AIR WAR COLLEGE

AIR UNIVERSITY

# ARE PILOTS GRADUATING SUPT TODAY MEETING AMC'S CURRENT AND FUTURE NEEDS

by

Robert H. VanHoose, Lt Col, USAF



A Research Report Submitted to the Faculty

In Partial Fulfillment of the Graduation Requirements

5 February 2012

# DISCLAIMER

The views expressed in this academic research paper are those of the author and do not reflect the official policy or position of the US government or the Department of Defense. In accordance with Air Force Instruction 51-303, it is not copyrighted, but is the property of the United States government.

# Biography

Lieutenant Colonel Robert H. VanHoose is a U.S. Air Force aviator assigned to the Air War College, Air University, Maxwell AFB, AL. He graduated from Wright State University in 1991 with a Bachelor of Science degree in Human Resource Management, and Embry Riddle Aeronautical University in 1995 with a Masters of Aeronautical Science. He earned his pilot wings in 1992 and has approximately 3,600 flying hours in the T-37, T-38, T-1, C-18, C-21, KC-10, and C-5. He has served at USTRANSCOM and is a graduated squadron commander.

## Abstract

The purpose of this study is to examine if Air Education and Training Command (AETC) is adequately training military pilots to meet the current and future needs of Air Mobility Command (AMC). The study is divided into four main sections: Pilot Training History and Evolution, Pilot Training Today, Future, and Conclusion/Recommendations.

The History section covers the evolution of pilot training from 1950 to present. During this period, pilot training went from a multi-track, to a single track, then back to a multi-track system. There were several rationales for alternating from one system to the other. This study provides a basic foundation as to why AETC is currently using a multi-track system.

The Pilot Training Today section describes how AETC gets the training requirements from the various major commands (MAJCOMS). Additionally, the skill sets taught at pilot training as well as the grading criteria used to evaluate the student pilots are discussed. Furthermore, the four methods used in this study to evaluate AETC's success are defined.

The Future section discusses what mobility pilots in the future may expect. The future operating environment is expected to be characterized by uncertainty, complexity, rapid change and persistent conflict. As these conditions change, AETC must keep pace. AETC must also constantly evaluate that the proper skill sets are being taught and if instructors and training devices are capable of conducting the training.

The conclusion and recommendations are the final section. The study concludes that AETC is currently meeting AMC's requirements. However, there are several recommendations for AETC to conduct further analysis and research on. Most importantly, AETC should place additional emphasis on human factors, situational awareness, and crew resource management training during the advanced phase of pilot training.

# Introduction

According to General Looney, when he was Commander, Air Education and Training Command (AETC), for the United States to continue to have the most respected Air Force (AF) in the world, "we must carefully consider the future." He further said "technological change is accelerating. To accomplish the AF mission in an environment of accelerating change, we will need to recruit, train, and educate Airmen with agile minds and cutting edge skills; Airmen able to counter future adversaries who seek out new technologies searching for an asymmetric war fighting advantage."[1]

AETC's mission is to "Develop America's Airman today…for tomorrow."[2] In supporting this mission, AETC's vision is to "Deliver unrivaled air, space and cyberspace education and training." AETC does this by providing basic military training, initial and advanced technical training, flying training, and professional military education.[3]

Air Mobility Command (AMC) is a major AETC customer. AMC launches a mobility mission about once every 17 seconds. Pilots fly missions "24/365" in some of the most difficult conditions and support every combatant commander and respond to virtually every humanitarian crisis. AMC has over a dozen types of aircraft in its inventory, some in service since the 1950s.[4] Although some aircraft are old, many have been upgraded with modern digital flight instrumentation and systems. Additionally, AMC will add a new, highly advanced aircraft in the near future, the KC-46.[5] As Gen Looney mentioned, for the AF to stay the world's best, we must look to the future. As AMC is upgrading its fleet, the command must ensure the pilots trained for these systems can effectively and safely fly them. The question: is AETC training pilots to meet AMC's current and future needs? To answer this question, skill sets will be the

fundamental focus area addressing whether or not the pilots are not only being taught well, but also taught AMC required skills.

This paper addresses that question. The paper's first section discusses the evolution of pilot training since the 1950s. This frames the paper for the second section, which discusses aspects of today's pilot training. The third section addresses AMC's future flying considerations. The final section makes recommendations for AETC and AMC leadership.

## Pilot Training: History/Evolution

From 1939 to 1959, the AF used specialized undergraduate pilot training (SUPT), which exposed students to different curricula depending on the student's follow-on assignment to a single-engine or multi-engine aircraft.[6] In this twenty-year period, the AF encountered many changes. The Army Air Corps (AAC) separated from the Army and became a separate and unified service. The AAC fought in World War II and the subsequent AF fought in the Korean War. The AF used variations of SUPT with uneven success during this period.

