# An Airline Pilot Attitude Evaluation: Transportation Security Administration's Federal Flight Deck Officer Program

by

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# ABSTRACT

The Federal Flight Deck Officer (FFDO) program was mandated legislatively, as part of the Homeland Security Act of 2002. This study replicated earlier research that investigated pilots' opinions of the current state of the FFDO program based on interviews. A Likert survey was created to allow simpler quantitative collection and analysis of opinions from large groups of pilots. A total of 43 airline pilots participated in this study. Responses to the Likert questions were compared with demographics, searching for significance through a Pearson chi-square test and frequencies were compared to earlier research findings. Significant chi-square results showed that those familiar with the program were more likely to agree the program should continue, it was effective, the screening and selection process of program applicants was adequate and the Federal Air Marshal Service's management of the FFDO program was effective. Those with Military experience were more likely to disagree it was reasonable that FFDOs were required to pay for their own room and board during training or train on their own time. All those who shared an opinion agreed there should be a suggestion medium between FFDOs and their management. Unlike the prior study, all those familiar with the program agreed the weapons transportation and carriage procedures were adequate. Furthermore, all those who shared an opinion found the holster locking mechanism adequate, which was another reversal of opinion from the prior study. Similar to the prior study, pilots unanimously agree FFDOs were well trained and agreed that the program was effective and should continue.

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# CHAPTER 1

## Introduction

Terrorists have been challenging the aviation industry for decades. “On a global basis, few major industries have been affected by the growing menace of terrorism as has civil aviation” (Crenshaw, 1988, p. 60). After the terrorist attacks on September 11, 2001 (9/11), Congress took major steps to curb this type of violence. One of these steps, the Federal Flight Deck Officer program (FFDO), was founded and considered an important last line of defense for civil aviation security (Turney, Bishop, & Fitzgerald, 2004). The FFDO program was established by Title XIV, ‘Arming Pilots Against Terrorism”, within the Homeland Security Act of 2002 (U.S. Congress, 2002). This legislation mandated a program be created for deputizing and arming airline pilots. Over time, the FFDO program proved to be much more cost effective than its parent organization, called the Federal Air Marshall Service (FAMS). FAMS failed an airline security-measures cost-benefit analysis mostly due to the fact the FAMS costs were extravagant and their coverage in the airlines was low (Stewart & Mueller, 2008). President Marcus W. Flagg of the Federal Flight Deck Officer Association (FFDOA) testified before Congress in 2011 that FFDOs’ covered five times as many flights as FAMS at only four percent of the cost. A cost-benefit analysis was completed again in 2013 and reported the FFDO program was so high-scoring that its funding should be doubled by pulling money from the still excessively expensive FAMS (Stewart & Mueller, 2013). The President of the Airline Pilots Association (ALPA), Tim Canoll testified on behalf of the pilot union in a House congressional hearing that the FAMS and FFDO program complement each other

and the financially efficient FFDO program should be expanded to help FAMS with risk-based security initiatives (Katko, 2015).

The FFDO program is praised for its cost effectiveness, but it has proven to have a long list of issues. Pilots have reported resistance from the highest levels of its management in the Transportation Security Administration (TSA). There was a long-standing perception that the TSA did not support arming pilots since the program was legislatively created and assigned to the TSA in 2002. Marcus Flagg (2011) reported the resistance continues because administrators in the TSA who didn't support the program in its infancy are still in leadership positions, with the same policies in place. For these reasons and many others, airline crews have been queried by researchers through surveys and interviews to identify specific problems with the FFDO program and lay the groundwork for conceivable solutions.

**FFDO Surveys**

In 2004, around the time the FFDO program was getting off the ground, a survey was taken to assess the overall importance of various aspects of aviation security. Responses were secured from 108 airline employees (57 pilot crew and 51 cabin crew). Pilot crews showed serious interest in being armed with lethal weapons, rating it as one of the top two most important security measures of 16 options. It was overwhelmingly mentioned in the write-in option (50% of the pilot crew). On the other hand, arming pilots with a stun gun was rejected by those same crew members (Turney, et al., 2004). The results of this survey showed pilots' desire for lethal weapons in their cockpits and brought to light the potential high participation rates for such an opportunity.

A study on pilot armament was conducted by Nolly (2011). He interviewed 25 airline pilots via recorded Skype interviews assessing their attitudes towards different aspects of the FFDO program. He intended to identify solvable issues for those organizations able to make changes in the program. The results showed that 92% felt pilots should be armed. He also noted many commonly agreed-on issues in relation to policies and procedures surrounding the program. He asked each participant 13 questions. The respondents had issues with the FFDO screening process and claimed the TSA's management of the program was unsupportive. They claimed the weapons transportation protocols and locking gun holster were burdensome and potentially dangerous. They said the isolated training location in New Mexico made training logistically difficult and the lack of federal or airline financial support during training showed a lack of their support for the program. Nolly (2011) concluded there was much room for improvement by the governing body, the TSA, and the airlines and gave recommendations for improvement.

**Statement of Purpose**

The purpose of this investigation was to replicate Nolly's research into pilot attitudes towards the FFDO program and the TSA by creating a survey, as he suggested (Nolly, 2011). The current FFDO survey has similar questions to those used in his interviews. Such a survey creates a standardized way of analyzing pilots' opinions of the current state of program characteristics. Study replications will be simpler for future researchers or institutions like the TSA, which could lead to the likelihood of successful longitudinal research. Determining attitudes towards various issues could highlight areas FFDO management can work on to improve the FFDO program. This area of study is relatively young, as the program was only written into law in 2002 and actually started in

early 2003. In spite of this, short periods of time between surveys are still crucial in evaluating issues affecting the future of the program. Problems from application processes to policies surrounding the type of firearm holsters to be used can influence application rates and overall effectiveness of the program (Nolly, 2011). Therefore, a large sample survey on the internet would serve well to compare with Nolly's interview results. The reusable survey simplifies future comparative analysis and provides results the TSA can consider in optimizing or changing their program or assessing pilots' perceptions to those changes over time.

**Objectives**

The overall goal of this study is to analyze the current status of the FFDO program from the perspective of current airline pilots and identifying the program's potential problem areas. The specific objectives are listed below:

1. Determine which issues with the FFDO program, according to pilots, are currently most in need of attention.
2. Determine pilot satisfaction levels of the program, management, procedures and policies.
3. Provide practical suggestions to legislators, TSA, Airline and FFDO management.
4. Design a new Likert survey based on Nolly's interview questions.
5. Provide recommendations for future research in this area.

**Scope**

The aviation community can be difficult to survey due to union governance and other managerial barriers. Federal Flight Deck Officers are restricted from even identifying themselves as such. The new survey was offered online, with access through a

URL link distributed by the researcher. Potential participants were discovered through online searches, including social media and business networking platforms. Each person contacted was asked to forward the documents and online survey link to other airline pilots. The online format allowed for survey participants to complete it on their own time, with no time-limit. A paper version was not utilized due to the complications of distribution, collection and the need for anonymity. Management of the location from which a paper survey would be distributed would have had to handle the distribution, collection, provide a location to complete it (e.g., in a pilot's lounge) and guarantee survey participants' privacy. The results would then need to be sealed and shipped to the researcher. The logistics required were too challenging for this investigation's timeline, so an anonymous online survey was the best option. SurveyMonkey.com was chosen by this researcher due to its range of product package options, survey customizability, user friendliness and popularity. Any willing and interested airline, union or other airline pilot organization like the FFDOA could easily host the online survey the same way.

Participants' identities were kept confidential by doing several things. Names were not collected in the survey and the surveymonkey.com platform was specifically configured to not collect survey takers' IP addresses. Unlike the Nolly (2011) study, the researcher did not identify the names of the airlines represented in this study. All remaining ASU IRB guidelines for surveying human subjects were also followed.

**Summary**

Participants in the FFDO program and the pilots who fly with them are likely to have the best insight into the current status and effectiveness of the program. For this reason, as Nolly suggested, his research of the FFDO program through pilot interviews should be

continued through a Likert survey (Nolly, 2011). This style of survey could be made easily available to a large group of pilots, potentially providing a much larger sample size in a quicker time frame, resulting in more substantial results. A Likert scale survey provides the capability to assess attitudes quantitatively and the simple fact that it is a survey and not an interview will permit easier reproductions of such research in the future. This leaves a high potential to provide results the TSA can consider in optimizing or changing their program and assessing pilots' perceptions to those changes over time. The effects of aviation terrorism on history will be explored in chapter two of this report, along with a look into the FFDO program and its cost-benefit feasibility.

# CHAPTER 2

## Literature Review

Aviation security acquired a whole new meaning on 9/11. The United States was again woken up by the ever-changing tactics of terrorists, this time at the cost of nearly 3,000 lives. The United States Congress responded with several pieces of legislation to drastically upgrade the country's aviation security. The creation of the TSA and Department of Homeland Security (DHS) are just a couple of the major changes brought about by this legislation. The importance of different security measures at both airports and in aircraft needed to be analyzed and new actions taken. After the TSA was founded, the Arming Pilots Against Terrorism Act created the FFDO program. The program is managed under the TSA with the help of the FAMS. The program's purpose is to train and deputize airline pilots and other cockpit crew members into qualified federal agents, arming them for flight security. The program has been plagued with problems, ranging from financial and other burdens put on pilots, a very inconvenient initial training location, limited refresher training locations, gun-carry policies, and a lack of support from airline management. Legislators subsequently complained of lower than expected applicant numbers. Another major obstacle the program has faced is funding. Presidential budgets proposed reducing the FFDO program's budget for several years. The FY 2013 budget proposed cutting the funding from $25 million to $12 million and received the most press attention to date (Pistole, 2012). Larger cuts and even defunding has been proposed yearly, including FY 2017 (Lamothe, Halsey, & Rein, 2017). This has happened despite congressional support and many security expert opinions. For example,

increasing the budget to $44 million was proposed in a 2013 cost-benefit analysis (Stewart & Mueller, 2013).

Nolly (2011) decided to interview airline pilots about their attitudes towards these characteristics of the FFDO program for his dissertation. He brought to light first-hand perspectives of airline pilots about what was wrong with the program and emphasized that further research should be completed via Likert survey. In effect, the earlier research created a baseline for assessing program problem areas and improvements. This investigation is a follow up on Nolly's research through a Likert-scale based survey, created to be as similar as possible to his interview questions. The following literature review briefly summarizes what caused the FFDO program to come about.

**Hijackings and Domestic Airlines**

Terrorism was introduced to the U.S. commercial aviation industry after a domestic airliner was hijacked in 1961 near Key West, Florida (Crenshaw, 1988). The term "terrorism" has been defined in many ways and debated for much longer than the life of aviation. Its definition is still not agreed upon. Though many hijackings occurred abroad prior to 1961 and even with small aircraft domestically, the term "hijack" became familiar with the broader American public as the act became a threat to their leisure and business travel on airliners. Hijackings became more common domestically in the late 1960's. These hostile acts were primarily used as a way for demanding money, defecting to or from a country and for other similar reasons. Hijacking attempts in the United States peaked in 1968 with 23 attempts, but that peak was immediately broken in 1969 when 40 attempts were made. In the 1980's there was another slew of hijackings and attempts. These individuals smuggled what they claimed to be explosive materials onto aircraft, yet

sometimes they were empty threats with fake explosives. Because of the potentially catastrophic consequences, crews treated all threats as real and typically negotiated with the terrorists (Crenshaw, 1988). Prior to the 9/11 attacks, it was standard operating procedure for airline crews to negotiate and comply with their hijackers. Terrorists' actions on 9/11 made it obvious that strategy was no longer realistic and new procedures needed to be adopted (Turney, et al., 2004). Unfortunately, the evolution of aviation related terrorism continued with its progression towards violence. Terrorism continued to harass domestic airlines, though largely unsuccessfully all the way until September 11, 2001, when four jetliners were hijacked in the United States by foreign suicide terrorists. Each of their passenger-occupied jetliners was used as an aerial missile. Three of these aircraft crashed into famous and occupied landmarks and one was forced down by resisting passengers before reaching its intended target. In one day, Al Qaeda killed nearly 3,000 innocent civilians in the America. That day initiated many changes in the USA, one of those was unifying Americans, or in other words, it brought them closer together (Kondrasuk, 2005).

