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## AND
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--- STUDENT REPORT ---

PERFORMANCE COMPARISON: USAF ACADEMY T-41
PILOT INDOCTRINATION PROGRAM VERSUS
USAF PILOT TRAINING

MAJOR ALISON L. PIOTTER          87-2020

*"insights into tomorrow"*

87

REPORT NUMBER    87-2020

TITLE    PERFORMANCE COMPARISON:  USAF ACADEMY T-41 PILOT INDOCTRINATION
PROGRAM VERSUS USAF PILOT TRAINING

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Cadets at the USAF Academy (USAFA) must successfully complete the USAFA T-41 Pilot Indoctrination Program (PIP) in order to enter any USAF pilot training program after graduation. There is a growing interest within the Air Force in developing effective screening measures to predict successful performance in pilot training. This study investigates the relationship between cadet performance in the USAFA T-41 PIP and subsequent graduate performance in two USAF pilot training programs: Undergraduate Pilot Training (UPT) and Euro-NATO Joint Jet Pilot Training (ENJJPT). The study concludes that performance in T-41 PIP is closely and directly related to performance in UPT/ENJJPT in the sample studied. It also recommends that USAFA establish an ongoing program for tracking and analyzing T-41 PIP performance with respect to subsequent performance in USAF pilot training programs.

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# PREFACE

The United States Air Force Academy is a relatively young institution. Although just over thirty years old, it has produced nearly 20,000 graduates. For a number of reasons, very little research on the performance of these graduates in the Air Force has been accomplished.

In the last few years, however, the Academy has been initiating a major research effort to investigate the performance of its graduates on active duty. It hopes to be able to study the relationship of Academy training programs and admissions criteria to graduate performance in the Air Force. Such feedback, whether positive or negative, could be a valuable source of ideas for modifying Academy admissions and training programs to better accomplish the mission of producing outstanding Air Force officers.

The Academy is a major source of pilot candidates for the Air Force. Over half of each graduating class enters pilot training programs. Prior to graduation, these cadets are screened for flying training in the T-41 Pilot Indoctrination Program at the Academy. Cadets must successfully complete this program in order to enter into any Air Force pilot training after graduation and commissioning.

To assist with the overall graduate research effort now underway, this project investigates the relationships between performance in the T-41 PIP at the Academy and graduate performance in pilot training. It is hoped that the findings of this study will shed some light on these relationships and open the door to future investigators for further research in specific areas of interest.

## ACKNOWLEDGEMENTS

# CONTINUED

# ABOUT THE AUTHOR

Major Alison L. Piotter is a distinguished graduate of the USAF Academy class of 1975. Upon commissioning he was assigned to the University of California, Los Angeles for graduate work in computer science. In 1976, after finishing his master's degree, he completed Undergraduate Navigator Training at Mather Air Force Base, California. He was then assigned to Blytheville Air Force Base, Arkansas, as an instructor navigator and radar navigator in the B-52G from 1977 to 1982.

Following a brief tour at the Pentagon in the Air Staff Training program, he was assigned to the US Air Force Academy in 1983, where he served as an instructor and assistant professor of computer science and as a division chief in the Plans and Programs Deputate. Major Piotter is currently a member of the Air Command and Staff College class of 1987.

# TABLE OF CONTENTS

**CONTINUED**

# LIST OF ILLUSTRATIONS

## TABLES

# EXECUTIVE SUMMARY

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AUTHOR(S)     MAJOR ALISON L. PIOTTER, USAF

TITLE     PERFORMANCE COMPARISON:  USAF ACADEMY T-41 PILOT INDOCTRINATION PROGRAM VERSUS USAF PILOT TRAINING

I. __Purpose__:  To investigate the relationship between cadet performance in the USAF Academy (USAFA) T-41 Pilot Indoctrination Program (PIP) and graduate performance in two USAF pilot training programs:  Undergraduate Pilot Training (UPT) and Euro-NATO Joint Jet Pilot Training (ENJJPT).

II. __Problem__:  USAFA is a major source of pilot candidates for the Air Force.  Over half of each class enters pilot training programs after graduation.  Cadets must successfully complete the T-41 PIP in order to enter any Air Force pilot training program as officers.  USAFA is currently interested in investigating the relationship between performance in T-41 PIP and UPT/ENJJPT.  This study will complement the recent research initiatives underway at USAFA to study the relationship of USAFA training and admissions programs to graduate performance in the Air Force.

III. __Data__:  USAFA currently has no established program for the permanent collection, retention, or analysis of cadet performance data in T-41 PIP.  However, ad hoc data for the classes of 1984 and 1985 is available.  Only two performance measures reflecting overall cadet performance are available:  the T-41 Checkride Score and the Prediction for UPT.  HQ ATC retains a certain amount of performance data on each UPT graduate in its data base.  The factors that represent overall UPT performance are the Category Checkride Composite score, the ATRB recom-

mendation, the Distinguished Graduate (DG) award, and the ATC Commander's Trophy award. A comparison of the T-41 PIP and UPT performance data indicates that there is a direct relationship between the T-41 Checkride Score and UPT performance, and a similar direct relationship between the T-41 Prediction for UPT score and UPT performance. Tests of significance and correlation between the data are less conclusive. While the tests for significance show a statistically significant relationship between the T-41 PIP and UPT performance, the tests for correlation do not show the relationship to be a strong one. However, the remainder of the analysis performed in this study suggests that strong relationships exist between the T-41 PIP and pilot training performance measures.

IV. Findings: Performance in T-41 PIP is closely and directly related to performance in UPT/ENJJPT in the sample studied.

V. Recommendations: USAFA should continue to assess cadet performance in T-41 PIP using the performance measures studied. USAFA should also establish an ongoing program for tracking and analyzing T-41 PIP performance with respect to subsequent performance in USAF pilot training programs.

Chapter One

INTRODUCTION

## PURPOSE

The USAF Academy (USAFA) has recently established a comprehensive evaluation program of its graduates. The purpose of the program is to gather data on the performance and capabilities of recent graduates and relate the findings to USAFA admissions criteria and training programs (3:21).

This research project is sponsored by USAFA and supports the overall graduate evaluation program. It will investigate one specific portion of that program, the relationship between cadet performance in the T-41 Pilot Indoctrination Program (PIP) at USAFA and graduate performance in two Air Force pilot training programs: Undergraduate Pilot Training (UPT) and Euro-NATO Joint Jet Pilot Training (ENJJPT).

## BACKGROUND

The T-41 PIP at USAFA is a required course for all physically qualified first class (senior year) cadets who volunteer to attend the UPT or ENJJPT programs. The goals of this program are to identify those cadets who have the basic aptitude to become Air Force pilots, motivate them toward a rated career in the Air Force, and minimize attrition of USAFA graduates in pilot training (9:37). Elimination for flying deficiency from the T-41 PIP will preclude a cadet from entering any Air Force pilot training program after graduation from USAFA (8:34).

The 557th Flying Training Squadron conducts the T-41 PIP at the USAFA airfield and uses Air Force pilots as instructors. The course of instruction includes ground training classes in airmanship, safety, and aircraft systems, as well as a flying phase consisting of 15 sorties (21 hours of flying time). When a cadet becomes proficient in all required flight maneuvers and is cleared for solo flight, he or she must successfully complete a final checkride in order to finish the course (9:37).