Beginning in 1950, the AF experienced a disturbing upward trend. A 53% attrition rate in pilot training over a period of seven graduating classes alarmed senior AF officers. A study was conducted to determine reasons for the high attrition. The study concluded over 90 percent of the non-graduates departed SUPT before they entered advance training. Surprisingly, 43.5 percent of the non-graduates were eliminated because of medical, academic or self-elimination issues, not because of flying deficiencies.[7] As a result of the study, HQ USAF turned their focus on the basic phase of training to address the high attrition rate. The study determined nearly 28 percent of the non-graduates lacked the motivation to become a pilot. ATC recognized motivation and attitude as key intangibles and thus turned to a psychological approach to address

the issue. The study mentioned, "all pilot training should be built around the assumption that each student was being trained to fly a jet fighter in combat." [8]

The high attrition rate however, was not the only concern. The training costs associated with wasted flying hours on non-graduates was also a factor. In order to save money, HQ USAF wanted a program that would weed out student pilots lacking potential prior to entering the basic phase.[9]

As a result of a 1951 study, HQ USAF recommended developing a revised course to include 16 weeks of pre-flight training, 4 weeks of flight screening, 16 weeks of basic training, and 16 weeks of advanced training. In May 1951, HQ USAF asked for Air Training Command (ATC) to review the proposed program with the anticipation of a 1 July 1951 activation.[10] These actions laid the groundwork for ATC switching to a generalized UPT program.

HQ USAF was asking for major changes to the pilot training program with only two months for AETC to review, assess, and implement the changes. Due to this short notice and having to develop some of the syllabus criteria from scratch, ATC determined the July date was unrealistic and began a study of their own. Various possibilities were debated and a conference of several different organizations was held in Washington D.C. in May 1952. A revised program resulted. Study participants came mostly from ATC and the Flying Training Air Force (FTAF), and a few officers came from the Air Staff. Beginning on 3 November 1952, a new program began; a pre-flight and screening phase of 18 weeks, an 18-week primary phase, an 18-week basic phase, and a 12-week advanced phase (corresponding to crew training and using current tactical aircraft).[11]

As the AF got more advanced aircraft, ATC developed plans for upgrading its training aircraft. The first step was adding the Beech T-34 to the primary phase as a supplement to the

T-6 and T-28. The next step for ATC was retiring the T-6 and Piper Cub by July 1956 and replacing the Piper with the T-34 in the light-plane screening phase. The next and final phase in the 1950s was to use the T-34 for light-plane screening, phase out the T-28 and replace it with the Cessna T-37 as the primary trainer, as well as implementing the Northrop T-38 for basic training. During each of these transitions, ATC used tactical aircraft for advanced training.[12]

Most of the pilot training bases conducting B-25 multi-engine training graduated their last class in 1958. On 24 January 1959, Reese was the last B-25 class to graduate, and the generalized undergraduate pilot training (UPT) era was born. Adding the T-38 to basic training at Webb AFB, Texas, on 9 February 1962, completed the nearly 10 year trainer upgrade process.[13]

During the 1960s, several studies continued to look at the future of pilot training. In the first study, ATC projected the AF would need to replace the T-38 as early as FY 75 and the T-37 beginning in FY 80, based on each aircraft's projected use. A second study directed by HQ USAF was the Project Flying Training Evaluation (FLYTE). It sought how pilot training could be improved to cope with the pilot production demands generated by the Vietnam conflict. ATC took the ideas generated from these two studies and developed a required operational capability (ROC) document. The ROC called for a comprehensive study of a totally integrated, cost effective, and flexible UPT system for the 1975-1990 period. However, ATC was forced into developing an actionable plan by 1974-75. The factor driving this timeline was the steep increase in pilot training production from 1,900 in FY66 to over 4,300 in FY71.[14]

In January 1969, HQ USAF directed Air Force Systems Command (AFSC) to conduct a UPT program study. AFSC requested contractor support from both Northrop Corporation and Lockheed Aircraft Corporation to recommend a best course of action for the AF. Northrop

suggested the continued use of the T-37 and T-38 aircraft in a generalized UPT program. However, a generalized UPT program could only be sustained if both flying hours were drastically decreased and simulator hours increased. These actions would increase the lifespan of both aircraft. Conversely, Lockheed proposed the AF convert to a specialized UPT program requiring the AF to purchase two new trainers. Under this recommendation, Lockheed also added the AF should use a single trainer that would replace both the T-37 and T-38, and then a second new trainer to replace the T-41.[15]

From these studies, the AF determined that an increase in simulator training hours offered the most for pilot training improvement. The AF rationalized if they invested in state-of-the-art simulators, they could not only save money by avoiding the direct costs associated with flying hours, but they would also extend the aircraft's service life.