**Impact on the United States**

Many liken 9/11 to the Pearl Harbor attack of WWII because of its impact on American society as a whole. It caught the American people, federal government, civil aviation industry, and airlines by surprise. The entire country's travel and insurance industries, economy, and its stock market were damaged by the attacks. The United States immediately started changing key aspects of its belief system, behaviors and relations to the rest of the world and their economic and administrative structures

(Kondrasuk, 2005). The 16 year-long War on Terror was started as a direct result of 9/11.

Turning a passenger jet into a missile was a new class of suicide terrorism that had not been seen before and it demanded serious change. Fortunately, the changes put in place have kept aviation terrorists largely unsuccessful since that point in time. Aviation security was a private sector industry until that failure, which led to the Aviation and Transportation Security Act that founded the Federal Government's TSA in November of 2001. This changed the United States' aviation security sector entirely. The commercial air traveling public and their government representatives showed that they do not accept failure in the commercial air travel system (Fredrickson & LaPorte, 2002).

**Airline Security**

**Pre-September 11, 2001.** The late 1960's made "hijacking" a common household term, and signaled many changes for aviation security. Starting in 1973, all passengers and carry-ons were required to be screened by the airlines themselves (Crenshaw, 1988). Airlines were in charge of hiring their own staff and equipment for screening their own passengers and luggage. Some of these measures included body scanning metal detectors, x-raying carry-on baggage and ID checking. This privatized security industry had many known faults, but stayed put until the legislative aftermath of 9/11. That day made clear that even the smallest details are crucial for aviation security to be sound. According to Fredrickson & LaPorte (2002), reliable aviation security requires processes that reward error discovery and correction; adequate and reliable funding; high mission valence; decentralized authority patterns; regular training; very high levels of technical competence; along with reliable and timely information.

The FAMS was founded in the late 1960's, about the same time as the spike occurred in attempted airline hijackings. This service put plain clothes, undercover, armed federal agents on selected flights. Typically, the flights they were assigned to were considered high risk. Essentially, Federal Air Marshals were strategically placed on flights to decrease the odds of aircraft being taken by hostile actions of passengers. This service was very minimal until the attacks of 9/11.

**Post-September 11, 2001.** Since 9/11, considerable funds have been spent to avoid another aviation terrorism disaster. Several major changes were made in aviation security. Most notably, the TSA was founded by the federal government, which was charged with wholly taking over the former private industry. With their takeover came new body scanning devices, bomb detection equipment, the Federal Flight Deck Officer program and positive ID scanning of employees, among other security measures (Turney, et al., 2004). Cockpits were secured with fortified doors and policies around pilots leaving their cockpit were changed. Changes also included revamping the FAMS. With these vast changes came many negative side effects for the aviation industry and traveling public. These negative effects included a large increase in delays, ticket costs rising because of government fees and skyrocketing airline insurance premiums, to name a few (Turney, et al., 2004). The benefits and efficiency of these new measures were analyzed, and some have proved much more cost effective than others (Stewart & Mueller, 2008).

**Security Measure Cost-Benefit Analysis.** When analyzing the entire government's budget for protecting the United States homeland from terrorism as a whole, it fails a cost-benefit analysis (Stewart & Mueller, 2008). The results show that

the estimated cost per life saved is at least $64 million, while the public's willingness to pay for a life-saved ranges from $1 to $10 million, depending on the study). For example, the FAMS initiative costs the US government and airlines $900 million annually, in 2008 dollars. Getting all cockpit doors reinforced cost approximately $40 million, whereas the FFDO program only costs $25 million annually (Stewart & Mueller, 2008). The FAMS placed agents on five to ten percent of airline flights while FFDOs were in about 8% as of 2008. It was suggested that a conservative assumption can be made that an event like 9/11, with 3,000 lives lost, may happen once every 10 years, if security measures weren't in place (Stewart & Mueller, 2013). So, this assumes an average of 300 lives would be lost annually without enhanced security measures. For the purposes of their cost-benefit analysis between FAMS and fortified cockpit doors, if only fortified doors were to be used, they decrease risk by over 16 percent and easily pass the cost-life differential at around $800,000 per life saved. FAMS is a different story, failing the cost-benefit analysis because its extravagant costs of nearly one billion dollars per year, which results in less than a 2% decrease in risk, equating to $180,000,000 per life saved. Stewart and Mueller (2008) also suggested that aircrew and passenger resistance is the largest deterrent and cheapest safety measure.

**Federal Flight Deck Officer Program**

The FFDO program was born from the Arming Pilots Against Terrorism Act of 2002, a part of the Homeland Security Act of 2002. The TSA is in charge of the FAMS, who directly manages and trains those in the FFDO program. The FFDO program was founded because after 9/11, attitudes began to favor arming pilots. It was considered the 'last line of defense' against airborne terrorists (Turney, et al., 2004). Pilots and

passengers were uneasy about potential terrorism and many pilots liked the idea of being able to defend themselves against aggressors. Turney, et al. (2004) surveyed 120 pilots and cabin crew members to access the perceived importance of recent security measures. Of the 108 crew members who completely finished the survey, a staggering 50% of the pilot crew members wrote in a response of 'arming pilots', when allowed any one write-in measure. When the statistical importance of this was analyzed through a two-sided t-test, comparing it with the 16 other security measures, only 'positive ID scanners for employees' surpassed the FFDO program in importance and both were significant. In other words, as a result of the events of 9/11, the American people were searching… "for heroes to step forward and lead it out of its sense of crisis" (Fraher, 2004 p. 585). Pilots and cabin crew members were no exception.

**Issues with the FFDO Program.** The U.S. Office of Management and Budget (OMB) performed an evaluation of the FFDO program and noted unsatisfactory results (Nolly, 2011). The unsatisfactory results primarily stemmed from the number of FFDOs being trained and certified yearly, as the FFDO program's participation rates have only been meeting the expectations of the TSA. Presidentially proposed budgets subsequently proposed cutting between half and all of the federal budget for the program between fiscal years 2013 and 2017. Congress has denied those requests and maintained a consistent budget through 2016. The FY2017 budget proposal is still in its infancy (Lamothe, Halsey, & Rein, 2017; Pistole, 2012).

Problems with the FFDO program were known in the airline community to be widespread, so Nolly (2011) interviewed pilots on their attitudes towards different aspects of the program, diagnosing the current problems. The 13 questions he asked each

of his 25 interview volunteers assessed their opinions, or attitudes on many known program issues. From the applicant screening process to the weapons transportation protocols, results showed that the majority of respondents stated that the TSA's management of the program was unsupportive and the weapons transportation protocols and locking gun holster were burdensome and potentially dangerous. The isolated training location made training logistically difficult and the lack of federal or airline financial support during training further convinced the surveyed pilots of a lack of managerial support for the program. Further study was recommended in the form of a Likert survey to help researchers and program management identify pilots' perspectives of any new or ongoing issues which can help in evaluating the success or failure of attempts to fix issues (Nolly, 2011).

**Conclusions**

Aviation security was changed forever after the hijackings, devastation and loss of life on 9/11. The United States needed to counteract the changing tactics of terrorists. The economy was devastated and the federal government decided to step into the public aviation security sector, taking over. Security levels rose with new equipment, procedures and programs. Over time, studies have shown some of those measures are more sensible in terms of their effectiveness and financial efficiency. The FFDO program is one of the latest and most financially feasible changes to be analyzed, but much is left to be perfected. The program needs further study from the perspectives of current airline pilots, to see if they believe it should continue, and if so, what needs to be done for its future success.

# CHAPTER 3

## Methodology

### Participants

A total of 43 pilots, representing 16 airlines and a wide range of ages and experience levels participated in this study.

### Research Materials

The method of research for this investigation was an online Likert-type survey of individuals who were actively working as airline pilots. George E. Nolly gave the researcher permission to continue his research in April of 2017. The survey questions (Appendix B), were intended to closely replicate the Nolly (2011) study's interview questions (Appendix C), with some additional questions. There were eight demographic questions, 11 Likert questions, and on one select-all question with 20 options, one of them being the ability to comment about "Anything Else". Most of the Likert questions included an optional comment box. The survey was designed to be brief, taking between 3 and 5 minutes of time to accomplish, to increase the participation rate.

Certain terms in each Likert question were purposely vague, to capture a wide range of opinions or attitudes, as Nolly did with his interview questions. Most Likert questions included an optional comment box to capture the attitudes that may not have been encompassed by the online Likert-survey medium. Table 8 on page 37 shows how each of the Nolly (2011) interview questions relate to the FFDO survey question numbers.

**Distribution and Collection.** All potential participants were contacted through electronic channels of communication, such as Facebook Messenger or e-mail. Each pilot

was provided the Survey Invitation document (Appendix A) that included the URL link to the anonymous survey. The initial pilots contacted were amassed from the researcher's personal experience in the aviation industry. The researcher also asked each contact to distribute the invitation document to as many peers as they felt comfortable.

**Summary**

This study replicated the Nolly (2011) investigation and compared results to determine differences and identify the current state of the FFDO program. Nolly's investigation aimed to identify whether or not the "screening, selection and procedures alienated airline pilots and influenced their perceptions and attitudes" towards the TSA and the FFDO program specifically (Nolly, 2011, p. 58). The FFDO survey questions attempted to specifically identify "what changes in FFDO program policies and procedures would result in improved pilot perceptions of the program", that could possibly result in higher pilot participation in the program (Nolly, 2011, p. 58).

# CHAPTER 4

## Results

This chapter details this study's participants' demographics (Refer to Table 9 in Appendix D) and the results of each Likert FFDO survey question, including a record of the optional comments for survey questions 11 through 19. Each of the studies questions have basic frequencies compared. Appendix B shows this study's survey questions and Appendix C lists the interview questions of Nolly's study (2011). The results of this study contain ordinal data that was analyzed through Pearson chi-square tests via the Statistical Package for the Social Sciences (SPSS). To do this with a small sample of 43 participants, the 5-point Likert scale that included "Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree", was reduced into two categories of "Agree" or "Disagree". The "Neutral" and "Don't Know" answers were counted as no answer and referred to as "no opinion" in this study. This is why there are not 25 responses to all of the Nolly (2011) questions, nor 43 responses to all of this study's questions. The purposeful reduction of response options served to both enable a chi-square analysis of a small sample size and reduced error in comparisons with the Nolly (2011) qualitative study. The chi-square tests looked for central tendencies, or what demographic was more likely to respond a certain way. The data collected in the Nolly (2011) interviews that was used for comparative analysis of frequencies is located in the tables of Appendix E.

Only those questions whose Pearson Chi-Square results were statistically significant ($p$-value < .05) have their chi-square value reported in this study. Three of the Likert FFDO survey questions resulted in unanimous agreement after the Likert results were separated into the "Agree" vs "Disagree" format, thus a chi-square test was impossible.

Tables 2-5 break down the Likert results, showing Q9-13 and Q14-19 separately. The overall demographics of the survey participants consisted of nearly all males with a wide range of age and experience levels, from many airlines.