UPT is conducted by the Air Force at five bases in the continental United States. The goal of UPT is to qualify officers for the aeronautical rating of pilot and to prepare them for future responsibilities as military officers and leaders. The program includes flying training to teach the principles and techniques of operating high speed jet aircraft, ground training to supplement and reinforce the flying training, and general officer development training. The course is 49 weeks in duration and includes approximately 185 total hours of flying time in the T-37 and T-38 aircraft (7:1).

ENJJPT is designed to qualify students from the United States and 11 Euro-NATO countries as pilots capable of flying high speed jet fighter-type aircraft (12:16,30). It is conducted by the USAF at Sheppard AFB, Texas and, like UPT, includes flying, ground, and officer development training. Slightly longer in duration than UPT, the course lasts 55 weeks and includes 260 total flying hours in the T-37 and T-38 aircraft (12:16).

<center>NEED</center>

There is a growing interest in the area of predicting successful performance in pilot training. At the request of Air Training Command, the Air Force Human Resources Laboratory (AFHRL) has conducted research since 1979 to improve the screening process of selecting and classifying candidates for pilot training (4:258-259). In addition, the AFHRL has recently completed research investigating the value of the USAF Flight Screening Program (FSP) in reducing pilot training attrition (15:i). Similar to the T-41 PIP at USAFA, the USAF FSP involves 14 hours of T-41 flying for pilot training candidates commissioned through sources other than USAFA (15:1).

USAFA has also recently become interested in establishing an ongoing tracking program to compare the T-41 PIP performance of its cadets with their subsequent pilot training performance (16:--). This research project is designed to assist that effort by providing an initial overview of the T-41 PIP and pilot training performance relationships. Also, the USAFA Directorate of Graduate Evaluation intends that this project be used as the foundation for the development of further research to support this proposed tracking program (16:--).

<center>2</center>

## OBJECTIVES

This study will accomplish the following objectives:

- Determine appropriate T-41 PIP and pilot training performance measures to be used for comparison

- Evaluate the statistical relationships between the T-41 PIP and pilot training performance measures

- Summarize findings and recommendations concerning the relationships between the performance measures

## SCOPE

This study will examine the flying performance of graduates of the USAFA classes of 1984 and 1985. These two classes constitute the only sample for which both T-41 PIP and Air Force pilot training performance data were available. The investigation will focus on these graduates primarily as a combined group, although the performance of each class will also be reported separately in most areas of investigation. The intent of the project is to study the performance of USAFA graduates as a whole, and not to focus extensively on performance differences that may occur between the classes.

The examination of pilot training performance will be limited to the UPT and ENJJPT programs only. Although there is a third pilot training program to which USAFA graduates may be assigned, Undergraduate Helicopter Training (UHT), no performance data was available for this program. In addition, UHT accounts for only approximately five percent of all USAFA graduates entering pilot training programs (18:--). Therefore, the term "pilot training" as used in this study will refer to the UPT and ENJJPT pilot training programs only.

## OVERVIEW

In order to compare performance in the T-41 PIP and Air Force pilot training programs, appropriate performance measures for each program must be identified. An analysis and selection of available performance measures for T-41 PIP is presented in Chapter Two. Similarly, Chapter Three analyzes and selects available measures of performance for the pilot training programs.

Once the performance measures to be used for comparison have been identified, the relationships between performance in these programs can be examined. Chapter Four presents the

analysis of these performance relationships. It describes the data characteristics of the performance measures, selects appropriate analysis techniques based on those characteristics, and reviews the results of the data analysis.

On the basis of this analysis, Chapter Five presents the overall findings of this study regarding the relationships between performance in T-41 PIP and pilot training. In addition, it makes recommendations for further action in the study of these relationships.

# Chapter Two

## T-41 PIP PERFORMANCE MEASURES

Detailed student performance data in T-41 PIP is collected and maintained throughout the training program (11:Ch 7). However, USAFA currently does not have a regular program for collecting or maintaining T-41 PIP student performance data on a long-term basis. The limited T-41 student performance data used in this study was collected by USAFA on a one-time basis in the summer of 1985 in anticipation of further research in this area (16:--).

In the data collected, there were only two performance measures available that reflected overall student performance in T-41 PIP. This chapter describes these performance measures and presents the rationale for their use in this study.

## T-41 CHECKRIDE SCORE

The T-41 PIP at USAFA is graded on a pass/fail basis. During the ground training phase of instruction, cadet performance is measured by emergency procedures quizzes, written standardization quizzes, and an academic exam, each of which has a minimum passing percentage. In the flying phase of training, student progress is monitored on each practice sortie by awarding a subjective grade for each subarea or maneuver evaluated, as well as an overall grade for the mission (21:--). These subjective grades are based on the judgment of the instructor pilot (IP) and are awarded according to the following criteria (10:2):

- Unable to Accomplish (U). The student is unsafe or lacks sufficient knowledge, skill, or ability to perform the operation, maneuver, or task.

- Fair (F). The student performs the operation, maneuver, or task safely, but has limited proficiency. Deviations occur which detract from performance.

- Good (G). The student performs the operation, maneuver, or task satisfactorily. Deviations occur but are recognized and/or corrected in a timely manner.

5

- **Excellent (E)**. The student performs the operation, maneuver, or task correctly, efficiently, and skillfully. Minor deviations occur but do not detract from overall performance.

The checkride at the end of the T-41 course is graded in a similar manner. Twenty-nine maneuvers are evaluated using the U/F/G/E grading system outlined above (14:Atch 3). If any maneuver is graded "U" (Unable to Accomplish), the subjective overall grade for the checkride is Unsatisfactory (10:9). Otherwise, the IP awards an overall grade of Fair, Good, or Excellent, based on a subjective evaluation of the student's overall performance. A cadet must receive a subjective overall checkride grade of Fair, Good, or Excellent in order to successfully pass the T-41 program (10:9; 21:--).

Following the final checkride, each cadet's checkride performance is converted into a quantitative score expressed as a percentage. In each maneuver area, the U/F/G/E grade is awarded a certain number of points. The point values for each grade will vary based on the relative weight of that maneuver area. The overall percentage is computed by adding up all the maneuver area point values awarded and dividing the sum by the maximum possible points (21:--).

This overall percentage grade will be referred to in this study as the "T-41 Checkride Score." This score does not affect the student's overall final course grade, which is pass/fail. Instead, it is used by USAFA primarily as a quality control device to compare the consistency of each IP's overall subjective grading on the final checrides with that of other instructors. This is done by comparing the overall subjective grades awarded by the IP with the computed percentage grades on those same checrides. This process helps to identify IPs whose overall subjective ratings may be higher or lower than the norm as compared to the computed checride percentage scores (21:--).

