlling, debriefing, and drawing lessons learned in offensive BFM<br>▪ Maintain the offensive advantage<br>▪ Recognize the T.C. and energy state of the bandit<br>▪ Control overtake, angle off and range to close to a WEZ<br>▪ Employ valid ordnance to kill | | |
| **END OF OFFENSIVE BFM PHASE** | | **TOTAL SORTIES** | **1** |
| **DEFENSIVE BFM PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **FLUG BFM-2** | ▪ Demonstrate proficiency in briefing, controlling, debriefing, and drawing lessons learned in Defensive BFM<br>▪ Employ Defensive BFM to deny/negate WEZ / Ordnance and Range to the Bandit<br>▪ Properly use OBCM / IRMD to deny / defeat weapons<br>▪ Exploit bandit errors<br>▪ Employ timely effective guns jinks | | |
| **END OF DEFENSIVE BFM PHASE** | | **TOTAL SORTIES** | **1** |

| HIGH ASPECT BFM PHASE | | | |
|---|---|---|---|
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **FLUG BFM-3** | ▪ Demonstrate proficiency in briefing, controlling, debriefing, and drawing lessons learned in Hi- Aspect BFM<br>▪ Effectively lead turn at every opportunity<br>▪ Exploit Bandit errors / weaknesses<br>▪ Proper gameplan execution<br>▪ Maneuver to WEZ and employ ordnance for a valid kill<br>▪ Effective AAMD to deny/defeat Radar missile | | |
| **END OF HIGH ASPECT BFM PHASE** | | **TOTAL SORTIES** | **1** |
| **INTERCEPT PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **FLUG TI-1** | ▪ Demonstrate proficiency in briefing, controlling, debriefing, and drawing lessons learned on a Tactical Intercept sortie<br>▪ Detect/Target/Sort all factor groups<br>▪ Proper Radar Mech and interpretation<br>▪ Clear, Concise 3-1 STD comm<br>▪ Correct picture call<br>▪ Proper intercept geometry<br>▪ Proper engagement decision<br>▪ Correct WEZ-in-Depth formation<br>▪ 100% valid IDs, shots, and kills | | |
| **FLUG TI-2** | ▪ Demonstrate proficiency in briefing, controlling, debriefing, and drawing lessons learned in a 4/2- ship Tactical Intercept sortie<br>▪ Detect/Target/Sort all factor groups<br>▪ Proper CAP Management<br>▪ Clear, Concise 3-1 STD COMM<br>▪ Proper engagement decision<br>▪ 100% valid weapons employment | | |
| **END OF INTERCEPT PHASE** | | **TOTAL SORTIES** | **2** |
| **AIR COMBAT MANEUVERING PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **FLUG (D)ACM** | ▪ Demonstrate proficiency in briefing, controlling, debriefing, and drawing lessons learned in ACM.<br>▪ Properly establish and execute ACM roles / contracts<br>▪ Maintain/ Maximize mutual support<br>▪ 3-1 Brevity, SA building Comm<br>▪ 100% valid IDs, shots, and kills. No missed shots | | |
| **END OF AIR COMBAT MANEUVERING PHASE** | | **TOTAL SORTIES** | **1** |

| AIR COMBAT TACTICS PHASE | | | |
|---|---|---|---|
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **FLUG (D)ACT-1 2 v X** | ▪ Demonstrate proficiency in briefing, controlling, debriefing, and drawing lessons learned in Air Combat Tactics<br>▪ Detect/Target/Sort all factor groups<br>▪ Effectively execute tactic<br>▪ Merge with advantage and mutual support<br>▪ Utilize WID tactics against aware adversaries<br>▪ Clear, Concise 3-1 STD COMM<br>▪ 100% valid IDs, shots, and kills | | |
| **FLUG (D)ACT-2 4 v X** | ▪ Demonstrate proficiency in briefing, controlling, debriefing, and drawing lessons learned in Air to Air tactics<br>▪ Detect/Target/Sort all factor groups<br>▪ Effectively execute tactic<br>▪ Proper engagement decisions<br>▪ Clear, Concise 3-1 STD COMM<br>▪ 100% valid IDs, shots, and kills | | |
| **END OF AIR COMBAT TACTICS PHASE** | | **TOTAL SORTIES** | **2** |
| **END OF AIR TO AIR PHASE** | | | |
| **START OF AIR TO GROUND PHASE** | | | |
| **SURFACE ATTACK PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **FLUG BSA** | ▪ Demonstrate proficiency in briefing, controlling, debriefing, and drawing lessons learned in basic bombing<br>▪ Achieve desired parameters<br>▪ Pipper within 6 mils of TGT<br>▪ No Top Gun gross errors<br>▪ Apply error analysis to improve success | | |
| **END OF SURFACE ATTACK PHASE** | | **TOTAL SORTIES** | **1** |
| **SURFACE ATTACK TACTICS PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **FLUG SAT-1** | ▪ Demonstrate proficiency in briefing, executing, debriefing, and drawing lessons learned in SAT<br>▪ Find and destroy an assigned target, 100% valid attacks, employing CBU-87<br>▪ Effective air-to-ground threat reactions<br>▪ Maintain/Maximize mutual support<br>▪ Clear/Concise 3-1 STD Comm | | |
| **FLUG SAT-2** | ▪ Demonstrate proficiency in briefing, executing, debriefing, and drawing lessons learned in opposed SAT<br>▪ Find and Destroy an assigned Target, 100% valid attacks, employing LDGP ordnance or Maverick.<br>▪ Defeat/Negate Air and Surface Threats<br>▪ Maintain/maximize mutual support<br>▪ 3-1 brevity/SA building comm | | |

