UNIVERSITY RELATED FLIGHT TRAINING PROGRAMS IN REGION VI OF THE NATIONAL INTERCOLLEGIATE FLYING ASSOCIATION

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PREFACE

This study was conducted to provide information to administrators at post-secondary institutions with aviation programs to guide them in making decisions relative to the organization, management, and conduct of flight operations. The study established the basis for, and history of, post-secondary aviation training at both public and private institutions. It also provides an example of a program in existence at a comprehensive university since the inception of collegiate flight training. In addition, the study describes current flight training needs and surveyed the administrators of aviation programs in Region VI of the Intercollegiate Flying Association. A descriptive analysis of the data is provided for comparison purposes, conclusions are drawn from the data, and recommendations are made based on the findings. It is the first study of its kind and is intended to increase standardization, act as a management tool for the most effective use of resources, and above all to benefit the individual student by providing a guide for administrators to organize, manage, and conduct university-level flight training in the best way possible. This study considers it uniquely the responsibility of flight training administrators to provide the nation's air transportation system with the highest quality graduate possible.

In thanks, I must first give all praise and accord to God. It is my belief that this accomplishment is firmly a result of His plan for my life and the energy, ideas, and

support necessary to complete this task were provided for with sources beyond my own ambition. I must also thank my family, in particular my wife Shannon, for un-ending support of what has been an eleven-year trek through the flight-training and academic process leading to this point. Without her support as my wife and best friend this study would not have been possible.

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CHAPTER I

INTRODUCTION

Background

In the United States of America there are over 200 post-secondary institutions offering non-engineering Aviation degree programs (Kiteley, 1999) . Although these schools vary in their aviation focus, the majority offers flight training as part of their curriculum. At Oklahoma State University there has been flight training in some form since 1939. The beginnings of organized flight training can be traced back to aircraft manufacturers for private customers and under military contract. Collegiate flight training can be traced to institutions like Embry Riddle University, Daytona Beach Florida, which began operations in 1926 followed closely by Spartan School of Aeronautics, Tulsa Oklahoma, in 1928. Since the practical beginning of commercial aviation with the Kelly Act, or as it is officially known, the Air Mail Act of 1925, there has been a recognized need for organized flight schools for the training of pilots (Wells, 2001) .

The United States military has provided the commercial aviation industry with the bulk of its pilots beginning with the return of pilots from World War II. The availability

of pilots and surplus aircraft fueled a massive expansion of the industry that began in earnest in the late 1940's (Wells, 2001) . The trend of pilots leaving the military and continuing their careers with commercial airlines continued through the end of the U.S. conflict in Vietnam. During times of high demand, the military has turned to organized flight schools, collegiate and private, for conducting initial pilot training. In current times, with the last of the Vietnam era pilots reaching the Federal Aviation Administration (F.A.A.) mandated retirement age of 60, and the U.S. Military requiring much longer service commitments for pilot trainees, the focus for pilot supply has shifted to organized flight schools. In particular, post-secondary institutions are being tapped because of the degree component of most of their programs.

A number of industry analysts predict that the pre-9/11 pilot-hiring boom has the potential to continue through the year 2007 (Tulsa World, March, 5, 2000 p. E-1) . The degree which these predictions come to fruition when hiring resumes in mass will place an exponential demand on flight training programs at post-secondary institutions.

Currently there are two primary organizations that act as organizing bodies and information resources for the conduct of collegiate or post-secondary aviation education. They are the University Aviation Association (UAA) and the National Intercollegiate Flying Association (NIFA). These are membership organizations and they have no regulatory over-site of any of their member institutions. Oklahoma State University (OSU) lies within the geographical boundary of Region VI of the NIFA along with 10 other member schools. OSU is also a member of the UAA.

Statement of the Problem

Post-secondary flight training, as an educational pursuit, is unique in that there are no specific general degree requirements imposed by the primary over-site organization, the Federal Aviation Administration (F.A.A.) . There are informal requirements at the industry level that necessitate the majority of commercial airline pilots have a Baccalaureate degree of some sort; but the F.A.A. only requires a pilot to read, speak, and understand the English language. There are certainly aeronautical experience and knowledge requirements but these can be obtained in a number of ways without pursuit of a formalized degree. Typically these programs are referred to as certification courses and they are offered at both private non-degree granting and post-secondary institutions. The lack of a particular degree requirement then leaves post-secondary aviation programs to be conducted as the institution sees fit; as long the conduct of the actual flight training falls within the guidelines of either part 61, or part 141 of the Federal Air Regulations.

The current way of conducting these programs lends itself to a high degree of localization and there appears to be considerable variability and little standardization in the organizational structure, management, and conduct of operations among the various post-secondary aviation programs. This having been said, there is little specific data that exists detailing the differences among different institutions. The questions of how collegiate aviation programs are structurally organized, how they are managed, and how flight-training operations are conducted, need to be answered.

Purpose of the Study

The purpose of this study is to assimilate data from the 11 schools in Region VI of the National Intercollegiate Flying Association in order to provide a database to post-secondary aviation training administrators, for comparing their programs to others in the region, to aid in decision-making. This information should provide for increased standardization and help maximize efficiency. The three areas of organization, management, and operations, were selected because they are the primary areas affecting flight training at the originating institution, Oklahoma State University. Information gathered in this study will help determine:

What is the Organizational Structure of Flight Training?

1. Organization of aviation programs,
2. College, department, or program affiliation;
3. Administrative and budgetary over-site;
4. Faculty member assignment;
5. Endowments, Booster Club, or Alumni financial involvement;
6. Legislative mandates;
7. Relationships with Regents or Board of Trustees.

What is the Management of Flight Training?

1. Personnel system classification of employees;
2. Educational requirements for the Chief and Asst. Chief Instructors;
3. Benefits available to Flight Instructors;
4. Flight transportation of university personnel (for university business);
5. Acquisition of aircraft and support equipment;
6. Use of flight training facilities i.e. in house, separate, leased or owned;
7. Use of simulators;
8. Fee structure for use of aircraft and other flight training devices;
9. How flight training is paid for by the student;
10. Budgeting of salaries for Chief, Asst. Chief, Instructors, Office, and Support staff;
11. Budgeting for operational expenses;
12. Handling of budget shortfalls and overages.

What are the Flight Training Operations?

1. Use of training syllabuses;
2. Maintenance of aircraft i.e. in house or contract;
3. Calendar operations for the programs;

4. Satisfactory progress requirements of students;

5. Operational restrictions on students;

6. Flight Instructor hiring and retention programs.

Objectives of the Study

The objectives of this study are to provide information, which administrators may use to compare their programs to other programs in the region and thus act as a database from which decisions can be made. Use of this information will lend itself to a reduction in variability between institutions, provide a means by which administrators can see how similar training is being accomplished by other programs, and allow for increased standardization of the region. To accomplish the purpose of this study and to meet its objectives the following must be accomplished:

1. Assimilate data from the 11 schools in Region VI of NIFA on the areas of organization, management, and operations.

2. Provide an analysis of the questionnaire data.

3. Make recommendations based on the findings.

Contracted. Any function such as maintenance, flight instruction, or servicing of aircraft not done by university employed personnel.

F.A.A. The Federal Aviation Administration.

FAR Part 141. A part of the Federal Air Regulations that covers organized flight schools typically geared toward development of professional pilots. Schools conducting training under this regulation must apply for and receive an Air Agency Certificate, have the curriculum approved by the F.A.A., and meet the requirements of the regulation for purposes of personnel, facilities, aircraft, and training standards. Because of these strict standards the F.A.A. allows a significant reduction in the number of flight hours required to obtain various licenses and certificates as compared to schools conducting training under FAR part 61.

FAR Part 61. The part of the Federal Air Regulations that, as part of the regulation, includes flight instruction done privately, individually, and free-lance. Typically Fixed Based Operators and Flying Clubs at most general aviation airports have flight instruction under this part available to clientele who do not intend on becoming professional pilots and only fly for personal or business applications.

Flight Training Program. This is the course of training conducted at a post-secondary and degree granting institution under Federal Air Regulations part 141 for the purposes

of achievement of the licenses and certificates necessary to enter the aviation workforce as a professional pilot at the entry level; typically the initial flight instructor position.

Line Support. This is the equipment and personnel used to service the aircraft i.e. move them around, fueling, cleaning, pre-heat etc.

Maintenance. This is the licensed mechanics, full and part-time, mechanics helpers, facilities, equipment, and the program(s) used to maintain the fleet.

Management. This is the personnel directly involved in managing the day-to-day operations of the flight school. The Chief and Assistant Chief Instructors, Program Managers, and office personnel are included in this category. In addition, administrators i.e. Deans, Associate Deans, School Heads, Department Heads, and/or any Boards with over-site of the training are included.

Operations. This is what, and how, flight training is conducted and paid for.

Organization. How the flight training program, including academics and administration, is structured, where it is placed within the university system, and its oversight.

UAA. This is the University Aviation Association, a national membership organization consisting of collegiate, corporate, and individual members with interest in post-secondary aviation education and training.

NIFA. National Intercollegiate Flying Association. A member organization that oversees collegiate and post-secondary private school, flying competitions.

Assumptions

For this study the following assumption has been applied:

The three areas of organization, management, and operations that most affect the training at Oklahoma State University also affect the other programs in the region.

Limitations of the Study

Because the originating school, Oklahoma State University, is located in Region VI of the National Intercollegiate Flying Association, it was selected as the region to be studied. Additionally, since NIFA regions are defined geographically, using the narrow focus of the region acts as a control for price differences, student pool, nominally public institutions, and competition. Data was collected on undergraduate programs only because none of the schools in the region have graduate flight programs. This study does not consider multi-cultural, socioeconomic, or gender make-up of a flight-training program because the schools in the region draw from the same student pool. In addition,

because this study is intended as a database from which each institution can make its own decisions and the data is empirical, no qualitative assessment of the quality of a particular program or aspect of a program is done. Additional research will need to be done to evaluate these elements.

Significance of the Study

This study is the first effort to systematically examine and describe the organization, management, and flight operations of post-secondary institutions. Other than F.A.A. mandated training requirements, each institution is able to determine its own way to conduct this training. Aviation, being a resource intensive activity at any level, this study seeks to provide the basis for program administrators to evaluate their programs as compared to what is being done at other institutions in their region. In this way this study acts as a management guide for decision making that can lead to the best process being used at each institution.

Organization of the Study

This research was designed to provide information to assist in determining the most effective way to organize, manage, and conduct flight operations at post-secondary institutions. Information was gathered with a questionnaire distributed on-line to administrators of post-secondary flight-training programs in Region VI of the National Intercollegiate Flying Association. The follow-up data was collected by telephone. This

study is specific to private and public post-secondary institutions offering aviation training as part of a degree-granting program because all of the schools in the region studied have structured their curricula to incorporate the training as part of the degree process. Therefore, the study can only be assessed within this context because it does not consider certification programs that may exist at institutions outside of the region studied. Following this introductory chapter, Chapter II reviews literature related to the research questions of; What is the organization structure of flight training?; what is the management of flight training?; and what are the flight training operations? In order to understand the basis of flight training per se, a section on early organized flight training is included. The Kelly and Air Commerce Acts, respectively, are discussed because they were the catalyst for flight schools and organized flight training. A section on the first big flight schools, Embry-Riddle University and Spartan School of Aeronautics is included because they were the beginnings of post-secondary aviation education and many of the theories and practices developed with respect to organization, safety and management are still in use today. World War II pilot training as it relates to collegiate flight training is discussed because it was the true genesis for flight training at public institutions both comprehensive and otherwise. Insight is gained in this section about how flight training is placed within universities as an organizational issue. The history of flight training at Oklahoma State University is presented because it is an example of a program in existence since the inception of collegiate aviation. The various organizational, management, and operational changes that have taken place in the program history mirror the research questions in that it none of the three have been clearly defined. The F.A.A. flight training requirements are discussed literally and with

respect to a management issue about what the industry needs in a graduate. The industry need for pilot's pre 9/11 and post is presented as an operations issue and illustrates the need for post-secondary institutions to continue producing quality aviation graduates. The last two sections in the chapter discuss the National Intercollegiate Flying Association because Region VI of NIFA is the one being studied and the University Aviation Association because it is the primary overseeing body for collegiate aviation. Chapter III discusses the procedures used to collect the data and analyze the data. Chapter IV explains the statistical treatments used to analyze the research data, describes the results of the research and summarizes the data. Chapter V summarizes the findings and conclusions of the study and makes recommendations as well as recommendations for further study.

CHAPTER II

REVIEW OF RELATED LITERATURE

Introduction

This chapter includes a review of various published sources of information regarding post-secondary flight training institutions in the United States, beginnings of organized flight training and flight schools, the Air Mail Act of 1925 or Kelly Act, World War II pilot training, history of flight training at Oklahoma State University, F.A.A. flight training requirements, demand for pilots pre-9/11 and post, the National Intercollegiate Flying Association, and the University Aviation Association. As explained in the organization of the study, each of these sections relates to one or all of the research questions of; what is the organizational structure of flight training?; what is the management of flight training?; and what are the flight training operations?

Post-secondary Flight Training Institutions

Post-secondary institutions are a component of growing importance to the aviation infrastructure of the United States; in particular, the aviation education offered by these colleges and universities. The Collegiate Aviation Guide, 1999, lists 119 institutions, but

those are only the members of the University Aviation Association. As cited earlier, Kiteley (1999) states that there are over 200 colleges and universities offering two-year Associate degree programs and four-year Baccalaureate programs. These programs are nearly equally divided between Associate (112) programs and Baccalaureate (93) programs. In addition, there are eight Master's programs. Oklahoma State University offers a Doctorate of Education degree with an Aviation Education option.

Nominally, the degree programs are designed to meet the unique technical requirements of a number of aviation fields. The three major categories of flight, electronics and avionics, and maintenance are the most common but specialized curricula exist beyond these major interests. Kiteley (1999) says, "...many institutions offer specialty options such as space studies, aviation computer science, atmospheric science, and air traffic control." (p.2). These specialized programs may be appropriate for students who have a specific career in mind and desire the specialized training necessary to enter the field.

Associate degree programs typically require credit hours in the 60-hour range with 15 to 20 of those hours being general studies while the Baccalaureate degree programs generally require 120 - 130 credit hours and typically require four years to complete (Kiteley, 1999, p.2) . The difference between Associate and Baccalaureate programs is generally found in the general studies component and the number of aviation classes required as well as the level of those classes. A typical four-year program requires 45 to 60 hours of general studies including English, communication, social science, humanities, math, physics, computer science, and some management.

Flight programs, titled Professional Pilot or Career Pilot, have at their core a focus on flight courses leading to the Commercial Pilot certificate with Instrument Rating and usually there is an option to complete Multi-engine training as well. The Commercial Pilot certificate with Instrument Rating is the basic license required to be professionally employed in the industry and the addition of a Multi-engine rating is a practical necessity for advancement. Although under FAR part 141 programs, a person can graduate by passing the course and not actually achieving the F.A.A. certificate, unilaterally students elect to take the F.A.A. check-ride for earning the respective certificates. Increasingly these programs are requiring the attainment of a Certified Flight Instructor certificate as part of the graduation requirement; the Certified Flight Instructor position is the typical entry-level position in the field. Students pursuing flight degrees enroll in flight courses that are usually conducted as a laboratory class and the flight training is done as part of the class. Upon completion of the flight course, credit hours are given appropriate to the level of flight training completed.

Increasing numbers of institutions are now using flight-training devices (simulators) of various levels to compliment the aircraft training and to reduce the cost of training to the student. Simulators are also able to give institutions the ability to conduct training for advanced aircraft such as turbo-prop or turbo-jet and glass cockpit aircraft that was not available before because the aircraft are cost prohibitive to obtain and operate. The aeronautical knowledge or ground school portion that is necessary for each license or certificate is taught separately as a credit-hour course itself. Typically flight instructors and/or regular faculty teach these courses depending on the subject matter and whether it is a theory class or not.

In addition to the professional or career pilot options, many institutions offer an Aviation Management degree. There is considerable variability in the amount of flying required to earn this type of degree with some institutions requiring the initial license, the Private Pilot, be earned and others requiring no flying be done. Management programs most usually require 9 to 15 hours of business management courses and 12 to 15 hours of aviation subjects (Kiteley, 1999, p.2.) . These programs have a strong foundation in business and management for the student who wishes to be prepared for various entry-level administrative and management positions such as airport management, airline management and operations, or general aviation operations and management.

The aviation institutions within the University Aviation Association (UAA) and virtually all of the others are accredited programs. There are two types of accreditation that these programs seek. The first is a national accreditation by organizations such as the North Central Association of Colleges and Schools. This particular accreditation is critical to a program since it is necessary for the program to qualify for offering federally sponsored financial aid to its students. Since flight training is so expensive, student aid is the financial linchpin to most flight training schools. The second type of accreditation is specialized accreditation bestowed by nationally recognized professional organizations. In the United States, for flight training organizations, this accreditation nominally means that given by the Council on Aviation Accreditation (CAA) . The CAA was developed by the UAA over a three-year period under direction of the Federal Aviation Administration and became incorporated in 1992 as an independent accrediting organization for non-engineering aviation programs at colleges and universities (Kiteley, 1999) .

The degree to which the ideology of an academic pursuit is personified in the professional community in which it serves can be largely defined by its relationships with that community and the success of the academia can be defined by the extent with which the industry signs-on to the ideology and depends on its graduates to further the science. Post-secondary collegiate aviation has enjoyed tremendous success by reaching into the industry with bridge programs that provide a path to airline positions for graduates, with partnerships with the National Business Aircraft Association that represents over 4,000 corporations that own and operate business aircraft, and by being a tool for the F.A.A. to conduct airway sciences education. Through these relationships, post-secondary aviation education has established itself as a national resource that is necessary for the safe, efficient, and profitable operation of the aviation industry. It is necessary to understand how collegiate aviation came to be interwoven in the fabric of the industry, how the relationships mentioned here came to be, and what their significance is. In the next section this review looks at the beginnings of organized flight training and flight training schools.

Early Organized Flight Training

Since the beginnings of powered heavier-than-air flight, flight training has taken place in some form or another. Initially the aircraft designers were the ones who taught themselves how to fly and occasionally they would teach others in an attempt to sell aircraft. Both Wilbur and Orville Wright did this for public and military sales. In a later analysis of his first attempt at flying the Wright Flyer on December 14th, 1903, the flight

the brothers did not count as a flight because of its short duration. Wilbur lamented that it was not wind but the fact that he had pulled the nose of the aircraft up too far too quickly that caused the crash (Millbrooke, 2000) . The need for pilot training became clear very soon after this momentous occasion. Prior to World War I it was manufacturers of aircraft that would teach the persons purchasing one of their planes how to fly. The first flight schools were in Britain with the Bristol Aircraft Manufacturing Company, founded in 1910 and in France with the Bleriot Aircraft Company founded in 1911. The Bristol school actually trained 664 pilots between 1910 and the beginning of WWI (Millbrooke). In the United States however, there were no schools during this time, only military training conducted by the manufacturers under contract, stand-alone military training and flying clubs.

The Wright brothers, who won a contract with the United States Signal Corps for powered heavier-than-air aircraft in December of 1907, had to include in the bid the training of Army personnel in use of the machine (Millbrooke, 2000) . The Wright brothers had incorporated at this time and become the Wright Company based in Dayton, Ohio. The training began in 1910 when the first students went to the factory for initial training. The actual flight training was conducted at nearby Huffman Prairie where the brothers had made their first flights outside of Kitty Hawk. The initial training actually began with an old airplane mounted on a sawhorse. After initial training the typical student would conduct 28 training flights over a ten-day period and make the last three landings without assistance. The pilots would then go to the Army airfield at College Park, Maryland for advanced training. College Park is recognized as the first U.S. Military Air Base (Millbrooke) .

The Wright brothers were not the only aircraft manufacturers or the only ones conducting flight training. Glenn Curtiss had sold Curtiss flying boats to the United States Navy and under contract with them trained Naval aviators in 1911 (Rea, 1987) . The Wright's, in heavy competition to sell airplanes, also gained a Navy contract and trained Naval pilot's at Huffman Prarie in exchange for the Navy purchasing a Wright pusher-plane. The Navy recognized the need to standardize aircraft training and opened the first Naval Air Base at the Naval Academy in Annapolis, Maryland, 1911 (Rea) . As the need for more training and the Navy's desire to conduct it in-house became stronger the Navy established the first military run flight school. In 1914 the United States Navy opened the Aeronautic Center at Pensacola, Florida; this was the first in-house, start-to-finish ground and flight school in the United States (Rea) . The U.S. Army would not be far behind in its organized flight training program. In May of 1917 the French Premiere, Alexandre Ribot, sent President Woodrow Wilson a telegram requesting a flying corps of 4,500 aircraft plus pilots and mechanics be formed for use in a campaign to take place in 1918 (Severe, 1997) . In that same month the Army National Guard unit in Mineola, Long Island, was activated and became the primary training ground for Army Signal Corps pilots (Severe) . These two services and the impending United States involvement in World War I spurred much flight training activity at the time.

Civilian flight training had grown right alongside the military but it was being done minimally by manufacturers but mostly by private individuals trying to earn money to fly or promote their own aircraft. This prompted the leaders of the industry, world wide, to form a group for the betterment of aviation. The flying clubs were called aero clubs and they were set up under national flags with eight total clubs from Europe and the United

States. They banded together to form the Federation Aeronautique Internationale (Millbrooke, 2000) . The clubs recognized the need for international standards of piloting skill and safety so they set standards and began to issue licenses. In order to encourage participation in the licensing process, the clubs would bar unlicensed pilots from club-sponsored competitions and from attempts to establish official records. The pilot's license had no sanction of law until world governments began issuing them in the 1920's although insurance companies often required a pilot to have the license. The Aero Club of America required a pilot to be 21 years old, make three supervised solo flights, and pass a safe flight skills test. This club issued licenses from 1910 - 1927 when the federal government took over (Millbrooke). The first real need to train pilots in mass did not come about in America until Congress passed the Air Mail or Kelly Act of 1925 and subsequently the Air Commerce Act of 1926.

The Air Mail and Air Commerce Acts

The Air Mail or Kelly Act and the Air Commerce Act of 1925 and 1926 respectively were the first, and most, organizing Acts that the United States aviation industry had had to that point. The federal government had been minimally involved in the development of aviation since 1918 with the beginning of air mail service by the post office (Wells, 1999). The development of aviation as an industry had been left to the Post Office and Post Master General; but that was the extent of federal development efforts. By 1925 the air mail system came to be more reliable and common place and the Post Master General realized the need for expansion and lobbied Congress. In 1925, the Kelly Act, named for

its sponsor Sen. Clyde Kelly, was passed by Congress as the Air Mail Act of 1925 (Wells). The significance of this act with respect to flight training is that it effectively gave the Post Master General the authority to "...enter into contracts with private persons or companies for the carriage of mail by air." (Wells) . News soon spread through the industry that the Act allowed for 80 percent of the revenue for carriage of the mail to go to the individual contractor or company and the post office was flooded with over 5,000 bids. This Act and its provisions, in effect, was the beginning of commercial aviation in the United States and served as the genesis for the nation's airlines. Colonial Airlines won a contract and would eventually become American Airlines. Western express won a contract and would eventually become part of Trans World Airlines (TWA). Northwest Airlines started by winning a contract, and United Airlines began by absorbing two operators, Varney Lines and Pacific Air Transport. These airlines needed pilots and pilots needed training. The need for flight schools grew.

The explosion of air commerce created by the Kelly Act prompted the Department of Commerce to ask for a joint congressional committee for civil aviation and one was established. The first report by this committee decried how far behind the United States was as compared to Europe in matters of aviation. President Calvin Coolidge appointed a board of businessmen to study the problem and they recommended the separation of civil and military aviation as well as federal regulation of the industry (Wells, 1999) . The result of the report of the joint committee of Congress and the Presidential Panel was the Air Commerce Act of 1926. The purpose of the Act was to promote air commerce, and the executive branch was made responsible for establishing and operating an airway system as well as navigational aids and a provision of the Act called for additional

promotion of air commerce through safety and a system of federal regulation (Gesell, 1998). This provision would prove crucial to the fledgling flight training industry because it cleared the way for the federal government to take over licensing of pilots from the Aero Club of America which happened in 1927. The need for training generated by the industry expansion in response to the Kelly Act, and the new federal regulation under the Department of Commerce created by the Air Commerce Act, provided a catalyst for many companies and schools to begin flight training programs. Some of the first schools to start operation during this expansion were private schools that did not initially offer degrees. They were Embry Riddle University in Daytona, Florida and Spartan School of Aeronautics in Tulsa, Oklahoma.

The First Big Flight Schools: Embry-Riddle and Spartan

It is important to look at these two schools in this study because they represent the precursor to post-secondary flight training as well as eventually becoming institutions in their own right. In particular, the ideologies, safety practices, and training standards developed at Embry-Riddle are still with us today in FAR Part 141 training syllabuses carried out at post-secondary institutions nation-wide. The flight operations and contracts executed by these schools were the foundation for collegiate flight schools to come.

John Paul Riddle was operating a flying business in Cincinnati, Ohio, when he sold a ride to Talton Higbee Embry and a relationship was immediately established. Mr. Embry loved flying, bought an airplane, and hired Mr. Riddle to be his flight instructor. On December 17th, 1925, which was the 22nd anniversary of the Wright brothers' first flight,

Embry and Riddle signed a contract and began their joint flying venture (McCollister & Ramsden, 1986). Embry-Riddle began with 2 Curtiss JN-4 Jenny's and a dream. The first enterprise was selling Waco aircraft from Lunken Airport in Cincinnati. Talton Embry was a pioneering businessman and was the first pilot to take a woman on the air tour circuit with him as well as openly encouraging women to share in the thrill of flight. The school began to gain fame when they asked the nearby University of Cincinnati to select one student who they would then teach and solo in one day. Frank Sheldon showed up at 9:30am on a Saturday morning and 74 landings later he soloed; it was Saturday afternoon (McCollister & Ramsden). In 1927 the school received an award for compiling 330,000 accident free miles and as a result they won an airmail contract from Cincinnati to Indianapolis to Chicago (McCollister & Ramsden).

The airmail business made Embry and Riddle realize the need for better piloting abilities in bad weather. They arranged to meet General Jimmy Doolittle who had just made the first flight solely by reference to his instruments and with his instruction they began to offer instrument flying classes to their airmail pilots and then to the public. They were the first flight school in the country where this type of training was being conducted.

The airmail business they had been awarded under the Air Mail Act of 1925 had begun to burgeon and grow as well as the carriage of passengers they were allowed to do because of the company's excellent safety record. The carriage of passengers grew so much that they began an "air information bureau" which was in effect the first travel agency (McCollister & Ramsden, 1986).

The huge success of Embry-Riddle and some others like it spawned many flight

schools but many were more about making a profit than teaching people to fly and safety. One of the chief aviators of the day, Lt. Barrett Studley of the U.S. Navy said, "The operation of these schools is of vital concern, not only to the student, but to everyone interested in aviation .... For every student who, half-trained and ill-prepared, wrecks his plane on an early solo flight, ten other prospective airplane buyers are discouraged" (McCollister & Ramsden, 1986) . Mr. Embry and Mr. Riddle publicly claimed, "A flight school cannot escape the responsibility of separating those who can fly safely from those who cannot". (McCollister & Ramsden) . The school established a standard of a minimum 10 hours of instruction before a solo. Although there is not a specific hour-requirement for solo today, most syllabuses call for nine-to-ten one-hour lessons before the solo flight is recommended. Not very many students are able to meet this goal but it is interesting that the Embry-Riddle school had such vision as to established standards that are still in use today.

The airmail business end of the Embry-Riddle started to demand a greater skill level of the pilot's so the school developed additional training called Professional Pilot Training Courses. We still use this terminology today. A student in these courses would get 10-hours of dual instruction, 1 solo-hour, and 30-hours of ground instruction. After this training, they would move on to Advanced Pilot Training Courses which were 50-hours in length and there were periodic checks to be passed (McCollister & Ramsden, 1986) . This concept of periodic checks is another concept used today; they are called stage checks and required under FAR Part 141 training syllabi. After passing the advanced training, a student would posses a "Limited Commercial License" and after accumulating 200 or more hours of experience they would become "Transport Pilots".

This concept of limiting privileges based on experience and license held is still in use today by the F.A.A. although with different numbers and nomenclature, but Embry-Riddle used it 32 years before there was an F.A.A.

Almost no other schools of the day had the concern for safety or the professional pilot approach to flight instruction. A horrific number of persons were being injured or killed during flight training or shortly after soloing. This lack of uniform quality of flying schools drew heavy criticism, particularly from Senator Hiram Brigham of Connecticut (McCollister & Ramsden, 1986) . He sponsored a bill that required annual examinations and rating of civilian flying schools. He wrote, "The Aeronautics Branch of the Department of Commerce daily is flooded with requests from people who ask: 'where can I obtain a good, reliable course in flying? ' Owing to the lack of standardization, stabilization, or rating of the flying schools in existence today, this vitally important information cannot be given" (McCollister & Ramsden) . This inspection brought about by the quality of Embry-Riddle and the lack of quality elsewhere is still in effect. All agencies, post-secondary or not, operating under FAR Part 141, must carry an F.A.A. approved Air Agency Certificate which is renewed semi-annually.

The cash generated from the airmail contracts, public carriage of passengers, and the flight school, plus their desire for safety and excellence in training, led Mr. Embry and Mr. Riddle to the realization that they needed to create a university dedicated to the study of aviation. However, the company was hurt badly by the stock market crash that occurred in October of 1929 and the "Air University" never got off the ground. Not much else did either (McCollister & Ramsden, 1986) . Eventually, Talton Embry sold his shares in the company and moved to California while John Riddle was forced to oversee

airline operations that had absorbed the school. After only a year, Mr. Riddle had tired of management life and set off to Florida to make a new dream and a new fortune. At age 32 he was already an aviation legend and about to begin again.

John Riddle went to Florida thinking that it was a gateway to South America and that aviation enterprises could be launched to support it. As you might expect, he began with a flight school and began training people in flying boats. He opened another center at the Miami airport because of a contract with the University of Miami. Although the flight training was done under contract by Riddle, this was the earnest beginning of post-secondary flight training.

In 1941, the Army Air Corps contracted with Mr. Riddle to give basic flight training to its cadets and the Army would conduct the advanced training at its own fields. The British Royal Air Force also contracted with Riddle for the training of 99 British pilots (McCollister & Ramsden, 1986) . Riddle field was established complete with training facilities and eventually primary, basic, and advanced instruction would be carried out there for 250 cadets at a time. In the spring of 1940, Dorothy Ashe, the daughter of the President of the University of Miami, became the first woman to solo at Riddle field, continuing the schools commitment to teach everyone who could fly, to fly safely. In fact, in 1941, Helen Covis was one of only 160 female Commercial Pilots in the U.S. and Embry-Riddle hired her as the first female Certified Flight Instructor in the United States (McCollister & Ramsden) .