**Demographic Questions**

In total, the initial survey invitation was distributed to approximately 80 individuals. In one month, the survey collected 43 responses on surveymonkey.com. Questions one through eight were demographic questions. Although question eight was in Likert format, its results were categorized as demographic. The condensed demographic table of this study's participants is below (Table 1).

Table 1
*FFDO Survey Demographics: Condensed*

| Birth Year Interval | # of Pilots | Hours | Domestic, International or Both (D/I/B) | Position (CP/FO) | Military Experience (Y/N) | Familiar (Y/N/Neutral) |
|---|---|---|---|---|---|---|
| 1 | 2 | 10750 | 0/1/1 | 0/2 | 2/0 | 2/0/0 |
| 2 | 7 | 14714.29 | 1/2/04 | 4/3 | 6/1 | 6/1/0 |
| 3 | 4 | 11000 | 1/0/3 | 2/2 | 3/1 | 4/0/0 |
| 4 | 6 | 6333.33 | 1/0/5 | 0/6 | 5/1 | 5/0/1 |
| 5 | 3 | 5833.33 | 0/0/3 | 0/3 | 3/0 | 3/0/0 |
| 6 | 4 | 5450 | 0/0/4 | 1/3 | 2/2 | 4/0/0 |
| 7 | 13 | 4365.39 | 2/0/11 | 6/7 | 4/9 | 13/0/0 |
| 8 | 4 | 2825 | 0/1/3 | 0/4 | 1/3 | 4/0/0 |

*Note.* Birth year interval: Age is summarized into eight 5-year intervals starting in 1955. Hours represent the average of that interval.

Refer to Appendix D for the comprehensive demographics of this study (Table 9).

**Survey Question One.** *What is your birth year?*

The average year of birth is 1977, so the average age of the FFDO survey participants was approximately 40 years old at the time of their participation. Birth years span from 1956 to 1992, meaning participants were 25 to 61 years old. Nolly (2011)

simply recorded the age of his interviewed pilots. They were 25 to 63 years old and averaged 11 years older than those of this study, at 51. The chi-square tests comparing age used eight, five-year birth year intervals spanning from 1955-1995 and did not show significance between FFDO survey participants' age and their responses to survey questions.

**Survey Question Two.** *What is your gender?*

This study's participants consisted of 42 males and one female, with all respondents electing to report their gender. Nolly (2011) did not record the gender of those he interviewed. The small number of female participants resulted in gender not being used in the data analysis.

**Survey Question Three.** *What airline are you currently working for?*

This study had pilots spanning 16 different companies. Forty pilots were working for legacy, major, or regional airline carriers, one was flying for a cargo specific company and two were flying for charter airlines. The charter airlines offered both passenger and cargo operations. The identities of specific airlines of this study were given a number between one and 16 and are not identified by name to offer an additional level of pilot anonymity. Of the 25 Nolly (2011) interviews, nine airlines were represented and consisted of legacy, major, regional and charter airline carriers. (See Table 1 of Appendix E).

**Survey Question Four.** *Does your schedule include domestic flights, international flights, or both?*

Survey participants were asked whether they flew domestically or internationally. They could select both options to indicate they flew both. This question was asked for

several reasons, but identifying whether flying internationally or domestically correlated to the FFDO survey's Likert questions was its main purpose. The results contained five pilots who only flew domestically, and four only internationally, while 34 flew both. FFDOs are not allowed to transport their service weapons internationally and represented 88.37% of the surveyed pilots.

The Nolly (2011) study did not identify whether its pilots flew domestically or internationally, but it did identify international routing as discouraging to program participation for 20% of the interviewed pilots (See Table 2c of Appendix E). In contrast, 67.44% of pilots who took the FFDO survey felt the same way.

**Survey Question Five.** *What is your total number of hours of flying experience? Estimates are Okay.*

Surveyed pilots filled in a blank text-box to report their estimated total flight hours. The estimations ranged from 1,300 to 20,000 hours of total time and averaged 7298.84 hours. This study recorded hours, instead of years in the airlines and put them into 2500 hour intervals (one through eight) to compare experience with the Likert questions.

The Nolly (2011) study recorded years of overall flight experience and years as an airline pilot. Those results averaged 30.36 years of aviation experience and 20 years in the airlines.

**Survey Question Six.** *Is your current duty position captain or first officer?*

The majority of survey participants were First Officers (FO). The 30 FOs represented 69.77% of the 43 participants, while there were 13 Captains (CP). The Nolly (2011) study was more evenly distributed by position, with 13 CPs and 12 FOs.

**Survey Question Seven.** *Are you a current or former military pilot?*

Survey participants had four options to this question, three of which included "yes". Each different "yes" options distinguished between current and former military pilots and those who were in the military at some point, while in a position other than pilot. For this study's data analysis, the three "yes" options were grouped together and compared to "no". This study had 26 current or former military members, representing 60.50% and 17, with no military experience. The Nolly (2011) study had 18 participants or 72% with prior military service and 7 pilots with no military experience.

**Survey Question Eight.** *I am familiar with the FFDO program.*

No pilots selected "Don't Know" or "Disagree", 21 selected "Strongly Agree, 20 "Agree", one "Neutral", and one "Strongly disagree". When the data was grouped into "Agree" vs "Disagree" for the final analysis, it resulted in 41 of 42, or 97.62% agreeing that they are familiar and one person disagreeing.

**Likert Questions**

FFDO survey questions nine through 19 were used to compare opinions with participants' demographics. The opinions collected by the FFDO survey Likert questions were then compared with the Nolly (2011) study. Table 8 on page 37 shows how the two study's questions relate with each other.

**Survey Question Nine.** *The FFDO program should continue on commercial domestic aircraft.*

The results of question nine's chi-square analysis were significant, when compared to familiarity. Those who were familiar with the FFDO program were more likely to have agreed that it should continue on commercial domestic aircraft. (chi-square,

df=1, Value=6.979, *p*=.008). Survey question nine was modeled after interview question 1, "Do you feel FFDOs should be protecting domestic aircraft?" (Nolly, 2011, p. 61). Less than 7% of each study's population had no opinion, 81.4% of all those surveyed, or 88% of those with an opinion and 92% of those interviewed (Nolly, 2011) agreed the FFDO program should continue on commercial domestic aircraft. No comment box was supplied for question nine.

**Survey Question 10.** *The FFDO program is effective.*

The results of question 10's chi-square analysis, when compared to familiarity, were significant. Those who were familiar with the FFDO program were more likely to have agreed that it was effective. (chi-square, df=1, Value=4.473, *p*=.034). Survey question 10 was modeled after interview question two, "Do you feel the FFDO program is effective?" (Nolly, 2011, p. 61). Twenty-six percent of those surveyed did not know or had a neutral opinion of FFDO survey question 10's statement, compared to 12% of those interviewed by Nolly (2011). Of the 32 surveyed pilots with an opinion, 81.25% of them agreed, which represented 60.47% of those surveyed. The interview resulted in 90.91% with an opinion agreeing, with that representing 80.00% of those interviewed. No comment box was supplied for question 10.

**Survey Question 11.** *The FFDO screening and selection process is adequate.*

Question 11's chi-square analysis was significant, when compared to familiarity. Those who were familiar with the FFDO program were more likely to have agreed that the FFDO screening and selection process was adequate (chi-square, df=1, Value=3.965, *p*=.046). Survey question 11 was modeled after interview question three, "What is your opinion of the FFDO screening and selection process?" (Nolly, 2011, p. 62). Over 44%

of those surveyed had no opinion and of the remaining 24 pilots, 79.17% agreed with FFDO survey question 11's statement. The Nolly (2011) interviews resulted in 20% with no opinion and of the remaining 20 interviewees, 65% agreed.

***Comments Q11.***

1) "I am not aware of other applicants' issues...only the pilots and friends I know who were accepted, and their selection into the program seemed very appropriate to me."
2) "I have flown with numerous FFDOs. All of them appeared to be well trained and screened."
3) "Though I feel it's a great program, I have not completed the application process
4) "I know of 2 people that should not be FFDOs...they are mentally unstable."
5) "There is no screening process other than being a US citizen with a pilot certificate and medical."
6) "I did my screening 8 years ago, and then it was fairly comprehensive, including a computerized Psych test and a short meeting with a psychologist. I have heard that it is mostly a phone interview now. Not sure if that is better or worse."

**Survey Question 12.** *The FAMS's management of the FFDO program is effective.*

Question 12's chi-square analysis was significant, when compared with familiarity. Those who were familiar with the FFDO program were more likely to agree that the FAMS's management of the program was effective (chi-square, df=1, Value=23.000, $p$=.000). Survey question 12 was modeled after interview question four, "What is your opinion of the management of the FFDO program?" (Nolly, 2011, p. 62). The results of the interview were separated by favorability by this researcher. Those who

had a positive response were labeled as “Agree” and those with a negative opinion towards the FFDO program management were labeled “Disagree”. The agreeability results for this question contrasted between the two studies. While 46.51% of those surveyed and 32% of those interviewed had no opinion, 95.65% of the 23 remaining surveyed pilots agreed in management’s effectiveness, while 70.59% of those interviewed had a negative opinion of the FFDO program management.

***Comments Q12.***

1) “The FAM service has always been very supportive and professional.”

**Survey Question 13.** *FFDO weapon transportation procedures are adequate.*

Question 13’s chi-square analysis was non-significant, however, 100% of those who were familiar with the program and had an opinion, agreed weapon transportation procedures were adequate. This contrasted with the results of the Nolly (2011) interview results. Survey question 13 represented the first half of interview question five, “What is your opinion of the FFDO weapons transportation and carriage procedures?” (Nolly, 2011, p. 62). The results of interview question five were compared with both survey question 13 and 14 after this researcher interpreted favorable responses as “Agree” and unfavorable as “Disagree”. A total of 34.88% of those surveyed and 12% of those interviewed had no opinion. Of the remaining 28 surveyed pilots with opinions, 85.71% agreed weapons transportation procedures were adequate, while 40.91% of those who were interviewed agreed. This left 59.09% of those interviewed and with an opinion, disagreeing that procedures were adequate.

***Comments Q13.***

1) “They move it around too much. Taking it in and out of the carry bag and un-

holstering and holstering is asking for an inadvertent discharge."

2) "The new holster and ATD have been well designed to take a minimum of space in our crew bags."

3) "FFDOs are easy to spot at the airport, very conspicuous bags and belt clip."

**Likert Tables (Q9-13).**

Table 2

*Likert Results: Agree vs Disagree (Q9-13)*

| | Continue | Effective | Screening & Selection Adequate | FAMS Mgmt. Effective | Weapon Transportation Procedures Adequate |
|---|---|---|---|---|---|
| # Agree (% of A or D) | 35 (.88) | 26 (.81) | 19 (.79) | 22 (.96) | 24 (.86) |
| # Disagree (% of A or D) | 5 (.13) | 6 (.19) | 5 (.21) | 1 (.04) | 4 (.14) |
| # With Opinion (% / N) | 40 (.93) | 32 (.74) | 24 (.56) | 23 (.53) | 28 (.65) |

*Note.* N=43.