The question of which training method was better, generalized or specialized, came up again numerous times over the next several years. In 1976, Gen Roberts, the ATC Commander, summed it up best: "I had a personal feeling when I was in the Pentagon, as well as after I got to ATC, sending everybody through the same training program was wrong…It doesn't make a lot of sense…We actually train people to be fighter pilots…We motivate them all through training to be a fighter pilot, and then all of a sudden, only 25 percent of them get to fly fighters, and we have 50 to 75 percent disappointed...I suggest we are doing it backwards. We ought to recruit people to fly airplanes by type before they ever step in a trainer…We will get to that type of training someday. We have to for economy reasons, but also we can do a lot better job of training by training in that matter."[16] Gen Chain, Strategic Air Command (SAC) Commander, however, was concerned SUPT would magnify the differences between fighter pilots and other AF pilots. The standard for excellence in the past was whether a student made the cut to become

a fighter pilot. By going to a SUPT system, this may make the non-fighter pilots feel second best.[17]

SUPT had the potential to benefit Military Airlift Command (MAC) as it provided a core of fundamental flying skills before the student pilot moved to the advanced phase. Students bound for MAC aircraft would then get specific training in flight deck procedures, asymmetric thrust, crew coordination, cockpit resource management, cell formation, airborne rendezvous, International Civil Aviation Organization (ICAO) procedures, and mission-oriented low-level procedures. These were not taught in the fighter-oriented generalized program. Another SUPT benefit the AF anticipated was an increase of student pilot flying time. All students were to receive 89.0 flying hours during the primary phase, as compared to 80.9 hours under the previous 52 week syllabus. In the advanced phase, MAC-bound students increased their flying hours from 108.8 to 128.5 hours. Additionally, under SUPT in the advanced phase, a second student pilot was on-board as an observer gaining 109.5 hours of observer time. Other benefits included increased maintenance reliability due to 16.5 percent fewer aircraft needed to produce the same number of flying hours, as well as operational support cost reductions of 20 percent for fuel and maintenance.[18]

## Pilot Training Today

The mechanism Air Mobility Command (AMC) utilizes to provide its training requirements to AETC is via a yearly training conference where training representatives from the major commands (MAJCOM) come to share their insights on skills their future aviators need. AMC sends a representative from the AMC/A3T that works the command's training issues. The representative gets his/her guidance from AMC training conferences that are held internally between senior leadership, standardization and evaluation (stan/eval), and other training staff

from across the command. During these AMC conferences, a thorough review of training concerns from the AMC wings, as well as stan/eval checkride results are discussed to determine if there are any trends that need to be corrected.[19]

Once AETC receives all the training requirements from the MAJCOMS, pilot training is then conducted in several phases with a variety of aircraft and other training equipment. The end goal is to produce a basic pilot capable of successfully completing his/her follow-on major weapon system Formal Training Unit (FTU) program.[20] The undergraduate portion of SUPT consists of three phases: screening, primary, and advanced training. During the screening phase, pilot candidates complete 50 hours of Introductory Flying Training (IFT). IFT's purpose is determining if a candidate has the potential to be a successful pilot. In IFT, the AF "weeds" out candidates demonstrating a lack of basic skills. Using IFT equipment and procedures, it is much cheaper to make this determination before advancing to the more expensive follow-on trainers. Civilian instructors conduct IFT at numerous sites around the country. Some students completing IFT go to Euro-NATO Joint Jet Pilot Training (ENJJPT) at Sheppard AFB, TX, but most go on to a SUPT or Joint SUPT (JSUPT) program conducted at one Navy and four AF bases.[21]

The SUPT's primary phase uses one of two single engine turboprop aircraft: the T-6 or, at the Navy's Whiting Field, the T-34C. The T-6 was introduced in October 2001 and eventually replaced the T-37, a twin-engine subsonic jet in AF use since 1956. During this phase of training, student pilots learn basic aircraft handling, instrument flying, two-ship formation, and basic navigation.[22]

The primary phase's skills, tasks and standards are designed to provide a solid foundation in basic knowledge and flying skills based on MAJCOM needs. According to the T-6 training

syllabus, "enforcement of course standards is fundamental to the future readiness of the USAF. Students must understand and apply the knowledge, airmanship, and flying skills to demonstrate mastery of primary flight training." The skill sets taught during the primary phase include the following: [23]

- Aircraft Control / Handling
- Attitude Instrument Flying
- Basic Formation Skills
- Instrument Approaches / Procedures
- Navigation: Visual, VFR, and IFR
- Situational Awareness
- Task Management
- Three-Dimensional Maneuvering

Two methods are used to evaluate student performance: an absolute grading scale for rating individual maneuver items, and a relative grading scale for assessing overall sortie performance.[24]

Table 1 (see appendix A) shows the rating scale that is used to document the student's performance on maneuvers attempted during each sortie. This is an absolute rating scale and the student's proficiency must be judged against the course training standard.[25]

The relative grading scale is used to grade the overall performance during a student sortie. The grades consist of: Excellent (E), Good (G), Fair (F), or Unsatisfactory (U). It is possible for a student to receive a grade of F or U on an individual maneuver, and still receive an overall grade of E if that maneuver only requires a performance level of a U for that sortie.[26]

