9-1997

An Examination of the Demographic and Career Progression of Air Force Institute of Technology Cost Analysis Graduates

Christopher S. Dalton

AFIT/GCA/LAS/97S-3

AN EXAMINATION OF THE DEMOGRAPHICS AND CAREER PROGRESSION OF AIR FORCE INSTITUTE OF TECHNOLOGY COST ANALYSIS GRADUATES

THESIS

Christopher S. Dalton, First Lieutenant, USAF

AFIT/GCA/LAS/97S-3

Approved for public release; distribution unlimited

The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government.

AFIT/GCA/LAS/97S-3

AN EXAMINATION OF THE DEMOGRAPHICS AND CAREER PROGRESSION OF AIR FORCE INSTITUTE OF TECHNOLOGY COST ANALYSIS GRADUATES

THESIS

Presented to the Faculty of the Graduate School of Logistics

and Acquisition Management of the Air Force Institute of Technology

Air University

Air Education and Training Command

In Partial Fulfillment of the Requirements for the

Degree of Master of Science in Cost Analysis

Christopher S. Dalton, BS, MS

First Lieutenant, USAF

September 1997

Acknowledgments

My thanks go out to the many participants who contributed to this research. First, Lieutenant Colonel Stephen Giuliano and Dr. Roland Kankey were extremely helpful as my thesis committee for holding me to a higher standard. They motivated me to complete a product I am proud to have others read.

Second, I would like to thank my GCA class leader, Captain Dave Marzo. Dave is the most unique individual I have ever met. By contributing uncountable hours to explain abstract points, consolidate class notes, organize study sessions, and create practice exams before we took the real ones, Dave made it possible for me to concentrate on this thesis when I needed to.

Third, I would like to thank my wife, Jera, for always believing in me. She kept my nose to the grindstone when I would have rather been doing anything else.

Finally, I would like to thank God for watching out for me. He has always provided an open door, even when I wasn't sure where I wanted to go.

Christopher S. Dalton

Table of Contents

Page

Acknowledgments ii

List of Tables v

Abstract vi

I. Introduction 1

Background 1

Research Questions 3

Scope 5

Summary 5

II. Literature Review 7

Overview 7

Harding, Downey, and Bottenberg, 1963. 7

Hart, 1965. 8

Cook and Greene, 1968. 10

Beam, 1973. 10

Davidson and Crowder, 1978. 11

Smith, 1986. 12

Beres and Camacho, 1992. 14

Baxter and Bolin, 1994. 15

Woodson and Yoder, 1994. 17

Pry, 1995. 17

Summary 19

III. Methodology 20

Overview 20

Survey Development 20

Population 27

Page

Data Collection....28
Data Analysis....29

IV. Findings and Analysis....30
Overview....30
Demographics....30
Subjective....40
Experiences and Opportunities....41
Program Strengths and Weaknesses....42
AFIT vs. Civilian Institutions....44
Education vs. Training....44
Thesis Dilemma....45
Likert....46
Sign Test....52

V. Conclusions and Recommendations....55
Introduction....55
Conclusions....55
Summary....58
Recommended Follow-On Research....59

Survey Cover Letter....61

AFIT Graduate Cost Analysis Survey....62

Bibliography....69

Vita....71

List of Tables

Page

1. Objectives and Related Survey Questions 23
2. Demographic Comparison 31
3. Survey and Response Results 32
4. Why Graduates Have Remained 33
5. Graduates' Pre-AFIT Active Duty 35
6. Respondent Rank Mix 37
7. Graduate Promotions 37
8. Time in Cost Jobs 38
9. AAD and Education Profile 40
10. Graduates' Cost Experiences 42
11. Likert Question #1 46
12. Likert Question #2 47
13. Likert Question #3 47
14. Likert Question #4 48
15. Likert Question #5 49
16. Likert Question #6 49
17. Likert Question #7 50
18. Likert Question #8 50
19. Likert Question #9 51
20. Likert Question #10 52
21. Likert Section Results of Sign Test 53

Abstract

The Air Force Institute of Technology (AFIT) was asked to develop a graduate curriculum to support cost analysts in the acquisition arena in October 1980. The first class entered in May 1982 and graduated in September 1983 with Master of Science degrees in Systems Management. This degree program gained autonomy by offering its first true Master of Science degree in Cost Analysis in 1988. Now there are nearly thirteen years of graduate cost analysts (GCAs) in the workforce.

This thesis examined the impact this program has had on these graduates and the Air Force. Surveys were mailed out to 73 of the 75 currently active-duty graduates in the classes from 1983 through 1994. Forty responses were received and evaluated. The general consensus is that the GCA program is very useful to the graduates and beneficial to their careers. The main strengths of the program include the ACEIT software training and the combination of Department of Defense (DOD) application, regression, and statistics. The weaknesses of the program include a lack of training to actually complete a cost estimate and a need for more in-depth education regarding budget topics. Overall, graduates believe this program could not be replaced by a civilian institution.

AN EXAMINATION OF THE DEMOGRAPHICS AND CAREER PROGRESSION OF AIR FORCE INSTITUTE OF TECHNOLOGY COST ANALYSIS GRADUATES

I. Introduction

Background

Cost analysis is not a new career field, by any means. The idea of estimating and controlling costs has been around for thousands of years. Even in early Roman times, people were concerned with the costs of projects, "Suppose one of you wants to build a tower. Will he not first sit down and estimate the cost to see if he has enough to complete it?" (Thompson, 1978: 1067). Since those times, the focus of estimating costs has shifted increasingly to more complex and technologically advanced weapons systems. In the earliest contemporary context for major weapons systems, T.P. Wright (1936) recognized a void in the methodology for estimating costs of a new and expensive item called the airplane. Wright recognized the phenomena, based on historical data, that unit costs decreased at a constant percentage as the number of units doubled. This "learning curve" theory was important because plotting the historical, observed costs on logarithmic graph paper yielded a straight line that could be extrapolated to predict costs for various lot sizes. This was a good estimating tool given the technology available to support the

analyst at the time. This is only one area where strides have been taken to improve the estimation accuracy for programs that can eventually cost in the billions of dollars.

Since that time, cost analysis has undergone an evolution of thought and process. One of the principal foci throughout that evolution has been the development and implementation of cost analysis education, training, and professional programs. An increasing amount of literature is being devoted to educating the cost estimator/analyst. As more and more people realized the importance of estimating and monitoring costs in defense weapons systems procurement, the Department of Defense (DOD) recognized a need to increase the size and expertise of its cost analyst force. This is partially due to the significant amounts of money allocated to acquisition organizations within the DOD, as well as the public's perceptions that the DOD's management of these funds had been less than satisfactory. This hastened the Air Force's decision in September 1961 to begin teaching cost analysis at the Air Force Institute of Technology (AFIT), sponsored by the DOD Cost Analysis Improvement Group.

While the canon of knowledge about cost estimation and analysis became increasingly more complex and diverse, there was still a lack of formalized education that went beyond on-the-job-training (OJT) and perhaps one or two classes (Hough, 1989:21). This educational void drove the implementation of three programs to improve the quality and image of cost analysts. First, in response to a request from the Air Force Comptroller, AFIT initiated a cost analysis Master's Degree program in 1981 and rapidly developed the curricula. In 1983, the first class of cost analysts earned Master of Science degrees in Systems Management with a Cost Analysis option. Second, AFIT, in

conjunction with the Institute of Cost Analysis (ICA), developed and offered a "Professional Designation in Cost Analysis and Price Analysis" (Hough 1989:21) which increased the proliferation and exchange of cost analysis knowledge among professionals. Third, professional certification programs were created to certify training and experience of individuals in the cost analysis career field. ICA created an examination board which could award qualified persons the title "Certified Cost Analyst" and the National Estimating Society developed a test for "Certified Professional Estimator." These programs and professional societies increased the availability and quality of cost analysis and estimation education.

Building on this progress, AFIT and the professional cost organizations have defined the Cost Analysis career field as a growing and respected field of professionals. AFIT awarded its first Master of Science Degree in Cost Analysis in 1988, and the National Estimating Society (NES, founded in 1966) merged with ICA (founded in 1981) to form a single professional organization, the Society of Cost Estimating and Analysis (SCEA) in 1990. SCEA now offers a single professional designation, as well: Certified Cost Estimator/Analyst (CCE/A). These events have led us to where the cost analysis career field and the Graduate Cost Analysis (GCA) program are currently.

Research Questions

Since the first class in 1983, there have been over 140 total graduates of the Graduate Cost Analysis program through 1996. The majority of these graduates are still in the military. The primary objective of this research, coupled with gathering some

necessary demographics, was to examine how their GCA education has served them in their Air Force careers. This objective was broken into two parts:

1. Gather demographic information on past GCA graduates
2. Gather information about experiences and opportunities GCA graduates have had

The secondary objective of this research was an evaluation of the GCA program itself. This was broken into two parts:

3. Evaluate the strengths and weaknesses of the current GCA curriculum, as perceived by the graduates
4. Determine whether the AFIT GCA program could be replaced by a similar program at a civilian institution

Originally, this research was also going to examine those graduates who have left the military. What factors have led our graduates to other pursuits? Were they not being promoted as rapidly as other Air Force members? Is there greater potential for financial gain for these graduates in the civilian world? Amidst continuing rumors of increasing, if not complete, civilianization of the Air Force cost analyst career field, what can active duty members expect if they transition to the civilian sector? Due to the lengthy process of receiving Office of Management and Budget (OMB) approval to survey anyone outside the Air Force, this objective has been omitted and will be recommended to future researchers who posses adequate time to pursue this information.

Scope

The scope of this research is unique in that it will try to examine the entire population of GCA graduates remaining in the Air Force through 1994, rather than just a sample. Only classes from 1983 through 1994 will be examined, to allow graduates to have at least two and a half years in their post-AFIT assignment. Examination of the entire population is based on several factors: 1) The active duty GCA graduates are readily accessible (using the Air Force Personnel Center, AFPC, to locate active duty Air Force personnel) and easily surveyed; 2) Surveying the entire population allows for more complete and accurate demographics and data without having to make inferences based on a small sample – this point is especially important due to the variety of opportunities both within and outside the government for Cost Analysis graduates; and 3) The population of GCA graduates remaining in the Air Force is small enough (through the class of 1994, 75 graduates remain in the Air Force) to easily justify complete examination. Additionally, there may be many graduates who have had opportunities and experiences which many others may not even know about, and sampling would not accurately address these types of issues. Historically, as indicated by the research reviewed below, a response rate above 50% is considered good. In fact, one thesis (Woodson and Yoder, 1994) documented that a response rate of only 35% (or better) is acceptable. The actual response rate was 55% for this thesis.

Summary

Scandals and failures in the defense acquisition arena have heightened the expectations of DOD cost analysts. Meeting these new expectations requires increased training and education. Fourteen years ago, AFIT created a program to fill this

professional educational void. Now, it is time to examine the graduates in the military workforce and survey the profession's progress.

The research results will be used to investigate whether the Graduate Cost Analysis program has provided a valuable education to its graduates. The value to the Air Force is measured in high quality, well-educated officers from the program, while value to the graduates includes increased job stability and future opportunities. Feedback from graduates still in the military will provide valuable information about the perceived value of the Graduate Cost Analysis degree to their careers. In short, do the graduates' perceive that their careers benefited from the AFIT GCA program? Further, this feedback will help evaluate the current GCA curriculum as to its appropriateness for the tasks that graduates will face.