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|---|---|---|---|
| **FLUG SAT-3 Night** | ▪ Demonstrate proficiency in briefing, executing, debriefing, and drawing lessons learned in night SAT<br>▪ Find and Destroy an assigned Target, 100% valid attacks, employing PWIII munitions<br>▪ Effective surface to air threat reactions<br>▪ Maintain / Maximize mutual support<br>▪ Clear Concise 3-1 STD Comm | | |
| **FLUG SAT-4 Night** | ▪ Demonstrate proficiency in briefing, executing, debriefing, and drawing lessons learned in opposed Night SAT<br>▪ Find and Destroy an assigned Target, 100% valid attacks, employing PWII munitions<br>▪ Defeat/Negate Air and Surface Threats<br>▪ Maintain/maximize mutual support<br>▪ 3-1 brevity/SA building comm | | |
| **END OF SURFACE ATTACK TACTICS PHASE** | | **TOTAL SORTIES** | **4** |
| **CLOSE AIR SUPPORT PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **FLUG CAS-1** | ▪ Demonstrate proficiency in briefing, controlling, debriefing, and drawing lessons learned in CAS<br>▪ Expeditious 9-line and FTR to FTR or KS to FTR briefings<br>▪ 100% correct target ID (No fratricide)<br>▪ TGT Destruction ( Pipper within 6 mils)<br>▪ Maintain mutual support | | |
| **END OF CLOSE AIR SUPPORT PHASE** | | **TOTAL SORTIES** | **1** |

Hill AFB Instructor Pilot Upgrade Syllabus

Syllabus Not Dated

**Course Overview:** This syllabus is used for instructor pilot upgrade training for pilots assigned to Hill AFB.

**Course Objectives**: Upgrade 4-ship flight lead to instructor pilot.

**Course Grading:** "2"—Performance is essentially correct. Recognizes and corrects errors.

| **Pilot Experience Level: Experienced** | | **Planned Noneffective Refly Rate = Unknown%** | |
|---|---|---|---|
| **Pilot Currency Level: Current** | | | |
| **AIR TO AIR PHASE** | | | |
| **BASIC FIGHTER MANEUVERS PHASE** | | | |
| **OFFENSIVE BFM PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **IPUG BFM-1** | ▪ Present an instructor-level offensive BFM briefing and debriefing with instructor techniques<br>▪ Demonstrate proficiency in offensive BFM from progressive visual perch setups<br>▪ Maintain the offensive advantage<br>▪ Recognize the T.C and energy state of the bandit<br>▪ Control overtake, angle off and range to close to a WEZ<br>▪ Employ valid ordnance to kill | | |
| **END OF OFFENSIVE BFM PHASE** | | **TOTAL SORTIES** | **1** |
| **DEFENSIVE BFM PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **IPUG BFM-2** | ▪ Present an instructor-level defensive BFM briefing and debriefing with instructor techniques<br>▪ Demonstrate proficiency in defensive BFM to deny/negate a Bandit WEZ from progressive visual perch setups<br>▪ Properly use OBCM / IRMD to deny / defeat weapons<br>▪ Exploit bandit errors<br>▪ Employ timely effective guns jinks | | |
| **END OF DEFENSIVE BFM PHASE** | | **TOTAL SORTIES** | **1** |