All of this training was done under the Civilian Pilot Training Program authorized by the Civil Aeronautics Administration which had new powers granted to it by Congress. This program was so critical to the training of pilots for WWII, and the outcomes, good

and bad, were so central to the flourishing of post-secondary flight education, that this topic is covered in its own section as a sub-heading of WWII pilot training. Numerous collegiate flight training programs, private and public, have their roots in the Civilian Pilot Training Program so it will not be discussed further in this section about Embry-Riddle but rather as a separate entity.

Embry-Riddle flourished under the war-time needs for pilots, and in 1940 they began training mechanics and technicians as well. At the time the peace treaty for WWII was signed over 26,000 men and women had trained as pilots, mechanics, and technicians at Embry-Riddle (McCollister & Ramsden, 1986) .

After WWII the school changed names to Embry-Riddle School of Aviation and they developed a technical school as well as flight training. The military did not need pilots trained there anymore and although some pilots were trained during the Korean Conflict it became clear that the future of the school lie in the civilian training market. After the demands of the Korean War were met and the military contracts ended Embry-Riddle re-united with the University of Miami to conduct flight training; but this time there was a degree component attached. This was a crucial step in the development of collegiate aviation because the schools formed the first aviation education alliance. Students could get a two-year certificate in the Business Pilot Program and a four-year degree in Aviation Administration; four-years later Embry-Riddle would begin training the universities ROTC cadets (McCollister & Ramsden, 1986) . By 1958 the school had international success with the student count in excess of 1,000 being from 44 states and 21 foreign countries. Within 10 years the school had massive expansion and had received accreditation for the institution, which now had an Engineering, Airframe and

Powerplant Mechanics, and Flight course. The accreditation came from the Southern Association of Schools and Colleges (McCollister & Ramsden) . The president, Jack Hunt, had to fight hard to sell the idea of an aviation university to a unilaterally academic entity but he got it done. The fight for accreditation made Mr. Hunt realize that the long-term success of the ideology and the school would require some mainstreaming. On June, 9, 1970, he dissolved the three divisions and established two Colleges under one University; the College of Aeronautical Studies and the College of Aviation Technology now came under the new Embry-Riddle Aeronautical University (McCollister & Ramsden) . The engineering program gained further accreditation by the Engineering Council for Professional Development and the flight program would become certified by the F.A.A. This was the first recognized exclusively aviation oriented post-secondary institution in the United States.

The importance of Embry-Riddle to the collegiate aviation community went beyond the previously mentioned ideology, safety practices, and training standards, into legitimizing aviation as a valid post-secondary academic pursuit. The alliance with the University of Miami, which continues to this day, and the establishment of an academically and professionally accredited university of its own right brought aviation training out of the shadows for good and into a recognized science and profession.

Spartan School of Aeronautics

Although it may seem redundant for this study to examine another flying school of the era having already given an example of the beginnings of collegiate aviation, it is

important to note that this study is geographically oriented around Region VI of the National Intercollegiate Flying Association that covers the state of Oklahoma. Spartan School of Aeronautics is an Oklahoma based post-secondary flying school and a unique story of its own. The impact of the school on the region, in particular Tulsa and Northeast Oklahoma, has been significant. Additionally, it further connects this type of flight training to developments in aviation as a whole and shows how inextricably linked advancement of aviation is to private post-secondary and public post-secondary institutions. The needs of the industry responded to by these institutions are often embryonic and exactly what and how pilots and technicians are trained is often rooted in the vision of school administrators as applied through their respective curricula. The unique needs of a flight training organization of this type have spurn developments in the field. This section of the report will not be as in-depth about Spartan as was with Embry-Riddle because many of the concepts are the same. Instead this section emphasizes the flight school portion of Spartan as a development of purely business needs envisioned by businessmen, which is uniquely different from the flight-for-passion beginnings of Embry-Riddle and others.

As with many schools of the day Spartan School of Aeronautics did not start out as a school per se; in fact, Spartan started as an aircraft manufacturing company known as the Mid-Continent Aircraft Company. The practical beginning of this company was on October 25, 1926 when Willis Brown flew the aircraft he and Paul Meng, O.K. Longren, and Waldo Emery had designed and built at McIntyre field in Tulsa, Oklahoma (Peek, 1994) . They called the aircraft the Spartan C-3 and what made the aircraft so different from other aircraft of the day was that it had structurally been designed to meet all the

requirements of a "Class 1" aircraft from the newly established Aeronautics Branch of the Department of Commerce (Peek) . The C-3 was the first attempt at safe and rapid transportation and as luck would have it the craft also made a great training aircraft. The C-3 caught on and the company soon had orders for eight airplanes.

As an entity of its own Spartan Aircraft Company began in 1928 When William G. Skelly, President of the Tulsa-based Skelly Oil Company, bought the Mid-Continent Aircraft Company as a way to expand his company into new fields (Peek, 1994) . Mr. Skelly's interest had been peaked when he noticed the sales of aviation grade fuels on the rise particularly in the Tulsa area. Mr. Skelly was a visionary and in the statement placed on the certificate of incorporation for his new company one can find the beginnings of Spartan Flight School and organized flight training in the region; he said "...build, equip, and sell airplanes, balloons, dirigibles, and all kinds of heavier-than-air and lighter-than-air flying machines; conduct a general manufacturing business; own fields; transport passengers, freight and mail, and conduct schools of instruction in flying and the manufacture of airplanes and accessories" (Peek) . In this simple statement of incorporation Mr. Skelly gave birth to the expansion of the aviation industry in Oklahoma.

Realizing the key development needed to bring aviation to an area was an airport; on Februrary 28, 1928, Billy Skelly, Waite Phillips, Robert Garland, Harry Rogers, and C.H. Terwilliger signed a joint note for $172,000 dollars to buy the land at the North East corner of Apache and Sheridan, which would eventually become Tulsa International Airport. In this way Spartan is directly responsible for bringing the airport and commercial aviation to Tulsa.

The flying school proper was brought about as an after thought of Mr.Skelly in realizing that his efforts to expand Spartan into a new aircraft factory and plans to develop an entire line of aircraft as part of the aviation boom would be in vane if there were no pilots or mechanics to fly and maintain the airplanes he sold. On October, 1, 1928 Mr. Skelly announced the establishment of Spartan School of Aeronautics which was touted as Tulsa's "University of the Air" (Peek, 1994) . Mr. Skelly would not stop his development efforts with a simple announcement and by January of 1929 the school was up and running with a modest list of students who were housed in borrowed quarters at the airport and taking flight instruction. In February, 1929, Mr.Skelly had his advertising staff place a full-page ad in various aviation publications touting Spartan as "...the best training possible" (Peek) . Spartan not only had physical facilities across from one of the most modern airports of the day they developed a complete curriculum for flight and maintenance programs which led to The Department of Commerce, Civil Aeronautics Authority issuing them an Approved School Certificate in 1929 (Peek) . In this we find another example of a school seeking legitimization as an organized and professional flight training school through accreditation or certification of some overseeing body of authority; in this case it was the Federal Government. This curriculum featured the 10-hours of dual instruction prior to solo, and many other hour requirements similar to those in use at Embry-Riddle, as well as granting limited privileges and licenses as flight time was accumulated. It is important to mention here because it represents the amplification of the beginnings of standardized training guidelines, which are the cornerstone of the flight portion, of post-secondary flight training today.

The directors of Spartan quickly realized the importance of the academic (ground-school) portion of their program and considered it of vital importance. The curriculum went beyond the requirements of the Department of Commerce and it was placed under the care of Lieutenant J.A. Reese, an experienced WWI aviator and graduate of Liverpool University, and regular flight instructors were only allowed to teach selected subjects (Peek, 1994) . This study finds this fact important as it relates to post-secondary flight education because although the concept of an Air University was not new this is the first recognition of the university-level aspect of aeronautical knowledge. In addition we see the first application of individuals with advanced accomplishments being used to teach the more involved and critical aspects of the ground curriculum thus lending validation to degree holders and laying the initial ideology behind aviation as a post-secondary educational pursuit. Spartan students were even required to spend time with the local weather observation station run by the Department of Agriculture and share this information with the commercial station operated by the local airlines. The students released weather balloons, charted atmospheric pressure, predicted winds, recognized cloud formation, and prepared maps; even tornadoes were studied. This was possibly the earliest aviation science research conducted in the United States.

Despite all of this the depression hit Spartan hard like it did the rest of the country and in the fall of 1929 only 30 students showed up at the fledgling school to start flying classes. But Spartan was not a regular school, it was a business enterprise, and with the backing of the Skelly Oil Company the school went on the offensive. Mr. Skelly realized that he needed a marketing ploy to fill his niche and he would find it with the school's own organization known as "The Dawn Patrol" and their associated logo. The Dawn

Patrol was actually a flying organization within the flight school that was started by three students from New England that wanted to learn formation flying like what they had seen at Army Air Corp exhibitions; they initially called themselves the three blind mice (Peek, 1994) . After getting approval from the Chief Flight Instructor and under his tutelage the three learned formation flying and soon other students wanted to learn as well. Since it was no longer appropriate to call themselves the three blind mice they decided on the name of The Dawn Patrol after the glorified exploits of Allied pilots in WWI flying off into the skies of France at dawn (Peek) . The logo of the Dawn Patrol was a black cat, with fiery red eyes, and the number thirteen on its side. The logo, and the motto, "Skill and Knowledge overcome Superstition and Luck", was just the thing Mr. Skelly needed to attract potential students. Very soon commercial flying clubs and various chambers of commerce were requesting visits by the Dawn Patrol because of the attention and business they generated (Peek, 1994) . It was a good deal for the sponsoring organization because the visit was at no cost because it was part of the student's training. Typically, hotel rooms and meals were furnished by the sponsoring organization. The news of Spartan was being spread to all parts of the region and it didn't cost the school a penny. Mr. Skelly, yet again, showed his flair for business and proved that flight training can very much be a commercial enterprise complete with advertising, demonstration of the product, and sales.

There was a massive expansion of Spartan, and organized flight training in general, that happened at the end of 1938 and early 1939. The growth was related to the Civilian Pilot Training Program and the preparation of the United States for WWII. As stated in the previous section, this part of the history of flight training is so critical to the

development of post-secondary flight education that it warrants its own section and this expansion will be referenced there. There is a unique part of this expansion at Spartan, as related to development of aviation training in Northeast Oklahoma, that should be mentioned here; the training of British Pilots during WWII.

The war intensified in Europe in 1940 and 1941 and the concept of British aircrews training in the United States gained favor among top officials in the R.A.F. (Royal Air Force) . There was precedent for this from 1917 when British cadets were moved from Canada to Texas to train because of better weather and training facilities but the critical difference here is that in 1917 the United States was at war and in 1940 the U.S. was decidedly neutral (Peek, 1994) . The U.S. was understanding of the British plight though and for the British there were distinct advantages to training here so negotiations were carried out at the highest levels and approved. Cost, however, was a concern for the British government and there was talk of sending their cadets to USAAF (United States Army Air Force) training schools alongside U.S. cadets and the setting up of private contract schools for use exclusively by the British Cadets called the "All through Scheme" (Peek) . Spartan and eight other schools were called to Washington, D.C. to listen to the proposal by the British government. Initially Spartan was not interested because the municipal airport in Tulsa would not support anymore training and in fact they had already expanded to Hat Box field in Muskogee, Oklahoma. The resources needed to train the British cadets were simply not there. The British government would not be deterred and they handed Spartan a proposal for the development of a training facility at the Miami, Oklahoma, airport. The proposal was tentative and depended on the passing of the Lend-lease Act that was working its way through Congress (Peek) .

The Lend-lease Act passed in the spring of 1941 was a way for the United States to aid Allied forces in Europe without getting directly involved in the conflict. Through the Lend-lease Act the U.S. would furnish supplies and equipment to Allied nation's in exchange for services or promise of future payment (Millbrooke, 2000) . No-one really expected the payments to be realized but it did allow countries like Britain to use U.S. resources and specifically allowed for the development of the British cadet training center in Miami, Oklahoma operated by Spartan. Important training developments happened at this site including the first organized use of the Link trainer, which was one of the first flight simulators. It was primarily used for training of instrument flight. All totaled, 2,114 R.A.F. cadets began the program and 1,376 earned their wings their as well as 116 USAAF cadets that went through the Miami training facility (Peek, 1994) . By 1941 Spartan had over 1,000 employees and branches in Tulsa, Muskogee, and Miami, Oklahoma and it was a large, profitable organization (Peek) .

Spartan School of Aeronautics was greatly expanded after WWII with more than 10,000 G.I. Bill students from 1945 - 1950, foreign enrollment of over 300 students and the training of over 2,000 men for airplane and helicopter maintenance during the Korean Conflict (Peek, 1994) . Since then the ownership has changed hands a number of times. J. Paul Getty owned the school as a result of an oil business deal that resulted in him gaining control of the Skelly Oil Company; he sold it to a company called Automated Systems; they sold it to the National Education Centers; they sold it to Harcourt Brace Publishing Company; and finally they sold it to the current President of Spartan, Mr. Terry Harrison and a group of investors. It is not an unreasonable observation to make that all the turmoil surrounding continuous ownership/management changes would make

it difficult to have an effective organization, yet Spartan continues to attract students from the U.S. and world-wide. It is verified by Peek, 1994, that as of 1994 there were over 80,000 graduates from Spartan and this is the last official number that this study was able to verify. Nonetheless, the fact that so many individuals and organizations have been willing to own and operate the school in itself is a validation of the ideology and necessity of post-secondary flight education; and in the case of Spartan as a commercial enterprise.

For this writing, this study will consider the contribution of Spartan as one of national importance and more specifically to the development of organized flight training in the region being studied.

World War II Pilot Training

Prior to World War II a significant portion of flight training schools were commercially operated and there were a few colleges and universities that had programs combining the study of aeronautics with engineering. The Civil Pilot Training Program was established in 1939 in order to help America prepare for war. This government sponsored program saw over 1,000 colleges and universities respond to the call for help and they developed training programs, facilities, and airports (Kiteley, 1999) . With respect to post-secondary, aviation specific, training, this was the catalyst and genesis for the starting and expansion of the ideology and the practice. When the war was over many of these programs would continue on as aviation specific curricula and in the early 1950s the government again suggested collegiate aviation as a pilot resource through the

Reserve Officer Training Corps (Kiteley) . Before this review examines the Civil Pilot Training Program and its effects on post-secondary flight training it is important to briefly discuss the agency that enacted and oversaw the program; the Civil Aeronautics Authority, and its outgrowth, the Civil Aeronautics Administration. These organizations are important because they represent the end result of frustrations felt throughout government, the public, and the industry mostly surrounding the lack of standardization and safety in aviation nominally associated with flight schools.

Civil Aeronautics Authority and Administration

Among the various safety and economic things the Air Commerce Act of 1926 did was it created, within the Department of Commerce, the Civil Aeronautics Authority (Wells, 2001) . It was recognized that aviation was becoming too large an endeavor to simply be a division within the Department of Commerce. The relationship to flight training was that one of the major functions of the authority was "the development of air commerce and safety" (Wells, 1999) . In 1938, the Civil Aeronautics Act was passed and it created the Civil Aeronautics Authority separate from the Department of Commerce (Gesell, 1998) . Under this act a board was set up for only the investigation of aviation safety problems but it was still under the Civil Aeronautics Authority. In a later re-organization, the Authority became the Civil Aeronautics Administration and the Civil Aeronautics Board was separated from it to assume authority from the Civil Aeronautics Authority as an independent agency for all matters related to economic and safety regulation of the aviation industry (Wells) . This Board set the tone for the industry

particularly with respect to flight-training and airmail and got the Federal Government involved in aviation safety in earnest. When the call went out for pilots for WWII it was a critical turn of attitude and genesis of sorts for collegiate flight training when the Civil Aeronautics Authority suggested colleges and universities be used to help prepare the nation for war.

The Civil Pilot Training Program

Training under this program began as a war preparedness exercise but it soon grew to become specific to the needs of the military as more and more nations joined the conflicts in Europe. To accommodate the expected training of pilots the United States Army built over fifty air bases in the Rocky Mountains because of the open space, generally good flying weather, and it was far enough inland as to be safe from attack (Millbrooke, 2000). The Civil Pilot Training Program would soon shed its civilian disguise and become the War Training Service.

In anticipation of the United States having to enter World War II Congress passed the Civil Pilot Training Act of 1939 to be administrated by the Civil Aeronautics Authority and in 1941 President Roosevelt created the Civil Air Patrol (Millbrooke, 2000) . The intended purpose of this program was for civilians to receive flight instruction despite the wartime restrictions on private flying. Under this program, and its successor the War Training Service, the various services were allowed to contract out with colleges and universities for the training of civilian pilots (Millbrooke) . The college and or university would conduct the classroom training prescribed by the individual service and then either

conduct the flight training or sub-contract to a flying school for the actual flight training. However, very soon after the beginning of the program these schools began training students in an Army Air Force Training Command program, Army Specialized Training Units, and the Navy's V-12 officer training program (Millbrooke) .

In 1939 the Chief of the Air Corps announced an expansion of the number of cadets in the Corps Primary Flying School classes to 344 when they had been between 70 - 200 (Severe, 1997) . The goal was to expand the total number of pilots in the Air Corps to 4,500 but since only 18.5% of the applicants were able to meet the physical, educational, and mental standards they would need 14,400 applicants a year in order to come up with 2,644 graduates a year to keep the ranks at the desired level (Severe) . The Air Corps turned to its most reliable source of aviation cadets, the universities, and now the Civil Pilot Training Program. During the 1939 - 1941 time-periods the accepted cadets became directly assigned to a primary school which was nominally a college or university.

When the pilot requirement went up from 4,500 pilots in two-years to 30,000 pilots a year the Air Corps had a problem on their hands (Severe, 1997) . The answer was publicity focused almost exclusively on colleges and universities. They constructed the idea of a glamorous life and in every college annual and magazine during 1939, 40, and 41. The image of the aviation cadet complete with helmet, goggles, and scarf was spread across the pages. Every graduating cadet had his picture printed in his hometown newspaper with a good write-up, films were made, newsreels, magazines, and newspapers, all touted the life of the aviation cadet; cadets even judged beauty contests and other activities attractive to young men (Severe) . The Army Air Corps even went so far as to tout Randolph Field, where advanced flight training took place and wings were

earned, as the "West Point of the Sky" (Severe) .

By 1940 the Air Corps had Flying Cadet Examining Boards at what was called elementary flying schools, which were the colleges and universities participating in the Civil Pilot Training Program. All a young college prospective or civilian off the street had to do was show up at one of these schools and they could be evaluated and have their answer within five days (Severe, 1997) .

The Navy soon caught on to the need for using colleges and universities to conduct aviation training and in January of 1942 they conducted a thorough investigation of all available schools to launch their "Pre-flight Program" (Rea, 1987) . In February "the Navy contracted with the University of Iowa at Iowa city for the first Pre-flight school, and others quickly followed: the University of North Carolina at Chapel Hill, the University of Georgia at Athens, St. Mary's College, and in 1943 Del Monte College in California" (Rea) .

The war effort required an extreme expansion of manpower and the Department of the Navy soon realized that it would need more early training programs to better prepare a cadet for the succeeding stages of training and thus expedite their call into active service.

In December of 1942 the Navy contracted with twenty colleges and universities to conduct flight preparatory school which preceded the pre-flight program training (Rea, 1987) . Under the Navy Flight Preparatory School (NFPS) a student would receive 15 weeks of ground training which was intended to relieve them of some of the academic burden of the pre-flight program so as to retain more cadets and get them through faster. The NFPS idea worked and the first classes began in January of 1943 at colleges that ranged from small private institutions like William Jewell in Missouri to Texas and

Pennsylvania State Universities (Rea) .

By June of 1942 the Civil Pilot Training Program had exposed thousands of civilians to flight training. During this time the syllabus had dramatically changed and it eventually was very closely aligned with that of the Army and Navy. It was in 1942 that the government required anyone who completed training under the act to enlist in one of the flying services of the military branches; the Navy was getting thirty percent of their pilots from this program and would eventually be involved in its operations at ninety-two campuses (Rea, 1987) .

The region under consideration by this study played a part in preparing for WWII under the Civil Pilot Training Program as well. Spartan School of Aeronautics became the 314th Army Air Force training Detachment in July of 1942 and operated out of the Tulsa Airport (Severe, 1997) . Spartan had been contacted directly by General H.H. Hap Arnold, in the fall of 1938, along with other schools for the purpose of setting up training fields for Army cadets. The General had heard about the Germans training on small fields using civilian contractors.

Spartan contracted with the Army, which agreed to furnish the planes, but Spartan had to furnish the instructors, flying fields, and living accommodations for the cadets (Peek, 1994) . The problem was finding instructors because of the program available instructors were hard to find and expensive for the day. Parks College, St. Louis, Missouri, was paying $250.00 dollars a month and almost any operator was giving $225.00 a month; some of Spartan's prospects were asking $300.00 (Peek) .

The program was very attractive to a young man of the era because jobs were hard to find and the pay of a cadet was $75.00 a month during training with free room and board.

On May 16, 1940, President Roosevelt informed Congress that the United States needed to train 50,000 pilots quickly (Peek, 1997) . It was already apparent to the Army Air Corps that using civilian primary schools was a success and the announcement of President Roosevelt caused the Corps to turn to existing schools to arrange for a massive expansion of facilities and Spartan grew tremendously.

Embry-Riddle was also part of the Civil Pilot Training Program and when war broke out for the United States they were ready to train cadets with facilities and 87 flight instructors (McCollister & Ramsden, 1986) . The Army Air Corps used Embry-Riddle for the primary training of cadets initially and conducted advanced training on its own fields but eventually Embry-Riddle would conduct training for all bomber and pursuit planes; including training of combat maneuvers. The urgent calls from the Government for more pilots and more planes caused Embry-Riddle to begin a technical division training mechanics for the services as well.

Embry-Riddle was a school that provided complete war effort aviation training. By September 2nd, 1945 when General Douglas MacArthur signed the peace treaty ending WWII, over 26,000 men and women had received their wings or technicians certificate at Embry-Riddle (McCollister & Ramsden, 1986) .

The Civil Pilot Training Program did a number of things for post-secondary flight education and not all of them directly related to flight training. As part of the program psychologists at the various schools conducted a Standard Testing Program in association with the National Research Council's Committee on Selection and Training of Aircraft Pilots (Millbrooke, 2000) . This committee's work developed a variety of tests that would be later used for pilot selection and they also developed "patter" which was a

speech pattern that could be used by flight instructors in flight so they could communicate with the student better (Millbrooke) . This was the first aviation research carried out at true four-year comprehensive universities.

The Civilian Pilot Training Program and the War Training Service did more in terms of cementing aviation as a university-level academic pursuit than any thing before or since its time. By the time the war ended the program(s) had trained over 375,000 people and it was a financial boom to campuses and private schools alike (Millbrooke, 2000) . The next section of this review will look at flight training conducted at Oklahoma State University.

History of Flight Training at Oklahoma State University

Oklahoma State University is being written about in this study not only because it is the school of origin for the study but rather because it is a prime example of a public post-secondary institution with its roots in the Civil Pilot Training Program and an illustration of the changes, growth, and effective modern programs being carried out at many institutions. Oklahoma State University is within Region VI of the National Intercollegiate Flying Association, which is the geographic scope of this study.

Oklahoma State University and Aviation Education

The Oklahoma State University is a land-grant university established on the 25th of December, 1890 as Oklahoma Agricultural and Mechanical College (A&M) just twenty

months after the Land Run of 1889 (Aviation and Space Department History, 1994) .

Aviation training is currently housed as a program in the School of Educational Studies within the College of Education. It has been closely linked with the NASA Aerospace Education Services program over the years and continues that relationship today. The training originated within the College of Arts and Sciences Division of Engineering and later became a school and part of the Institute of Technology within the college. The program has been with the College of Education since 1952 and has also been a Department, and, under the School of Occupational and Adult Education (Aviation and Space Department History, 1994). The university currently conducts the actual flight training but it has been done under contract during two different time periods. The next section of this writing looks at the chronology, developments, and growth of the aviation program at this comprehensive four-year university.

Beginning Years: 1939 - 1951

In the fall of 1939, under the Civil Aeronautics Authority Civil Pilot Training Program, the first ground classes were held at what was Oklahoma A&M. The Division of Engineering taught the ground schools and plans were made with Stillwater Flying Service to begin conducting flight training at the Stillwater airport which was then a series of grass runways known as Searcy Field (Aviation and Space Department History,1994) . Stillwater Flying Service was started by Mr. Al Guthrie, who was also the airport manager, with 1 aircraft in 1935 and had grown to 4 by the time flight training had begun. The program was not originally intended to be part of the national defense

program when the first students, 39 men and 1 woman, started flight training on November 25th, 1940; but by the end of 1940 Stillwater Flying Service had 63 planes and a staff of 80. The A. and M. College Magazine (1940) . The training now became part of the War Training Service and was conducted under the government of the 90th Training Detachment.

All of the students completed their training within 90 days and Oklahoma A&M became the first school in Oklahoma to finish all of its students; they flew 500 hours with no accidents or incidents (Aviation and Space Department History, 1994) . The Civil Aeronautics Authority was impressed with this record and allowed more advanced ground schools to be taught at the school. The Oklahoma A&M training saw more of its students join the Armed Forces than did any other college in the United States and an even bigger statement about the training received at Searcy Field is that no-one who trained there washed out of U.S. Army Air Force training. The A. and M. College Magazine (1942) .

The initial flight instruction consisted of 8 hours of dual instruction, 2 hours of solo time, and then another 1 hour of dual before advanced training began (Aviation and Space Department History, 1994) . The students would typically fly 25 hours a week and after a total of 50 hours of training they took a ground test and a flight test for award of the Private Pilot License (Department History) . Some of the maneuvers such as the Power-off 180 degree landing and the Steep Spiral are still being taught today. Some of the classes being taught were Air Traffic Control, Navigation, Meteorology, and Aircraft Maintenance. The success of the program allowed for the advanced classes of Principles of Flight, Aerodynamics, Avigation, Aeronautical Meteorology, Weather Mapping,

Instrument Flying Technique, and Flight Instructors courses to be taught. Oklahoma A & M College General Catalog, Vol. 43 . The flight courses offered were Primary Flight Instruction, Advanced Flight A, Advanced Flight B, Advanced Flight C, Instruments Course, and Instructors Course; all of these courses were progressive and required attaining successive licenses until the student became a certified instructor (Oklahoma A & M College General Catalog) .

In 1945 the aviation training had become so big and was recognized as being of national importance so a separate School of Flight was established under the Division of Engineering along with the schools of Architecture and Applied Art, Technical Training, Engineering Extension, and the Engineering Experimental Station (Aviation and Space Department History, 1996) . In 1947 the School of Flight was moved to the Institute of Technology within the College of Engineering Architecture and Technology because they had a Aeronautical Engineering program (Department History) . Flight training grew as returning World War II pilots were eager to help the program, G.I. Bill students were plentiful, and the Civil Aeronautics Authority was still overseeing the program.

The School of Flight hit a major milestone in 1947 when the President of the University, Henry G. Bennett, authorized the purchase of 6 training airplanes and 2 charter aircraft to fly university faculty and staff on state business. OSU Magazine, Summer (1993). Stillwater Flying Service was still doing the flight training at this point and now they would assume responsibility for the business travel as well. At this point the School of Flight combined flight instruction, airport management, aeronautical research, and flight service for the university under one school.

In 1948, the Flying Aggies, student organization, was formed by Mr. Hoyt Walkup,

with strong support from the airport manager Mr. Glen Rucker. OSU Magazine, Summer (1993). The Flying Aggies were formed to continue campus interest in aviation and they grew quickly. In 1951 the organization joined the National Intercollegiate Flying Association and won their first competition in 1952 (Aviation and Space Department History, 1994). Excellence in flying has always been the standard for the organization as evidenced by their earning of the Grover Loening Silver Cup for best aviation student organization 21 times and the Bendix Trophy for best flight team 8 times.

The continued massive post-war expansion of the aviation industry prompted the Division of Engineering to develop Aviation Engineering programs in 1949 and allowed for the School of Flight to enjoy continued increases in enrollment (Oklahoma A & M College, General Catalog, 1948-49, Volume 46). The Korean War training effort 1950-1951 saw some help from Oklahoma A & M but mostly G.I. Bill training was done.

The Middle Years: 1952 - 1986

In 1952 the School of flight was moved and established under the College of Education because it had become clear that the need to provide aviation trainers and educators was pressing. Although the aviation education was being done in the College of Education the aircraft engineering and mechanics programs were left in the Division of Engineering. The Aviation and Space Program History, 1994, reports though "although the instruction was in Education ...in function they cut across departmental lines, drawing students from all divisions". This statement illustrates the multi-disciplinary nature of the field of aviation and how the conduct of post-secondary aviation training

can become fractionalized.

In 1953 the name was again changed, this time to Aviation Education and Flight Training to better denote its standing within the College of Education (Oklahoma A & M College, General Catalog, 1952 - 1953, Volume 50) . In the 1952/53 school year the College of Education decided to take over flight training operations from Stillwater Flying Service, under the School of Flight Training, and Mr. William Randall was in charge of flight instruction (Aviation and Space Department History, 1994) .

In 1954 the founder of the Flying Aggies, Mr. Hoyt Walkup, joined the college as an aviation academic instructor and eventually as the flight examiner too. The program was now able to be solely conducted in-house. By 1965 the School of Flight Training was producing 180 - 230 licensed pilots a year with a ninety to ninety-five percent first-time pass rate (Aviation and Space Department History, 1996) .

A major boost for the program came in 1968 when what was now called Oklahoma State University was selected to head-up a space-age education project for public schools through space demonstration programs (Department History, 1994) . NASA Johnson Space Center oversaw the program nationally and awarded OSU a contract to set up the demonstrations in 8 states. OSU was awarded a contract to manage the Space Science Education project regionally in 1968 and nationally in 1969 through 1975 and again in 1979 – present; called the Aerospace Education Services Program, it is the longest running continuous project at the university (OSU College of Education, Annual Report of Research and Projects, 1994, p.3) . The principal investigator for the contract was Dr. Kenneth Wiggins. Dr. Wiggins, under the Department of Curriculum and Instruction, within the College of Education, administered the contract. The education program

administered by Oklahoma State University on behalf of NASA is in every NASA field center in the United States as well as at NASA headquarters. The university employs education specialists that travel to public elementary and secondary schools to educate about the accomplishments and the responsibilities of NASA (Department History, 1994). In 1973 aviation education was moved to the School of Occupational and Adult Education, still under the College of Education. By 1980 the program had an endowed chair with the initiation of the Clarence B. Page chair.

Beginning in 1984 - present, OSU, NASA, was placed in charge of funding for the teacher in space program and in 1985 reorganization was suggested to merge Aviation Education with Space Education functions to be more effective and because of the Teacher in Space Program and the close working relationship the two programs already had (Aviation and Space Department History, 1996) . By 1985 the combined Aviation and Space Education program at OSU was one of only 23 programs in the United States certified under the F.A.A. Airway Sciences program.