Chapter II documents similar research to date involving past AFIT graduates of other programs. As mentioned previously, this thesis is unique in its GCA focus. There has not been any research effort before now which specifically examined the GCA population for demographics, career enhancement due to AFIT education, and strengths and weaknesses of the program. Chapter III lays out the methodology of this research process including the development of survey questions and identification of the population. Chapter IV is an analysis of the survey responses and the presentation of the results. Chapter V provides conclusions about this effort and recommends potential future research topics.

II. Literature Review

Overview

Before pursuing the research objectives of this thesis, it is necessary to first evaluate previous research that examined AFIT graduates and capture what they have accomplished. Once an examination of previous research accomplishments is complete, it will become clear that past research has left a major hole regarding the GCA program and its graduates. There is very little literature in existence that discusses and examines cost analysis education at AFIT. Those efforts that incorporate some aspects of the GCA graduates have been included and evaluated. This literature review is organized chronologically, rather than alphabetically.

Harding, Downey, and Bottenberg, 1963. One of the more relevant efforts examined, Harding et. al.'s technical documentary examines the career experiences of two classes: 1955 and 1956. Obviously the results are dated for this current effort but the precedent remains, nonetheless. Harding et. al.'s objectives were to determine the utilization, attitudes, and retainability of officers who participated in AFIT programs during those two years. With a two-year population of over 1700 officers (1380 current active duty and 387 who had left the Air Force), their conclusions are based on considerably more data than this current thesis and they achieved an overall response rate of 77.6%. Although the Harding team's study is over 34 years old, the research objectives closely match those of this current study. Harding's team examined factors regarding pre-AFIT experience, AFIT training, post-AFIT assignment, and attitudes and

opinions. Harding's team was able to examine those graduates who had left the Air Force as well. This significant factor allowed for examination of internal and external factors driving AFIT graduates from the Air Force. The primary results of this study indicated that those officers most likely to remain in the service:

> ...were older, married, regular officers. Younger officers who were ROTC graduates assigned to engineering and scientific fields were likely to leave the service. Most frequent reasons given for leaving the Air Force were: promotions not based on merit; better civilian job opportunities; low pay; and unsettled family life. In-service officers' reasons for remaining were retirement advantages and time already invested. They might decide to leave for a high-paying civilian job, loss of flight pay, or missing out on a promotion. (Harding, et al., 1963: iii)

The study clearly did not discuss GCA graduates since the program had not yet been created. Hopefully, this current thesis examining GCA graduates in the Air Force coupled with a follow-on thesis examining those who have left the Air Force can complete the picture Harding's team started sketching 34 years ago.

Hart, 1965. Hart's thesis contributed to the early examination of graduates of an AFIT program. Although Hart was strictly examining logistics managers for the classes of 1963 and 1964, his survey sample of 81 graduates (65 responded) closely mirrors the sample size (73) of the current GCA thesis. The stated objective of this thesis was to evaluate only two classes of graduates since changes in the program structure and curriculum over the ten years prior to this thesis made comparison of all graduates meaningless (Hart, 1965: 7). His thesis developed a survey designed to focus on the utilization of the education received at AFIT. This thesis, too, was conducted prior to the existence of an AFIT GCA class but limited itself to examining only logistics graduates. This established a precedent for isolating a specific degree program, examining a

specified group of graduates, and reporting the results for the benefit of the Dean, the faculty, the school itself, and all the graduates who would follow. Hart's survey, although focused on the graduates' contributions to the logistics field, grew into an effort that also examined grade point average (GPA) and the AFIT logistics curriculum. This is another groundbreaking aspect of Hart's research. His conclusions are repeated below (Hart, 1965: 55-56):

1. Graduates of the logistics program have been better utilized than have non-graduates of equal rank and experience. They have jobs requiring more knowledge, skill, and responsibility.
2. The graduates have been assigned to materiel career area jobs. Of the 65 respondents, 64 are presently working in a materiel job.
3. The majority of those responding (85%) were assigned to as good or better jobs than those held prior to entering the program.
4. The curriculum presented to the class of 1965 is considered to be excellent and to contain all courses needed with one exception: a course in Logistics Planning should be added.
5. Adequate time in the academic schedule for the inclusion of a Logistics Planning course could be obtained by combining the Transportation and Supply courses presently taught.
6. The curriculum is properly balanced regarding quantitative content.
7. The lack of mathematical experience and background did not have an adverse effect upon the success of the students. The grade point averages earned in quantitative courses did not show a significant difference between those reporting "inadequate preparation in math" and those stating that they were "adequately prepared."

8. The quantitative skill area provided the differentiating factor in grade point spread. This differentiation was independent of the preparation, no relationship between GPA and preparation could be established.
9. The faculty was considered to be of average quality.
10. Of the 65 respondents only 2 were considered to have a poor attitude toward the program.

Cook and Greene, 1968. Cook and Greene essentially continued the work Lt Col Hart (1965) started, evaluating the graduate logistics program. Their data set consisted of 173 logistics graduates from the classes of 1965-1967 who responded to their survey (215 surveys were mailed out). This research was not unique, but simply a continuation of previous research, which also examined changes in the curriculum between Hart's thesis and their thesis three years later. This thesis, although qualitative in overall nature, also used numerical analysis in an attempt to quantify the responses of the survey respondents. To test their two null-hypotheses, Cook and Green calculated median values, correlation coefficients, and significance levels in their various tests (Spearman rank correlation test, chi-square test, and sign test) for the responses to accept or reject their hypotheses and make inferences about the population. Again, this research cannot account for GCA graduates, but does set a precedent for a follow-on effort to a previous thesis examining degree-specific graduates.

Beam, 1973. Beam's thesis broke away from the graduate focus by examining the Advanced Academic Degree Management System (AADMS) the graduates would become a part of. Beam queried supervisors who were in charge of AAD billets.

Although Beam's questionnaire did not require the supervisors to supervise AFIT graduates specifically, all AFIT graduates are supposed to fill AAD coded positions. The initial importance of reviewing this thesis was simply to acquaint the current author with the AAD program and supervisor's perceptions of the people filling those positions. Beam sent surveys to 56 people and received 49 responses (87%), the highest response rate for any research reviewed here. The results support the current belief, from a general standpoint, that the advanced degrees granted by AFIT are important to the Air Force. Beam's thesis, however, identified several problems with the AADMS program including the non-utilization of graduates' skills and poorly defined AAD positions. Beam pointed out that numerous supervisors were not using the AAD system and in fact, there were many who did not even know it existed! This is a very important facet to the current GCA thesis – whether GCA graduates are being utilized in positions that can take maximum advantage of their skills.

Davidson and Crowder, 1978. Davidson and Crowder's thesis was another follow-on work to Hart and Cook and Greene's theses that examined graduates of AFIT's logistics program. This thesis also incorporated an aspect of Beam's thesis regarding supervisors' perceptions of the logistics graduates they supervised. Their primary objective was to determine the extent to which graduates of the logistics program were using their AFIT logistics education in their present assignments. Again, this thesis provided information for only the logistics community. They mailed out 300 surveys to graduates and 300 to their respective supervisors. They received 219 responses from

graduates (72.3%) and 189 from supervisors (62.5%). Their survey, like all discussed here, incorporated a variation of the Likert numerical scale for at least some of the survey responses. This facilitated a certain amount of parametric numerical factor analysis regarding specific questions on the survey. Those questions not meeting criteria for the factor analysis were subject to expert opinion. Davidson and Crowder's conclusions affirmatively supported the two primary questions they set out to answer: 1) whether the logistics program was perceived to be useful by the graduates; and 2) whether the logistics program was perceived to be useful by the graduates' supervisors. It is important to re-emphasize here, that no other degree programs outside logistics have conducted any graduate-focused research to this point.

Smith, 1986. Smith's thesis continued the research evaluating the graduates of the Graduate Logistics Management (GLM) program. Like Davidson and Crowder, Smith incorporated the graduates' supervisors in the research. The two studies are extremely similar; Smith's is simply more contemporary. Smith mailed out 169 surveys to graduates (and an equal number to their supervisors) and received 124 (73%). He only received 109 surveys back from supervisors (64%). Smith even acknowledged taking the majority of his survey questions directly from Davidson and Crowder's 1978 thesis (Smith, 1986: 17). An important conclusion from Smith's thesis, however, details skills/subject areas taught in the GLM program which are considered most important/useful in helping the graduate do his/her job. Those most relevant to the

current effort are listed below in order of importance from most to least (Smith, 1986: 55):

1. Verbal Communication
2. Written Communication
3. Organizational Behavior
4. Problem Solving
5. Organizational Management
6. Federal Financial Management
12. Reliability and Maintainability
17. Life Cycle Costs
18. Statistics
22. Microeconomics
23. Macroeconomics
24. International Logistics

Smith cited another study that arrived at the same top five important skills, indicating that these are important to all Air Force officers, not just logisticians. Additionally, it is noteworthy to mention here, particularly with the 12 listed (out of 24 total), that a number of these skills are even more important to the cost analyst. Cost analysts must understand the economics of various situations, must perform the Life Cycle Cost (LCC) analysis including system reliability and maintainability, and must therefore brief the conclusions orally and in writing to decision makers at various levels. It is interesting to note that there are numerous financial/cost topics considered more important to the logistician than some purely logistical subjects. Despite the evident importance of cost and financial topics, a true Master of Science degree in Cost Analysis did not even exist until 1988,

two years after this thesis (although, as mentioned previously, the cost analysis option was offered as part of the Systems Management degree starting in 1983).

The importance of mentioning the number of theses conducted for the logistics community is to point out the glaring lack of research for graduates of the other degree programs at AFIT, as well as to establish a precedence for conducting such research. Further, examining a wide range of theses, despite covering the same basic population, allows for an examination, evaluation, and assimilation of survey methods, research objectives, and data analysis. The following theses are not only more current, but their research areas are also more pertinent to the necessary history for conducting this current GCA effort.

Beres and Camacho, 1992. Beres and Camacho's thesis is groundbreaking in that they conducted the first effort that examined demographics and retention rates of all AFIT degree programs (1973-1987). Their data is strictly from the AFIT Registrar's office (AFIT/RR) and the Defense Manpower Data Center (DMDC). This is significant because they did not have to conduct a survey, but were able to rely solely on Air Force records. Their primary research objective was strictly to gather information on retention rates and demographics of AFIT graduates. They considered categories such as percent female, percent rated, graduate grade point average (GPA), and age at graduation. The only apparent limitation of their information in relation to the GCA program, based purely on demographics (obviously, AFIT/RR and DMDC cannot provide valid, subjective assessments of graduates' perceptions of their current jobs, their AFIT education, or their career as a whole), is the small sample size. Since the first class to be offered the cost analysis option was 1983, Beres and Camacho's thesis only has data for

five years. One final point worth mentioning is that Beres and Camacho's number of graduates for the classes of 1984 through 1987 (four of their five years) are inaccurate. Beres and Camacho indicated that the master roster of graduates contained errors and there were instances of graduates being omitted (Beres and Camacho, 1992: 12). They also mentioned numerous other errors in the AFIT Registrars database. The fact that these exist can, in itself, potentially explain why Beres and Camacho listed differing numbers of graduates for some classes than the current effort. Additionally, while it is not stated outright in their research, it appears that Beres and Camacho only considered active duty Air Force graduates in their numbers, omitting numbers for civilians, officers from the other armed services, and foreign exchange officers. This could further explain any discrepancies between their results and the numbers presented here.