## POTENTIAL FOR UPT

Another measure used to evaluate cadet performance in the T-41 PIP is the Potential for UPT rating. This rating is used primarily by supervisors as a tool in determining which cadets should be considered for the ENJJPT program. The cadet's flight commander is responsible for assigning this grade and uses inputs from the cadet's IP. Factors considered in this subjective grade include, but are not limited to, daily flying performance, standardization and academic quiz performance, and checkride results. This area is graded according to the

6

following criteria (14:Atch 2):

| Rating | Criteria |
|--------|----------|
| 1 | Student has marginal aptitude and marginal academic scores. Limited potential to finish UPT. |
| 2 | Student has slightly below average flying aptitude and academic ability. May have difficulty completing UPT. |
| 3 | Student has average flying aptitude and academic ability. Should complete UPT with no difficulty. |
| 4 | Student has slightly above average flying aptitude and academic ability. Should complete UPT in the top 50 percent of the class. |
| 5 | Student has exceptional flying aptitude and academic ability. Should finish in the top 25 percent of the class. Should be considered for ENJJPT. |

Because the ENJJPT program is currently not open to female USAF students, female cadets are not considered for ENJJPT, although they may be awarded a "5" Potential for UPT rating (21:--).

## PERFORMANCE MEASURES SELECTED

The T-41 Checkride Score and the Prediction for UPT will both be used in this study as measures of performance in T-41 PIP. Both scores are useful in differentiating between cadets in T-41 performance, as well as in comparing each cadet's T-41 performance with his or her subsequent performance in pilot training.

In the discussion of the T-41 Checkride Score presented earlier in this chapter, mention was made of a subjective overall checkride grade (U/F/G/E) awarded by the IP. This grade should not be confused with the T-41 Checkride Score, which is expressed as a percentage of total points possible on the checkride. Although this subjective overall checkride grade would appear to be a good measure of T-41 PIP performance, it was not available in the sample of data collected, and therefore cannot be used in this study.

# Chapter Three

## PILOT TRAINING PERFORMANCE MEASURES

A great deal of data is maintained on each student through-out pilot training.  However, after graduation, only a limited amount of data is maintained by Headquarters Air Training Command (HQ ATC) in its automated data base (17:--).  This chapter will describe the performance measures and other data maintained by HQ ATC and identify those items that will be used in this study.

### CATEGORY CHECKS

UPT students are trained and evaluated in the areas of flying training, ground training, and officer development throughout the course (7:1).  Evaluation of a student's flying performance includes six major checkrides, three during the T-37 phase of instruction and three during the T-38 phase.  These checkrides are identified by category as follows (7:23,24,27, 40,46,50):

| T-37 | T-38 |
|---|---|
| Mid Phase Evaluation | Day Contact Check |
| Final Contact Evaluation | Navigation/Instrument Check |
| Aircraft Instrument Evaluation | Day Two-Ship Formation Check |

On each UPT checkride, the student's characteristic performance on each of a prescribed group of maneuvers is evaluated.  The grade awarded on any maneuver is determined by the same absolute grading scale (U/F/G/E) used in the T-41 PIP program described in Chapter Two of this study (7:11).

After rating the student's performance in the individual maneuvers, the evaluator awards an overall grade of Excellent (E), Good (G), or Unsatisfactory (U) for the checkride, based on a subjective evaluation of the student's overall performance.  However, if any individual maneuver on a checkride is graded "U," the overall grade for the checkride is Unsatisfactory.  A checkride will also be rated Unsatisfactory if any maneuver is graded below the minimum grade required by the syllabus for that maneuver (7:11).  For example, if a maneuver

requires a minimum grade of "G," a student scoring an "F" on that maneuver would receive an overall checkride grade of "U."

It is also possible for a student to receive an overall checkride grade of "N" (Not Graded) instead of "U," "G," or "E." Under certain circumstances, when a student's flying progress is determined to be substandard during training, the student will be required to fly a progress checkride to evaluate the student's weak areas of performance. If the student successfully passes the progress check, and the following sortie in the syllabus is one of the six category checks, at the IP's discretion the category check need not be flown provided that all the category check objectives were satisfied on the progress check. In this situation, the category check would receive an overall score of "N" (Not Graded) (7:11-14).

## CATEGORY CHECK COMPOSITE

In addition to the individual category checkride scores, HQ ATC/DOTC (Curriculum Division, Flight Operations Directorate) computes an unofficial composite checkride score for each UPT graduate. This score is designed to be a representative indicator of overall checkride performance that can be used to differentiate the higher performing students from the lower. The score is computed by taking each category checkride score (U/N/G/E) and awarding a point value for that score according to the following scale (17:--):

| Score | Points |
|---|---|
| U (Unsatisfactory) | 0 |
| N (Not Graded) | 0 |
| G (Good) | 2 |
| E (Excellent) | 3 |

The category check composite score is then computed by adding the six category checkride point values together. Because each category checkride score represents the lowest checkride score awarded the student in that category, a "U" is recorded if the student initially fails the checkride even though the student subsequently passes the recheck for that category. By awarding zero points for initial failure on any category checkride, a substantial point differential between students with no failures and those with one or more failures can be established (17:--). In the case of an "N" (Not Graded) score, the student's substandard training performance prompted a progress check that was accomplished in lieu of the regular

9

category check (7:13-14). Therefore, the "N" score is treated like a "U" in computing the checkride composite, and zero points are awarded for that category check. It should be noted that this composite checkride score exists only for the internal use of HQ ATC/DOTC in helping to distinguish relative performance between UPT students (17:--).

## ATRB RECOMMENDATION

Each ATC flying training wing convenes an Advanced Training Recommendation Board (ATRB) to evaluate each USAF student's capability and potential to assume the varying mission requirements of Air Force aircraft weapons systems immediately upon graduation (6:1). The ATRB procedures outlined below apply to USAF students in both UPT and ENJJPT (6:2).

Prior to the convening of the ATRB, supervisors of each flying training squadron meet to review the characteristic performance of each student and make tentative recommendations for advanced training. Among the factors considered in this evaluation are the student's performance in flying, academics, emergency procedures, remedial training, and individual IP recommendations (6:1).

The ATRB meets near the end of the pilot training course to make final advanced training recommendations on each student. It reviews the advanced training recommendations forwarded by the flying training squadrons and carefully considers each student's characteristic performance, demonstrated capability, and potential to perform duties in the various Air Force aircraft upon graduation. The board first identifies those male students to be recommended for fighter, attack, and reconnaissance (FAR) assignments. It then determines which of these FAR students should also be recommmended for ATC IP duty. From the students not recommended for FAR duties, the board selects additional students for ATC IP recommendation. Females and USAFA graduates with TTB ONLY (tanker, transport, and bomber) vision waivers may be included in this IP group. The remaining students in the class are then eligible for TTB assignments only (6:1-2).

## DISTINGUISHED GRADUATE

Each UPT/ENJJPT flying training wing selects students from each class as distinguished graduates. In order to qualify as a distinguished graduate (DG), a student must have demonstrated outstanding officer qualities and leadership ability and be in the top 10 percent of the graduating class. The following factors are used in evaluating each student (5:5):

10

a) Flying training record

b) Officer qualities

c) Academic performance

d) Attitude, capability, and rated potential

e) Student's background and personnel records

## ATC COMMANDER'S TROPHY

Each UPT/ENJJPT flying training wing is authorized to award the ATC Commander's Trophy to the most outstanding graduate in each pilot training class (5:5). Students receiving this award are in the top 10 percent of their class and are thus also DGs of their class. Therefore, the evaluation criteria used in this determination are the same as those listed above for the DG award (17:--).