The following proficiency standards are followed during the primary phase:[27]

a. Achieve training standards for visual meteorological conditions (VMC) maneuvers in conjunction with visually clearing outside the aircraft.
b. Aircraft control must be smooth and positive. Students may meet the plus / minus numerical standards and still not receive a satisfactory grade if control inputs are erratic or imprecise.
c. Momentary deviations are acceptable if timely corrections are made and safety of flight is not compromised.
d. Procedural knowledge must be in accordance with applicable directives and allow the sortie to be accomplished effectively. If the individual tasks require pre-mission planning, the standards from Mission Planning / Briefing / Debriefing apply.
e. Standards equate directly to the grade scale of Good unless otherwise stated. Special performance tasks requiring introduction or ground training are specified under the job task performance description. Maneuvers containing Practice in the standard do not require proficiency for graduation.
f. Where no specific standard is stated, these standards and those of basic control apply.

Following the primary phase, students are "tracked" for the advanced phase. Students are assigned to a fighter/bomber, a tanker/airlift, or helicopter track. Several criteria help determine which track a student is assigned. These include: performance, instructor recommendations, student's preferences, and available aircraft assignments. Students tracked as a tanker/airlift proceed to the T-1A, the military version of a commercial business jet.[28]

The objective of the advanced phase of training is to award commissioned officers the aeronautical rating of AF pilot or Naval Aviator and prepare them for airlift / tanker / maritime aircraft. Course graduates are proficient in the following skill sets:[29]

a. Operating in USAF/FAA terminal and enroute airspace.
b. Flight planning and conducting flight operations under Instrument or VFR to include day / night IFR operations in the terminal and enroute environment.
c. The conduct of mission in a defined area.
d. Normal and emergency visual patterns and landings.
e. Basic control and performance concept of instrument flying.
f. Basic instrument procedures to include departure, enroute procedures, enroute descents, GPS operations and instrument approaches.
g. Leading a formation to and from the area and executing a mission profile in a defined area.
h. Three-dimensional maneuvering and energy management.
i. Low-level operations down to 500' as a single-ship or in a 2-ship formation.
j. Task management, situational awareness, risk management / decision-making. CRM, and emergency procedures required to safely and effectively accomplish the mission.
k. A thorough understanding of aircraft systems capabilities, aircraft directives, AFIs, and local procedures and demonstrate proficiency in applying procedures from all applicable source guidance.
l. Air Mobility Fundamentals: Formation, Airdrop, and Air Refueling

The grading and proficiency standards used during the primary phase are also used during the advanced phase of training.

After successfully completing the 52-week SUPT course, students earn basic pilot wings. AMC bound pilots then report to their major weapon system (MWS) FTU and begin their MWS specific training prior to arriving at their operational unit.[30]

So how has AETC done providing AMC the pilots they asked for? One measure of success is if the student successfully passes a checkride. Each skill set has grading criteria associated with it. If each student meets the minimum standards during the evaluation, then one could say AETC succeeded. During this research, representatives from AMC Stan/Eval were interviewed. After reviewing evaluations over the last ten years, there does not appear to be any negative flight evaluation trends associated with SUPT graduates transitioning to a MWS.[31]

Another measure of success is a unit's safety record. All Air Force accidents are logged and tracked in the Air Force Safety Automated System (AFSAS).[32] During this research, AFSAS was accessed, as well as interviewing AMC Safety personnel,[33] to see if there had been any major safety mishaps over the last ten years that attributed to poorly trained SUPT graduates. There was no evidence found in AFSAS or from discussions with AMC safety personnel that related a major incident to inadequate skills being taught in SUPT.

A third measure of success is evaluation surveys conducted by FTU instructors on SUPT graduates attending training for their first MWS. AETC has an automated survey system called GradEval that may be completed by gaining units. This provides an opportunity for gaining evaluators to provide direct feedback to AETC on students they have received from SUPT. More than 550 surveys over the past five years were reviewed and Airmanship had an average rating of 5.1 out of 6.0. A five rating represents "Excellent: Skill/Knowledge exceeded expectations."[34]

Perhaps the most important measure of success is to review AMC's newly defined measure of success. According to AMC/A3T, they "would like an SUPT graduate to possess the skills necessary to perform disciplined compliance with AFIs and FARs with the ability to aviate, navigate, and communicate in an FAA/ICAO environment. Capability should be executable independently (single operator) and in a team environment (CRM) under a full spectrum of environments, from routine to high stress (combat/emergency)."[35] Based on the three previously identified measures of success, AETC is succeeding in training pilots to this required level.