Baxter and Bolin, 1994. Baxter and Bolin's thesis was the first to really address cost management competencies for DOD program managers. Although their thesis was more related specifically to the program manager's required competencies, this was a firm beginning for identifying what competencies and skills were in demand in the acquisition arena. Many cost analysts will, at some point, spend some time interacting with program management, contracting, and engineering. These disciplines will also be interacting with one another on a daily basis. Not only does this thesis help reinforce the current GCA curriculum but seems to indicate a need to further educate the other disciplines in cost analysis skills. Their survey was divided into two separate instruments: one measuring the *importance* of the competencies used and the other

measuring the *frequency* of use. They sent out 682 surveys to program managers and received 330 responses (48.4%). From a program manager's perspective, Baxter and Bolin concluded that the following ten cost competencies are most important (Baxter and Bolin, 1994:68):

1. Evaluation of contractor-recommended corrective actions; select course of action
2. Understand the cost implications of alternative contract types and pricing mechanisms
3. Understand the impact of changes in scope on the cost of defense contracts
4. Understand the role the organization plays in the Planning, Programming, and Budgeting System (PPBS)
5. Be able to develop corrective actions to counter unfavorable program variances
6. Understand cost estimates developed using appropriate methods (e.g. parametric, analogy, grass roots)
7. Understand the impact of production rate and quantity decisions on program cost
8. Understand the flow of funds through expenditure categories of commitments, obligations, and expenditures
9. Understand cost elements such as direct labor, direct materials, general and administrative, profit, and overhead
10. Understand contractor cost reports such as the Contractor Performance Report (CPR) and Cost/Schedule Status Report (C/SSR)

Their research also indicated a potentially weak area in the current GCA curriculum: a lack of education regarding financial management (i.e. obligations, expenditures, colors of money, POM/BES familiarity, etc.). While the Federal Financial Management course touches all these areas, it is not geared toward preparing an officer for the challenges of a budget assignment. Although GCA graduates would benefit most from the in-depth

study of this information, it is also extremely important for other acquisition professionals (i.e. contracting officers, program managers, etc) to gain at least a fundamental understanding of federal financial management. Therefore, it seems important to maintain the current course in its current form, but also to offer additional and more advanced budget education for the cost analysts.

Woodson and Yoder, 1994. This thesis is the most evolved model, through 1994, of all the graduate/supervisor surveys reviewed here. Although the focus is on the contracting career field, Woodson and Yoder's research approach is very thoughtful and might serve as a strong basis for similar future endeavors for the cost analysis program. Their primary objectives were to determine which skills are perceived as most important for contracting professionals, to determine the extent these skills were learned in their graduate degree programs, and to evaluate supervisors' responses against the graduates' responses. They identified the primary skills via a previous research effort and included the information in their surveys. They mailed out 221 graduate and supervisor surveys. They received 131 graduate responses (59.3%) and 89 supervisor responses (40.3%). Their basic premise is that the usefulness of any graduate education is contingent upon the development of the skills particular to that field. The current GCA thesis utilized many of their survey questions in a GCA context.

Pry, 1995. Pry's thesis lays a strong foundation for the identification of cost management competencies required by the financial manager/cost analyst. Pry's sample of 535 (978 surveys mailed out: 54.7% response rate) financial analysts throughout the

Air Force (not limited to AFIT graduates) provides keen insight into the financial skills and abilities needed and how frequently they're used. This research is an important building block in the discussion of the GCA program. Pry has taken Baxter and Bolin's idea one step beyond the program manager and applied it directly to the analyst. The results of her research clearly outline the areas in the curriculum that should receive the greatest and the least attention. This is paramount to knowing if the curriculum is structured properly and will be useful when interpreting feedback from the current GCA research regarding the strengths and weaknesses of the cost analysis program. The ten most important competencies are listed below, from most to least important (Pry, 1995: 38):

1. Understand the different types of appropriations (3080, 3400, 2600, etc.) and the years they are available (including active, expired, and cancelled years)
2. Understand the cost elements such as direct labor, direct materials, general and administrative, profit, and overhead
3. Understand the impact of inflation on program costs and funding
4. Understand ways to characterize costs such as fixed/variable and recurring/nonrecurring
5. Understand the flow of funds through the expenditure categories of commitments, obligations, and expenditures
6. Understand the role the organization plays in the Planning, Programming, and Budgeting System (PPBS)
7. Be able to apply inflation factors to program costs and funding
8. Understand cost estimates developed using appropriate methods (e.g. parametric, analogy, grass roots)

9. Understand the impact of production rate and quantity decisions on program costs
10. Understand the obligation rates set by the Air Force and the implications if these rates are not met

Pry's thesis is the most important and relevant to date pertaining to the cost analyst. The current researcher hopes to build upon her success in helping to improve the career field through identifying and improving weak areas of the cost analysis graduate program as well as capitalizing on the current strengths of the program and its analysts.

Summary

Based on the above literature, it is evident that there is a need to gather similar information from the graduates of the GCA program. This will further highlight the curriculum, provide insight into the benefits to the graduates of the focused GCA curriculum, and provide information to decision makers regarding the benefits to the Air Force as a whole. The above literature has established the groundwork for monitoring and evaluating a program's strengths and weaknesses as well as the graduates' career progress. The following chapter details the steps taken by the current effort to build upon this research stream.

III. Methodology

Overview

The factors being examined in this research are related to the graduates' post-AFIT career experiences and not their performance at AFIT. While there may be disparities between abilities of different graduates, no inferences will be based on ability, intelligence, or effort. This is strictly an investigation of graduates' post-AFIT jobs, experiences, and opportunities in the hope that this information will provide decision-makers and fellow graduates with insight on the future of GCA graduates.

This research was divided into three distinct phases. Phase one was preparation and formulation of research questions and survey questions. This phase also involved the development of a research proposal, which has made the actual writing of the thesis significantly more focused and organized. Phase two was the collection of names and addresses of active duty graduates and the data gathering itself. Finally, phase three was the recording and analysis of all received responses.

Survey Development

The first step in this research was deciding exactly what information was desired and determining how it could best be gathered. Numerous potential research questions were raised, evaluated, and refined until the topic seemed focused enough to proceed. The original scope of this research included surveying all past GCA graduates. This

would have facilitated the gathering of more complete demographics including information about why some graduates have separated and what civilian job prospects exist for current active duty members contemplating a separation from the Air Force. As mentioned previously (and discussed in more detail in the *Population* section below), the OMB approval process stymied the potential for a complete examination, and the research was scaled to include only active duty Air Force officers.

Once the direction of the research was decided, gathering the desired information was the next hurdle. The survey was selected as the basic instrument of data collection due to its simplicity and flexibility. Flexibility was paramount for this exercise to allow last minute changes to the survey before being mailed out. This was extremely important due to the last minute exclusion of graduates who have left the Air Force. The survey had to be restructured only slightly to focus on active duty graduates only.

Although the survey offers a flexible instrument for gathering data, it does have weaknesses. Its greatest weakness is its "dependency upon the respondent's verbal behavior" (Cooper and Emory, 1995:321). While verbal behavior and the willingness of the respondents to reply are two limitations of many surveys, steps were taken during the data collection process to minimize the impact of these potential weaknesses. First, although there are many reasons the graduates might not respond to this survey, those who were contacted personally expressed great interest in the subject. They found the topic personal and interesting enough (especially with the uncertain future of AFIT and the active duty Air Force Cost Analysis career field) to volunteer their responses. Second, every respondent has at least a Master's degree and due to the high value placed

on communication skills in the Air Force, verbal behavior in the responses was always commendable. Further, since open-ended questions tend to require greater effort on the respondent's part, a Likert-type scale was used for as many questions as possible. The Likert scale measures the degree to which a respondent agrees or disagrees with a statement (usually on a scale from 1 to 5). There are three main advantages of using the Likert scale. First, the scale can be developed with ease. This is important since many other methods require complex planning and statistical scale-analysis beforehand. Second, reliability is improved with a standardized list of possible responses and the requirement that respondents answer every question. This is especially important when compared to other scales (i.e. Thurstone-Scale), which do not require respondents to answer every question. Finally, relating again to answering every question, the volume of data is increased (Cooper and Emory, 1995:180). The combination of these elements produced a simple, yet useful survey structure.

Once the decisions about the data-gathering instrument were made, survey questions had to be structured to achieve the stated research objectives. The overall objectives fell into four main areas. First, gather up-to-date demographic information on GCA graduates. Second, gather information about experiences and opportunities of prior graduates. Third, evaluate the strengths and weaknesses of the current GCA curriculum, as perceived by its graduates. Finally, determine whether a similar program at a civilian institution could replace the AFIT GCA program. Survey questions had to be designed to meet these objectives. Since numerous, similar research efforts exist, this thesis made extensive use of the previously developed survey questions. For each objective,

questions were either borrowed/modified from previous surveys or were created specifically to focus that objective on the GCA program. The final total number of questions relating to each objective is listed in the following table:

Table 1. Objectives and Related Survey Questions

Objective:	Related Survey Question Numbers:
1) Gather demographic information on past GCA graduates	1,2,3,4,5,6,7,8,9,10,11,12,13,14
2) Gather information about experiences and opportunities GCA graduates have had	6, 12, 13, 14, 15, 16, 17, 18, 19, 20 L1, L2, L3, L4, L5, L6, L7, L8, L9
3) Evaluate the strengths and weaknesses of the GCA curriculum, as perceived by past graduates	21,22 L10
4) Determine whether the AFIT GCA program could be wholly replaced by a similar program at a civilian institution	23 L10

The first row of survey question numbers represents the first 23 questions in the survey. All numbers preceded by an 'L' represent questions from the Likert Scale section of the survey. It should be noted that several survey questions were designed to meet more than one objective. While it may seem that latter objectives received lower attention, since there are fewer related questions, nearly the opposite is true. Many questions on the survey were designed to be open-ended to allow respondents to contribute as much or as little information as they felt necessary, thus allowing the most candid responses. This is not always possible when a question is designed with a finite selection of answers.

Therefore, as the survey progressed, questions became more open-ended and individually interpretable.

There are several possible statistical tests that can be performed on Likert Scale responses. Those considered for this particular survey were limited due to the small sample size as well as the small number of questions in the Likert section. The item analysis test is primarily designed to evaluate the reliability of any one question. Basically, is the question such that people tend to respond on one end of the spectrum or the other (more strongly for or against the statement), rather than remaining neutral or undecided? This test uses the frequencies of responses to each question to eventually calculate a t-value (level of significance) for each question to determine if it should be included in the final analysis. There are several problems with implementing the item analysis test in this thesis. First, this test is based on taking only the upper 25 percent and the lower 25 percent of the responses, ignoring the middle 50 percent. This would effectively eliminate 20 of the 40 responses received. If that occurred, the recommended significance level of 1.75 (or greater) for this test could not be achieved since this is only possible "provided there are 25 or more subjects in each group" (Cooper and Emory, 1995: 180). Additionally, this test is designed to eliminate insignificant questions in the Likert Scale. This is based on the premise that there were more than 20 or 25 questions in the scale to begin with. Under normal circumstances, a large Likert Scale questionnaire would be reduced to 20 or 25 questions using the item analysis. This particular effort only included 10 questions and eliminating even one would reduce the survey's ability to convey specific information.