Table 3

*Likert Response Rates (Q9-13)*

| Answer | Continue | Effective | Screen & Selection Adequate | FAMS Mgmt. Effective | Weapon. Transportation Procedures Adequate |
|---|---|---|---|---|---|
| Don't Know | 0 (.00) | 5 (.12) | 14 (.33) | 18 (.42) | 10 (.23) |
| Strongly Agree | 25 (.58) | 19 (.44) | 7 (.16) | 8 (.19) | 8 (.19) |
| Agree | 10 (.23) | 7 (.16) | 12 (.28) | 14 (.33) | 16 (.37) |
| Neutral | 3 (.07) | 6 (.14) | 5 (.12) | 2 (.05) | 5 (.12) |
| Disagree | 4 (.09) | 5 (.12) | 2 (.05) | 0 (.00) | 4 (.09) |
| Strongly Disagree | 1 (.02) | 1 (.02) | 3 (.07) | 1 (.02) | 0 (.00) |

*Note.* Quantity and frequency is out of 43 participants.

**Survey Question 14.** *FFDO weapon carriage procedures are adequate.*

Question 14's chi-square analysis was non-significant, however, 100% of those who were familiar with the program and had an opinion, agreed weapon transportation procedures were adequate. This also contrasted with the results of the Nolly (2011) interview results. Survey question 14 represented the second half of interview question five, "What is your opinion of the FFDO weapons transportation and carriage procedures?" (Nolly, 2011, p. 62). The results of the interview question five were compared with both survey question 13 (weapon transportation) and 14 (weapon carriage) after this researcher interpreted favorable responses as "Agree" and unfavorable as "Disagree". A total of 37.21% of those surveyed and 12% of those interviewed had no opinion. Of the remaining 26 surveyed pilots with opinions, 96.15% agreed weapons carriage procedures were adequate, while 40.91% of those interviewed agreed. As with

the comparison to FFDO survey question 12 (FAMS management), this left 13 of 22, or 59.09% of those interviewed and with an opinion disagreeing that procedures were adequate. There were no comments left for question 14.

**Survey Question 15.** *The FFDO holster locking mechanism used by FFDOs is adequate.*

No chi-square test was able to be performed for question 15 in the "Agree" vs "Disagree" analysis because 100% of those who had an opinion unanimously responded in agreement, across the board, by birth year, hours, position, military experience and familiarity, meanwhile 51.16% of survey participants had no opinion. Survey question 15 was modeled after interview question six, "What is your opinion of the holster locking mechanism used by FFDOs??" (Nolly, 2011, p. 63). The interview results contrasted with those of the survey, with 12% having no opinion, 40.91% favorability and 59.09% of responses being negative in regards to the holster locking mechanism.

***Comments Q15.***

1) "There are times that carrying the LNDB (an alternate transport system) is preferable to the locking holster. I find the holster a bit more cumbersome than the LNDB."
2) "If the weapon is stolen or misplaced, it is possible to get to the weapon if you have adequate tools. In an aircraft environment, it would be very difficult to near impossible to get the weapon loose."

**Survey Question 16.** *From what you have observed or experienced, FFDOs are well trained.*

Like question 15, no chi-square test was able to be performed, because 100% of those who were surveyed and had an opinion, unanimously responded in agreement that

FFDOs were well trained. This question was modeled after interview question seven "From what you have observed, are the FFDOs well-trained?" (Nolly, 2011, p. 63). A total of 23.26% of surveyed pilots had no opinion. All pilots from the Nolly (2011) interviews had an opinion in this matter and also responded unanimously in agreement.

***Comments Q16.***

1) "We could always use more training, but time is difficult to schedule."

**Survey Question 17.** *It is reasonable to have pilots complete FFDO training on their own time.*

Question 17's chi-square analysis was significant when compared with military experience. Those who had military experience were more likely to disagree that it is reasonable to have pilots complete FFDO initial training on their own time (chi-square, df=1, Value=7.887, *p*=.005). Interview question 10 asked, "What is your opinion about the requirement pilots must pay for room and board at FFDO initial training and must train on their own time?" (Nolly, 2011, p. 63). Survey questions 17 and 18 split Nolly (2011) interview question 10 into halves, 17 covered the training on one's own time, and 18 covered pilots paying their own room and board. Both survey questions were compared to the results of interview question 10 and 18.6% of pilots surveyed had no opinion in this matter. There were 25 pilots, which represented 71.43% of those who had an opinion, who disagreed. Of the 10 pilots with an opinion, who agreed, two of them had military experience. The Nolly (2011) interviews had a total of 12 pilots with no opinion, representing 52% of those interviewed. The remaining 48% of interviewed pilots unanimously disagreed.

***Comments Q17.***

1) "The airlines shouldn't pay for it unless they require it."
2) "The airlines and traveling public all benefit from the FFDO program but the Pilot assumes all the burdens from getting trained--personal time off, lost wages, etc."
3) "I think their company should cover the costs of travel, work time lost and lodging."
4) "It's a volunteer program."
5) "Should be paid time - my airline currently has it as unpaid excused absence."
6) "Should be funded by Government or airline."
7) "Many companies make it hard on pilots forcing them to seek the training required during their time off."
8) "This is the biggest problem with the program, in my opinion. That is a large amount of time spent away from work without compensation. My suggestion is to write a law, similar to compensation requirements when selected for Jury Duty."

**Survey Question 18.** *It is reasonable to have pilots pay for their own room and board at initial Training.*

The results of question 18's chi-square analysis also showed significance when compared with military experience. Those who had military experience were more likely to disagree that is reasonable to have pilots pay for their own room and board at initial FFDO training (chi-square, df=1, Value=10.925, $p$=.001). Survey question 18 represented the second half of interview question 10, and was quoted above. The results showed 32 pilots, which represented 84.21% who had an opinion in the matter, disagreed with FFDO survey question 18's statement. A total of 5 pilots had no opinion and none of the 6 pilots who agreed had military experience.

***Comments Q18.***

1) “The airlines and traveling public all benefit from the FFDO program but the Pilot assumes all the costs of getting trained--transportation, lodging, meals etc.”
2) “I think their company should cover the costs of travel, work time lost and lodging.”
3) “I know in the past it was paid for by each FFDO, but now it's all paid for. I think that's an incentive for people to join the program.”
4) “The price was actually very reasonable and the dorms were adequate.”
5) “If this adds value in the form of safety why should pilots have to pay for it? Do security guards or TSA folks have to pay for their room and board during training? Either the program adds value or it doesn't. If it does these costs should be borne by either the airline or the government. Open to a debate on which one....”

**Survey Question 19.** *The TSA and/or FAMS should adopt an official channel for accepting suggestions for improvements to the FFDO program.*

This question was unanimously agreed upon by all those who had an opinion in the survey, which for this question represented 90.70% of all participants, and four had no opinion. This question was not an interview question, but was the third recommendation in chapter five of Nolly’s study (Nolly, 2011, p. 101-102).

***Comments Q19.***

1) “Reporting system is already in place.”

**Likert Tables (Q14-19).**

Table 4

*Likert Results: Agree vs Disagree (Q14-19)*

| | Weapon Carriage Procedures Adequate | Holster Adequate | Well Trained | Train on Own Time | Pilot Pay Room & Board | Adopt Suggestion Channel |
|---|---|---|---|---|---|---|
| # Agree (% of A or D) | 25 (.96) | 21 (1.00) | 33 (1.00) | 10 (.29) | 6 (.16) | 39 (1.00) |
| # Disagree (% of A or D) | 1 (.04) | 0 (.00) | 0 (.00) | 25 (.71) | 32 (.84) | 0 (.00) |
| # With Opinion (% / N) | 26(.60) | 21 (.49) | 33 (.77) | 35 (.81) | 38 (.88) | 39 (.91) |

*Note.* N=43

Table 5

Likert Response Rates (Q14-19)

| Answer | Weapon Carriage Procedures Adequate | Holster Adequate | Well Trained | Train on Own Time | Pilot Pay Room & Board | Adopt Suggestion Channel |
|---|---|---|---|---|---|---|
| Don't Know | 9 (.21) | 17 (.40) | 5 (.12) | 2 (.05) | 0 (.00) | 1 (.02) |
| Strongly Agree | 6 (.14) | 9 (.21) | 15 (.35) | 3 (.07) | 2 (.05) | 19 (.44) |
| Agree | 19 (.44) | 12 (.28) | 18 (.42) | 7 (.17) | 4 (.09) | 20 (.47) |
| Neutral | 8 (.19) | 5 (.12) | 5 (.12) | 6 (.14) | 5 (.12) | 3 (.07) |
| Disagree | 1 (.02) | 0 (.00) | 0 (.00) | 19 (.44) | 21 (.49) | 0 (.00) |
| Strongly Disagree | 0 (.00) | 0 (.00) | 0 (.00) | 6 (.14) | 11 (.26) | 0 (.00) |

*Note.* Quantity and frequency is out of 43 participants.

**Select-All Question**

Question 20 was designed to inquire about many of the various discouraging program characteristics mentioned by interviewed pilots in the Nolly (2011) study, possibly identifying areas for future researchers to focus on. Options were compiled from participants' comments in the Nolly (2011) study.

**Survey Question 20.** *Select all aspects of the FFDO program you believe discourage pilots from volunteering to participate.*

No correlation or significance test was performed on the resulting data. There were five options that resulted in over 50% of all surveyed pilots agreeing on, three options related to finance burdens, one was the challenge of getting to Artesia and one was having international routes in one's schedule. The last sub-question (T) asked for "anything else" the pilots had to say, and resulted in the most comments of any individual question. Please refer to Table 6 on page 33.

Table 6

*Q20: Select all aspects of the FFDO program you believe discourage pilots from volunteering to participate*

| Sub-question | Answer Choices | % | # of 43 |
|---|---|---|---|
| A | Holster | 6.98% | 3 |
| B | Firearm carriage and/or transportation requirements | 27.91% | 12 |
| C | FFDO operational procedures | 9.30% | 4 |
| D | Most training expenses are self-paid | 58.14% | 25 |
| E | The initial and recurrent training is not extensive enough for the subsequent responsibilities of an FFDO | 4.65% | 2 |
| F | Requirements for recurrent training | 16.28% | 7 |
| G | Airline does not grant time off specifically for training | 65.12% | 28 |
| H | Pilot's Logistical effort getting to Artesia, NM | 62.79% | 27 |
| I | Lack of a need for the program | 9.30% | 4 |
| J | TSA security screening requirements | 23.26% | 10 |
| K | Lack of support from my airline | 30.23% | 13 |
| L | Lack of support from TSA | 18.60% | 8 |
| M | Lack of support from FAMS | 6.98% | 3 |
| N | The program's ongoing funding insecurities | 23.26% | 10 |
| O | Flight schedule includes international destinations | 67.44% | 29 |
| P | Extensive application process | 11.63% | 5 |
| Q | Lack of extra pay for participating in program | 32.56% | 14 |
| R | Lack of pay (salary or stipend) while training | 53.49% | 23 |
| S | None of these | 0.00% | 0 |
| T | Anything else? (Comments) | 23.26% | 10 |

***Comments for "Anything Else?".***

1) "You have to wait for a supervisor to show at (Known Crewmember) KCM checkpoints to carry a weapon through. This wait is an extra 5-15 minutes, is very inconvenient, and invalidates the whole purpose of KCM, quick passage through security. I perceive the FFDO program as being very inconvenient for me personally and will never volunteer for it. The bureaucracy isn't worth it."
2) "Should include International destinations."
3) "FFDO's offer a monumental cost savings for tax payers over FAM's. We should be expanding the FFDO program and eliminating the FAM program. We could increase the amount of armed personal on commercial aircraft by tenfold while reducing the costs to tax payers, airlines, and the traveling public by 75%."
4) "90% of the FFDOs I fly with are not concerned with airline security. They are concerned with carrying a badge to get out of tickets. That is the only reason I have thought about the program."
5) "Often times the FFDOs that I've flown with seem to have some fantasy about being a hero and talk about little else than guns. They seem to want to have an opportunity to use the gun. I felt when this program began that only the people you don't want to have a gun would apply to become an FFDO."
6) "Time off is the biggest factor. Took me close to a year and my own vacation time to finally be able to schedule a class. The program should be more pushed by airlines, FAA, and TSA. They should collaborate to work with a paid leave system and time off to do the initial training. The big road block is getting time off and then using your paid vacation that is accrued very slowly on voluntary training."