## Future

According to Admiral Michael Mullen, "as capable as our joint forces are today, this will not be enough to meet future challenges. We will need to select, educate, train, equip and manage our people differently."[36] As technology improves and weapons systems advance, it is imperative that training methodology keeps pace. For the U.S. to maintain operational and training superiority, the Department of Defense (DoD) must effectively and efficiently prepare students during times of limited fiscal, material, and personnel resources. Additionally, the future operating environment is expected to be characterized by uncertainty, complexity, rapid change and persistent conflict. In evaluating future success, skills needed in the future, changes in aircraft technology, and which of those skills will be emphasized and how they are taught need to be evaluated.[37]

In 2005, the RAND Corporation conducted a study "Assessing the Impact of Future Operations on Training Aircraft Requirements." The study was commissioned under the AETC Commander, Gen Cook, to determine how the skills required to fly future AF aircraft might affect the decision to modify or replace the current fleet of trainers. RAND attempted to answer

the question of what new skills, if any, should be taught in SUPT to meet the challenges of the next generation of modern war fighting machines.[38]

To begin the process of evaluating these future needs, RAND conducted the study by interviewing students and pilots in all stages of training and operational experience. They used an open-ended questionnaire, gathered feedback on skills pilots felt were best taught in operational aircraft, in the simulator, and/or in a training aircraft.

RAND did answer many issues concerning future skills but in the bottom line, they did not formalize any particular "skill sets." But the study did provide several generalized broad areas and provided the following recommendations for the future of SUPT:[39]

- "Collection, synthesis and prioritization of information in the cockpit" will place greater demands on the pilot
- Flying and controlling the aircraft must continue to be second nature
- Pilots will be challenged with greater responsibilities that are "focused on the management of information, sensors, and weapons"
- Proficiency at "layering technology solutions in the cockpit" must increase
- Pilot training must continue to teach the fundamentals of flying

In addition, the study also suggests pilots will face a future characterized by the following:

- 24 hour operations conducted in all weather and geographical conditions
- Operations requiring near real-time implementation of air-power against an enemy
- Incorporation of precision weapons to increase mission effectiveness while minimizing the exposure of manned aircraft to threats
- Mobility missions taking place in closer proximity to the enemy

- Integration of large amounts of information from disparate sources (land, air, and space based) in real-time conditions
- Flight profiles involving greater physiological demands

The afore findings may suggest a need for teaching a new skill set at SUPT. As missions become more complicated, aircraft more advanced, and the demands for information management increased, the question needing an answer is which of these skills, if any, need to be taught at SUPT vs. an FTU or at the operational unit. Additionally, if new skill sets are identified, are the current aircraft and simulators at pilot training capable of training these new skills?

Associated with teaching skill sets, old or new, not addressed in the RAND study is the challenge of having an adequately trained instructor force to properly train new students. Due to operations tempo and other constraints, AMC may have difficulties releasing experienced aviators to go to AETC to become SUPT instructors. Additionally, during interviews conducted with current SUPT instructors, it was mentioned on numerous occasions MWS pilots coming to AETC instructor duty are lacking basic rudder and yoke flying skills needed to teach new students. Advanced MWS aircraft, such as the C-17, have become so automated pilots become rusty with basic piloting skills needed in a training environment.

An additional skill the RAND study identified during interviews was Situational Awareness (SA). SA is a term aviators use to describe a trait required of all pilots. SA is the pilot's ability to understand how one relates to the overall environment around himself/herself and the aircraft. A pilot with good SA identifies potential threats and hazards that may occur and takes actions to mitigate those potential threats. The RAND corporation concluded SUPT needs to focus on developing this skill. A student with good SA is more capable of handling new

demands in the cockpit whereas a student with poor SA has more difficulty. The study further stated "exposure to advanced cockpit resources is less important in undergraduate pilot training than is the rigorous development of basic flying skills."[40]

To determine if pilots currently graduating from SUPT are capable of meeting AMC's current and future needs, a review of AMC's current and future aircraft should be made. AMC has placed a significant emphasis on the future viability of its mobility fleet. AMC is required to modernize its aircraft in many instances to simply maintain or reverse degraded capability due to material age or obsolescence.[41] AMC is conducting the Avionics Modernization Program (AMP), and Reliability Enhancement and Re-engining Program (RERP), which modernizes the C-5 fleet. After a C-5B has been modified it is re-designated as a C-5M. The AMP turns the C-5M in to a modern digital glass cockpit. Such systems as the All Weather Flight Control System (AWFCS) and Communication, Navigation, Surveillance/Air Traffic Management (CNS/ATM) are introduced to the aircraft. The modification also replaces unsupportable flight and engine instruments with a new digital electronic display suite. These upgrades along with many others not listed, change the appearance of the flight deck from a 1960s vintage look to something futuristic complete with joystick controls on the center pedestal.[42]

Although the C-5M is the most recent AMC aircraft to get upgraded, the C-17 is currently the newest heavy aircraft in AMC's inventory. The C-17 flight deck is very similar in appearance to the new C-5M flight deck, however the pilot flies the aircraft with a stick vs. a conventional yoke. The airplane is also equipped with a heads-up-display (HUD). The C-17's heart is its propulsive lift system, which uses engine exhaust to augment lift generation. By directing engine exhaust onto large flaps extended into the exhaust stream, the C-17 is capable of flying steep approaches at remarkably slow landing speeds. This equates to the aircraft's ability

to land with payloads as large as 160,000 pounds on runways as short as 3000 feet.[43] The propulsive lift system causes the flight characteristics to be considerably different from any other AMC aircraft. Usually, lift is controlled by pulling and pushing on the yoke to change the flight angle. Airspeed is controlled by changing the throttle position. On the C-17, it works just the opposite. Changing the throttle input controls lift and airspeed is controlled by changing the aircraft's pitch. Pilots require training at the operational base to become accustom to these unique characteristics.