## OTHER DATA

The following performance measures and data are maintained by HQ ATC/DOTC (17:--) but are not used for comparison in this study:

a) Number of flying hours -- the number of hours flown in the T-37 and T-38 phases of training, as well as the combined total. In the student sample used for this study, total flying hours ranged from a low of 169.3 to a high of 202.3, with most values falling between 175 and 190. Because of the limited variation in the number of hours flown to complete the program, this data was not included among the performance factors evaluated in this study.

b) Aircraft assignment -- the type of aircraft to which the student was actually assigned in the first assignment following graduation. The aircraft assignment can vary from the ATRB recommendation in the cases of the IP and FAR recommendations. These recommendations are necessary but not sufficient conditions for assignment to IP and FAR duties. Students without either one of these recommendations are assigned to TTB aircraft. Students with only the IP recommendation will be assigned to either IP or TTB duties. Those with only the FAR recommendation can be assigned to either FAR or TTB aircraft, while those with both the FAR and IP recommendations can be assigned to IP, FAR, or TTB duties (17:--). Because of this diversity in actual aircraft assignments, this study will con-

sider the ATRB recommendation to be a better measure of overall pilot training performance than the actual aircraft assignment.

c) Class number, training base, and graduation date -- self-explanatory. For the purposes of this study, all UPT bases and classes will be considered to be uniform with respect to training and student performance.

## PERFORMANCE MEASURES SELECTED

### UPT

This study will use the UPT category check composite, the ATRB recommendation, the DG award, and the ATC Commander's Trophy award in comparing pilot training performance with T-41 PIP performance. The category check composite allows comparison of overall student checkride performance spanning the entire training program. The ATRB recommendation allows an overall assessment of student performance based on a final recommendation for aircraft duties, with FAR and IP recommendations considered to indicate higher overall performance than TTB recommendations. The DG and ATC Commander's Trophy awards identify a small percentage of UPT graduates at the very top of their class and are useful in identifying the students whose performance has been the best overall.

### ENJJPT

Very little performance data on ENJJPT students was available for this study. Although ENJJPT, like UPT, gives ATRB recommendations, designates students as DGs and awards the ATC Commander's Trophy, this data is not maintained by HQ ATC/DOTC. Available data was limited to class number, graduation date, number of flying hours, aircraft assignment, and individual category checkride scores (17:--).

The first three of these available items were rejected for the same reasons as in UPT. The fourth item, aircraft assignment, was not used because all but three of the 69 graduates were assigned to FAR or IP duties, therefore offering minimal opportunity to differentiate student performance. The last item, individual checkride scores, was not used for several reasons. ENJJPT checkrides are graded on a pass/fail basis rather than on the U/N/G/E scale used in UPT (17:--). Additionally, the number of ENJJPT checkrides varied within the sample, with earlier students (USAFA class of 1984) completing eight checkrides and later students (USAFA class of 1985) completing 10. Also, there was minimal variation in the number of checkrides initially failed, again offering minimal opportunity to differentiate student performance.

Therefore, because of the unavailability of other meaning-
ful performance measures, this study will use graduation/elimi-
nation as the only measure of ENJJPT performance to be investi-
gated. Because of the demanding nature of the program, ENJJPT
graduation will be considered to be a strong indicator of
success in pilot training.

Chapter Four

DATA ANALYSIS

## DATA GATHERING

The data used in this study was collected from two sources: USAFA and HQ ATC. USAFA provided records of cadet performance in its T-41 PIP program for cadets in the graduating classes of 1984 and 1985, which were the only classes for which data had been compiled. It also provided a listing of the Social Security Numbers (SSNs) of all graduates of these two USAFA classes. HQ ATC/DOTC provided records of the pilot training classes (both UPT and ENJJPT) in which graduates of the USAFA classes of 1984 and 1985 had been enrolled, and also a list of eliminees from those pilot training classes. The data records from both sources were entered into files on the Air University Honeywell 6000 computer system for file manipulation and data processing.

In order to compare the T-41 PIP performance with the pilot training performance of USAFA graduates of 1984 and 1985, the T-41 PIP performance data of each graduate needed to be matched by SSN with the corresponding pilot training performance data. The first step in this process was to compare the SSNs of the individual UPT and ENJJPT performance records with those contained in the USAFA graduate SSN file. This process allowed the identification and collection of those UPT/ENJJPT graduates who were also USAFA graduates of the classes of 1984 and 1985. Next, these records were matched by SSN with the T-41 performance records of these two classes, and the corresponding T-41 data was merged into the pilot training record of each UPT/ENJJPT graduate. Because of the differences in record structure and content, the UPT and ENJJPT records were maintained in separate files.

In addition to merging the T-41 PIP and pilot training performance data for UPT/ENJJPT graduates, the T-41 PIP performance data for UPT/ENJJPT eliminees was separated into a separate file for analysis. Although no pilot training performance data was available on these eliminees, the reason for pilot training elimination was available for study.

As a result of these matching and merging operations, a
sample of 1007 graduates of USAFA classes 1984 and 1985 was
created. This sample consisted of 762 UPT graduates, 68 ENJJPT
graduates, and 177 UPT/ENJJPT eliminees. However, there are
some limitations to this sample that deserve mention.

Not all of the pilot training performance data for the
USAFA class of 1985 was available for this study. ATC provided
performance data only through UPT class 8701 and ENJJPT class
8608. Therefore, pilot training data from approximately 15
percent of the USAFA class of 1985 was unavailable due to
graduation dates later than the collection date for the data to
be used in this study. This percentage was computed based on
the number of class of 1985 pilot training records collected
versus the number of cadets whose first active duty assignment
was UPT or ENJJPT (18:--).

Another limitation exists in the T-41 PIP performance data.
The T-41 Checkride Score was unavailable for 125 of the 1007
USAFA graduates in the sample. The data for this performance
measure was completely missing for one of the five T-41
training sessions conducted during the 1983-84 school year for
the class of 1984.


## DATA ANALYSIS TOOLS

After the T-41 PIP and pilot training data had been matched
and merged, it was ready for analysis. The Statistical Package
for the Social Sciences (SPSS) Information Analysis System was
used for this purpose. SPSS is a comprehensive, integrated
computer software package for managing, analyzing, and
displaying information (2:v). Available on the Air University
Honeywell 6000 computer system, it allowed a variety of statis-
tical analysis techniques to be used in analyzing the rela-
tionships between T-41 PIP and pilot training performance.


## ASSUMPTIONS

In analyzing the pilot training performance data, this
study will make the following assumptions:

1) Higher UPT checkride composite scores indicate better
UPT overall performance than do lower scores. Although the
computation of this composite score is arbitrary, it is assumed
to reflect with reasonable accuracy the quality of the stu-
dent's overall performance in UPT.

2) FAR and FAR/IP recommendations by the ATRB indicate
better overall UPT performance than TTB or TTB/IP recommenda-

tions. This is consistent with the treatment of these recommendations by ATC (17:--). Therefore, for the purpose of simplicity, this study will combine FAR and FAR/IP recommendations into a single "FAR" recommendation, and will in a similar manner combine TTB and TTB/IP into a single "TTB" recommendation.

3) As pointed out in the DATA GATHERING section above, not all pilot training performance data is available for the USAFA class of 1985 due to the cutoff date for data collection. It is assumed that the available data, representing approximately 85 percent of the pilot training students in this class, is representative of the class as a whole.