A second statistical test considered for the Likert section was the chi-square test. The chi-square test is "probably the most widely used non-parametric test of significance" (Cooper and Emory, 1995: 447). This test primarily looks at the expected distribution versus the observed distribution based upon a null hypothesis. This test was not examined in depth due to the fact that the calculations involved require a frequency of 5 or greater in each category (Cooper and Emory, 1995: 448). A quick visual examination of the Likert section results indicate there were no questions with all sections receiving 5 or more selections. For example, Likert question 1 had only 3 responses in the "strongly disagree" category.

The final test considered for the Likert section was a simple sign test. "The sign test is used with matched pairs when the only information is identification of the pair member that is larger or smaller or has more or less of some characteristic" (Cooper and Emory, 1995: 648). The null hypothesis for the sign test would indicate that the number of pairs "in which $X_A > X_B$ [are equal] to the number of pairs in which $X_B > X_A$" (Cooper and Emory, 1995: 648). This test and its variants (Wilcoxon Matched-Pairs Test, Kolmogorov-Smirnov Two-Sample Test, and Mann-Whitney U Test) are all particularly suited to the sample size and structure of the Likert section. Since only the direction of the differences (not magnitude) was known, the simpler sign test was selected over the variants.

For the purposes of this test, any responses in the "agree" area, whether "slightly" or "strongly," were combined as a single "agree" category. The same was true for the "disagree" responses. The null hypothesis, H_0: "no perceived difference," essentially

states that the population showed no difference between agreeable and disagreeable responses for that particular Likert question. The alternate hypothesis, H_a: "a difference exists," indicates that respondents felt strongly enough about the question to respond more agreeably or more disagreeably, not to remain neutral or undecided. These were tested in the following manner:

1. Responses in the "slightly" or "strongly" categories, whether "agree" or "disagree", were grouped as a single category. For example, if one response was "strongly agree" and the other was "slightly agree," they would count as two responses in the "agree" category. The same is true for the "disagree" category. Any "neutral/undecided" responses were not included in n (sum of agreeable and disagreeable responses) since they exhibit zero difference. Using Likert question 1 as an example, there were 10 "disagree" responses, 2 "neutral" responses, and 28 "agree" responses (40 total responses). Dropping the two neutral responses makes n=38.
2. The equation for the normal approximation to the binomial distribution was used since the sample size for each question was greater than 10 (Winkler and Hays, 1975: 855). This equation resulted in a standard-normal, cumulative Z-value for which a known probability could be determined. The equation is

   $Z = \frac{R - E(R)}{\sigma_R} = \frac{R - np}{\sqrt{npq}}$ (Winkler and Hays, 1975: 246) where R is the number of successes (or "agree" responses), p is the probability of success, and q is the probability of failure ("disagree" response).

3. Once a Z-value for each Likert question was calculated, the associated cumulative normal probability was found using a regular Z-table of cumulative probabilities. This value was subtracted from 1 and then multiplied by 2 to arrive at an appropriate two-tailed P-value for each Likert question.
4. Since desired significance levels may differ, P-values for a two-tailed test are reported.

Again, since all that is known about each pair tested is the direction, not magnitude, of the difference, a parametric T-test for matched pairs cannot be used. To present all relevant information to the Likert section, the numbers of responses per category to each question are summed and are presented in Chapter IV as well as the results of the sign test.

Population

The entire population of all GCA graduates includes over 140 total graduates through the class of 1996S. This total includes a number of Air Force civilians, Army students, several foreign military graduates, as well as a large portion of military members who have since left the Air Force. Gathering information about this population involved contacting the AFIT Registrar's office and Air Force Personnel Center (AFPC) and giving them as much information as possible about the target population. Between AFPC and the Registrar, 143 GCA graduates were originally identified (1983-1994). Originally, this thesis intended to survey all graduates. Due to the lengthy process of gaining OMB approval to survey anyone other than active duty Air Force officers, this thesis was tailored to include only the 75 current Air Force officers. One member was

omitted from the sample due to data masking by AFPC and another member, the current thesis advisor, was omitted to reduce bias (or conflict of interest), decreasing the total sample size to 73 graduates. This thesis, therefore, focused only on those 73 surveyable Active Duty (AD) Air Force members from the classes of 1983 through 1994. For this purpose, the use of the term *population* in this thesis will refer to the 73 AD Air Force members who were surveyed. This reduction in scope facilitated gathering current duty location addresses of the target population.

Data Collection

Once the survey was complete and the population identified, AFPC was formally contacted with a research proposal and a sample survey. AFPC approved the survey within one week and assigned it a Survey Control Number (SCN97-34). A final cover letter was drafted, and the surveys were mailed out on June 10, 1997. The cover letter indicated a survey return not later than (NLT) date of July 7, 1997. A self-addressed return envelope was included in every survey package sent out. Including a return envelope, which could be sent back through official mail or through Air Force pouch mail without the inconvenience of having to pay postage, encouraged respondents to reply. Since the response rate was below 50% on the NLT date, this researcher began placing phone calls to all participants for whom accurate phone numbers could be gathered to hopefully increase the response rate. Due to anonymity, it was impossible to know which graduates had returned surveys and which had not, so all graduates that could be reached (46 accurate phone numbers were known) were contacted. This researcher did not contact seven of the respondents who requested survey results, since it was apparent they had completed the survey. The last survey was received July 28, 1997. The final total number of surveys received was 40, giving an overall response rate of 55%.

Data Analysis

All demographic-related responses and Likert-scale responses were entered into a Microsoft Excel® spreadsheet to perform basic statistical analysis (calculate means) and report percentages. Every question on the survey that was quantifiable was listed across a single row on a spreadsheet. As responses were received, pertinent information was entered across the row for that response. Once a response was received, quantities and percentages automatically calculated throughout the spreadsheet and automatically updated the tables within this thesis. These entries were linked to the actual document in Microsoft Word® so that any last minute changes in the spreadsheet would automatically be reflected throughout the thesis. The Likert Scale section was set up in exactly the same manner in order to quantify how strongly a number of respondents felt about that particular question. The columns were summed at the bottom of the last response (40 rows) and total responses to each area of the Likert Scale are reported below. The more open-ended questions, those requiring opinions or which were not specifically designed to report demographic information, were recorded and stratified according to the general response. For example, one respondent indicated that the curriculum used "too much of the fire-hose method of instruction" while another said the curriculum "covered too much information too quickly." These were considered a single response, although the number of people responding similarly to each question was noted in an attempt to gauge the overall perspective for that particular question. These responses are summarized in Chapter IV.

IV. Findings and Analysis

Overview

The process of reading and analyzing surveys containing open-ended questions is not an easy one. Respondents convey numerous emotions and opinions that cannot simply be quantified. They must be read, understood, and presented in the research in such a manner as to maintain the integrity of the respondents' original thoughts. The information presented in this section has retained the essence of the responses received, without simply quoting every survey response. The demographics section, presented first, makes a brief comparison with Beres and Camacho's 1992 thesis and then goes on to present as much demographic information as could be gathered about the 73 surveyed active duty GCA-graduates. More specific information was available for the portion of the population who responded to the survey and is presented as such. The subjective section presents the reader with the sentiments and experiences of the respondents regarding their GCA education and subsequent cost analysis jobs. Finally, the Likert section discusses the results of the Likert Scale portion of the survey.

Demographics

The descriptive statistics for the GCA classes from 1983 through 1987, as presented by the Beres and Camacho thesis (1992) make an interesting comparison against the current numbers today. As mentioned in Chapter II, Beres and Camacho

reported fewer numbers of GCA graduates for the classes of 1985 and 1986. This is potentially due to the mentioned errors in the record keeping databases when Beres and Camacho gathered their data, as well as being unable to classify every graduate as active duty Air Force, civilian, or other service. The difference is relatively insignificant but is reported below to insure accurate comparison. There was no way for the current author to verify the validity of the Beres and Camacho's "percent in Air Force" column since it reflects the percentage of graduates in the Air Force at the time their thesis was written. Again, their original values are reported to insure accurate comparison:

Table 2. Demographic Comparison

Grad Yr	Tot Active Duty AF Grads	% in AF as of Sep 92	Grad Yr	Tot Active Duty AF Grads	% in AF as of Feb 97
83	10	40%	83	10	10%
84	9	89%	84	9	33%
85	9	78%	85	12	33%
86	10	100%	86	11	55%
87	10	90%	87	10	50%
			88	10	80%
*Totals only include active duty AF. Totals DO NOT include civilian graduates or graduates from other services who could be identified as such.			89	10	10%
			90	9	67%
			91	13	69%
			92	13	77%
			93	14	86%
			94	10	100%
Mean	10	79%		11	56%

Table 3 represents the total number of responses received compared to the number of surveys sent, by class. The number of surveys sent (TOT SURVEYS SENT) column

represents the total number of graduates from each class who are currently on active duty (based on AFPC data), while the number of graduates from each class (NUM GRAD) column represents the total graduates at the time of graduation.

Table 3. Survey and Response Results

SURVEY & RESPONSE RESULTS					
GRAD YEAR	NUM RESPONDING	TOT SURVEYS SENT	% RESPONDING	NUM GRAD	% IN AF NOW
83	0	1	0%	10	10%
84	2	3	67%	9	33%
85	3	4	75%	12	33%
86	4	6	67%	11	55%
87	1	4	25%	10	50%
88	6	7	86%	10	80%
89	0	1	0%	10	10%
90	2	6	33%	9	67%
91	2	9	22%	13	69%
92	8	10	80%	13	77%
93	4	12	33%	14	86%
94	8	10	80%	10	100%
MEAN	3	6	47%	12	51%
TOTAL	40	73	55%	131	56%

This table indicated that the majority of GCA graduates remain on active duty (again, these totals only include active duty Air Force officers). Although this is not a startlingly high majority, the implications are that graduates are choosing to remain in the Air Force over separating from the Air Force to move into the private sector. It is evident that the earlier classes have had more members leave the Air Force. Again, without examining

the population who has left the Air Force, one may only speculate on possible causes such as retirement, missed promotions, or higher pay as civilians. Respondents also supplied information regarding their decisions to remain in the Air Force so it is possible to gauge what, exactly, is keeping the majority of the graduates loyal to the Air Force. On the survey, six possible choices were given (the sixth being for the respondent to specify another reason not included on the survey). Respondents were given the option of choosing more than one reason for remaining in the Air Force, and those responses are given in Table 4 below.

Table 4. Why Graduates Have Remained

REASONS FOR REMAINING IN AF		
REASONS	# SELECTED	%
Pay	7	11%
Medical benefits	4	6%
Retirement benefits	16	26%
Promotion opportunities	4	6%
Too much time already invested in AF	14	23%
Other (respondent specified)	17	27%
TOTAL*	62	100%

*Total reasons exceeded total number of surveys received since respondents were given the option of selecting more than one reason for staying in.