The Airway Sciences Program had its roots in 1982 when the director at that time, Mr. J. Lynn Helms, saw the need for a formal education program to address the challenges surrounding implementation of the National Aviation System Plan (Kiteley, 1996). This system was to modernize the navigation and air traffic control system of the United States over the course of a decade. A taskforce of educators working with the F.A.A. developed a Baccalaureate degree designed to provide the F.A.A. with its future technical managers. The programs were comprehensive and required calculus, physics, management, computer science, and other courses. These course were then "...augmented by five areas of concentration leading to flight, aircraft maintenance, avionics, management, and

computer science specializations" (Kiteley) . Oklahoma State University was the first institution in Oklahoma to receive certification under this program.

The Modern Program: 1987 - present

During the reorganization efforts it became clear that departmental organization of the Aviation Program was necessary and one of the first proposed responsibilities of the new department would be to analyze the curriculum and degree needs in light of the airway science program and changes in the industry. The reorganization was approved by the President in July, 1987, and the Department of Aviation and Space Education was established with Dr. Kenneth Wiggins, who had been the principal investigator for the NASA contract(s), as the first Department Chair (K. Wiggins, personal communication, March 18, 2003) . As part of the reorganization the Aerospace Professional Development Center for teachers became the NASA Regional Resource Center (S. Marks, personal communication, March, 10, 2003) . Additionally, under the new department, the F.A.A. certified three programs to be conducted under the Airway Science Program; Professional Pilot, Aviation Management, and Technical Services programs became available.

The university by this time had established a long history of successful flight training in the State of Oklahoma and had, since the purchase of aircraft in 1947, owned its own aircraft. As stated earlier the college had also conducted its own flight training since moving to the College of Education in 1952. The university continued this practice of owning or owning and leasing-to-own aircraft and conducting its own flight training until 1984 when financial hardships prompted the College of Education to sell its aircraft and

contract-out the flight training to vendor(s) (B. Hoover, personal communication, March, 19, 2003) . There were two primary vendors at this time, Stillwater Flying Service, and a private individual, Mr. Fred Delacerta. Students were able to choose which venue they wished to take their flight training through and academics were still conducted at the university.

The new Department did a lot for student enrollment increases and it also prompted thoughts about a department specific degree. In 1988 a proposal for the Bachelor of Science degree in aviation science was sent to the Oklahoma State Regents for Higher Education and subsequently approved in the fall of 1989; previously aviation students earned Bachelor of University Studies degrees (K. Wiggins, personal communication, March, 19, 2003) . At this time the increases in students saw membership in the Flying Aggies student organization increase and they gained faculty advisors; these advisors would eventually begin advising the local chapter of the Association of Airport Executives as well in 1992. Space Science Education at this time was refined to present courses that are primarily intended for pre-service and in-service teacher enhancement and to administer the F.A.A. and NASA Aerospace Education Resource Centers which facilitate the nationwide distribution of reference materials. In addition to these activities, the department, under funding by the Oklahoma Aeronautics Commission, had developed and administered the Aerospace Education Workshop for teachers since 1969 (Aviation and Space Department History, 1996) .

As academic enrollment increased the need for the next academic step, a master's degree was realized and in 1990 the Graduate College Faculty approved the inclusion of a Aviation and Space Science option to the Master of Science in Natural and Applied

Sciences degree ("Approval Letter" Oklahoma State Regents for Higher Education, 1989). The Department would later propose and have accepted into the interdisciplinary Doctorate of Applied Educational Studies, an Aviation Education option in 1995 (K. Wiggins, personal communication, March, 19, 2003) . In 1990, the F.A.A. and the Oklahoma State Regents for Higher Education approved the High School Aerospace Education Academy developed by the Space Education department. In this program students are given two-weeks of curricular instruction and one-week of field experience in aviation. Additionally in 1990, the OSU Aviation Education Careers program for high school students is started, sponsored by the Oklahoma Aeronautics Commission, whereby students are given exposure to the field of aviation during their summer break (Wiggins).

The Mayor of Tulsa, Oklahoma, Mr. Roger Randal, in 1990, began discussions with what was then Tulsa Junior College, Tulsa Technology Center, and OSU about the importance of aviation to the Tulsa area and he proposed an aviation education alliance be formed between the three entities with each performing a separate function (J. Sellers, personal communication, March, 21, 2003) . In 1991 an articulation agreement is reached for what is called a 2+2+2 program whereby high school students can get 2yrs at the Tulsa Technology Center followed by 2 yrs at what is now Tulsa Community College followed by the final 2 yrs at Oklahoma State University; this program is backed up by the formation of the Roger and Donna Hardesty endowed chair at the University Center at Tulsa (J. Sellers) .

The Aviation and Space Education Department, in keeping with the Land-grant institution mission of extension, feels that an increase in student population can be realized by providing a pathway for non-traditional students, particularly military,

through the university system. In 1991, based on the American Council on Education Guide to Evaluation of Educational Experiences in the Armed Services, begins a program through the Oklahoma Military Department (K. Wiggins, personal communication, March, 21, 2003) . Additional extension opportunities are realized through an alliance with the College of Osteopathic medicine which, beginning in 1991, began providing high-altitude physiology training for aviation students (Aviation and Space Department History, 1996) . The addition of the hyperbaric (altitude) chambers to the aviation program makes it one of only two universities in the country to have its own chambers. The College of Osteopathic Medicine has since developed the OSU Center for Aerospace and Hyperbaric Medicine which conducts aviation research and education (G. Tatum, personal communication, March, 20, 2003) .

In support of the aerospace education alliance forming in Tulsa, Mr. Roger Hardesty, in 1991, became the third contractor in use by OSU for conduct of flight training. He opened a training facility at Tulsa International Airport through the Hardesty Flight Center and flight training was now being conducted in Stillwater and Tulsa, both by contractors (J. Burton, personal communication, March, 20, 2003) .

In April of 1992, what is now Tulsa Community College, begins offering general education and primary aviation courses as part of the budding education alliance in Tulsa. The program's relationship with Roger Hardesty was closed out when Mr. Hardesty gave notice of discontinuance of flight training through the Hardesty Flight Center in the summer of 1992 (J. Burton, personal communication, March, 20, 2003) . The Stillwater Flying Service, Mr. Bob Wedlake, is contacted and asked to furnish additional aircraft for the Tulsa operation and flight training is resumed at the Tulsa Technology Center facility

at the Downtown Airpark in Tulsa (J. Sellers, personal communication, March, 21, 2003).

The problems with Mr. Hardesty were not the only difficulties in using contract training. There were many concerns within the department about quality control of training and furnishing of aircraft as well as customer service issues; it was realized that they were graduating students with OSU degrees without a reasonable assurance of the quality of flight training received (K. Wiggins, personal communication, March, 21, 2003) . In early 1995, with Dr. Wiggins pushing the university leadership to resume in-house training, and Stillwater Flying Service becoming less interested in conducting the training, notice was given by Mr. Wedlake that he would no longer provide contracting services as of June of 1995 (J. Burton, personal communication, March, 20, 2003) . Mr. Bill Christiansen of Christiansen Aviation was approached and asked to furnish leased aircraft to OSU so they could resume in-house flight training. Mr. Christiansen agreed and the university maintains this relationship today with 28 aircraft under lease to the university (J. Burton).

In January of 1994 the memorandum of understanding between Tulsa Technology Center, what is now Tulsa Community College, and what is now OSU-Tulsa, is formally adopted and the Oklahoma State Regents for Higher Education formally recognize the merit of the OSU Aviation and Space Education program particularly lauding the new career paths possible through the alliance with the College of Osteopathic Medicine and the hyperbaric chambers (System-wide Aviation/Aerospace Education Program Review, January, 1994, p.1) .

In 1995 the Aviation Education program, because of its uniqueness, was selected to be included in the Southern Regional Education Board's "Academic Common Market".

This is an agreement by which institutions have formed an interstate alliance for exchange of students without the student having to pay out-of-state tuition charges. This increases the flow of students to OSU from other states not offering aviation at a four-year university (Aviation and Space Department History, 1994) .

The Flying Aggies have continued their excellence in flying competition throughout the years and again in 1995 they won top-honors at the Region VI SAFECON; which is the qualifying competition for rights to compete at the national competition.

The program hit another milestone in 1995 with the initiation of two endowed scholarships for aviation, the Frank E. and Harriet Hedrick, and the John Leslie Lehew III, scholarships. Additional scholarships available to aviation students are the Gretchen Lynette Cumberlege Memorial, Leo Galanis Memorial, James R. Vandegriff Memorial and Coaches Trophy, Hoyt E. Walkup, Outstanding AVED Freshman, Air Traffic Control Association, and the Oklahoma Ninety-Nines Inc. At OSU-Tulsa the Roger and Donna Hardesty scholarship is available.

In 1996 the home of the College of Education, Willard Hall, underwent renovation and the administrative offices for all of the College were moved there. Shortly after this move, in 1997, the Dean of the College of Education re-organized the college in an attempt to conserve resources and streamline processes; in this re-organization, the Department of Aviation and Space Education became a program under the School of Educational Studies where it currently is housed (S. Marks, personal communication, March, 10, 2003) .

There have been no major changes since the 1997 re-organization but as you can see aviation training has a long history at this comprehensive university and has been a

vibrant part of the College of Education since being placed there in 1952. The argument about aviation training not belonging in the university environment is made mute by the 51-year existence of the Aviation and Space Education program in a standard college, the prospering of the program from its inception in 1939 to 1952 under Divisions and as a School of Flight, and the enormous impact the education efforts have made on a national level.

The next section of this review will discuss the flight training requirements that must be met for a school to conduct flight training.

F.A.A. Flight Training Requirements

Flight training is conducted in the United States, by public institutions, private institutions, and by private individuals in accordance with the requirements set forth in either Part 61 or Part 141 of the Federal Air Regulations. The Federal Air Regulations are part of Title 14 of the code of Federal Regulations and thus the Federal Air Regulations have the full force of law and are enforceable as such by the F.A.A. administrator (Gesell, 1998) .

The two parts of the regulations for flight training are intended to serve different purposes. The goal of Part 61 flight training, under which all the certificates and ratings available under Part 141 can be obtained, is that of private flight training for the general public. Persons generally not interested in pursuing a professional flying career or are uncertain and do not wish to commit to a full-time flight training regimen use part 61 rules. Typically, this type of training is carried out at flying clubs, fixed-base operators,

local airports, and by free-lance flight instructors. The aeronautical experience requirements for training conducted under Part 61 are higher than Part 141 because it is relatively unstructured. For example, the hours required to obtain a commercial pilot license at a school conducting training under Part 141 is 190 total hours compared to 250 total hours under Part 61 Federal Air Regulations (2003).

Training conducted under Part 141 of the Federal Air Regulations must be conducted at a school certified under that part of the regulations whereas there is no particular certification for a school under Part 61. The Part 141 school must be eligible for, and receive, an Air Agency Certificate, issued by the F.A.A. and renewed every 24 months Federal Air Regulations (2003). In addition, there are specific requirements made of the qualifications of the Chief, Assistant Chief, Stage Check Airman, and regular instructors to be qualified and re-qualified to instruct in a course approved under Part 141. The courses of training leading to achievement of a license or certificate must be approved by the F.A.A. as well as the equipment used, classrooms, and facilities. Training conducted under this part is intended for organized flight schools in the business of producing professional pilots. Schools certified under Part 141 also must maintain a minimum 80 percent pass rate on F.A.A. check-rides their students take. As a result of this oversight by the F.A.A., and the standards imposed, the aeronautical experience (flight-hours) for a particular license, certificate, or rating is reduced as compared to part 61 training.

In a post-secondary application the part 141 training rules make sense because of the curriculum structure and the flexibility an institution has in that an institution specific flight-training curriculum can be constructed to parallel academic instruction being received at the university. In addition, federal financial aid can be used to fund a

particular flight training program for a student enrolled in a Part 141 course of training whereas these funds cannot be used for Part 61 training.

The flight training requirements proper i.e. those required for attainment of a particular license or rating have not changed much over the last several years but post-secondary institutions, as public entities, cannot be exclusively concerned or limit themselves to simply producing a minimally qualified graduate. Distinction between institutions is critical and the public demands a certain amount of employability of the graduates of any particular curriculum at its universities. Flight training programs typically focus on training of the individual to be an individual pilot or flight instructor and not to operate as part of a crew as is required in airline flying. At a conference sponsored by American Airlines, in February of 2002, they explored the possibility of providing Human Factors and Crew Resource training materials to select post-secondary institutions, under articulation, to bridge the gap between the flight instructor stage and the first airline position (J. Sellers, personal communication, March, 21, 2003) . This training and this type of training would be conducted at the university level and provide the industry with a more airline ready applicant than the technically qualified, but practically speaking, airline deficient graduate that the industry is being forced to hire now. The challenge for post-secondary flight training institutions now is not the production of good pilots but the production of industry ready graduates. This issue is being addressed at many institutions and the next item in this flight training requirements section explains what is being done.

Bridge Programs and Cooperative Education Programs

The professional pilot degree curriculum is designed at many institutions to teach the people skills required to be part of a multi-crew environment as the industry calls it as well as the technical piloting skills required. Since collegiate schools have a long history of partnerships with industry it is natural for aviation to reach into the schools to fill its needs. Nominally this is done with internships and there are a number of different types of them available now under what is called "bridge programs" (Mitchell, 2000) . Some of these programs lead to conditional employment offers upon completion. The catalyst from industry for these programs is the lower training costs, steady flow of qualified applicants, and applicants trained to company specific criteria. These bridge programs offer an important employment incentive to the graduate. Examples of bridge programs are; Embry-Riddle University with Atlantic Coast, Atlantic Southeast, American Eagle, Continental Express; The University of North Dakota with Great Lakes-United Express, Horizon Air, Mesaba Airlines, Piedmont Airlines, PSA Airlines, and US Airways Express; Purdue University with Chataqua, PSA, ASA, Eagle, and Piedmont; and Western Michigan University with Mesaba Airlines (Mitchell, 2000) . These programs all have high quality joint curricula driven by airline requirements.

These bridge programs must be facilitated through internships. Mostly they are referred to as Cooperative Education and Internship programs because they provide for alternating study between the university and an industry sponsored position (Kiteley, 1997) . The two activities, academia and industry, are planned and supervised in a way that contributes to the development of the student toward their career goal. The result is

an increase in graduate placement for the school and industry gains "...committed, knowledgeable, temporary, and low-cost help plus an opportunity to groom potential full-time employees" (Kiteley) .

A study by Dr. Michael Schukert of the Aerospace Department of Middle Tennessee State University indicates there are over sixty cooperative education programs in the United States and they fall into the three categories of Alternating, Consecutive, and Parallel plans.

The alternating plan allows for a student to alternate between academic terms and full-time work; the consecutive plan calls for spending two or more academic terms at a jobsite with no academic intervention; the parallel plan allows for concurrent academic and jobsite activities equally. The alternating plan is by far the most used and for a baccalaureate degree it can extend the time to earn the degree by one-year to eighteen months (Kiteley, 1997) .

In addition to these cooperative education internships there are straight internships available and a survey conducted by the University Aviation Association, 1997, indicated that all twelve major airlines surveyed used interns in flight operations; the number ranged from two to forty and five of the twelve surveyed had guaranteed interviews after graduation. All of the respondents indicated they allowed, or even required, jump-seat or what is technically known as pilot observer seat rides which provide real cockpit experience for the student. Two of the internships were paid internships but all of the airlines indicated unlimited travel pass privileges existed for the term of the internship which was usually one academic semester or a summer term.

The internships opportunities offered by industry are not for students exclusively. A

limited number of internship opportunities exist for faculty members as well. This idea harkens back to the Wisconsin idea reported by Vessey, 1967, whereby program quality is enhanced and industry needs met by loaning faculty to industry locations and bringing back knowledge of current industry needs and technology while lending academic support to the business. Some institutions have taken this one step further and initiated faculty exchange programs where faculty switch places with an industry professional for a semester thus staying abreast of their field first-hand (Kiteley, 1997) .

The Professional Pilot degree program continues to be the staple of the post-secondary aviation training institution particularly within the University Aviation Association. There are over 25,000 students enrolled at two and four-year institutions producing more than 6,000 graduates per year, and of those 25,000 students, 10,165 are professional pilot majors producing over 2,000 graduates per year (Mitchell, 2000) . At Oklahoma State University the division between Professional Pilot majors and Aviation Management majors is two-thirds to one-third in favor of the professional pilot degree (G. Nemecek, personal communication, March, 24, 2003) . The major airlines typically hired scores of former military pilots but that wellspring has dried up and there has been and will be again a greater demand for civilian trained pilots. Even the U.S. Air Force has recognized the importance of collegiate aviation with its Introductory Flight Training Program.

This program was initiated to reduce the amount of attrition at the Specialized Undergraduate Pilot Training School that was initially used by the Air Force to conduct primary flight training. Now, ROTC pilot selected students, in their junior year of college, begin a program of 50 hours of flight training in which a Private Pilot's license is

obtained prior to beginning regular Air Force pilot training after graduation Air Force News, October, (2000) . Under this program over 150 colleges and universities train ROTC selected pilot candidates and one university, Embry-Riddle, has a contract to provide training for as many as 130 cadets over a five-year period with specially ordered C1, Falcon aircraft manufactured by Diamond Aircraft in New London Ontario Air Force News, November, (2002) .

The success and viability of collegiate aviation programs has a causal relationship with the involvement of the university in industry. This information was presented in this section because when administrators are discussing and making decisions about flight training requirements in a given curricula structure they must make considerations far beyond the guidelines provided in the Federal Air Regulations.

The next section of this study looks at the industry requirements for pilots from the perspective of the pre-September 11th tragedy and the post-September 11th environment. The illustration here is that the industry is very cyclical and dynamic usually mirroring domestic and international economic conditions and the challenge for post-secondary institutions is adjusting to varying degrees of demand for pilots.

Industry Needs Pre and Post 9/11

The two periods under consideration for this section are eerily different and stand in stark contrast to each other in terms of pilot hiring opportunity. It seems as if the attacks of 9/11 and the after math almost coincided with a sharp decline in the U.S. economy and there has been a corresponding ripple effect felt in the aviation industry as pilot hiring

came to an abrupt halt. The first portion of this section is dedicated to the status of the industry pre-9/11 and the subsequent section will discuss the current situation and future outlook.

Pre-9/11 Analysis and Outlook

In 1999 the F.A.A. aerospace forecast for the years 2000 - 2011 showed a prediction that scheduled domestic passenger enplanements would increase fifty-five percent, air carriers in general increasing fifty-three percent to 888 million, and the regional and commuter carrier enplanements growing ninety-one percent to top 138 million; while International traffic carried on U.S. carriers was predicted to grow ninety-one percent to total 102 million enplanements (Mitchell, 1999) . In addition to these increases the general aviation (business and charter aircraft) was expected to increase by twelve percent to total 231,000 aircraft which is a 24,000 aircraft increase and it could have produced a thirty-one percent growth in flight hours to reach thirty-nine million by the same 2011 forecast (Mitchell) .

The last year of the twentieth century, 1999, produced some staggering hiring numbers with AIR, Inc., in its March, 2000, issue reporting 16,000 pilots getting hired at airline jobs making 1999 the fifth consecutive record breaking year. The major airlines (ones with more than 1 billion in sales) hired 4,700 pilots followed closely by the national airlines (1 million to 1 billion annual sales) with 5,100 pilots and the rest at jet and non-jet airlines.

In the State of Oklahoma the pace was fierce with 1 in 13 Oklahomans directly

employed by the aerospace industry and more than 80,000 jobs and 2.5 billion in personal income; the average annual growth for the industry reached 15.6 percent (Tulsa World, September, 21, 1999, p. E-1) .

What was happening with the economy could not have been predicted very far in advance but what was happening to the pilot pool was no surprise. The major airlines were losing 1,200 pilots a year and it was expected to reach 2,300 a year by 2007; with only 83,000 licensed airline pilots it doesn't take long to deplete the source (Tulsa World, March 5, 2000, p. E-8) . The airlines for years hired retired military pilots or military pilots who decided to separate early. The Vietnam era pilots were, and are, reaching their F.A.A mandated retirement age of 60 and stiff new training contracts by the military that required extensive service commitments for pilots made replacements unavailable. The airlines were forced to dip down into the regional airlines and even the flight schools for pilots. At Oklahoma State University in the 1999 and 2000 school years there was a fifty-percent turnover each year respectively (J. Burton, personal communication, March, 20, 2003) .

There were efforts everywhere to try and stop the hemorrhaging and even the Supreme Court of the United States took up the issue of the mandatory age 60 retirement requirement imposed by the F.A.A. on airline transport pilots (World Airline News, March 16, 2001) . At the time the industry was facing safety concerns because there were expected to be 18,600 mandatory retirements over the subsequent two-year period and the airlines faced promotion of much younger and less experienced pilots into senior positions which had never been done before (World Airline News) . The court eventually upheld the F.A.A. rule as constitutional and no change has yet been made.

In summary of the pre-9/11 environment one could say it was the most wide-open pilot hiring period in the history of the industry not even rivaled by the post WWII expansion of the whole industry. The industry was growing to meet the needs of the economy, the pilot pool was shrinking because of mandatory retirements and slowness of the industry in developing new hiring sources outside the military, and the void being left by these two opposites was hard to fill.

The post-9/11 Environment and Outlook

As of the February, 2003, hiring report by Airline Pilot magazine there were 66,244 pilots listed as employed at the 15 major airlines and 6,118 of these pilots (9%) were on furlough. The pilot hiring for the year had only been 45 total with an expected rise to 76 when the final numbers for the month came in; this is in contrast to a hiring of 4,855 at the majors in 2000, 3,184 in 2001, and 508 in 2002 (Airline Pilot Magazine, February, 2003) . The percentages of pilot workforce on furlough at each of the major airlines ranged from five percent to thirty-two percent.

These numbers are representative of what is happening in the commercial airline industry today. The airlines which were hiring pilots with as little as 1,000 hours of total time and 100 hours of multi-engine time have now raised their minimums to as high as 2,500 total time and 1,000 hours of multi-engine time (Airline Pilot Magazine, February, 2003) . The raising of these minimums reflects the glut of pilots available in the market due to massive furloughs and financial difficulties at the airlines that have caused significant downsizing and parking of aircraft.

The effect(s) of these furloughs on post-secondary aviation programs is two-fold. There is an indirect management benefit in that there is no shortage of instructors and the average tenure of an instructor has gone up significantly. This has allowed for the replenishing of the hiring pool of new flight instructor applicants that was run-dry by the massive hiring pre-September 11th. Although this may be a desirable situation in that students are benefited by having both more experienced instructors and just having an instructor available; it is not the optimal situation for a flight school. The increased program quality and safety afforded by additional and experienced instructors is appreciated but feast/famine rollercoaster instructor availability is not preferred; a steady flow of persons through a program is preferable. Some students find it difficult to motivate through a course of training to the flight instructor certification point when there is little or no need for them at their school thus little or no chance of being hired.

The average tenure of a flight instructor at a post-secondary aviation school has gone from 6 to 12 months after graduation to nearly 24 months and in some cases longer (J. Burton, personal communication, March, 20, 2003) .

The Industry

The current problems actually began in 2000 when the airlines were flush with profits and began acquiescing to huge contracts by the airline unions. The slowing of the U.S. economy and the combined effects of this and the September 11th attacks made 2001 the worst year in airline history with the major airlines losing a combined 7.3 billion dollars with over 3.2 billion of that coming in the fourth quarter; collective losses of the industry

world-wide soared to 12.6 billion (Airline Business Magazine, September, 2002, p. 53) .

In the 2002 -2003 time frame the industry has continued to have drops in traffic, 10 percent, and sharp rises in the cost of insurance and fuel (Aviation Week and Space Technology, March 17, 2003, p. 20-21) . The time frame has also seen nearly wholesale bankruptcy filings with only 4 of the 15 major carriers, Southwest, Delta, Northwest, and American not filing for protection under Chapter 11 of U.S. bankruptcy rules; and Ameican is expected to have to file (Aviation Week and Space Technology). The U.S. airlines expect to lose 6.7 billion in 2003 and the war in Iraq could send those numbers skyrocketing; based on the 8 percent downturn in traffic after the last gulf war the industry believes it would be closer to 10 percent this time (Aviation Week and Space Technology) .

The chief problem with a war is the instability in fuel prices and insurance. The increase of 1.5 billion in fuel costs during the last gulf war would likely hit 2 billion this time and with an annual bill of 40 billion for fuel the industry could spend 600 million-dollars more for every penny increase in fuel prices; insurance prices went from 1.8 billion pre September 11th to 5.8 billion post (Aviation Week and Space Technology, February 17, 2003) . This comes at a time when airlines are already hurting due to unfunded government mandates such as reinforced cockpit doors and extra costs associated with the new Transportation Security Administration that is being funded with airline taxes. Airlines have little option to raise fares because there is so much competition for each ticket in the depressed travel market.

The airline transport association Chief Economist, David Swierenga, produced a report "The Perfect Economic Storm" in which he estimates the damage to U.S. airlines

in the most likely war scenario, which would be one lasting less than ninety-days, and his findings are: additional loses of 4 billion on top of the forecast 6.7 billion; 52 million fewer passengers for 2003 compared to 2002; 2,200 fewer flights per day; and a loss of 70,000 jobs on top of the 80,000 lost since September 11th attacks. The report goes on to say that if the war drags on beyond ninety-days it could likely mean the end of the U.S. airline industry as we know it due to wholesale liquidations and debtor receiverships at all major airlines. It estimates a 75 million passenger drop in enplanements and break-even load factors (the percentage of seats required to be filled) to reach somewhere between 85 percent and 92 percent. These numbers are impossibly high and well above the 70 percent, or seven percent above actual, that they are now (Aviation Week and Space Technology, March 17, 2003, p. 20-21) . Erosion in airline fares would only compound this problem.

Current Outlook

The airline industry is desperate and looking for a lifeline; as in the past they are seeking relief from the government. The call for help is to the tune of 4 billion dollars to account for supposed non-market forces beyond the control of the airlines that are already 93 percent leveraged on average (Aviation Week and Space Technology, March 17, 2003, p.22) .

There are four primary avenues of relief being sought by the industry; a tax holiday, security costs, government war-risk insurance, and oil releases from the Strategic Petroleum Reserve.

As reported in Aviation Week and Space Technology magazines March 17th issue, the industry currently pays six separate taxes totaling 8 to 9 billion annually and go into the Airways Trust Fund, they wish the government to assume the costs of security under the Transportation Services Administration, the current war-risk insurance from the government runs out on August 31st, and a release of oil from the Strategic Petroleum Reserve would lower fuel prices.

In addition to these costs, in an attempt to keep customers flying, most of the major airlines are allowing ticketing flexibility that enables a customer to make a one-time change of a purchased ticket in the event of war or "code red" security alert. This will cost extra money for the airlines because a seat is a perishable item. Once the seat for the purchased flight goes on the flight, with a passenger or not, the cost is incurred by the airline and if they have to fly that person at a later date with no additional income it is a loss.

The outlook for the industry for 2003 really depends on the length of the war in Iraq and the amount of time it takes for people to start flying again. Most analysts forecast a 6 or 7 billion dollar loss industry wide plus as much as an additional 4 billion loss due to the war (Aviation Week and Space Technology, March 17, 2003, p. 20-21) . The industry may break even in 2004 with profits not expected again until 2005 or 2006.

The outlook for the industry as a whole is circumspect depending on the length and outcome of the war and the degree of success airline management has with congress and the various avenues of relief they are seeking. As is stands a wholesale collapse of the industry is not impossible and maybe likely. Only one operator, Southwest Airlines is healthy right now and that is not enough to balance the rest of the industry losses. It is

the opinion of this study that a combination of post-war economic increases and government relief will sustain some of the stronger carriers through this time but a major consolidation of the industry is likely.

The outlook for post-secondary flight training is steady. The military is still not releasing its pilots and any pilots needed after the return of furlough pilots will still have to come from the flight schools. The enrollment at Oklahoma State University has been steady over the last two-years (A. Lotven, personal communication, March, 14, 2003) .

The next section of this study looks at the largest organizing body in post-secondary aviation education, the University Aviation Association.

The University Aviation Association

The University Aviation Association (UAA) was started in Denver, Colorado in 1947 and serves a vital role in the support and advancement of collegiate aviation (UAA, April/May, 1998) . The association has over 600 members of which 115 are institutions and 74 are corporations with the rest being individuals (UAA) . The UAA carries out its objectives through its publications and its conferences and meetings. The UAA conducts education conferences for any member, workshops for institutional members, roundtable discussions for aviation research, and it has over 20 committees. The UAA also sponsors aviation policy seminars in Washington D.C., and numerous career fairs at the National Business Aircraft Association, National Congress on Aviation and Space Education, Women in Aviation International Conference, and the Experimental Aircraft Associations annual fly-in (UAA) .

One of the associations' biggest achievements is reaching out and creating a bridge between the industry and post-secondary aviation institutions. Any of the associations' corporate members and individual members has access to all its publications, conferences, workshops, and research capabilities. This serves as a tremendous link between the two entities.

The UAA, in addition to its membership roles, supports over 41,000 students enrolled in collegiate aviation programs (UAA, April/May, 1998) . The association is an important voice for its members and the students of it member institutions through the aviation policy seminar held each year which brings industry leaders together with students and politicians to form ideas about what is best for the industry as a whole.

The last section of this chapter will cover another organizing body in collegiate aviation, the National Intercollegiate Flying Association.

The National Intercollegiate Flying Association

The National Intercollegiate Flying Association was established to promote and advance aviation education, safety, and communication between aviation students, educators, institutions, and the aviation industry (NIFA News, Mission Statement, April 2, 2003) . The NIFA has a Board of Directors as well as a Board of Senior Advisors primarily made up of industry professionals and retired educators.

Internally there is a President, 2 Vice Presidents, Secretary and a Treasurer. There is also a Faculty Advisor who is responsible for on-site leadership and guidance and is the primary host and coordinator for the SAFECON competitions.

The SAFECON competitions are held in each of the 11 Regions of NIFA during the fall semester of each school year and the top teams from each region are then selected to compete at the national SAFECON, which is held in May of each year at one host school.

The NIFA has 6 committees, which comprise the governing body under a General Director who is the Chair of the Board of Directors. The committees are the Executive which is the overseeing committee for the organization; the Judges which recruits and trains judges for the SAFECON competitions; the Legal which is primarily concerned with insurance and aircraft safety, the Planning which is in charge of membership, fund raising, and events coordination; the Rules which establishes standards and procedures for the SAFECON competitions as well as membership; and the Testing which develops and administers all written tests during the SAFECON competitions (NIFA News, Committees, April 2, 2003) .

The NIFA is primarily a safety and testing organization that, as the name implies, has national membership of collegiate aviation institutions and corporate sponsorship as well. Student flying organizations such as the Oklahoma State University Flying Aggies compete against other schools, gain industry perspective through contact with professionals, and strive for flying excellence through competition and evaluation. Doing well and not doing well in NIFA SAFECON competitions says a lot about a program and can affect student populations.