4) As was also discussed above, the T-41 Checkride Score was unavailable for 125 of the graduates in this sample. This missing data represented one of the five T-41 training sessions conducted during the 1983-84 school year. Therefore, it is assumed that the scores from this missing session would be distributed similarly to the other nine sessions making up the sample, and that the available data is representative of the sample as a whole.

5) ENJJPT students will be assumed to be uniform in their pilot training performance, with the exception of graduation/elimination from the program. As discussed in Chapter Three, the pilot training performance measures available for UPT graduates were not available for the ENJJPT graduates. In addition, there was little variation between the ENJJPT students in their T-41 PIP performance. All 69 ENJJPT students had received a "5" Prediction for UPT rating, with the exception of a single "4." Therefore, ENJJPT students will be included only in the graduation/elimination analysis in this study.

6) No distinction is made between male and female graduates in the sample. Although females do not receive FAR recommendations in pilot training, the available data did not identify graduates by sex. Although this has some effect on the distribution between FAR and TTB assignments in the sample, the effect is assumed to be minimal due to the relatively small number of female student pilots as compared to male. Therefore, the sex of the graduates in this sample will not be considered in analyzing and reporting the data.

## DATA CHARACTERISTICS

Before performing statistical analysis on research data, it is important to identify the characteristics of the data elements being studied. Different types of statistical tests are

appropriate only for certain types of data, and can produce results that are erroneous or not meaningful when used with inappropriate types of data. The data types used in this study are reviewed below (1:4-8; 13:18-20):

## T-41 Performance Data

| Name | Range of Values | Data Type |
|------|-----------------|-----------|
| T-41 Checkride Score | 0.0 - 100.0 | continuous |
| Prediction for UPT | 1, 2, 3, 4, 5 | categorical |

## UPT Performance Data

| Name | Range of Values | Data Type |
|------|-----------------|-----------|
| UPT Checkride Composite | 0,1,2,. . . 18 | categorical |
| ATRB Recommendation | FAR, TTB* | dichotomous |
| Distinguished Graduate | YES, NO | dichotomous |
| ATC Commander's Trophy | YES, NO | dichotomous |

* NOTE: FAR and FAR/IP have been combined,
as have TTB and TTB/IP.

Three of the six data items are nonnumeric, and only one of the three remaining data items is considered to be continuous. In addition, these data items measure subjective evaluations of performance rather than hard, precise physical data. For these reasons, this study will concentrate on identifying general trends and relationships between the data items, rather than focusing on rigorous statistical analysis of precise functional relationships between these items. However, some basic tests for statistical significance and correlation between performance measures will be performed also.

## ANALYSIS

### T-41 Prediction for UPT versus UPT Performance

The relationship between the T-41 Prediction for UPT score and UPT performance is shown in Tables 1 through 3. For this analysis, the sample was divided into groups based on the value of the Prediction for UPT score. It should be noted that there were no UPT graduates in the entire sample who received a "1"

Prediction for UPT score. For each group ("2" through "5"), the average (mean, median, and mode) values of the UPT checkride composite are listed. Also, the percentages of students awarded FAR and TTB recommendations, and the percentages designated as ATC Commander's Trophy winners ("ATC") and DGs, are listed for each group.

This analysis indicates, in general, a direct relationship between the T-41 Prediction for UPT rating and overall performance in UPT. In general, all UPT performance measures decrease as the value of the Prediction for UPT score decreases. The exceptions to this trend are the mode UPT Checkride Composite score for both classes combined and for the class of 1985, and the percentage of ATC Commander's Trophy winners and DGs in the class of 1985 for the group scoring a "5" in the Prediction for UPT rating.

Upon examination of the distribution of the UPT Checkride Composite scores, it appears that the mode is not a good indicator of "average" performance in this area. For example, in Table 1, the mode UPT Checkride Composite score in the "5" Prediction for UPT group for both classes combined is 11, which is lower than the mode for the "4" and "3" groups. However, if the source data for that "5" group were to be examined, it would show that nine students scored the mode of 11, 36 students scored higher than the mode, while only 13 students scored lower. Because this mode is significantly displaced from the "middle" of the group, and because it deviates so greatly from the mean and median scores, it does not appear to be representative of "average" performance for the group. This same relationship holds true in Table 3 for the groups scoring "5," "4," and "3" in the Prediction for UPT category, where the mode scores are significantly offset from the mean and median scores also.

Another apparent "anomaly" in the general trend of the data occurs in Table 3 in the percentage of ATC Commander's Trophy winners and DGs in the class of 1985. In the group scoring "5" in the Prediction for UPT category, there were no ATC Commander's Trophy winners, and only 6.7 percent of the group were DGs, as compared to 12.8 percent for the "4" group.

A possible explanation for this occurrence can be found in examining the number of students scoring a "5" in the Prediction for UPT category for the class of 1985, and comparing that number with the same group in the class of 1984. In the class of 1985, only 44 cadets were awarded a "5" in this category, and 28 of those 44 cadets entered the ENJJPT program. Therefore, only 16 cadets (36 percent) of the "5" cadets in 1985 enrolled in UPT. In the class of 1984, however, 82 cadets scored a "5," and only 37 of those 82 cadets entered ENJJPT.

18

Therefore, 45 cadets (55 percent) of the "5" group entered UPT. Because the actual number of cadets from 1985 in the "5" group was far less than from the class of 1984 (16 versus 45), and because the percentages were lower also (36 percent versus 55 percent), the effect of even a single student not winning the ATC Commander's Trophy or not being designated a DG has a large impact on the percentages computed for these awards in the "5" group for 1985.

Because the number of student records in both year groups is roughly equivalent (530 for 1984, 477 for 1985), it would be expected that the number of "5" Prediction for UPT scores awarded in the 1985 group would be roughly equivalent or only slightly less than the number awarded in the 1984 group. Instead, the number is considerably less (44 versus 82). This difference can be partially accounted for by the fact that the 1985 group is 10 percent smaller than the 1984 group. However, the remainder of the difference might be accounted for by another factor.

Prior to 1984, the number of "5" scores awarded in this category was unrestricted, and each T-41 IP awarded this score based only on his or her subjective judgment. For the class of 1985, however, USAFA changed the procedure for the awarding of the "5" score. Although the number of "5" scores awarded remained unrestricted (no quota), the awarding of this score was made subject to a board review to ensure that all "5" ratings awarded accurately reflected the student's potential and performance. The net result of this change was to lower the percentage of cadets receiving the "5" Prediction for UPT rating (19:--).

## T-41 Checkride Score versus UPT Performance

The relationship between the T-41 Checkride Score and UPT performance is shown in Tables 4 through 6. For this analysis, cadets who entered UPT were divided into five groups based on the mean and standard deviation of the T-41 Checkride Score percentages in their class. For both classes combined, the mean and standard deviation were computed for the entire sample without regard to class. The five groups represent an arbitrary division into artificial "A," "B," "C," "D," AND "F" groups based on the scale shown below:

19

| Group | Range |
|-------|-------|
| A | score > (mean + 1 std dev) |
| B | mean < score <= (mean + 1 std dev) |
| C | (mean - 1 std dev) < score <= mean |
| D | (mean - 2 std dev) < score <= (mean - 1 std dev) |
| F | score <= (mean - 2 std dev) |

This division of scores into artificial "grade" groups is consistent with the award of letter grades in many academic courses at USAFA. Although the T-41 PIP program remains a pass/fail course, these divisions were made in order to divide the cadets into relative groups in order to compare the overall UPT performance of each group with other groups. The UPT performance data is listed in the same manner as it was for the comparison of the T-41 Prediction for UPT score with performance in UPT in Tables 1 through 3.