It is interesting to note how many graduates selected the option of "Too much time already invested." Since the specified reasons for option six (reason: Other) varied widely, it cannot be considered the most highly selected single reason for staying in the Air Force. Therefore, time invested becomes the second most highly chosen response,

after retirement benefits, to this question. The potential implications here are that the two (retirement benefits and too much time invested) are related. Possibly, the Air Force is identifying sharp individuals, targeting them at the right time in their careers, and offering them advanced degrees. This commits the officers to the Air Force longer, thus rewarding the Air Force as more officers complete their careers. Future research in this area, even across other degree programs, might benefit greatly from delving more deeply into these two major reasons. Greater insight into the various Air Force retirement plans, as well as proposed future plans, might lead decision makers to reason differently knowing how strongly their personnel feel about their post-Air Force lives. Further, has there been a conscious decision that has pushed graduates into a timeline where they feel there is no turning back or changing direction? In an attempt to answer this question, the survey included questions regarding total active duty time and total commissioned time. It was considered entirely possible that graduates were entering the GCA program with a significant amount of total time invested in the Air Force (prior enlisted as well as commissioned time) and the additional AFIT commitment made leaving the Air Force a near impossibility. Respondents' pre-AFIT years of active duty service are summarized in Table 5, below.

Table 5. Graduates' Pre-AFIT Active Duty

AVERAGE PRE-AFIT YEARS OF SERVICE (Applies to respondents only)			
GRAD YEAR	Commissioned YEARS (avg)	Tot Active Duty YEARS (avg)	Tot Num Respondents
83	0	0	0
84	3.0	3.0	2
85	4.7	6.0	3
86	7.3	9.7	4
87	6.0	15.0	1
88	5.9	6.7	6
89	0.0	0.0	0
90	11.5	9.5	2
91	7.0	7.0	2
92	5.9	6.5	8
93	7.6	8.6	4
94	5.8	7.6	8
MEAN	5.4	6.6	3

The Total Active Duty years column represents the total number of years each respondent had on active duty, whether enlisted or commissioned. The Commissioned Years column represents only the years each graduate was an officer before entering AFIT. The difference of the two is prior enlisted time. For the purposes of this research, *total* years of service of all graduates in each class would be a meaningless statistic. Therefore, times given are averages for each class. Due to the low number of respondents in some classes, the Total Number of Respondents is listed so the reader can gauge the potential for skewed results by a single individual's response. For example, the one respondent

from the class of 1987 had nine years of prior service time. The averages given are the actual years for that person. If a second respondent with no prior service were added to that class, it would appear that everyone in that class averaged 4.5 years of prior service time. Thus, the reader is cautioned when examining these average years of service. They are presented merely as pieces of the puzzle of why many graduates have found themselves in positions where they feel obligated to the Air Force due to time already invested.

Tied for the least chosen options are medical benefits and promotion opportunities (see Table 4). There are several possible explanations for this. First, most civilian employers offer relatively comprehensive health and medical insurance. This becomes an irrelevant consideration for graduates choosing between employers. Second, regarding promotion opportunities, the Air Force promotion system is laid out very linearly. There is very little chance of being promoted, for example, from Captain to Major in two years based on job performance and contribution to the organization. It is also unlikely that anyone would ever be promoted directly from Second Lieutenant to Captain (skipping the promotion to First Lieutenant) for the same reasons. In the civilian world, however, promotions are less linear. Civilians can be promoted to any level in their organization based on aggressiveness, ability, contribution, etc. Further, 48% of the respondents are Majors (see Table 6), none of whom have been promoted below the zone.

Table 6. Respondent Rank Mix

RESPONDENT RANK MIX		
RANK	NUMBER	%
CAPT	16	40%
MAJ	19	48%
LTC	5	13%
TOT	40	100%

In fact, one respondent indicated promotion above the zone, which is later than usual (see Table 7).

Table 7. Graduate Promotions

PROMOTIONS		
	MAJOR	LIEUTENANT COLONEL
WITHIN PRIMARY ZONE	24	5
ABOVE PRIMARY ZONE (LATE)	1	0
BELOW PRIMARY ZONE (EARLY)	0	0
TOTAL*	25	5

* This number includes captains who have been selected for promotion to Major but have not yet pinned on.

One respondent charged that, "Cost is seen more as a 'nice to have' function – nearly impossible to get promoted below the zone – not motivating to excel." It is arguable that the Air Force is not encouraging GCA graduates to remain in the Air Force through its promotion process alone. A significant number of respondents remain, however, who have been promoted. The weakness of any argument here is the simple fact that data do not exist for those who have chosen to leave the Air Force. Were they passed over for promotion? There is no way to accurately determine whether or not these people have

left the Air Force because they wanted the change or because they felt noncompetitive within the system. Only a complete examination of those graduates who have left the Air Force can fully explore the potential of this theory.

It is important to examine the final option in Table 4, reasons the GCA graduates have remained in the Air Force, more closely before proceeding. The single most mentioned response in the "other" category for remaining in the Air Force was because some graduates simply enjoy their jobs and the challenges the Air Force provides. Several respondents indicated that they enjoyed moving around with the Air Force and living in different places. This, however, was also a point of contention among some graduates. A few graduates indicated that they are separating from the Air Force and listed instability as the primary reason. Other factors such as higher pay in the civilian world were also mentioned. Without a formal survey of graduates who have left the Air Force, however, a complete examination of the factors drawing some graduates away from the Air Force is impractical here.

Building upon this information, the survey queried graduates about their current jobs and post-AFIT experiences. Table 8 gives a rough breakdown of the percent of time graduates have performed in a cost-analysis or estimating job.

Table 8. Time in Cost Jobs

	% TIME IN COST RELATED JOBS				
	0-10%	11-25%	26-50%	51-75%	76-100%
# RESPONDENTS	2	4	10	10	14
% RESPONDENTS	5%	10%	25%	25%	35%

It is clear that the majority of graduates are spending most of their time in cost-related jobs. Probing deeper, it was determined that many of these jobs do not require an Advanced Academic Degree (AAD). However, there are two other things to consider here. First, AFIT justifies its number of students by the number of AAD positions available in the Air Force. If there were many people already filling those positions, AFIT would have little justification for the number of students admitted to each class. Second, many respondents, after fulfilling their AAD requirement, move on into jobs that are considered career broadening, in an effort to increase their promotability. Both sides of this issue are presented in order to maintain the neutrality of this research. Table 9 clearly shows the breakout of graduates currently filling AAD positions. This table also indicates the highest level of education these graduates have received. This was originally considered pertinent to evaluate whether graduates have gone on to Ph.D. programs in other fields of expertise and if so, to examine how this has affected their careers. Unfortunately, not one of the respondents had a Ph.D. and any inferences about education beyond AFIT were considered inappropriate.

Table 9. AAD and Education Profile

GRAD YEAR	NUM RESPONDING	# FILLING AAD SLOTS	% FILLING AAD SLOTS	MASTER'S DEGREES	PhD's
83	0	0	0%	0	0
84	2	0	0%	2	0
85	3	0	0%	3	0
86	4	1	25%	4	0
87	1	0	0%	1	0
88	6	2	33%	6	0
89	0	0	0%	0	0
90	2	0	0%	2	0
91	2	1	50%	2	0
92	8	4	50%	8	0
93	4	2	50%	4	0
94	8	5	63%	8	0
TOTAL	40	15	38%	40	0

*Several respondents indicated having a second Masters degree.
For this research, only the AFIT Master's degree is being considered
in the degree count.

The higher percentage for the class of 1994 is mainly due to the fact that many of those graduates are still filling their required post-AFIT AAD positions.

Subjective

Continuing to explore graduates' experiences, respondents were asked to indicate which areas of cost they have encountered most frequently. This question took two forms on the survey. First, respondents were given a choice of eight areas of cost, the eighth being the option to specify an area not listed on the survey. The second part of the

question was more subjective and respondents were encouraged to discuss their post-AFIT experiences and opportunities.

Experiences and Opportunities. GCA graduates' experiences cover nearly all levels of cost analysis and financial management in the government. Graduates have worked as base-level cost analysts, System Program Office (SPO) analysts, Program Element Monitors (PEM), Planning Programming and Budgeting System (PPBS) analysts, Air Force Cost Analysis Agency (AFCAA) analysts, cost staff analysts, cost research analysts, Office of the Secretary of Defense/Cost Analysis Improvement Group (OSD/CAIG) analysts, base financial services officers, Air Force Working Capitol Fund (AFWCF) officers, Base Realignment and Closure (BRAC) analysts, SPO financial managers, as well as top secret analyst positions throughout the government. Graduates are also distributed throughout the world from the United States to Panama, Italy, Germany, and Korea. Throughout these jobs and locations, there are elements of the cost career field which are constants. These were captured in eight main areas of graduate experience and are summarized in Table 10 below.

Table 10. Graduates' Cost Experiences

COST EXPERIENCE		
EXPERIENCE	# SELECTED	%
Software cost estimation	12	10%
Hardware cost estimation	22	19%
Contractor performance measurement	14	12%
Staff	15	13%
Reviewing estimates	20	17%
Source selection	16	14%
Base level cost	10	8%
Other (respondent specified)	9	8%
TOTAL*	118	100%

*Total areas of experience exceeded total number of surveys received since respondents were given the option of selecting more than one area of experience.

This table indicates that the most frequently performed cost work is in hardware estimation. Nearly one-fifth of all the graduates' experiences have been spent preparing and supporting estimates for systems ranging from the F-22 aircraft to the Global Positioning Satellite system. This level of responsibility attests to the skills possessed by the GCA graduates. Second to hardware estimation is the reviewing of estimates. This means the next most prevalent experience involves reviewing the work of others. As the possible final authority before an estimate is released or briefed, an even greater responsibility is placed on the graduate to be knowledgeable and accurate. The least selected category, "other," included experience from cost research to privatization studies to cost accounting.

Program Strengths and Weaknesses. In the evaluation of the responses received, respondents pointed out numerous strengths and weaknesses of the GCA

program. These were usually brought to light when discussing situations they may or may not have been prepared to handle. The single greatest weakness of the GCA program that graduates identified was the absence of ever working an actual cost estimate from beginning to end. Respondents indicated a need for less theory and more application, especially as software-estimating tools have increased in popularity and availability. The software takes care of the theory and the minute details while the analyst attends to more important aspects. Furthermore, graduates indicated that the Air Force's move toward more fee-for-service operations as well as a greater business focus has increased the need to teach more cost-accounting courses and in greater depth in the GCA program. Finally, graduates suggested that more financial-management topics be covered in the GCA curriculum. A vast majority of the respondents indicated holding at least one or more jobs where financial management and budget knowledge was required. These skills had to be learned on the job and often were not at a very high level of understanding. As only one half of the financial side of the government, cost analysts cannot ignore financial management (budget) issues and jobs. Producing a more well-rounded cost analyst should include the addition of one or more budget courses to supplement the current Federal Financial Management course, which tends to be overly general and from a top level viewpoint.