AMC's newest intra-theater tactical aircraft is the C-130J. The C-130J is an improved version of the C-130E and H models. The airframe is slightly larger and the AF claims it is 70 percent newer than the previous versions. The cockpit is composed of a digital instrumentation that includes a HUD. The aircraft is capable of dropping airloads at low or high altitudes and in all weather conditions.[44]

The Boeing Company was awarded a contract for the development of the KC-46A which will be the newest tanker in the fleet. Sometime in 2014, it is scheduled for its first flight. The aircraft will have an all-digital multi-glass cockpit capable of operating during times of spectrum interference of communications, navigation, and radar, and accomplish the mission during Emission Control (EMCON) 4 operations. It will have the ability refuel any fixed wing aircraft and able to do simultaneous multi-point drogue air refueling in all weather conditions.[45]

According to Mr. Perry, KC-46 Boeing Training Representative, he is often asked by senior AMC leadership as to how the AF can get pilots trained quicker and into the MWS sooner. Since the new generation of pilots are more comfortable with advanced gaming systems and digital technology, they tend to pick up on things much quicker when exposed to SUPT training simulators. Boeing feels, for example, with regards to the KC-46, there is the possibility

of shortening training time in the simulator because the younger students can pick up the skills very quickly.[46] Perhaps it would be worthwhile for AETC to consider using this time saved to focus on providing SA training as previously addressed.

## Conclusion and Recommendations

Based on historical checkride and safety performance data, completed surveys by gaining evaluators, and reviewing AMC/A3T's new definition of success, this study concludes that AETC is meeting or exceeding AMC's pilot training needs. However, other research such as that provided by the RAND Corporation, shows there is room for improvement. AETC should conduct further research on those areas previously mentioned to determine their future usefulness. If it is determined that value would be added, then AETC must evaluate if new equipment and/or new resources, such as manpower, is required in order to do the training.

Another area for consideration identified by NASA, is human factors training. The ditching of US Airways Airbus A320 in the Hudson River following a bird strike and subsequent dual engine shutdown is one reason the airlines puts such an emphasis on this area. Human factors looks at the personality of those involved, how they manage a situation, and then focus on the correct response. According to Werner Naef, a former Swissair and Swiss AF pilot, "by recognizing the personality, we can actually predict how they will react, and then train to ensure the crews can make the right decisions under stress in an emergency situation".[47] AETC should incorporate human factors training in its Crew Resource Management (CRM) training during the advanced phase of SUPT. By emphasizing these items early in a pilot's career, it will better prepare them to recognize the early warning signs for the onset of distress and be able to better handle difficult situations.

Finally, as technology continues to develop, it is imperative AETC continually update its training devices and ensure SA, CRM and Human Factors training gets incorporated with the devices. One such upgrade may be providing the training simulators with interactive airport environment capabilities. This will provide students with realistic airport environments. By maintaining the current, three-stage pilot training process, incorporating the newest technological training devices, cultivating situational awareness, and fostering human factor training, AETC will continue to meet or exceed AMC's pilot training needs now and in the future.

# Appendix A

## Table 1 – Absolute Rating Scale

| *Proficiency Grades* | *MIF Level* | *Description* |
|---|---|---|
| **No Grade (NG)** | **1** | Enter NG on the training record when maneuver is demonstrated by the instructor pilot but not practiced by the student or unobserved maneuver completed by a solo student. |
| **Unable / Unsatisfactory (U)** | **2** | The student is unsafe or lacks sufficient knowledge, skill or ability to perform the operation, maneuver or task. |
| **Fair (F)** | **3** | The student performs the operation, maneuver or task safely but has limited proficiency. Deviations occur which detract from performance and/or verbal prompting is required from the instructor. |
| **Good (G)** | **4** | The student performs the operation, maneuver or task satisfactorily. Deviations occur which are recognized and corrected in a timely manner without any verbal prompting from the instructor. |
| **Excellent (E)** | **5** | The student performs the operation, maneuver or task with a high degree of skill, efficiency, and effectiveness. |