7) “I do wonder about anti-gun captains and whether they will clam up and this will cause an issue with CRM during flight.”

8) “Unfortunately, I am not very familiar with many of the FFDO program's specifics regarding selection, training etc. I hope the multiple "Don't Know" responses does not render this particular survey irrelevant or useless.”

9) “I'm not an FFDO due to time constraints with my military job and family priorities. I am interested in it for later in my airline career perhaps when I bid Capt.”

10) “As a First Officer, some Captains look down on FOs for being FFDOs. I believe this forces many FOs that would otherwise participate in the program to defer their participation until after they upgrade to the left seat.”

**Summary of Results**

Questions one through eight collected demographic information. Pilots’ ages ranged from 25 to 61 years old, with the average year of birth being 1977. There were 42 males and one female who flew for 16 different companies. Five pilots flew only domestically, four internationally, and 34 flew both domestic and international routes. Their total flight time spanned from 1,300 to 20,000 hours, with an average of just under 7300 hours. Thirty of the pilots were First Officers and 13 were Captains. Twenty-six of the pilots had military experience and all but two pilots either agreed or strongly agreed with being familiar with the FFDO program.

In total, two demographics showed significant chi-square comparisons with a total of six FFDO survey Likert questions. The “Familiar” demographic resulted in a significant chi-square or unanimous agreement for all but two Likert questions. Those questions (17 and 18) assessed whether pilots thought it was reasonable to pay for their

own room and board during training, or train on their own time. Those who had military experience, were more likely to disagree that it was reasonable in both cases. There were three Likert questions (15,16 and 19) that resulted in a unanimous agreement. Those questions regarded the holster locking mechanism's adequacy, if FFDOs were well trained, and whether FFDO program management should create a way for FFDOs to provide suggestions. Table 7 summarizes those results on the next page.

Table 7

*Significant and Unanimous Survey Results*

| Question | Military | Familiarity | 100%. Agreement |
|---|---|---|---|
| | Significant Chi-Square | | Demographic |
| Q9 Continue | | 0.008 | |
| Q10 Effective | | 0.034 | |
| Q11 Screen & Select | | 0.046 | |
| Q12 FAMS Manage. | | 0.000 | |
| Q13 Weapon Trans | | | Familiarity |
| Q14 Weapon Carriage | | | Familiarity |
| Q15 Holster Locking Mech. | | | All |
| Q16 Well Trained | | | All |
| Q17 Own Time | 0.005 | | |
| Q18 Pay Room & Board | 0.001 | | |
| Q19 Adopt Sugg. Medium | | | All |

*Note.* Tabled data is of "Agree vs Disagree" data analysis. No results are recorded when p-values >.05.

**Survey vs Nolly (2011) Study.** The results of several FFDO survey Likert questions are similar to those of the Nolly (2011) interview, while others have swayed nearly completely in the other direction. The Comparing Studies Table 8 shows how questions relate between the two studies.

Table 8
*Comparing Studies*

| Nolly (2011) Interview Question | Agree | Disagree | Corresponding Survey Question | Agree | Disagree |
|---|---|---|---|---|---|
| 1 | 23 | 1 | Continue 9 | 35 | 5 |
| 2 | 20 | 2 | Effective 10 | 26 | 6 |
| 3 | 13 | 7 | Screen & Select 11 | 19 | 5 |
| 4 | 5 | 12 | Management 12 | 22 | 1 |
| 5.1 | 9 | 13 | Weapon Trans. 13 | 24 | 4 |
| 5.2 | 9 | 13 | Weapon Carry 14 | 25 | 1 |
| 6 | 9 | 13 | Holster 15 | 21 | 0 |
| 7 | 25 | 0 | Well Trained 16 | 33 | 0 |
| 8 | 25 | 0 | N/A | N/A | N/A |
| 9 | 8 | 11 | Training Loc. 20H | 27 | |
| 10.1 | 0 | 13 | Own Time17 | 10 | 25 |
| 10.2 | 0 | 17 | Room & Board 18 | 6 | 32 |
| N/A | N/A | N/A | Sugg. Medium19 | 39 | 0 |
| 11 | N/A | N/A | Select All 20 | N/A | N/A |
| 12 | N/A | N/A | Select All 20 | N/A | N/A |
| 13 | N/A | N/A | Anything Else 20T | N/A | N/A |

*Note.* N/A= Not applicable, due to lack of corresponding question.
Nolly (2011): N=25
FFDO Survey: N=43

In both studies, participants felt that FFDOs should be protecting domestic aircraft with 92% of all interviewed pilots and 88% of those surveyed, who had an opinion. The results of those who thought the program was effective was similar in each study, decreasing from 92% (Nolly, 2011) to 81% of those who had an opinion in the survey.

Both studies resulted in unanimous agreement that FFDOs are well trained. Pilots who were interviewed all had favorable opinions of FFDO training and 33 surveyed pilots, or 100% of those with an opinion also agreed the training was adequate. The FFDO screening and selection process favorability rating rose from 65% of 20 interviewed pilots who shared an opinion to 79% of the 24 pilots who shared an opinion in the survey. The FFDO management approval rating rose substantially, from 29% in Nolly's 2011 interviews, to 96% of those with an opinion in the survey. The weapons transportation and carriage approval ratings also rose substantially. While just 36% of those in the Nolly (2011) study had a favorable view of the transportation and carriage procedures, 86% of surveyed pilots who had an opinion thought transportation procedures were adequate and 96% felt the carriage procedures were adequate. The holster locking mechanism's approval rose substantially with results rising from 52% of those interviewed having an unfavorable opinion, to 100% agreement of the holster's adequacy between the 21 pilots who had an opinion in the survey. The training location of Artesia, New Mexico received a range of answers in the Nolly (2011) study. Table 2c located in Appendix E appears to show 56% of the interviewed pilots with an unfavorable view of the Artesia location, which was similar in comparison to the results of survey question 20H, for which 63% of surveyed pilots found the logistical efforts of getting to that location discouraged pilots from volunteering for the program. The Nolly (2011) interview question asking about pilots' perspectives of both having to pay their room and board at training and having to do it on one's own time was split into two questions in the survey. Nolly noted that 68% of pilots were against paying their own room and board and 52% were against training on their own time. The survey resulted in an extra 16% of pilots against paying their room

and board (84% of opinions), and a 19% higher rate against training on their own time (71%).

When Nolly asked if there were any other things that discourage FFDO program participation, 52% again mentioned personal costs (58% surveyed, Q20D) and 13% said international flights (67% of those surveyed, Q20O). Of those interviewed, 24% said a lack of respect from program management was discouraging and similarly, 18.60% of those surveyed stated "Lack of support from TSA" was discouraging. A discussion of the significant results, questions with unanimous agreement, the major differences and similarities between this study and that of Nolly (2011) will be covered in the following chapter.

# CHAPTER 5

## Discussion

This study continued Nolly's investigation into whether "current screening, selection, and operational procedures alienated airline pilots and influenced their perceptions and attitudes toward the TSA in general and toward the FFDO program in particular" by creating and utilizing a survey (Nolly, 2011, p. 92).

The purpose of this study was to create, distribute and analyze the results of a Likert survey to give updated (2017) insights into pilots' opinions of the FFDO program, for comparison to the Nolly (2011) study. A survey was used to convert the previous set of interview questions into an easily replicable way to assess pilot opinions of the FFDO program and the corresponding convictions of those opinions, in a quantifiable medium. A survey fosters faster data collection, reduces error from qualitatively analyzing interview responses and simplifies its replication for longitudinal study. This will allow for the program's management, being the TSA or FAMS, to take the results and decide if, or where to implement changes, and then analyze the pilots' opinions of the results from those changes. Fixing identified issues could incentivize pilots to continue participating in the program or to apply to become FFDOs, increasing program participation.

The results of this study replicate some prior opinions in some questions, but represent major changes of other opinions regarding various other aspects of the FFDO program. Nolly (2011) used slightly different wording for its questions and its qualitative analysis of interviews has made the comparison of these two studies' results more exploratory than scientific, but gave insights of general opinions between 2011 and 2017. Future research can replicate this study's survey and more accurately compare the

quantitative results for insights into the changing of program policies or characteristics and pilots' opinions of them, over time.

**Limitations**

This investigation did not query TSA or FAMS employees or management for clarification of FFDO program characteristics. It did not attempt to distinguish which participants are actually FFDOs due to their inability to legally disclose that information and the level of guesswork and error that would introduce into the study. This investigation also did not survey foreign airline pilots for their opinions on the FFDO program, even though there are other countries that allow airline pilots to be armed. Nolly was a former FFDO and had inside knowledge of the program, this researcher however is not an airline pilot, nor an FFDO. Due to the program's secrecy, inside knowledge continues to be the only way to gain information about many aspects of it and therefore limited the researcher from gaining specifics on program characteristics or changes that may have happened between the prior study and this one. The program secrecy also contributed to the number of pilots in this study, whom were probably not program participants and resulted in them choosing "Neutral" and "Don't Know" for many program-specific Likert questions. That resulted in many responses' being counted as "No Opinion" in the "Agree vs Disagree" analysis.

The researcher's original intent was to compare every demographic to all of the Likert responses and identify any significance. Finding that type of information could give future researchers areas to focus on. The sample size of 43 pilots introduced several limitations and did not allow all of the demographics to be analyzed with the original intent. For instance, this investigation could not make comparisons between genders due

to only one female submitting the survey. At the other end of the spectrum, there were many unique airlines represented (16), in comparison to the sample size, which restricted the researcher from pursuing comparisons between the FFDO survey's Likert questions and the airlines. The sample size also required the researcher to reduce the Likert scale from a five-point scale, down to two, being "Agree" or "Disagree", with the remaining counted as no answer. Reducing the Likert options, reduced the possibility of a false-positive correlation in the chi-square analysis of the small sample size.

When designing the survey, an optional comment box was not provided for survey questions nine and 10, which asked whether the program should continue and if it is effective. Nolly intentionally made the effective question vague, and the comment box would have allowed for any pilot's desired clarification (Nolly, 2011). This restricted the researcher's ability to analyze either of those highly agreed upon responses more thoroughly.

One of the most challenging limitations to this study and research area is that the FFDO program is secretive by design and FFDOs are not allowed to identify themselves as such. There was resistance by many to even access the online survey to consider answering its questions. In one example, the researcher was called by a pilot who was directly invited to complete the survey. The pilot happened to be one of the participating carrier's FFDO program representatives and needed clarification of survey purpose and confidentiality. Several of that representative's peers, who worked for the same airline, received the survey invite and happened to be FFDOs. They were concerned about why and how they were chosen to participate and asked the representative to make sure they

weren't known to be FFDOs. It is unclear if any of these individuals followed through and completed the survey.