Respondents did not ignore the strengths of the GCA program. At the top of the list of program strengths were the statistical and regression courses. Nearly every respondent mentioned some facet of the statistical and regression curriculum that has

been valuable in his or her career. The virtues of the Automated Cost Estimator and Integrated Tools (ACEIT) software and training could not be praised enough.

AFIT vs. Civilian Institutions. The GCA program provides a Department of Defense (DOD) perspective that is unavailable at a purely civilian institution. Feedback from the few graduates with second masters degrees, one from AFIT, and one from a civilian school, indicated that the GCA program is truly unique. There may be some overlap between some of the general courses, such as economics or organizational behavior, but there can be no replacement for the dynamics of a military-focused school. The fact that GCA students interact with other students from other degree programs and benefit from each other's experiences and education cannot be replaced or duplicated in a civilian school. Adding to this, AFIT teaches military application, references military regulations, directives, instructions, policies, and guidance, and maintains a military environment in the education of military officers pursuing military careers. Graduates indicated having a much stronger foothold in the acquisition arena following AFIT than their contemporaries who did not attend AFIT. Overall, AFIT is providing valuable tools to its GCA graduates, but there are some apparent changes that could further benefit the Air Force and the GCA graduates.

Education vs. Training. This is, arguably, one of the greatest dilemmas faced by any school. Ideally, education should give the graduates the tools and the abilities to solve problems and handle tough situations in complex environments. Education should

teach them to think their way through their problems. Training, on the other hand, may prepare an individual better for specific situations but anything "outside the box" may only lead to confusion. Numerous comments by respondents acknowledged the lack of realistic training in the GCA program. There seems to be little training for the real world process involved in building a complete estimate, the politics involved, or the level of review required. It was pointed out that when graduates leave AFIT and go to their next jobs, most people there expect the graduates to be experts on every aspect of cost. In reality, many graduates admitted not even being able to complete a cost estimate upon leaving AFIT. Most practical and working knowledge has been gained on the job working with experienced analysts. GCA graduates learn and develop the necessary tools for performing the estimates but have little instruction on how to use the tools from beginning to end.

Thesis Dilemma. One major point mentioned in nearly every response was the thesis. Some graduates indicated that the thesis was an absolute waste of time. That time could have been better spent learning about financial management and budget or even other cost topics. Several graduates suggested replacing the thesis with a large-scale cost-estimating project or even creating a "cost-internship" in various System Program Offices (SPO). This idea certainly has merits. Graduates would receive the benefits of the 15-months of education and receive training at the same time. Other comments, however, eschewed this notion and supported the thesis process by saying it was valuable because it taught them to conduct research, which they must do in some of their cost analysis jobs.

The dividing line appears to be right down the middle, with half of the graduates espousing the thesis process and the other half condemning it. Perhaps there will never be a single solution to this quandary. As mentioned previously, suggestions included replacing the thesis with a single large-scale cost estimate or even with an "internship" in a SPO or on the headquarters staff.

Likert

The final section of the survey served as an attempt to quantify respondents' feelings about several areas in a standardized manner. There were ten questions and respondents were asked to indicate their strength of preference for each question by responding A, B, C, D, or E, where A was "strongly agree," E was "strongly disagree," and C was neutral or undecided. B and D were slightly disagree or slightly agree, respectively. The following sections present each question and its results individually, with a short discussion following each.

Table 11. Likert Question #1

My first assignment made excellent use of the skills I learned in the AFIT Cost Analysis (GCA) program.					
	STRONGLY DISAGREE	SLIGHTLY DISAGREE	NEUTRAL/ UNDECIDED	SLIGHTLY AGREE	STRONGLY AGREE
REPLIES	3	7	2	15	13

While most respondents responded favorably to this question, it was brought to light that a significant number of graduates were placed in budget and financial management positions after graduation, instead of cost analysis positions. This again raises the

question of whether the Air Force is receiving the maximum benefit from its cost analysis graduates. Although in the minority, there were enough disagreeable responses (10 respondents either strongly or slightly disagreed, or one fourth of the total responding) to make this a possible focus area for future inquiries.

Table 12. Likert Question #2

My GCA education is/has been useful to the Air Force.					
	STRONGLY DISAGREE	SLIGHTLY DISAGREE	NEUTRAL/ UNDECIDED	SLIGHTLY AGREE	STRONGLY AGREE
REPLIES	2	3	1	13	21

This question was hardly contested. A strong majority of the respondents felt that their education is and has been useful to the Air Force. The five disagreeable responses are mainly due to being over-utilized in budget and managerial jobs and receiving very little cost-analysis work. The number of favorable responses to this question should encourage decision-makers to reconsider how well cost analysis could be taught at a civilian institution.

Table 13. Likert Question #3

I feel I am better able to solve on-the-job problems because of my GCA education.					
	STRONGLY DISAGREE	SLIGHTLY DISAGREE	NEUTRAL/ UNDECIDED	SLIGHTLY AGREE	STRONGLY AGREE
REPLIES	1	2	4	18	15

Graduates pointed out time and time again that the GCA curriculum teaches excellent tools, which certainly aid in solving on-the-job problems. Again, those graduates who

have not been given the opportunity to fully explore their cost skills due to being assigned non-cost jobs are the main source for negative responses.

Table 14. Likert Question #4

My GCA education has been important in my assignments/jobs since graduation.					
	STRONGLY DISAGREE	SLIGHTLY DISAGREE	NEUTRAL/ UNDECIDED	SLIGHTLY AGREE	STRONGLY AGREE
REPLIES	1	7	4	12	16

A majority of the respondents have held at least one or more jobs outside the cost career field. Most have been in an effort to broaden their experiences but an unfortunate few have been involuntarily assigned to some of these positions, including overseas. These included command positions, executive officers, and budget officers. Since these jobs require little if any cost analysis, the Air Force, again, may not be maximizing its possible return. This point obviously has two sides. The curriculum is designed be broad to prepare an officer for a career, not just a cost analysis job. Most respondents indicated that their AFIT education did open doors to more exciting and challenging jobs than they might otherwise have been offered. Obviously, this could not be totally gleaned from the Likert responses alone. Many respondents mentioned on question 19 of the survey (an open-ended discussion question regarding job and career opportunities graduates have had) the opportunities which have been available to them since graduating from AFIT. Graduates have filled numerous branch-chief positions, even in other career fields, as well as working with cutting-edge technology and programs with very high visibility even at the congressional level.

Table 15. Likert Question #5

My GCA education was important in getting my current assignment/job.					
	STRONGLY DISAGREE	SLIGHTLY DISAGREE	NEUTRAL/ UNDECIDED	SLIGHTLY AGREE	STRONGLY AGREE
REPLIES	6	3	7	15	9

This is a more focused version of the previous question. While the previous question was generally investigating all jobs since graduation, this question emphasizes only the current job. This is simply another measure of how beneficial the program is in respondents' assignments. A majority still answered favorably but the negative responses were greater for this question than last. This is primarily due to the graduates from earlier classes currently holding jobs of greater responsibility and breadth, such as commanders and comptrollers, which require very little cost analysis. Also, as mentioned previously, a number of these graduates also hold budget positions that do not require specific cost analysis education.

Table 16. Likert Question #6

I feel my Graduate Cost Analysis education has enhanced my career.					
	STRONGLY DISAGREE	SLIGHTLY DISAGREE	NEUTRAL/ UNDECIDED	SLIGHTLY AGREE	STRONGLY AGREE
REPLIES	1	1	5	15	18

The vast majority of respondents answered favorably to this question. Only 5 percent disagreed that the GCA program has enhanced their careers. Obviously, the GCA education is perceived to be good for an Air Force career. While there are careers with higher visibility and promotion rates, respondents indicated a tremendous sense of overall satisfaction and job enjoyment with their cost-analysis careers. The majority of the

undecided responses are largely due to officers being very early in their careers and not having had enough career time to be able to answer this question one way or the other.

Table 17. Likert Question #7

While in the Air Force, my GCA education has been helpful in getting promoted.					
	STRONGLY DISAGREE	SLIGHTLY DISAGREE	NEUTRAL/ UNDECIDED	SLIGHTLY AGREE	STRONGLY AGREE
REPLIES	4	5	14	9	8

Promotions are somewhat of a sore point for GCA graduates. Not one respondent has been promoted below the zone and one graduate indicated receiving a late promotion. Several written responses indicated that it is common knowledge that hardly anyone in this career field gets promoted below the zone, whether from AFIT or not. Those who answered favorably tended to be majors or lieutenant colonels who made their promotions within the primary zone. Most neutral responses were from captains yet to meet their next promotion boards. The disagreeable responses were relatively evenly spread between the captains, majors, and lieutenant colonels. Several of these mentioned inconsistencies in the promotion process as a primary reason for negative responses.

Table 18. Likert Question #8

My supervisor feels that my GCA degree is important/useful.					
	STRONGLY DISAGREE	SLIGHTLY DISAGREE	NEUTRAL/ UNDECIDED	SLIGHTLY AGREE	STRONGLY AGREE
REPLIES	3	6	10	16	5

Once again, many graduates indicated throughout the survey that they are not being utilized in purely cost roles. This question attempted to determine how the graduates' supervisors perceive the usefulness of the GCA education. If a supervisor does not

perceive the degree as useful, he or she may be the one who tasks the analyst with other jobs and responsibilities outside the cost job. This potentially detracts from the graduate's value to the Air Force as a cost analyst, as well as decreasing the experience the graduate can take from the job. For those not even in cost jobs currently, this is even more real.

Table 19. Likert Question #9

Since graduating from AFIT, I have usually had jobs with greater responsibility than my contemporaries who did not attend AFIT.					
	STRONGLY DISAGREE	SLIGHTLY DISAGREE	NEUTRAL/ UNDECIDED	SLIGHTLY AGREE	STRONGLY AGREE
REPLIES	4	9	14	10	3

This question is unique in that it is evenly split between positive and negative responses. Many graduates indicated having no real way to gauge this. Often, positions with greater responsibility are based on an individual's motivation and job performance and sometimes politics. The previously mentioned examination of assignments based on being an AFIT GCA graduate indicated that sometimes very little concern is given to whether that person went to AFIT or not. While it is good that anyone can be given greater responsibility due to previous job performance and motivation, it should also be considered whether that person has the skills and tools to assume that next higher position. AFIT graduates, in general, receive more in-depth and DOD-focused education than anyone receiving a master's degree through a civilian school. This fact alone should enable them to at least be considered for all higher-responsibility jobs. It is true,

however, that there are many outstanding people in the Air Force who have not attended AFIT and who may be more qualified for these jobs.

Table 20. Likert Question #10

I would recommend the GCA program to other Air Force officers.					
	STRONGLY DISAGREE	SLIGHTLY DISAGREE	NEUTRAL/ UNDECIDED	SLIGHTLY AGREE	STRONGLY AGREE
REPLIES	2	3	1	13	21

This final question is basically the culmination of everything else in this research. Does the graduate feel the program has enough merits and future potential to recommend it to other Air Force officers? The overwhelming majority indicated affirmatively. The few negative responses included individuals who do not enjoy the Air Force and some that, more specifically, do not like the cost-analysis career field (especially those not given much opportunity to experience the cost-analysis career field). Several had reservations about recommending the program since AFIT is likely to close. There is some worry among graduates who are unsure what their degree will be worth once AFIT closes. This is especially true among those considering a departure from the Air Force to become, as one respondent put it, "beltway bandits," or civilian contractors.