This analysis indicates, in general, a direct relationship between the T-41 Checkride Score and overall performance in UPT. Generally, all UPT performance measures decrease as the "grade" in the T-41 Checkride Score decreases. Minor differences from this general trend occur in the FAR/TTB distribution in the "D" group for the class of 1984 and in the "C" group for the class of 1985. Other minor differences appear in the mean, median, and mode of the UPT Checkride Composite scores in the "D" and "F" groups.

The most notable deviations from this trend, however, occur in the class of 1985 in the ATC Commander's Trophy in the "A" group and the DG category in the "A" and "F" groups. It should be noted, however, that if only two of the 35 "A" students in 1985 had won the ATC Commander's Trophy (instead of 0), the percentage of trophy winners would be the same as for 1984. But it would take a total of eight students (instead of the actual three) being designated DG in 1985 to equal the percentage in 1984. These differences between 1984 and 1985 may be worthy of further study. However, since this analysis is examining USAFA graduate performance as a whole, it will not focus extensively on differences between the classes.

The other notable difference mentioned was in the DG percentage in the "F" category for the class of 1985. While no students in the "F" category were designated DG in 1984, 6.7 percent of the "F" students in 1985 attained DG status. However, as there are only 15 students in the "F" category in

1985, the 6.7 percent represents just one of those 15 students becoming a DG. Because of the small number of students in this category, it would appear that the differences between the classes of 1984 and 1985 in this area are not significant.

## T-41 Prediction for UPT versus Graduation Status

The relationship between the T-41 Prediction for UPT score and pilot training graduation status is shown in Tables 7 through 9. For each Prediction for UPT group, the numbers and percentages of that group graduating from UPT, graduating from ENJJPT, and being eliminated from either program are shown. In addition, the overall totals and percentages for all Prediction for UPT groups in these three graduation status categories are also shown.

An analysis of these tables indicates, in general, a direct relationship between the Prediction for UPT score and successful completion of UPT. In all three tables, as the Prediction for UPT score decreases, the combined percentage of UPT and ENJJPT graduates in that scoring group also decreases. Similarly, these tables indicate a generally inverse relationship between the Prediction for UPT score and elimination from pilot training. In all three tables, as the Prediction for UPT score decreases, the percentage of pilot training eliminees in that scoring group increases.

## Analysis of Eliminees

Table 10 contains an analysis of the T-41 PIP performance of eliminees from both classes combined and for each class separately. It compares the mean scores of the T-41 Checkride Score and the Prediction for UPT score for both UPT graduates and UPT eliminees. (Because there was only one eliminee from ENJJPT in the 1984 and 1985 year groups combined, the table presents UPT data only). The table shows that for all year groups, the mean T-41 PIP performance scores for eliminees are substantially lower than those for the UPT graduates.

Table 11 illustrates the distribution of reasons for elimination among the Prediction for UPT score groupings for the classes of 1984 and 1985 combined. It shows that over three-fourths (76.7 percent) of the UPT/ENJJPT eliminees were eliminated because of flying deficiency. It also shows that the overwhelming majority (150) of the 176 eliminees were students who scored either a "3" (95 students) or a "2" (55 students) on the T-41 Prediction for UPT rating.

## Analysis of Correlation and Significance

Statistical tests for significance and correlation between the T-41 PIP and pilot training performance measures were also conducted for both USAFA classes combined. Table 12 lists the results of chi-square tests of statistical significance between the pairs of performance measures. It shows that in all cases the computed value of significance is less than 0.01, indicating that there is a statistically significant difference between the expected and actual performance measure means (13:24-25). This difference indicates that any relationships that exist between the performance measures in the sample are "real" and do not occur randomly or by chance (13:24).

Tests of statistical correlation were also performed for the purpose of determining the strength of the relationships between the performance measures. Because the performance measures compared are either categorical or dichotomous in nature (13:18-20), a nonparametric test of correlation, the contingency coefficient, was used (1:5-7; 13:45,53). The results of these tests are presented in Table 13. It should be noted that nonparametric tests of correlation on categorical or dichotomous data produce results that are generally less accurate than parametric tests involving continuous data (20:--). As is shown in Table 13, the computed values of correlation in all cases indicate a weak to slightly moderate correlation (values less than 0.4) between the pairs of performance measures.

These tests for significance and correlation indicate that statistically significant relationships exist between the T-41 PIP and pilot training performance measures. However, they do not indicate that these measures are closely or strongly related. Therefore, these tests do not appear to indicate as strong a relationship between these performance measures as is indicated by the rest of the analysis presented in this chapter.

## Chapter Five

## FINDINGS AND RECOMMENDATIONS

### FINDINGS

Based on the preceding data analysis, the following findings are presented:

1) In general, the T-41 Prediction for UPT score is directly related to performance in pilot training in the sample studied. Higher Prediction for UPT scores are generally associated with higher overall performance scores in pilot training, and vice versa.

2) In general, the T-41 Checkride Score is also directly related to pilot training performance in the sample studied. Higher T-41 Checkride Scores are generally associated with higher overall pilot training performance scores, and vice versa.

3) The T-41 Prediction for UPT score generally relates directly to success in pilot training as measured by graduation/elimination status in this sample. Higher Prediction for UPT scores are generally associated with higher percentages of graduation, and vice versa.

4) Eliminees from pilot training in this sample scored substantially lower in both T-41 PIP performance measures than did pilot training graduates. The majority of the pilot training eliminees were eliminated for flying deficiency, and most eliminees scored either a "2" or "3" in the T-41 Prediction for UPT rating.

5) Statistical tests for significance and correlation indicate that the T-41 PIP and pilot training performance measures are somewhat related in this sample. However, the remainder of the analysis performed in this study suggests that stronger relationships exist between the performance measures. This difference in results might be partially explained by the limited accuracy inherent in nonparametric tests of correlation. In any event, this difference is notable and may be of interest to future studies in this area.

# RECOMMENDATIONS

The data analysis performed in this study leads to the following recommendations:

1) USAFA should continue to rate cadets in T-41 PIP using the Prediction for UPT measure of performance. In addition, USAFA should consider adopting the T-41 Checkride Score percentage as a formal measure of cadet performance, rather than only using it as a quality control tool for the IP force. The relationships between these T-41 performance measures and performance in pilot training appear to be strong.

2) USAFA should continue to select cadets for ENJJPT on the basis of the "5" score in the Prediction for UPT rating. In the sample studied, the elimination rate of USAFA T-41 PIP graduates from ENJJPT was negligible, and the overwhelming majority of these former cadets were assigned to FAR/IP duties, as expected by the ENJJPT program.

3) USAFA should continue to award cadets a subjective overall checkride grade (U/F/G/E) in T-41 PIP. However, this grade should also be maintained on a permanent basis and made available for analysis, as should the other two T-41 PIP performance measures investigated in this study.