An inherent limitation came from the challenges in comparing a qualitative analysis to a quantitative analysis. Many different answers to each interview question were interpreted by Nolly and were mostly distinguished by him as either agree, neutral, disagree or no opinion. This left room for misinterpretations, as there may have been a weak agreement for instance, that was interpreted as neutral. To expand on this limitation, the Likert questions were closely worded to Nolly's interview questions, but not the same. Some of Nolly's questions were split into two Likert questions to clarify between two similar program characteristics. Take for example, comparing the results from the Nolly (2011) question 10. The survey split the interview question in two, with question 17 regarding training on one's own time and 18 regarding pilots paying for their own room and board instead of analyzing them together. Those interviewed may have felt strongly about one and not the other, where those surveyed could distinguish their opinions of each more specifically. Another example is of survey question 12, which pursued pilots' perspectives of the FAMS's management of the FFDO program, when the Nolly (2011) study's interview question four simply asked about FFDO program management. The interviewed pilots may have interpreted that as the TSA or FAMS. A larger sample size, made possible from an organization such as either tier of the program's management, would eliminate much of the limitations of this study.

## Implications

This study resulted in several significant chi-square comparisons, questions with 100% agreement of the pilots with opinions and also unanimous agreement to several survey questions.

**Significant Results.** The significant chi-square results were found when comparing military experience and pilots' familiarity with the FFDO program against several of the Likert questions. Those who had military experience were more likely to disagree that pilots should have to pay for their own room and board, or train on their own time during the FFDO initial training course. These questions received many comments with differing opinions, but one (anonymous) pilot in the survey, with military experience, summarized those left by military pilots:

> If this adds value in the form of safety why should pilots have to pay for it? Do security guards or TSA folks have to pay for their room and board during training? Either the program adds value or it doesn't. If it does these costs should be borne by either the airline or the government. Open to a debate on which one...

Since this study utilized a survey, the researcher did not have the opportunity to ask these individuals to explain their opinions further. It is unclear why military members were more likely to feel they shouldn't be burdened with the stated costs. You might infer that their military services' practices of paying for their salary and any expenses related to training may have led them to feel the way they did about their civilian job-related training.

The remaining significant chi-square tests were found when comparing pilots who were familiar with the FFDO program with answers to many of the Likert questions. Those who were familiar with the program were more likely to agree that the program was effective and should continue. They were also more likely to agree that the program's screening and selection process was adequate and that the FAMS management of the FFDO program was effective. These results could be accredited to the fact that those who were actually FFDOs had participated in the program's processes and experienced the FAMS management first hand. They had behind the scenes perspectives of the program's effectiveness and importance. It should be noted that out of all 43 participants, only two were either neutral or unfamiliar, meaning that over 95% of those who took the survey, also claimed to be familiar with the program. Nearly half of all participants (48.84%) strongly agreed that they were familiar and it is unknown if that implied a higher number of those were current or former participants or even past applicants of the FFDO program.

In addition to significant results, there were five FFDO survey Likert questions that received unanimous agreement. Two of the five were unanimously agreed upon by the "familiar" participants and the other three were agreed upon by all participants with an opinion.

**Unanimous Agreement.** All pilots who were familiar with the weapon transportation and carriage procedures agreed that they were adequate, accounting for 86% and 96%, respectively, of all those who had an opinion. This was a reversal from 36% favorability found between all of those interviewed by Nolly (2011). The holster locking mechanism's favorability rating rose from 52% of those interviewed having

negative opinions, to unanimous agreement (positive) of all surveyed pilots who had an opinion of its adequacy. There was an enlightening, but unverified comment left regarding changes to weapons transportation equipment. The comment stated that there was a new holster and ATD (Alternate Transportation Device). It is assumed the specifics of these changes were still sensitive security information and the reason the researcher was unable to find pictures or more definitive explanations of each item through online research. The Federal Flight Deck Officer Association's website hosts an article that acknowledges, without specifics, an "Alternate Transportation System" was approved in December of 2013 (Cason, 2013). Those changes likely had an influence on the rise of favorable opinions of the holster locking mechanism and weapons transportation and carriage procedure since Nolly's study was completed in 2011.

There were 10 pilots who responded "Don't Know" or "Neutral", leaving 100% of those in the "Agree vs Disagree" analysis in agreement that FFDO's were well trained. The Nolly (2011) interviews resulted in 100% of pilots agreeing to the same, showing that the sentiment towards FFDO training did not shift much, if at all. The slight drop may be explained by the comment, "We could always use more training, but time is difficult to schedule." The pilot's comment reinforced the sentiment that pilots felt they should not be training on their own time, or personally bearing training's associated costs. The last Likert question with a unanimous response, from all survey takers with opinions (39 of 43) was number 19, that stated, "The TSA and/or FAMS should adopt an official channel for accepting suggestions for improvements to the FFDO program". Question 19 was the third recommendation of the prior study and resulted in the strongest agreement of the entire survey, which implied that such a system was highly desired

(Nolly, 2011, p. 101). However, the sole comment came from a pilot who had claimed that they were familiar with the FFDO program and claimed that a suggestion channel was already in place for FFDOs.

The significant and unanimous results implied there were characteristics of the FFDO program that were doing well, in comparison to 2011, possibly pointing out program changes that were well received, but also areas needing change.

**Recommendations**

Based on the opinions or attitudes expressed by pilots who took this study's survey, the researcher has the following recommendation for consideration by airline management, the TSA, FFDO management (which at the time of the study was the FAMS), and also federal legislators.

1) More than 80% of surveyed pilots agreed the FFDO program should continue on commercial domestic aircraft and nearly 68% of pilots indicated international routes discourage program participation. Therefore, legislators should not only support the current program, but also consider creating a legal pathway for international FFDO cockpit-carry. In the meantime, airline or FFDO program management should consider making the airport-storage of weapons more appealing and simple for pilots' preparing to leave the county for flight segments, especially when mid-trip.
2) Similar to the first recommendation in the Nolly (2011) study, because the vast majority of respondents who had an opinion agreed that the screening and selection process was adequate (p. 101), the researcher suggests the process should continue, as is. Only 56% of surveyed pilots had an opinion, but they were more likely to be familiar with the program and therefore the process.

3) Unlike the reasoning behind the Nolly (2011) study's third recommendation, the sentiment of the FFDO program's direct management is now nearly completely positive (95.65%), of the 23 pilots' who had an opinion. The individuals who felt this way were also more likely to be familiar with the program, while 18 of the remaining 20 participants responded "Don't know". This study's survey asked about the FAMS's management of the FFDO program, unlike Nolly (2011). Nolly wasn't specific about which level of FFDO management and may account for opinion differences between the studies. The rise in approval may also be due to a suggestion program already existing, as one of the surveyed pilots claimed, however, that was unable to be verified. Regardless, the unanimous support for the suggestion channel from those with an opinion, was represented by the largest agreement of the study, with 39 of the 43 pilots. Because of these results, it is recommended again, that if there is not a suggestion program that allows two-way feedback for program improvements, one should be implemented (Nolly, 2011, p. 101-102).

4) There was a large increase in the percentage of pilots who approved of the weapons transportation and carriage procedures. Approval rose from 36% to 86% and 96% respectively. Those with an opinion were unanimously familiar with the program and responded in agreement. There was an opinion left by a pilot claiming that an alternative transportation device and newer holster had been released and Cason (2013) indicated there was a new and improved system for transporting weapons. Those with opinions of the holster locking mechanism were also unanimously positive. Because of the increase in pilot approval ratings of transportation and carriage procedures, the holster, and the indications of program

changes since the Nolly (2011) study, it is recommended that FFDOs be allowed to continue using the transportation device and holster that was current during the summer of 2017.

5) Of the 35 pilots who expressed an opinion about training on their own time, 71% felt it was unreasonable, which was two and a half times that of those who felt opposite. Question 20, which asked for participants to select all aspects of the FFDO program they believed discouraged pilots from volunteering to participate, confirmed the sentiment with three of 19 total options. These were three of the only five out of 19 total options that were selected by over 50% of all surveyed pilots. The three addressed training being self-paid, training on one's own time, and the lack of a salary or training stipend. Thus, the researcher suggests either the airlines supply additional paid time off, specifically for the required training or at least supply additional time off, if the federal government would pay a stipend for training.

6) There were 32 pilots, or 84% of those who shared an opinion, who found paying for one's room and board at training unreasonable. The logistical challenge of getting to the training location in Artesia, NM was also claimed as discouraging by 27 pilots. When these factors are added up in relation to the overall results of the study, most of the negative sentiment is built around getting to and paying for training related expenses. One surveyed pilot left a comment that claimed training room and board was actually paid for, but his claim could not be confirmed. The researcher suggests that either the airlines or federal government directly pay for room and board at all FFDO training, if they are not already doing so.

**Further Study**

The researcher originally desired to have an airline training department, pilot union, or selection of Chief Pilots who would distribute an online link to this study's survey, because newsletters, group emails or meetings would have been the ideal medium for mass-distribution. Unfortunately, as with the Nolly (2011) study, asking for outside cooperation proved to be futile. For example, the ALPA was contacted by email and a representative responded by stating that each question of the survey would need to be evaluated by their Aviation Security Specialist leadership before they could help. The researcher did not receive a response after supplying the survey questions. The online pilot forum website Airline Pilot Central (APC) administration was also contacted through their website, as their bylaws dictated, with a request to post the survey invitation document and URL. APC staff did not respond to the researcher's request. Comparisons to this study should attempt to include larger sample sizes, but if that is not possible, due to the above stated reasons, or otherwise, they should pursue an airline industry-representative balance of women and men, captains versus first officers and so on. The researcher suggests that the future researcher should allot several months to pursuing outside cooperation from large organizations.

Future studies with the intent of continuing this research, which was initiated by Nolly (2011), should take this study's survey questions, add questions where current problems are being reported, and then compare their results to this study. Research should pursue further explanation of the questions of this study that had significant and unanimous responses. For example, a follow up study could look into why military members were more likely to feel the lack of salary or room and board for training was

unreasonable, or if that is still the case. If so, and the FFDO program desired to lure more participants who had military experience, the results may confirm that making those program changes would likely result in doing that.

In relation to the actual survey structure, the researcher suggests future surveys include a Likert question directed at assessing the TSA's management of the FFDO program be separate from one asking about the FAMS's. Also, the survey should include an optional comment box for all Likert questions, including the ones asking whether the program should continue and if it is effective (survey questions 9 and 10).

There were two comments unable to be substantiated, and if true, would have major implications on this survey results, and those continuing this research in the future. These comments claimed that room and board were already being paid for and that the FFDO program already has a suggestion channel. It is suggested that FAMS level FFDO program management or participants themselves be interviewed, to gain such information. A third comment, which regarded a new holster and the ATD were partially verified by a 2013 press release claiming there was a new transportation system approved for FFDOs (Cason, 2013). It is recommended future research pursues what changes were made, who initiated them and pilot perceptions of the new vs old. Or, researchers could confirm pilots are happy with the changes and suggest removing the questions from future surveys.

**Conclusions**

The purpose of this study was to create a Likert survey, as Nolly (2011) suggested, to replicate his study, that aimed to identify and evaluate what factors in the FFDO program influenced pilot opinions toward the program. Chi-square tests were

assessed seeking correlations between the demographic questions and the Likert questions administered in the survey. The pilots who claimed to be familiar with the FFDO program were more likely to agree that it was effective and should continue. They were also more likely to agree that the FAMS's management of the program and the screening and selection processes were adequate. These questions were backed by 81% to 96% of all pilots who expressed an opinion, in agreement of the Likert questions. Pilots with military experience were found to be more likely to feel they should not be paying for their room and board at training or training on their own time. There were several questions which resulted in unanimous agreement between all pilots with an opinion. This included agreement that training and the holster locking mechanism were adequate and that a suggestion program between pilots and FFDO management should exist. Pilots familiar with the program unanimously agreed the weapons and transportation procedures were adequate. The results also revealed a lack of significant results in relation to age, hours of experience, whether pilots flew internationally or not, and their seat position, when compared with the Likert questions in chi-square tests.