| HIGH ASPECT BFM PHASE | | | |
|---|---|---|---|
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **IPUG BFM-3** | ▪ Present an instructor-level high aspect BFM briefing and debriefing with instructor techniques<br>▪ Demonstrate proficiency in high aspect BFM with emphasis on gameplan execution, proper energy management, and exploitation of Bandit weaknesses/errors<br>▪ Recognize/capitalize on lead turn opportunities<br>▪ Maneuver to WEZ and employ ordnance for a valid kill<br>▪ Effective AAMD to deny/defeat the Bandits WEZ | | |
| **END OF HIGH ASPECT BFM PHASE** | | **TOTAL SORTIES** | **1** |
| **INTERCEPT PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **IPUG TI-1** | ▪ Present and instructor-level TI briefing and debriefing with emphasis on radar mech, intercept geometry, WID tactics, and lethality at the merge<br>▪ Detect/target/sort all factor groups<br>▪ Execute gameplan with proper pacing<br>▪ Utilize solid radar mech and scope interpretation to choose the proper offset<br>▪ Execute timely engagement decisions to keep fighters in an offensive posture<br>▪ 100% valid IDs, shots, and kills<br>▪ Clear, concise 3-1 comm with group/inner group labels | | |
| **END OF INTERCEPT PHASE** | | **TOTAL SORTIES** | **1** |
| **AIR COMBAT MANEUVERING PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **IPUG (D)ACM** | ▪ Present an instructor-level ACM briefing and debriefing on element tactical maneuvering, element contracts and roles, and mutual support<br>▪ Demonstrate proficiency in effective 2-ship fluid tactics, maneuvering, and mutual support<br>▪ Properly establish and execute ACM roles and contracts<br>▪ 100% valid IDs, shots, and kills. No missed shot opportunities<br>▪ Maintain / Maximize mutual support<br>▪ 3-1 Brevity, SA building Comm | | |
| **END OF AIR COMBAT MANEUVERING PHASE** | | **TOTAL SORTIES** | **1** |

| AIR COMBAT TACTICS PHASE | | | |
|---|---|---|---|
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **IPUG (D)ACT-1 4 v X** | ▪ Present an instructor-level briefing, in-flight execution, and debriefing in a 4-ship DCA lane defense scenario<br>▪ Detect/Target/Sort all factor groups<br>▪ Execute the briefed tactic<br>▪ Execute proper engagement decisions<br>▪ 100% valid Ids and weapons employment<br>▪ Clear, Concise 301 STD COMM | | |
| **END OF AIR COMBAT TACTICS PHASE** | | **TOTAL SORTIES** | **1** |
| **END OF AIR TO AIR PHASE** | | | |
| **START OF AIR TO GROUND PHASE** | | | |
| **SURFACE ATTACK PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **IPUG BSA** | ▪ Present an instructor-level briefing, in-flight execution, and debriefing of a basic surface attack mission<br>▪ Achieve desired parameters<br>▪ Pipper within 3 mils of aimpoint or target<br>▪ Correctly apply error analysis to improve success<br>▪ No Top Gun gross errors | | |
| **END OF SURFACE ATTACK PHASE** | | **TOTAL SORTIES** | **1** |
| **SURFACE ATTACK TACTICS PHASE** | | | |
| **SORTIE** | **MISSION OBJECTIVES** | | |
| **IPUG SAT-1** | ▪ Present an instructor-level briefing, in-flight execution, and debriefing of an unopposed day SAT mission<br>▪ Damage/destroy assigned target on time employing CBU-87, 100% valid attacks<br>▪ Effective air-to-ground threat reactions<br>▪ Maintain/Maximize mutual support<br>▪ Clear/Concise 3-1 STD Comm | | |
| **IPUG SAT-2** | ▪ Present an instructor-level briefing, in-flight execution, and debriefing of an opposed SAT mission<br>▪ Destroy the assigned target employing LDGP munitions, 100% valid attacks<br>▪ Execute the briefed tactic<br>▪ Defeat/negate air and surface Threats<br>▪ 100% valid Ids and weapons employment<br>▪ Maintain/maximize mutual support<br>▪ 3-1 brevity/SA building comm | | |

| | | | |
|---|---|---|---|
| **IPUG SAT-3 Night** | ▪ Present an instructor-level briefing, in-flight execution, and debriefing of an opposed NSAT mission<br>▪ 100% valid attacks, achieve the required $P_D$ to destroy/damage the assigned target using PWII munitions<br>▪ Execute the briefed tactic to defeat/negate air and surface threats<br>▪ 100% valid weapons employment<br>▪ Maintain / maximize mutual support<br>▪ 3-1 brevity/SA building comm | | |
| **END OF SURFACE ATTACK TACTICS PHASE** | | **TOTAL SORTIES** | **3** |

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This study investigates the problems associated with development of an optimized continuation training (CT) framework in an operational F-16 squadron. The end result of the study is a suggested CT framework that efficiently utilizes the limited training sorties available to operational fighter squadrons.

The study begins by analyzing a spectrum of training syllabi, ranging from introduction to fighter fundamentals to the F-16 weapons instructor course, to determine the optimal number of sorties needed to train specific fighter pilot skills. After determining the optimal number of training sorties needed for each skill, a CT framework is developed by grouping training sorties into a building block training program. This CT framework is then compared with the expeditionary air force (EAF) training timeline to see if the EAF training timeline allocates sufficient time for the proposed CT framework training cycles.

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