Summary

The field of aviation is a dynamic and cyclical industry. We are in an technological era where is was only 66 years between the Wright brother's first flight and Neil Armstrong's walk on the moon; and the wingspan of a 747-400 is longer than the Wright's first flight. As a science we are just now reaching the century mark and trying to fit in with the so-called hard sciences that have been in existence since the middle-ages is not always easy. The very existence of post-secondary collegiate aviation at so many colleges is in itself validation of the science. We struggle with placement within comprehensive university systems and in many states the training is relegated to community colleges and all too often contractors are used. Through it all though, at the core, has been education. Whether it was Octave Chanute and the Smithsonian Institution providing materials and instruction to the Wright's, or a modern day flight instructor giving a syllabus lesson, the aviation educator and aviation schools have been there from the start. That concept is essentially what drove this study. No matter what the accomplishment of flight, at some point there was a flight instructor; no matter what the accomplishment of academic purpose, at some point there were classroom instructors; no matter what the venue, success depended on administrators and instructors. It is the opinion of this study that the progress and viability of the air transportation system in the United States has a direct causal relationship to the quality, capabilities, and efficiency of collegiate aviation training programs; particularly in light of the reduction of availability of military pilots and the military turning to collegiate flight schools for primary training.

This study establishes a database from which decisions can be made about the

organization, management, and conduct of flight operations at collegiate aviation training institutions. It is intended to generate an understanding about the beginnings of collegiate flight training, provide an example of a modern program in existence since the practical beginning of post-secondary aviation training, provide data about the research questions, draw conclusions from the data, and make recommendations for programs and future research based on the findings.

Research Questions

This study was designed to determine the answers to these questions:

1. What is the organization of flight training? Organization of the programs; college, department, or program affiliation; administrative and budgetary over-site; faculty member assignment; endowments, booster club, or alumni financial involvement; legislative mandates; and relationship to Regents or Board of Trustees.
2. What is the management of flight training? Personnel system classification of employees; educational requirements for the Chief and Assistant Chief Instructors; benefits available to flight instructors; flight transportation of university personnel (for business); acquisition of aircraft support equipment; use of flight training facilities i.e. in-house, separate, leased or owned; use of simulators; fee structure for use of aircraft and other flight flight training devices; how flight training is paid for by the student; budgeting of salaries for Chief, Assistant Chief, Instructors, Office, and

support staff; budgeting for operational expenses; and handling of budget shortfalls and overages.

3. What are flight training operations? Use of training syllabuses; maintenance of aircraft i.e. in-house or contract; calendar operations; satisfactory progress requirements of students; operational restrictions on students; and flight instructor hiring and retention programs.

CHAPTER III

METHODOLOGY

Introduction

This study involves the collection of data to answer questions from the problem statement regarding the organizational structure, management, and conduct of flight training operations at post-secondary institutions within Region VI of the National Intercollegiate Flying Association. The information will be used to provide a database for flight training administrators in the region to use for comparison of their organization, management, and operations, to the other schools in the region. In this way the data will act as a decision making tool to help each institution maximize its efforts. Data for this study was collected using an exploratory questionnaire and a follow-up interview where necessary. The questionnaire was sent on-line and the follow-up interview was done via phone or on-line. The questionnaire responses were returned electronically. The interviews were conducted and responses recorded by the study director.

This chapter explains the methodology of the study and describes the population and selection of the sample. The development of the questionnaire, interview questions, and their purpose is explained.

Selection of the Sample

The population for this study is the 11 member schools of Region VI of the National Intercollegiate Flying Association as of March 2001. These schools are categorized geographically into one of 11 regions. The sample was selected to be the 11 schools in Region VI of the NIFA because it is the geographic region where Oklahoma State University is located and there are similarities in how post-secondary education is carried out in general; this facilitates similarities in organization, management, and operations of the flight training programs. In addition, using the narrow focus of a regional analysis acts as a control for differences between regions in how post-secondary education is conducted in general, price, student pool, and competition. The schools in Region VI are: Central Missouri State University, Kansas State University at Salina, Oklahoma State University, Parks College, Rose State College, Spartan School of Aeronautics, Southeastern Oklahoma State University, Tulsa Community College, University of Nebraska at Omaha, University of Oklahoma, and Western Oklahoma State College.

Research Instrument

The instrument was a survey consisting of 42 questions (Appendix A) . With the help of aviation faculty at Oklahoma State University (OSU), and the study director, the major areas under organization, management, and operations of the OSU program were identified. A question was formulated for each area to best allow responding institutions to indicate how the particular area was handled at its institution. There were "other"

responses available to be used if a listed area did not apply or to indicate a response that was not provided on the questionnaire. The survey was distributed on-line and responses were returned on-line as well. The survey was designed to collect data about specific portions of the organization, management, and conduct of post-secondary aviation training operations. Follow-up contacts, when necessary, were done by phone or on-line.

Research Design and Procedure

This study was designed to answer the questions from the problem statement from Chapter I and the supporting questions from the Review of Literature in Chapter II:

1. What the organization of flight training is?
2. What the management of flight training is?
3. What the operations of flight training are?

The answers to these questions provide information that will be useful to administrators at post-secondary institutions in the region, conducting aviation training, with respect to how their training programs are organized, managed, and what their operations are as compared to other schools in the region. This information will be useful in program decision making at each institution.

Analysis of Data

Upon receipt of the returned questionnaires, the data were coded and entered into a Microsoft Excel spreadsheet. The responses to each question from each section were

recorded and percentages of responses to each item were calculated. The study director analyzed the responses. The responses were graphically expressed with supporting text and notes made about any anomalies or "other" responses that were pertinent to present for preservation of accuracy of the responses. Particular attention was paid to the responses as they related to the responses from the other institutions on each item.

Summary

In summary, this chapter gives a description of the research instrument, design of the study, and presentation of the data. The major areas are the description of the purpose of the study and the sample used for it, how the data was collected, how the data was analyzed, and how the data was presented.

CHAPTER IV

RESULTS OF THE STUDY

Introduction

The first three chapters of this study have given an overview of the study, a review of the related literature, and the methodology of the investigation. In this chapter the findings of the study are presented from the survey of Related University Flight Training Programs in Region VI of the National Intercollegiate Flying Association. The data from the returned questionnaires is discussed and presented in three sections.

The first section presents data from the responses to questionnaire items on the area of organization of flight training, and specifically:

1. Placement of the Aviation training within the university;
2. College, department, or program affiliation;
3. Administrative and budgetary over-site of the training;
4. Faculty member assignment;
5. Endowments, Booster Club, of Alumni financial involvement;
6. Legislative mandates;
7. Relationships with Regents or Board of Trustees;

The second section of the questionnaire made inquiries about the management of the actual flight training and the responses are reported here specifically about:

1. University conducted or contractor conducted flight training;
2. Classification of the Chief and Assistant Chief Flight Instructors;
3. Educational requirements of the Chief and Assistant Chief Flight Instructors;
4. Other duties of the Chief and Assistant Chief Flight Instructors;
5. Classification of flight instructors;
6. University benefits available to flight instructors;
7. Classification of office personnel;
8. University Flight Transportation;
9. Financial disposition of the flight training aircraft;
10. Use of simulators;
11. How flight training aircraft and simulators are paid for;
12. How support equipment is paid for;
13. Facilities and office space;
14. Fee structure for flight training devices;
15. How fees are set for flight training devices;
16. Classification of aviation operations as budgeted items or auxiliary operations;
17. How students pay for flight training;
18. How faculty members are paid;
19. How the Chief and Assistant Chief Flight Instructors are paid;
20. How operational expenses are paid for.

Section three of this chapter addresses operational issues surrounding the conduct of flight operations and specifically:

1. Use of university owned or commercially available syllabi;
2. Performing maintenance on the aircraft;
3. Amount of time the flight center is open;
4. Student flying requirements;
5. Fuel purchase at the flight center;
6. Fuel purchases off-station;
7. Hiring of flight instructors;
8. Paying of flight instructors;
9. Retention program for flight instructors.

Responses to the Questionnaire

A list of program coordinators, managers, Department Heads, and other persons in management positions at the 11 schools in Region VI of the National Intercollegiate Flying Association (NIFA) was obtained from NIFA and a questionnaire was sent electronically to the manager/administrator most directly linked with the training at each school. Eleven questionnaires were sent and 8 (72.7%) were returned. The responses to each question, from each section, are reported and discussed here.

In order to determine the placement of each program within its respective university or college the question was asked; is aviation a stand-alone operation? (Figure 1)

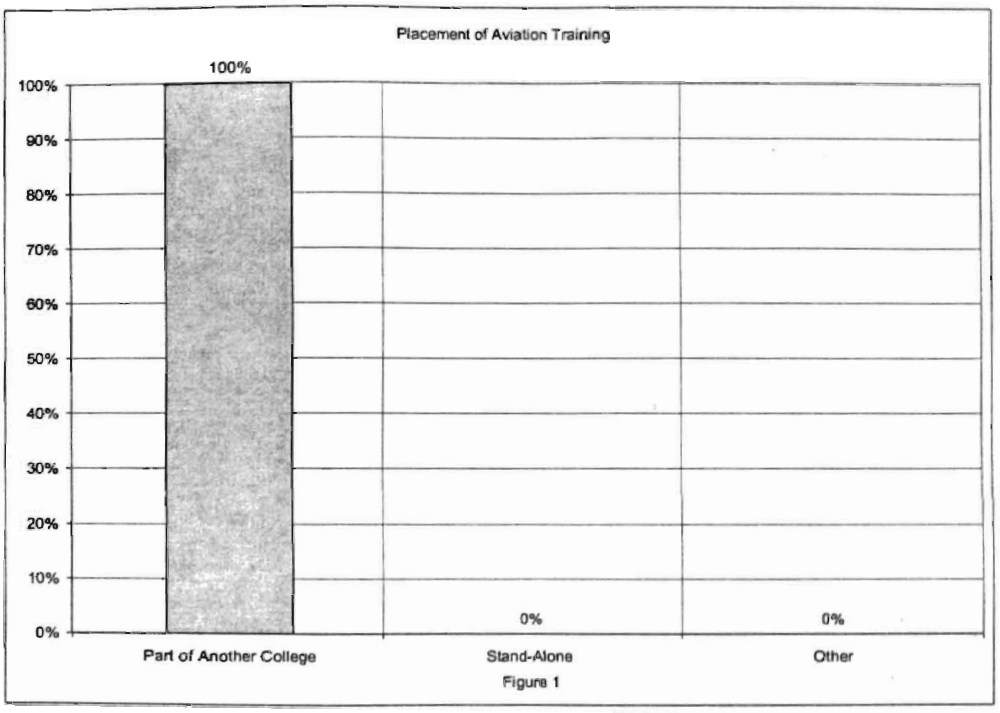

Figure 1. Placement of Aviation Training

All of the responding programs indicated that they were part of another college within the university system. There was one anomaly that should be mentioned with respect to this question. One of the programs is an Institute of Aviation within a School of Business. The Institute has a Director with two Department Heads reporting to the

Director and they have their own faculty in each Department although shared between the two. This study felt this Institute important to mention separately because it is much like a College of Aviation would be although for data purposes it must be listed as part of another college.

In order to determine where aviation is placed at the various universities the study asked; if aviation is part of another college, which one?

TABLE I

LOCATION OF AVIATION TRAINING BY COLLEGE

College of Education	College of Technology and Aviation
College of Continuing Education	School of Business
College of Engineering Science	Division of Science, Math, & Engineering

One of the responding programs, although post-secondary, is located at a college and not a university and therefore is part of the college proper. Another of the programs, also post-secondary, is conducted at a community college and is reported under the Division of Science, Math, and Engineering and not a under a College.

Because there are no colleges of aviation it is important to determine the standing of aviation training within the respective colleges within which it has been placed; is aviation a Department, a Program, or Other? (Figure 2)

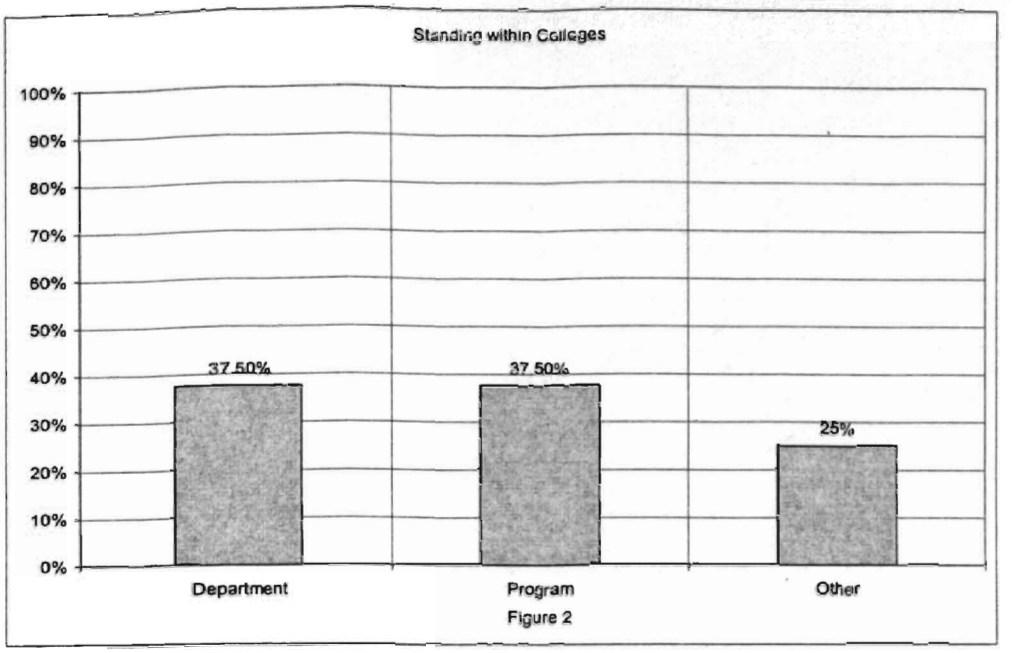

Figure 2. Standing within Colleges

The responses indicated an even split at 37.5% respectively as to aviation training being a Department or a Program within a College or School. The 25% other responses indicates the presence of the Institute of Aviation at one of the responding schools and a community college.

The next two questions dealt with administrative and budgetary oversight of the training; specifically inquiring as to whom in the system handled these areas of operation.

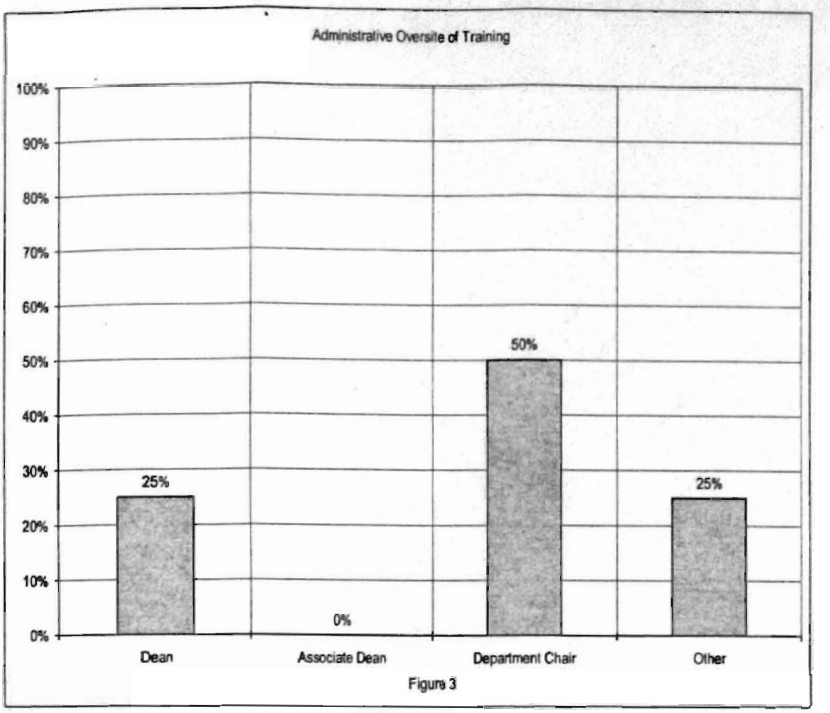

Figure 3. Administrative Oversight of Training

Half of the programs reported administrative oversight by a Department Chair and 25% indicate they report directly to a Dean. The 25% other responses are indications from two programs in which one reports to a Training Manager and the Institute reports to the Director of the Institute.

Tied closely to administrative oversight of a program is the budgetary oversight of the training and this study asked the question; who has budgetary oversight of the training? (Figure 4)

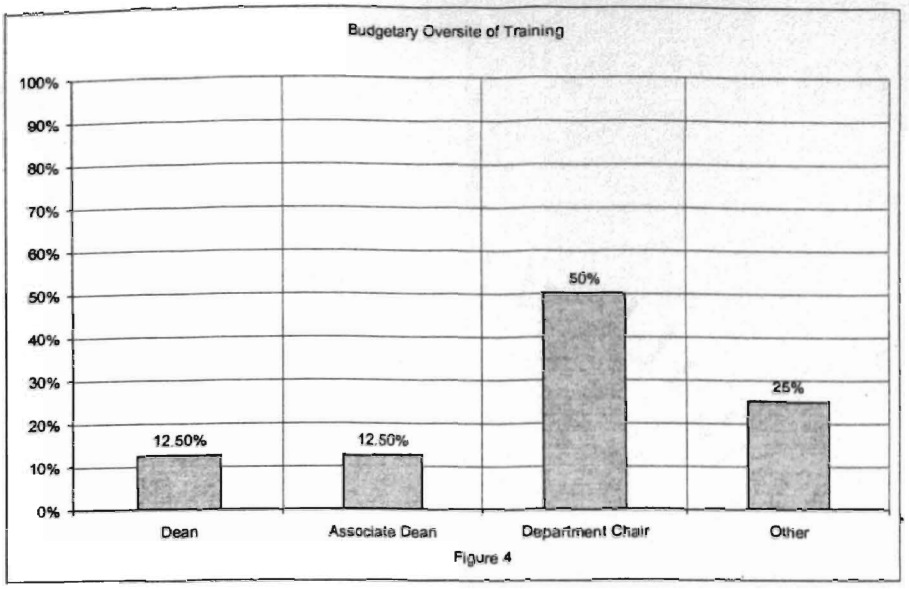

Figure 4. Budgetary Oversight of Training

The majority response indicates that the Department Chair, at 50%, is the primary budgetary overseer of the training. The Dean and Associate Dean positions were split evenly at 12.5% respectively and the 25% other responses indicated the Institute of Aviation using the Director of the Institute and the community college using the Program Director.

This study recognizes the importance of faculty members to any training program, and in realizing that all of the respondents reported they were not stand-alone colleges, a question was asked about faculty members with respect to having dedicated aviation faculty or sharing with other departments or programs (Figure 5).

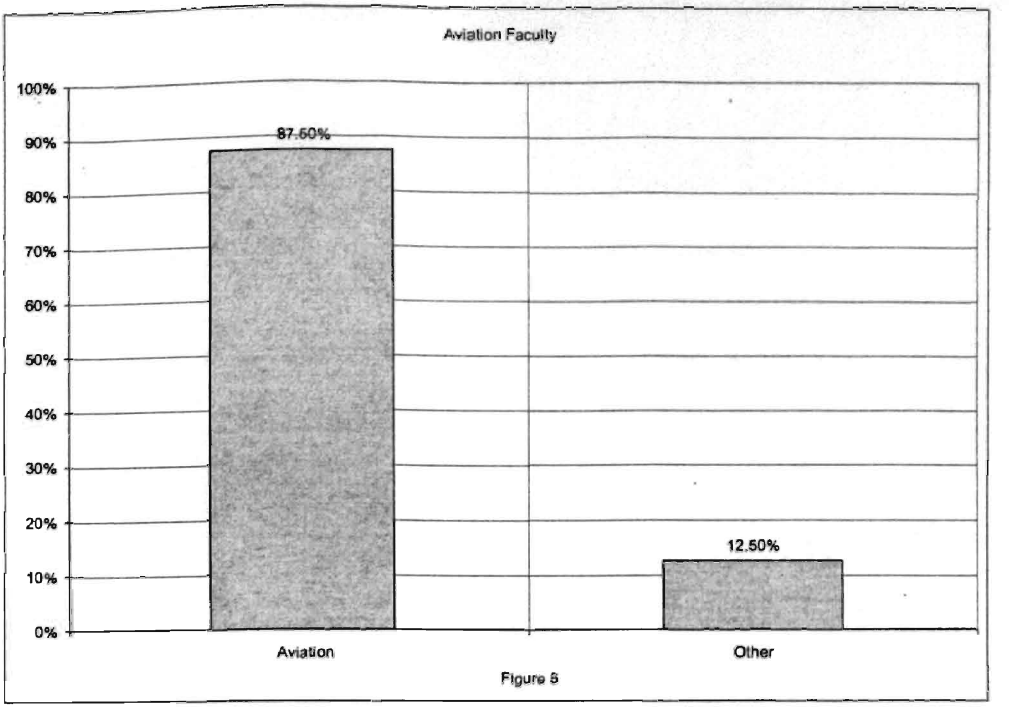

Figure 5. Aviation Faculty

There was a majority response to having dedicated aviation faculty members with 87.5% of the respondents indicating full-time faculty as part of the aviation training. The 12.5% other response indicates the use of 1 full-time faculty member and a staff of recurring contract adjunct professors at a community college. All respondents reported using adjunct professors for at least some courses.

The study next inquired about the existence of any endowments for flight training at the various institutions. The question was asked; are there any endowments for flight training? (Figure 6)

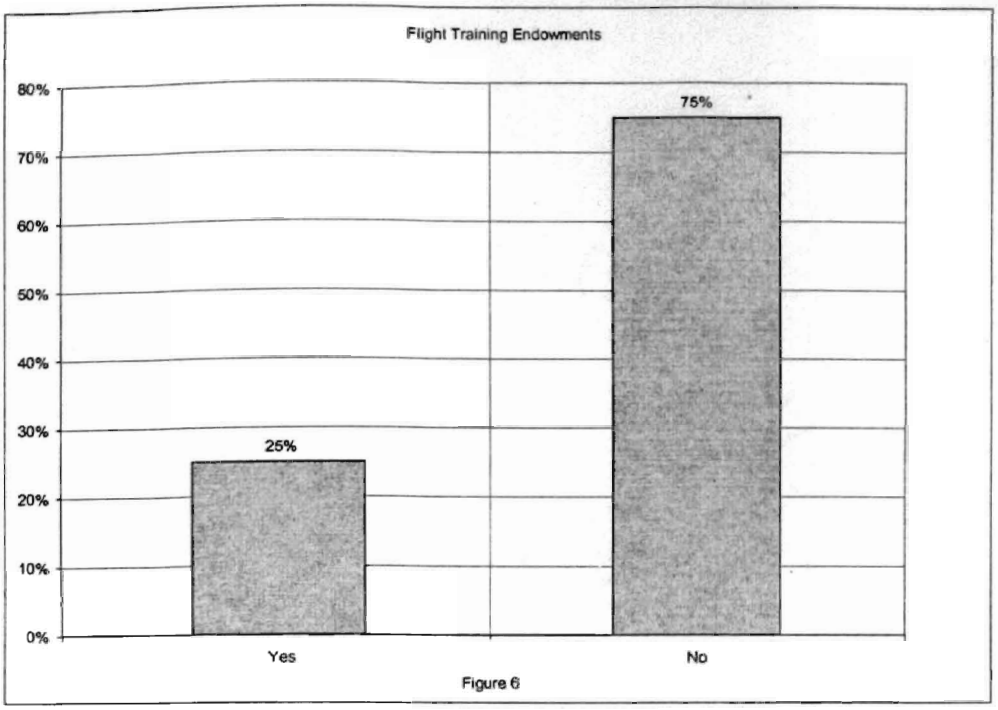

Figure 6. Flight Training Endowments

A majority of the schools, 75%, reported not having any endowments for flight training while 25% of the schools did have at least one. One of the endowments was valued at 1.19 million-dollars and another institution reported $322,000 dollars in endowments.

The next two questions dealt with the possible existence of legislative mandates with respect to flight training either at a state level or if there was a direct relationship to the university Board of Trustees or similar body. The questions were asked if there were any legislative mandates concerning aviation operations? And a separate question; if there were any direct relationships to the university Board of Trustees? (Figures 7 & 8)

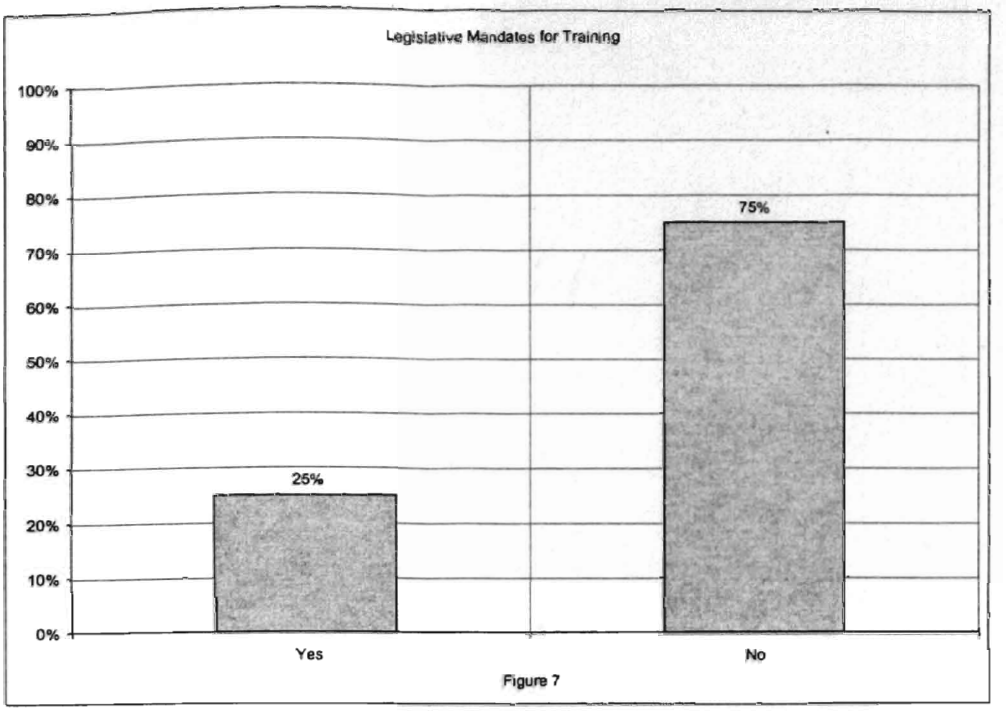

Figure 7. Legislative Mandates for Training

Of the schools responding to this question 75% reported no legislative mandates regarding aviation training while 25% reported there was at least some legislative requirement with respect to their program(s). One of the mandates related to a requirement for the training to be self-funding.

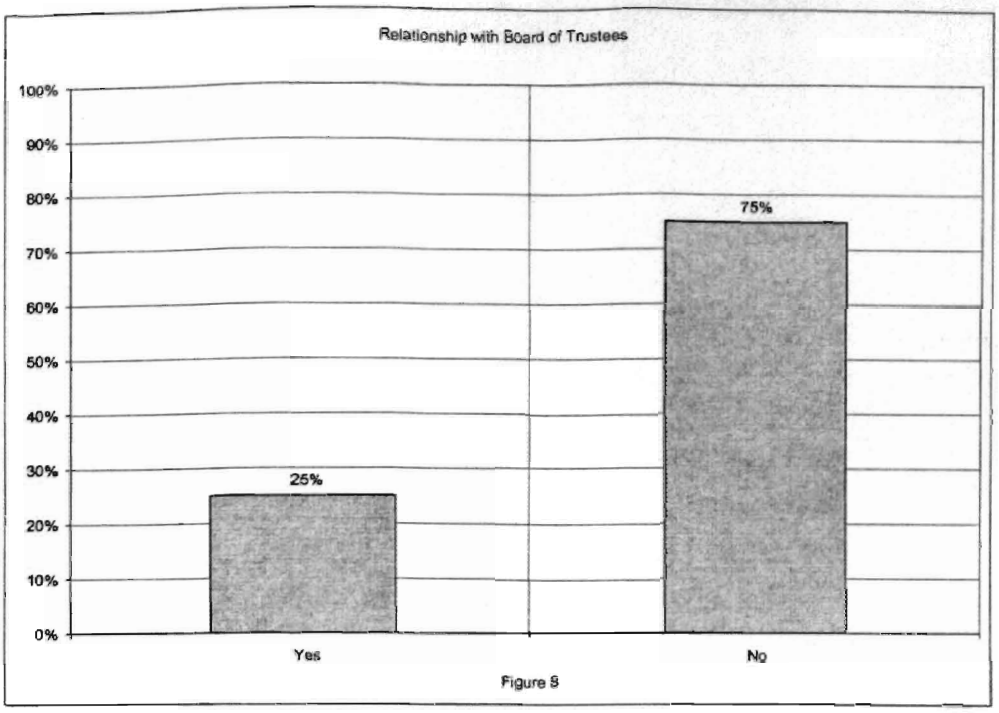

Figure 8. Relationship to Board of Trustees

The majority of schools reported no particular relationship to the Board of Trustees or similar oversight organization; with 75% reporting none existed. There were 25% of the schools reporting some direct interaction with the Board of Trustees with one school reporting the Board being required to set and adjust all fees associated with the training and another school reporting that a Academic Board of Regents oversaw aviation training matters.

The last question in the section of organization of flight training is related to the level of support of aviation training from Alumni or Booster Clubs. The question of what role Alumni or Booster Clubs play with respect to financial support of the training was asked (Figure 9).

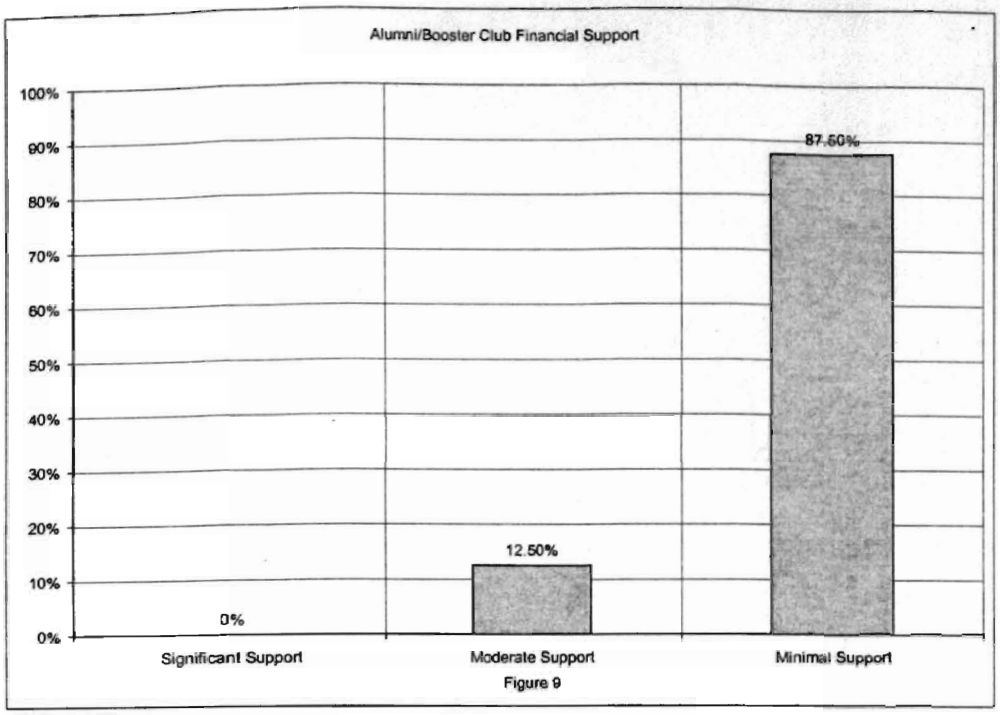

Figure 9. Alumni/Booster Club Financial Support

Most of the schools, 87.5%, reported having minimal financial support from the associated Alumni Association or Booster Club. Moderate support is given at 12.5% of the schools and no respondents indicated that significant financial support was available through these organizations.