Sign Test

As explained in Chapter III, a sign test was implemented to evaluate the significance of Likert responses in the general "agree" or "disagree" categories. The following table summarizes the results of the sign test on each Likert question:

Table 21. Likert Section Results of Sign Test

Likert Sign Test					
Likert Question	Num Agree	Num Disagree	Tot n	Z val	2 Tail P val
1	28	10	38	2.920	0.004
2	34	5	39	4.644	0.000
3	33	3	36	5.000	0.000
4	28	8	36	3.333	0.001
5	24	9	33	2.611	0.009
6	33	2	35	5.240	0.000
7	17	9	26	1.569	0.117
8	21	9	30	2.191	0.028
9	13	13	26	0.000	1.000
10	34	5	39	4.644	0.000

The most noteworthy question was number nine. The two-tailed P-value of 1.00 indicates that the null hypothesis of no perceived difference cannot be rejected. The population of graduates is equally distributed about whether their jobs have or have not entailed greater responsibility than their contemporaries who did not attend AFIT. A possible explanation, as discussed earlier, is that AAD coded positions do not always translate into more challenging or rewarding jobs, requiring greater responsibility. One additional question worth mentioning is number seven. If an alpha value of .1 were specified (90% confidence), this question would also be unable to reject the null hypothesis. The remaining eight questions all had significantly low two-tailed P-values which would tend to reject the null hypothesis. This indicates that there was a distinct preference in each question. Since the "agree" responses always outnumbered the "disagree" responses (excluding question nine), and the entire Likert section was designed to equate agreeable responses with positive aspects of being a GCA graduate, it

seems reasonable to conclude that graduates perceive their AFIT education to be useful in their careers and important to the Air Force.

V. Conclusions and Recommendations

Introduction

AFIT GCA graduates are a valuable resource for the Air Force. A world of exciting possibilities exists for most graduates. This research set out to explore those possibilities by evaluating the realities. The research was guided by the two principle objectives stated in Chapter I. These were to examine how GCA education has served its graduates in their Air Force careers and to evaluate the GCA program itself. These two broadly defined objectives were broken into four more focused objectives, discussed below.

Conclusions

The original objectives of this research were to:

1. Gather demographic information on past GCA graduates
2. Gather information about experiences and opportunities GCA graduates have had
3. Evaluate the strengths and weaknesses of the current GCA curriculum, as perceived by the graduates
4. Determine whether the AFIT GCA program could be replaced by a similar program at a civilian institution

Data supporting the first objective indicate the majority of respondents are Majors (19 of 40 respondents) or Major-selectees (six), none of whom were promoted below the primary zone. 16 Captains and 5 Lieutenant Colonels also responded. The two most frequently identified reasons for remaining in the Air Force were 'retirement benefits' and 'too much time already invested in the Air Force.' Respondents averaged 6.6 years of total active duty time prior to entering AFIT, 5.4 of which were commissioned years (average of 1.2 years of prior-enlisted time). Sixty percent of the respondents indicated spending at least 51% of their time in cost related jobs (10 respondents, or 25%, were in the 51-75% category while 14, or 35%, were in the 76-100% category). Thirty-eight percent of the respondents indicated that they are currently filling AAD coded positions and 100% indicated the graduate degree as their highest level of education (several respondents also have second Master's degrees from civilian schools but no one has yet received a Ph.D.). The top three areas where graduates have spent their time are in hardware cost estimation (19%), reviewing estimates (17%), and source selection (14%).

Supporting objectives two and three, most graduates' careers have benefited from the GCA education. Many have had opportunities to work on new programs demonstrating cutting edge technology with a politically high level of visibility. Many attribute their last promotion, at least partly, to their GCA education. Overall, GCA graduates are happy with their careers and their future options, and they attribute much of it to their AFIT GCA education.

There are graduates, however, who are dissatisfied. They feel their skills have never been utilized appropriately in cost-analysis jobs. Many have had fewer cost jobs

than they desired. Moreover, many have had to take jobs they were not trained for, most frequently in the budget area. This leads to objective three, the strengths and shortfalls of the program itself.

The GCA education is highly touted by most graduates. The development of the combination of regression analysis skills, statistical knowledge, and DOD application throughout the program are, arguably, unmatched by civilian institutions. Graduates bring in a range of experiences and backgrounds and not only benefit from interaction within the GCA program, but between other programs as well. The DOD focus and the concentration of acquisition topics round out the benefits of the AFIT GCA program.

The biggest weakness of the GCA program is a lack of practical knowledge in developing a real cost estimate. Many graduates spurned the thesis process and recommended instead, a large-scale cost-estimating project or even a cost-internship in a SPO. Others, however, indicated that they believed the thesis process was a useful approach to developing required research skills. The second most common complaint about the program is the lack of budget training. Cost analysis is only a half of the DOD financial picture. Most analysts not only interact with their budget counterparts; they eventually become budget officers themselves. Due to the low level of budget education in the GCA curriculum, these transitioning analysts are forced to take even more courses on budgeting. This often entails costly and time-consuming Temporary Duty (TDY) travels for the graduate; time and cost which could have been saved if the GCA program offered greater depth of education in the budget area. This is certainly not in the Air Force's best interest.

The final objective garnered the single unanimous sentiment among all respondents. It is a strongly held conviction that graduates feel the GCA program is irreplaceable. While it is true that many of the courses could be taught at civilian schools (especially mentioned were organizational behavior and economics), there is no replacement for the graduates' interaction, the DOD focus, or the instructors' acquisition experience. Most respondents indicated a certain level of education due solely to the experiences and interaction of their fellow AFIT classmates. Further, since several degree programs are together at AFIT, GCA graduates gain important insight into the other acquisition career fields (and vice versa) as well as the ability to become acquainted with the future leaders of those career fields. Also, the DOD focus of the entire program is something that cannot be easily replicated at a civilian school. Respondents indicated learning about Air Force regulations, acquisition policies, and professional practices throughout the GCA program. Finally, the experience that the instructors have to offer the students is irreplaceable. Sometimes, more can be learned from a simple, short story or example about a real world experience, than several chapters from a textbook (or an instructor without the experience) could teach.

Summary

Right now, GCA graduates have a solid foundation in the Air Force, despite rumors about continued downsizing of this career field. Exciting and rewarding jobs exist throughout the DOD, but it is the individual analyst, not the degree, that determines

the future through hard work and dedication. The GCA education provides the tools, but the analysts must be sharp and motivated to perform the job.

Promotions within the cost analysis career field are, arguably, not as rapid or as plentiful as some other fields. Realistically, however, this is not startling due to continued Air Force downsizing and a focus that has remained on the warfighters, the pilots. As line officers, cost analysts cannot allow the promotion process alone to be the barometer for the leadership's sentiments regarding this career field. An AFIT GCA degree can give candidates the edge. Particularly now, when advanced degrees are masked, a 15-month tour at AFIT can tell a promotion board that this person is worthy of and ready for greater responsibility.

The program itself is not perfect. It must be perpetually dynamic to meet the challenges of a constantly changing environment, within the DOD and even the world. Graduates must be educated in the most up to date methods and techniques available. For the most part, the AFIT GCA program is doing that. Overall, the program is useful to the Air Force and to its graduates. The Air Force is receiving high-quality analysts and the graduates are receiving a future.

Recommended Follow-On Research

This study opens new doors in GCA research. While this study only focused on active duty military graduates, there are nearly an equal number of separated or retired graduates who could provide additional information about the program and the opportunities it provides. This type of research would have to be started early in the

GCA program due to the time required for OMB approval (6-12 months) to survey outside the Air Force. Furthermore, an examination of various civilian employers around the country could explore the options available to graduates outside the Air Force as well as determine what areas of education and experience employers look for in an applicant. This would help the Air Force prepare the transition of those graduates who are separating or retiring into the civilian work force. Additionally, it would be interesting to track all changes in the curriculum since 1983 and make inferences about those changes when matched to their respective classes. Are some classes apparently more successful than others? If so, is it due to a curriculum change at some point?

This effort is only a modicum of potential GCA related research when compared to the numerous studies that have focused on other programs. The cost analysis career field has demonstrated its necessity in the civilian and military environments; so long as there are costs, there will be cost analysts and there will be a need to educate them. If educators and decision-makers go forth, armed with greater knowledge of the cost analysis profession, its students, and the long-term impacts of such education, future analysts will be prepared to face the challenges of tomorrow's career field.

Survey Cover Letter

MEMORANDUM FOR SURVEY RESPONDENTS

FROM: AFIT/LAS
2950 P Street
WRIGHT-PATTERSON AFB OH 45433-7765

SUBJECT: AFIT Graduate Cost Analyst (GCA) Survey Package

In these days of uncertainty for the Cost Analyst career field and the Air Force Institute of Technology (AFIT), it is important to gather information from graduates to examine the opportunities which this education has provided to you as well as to evaluate the benefits and shortcomings of the AFIT GCA program. As an alumnus of the GCA program, your inputs to this research are invaluable. Since the first class in 1983, no study has been conducted which examined the benefits of being a GCA graduate or evaluated the curriculum strictly from a GCA standpoint. Your participation in this study will help assess the value of the GCA program and will provide inputs into future curriculum development.

This survey is the core of a GCA student thesis, and I guarantee that the student will greatly appreciate your response. This is not a test and there are no incorrect answers. Participation in this research is strictly voluntary but your response is important if the study is to be complete. Your identity will not be linked to your responses, so feel free to answer honestly and to add any additional comments you feel are important.

Please return this survey package in the enclosed return envelop no later than 7 Jul 97. If you require additional information or instructions, please contact Lt. Chris Dalton at commercial (937) 256-9574, or e-mail him at CDALTON@AFIT.AF.MIL. Thank you in advance for your time on this very important effort. This survey has been assigned a Survey Control Number (SCN) of USAF SCN 97-34.

ORIGINAL SIGNED

ROLAND D. KANKEY, Ph.D.
Head, Department of Acquisition Management
Graduate School of Logistics and
Acquisition Management

AFIT Graduate Cost Analysis Survey

Instructions:

- Please mark all responses on the survey itself and return the survey in the enclosed return-envelope OR you may e-mail responses to CDALTON@AFIT.AF.MIL.
- Please feel free to attach any additional paper of you require more space for comments
- Your responses WILL REMAIN ANONYMOUS. You do not need to put your name on the survey.

Feedback:

- If you would like an electronic copy of the final results of this study (thesis), please include your name and e-mail address with your survey or, to retain anonymity, you may mail or e-mail your request to CDALTON@AFIT.AF.MIL separately from your survey.

Thank you again for your participation.