Major changes in pilot opinions between the Nolly (2011) study and this one suggest positive changes may have been made to the weapons transportation procedures, carriage procedures and related equipment. The researcher found a majority of surveyed pilots approved most aspects of the FFDO program, especially those who expressed opinions other than "neutral", but there were also a few issues identified as still existing. Pilots expressed their disdain with their need to take leave without pay to train and also pay for their own room and board for FFDO training through their responses to the Likert questions. The general attitude towards these requirements were confirmed in the final

select-all question. The majority of pilots interviewed also flew both domestically and internationally. There were 29 pilots, which represented 67.44% of all that were surveyed that claimed international segments in flight schedules also discourage participation. In conclusion, the industry, program and legislative changes that were recommended by the researcher should not only raise the rates of military and international pilots' volunteering for the program, but improve most airline pilots' overall perception of the program.

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# APPENDIX A

## FFDO SURVEY INVITATION

August 26, 2017

Dear Participant,

Thank you for taking a few minutes to consider participating in this study. My name is Marc Ferrara and I am a graduate student under the direction of Dr. Mary Niemczyk in the Aviation Management and Human Factors program of the Ira A. Fulton School of Engineering at Arizona State University.

I am conducting a research study investigating airline pilot attitudes towards different aspects of the Federal Flight Deck Officer program. I am inviting you to participate in a completely anonymous online survey that should only take between 3 and 5 minutes of your time. Your response will provide a baseline for researchers to compare with future results, giving a way to easily analyze pilot perspectives towards changes to the program.

You must be a current airline pilot to participate in this study. Participation is completely voluntary and you may choose to exit from the survey at any time. Incomplete surveys will not be utilized in our research and ending your participation or leaving your survey unfinished has no penalty.

The survey starts with demographic questions. Your identity and IP addresses will not be recorded. Responses will remain anonymous, in aggregate form. Therefore, there are no foreseeable risks due to your participation. Following the demographic questions, "Likert" 5-point scale questions are asked, rating your level of agreement with the specific question or statement. "Don't Know" is an additional option for each of these questions. An optional comment box is also provided with each Likert question.

No financial compensation will be given for participating in this study. The aggregate results may be used in reports, presentations, or publications. Completing the online survey will be considered your consent to participate.

If you have any questions concerning the research study, please see if it is answered in the following pages of this document. You may also contact the research team at Mary.Niemczyk@asu.edu (Primary Investigator) or Marc.Ferrara@asu.edu (Co-Investigator). If you have any questions, concerns or complaints that you would like to take beyond the research team, please contact the ASU Office of Research Integrity and Assurance. Call (480) 965-6788, or email research.integrity@asu.edu and visit their website at researchintegrity.asu.edu.

Please access the survey by clicking below or by pasting the link into your browser.
https://www.surveymonkey.com/r/AirlinePilotSurveyOnFFDOProgram
Sincerely,
Marc Ferrara

**Title of research study:**

*An Airline Pilot Attitude Evaluation: Transportation Security Administration's Federal Flight Deck Officer Program*

**Investigators:**

*Marc Ferrara, Master's Candidate, Arizona State University*
*Dr. Mary Niemczyk, Faculty Chair, Arizona State University*
*Dr. Robert Nullmeyer, Faculty, Arizona State University*
*Dr. Russell Branaghan, Faculty, Arizona State University*

**Why am I being invited to take part in a research study?**

We invite you to take part in this research study because you are an airline pilot and being such has likely led you to attitudes, or opinions towards different aspects of the FFDO program.

**Why is this research being done?**

*We are interested in researching pilots' attitudes towards the FFDO program. This survey is to collect raw data from individual pilots with the potential to serve multiple purposes. The main purpose of this survey is for a thesis at Arizona State University comparing survey data with a 2011 FFDO study by George E. Nolly. Another hypothetical purpose is that the survey will give pilots a platform to anonymously voice their opinions of FFDO program characteristics to the program's management, airline management, congress, or whomever they desire, in a standardized, quantifiable and repeatable fashion.*

**How long will the research last?**

This survey will be distributed for up to one month and data will be analyzed for a thesis being completed in Fall 2017.

**How many people will be studied?**

We expect between 50 and 100 people will participate in this research study.

**What happens if I say yes, I want to be in this research?**

Simply fill out the survey.

You are free to decide whether you wish to participate in this study.

**What happens if I say yes, but I change my mind later?**

You may exit the survey at any time and it will not be held against you. If you submit your responses and change your mind, contact the research team before results are published in the thesis and your data may be removed. Incomplete surveys will not be used in the data analysis.

**Is there any way being in this study could be bad for me?**

We are aware that if you are currently an FFDO, you are not allowed to identify yourself as such. Those who are not FFDOs may also want to remain anonymous while providing their perspectives of the program. That is why we will not be collecting names, IP addresses, pursuing or publishing any other way of identifying individuals, or asking if you participate in the FFDO program.

Potential Risks:

- Legal risks – If you leave your name or other personally identifiable information, it will be deleted to avoid legal risks.
- Social risks – Again, no names or other ways of positively identifying you will be collected to avoid any social implications from coworkers or management.

**Will being in this study help me in any way?**

We cannot promise any benefits to you or others from your taking part in this research. However, possible benefits may include survey results being used by program or airline management to justify making changes in response to survey results. Data may also influence presidential or congressional budgetary changes for the program.

**What happens to the information collected for the research?**

The use and disclosure of your personal information, including research study records will be limited to people who have a need to review this information. We cannot promise complete secrecy. The raw results of this study will be used in a thesis, but names and other personally identifiable information will not be collected. All data will be stored in a locked file cabinet in the primary investigator's office. This raw data will be retained for no more than two years to compare with future research and then it will be destroyed.

**Who can I talk to?**

If you have questions, concerns, or complaints, please email research team member Marc Ferrara or Dr. Mary Niemczyk: marc.ferrara@asu.edu; mary.niemczyk@asu.edu.

**This research has been reviewed and approved by the Social Behavioral IRB. You may talk to them at (480) 965-6788 or by email at research.integrity@asu.edu if:**

- Your questions, concerns, or complaints are not being answered by the research team.
- You cannot reach the research team.
- You want to talk to someone besides the research team.
- You have questions about your rights as a research participant.
- You want to get information or provide input about this research.

# APPENDIX B

## FFDO SURVEY QUESTIONS

Q1 What is your birth year? (Fill in Blank)

Q2 What is your gender? (M/F/Prefer not to Disclose)

Q3 What airline are you currently working for? (Fill in Blank)

Q4 Does your schedule include domestic flights, international flights, or both? (Select All)

Q5 What is your total number of hours of flying experience? Estimates are okay. (Fill in Blank)

Q6 Is your current duty position captain or first officer? (Select One)

Q7 Are you a current or former military pilot?

1) No 2) Yes, I currently fly for the military. 3) Yes, I formerly flew for the military.

4) I serve or formerly served in the military in a position other than pilot.

Q8 I am familiar with the FFDO program.

Q9 The FFDO program should continue on commercial domestic aircraft.

Q10 The FFDO program is effective

Q11 The FFDO screening and selection process is adequate.

Q12 The FAMS's management of the FFDO program is effective.

Q13 FFDO weapon transportation procedures are adequate.

Q14 FFDO weapon carriage procedures are adequate.

Q15 The FFDO holster locking mechanism used by FFDO's is adequate.

Q16 From what you have observed or experienced, FFDOs are well trained.

Q17 It is reasonable to have pilots complete FFDO training on their own time.

Q18 It is reasonable to have pilots pay for their own room and board at initial training.

Q19 The TSA and/or FAMS should adopt an official channel for accepting suggestions for improvements to the FFDO program. (new idea not from Nolly's interview, but from his Ch5?)

Q20 SELECT ALL "Select all aspects of the FFDO program you believe discourage pilots from volunteering to participate:"

A) Holster
B) Firearm carriage and/or transportation requirements
C) FFDO operational procedures
D) Most training expenses are self-paid
E) The initial and recurrent training is not extensive enough for the subsequent responsibilities of an FFDO
F) Requirements for recurrent training
G) Airline does not grant time off specifically for training
H) Getting to Artesia, NM requires too much logistical effort on the pilot's behalf
I) Lack of a need for the program
J) TSA security screening requirements
K) Lack of support from my airline
L) Lack of support from TSA
M) Lack of support from FAMS
N) The program's ongoing funding insecurities
O) Their flight schedule sometimes includes international destinations
P) Extensive application process
Q) Lack of extra pay for participating in program
R) Lack of pay in form of salary or stipend while training for FFDO program
S) None of these
T) Anything Else (Comments)

*Notes.*

1) Likert question options were Don't Know, Strongly Agree, Agree, Neutral, Disagree and Strongly Disagree and they could select one.
2) Q8-19 were Likert questions
3) Q11-20 also had an optional comment box
4) Don't Know and Neutral were counted as no opinion in the data analysis.
5) All questions had to be answered or the survey could not be submitted.
6) Survey takers could see all previous questions and answers and could go back and change anything before submitting the survey.



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# APPENDIX C

## NOLLY (2011) INTERVIEW QUESTIONS

Interview Question 1: *Do you feel FFDOs should be protecting domestic aircraft?*

Interview Question 2: *Do you feel the FFDO program is effective?*

Interview Question 3: *What is your opinion of the FFDO screening and selection process?*

Interview Question 4: *What is your opinion of the management of the FFDO program?*

Interview Question 5: *What is your opinion of the FFDO weapons transportation and carriage procedures?*

Interview Question 6: *What is your opinion of the holster locking mechanism used by FFDOs?*

Interview Question 7: *From what you have observed, are the FFDOs well- trained?*

Interview Question 8: *From what you have heard, do you think the FFDO training program is well run?*

Interview Question 9: *What is your opinion about the location of the FFDO training facility in Artesia?*

Interview Question 10: *What is your opinion about the requirement pilots must pay for room and board at FFDO initial training and must train on their own time?*

Interview Question 11: *Are there any aspects of the FFDO program you believe discourage pilots from volunteering?*

Interview Question 12: *In your opinion, what changes to the FFDO program would elicit greater pilot participation?*

Interview Question 13: *Do you have any other thoughts about the FFDO program?*

(Nolly 2011, 71- 87)