4) USAFA should further investigate the pilot training performance of cadets who score in the lower portions of the T-41 PIP performance measures. Further studies of these graduates could indicate whether or not all cadets receiving a "2" Prediction for UPT rating, for example, should be allowed to enter pilot training. Such studies might also determine whether additional screening measures for these cadets would be warranted before accepting them for UPT entry.

5) USAFA should begin an ongoing program to record and track historical data of cadet performance in T-41 PIP and graduate performance in the UPT/ENJJPT programs. The T-41 PIP performance data used in this study was available only because of an ad hoc collection of this data on a one-time basis. By establishing a regular data collection system and common data base for T-41 PIP and pilot training performance data, a long-term, in-depth study of the relationships between these performance measures could be conducted. As a result of such a study, the relationship between performance in T-41 PIP and pilot training could be better studied and understood. Thus, improvements in the means of screening T-41 PIP students for UPT and predicting UPT performance could be developed, with the goal of lowering pilot training attrition rates.

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# APPENDIX

## COMPARISON OF T-41 PREDICTION FOR UPT

## WITH

## UPT PERFORMANCE

## (BOTH CLASSES)

| PREDICTION FOR UPT | UPT CHECK COMPOSITE (MEAN/MEDIAN/MODE) | ATRB | | AWARDS | |
|---|---|---|---|---|---|
| | | FAR (%) | TTB (%) | ATC (%) | DG (%) |
| ALL | 10.94 / 11 / 12 | 52.8 | 47.2 | 1.2 | 7.7 |
| 5 | 12.90 / 13 / 11 | 82.8 | 17.2 | 5.2 | 31.0 |
| 4 | 11.74 / 12 / 12 | 66.0 | 34.0 | 1.2 | 10.9 |
| 3 | 10.40 / 11 / 12 | 45.4 | 54.6 | 0.8 | 3.3 |
| 2 | 9.37 / 10 / 11 | 20.5 | 79.5 | 0.0 | 0.0 |

Table 1. Prediction for UPT versus UPT Performance.

## COMPARISON OF T-41 PREDICTION FOR UPT

## WITH

## UPT PERFORMANCE

## (1984)

| PREDICTION FOR UPT | UPT CHECK COMPOSITE (MEAN/MEDIAN/MODE) | ATRB | | AWARDS | |
|---|---|---|---|---|---|
| | | FA? (%) | TTB (%) | A?C (%) | DG (%) |
| ALL | 11.02 / 11 / 12 | 53.8 | 46.2 | 1.7 | 8.9 |
| 5 | 13.00 / 13 / 15 | 81.4 | 18.6 | 7.0 | 39.6 |
| 4 | 11.80 / 12 / 12 | 64.8 | 35.2 | 1.4 | 9.1 |
| 3 | 10.43 / 11 / 8 | 45.9 | 54.1 | 1.1 | 3.8 |
| 2 | 9.32 / 10 / 8 | 26.5 | 73.5 | 0.0 | 0.0 |

Table 2.  Prediction for UPT versus UPT Performance (1984).

# COMPARISON OF T-41 PREDICTION FOR UPT

## WITH

## UPT PERFORMANCE

## (1985)

| PREDICTION FOR UPT | UPT CHECK COMPOSITE (MEAN/MEDIAN/MODE) | ATRB | | AWARDS | |
|---|---|---|---|---|---|
| | | FAR (%) | TTB (%) | ATC (%) | DG (%) |
| ALL | 10.83 / 11 / 11 | 51.3 | 48.7 | 0.6 | 6.2 |
| 5 | 12.67 / 12 / 11 | 86.7 | 13.3 | 0.0 | 6.7 |
| 4 | 11.67 / 12 / 14 | 67.5 | 32.5 | 0.9 | 12.8 |
| 3 | 10.37 / 11 / 12 | 44.5 | 55.5 | 0.5 | 2.7 |
| 2 | 9.45 / 10 / 11 | 10.3 | 89.7 | 0.0 | 0.0 |

Table 3.  Prediction for UPT versus UPT Performance (1985).

COMPARISON OF T-41 CHECKRIDE SCORE

WITH

UPT PERFORMANCE

(BOTH CLASSES)

| T-41 CHKRIDE SCORE GP | UPT CHECK COMPOSITE (MEAN/MEDIAN/MODE) | ATRB | | AWARDS | |
|---|---|---|---|---|---|
| | | FAR (%) | TTB (%) | ATC (%) | DG (%) |
| ALL | 10.94 / 11 / 12 | 52.8 | 47.2 | 1.2 | 7.7 |
| A | 12.25 / 12 / 12 | 80.9 | 19.1 | 2.9 | 16.1 |
| B | 11.46 / 12 / 12 | 59.7 | 40.3 | 1.3 | 9.9 |
| C | 10.13 / 10 / 11 | 39.2 | 60.8 | 0.5 | 2.8 |
| D | 9.91 / 10 / 8 | 38.6 | 61.4 | 0.0 | 0.0 |
| F | 9.75 / 10 / 11 | 25.0 | 75.0 | 0.0 | 4.2 |

Table 4.  T-41 Checkride Score versus UPT Performance.

## COMPARISON OF T-41 CHECKRIDE SCORE

## WITH

## UPT PERFORMANCE

## (1984)

| T-41 CHKRIDE SCORE GP | UPT CHECK COMPOSITE (MEAN/MEDIAN/MODE) | ATRB | | AWARDS | |
|---|---|---|---|---|---|
| | | FAR (%) | TTB (%) | ATC (%) | DG (%) |
| ALL | 11.02 / 11 / 12 | 53.8 | 46.2 | 1.7 | 8.9 |
| A | 12.66 / 13 / 12 | 74.3 | 25.7 | 5.7 | 22.8 |
| B | 11.41 / 12 / 12 | 56.2 | 43.8 | 2.2 | 11.7 |
| C | 10.24 / 11 / 8 | 45.5 | 54.5 | 0.0 | 2.0 |
| D | 9.85 / 10 / 8 | 38.5 | 61.5 | 0.0 | 0.0 |
| F | 9.90 / 11 / 6 | 40.0 | 60.0 | 0.0 | 0.0 |

Table 5. T-41 Checkride Score versus UPT Performance (1984).

COMPARISON OF T-41 CHECKRIDE SCORE

WITH

UPT PERFORMANCE

(1985)

| T-41 CHKRIDE SCORE GP | UPT CHECK COMPOSITE (MEAN/MEDIAN/MODE) | ATRB | | AWARDS | |
|---|---|---|---|---|---|
| | | FAR (%) | TTB (%) | ATC (%) | DG (%) |
| ALL | 10.83 / 11 / 11 | 51.3 | 48.7 | 0.6 | 6.2 |
| A | 11.77 / 12 / 14 | 82.9 | 17.1 | 0.0 | 8.6 |
| B | 11.51 / 12 / 11 | 62.3 | 37.7 | 1.3 | 9.0 |
| C | 9.99 / 10 / 11 | 33.6 | 66.4 | 0.0 | 2.8 |
| D | 9.84 / 10 / 8 | 36.8 | 63.2 | 0.0 | 0.0 |
| F | 9.67 / 9 / 9 | 20.0 | 80.0 | 0.0 | 6.7 |

Table 6. T-41 Checkride Score versus UPT Performance (1985).