Management of Flight Training

The management section of this questionnaire deals mainly with personnel, equipment, and budget. It necessary to inquire as to how personnel are classified and paid for, how equipment is obtained/maintained, and how operations are conducted.

The first question in this section established how the actual flight training is conducted by first asking if the university conducted the flight training or if they used a contractor (Figure 10) .

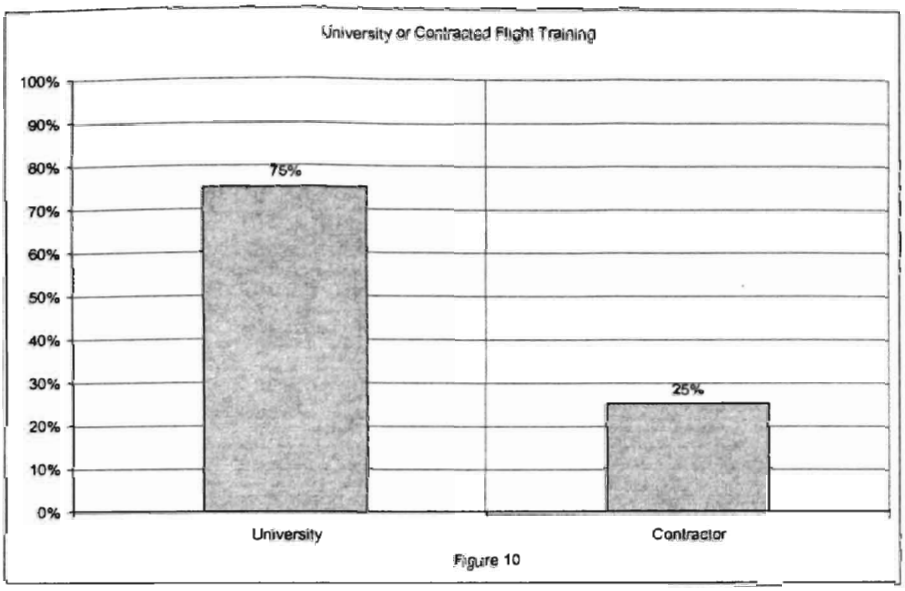

Figure 10. University or Contracted Flight Training

The responses to this question indicate that 75% of the schools conduct their own flight training while 25% use a contractor. One of the schools using a contractor actually contracts with a Fixed-base Operator for the flight training while conducting the academics themselves. Another school reporting the use of a contractor is actually a community college, which conducts academics but has their students fly with a program at a senior university through an education alliance agreement.

The Chief and Assistant Chief Flight Instructor's are important managers at a flight school and it is necessary to determine their classification within the university, their

educational requirements, and any non-flight duties they might have. The first question asked determines their respective classifications (Figure 11).

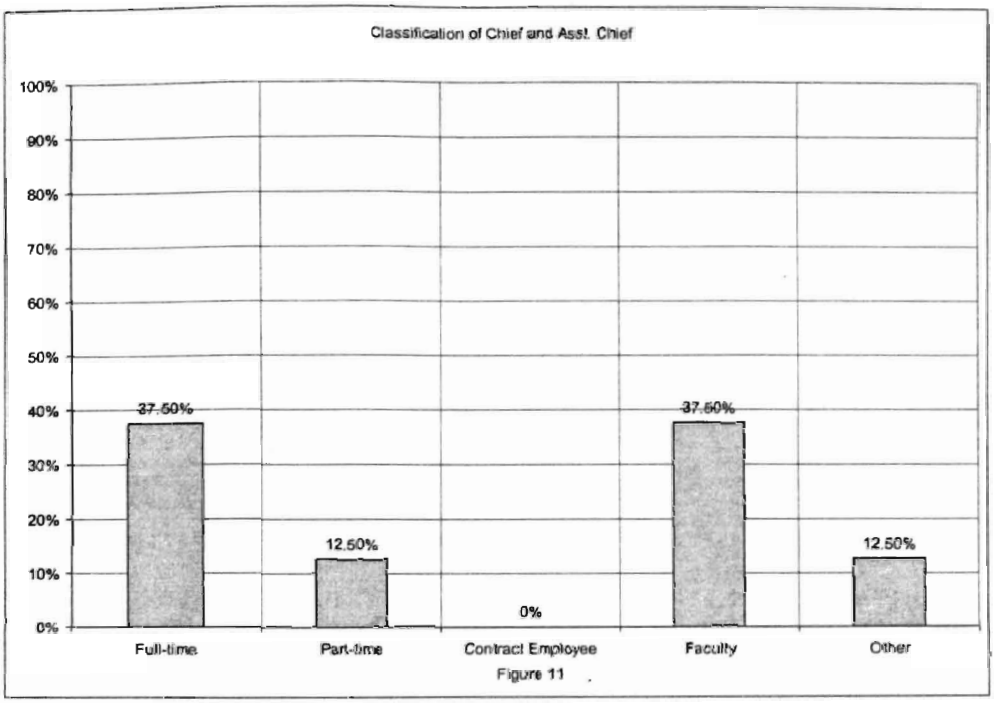

Figure 11. Classification of Chief and Assistant Chief Instructors

The responses were split at 37.5% as to whether the Chief and/or Assistant Chief Instructors are regular full-time staff employees or if they are classified as faculty. An additional 12.5% of the responses indicate that at least the Assistant Chief Instructor is a part-time employee. The remaining 12.5% responses in the "other" category are from a school using a contractor and a community college using a senior institution. The schools reporting classification of these positions as faculty indicate they begin at the Assistant Professor level.

The classification of some Chief and/or Assistant Chief Instructors as faculty leads to the next question which inquires about the educational requirements for these positions (Figure 12).

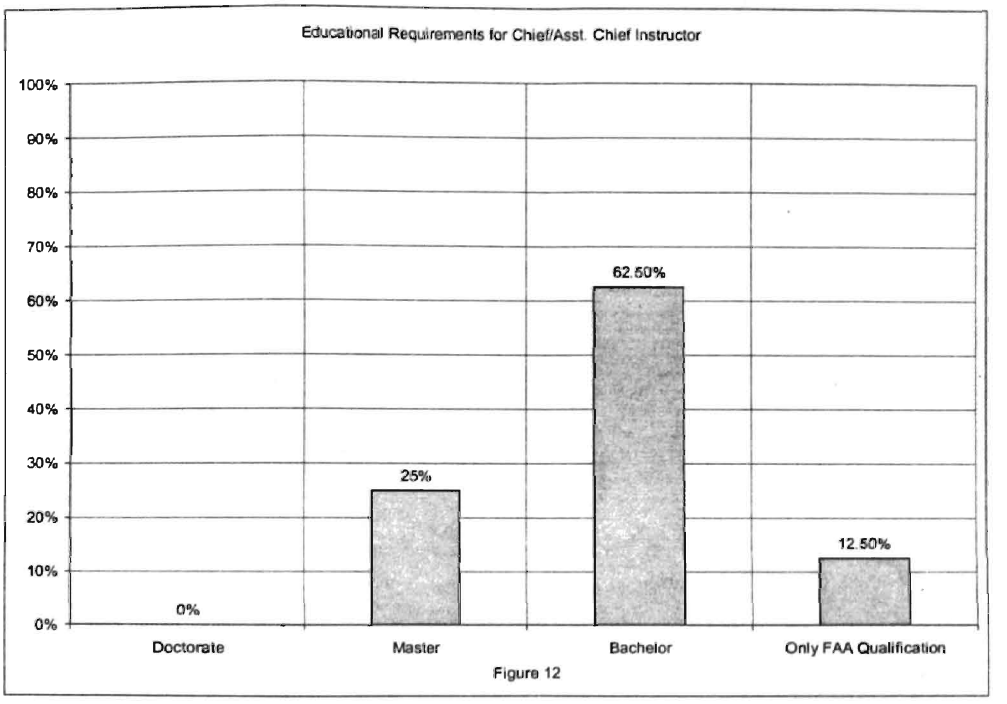

Figure 12. Educational Requirements of the Chief/Assistant Chief Instructors

Most of the schools, 62.5%, reported requiring a Baccalaureate degree for the Chief and/or Assistant Chief Flight instructor while 25% require a Masters level degree and only 12.5% require FAA certification only. None of the respondents required a Doctorate degree be held; including the institutions classifying these positions as faculty members.

The next set of responses has to do with teaching or non-flight duties required of the Chief and/or Assistant Chief Flight Instructors. The question asked if there were any teaching or non-flight responsibilities (Figure 13).

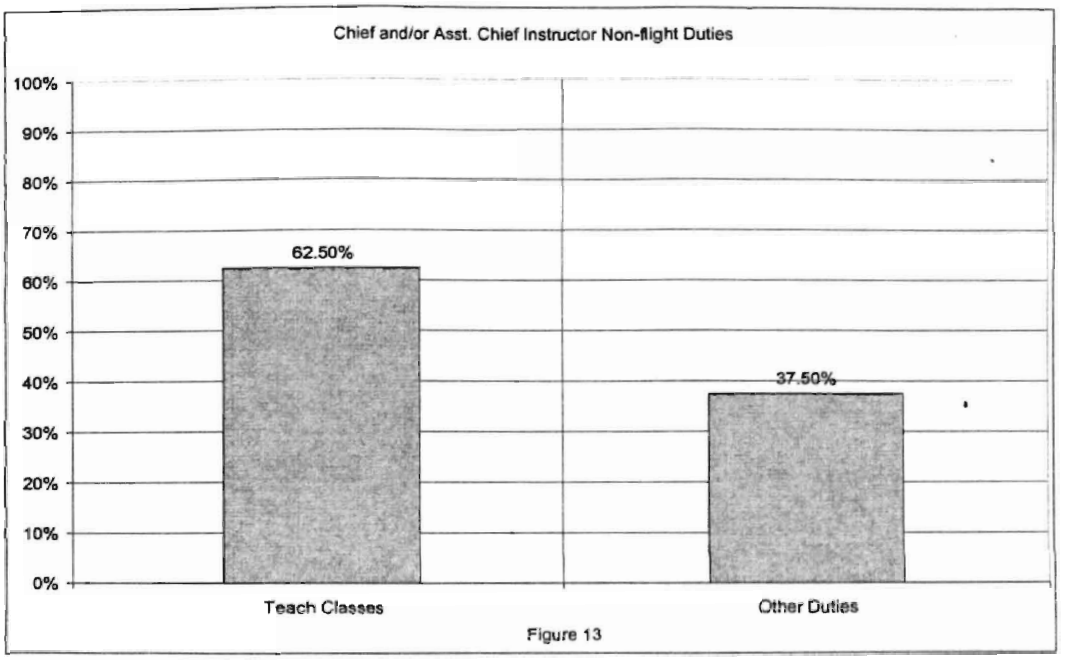

Figure 13. Chief and/or Assistant Chief Instructor Non-flight Duties

Among the respondents 62.5% of the schools reported that the Chief and/or Assistant Chief Flight Instructor's teach classes. The other duties responses accounted for 37.5% of the responses. Among the schools reporting theses positions as teaching classes one of the schools indicated that the positions were tenure track positions. All respondents reported that these positions have additional management duties, at least at the flight center, and one of the schools actually has examining authority authorized by the F.A.A.

so the Chief and Assistant Chief Instructor's perform duties as pilot examiners for the schools students.

Since it is unusual for regular flight instructors to have any benefits or compensation packages, other than hourly pay, as part of their employment, the next question sought to determine what, if any, was available at post-secondary institutions (Figure 14).

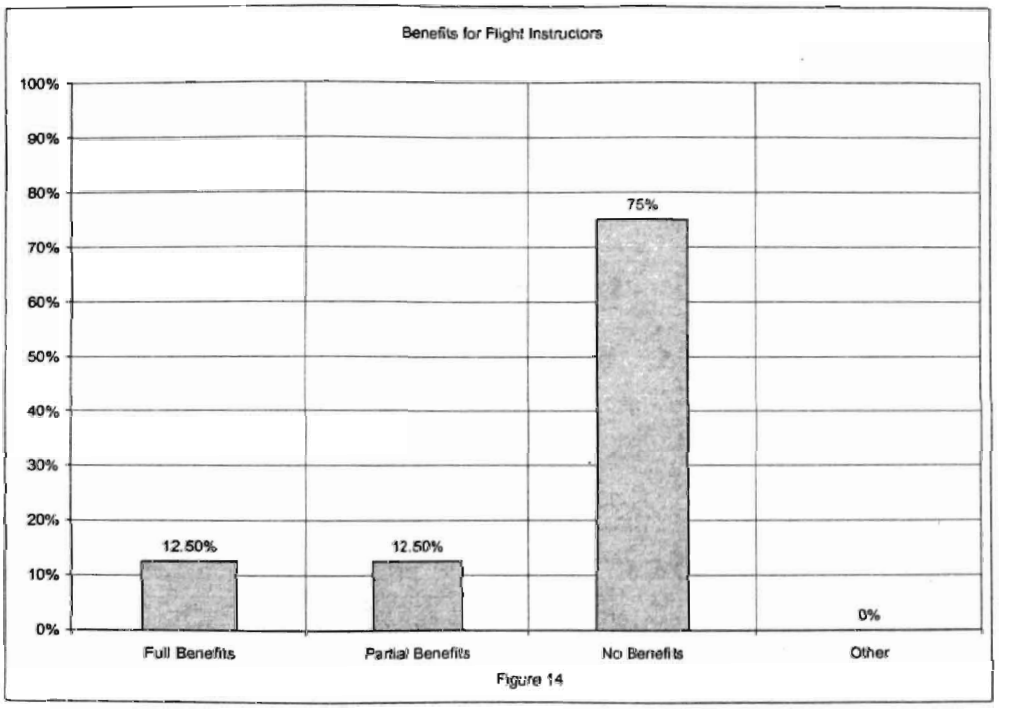

Figure 14. Benefits for Flight Instructors

The majority of the responding schools, 75%, report that no benefits are available to the flight instructors. A small percentage of respondents, 12.5%, indicate that partial benefits are available to the instructor. And another 12.5% indicate that full university

benefits are available. The partial benefits response was dependent on availability of sufficient work-study positions, which flight instructors are employed under and the full-benefit response was referenced to full-time flight instructor positions.

The study follows-up on the question of benefits by asking how the regular flight instructors are classified by the university personnel system (Figure 15).

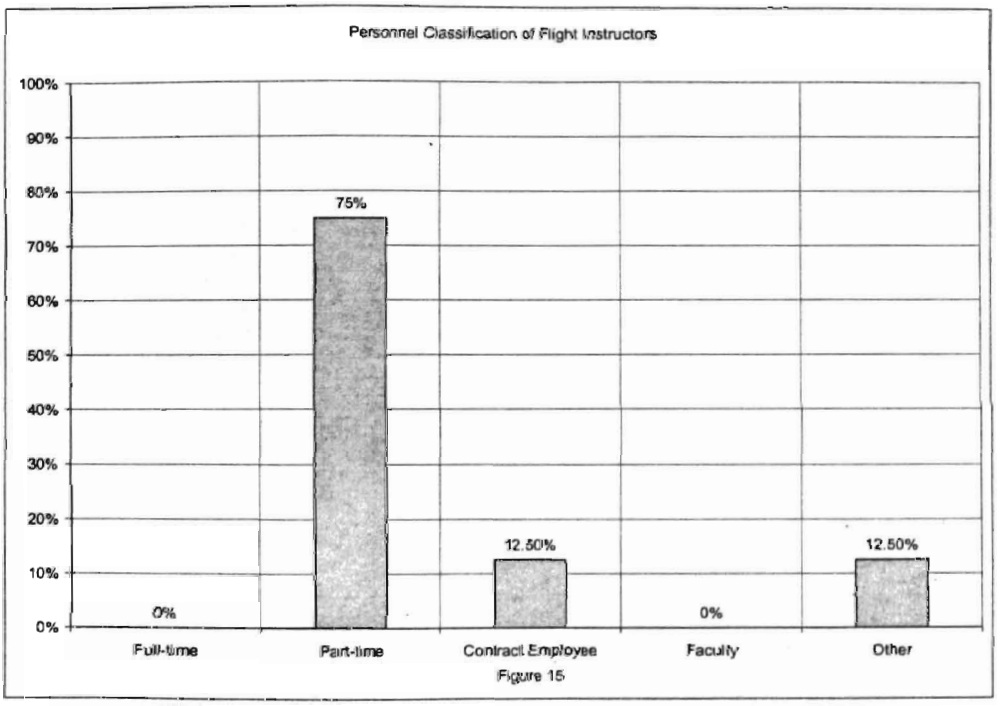

Figure 15. Personnel Classification of Flight Instructors

The instructors at 75% of the responding institutions are part-time employees. At 12.5% of the schools the flight instructors are under contract and the 12.5% other response indicates one school with flight instructors classified as staff.

Flight centers nominally use office staff and the study makes inquiry as to the university personnel classification of these positions. Office staff is considered to be non-flight administrative personnel who work in or for the aviation program directly (Figure 16).

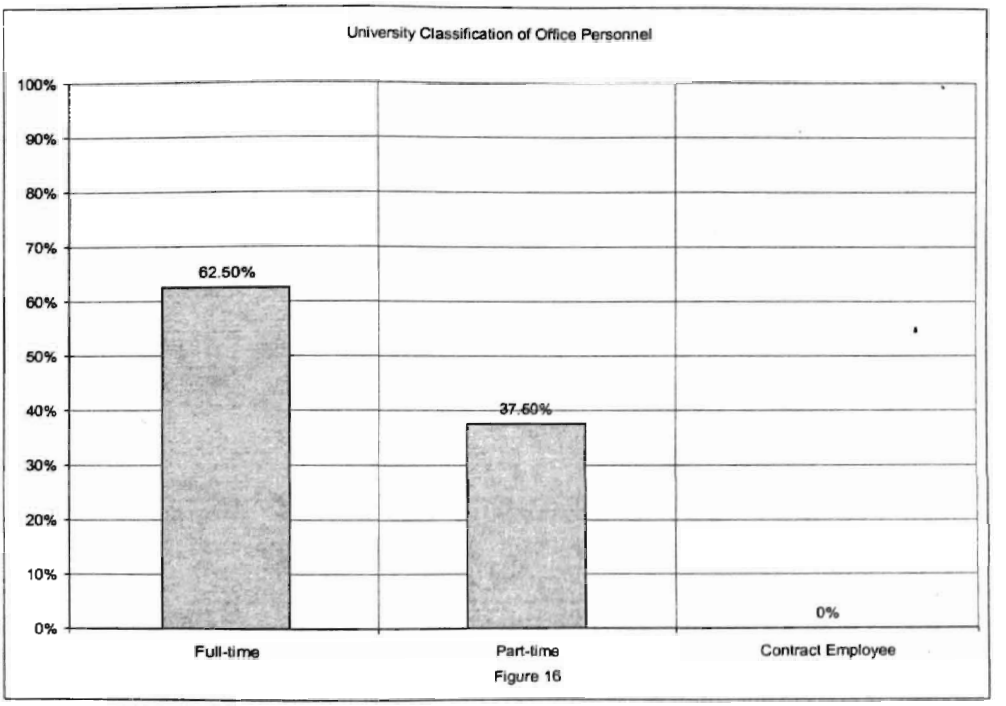

Figure 16. University Classification of Office Personnel

Office staff reported as 62.5% full-time employees and 37.5% were reported as being part-time employees. No office staff employees were reported as being on contract.

In light of increased security issues related to air transportation the study inquired as to the existence of a separate flight transportation department at each school (Figure 17).

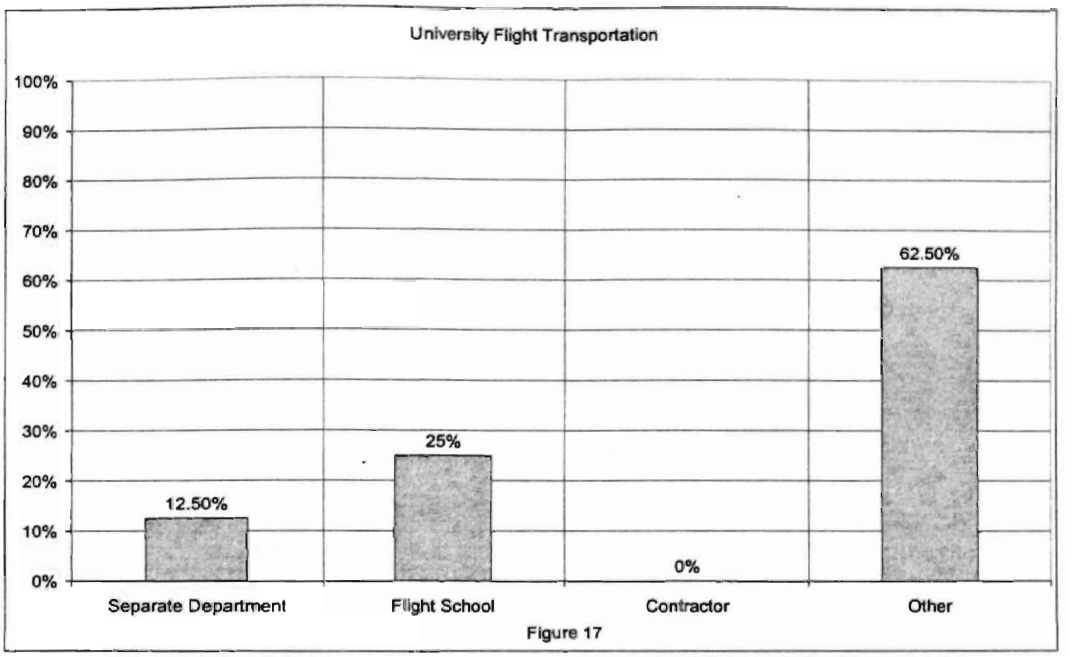

Figure 17. University Flight Transportation

In a small percentage of responses, 12.5%, the reporting university has a separate department for air transportation of university personnel. At 25% of the universities the flight school performs the air transportation mission. The 62.5% other responses were unilaterally universities with no air transportation program. No universities reported using contractors.

Funding of aviation programs is of particular interest because of the high resource requirement associated with operation of aircraft. The next question asks; does the university own their flight training aircraft? (Figure 18)

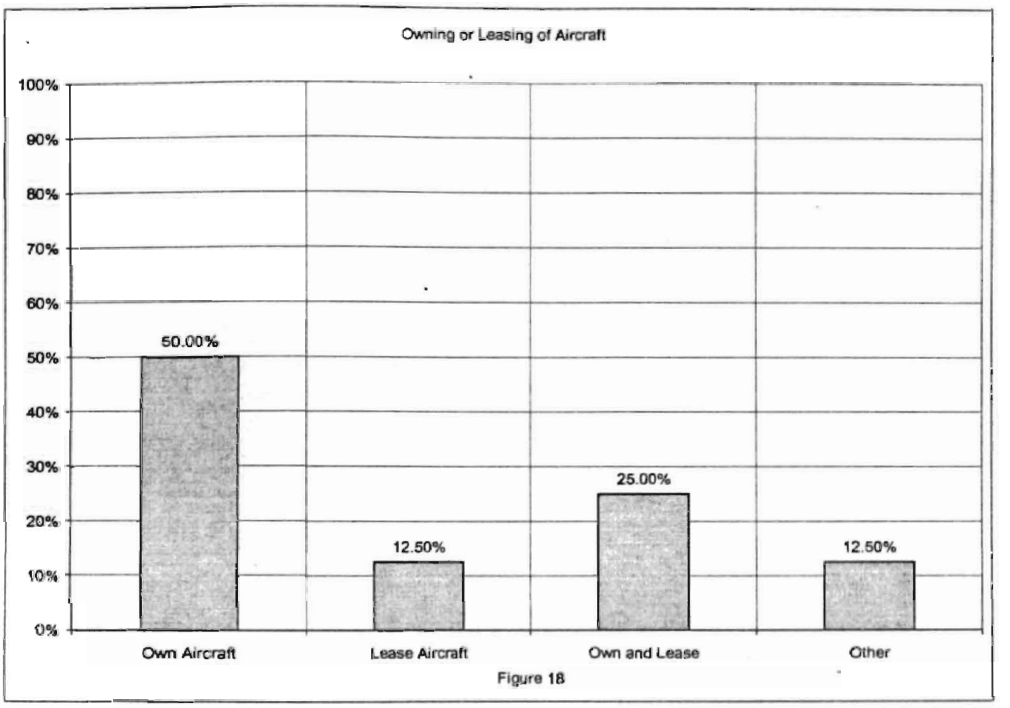

Figure 18. Owning or Leasing of Aircraft

Half of the universities report owning their own aircraft. At 25% of the universities the flight training is done with owned and leased aircraft. A small percentage, 12.5%, of the respondents report using only leased aircraft and the 12.5% other responses were from a university using a contractor for its flight training.

The use of simulators in flight training curriculum is becoming pervasive and the questions asked by this study are if simulators are used and if the university owns the simulator (Figure 19).

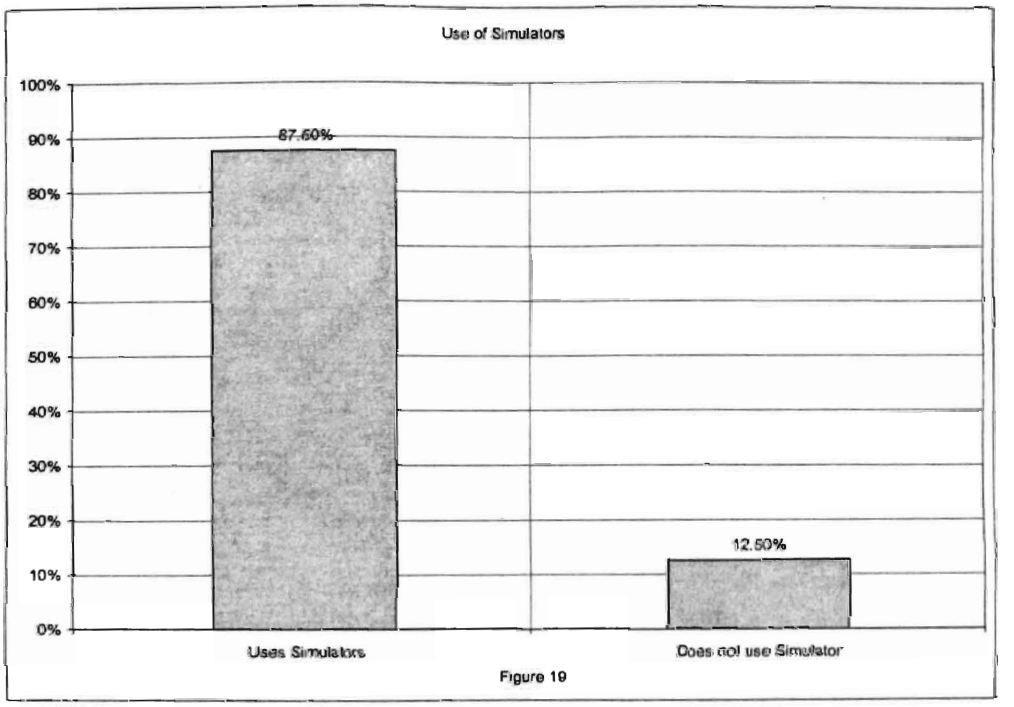

Figure 19. Use of Simulators

The use of simulators was reported at 87.5% of the responding universities and 12.5% of the schools reported that they did not have a simulator portion of the flight training curriculum.

The same financial resource concerns exist with obtaining and maintaining simulators as with training aircraft and the question asked by this study was if the universities owned or leased the simulator(s) (Figure 20).

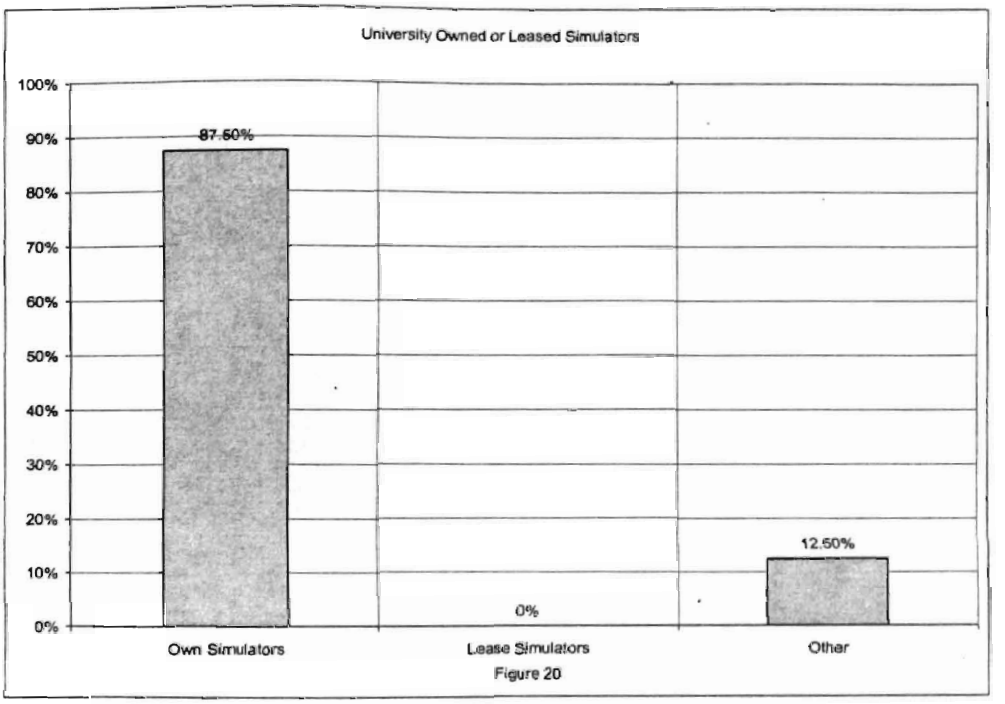

Figure 20. University Owned or Leased Simulators

The simulators in use at universities are owned at 87.5% of the schools. No schools reported leasing a simulator and the 12.5% other response is from one of the universities that have access to a simulator by agreement with another institution.