# APPENDIX D

## SURVEYED PILOTS' DEMOGRAPHICS TABLE

Table 9

*FFDO Survey Demographics*

| Pilot | Birth Year Interval | Age | Hours | Gender | Dom, Intl, or Both | Position (CP/FO) | Military Exp. (Y/N) | Airline # | Familiar (Y/N) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 3 | 51 | 12000 | M | D | CP | Y | 1 | Y |
| 2 | 1 | 58 | 11000 | M | I | FO | Y | 2 | Y |
| 3 | 3 | 51 | 10000 | M | B | FO | Y | 3 | Y |
| 4 | 2 | 54 | 16000 | M | B | FO | Y | 1 | Y |
| 5 | 4 | 45 | 5000 | M | B | FO | Y | 1 | Y |
| 6 | 2 | 57 | 13000 | M | I | FO | Y | 2 | Y |
| 7 | 4 | 45 | 8000 | M | B | FO | Y | 3 | Y |
| 8 | 2 | 54 | 10000 | M | I | FO | Y | 3 | Y |
| 9 | 2 | 57 | 20000 | M | B | CP | Y | 4 | Y |
| 10 | 3 | 52 | 9000 | M | B | FO | Y | 1 | Y |
| 11 | 2 | 54 | 15000 | M | D | CP | Y | 4 | Y |
| 12 | 1 | 61 | 10500 | M | B | FO | Y | 4 | Y |
| 13 | 2 | 53 | 15000 | M | B | CP | Y | 4 | N |
| 14 | 7 | 30 | 6000 | M | B | CP | N | 5 | Y |
| 15 | 7 | 29 | 5500 | M | D | CP | N | 6 | Y |
| 16 | 4 | 43 | 5000 | M | D | FO | Y | 1 | Y |
| 17 | 7 | 28 | 4100 | M | B | CP | N | 7 | Y |
| 18 | 6 | 35 | 10000 | M | B | FO | N | 3 | Y |
| 19 | 4 | 46 | 10000 | M | B | FO | N | 8 | Y |
| 20 | 2 | 53 | 14000 | M | B | CP | N | 9 | Y |
| 21 | 6 | 33 | 7500 | F | B | CP | N | 10 | Y |
| 22 | 7 | 30 | 4000 | M | B | FO | N | 10 | Y |
| 23 | 5 | 40 | 5500 | M | B | FO | Y | 1 | Y |
| 24 | 7 | 29 | 3250 | M | B | CP | N | 7 | Y |
| 25 | 8 | 26 | 4000 | M | B | FO | N | 11 | Y |
| 26 | 3 | 49 | 13000 | M | B | CP | N | 10 | Y |
| 27 | 7 | 30 | 5000 | M | B | CP | N | 12 | Y |
| 28 | 7 | 30 | 2000 | M | D | FO | Y | 13 | Y |
| 29 | 4 | 44 | 6000 | M | B | FO | Y | 14 | Y |
| 30 | 6 | 33 | 3000 | M | B | FO | Y | 15 | Y |
| 31 | 6 | 34 | 1300 | M | B | FO | Y | 12 | Y |
| 32 | 7 | 32 | 2300 | M | B | FO | Y | 16 | Y |
| 33 | 5 | 42 | 6000 | M | B | FO | Y | 1 | Y |
| 34 | 7 | 31 | 5000 | M | B | FO | N | 1 | Y |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 35 | 7 | 32 | 6500 | M | B | FO | Y | 14 | Y |
| 36 | 7 | 28 | 4100 | M | B | FO | N | 11 | Y |
| 37 | 7 | 30 | 6000 | M | B | CP | N | 12 | Y |
| 38 | 8 | 26 | 2500 | M | B | FO | N | 5 | Y |
| 39 | 4 | 43 | 4000 | M | B | FO | Y | 1 | Neutral |
| 40 | 7 | 29 | 3000 | M | B | FO | Y | 16 | Y |
| 41 | 8 | 27 | 1500 | M | B | FO | Y | 16 | Y |
| 42 | 8 | 25 | 3300 | M | I | FO | N | 5 | Y |
| 43 | 5 | 38 | 6000 | M | B | FO | Y | 1 | Y |

*Note*. Neutral was counted as no answer. Hours were analyzed in 2500 hour intervals (1-8), starting with 0-2500. Age was analyzed by birth year in five year intervals (1-8), starting with 1955. The military experience question had four options that were grouped into yes or no for the analysis.

# APPENDIX E

# NOLLY (2011) TABULATED RESULTS

Table 1
*Participant Profiles*

| Number | Age | Pilot Years | Airline Years | Position | Mil Status | Airline |
|---|---|---|---|---|---|---|
| 01 | 62 | 40 | 32 | C | Mil | UAL |
| 02 | 45 | 29 | 19 | F | Mil | UAL |
| 03 | 48 | 27 | 23 | F | Civ | UAL |
| 04 | 62 | 41 | 19 | C | Mil | SWA |
| 05 | 26 | 06 | 02 | F | Civ | GJA |
| 06FF | 37 | 16 | 10 | C | Civ | GJA |
| 07FF | 52 | 28 | 20 | F | Mil | UAL |
| 08 | 61 | 38 | 32 | C | Mil | UAL |
| 09 | 62 | 38 | 32 | C | Mil | UAL |
| 10FF | 48 | 23 | 21 | F | Mil | UAL |
| 11FF | 49 | 27 | 16 | F | Mil | UAL |
| 12 | 49 | 28 | 16 | F | Mil | UAL |
| 13FF | 61 | 44 | 34 | C | Mil | UAL |
| 14FF | 49 | 25 | 16 | F | Mil | UAL |
| 15 | 25 | 08 | 03 | F | Civ | GJA |
| 16 | 62 | 44 | 19 | F | Mil | DLT |
| 17FF | 42 | 30 | 13 | C | Civ | SWA |
| 18FF | 41 | 18 | 12 | F | Mil | AMR |
| 19FF | 55 | 34 | 16 | C | Mil | SWA |
| 20 | 60 | 38 | 18 | C | Mil | ATL |
| 21FF | 54 | 33 | 13 | C | Mil | AMJ |
| 22FF | 47 | 31 | 23 | C | Civ | SWA |
| 23FF | 56 | 34 | 24 | F | Civ | USA |
| 24FF | 59 | 35 | 33 | C | Mil | SWA |
| 25 | 43 | 44 | 34 | C | Mil | DYN |

*Notes:* FF = FFDO C = Captain F = First Officer Mil = Military Civ = Civilian
UAL = United Airlines SWA = Southwest Airlines GJA = GoJet Airlines
DLT = Delta Airlines AMR = American Airlines AMJ = AmeriJet
USA = US Air DYN = Dynamic Airlines ATL = Atlas Air

Table 2a
*Major Constructs*

| | Favor FFDO | Program effective | Selection process | Program Management |
|---|---|---|---|---|
| Pilot 1 | Yes | As deterrent | No knowledge | No knowledge |
| Pilot 2 | Yes | Yes | Good | Bureaucratic |
| Pilot 3 | Yes | Yes | More than adequate | Stellar |
| Pilot 4 | Absolutely | Bureaucracy maze | Greatly flawed | |
| Pilot 5 | Yes | Yes | No opinion | No opinion |
| Pilot 6F | Yes and no | Yes | Silly | Pretty good |
| Pilot 7F | Yes | Yes | Good process | Left on your own |
| Pilot 8 | Yes | Yes | Probably good | No problems |
| Pilot 9 | Yes | Yes | Can't say | Don't know |
| Pilot 10F | Yes | Yes | Takes forever | Low on TSA order |
| Pilot 11F | Yes | Deterrent | Thorough | No problems |
| Pilot 12 | No | Yes | Questionable FFDOs | Don't know |
| Pilot 13F | Yes | Yes and no | Excellent | Bureaucratic |
| Pilot 14F | Yes | Yes | Reasonable | Conflict of interest |
| Pilot 15 | Yes | No. No support | No knowledge | Not funded enouth |
| Pilot 16 | Yes | Yes | Fairly good process | Haven't heard much |
| Pilot 17F | Yes | Yes | Some eyewash | Unwanted by TSA |
| Pilot 18F | Absolutely | Absolutely | Too lengthy | Bureaucratic |
| Pilot 19F | Yes | For the most part | Very effective | Good management |
| Pilot 20 | Yes | May be deterrent | Questionable FFDOs | No knowledge |
| Pilot 21F | Yes | Yes | Useful tool | Cumbersome |
| Pilot 22F | Yes | Deterrent | Fairly thorough | Bureaucratic |
| Pilot 23F | Yes | Needs improvement | Could be improved | What management? |
| Pilot 24F | Yes | Yes | Eyewash | It sucks! No support |
| Pilot 25 | Yes | Yes | No knowledge | Satisfactory |

Table 2b
*Major Constructs (continued)*

| | Weapons transport | Locking holster | Well trained | Well run program |
|---|---|---|---|---|
| Pilot 1 | Burdensome | No opinion | No opinion | No opinion |
| Pilot 2 | Needs improvement | Effective | Yes | Yes |
| Pilot 3 | Adequate | No knowledge | Yes | Yes |
| Pilot 4 | Dangerous | Dangerous | Yes | Insanity |
| Pilot 5 | Safest way | Safest way | Yes | Yes |
| Pilot 6F | Pretty good | Good way | Yes | Yes |
| Pilot 7F | Easy to lose gun | Hard to do at night | Yes | Amazing |
| Pilot 8 | Very good | No problems | Yes | Yes |
| Pilot 9 | Seems silly | No opinion | Yes | Yes |
| Pilot 10F | Easy to lose gun | Not a fan | Yes | Yes |
| Pilot 11F | I support it | Has flaws | Yes | Top notch |
| Pilot 12 | Good | No knowledge | Yes | Yes |
| Pilot 13F | Adequate | Awkward | I think so | Yes |
| Pilot 14F | Should allow carry | Okay | Yes | 5-star |
| Pilot 15 | Seems okay | No opinion | Yes | Yes |
| Pilot 16 | Should be on person | Not familiar | Very professional | Yes |
| Pilot 17F | A joke | Accidental discharge | Yes | Excellent |
| Pilot 18F | Reckless/dangerous | Dangerous | Outstanding | Outstanding |
| Pilot 19F | Awkward | Awkward | Yes | Yes |
| Pilot 20 | Good | No opinion | Yes | Don't know |
| Pilot 21F | Cumbersome | Better than box | Yes | Yes |
| Pilot 22F | Very stupid | Ridiculous | Yes | Yes |
| Pilot 23F | Dangerous | Dangerous | Adequarely | Yes |
| Pilot 24F | Don't like | Accidental discharge | Yes | Exceptional |
| Pilot 25 | Don't like | No opinion | Qualified yes | No opinion |

Table 2c
*Major constructs (continued)*

| | Artesia location | Pay for room/board | Discourage | Elicit participation |
|---|---|---|---|---|
| Pilot 1 | No opinion | Insane | Own time/money | |
| Pilot 2 | Okay | Pilots should not pay | Time/$/carriage | |
| Pilot 3 | Less than desirable | Despicable | Lack of support | Company support |
| Pilot 4 | Middle of nowhere | Knee jerk reaction | Bureaucracy | Make it easier |
| Pilot 5 | Should be central | Pilots should pay | Time requirement | Change tng location |
| Pilot 6F | Out of the way | Pilots should not pay | Time requirement | Free room/board |
| Pilot 7F | Okay | Pilots should not pay | Time/$/carriage | |
| Pilot 8 | No problem | Should be comped. | No international | |
| Pilot 9 | Terrible | Ridiculous | Time/$/international | $/ international |
| Pilot 10F | Hard to get to | Should be comped. | Bastard step child | $/time off |
| Pilot 11F | Disliked remoteness | Adds commitment | Time/$ | $/time off |
| Pilot 12 | Fine | Pilots should pay | Time/$ | Other tng locations |
| Pilot 13F | As well as any | Pilots should not pay | Bypass security | Pay for training |
| Pilot 14F | Difficult to get to | Load of crap | | International |
| Pilot 15 | Difficult to get to | Pilots should not pay | Time | Easier location |
| Pilot 16 | No opinion | Necessary evil | Weapons transport | No opinion |
| Pilot 17F | Dissuading | Discouraging | Layers or BS | Other tng locations |
| Pilot 18F | As well as any | Absurd | Time/$/international | $ for ammo |
| Pilot 19F | As good as any | Pilots should not pay | Not wanted by TSA | Don't stifle program |
| Pilot 20 | Hard to get to | Pilots should not pay | No international | Open carry |
| Pilot 21F | No issues | Pilots should not pay | Screening delay | Open carry |
| Pilot 22F | Middle of nowhere | Pilots should not pay | Protocols/fear | $/ammo |
| Pilot 23F | Not convenient | Sucks! | $ | $ |
| Pilot 24F | Intentionally remote | Crock of shit | $/location | $/location |
| Pilot 25 | Terrible | Pilots should not pay | No international | $/time off |

(Nolly 2011, 67-71)



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