## Bibliography


1. AETC / CNATRA Syllabus P-V4A-J. *T-6A Joint Primary Pilot Training*, September 2011.
2. AETC Syllabus P-V4A-G. *T-1 Joint Specialized Undergraduate Pilot Training*, June 2011.
3. Air Force Safety Automated System (AFSAS), https://afsas.kirtland.af.mil, accessed 10 October 2011.
4. Air Mobility Master Plan (AMMP), 2012.
5. Ausink, John A., Richard S. Marken, Laura Miller, Thomas Manacapilli, William W. Taylor, and Michael R. Thirtle. *Assessing the Impact of Future Operations on Trainer Aircraft Requirements.* RAND Corporation, 2005.
6. "BAE Systems to Pursue USAF Jet Trainer Replacement Program." *Find Articles.Com.* http://findarticles.com/p/news-articles/wireless-news/mi_hb5558/is_20100915/bae-systems-pursue-usaf-jet/ai_n55214272/?tag=content;col1 (accessed 22 September 2011).
7. Braybrook, Roy, and Paolo Valpolini. "Trainer Orders in Prospect." *Find Articles.Com." http://findarticles.com/p/articles/mi_hb3031/is_1_35/ai_n57191127/?tag=content;col1 (accessed 22 August 2011).*
8. Davies, Squadron Leader Tony. *RNZAF C-130 Simulator Training: The Future of a Costly Necessity.* Research Paper. April 2000. http://www.dtic.mil/dtic/tr/fulltext/u2/a425315.pdf (accessed 20 September 2011).
9. Deptula, Lt Gen (Ret) David A. "The Unmanned Future." *Armed Forces Journal*, June 2011.
10. Emmons, Richard H. *Specialized Undergraduate Pilot Training and the Tanker-Transport Training System.* History and Research Office Office of the Chief of Staff HQ AETC. July 1991.
11. Gillis, Dobie. AETC/A3F, "SUPT Update." Briefing. AETC HQ, 23 August 2011.
12. GradEval, https://my.af.mil/agepiftprod, accessed 20 October 2011.
13. Hale, Timothy L. "Jet Training Soars." *Find Articles.Com*." http://findarticles.com/p/articles/mi_7246/is_201101/ai_n57036753/?tag=content;col1 (accessed 22 August 2011).
14. Hauck, Maj David R. *Reengineering Joint Specialized Undergraduate Pilot Training*. Research Paper. June 2009. AUL DOC M-U 39567-5 H368r.
15. Hays, Maj. Michael D. *The Training of Military Pilots: Men, Machines, and Methods.* Research Paper. June 2002. AUL DOC M-U 43998-1 H425t.
16. Houde, Maj Neal J. *Lessons to Learn From Soviet UPT*. Research Paper. April 1987. AUL DOC M-U 43122H836LC.1.
17. "The Importance of Human Factors Training". *Air Safety Week*. http://findarticles.com/p/articles/mi_m0UBT/is_13_23/ai_n31488789/pg_2/?tag=content;col1 (accessed 27 September, 2011.
18. Lindlaw, Scott. "Human Error is Causing Most Predator Crashes." *Deseret News (Salt Lake City). http://findarticles.com/p/articles/mi_qn4188/is_20080826/ai_n28040877/?tag=content;col%201* (accessed 28 August 2011).
19. Manning, Thomas A., *Major Changes in Undergraduate Pilot Training 1939-2002.* History and Research Office, Office of the Chief of Staff HQ AETC. January 2007.

20. McCain, Col John. *Filling the Security Assistance Gap—Increasing USAF International Flight Training to Enhance Coalition Interoperability*. Research Paper. February 2007. AUL DOC M-U 43117 M113f.
21. McClure, Gideon. "Air Education and Training Command News Service: Air Force Introduces New Helicopter for Pilot Training." *Find Articles.Com."* http://findarticles.com/p/articles/mi_m0QMG/is_2_35/ai_n26824258/?tag=rel.res2 (accessed 30 August 2011).
22. Pilot, Maj Carl E. *Future Pilot Training—Single Phase UPT*. Research Paper. May 1975. AUL DOC M-U 35582-7P643fC1
23. Rahul, Chandawarkar. "Advanced Trainers Need of the Hour." *Find Articles.Com*." http://findarticles.com/p/news-articles/dna-daily-news-analysis-mumbai/mi_8111/is_20110805/advanced-trainers-hour/ai_n57984456/?tag=content;col1 (accessed 9 September 2011).
24. Roeder, Tom. "Flying 20 Years Into the Air Force Future." *The Gazette (Colorado Springs)*, 28 September 2009. http://findarticles.com/p/articles/mi_qn4191/is_20090928/ai_n39177538/?tag=content;col%201 (accessed 22 August 2011).
25. Shapiro, Maj Roger D. *Mobility Pilot Development: Is AMC Off Course?* Research Paper. April 2007. AUL DOC M-U 43122 S5291M
26. "T-1A Jayhawk / T-400." *Global Security.Org.* http://www.globalsecurity.org/military/systems/aircraft/t-1.htm (accessed 22 August 2011).
27. "T-6A JPATS (Texan II / Harvard II.) *Global Security.Org*. http://www.globalsecurity.org/military/systems/aircraft/t-6.htm (accessed 22 August 2011).
28. "T-37 Tweet." *Global Security.Org. http://www.globalsecurity.org/military/systems/aircraft/t-37.htm* (accessed 22 August 2011).
29. "T-38 Talon." *Global Security.Org.* http://www.globalsecurity.org/military/systems/aircraft/t-38.htm (accessed 22 August 2011).
30. "Training Aircraft." *Global Security.Org.* http://www.globalsecurity.org/military/systems/aircraft/training.htm (accessed 22 August 2011).
31. "T-X Advanced Trainer Replacement." *Global Security.Org. http://www.globalsecurity.org/military/systems/aircraft/t-x.htm* (accessed 22 August 2011).
32. Wash, Col Benjamin C. "The Next Training Revolution: Explosive Changes in Information Availability will Profoundly Affect How Training is Delivered." *Armed Forces Journal*, May 2011.
33. William R. Looney, III, "On Learning: The Future of Air Force Education and Training," *Air Space Cyberspace*, January 2008.