When a university has a simulator or any training device it must be housed somewhere and that requires some resource expenditure. The question is asked here; where simulators are housed? (Figure 21)

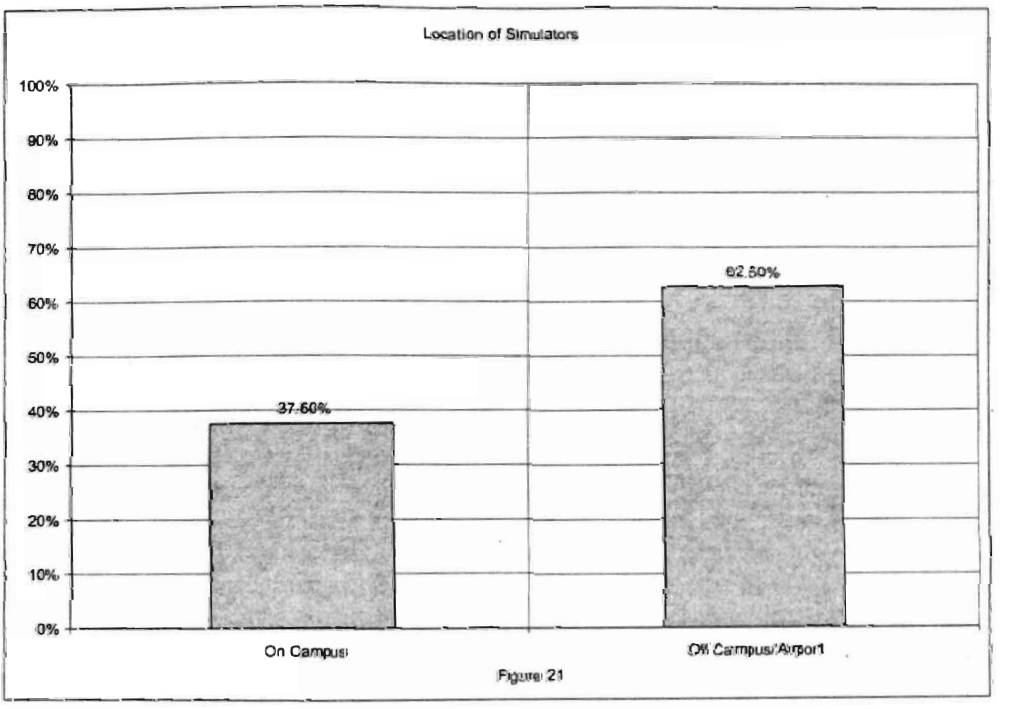

Figure 21. Location of Simulators

The majority of the responses, 62.5%, indicated that the simulators in use are housed at an off-campus and/or airport facility. The remainder of the institutions using simulators, 37.5%, indicated the simulators were housed in an on-campus facility.

Obtaining aircraft, simulators, and flight training devices is a costly endeavor and it is pertinent to determine at what level within the university system these acquisitions are paid for (Figure 22).

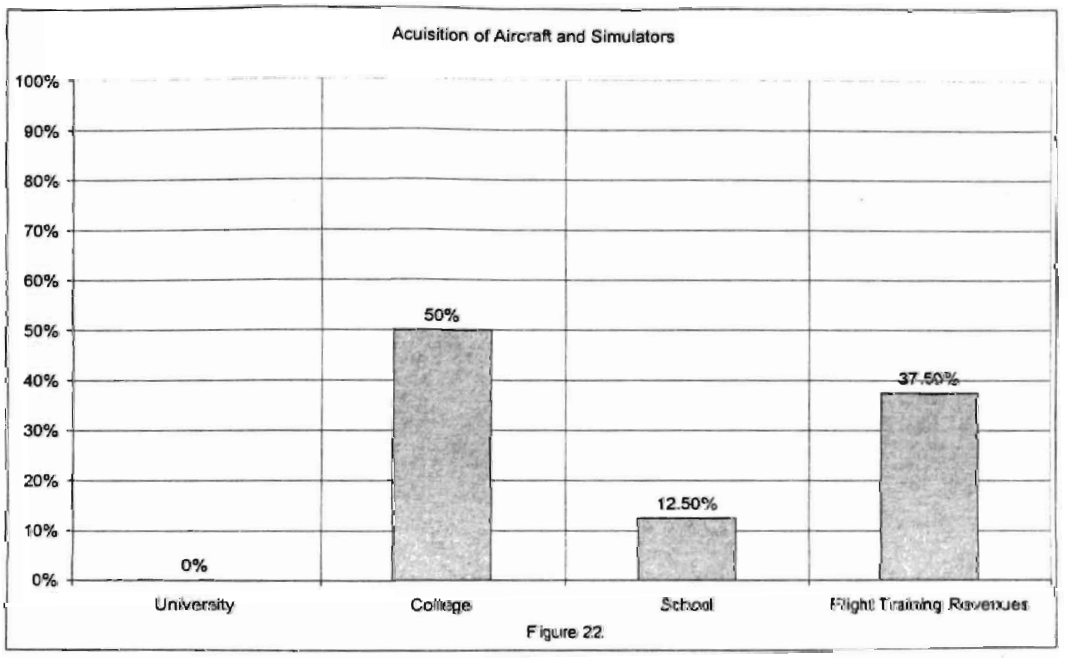

Figure 22. Acquisition of Aircraft and Simulators

None of the respondents indicated that either their aircraft or their simulators were budgeted for at the university level. The largest response, 50%, indicated that these items were handled at the college level. The next largest response, 37.5%, indicated that these items were paid for with revenues generated from flight training. The 12.5% response is the smallest of the data set and indicates that the school under the college budgets for aircraft and simulators.

An additional budget drain with respect to operation of aircraft and flight training is the acquisition, maintenance, and operation of support equipment known as line-support. This additional expense needs to be budgeted for and this study inquired as to which budget support these functions (Figure 23).

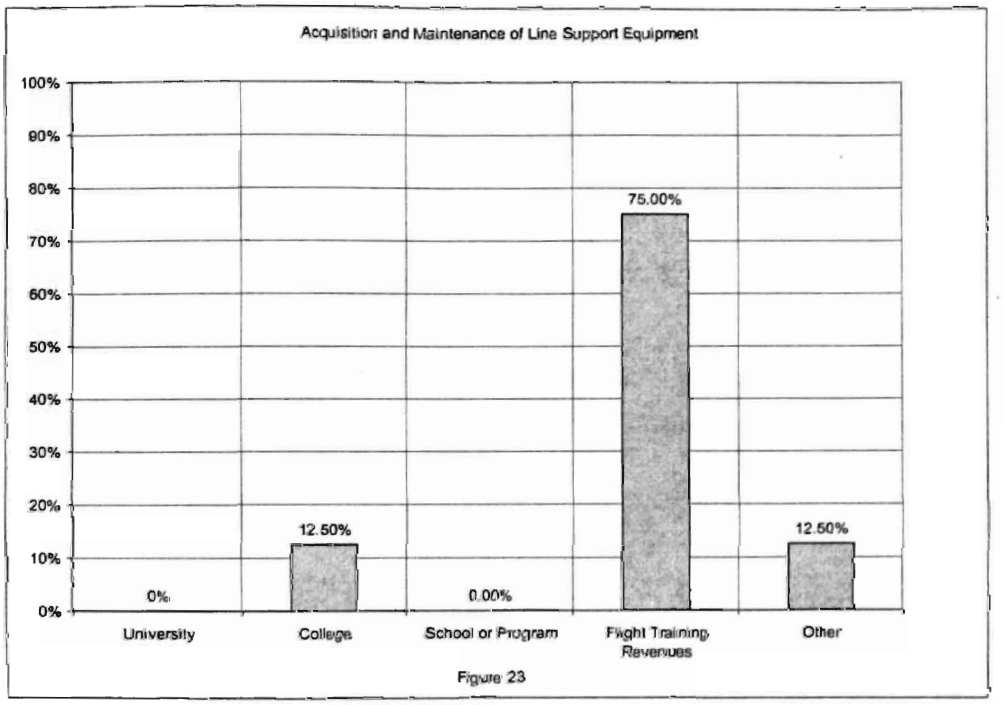

Figure 23. Acquisition and Maintenance of Line Support Equipment

Most of the training programs, 75%, provided responses indicating that revenues generated from flight training are used to obtain and maintain line-support equipment. An even split, 12.5% respectively, occurred between the program using college-level funding for this equipment and an "other" response that is undefined.

Another expense involved in aviation training is facilities expenses. Typically airport facilities are required to provide support for the flight training portion and maintenance of the aircraft. The question was asked; what facilities are used? (Figure 24)

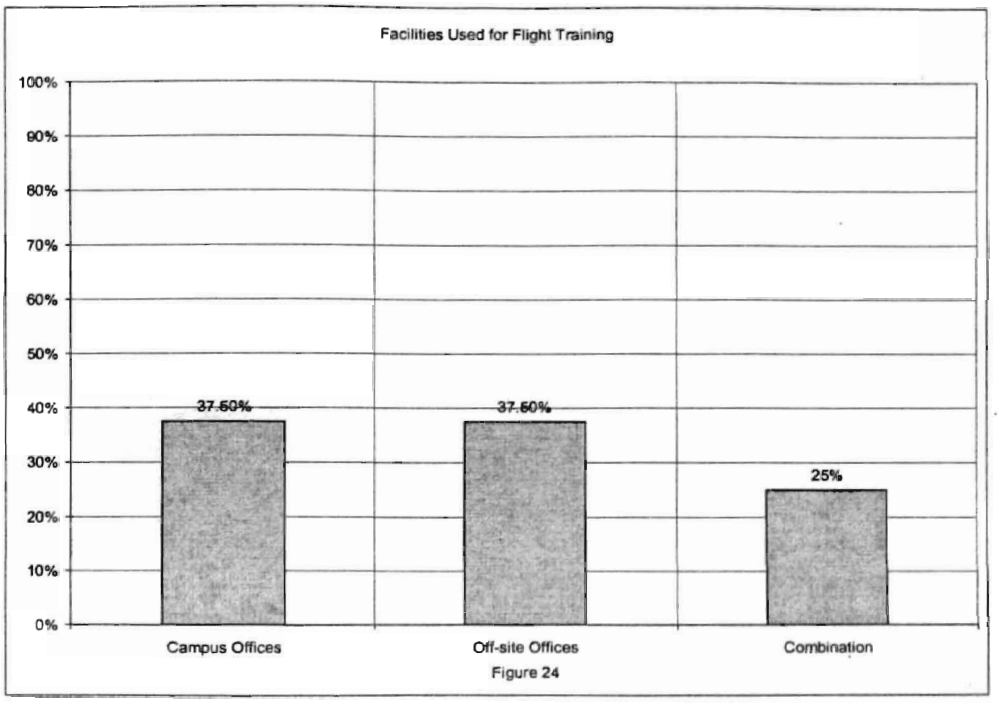

Figure 24. Facilities Used for Flight Training

Equally, 37.5% respectively, responding universities indicated that they use campus offices and others use off-site offices. The remaining 25% of the respondents report using a combination of campus offices and off-site facilities as well.

It is reasonable to question if the university rents office space or facilities and the question is asked here to determine what, if any, are rented (Figure 25).

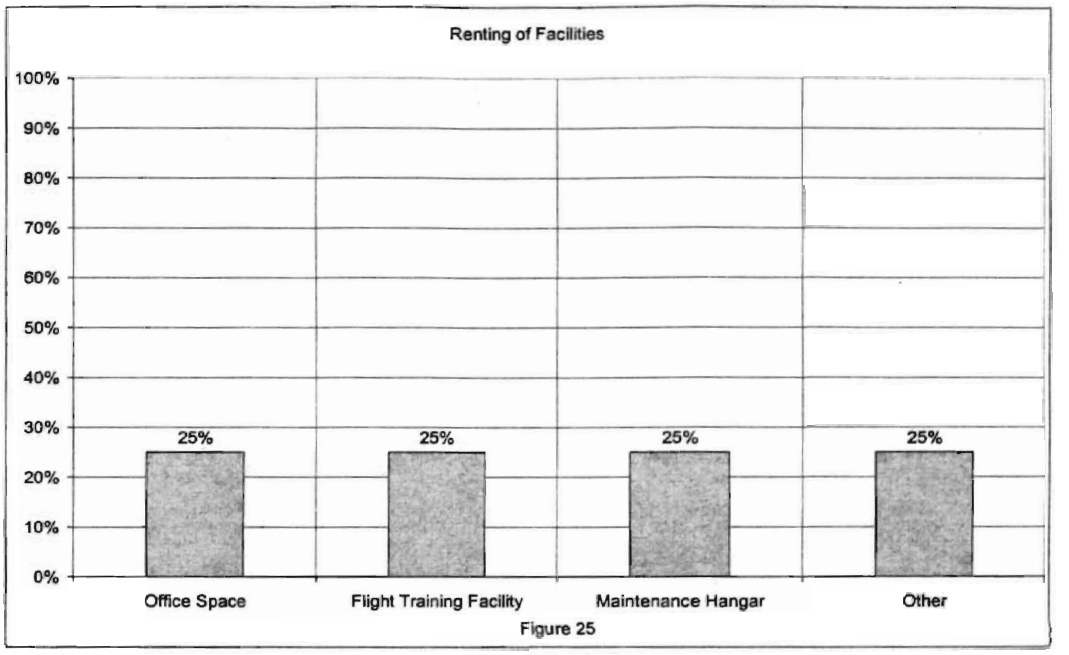

Figure 25. Renting of Facilities

The responding universities report that 25% of them rent office space, 25% rent a flight training facility, 25% rent a maintenance hangar, and the 25% "other" response indicates schools that either use a contractor for flight training or do not otherwise need facilities to conduct flight training.

The follow-up question to renting of facilities is naturally to inquire if the university owns any facilities. This study asked that question (Figure 26).

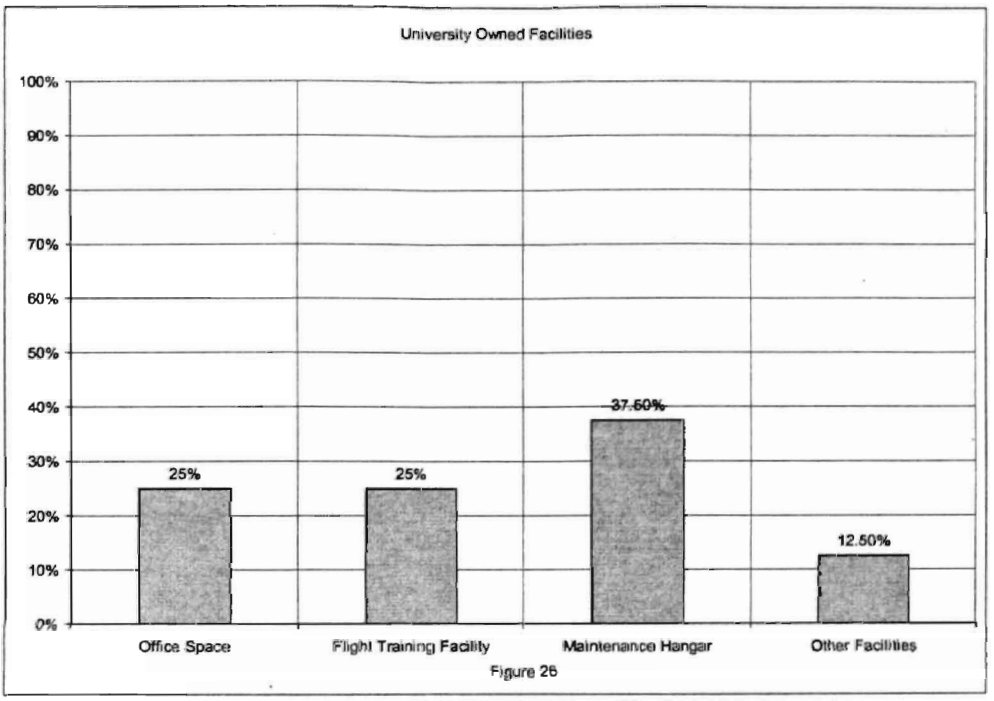

Figure 26. University Owned Facilities

At 25% of the universities office space is owned and at 25% of the universities the flight training facility is also owned. The largest response on facilities ownership, 37.5%, came from the maintenance hangar category. The 12.5% response in the other category came from universities using a contractor or otherwise not needing a facility to conduct training.

The fee structure at a flight-training center is of significant importance to the student as far as affordability of training is concerned and is a matter of high interest for the institution with respect to fiscal solvency of the training. This study asked what the fee structure is for the flight training devices, i.e. aircraft and simulators, to determine how these things are paid for by the student(s) (Figure 27).

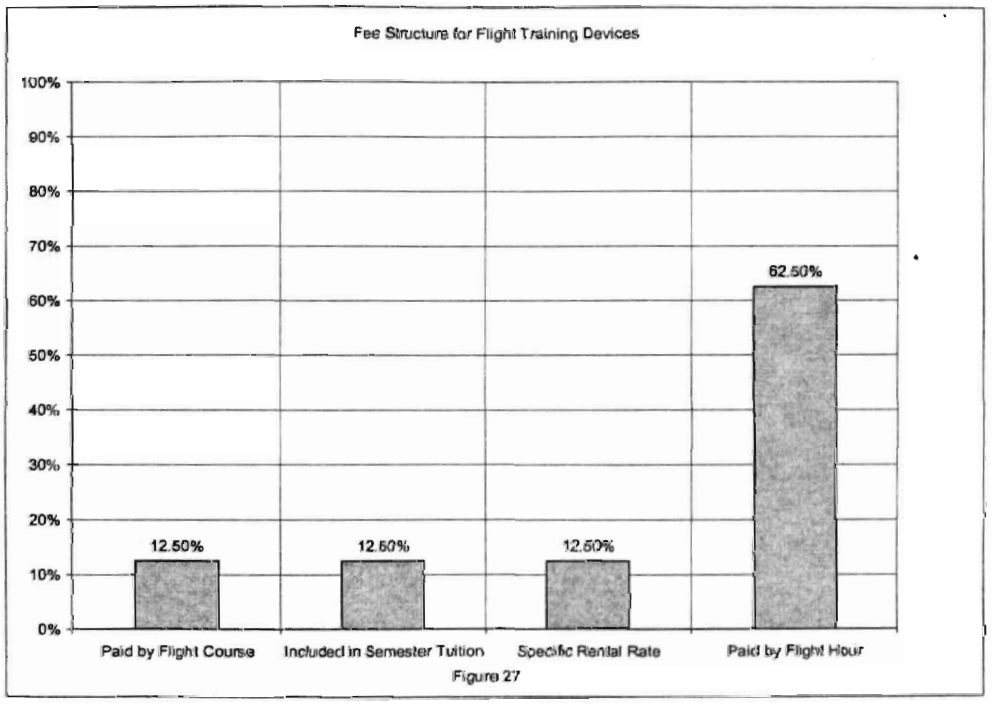

Figure 27. Fee Structure for Flight Training Devices

The majority response, 62.5%, indicated that the use of flight training devices, simulators and aircraft, is charged by the hour. A 12.5% response indicated that one of the schools includes the use of aircraft and/or simulators in the tuition charge for the

semester. An additional 12.5% response indicates that one school charges tuition by flight course and the remaining 12.5% response indicates that one school charges a flat rate fee for use of the devices.

In this section dealing with management of flight operations the setting of fees is an important management tool and the question is asked; how are fees for flight training devices set? (Figure 28)

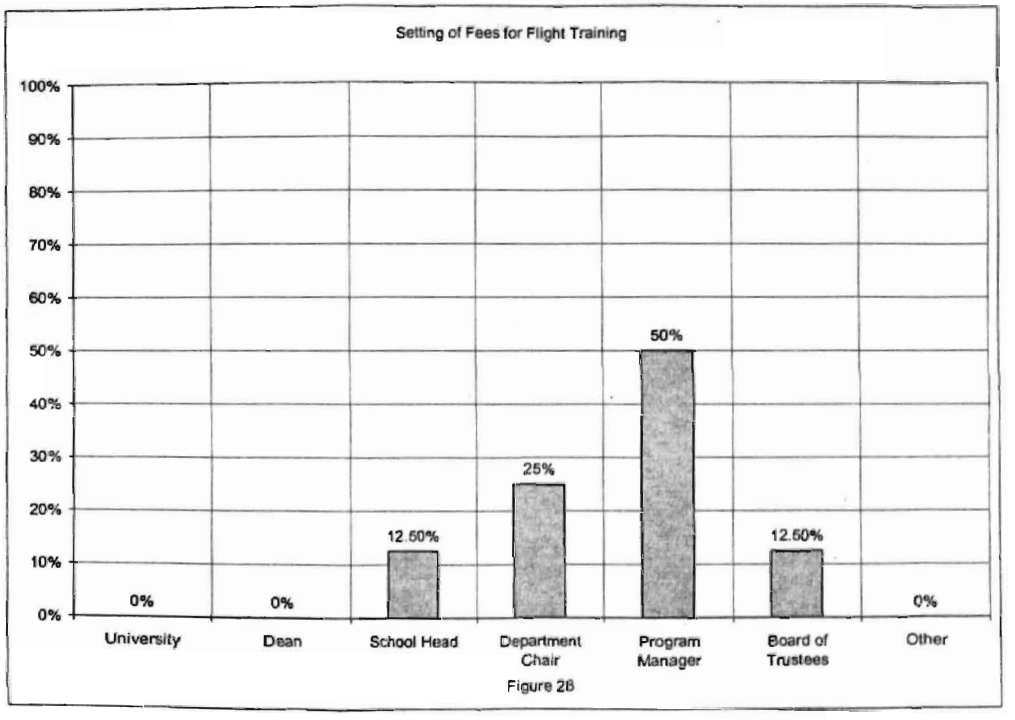

Figure 28. Setting of Fees for Flight Training

None of the respondents indicated that the university administration or dean set rates for use of aircraft or simulators. A 12.5% response indicated the School Head set rates.

A 25% response indicates some of the schools with a Department Chair set rates at that level. The largest response category, 50%, report that rates are set at the program level and 12.5% report rates being set by the Board of Trustees or similar overseeing body. It should be noted that, except in the case of the Board of Trustees setting the rates, the other programs required approval to change rates at a level other than where the recommendation is made.

In concern on a management level about fiscal viability the question arises about aviation training being a budgeted item or being a separate auxiliary item required to self-fund or operate on a break-even basis. The question was asked; are aviation operations an auxiliary operation and held to profitability standards? (Figure 29)

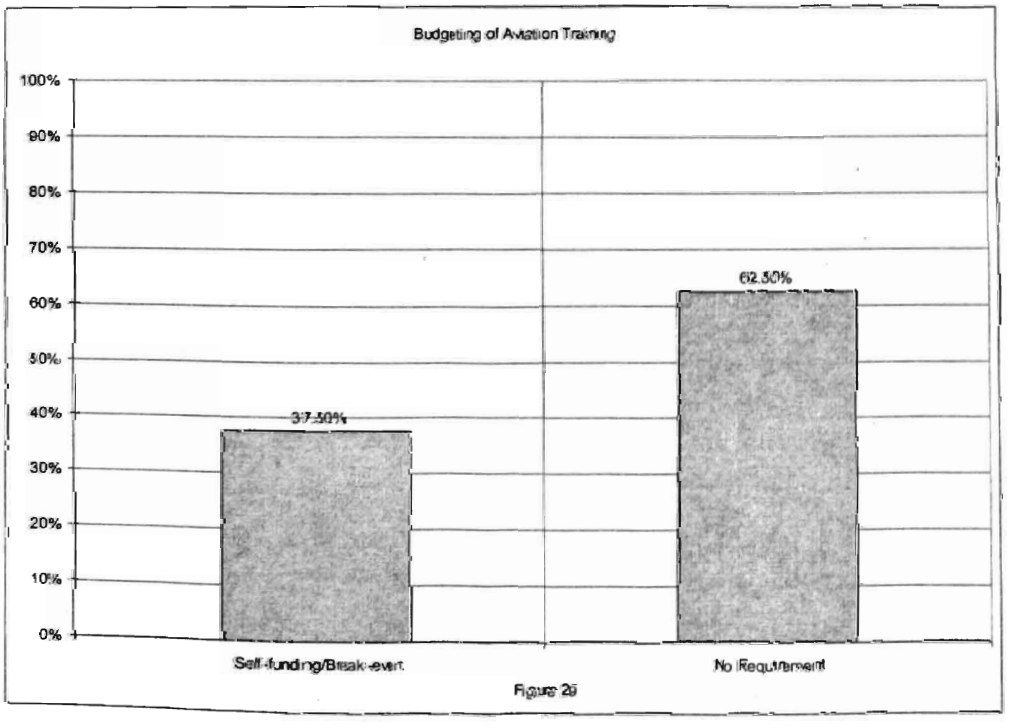

Figure 29. Budgeting of Aviation Training

The majority response, 62.5%, indicates training at some of the schools is budgeted or the flight training revenue is subsidized in some way. The remaining responses, 37.5%, indicate that these programs are at least required to break-even. The type, amount, or process by which the training is budgeted or subsidized in the majority response programs was not defined by this question.

Faculty members are an important part of any training program and the cost of personnel, in general, is one of the biggest resource users in any program so this study asked the question; what budget pays for faculty members? (Figure 30)

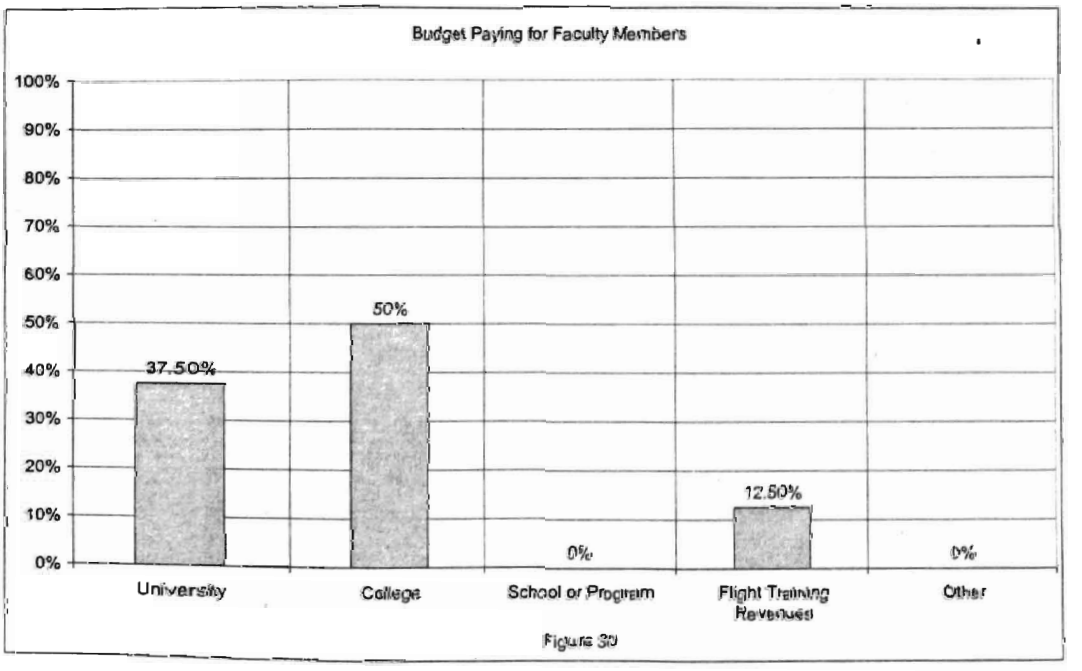

Figure 30. Budget Paying for Faculty Members

Half of the respondents, 50%, indicated that faculty members were paid for at the college level. An additional 37.5% of the responses indicate that faculty members are budgeted at the university level. The 12.5% response recorded as flight-training revenues used to support faculty members needs to be qualified in that it is a shared expense with the college and not a requirement for the flight training revenues to solely fund faculty.

The next logical question with respect to resources used for personnel is what budget pays for the Chief and/or Assistant Chief Instructors (Figure 31).

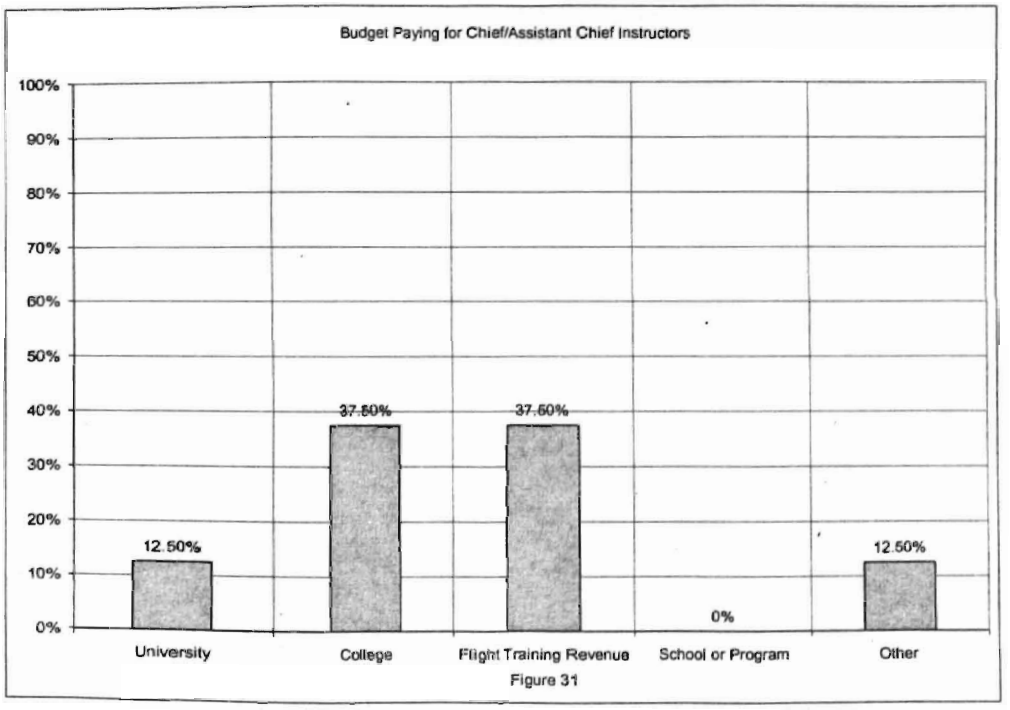

Figure 31. Budget Paying for Chief/Assistant Chief Instructors

The two largest responses, 37.5% each, respectively, were split between the Chief and/or Assistant Chief Instructors being paid out of college funds or being paid out of flight training revenues. A 12.5% response indicated these positions being paid at the university level and another 12.5% response was recorded as "other". The 12.5% university category response needs to be qualified because the school is part of a college and not a university system so all administrative and professional personnel are paid at what would be the university level. The 12.5% "other" response is from schools using a contractor and thus not paying for a Chief or Assistant Chief Instructor or a school conducting flight training under agreement with another university and thus not paying for these positions either. This question did not define whether partial budgeting i.e. paying 50% from one budget and 50% from another is done.

Budgeting of operational expenses associated with flight operations is a critical financial item and affects the viability of breaking even for the flight training operation. This study inquired as to what budget paid for the various expenses and expresses the responses in Table II.