COMPARISON OF T-41 PREDICTION FOR UPT

WITH

PILOT TRAINING GRADUATION STATUS

(BOTH CLASSES)

| GRADUATION STATUS | T-41 PREDICTION FOR UPT | | | | | ALL |
|---|---|---|---|---|---|---|
| | 5 | 4 | 3 | 2 | (UNKNOWN) | |
| UPT GRADS | 58 (46.0%) | 259 (91.8%) | 366 (79.4%) | 78 (58.6%) | 1 | 762 (75.7%) |
| ENJJPT GRADS | 64 (50.8%) | 1 (0.4%) | 0 (0.0%) | 0 (0.0%) | 3 | 68 (6.8%) |
| ELIMINEES | 4 (3.2%) | 22 (7.8%) | 95 (20.6%) | 55 (41.4%) | 1 | 177 (17.6%) |
| TOTAL | 126 (100%) | 282 (100%) | 461 (100%) | 133 (100%) | 5 | 1007 (100%) |

NOTE: Percentages are additive within the columns. Raw numbers are additive both vertically and horizontally.

Table 7. Prediction for UPT versus Graduation Status.

35

COMPARISON OF T-41 PREDICTION FOR UPT

WITH

PILOT TRAINING GRADUATION STATUS

(1984)

| GRADUATION STATUS | T-41 PREDICTION FOR UPT | | | | | ALL |
|---|---|---|---|---|---|---|
| | 5 | 4 | 3 | 2 | (UNKNOWN) | |
| UPT GRADS | 43 (52.4%) | 142 (92.2%) | 183 (84.7%) | 49 (66.2%) | 1 | 418 (78.9%) |
| ENJJPT GRADS | 36 (43.9%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 3 | 39 (7.4%) |
| ELIMINEES | 3 (3.7%) | 12 (7.8%) | 33 (15.3%) | 25 (33.8%) | 0 | 73 (13.8%) |
| TOTAL | 82 (100%) | 154 (100%) | 216 (100%) | 74 (100%) | 4 | 530 (100%) |

NOTE: Percentages are additive within the column. Raw numbers are additive both vertically and horizontally.

Table 8. Prediction for UPT versus Graduation Status (1984).

36

COMPARISON OF T-41 PREDICTION FOR UPT

WITH

PILOT TRAINING GRADUATION STATUS

(1985)

| GRADUATION STATUS | T-41 PREDICTION FOR UPT | | | | | ALL |
|---|---|---|---|---|---|---|
| | 5 | 4 | 3 | 2 | (UNKNOWN) | |
| UPT GRADS | 15 (34.1%) | 117 (91.4%) | 183 (74.7%) | 29 (49.2%) | 0 | 344 (72.1%) |
| ENJJPT GRADS | 28 (63.6%) | 1 (0.8%) | 0 (0.0%) | 0 (0.0%) | 0 | 29 (6.1%) |
| ELIMINEES | 1 (2.3%) | 10 (7.8%) | 62 (25.3%) | 30 (50.8%) | 1 | 104 (21.8%) |
| TOTAL | 44 (100%) | 128 (100%) | 245 (100%) | 59 (100%) | 1 | 477 (100%) |

NOTE: Percentages are additive within the columns. Raw numbers are additive both vertically and horizontally.

Table 9. Prediction for UPT versus Graduation Status (1985).

# COMPARISON OF T-41 PERFORMANCE MEASURES

## WITH

## UPT GRADUATION STATUS

| | PILOT TRAINING GRAD STATUS | MEAN T-41 CHECK SCORE | MEAN PREDICTION FOR UPT SCORE |
|---|---|---|---|
| BOTH CLASSES | GRADUATES | 81.57 | 3.39 |
| | ELIMINEES | 76.36 | 2.85 |
| CLASS OF 1984 | GRADUATES | 81.84 | 3.43 |
| | ELIMINEES | 75.75 | 2.87 |
| CLASS OF 1985 | GRADUATES | 81.36 | 3.34 |
| | ELIMINEES | 76.51 | 2.84 |

Table 10. T-41 Performance versus UPT Graduation Status.

# DISTRIBUTION OF PILOT TRAINING ELIMINEES

## BY

## T-41 PREDICTION FOR UPT

## AND

## REASON FOR ELIMINATION

## (BOTH CLASSES)

|  |  | 5 | 4 | 3 | 2 | ALL | |
|---|---|---|---|---|---|---|---|
|  | FLYING | 3 | 12 | 71 | 49 | 135 | (76.7%) |
|  | ACADEMIC |  | 1 |  |  | 1 | (0.6%) |
|  | MILITARY |  |  | 2 |  | 2 | (1.1%) |
| REASON FOR ELIMINATION | MEDICAL |  | 6 | 6 | 3 | 15 | (8.5%) |
|  | MOA* |  | 1 | 5 | 1 | 7 | (4.0%) |
|  | SIE** | 1 | 2 | 10 | 2 | 15 | (8.5%) |
|  | OTHER |  |  | 1 |  | 1 | (0.6%) |
|  | TOTAL | 4 | 22 | 95 | 55 | 176 | (100%) |

(Column header: PREDICTION FOR UPT)

\* MANIFESTATION OF APPREHENSION

\*\* SELF-INITIATED ELIMINATION

Table 11.  Distribution of Pilot Training Eliminees.

## CHI-SQUARE TESTS OF STATISTICAL SIGNIFICANCE

### BETWEEN

### T-41 PIP AND UPT PERFORMANCE MEASURES

### (BOTH CLASSES)

| PERFORMANCE MEASURES | CHI-SQUARE VALUE | DEGREES OF FREEDOM | SIGNIFICANCE LEVEL |
|---|---|---|---|
| T-41 PRED FOR UPT vs: | | | |
| UPT CHECKRIDE COMPOSITE | 135.6 | 64 | 0.0000 |
| ATRB RECOMM (FAR/TTB) | 80.7 | 4 | 0.0000 |
| AWARDS (ATC/DG) | 66.4 | 8 | 0.0000 |
| T-41 CHECKRIDE SCORE vs: | | | |
| UPT CHECKRIDE COMPOSITE | 107.7 | 64 | 0.0005 |
| ATRB RECOMM (FAR/TTB) | 53.7 | 4 | 0.0000 |
| AWARDS (ATC/DG) | 21.3 | 8 | 0.0064 |

TABLE 12.  Chi-Square Tests of Significance.

## TESTS OF STATISTICAL CORRELATION

## BETWEEN

## T-41 PIP AND UPT PERFORMANCE MEASURES

## (BOTH CLASSES)

| PERFORMANCE<br>MEASURES | CONTINGENCY COEFFICIENT<br>OF CORRELATION |
|---|---|
| **T-41 PRED FOR UPT vs:** | |
| UPT CHECKRIDE<br>COMPOSITE | 0.39 |
| ATRB RECOMM<br>(FAR/TTB) | 0.31 |
| AWARDS<br>(ATC/DG) | 0.28 |
| **T-41 CHECKRIDE SCORE GROUP vs:** | |
| UPT CHECKRIDE<br>COMPOSITE | 0.38 |
| ATRB RECOMM<br>(FAR/TTB) | 0.28 |
| AWARDS<br>(ATC/DG) | 0.18 |

TABLE 13.   Tests of Statistical Correlation.