## Notes

[1] William R. Looney, III, "On Learning: The Future of Air Force Education and Training," *Air Space Cyberspace*, January 2008, 2.
[2] Air Education and Training Command fact sheet, http://www.af.mil/information/factsheets/factsheet.asp?id=138, (accessed 7 Dec).
[3] Ibid
[4] Air Mobility Command fact sheet, http://www.af.mil/information/factsheets/factsheet.asp?id=159, (accessed 7 Dec).
[5] KC-46 Air Force fact sheet, http://www.af.mil/information/factsheets/ factsheet.asp?id=18206, (accessed 7 Dec).
[6] Emmons, Richard H., *Specialized Undergraduate Pilot Training and the Tanker Transport Training System*, History and Research Office Office of the Chief of Staff HQ AETC, July 1991,
[7] Ibid., 1.
[8] Ibid., 3.
[9] Ibid., 2.
[10] Ibid., 2.
[11] Ibid., 2.
[12] Ibid., 3.
[13] Ibid., 8.
[14] Ibid., 11.
[15] Ibid., 11.
[16] Ibid., 14.
[17] Ibid., 22.
[18] Ibid., 26.
[19] Lt Col Jim Dittus, AMC/DA3T, interview by author, 19 November 2011.
[20] Ibid., 19 November 2011.
[21] Ausink, John A., Richard S. Marken, Laura Miller, Thomas Manacapilli, William W. Taylor, and Michael R. Thirtle. *Assessing the Impact of Future Operations on Trainer Aircraft Requirements*. RAND Corporation, 2005. 1.
[22] Ibid., 2.
[23] AETC / CNATRA Syllabus P-V4A-J. *T-6A Joint Primary Pilot Training*, September 2011, 3.
[24] Ibid., 13.
[25] Ibid., 13.
[26] Ibid., 13.
[27] Ibid., 14.
[28] Ausink, John A., *Assessing the Impact of Future Operations on Trainer Aircraft Requirements*. RAND Corporation, 2005. 3.
[29] AETC Syllabus P-V4A-G. *T-1 Joint Specialized Undergraduate Pilot Training*, June 2011, 3.
[30] Ausink, John A., *Assessing the Impact of Future Operations on Trainer Aircraft Requirements*. RAND Corporation, 2005. 3.
[31] Col Michael D. Cassidy, AMC/A3V, interview by author, 13 September 2011.
[32] Air Force Safety Automated System (AFSAS), https://afsas.kirtland.af.mil, accessed 10 October 2011.
[33] Lt Col Sean A. Bordenave, AMC SE/SEF, interview by author, 14 September 2011.

[34] GradEval, https://my.af.mil/agepiftprod, accessed 20 October 2011.
[35] Lt Col Jim Dittus, AMC/DA3T, interview by author, 19 November 2011.
[36] Admiral Mullen, *Capstone Concept for Joint Operations Version 3.0*, http://www.jfcom.mil/newslink/storyarchive/2009/CCJO_2009.pdf, accessed 7 December 2011, iv.
[37] Strategic Plan for the Next Generation of Training for the Department of Defense, 23 September 2010, 3.
[38] Ausink, John A., *Assessing the Impact of Future Operations on Trainer Aircraft Requirements*. RAND Corporation, 2005.
[39] Ibid., xv.
[40] Ibid., 12.
[41] Air Mobility Master Plan (AMMP), 2012, 4
[42] Ibid., 53.
[43] C-17 Globe Master III, http://www.globalsecurity.org/military/systems/aircraft/c-17.htm, accessed 3 December 2011.
[44] C-130J Hercules, http://www.globalsecurity.org/military/systems/aircraft/c-130j.htm, accessed 3 December 2011.
[45] AMMP, 88.
[46] Mr. Perry, Boeing training representative, interview by author 3 November 2011.
[47] The Importance of Human Factors Training, *Air Safety Week*, 30 March 2009