TABLE II

REVENUE SOURCE FOR OPERATIONAL EXPENSES

	Fuel/Oil	Aircraft Parts	Insurance	Office Supplies	Airport
College or Program	0%	12.5%	12.5%	50%	12.5%
Flight Training Revenues	100%	87.5%	87.5%	50%	87.5%

It is important to make one differentiation of the data reported in this table under the airport fees category. Two of the responding institutions have their own airport and thus fees are not applicable.

At least a portion of the universities surveyed for this study are charged with the responsibility of being self-funding or breaking even and fiscal viability of the training is of concern at all of the institutions. It is important to know how the inevitable occasional fiscal shortfall or overage was dealt with. The question was asked; how is budgetary overages/shortfalls handled? (Figure 32)

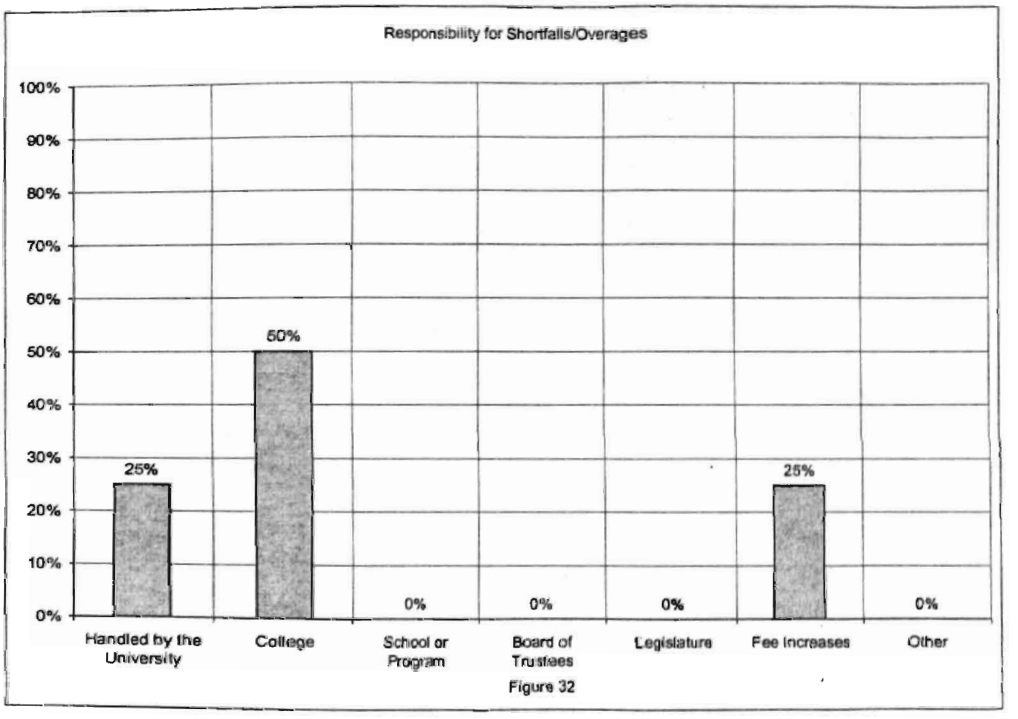

Figure 32. Responsibility for Shortfalls/Overages

The largest response category, 50%, indicates that the fiscal shortfalls or overages are handled at the college level. At 25% of the responding institutions the university budget

absorbs shortfalls or overages. Another 25% of the institutions report handling fiscal shortfalls with fee increases.

The next section of the study includes responses from the data collected on operations.

Operations

The operations section of this survey dealt with the actual conduct of flight operations such as when the flight center is open, student flight requirements, fuel purchases, and instructor issues.

The first question of this section asks; is the Jeppesen or commercially available syllabi used or does the university use its own? (Figure 33)

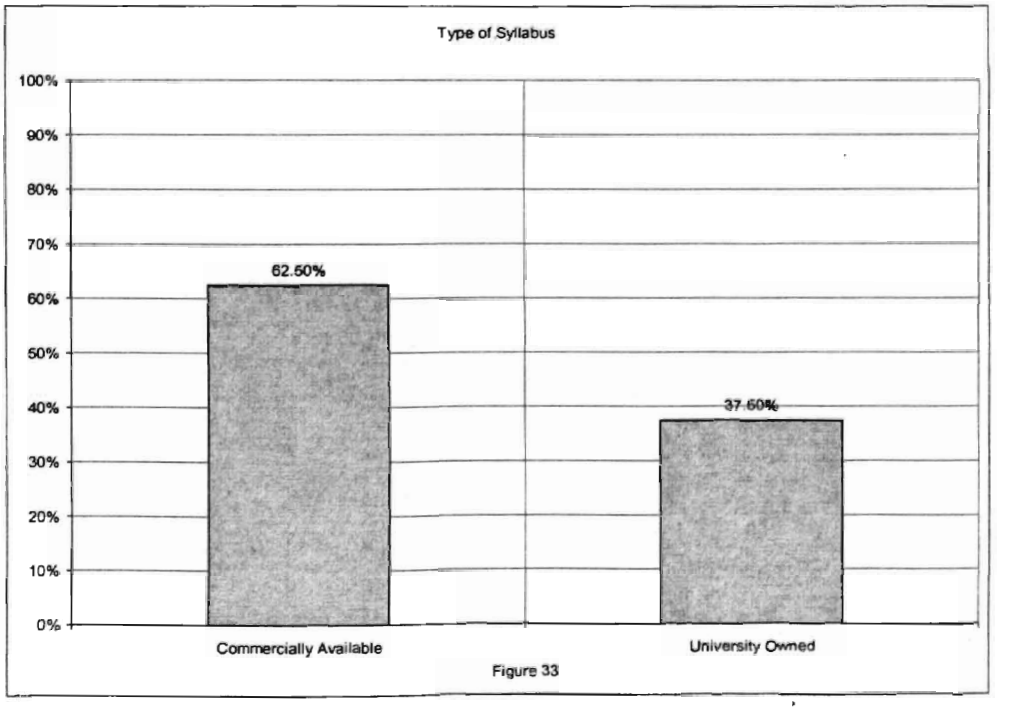

Figure 33. Type of Syllabus

The use of commercially available flight training syllabi is prevalent among the responding schools, 62.5%, indicated they purchase their syllabi for the various flight training courses. At 37.5% of the responding institutions they have developed their own flight training syllabi. This requires an F.A.A. approval process.

Maintenance of aircraft and support equipment is often the most financially draining portion of a flight-training budget. The next questions inquired; do university employees perform maintenance on the aircraft? (Figure 34)

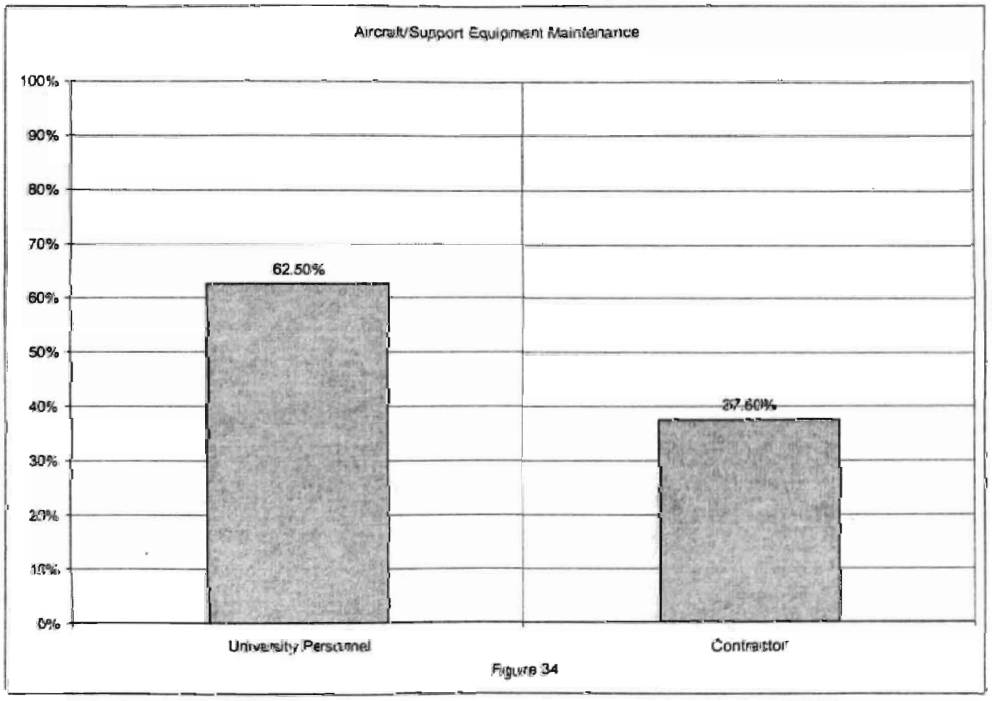

Figure 34. Aircraft/Support Equipment Maintenance

Most of the institutions, 62.5%, report that they have mechanics on staff to perform maintenance on the aircraft and support equipment. The remaining 37.5% of the respondents report using a contractor to do maintenance. It is important to note that a portion of these respondents are schools using a contractor to do flight training as well.

Post-secondary aviation training is slightly unusual in its scheduling in that it is not necessarily a year-round operation. Holidays, semester breaks, and summer break can interrupt training. This study felt it important to determine if the flight centers are open year-round for flight training (Figure 35).

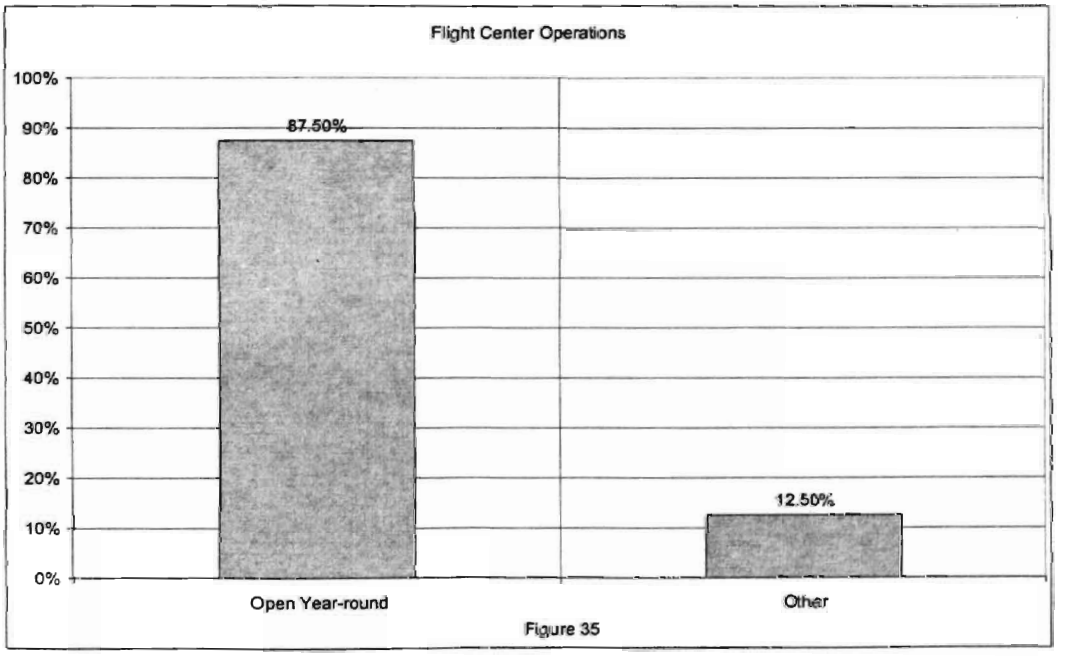

Figure 35. Flight Center Operations

A majority of the responding universities indicate that they have flight centers open year-round. The remaining 12.5% of responses indicated that they are closed during fall and spring breaks. All of the flight centers remain open during the summer.

The follow-up to when the flight centers are open is a correlating question as to any requirements there might be on the frequency or amount of flying required of the students. The question was asked; are students required to fly a certain number of hours per semester or year? (Figure 36)

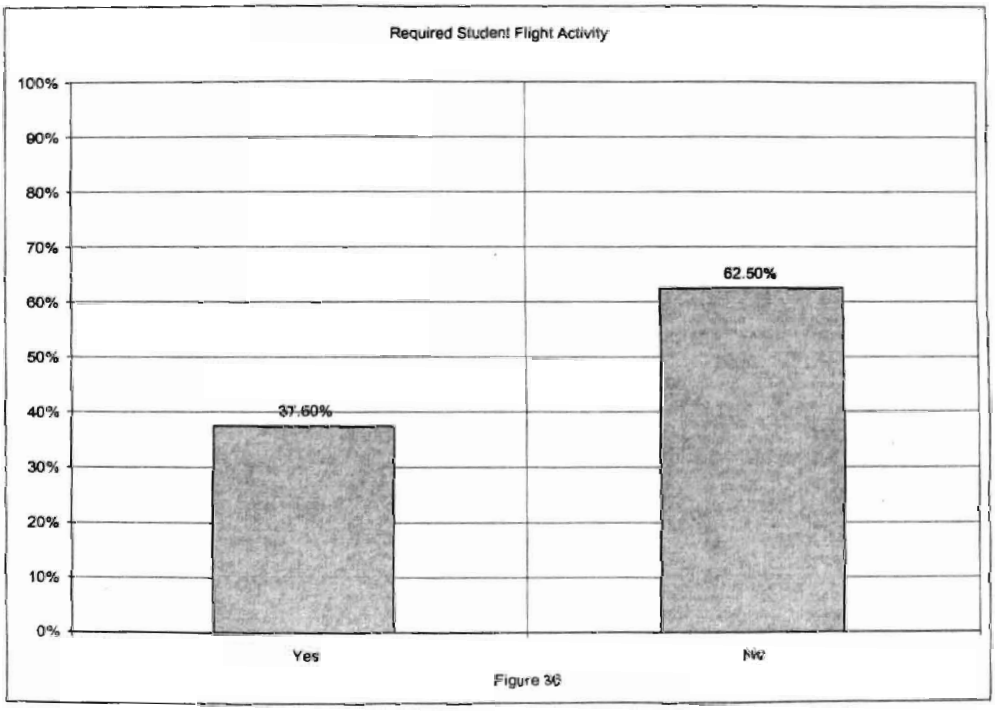

Figure 36. Required Student Flight Activity

Most of the schools, 62.5%, report that they do not have a particular requirement as far as mandatory flying by students. The remaining 37.5% indicate a certain number of times per week students are required to schedule. The objective is reported as being the completion of the flight course the student is enrolled in during the semester of initial enrollment.

The cost of fuel is a constant and recurring major expense for a flight center and there are various options of how to purchase it depending upon the airport the operations are conducted at and the agreements made with businesses and the associated city. The question is; how is fuel purchased at the flight center? (Figure 37)

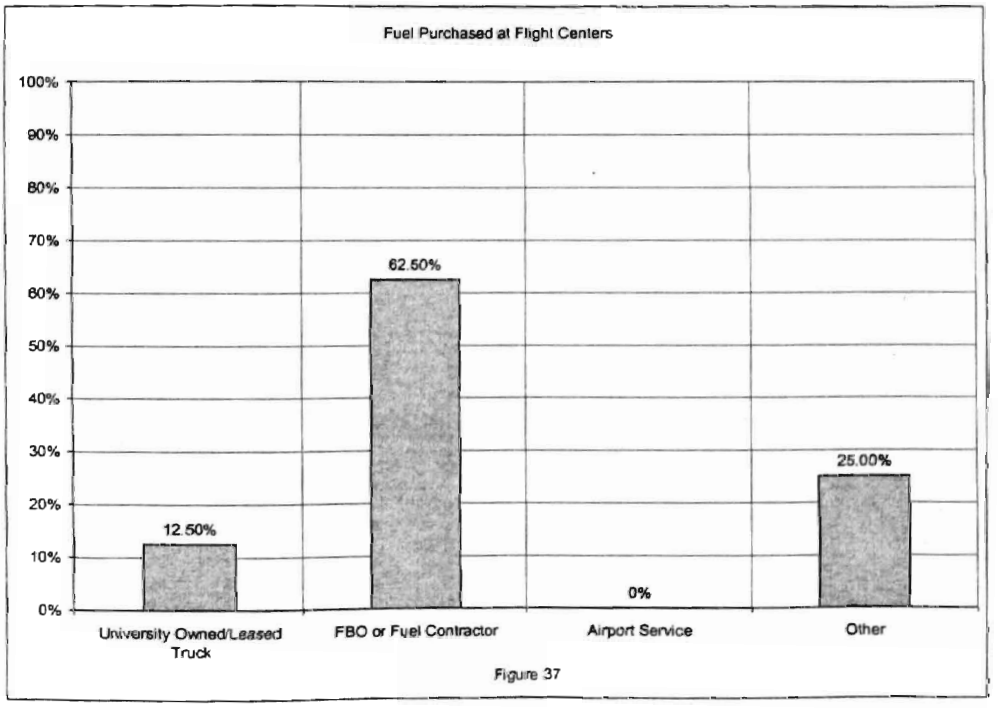

Figure 37. Fuel Purchased at Flight Centers

The majority of schools, 62.5%, report purchasing fuel through a Fixed Base Operator (FBO) or a fuel contractor at the airport. At 12.5% of the schools the university has their own fuel storage tank and truck. The remaining 25% of responding schools report having some other arrangement for the purchase of fuel. One of the schools indicates they purchase it wholesale and it is delivered to the flight center. One of the schools having ownership of the airport where flight operations are conducted reported having their own storage tank and truck. It is important to note that the location of the flight center and the agreements made with fuel vendors is critical to fiscal success.

A separate but equally resource intensive account is the fuel purchase reimbursements to students purchasing fuel off-station while on cross-country flights. Because of the usually large amount of fuel purchased by the flight centers the price per gallon can be reduced even when purchased commercially from a vendor; not so on individual purchases off-station. The question asked then is; how are student cross-country fuel reimbursements handled? (Figure 38)

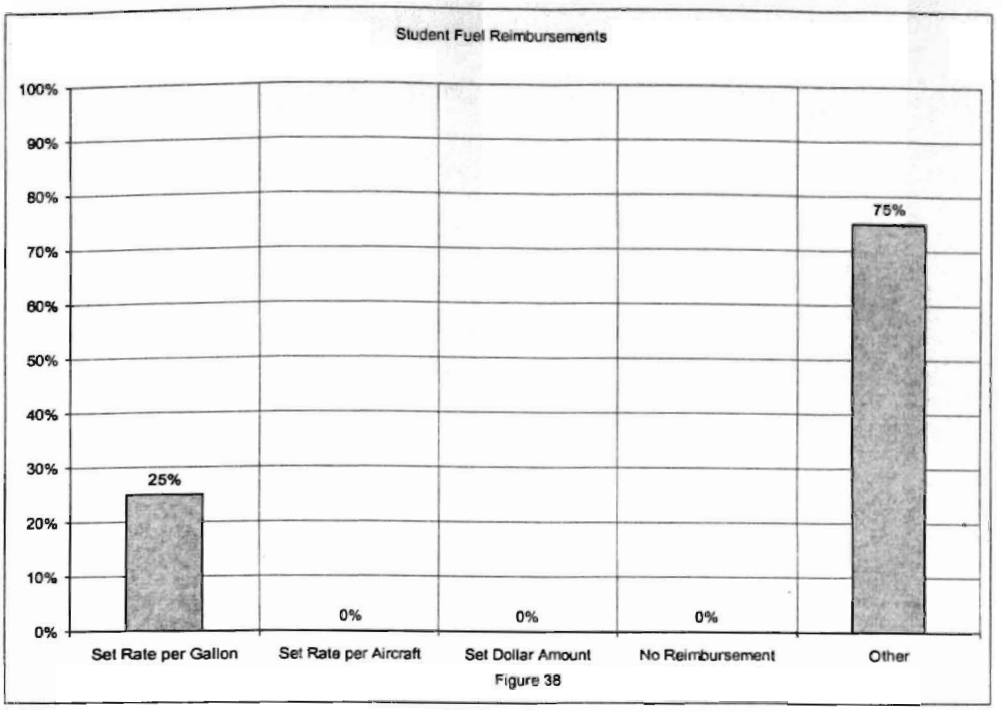

Figure 38. Student Fuel Reimbursements

At 25% of the responding schools the survey indicates that students are reimbursed at a set rate per gallon regardless of actual cost. The 75% "other" responses varied greatly in how this expense is handled. Generally, programs have a list of approved airports where they have negotiated fuel prices or generally acceptable rates separate from any agreements. Students are issued fuel cards and only allowed to go to those airports. One of the schools reporting reimbursement at a set rate per gallon also issued fuel cards but makes the student responsible for any charge over the set rate. One school reported reimbursement on an actual cost basis.

The flight instructors are an important part of any flight training operation and the study made inquiry as to how they are hired at the various institutions. The question was asked; how are flight instructors hired? (Figure 39)

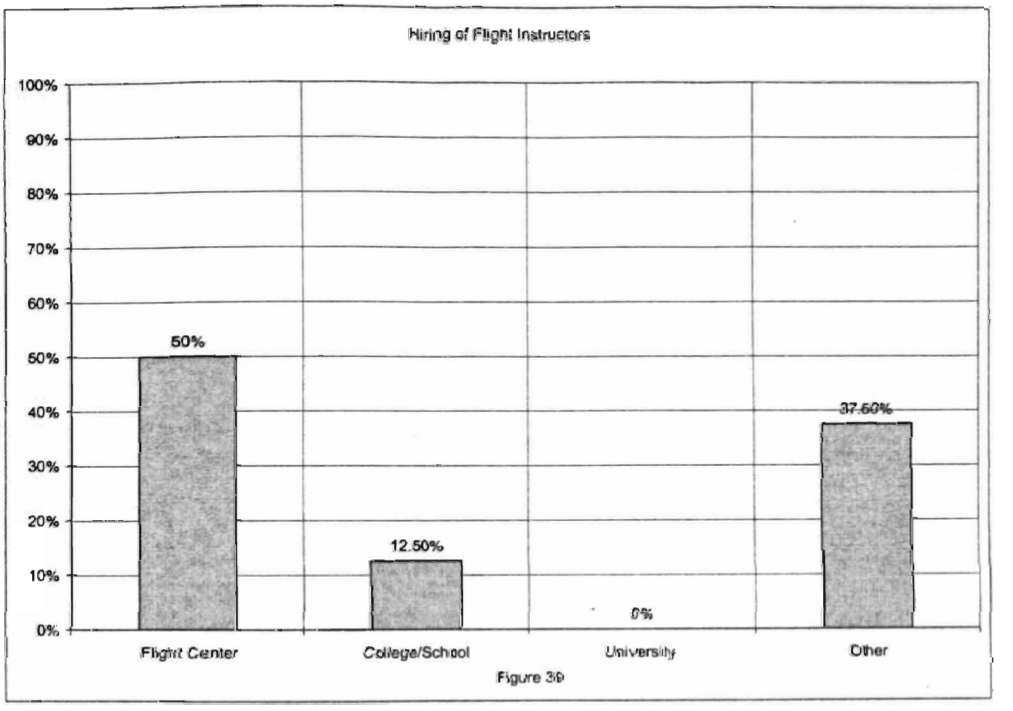

Figure 39. Hiring of Flight Instructors

In 50% of the responses the institution reported that the hiring of flight instructors is handled by the flight center. A 12.5% response indicates that the instructors are hired at the college or school level. A 37.5% "other" response is from schools that use a contractor and thus do not hire flight instructors and one school that hires their instructors at the Aviation Department level.

The amount and method by which flight instructors get paid varies greatly from place to place and the question of how instructors get paid is pertinent to any training operation. This study asked; how are flight instructors paid? (Figure 40)

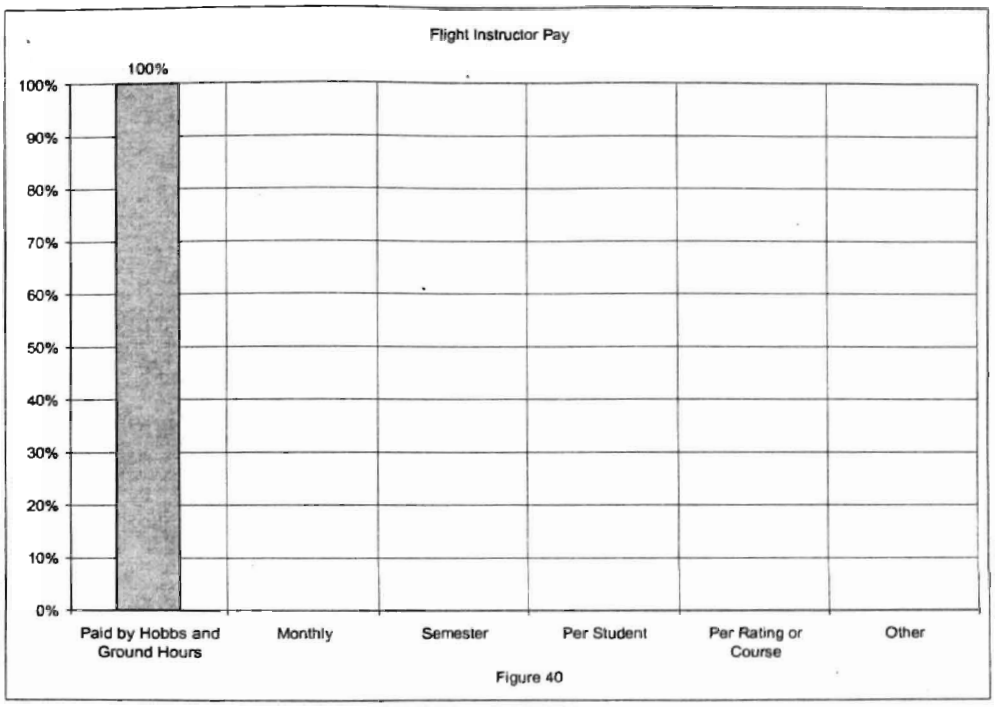

Figure 40. Flight Instructor Pay

All of the institutions report paying their instructors using the Hobbs meter in the aircraft which is what the aircraft rental is billed off of, and by the clock hour for ground instruction.

During times of economic growth the airline industry typically runs short of more experienced pilots and generally the flight instructor ranks become quite thinned out due

to airline hiring. Although this is a typical cycle and part of the career progression for the instructor, from a management standpoint it can be difficult to maintain production and quality of instruction without senior instructors; particularly those qualified to teach multi-engine and certified flight instructor courses. This study recognizes it is unreasonable to expect to keep any significant percentage of a given instructor corps for very long but the question has to be asked about retention programs to try and keep instructors as long as possible instead of them taking the very first opportunity that presents itself. The question is; is there an instructor retention program? (Figure 41)

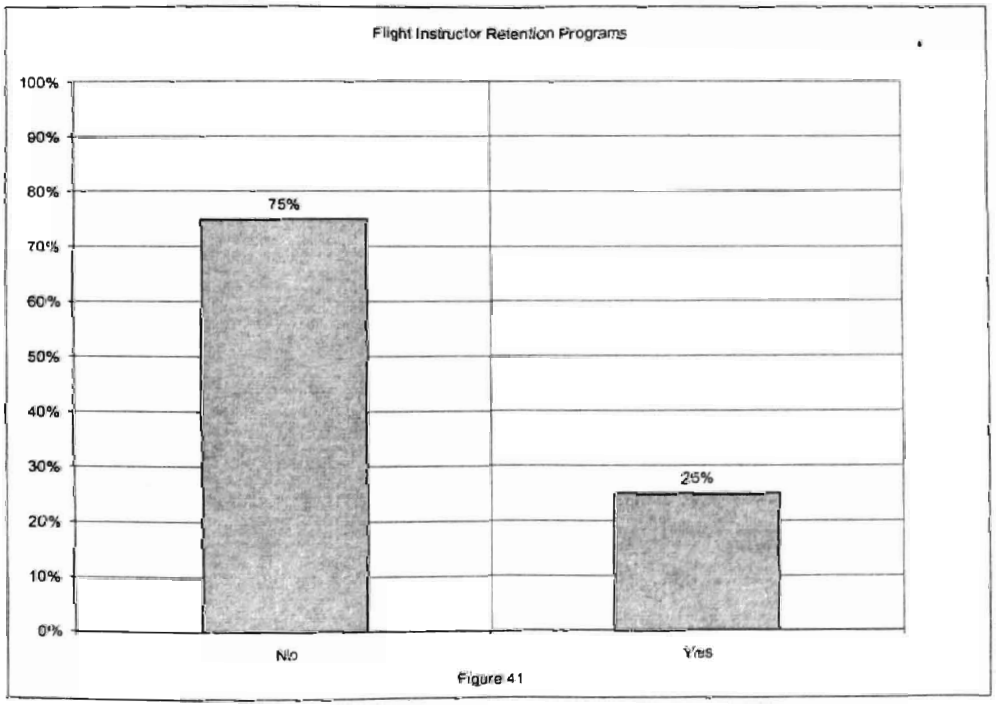

Figure 41. Flight Instructor Retention Programs

The majority of training programs, 75%, report not having any particular retention program available. At 25% of the responding institutions there is a retention program. The universities reporting a retention program indicate that pay increases are given for earning additional ratings such as instrument instructor and multi-engine instructor. It is not defined here whether these pay increases are available at the other schools as well, but are not considered a retention program. Or whether no pay increases are given summarily.

Summary

This chapter is a presentation of the findings from the Survey on Related University Flight Training Programs in Region VI of the National Intercollegiate Flying Association. The data obtained from the questionnaire has been descriptively presented in three sections.

The first section contained responses from institutions concerning the organization and structure of their flight training programs. The second section contained responses concerning management of flight training operations. The third section contained responses with respect to how the flight training operations are carried out. All of the results presented were derived from analysis of the questionnaire responses.

The next chapter, Chapter V, presents the conclusions reached by this study from analysis of the questionnaire responses and the recommendations resulting from the research findings.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Introduction

The purpose of this study was to assimilate data from the 11 schools in Region VI of the National Intercollegiate Flying Association in order to provide a database of information for flight training administrators in the region, for comparison, to aid in decision-making. Information gathered during this study should provide for increased standardization and help maximize efficiency at the various institutions. The information was collected in the three areas of organization, management, and operations to determine:

<u>What is the Organization of Flight Training?</u>

- Organization of aviation programs;
- College, Department, or Program affiliation;
- Administrative and budgetary oversight;
- Faculty member assignment;
- Endowments, Booster Club, or Alumni financial involvement;

- Legislative mandates;
- Relationships with Regents or Board of Trustees.

What is the Management of Flight Training?

- Personnel system classification of employees;
- Educational requirements of the Chief or Assistant Chief Instructor;
- Benefits available to Flight Instructors;
- Flight Transportation of University Personnel;
- Acquisition of aircraft and support equipment;
- Use of flight training facilities;
- Use of simulators;
- Fee structure for use of aircraft and other flight training devices;
- How flight training is paid for by the student;
- Budgeting of salaries;
- Budgeting of operational expenses;
- Handling of budget shortfalls and overages.

What are the Flight Training Operations?

- Use of training syllabuses;
- Maintenance of aircraft;
- Calendar operations of the programs;

- Satisfactory progress requirements of the students;
- Operational restrictions on students;
- Flight Instructor hiring and retention programs.