AFIT Graduate Cost Analyst Survey

1. Before entering AFIT, what was your primary AFSC and job title?

2. What year did you graduate from AFIT?

3. Upon Graduation from AFIT, what was your rank?
    1. 0-1
    2. 0-2
    3. 0-3
    4. 0-4
    5. 0-5

4. Upon Graduation from AFIT, how many years of *total* active duty service did you have?

5. Upon Graduation from AFIT, how many years of *commissioned* service did you have?

6. What is your current job title and what are your primary responsibilities?

7. What is your current rank?
    1. 0-3
    2. 0-4
    3. 0-5
    4. 0-6

8. What is your current AFSC/job series (i.e. 65WX [cost], 65FX [FM], etc.)

Please specify_____

9. Which MAJCOM are you assigned to? (i.e. AFMC, ACC, AETC, etc.)

10. What is your organizational level? (i.e. SPO, SAF, HQ, etc.)

11. Does your current duty assignment have an Advanced Academic Degree code requiring your Graduate Cost Analysis degree?

1. Yes
2. No

12. What is the main reason you have remained in the Air Force?

1. Pay
2. Medical benefits
3. Retirement benefits
4. Promotion opportunities
5. Too much time already invested in AF
6. Other (please specify)_____

13. What is your highest level of education?

1. Master's degree
2. Doctorate
3. Other (please specify)_____

14. Since graduation, approximately what percentage of time have you served in a cost analysis related job?

1. 0-10%
2. 11-25%
3. 26-50%
4. 51-75%
5. 76-100%

For the following promotion questions, please remember this survey is completely confidential and this information is necessary to gather as complete demographics of GCA graduates as possible in gauging the benefits of the GCA program.

15. Were you promoted to Major_____
    1. Below the zone
    2. Within the primary zone
    3. Above the zone
    4. Not selected
    5. N/A

16. Were you promoted to Lieutenant Colonel_____
    1. Below the zone
    2. Within the primary zone
    3. Above the zone
    4. Not selected
    5. N/A

17. Were you promoted to Colonel_____
    1. Below the zone
    2. Within the primary zone
    3. Above the zone
    4. Not selected
    5. N/A

18. Which area(s) of the Cost Analysis career field have you had the most experience with: (circle more than one if applicable)
    1. Software cost estimation
    2. Hardware cost estimation
    3. Contractor performance measurement
    4. Staff
    5. Reviewing estimates
    6. Source selection
    7. Base level cost
    8. Other (please specify)_____

19. Since graduating from AFIT, have you had any unique experiences, opportunities, or offers you consider significant or which others might be interested in? Please explain.

Please include all jobs and responsibilities you have held since graduating from AFIT. (continue on back or additional sheet of paper if necessary)

20. If you had to do it all over again, would you make the same career decisions (particularly with respect to attending AFIT) you've made? Which would you change?

21. What do you perceive to be the greatest strength(s) of the AFIT Cost Analysis program? (please consider courses and experiences)

22. Greatest Weakness(es)?

23. Could you have been better served/prepared at a civilian school?

Likert Scale Section

The questions in this section are concerned with your perceived usefulness of your AFIT education in your post-graduate career.

Please read each statement, then indicate your choice to the left of the question to indicate how strongly you agree or disagree with each statement. Remember, all responses are voluntary and confidential. Use the following scale for each question in this section:

Strongly Disagree	Slightly Disagree	Neutral/ Undecided	Slightly Agree	Strongly Agree
A	B	C	D	E

1. My first assignment made excellent use of the skills I learned in the AFIT Cost Analysis (GCA) program.
2. My GCA education is/has been useful to the Air Force.
3. I feel I am better able to solve on-the-job problems because of my GCA education.
4. My GCA education has been important in my assignments/jobs since graduation.
5. My GCA education was important in getting my current assignment/job.
6. I feel my Graduate Cost Analysis education has enhanced my career.
7. While in the Air Force, my GCA education has been helpful in getting promoted.
8. My supervisor feels that my GCA degree is important/useful.
9. Since graduating from AFIT, I have usually had jobs with greater responsibility than my contemporaries who did not attend AFIT.
10. I would recommend the GCA program to other Air Force officers.

Bibliography

Baxter, B. R. and K. R. Bolin. Cost Management Competencies for Department of Defense Program Managers. MS thesis, AFIT/GSM/LAS/94S-2. School of Logistics and Acquisition Management, Air Force Institute of Technology (AU), Wright-Patterson AFB OH, September 1994 (AD-A285026).

Beam, D. A. An Analysis of Supervisory Perceptions Regarding the Advanced Academic Degree Management System. MS Thesis, AFIT/GSM/SM/73-4. School of Systems and Logistics, Air Force Institute of Technology (AU), Wright-Patterson AFB OH, November 1973.

Beres, C. A. and M. G. Camacho. An Analysis of Retention Rates and Demographics of Graduates of the Air Force Institute of Technology. MS Thesis, AFIT/GSM/LSY/92S-3. School of Systems and Logistics, Air Force Institute of Technology (AU), Wright-Patterson AFB OH, September 1992 (AD-A258140).

Cook, R. and J. E. Greene. An Analytical Study of the Graduates of the Graduate Logistics Program of 1965, 1966, and 1967. MS Thesis, AFIT. School of Systems and Logistics, Air Force Institute of Technology (AU), Wright-Patterson AFB OH, August 1968 (AD-846434).

Cooper, D. R. and C. W. Emory. Business Research Methods. Chicago: Irwin. 1995.

Crowder, W. N. and J. A. Davidson. An Analysis of the Usefulness of the Graduate Logistics Program as Perceived by Alumni and Their Supervisors. MS Thesis, AFIT/LSSR/1-78A. School of Systems and Logistics, Air Force Institute of Technology (AU), Wright-Patterson AFB OH, June 1978 (AD-A059179).

Harding, F. D. and R. L. Downey Jr. Career Experiences of AFIT Classes of 1955 and 1956. Technical Documentary Report PRL-TDR-63-9. Lackland AFB TX: 6570th Personnel Research Laboratory, April 1963.

Hart, A. C. A Study of the Graduates of the School of Logistics and Acquisition Management Graduate Logistics Program. MS Thesis, AFIT/SLSR-24-65. School of Systems and Logistics, Air Force Institute of Technology (AU), Wright-Patterson AFB OH, August 1965 (AD-479928).

Hough, P. G. Birth of a profession: Four decades of military cost analysis. The RAND Corporation, 1989.

Pry, D. E. Cost Management Competencies: The Importance and Frequency as Seen by the Financial Analyst. MS Thesis, AFIT/GCA/LAP/95S-8. School of Logistics and Acquisition Management, Air Force Institute of Technology (AU), Wright-Patterson AFB OH, September 1995 (AD-A300687).

Smith, M. L. An Analysis of the Usefulness of the Graduate Logistics Management Program Logistics Management Option as Perceived by Graduates and Their Supervisors. MS Thesis, AFIT/GLM/LSM/86S-79. School of Logistics and Acquisition Management, Air Force Institute of Technology (AU), Wright-Patterson AFB OH, September 1986 (AD-A174342).

Thompson, F. C. Ed. The Thompson Chain-Reference Bible, New International Version. Indianapolis: B.B. Kirkbride. 1978.

Winkler, R. L. and W. L. Hays. Statistics: Probability, Inference, and Decision. New York: Holt, Rinehart, and Winston. 1975.

Woodson, U. J. and K. L. Yoder. An Analysis of the Usefulness of Graduate Education to Contracting Professionals as Perceived by Graduates and their Supervisors. MS Thesis, AFIT/GCM/LAS/94S-9. School of Logistics and Acquisition Management, Air Force Institute of Technology (AU), Wright-Patterson AFB OH, September 1994 (AD-A285030).

Wright, T. P. Factors Affecting the Cost of Airplanes. Journal of Aeronautical Sciences, 3 (4). 1936.

Vita

First Lieutenant Christopher S. Dalton [redacted]. After graduating from Cañon City High School in 1990, he attended the United States Air Force Academy in Colorado Springs, Colorado. He graduated with a regular commission on 01 June 1994 with a Bachelor of Science in English. He was then assigned to the Aerial Targets division of the Aeronautical Systems Center, Eglin Air Force Base, Florida, as a financial manager for several USAF Aerial Target programs. After two years at Eglin AFB, Lieutenant Dalton was selected to attend AFIT in May 1996. Upon graduation from AFIT, he will be assigned to the Cost Staff at the Space and Missile Systems Center, Los Angeles Air Force Base, California.

Permanent Mailing Address:

[redacted]

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 074-0188

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	September 1997	Master's Thesis

4. TITLE AND SUBTITLE
AN EXAMINATION OF THE DEMOGRAPHICS AND CAREER PROGRESSION OF AIR FORCE INSTITUTE OF TECHNOLOGY COST ANALYSIS GRADUATES

5. FUNDING NUMBERS

6. AUTHOR(S)
Christopher S. Dalton, 1Lt, USAF

7. PERFORMING ORGANIZATION NAMES(S) AND ADDRESS(S)

Air Force Institute of Technology
2950 P Street
WPAFB OH 45433-7765

8. PERFORMING ORGANIZATION REPORT NUMBER

AFIT/GCA/LAS/97S-3

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)

N/A

10. SPONSORING / MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION / AVAILABILITY STATEMENT

Approved for public release; distribution unlimited

12b. DISTRIBUTION CODE

13. ABSTRACT (*Maximum 200 Words*)
The Air Force Institute of Technology (AFIT) was asked to develop a graduate curriculum to support cost analysts in the acquisition arena in October 1980. The first class entered in May 1982 and graduated in September 1983 with Master of Science degrees in Systems Management. This degree program gained autonomy by offering its first true Master of Science degree in Cost Analysis in 1988. Now there are nearly thirteen years of graduate cost analysts (GCAs) in the workforce. This thesis examined the impact this program has had on these graduates and the Air Force. Surveys were mailed out to 73 of the 75 currently active-duty graduates in the classes from 1983 through 1994. Forty responses were received and evaluated. The general consensus is that the GCA program is very useful to the graduates and beneficial to their careers. The main strengths of the program include the ACEIT software training and the combination of Department of Defense (DOD) application, regression, and statistics. The weaknesses of the program include a lack of training to actually complete a cost estimate and a need for more in-depth education regarding budget topics. Overall, graduates believe this program could not be replaced by a civilian institution.

14. Subject Terms	15. NUMBER OF PAGES
Graduates, Cost Analysis, Demography, Careers	81
	16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UL

AFIT Control Number AFIT/GCA/LAS/97S-3

AFIT RESEARCH ASSESSMENT

The purpose of this questionnaire is to determine the potential for current and future applications of AFIT thesis research. **Please return completed questionnaire** to: AIR FORCE INSTITUTE OF TECHNOLOGY/LAC, 2950 P STREET, WRIGHT-PATTERSON AFB OH 45433-7765. Your response is **important.** Thank you.

1. Did this research contribute to a current research project? a. Yes b. No

2. Do you believe this research topic is significant enough that it would have been researched (or contracted) by your organization or another agency if AFIT had not researched it?
a. Yes b. No

3. **Please estimate** what this research would have cost in terms of manpower and dollars if it had been accomplished under contract or if it had been done in-house.

Man Years_____ $_____

4. Whether or not you were able to establish an equivalent value for this research (in Question 3), what is your estimate of its significance?

a. Highly Significant b. Significant c. Slightly Significant d. Of No Significance

5. Comments (Please feel free to use a separate sheet for more detailed answers and include it with this form):

_____ _____
Name and Grade Organization

_____ _____
Position or Title Address