The subjects of this study were the 11 schools that lie within the geographical boundary of Region VI of the National Intercollegiate Flying Association. The administrator deemed most directly linked with supervision of the flight training was sent an approved questionnaire, with directions, via electronic mail, during the month of October, 2002. The questionnaire was developed with the help of aviation faculty at Oklahoma State University and was comprised of 42 questions organized into the three sections of, Organization of Flight Training, Management of Flight Training, and Operations. The responses were received via electronic mail as well; and 8 of the 11 administrators responded.

Upon receipt of the questionnaire the data from each question was placed into a Microsoft Excel spreadsheet and then graphed for descriptive purposes. Percentages of responses for the various question response categories within each section were tabulated and expressed on each graphical presentation. Any anomalies or "other" category responses deemed pertinent to the accurate depiction of the responses or to the study were explained as necessary in textual form following the appropriate graphical presentation of the data.

Conclusions

The conclusions of this study will be presented for each of the three sections of Organization, Management, and Operations of Flight Training as organized in the approved questionnaire.

Organization of Flight Training

Considering the economic significance of the aerospace industry in the geographical region comprising the scope of this study, this study finds unusual that none of the 11 institutions have a College of Aviation. The closest resemblance of one is a training situation where there is an Institute of Aviation with a Director and Department Heads responsible for various aspects of the training majors. In view of the disparity of placements of aviation training among the various institutions providing data for this study it must be concluded that the multi-disciplinary nature of the science of aviation makes it malleable and able to fit in a variety of venues successfully or at least workably.

The academic relevance of the science of aviation is proven out, at least in this region, with the data indicating that more than one-third of the schools have aviation as an academic department. The existence of an Institute of Aviation, albeit within another school, shows acceptance of the science as a viable pedagogy within a comprehensive university.

Administrative and budgetary oversight of a program is one indication of the importance of the training operations to a school, college, or university in that more

senior members of an organization being tasked with responsibilities for it indicate a certain level of import. At least 50% of the programs report having a Department Chair with responsibilities over the program and 25% of the institutions report having a Dean they directly report to. It is a reasonable conclusion that the activity has gained acceptance at these institutions as viable academic pursuits and also as resource intensive activities requiring senior management. The elevation of these programs indicates the vocational stigma long associated with aviation education may be waning.

Overwhelmingly, 87.5% of the respondents, regardless of placement within the university system, indicate having dedicated aviation faculty with no teaching responsibilities outside of the science. This is important in that it sets up a collegiality and department-like stature of the training whether one exists in name or not. It is not unreasonable to conclude that formal departments and schools of aviation are not far behind where they do not already exist.

As suspected when constructing the question about the existence of endowments for aviation training the majority, 75%, indicate that there are none. Although the eventual salaries of the pilot population can be significant, this study points out, that only a small percentage of pilots make it to the senior-captain international flying that nets the largest salaries and the amount of time it takes to get to that point is considerable. This fact combined with the transitory nature of pilots makes it difficult for alumni associations to remain in contact with pilots and the majority of the salaries earned do not lend themselves to giving of any significant amounts of monies. In conjunction with this question there was an inquiry as to the level of support for aviation training garnered from alumni associations, booster clubs, and like organizations. Of course 87.5% of the

institutions reported minimal support available from these sources. There is however at least one endowment in excess of 1 million-dollars at one of the responding schools and it is noted here as a possible change in the way comprehensive universities view aviation training.

Management of Flight Training

The first issue with respect to management of aviation training is whether to conduct the training within the university or to contract it out. This study concludes that the 75% response indicating that the majority of schools conduct their own training makes it the sound choice. The internal quality control and oversight available with in-house training cannot be overstated. This study further notes that it adds to the collegiality and enhances the learning experience when flight training is treated as part of the curriculum and not as an additional requirement farmed out to non post-secondary sub-parties.

The realization that the Chief and/or Assistant Chief positions are academic in nature in the post-secondary aviation environment that is indicated by the 37.5% response showing these positions as faculty, including tenure-track, is important. Consequently the requirement of 25% of the institutions that, at least the Chief Instructor, hold a master's degree adds credibility to the academic nature of the position(s). An additional 62.5% of the institutions require a baccalaureate degree of the Chief and/or Assistant Chief which led this study to conclude that there is a paradigm shift underway with respect to the academic standing of aviation training within the university environment. Supporting the ideology of these positions as academicians as well as technicians is the

report by 62.5% of the schools that the Chief and/or Assistant Chief Instructors regularly teach classes. The crossover point from additional duty teaching to faculty status with flight center responsibilities is thought to be short and currently happening at some institutions.

In contrast to the Chief and Assistant Chief positions the regular flight instructors are typically viewed as highly transient employees and that their tenure is an internship or dues paying time of sorts. This is supported by the survey results indicating that at 75% of the institutions there are no benefits available to the flight instructor through the university system. Additionally, 75% of the institutions reported that flight instructors are classified as part-time employees. It is important to note that at one school there is work-study money available for paying flight instructors and depending on the availability of these monies and hours worked there is the possibility of earning some benefits. This is an important and dramatic change in philosophy with regard to the classification of flight instructors, in general, and in particular within a post-secondary system.

One way a flight school can provide employment incentives to its instructors is to use them in advanced aircraft for university air transportation or to have a separate flight transportation department that uses staff pilots and instructors as well. However, this study concluded that currently only 25% of the schools use the flight school and 12.5% have a separate flight transportation department; indicating that the majority of the schools, 62.5%, have other arrangements for flight transportation. The effects of the attacks of 9/11 and some highly publicized general aviation accidents, such as the one involving OSU students, may have had an adverse effect on university air transportation.

The resource allocation required to conduct aviation training is of constant concern particularly at institutions having a break-even or self-funding mandate and this study found that 50% of the schools own their own aircraft and an additional 25% both own and lease aircraft. The data on this most critical response, in particular at OSU, which is the one school in the region that leases its aircraft exclusively, indicates that it is both feasible and necessary for purposes of breaking even that universities own and manage their own aircraft. Additionally, with respect to flight training equipment, the use of simulators and owning of the simulators, 87.5% each respectively, indicates that simulators are used and owned at the responding universities. Clearly the institutions in this study have determined that it is good fiscal practice to own their own flight training equipment and lease as necessary.

Obtaining flight-training equipment is never an easy task and budgeting responsibilities for these items fall at the college level at 50% of the universities and the use of flight training revenues occurs at 37.5% of the schools. The recognition by half of the schools that obtaining aviation-training equipment is part of the college budget much the same as obtaining any educational resource is important because it further engrains aviation training as a part of the university system. The acquisition and maintenance of line-support equipment however is only paid for out of college budgets 12.5% of the time and 75% of the time from flight training revenues. This study concludes that it is generally not understood that the aircraft, and to some extent the simulators, do not stand-alone and that line-support equipment is a necessary expenditure as part of the aircraft cost. Budgeting of these items should be from the same budget as aircraft acquisition.

Aviation training does not have the luxury of exclusively using existing university facilities except at schools that have their own airport. At more than one-third of the responding schools off-site facilities are used and an additional 25% of the schools report using both on-campus and off-campus/airport facilities. The survey responses indicate that at 25% of the schools office space, flight training facilities, maintenance hangars, and other space is rented while 37.5% of the schools own their own hangar and 25% own their own flight training facilities and offices. The cost of these facilities must be part of the aviation-training budget and this study points out that whether these costs are deducted from flight training revenues or are budgeted by the college or school as facilities expenses is critical to whether the program is able to break-even.

The students in an aviation program must be charged for use of the equipment and at most of the institutions, 62.5%, they are charged by flight hour through the use of the aircraft or simulator Hobbs meter. There is one responding school that includes the flight fees as part of the semester tuition and another that sets a flat fee per rating course. It could be concluded from the responses that nominally the institutions have decided that it is fiscally wise to charge per hour in order to account for differences in training times between students.

The setting of fees for aviation training is a concern. Because it must generate sufficient revenue to sustain the operation yet allow the university to remain competitive with other universities on cost of training issues. Half of the schools report using a program manager to set fees and another 25% do it at the Department Chair level; an additional 25% use the School Head. All of the universities indicated that approval of rates is required at some level higher than where they are set except at one institution that

reported a Board of Trustees setting the rates. The data indicates that administrators in close contact with the day-to-day operations recommend (set) a rate that is then sent through a senior administrator for approval.

All of the financial issues discussed in this study surround the fiscal viability of conducting aviation training at a university. It is interesting to note that, unlike a private institution, a public post-secondary institution has some option as to budgeting or subsidization of the training. This study found the data on this item indicates that 62.5% of the respondents do not have a requirement to self-fund; of course that means that more than one-third do have the requirement. This question did not define the means of subsidization or budgeting but it is concluded from this data that at least some mechanism exists at most of the responding universities that in part or in whole relieves aviation training from relying solely on flight training revenues for operation.

Other than aircraft, equipment, and facilities costs, personnel costs are a major resource requirement in aviation training programs. The data indicates that only 12.5% of the programs use flight-training revenue to support faculty positions and 50% of the respondents pay for faculty at the college level while the remaining schools pay faculty from the university budget. The data indicates that most of the institutions view faculty as a whole and do not separate aviation faculty from other faculty members thus paying them as they would any faculty member. In contrast to the views about classification of faculty members as a university or college function the Chief and/or Assistant Chief Instructors are not budgeted as college staff at 37.5% of the institutions in this study. The flight training revenues pay for their salaries but it should be noted that at 37.5% of the responding institutions the Chief and/or Assistant Chief positions are budgeted at the

college level. This study concludes that this data lends itself to the thinking that revenue sharing, meaning paying for part of a salary with flight training revenue and part with college budget, is probably the cause for the even 37.5% split in the responses.

Along with equipment, facilities, and personnel costs, operational expenses, in particular fuel, are a major revenue draw for aviation training budgets. Operational expenses include fuel, oil, parts, insurance, office supplies, and airport fees. All of the schools pay for fuel with flight training revenues and 87.5% of the schools pay for the remaining items, except office supplies, out of flight training revenues as well. This data indicates that these operational expenses are considered part of the cost of the aircraft rental and thus recuperated through the rental rate.

The overall fiscal concern for at least 37.5% of the schools is breaking-even and the possibility exists of a shortfall or even overage. How this affects the training and how the item, in particular shortfalls, is handled is a critical point. The study revealed that at 50% of the responding schools the shortfall is handled by the associated college, 25% indicate the university handles it and 25% address the shortfall issue with fee increases. The study concludes from this data that although more than one-third of the programs have self-funding or break-even mandates the associated college typically treats aviation-training shortfalls like other budgetary shortfalls and attempts to absorb it or use fee increases to abate it.

Flight Operations

The training syllabus used is an important decision because it sets the flight-hour and equipment requirements for the training program. This study found that 62.5% of the universities use a commercially available syllabus instead of having their own. The remaining respondents created their own syllabus and had it approved by the F.A.A. The consensus is that the Jeppesen Corporation has developed a workable syllabus that fits into a variety of academic settings and its use is prevalent at post-secondary institutions.

The linchpin of a flight training operation is its maintenance capabilities. Regardless of administrative efforts, student availability, instructor availability, and facilities, if aircraft are not available to fly then all other efforts are mute. At 62.5% of the institutions the university employs maintenance personnel to work on the aircraft and support equipment; 37.5% use a contractor. The same quality control issues exist as with the issue of conducting flight-training in-house or by contract and the consensus is the same with maintenance in that the direct control of the aircraft should be an in-house function for safety, production, and customer service reasons.

Flight training does not have, from a learning standpoint, a lot of good places for a break in training. At post-secondary institutions it is difficult because breaks in the academic school year are not usually beneficial to aviation training. For this reason flight centers at 87.5% of the schools are open year-round to facilitate any lapses in training that occur during the regular school year and to allow others early advance if desired. Since progress of flight training optimally should coincide with the academics being taken, it is not unheard of to require that aviation students be required to accomplish a

certain amount of flying each semester. However, the data indicates that only 37.5% of the institutions have such requirements and that most of the institutions do not impose a flying requirement on their students.

A major operational expense is fuel purchased at the home airport and secondarily fuel purchased by students off-station. The study found that the majority of the schools, 62.5%, purchase fuel from a Fixed-base Operator or private fuel contractor while 12.5% have their own truck, and 25%, the schools with their own airport, have access to wholesale fuel purchases because they own their own storage tank. The reimbursement for fuel used off-station by students is generally handled by university owned fuel card accounts. Some of the institutions have a set rate per gallon they will pay for while others pay actual use cost. This study concluded from this data that it is impractical to set up a fuel tank or fuel truck service at an existing airport that is not already owned by the university. The extra cost associated with using a FBO or fuel contractor is passed on to the student through the rental rate.

Flight Instructors make up the bulk of the personnel at a flight training facility and the way they are hired, paid, and retained can affect the quality of a training program. Half of the programs hire their instructors through the flight center while 12.5% hire through the college. This data indicates that the schools are typically hiring their own graduates and allowing the flight center management, who had the closest contact with the graduate, to make the decision for hiring.

The pay for flight instructors is unilaterally done by the Hobbs hour from the aircraft Hobbs meter or by the clock-hour for ground instruction. This data reflects the industry-wide practice of pay-per-hour for flight instructors regardless of the venue.

The ability of a flight program to continue and prosper has a lot to do with continually having enough flight instructors, particularly those with advanced qualifications and experience, even during times of active hiring by the airline industry. The data collected on flight instructor retention programs, however, indicates that 75% of the institutions have no particular program in place to retain flight instructors. This reflects the paradigm that 100% of the instructors do not wish to continue in the flight training profession and will all leave for other jobs eventually.

Recommendations

The recommendations arising from this research will be done in each of the three sections of Organization of Flight Training, Management of Flight Training, and Operations.

Organization of Flight Training

The placement of aviation programs within university systems lacks standardization and to date there is no F.A.A. guidance or academic reference suggesting criteria for placement of aviation training. The disparity of placement from a College of Education, College of Continuing Education, School of Business, College of Engineering Science, College of Technology and Aviation, to a Division of Science, Math, and Engineering leads to fractionalized processes and makes other than local alliances difficult. This study recommends that further research be done and an academic guide developed to help

institutions most appropriately place aviation within their respective systems. This should lead to a greater degree of standardization and facilitate articulation agreements and alliances with geographically close schools. An additional benefactor will be the science itself in that standardization will lead to a broader acceptance of the study at the post-secondary level without the current stigma at some schools of the training being a constant appendage to other sciences.

The lack of endowments for aviation training is understandable but not necessarily a livable long-term condition. The formation of aviation leaders into advisory councils for individual programs is essential in that universities must be able to reach out into the industry for support. This study considers advisory councils as a pathway for internships, training agreements, physical resource procurement, and financial support in the form of gifts and endowments.

In conjunction with advisory councils the alumni association at each institution should be given help with better tracking of aviation graduates. Each program can either provide resource data to the associations, such as F.A.A. websites, that can provide pilot information or the programs themselves can do the research and provide it to the alumni association. In this way the aviation graduate is not lost as a potential source of financial support.

Management of Flight Training

As an educational pursuit aviation has difficulty in that it is so multi-disciplinary and technical in nature. The use of contractors for flight training by some institutions

undermines the collegiality and presence of flight training at the institution. The college or university is less committed to the training if a simple contract is all that it has invested in the training and the separation both physically and financially does not lend itself to acceptance of the science as a viable academic pedagogy. Additionally, without control over the instructors and aircraft the quality of the training cannot be ensured and institutions run the risk of graduating an aviation student that may be academically sound but minimally qualified as a pilot. This study recommends that attempts be made within the University Aviation Association and the National Intercollegiate Flying Association to minimize institutions using contractors to conduct flight training.

The classification of the Chief and/or Assistant Chief Instructors at some institutions as faculty, and the data indicating that most are used in the classroom, is important and the paradigm should be fostered toward acceptance of these positions as academic positions and not strictly administrative/professional positions. The requirement at some institutions for at least the Chief Instructor to have a master's degree lends itself to the support of the position as a teaching position. There is no more imprtant aviation resource for a student than the Chief Instructor and his Assistants and access to these individuals should be maximized through use of them in classroom settings and through advisement; at least with respect to the flight curriculum. This study recommends a post-secondary, voluntary, certification processes revolving around graduate degrees or as additions to baccalaureate degrees, be developed for aviation education professionals to help accentuate the positions at the flight centers as academically oriented positions. This will give flight centers greater flexibility with its personnel and the student will benefit from increased educational proficiency by flight training administrators. The UAA and

NIFA should spearhead the certification protocol and begin programs at each institution that can result in a greater percentage of Chief and Assistant Chief Instructors achieving graduate degrees or at least aviation education certification outside of the F.A.A.

Universities may be passing up an opportunity to gain instructional advantages and enhance program quality and stability by not providing a pathway for instructors to stay and become aviation educators. This study does not pretend to imply that there would be a significant number of flight instructors wishing to continue it as a profession, but some will, particularly with non-traditional student ranks growing. In the current situation with no benefits and strictly flight-hour salaries available universities ensure there will be no continuation and thus the flight program is in continual need of advanced qualification and experienced instructors; at least during times of normal and aggressive airline hiring. This is a safety issue as well in that a lack of experienced instructors in the cockpit and available on the ground to mentor and guide lesser experienced instructors increases the potential for safety related problems. This study makes a recommendation that universities consider having a fraction of their regular flight instructors as full-time employees. This should ease the transitional turmoil that occurs during times of aggressive hiring and provide a greater degree of program quality in general.

Another missed opportunity for program quality may be with flight transportation; although 25% of the schools use the flight school for flight transportation. There are a number of medium-duty and even turbo-prop aircraft that can legally and safely be operated by a single pilot-in-command augmented by a second-in-command that is non-regulatory. In this way the university can provide advanced aircraft training while conducting its own business and the cost of training in the aircraft can be charged to the

student which will offset a small portion of the cost of operation of the aircraft. The program benefits from a more prepared graduate and the university benefits from an increased level of safety and reduced costs to their flight transportation budget.

The recommendation felt most critical to the financial goal of breaking-even is the owning of the aircraft and simulators. The lease payments on aircraft take a portion of the revenue greater than the operational cost savings provided by the leasing company. In addition, gains in production are never fully realized because lease payments go up proportionally with flight hours. When aircraft are owned, costs of operation do not necessarily parallel flight-hour production. There is an economy of scale that can be realized without the constant drain of lease payments.

The acquisition of flight training equipment is an extensive undertaking and this study determined that half of the schools use college-level funding for these things but 37.5% of them use flight-training revenues. This study recommends that flight-training revenues be used only for operational expenses and not capital items. It is unlikely that a rental rate and fee structure could be set up that would allow for the acquisition, upgrade, and eventual replacement of aircraft and support equipment while still remaining affordable for the student and competitively priced with other institutions. Placing demands on flight training revenues beyond operational items, particularly full or partial funding of staff positions, will nominally cause fiscal shortfalls. The staff of an aviation program should not be classified any differently than the staff of any other program within the respective colleges and should be budgeted for accordingly.

The long standing tradition of charging for flight training by the Hobbs hour may require a paradigm shift to most effectively ensure the timely completion of students

training and to allow for better financial planning at the flight centers. If a student enrolls in a flight course that has a fee, or enrolls for a semester where the flight fees are part of the tuition, then the monies are immediately available to the student for flying and to the flight center for support of the flying. This should remove a great many financial pitfalls students run into mid-semester that usually affects their ability to fly. As it stands at 62.5% of the institutions a student pays by the flight hour and theoretically does not have to deposit the money for an entire course of training thus the possibility of not having the money to finish exists. And the flight center does not have a definite revenue stream from which to operate so the possibility of overspending exists. This study recommends institutions adopt a policy of including the fees for a flight course in the tuition for the semester. The federal financial aid adjustments can be made based on program cost and students with the financial ability to fly will not be hampered scheduling wise by inconsistent cancellations of other students with sporadic periods of flight training.

The discussion most closely related to flight center spending and fiscal viability of flight training is the self-funding mandate or break-even requirement of 37.5% of the schools. The study did not define the mechanism or process used to subsidize or budget the flight training at the remaining 62.5% of the responding schools. Further research needs to be done to identify how the determination is made with regards to self-funding and to delineate how those programs without break-even criteria are funded.

Flight Operations

The section of the study concerned with flight operations revealed that most of the schools do not have a particular flight requirement, in terms of hours or lessons, for their flight-students. Enough empirical data exists with respect to flight training that reasonable expectations of progress can be made of a student. The Jeppesen Corporation syllabus in use at most of the schools in this study does allow for each course to be completed within a semester insomuch as the number of lessons per course can be done over a normal semester. Aviation students should be expected to complete one flight course or rating per semester which, in most programs, would have them earning their Certified Flight Instructor rating at the end of their junior year. This would make them available to the university as a flight instructor for a minimum of one year; thus reducing the backlash of vacancies that can occur during times of aggressive hiring by industry.

The final recommendation of this study is reference to the issue of instructor retention and echo's a recommendation from the previous section on management. The 75% majority response indicating that there is no particular instructor retention program is troubling in that universities are conceding the loss of the most valuable part of their training programs, the experienced instructor. Programs adopting this philosophy relegate their programs to constant turnover difficulties, place unnecessary change of instructor problems on their students, and effectively place a cap on the quality and level of flight instruction available at their school. There are probably more individuals willing to remain in flight education than current paradigms allow for and that we do not see more of them because a career path does not exist. The recommendation is that serious

consideration be given to funding of some full-time instructor positions, with university benefits, as staff positions with career progression possibilities.

Summary

This study provides information that assists administrators of post-secondary aviation training programs in evaluating the various processes by which the organization, management, and conduct of flight operations are carried out. It established the historical background for post-secondary aviation training, provided data about private post-secondary institutions as well as an example of a program in use at a comprehensive university, discussed pilot training needs pre and post 9/11, and pilot training requirements. It provided an overview of the universities within Region VI of the National Intercollegiate Flying Association in the areas of organization of flight training, management of flight training, and conduct of flight training operations. Recommendations for more effectively operating in each of the three areas were given and further research recommended in some critical areas. The data gathered for this study should serve as a database and management tool for decision making by aviation training administrators within the region being studied. The principles discussed in many of the sections can be applied to all post-secondary flight-training programs.

This study was the first of its kind. This research should serve to bring programs at various institutions more in-line with each other and advance the science of aviation teaching by reducing fractionalization and increasing acceptance of the pedagogy at universities while making the best use of available resources. It is further intended by

this study that internal changes within the aviation education community be made with this information to bring about a paradigm shift with respect to aviation educators being academicians in equal standing with other sciences. Ultimately the benefits of this study will be to the student who will take training in a program appropriately placed, staffed, managed, and operated within a university system. The nation's air transportation system depends on our ability to produce the very best graduate possible.

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APPENDIXES

APPENDIX A

QUESTIONNAIRE

QUESTIONNAIRE

Study: Related University Flight Training Programs in Region VI of the Intercollegiate Flying Association

Instructions: Please mark the most appropriate box for each selection. If "Other" is selected, please provide a brief comment in the space provided. Feel free to attach additional information sheet(s) as you feel necessary. If a line and staff chart is available, please include one with the questionnaire. Email back when complete.

Name: _____ Title: _____

Institution: _____

Organization of Flight Training

1. Is Aviation a stand-alone operation?

   _____Stand-alone College _____Part of another College _____Other

   _____

2. If part of another College, which one?_____

3. Is Aviation a Department or a program?

   _____Department _____Program _____Other

   _____

4. Who has administrative over-site of the operation?

   _____Dean _____Assoc. Dean _____Dept. Chair _____Other

   _____

5. Who has budgetary over-site for the operation?

   _____Dean _____Assoc. Dean _____Dept. Chair _____Other

   _____

6. What faculty members are used in the operation?
   _____Aviation College _____Other _____

7. Are there any endowments for flight training?

_____Yes (please include how many and what amount)_____

_____No

8. Are there any legislative mandates concerning the aviation operation?

_____Yes (please briefly explain)_____

_____

_____No

9. Are there any direct relationships with the University Board of Trustees?

_____Yes (please briefly explain)_____

_____

_____No

10. What role does Alumni or Booster Clubs play with financial donations?

_____Significant Support _____Moderate Support _____Minimal Support

Management of Flight Training (Personnel, Equipment, Operations)

1. How does the University conduct flight training?

_____University _____Contracted

2. How are the Chief and Asst. Chief Instructors classified by the University personnel system?

_____Full-time _____Part-time _____Contract employee ____Faculty Position

_____Other _____

3. What are the educational requirements for the Chief and/or Asst. Chief Instructor?

_____Doctorate _____Master _____Bachelor _____FAA certification only

4. Do the Chief and/or Asst. Chief teach classes or have other non-flight duties?

_____Teach classes _____Other duties (please briefly explain)_____

_____

5. How are the Flight Instructors classified by the University personnel system?

_____Full-time _____Part-time _____Contract Employee ____Faculty Position

_____Other _____

6. Are University benefits available to Flight Instructors?

_____Full benefits _____Partial benefits _____No benefits _____Other

_____

7. How are office/support personnel classified by the University personnel system?

_____Full-time _____Part-time _____Contract Employee

8. Does the University have a separate Flight Transportation Department?

_____Yes _____Flight School does it _____Private contractor _____Other

_____

9. Does the University own the flight training aircraft?

_____Owned _____Leased _____Both _____On a lease/buy program

10. Are simulators used? _____Yes _____No

a) Does the University own them? _____Own _____Lease _____Other

_____

b) Where are they housed? _____On-campus _____Off-campus/airport

11. At what level in the University are aircraft and/or simulators paid for?

_____University budget _____College _____School or Program

_____Flight Training Revenues _____Other_____

12. How is line-support equipment obtained?

_____University budget _____College _____School or Program

_____Flight Training Revenues _____Other_____

13. What facility(s) are used?

_____Campus offices _____Off-site separate offices _____Combination thereof

14. Is any facility/office space rented? (please mark all that apply)

_____Office Space _____Flight Training Facility _____ Maintenance Hangar

_____Other_____

15. Does the University own any facilities? (please mark all that apply)

_____Office Space _____Flight Training Facility _____Maintenance Hangar

_____Other_____

16. What is the fee structure for flight training devices?

(please explain)_____

_____

17. How are fees for flight training devices set?

_____University _____Dean _____School Head _____Dept. Chair

_____Training/Program Mgr. _____Board of Trustees _____Other

_____

18. Are aviation operations an auxiliary operation and held to profitability standards?
_____Yes _____No Additional Comments: _____

_____

19. How does the student pay for flight training?

_____By flight laboratory _____By semester _____By flight _____By training block

_____By rating _____Other_____

20. What budget pays for faculty members? _____University _____College

_____School or Program _____Flight Training Revenues _____Other

_____

21. What budget pays for the Chief and Asst. Chief Instructors?

_____University _____College _____Flight Training Revenues

_____School or Program _____Other_____

22. What budget pays for operational expenses? (mark appropriate boxes)

	Fuel/Oil	Aircraft Parts	Insurance	Office Supplies	Airport Fees
College or Program					
Flight Training Revenues					

Additional comments on budget items_____

_____

23. How is budgetary overages/shortfalls handled?

_____Overages/Shortfalls handled by University _____College _____School/Prog.

_____Board of Trustees _____Legislature _____Fee Increases _____Other

_____

Operations

1. Is the Jeppesen or other commercially available syllabi used or does the University use its own? _____University _____Jeppesen or Commercially Available

2. Do University employees perform maintenance on the aircraft?

_____University _____Contractor

3. Is the flight center open year-round? _____Yes _____No (If no, when?) _____

4. Are students required to fly a certain number of hours per semester or year?

_____No _____Yes (If yes, how many?)_____

5. How is fuel purchased at the flight center?

_____University owned/leased truck _____FBO or Fuel Contractor

_____Airport Service _____Other_____

6. How are student cross-country fuel reimbursements handled?

_____Set rate per gallon _____Set rate per aircraft _____Set dollar amount

_____No reimbursement _____Other_____

7. How are flight instructors hired?

_____By flight center _____By the College or School _____By University Admin.

_____Other_____

8. How are flight instructors paid?

_____By the Hobbs hours and ground hour _____Monthly Salary

_____Semester Salary _____Per Student _____Per rating or course

_____Other_____

9. Is there an instructor retention program?

_____No _____Yes (If yes, what?)_____

Additional Comments About Operations:_____

APPENDIX B

INSTITUTIONAL REVIEW BOARD

APPROVAL FORM

Oklahoma State University
Institutional Review Board

Protocol Expires: 7/17/2003

Date: Thursday, July 18, 2002 IRB Application No ED037

Proposal Title: UNIVERSITY RELATED FLIGHT TRAINING PROGRAMS IN REGION VI OF THE NATIONAL INTERCOLLEGIATE FLYING ASSOCIATION

Principal Investigator(s):

Richard L. Mangrum
8510 E. 92nd St.
Tulsa, OK 74133

Steven Marks
308 Cordell North
Stillwater, OK 74078

Reviewed and Processed as: Exempt

Approval Status Recommended by Reviewer(s): Approved *

Dear PI :

Your IRB application referenced above has been approved for one calendar year. Please make note of the expiration date indicated above. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval.
2. Submit a request for continuation if the study extends beyond the approval period of one calendar year. This continuation must receive IRB review and approval before the research can continue.
3. Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of this research; and
4. Notify the IRB office in writing when your research project is complete.

Please note that approved projects are subject to monitoring by the IRB. If you have questions about the IRB procedures or need any assistance from the Board, please contact Sharon Bacher, the Executive Secretary to the IRB, in 415 Whitehurst (phone: 405-744-5700, sbacher@okstate.edu).

Sincerely,

Carol Olson

Carol Olson, Chair
Institutional Review Board

*NOTE: IRB chair recommends not requiring participant signature, based on low-risk of study. The current form is not appropriate for a written consent form, but is appropriate as a way to inform the subject. Returning the survey denotes their voluntary consent to participate in this case.

VITA

Richard Lee Mangrum

Candidate for the Degree of

Doctor of Education

Dissertation: RELATED UNIVERSITY FLIGHT TRAINING PROGRAMS IN REGION VI OF THE NATIONAL INTERCOLLEGIATE FLYING ASSOCIATION

Major Field: Applied Educational Studies

Biographical:

Personal Data: Born in Paris, France, on February, 8, 1964, the son of Jesse B. and Milagro Mangrum.

Education: Graduated from Robert Service High School, Anchorage, Alaska in May, 1982; received Bachelor of Science degree in Business from Phillips University, Enid, Oklahoma in May, 1996. Received Masters of Science degree in Natural and Applied Sciences from Oklahoma State University, in July, 1999. Completed the requirements for a Doctor of Education degree in Applied Educational Studies with an emphasis in Aviation and Space Education at Oklahoma State University, Stillwater, Oklahoma, in August, 2003.

Experience: Member of the United States Air Force, Helicopter Mechanic, E-5, from 1982 to 1992. Several service industry jobs while attending Spartan School of Aeronautics 1992 to 1994. Employed by Spartan School of Aeronautics as a Flight Instructor and later as Flight Commander from 1995 to 1999. Employed by Oklahoma State University as the Assistant Chief Flight Instructor from 1999 to present.

Professional Memberships: University Aviation Association.